



## MACKAS SAND ANNUAL REVIEW 2024

January–December 2024

**FINAL**

March 2025

<b>Annual Review Title Block</b>	
<b>Name of operation</b>	Mackas Sand Project
<b>Name of operator</b>	Mackas Sand Pty Limited
<b>Development Consent / Project Approval No.</b>	PA 08_0142 (MOD 2)
<b>Name of holder of development consent/project approval</b>	Mackas Sand Pty Limited
<b>Mining lease No.</b>	No Mining Lease applicable to site under the Mining Act (1992).
<b>Name of holder of mining lease</b>	N/A
<b>Water licence #</b>	N/A
<b>Name of holder of water licence</b>	N/A
<b>MOP/RMP start date</b>	N/A
<b>MOP/RMP end date</b>	N/A
<b>Annual Review start date</b>	1 January 2024
<b>Annual Review end date</b>	31 December 2024
<p>I, Robert Mackenzie, certify that this audit report is a true and accurate record of the compliance status of Macka's Sand Pty Ltd for the period 1 January 2024 to 31 December 2024 and that I am authorised to make this statement on behalf of Macka's Sand Pty Ltd.</p> <p>Note: The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</p> <p>The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents – maximum penalty 2 years imprisonment or \$22,000, or both).</p>	
<b>Name of authorised reporting officer:</b>	Robert MacKenzie
<b>Title of authorised reporting officer:</b>	Director
<b>Signature of authorised reporting officer:</b>	
<b>Date:</b>	

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# 1.0 Statement of Compliance

Mackas Sand Pty Limited (Mackas Sand) operate the Mackas Sand Project (the Project), a sand quarry on Lot 218/DP 1044608 and Lot 220/DP 1049608, located approximately 25 kilometres (km) north-east of Newcastle, near Salt Ash in the Port Stephens Local Government Area (LGA) of New South Wales (NSW). The Mackas Sand directors have operated sand extraction operations in the area since 1992.

Lot 218 and Lot 220 are owned by the Worimi Local Aboriginal Land Council, with the Project being operated under agreement with Mackas Sand.

This Annual Review provides a summary of Mackas Sands’ operational performance against the approvals listed in **Table 1.1** over the period 1 January 2024 to 31 December 2024 (referred to hereafter as the reporting period). The compliance status of Grafil operations (Environmental Protection Licence (EPL) 12108) has not been discussed in this Annual Review.

The compliance of the operation against relevant approvals was managed during the reporting period by Mackas Sand and is summarised in **Table 1.1**. For the reporting period, three (3) non-compliances were identified. These three (3) non-compliances have been ranked according to the risk matrix included in **Table 1.3** and a brief description of each is provided in **Table 1.3**. Further information is provided in **Section 11.1**.

**Table 1.1 Statement of Compliance**

Relevant approval	All conditions complied with?
Development consent PA 08_0142 (MOD 2)	No – refer to <b>Table 2.1</b> for further details
Environment Protection Licence EPL 13218	No – refer to <b>Table 1.3</b> for further details
EPBC Approval 2011/6214	Yes – refer to <b>Table 1.3</b> for further details

The non-compliances for the reporting period are detailed below in **Table 1.3**.

**Table 1.2 Compliance Status Key (NSW Government, 2015)**

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>Potential for serious environmental consequences, but is unlikely to occur.</li> <li>Potential for moderate environmental consequences but is likely to occur.</li> </ul>
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>Potential for moderate environmental consequences, but is unlikely to occur.</li> <li>Potential for low environmental consequences but is likely to occur.</li> </ul>
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

**Table 1.3 Non-Compliances during the Reporting Period**

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment
EPL 13218 PA 08_0142	Condition M2.2 Schedule 3 Condition 11	Air monitoring is required to be undertaken at EPA Point 7 and 8 in accordance with AM-19.	Administrative Non-compliance	During the January, February, May, July, September and November 2024 sampling periods, air monitoring samples were sampled outside the monthly frequency criteria.
PA 08_0142	Schedule 3 Condition 11	The Proponent shall ensure that the dust emissions generated by the project do not cause additional exceedances of the air quality impact assessment criteria listed in Tables 5, 6 and 7 at any residence on privately owned land, or on more than 25 percent of any privately owned land.	Low	DDG2 exceeded the maximum total in deposited dust level for August and September 2024 sampling periods. Mackas Sand notes dust gauge locations are in proximity to Mackas Sand approval boundaries and are not within the vicinity to nearby residences. Investigation letters of dust exceedances noting influences from adjacent agricultural activities were submitted to DPHI and EPA on 9 May 2024, 5 October 2024, and 5 December 2024. Mackas Sand has proposed to update the approved AQMP (Umwelt, 2018a) due to impacts on monitoring results from agricultural and other activities undertaken outside of Mackas Sand operations with the proposed revision also incorporating changes to the proposed monitoring network, refer to <b>Section 6.2.3</b> and <b>Section 6.2.4</b> .
CA VC0532	Annexure D (c)	Produce a monitoring report on the CA by 31 December of each year, beginning in 2020.	Administrative Non-compliance	The Biodiversity Offset Monitoring Report was submitted to BCT on 30 January 2025. The report is required to be submitted to BCT 31 December annually, however, was submitted to BCT on 30 January 2025 due to an administrative oversight.

## 2.0 Introduction

Mackas Sand was granted PA 08\_0142 on 20 September 2009 by the Minister for Planning under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to operate sand extraction operations at Lot 220 and Lot 218. It is estimated that in excess of 21 million tonnes of sand resource will be extracted from Lot 218 and Lot 220, with Lot 218 having an indefinite extraction life due to the ongoing movement of sand from the adjoining mobile dunes.

A modification to PA 08\_0142 (MOD 1) was approved on 30 September 2013 by the then NSW Planning Assessment Commission (PAC) under delegation of the Minister for the former Planning and Infrastructure (DPI), now Department of Planning, Housing and Infrastructure (DPHI). The modification included a reduction in extraction level during operations, and the approval of an alternate route to access Lot 218. The alternate route connects directly from Lot 218, northward to Nelson Bay Road, as depicted within **Figure 2.1**.

A second modification to PA 08\_0142 (MOD 2), was approved by the PAC on 16 March 2016. The modification allows for an increase in maximum hourly truck movements from Lot 218 via the approved alternate access road.

Mackas Sand submitted a modification application (MOD 3) during October 2020 which sought to temporarily increase the 2020 calendar year transportation limit of sand product from Lot 218 by 100,000 tonnes (increase of 10%) to assist with meeting the continued demand from construction and infrastructure projects across NSW. The modification however was withdrawn during January 2021 following timing constraints associated with the approval of the modification.

Mackas Sand has prepared this Annual Review document for the reporting period to meet the requirement Schedule 5, Condition 4 of PA 08\_0142 (MOD 2). The report has been produced in accordance with the NSW Government Annual Review Guideline: Post-approval requirements for State significant mining developments (October, 2015).

Requirements for the Annual Review under PA 08\_0142 (MOD 2) are presented in **Table 2.1**.

**Table 2.1 PA 08\_0142 Conditions for the Annual Review**

PA 08_0142 Condition	Section of Document
1. By the end of March each year, or other timing agreed by the Secretary, the Proponent shall review the environmental performance of the Project to the satisfaction of the Secretary. This review must:	This Document
2. describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the next year	Section 4.0 and Section 7.2.3
3. include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the: <ul style="list-style-type: none"> <li>▪ relevant statutory requirements, limits or performance measures/criteria</li> <li>▪ requirements of any plan, program or strategy required under this approval</li> <li>▪ monitoring results of previous years</li> <li>▪ relevant predictions in the EA and the EA (MOD 1).</li> </ul>	Section 6.0

PA 08_0142 Condition	Section of Document
4. identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance	Section 1.0 , Section 10.0 and Section 11.0
5. identify any trends in the monitoring data over the life of the project	Sections 6.0 and Section 7.0
6. identify any discrepancies between the predicted and the actual impacts of the Project, and analyse the potential cause of any significant discrepancies	Sections 6.0 and Section 7.0
7. describe what measures will be implemented over the current calendar year to improve the environmental performance of the Project.	Sections 6.0 and Section 12.0

## 2.1 Quarry Contacts

The Mackas Sand Quarry Manager is responsible to the regulatory authorities for all aspects of environmental compliance at the site including day-to-day site environmental management, reporting, monitoring and supervision of operations including any environmental works.

Contact details for Mackas Sand personnel are listed in **Table 2.2**.

**Table 2.2 Personnel Responsible for Environmental Management during 2024**

Name	Position	Company	Contact Phone No.
Robert Mackenzie	Quarry Manager	Mackas Sand	(w) 02 4982 6227 (m) 0408 490 911
Bret Jenkins	HSE Manager	Mackas Sand	(w) 02 4982 6227 (m) 0400 490 911

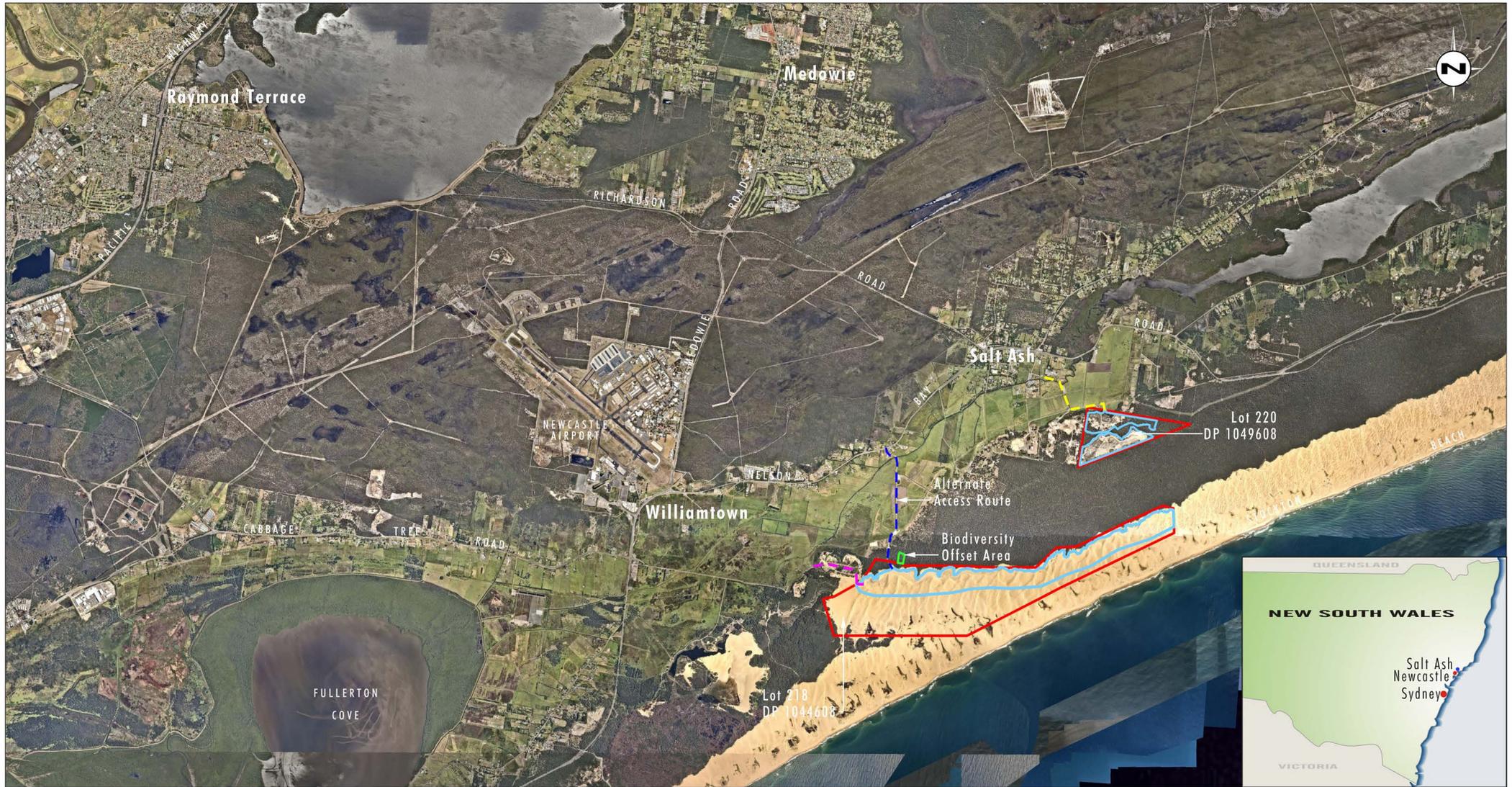


Image Source: Nearmap (Mar 2023)

**Legend**

- ▭ Lot Boundaries
- ▭ Biodiversity Offset Area
- ▭ Approval Areas
- - - Approved Site Access (not-utilised)
- - - Approved Site Access (utilised)
- - - Approved Alternate Site Access (utilised)

File Name (A4): R119/1646\_541.dgn  
20200330 10.30

**FIGURE 2.1**  
**Locality Plan**

## 3.0 Approvals and Management Plans

### 3.1 Status of Approvals, Licences and Permits

The operation of the Mackas Sand quarry during the reporting period was regulated by a range of approvals and licences. **Table 3.1** provides a list of the relevant approvals, licences and their status for the reporting period.

**Table 3.1 Current Approvals, Licences and Permits**

Approval	Development	Date Granted	Expiry Date	Status	Authority
PA 08_0142 (as modified)	Sand Extraction Operations from Lots 218 and 220, Salt Ash	20 September 2009	31 December 2029	Current	DPHI
Commonwealth EPBC Act Approval 2011/6214	Construction and use of Alternate Access Road (Lot 218)	29 November 2013	31 December 2029	Current	Commonwealth DCCEEW
Environment Protection Licence 13218	Mackas Sand	24 December 2009	Reviewed every 5 years	Current	EPA
Hunter Water Regulation (2015) Approval	Mackas Sand	7 June 2012	31 December 2029	Current	Hunter Water Corporation

Environmental Protection Licence (EPL) No. 13218 authorises Mackas Sand to carry out activities at Nelson Bay Road, Salt Ash, NSW, 2318 (the premises). In November 2024, the NSW EPA completed a review of the Mackas Sand EPL 13218 following completion of Condition U1.1 and U1.2 of EPL 13218. As an outcome of the review, the EPA provided Mackas Sand with a draft notice of variation of EPL 13218 which included minor administrative changes whilst also including special conditions related to the next update of the Mackas Sand groundwater model and Maximum Extraction Depth Map (MEDM). The EPA issued a variation of EPL 13218 on 18 February 2025 (refer to **Section 7.2**).

### 3.2 Management Plans

In accordance with PA 08\_0142 (MOD 2), Mackas Sand is required to implement a range of environmental management plans and the Environmental Management Strategy (EMS) for the Project. **Table 3.2** identifies the environmental management strategy and plans and their approval status as at the end of the reporting period.

Mackas Sand operated under a set of DPHI approved environmental management plans during the reporting period. In accordance with Schedule 5 Condition 4A of PA 08\_0142 (MOD 2), the respective management plans for the Mackas Sand quarry were reviewed during 2024 following the submission of the 2023 Annual Review. Additionally, management plans were also reviewed following completion of the 2024 Independent Environmental Audit in accordance with Schedule 5 Condition 7 (a) of PA 08\_0142 (MOD 2). Selected management plans were updated with a number of the management plans being determined to not require a revision.

**Table 3.2 Status of Management Plans**

Management Strategy/Plan <sup>1</sup>	Revision Date of the Approved Plan	Relevant Agency	Review Status
Environmental Management Strategy (EMS)	July 2016	DPHI	Mackas Sand committed to update the EMS by 4 October 2024 following the submission of the 2024 Independent Environmental Audit on 4 July 2024. Mackas Sand is seeking a revised timeframe to update the EMS in 2025. This has not been reported as a non-compliance in <b>Table 1.1</b> .
Noise Management Plan (NMP)	November 2018	DPHI	Reviewed following the submission of the 2024 Independent Environmental Audit on 4 July 2024. No update required.
Air Quality Management Plan (AQMP)	June 2018	DPHI	Reviewed due to impacts on monitoring results from activities undertaken outside of Mackas Sand operations, with the proposed revision also incorporating changes to the proposed monitoring onsite. A revised draft AQMP was submitted to DPHI and EPA for comment on 6 February 2025. A response from DPHI has not yet been provided to Mackas Sand.
Soil and Water Management Plan (SWMP)	November 2021	DPHI	SWMP required to be updated following DPHI acceptance of Mackas Sand MEDM update (refer to <b>Section 7.2.3</b> ). Update of SWMP to be completed in Q2 of 2025.
Unexploded Ordnance Management Plan (UOMP)	September 2011	DPHI	Reviewed following the submission of the 2024 Independent Environmental Audit on 4 July 2024. No update required.
Landscape Management Plan	November 2021	DPHI	Reviewed following the submission of the 2024 Independent Environmental Audit on 4 July 2024. No update required.
Aboriginal Cultural Heritage Management Plan (ACHMP)	July 2016	DPHI	Reviewed following the submission of the 2024 Independent Environmental Audit on 4 July 2024. No update required.
Non-Indigenous Heritage Management Plan (NIHMP)	July 2016	DPHI	Mackas Sand committed to include records of consultation to the NIHMP by 4 October 2024 following the submission of the 2024 Independent Environmental Audit on 4 July 2024. Mackas Sand is seeking a revised timeframe to update the NIHMP in 2025. This has not been reported as a non-compliance in <b>Table 1.1</b> .
Drivers Code of Conduct	February 2023	DPHI	Reviewed following the submission of the 2024 Independent Environmental Audit on 4 July 2024. No update required.
Pollution Incident Response Management Plan (PIRMP)	December 2024	EPA	Reviewed following the PIRMP being tested on 10 October 2024. Revised in December 2024.

<sup>1</sup> Note: All references to management plans within this Annual Review refer to the current DPHI approved version of the management plan at the time of writing this Annual Review. The current version of the management plans can also be found on the Mackas Sand website (<https://mackassand.com.au>).

<b>Management Strategy/Plan<sup>1</sup></b>	<b>Revision Date of the Approved Plan</b>	<b>Relevant Agency</b>	<b>Review Status</b>
<b>EPBC Landscape Management Plan</b>	December 2013	Cth DCCEE <sup>2</sup>	Reviewed following the submission of the 2024 EPBC Compliance Report. No update required.
<b>Operations Management Procedures</b>	January 2014 [Draft]	HWC <sup>3</sup>	Reviewed following the submission of the 2024 Independent Environmental Audit on 4 July 2024. No update required.

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<sup>2</sup> Commonwealth Department of Climate Change, Energy, the Environment and Water

<sup>3</sup> Hunter Water Corporation

## 4.0 Operations Summary

A summary of the operations undertaken at Mackas Sand Quarry during the report period is included in the following sections.

### 4.1 Extraction Operations

Sand extraction was undertaken at Lot 218 during the reporting period. Limited sand extraction was undertaken at Lot 220 during the reporting period. An overview of the operations for each Lot is featured in **Section 4.1.1** and **Section 4.1.2**.

There was no hydrocarbon spills recorded during the reporting period.

#### 4.1.1 Lot 218

Sand extraction operations at Lot 218 commenced during February 2015 following the construction of an alternate haul route, as approved by Modification 1 of the PA 08\_0142.

During the reporting period, there were no significant changes to operations in Lot 218. Sand continued to be extracted from the dune face using front end loaders, screened, and stockpiled before being transported offsite by road truck via the alternate haul route. Sand tonnage volumes are detailed in **Table 4.1**.

No trucks used the Lavis Lane haul route to enter or exit the site during the reporting period.

Extraction activities were primarily undertaken in the eastern portion of Lot 218, adjacent to the northern (i.e. landward) extraction boundary. Minimal sand extraction activities also occurred near the southern extraction boundary of Lot 218, extracting the wind-blown sand resource. The full extent of the extraction boundary has not been reached. Extraction activities are therefore continuing to progress in a linear fashion, as well as recovering wind-blown sand which enters the full length of the extraction area. Sand extraction status for Lot 218 can be found in **Appendix 1**.

An automated weighbridge and traffic light system servicing Lot 218 is used to manage vehicle movement compliance with the requirements of PA 08\_0142 (MOD 2). In addition to this traffic light system, Mackas Sand completes a secondary validation process on the weighbridge logs to confirm compliance with truck movement PA 08\_0142 (MOD 2) conditions. Traffic data is discussed further in **Section 6.9**.

#### 4.1.2 Lot 220

Sand extraction operations at Lot 220 commenced in November 2009. Sand extraction at Lot 220 is largely completed with current operations involving rehabilitation works to establish the final landform of the area. Current extraction operations involve excess sand resulting from final landform re-shaping for rehabilitation purposes. Rehabilitation works of Lot 220 are discussed in **Section 8.1.2**.

Operations at Lot 220 are within 250 m of the nearest resident (R27). Operations conducted within 250 m of the R27 are undertaken within the hours outlined within Schedule 3 Condition 3 of PA 08\_0142 (MOD 2).

No land was cleared during the reporting period at Lot 220.

## 4.2 Extraction Depth and Extent Survey Control

Mackas Sand operates a GPS unit in at least one operating loader at Lot 218 which is used to check the vertical and horizontal extraction limits of the active extraction/processing areas at each lot.

GPS checks have been supported by quarterly surveys. Copies of the quarterly surveys are provided in Appendix 1.

## 4.3 Production Limits

During the reporting period a total of approximately 925,333 tonnes of product was transported from Lot 218. Approximately 4,630 tonnes of product was transported from Lot 220. This is below the 1,000,000 tonnes per annum for each Lot permitted under PA 08\_0142 (MOD 2).

**Table 4.1** provides the annual amount of product transported for the 2023 and 2024 reporting years and a forecast for the 2025 reporting period. The 2023 and 2024 tonnages provided are based on the weighbridge data.

**Table 4.1 Production Summary (Lot 218 and Lot 220)**

Material	Approved Limit (Source – PA 08_0142 (MOD 2))	2023 Reporting Period (Actual Tonnes)	2024 Reporting Period (Actual Tonnes)	2025 Reporting Period (Forecast Tonnes)	Compliance with Approved Limit (Yes/ No)
Total Saleable Product from Lot 218	1,000,000 tonnes from Lot 218	944,765.9	925,333	1,000,000	Yes
Total Saleable Product from Lot 220	1,000,000 tonnes from Lot 220	Nil	4,630	5,000	Yes
Total Saleable Product from Lot 218 and 220 combined	2,000,000 tonnes of product in a calendar year (1,000,000 tonnes from Lot 218; 1,000,000 tonnes from Lot 220).	944,765.9	929,963	1,005,000	Yes

### 4.3.1 Hours of Operations

Quarrying operations at Lot 220 have been undertaken between 7:00 am and 5:30 pm Monday–Friday. Sand extraction at Lot 220 is largely completed with current operations involving rehabilitation activities to establish the final landform of the area. Current extraction operations involve excess sand resulting from final landform re-shaping for rehabilitation purposes. The need to hold an extended hours agreement with the owners of private residence R27 has not been triggered, as per Schedule 3, Condition 9(a) of PA 08\_0142 (MOD 2).

Extraction and haulage activities within the reporting period complied with the operating hours as detailed in Schedule 3, condition 9 of PA 08\_0142 (MOD 2).

Quarrying operations at Lot 218 are permitted 24 hours / 7 days a week.

Mackas Sand holds agreements with the owners of specified residences on Nelson Bay Road and Oakvale Drive for extended trucking hours, in accordance with Schedule 3 Condition 9(a) of PA 08\_0142 (MOD 2). Copies of these agreements have previously been provided to the DPHI.

#### **4.4 Construction and Demolition Activities**

A replacement fuel storage tank located at Lot 218 weighbridge was installed by Mackas Sand during the reporting period in response to an Independent Environmental Audit recommendation (see **Section 10.0** for further information). No road base material was imported during the reporting period. Mackas Sand did not undertake any other construction activities during the reporting period. Mackas Sand will report any future construction activities and material import volumes in future Annual Review documents.

There were no demolition activities undertaken during the reporting period at Lot 218 or Lot 220.

#### **4.5 2025 Report Period Extraction Operations**

2025 is expected to see a continuation of sand extraction operations at Lot 218. Sand extraction is projected to occur in Lot 220 in minimum volumes and will be undertaken in conjunction with establishing final landform areas. Mackas Sand does not expect any significant changes to quarrying methods during the next reporting period relative to that undertaken in 2024.

## 5.0 Actions Required from Previous Annual Review

In accordance with Schedule 5 Condition 4 of PA 08\_0142 (MOD 2), the 2023 Annual Review was submitted to DPHI on 28 March 2024. Mackas Sand received correspondence from DPHI on 22 August 2024 accepting the 2023 Annual Review. DPHI requested that for future annual reviews that Mackas Sand report groundwater monitoring results for cobalt, chromium, zinc or petroleum hydrocarbons.

A summary of Mackas Sand management commitments made in the 2023 Annual Review are addressed in **Table 5.1**. A summary of Mackas Sand actions to DPHI requests from correspondence following the 2023 Annual Review submission are addressed in **Table 5.2**.

**Table 5.1 Mackas Sand Response to Actions Identified in 2023 Annual Review**

Action	Status	Section of this document	Comment
Mackas Sand will investigate relocating dust gauge DDG2 to avoid any air quality impacts generated from neighbouring properties.	Ongoing	Section 6.2.4	Mackas Sand submitted a draft AQMP to DPHI and EPA on 6 February 2025 for comment following initial consultation with the EPA in response to ongoing issues with the Mackas Sand dust deposition gauges results. DPHI and EPA have not currently provided feedback.
Ensure fencing is adequate to continue to exclude cattle, anchoring posts into the ground at regular intervals, and including regular monitoring (and evidence thereof) to ensure this is the case.	Ongoing	Section 6.4	Fence monitoring and maintenance was undertaken by Mackas Sand in 2024. Ongoing fence inspections and weed management will be undertaken in the 2025 reporting period.
Engage suitably qualified and experienced land management professionals complete weed and early colonising native species management works at least twice during the period between and including December to April. Works are to be completed with written permission from the BCT and will occur strictly in a manner that does not impact the threatened orchid populations. Evidence of these works will be provided to BCT after each event.	Ongoing	Section 6.4	Weed management was undertaken in September 2024 along the access track and to the north of the BOA. This was outside the BOA due to orchid flowering season. Further weed management was undertaken in November 2024 within the BOA focussing on removal of Whiskey Grass.
Weed management works are to be completed within the CA and within approximately 20m surrounding the BOA (i.e., the weed management area) to reduce potential weed source populations.	Ongoing	Section 6.4	Weed management was undertaken in September 2024 along the access track and to the north of the BOA. This was outside the BOA due to orchid flowering season. Further weed management was undertaken in November 2024 within the BOA focussing on removal of Whiskey Grass.

Action	Status	Section of this document	Comment
Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.	Ongoing	Section 6.4	Management actions undertaken include monthly inspections of the VCA, and biodiversity monitoring and reporting. Fence monitoring and maintenance was undertaken by Mackas Sand in 2024.
Undertake the BOA management actions recommended in Table 6.22, as practicable	Ongoing	Section 6.4– Section 6.4.7	Management actions of the BOA are an ongoing process and include monthly inspections of the VCA, and biodiversity monitoring and reporting. Mackas Sand is undertaking further actions where performance criteria were triggered. Refer to <b>Section 6.5</b> .
Mackas Sand will continue collecting artefacts from Lot 218 and Lot 220 in the next reporting period.	Ongoing	Section 6.5	Artefacts observed during extraction and sand screening processes are to be collected and stored. Any artefacts are to be returned to Lot 220 as part of the site rehabilitation process (Umwelt, 2016).
Review and assess the recommendations from the EPA in regard to the groundwater level review and model update, and if necessary, an update of the Mackas Sand SWMP.	Ongoing	Section 7.2.3	Following a response to the EPA review of the groundwater model and MEDM update on 14 November 2024, the EPA provided a draft notice of variation for EPL 13218 on 6 December 2024 to include special conditions relating to the next model update (refer to <b>Section 7.2</b> ). In response to the EPA review, DPHI has requested an update of the Mackas Sand SWMP. A revised SWMP is planned to be submitted to DPHI and EPA in Q2 2025.
Mackas will implement the actions in Section 8.5 during the next reporting period. Specifically, undertaking a regular sitewide weed management program, distributing existing stockpiled salvaged habitat timber features and undertaking tube stock planting and infill planting of local species.	Ongoing	Section 8.5	The gravel road base stockpile has reduced in size. Tube stock planting was not undertaken during the reporting period. Tubestock infill planting is proposed during the next reporting period. A weed management program was not undertaken during the reporting period due to scheduling issues and discussions of other management options with BCT. A weed management program is planned to occur in 2025.

**Table 5.2 Mackas Sand Response to Actions Requested by DPHI following 2023 Mackas Sand Annual Review Submission**

Action	Status	Section of this document	Comment
Mackas Sand to include monitoring results for cobalt, chromium, zinc or petroleum hydrocarbons for future Annual Reviews.	Ongoing	Section 7.2	Cobalt, chromium, and zinc have been included as analytes to the quarterly groundwater monitoring events for the 2024 reporting period. Monitoring results are further detailed in <b>Section 7.2</b> .

## 6.0 Environmental Performance

The following sections provide a summary of environmental monitoring and management undertaken during the reporting period. In accordance with the *Annual Review Guideline* (NSW Government, 2015) this report contains a summary of environmental monitoring data where it is required to explain trends or environmental performance during the reporting period.

It is noted that environmental monitoring data has also been published on the Mackas Sand website (<http://www.Mackassand.com.au>) in accordance with Schedule 5 Condition 10 of PA 08\_0142 (MOD 2).

A range of environmental monitoring is required to be undertaken by the Development Consent, EPL and management plans.

**Figure 6.1** shows the Mackas Sand environmental monitoring locations.



Image Source: Nearmap (Mar 2023)

0 0.5 1 2km  
1:45 000

**Legend**

- ▭ Lot Boundaries
- ▭ Approval Area
- ▭ Approved Site Access (not-utilised)
- ▭ Approved Site Access (utilised)
- ▭ Approved Alternate Site Access (utilised)
- Noise Monitoring Location
- Dust Monitoring Location
- Groundwater Monitoring Location
- Residential Receivers
- ◆ Williamtown RAAF BOM Meteorological Station

FIGURE 6.1

Mackas Sand Monitoring Locations

## 6.1 Noise

Noise monitoring is undertaken in accordance with the approved Noise Management Plan (NMP) (Umwelt, 2018) which sets out the procedures and management measures to monitor, mitigate and assess the noise impacts from Mackas Sand. The noise quality monitoring network consists of five monitoring locations (Site 1, Site 2, Site 4, Site 5, Site 6), which are used to measure noise levels on an annual basis (refer **Figure 6.1**). Monitoring is generally undertaken during winter to early spring as this is when noise propagation from the premises is likely to be at its worst.

Mackas Sand holds agreements with the specified residences on Nelson Bay Road and Oakvale Drive for extended trucking hours and noise levels above that stated in the PA 08\_0142 (MOD 2). Copies of these agreements have been provided to DPHI.

### 6.1.1 Environmental Assessment Predictions

#### Operational Noise

A Noise Impact Assessment (2009) was developed in support of the Mackas Sand Project Environmental Assessment (2009) (EA). The Noise Impact Assessment concluded that operational noise would remain within project specific noise criteria during all operational periods at all residential receivers nearest to Lot 218 and Lot 220, if project specific controls were put in place whilst operations were within 250 m of private residence R27.

Controls included limiting work to daytime only (7.00 am – 6.00 pm Monday – Saturday and 8.00 am-6.00 pm on Sundays and Public Holidays).

#### Sleep Disturbance

Predicted noise levels are expected to be less than the project specific noise criteria. The Noise Impact Assessment further stated that predicted noise levels are expected to comply with the recommended sleep disturbance noise goals at all residential receivers of 41 dB(a)  $LA_{1,1 \text{ minute}}$ .

The noise impact assessment criteria specified in the Schedule 3 Condition 4 of PA 08\_0142 (MOD 2) that relate to operational noise generated specifically by sand quarrying are set out in **Table 6.1**.

#### Alternate Access Road Traffic Noise

Noise impact assessment criteria specified in the Schedule 3 Condition 4A of PA 08\_0142 (MOD 2) that relate to the Alternate Access Road are shown in **Table 6.2**.

**Table 6.1 Industrial Noise Impact Assessment Criteria, dB(A)**

Location	Day <sup>1</sup> $LA_{eq,15 \text{ minute}}$	Evening <sup>1</sup> $LA_{eq,15 \text{ minute}}$	Night <sup>1</sup> $LA_{eq,15 \text{ minute}}$	Night <sup>1</sup> $LA_{1,1 \text{ minute}}$
R18 – 300 Nelson Bay Road	39	39	40	45
R01 – Lavis Lane residence	39	39	39	45
R19 – 316 Nelson Bay Road	36	36	37	45
R26 – Residence opp. Oakvale Farm	36	36	35	45
R27 – Hufnagl residence	36	35	35	45

Location	Day <sup>1</sup> LA <sub>eq,15 minute</sub>	Evening <sup>1</sup> LA <sub>eq,15 minute</sub>	Night <sup>1</sup> LA <sub>eq,15 minute</sub>	Night <sup>1</sup> LA <sub>1,1 minute</sub>
R17 – 287 Nelson Bay Road	35	35	36	45
All other residences	35	35	35	45

**Table 6.2 Alternate Access Road Noise Impact Assessment Criteria dB(A)**

Location	Shoulder <sup>1</sup> LA <sub>eq,15 minute</sub>	Day <sup>1</sup> LA <sub>eq,15 minute</sub>	Evening <sup>1</sup> LA <sub>eq,15 minute</sub>
2344 Nelson Bay Road, Williamtown	38	40	40
2353 Nelson Bay Road, Williamtown	39	41	41
2367 Nelson Bay Road, Williamtown	36	38	38
2368 Nelson Bay Road, Williamtown	38	40	40
All other residences	35	35	35

*Note 1: Day time is 7.00 am to 6.00 pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays, evening is 6.00 pm to 10.00 pm (NSW Industrial Noise Policy (INP) EPA, 2000). Shoulder is the period from 5am to 7am on Monday to Friday, but only for the use of the Alternate access road (see Condition 4A of Schedule 3 of PA 08\_0142 MOD 2).*

As noted in Schedule 3 Condition 4 of PA 08\_0142 (MOD 2), the Alternate Access Road noise impact assessment criteria do not apply if Mackas Sand has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and Mackas Sand has advised the DPHI in writing of the terms of this agreement.

### Road Traffic Noise

The following noise criteria in **Table 6.3** were assigned to road traffic from trucks servicing the Mackas Sand quarry using Lavis Lane, Oakvale Road and Nelsons Bay Road in Schedule 3 Condition 7 of PA 08\_0142 (MOD 2).

**Table 6.3 Traffic Noise Impact Assessment Criteria, dB(A)**

Road	Day/Evening	Night - Shoulder
Lavis Lane, Oakvale Drive	60 LA <sub>eq,1 hour</sub>	55 LA <sub>eq,1 hour</sub>
Nelson Bay Road	60 LA <sub>eq,15 hour</sub>	55 LA <sub>eq,9 hour</sub>

## 6.1.2 Noise Monitoring Results

During the reporting period, attended noise monitoring was undertaken between 15 and 24 August 2024, at the noise monitoring locations shown on **Figure 6.1**. These locations are representative of the nearest sensitive receivers to the extractive and haulage operations in accordance with NSW Industrial Noise Policy (EPA, 2000) and Australian Standard 1055:2018. For example, measurements of industrial noise levels at Site 6 are taken to be representative of industrial noise levels received at Site 5, as Site 5 is slightly farther than Site 6 from Lot 218 and from the Alternate Access Road.

In determining compliance, since noise levels reduce with increasing distance from a noise source, it is deemed that the noise level at receivers located further from Site 6, for example at Site 5 being located in approximately the same direction, would therefore be lower than noise levels measured at Site 6.

**Table 6.4 2024 Night Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)**

Location	LAeq,15 minute		LA1,1 minute	
	Noise criteria	Mackas Sand noise level contribution	Noise criteria	Mackas Sand noise level contribution
Site 1	35	Inaudible	45	Inaudible
Site 2	35	Inaudible	45	Inaudible
Site 4	36	Inaudible	45	Inaudible
Site 5 <sup>1</sup>	35	-	45	-
Site 6	35	Inaudible	45	Inaudible

<sup>1</sup> Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

**Table 6.5 2024 Day Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)**

Location	LAeq,15 minute	
	Noise criteria	Mackas Sand noise level contribution
Site 1	36	Inaudible
Site 2	36	Inaudible
Site 4	35	Inaudible
Site 5 <sup>1</sup>	35	-
Site 6	35	Inaudible

<sup>1</sup> Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

**Table 6.6 2024 Evening Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)**

Location	LAeq,15 minute	
	Noise criteria	Mackas Sand noise level contribution
Site 1	35	Inaudible
Site 2	36	Inaudible
Site 4	35	Inaudible
Site 5 <sup>1</sup>	35	-
Site 6	35	Inaudible

<sup>1</sup> Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

**Table 6.7 2024 Industrial Noise Levels – Alternate Access Road to Lot 218**

Location	Period	LAeq,15 minute	
		Noise criteria	Mackas Sand noise level contribution
Site 5 <sup>1</sup>	Day Time	41	-
Site 6	Day Time	40	39
Site 5 <sup>1</sup>	Night Time/Shoulder	39	-
Site 6	Night Time/Shoulder	38	32
Site 5 <sup>1</sup>	Evening	41	-
Site 6	Evening	40	Inaudible

<sup>1</sup> Monitoring not required as Site 6 is representative of Site 5 and if compliance is measured at Site 6 then compliance is achieved at Site 5.

**Table 6.8 Mackas Sand 1 hour Night and Day Time Road Traffic Noise Level Contribution versus Noise Criteria, dB(A)**

Road	Period	Noise criteria LA <sub>eq, 1hour</sub>	Noise level contribution LA <sub>eq, 1hour</sub>	
			Cnr Oakvale Dr and Nelson Bay Rd (Site 4)	2353 Nelson Bay Road (Site 6)
Lavis Lane, Oakvale Drive as measured at corner of Oakvale and Nelson Bay Road	Night	55	Inaudible	47
	Day	60	Inaudible	47

### 6.1.3 Trends in Data

The 2024 attended noise monitoring indicates Mackas Sand was compliant with the industrial and traffic noise criteria at all industrial and traffic sites in accordance with Schedule 3 Conditions 4 to 8 of PA 08\_0142, and Condition L3 of EPL 13218.

The 2024 annual noise monitoring results are consistent with the long-term trend of complying with the industrial and traffic noise criteria at all sites in accordance with Schedule 3 Conditions 4 to 8 of PA 08\_0142, and Condition L3 of EPL 13218.

### 6.1.4 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are in addition to the approved NMP (Umwelt, 2018a).

## 6.2 Air Quality

Air quality monitoring is undertaken in accordance with the approved Air Quality Management Plan (AQMP) (Umwelt, 2018b) which sets out the procedures and mitigation measures for the management of dust. The air quality monitoring network consists of two dust deposition gauges (DDG1 and DDG2), which are used to measure depositional dust on a monthly basis (refer **Figure 6.1**).

Particulate Matter (PM<sub>10</sub>) and Total Suspended Particulate (TSP) monitoring are not currently undertaken. The trigger for commencing PM<sub>10</sub> and TSP monitoring is the receipt of a written request from Resident R27, the nearest residential receiver to operations at Lot 220. As at the end of the reporting period, R27 had not issued such a request.

Previous years have demonstrated that Aeolian transport of dune sand during periods of high winds result in conditions where deposition levels can naturally exceed the air quality impact assessment criteria of 4 g/m<sup>2</sup>/month.

## 6.2.1 Environmental Assessment Predictions

An Air Quality Impact Assessment (2009) was developed in support of the Mackas Sand EA. The Air Quality Impact Assessment considered the direct and cumulative air quality impacts associated with the Project's ongoing operations. Modelling was undertaken which concluded that dust control measures at Lot 218 and Lot 220 would be required to remain within relevant compliance limits for PM<sub>10</sub>, TSP and Depositional Dust. As noted in the EA, the primary source of the dust generation at Mackas Sand was predicted to be from Wheel Generated Dust (Haulage). The alternate access road has been fully sealed to mitigate the risk of dust generation from this potential source.

Air Impact Assessment Criteria are specified in Schedule 3 Condition 11 of PA 08\_0142 (MOD 2). These criteria are used to assess the environmental performance of the Project and are represented in **Table 6.9** to **Table 6.11**.

**Table 6.9 Long term Impact Assessment Criteria for Particulate Matter**

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m <sup>3</sup>
Particulate matter < 10 µm (PM <sub>10</sub> )	Annual	30 µg/m <sup>3</sup>

**Table 6.10 Short term Impact Assessment Criterion for Particulate Matter**

Pollutant	Averaging period	Criterion
Particulate matter <10 µm (PM <sub>10</sub> )	24 hours	50 µg/m <sup>3</sup>

**Table 6.11 Long term Impact Assessment Criteria for Deposited Dust**

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m <sup>2</sup> /month	4 g/m <sup>2</sup> /month

## 6.2.2 Air Quality Monitoring Results

Depositional dust gauge samples were collected during the reporting period on approximately a monthly basis from each of the monitoring location DDG1 and DDG2. The monthly and annual average results for DDG1 and DDG2 are shown in **Table 6.12** and **Table 6.13**. Non-compliances related to air quality monitoring results are detailed in **Section 11.1**.

**Table 6.12 Total Dust Deposition Levels at DDG 1 – Lot 220 (g/m<sup>2</sup>/month)**

Sample date	Exposure Period (Days)	Total Insoluble Matter (g/m <sup>2</sup> /month)
25/01/2024	34	2.5
29/02/2024	35	6.0 <sup>1</sup>
28/03/2024	28	15.7 <sup>1</sup>
2/05/2024	35	3.5
30/05/2024	28	0.8
2/07/2024	33	2.9

Sample date	Exposure Period (Days)	Total Insoluble Matter (g/m <sup>2</sup> /month)
1/08/2024	30	0.2
5/09/2024	35	0.4
3/10/2024	28	0.5 <sup>1</sup>
7/11/2024	35	1.4
5/12/2024	28	9.0 <sup>1</sup>
<b>Annual Average:</b>		<b>1.7<sup>2</sup></b>

<sup>1</sup> Sample results considered to have been influenced by external activities outside Mackas Sand operations.

<sup>2</sup> February, March, October and December sample results excluded from annual average result.

**Table 6.13 Total Dust Deposition Levels at DDG 2 – Lot 218 (g/m<sup>2</sup>/month)**

Sample date	Exposure Period (Days)	Total Insoluble Matter (g/m <sup>2</sup> /month)
25/01/2024	34	4.6 <sup>1</sup>
29/02/2024	35	15.0 <sup>1</sup>
28/03/2024	28	14.2 <sup>1</sup>
2/05/2024	35	7.5 <sup>1</sup>
30/05/2024	28	7.1 <sup>1</sup>
2/07/2024	33	3.9
1/08/2024	60	8.5
5/09/2024	35	9.3
3/10/2024	28	21.9 <sup>1</sup>
7/11/2024	35	9.9 <sup>1</sup>
5/12/2024	28	10.2 <sup>1</sup>
<b>Annual Average:</b>		<b>7.2<sup>2</sup></b>

<sup>1</sup> Sample results considered to have been influenced by external activities outside Mackas Sand operations.

<sup>2</sup> January, February, March, May, October, November and December sample results excluded from annual average calculation.

### 6.2.3 Trends in Data

The monthly results during the reporting period for DDG1 ranged from 0.2 g/m<sup>2</sup>/month to 15.7 g/m<sup>2</sup>/month, with an annual average of 1.7 g/m<sup>2</sup>/month. Monthly dust monitoring sampling results for the months February, March, October and December were determined by Mackas Sand to be influenced by external activities outside Mackas Sand operations and have not been reported as a non-compliance in **Table 1.1**. Agricultural activity was observed from an adjacent Lot in proximity to DDG1 during these months and have therefore been removed from the DDG1 annual average statistic.

The monthly results for DDG2 varied from 3.9 g/m<sup>2</sup>/month to 21.9 g/m<sup>2</sup>/month, with an annual average of 7.2 g/m<sup>2</sup>/month. Monthly dust monitoring sampling results for the months January, February, March, May, October, November and December were determined by Mackas Sand to be influenced by external activities outside Mackas Sand operations and have not been reported as a non-compliance in **Table 1.1**. Agricultural activity and earthworks in neighbouring properties was observed in proximity to DDG2 during these months and have therefore been removed from the DDG2 annual average statistic.

**Table 6.14** provides a comparison of annual average deposition dust monitoring data since 2017. The 2024 DDG1 annual average has slightly increased since 2023 to 1.7 g/m<sup>2</sup>/month. The annual average of DDG1 is likely influenced by activities beyond Mackas Sand operations as very little sand extraction activity occurred in Lot 220, in proximity to DDG1. The 2024 DDG2 annual average of 7.2 g/m<sup>2</sup>/month has increased since 2023 and again is likely influenced by activities beyond Mackas Sand operations. DDG2 annual average has fluctuated historically with an annual average of 5.3 g/m<sup>2</sup>/month being recorded in 2020.

**Table 6.14 Annual Averages for Dust Deposition 2017 – 2024**

Year	Total Insoluble Solids (g/m <sup>2</sup> /month)	
	DDG1 (Lot 220)	DDG2 (Lot 218)
2017	2.0	2.5
2018	1.6	1.7
2019	1.7	3.4
2020	0.9	5.3
2021	2.8	6.4, adjusted 3.7
2022	0.7	2.2
2023	1.1	3.7, adjusted 2.4
2024	4.2, adjusted 1.8 <sup>1</sup>	10.5, adjusted 7.2 <sup>2</sup>

<sup>1</sup> Excluding February, March, October and December results.

<sup>2</sup> Excluding January, February, March, May, October, November and December results.

Mackas Sand notified the DPHI and EPA on 9 May 2024, 5 October 2024, and 5 December 2024 via letter of depositional dust monitoring results being impacted by agricultural activities undertaken in nearby properties and other influences beyond Mackas Sand operations. In response to this Mackas revised the approved AQMP (Umwelt, 2018b) which proposed to discontinue ongoing monthly dust gauge monitoring due to external influences being likely to continue in effect results received at both gauges. A revised draft AQMP was submitted to DPHI and EPA on 6 February 2025. Mackas Sand has not received a response from EPA and DPHI.

No community complaints relating to operational dust or air quality were received by Mackas Sand during the reporting period. Mackas Sand will continue to monitor deposited dust levels in accordance with the AQMP (Umwelt, 2018b) in the 2025 reporting period.

#### 6.2.4 Proposed Improvements or Actions for the Next Reporting Period

A draft version of the revised AQMP was submitted to the EPA and DPHI on 6 February 2025. Mackas Sand has not received a response from EPA and DPHI. Mackas Sand will review the EPA and DPHI response to the revised AQMP and address any responses / recommendations received.

Mackas Sand will continue to operate in accordance with the approved AQMP (Umwelt, 2018b) during the next reporting period. Should the revised AQMP be approved by the Department during the next reporting period, Mackas Sand will undertake activities in accordance with the revised AQMP and implement management or mitigation measures of the revised AQMP, where necessary.

## 6.3 Meteorology

Meteorological data is collected on a monthly basis from the Bureau of Meteorology station at the nearby Williamstown RAAF Base (Station 061078). As shown on **Figure 6.1**, Station 061078 is located approximately 5.3 km north-west of Lot 218 and 7.8 km west of Lot 220 and has been active prior to the commencement of operations at Lot 218 and Lot 220.

### 6.3.1 Rainfall

Rainfall data for the reporting period is summarised in **Table 6.15**.

**Table 6.15 Monthly Rainfall and Number of Rain Days during 2024**

Month	Rainfall (mm)	Highest Daily (mm)	Rain Days (i.e ≥0.2 mm)
January	20.0	13	10
February	118.2	25.2	17
March	45.4	9.0	14
April	195.4	103.6	13
May	309.4	54.0	24
June	167.4	49.4	15
July	96.0	32.8	14
August	56.8	18.2	17
September	65.8	24.0	10
October	54.0	10.0	18
November	73.8	25.6	14
December	12.8	6.2	9
<b>TOTAL</b>	<b>1215.0</b>	<b>N/A</b>	<b>175</b>

**Figure 6.2** provides a comparison of monthly rainfall from 2020–2024. During the reporting period, 1215 mm of rainfall was recorded across 175 rain days. Approximately 69% of the annual recorded rainfall for 2024 was experienced across February, March, April, May, and June.

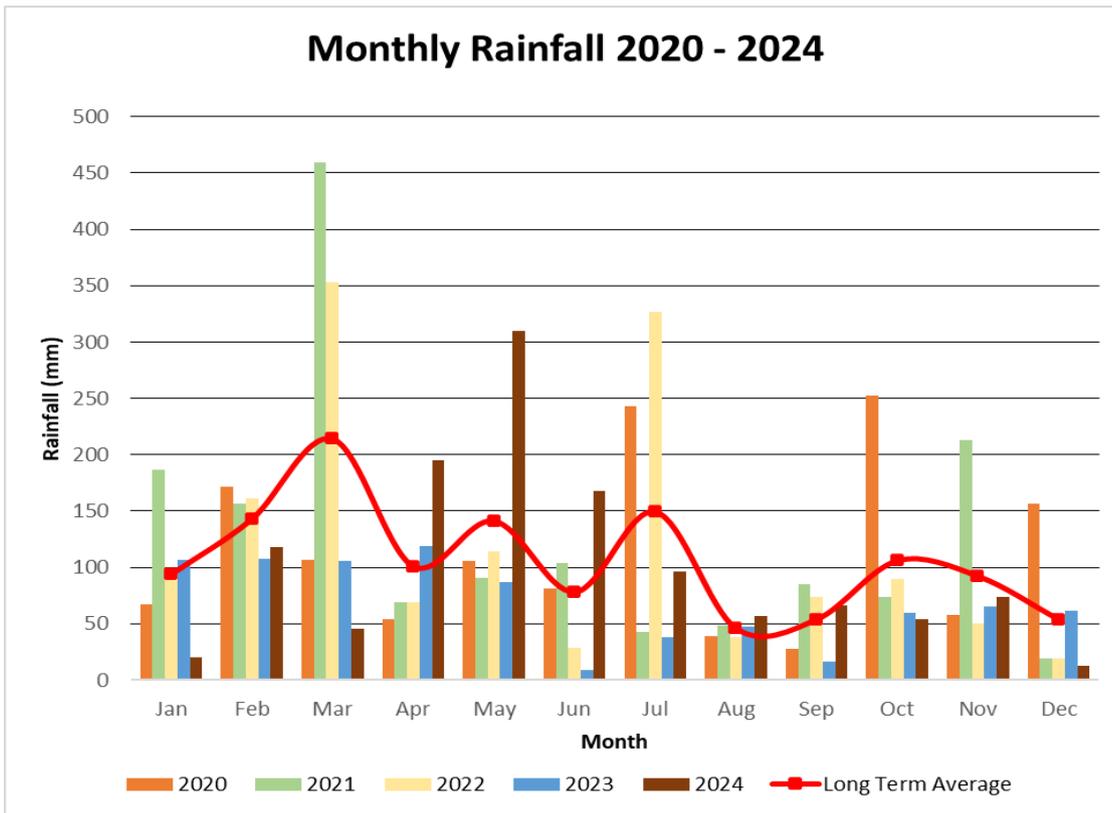


Figure 6.2 Monthly Rainfall 2020-2024

### 6.3.2 Temperature

Maximum and minimum temperature data for the reporting period is summarised below in **Table 6.16**. January was the warmest month of the year with an average maximum daily temperature of 30.7 °C. Both June and July were the coolest months of the year, with an average minimum daily temperature of 8.4 °C.

Table 6.16 Monthly Minimum and Maximum Daily Temperatures during 2024

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
January	15.3	20.3	30.7	42.4
February	16.1	19.8	29.2	39.7
March	12.2	17.0	27.3	35.1
April	10.3	13.8	24.3	29.1
May	6.5	11.3	20.3	23.6
June	3.0	8.4	17.5	21.7
July	3.0	8.4	17.4	23.7
August	2.7	10.0	20.1	30.3
September	2.8	10.0	23.4	30.5
October	7.0	12.8	23.7	30.8
November	12.7	17.5	27.0	37.7
December	12.9	18.7	29.7	37.6

## 6.4 Biodiversity Offset Strategy

In accordance with PA 08\_0142 Mackas Sand holds an approved Landscape Management Plan (LMP) (Umwelt, 2021a). The LMP sets out the procedures and management requirements associated with the site's rehabilitation areas.

Originally, the Biodiversity Offset Strategy (BOS) (as required by Schedule 3 Condition 28A of PA 08\_0142) for Mackas Sand was included as part of the Mackas Sand LMP. However, following consultation with DPHI the Biodiversity Offset Strategy was required to be developed as a standalone document. Mackas Sand subsequently extracted all the relevant BOS information from the LMP to create a standalone BOS document. The standalone BOS document was reviewed by stakeholders and subsequently revised with the final version submitted to DPHI on 22 September 2023 (Umwelt, 2023b). The BOS was approved by DPHI on 11 January 2024.

The 2024 annual Biodiversity Offset Area (BOA) monitoring report was completed by Cool Burn Pty Ltd (Cool Burn, 2025). Monitoring of the BOA was undertaken by both Umwelt, Worimi LALC and Cool Burn during the reporting period. Umwelt ecologists completed Stage 1 orchid monitoring of the BOA on 23 August 2024 and Stage 2 orchid monitoring on 9 September 2024. Cool Burn and Worimi LALC ecologists also completed orchid monitoring of the BOA on 13 September and 25 September 2024; however, due to the timing of the Cool Burn orchid monitoring event these results were excluded from the BOA monitoring report (Cool Burn, 2025). The Umwelt orchid monitoring results were utilised for the BOA monitoring report (Cool Burn, 2025).

The annual BOA monitoring report was submitted to BCT on 30 January 2025. The annual BOA monitoring report is required to be submitted to BCT by 31 December each year in accordance with the Mackas Sand Conservation Agreement VC0532 Annexure D (c) however it was submitted late due to an administrative oversight, refer to **Section 11.0**. The BOA monitoring report (Cool Burn, 2025) included recommendations to be implemented within the Biodiversity Offset Area (refer to **Section 6.4.8** and **Section 12.0**).

### 6.4.1 Environmental Assessment Predictions

A detailed ecological assessment was undertaken to support the Mackas Sand EA (Umwelt, 2009). This assessment identified the existing natural environment and likely impacts of the proposal on the biodiversity of the area, particularly on threatened species, populations and communities.

The ecology impacts at Mackas Sand are predominantly related to clearance of vegetation for quarrying activities in Lot 220, but also for the establishment of the alternate access road to Lot 218. To address these impacts a pre-clearance procedure, rehabilitation of Lot 220 and the establishment of a biodiversity area to offset the impact on two orchids (i.e. Newcastle Doubletail (*Diuris praecox*) and Sand Doubletail (*Diuris arenaria*) and a number of fauna species have been undertaken by Mackas Sand.

### 6.4.2 Biodiversity Impact Mitigation

The rehabilitation, ecological and biodiversity impact assessment mitigation measures for rehabilitation and the BOA are associated with the procedures detailed in the LMP (Umwelt, 2021a) and BOS (Umwelt, 2023b), being:

- Ecological pre-clearance surveys.

- Limiting vegetation impacts to the approved areas (e.g., extraction area and haul roads).
- Salvage of topsoil and woody debris for rehabilitation of the extraction area at Lot 220.
- Weed management.
- Bushfire management.
- Rehabilitation of the extraction area at Lot 220.
- Monitoring the performance and progression of the rehabilitation areas.
- Arranging for the long-term security of the biodiversity offset area.

### 6.4.3 Monitoring Results

#### 6.4.3.1 Rehabilitation and Ecological

The alternate access road to Lot 218 has been constructed and is fully sealed. As the alternate access road is in use, rehabilitation of the alternate access road and subsequent rehabilitation performance monitoring has not been commenced.

During the reporting period, Mackas Sand monitored the progress of land under rehabilitation at Lot 220 to identify the need for any rehabilitation management measures. Refer to **Section 7.2.3** for further details.

#### 6.4.3.2 Biodiversity Offset

In accordance with Schedule 3 Condition 28B of PA 08\_0142, Mackas Sand is required to provide long-term security for the BOA. On 30 June 2020, the Coordinator General, Environment, Energy and Science Group, Department of Planning, Industry and Environment executed the Mackas Sand BOA Conservation Agreement (VC00532).

Monitoring of the biodiversity offset area is undertaken generally during August/ September to align with the peak flowering season of the Newcastle Doubletail (*Diuris praecox*) and Sand Doubletail (*Diuris arenaria*). During the reporting period, orchid monitoring of the BOA was undertaken by both Umwelt and Cool Burn and Worimi LALC ecologists. Umwelt ecologists completed Stage 1 orchid monitoring on 23 August 2024 and Stage 2 orchid monitoring on 9 September 2024. Cool Burn and Worimi ecologists completed orchid monitoring on 13 September and 25 September 2024; however, due to the timing of the orchid flowering events in 2024, the Umwelt orchid monitoring results were utilised for the BOA monitoring report (Cool Burn, 2025).

While the timing of the monitoring is designed to target and monitor the orchid population numbers, the following additional ecological information is also collected:

- Habitat Assessment - including dominant flora species in each stratum, groundcover, evidence of disturbance and dieback, presence of standing and fallen dead timber and hollow-bearing trees.
- Vegetation Structure Assessment - Two permanent 50 m transects have been established at the eastern section of the Lot and are surveyed to monitor structural change to vegetation assemblage and habitat surrounding known orchid populations.

- Photo Monitoring – Five photo monitoring points have been established to monitor structural development and identify temporal changes in vegetation assemblage.
- Exotic Species Monitoring and Management – Monitoring and management of exotic species with target species including Whisky grass (*Andropogon virginicus*), Bitou Bush (*Chrysanthemoides monilifera* sp.) and Lantana (*Lantana camara*).
- Site Walk Through – An opportunistic assessment to identify and record potential impacts (e.g. weeds, pest animals, bushfire etc.) or positive observations (e.g. threatened species, points of interest) within the BOA.

The above ecological information was collected by Cool Burn and Worimi LALC ecologists and reported in the 2024 BOA monitoring report (Cool Burn, 2025). This ecological information is further detailed below.

### Orchid Monitoring

The results of the monitoring data for Newcastle Doubletail (*Diuris praecox*) and Sand Doubletail (*Diuris arenaria*) between 2018 and 2024 are shown in **Table 6.17** and **Table 6.18**. Historical orchid monitoring results can be found in **Appendix 2**. Baseline results recorded during 2014 and the management criteria from the BOS (Umwelt, 2023b) are also provided in **Table 6.17** and **Table 6.18** for reference.

**Table 6.17 Results of Diuris praecox Searches Baseline**

	2014 (Baseline)	Criteria*	2020	2021	2022	2023	2024
Date of survey	27/08/14	N/A	01/09/20	13/09/21	26/08/22	24/08/23 and 7/09/23	23/08/24
Number of stems	64	16	0	0	3	15	29
Maximum flowers per stem	9	N/A	0	0	7	6	7
Minimum flowers per stem	0	N/A	0	0	3	1	0
Mean flowers per stem	4.2	N/A	0	0	5	4.3	2.6

\*25% of baseline for 3 consecutive years.

**Table 6.18 Results of Diuris arenaria Searches Baseline**

	2014 (Baseline)	Criteria*	2020	2021	2022	2023	2024
Date of survey	10/08/14	N/A	11/09/20	13/09/21	16/09/22	24/08/23 and 7/09/23	09/09/24
Number of stems	72	18	2	82	62	131	129
Maximum flowers per stem	7	N/A	2	7	7	7	6

	2014 (Baseline)	Criteria*	2020	2021	2022	2023	2024
Minimum flowers per stem	1	N/A	0	0	1	0	0
Mean flowers per stem	2.2	N/A	1	2.5	3.2	2.3	1.9

### Habitat Assessment Monitoring

The results of the 2024 habitat monitoring are shown in **Table 6.19** below. The table also shows the accumulated results from 2020 – 2024 and baseline survey results from 2014. Historical habitat monitoring results can be found in **Appendix 2**.

**Table 6.19 Results of Habitat Assessment for Baseline**

Habitat Attribute	2014 (Baseline)	2020	2021	2022	2023	2024
<b>Disturbances</b>						
<b>Weeds (density/species)</b>	Low Whiskey grass ( <i>Andropogon virginicus</i> )	Low Whiskey grass ( <i>Andropogon virginicus</i> )	Moderate Whiskey grass ( <i>Andropogon virginicus</i> ), several mapped clusters as well as scattered individual occurrences throughout. Bitou bush ( <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> ) saplings scattered throughout. Low levels of fireweed ( <i>Senecio madagascariensis</i> ), catsear ( <i>Hypochaeris radicata</i> ) and quaking grass ( <i>Briza maxima</i> ) scattered throughout.	Low Whiskey grass ( <i>Andropogon virginicus</i> ), mapped clusters have decreased since 2021. Small patches recorded. Low levels of bitou bush ( <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> ) saplings scattered throughout. Low levels of fireweed ( <i>Senecio madagascariensis</i> ) and catsear ( <i>Hypochaeris radicata</i> ) scattered throughout.	Moderate Whiskey grass ( <i>Andropogon virginicus</i> ) relatively consistent with 2022. Low densities still present in previously mapped areas. Some new occurrences observed in previously inundated areas. Bitou bush ( <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> ) saplings scattered throughout. Low levels of fireweed ( <i>Senecio madagascariensis</i> ) and catsear ( <i>Hypochaeris radicata</i> ) scattered throughout the BOA, particularly in the SE corner.	Low Whiskey grass ( <i>Andropogon virginicus</i> ) identified along eastern boundary. Low densities of several scattered plants located in western area. Three Bitou Bush ( <i>Chrysanthemoides monilifera</i> subsp.) seedlings identified and removed. Two semi-mature plants were recorded along the eastern fence line outside the BOA. Low levels of Quaking Grass ( <i>Briza maxima</i> ) and Catsear ( <i>Hypochaeris radicata</i> ) identified.
<b>Pests</b>	Nil identified	Nil Identified	Rabbit ( <i>Oryctolagus cuniculus</i> ) – minimal impact	Nil identified. Evidence of digging in SE corner in proximity to previous orchid records. Likely fox scat recorded.	Nil identified. Evidence of digging in SW and SE corner, likely bandicoot.	No evidence of pest animals observed during the assessment.

Habitat Attribute	2014 (Baseline)	2020	2021	2022	2023	2024
<b>Fire</b>	Evidence of previous	Nil	Nil	Nil	Nil	No evidence of fire activity was observed during the assessment.
<b>Grazing</b>	Cattle	Cattle present at the time of both surveys. Extensive grazing affecting all vegetation <2 m in height. Some smaller shrubs pushed over. Ground cover very sparse.	No cattle present at time of survey	No cattle present at the time of survey.	No cattle present at the time of survey. Evidence of grazing 1m inside the western boundary fence.	No evidence of grazing was observed within the BOA.
<b>Erosion</b>	Minor (Aeolian)	Moderate (trampling exacerbated by Aeolian soils)	None identified	None identified.	None identified	No evidence of erosion was observed within the BOA.
<b>Logging</b>	Historic (cut stumps)	Nil logging; vegetation removed by intense grazing. Some shrubs pushed over by cattle from grazing and rubbing. Bark stripping on some vegetation from cattle rubbing.	Nil since 2014	Nil Since 2014	Nil since 2014	No evidence of logging was observed within the BOA.
<b>Features (Relative Abundance)</b>						
<b>Fallen timber/ logs</b>	Moderate	Moderate	Moderate	Moderate	Moderate	The BOA contains positive levels of logs and fallen timber.
<b>Stags</b>	Nil	Scarce	Scarce	Scarce	Scarce	The BOA contains several stags of medium size.

Habitat Attribute	2014 (Baseline)	2020	2021	2022	2023	2024
<b>Ground cover (litter and vegetation)**</b>	Moderate	Low-Moderate Areas of litter concentrated under denser vegetation but bare areas common where cattle activity was highest. High proportion of vegetative ground cover removed from intense grazing.	Moderate areas of litter concentrated under dense vegetation but bare areas common where cattle activity was highest previously (albeit improving). Native ground cover now moderate (grasses, forbs, ferns and lichens) in terms of foliage cover now grazing no longer occurring	Moderate to high levels of ground cover/litter observed throughout the BOA. Increased areas of lichen cover due to increased moisture levels.	Moderate to high levels of leaf litter observed throughout. SE corner reasonably sparse – low ground cover and high level of digging.	Low to moderate levels of litter. Bare soil (sand) patches can be observed around the BOA but they are not common. Litter build is generally 0 – 2cm deep.
<b>Mistletoe</b>	Nil	Scarce	Scarce	Few	Scarce	Mistletoe plants can be seen within the BOA growing on Old Man Banksia.
<b>Dieback</b>	Nil	Minor canopy dieback	Minor canopy dieback	Minor - midstory and ground cover (predominantly bracken fern but also in some leptospermum) dieback due to increased inundation levels.	Minor – Predominantly ground cover, bracken fern and wetland associated species on higher points of the site (likely due to high previous rainfall). Some dieback in these species observed due to reduced rainfall and inundated areas retreating. Minor shrub dieback observed.	Some dieback is evident in some Old Man Banksia trees. This may be related to Banksia Mistletoe and/or natural senescence of this rapid regenerative species. No dieback was observed in <i>Melaleuca quinquenervia</i> (Broad-leaved Paperbark) or <i>Eucalyptus pilularis</i> (Blackbutt).

Habitat Attribute	2014 (Baseline)	2020	2021	2022	2023	2024
<b>Loose bark on trees</b>	Moderate	Few. Some bark rubbed off by cattle.	Scarce. Former damage to tree bark as a result of cattle rubbing recovering.	Few	Few	Loose bark can be observed on Broad-leaved paperbark trees.
<b>Tree Hollows</b>						
<b>Number of trees with hollows</b>	12	12	12	12	12	10 Numerous other potential hollows exist (small hollows in high canopy/stem) but could not be verified.
<b>Size classes present</b>	Very small (vs), small (s), medium (m), large (l) and very large (vl)	vs, s, m, l, vl	Vs, s, m, l, vl	vs, s, m, l, vl	vs, s, m, l, vl	-***

\*Vegetation removed along northern and western boundary – approximately 5m – 7m in width along with additional areas to stockpile.

\*\*Categories of ground cover range from scarce, low, moderate, abundant, and very abundant.

\*\*\*Size classes of tree hollows were not undertaken by Cool Burn in 2024 (Cool Burn, 2025).

## Vegetation Structure Assessment, Exotic Species and Photo Monitoring

The results of the 2024 vegetation structure monitoring at Transect 1 and Transect 2 are shown in **Table 6.20** and **Table 6.21**, respectively. The tables also show the accumulated results from 2020 – 2024. Historical habitat monitoring results can be found in **Appendix 2**.

**Table 6.20 Transect 1 Results of 50 m Transect Data**

% Cover	2020	2021	2022	2023	2024
<b>Canopy Cover</b>					
Native Over-storey	27.5%	21%	16%	14%	22%
Native Mid-storey	7%	4.5%	7%	22.7%	17%
<b>Ground Cover</b>					
Native Grass	14%	42%	44%	22%	20%
Native Shrubs	8%	6%	8%	28%	24%
Native other (e.g. Forbs)	28%	16%	52%	26%	58%
Exotic	12%	2%	2%	0%	4%
Bare Earth	42%	44%	34%	66%	10%

**Table 6.21 Transect 2 Results of 50 m Transect Data**

% Cover	2020	2021	2022	2023	2024
<b>Canopy Cover</b>					
Native Over-storey	17%	10%	14.5%	17%	26%
Native Mid-storey	15%	11.5%	8%	11.3%	0.5%
<b>Ground Cover</b>					
Native Grass	20%	34%	58%	8%	20%
Native Shrubs	14%	26%	2%	8%	5%
Native other (eg. Forbs)	24%	20%	34%	74%	92%
Exotic	10%	4%	0%	16%	18%
Bare Earth	38%	36%	28%	16%	0%

### 6.4.4 Trends in Data

#### 6.4.4.1 Orchids

**Table 6.17** and **Table 6.18** show that there are annual fluctuations in the monitoring data for Newcastle Doubletail (*Diuris praecox*) and Sand Doubletail (*Diuris arenaria*). Results for both the Newcastle Doubletail and Sand Doubletail were above respective criteria during the reporting period, with Newcastle Doubletail recording 29 stems and Sand Doubletail recording 129 stems. This is an improvement over Newcastle Doubletail results in previous monitoring periods which recorded results below criteria from 2020 – 2023 with 15 stems recorded in 2023. Stem counts for Sand Doubletail slightly decreased from results recorded during 2023; however, were still well above the criteria for Sand Doubletail. The improved results of Newcastle Doubletail and Sand Doubletail during 2023 and 2024 indicates some degree of resilience and recovery in the BOA, likely influenced by favourable rainfall conditions in 2023 and 2024, and the exclusion of cattle from the area since 2020.

Generally, the individuals recorded were healthy, with a small number with browsed leaves and a snapped inflorescence (rare) and demonstrated all major phases in the flowering life cycle (buds, flowering, and

fruiting). The average flowers per stem has shown a slight decrease for both species; however all flowering stems appeared healthy there is not concern or a sign of ill health of the populations.

The distribution of the orchids population has changed since baseline surveys. The majority of the orchids are located in the southern portion of the site where there are more open areas. The northeastern area has seen an increase in Whisky Grass and *Baloskion tetraphyllum*. A dense stand of *Baloskion tetraphyllum* now occurs in a depression associated to a wetland formation (currently not holding water). The rhizomatous species grows to approximately 1.5 m in height with close to 100% cover where it occurs. Increases in this plant will potentially result in reduced 'open' habitat for orchids.

#### 6.4.4.2 Habitat Assessment

The 2024 monitoring results showed continued improvement in conservation values within the BOA with conservation values being maintained and in a satisfactory condition. The Smooth-barked Apple - Blackbutt - Old Man Banksia Woodland is in a healthy regenerating condition with good recruitment of the canopy species. The shrub and understorey layers have good species diversity (richness) with minimal bare ground and moderate levels of fallen timber that will be providing habitat for numerous terrestrial reptiles, small mammals and insects.

The BOA has mature trees that contain hollowing features. These trees are primarily Blackbutt trees, but Old man Banksia trees also develop small hollows suitable for microbats. Ten hollows were recorded which was a reduction from previous years (12) however this may be due to variation in assessment methodology (original methodology not defined) and certainty of hollowing. Various dead limbs were also observed on the ground due to natural processes such as storm damage which could account for the variation to the figure.

Several mistletoe plants were observed in and around the BOA. Mistletoe provides a high value food source for various birds and mammals as well as breeding habitat for various animals. The Regent Honeyeater (*Anthochaera phrygia* – Critically Endangered) is one species known to occur in the locality that forages on, and breeds within, Mistletoe. Notably the Mistletoe plant is resulting in minor dieback to Old Man Banksia tree limbs (Cool Burn, 2025).

The population counts for the Sand Doubletail and the Newcastle Doubletail were positive. The results for the Sand Doubletail were consistent with 2023 with an increase from 2022. Numerous plants were also observed east and south of the BOA within the Worimi National Park after the 2023 fire. This information supports the use of fire as a disturbance mechanism within the BOA. The Newcastle Doubletail results doubled in count from 2023 and greater increase from 2022. Average flowers per stem has decreased for both orchids year on year, the reason for this is unknown and likely to be highly variable (methodology, human error, timing etc.); however, the 2024 results demonstrate the BOA is being effective in protecting habitat for these two orchid species (Cool Burn, 2025). Impacts from Whisky Grass, Bladay Grass (*Imperata cylindrica*) and Bracken Fern (*Pteridium esculentum*) appear to be minimal, although the population of *Baloskion tetraphyllum* along Transect 2 will need to be monitored for potential future impacts. Prescribed burning in this area may support management of this species (Cool Burn, 2025).

Other values of note within the BOA include stag trees, decortivating bark on Broad-leaved Paperbarks, and wetland habitat (Cool Burn, 2025).

### 6.4.4.3 Vegetation Structure, Exotic Species and Photo Monitoring

In 2024, the BOA was generally moderate in coverage and native diversity (grasses, forbs, shrubs, sedges and rushes). The absence of previous impacts from cattle and drought have contributed to the general improvement, particularly in native over-storey and native grasses/other species. Results from the 2024 monitoring observed reasonable stability in native shrubs, improvements in native over-storey, improvements in other native cover, and a decrease in bare earth at both transects. Notable decreases were recorded in native mid-storey cover, and exotic species presence increased at both transects.

Although the combined average of 24% native over-storey cover and 9% native mid-storey cover across both transects demonstrates an increase since 2023, the over-storey increased, and mid-storey decreased at both locations. Transect 1 showed a mid-storey decrease from 23% to 17% between 2023 and 2024, while Transect 2 decreased from 11% in 2023 to 1% mid-storey cover in 2024. These results paired with notable increases in over-storey from 14% to 22% at Transect 1 and 17% to 26% at Transect 2, indicate the potential maturing of native species between monitoring periods, with growth contributing to a greater density of taller species.

Native grass cover was recorded to be 20% at both transects, being consistent with 2023 results at Transect 1 and showing an increase in cover at Transect 2. Native shrub cover was relatively consistent with a slight decrease in cover observed at both transects during 2024; 28% to 24% at Transect 1, and 8% to 5% at Transect 2. Other native cover has increased at both transects since the last monitoring period, increasing from 26% to 58% at Transect 1, and from 74% to 92% at Transect 2. *Machaerina juncea* (Bare Twig-rush) was prevalent in Transect 1, where it dominates the lower-lying areas associated with the wetland habitat. In Transect 2, the dominant species was *Baloskion tetraphyllum* (Tassel Cord-Rush), a native plant that typically establishes in wetter environments near wetlands and spreads through rhizomatous growth. This trend is potentially a result of inundation observed during the 2022 monitoring event where native sedges and rushes were observed in high densities.

Exotic species cover increased at both transects during 2024, from 0% to 4% at Transect 1, and from 16% to 18% at Transect 2. The changes observed at Transect 2 are primarily related to the occurrence of *Andropogon virginicus* (Whisky Grass) which was recorded to be dominant along the central portion of the study area. The results from Transect 2 triggered a management action related to weed density from the BOS as weed cover higher than the revised baseline cover (2018) was observed for more than two consecutive years. This baseline value is 4% cover at Transect 2, which was exceeded in both 2023 (16%) and 2024 (18%), while the baseline value at Transect 1 (6%) has not been exceeded. This result has resulted in a revised approach to weed management actions as discussed in **Section 6.4.8**.

Photo monitoring undertaken in the 2024 monitoring period of the BOA can be found in the BOA Annual Monitoring Report (Cool Burn, 2025) and are accompanied by a description of vegetation, including type, health, changes and management issues. Photo monitoring have been compared to those taken in 2022 with the results not highlighting any significant or negative changes occurring within the BOA.

### 6.4.5 Comparison of Results against Performance Indicators

To track the biodiversity value changes of the BOA, the 2024 monitoring results were compared to the relevant performance criteria within the BOS (Umwelt, 2023b). **Table 6.22** summarises how aspects of the BOA are performing against the relevant action triggers. If a management action trigger is activated, it is assessed to determine whether it is likely to be a result of natural fluctuation in the biological system or whether it relates to current management actions.

**Table 6.22 Comparison of 2024 BOA Monitoring Results Against Performance Criteria from the BOS**

BOA Performance Criteria	Trigger Response	Further Action / Comment
<b>Short Term Action Triggers</b>		
<p>Any area of Coastal Sands Apple – Blackbutt Forest, Newcastle Doubletail (<i>Diuris praecox</i>) or Sand Doubletail (<i>Diuris arenaria</i>) habitat, identified during the revised baseline (2018) survey, is cleared either by natural processes such as fire or anthropogenic processes such as clearing.</p>	<p><b>Trigger: Not triggered</b></p>	<p>No further actions required.</p>
<p>The Newcastle Doubletail (<i>Diuris praecox</i>) or Sand Doubletail (<i>Diuris arenaria</i>) stem count is less than 25% of the revised baseline count for three consecutive years.</p>	<p><b>Trigger: Not Triggered</b> Stem count is above 25% of the revised baseline count for both the Newcastle Doubletail (<i>Diuris praecox</i>) and Sand Doubletail (<i>Diuris arenaria</i>).</p>	<p>The 2024 monitoring observed 29 Newcastle Doubletail (<i>Diuris praecox</i>) stems within the BOA. This is above the 25% revised baseline count trigger for Newcastle Doubletail and is an increase since 2023 (15 individuals), 2022 (three individuals) and zero in 2021. The 2024 monitoring observed 129 Sand Doubletail (<i>Diuris arenaria</i>) stems within the BOA, also above the 25% revised baseline count for Sand Doubletail. A slight decrease from 131 stems in 2023 occurred, however, this is still an increase from the previous two years with 62 stems in 2022 and 82 stems in 2021. Mackas Sand will implement the actions prescribed in <b>Section 6.4.8</b> during 2025.</p>
<p>The diversity or density of weed species is higher than the revised baseline (2018) results for more than two consecutive years.</p>	<p><b>Trigger: Triggered in Transect 2 but Not Triggered in Transect 1</b> Increased weed density in Transect 2 will require a revised approach to weed management actions. Density of weeds within Transect 1 has slightly increased but is below the 2018 revised baseline. Across the BOA, weed diversity and abundance is generally increasing, with a substantial increase in the extent of the areas occupied by whiskey grass.</p>	<p>Hand weeding in Transect 2 has helped to manage weed density and diversity; however, this needs to continue, particularly for Whisky Grass. The use of fire may assist in the reduction of Whisky Grass seed banks within leaf litter, however should be monitored and followed up with further weed management. Mackas Sand will implement weed management and prescribed burning actions detailed in <b>Section 6.4.8</b> during 2025, following written permission from BCT prior to any future disturbance.</p>

BOA Performance Criteria	Trigger Response	Further Action / Comment
Undertake management actions listed in Item 1 of Annexure C to the Conservation Agreement for a period of 10 years.	<b>Trigger: Trigger Activated</b> In 2024: Monitoring was undertaken to assess whether any form of disturbance regime is required to support the presence of <i>D. praecox</i> and <i>D. arenaria</i> orchids within the BOA. Weed management was undertaken in September and November 2024. No further disturbance activities (targeting improvement of threatened orchid habitat) was undertaken in 2024. Ongoing consultation with BCT required to determine preferred approach.	Mackas Sand will implement the actions prescribed in <b>Section 6.4.8</b> during 2025.
<b>Long Term Triggers</b>		
Maintain the same area of Coastal Sands Apple – Blackbutt Forest as identified in the 2014 baseline surveys.	<b>Trigger: Not triggered</b> In 2024 the same area of Coastal Sands Apple – Blackbutt Forest is managed through the establishment of the BOA.	No further actions required.
Maintain the same area of Newcastle Doubletail ( <i>Diuris praecox</i> ) habitat as identified in the 2014 baseline surveys.	<b>Trigger: Trigger Activated</b> Monitoring in 2024 demonstrated an increase in the area of <i>D. praecox</i> compared to the past four years of monitoring, however continued to demonstrate a smaller area than observed in 2014 baseline surveys.	Mackas Sand will implement the actions prescribed in <b>Section 6.4.8</b> during 2025.
Maintain the same area of Sand Doubletail ( <i>Diuris arenaria</i> ) habitat as identified in the 2014 baseline surveys.	<b>Trigger: Not Triggered</b> Monitoring in 2024 demonstrated increased area of <i>D. arenaria</i> compared to 2014 baseline surveys.	Mackas Sand will implement the actions prescribed in <b>Section 6.4.8</b> during 2025.
Maintain or reduce the diversity and density of weed species.	<b>Trigger: Trigger Activated</b> The 2024 results indicated increased levels of Whisky Grass ( <i>Andropogon virginicus</i> ). The 2024 results indicated Bitou Bush ( <i>Chrysanthemoides monilifera</i> ) was infrequently observed.	Three Bitou Bush seedlings were subsequently removed during 2024 assessment. Mackas Sand will implement weed management and prescribed burning actions detailed in <b>Section 6.4.8</b> during 2025, following written permission from BCT prior to any future disturbance.
Undertake management actions listed in Item 2 of Annexure C to the Conservation Agreement from Year 11 onwards.	<b>Trigger: Not triggered</b>	Not yet relevant.

## 6.4.6 Weed and Vertebrate Pest Management in the Biodiversity Offset Area

A weed management program was implemented within the BOA. Thirty-two hours of weed control was undertaken by the Worimi Green Team in September 2024. These works were undertaken outside of the BOA due to orchid flowering season and concentrated on weeds along the access track into the site, and to the north of the site. Target species included Bitou Bush and Lantana (*Lantana camara*). An additional 16

hours of hand weeding Whisky Grass was undertaken within the BOA in November 2024. Seed heads of Whisky Grass were removed and bagged to be taken off site. Bitou Bush plants were observed to occur along the eastern boundary of the BOA and into the Worimi National Park.

A revised approach to weed management actions within the BOA using cool burn practices is being discussed between Mackas Sand and BCT to reduce the diversity and density of weed species, in response to the trigger of BOA performance criteria outlined in **Table 6.22**. Mackas Sand will seek BCT approval of a Burn Plan prior to any future disturbance works within the BOA and will implement the revised approach to weed management in accordance with Item 1 of Annexure C of the Conservation Agreement. Results of future weed management works will be reported in the 2025 Annual Review.

### 6.4.7 2023 Biodiversity Offset Area Management Recommendation Progress

The progress on the 2023 Mackas Sand Biodiversity Offset Area management recommendations is presented in **Table 6.23**.

**Table 6.23 2023 Mackas Sand Biodiversity Offset Management Recommendations**

Action	Status	Comment
Ensure fencing is adequate to continue to exclude cattle, anchoring posts into the ground at regular intervals, and including regular monitoring (and evidence thereof) to ensure this is the case.	Ongoing	Regular monitoring of fencing is being undertaken by Mackas Sand. Fallen branches were removed from the fence line on two occasions during 2024, and fence repairs were undertaken.  Further monitoring and maintenance will be conducted in 2025, including removal of tree limbs and fence repairs where required.
Engage suitably qualified and experienced land management professionals to complete weed and early colonising native species management works at least twice during the period between and including December to April. Works are to be completed with written permission from the BCT and will occur strictly in a manner that does not impact the threatened orchid populations. Evidence of these works will be provided to BCT after each event.	Ongoing	Weed control was undertaken by the Worimi Green Team in September 2024 outside of the BOA due to the orchid flowering season, and targeted Bitou Bush ( <i>Chrysanthemoides monilifera</i> ) and Lantana ( <i>Lantana camara</i> ). Further weed management occurred in November within the BOA, involving the removal of Whisky Grass ( <i>Andropogon virginicus</i> ) under supervision of an ecologist.  Further weed works including prescribed burning are proposed to occur in 2025 following approval from BCT. Mackas Sand propose to liaise with NPWS to remove Bitou Bush east of the BOA boundary.
Weed management works are to be completed within the CA and within approximately 20m surrounding the BOA (i.e., the weed management area) to reduce potential weed source populations.	Ongoing	As per above row.  Further weed works including prescribed burning are proposed to occur in 2025 following approval from BCT. Mackas Sand to liaise with NPWS to remove Bitou Bush east of the BOA boundary.

Action	Status	Comment
Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.	Ongoing	Annual biometric monitoring at the two established 50 m transects, including vegetation assessment, photo mapping and recording of habitat attributes was undertaken. Weed management works outside of the orchid growth and flowering seasons was also performed and a livestock-exclusion fence was maintained to further support the orchid species.  Further weed management works including prescribed burning following approval from BCT is proposed to be undertaken within the BOA in 2025.

### 6.4.8 Proposed Improvements or Actions for the Next Reporting Period

During the 2025 reporting period Mackas Sand will implement the recommendations from the 2024 BOA report (Cool Burn, 2025), being:

- Fencing:
  - Removal of any tree limbs affecting the BOA fence line.
  - Repairs to BOA boundary fence wires where required.
  - Regular monthly inspections of the fence line, and maintenance conducted as required (limb removal etc.).
- Weed management actions:
  - Increase Whisky Grass control to twice per year (recommend November and May).
  - Whisky Grass controlled manually inside the BOA and all seeding bodies removed offsite. Herbicide may be considered for dense patches and will be done in accordance with the Conservation Agreement VC 00532.
  - Prescribed burning, if conducted, to be followed up with weed monitoring and control.
  - Whisky Grass controlled out to 20 m from the BOA boundary and include any pronounced infestations beyond this distance.
  - Bitou Bush seedlings within the BOA to be hand pulled during weed management occurrences.
  - Discussion with National Parks and Wildlife Service to discuss treatment of Bitou bush within the Worimi National Park.
- Cool burn practices:
  - Cool burn weed control practices will be undertaken following approval of a Burn Plan by BCT prior to any future disturbance. The required Burn Plan will consider:

- appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.
- burn less than 50% of the BOA in any given event.
- not to be undertaken during orchid growth, flowering and seeding life cycle (i.e. November – April).
- Avoid direct impact to dense stands of orchid populations.
- A mosaic burn pattern would be incorporated to ensure sufficient pockets of leaf litter are retained within the BOA.
- Fire would support the control of Whisky Grass infestations and can be used in conjunction with weed management actions.
- Fire would target the management of the encroaching *Baloskion tetraphyllum* along Transect 2.

## 6.5 Aboriginal Heritage

### 6.5.1 Aboriginal Cultural Heritage Management

In accordance with PA 08\_0142 (MOD 2) Mackas Sand holds an approved Aboriginal Cultural Heritage Management Plan (ACHMP) (Umwelt, July 2016). The ACHMP sets out the procedures and management requirements associated with the Aboriginal Cultural Heritage matters and consultation regarding the rehabilitation, ecological and biodiversity offset matters as well as the establishment of the Aboriginal Cultural Heritage Group (ACHG) as the primary consultation mechanism for ongoing Aboriginal Cultural Heritage management matters for the project.

It is noted that the Mackas Sand extraction area is owned by the Worimi Local Aboriginal Land Council (Worimi LALC), who at the time of the environmental assessment dedicated a significant area of remnant coastal vegetation adjacent to the sand extraction area to permanent conservation status as National Park. Worimi LALC are members of the ACHG.

### 6.5.2 Environmental Assessment Predictions

A detailed Aboriginal Cultural Heritage Assessment (ACHA) was prepared to support the Mackas Sand EA. The study area was determined to have high Aboriginal cultural significance through consultation undertaken with Aboriginal stakeholders.

The ACHA determined that the sand extraction operations at Lot 218 may uncover buried former soil horizons within the transient sand dunes that may contain archaeological material. As these soil surfaces are distributed discontinuously at varying depths across and within the dune field, significant logistical and safety issues have been experienced with traversing the transient sand dunes with mechanical sampling equipment prior to extraction occurring. As such, it has not been possible to safely undertake a typical sub-surface sampling program prior to extraction of the sand, in order to accurately identify where the remnant soil horizons occur prior to extraction commencing.

In contrast, all of Lot 220 consists of stabilised soils which will be impacted by the project, making it safe and achievable to undertake further archaeological investigations where required. One area of Potential Archaeological Deposit (PAD) was identified in the low-lying central area of Lot 220. Impacts to the area of

PAD in the central section of this site were expected to be minimal, as any impact is limited to the construction of up to two vehicle access tracks across the narrowest sections of the PAD area. The key impacts associated with the project will occur in the elevated dunes and associated slopes that have been assessed as unlikely to contain PAD, although may contain low densities of archaeological material.

### **6.5.3 Aboriginal Cultural Heritage Impact Assessment Criteria**

The Aboriginal cultural heritage impact assessment criteria are associated with the following procedures as detailed in the ACHMP:

- Establishment of an ACHG.
- Cultural awareness training.
- The recording and salvage of known Archaeological sites and PADs.
- Monitoring inspections by the ACHG.
- Analysis and interpretation of results of mitigation activities.
- Care and control of salvaged material.

### **6.5.4 Aboriginal Cultural Heritage Results**

Mackas Sand has established an ACHG, and the plant operators have completed cultural awareness training as part of the induction process. This training is supplemented by the plant operator(s) also attending and participating in the ACHG meeting and the monitoring inspections conducted by the ACHG.

During the report period, an ACHG inspection and meeting was undertaken on 5 September 2024. All potential artefact material salvaged from sand extraction activities was stored on site in a locked container for investigation by ACHG members. This was undertaken on 5 September 2024 and no artefacts were identified in the salvaged material. Mackas Sand will seek to hold further ACHG meetings during 2025.

Artefacts identified during inspections are typically inspected and analysed by the ACHG. All artefacts are stored securely onsite as well as those found as part of ACHG inspections. Artefacts collected from screened material from are buried at the ACHG's nominated keeping place.

The ACHG has previously indicated there is no need to bag materials from Lot 220 for later analysis, however any artefacts are to be stored and returned to Lot 220 as part of the site rehabilitation process.

### **6.5.5 Proposed Improvements or Actions for the Next Reporting Period**

Mackas Sand will continue to collect potential artefacts from Lot 218 and Lot 220 in the next reporting period as per the requirements of the ACHMP, for inspection by ACHG members in 2025. No additional management or mitigation measures are proposed to be implemented which are outside the approved ACHMP.

## 6.6 Non-Aboriginal Heritage

The Mackas Sand EA identified an alignment of World War II era tank traps traversing a section of Lot 220. These tank traps are also believed to exist beneath the mobile sand dunes on north-eastern end of Lot 218. No other historical heritage items were identified within the study area.

The tanks traps within the Lot 220 extraction area have been temporarily relocated during a previous reporting period. They will be returned to their original position when they will not restrict extraction and/or rehabilitation activities. No additional tanks traps were uncovered at Lot 218 and Lot 220 during the reporting period.

No actions or impacts in relation to non-Aboriginal heritage occurred during the reporting period.

Mackas Sand will provide an updated NIHMP (Umwelt, 2016) to DPHI during the next reporting period to include records of consultation and approval of the NIHMP (if available). No additional management or mitigation measures are proposed to be implemented in the 2025 reporting period.

## 6.7 Erosion and Sediment Control

In accordance with PA 08\_0142 (MOD 2) Mackas Sand holds an approved Soil and Water Management Plan (SWMP) (Umwelt, 2021b), which sets out the procedures and management requirements.

The Mackas Sand EA identified that small quantities of surface run-off will be generated from access roads and small parking areas, with this surface run-off readily managed through the establishment of table drains and flow dissipation structures, such as level spreaders along each access road.

Mackas Sand's experience in relation to the extraction area is that the in-situ sand is highly permeable. This in combination with the extraction area being the lowest point in the landscape results in there being negligible potential for the operation to generate runoff or impact on surface waters.

Mackas Sand completed an extensive road sealing program during 2017. This effectively eliminated the potential for erosion and sediment transport along the Lot 218 alternate access road and the Lot 220 access roads. Spoon drains and localised erosion sediment controls are located near the entrance to the sand extraction areas where the road has not been sealed.

No additional erosion and sediment control works were completed during the 2024 reporting period.

The SWMP will be updated in 2025 following consultation with EPA and DPHI to incorporate a revised Maximum Extraction Depth Map (MEDM) (refer to **Section 7.2.3**). Mackas Sand will continue to operate in accordance with the approved SWMP (Umwelt, 2021b) during the next reporting period. Should the revised SWMP be approved by the Department during the next reporting period, Mackas Sand will undertake activities in accordance with the revised SWMP and implement the management or mitigation measures of the revised SWMP, where necessary.

## 6.8 Waste Management

The Mackas Sand EA identified that wastes from the Project include sand processing and ablution wastes.

During the reporting period sand processing wastes (i.e., screen waste) have consisted of sand aggregates, fallen vegetation and leaf litter. These natural waste materials have been incorporated into the final landform of the site as per the EA.

No additional management or mitigation measures for waste are proposed to be implemented during the 2025 reporting period.

## **6.9 Traffic**

Traffic Management at Mackas Sand is undertaken in accordance with the approved Drivers Code of Conduct (DCC) (Umwelt, 2023a). The DCC applies to drivers of all project related vehicles, including trucks that haul sand from Mackas Sand operations on Lot 218 and Lot 220. The DCC details:

- safety considerations when operating on site and when on public road haulage routes
- times of heavy traffic
- school bus travel times and bus stop locations
- potential interactions with traffic and fauna on roads
- emergency and accident contact details (including details for care of injured fauna)
- local road condition updates
- measures to minimise truck noise impacts including on-site speed restrictions
- the requirement for all truck loads to be covered when leaving site, and
- measures to minimise movement to site prior to 5am weekdays.

### **6.9.1 Environmental Assessment Predictions**

A detailed Traffic Assessment was prepared by GHD to support a modification to the Mackas Sand Project and was included as an appendix within the Environmental Assessment (Umwelt, 2015) (i.e. Modification 2). The modification allowed for an increase in maximum hourly truck movements from Lot 218 via the approved alternate access road. All other traffic aspects remained unchanged from that approved as part of the 2009 EA. No changes to the transport routes were sought by the modification.

The traffic impact assessment concluded that the site access and the intersection with Nelson Bay Road will continue to operate with spare capacity from 2015 to 2035 and that the existing road network will continue to operate with minimal negative impacts as a result of the proposed modification to the approved truck movements.

### **6.9.2 Monitoring Results**

#### **6.9.2.1 Vehicle Movements**

Transport of product material was undertaken in accordance with the hourly truck limits specified in PA 08\_0142 (MOD 2) during the reporting period.

Mackas Sand is not aware of any traffic accidents involving trucks entering or departing via the Lot 218 or Lot 220 access roads intersection with Nelson Bay Road during the reporting period.

### **6.9.2.2 Road Haulage**

Schedule 3 Condition 33 of PA 08\_0142 (MOD 2) states that all vehicles entering and leaving the site are covered and that all loaded vehicles leaving the site are cleaned of materials that may fall on the road, before they leave the site.

Mackas Sand notes there were no non-compliances with Schedule 3 Condition 33 of PA 08\_0142 (MOD 2) during the reporting period.

### **6.9.2.3 Fauna Strikes**

Schedule 3 Conditions 33B and 33C of PA 08\_0142 (MOD 2) details the requirement for the commitments made in the DCC to be discussed in each Annual Review. This shall include details of all fauna injured or killed by vehicle strikes, time and date of any such strike, species involved, action taken immediately following the strike and any consequent measures put in place to prevent or minimise a recurrence of fauna strikes.

There were no reported fauna strikes during the reporting period.

### **6.9.3 Trend in Data**

From Lot 218, Mackas Sand identified that two additional traffic movements occurred in 2018, and one additional traffic movement occurred in 2019. Mackas Sand were compliant with its traffic movement compliance limits during the 2020 and 2021 reporting period. There was one exceedance of traffic movements in 2022. Mackas Sand were compliant with its traffic movement compliance limits during the 2023 and 2024 reporting period.

### **6.9.4 Proposed Improvements or Actions for the Next Reporting Period**

No additional management or mitigation measures are proposed to be implemented in the 2025 reporting period which are outside the approved DCC (Umwelt, 2023a).

# 7.0 Water Management

Mackas Sand does not extract groundwater for use at either Lot 218 or Lot 220 and does not hold any licences for the extraction of groundwater for use at either Lot 218 or Lot 220. Water management needs on-site are negligible and are limited to surface runoff from the sealed access road. The remainder of the site is comprised of sand which is free draining. There is no surface water runoff at either of the Lots that requires diversion or specific management.

The potential major water demands for the Project are the approved wash plant and dust suppression associated with the minimisation of vehicle generated dust emission. Mackas Sand has however, effectively minimised its water demand as the approved wash plant has not been constructed and the access roads have been sealed. As noted in the Soil and Water Management Plan (SWMP, 2021b), Mackas Sand will keep a record of any extraordinary water usage on-site and will compile and present this information as part of the Annual Review.

No extraordinary water usage was recorded at Mackas Sand during the reporting period.

## 7.1 Surface Water

There are no surface flows or drainage lines on either Lot 218 or Lot 220 due to the high permeability of the underlying sand. As a result, there is no surface water that can be monitored to establish baseline conditions other than in low-lying areas that may intermittently flood following an intense rainfall event due to the infiltration rate being exceeded (i.e., perched water).

## 7.2 Groundwater

In accordance with the PA 08\_0142 (MOD 2), Mackas Sand holds an approved SWMP (Umwelt, 2021b), which sets out the procedures and management requirements for groundwater. The groundwater monitoring network consists of six bores, which are monitored each quarter. The location of the monitoring bores is shown on **Figure 6.1**.

### 7.2.1 Environmental Assessment Predictions

The Mackas Sand EA identified that the sand extraction areas are located on the Stockton Sandbeds, which form part of the Tomago-Tomaree-Stockton groundwater source that is managed in accordance with the Hunter Water (Special Areas) Regulation 2003, Tomago-Tomaree-Stockton Groundwater Management Plan 1996 and Water Sharing Plan for the Tomago-Tomaree-Stockton Groundwater Sources 2003.

A Groundwater Impact Assessment was developed in support of the Mackas Sand EA. The EA predicted that the sand extraction operations at Lot 218 and Lot 220 would have a negligible impact at both locations under average rainfall conditions.

The EA does not include information on groundwater quality impacts. The assessment findings for the temporary reduction in extraction level (i.e., Modification 1 of PA 08\_0142) were unchanged from the 2009 EA (Umwelt, 2009).

## 7.2.2 Impact Assessment Criteria

### 7.2.2.1 Groundwater Level

To ensure adequate protection of the underlying groundwater resource, the SWMP includes a Maximum Extraction Depth Map (MEDM) for Lot 218 and Lot 220, which satisfies the requirements of Schedule 2 Conditions 7 and 7A of PA 08\_0142 (MOD 2). The history of MEDM updates for the Mackas Sand SWMP is detailed in **Section 7.2.3**. The standing water level in the six bores is measured each quarter and compared to the predictions shown in **Table 7.1**. It is noted that additional groundwater monitoring has been undertaken and an updated MEDM has been prepared based on modelling results from an updated Visual MODFLOW Pro Version 2009.1 groundwater model using meteorological data from the Australian Bureau of Meteorology (BoM) Williamtown RAAF Base station (station no. 061078).

The updated MEDM incorporates both meteorological data and observed groundwater data to the end of September 2023 and was submitted to the EPA in December 2023. Outcomes of the MEDM update was provided to the DPHI on 28 March 2024 via the 2023 Annual Review, with the report provided to DPHI on 19 September 2024 following DPHI response to the submission of the 2023 Annual Review, refer to **Section 7.2.3**. The groundwater levels included in **Table 7.1** are the currently approved levels presented in the SWMP (Umwelt, 2021b). The SWMP will be updated as required following DPHI's response to the revised MEDM (refer to **Section 7.2.3**). **Table 7.1** shows the predicted maximum groundwater levels at each groundwater monitoring bore.

**Table 7.1 Predicted Maximum Groundwater Levels**

Groundwater Monitoring Bore	Approximate Predicted Maximum (mAHD)
SP1	3.60
SP2	2.80
SP3	2.60
SP4	1.25
SP5	3.60
BL158	3.70

### 7.2.2.2 Groundwater Quality

The SWMP (Umwelt, 2021b) includes a suite of groundwater monitoring parameters and trigger levels which are measured each quarter, as shown in **Table 7.2**. The list of tested analytes has been in place since 2008, except for chromium, cobalt and zinc which were included as part of the 2019 revision of the SWMP. Chromium, cobalt and zinc were analysed during the 2023 reporting period, however were not reported to the DPHI in the 2023 Annual Review due to administrative oversight. Reporting of chromium, cobalt and zinc has been included in the 2024 Annual Review in response to DPHI feedback on the Mackas Sand 2023 Annual Review.

**Table 7.2 SWMP Groundwater Quality Investigation Trigger Values (Umwelt, 2021b)**

Parameter	Units	Minimum	Maximum
pH	pH Unit	4.5**	8.5*
Conductivity	µS/cm	NA	600**
Turbidity	NTU	NA	50**
Arsenic (Total)	mg/L	NA	0.01*

Parameter	Units	Minimum	Maximum
Manganese (Total)	mg/L	NA	0.1*
Iron (Total)	mg/L	NA	5.7**
Chromium (Total)	mg/L	NA	0.0906***
Cobalt (Total)	mg/L	NA	0.15***
Zinc (Total)	mg/L	NA	3*

\*Values are based on the Australian Drinking Water Guidelines 2011 (NHMRC, 2011).

\*\*Values are based on long term groundwater monitoring from a previous operation in the local area.

\*\*\*Values are based on ANZECC (2000) guidelines

## Trends in Data

During the reporting period, four monitoring events were undertaken in accordance with the current SWMP (Umwelt, 2021b). The 2024 monitoring results are shown in **Table 7.3** to **Table 7.12**.

The results are compiled and compared against trigger values provided in **Table 7.1** and **Table 7.2**, the minimum/maximum range and trends in the previous results.

In accordance with Section 5.4 of the current SWMP (Umwelt, 2021b), if groundwater monitoring results exceed the nominated investigation trigger values, the Quarry Manager is required to investigate.

The Quarry Manager is required to interrogate and explore any reasons for results exceeding the nominated trigger value and requires notification to be made to DPHI in the event of three or more consecutive quarterly monitoring results outside of the nominated trigger value.

Mackas Sand provided notification to the DPHI on 6 February 2025 regarding groundwater results recorded above the SWMP trigger values. Details of this notification are summarised below.

During the reporting period, Mackas Sand investigated elevated groundwater level monitoring results recorded at SP2 and SP3. Elevated groundwater level recorded at SP2 and SP3 during the December 2024 quarterly monitoring round was reported to DPHI as the results were outside of the nominated trigger value for three consecutive quarterly periods, as required under the current SWMP (Umwelt, 2021b).

The Mackas Sand Project EIS (Umwelt, 2009) identified and assessed the potential for the extraction of groundwater for supply to sand processing activities, including recharge through an aquifer recharge basin. This was modelled in the groundwater impact assessment.

Mackas Sand advised there was no groundwater extraction or recharge undertaken for the benefit of operations during the reporting period. However, it is noted that the observed groundwater levels have exceeded the trigger levels at SP2 and SP3. The groundwater levels increased in response to above average rainfall from 2020 to 2023 and more recently following significant rainfall in May 2024. The numerical groundwater modelling was reviewed by GHD (GHD 2023b), which recommended that the model be re-calibrated to better replicate observed groundwater conditions and update the MEDM for the site.

Mackas Sand will undertake a review and update of the Groundwater Model and associated Maximum Extraction Depth Map, in accordance with the revised conditions of EPL 13218 (refer to **Section 7.2.3**).

### 7.2.2.3 Groundwater Level

During the reporting period measured groundwater levels for SP1, SP4, SP5, and BL158 were below the predicted maximum groundwater levels. SP2 and SP3 exceeded the predicted maximum groundwater levels for the following months:

- June, September and December 2024.

The groundwater level was recorded as 2.48 mAHD at SP2 and 1.80 mAHD at SP3 in March 2024, which is below the predicted maximum groundwater levels of 2.80 mAHD and 2.60 mAHD, respectively. The groundwater level at both SP2 and SP3 were monitored in June 2024 where levels had increased to 4.06 mAHD and 3.22 mAHD, respectively; both exceeding the predicted maximum. Groundwater levels decreased at SP2 to 3.73 mAHD and at SP3 to 3.06 mAHD in September 2024 and decreased further in December 2024 to 3.21 mAHD at SP2 and 2.64 mAHD at SP3. However, these results continued to exceed the predicted maximum in for three consecutive monitoring events with an exceedance of SWMP trigger level notification provided to DPHI on 6 February 2025.

Groundwater levels in all bores decreased between December 2023 and March 2024, followed by an increase in levels generally until June 2024. Groundwater levels decreased again by December 2024 in response to rainfall trends over the same period.

**Table 7.3** shows the recorded groundwater levels for the reporting period. The groundwater results since 2017 are shown graphically in **Appendix 3**.

**Table 7.3 Groundwater Levels (mAHD)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Approximate Predicted Maximum (mAHD)	3.60	2.80	2.60	1.25	3.60	3.70
Observed Groundwater Level (18/03/2024)	0.87	2.48	1.80	0.43	1.19	1.57
Observed Groundwater Level (07/06/2024)	1.97	4.06	3.22	1.01	2.55	2.82
Observed Groundwater Level (02/09/2024)	2.11	3.73	3.06	0.87	2.56	2.81
Observed Groundwater Level (16/12/2024)	1.70	3.21	2.64	0.62	2.05	2.30

Note: Red values indicate exceedance of trigger values, refer to **Section 7.2.2.3** for discussion regarding results.

### 7.2.2.4 Groundwater pH

The pH results for the reporting period remained within the SWMP (Umwelt, 2021b) specified trigger value range and were generally consistent with historical records. The groundwater pH results since 2017 are shown graphically in **Appendix 3**. **Table 7.4** shows the recorded pH groundwater levels for the reporting period.

The pH levels for SP1, SP4 and SP5 peaked during the March quarterly monitoring event, while SP2 peaked in September 2024. SP3 remained relatively stable throughout the year, with a maximum pH of 4.90 recorded in March, September and December, and only a slight decrease in June to 4.80. All monitoring locations except for SP2 and SP3 showed a decreasing trend overall between January and December 2024.

**Table 7.4 Groundwater Quality – pH**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Minimum/Maximum (pH)	4.5/8.5	4.5/8.5	4.5/8.5	4.5/8.5	4.5/8.5	4.5/8.5
Recorded pH (18/03/2024)	5.40	5.20	4.90	5.80	5.40	5.30
Recorded pH (07/06/2024)	5.20	5.20	4.80	5.20	5.20	5.30
Recorded pH (02/09/2024)	5.30	5.30	4.90	5.60	5.30	5.30
Recorded pH (16/12/2024)	5.10	5.20	4.90	5.60	5.30	5.20

**7.2.2.5 Groundwater Electrical Conductivity**

Monitoring point BL158 recorded electrical conductivity (EC) levels above the trigger value during the March and June 2024 monitoring rounds, measuring 678 µS/cm and 603 µS/cm, respectively. EC levels recorded during September and December 2024 returned below the trigger value of 600 µS/cm. **Table 7.5** shows the recorded EC levels for the reporting period. The groundwater EC results recorded since 2017 are shown graphically in **Appendix 3**.

Monitoring point BL158 showed a decreasing trend in EC across the reporting period and were below the historical maximum recorded of 728 µS/cm. While quarry activities were near BL158, the extraction area surveys show that extraction was being undertaken in accordance with the approved MEDM.

It is also noted that, although not above the trigger value, monitoring points SP1 and SP4 recorded a spike in EC levels in June 2024 of 287 µS/cm and 448 µS/cm, respectively, following above average rainfall in May 2024. All EC results recorded over the reporting period were below the historical maximums for each monitoring site.

**Table 7.5 Groundwater Quality – Electrical Conductivity (µS/cm)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (µS/cm)	600	600	600	600	600	600
Recorded EC (18/03/2024)	137	131	290	221	102	678
Recorded EC (07/06/2024)	287	111	280	448	120	603
Recorded EC (02/09/2024)	194	99	302	219	127	599
Recorded EC (16/12/2024)	203	93	265	228	127	527

Note: Red values indicate result above trigger values.

**7.2.2.6 Groundwater Turbidity**

The turbidity results for all monitoring points during the reporting period remained below the specified trigger value, with the exception of SP1. The turbidity recorded at SP1 in March 2024 measured 80.0 NTU, exceeding the trigger value maximum of 50.0 NTU. **Table 7.6** shows the recorded NTU groundwater levels for the reporting period.

The groundwater turbidity results since 2017 are shown graphically in **Appendix 3**. Monitoring results for the reporting period remained below the historical maximum with the exception of SP1. Turbidity generally

increased as groundwater levels declined in response to below average rainfall. Turbidity declined in all monitoring sites following above average rainfall in May 2024 and a corresponding increase in groundwater levels.

**Table 7.6 Groundwater Quality – Turbidity (NTU)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (NTU)	50	50	50	50	50	50
Recorded Turbidity (18/03/2024)	80.0	28.0	1.7	50.0*	35.0	1.3
Recorded Turbidity (07/06/2024)	4.2	8.8	2.0	7.1	13.0	13.0
Recorded Turbidity (02/09/2024)	9.3	6.0	15.0	7.0	11.0	10.0
Recorded Turbidity (16/12/2024)	1.8	17	1.9	2.9	20	8.1

Note: **Red** values indicate exceedance of trigger values

\*This is not considered an exceedance of the trigger value maximum as SP4 result is not above the trigger value maximum.

### 7.2.2.7 Groundwater Arsenic

Arsenic concentrations for all monitoring points were recorded below the SWMP trigger value of 0.01 mg/L and are generally consistent with historical values. Over 2024, concentrations were only detected above the laboratory limit of reporting (LoR) of 0.001 mg/L at monitoring sites SP4, SP5 and BL158.

Concentrations fluctuated in SP5 with a spike recorded of 0.006 mg/L in June 2024. **Table 7.7** shows the recorded groundwater arsenic concentrations over the reporting period.

The concentration of arsenic in groundwater recorded since 2017 is shown graphically in **Appendix 3**. Since 2017, arsenic concentrations have generally been well below the trigger value of 0.01 mg/L). However, SP4 and SP5 have historically shown spikes in arsenic concentrations with SP4 exceeding trigger values in 2020, and SP5 exceeding trigger values in 2022.

**Table 7.7 Groundwater Quality – Arsenic (mg/L)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (mg/L)	0.01	0.01	0.01	0.01	0.01	0.01
Recorded Arsenic (18/03/2024)	<0.001	<0.001	<0.001	<0.001	<b>0.002</b>	<0.001
Recorded Arsenic (07/06/2024)	<0.001	<0.001	<0.001	<0.001	<b>0.006</b>	<0.001
Recorded Arsenic (02/09/2024)	<0.001	<0.001	<0.001	<0.001	<b>0.002</b>	<0.001
Recorded Arsenic (16/12/2024)	<0.001	<0.001	<0.001	<0.001	<b>0.002</b>	<0.001

Note: **Bold** values indicate values greater than laboratory LoR (0.001 mg/L) (i.e. limit of detection).

### 7.2.2.8 Groundwater Manganese

Manganese results for all monitoring points were below the trigger level during the reporting period. **Table 7.8** shows the recorded manganese groundwater levels for the reporting period.

The groundwater manganese results since 2017 are shown graphically in **Appendix 3**. Manganese concentrations in all monitoring points, but more significantly in SP1, SP4 and SP5, showed an increasing

trend during the period of below average rainfall, before declining again from June 2024 following the high rainfall event in May 2024. The manganese results recorded during the reporting period are generally consistent with historical observations.

**Table 7.8 Groundwater Quality – Manganese (mg/L)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (mg/L)	0.1	0.1	0.1	0.1	0.1	0.1
Recorded Manganese (18/03/2024)	<b>0.03</b>	<b>0.022</b>	<b>0.010</b>	<b>0.021</b>	<b>0.018</b>	<b>0.018</b>
Recorded Manganese (07/06/2024)	<b>0.037</b>	<b>0.015</b>	<b>0.005</b>	<b>0.047</b>	<b>0.034</b>	<b>0.017</b>
Recorded Manganese (02/09/2024)	<b>0.01</b>	<b>0.01</b>	<b>0.005</b>	<b>0.01</b>	<b>0.020</b>	<b>0.010</b>
Recorded Manganese (16/12/2023)	<b>0.023</b>	<b>0.014</b>	<b>0.005</b>	<b>0.001</b>	<b>0.013</b>	<b>0.01</b>

Note: **Bold** values indicate values greater than laboratory LoR (0.001 mg/L) (i.e. limit of detection).

### 7.2.2.9 Groundwater Iron

**Table 7.9** shows the concentration of iron within groundwater over the reporting period. During the reporting period, iron concentrations for all monitoring points were below the trigger level of 5.7 mg/L, with the exception of SP4 in the June quarterly groundwater monitoring event, which recorded 9.70 mg/L. Iron concentrations recorded at SP4 have historically been highly variable, fluctuating between 0.27 mg/L to 34 mg/L, as shown in the graph in **Appendix 3**.

The iron concentration results since 2017 are shown graphically in **Appendix 3**, which shows the highly variable and fluctuating nature of iron concentrations at SP4, most notably since December 2017. This fluctuating trend continued throughout the reporting period, and has returned to below the trigger value by September 2024.

**Table 7.9 Groundwater Quality – Iron (mg/L)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (mg/L)	5.7	5.7	5.7	5.7	5.7	5.7
Recorded Iron (18/03/2024)	<b>0.01</b>	<b>1.00</b>	<b>0.14</b>	<b>1.10</b>	<b>0.76</b>	<b>1.40</b>
Recorded Iron (07/06/2024)	<b>0.04</b>	<b>0.92</b>	<b>0.12</b>	<b>9.70</b>	<b>1.20</b>	<b>1.50</b>
Recorded Iron (02/09/2024)	<b>0.02</b>	<b>0.79</b>	<b>0.18</b>	<b>1.10</b>	<b>0.67</b>	<b>1.30</b>
Recorded Iron (16/12/2024)	<b>0.02</b>	<b>0.73</b>	<b>0.15</b>	<b>0.47</b>	<b>0.48</b>	<b>0.98</b>

Note: **Red** values indicate exceedance of trigger values

**Bold** values indicate values greater than laboratory LoR (0.001 mg/L) (i.e. limit of detection).

### 7.2.2.10 Groundwater Chromium

Chromium concentrations in groundwater for all monitoring points were below the trigger value during the reporting period. **Table 7.10** shows the recorded chromium concentrations recorded over the reporting period.

The chromium results since 2017 are shown graphically in **Appendix 3**. The chromium results recorded during the reporting period are generally consistent with historical observations.

**Table 7.10 Groundwater Quality – Chromium (mg/L)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (mg/L)	0.0906	0.0906	0.0906	0.0906	0.0906	0.0906
Recorded Chromium (18/03/2024)	<0.001	<b>0.002</b>	<0.001	0.001	<0.001	<b>0.003</b>
Recorded Chromium (07/06/2024)	<0.001	<b>0.002</b>	<0.001	<b>0.002</b>	<0.001	<b>0.002</b>
Recorded Chromium (02/09/2024)	<0.001	<b>0.002</b>	<b>0.002</b>	<0.001	<0.001	<b>0.002</b>
Recorded Chromium (16/12/2024)	<0.001	<b>0.004</b>	<b>0.002</b>	<b>0.002</b>	<0.001	<b>0.002</b>

Note: **Bold** values indicate values greater than laboratory LoR (0.001 mg/L) (i.e. limit of detection).

### 7.2.2.11 Groundwater Cobalt

Cobalt concentrations in groundwater for all monitoring points were below the trigger value during the reporting period. **Table 7.11** shows the recorded cobalt concentrations over the reporting period.

The cobalt results since 2017 are shown graphically in **Appendix 3**. The cobalt results recorded during the reporting period are generally consistent with historical observations.

**Table 7.11 Groundwater Quality – Cobalt (mg/L)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (mg/L)	0.15	0.15	0.15	0.15	0.15	0.15
Recorded Cobalt (18/03/2024)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Recorded Cobalt (07/06/2024)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Recorded Cobalt (02/09/2024)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Recorded Cobalt (16/12/2024)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Note: **Bold** values indicate values greater than laboratory LoR (0.001 mg/L) (i.e. limit of detection).

### 7.2.2.12 Groundwater Zinc

Zinc concentrations in groundwater for all monitoring points were below the trigger level during the reporting period. **Table 7.12** shows the recorded zinc concentrations over the reporting period.

The zinc results since 2017 are shown graphically in **Appendix 3**. The zinc results recorded during the reporting period are generally consistent with historical observations.

**Table 7.12 Groundwater Quality – Zinc (mg/L)**

Sample Date	Groundwater Monitoring Bore					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum (mg/L)	3	3	3	3	3	3
Recorded Zinc (18/03/2024)	<b>0.140</b>	<b>0.054</b>	<b>0.053</b>	<b>0.020</b>	<b>0.055</b>	<b>0.028</b>
Recorded Zinc (07/06/2024)	<b>0.049</b>	<b>0.037</b>	<b>0.032</b>	<b>0.030</b>	<b>0.030</b>	<b>0.032</b>
Recorded Zinc (02/09/2024)	<b>0.028</b>	<b>0.028</b>	<b>0.023</b>	<b>0.024</b>	<b>0.026</b>	<b>0.030</b>
Recorded Zinc (16/12/2024)	<b>0.052</b>	<b>0.058</b>	<b>0.040</b>	<b>0.031</b>	<b>0.029</b>	<b>0.024</b>

Note: **Bold** values indicate values greater than laboratory LoR (0.001 mg/L) (i.e. limit of detection).

### 7.2.3 Groundwater Model Validation

The history of MEDM updates undertaken on site has been included in the respective Annual Reviews and there have been a series of reviews undertaken in recent years. The current groundwater level review was undertaken by GHD on 29 August 2023 to address condition U1.2c of the EPL (GHD, 2023c). As a result of the model update, predicted maximum groundwater levels did not change, and there was no update to the MEDM compared to the previous model update in 2022. The model update was provided to the EPA on 21 December 2023.

Following completion of the 2024 Mackas Sand Project Independent Environmental Audit (IEA) (JBA, 2024) on 27 June 2024 and in accordance with Schedule 3 Condition 3 of PA 08\_0142 (MOD 2), a review and subsequent update of the Maximum Extraction Depth Map (MEDM) was required to be undertaken. As detailed in the response to the recommendations of the 2024 IEA, Mackas Sand proposed not to review the MEDM until 3 years after the IEA, noting the Groundwater Model and MEDM was updated and submitted to EPA on 21 December 2023, and to DPHI on 28 March 2024 via the 2023 Annual Review. This was supported by the groundwater model and MEDM compliance surveys not identifying any non-compliances during the IEA period.

On the 14 November 2024 the EPA advised Mackas Sand the groundwater model and MEDM update satisfied Condition U1.1 and U1.2 of EPL 13218 and requested Mackas Sand to incorporate additional actions into the next groundwater model update prior to June 2027. On the 6 December 2024 the EPA provided a draft notice of variation of EPL 13218 which removed satisfied Condition U1.1 and U1.2 and included a special condition that requires incorporation of some quantitative metrics to objectively evaluate the performance of the updated groundwater model against observed groundwater levels.

A licence variation of EPL 13218 was issued by the EPA on 18 February 2025.

In response to the request to delay the IEA-related update of the MEDM, and following the EPA review of the groundwater model and MEDM update, DPHI acknowledged to defer the subsequent update of the MEDM and requested Mackas Sand to update the approved Mackas Sand SWMP (Umwelt, 2021b) to include the updated MEDM, as reviewed by EPA. The approved SWMP (Umwelt, 2021b) is currently being revised by Umwelt on behalf of Mackas Sand and a draft version of the management plan is anticipated to be submitted to EPA and DPHI for comment in Q2 2025.

## 7.3 Proposed Improvement or Actions Next Reporting Period

In the next reporting period, Mackas Sand will undertake the following:

- Review the requirements from the updated EPL 13218 licence variation, specifically the requirements of the updated special condition.
- Update of the existing approved Mackas Sand Soil and Water Management Plan (Umwelt, 2021b) to include the updated MEDM.

A report on the review and calibration of the groundwater model and updated MEDM is not required to be completed until 2 July 2027 in accordance with the EPL 13218 variation (**Section 7.2.3**).

# 8.0 Rehabilitation

## 8.1 Rehabilitation of Disturbed Land

In accordance with Schedule 3, Condition 24 of PA 08\_0142 (MOD 2) progressive rehabilitation of disturbed area at Lot 220 is to be undertaken in a manner that is generally consistent with the final landform in the EA, in alignment with statutory conditions and requirements within management plans.

### 8.1.1 Lot 218

Rehabilitation requirements at Lot 218 include the establishment of a vegetative bund on the northern edge of the western extraction area as the site is governed by the natural movement of sand into the extraction area.

As current activities occurred along the extraction boundary on the northern side of Lot 218 during 2024, the bund has not yet been constructed and vegetated. The objective of the bund is to provide a physical barrier between the mobile sand and native vegetation on the landward side of the mobile dunes to the north.

### 8.1.2 Lot 220

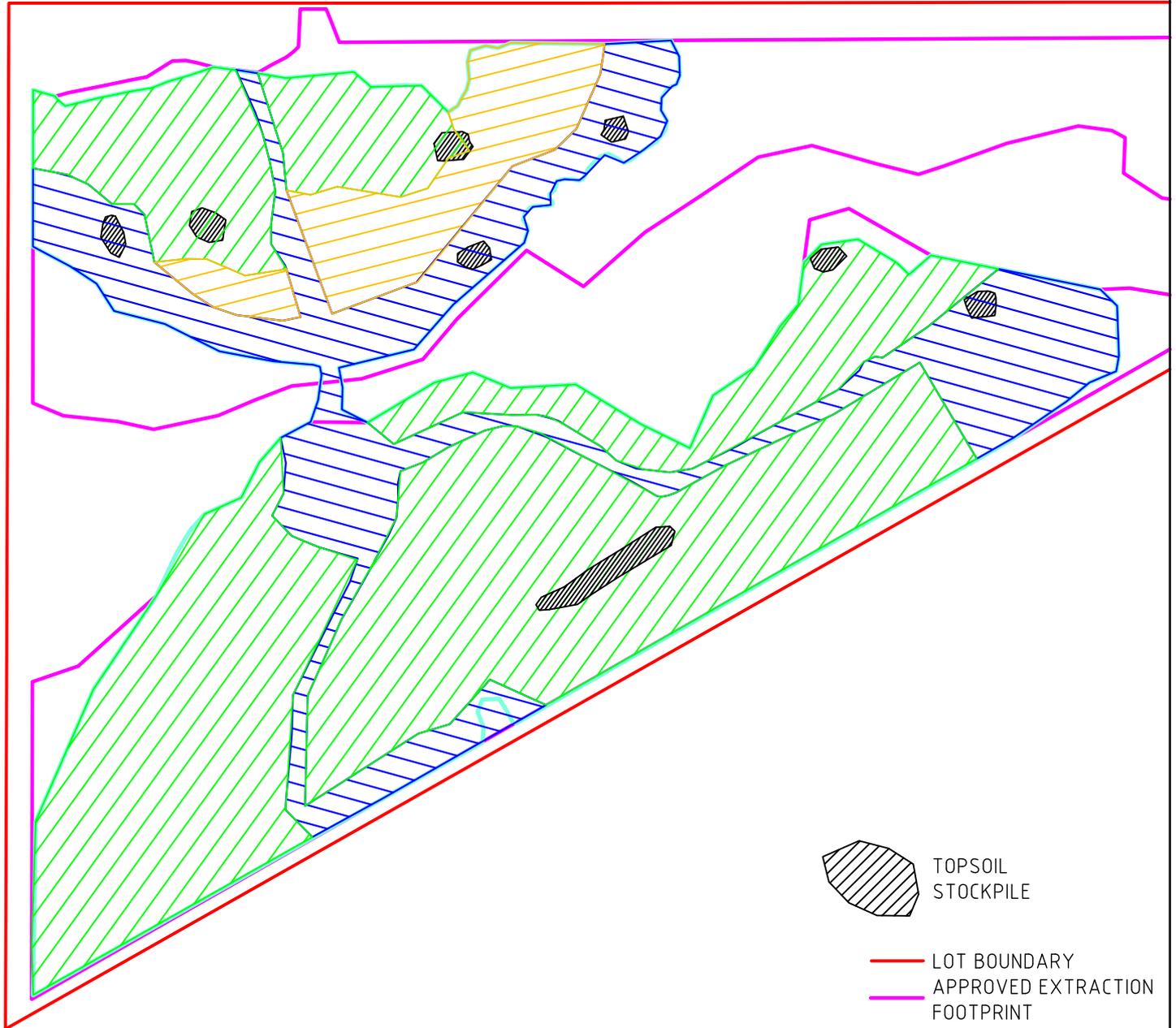
Rehabilitation at Lot 220 is to be undertaken progressively as sand extraction and operating space on the active quarry floor permits.

Rehabilitation activities in Lot 220 during the reporting period included regular inspections of revegetation progress, including reviewing for evidence of feral animals and weeds. Passive rehabilitation occurred in Lot 220 in the form of wind-blown seeds and the migration of sand and/ or flora across the area.

Mackas Sand has scheduled the planting of additional tube stock during 2025 as part of the next rehabilitation works program. **Table 8.1** and **Figure 8.1** show the status of rehabilitation at Lot 220. **Figure 8.1** shows rehabilitation of Lot 220 as of December 2023. As no additional land was undergoing rehabilitation in Lot 220 during 2024, this figure is still indicative of the current rehabilitation status of Lot 220.

**Table 8.1 Summary of Rehabilitation Status at Mackas Sand (Lot 220)**

	2023 Report Period (ha)	2024 Report Period (ha)	2025 Report Period (ha) (forecast)
Total Mine Footprint	36.2	36.2	36.2
Total Active Disturbance	9.3	9.3	7.3
Land being prepared for rehabilitation	3.0	3.0	2.5
Land under active rehabilitation	23.9	23.9	26.4
Completed Rehabilitation	0	0	0



	AREA DESCRIPTION	2022 REPORT PERIOD (ha)
	TOTAL MINE FOOTPRINT	36.2
	TOTAL ACTIVE DISTURBANCE	9.3
	LAND BEING PREPARED FOR REHABILITATION	3.0
	LAND UNDER ACTIVE REHABILITATION	23.9
	COMPLETED REHABILITATION	0.0

SITE: <b>LOT 220 DP 1049608</b>		<b>1</b>		<b>0014</b>	<b>31/12/2023</b>
		DRAWING NO.		PROJECT NO.	DATE.
TITLE: <b>SITE REHABILITATION PLAN 31/12/2023</b>		<b>NOT TO SCALE</b>	<b>CEJ</b>	<b>CEJ</b>	<b>A</b>
		SCALE AT A4.	DRAWN.	CHECKED.	REVISION.

## Annual Rehabilitation Inspection

Rehabilitation areas at Mackas Sand range in age from approximately 12 months to eight years with the status of the rehabilitation reviewed during the 2024 Independent Environmental Audit (IEA) (JBA, 2024). It was noted by the auditor that rehabilitation efforts within Lot 220 were generally consistent with the rehabilitation objectives associated with PA 08\_0142 (as modified). Positive trends in species diversity and density were identified as well as ongoing weed management activities, installation of beehives to increase chances of fertile seeds, stag trees installed to encourage wildlife, seed collection from Lot 220 for growth in an onsite nursery (JBA, 2024). It was also noted that although no large-scale progressive rehabilitation efforts have been made in Lot 218 at the time of audit as a result of ongoing sand extraction operations, vegetation was being established on the non-active face of the quarrying corridor and collected debris from sand extraction was placed to stabilise slopes of the non-active face (JBA, 2024). The IEA report recommended Mackas Sand document the completion of rehabilitation management actions raised in the annual rehabilitation inspection reports.

Mackas Sand have identified rehabilitation actions to be undertaken in 2025 in **Section 8.0**. An update of any outstanding rehabilitation actions proposed in previous rehabilitation inspection reports are provided in the 2024 rehabilitation inspection report.

As noted within the LMP (Umwelt, 2021a), the annual rehabilitation inspection utilises qualitative monitoring practices during the early stages of rehabilitation and typically until vegetation within the rehabilitation zone has reached a level of maturity where a quantitative assessment is of benefit. As a result, qualitative monitoring practices continue to be undertaken across all rehabilitation areas at Mackas Sand due to the level of maturity of the rehabilitation.

The annual rehabilitation inspection of Lot 220 was undertaken by two Umwelt environmental scientists on 10 October 2024. The inspection consisted of a walkover of four key areas within Lot 220 (**Figure 8.2**). The annual inspection is undertaken to track current rehabilitation progress and to inform any rehabilitation management actions required onsite. The inspection looks to identify the presence of exotic flora and any signs of exotic fauna, the presence and the emergence of native flora. A full floristic assessment was not undertaken as part of the assessment.

Key observations made during the 2024 rehabilitation inspection included:

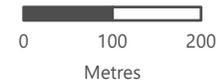
- The need to continue ongoing management to prevent a long-term seedbank of undesirable weed species establishing in the area. Weed control should prioritise a variety of invasive species observed during the rehabilitation inspection, particularly Stinking roger (*Tagetes minuta*), Bitou bush (*Chrysanthemoides monilifera*), Paddy melon (*Cucumis myriocarpus*), Spiny burr (*Acanthospermum australe*), Red natal grass (*Melinis repens*), Lantana (*Lantana cambara*) and Asparagus fern (*Asparagus virgatus*).
- Rehabilitation in Lot 220 is progressing well, with natural vegetation establishment, including native groundcover and mid-storey species naturally colonising (e.g. Flannel flower (*Actinotus helianthi*)).
- While recent tube stock planting shows good survival rates, Eucalyptus and Acacia species are sparse and additional infill planting is recommended to meet density targets outlined in the LMP (Umwelt, 2021a). A plan to undertake infill tubestock planting should be developed by Mackas Sand to increase the density of tube stock across Lot 220.
- The need to remove redundant infrastructure including steel pipe, concrete blocks, conveyor belt and agricultural pipe located in the rehabilitation areas.

D:\UMWELT (AUSTRALIA) PTY LTD\2023\10 - GDA2020 Project\2023\10 - Maitland\Info Maps - 2023\10 - 0100 - Rehabilitation Inspection Areas.mxd



**FIGURE 2.1**  
**Lot 220 Rehabilitation and Inspection Areas**

- Legend**
- Lot 220 LPI Boundary
  - Lot 220 Approved Operational Area
  - Rehabilitation Inspection Areas



Scale 1:8,500 at A4  
GDA2020 MGA Zone 56

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## 8.2 Rehabilitation Trials and Research

No rehabilitation trials were undertaken during the report period.

## 8.3 Rehabilitation Bond

Following the completion of the 2024 IEA (JBA, 2024), Mackas Sand reviewed and revised the rehabilitation bond associated with Lot 218 and Lot 220 in accordance with Schedule 3 Condition 28 of PA 08\_0142 (MOD 2). The reviewed and revised rehabilitation bond was submitted to DPPI for approval on 22 November 2024. The revised rehabilitation bond was approved by DPPI on 19 March 2025. Mackas Sand will progress the issuing of the revised rehabilitation bond and will report the progress in the 2025 Annual Review.

## 8.4 2023 Annual Review Rehabilitation Recommendations Progress

The progress on the 2023 Mackas Sand Annual Review rehabilitation recommendations is presented in **Table 8.2**.

**Table 8.2 2023 Mackas Sand Annual Review Rehabilitation Recommendations**

Action	Status	Comment
Re-shape existing sand stockpiles within the site to gentler and more natural looking slopes, or flatten out completely	Ongoing	Findings of the 2024 walkover inspection indicated stockpiles across Lot 220 have decreased in number. Existing stockpiles will be further reduced as Mackas Sand undertake additional topsoiling activities.
Neatly blend in transition zones at the edge of quarry with existing undisturbed vegetation areas	Ongoing	Blending of transition zones are to be undertaken in future reporting periods as part of rehabilitation activities to establish final landform of Lot 220.
Remove the gravel stockpile and nearby pad	Ongoing	Gravel stockpile and nearby pad has decreased in size as observed during the 2024 walkover inspection report.
Remove all redundant infrastructure including concrete blocks, pipework, conveyor belts and signposts	Ongoing	Redundant infrastructure will be removed as part of future rehabilitation activities.
Prevent any unauthorised access to the rehabilitation areas (except when authorised on designated tracks)	Ongoing	Unauthorised access tracks will be reshaped as part of rehabilitation activities to reshape outside batters, where required.
Undertake a regular sitewide weed management program with specialist weed management contractors	Ongoing	Weed management works are proposed to be undertaken during the 2025 reporting period.
Distribute existing stockpiled salvaged habitat timber features throughout the rehabilitation area	Ongoing	Some stockpiled salvaged habitat timber was distributed during the reporting period. Further distributing will occur as part of future rehabilitation activities.
Source local seed for propagation and undertake tube stock infill planting at higher densities than previously undertaken	Ongoing	Further tube stock infill planting is proposed to be undertaken during the 2025 reporting period.
Consider the need to undertake direct seeding and follow-up infill planting of rehabilitated areas.	Ongoing	Direct seeding and infill tube stock planting is proposed for the next reporting period. Mackas Sand will assess areas requiring infill planting and this will be reported in the next Annual Review.

## 8.5 Proposed Improvements or Actions for the Next Reporting Period

Rehabilitation actions proposed to be undertaken by Mackas Sand during the 2025 reporting period are presented in **Table 8.3**.

**Table 8.3 Recommended Management Actions for Ongoing Rehabilitation**

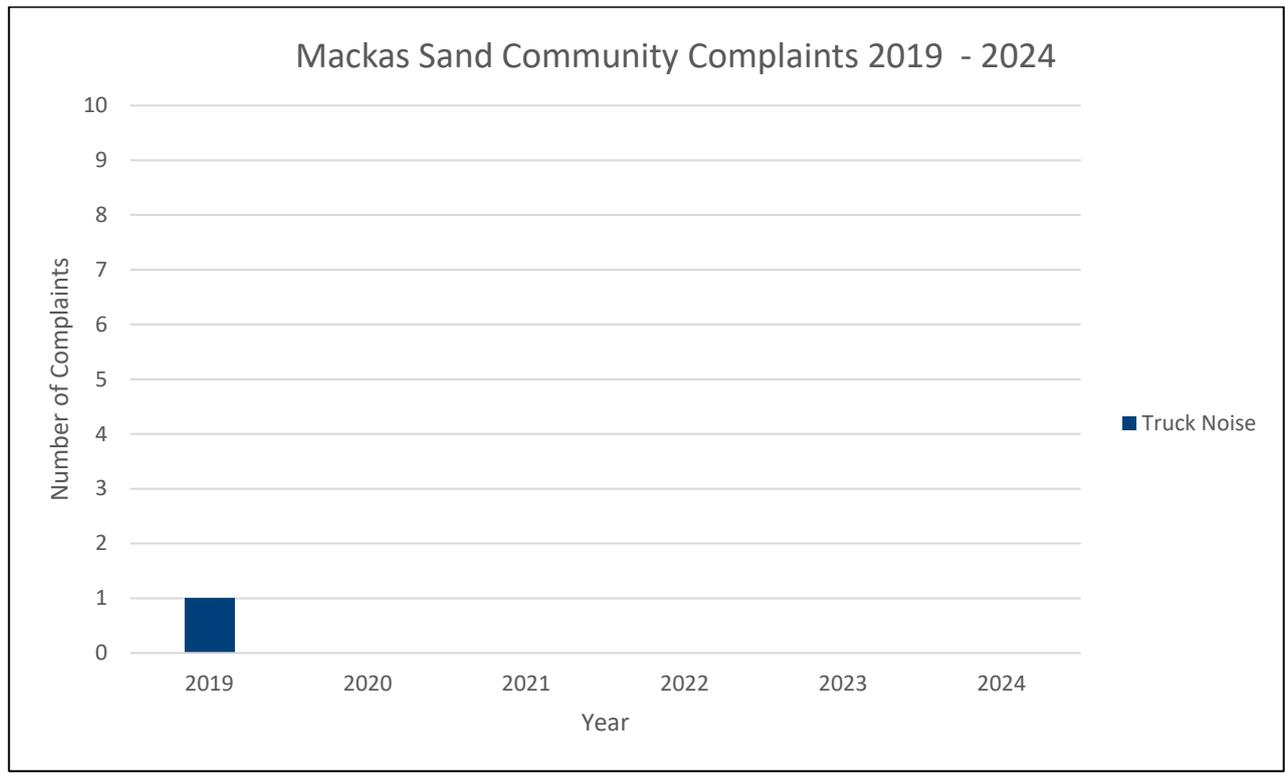
Recommendation	Recommendation to be undertaken in Inspection Area (Yes / No)			
	Inspection Area 1*	Inspection Area 2*	Inspection Area 3*	Inspection Area 4*
Re-shape existing sand stockpiles within the site to gentler and more natural looking slopes, or flatten out completely	Yes	Yes	Yes	No
Neatly blend in transition zones at the edge of quarry with existing undisturbed vegetation areas	Yes	No	Yes	Yes
Remove the gravel stockpile and nearby pad	No	No	No	Yes
Remove all redundant infrastructure including concrete blocks, pipework, conveyor belts and signposts	Yes	Yes	No	Yes
Prevent any unauthorised access to the rehabilitation areas (except when authorised on designated tracks)	No	No	No	Yes
Undertake a regular sitewide weed management program with specialist weed management contractors, setting priorities based on weed species with the potential to impact on long term rehabilitation outcomes. The following species should be considered the major species targeted for control: <ul style="list-style-type: none"> <li>Asparagus fern (<i>Asparagus virgatus</i>);</li> <li>Bitou bush (<i>Chrysanthemoides monilifera</i>);</li> <li>Lantana (<i>Lantana cambara</i>);</li> <li>Pampas grass (<i>Cortaderia sp.</i>);</li> <li>Paddy melon (<i>Cucumis myriocarpus</i>);</li> <li>Stinking Roger (<i>Tagetes minuta</i>);</li> <li>Spiny burr (<i>Acanthospermum australe</i>); and</li> <li>Introduced grasses such as red natal grass (<i>Melinis repens</i>)</li> </ul>	Yes	Yes	Yes	Yes
Distribute existing stockpiled salvaged habitat timber features throughout the rehabilitation area	No	No	Yes	No
Source local seed for propagation and undertake tube stock infill planting at higher densities than previously undertaken	Yes	Yes	Yes	Yes
Consider the need to undertake direct seeding and follow-up infill planting of rehabilitated areas	Yes	Yes	Yes	Yes

# 9.0 Community

## 9.1 Community Complaints

Mackas Sand did not receive any community complaints during the 2024 reporting period.

A summary of community complaints received for the last five reporting periods is displayed in **Figure 9.1**. It is noted that 1 community complaint has been received relating to truck noise between 2019 – 2024, but it did not occur during the 2024 reporting period.



**Figure 9.1 Summary of Mackas Sand Community Complaints 2019 - 2024**

## 9.2 Community Consultative Committee

The 2023 Community Consultative Committee (CCC) meeting held on 19 July 2023 unanimously agreed the chairperson seek DPHI approval to suspend the committee until there is activity that necessitates another meeting. As a result, Macka’s Sand representative agreed to advise members of any future activities or proposals, and keep members informed on Lot 218.

The Mackas CCC 2023 Annual Report was prepared by the CCC Chairperson and provided to Mackas Sand on 31 January 2024. The report confirmed the disbandment of the CCC with DPHI subsequently agreeing to suspend the CCC in August 2023.

No CCC meeting was undertaken during the 2024 reporting period.

## 9.3 Community Engagement

During the reporting period, Mackas Sand contributed to charities and local community events including:

- \$520 donation to the Ned Brockman Uncomfortable Challenge
- \$585 donation to the McFayden Family.

Additionally, Mackas Sand provides royalties to the Worimi Local Aboriginal Land Council (WLALC) which contributes to WLALC community programs and the WLALC education and training program.

# 10.0 Independent Audit

After being endorsed by the DPPI on 19 March 2024, Dorian Walsh (lead auditor, James Bailey and Associates), Travis Edwards (assistant auditor), Clayton Edwards (Rehabilitation Specialist), Patrick McEvoy (Biodiversity Specialist), and Bryce McKay (Groundwater Specialist) were engaged by Mackas Sand to undertake an Independent Environmental Audit (IEA) of the Mackas Sand Project in 2024 for the operational period from 5 June 2021 to 30 April 2024 (JBA, 2024).

The IEA report was finalised, submitted, and approved by DPPI during the 2024 reporting period.

A number of administrative and low-risk non-compliances and recommendations were identified during the IEA period, refer to **Table 10.1**.

As of December 2024, three (3) Audit recommendation actions remain in progress (**Table 10.1**).

The next IEA is scheduled to be undertaken post April 2027.

**Table 10.1 Auditor Non-compliances and Recommendations**

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
PA 08_0142				
NC-01	<p><i>Schedule 3, Condition 3</i></p> <p>Within 3 months of the completion of the Independent Environmental Audit (see condition 5 of schedule 5), the Proponent shall review and update as required the Maximum Extraction Depth Map for the project to the satisfaction of the Secretary.</p>	<p>The Maximum Extraction Depth Map (MEDM) for the Project was not reviewed within three months of completion of the previous IEA. Mackas Sand submitted an extension to DPHI on 22/12/22 to complete an update of the MEDM by 3/02/23.</p> <p><b>It is recommended that a review of the Project MEDM is completed within three months of this IEA and submitted to DPHI for approval.</b></p>	<p>As defined within 2023 Annual Review, Mackas Sand notes revised Groundwater Model and MEDM update was submitted to EPA on 21st December 2023, and to DPHI on 28 March 2024 via 2023 Annual Review. Mackas Sand has not received feedback in regard to Model submitted. The Groundwater Model update and MEDM compliance surveys have not identified any non-compliances during the audit period. The floor of the workings is compliant with the MEDM mapping.</p> <p>As there are no non-compliances identified by the model review or the quarterly compliance mapping, Mackas Sand propose not to review MEDM until December 2024. Quarterly operational floor compliance surveying will continue throughout 2024.</p>	<p><b>Completed.</b></p> <p>Following EPA’s confirmation of the current MEDM update in November 2024, DPHI agreed to defer the subsequent review of the MEDM and requested Mackas Sand to update the approved Mackas Sand SWMP (Umwelt, 2021b) to include the updated MEDM reviewed by EPA, refer to <b>Section 7.2.3</b> for further information.</p> <p>Mackas Sand has engaged Umwelt to update the SWMP (Umwelt, 2021b).</p>
NC-02	<p><i>Schedule 3, Condition 4B</i></p> <p>The Proponent shall ensure, for the use of the Alternate access road, that:</p> <p>(a) a speed limit of 40 km/hour is applied and enforced for all vehicles;</p> <p>(b) trucks slowing to use the intersection of the access road and Nelson Bay Road do not use engine or compression braking systems;</p>	<p>Viewed an example of Macka’s Sand and Soil Supplies Transport Log dated 14/12/23 for the period 11/11/12 – 29/11/23, created from site weighbridge data.</p> <p>The log records vehicle details, weights and times in / out of each for each truck movement. BJ (pers comms) confirmed that the log is reviewed on a monthly</p>	<p>Noted.</p> <p><b>Action:</b> Mackas Sand have implemented a register to record monthly truck movement validation. Mackas Sand will review and update, if necessary, the Drivers COC within three months of the submission of the Audit Report to DPHI as per Condition 7 Schedule 5.</p>	<p><b>Completed.</b></p> <p>Mackas Sand have implemented a movement register to record monthly truck movement validation and is updated monthly following monthly validation of truck movements.</p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
	<p>(c) laden truck movements exiting the site do not exceed 14 per hour during the period from 5 am to 6 am, Monday to Friday (except for Public Holidays);</p> <p>(d) laden truck movements exiting the site do not exceed 8 per hour during the period from 6 am to 9 am, Monday to Friday (except for Public Holidays);</p> <p>(e) laden truck movements exiting the site do not exceed 24 per hour during the period from 9 am to 10 pm, Monday to Friday (except for Public Holidays);</p> <p>(f) laden truck movements exiting the site do not exceed 5 per hour between 5 am and 6 am on Saturdays (except for Public Holidays);</p> <p>(g) laden truck movements exiting the site do not exceed 9 per hour between 6 am and 7 am on Saturdays (except for Public Holidays);</p> <p>(h) laden truck movements exiting the site do not exceed 24 per hour between 7 am and 4 pm on Saturdays (except for Public Holidays); and</p> <p>(i) combined laden truck movements exiting from Lots 218 and 220 do not exceed 10 per hour in total on Sundays and Public Holidays.</p> <p>Note: In this condition, “per hour” means within any period of 60 minutes following the change of hour.</p>	<p>basis as a check that vehicle movements are in compliant with PA 08_0142 requirements. Sections 6.10.2.1 and 11.1 of the 2022 AR note that 11 laden trucks (greater than the number approved for the time period under PA 08_0142) were recorded leaving Mackas Sand on 09/11/22. This was identified in an internal review completed on 13/12/22 and the incident was reported via letter lodged on the DPE portal 14/12/22.</p> <p>It is noted that the see Schedule 5, Condition 1 was updated following this incident.</p> <p><b>It is recommended that Mackas Sand continue to implement the actions put in place in response to the November 2022 truck frequency incident, including the validation of truck movement records and regular review of the site induction and Drivers Code of Conduct (COC).</b></p>		<p>The Mackas Sand DCC was reviewed in August 2024 and determined to be current, and a revision of the plan was not necessary.</p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
NC-03	<p><i>Schedule 3, Condition 13</i></p> <p>The Proponent shall prepare an Air Quality Monitoring Program for the project to the satisfaction of the Secretary. This program must:</p> <p>(a) be prepared in consultation with EPA, and be submitted to the Secretary for approval within 3 months of the date of this approval; and</p> <p>(b) include details of how the air quality performance of the project will be monitored, and include a protocol for evaluating compliance with the relevant air quality criteria in this approval. Note: Initially, this program should concentrate on monitoring the dust deposition impacts of the project. However, in time, it may be expanded to include other pollutants. The Proponent shall implement the approved monitoring program as approved from time to time by the Secretary.</p>	<p>Non-compliances with the AQMP were identified by Mackas Sand during the audit period:</p> <ul style="list-style-type: none"> <li>• Table 1.2, Section 1 of the 2022 AR notes that a late air quality monitoring sample for January 2022 depositional dust was taken on 2 February 2022;</li> <li>• It is recommended that air quality monitoring samples are taken within the required sample period outlined in the AQMP;</li> <li>• Table 1.2 Section 1 of the 2023 AR. Air quality monitoring samples for July 2023 were damaged whilst being transported and subsequently, no dust monitoring results were recorded for July 2023. This noncompliance was reported via the DPE portal dated 11/04/24. A courier has subsequently been engaged to transport dust samples from site to the lab for analysis; and</li> <li>• Table 1.2 Section 1 of the 2023 AR. During September 2023, the air quality monitor at EPA point 8 was recorded as damaged and replaced.</li> </ul> <p><b>It is recommended that air quality monitoring samples are taken within the required sample period outlined in the AQMP.</b></p>	<p>Noted.</p> <p>Action: As recorded in the 2024 IEA Report, a courier has been engaged to transport future air quality monitoring samples from the Mackas Sand site to an approved laboratory for analysis. There are no updates to the AQMP in response to the recommendations of the Audit report.</p>	<p><b>Ongoing.</b></p> <p>Due to the proposed monitoring methodology not being appropriate for Mackas Sand operations and impacts on monitoring results from agricultural and other activities outside of Mackas Sand operations, Mackas Sand submitted a revised draft AQMP to the DPHI and EPA on 6 February 2025 for comment. The revised AQMP is currently being reviewed by DPHI.</p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
NC-04	<p><i>Schedule 3, Condition 24</i></p> <p>The Proponent shall progressively rehabilitate the site in a manner that is generally consistent with the final landform in the EA (as reproduced in Appendix 4), to the satisfaction of the Secretary. Note: The Department acknowledges that rehabilitation activities on Lot 218 may be limited given the planned ongoing extraction on this lot. However, the long-term/final landform for Lot 218 must be addressed as part of the Landscape Management Plan (see below).</p>	<p>Viewed examples of Mackas Sand annual Rehabilitation Walkover Inspection Reports completed by Umwelt for 2022 and 2023. The reports document a rapid condition assessment of Lot 220 rehabilitation and provide comments on general performance and recommendations on corrective actions.</p> <p><b>It is recommended that Mackas Sand document the completion of rehabilitation management actions raised in the annual rehabilitation inspection reports.</b></p>	<p>Noted.</p> <p>Mackas Sand has developed an internal register to track completion of actions identified within the Annual Rehabilitation Walkover Inspection Reports. For Annual Reviews completed in future reporting periods, Rehabilitation sections of the Annual Review will include a status update of management actions identified in Annual Rehabilitation Walkover Inspection Reports.</p>	<p><b>Completed.</b></p> <p>Status update of rehabilitation management actions is provided in <b>Section 8.4</b> of this Annual Review.</p>
NC-05	<p><i>Schedule 3, Condition 28A</i></p> <p>The Proponent shall prepare a Biodiversity Offset Strategy for the Biodiversity Offset Area, in consultation with OEH and to the satisfaction of the Secretary. The strategy must include:</p> <p>(a) performance criteria for the offset area;</p> <p>(b) a description of the proposed short-term and longterm management measures for the offset area, including to:</p> <ul style="list-style-type: none"> <li>• protect, conserve and enhance the vegetation within the offset area;</li> <li>• control access to the offset area;</li> <li>• control weeds and feral pests; and</li> </ul> <p>(c) a program to measure and monitor the effectiveness of the Strategy against the performance criteria. The Proponent shall implement the approved strategy as approved from time to time by the Secretary.</p>	<p>Viewed correspondence between Mackas Sand and DPHI during the audit period over the Project Biodiversity Offset Strategy (BOS), including:</p> <ul style="list-style-type: none"> <li>• Letter from Umwelt to DPE seeking guidance of the form of the BOS on 19/08/21 and DPE-BCD response dated 26/08/32;</li> <li>• DPE-BCD letter to Umwelt providing comment on the draft BOS, dated 04/10/22;</li> <li>• Draft BOS dates June 2023;</li> <li>• Revised Draft BOS dated September 2023.</li> </ul> <p><b>It is recommended that Mackas Sand continue to liaise closely with DPHI and NSW DCCCEEW to gain approval for the Project BOS.</b></p>	<p>Noted.</p> <p>Following feedback from the submission of this Response to Audit Recommendations to DPHI, Mackas Sand will submit a correspondence letter to DPHI and NSW DCCEEW requesting responses to the BOS submitted in September 2023 and not yet received.</p>	<p><b>Completed.</b></p> <p>Mackas Sand received feedback from DPHI on 11 January 2024 approving the BOS.</p>
NC-06	<p><i>Schedule 3, Condition 29</i></p>	<p>Viewed July 2016 Aboriginal Cultural Heritage Management Plan (ACHMP) for</p>	<p>Noted.</p>	<p><b>Completed.</b></p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
	<p>The Proponent shall prepare an Aboriginal Cultural Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with OEH and the Aboriginal community, and be submitted to the Secretary for approval prior to the disturbance of any Aboriginal object or site; and</p> <p>(b) include a:</p> <ul style="list-style-type: none"> <li>• detailed salvage program and management plan for all identified Aboriginal sites within the project disturbance area;</li> <li>• detailed description of the measures that would be implemented to protect Aboriginal sites and PAD outside the project disturbance area;</li> <li>• protocol for monitoring operations and vegetation removal on the site;</li> <li>• protocol for undertaking additional archaeological investigation, and where warranted excavation and/or salvage, on: o any identified stabilised soil surfaces on Lot 218 that are proposed to be disturbed; or o any area of the identified PAD on Lot 220 that is proposed to be disturbed;</li> <li>• protocol for monitoring of reject material;</li> <li>• description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the project; and</li> <li>• protocol for the ongoing consultation and involvement of the Aboriginal community in the conservation and management of Aboriginal cultural heritage on the site, including the establishment of a management group comprising Aboriginal</li> </ul>	<p>the Project prepared by Umwelt. The ACHMP includes:</p> <p>(a) Summary of consultation undertaken with the local Aboriginal community (Section 2.1) and Appendix A of the plan;</p> <p>(b) Measures for the protection and salvage of Aboriginal artefacts and for heritage sites outside of the Project disturbance boundary (Section 5.1 – 5.3)</p> <ul style="list-style-type: none"> <li>• Monitoring protocols, including for reject material screened during site operations (Sections 5.7);</li> <li>• Procedures for the discovery of any new heritage sites (Sections 5.8 – 5.13);</li> <li>• Ongoing consultation processes (Sections 5.13 – 5.17). BJ (pers comms) noted that reject material has continued to be screening during the audit period, with no new artefacts identified during the audit period. Viewed R. Mackenzie email to BJ dated 06/06/24, noting that meetings and site inspections by the Aboriginal Heritage Working Group were cancelled during Covid (2020 and 2021). Following this, Worimi LALC have been unavailable to attend site to review collected samples due to heavy workload on other projects.</li> </ul> <p><b>It is recommended that Mackas Sand consult with the Worimi LALC over recommencing inspections of screened material recovered during site operations, in accordance with the ACHMP.</b></p>	<p><b>Action:</b> Mackas Sand have consulted with WLALC in June 2024 on availability to undertake annual inspections of screened material. Mackas Sand will report the outcome of any consultation during the 2024 Annual Review.</p>	<p>A site inspection and meeting were undertaken with WLALC on 5 September 2024. Outcomes of the visit are detailed in <b>Section 6.6.4.</b></p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
	<p>stakeholders and a suitably qualified archaeologist.</p> <p>The Proponent shall implement the approved management plan as approved from time to time by the Secretary.</p>			
NC-07	<p><i>Schedule 3, Condition 30</i></p> <p>The Proponent shall prepare a non-indigenous Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must:</p> <p>(a) be prepared in consultation with the Heritage Branch and Council, and be submitted to the Secretary for approval prior to the disturbance of any heritage item, including the identified tank traps;</p> <p>(b) include:</p> <ul style="list-style-type: none"> <li>• archival recording of the tank traps, in accordance with the requirements and guidelines of the Heritage Branch;</li> <li>• a protocol for the investigation, removal and storage of the tank traps, and for their reinstallation following quarrying operations; and</li> <li>• a description of the measures that would be implemented if any new heritage objects or items are discovered during the project.</li> </ul> <p>The Proponent shall implement the approved management plan as approved from time to time by the Secretary.</p>	<p>Viewed the Non-Indigenous Heritage Management Plan (NIHMP) prepared for the Project by Umwelt, dated July 2016.</p> <p>(a) Consultation records for the 2016 NIHMP are not included in the approved plan.</p> <p><b>It is recommended that records of consultation and approval of the NIHMP are included in the next revision of the document.</b></p>	<p>Noted.</p> <p>The NIHMP was approved by Department of Planning in December 2017.</p> <p><b>Action:</b> Mackas Sand will review and add correspondence to the NIHMP.</p>	<p><b>Ongoing.</b></p> <p>Mackas Sand committed to update the NIHMP by 4 October 2024 following the submission of the 2024 Independent Environmental Audit on 4 July 2024. Mackas Sand is seeking a revised timeframe to update the NIHMP in 2025.</p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
NC-08	<p><i>Schedule 3, Condition 39</i></p> <p>The Proponent shall ensure that the storage, handling, and transport of fuels and dangerous goods are conducted in accordance with the relevant Australian Standards, particularly AS1940 and AS1596, and the Dangerous Goods Code.</p>	<p>No significant volumes of fuels or other potentially hazardous materials were observed to be stored in pit during the site inspection. A bunded refuelling tank for Project equipment has been set up outside of the Lot 218 operational area, however evidence was not available to confirm that the tank complies with the relevant AS.</p> <p><b>It is recommended that the existing refuelling tank is decommissioned and removed from site as soon as possible once the replacement tank is in operation.</b></p>	<p>Noted.</p> <p><b>Action:</b> As recorded in 2024 IEA report Mackas Sand have acquired a replacement 33,000 L fuel tank manufactured in accordance with AS 1940-2017. Replacement tank will be installed Q3 2024.</p>	<p><b>Completed.</b></p> <p>Mackas Sand decommissioned the existing refuelling tank adjacent to the Lot 218 weighbridge and installed a replacement 33,000 L fuel tank during the reporting period.</p>
NC-09	<p><i>Schedule 3, Condition 42</i></p> <p>The Proponent shall:</p> <p>(a) provide annual production data to the DRE using the standard form for that purpose; and</p> <p>(b) include a copy of this data in the Annual Review.</p>	<p>(a) Viewed examples of Extractive Materials Returns for Lot 218 (22/09/21) and Lot 220 (27/08/21) lodged with the Resources Regulator. BJ (pers comms) confirmed that subsequent data was lodged on the RR portal.</p> <p>(b) Annual production data is reported in Project ARs (see Schedule 2, Condition 6 above).</p> <p><b>It is recommended that Mackas Sand retain evidence of annual production data being lodged on the Resources Regulatory portal.</b></p>	<p>Noted.</p> <p><b>Action:</b> Mackas Sand will keep a register of annual production data being lodged on the Resources Regulatory portal.</p>	<p><b>Completed.</b></p> <p>Mackas Sand has developed a register to record annual production data being lodged on the Resources Regulatory portal.</p>

Referenced ID	Condition ID and Text	Audit Finding/ Recommendation	Mackas Sand Response	Action Status
NC-10	<p><i>Schedule 5, Condition 10</i></p> <p>During the project, the Proponent shall:</p> <p>(a) make a summary of monitoring results required under this approval publicly available on its website and at the site; and</p> <p>(b) update these results on a regular basis (at least every 3 months).</p>	<p>Air quality and groundwater monitoring reports from Q4 2023 were not available on the Project website at the time of audit.</p> <p><b>It is recommended that Mackas Sand regularly review the Project website to ensure it includes the document required to be published under Schedule 5, Conditions 9 and 10.</b></p>	<p>Noted.</p> <p><b>Action:</b> Mackas Sand will upload documents to the project website as required.</p>	<p><b>Completed.</b></p> <p>Mackas Sand uploads relevant documents to the Mackas Sand website when required.</p>
NC-11	<p><i>SoC 1.3.3 and SoC 1.3.5</i></p> <p>The Aboriginal Cultural Heritage Management Group will conduct a monitoring visit to the Lot 218 proposal area on a monthly basis for the first 12 months of operation, with subsequent inspection intervals to be determined as part of the ACHMP. A sample of reject material from the screening operations on Lot 220 will be taken each day, where sufficient material is present. The samples will be provided to the Aboriginal Cultural Heritage Management Group on a monthly basis.</p>	<p>Non-compliances against the conditions of PA 08_0142 were noted during the audit period. See audit finding of Schedule 3, Condition 29.</p> <p><b>It is recommended that Mackas Sand consult with the Worimi LALC over recommencing inspections of screened material recovered during site operations, in accordance with the ACHMP.</b></p>	<p>Noted.</p> <p>Mackas have consulted with Worimi during June 2024 regarding recommencing inspections of recovered material.</p> <p><b>Action:</b> Mackas Sand will implement the actions identified for Condition 29 Schedule 3 of this Action Plan.</p>	<p><b>Completed.</b></p> <p>A site inspection and meeting were undertaken with WLALC on 5 September 2024. Outcomes of the visit are detailed in <b>Section 6.5.4.</b></p>
NC-12	<p><i>SoC 1.10.1</i></p> <p>High visibility fencing with appropriate set back from the extraction face and signage will be erected on the seaward side of the Lot 218 operational area.</p>	<p>High visibility fencing around extraction areas within Lot 218 was not in place at the time of audit.</p> <p><b>It is recommended that Mackas Sand seek to formalise the arrangement for not installing high visibility fencing and signage on the seaward side of the Lot 218 extraction face, in consultation with the landholder.</b></p>	<p>Noted.</p> <p><b>Action:</b> Mackas Sand will consult with landholder (Worimi LALC) to formalise and retain evidence of landholder request to not install high-visibility fencing by December 2024.</p>	<p><b>Ongoing.</b></p> <p>Ongoing consultation is being undertaken with WLALC to formalise evidence of request.</p>

# 11.0 Incidents and Non-compliances during the Report Period

## 11.1 Incidents, Notifications and Non-Compliances

As noted in **Section 1.0**, Mackas Sand identified three (3) non-compliances during the 2024 reporting period. Mackas Sand has addressed the three (3) non-compliances that were identified during the reporting period, further details of which are provided in **Table 11.1**.

**Table 11.1 2024 Incidents and Non-compliances**

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment
EPL 13218 PA 08_0142	Condition M2.2 Schedule 3 Condition 11	Air monitoring is required to be undertaken at EPA Point 7 and 8 in accordance with AM-19.	Administrative Non-compliance	During the January, February, May, July, September and November 2024 sampling periods, air monitoring samples were sampled outside the monthly frequency criteria.
PA 08_0142	Schedule 3 Condition 11	The Proponent shall ensure that the dust emissions generated by the project do not cause additional exceedances of the air quality impact assessment criteria listed in Tables 5, 6 and 7 at any residence on privately owned land, or on more than 25 percent of any privately owned land.	Low	DDG2 exceeded the maximum total in deposited dust level for August and September 2024 sampling periods. Mackas Sand notes dust gauge locations are in proximity to Mackas Sand approval boundaries and are not within the vicinity to nearby residences. Investigation letters of dust exceedances noting influences from adjacent agricultural activities were submitted to DPHI and EPA on 9 May 2024, 5 October 2024, and 5 December 2024. Mackas Sand has proposed to update the approved AQMP (Umwelt, 2018a) due to impacts on monitoring results from agricultural and other activities undertaken outside of Mackas Sand operations with the proposed revision also incorporating changes to the proposed monitoring network, refer to <b>Section 6.2.3</b> and <b>6.2.4</b> .
CA VC0532	Annexure D (c)	Produce a monitoring report on the CA by 31 December of each year, beginning in 2020.	Administrative Non-compliance	The Biodiversity Offset Monitoring Report was submitted to BCT on 30 January 2025. The report is required to be submitted to BCT 31 December annually, however, was submitted to BCT on 30 January 2025 due to an administrative oversight.

## **11.2 Regulatory Correspondence**

In accordance with the Annual Review Guideline (NSW Government, 2015) a summary of official cautions or warning letters, penalty notices or prosecution proceedings by any regulatory authority and Mackas Sand is required to be included within the Annual Review. There were no official cautions, warning letters, penalty notices or prosecution proceedings for Mackas Sand during the report period.

# 12.0 Activities Proposed in the 2025 Report Period

The anticipated environmental management activities for Mackas Sand during the 2025 report period are included in **Table 12.1**.

**Table 12.1 Environmental Management Activities Proposed for 2025**

Document Section	Area/ Nature of Activity	Actions Proposed during 2025
6.2.4	Air Quality	Due to the proposed monitoring methodology not being appropriate for Mackas Sand operations and impacts on monitoring results from activities outside of Mackas Sand operations, Mackas Sand submitted a revised draft AQMP to the DPHI and EPA on 6 February 2025 for comment. The revised AQMP is currently being reviewed by DPHI. Mackas Sand will review the EPA and DPHI response to the revised AQMP and address any responses/ recommendations received, if any. No additional management or mitigation measures are proposed to be implemented which are outside the approved AQMP (Umwelt, 2018b).
6.4.8	Biodiversity Offset Area	Mackas Sand will implement the proposed actions recommended in the 2024 BOA monitoring report (Cool Burn, 2025) detailed in <b>Section 6.4.8</b> . Proposed actions will be undertaken in accordance with VC 00532.
6.5.5	Aboriginal Heritage	Mackas Sand will continue to collect potential artefacts from Lot 218 and Lot 220 in the next reporting period as per the requirements of the ACHMP (Umwelt, 2016). These will be inspected by ACHG members.
7.2.4	Water Management - Groundwater	Review the requirements from the updated EPL 13218 licence variation, specifically the requirements of the updated special condition. A report on the review and calibration of the groundwater model and updated MEDM is not required to be completed until 2 July 2027 in accordance with the EPL 13218 variation ( <b>Section 7.2.3</b> ). Update of the existing approved Mackas Sand Soil and Water Management Plan (Umwelt, 2021b) to include the updated MEDM.
8.5	Rehabilitation	Mackas Sand will implement the proposed actions recommended in the 2024 rehabilitation inspection report detailed in <b>Section 8.5</b> , including: <ul style="list-style-type: none"> <li>• Blending of transition zones</li> <li>• Removal of redundant infrastructure</li> <li>• Completion of sitewide weed management works</li> <li>• Distribute salvaged habitat timber features in new rehabilitation areas</li> <li>• Undertake infill tubestock planting</li> </ul>

## 13.0 References

Cool Burn Fire Pty Ltd (2024) Mackas Sand Biodiversity Offset Area Annual Monitoring Report. *Lot 122 DP753192 Nelson Bay Road, Williamtown NSW. January 2025.*

GHD Pty Limited (2023a) Macka's Sand Groundwater Model Rerun. Prepared for Mackas Sand Pty Limited.

GHD Pty Limited (2023b) Macka's Sand Groundwater data review and model update – Phase 1, Report Prepared for Macka's Sand Pty Limited. *August 2023.*

GHD Pty Limited (2023c) Phase 2 – 2023 Groundwater Model Update. Macka's Sand Groundwater Data Review and Model Update. *December 2023.*

James Bailey & Associates (2024) Mackas Sand Project Independent Environmental Audit. *For Mackas Sand Pty Limited. 27 June 2024.*

James Hart Consulting (2021) Independent Environmental Audit: Mackas Sand Quarry (PA 08\_0142 (MOD 2) NSW.

NHMRC, NRMCC (2011) Australian Drinking Water Guidelines Paper 6 – National Water Quality Management Strategy.

NSW Government (2015) Annual Review Guideline: Post-approval requirements for State significant mining developments. *October 2015.*

Umwelt (Australia) Pty Limited (2009) Environmental Assessment of Sand Extraction Operations from Lot 218 DP 1044608 and Lot 220 DP 1049608, Salt Ash. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2011) Determination of Maximum Predicted Groundwater Level and Maximum Extraction Level at Lot 218 and Lot 220, Salt Ash. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2015) Environmental Assessment of Modifications to Macka's Sand Extraction Operations on Lot 218, Salt Ash. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2016) *Aboriginal Cultural Heritage Management Plan*. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2018) *Air Quality Monitoring Program for Lot 218 and Lot 220, Salt Ash NSW*. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2018) *Noise Management Plan for Sand Extraction Operations*. Prepared for Macka's Sand Pty Limited. Lot 218 and Lot 220 Nelson Bay Road, Salt Ash NSW.

Umwelt (Australia) Pty Limited (2021a) *Landscape Management Plan*. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2021b) *Soil and Water Management Plan*. Prepared for Macka's Sand Pty Limited. – For Lot 218 and Lot 220, Salt Ash, NSW.

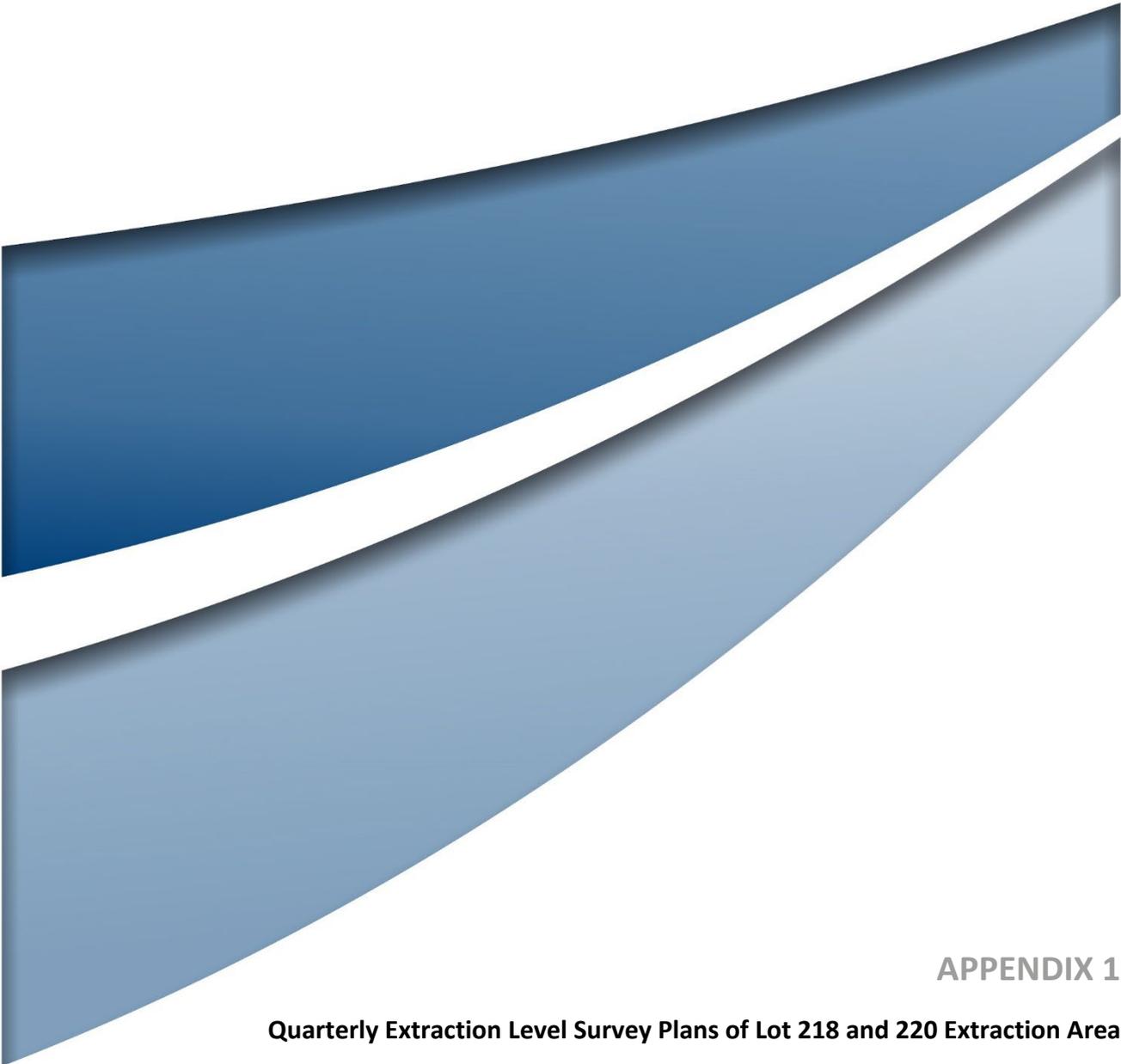
Umwelt (Australia) Pty Limited (2023a) *Drivers Code of Conduct*. Prepared for Mackas Sand Pty Limited.

Umwelt (Australia) Pty Limited (2023b) *Biodiversity Offset Strategy*. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2023c) *Mackas Sand Environmental Noise Monitoring Report 2023*. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2023d) *Mackas Sand EPBC 2011/6214 2022 Annual Compliance Report*. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2024) *2023 Annual Ecological Monitoring Lot 218 Biodiversity Offset Area Report*. Prepared for Macka's Sand Pty Limited.



**APPENDIX 1**

**Quarterly Extraction Level Survey Plans of Lot 218 and 220 Extraction Area**



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 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/09/2024  
 REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING



ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

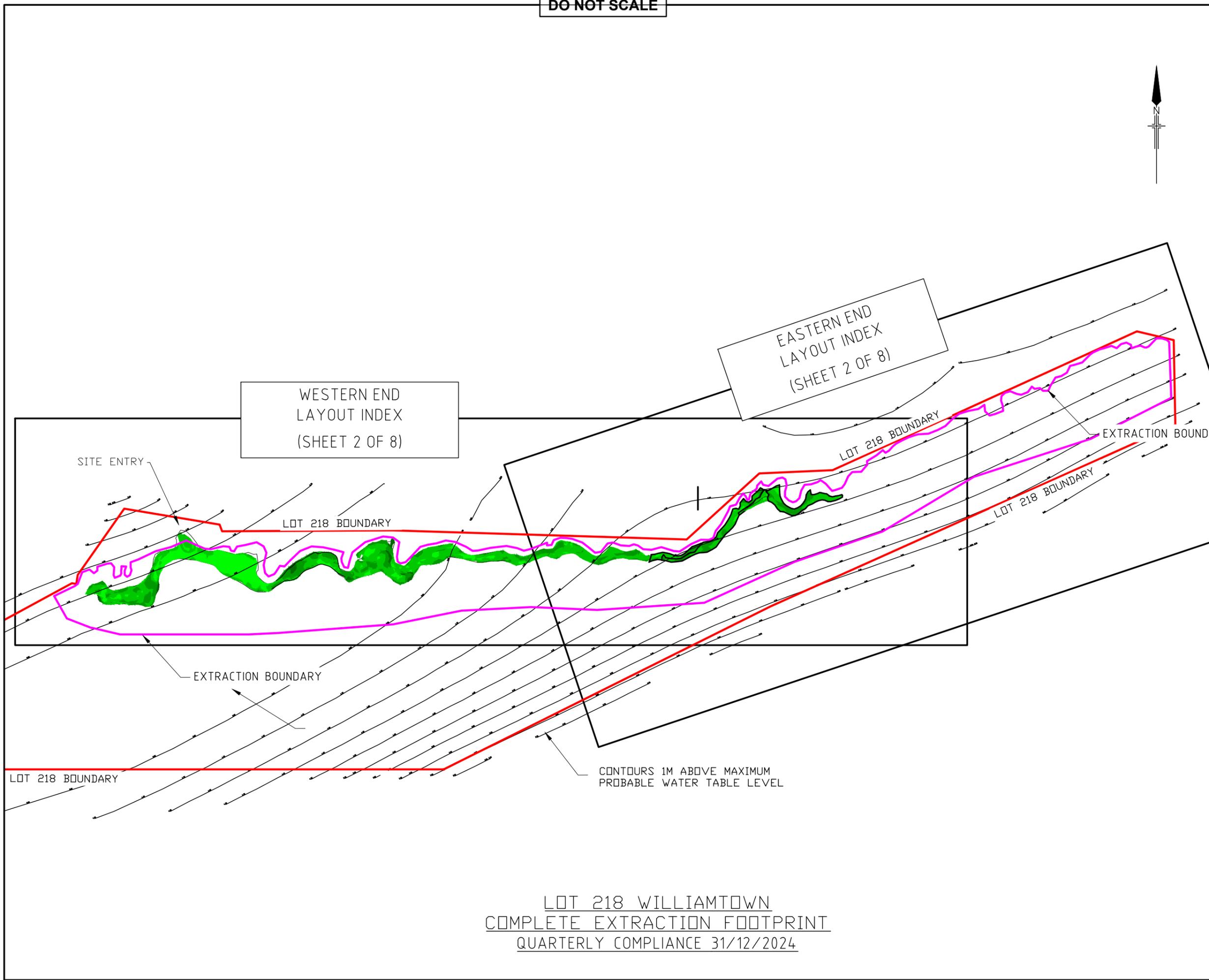
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 LOT 218  
 QUARTERLY COMPLIANCE  
 SHEET LAYOUT INDEX

STATUS:  
 DECEMBER 2024

DRAWING NUMBER:

SHEET 1 OF 8 SHEETS

A3



LOT 218 WILLIAMTOWN  
 COMPLETE EXTRACTION FOOTPRINT  
 QUARTERLY COMPLIANCE 31/12/2024

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DRAWN: CJ  
CHECKED: CJ  
DATUM: AHD  
ISSUE DATE: 30/09/2024  
REVISION: A

CLIENT & JOB:

MACKAS  
SAND & SOIL

WILLIAMTOWN  
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REPORTING



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TITLE:

LOT 218  
SHEET INDEX  
PLAN

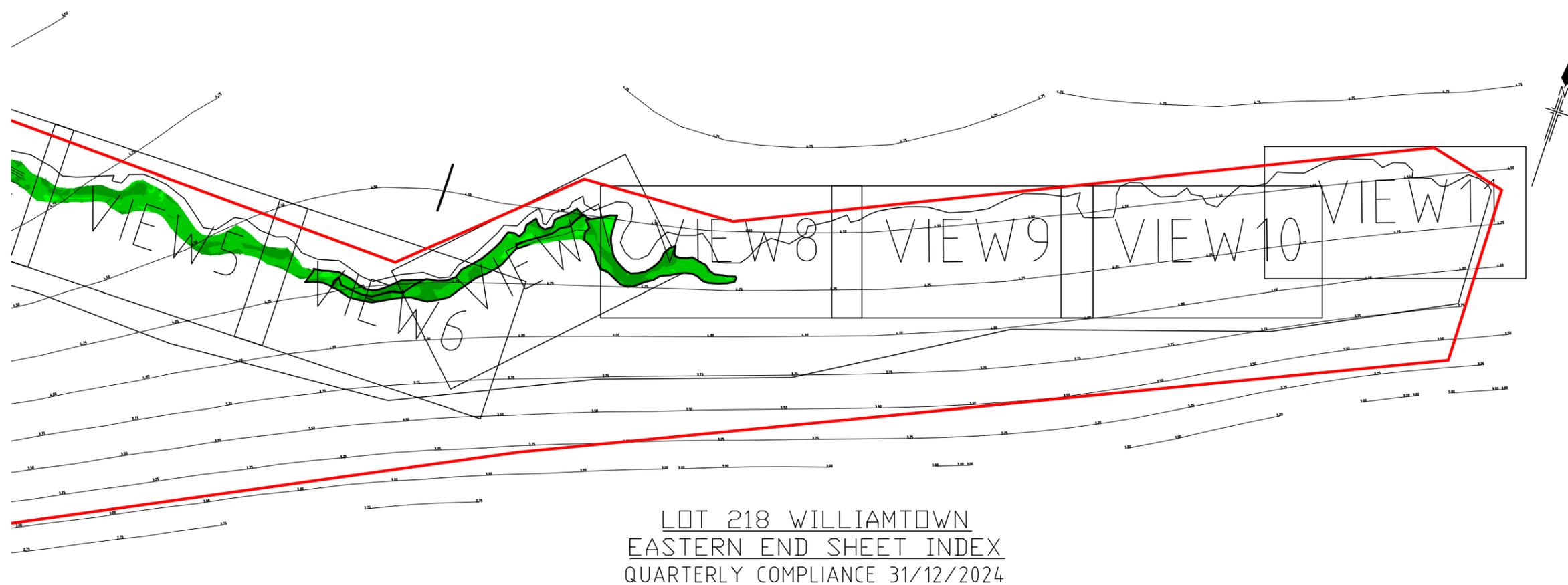
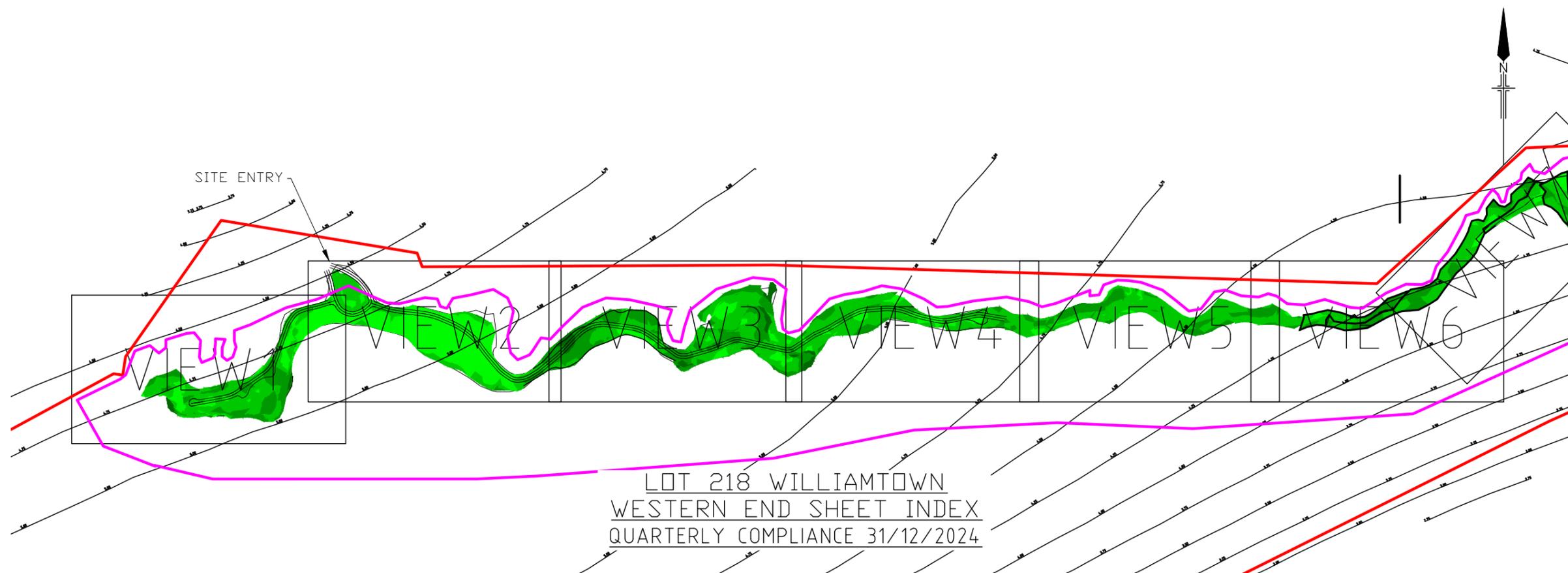
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DECEMBER 2024

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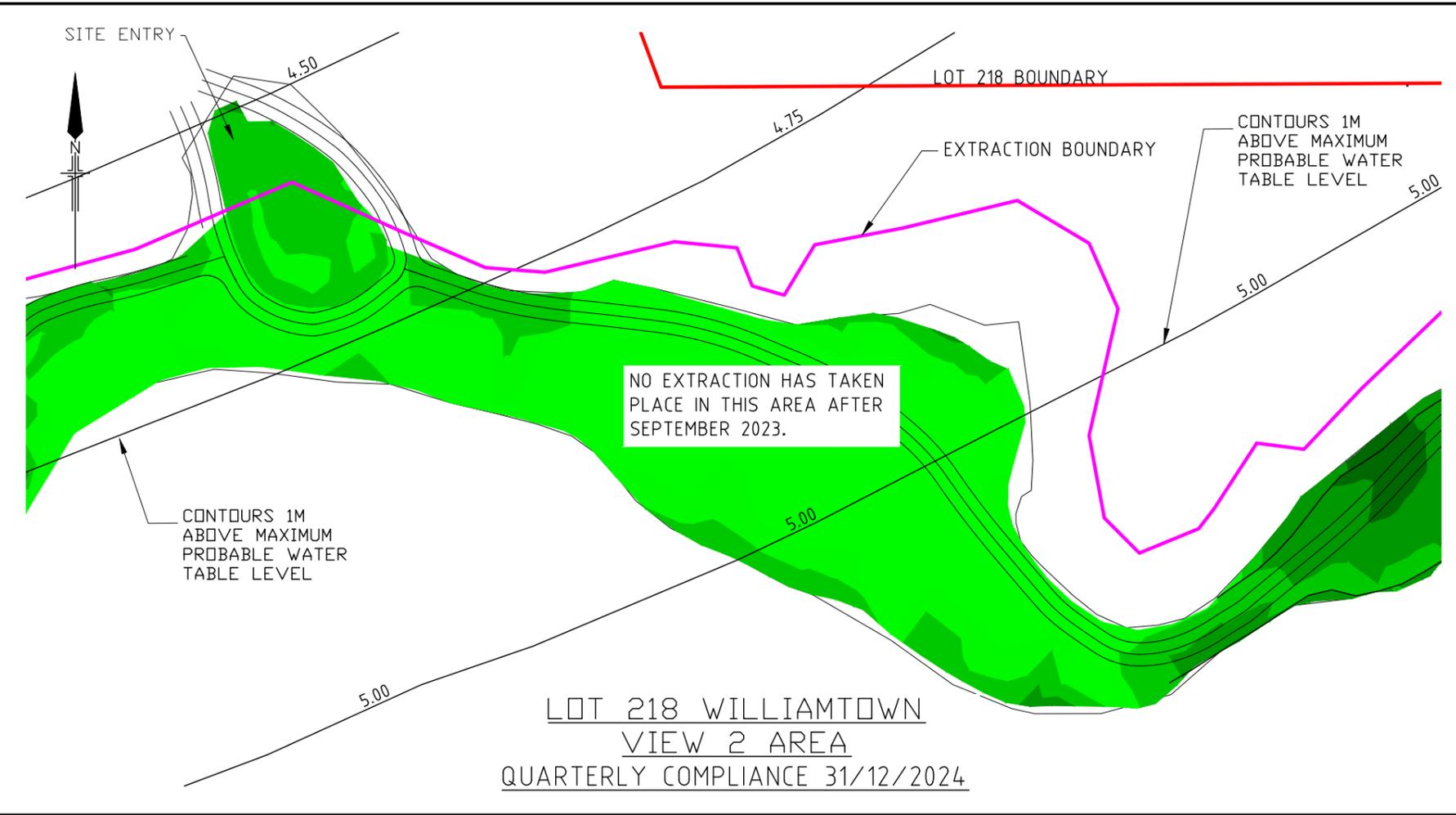
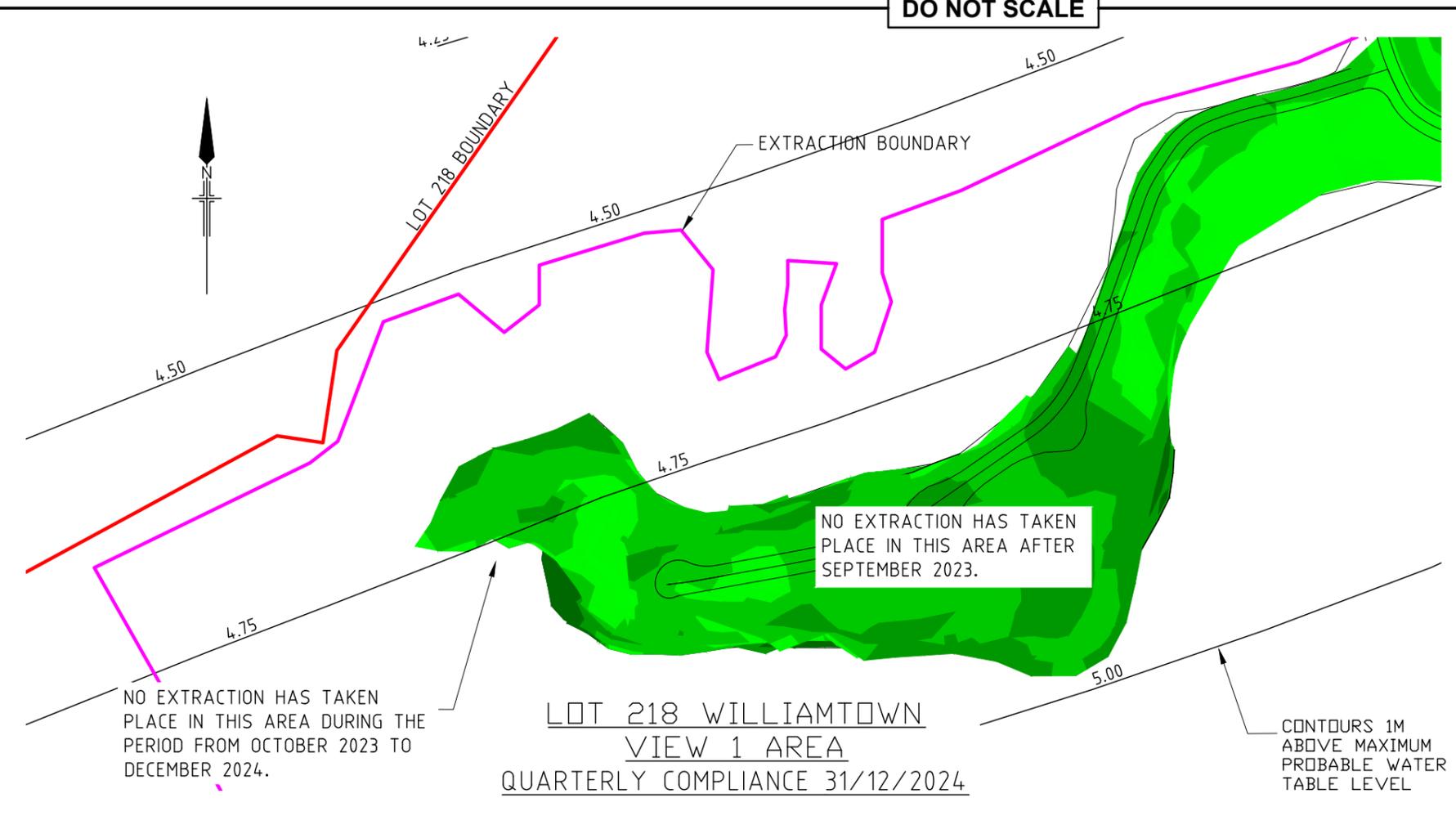
SHEET 2 OF 8 SHEETS

A3



\\cc\cs\jobs\0014 - Mackas Sands\dwg\Extraction Level Plans\0014\_CS\_LOT\_218\_Compliance\_241231.dwg, 6/02/2025 5:17:49 PM

DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/12/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY.
4. AREAS WITHOUT SPOT HEIGHT SHOWN WERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION AND DO NOT FORM PART OF THIS SURVEY REPORT AND ARE ONLY SHOWN TO IDENTIFY THE CURRENT EXTENT OF THE EXTRACTION FLOOR.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/12/2024 WAS COMPLETED 17/10/2023.
6. DATE OF CURRENT SURVEY: 10/01/2025

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow-Orange
-0.1	to 0.0	m	Yellow
0.0	to 0.1	m	Light Green
0.1	to 0.2	m	Green
0.2	to 0.5	m	Dark Green
0.5	to 1.0	m	Very Dark Green
1.0	to 2.0	m	Black

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_241231.dwg

SURVEYED: CJ & LC

DRAWN: CJ

CHECKED: CJ

DATUM: AHD

ISSUE DATE: 30/09/2024

REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING

ABN: 66 605 045 314  
P: (02) 4967 5927  
M: 0429 987 821  
Unit 11 56 Industrial Dr  
Mayfield NSW 2304

TITLE:

LOT 218 EXTRACTION COMPLIANCE VIEW AREA 1 & 2

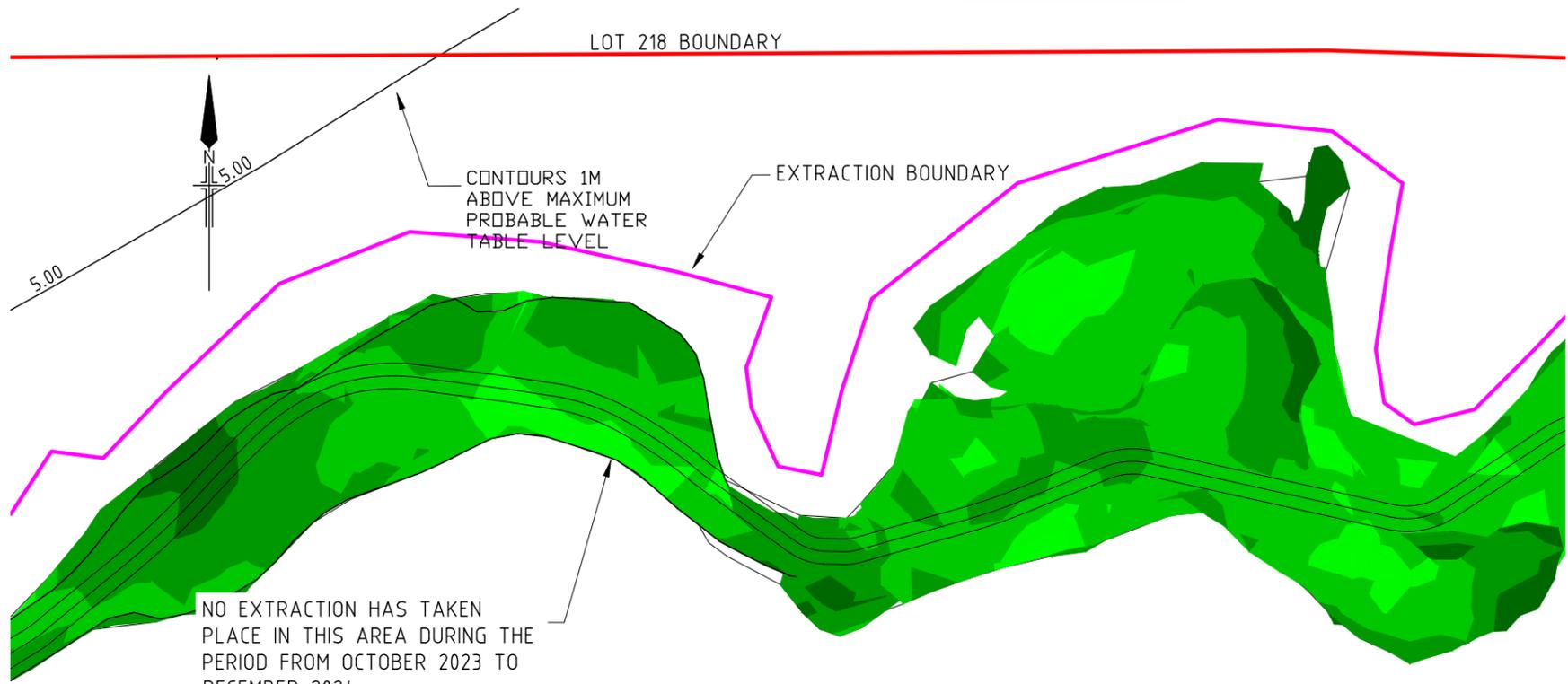
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DECEMBER 2024

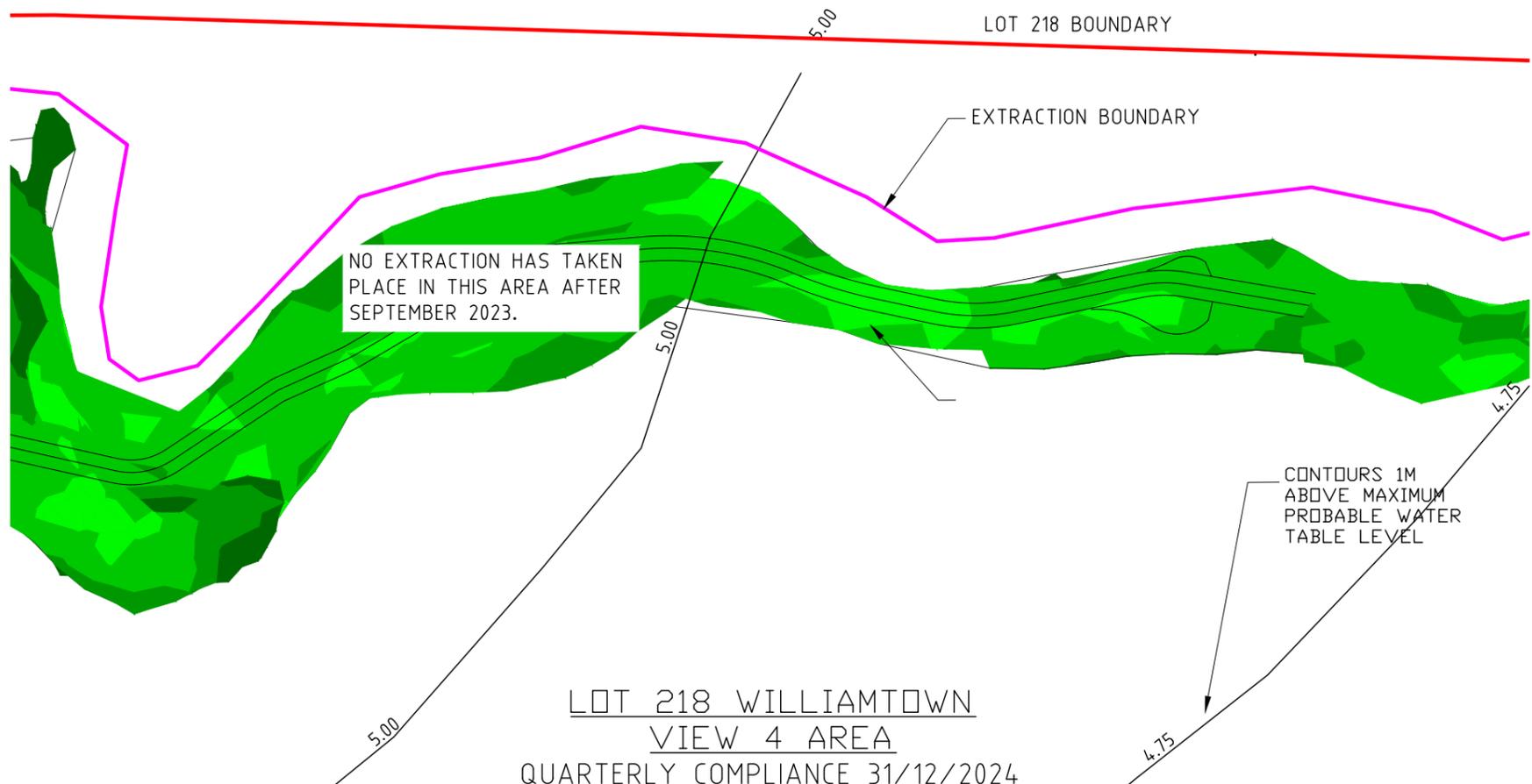
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DO NOT SCALE



LOT 218 WILLIAMTOWN  
VIEW 3 AREA  
QUARTERLY COMPLIANCE 31/12/2024



LOT 218 WILLIAMTOWN  
VIEW 4 AREA  
QUARTERLY COMPLIANCE 31/12/2024

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/12/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY.
4. AREAS WITHOUT SPOT HEIGHT SHOWN WERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION AND DO NOT FORM PART OF THIS SURVEY REPORT AND ARE ONLY SHOWN TO IDENTIFY THE CURRENT EXTENT OF THE EXTRACTION FLOOR.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/12/2024 WAS COMPLETED 17/10/2023.
6. DATE OF CURRENT SURVEY: 10/01/2025

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow-Orange
-0.1	to 0.0	m	Yellow
0.0	to 0.1	m	Light Green
0.1	to 0.2	m	Green
0.2	to 0.5	m	Dark Green
0.5	to 1.0	m	Very Dark Green
1.0	to 2.0	m	Black

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_241231.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/09/2024  
 REVISION: A

CLIENT & JOB:  
**MACKAS SAND & SOIL**  
 WILLIAMTOWN COMPLIANCE REPORTING

ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

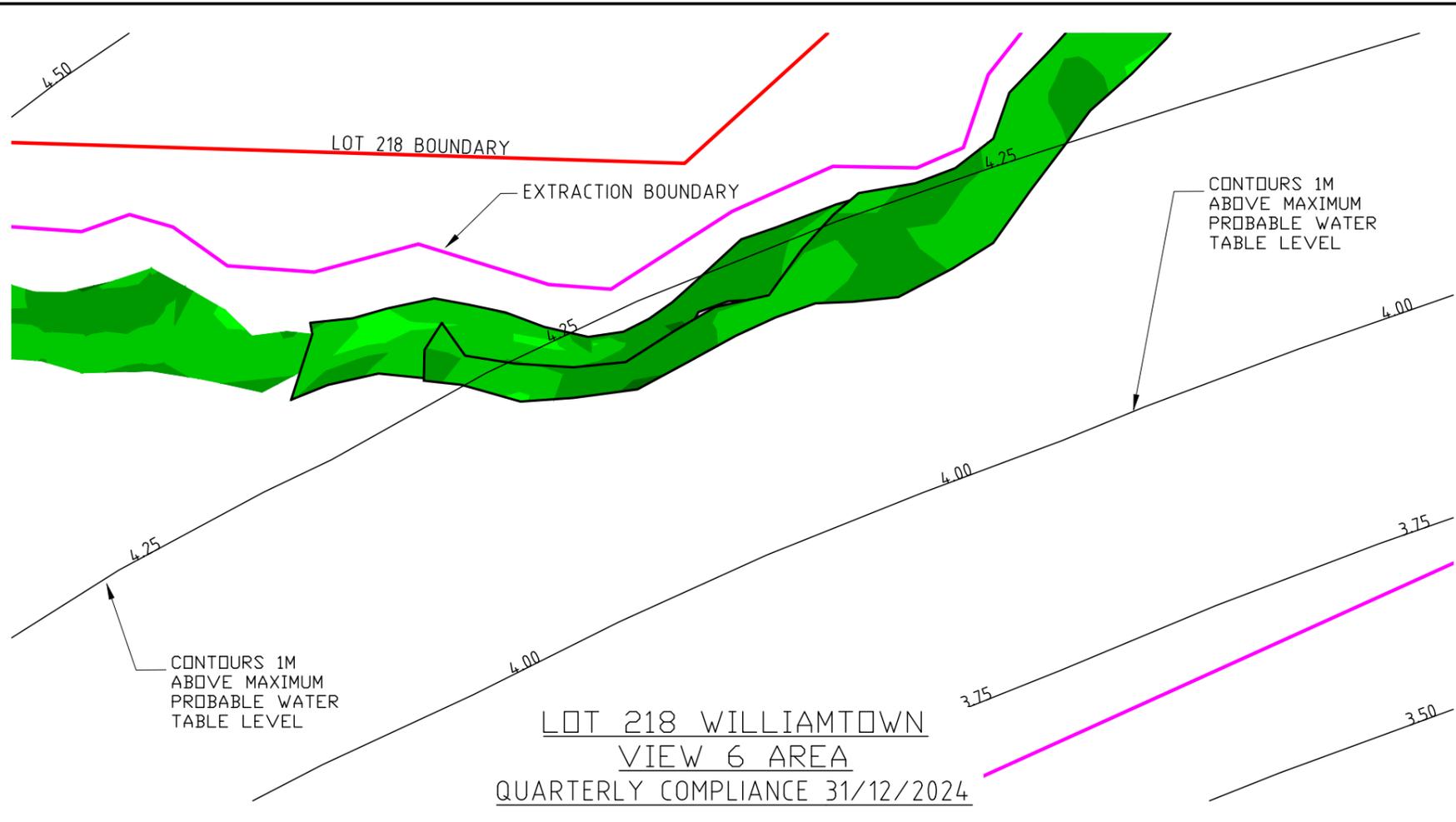
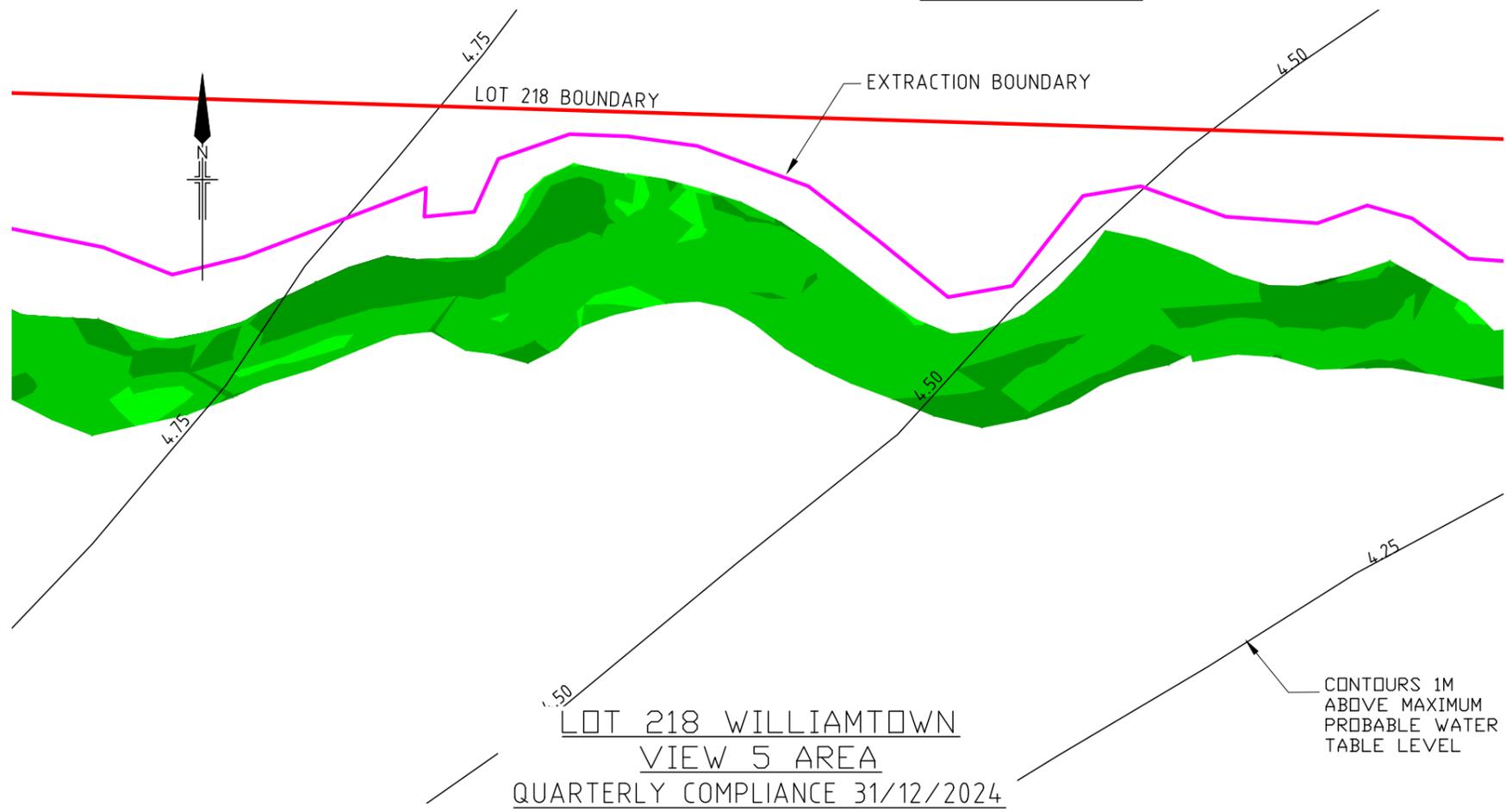
TITLE:  
**LOT 218 EXTRACTION COMPLIANCE VIEW AREA 3 & 4**

STATUS:  
**DECEMBER 2024**

DRAWING NUMBER:

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DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/12/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY.
4. AREAS WITHOUT SPOT HEIGHT SHOWN WERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION AND DO NOT FORM PART OF THIS SURVEY REPORT AND ARE ONLY SHOWN TO IDENTIFY THE CURRENT EXTENT OF THE EXTRACTION FLOOR.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/12/2024 WAS COMPLETED 17/10/2023.
6. DATE OF CURRENT SURVEY: 10/01/2025

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow-Orange
-0.1	to 0.0	m	Yellow
0.0	to 0.1	m	Light Green
0.1	to 0.2	m	Green
0.2	to 0.5	m	Dark Green
0.5	to 1.0	m	Very Dark Green
1.0	to 2.0	m	Black

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_241231.dwg

SURVEYED: CJ & LC

DRAWN: CJ

CHECKED: CJ

DATUM: AHD

ISSUE DATE: 30/09/2024

REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING

ABN: 66 605 045 314  
P: (02) 4967 5927  
M: 0429 987 821  
Unit 11 56 Industrial Dr  
Mayfield NSW 2304

TITLE:

LOT 218 EXTRACTION COMPLIANCE VIEW AREA 5 & 6

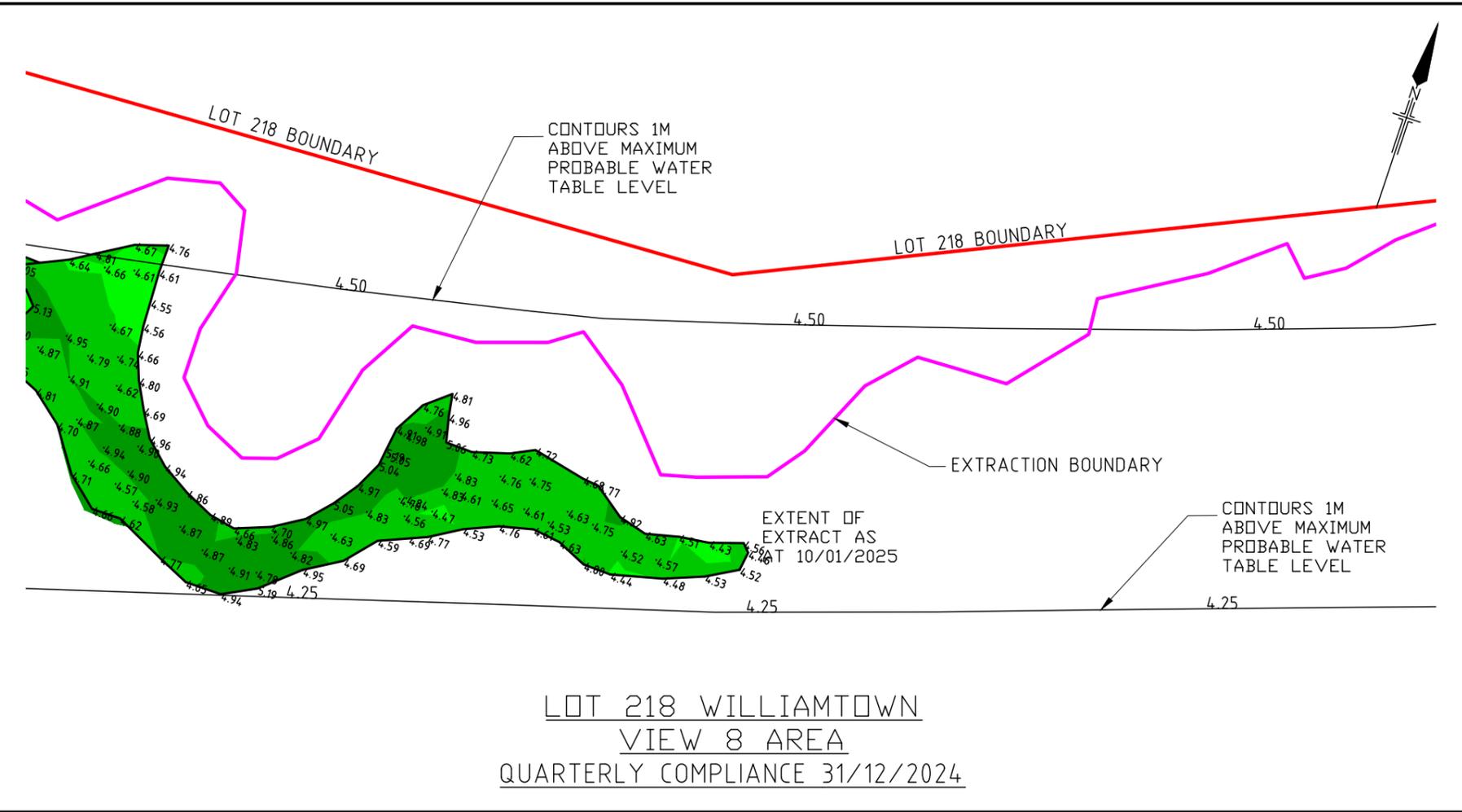
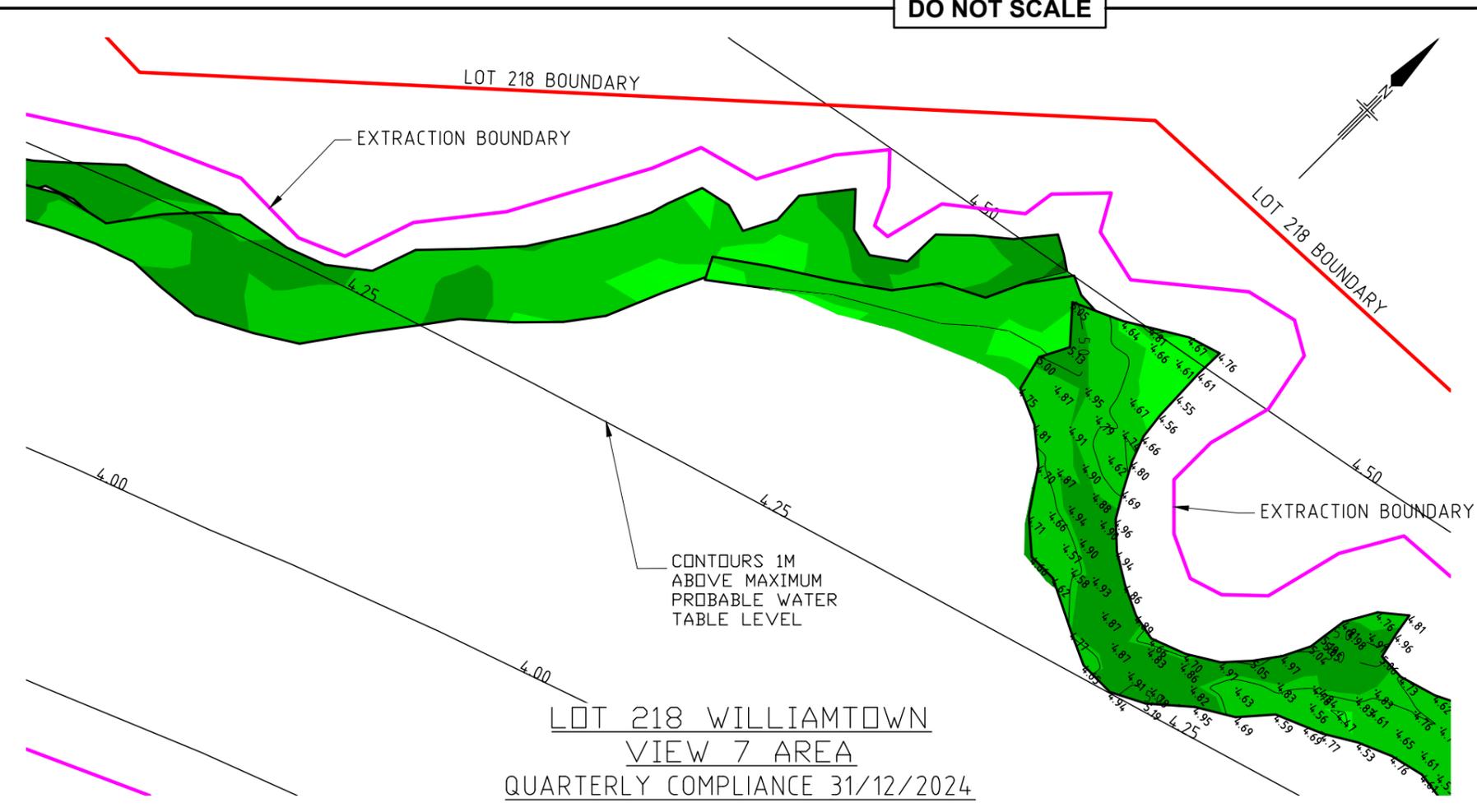
STATUS:

DECEMBER 2024

DRAWING NUMBER:

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DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/12/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY.
4. AREAS WITHOUT SPOT HEIGHT SHOWN WERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION AND DO NOT FORM PART OF THIS SURVEY REPORT AND ARE ONLY SHOWN TO IDENTIFY THE CURRENT EXTENT OF THE EXTRACTION FLOOR.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/12/2024 WAS COMPLETED 17/10/2023.
6. DATE OF CURRENT SURVEY: 10/01/2025

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	
-0.3	to -0.2	m	
-0.2	to -0.1	m	
-0.1	to 0.0	m	
0.0	to 0.1	m	
0.1	to 0.2	m	
0.2	to 0.5	m	
0.5	to 1.0	m	
1.0	to 2.0	m	

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_241231.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/09/2024  
 REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING

ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:

LOT 218 EXTRACTION COMPLIANCE VIEW AREA 7 & 8

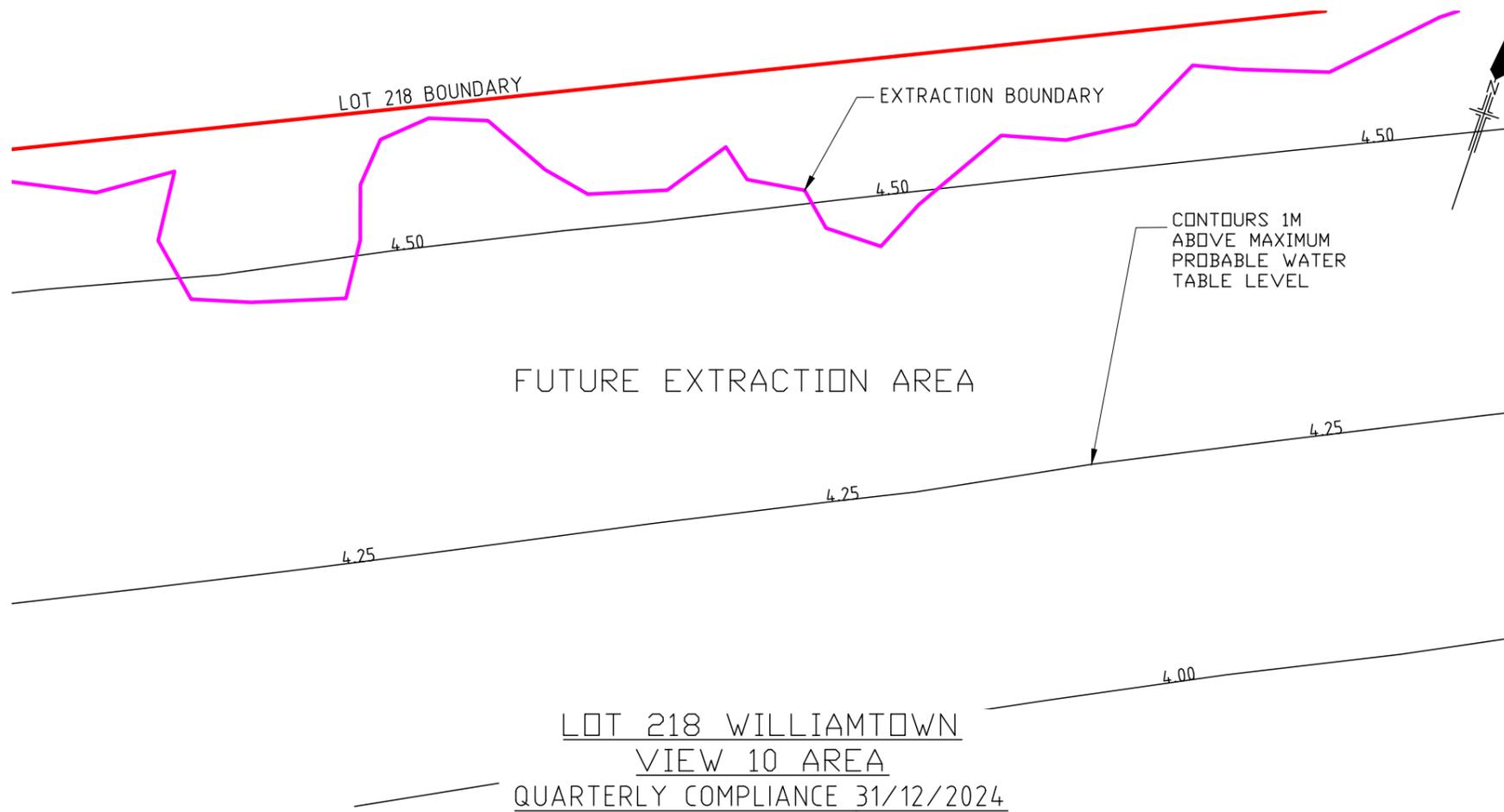
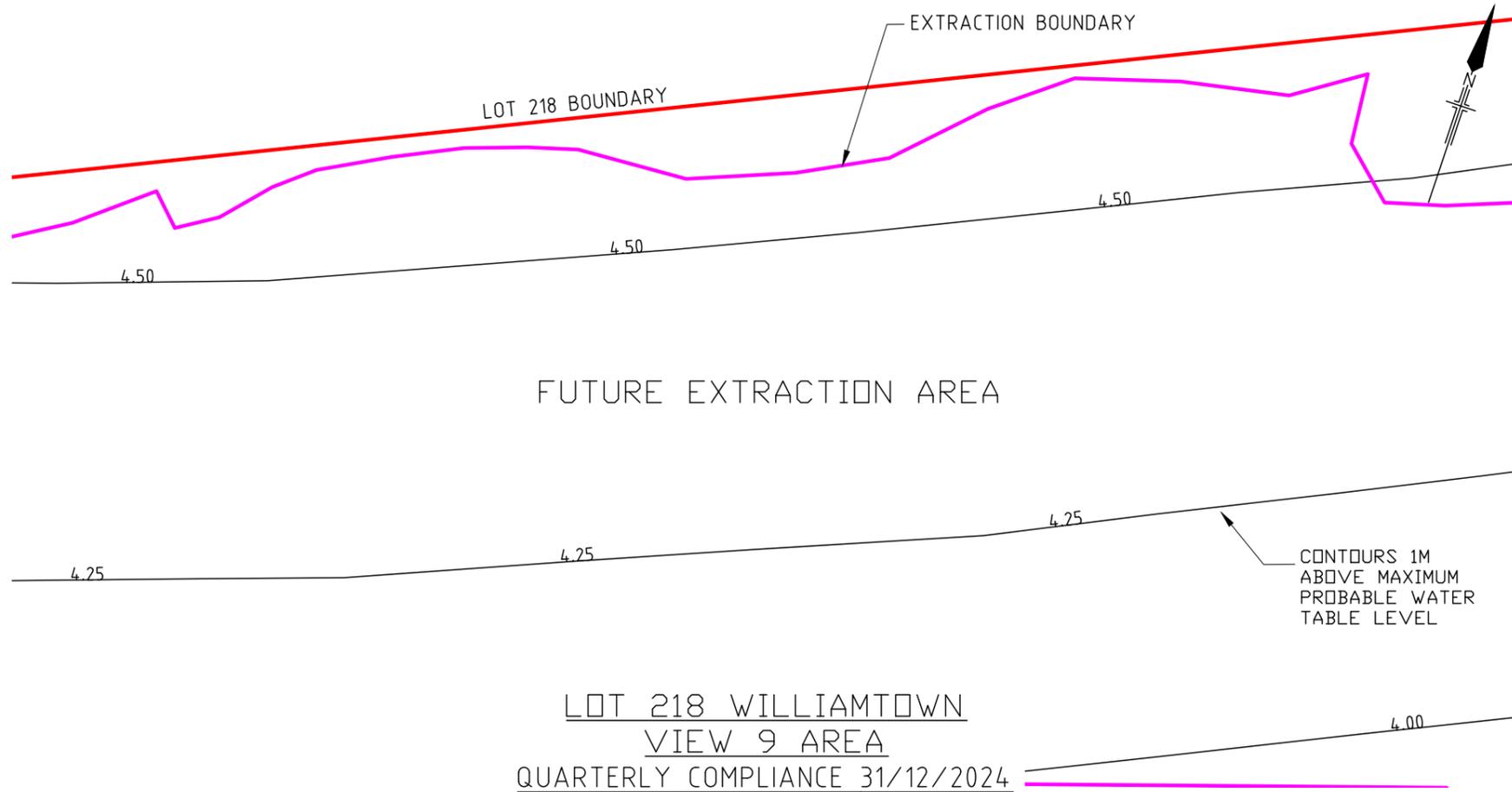
STATUS:

DECEMBER 2024

DRAWING NUMBER:

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DO NOT SCALE



SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_241231.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/09/2024  
 REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING



ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/12/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY.
4. AREAS WITHOUT SPOT HEIGHT SHOWN WERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION AND DO NOT FORM PART OF THIS SURVEY REPORT AND ARE ONLY SHOWN TO IDENTIFY THE CURRENT EXTENT OF THE EXTRACTION FLOOR.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/12/2024 WAS COMPLETED 17/10/2023.
6. DATE OF CURRENT SURVEY: 10/01/2025

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL

LOWER VALUE	UPPER VALUE	COLOUR
-0.35 to	-0.3 m	Red
-0.3 to	-0.2 m	Orange
-0.2 to	-0.1 m	Yellow-Orange
-0.1 to	0.0 m	Yellow
0.0 to	0.1 m	Light Green
0.1 to	0.2 m	Green
0.2 to	0.5 m	Dark Green
0.5 to	1.0 m	Very Dark Green
1.0 to	2.0 m	Black

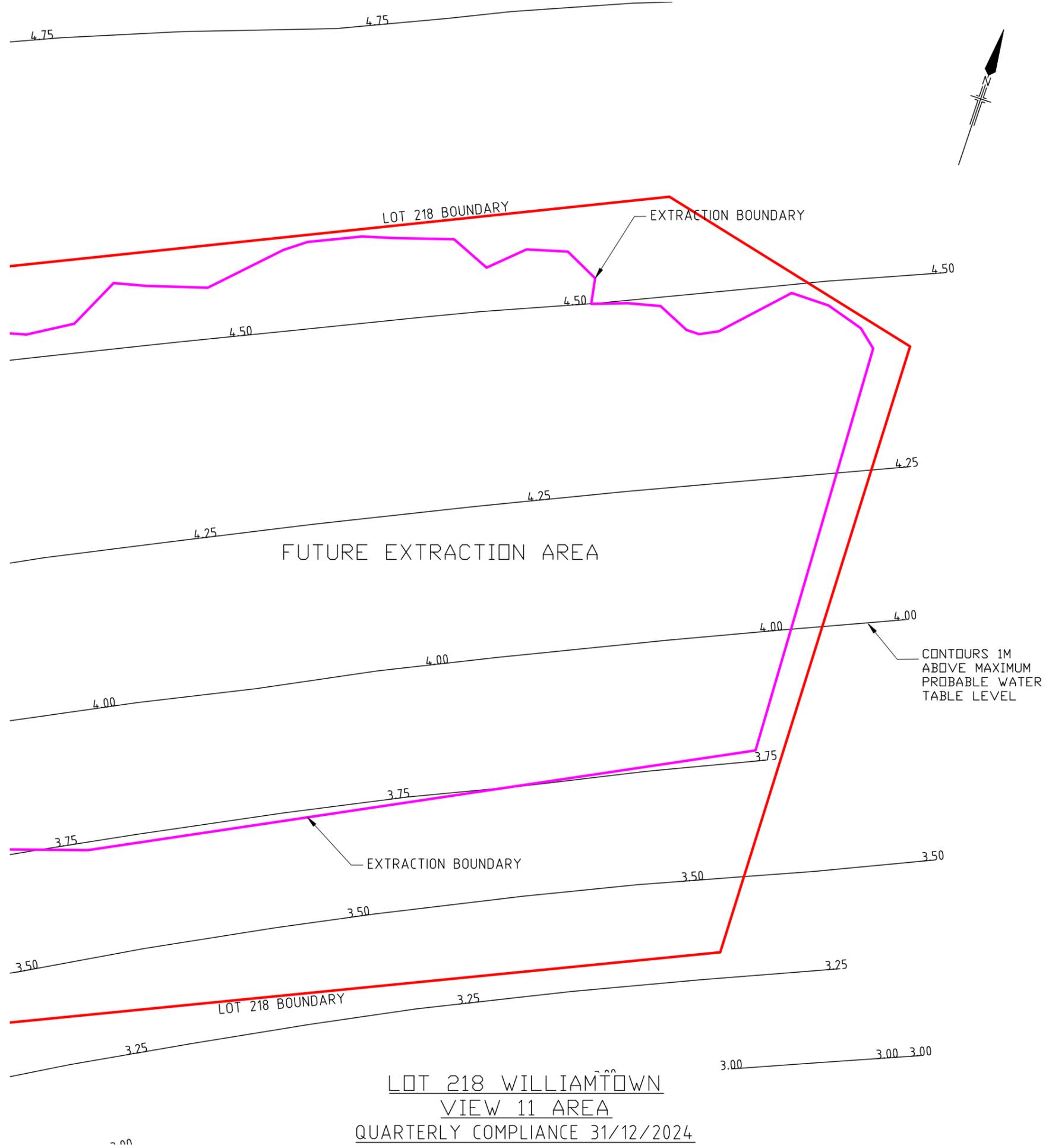
TITLE:  
 LOT 218  
 EXTRACTION COMPLIANCE  
 VIEW AREA 9 & 10

STATUS:  
 DECEMBER 2024

DRAWING NUMBER:

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DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
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5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/12/2024 WAS COMPLETED 17/10/2023.
6. DATE OF CURRENT SURVEY: 10/01/2025

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL				
LOWER VALUE	to	UPPER VALUE	COLOUR	
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_241231.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/09/2024  
 REVISION: A

CLIENT & JOB:

**MACKAS SAND & SOIL**

**WILLIAMTOWN COMPLIANCE REPORTING**

ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:

**LOT 218 EXTRACTION COMPLIANCE VIEW AREA 9 & 10**

STATUS:

**DECEMBER 2024**

DRAWING NUMBER:

DO NOT SCALE

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_220\_Compliance\_240930.dwg  
 SURVEYED: CJ  
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 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/09/2024  
 REVISION: A

CLIENT & JOB:  
 MACKAS SAND & SOIL SALT ASH  
 COMPLIANCE REPORTING

**CENTURION SURVEY PTY LTD**  
 ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

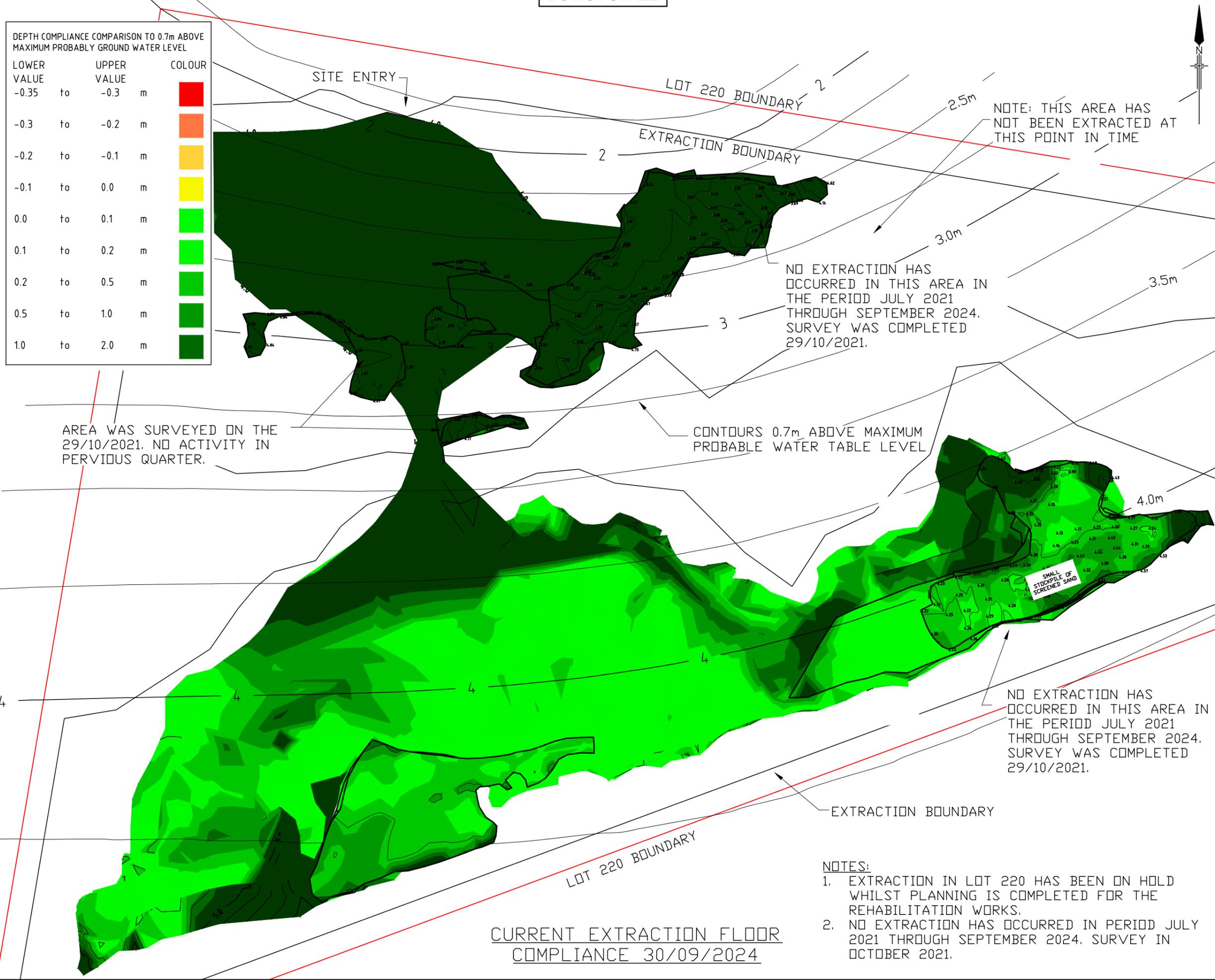
TITLE:  
 LOT 220  
 EXTRACTION LEVEL  
 COMPLIANCE

STATUS:  
 SEPTEMBER 2024

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

LOWER VALUE	UPPER VALUE	COLOUR
-0.35 to	-0.3 m	Red
-0.3 to	-0.2 m	Orange
-0.2 to	-0.1 m	Yellow-Orange
-0.1 to	0.0 m	Yellow
0.0 to	0.1 m	Light Green
0.1 to	0.2 m	Green
0.2 to	0.5 m	Dark Green
0.5 to	1.0 m	Very Dark Green
1.0 to	2.0 m	Black



NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH SEPTEMBER 2024. SURVEY WAS COMPLETED 29/10/2021.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

AREA WAS SURVEYED ON THE 29/10/2021. NO ACTIVITY IN PERVIOUS QUARTER.

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH SEPTEMBER 2024. SURVEY WAS COMPLETED 29/10/2021.

SMALL STOCKPILE OF SCREENED SAND

- NOTES:**
- EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
  - NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH SEPTEMBER 2024. SURVEY IN OCTOBER 2021.

CURRENT EXTRACTION FLOOR  
 COMPLIANCE 30/09/2024

DO NOT SCALE

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240930.dwg  
SURVEYED: CJ & LC  
DRAWN: CJ  
CHECKED: CJ  
DATUM: AHD  
ISSUE DATE: 30/09/2024  
REVISION: A

CLIENT & JOB:

MACKAS  
SAND & SOIL

WILLIAMTOWN  
COMPLIANCE  
REPORTING



ABN: 66 605 045 314  
P: (02) 4967 5927  
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Unit 11 56 Industrial Dr  
Mayfield NSW 2304

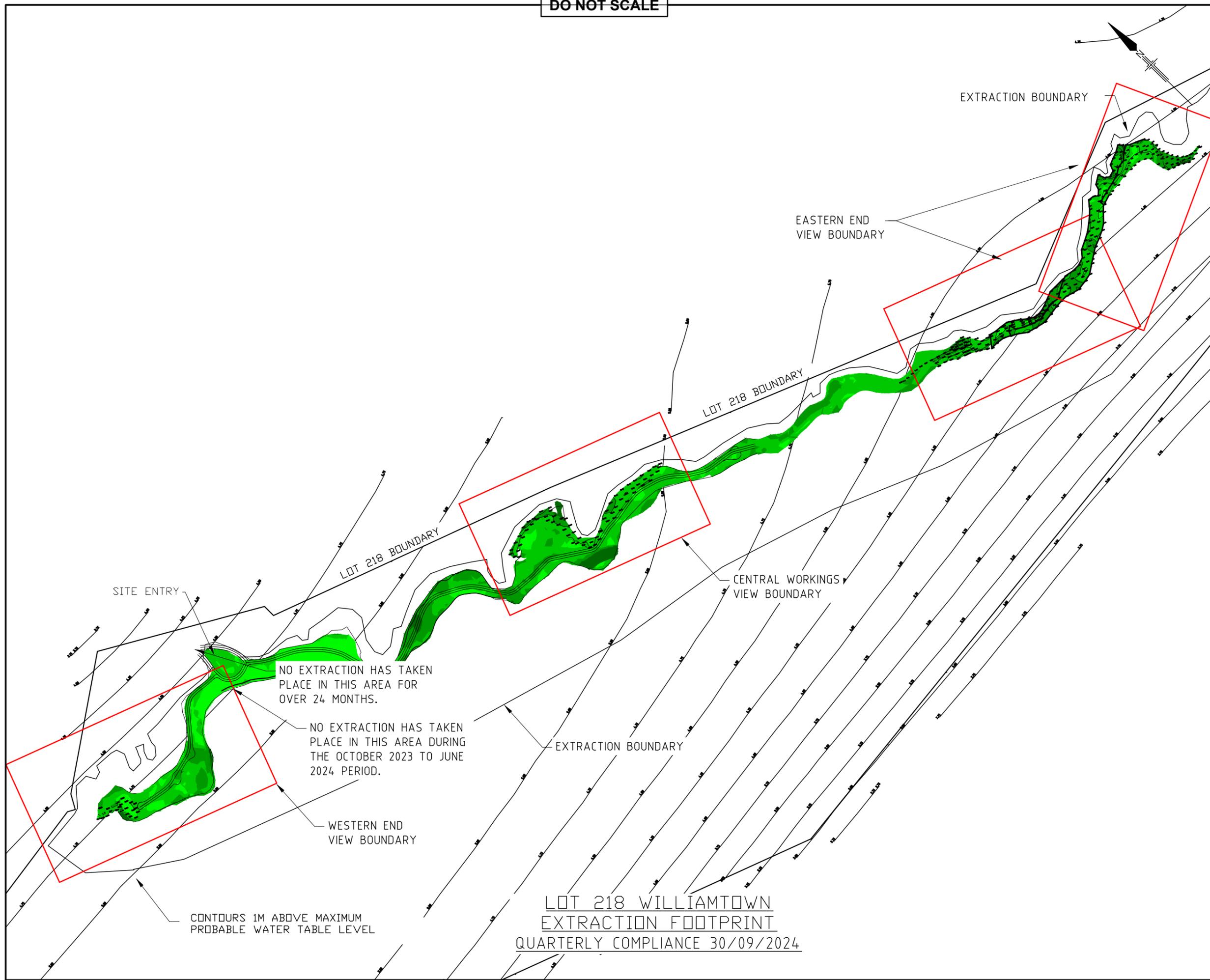
TITLE:  
LOT 218  
EXTRACTION LEVEL  
QUARTERLY COMPLIANCE

STATUS:  
JUNE 2024

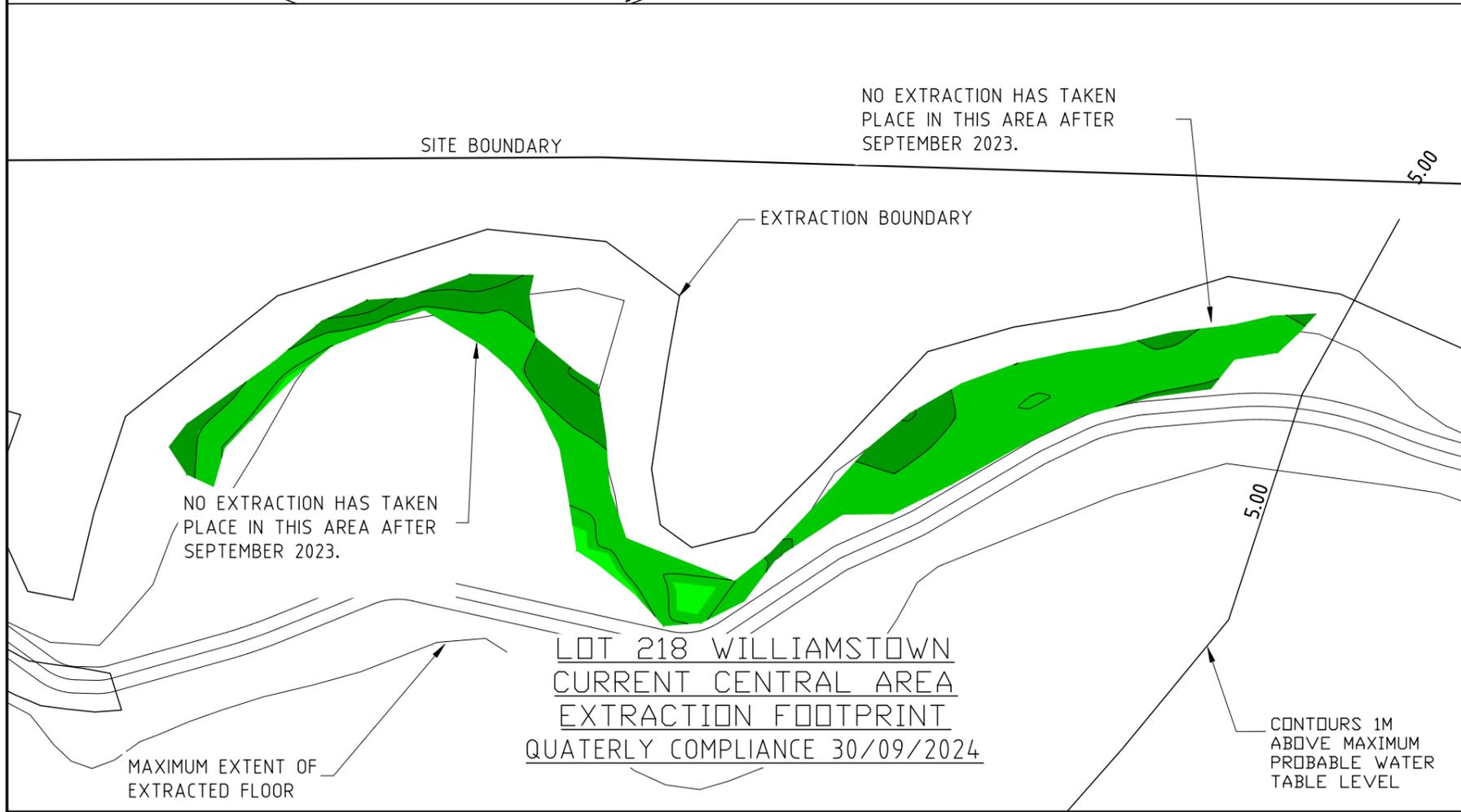
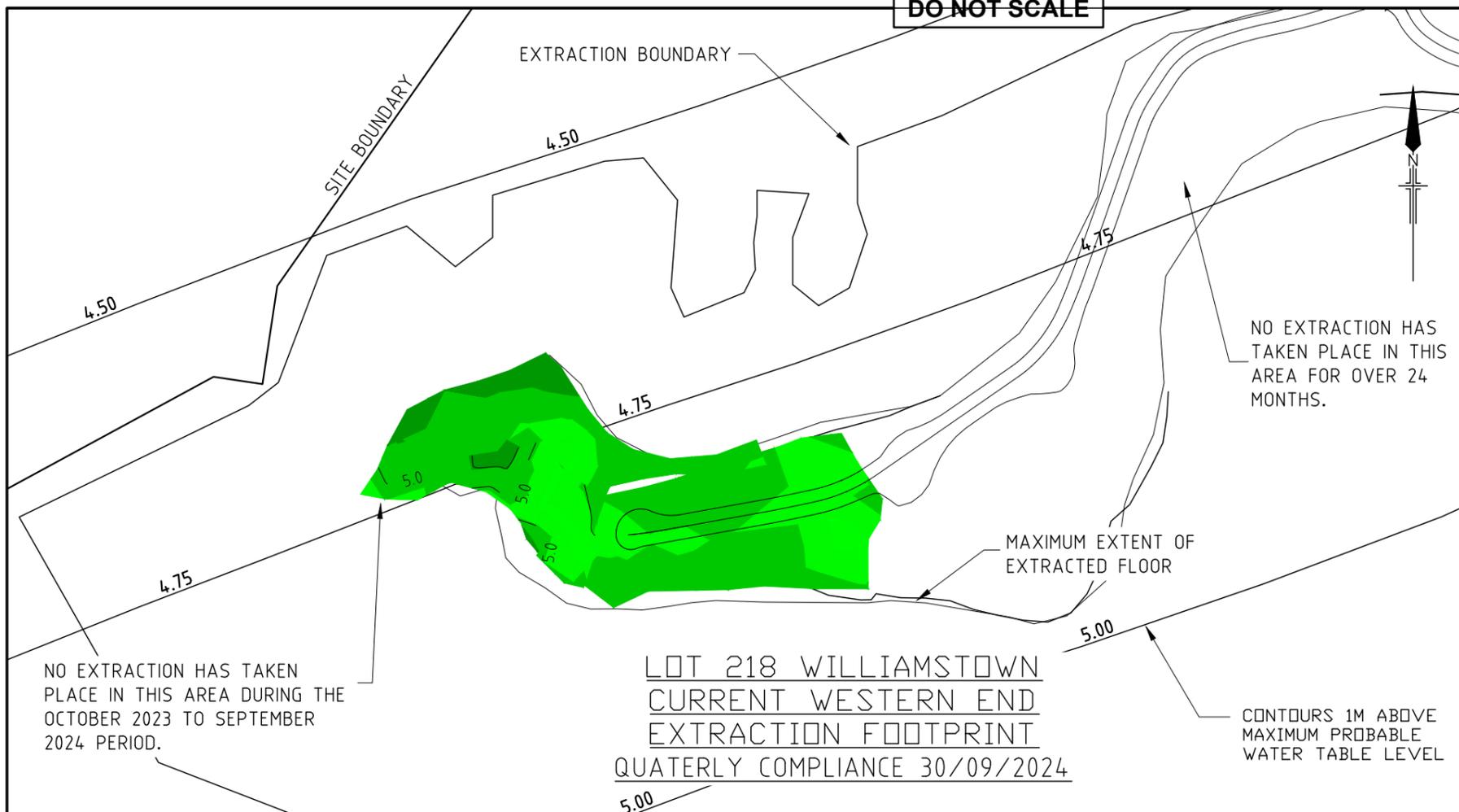
DRAWING NUMBER:

SHEET 1 OF 3 SHEETS

A3



DO NOT SCALE



SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240930.dwg

SURVEYED: CJ & LC

DRAWN: CJ

CHECKED: CJ

DATUM: AHD

ISSUE DATE: 10/01/2024

REVISION: A

CLIENT & JOB:

**MACKAS SAND & SOIL**

**WILLIAMTOWN COMPLIANCE REPORTING**



ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

- NOTES:**
1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
  2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 30/09/2024.
  3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.
  4. SURVEY TO CONFIRM COMPLIANCE AT CENTRAL WORKING AREA FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 17/10/2023.
  5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 17/10/2023.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow
-0.1	to 0.0	m	Light Green
0.0	to 0.1	m	Green
0.1	to 0.2	m	Dark Green
0.2	to 0.5	m	Very Dark Green
0.5	to 1.0	m	Black
1.0	to 2.0	m	Black

TITLE:

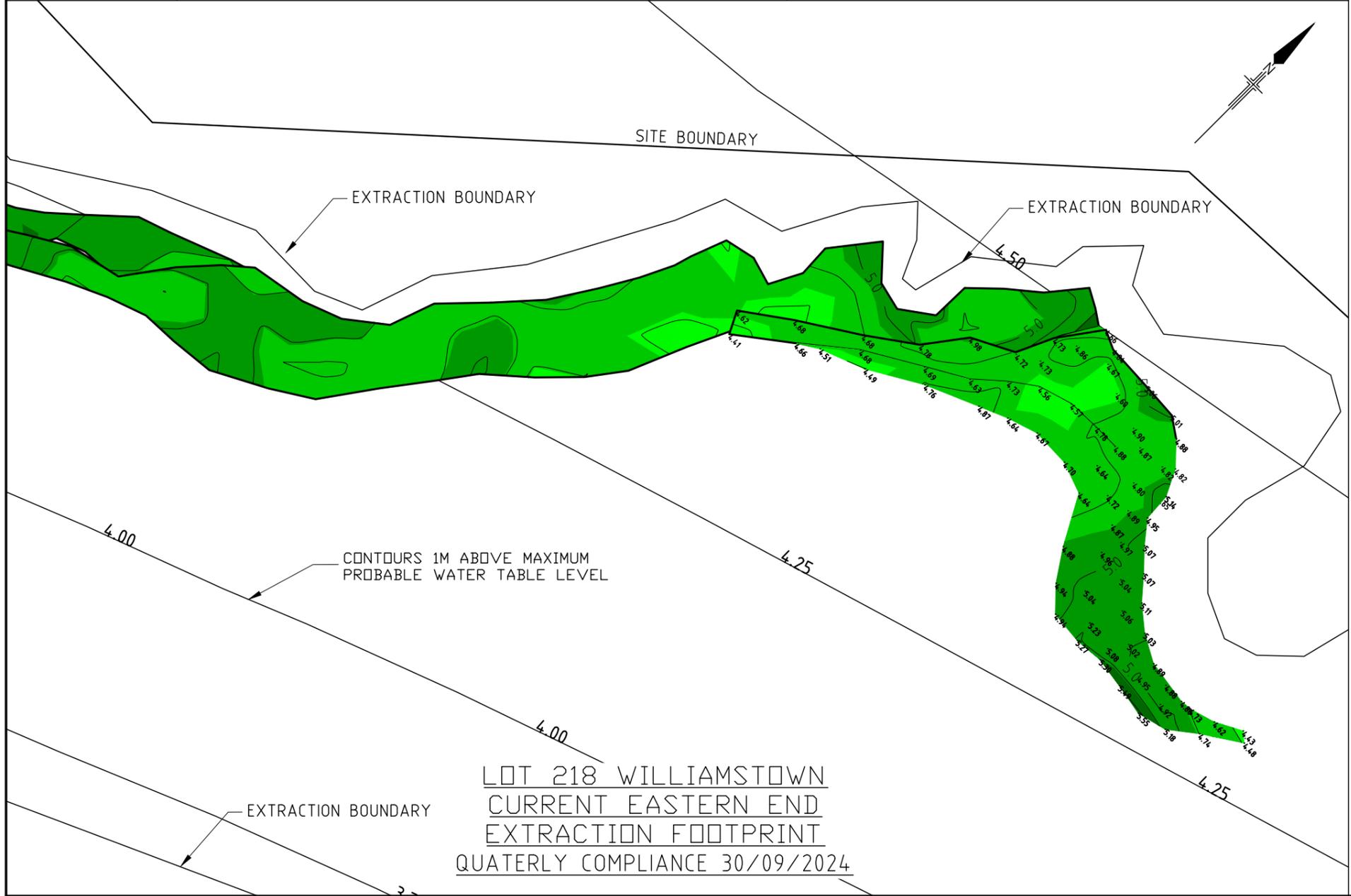
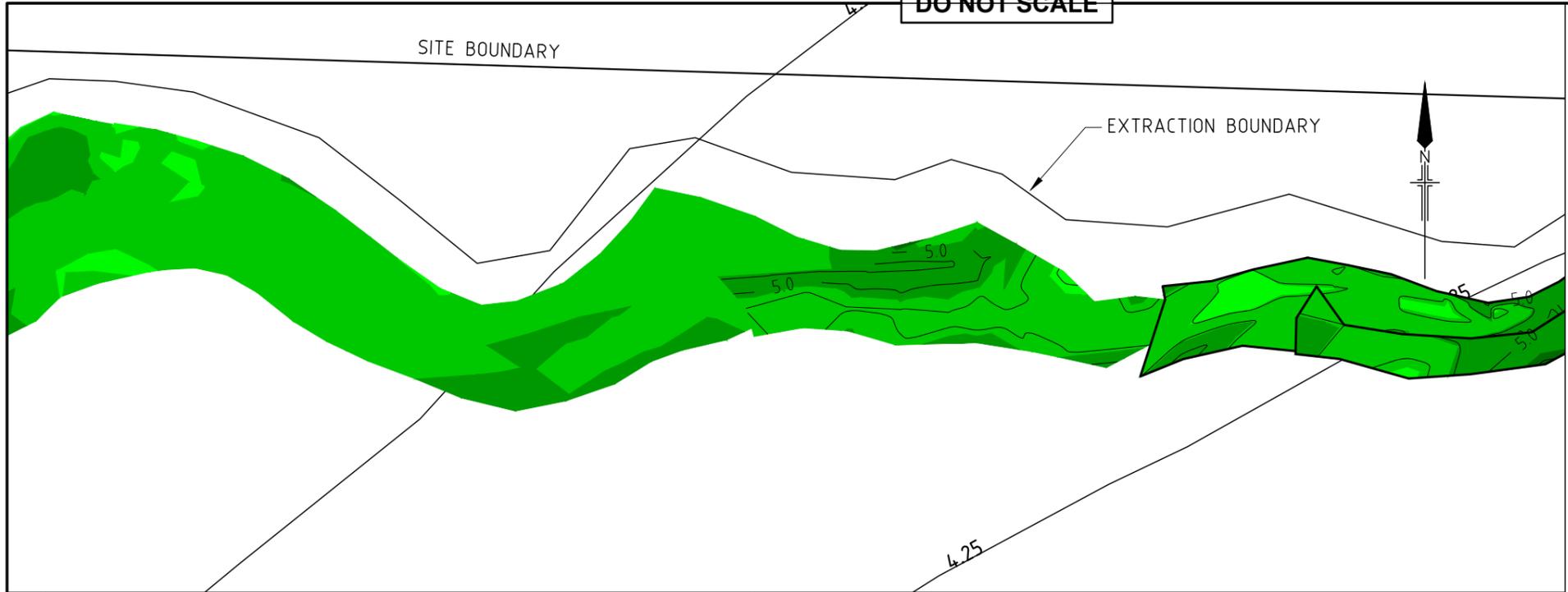
**LOT 218 EXTRACTION LEVEL QUATERLY COMPLIANCE**

STATUS:

**SEPTEMBER 2024**

DRAWING NUMBER:

DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
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4. SURVEY TO CONFIRM COMPLIANCE AT EASTERN END FOR THE QUARTER ENDING 30/09/2024 WAS COMPLETED 27/09/2024.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR	
LOWER VALUE	UPPER VALUE			
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240930.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 30/06/2024  
 REVISION: A

CLIENT & JOB:  
**MACKAS SAND & SOIL**  
**WILLIAMTOWN COMPLIANCE REPORTING**



ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:  
**LOT 218 EXTRACTION LEVEL QUATERLY COMPLIANCE**

STATUS:  
**SEPTEMBER 2024**

DRAWING NUMBER:

DO NOT SCALE

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_220\_Compliance\_240630.dwg  
SURVEYED: CJ  
DRAWN: CJ  
CHECKED: CJ  
DATUM: AHD  
ISSUE DATE: 30/06/2024  
REVISION: A

CLIENT & JOB:

MACKAS  
SAND & SOIL  
SALT ASH  
  
COMPLIANCE  
REPORTING



ABN: 66 605 045 314  
P: (02) 4967 5927  
M: 0429 987 821  
Unit 11 56 Industrial Dr  
Mayfield NSW 2304

TITLE:

LOT 220  
EXTRACTION LEVEL  
COMPLIANCE

STATUS:

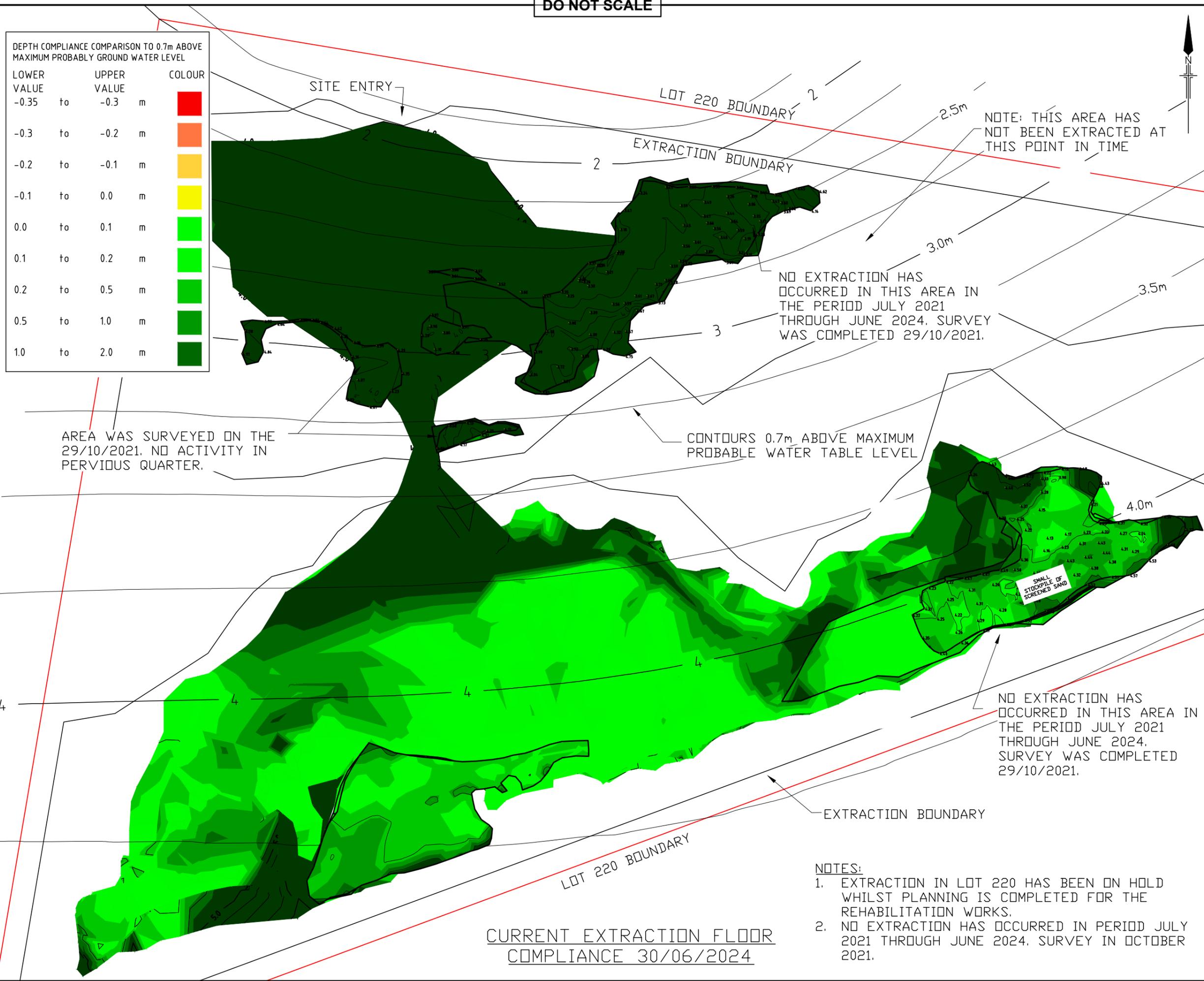
JUNE 2024

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL			COLOUR	
LOWER VALUE	UPPER VALUE			
-0.35	to	-0.3	m	Red
-0.3	to	-0.2	m	Orange
-0.2	to	-0.1	m	Yellow
-0.1	to	0.0	m	Light Green
0.0	to	0.1	m	Green
0.1	to	0.2	m	Dark Green
0.2	to	0.5	m	Very Dark Green
0.5	to	1.0	m	Black
1.0	to	2.0	m	Black



NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH JUNE 2024. SURVEY WAS COMPLETED 29/10/2021.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

AREA WAS SURVEYED ON THE 29/10/2021. NO ACTIVITY IN PERVIOUS QUARTER.

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH JUNE 2024. SURVEY WAS COMPLETED 29/10/2021.

- NOTES:**
- EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
  - NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH JUNE 2024. SURVEY IN OCTOBER 2021.

CURRENT EXTRACTION FLOOR COMPLIANCE 30/06/2024

DO NOT SCALE

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240630.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 12/04/2024  
 REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING



ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

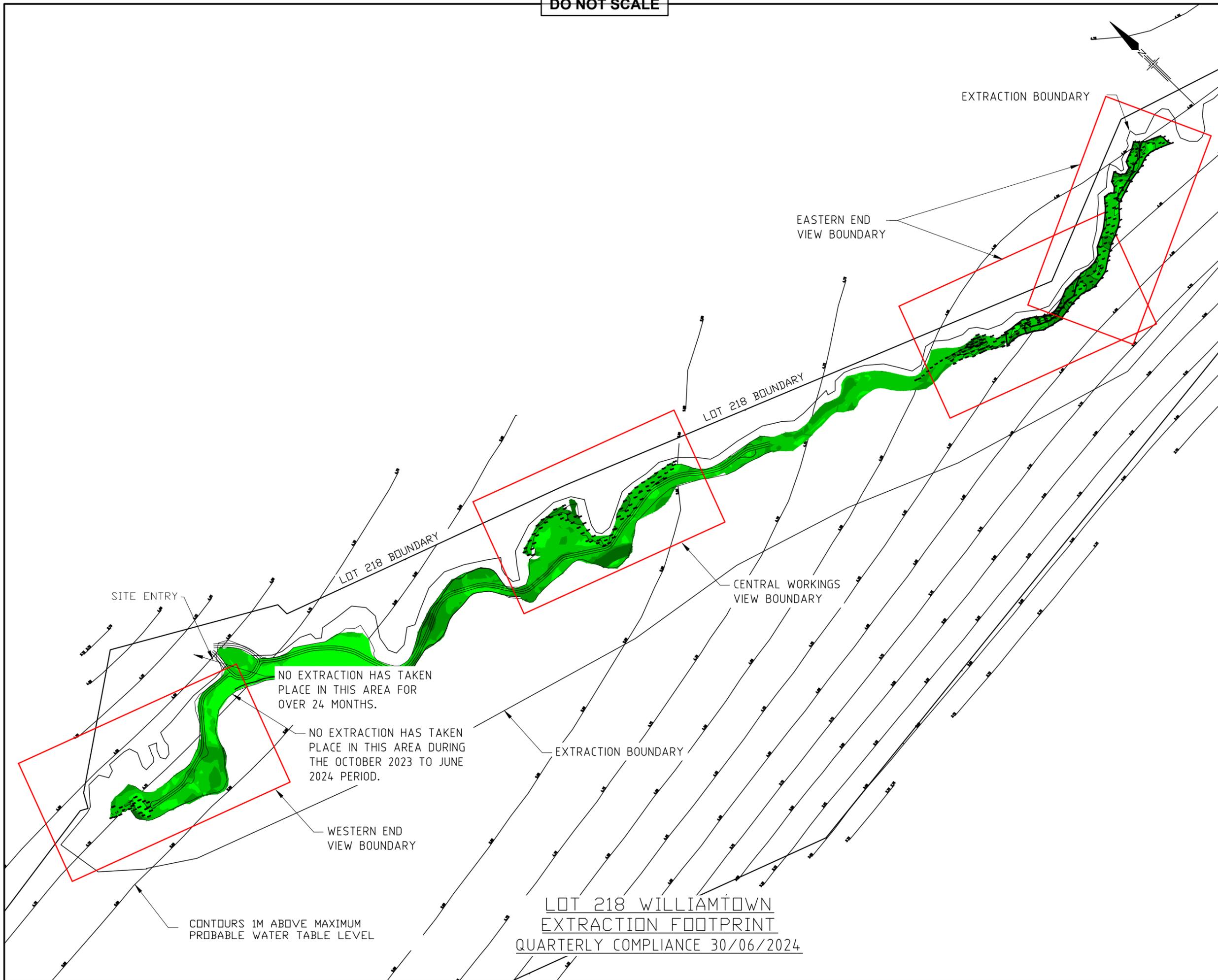
TITLE:  
 LOT 218  
 EXTRACTION LEVEL  
 QUATERLY COMPLIANCE

STATUS:  
 JUNE 2024

DRAWING NUMBER:

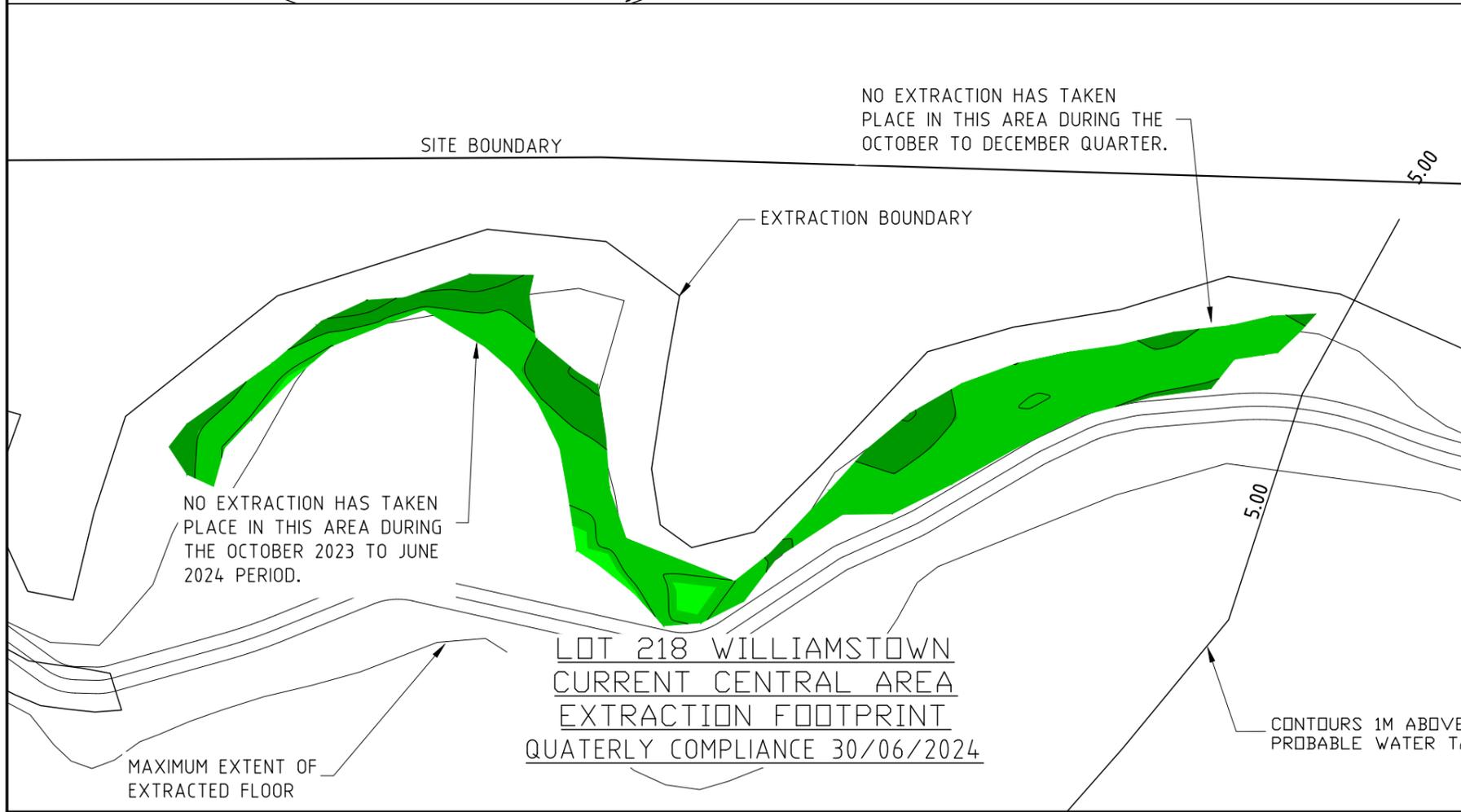
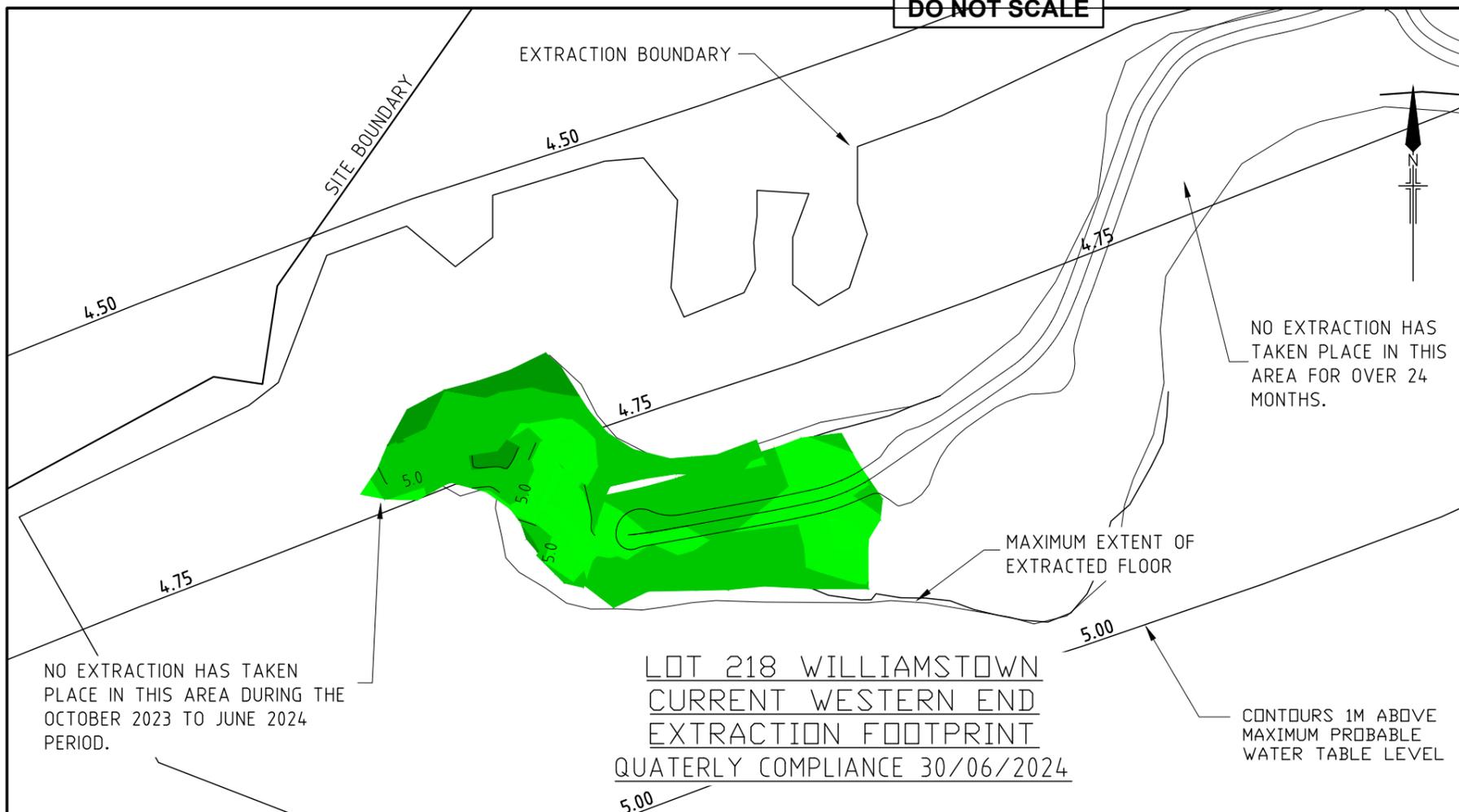
SHEET 1 OF 3 SHEETS

A3



LOT 218 WILLIAMTOWN  
 EXTRACTION FOOTPRINT  
 QUATERLY COMPLIANCE 30/06/2024

DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 30/06/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.
4. SURVEY TO CONFIRM COMPLIANCE AT CENTRAL WORKING AREA FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 17/10/2023.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 17/10/2023.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow
-0.1	to 0.0	m	Light Green
0.0	to 0.1	m	Green
0.1	to 0.2	m	Dark Green
0.2	to 0.5	m	Very Dark Green
0.5	to 1.0	m	Black
1.0	to 2.0	m	Black

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240630.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 10/01/2024  
 REVISION: A

CLIENT & JOB:  
**MACKAS SAND & SOIL**  
**WILLIAMTOWN COMPLIANCE REPORTING**

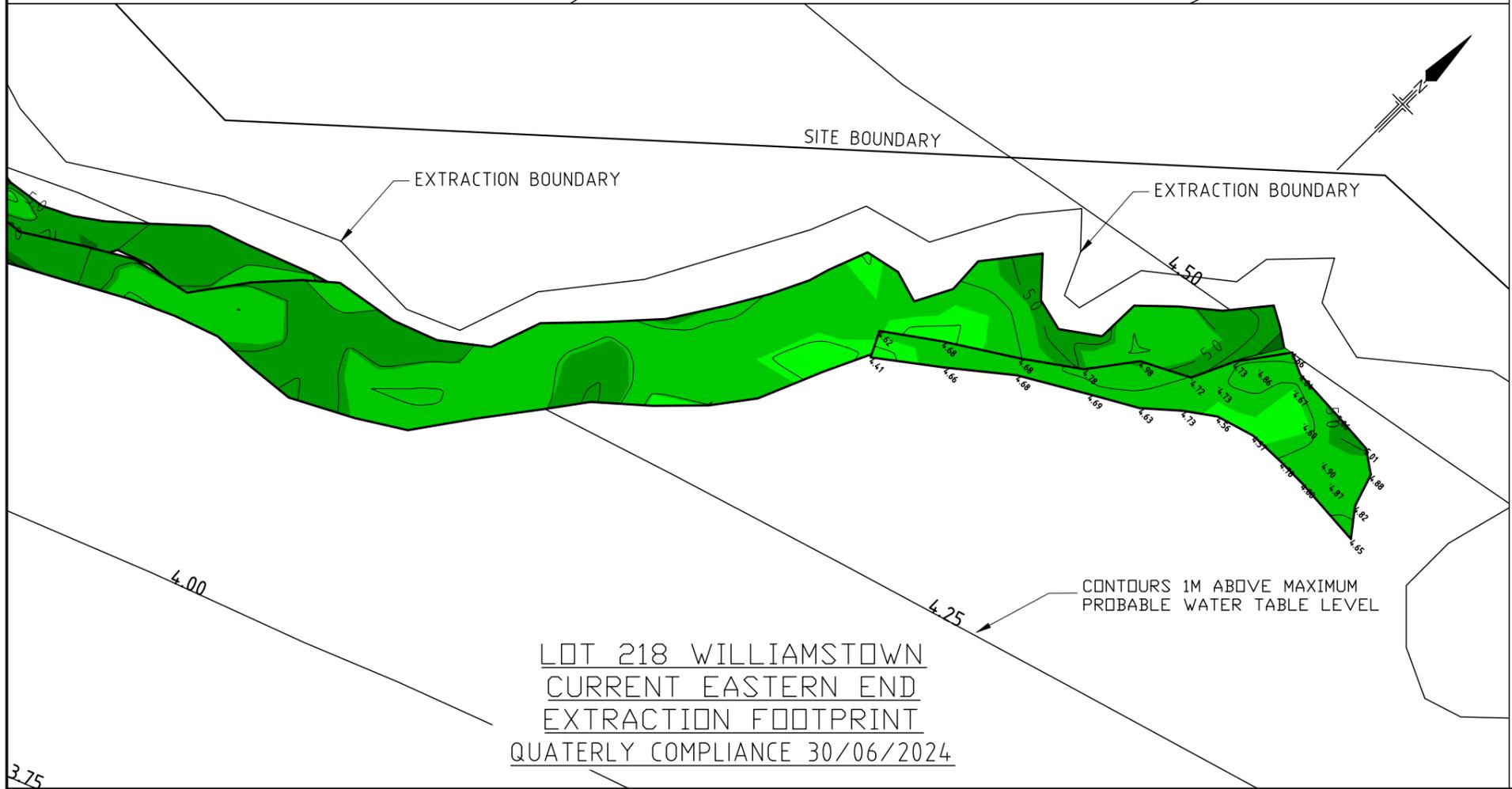
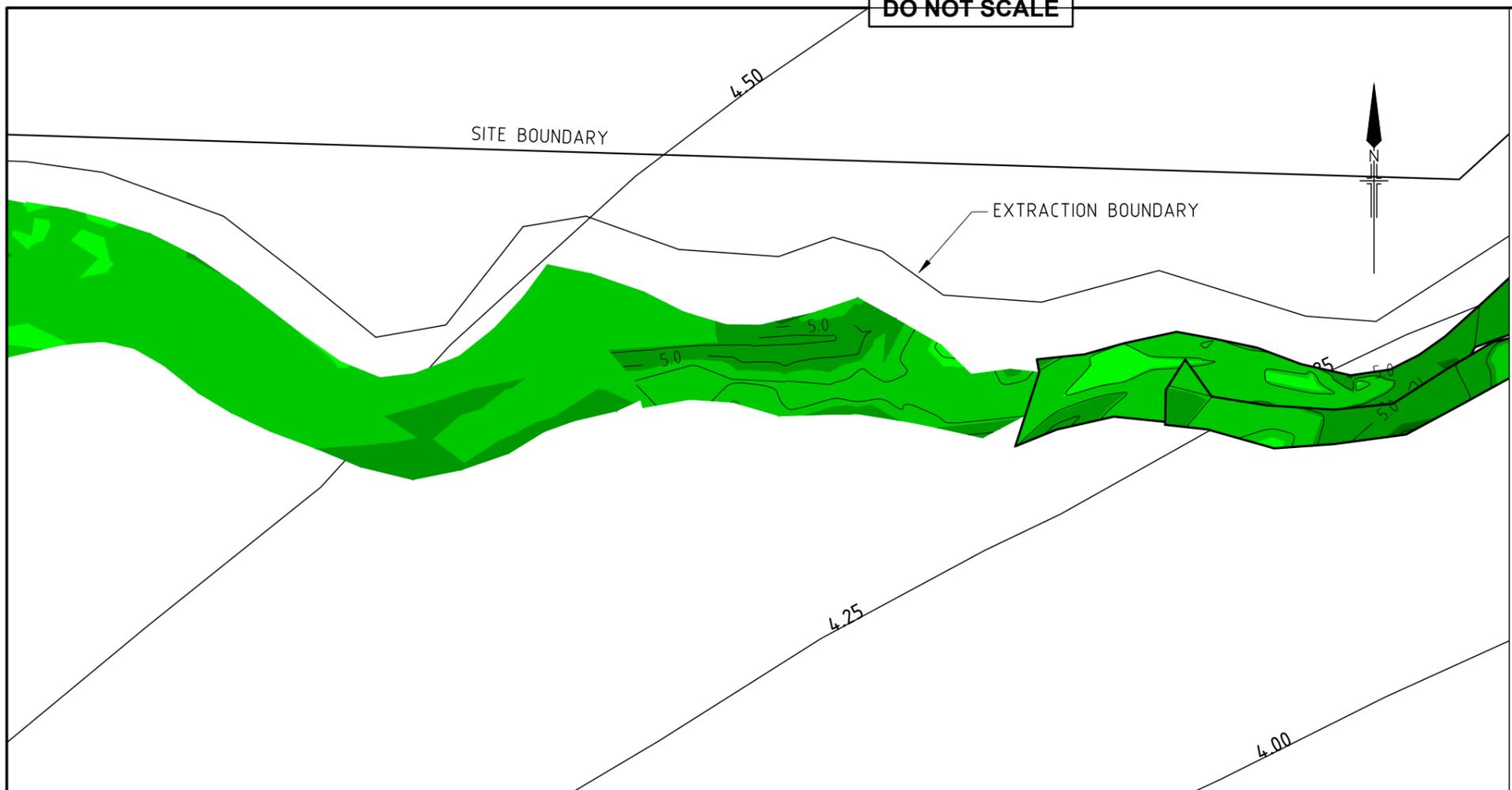
ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:  
**LOT 218 EXTRACTION LEVEL QUATERLY COMPLIANCE**

STATUS:  
**JUNE 2024**

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN  
 CURRENT EASTERN END  
 EXTRACTION FOOTPRINT  
 QUATERLY COMPLIANCE 30/06/2024

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 30/06/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL AREAS AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLIANT IN PREVIOUS SURVEYS. THESE AREAS DO NOT FROM PART OF THE ACTIVE EXTRACTION OPERATION.
4. SURVEY TO CONFIRM COMPLIANCE AT EASTERN END FOR THE QUARTER ENDING 30/06/2024 WAS COMPLETED 28/06/2024.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL

LOWER VALUE	UPPER VALUE	COLOUR
-0.35 to	-0.3 m	Red
-0.3 to	-0.2 m	Orange
-0.2 to	-0.1 m	Yellow
-0.1 to	0.0 m	Light Green
0.0 to	0.1 m	Green
0.1 to	0.2 m	Dark Green
0.2 to	0.5 m	Very Dark Green
0.5 to	1.0 m	Dark Green
1.0 to	2.0 m	Very Dark Green

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240630.dwg

SURVEYED: CJ & LC

DRAWN: CJ

CHECKED: CJ

DATUM: AHD

ISSUE DATE: 30/06/2024

REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:

LOT 218 EXTRACTION LEVEL QUATERLY COMPLIANCE

STATUS:

JUNE 2024

DRAWING NUMBER:

DO NOT SCALE

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_220\_Compliance\_240331.dwg  
SURVEYED: CJ  
DRAWN: CJ  
CHECKED: CJ  
DATUM: AHD  
ISSUE DATE: 12/04/2024  
REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL SALT ASH  
COMPLIANCE REPORTING



ABN: 66 605 045 314  
P: (02) 4967 5927  
M: 0429 987 821  
Unit 11 56 Industrial Dr  
Mayfield NSW 2304

TITLE:  
LOT 220  
EXTRACTION LEVEL  
COMPLIANCE

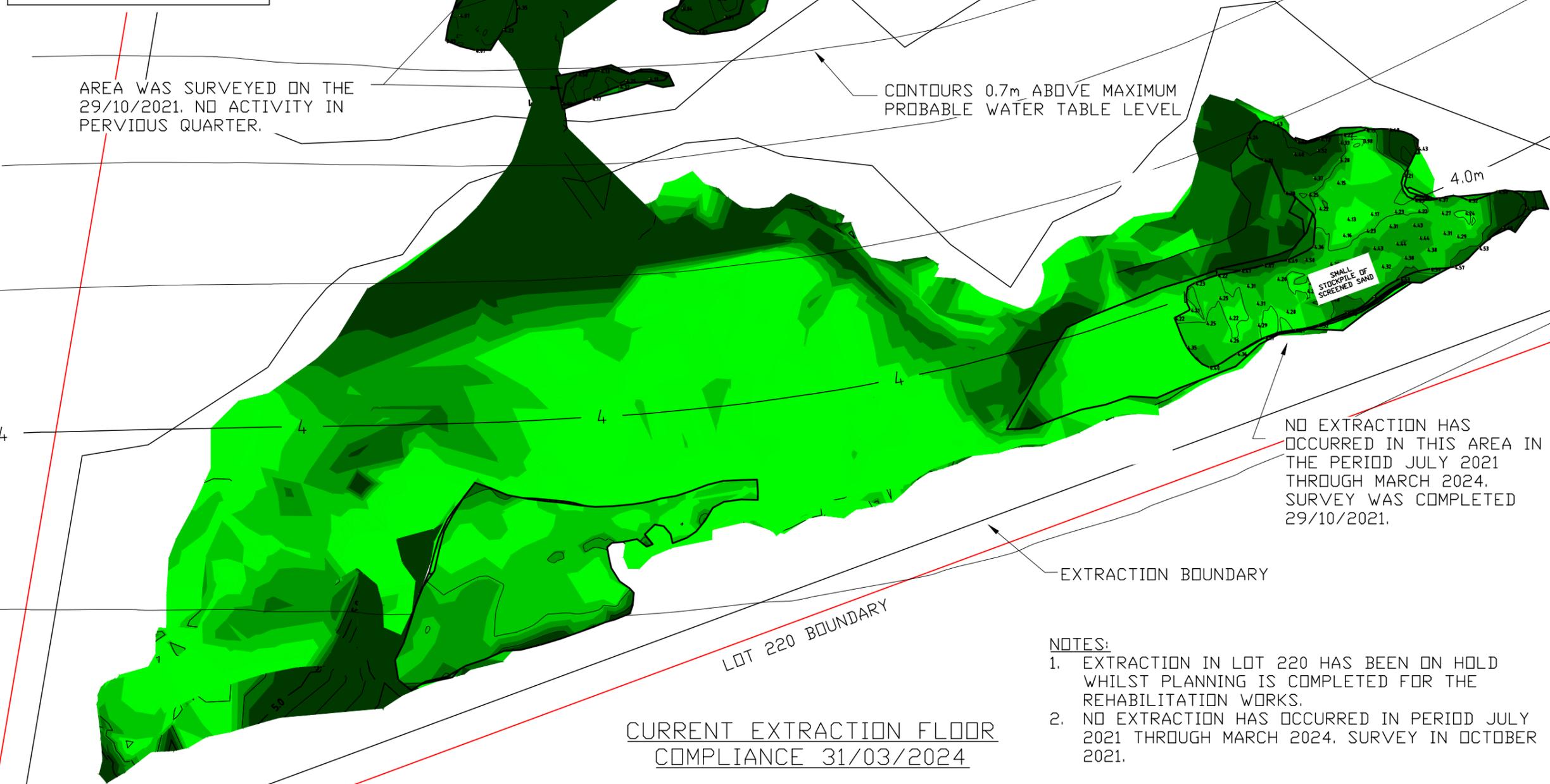
STATUS:  
MARCH 2024

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow-Orange
-0.1	to 0.0	m	Yellow
0.0	to 0.1	m	Light Green
0.1	to 0.2	m	Green
0.2	to 0.5	m	Dark Green
0.5	to 1.0	m	Very Dark Green
1.0	to 2.0	m	Black



NOTE: THIS AREA HAS NOT BEEN EXTRACTED AT THIS POINT IN TIME

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH MARCH 2024. SURVEY WAS COMPLETED 29/10/2021.

AREA WAS SURVEYED ON THE 29/10/2021. NO ACTIVITY IN PERVIOUS QUARTER.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH MARCH 2024. SURVEY WAS COMPLETED 29/10/2021.

- NOTES:
- EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
  - NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH MARCH 2024. SURVEY IN OCTOBER 2021.

CURRENT EXTRACTION FLOOR COMPLIANCE 31/03/2024

DO NOT SCALE

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240331.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 12/04/2024  
 REVISION: A

CLIENT & JOB:

MACKAS SAND & SOIL

WILLIAMTOWN COMPLIANCE REPORTING



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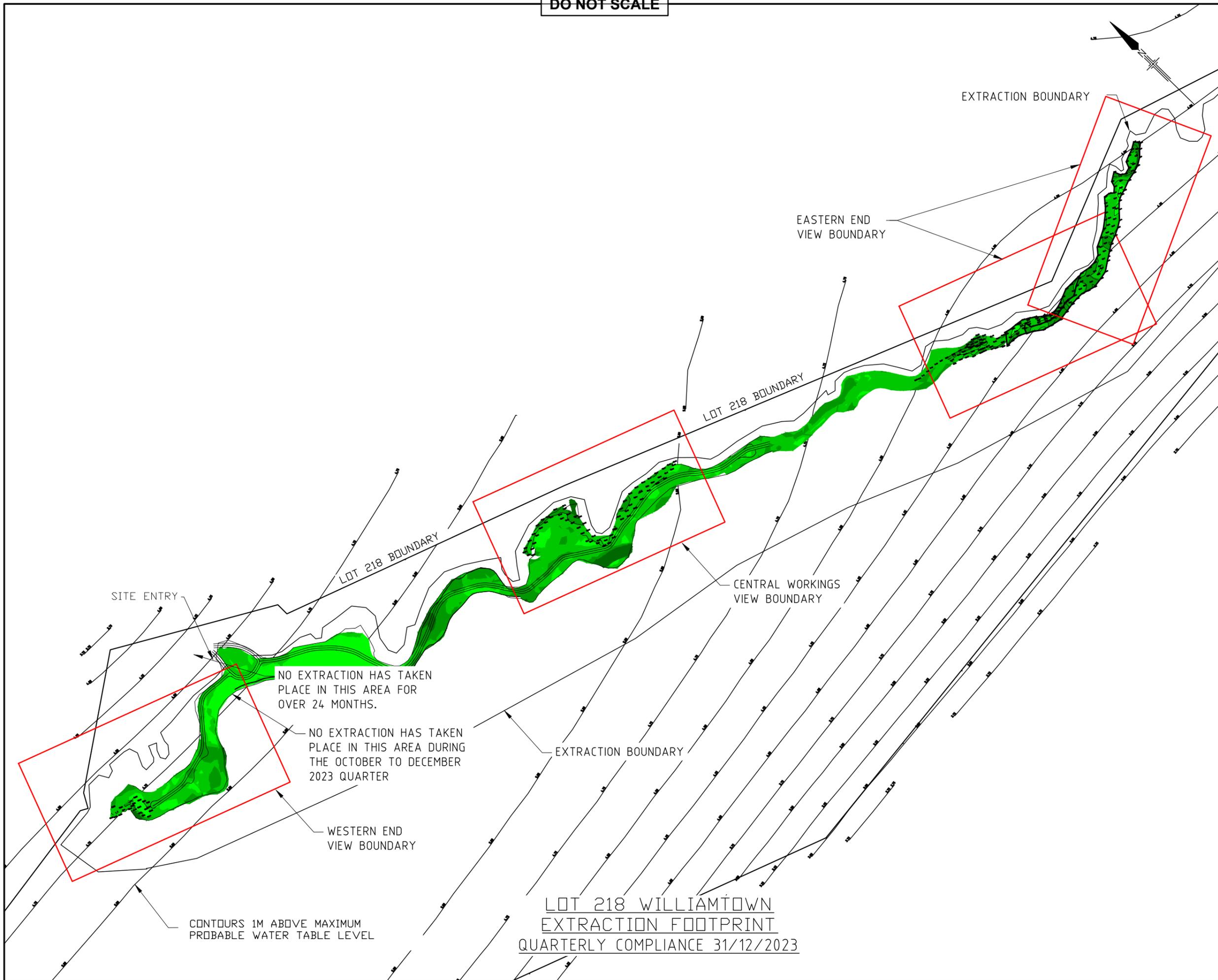
TITLE:  
 LOT 218  
 EXTRACTION LEVEL  
 QUATERLY COMPLIANCE

STATUS:  
 MARCH 2024

DRAWING NUMBER:

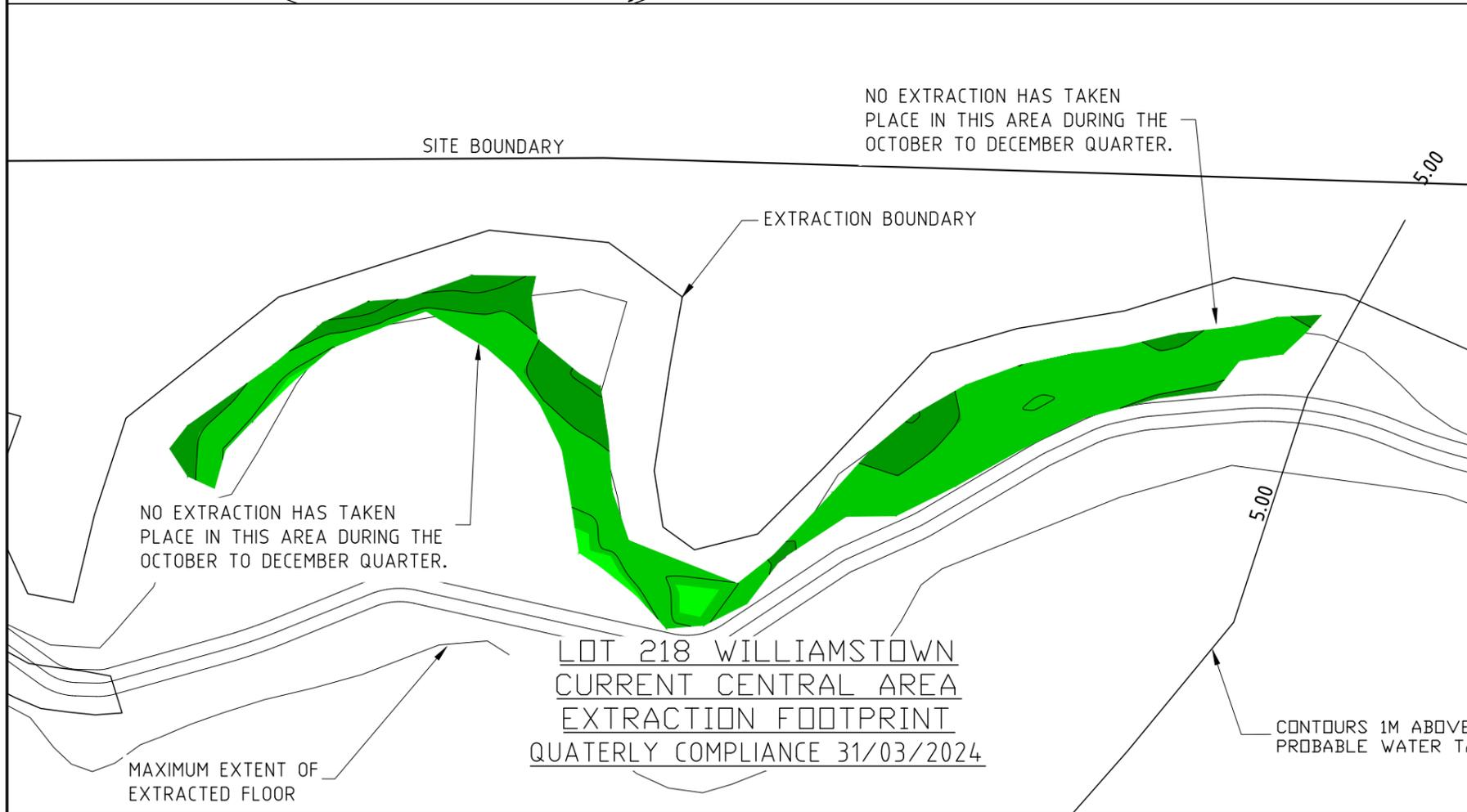
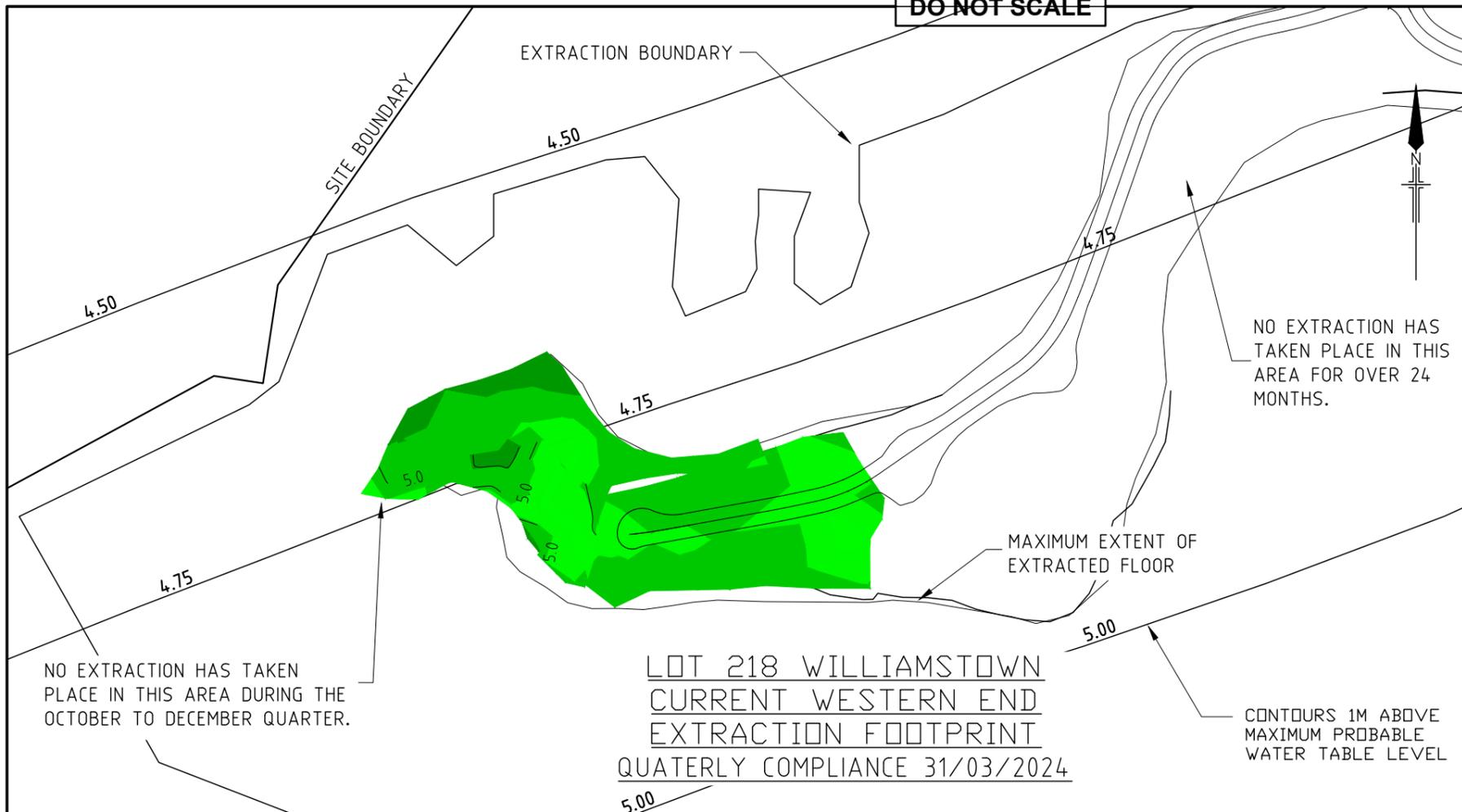
SHEET 1 OF 3 SHEETS

A3



LOT 218 WILLIAMTOWN  
 EXTRACTION FOOTPRINT  
 QUATERLY COMPLIANCE 31/12/2023

DO NOT SCALE



NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/03/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL FOOTPRINT AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLYING IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION.
4. SURVEY TO CONFIRM COMPLIANCE AT CENTRAL WORKING AREA FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 17/10/2023.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 17/10/2023.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	Red
-0.3	to -0.2	m	Orange
-0.2	to -0.1	m	Yellow
-0.1	to 0.0	m	Light Green
0.0	to 0.1	m	Green
0.1	to 0.2	m	Dark Green
0.2	to 0.5	m	Very Dark Green
0.5	to 1.0	m	Black
1.0	to 2.0	m	Black

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240331.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 10/01/2024  
 REVISION: A

CLIENT & JOB:  
**MACKAS SAND & SOIL**  
**WILLIAMTOWN COMPLIANCE REPORTING**



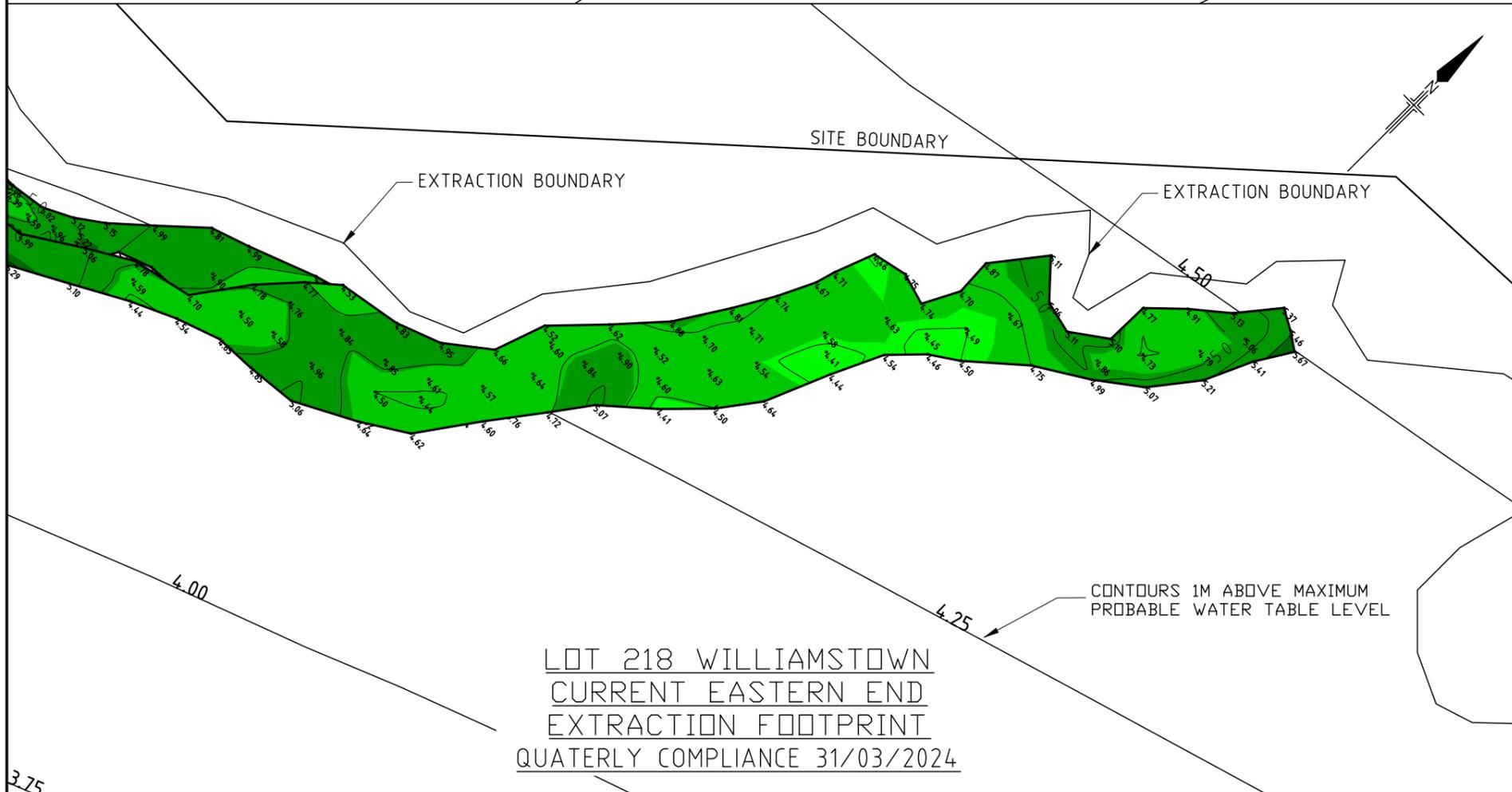
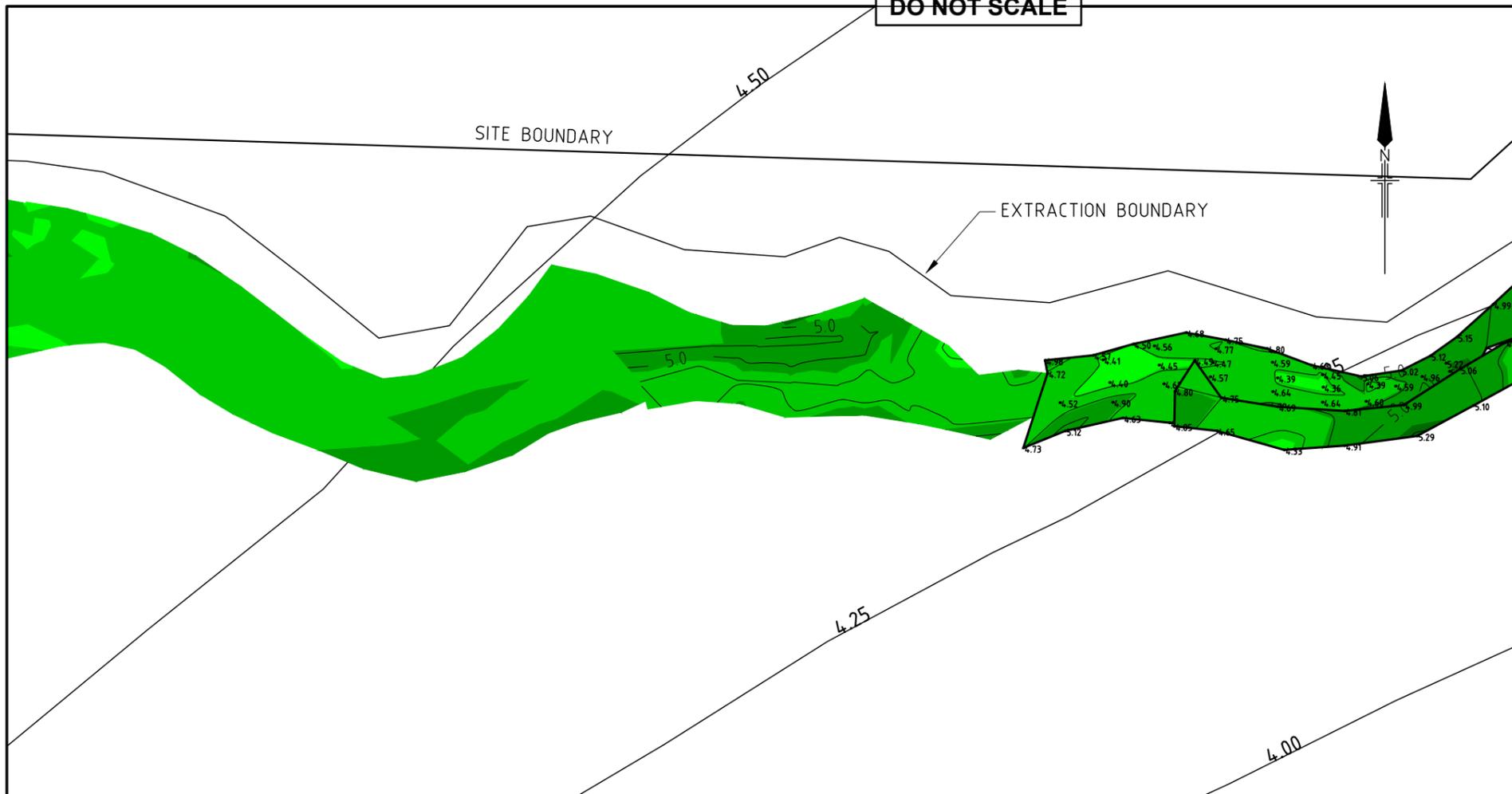
ABN: 66 605 045 314  
 P: (02) 4967 5927  
 M: 0429 987 821  
 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:  
**LOT 218  
 EXTRACTION LEVEL  
 QUARTERLY COMPLIANCE**

STATUS:  
**DECEMBER 2023**

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN  
 CURRENT EASTERN END  
 EXTRACTION FOOTPRINT  
 QUARTERLY COMPLIANCE 31/03/2024

NOTES:

1. THE ROAD SURFACE LEVEL HAS BEEN RAISED TO A MINIMUM OF 300mm-400mm ABOVE THE EXTRACTION SURFACE.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IN OPERATIONAL AREAS IS COMPLIANT AS AT 31/03/2024.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT OPERATIONAL AREAS AND CAN BE USED TO IDENTIFY THE EXTENT OF THE SURVEY. OTHER AREAS WHERE IDENTIFIED AS COMPLIANT IN PREVIOUS SURVEYS. THESE AREAS DO NOT FORM PART OF THE ACTIVE EXTRACTION OPERATION.
4. SURVEY TO CONFIRM COMPLIANCE AT EASTERN END FOR THE QUARTER ENDING 31/03/2024 WAS COMPLETED 12/04/2024.

DEPTH COMPLIANCE COMPARISON TO 1m ABOVE MAXIMUM PROBABLE GROUND WATER LEVEL			COLOUR
LOWER VALUE	UPPER VALUE		
-0.35	to -0.3	m	
-0.3	to -0.2	m	
-0.2	to -0.1	m	
-0.1	to 0.0	m	
0.0	to 0.1	m	
0.1	to 0.2	m	
0.2	to 0.5	m	
0.5	to 1.0	m	
1.0	to 2.0	m	

SCALE: NOT TO SCALE

FILE: 0014\_CS\_LOT\_218\_Compliance\_240331.dwg  
 SURVEYED: CJ & LC  
 DRAWN: CJ  
 CHECKED: CJ  
 DATUM: AHD  
 ISSUE DATE: 12/04/2024  
 REVISION: A

CLIENT & JOB:  
**MACKAS SAND & SOIL**  
 WILLIAMTOWN COMPLIANCE REPORTING



ABN: 66 605 045 314  
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 Unit 11 56 Industrial Dr  
 Mayfield NSW 2304

TITLE:  
**LOT 218  
 EXTRACTION LEVEL  
 QUARTERLY COMPLIANCE**

STATUS:  
**MARCH 2024**

DRAWING NUMBER:



## APPENDIX 2

### Historical Biodiversity Offset Monitoring Results

**Table 2A Results of *Diuris praecox* Searches Baseline**

	2014 (Baseline)	Criteria*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Date of survey	27/08/14	N/A	26/08/2015	26/08/16	25/08/17	7/09/18	28/08/19	01/09/20	13/09/21	26/08/22	24/08/23 and 7/09/23	23/08/24
Number of stems	64	16	69	39	93	20	23	0	0	3	15	29
Maximum flowers per stem	9	N/A	10	7	8	9	6	0	0	7	6	7
Minimum flowers per stem	0	N/A	0	0	0	0	1	0	0	3	1	0
Mean flowers per stem	4.2	N/A	4.7	2.7	3.4	4.3	4	0	0	5	4.3	2.6

\*25% of baseline for 3 consecutive years.

**Table 2B Results of *Diuris arenaria* Searches Baseline**

	2014 (Baseline)	Criteria*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Date of survey	10/08/14	N/A	11/09/2015	14/09/16	7/09/17	7/09/18	28/08/19	11/09/20	13/09/21	16/09/22	24/08/23 and 7/09/23	09/09/24
Number of stems	72	18	156	200	150	119	39	2	82	62	131	129
Maximum flowers per stem	7	N/A	9	7	5	6	3	2	7	7	7	6
Minimum flowers per stem	1	N/A	0	0	0	0	0	0	0	1	0	0
Mean flowers per stem	2.2	N/A	2.4	2.7	1.3	1	1	1	2.5	3.2	2.3	1.9

\*25% of baseline for 3 consecutive years.

**Table 2C Results of Habitat Assessment for Baseline**

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022	2023	2024
<b>Disturbances</b>									
Weeds (density/species)	Low Whiskey grass (Andropogon virginicus)	Low Whiskey grass (Andropogon virginicus)	Low Whiskey grass (Andropogon virginicus)	Low Whiskey grass (Andropogon virginicus)	Low Whiskey grass (Andropogon virginicus)	Moderate Whiskey grass ( <i>Andropogon virginicus</i> ), several mapped clusters as well as scattered individual occurrences throughout. Bitou bush ( <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> ) saplings scattered throughout. Low levels of fireweed ( <i>Senecio madagascariensis</i> ), catsear ( <i>Hypochaeris radicata</i> ) and quaking grass ( <i>Briza maxima</i> ) scattered throughout.	Low Whiskey grass ( <i>Andropogon virginicus</i> ), mapped clusters have decreased since 2021. Small patches recorded. Low levels of bitou bush ( <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> ) saplings scattered throughout. Low levels of fireweed ( <i>Senecio madagascariensis</i> ) and catsear ( <i>Hypochaeris radicata</i> ) scattered throughout.	Moderate Whiskey grass ( <i>Andropogon virginicus</i> ) relatively consistent with 2022. Low densities still present in previously mapped areas. Some new occurrences observed in previously inundated areas. Bitou bush ( <i>Chrysanthemoides monilifera</i> subsp. <i>rotundata</i> ) saplings scattered throughout. Low levels of fireweed ( <i>Senecio madagascariensis</i> ) and catsear ( <i>Hypochaeris radicata</i> ) scattered throughout the BOA, particularly in the SE corner.	Low Whiskey grass ( <i>Andropogon virginicus</i> ) identified along eastern boundary. Low densities of several scattered plants located in western area. Three Bitou Bush ( <i>Chrysanthemoides monilifera</i> subsp.) seedlings identified and removed. Two semi-mature plants were recorded along the eastern fence line outside the BOA. Low levels of Quaking Grass ( <i>Briza maxima</i> ) and Catsear ( <i>Hypochaeris radicata</i> ) identified.
Pests	Nil identified	Nil Identified	Nil Identified	Rabbit ( <i>Oryctolagus cuniculus</i> )	Nil Identified	Rabbit ( <i>Oryctolagus cuniculus</i> ) – minimal impact	Nil identified. Evidence of digging in SE corner in proximity to previous orchid records. Likely fox scat recorded.	Nil identified. Evidence of digging in SW and SE corner, likely bandicoot.	No evidence of pest animals observed during the assessment
Fire	Evidence of previous	Nil during reporting year	Nil during reporting year	Nil	Nil	Nil	Nil	Nil	No evidence of fire activity was observed during the assessment.
Grazing	Cattle	Cattle	Ground vegetation and small shrubs impacted by cattle grazing	Cattle present at the time of survey. Signs of historic cattle grazing during Stage 1 inspection; cattle grazing in the Biodiversity Offset Area during Stage 2 inspection. Grazing impacts present.	Cattle present at the time of both surveys. Extensive grazing affecting all vegetation <2 m in height. Some smaller shrubs pushed over. Ground cover very sparse.	No cattle present at time of survey	No cattle present at the time of survey.	No cattle present at the time of survey. Evidence of grazing 1m inside the western boundary fence.	No evidence of grazing was observed within the BOA.
Erosion	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Moderate (trampling exacerbated by Aeolian soils)	None identified	None identified.	None identified	No evidence of erosion was observed within the BOA.

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022	2023	2024
Logging	Historic (cut stumps)	Nil during reporting year; Vegetation removed to install fence*	Nil during reporting year - Vegetation removed by grazing	Nil during reporting year; minor impacts to ground vegetation by grazing.	Nil logging; vegetation removed by intense grazing. Some shrubs pushed over by cattle from grazing and rubbing. Bark stripping on some vegetation from cattle rubbing.	Nil since 2014	Nil Since 2014	Nil since 2014	No evidence of logging was observed within the BOA.
Features (Relative Abundance)									
Fallen timber/ logs	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	The BOA contains positive levels of logs and fallen timber.
Stags	Nil	Nil	Nil	Nil	Scarce	Scarce	Scarce	Scarce	The BOA contains several stags of medium size.
Ground cover (litter and vegetation)**	Moderate	Common	Moderate	Sparse – Moderate Signs of minor vegetation recovery and litter production following 2018 cattle grazing event. Signs of 2019 grazing impacts.	Low-Moderate Areas of litter concentrated under denser vegetation but bare areas common where cattle activity was highest. High proportion of vegetative ground cover removed from intense grazing.	Moderate areas of litter concentrated under dense vegetation but bare areas common where cattle activity was highest previously (albeit improving). Native ground cover now moderate (grasses, forbs, ferns and lichens) in terms of foliage cover now grazing no longer occurring	Moderate to high levels of ground cover/littler observed throughout the BOA. Increased areas of lichen cover due to increased moisture levels.	Moderate to high levels of leaf litter observed throughout. SE corner reasonably sparse – low ground cover and high level of digging.	Low to moderate levels of litter. Bare soil (sand) patches can be observed around the BOA but they are not common. Litter build is generally 0 – 2cm deep.
Mistletoe	Nil	Few	Few	Few	Scarce	Scarce	Few	Scarce	Mistletoe plants can be seen within the BOA growing on Old Man Banksia.
Dieback	Nil	Nil	Minor canopy dieback	Nil	Minor canopy dieback	Minor canopy dieback	Minor - midstory and ground cover (predominantly bracken fern but also in some leptospermum) dieback due to increased inundation levels.	Minor – Predominantly ground cover, bracken fern and wetland associated species on higher points of the site (likely due to high previous rainfall). Some dieback in these species observed due to reduced rainfall and inundated areas retreating. Minor shrub dieback observed.	Some dieback is evident in some Old Man Banksia trees. This may be related to Banksia Mistletoe and/or natural senescence of this rapid regenerative species. No dieback was observed in Melaleuca quinquenervia (Broad-leaved Paperbark) or Eucalyptus pilularis (Blackbutt).
Loose bark on trees	Moderate	Moderate	Few	Few	Few. Some bark rubbed off by cattle.	Scarce. Former damage to tree bark as a result of cattle rubbing recovering.	Few	Few	Loose bark can be observed on Broad-leaved paperbark trees.

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022	2023	2024
Tree Hollows									
Number of trees with hollows	12	12	12	12	12	12	12	12	10 Numerous other potential hollows exist (small hollows in high canopy/stem) but could not be verified.
Size classes present	Very small (vs), small (s), medium (m), large (l) and very large (vl)	vs, s, m, l, vl	-.***						

\*Vegetation removed along northern and western boundary – approximately 5m – 7m in width along with additional areas to stockpile.

\*\*Categories of ground cover range from scarce, low, moderate, abundant, and very abundant.

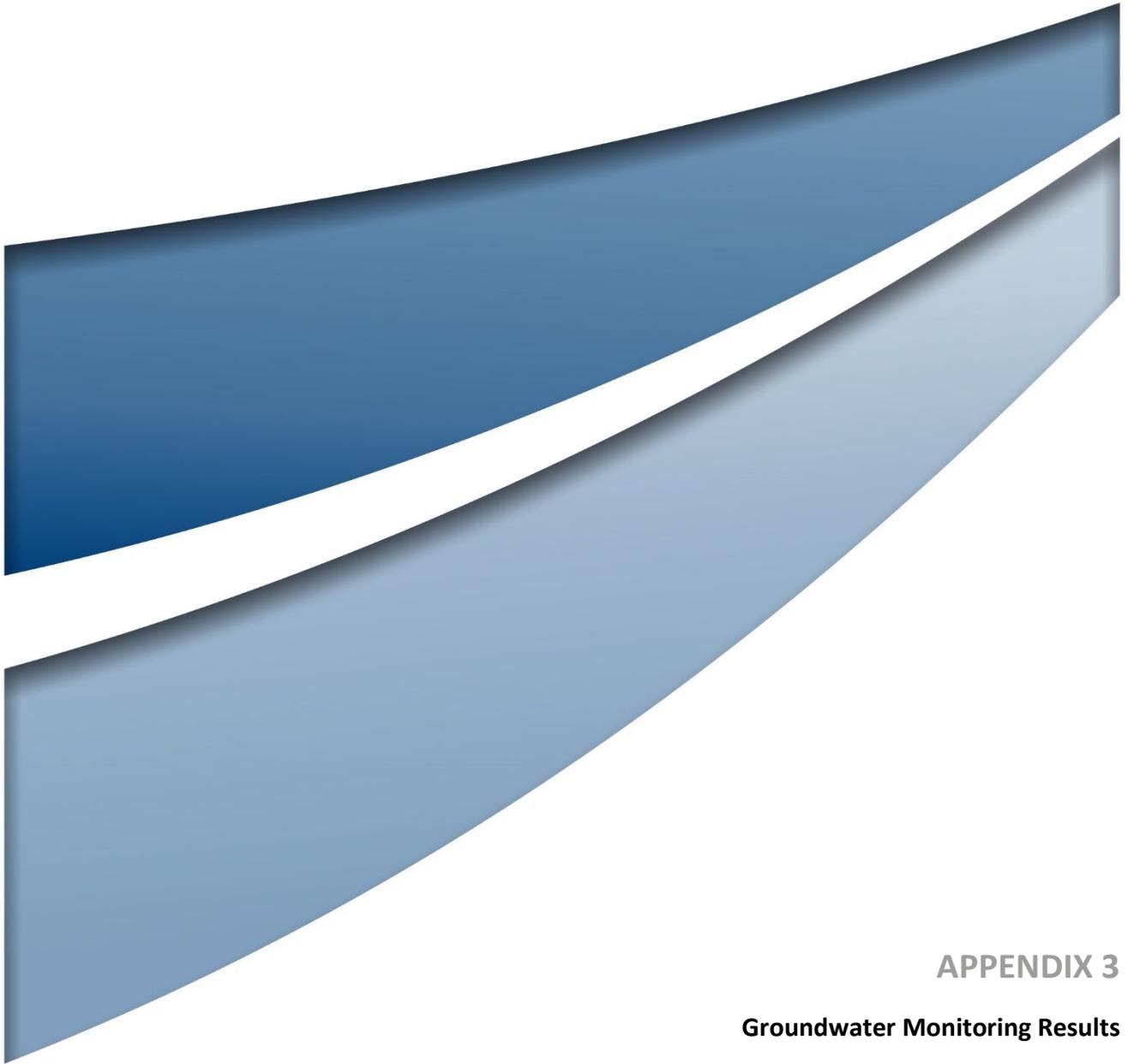
\*\*\*Size classes of tree hollows were not undertaken by Cool Burn in 2024 (Cool Burn, 2024).

**Table 2D Transect 1 Results of 50 m Transect Data**

% Cover	2016	2017	2018	2019	2020	2021	2022	2023	2024
Canopy Cover									
Native Over-storey	12%	12%	6%	7%	27.5%	21%	16%	14%	22%
Native Mid-storey	5%	4.5%	4%	6.6%	7%	4.5%	7%	22.7%	17%
Ground Cover									
Native Grass	14%	20%	16%	41%	14%	42%	44%	22%	20%
Native Shrubs	8%	24%	8%	6%	8%	6%	8%	28%	24%
Native other (e.g. Forbs)	32%	22%	10%	20%	28%	16%	52%	26%	58%
Exotic	12%	4%	6%	2%	12%	2%	2%	0%	4%
Bare Earth	36%	34%	62%	40%	42%	44%	34%	66%	10%

**Table 2E Transect 2 Results of 50 m Transect Data**

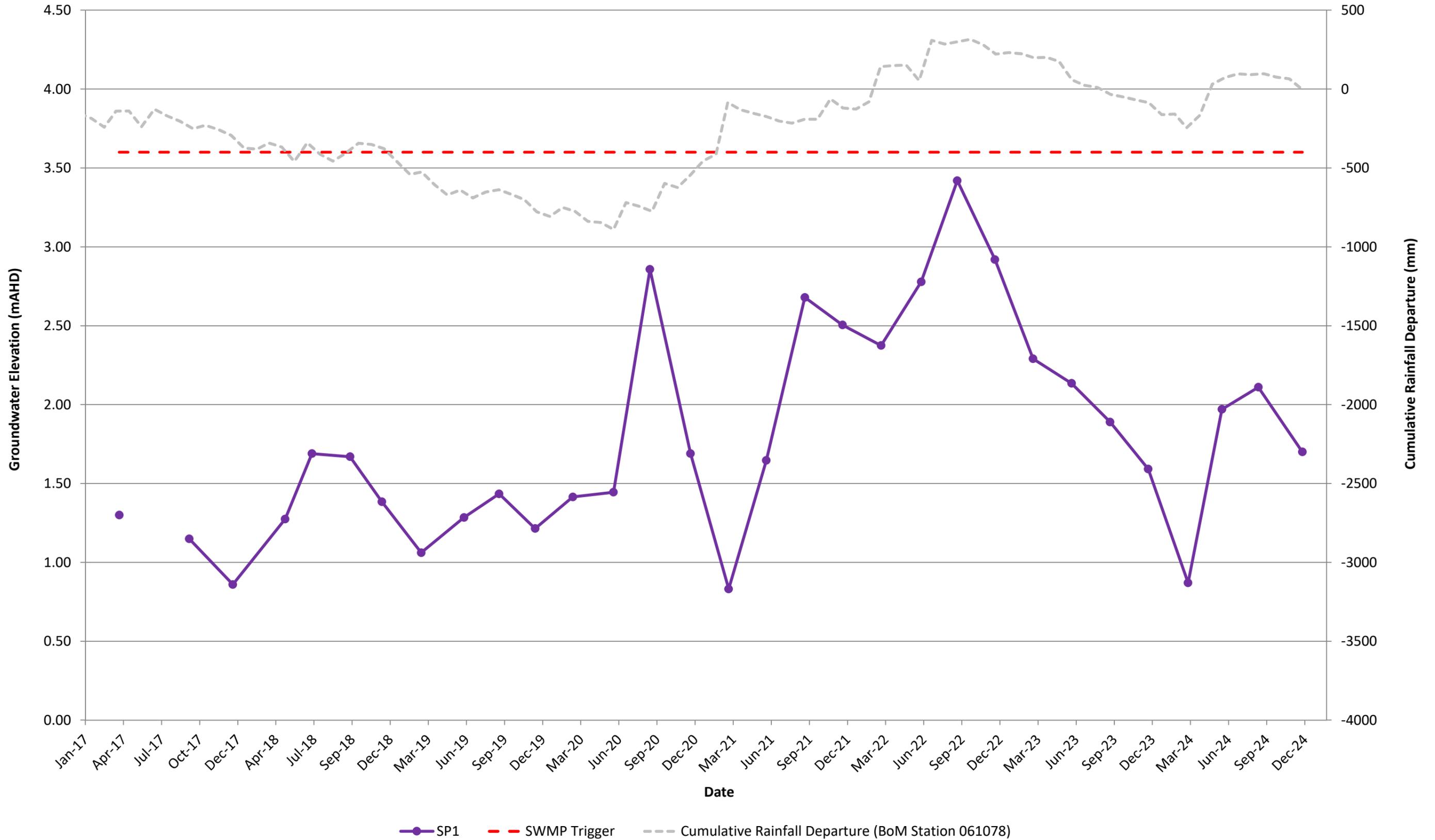
% Cover	2016	2017	2018	2019	2020	2021	2022	2023	2024
Canopy Cover									
Native Over-storey	31%	34%	18%	17%	17%	10%	14.5%	17%	26%
Native Mid-storey	1%	1%	0.1%	3.8%	15%	11.5%	8%	11.3%	0.5%
Ground Cover									
Native Grass	16%	12%	6%	4%	20%	34%	58%	8%	20%
Native Shrubs	2%	2%	2%	0%	14%	26%	2%	8%	5%
Native other (eg. Forbs)	44%	46%	8%	48%	24%	20%	34%	74%	92%
Exotic	10%	12%	4%	2%	10%	4%	0%	16%	18%
Bare Earth	34%	34%	80%	48%	38%	36%	28%	16%	0%



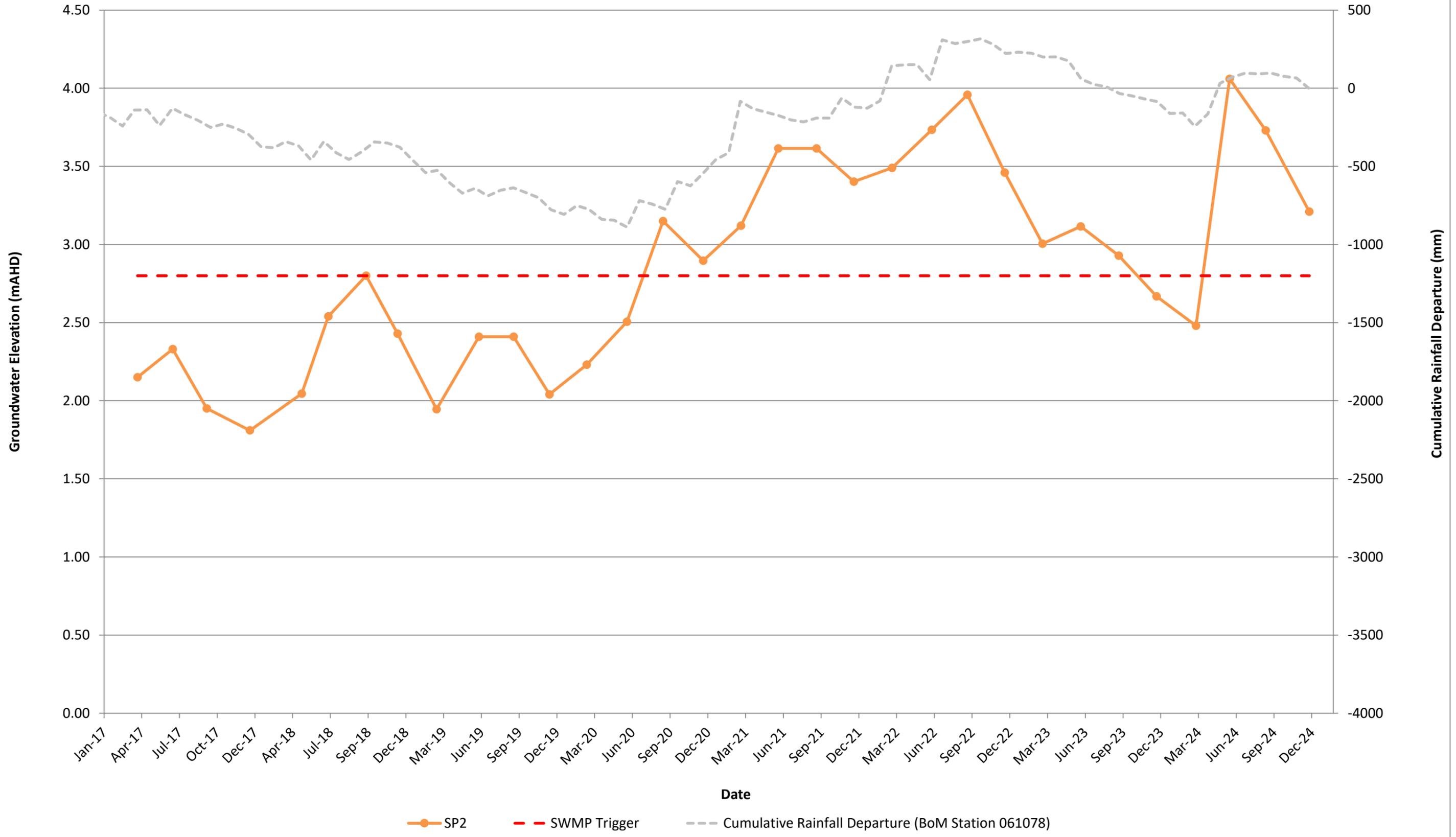
## APPENDIX 3

### Groundwater Monitoring Results

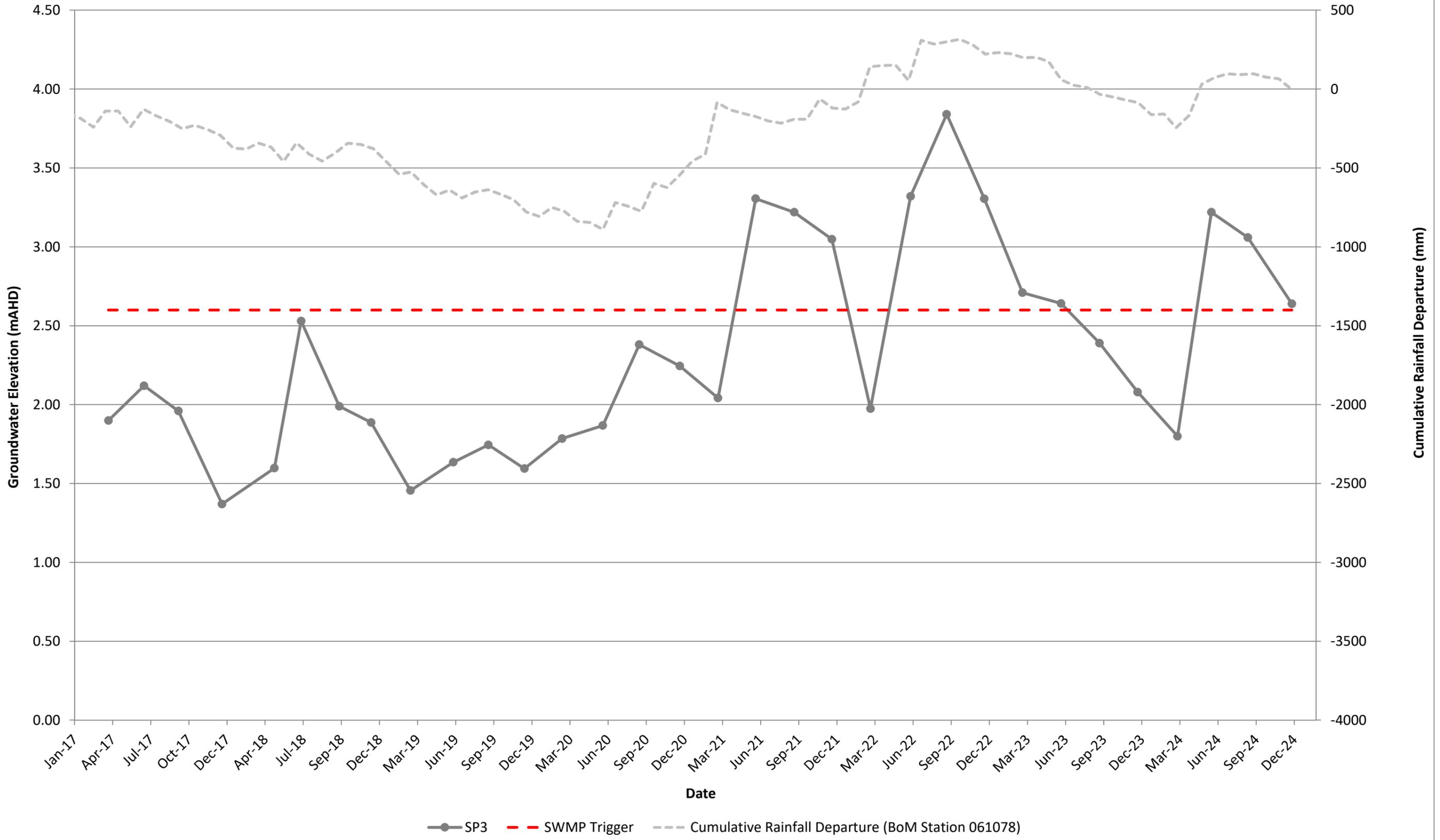
### Groundwater Levels (mAHD) SP1



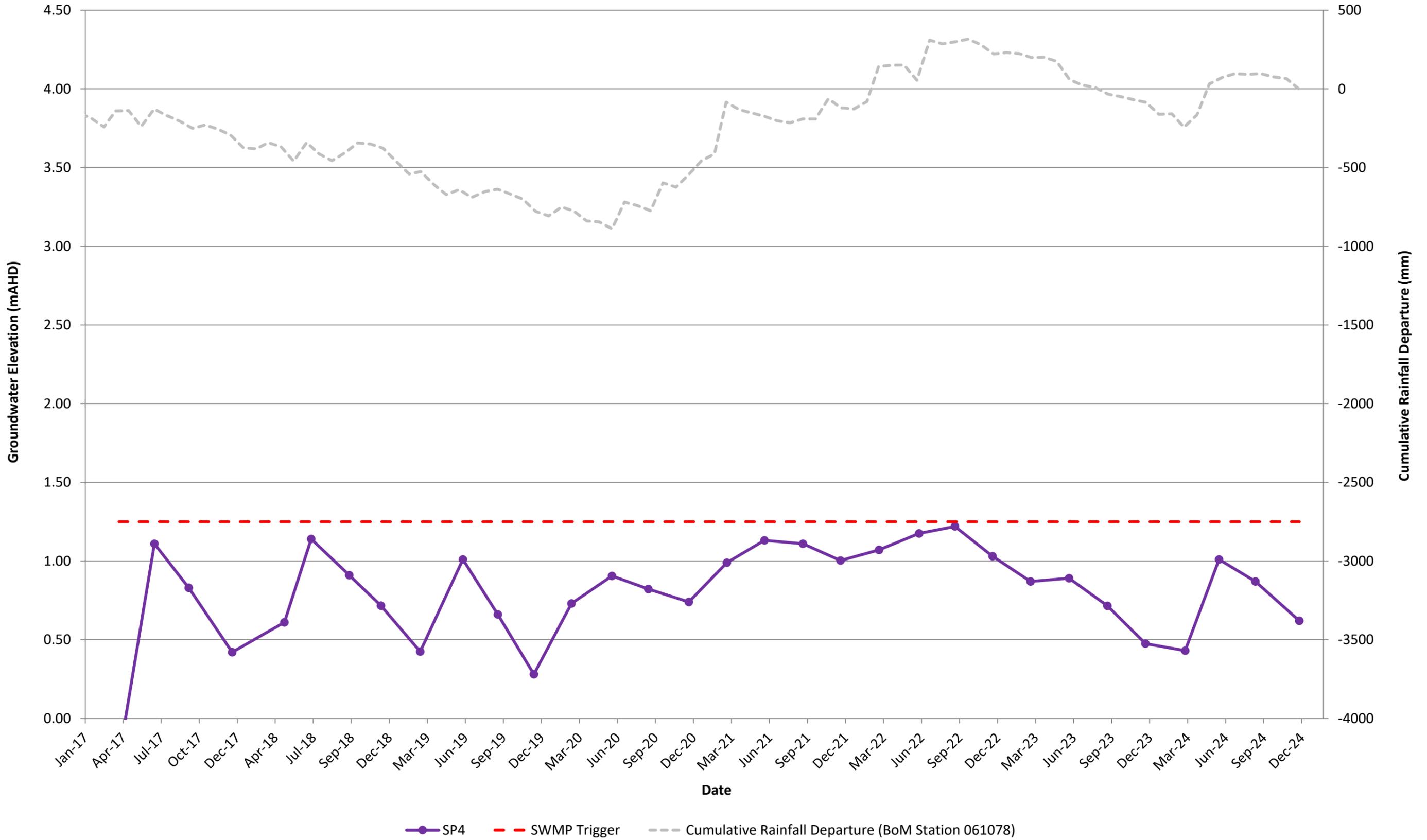
### Groundwater Levels (mAHD) SP2



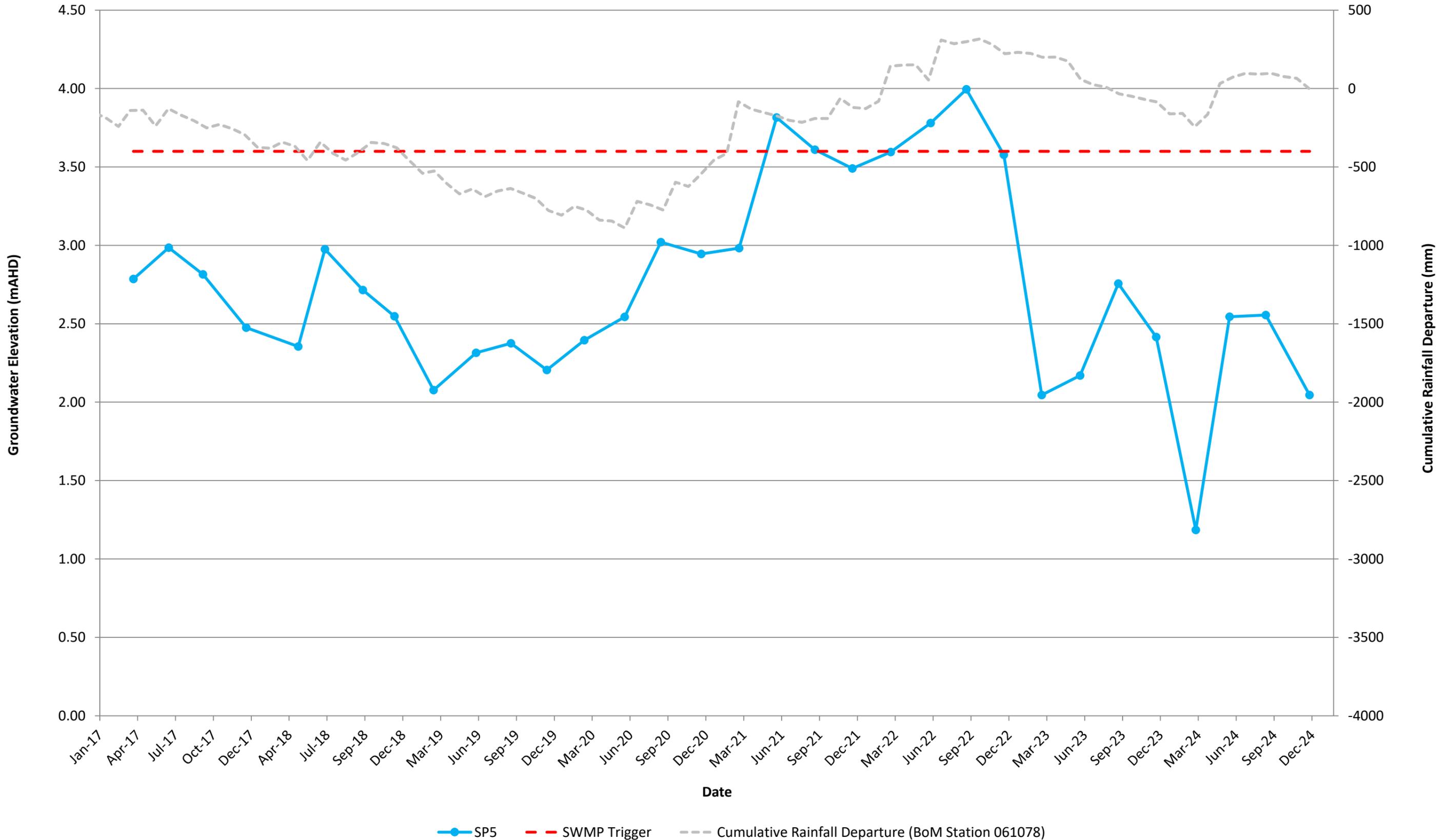
### Groundwater Levels (mAHD) SP3



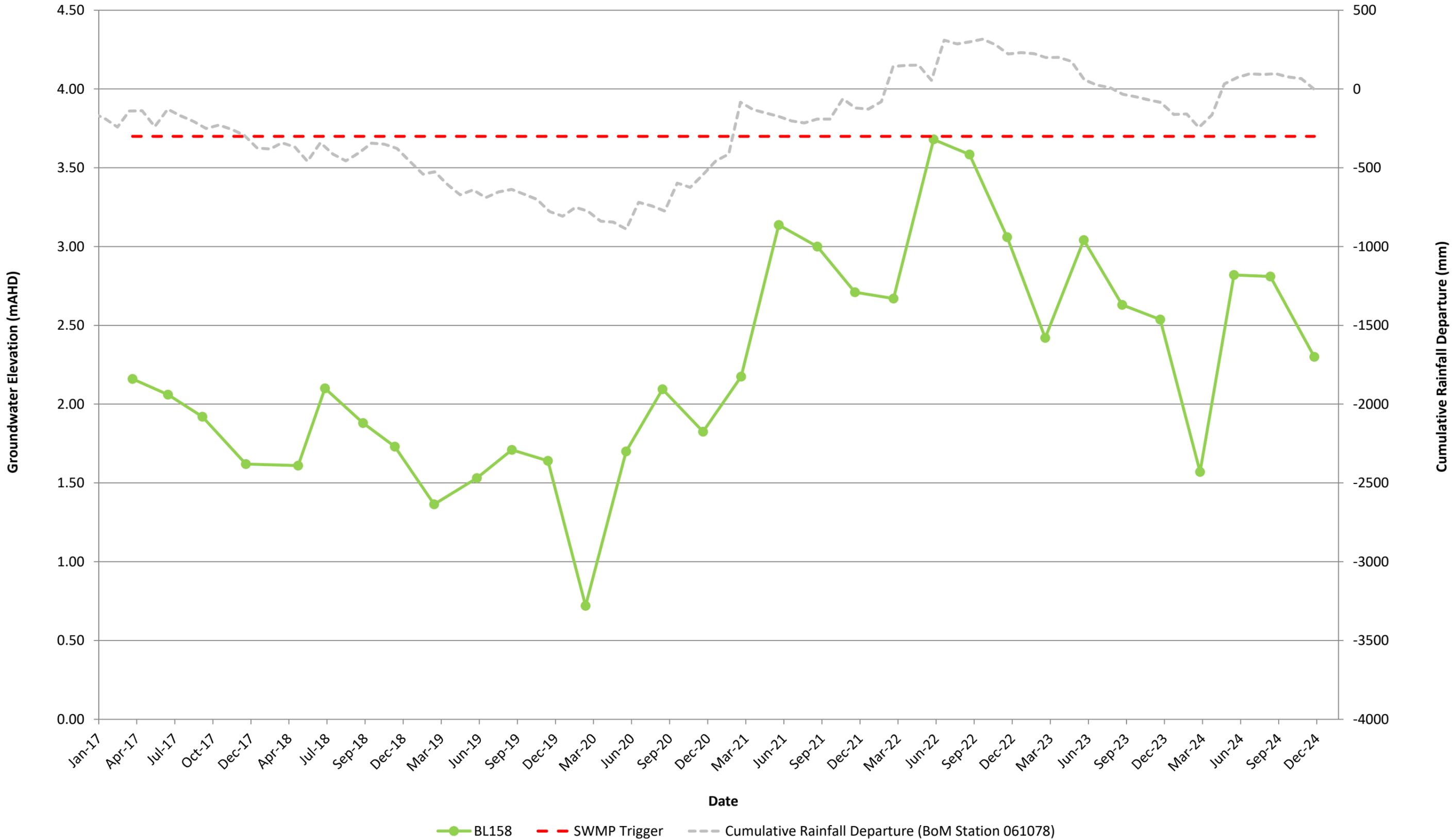
### Groundwater Levels (mAHD) SP4



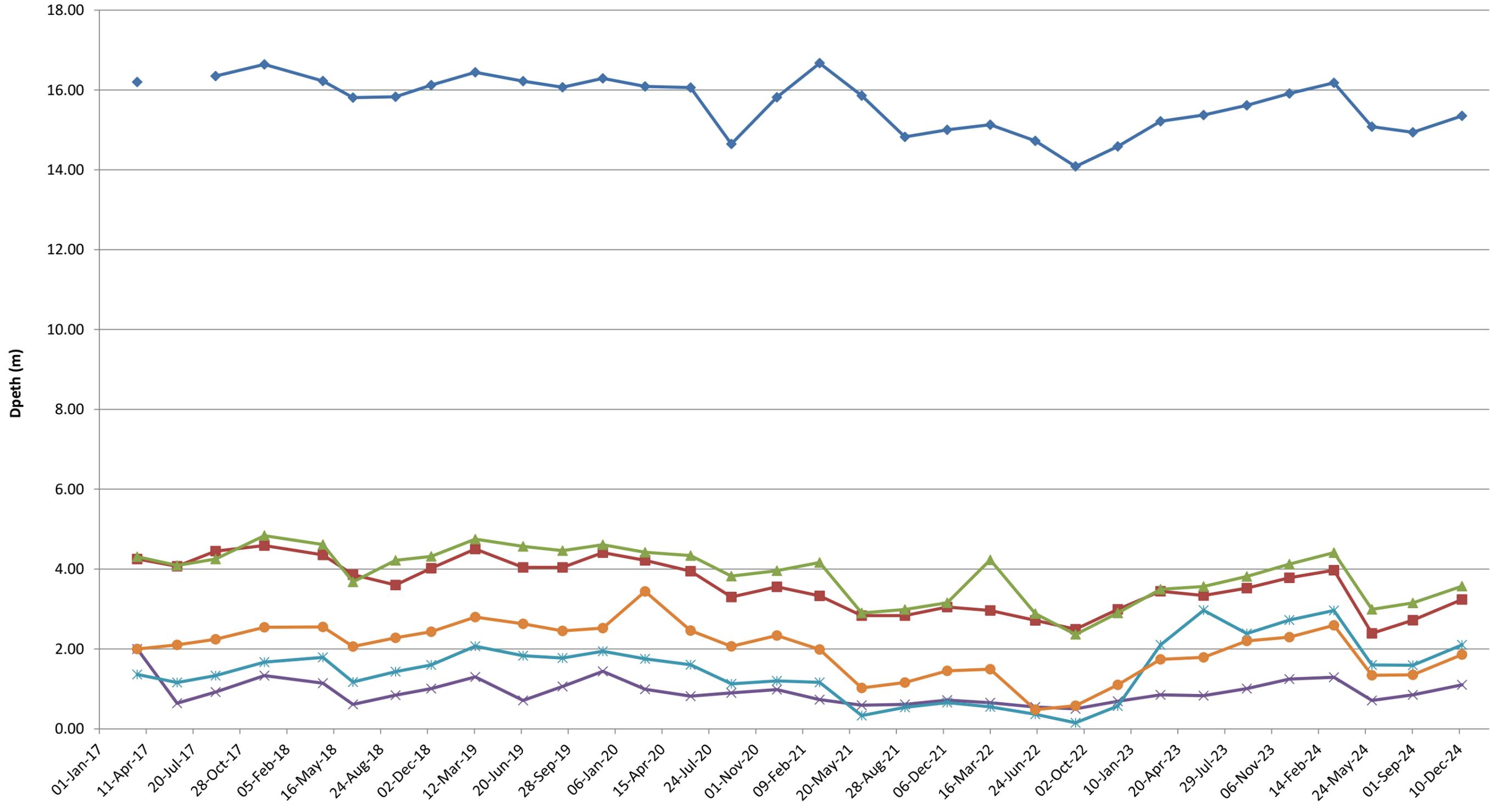
### Groundwater Levels (mAHD) SP5



### Groundwater Levels (mAHD) BL158



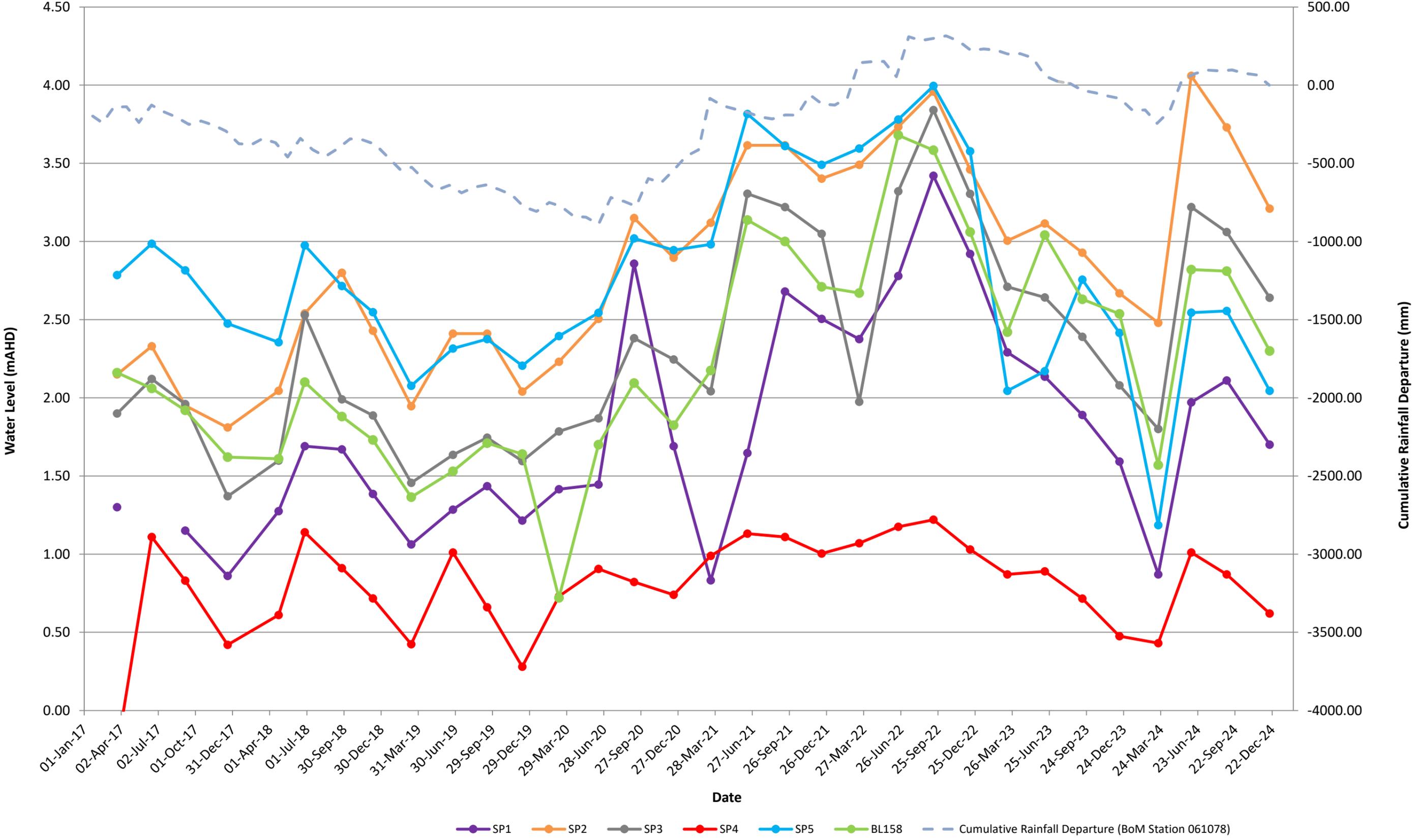
### Groundwater Depths (m)



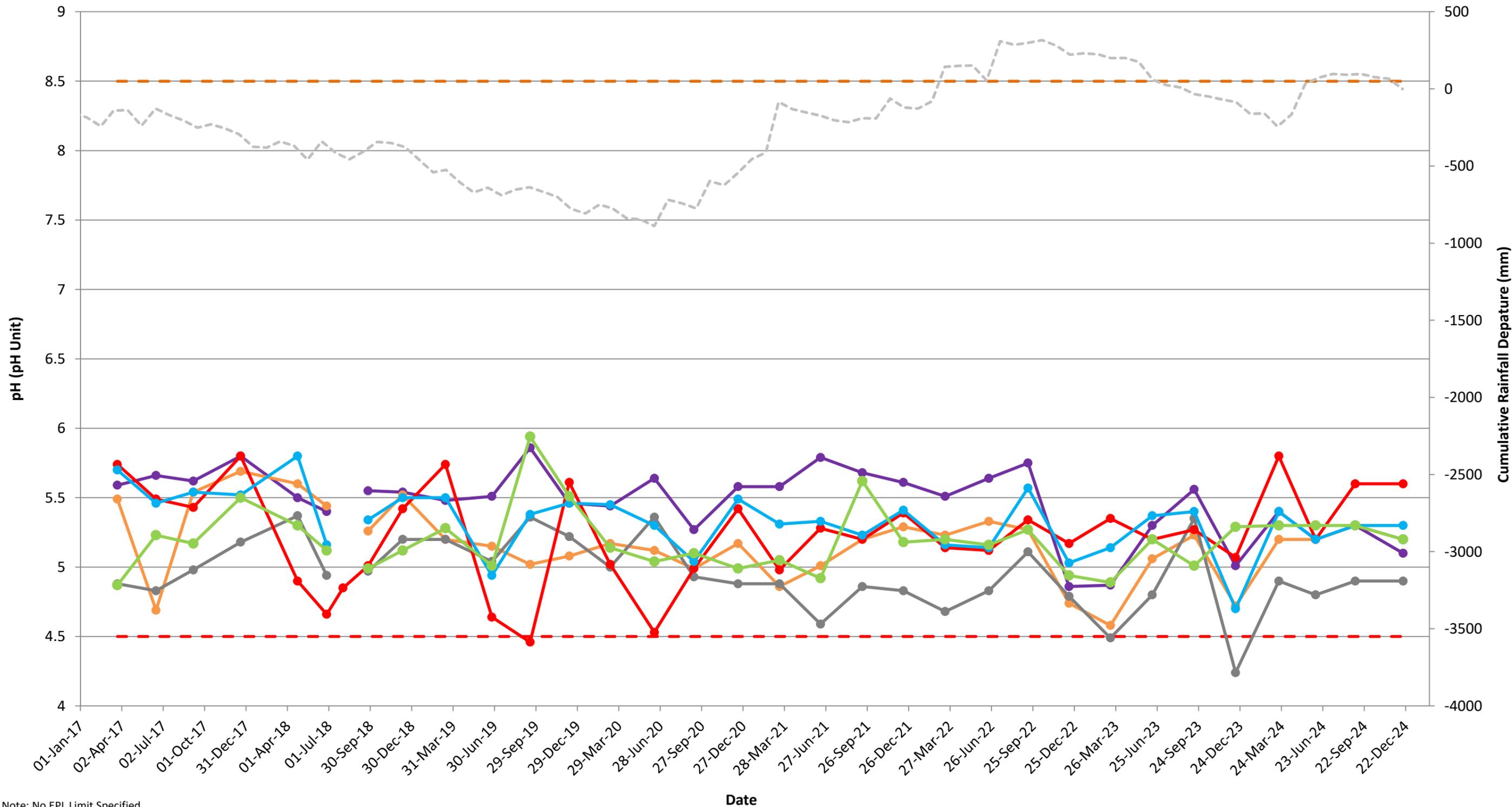
Note: No EPL Limit Specified

SP1 SP2 SP3 SP4 SP5 BL158

### Groundwater Levels (mAHD)



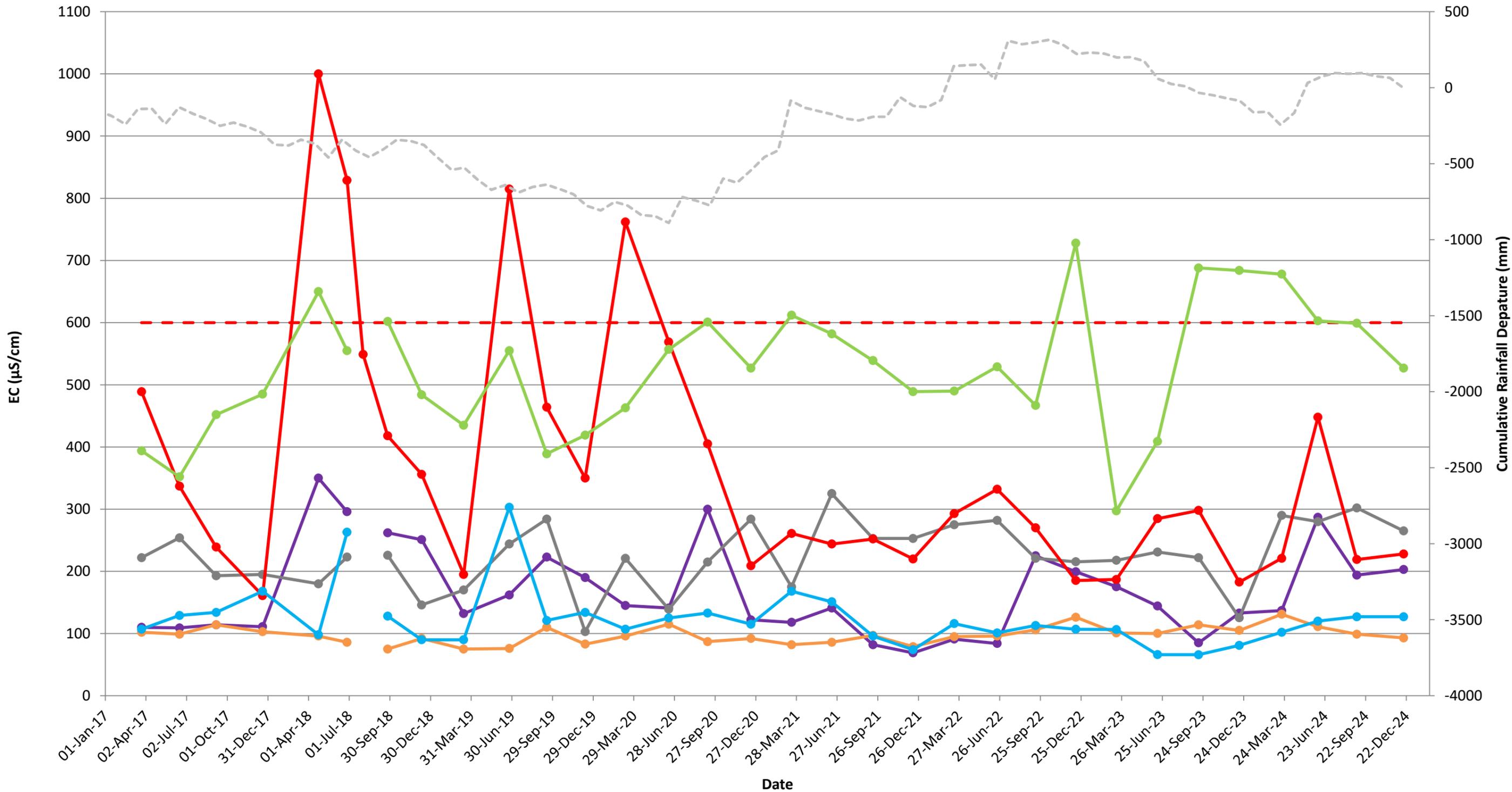
### Groundwater - pH



Note: No EPL Limit Specified

- - - Lower SWMP Trigger   
 - - - Upper SWMP Trigger   
 ● SP1   
 ● SP2   
 ● SP3   
 ● SP4   
 ● SP5   
 ● BL158   
 - - - Cumulative Rainfall Departure (Station 061078)

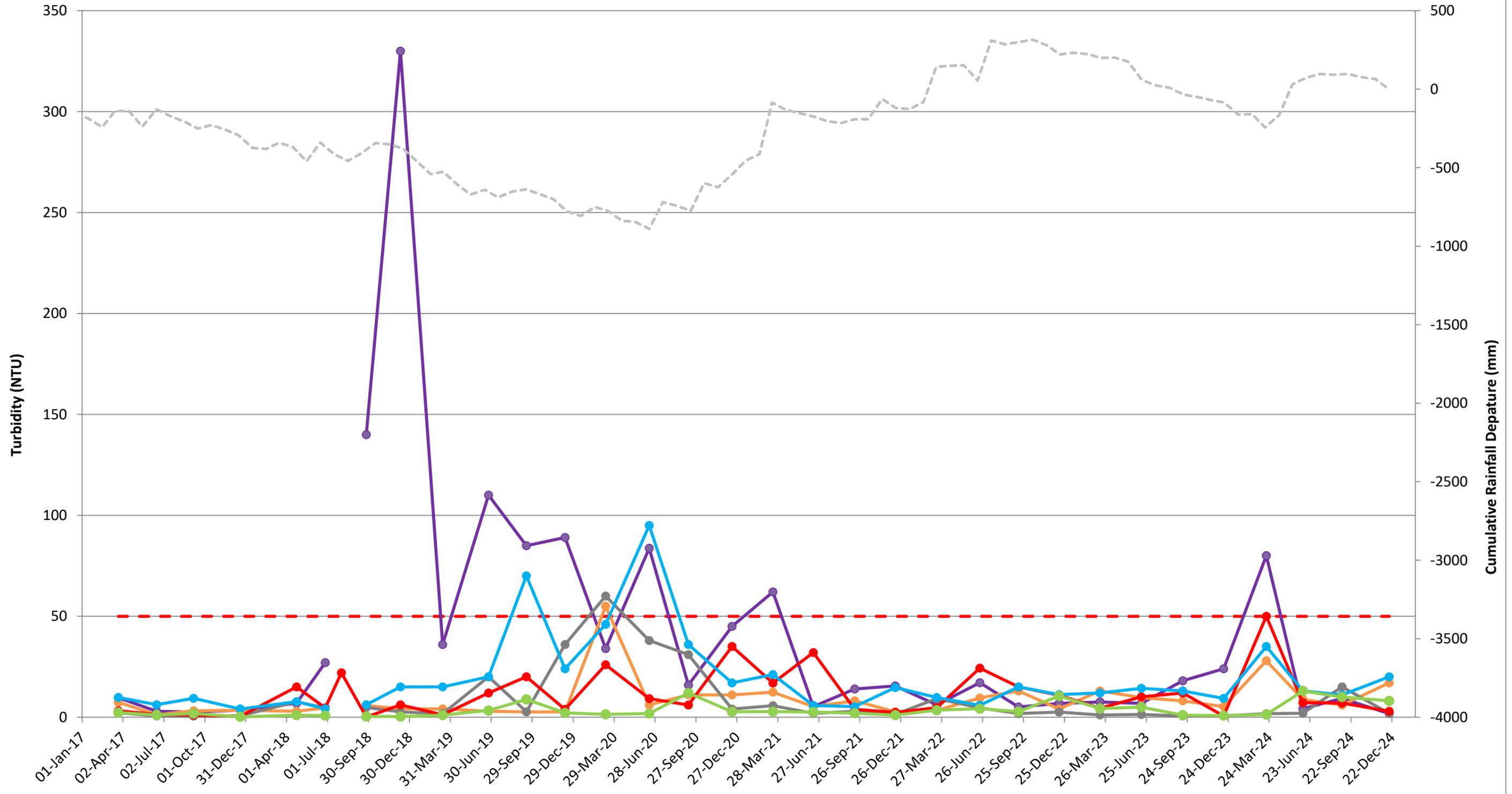
### Groundwater - Electrical Conductivity (EC)



Note: No EPL Limit Specified

--- SWMP Trigger    ● SP1    ● SP2    ● SP3    ● SP4    ● SP5    ● BL158    - - - Cumulative Rainfall Departure (Station 061078)

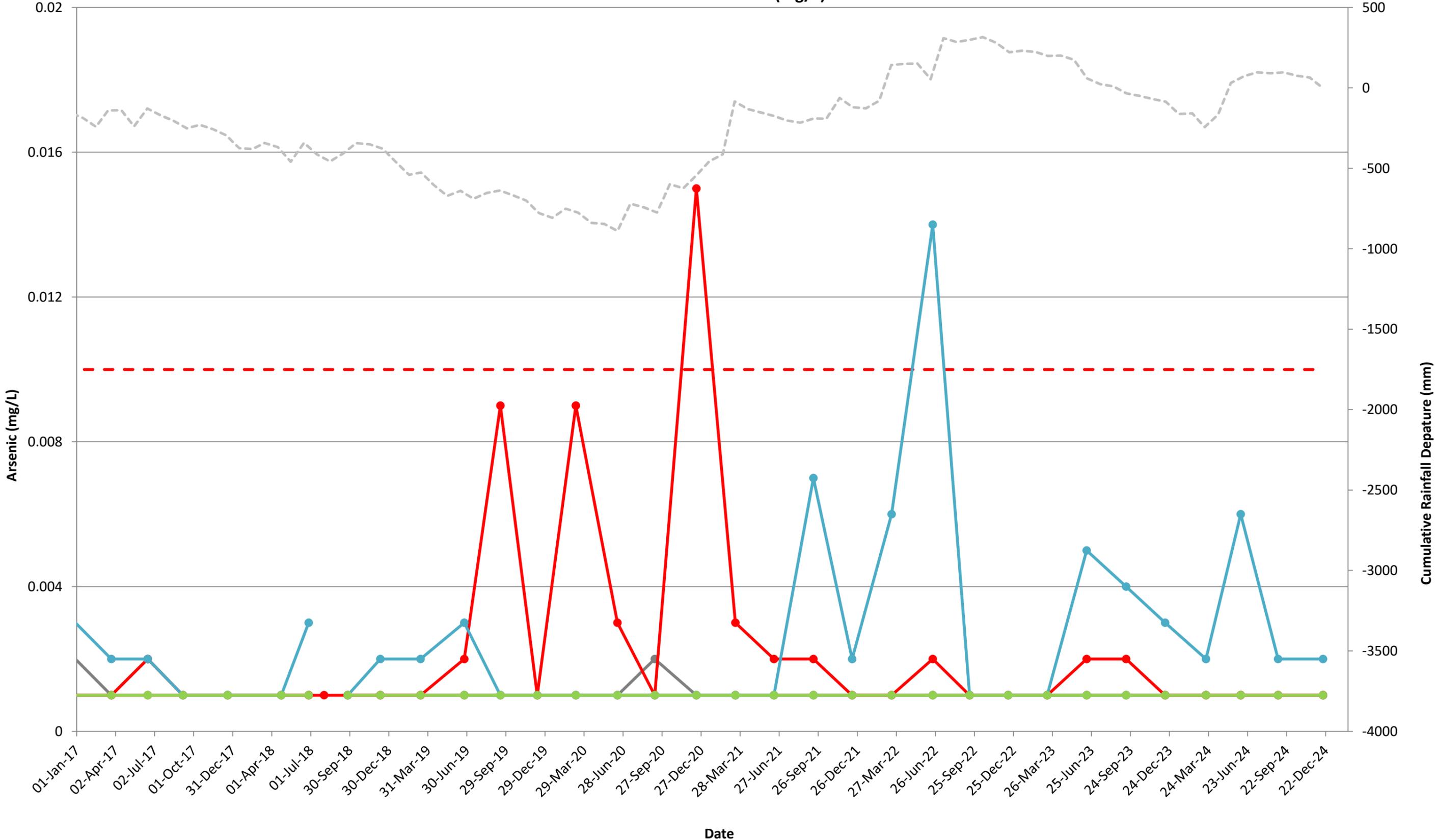
### Groundwater - Turbidity (NTU)



Note: No EPL Limit Specified

--- SWMP Trigger   
 —●— SP1   
 —●— SP2   
 —●— SP3   
 —●— SP4   
 —●— SP5   
 —●— BL158   
 - - - Cumulative Rainfall Departure (Station 061078)

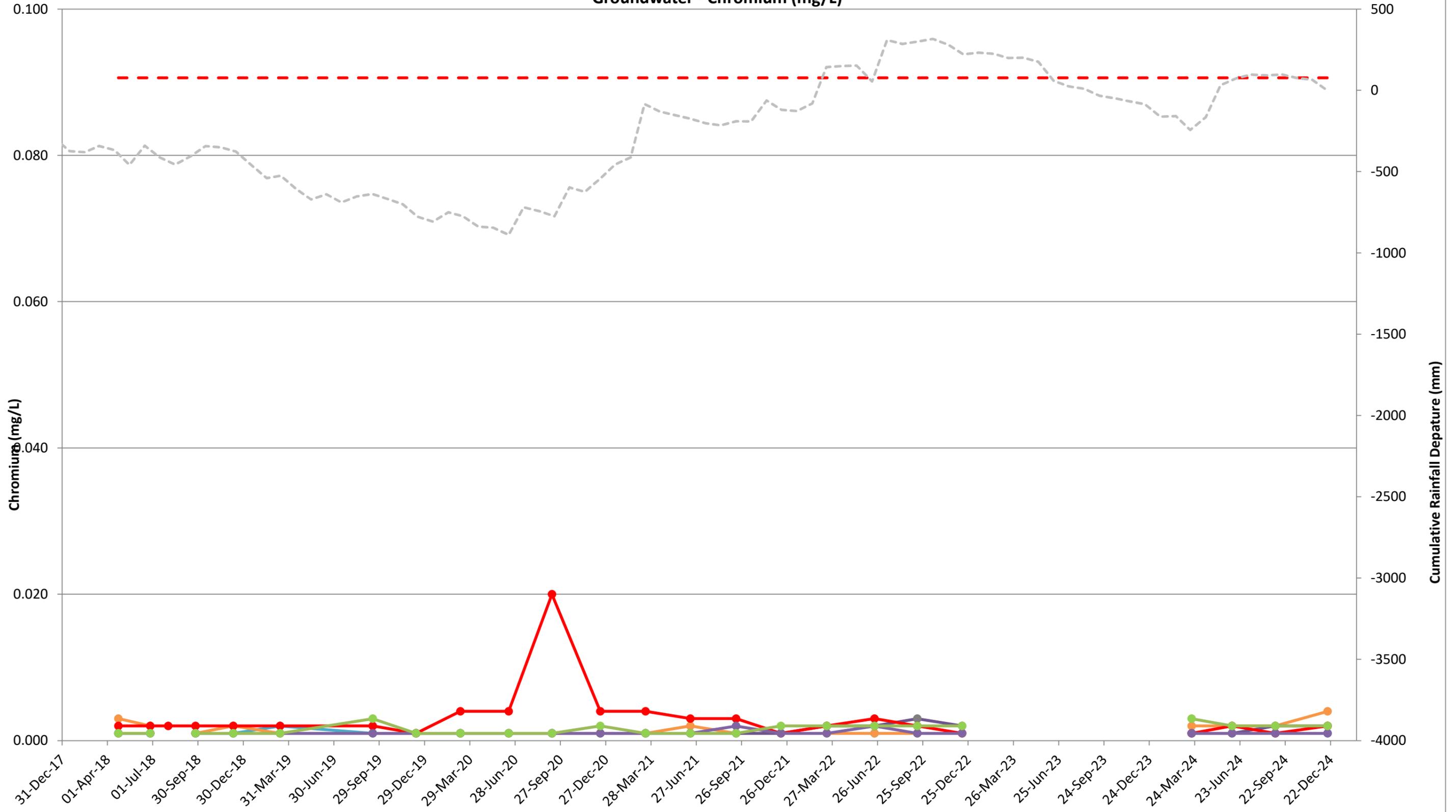
### Groundwater - Arsenic (mg/L)



Note: No EPL Limit Specified  
 Results reported as 0.001 mg/L are below  
 laboratory Limit of Reporting (LoR)

--- SWMP Trigger      ● SP1

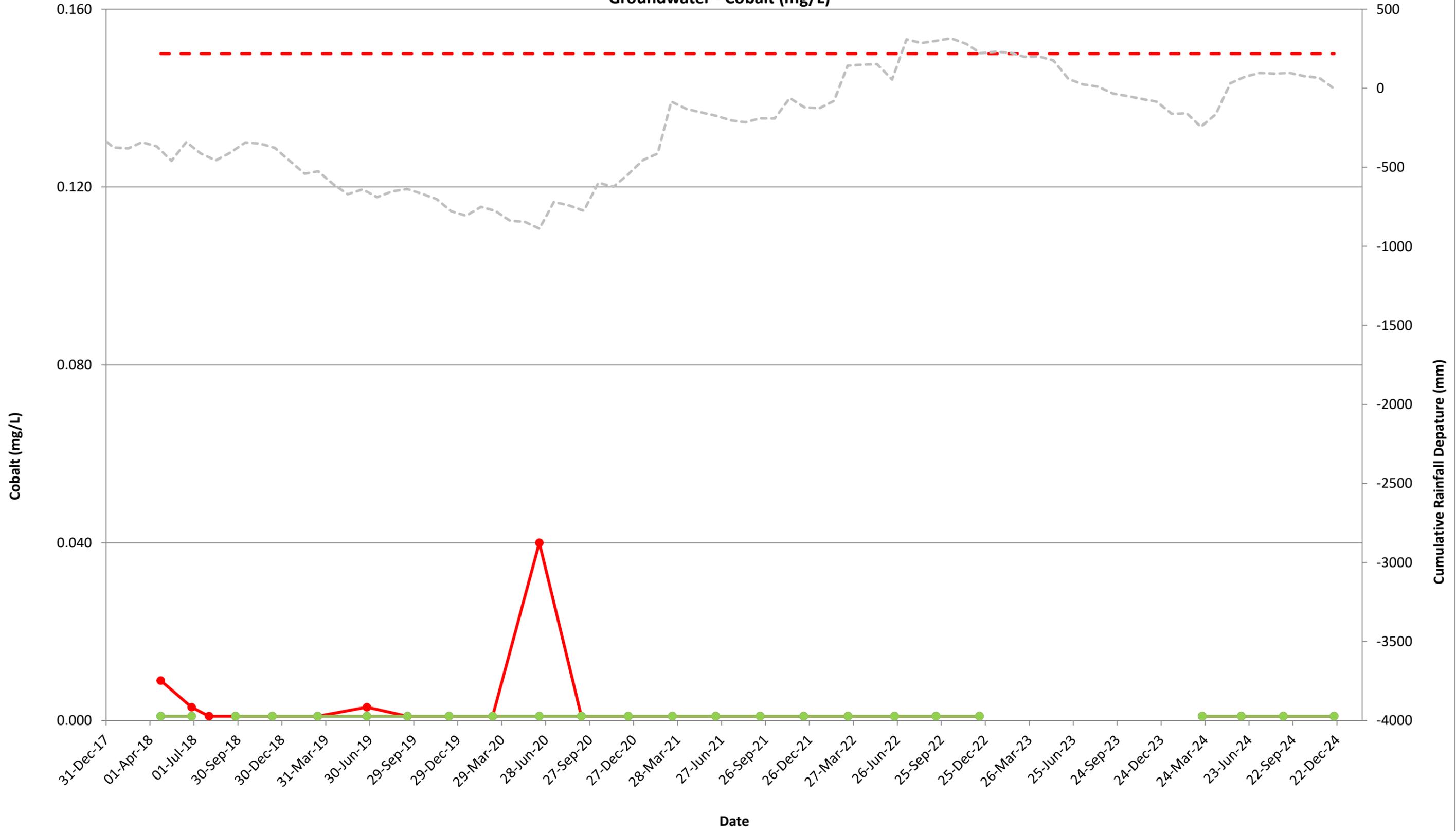
### Groundwater - Chromium (mg/L)



Note: No EPL Limit Specified  
 Results reported as 0.001 mg/L are below laboratory Limit of Reporting (LoR)

- - - SWMP Trigger
- SP1
- SP2
- SP3
- SP4
- SP5
- BL158
- - - Cumulative Rainfall Departure (Station 061078)

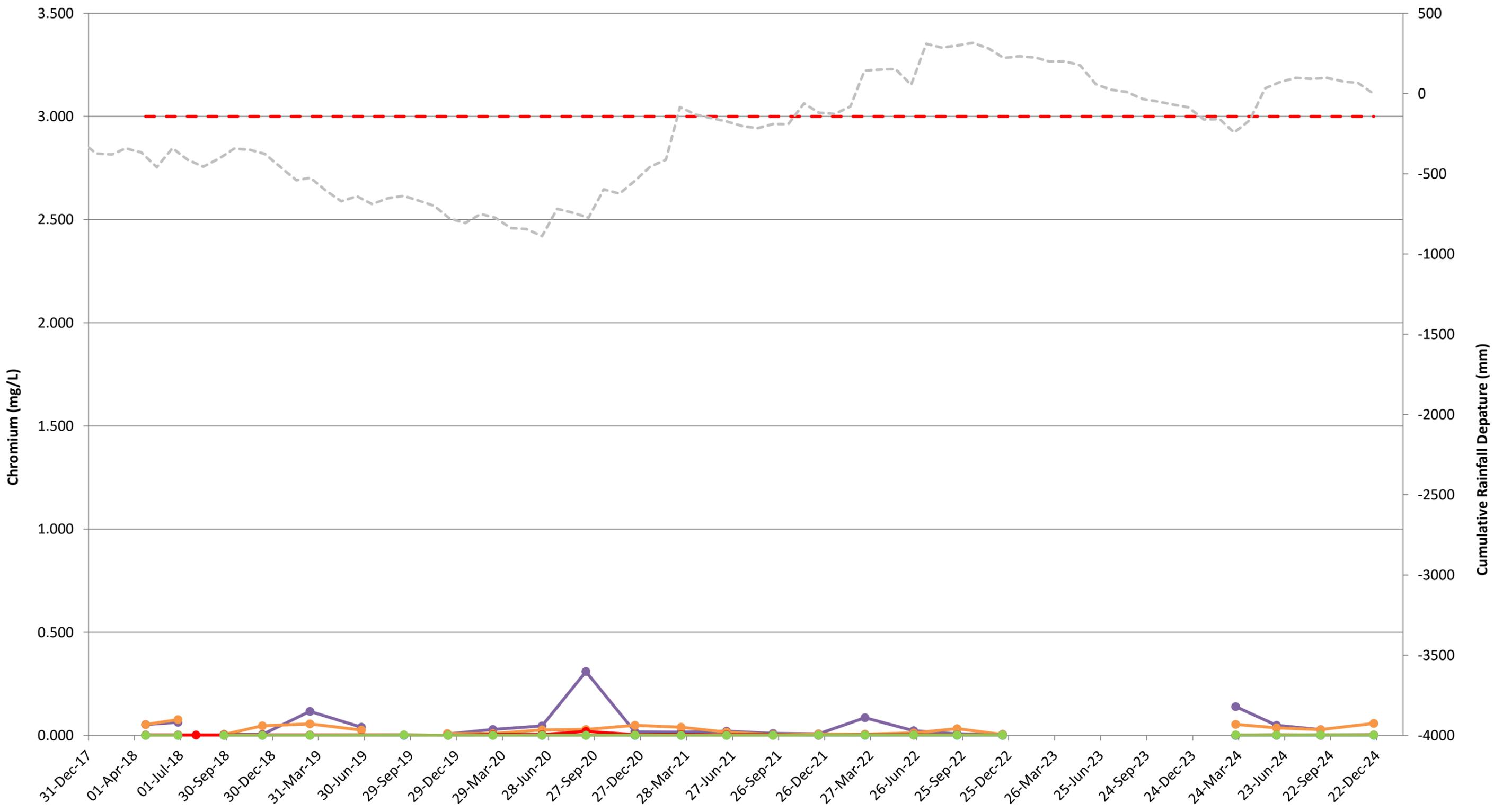
### Groundwater - Cobalt (mg/L)



Note: No EPL Limit Specified  
 Results reported as 0.001 mg/L are below laboratory Limit of Reporting (LoR)

--- SWMP Trigger   
 ● SP1   
 ● SP2   
 ● SP3   
 ● SP4   
 ● SP5   
 ● BL158   
 --- Cumulative Rainfall Departure (Station 061078)

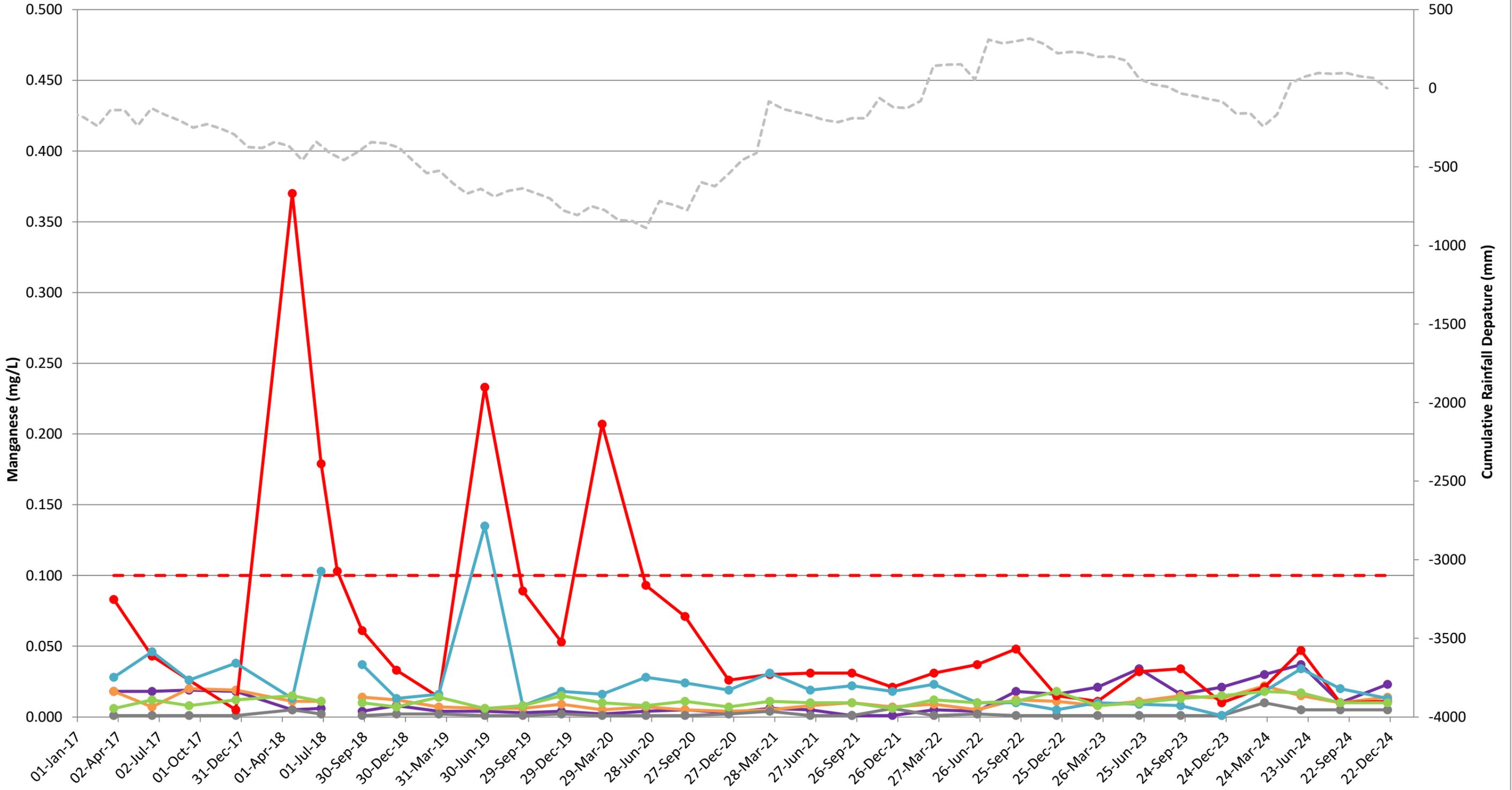
### Groundwater - Zinc (mg/L)



Note: No EPL Limit Specified  
 Results reported as 0.001 mg/L are below  
 laboratory Limit of Reporting (LoR)

- - - SWMP Trigger
- SP1
- SP2
- SP3
- SP4
- SP5
- BL158
- - - Cumulative Rainfall Depature (Station 061078)

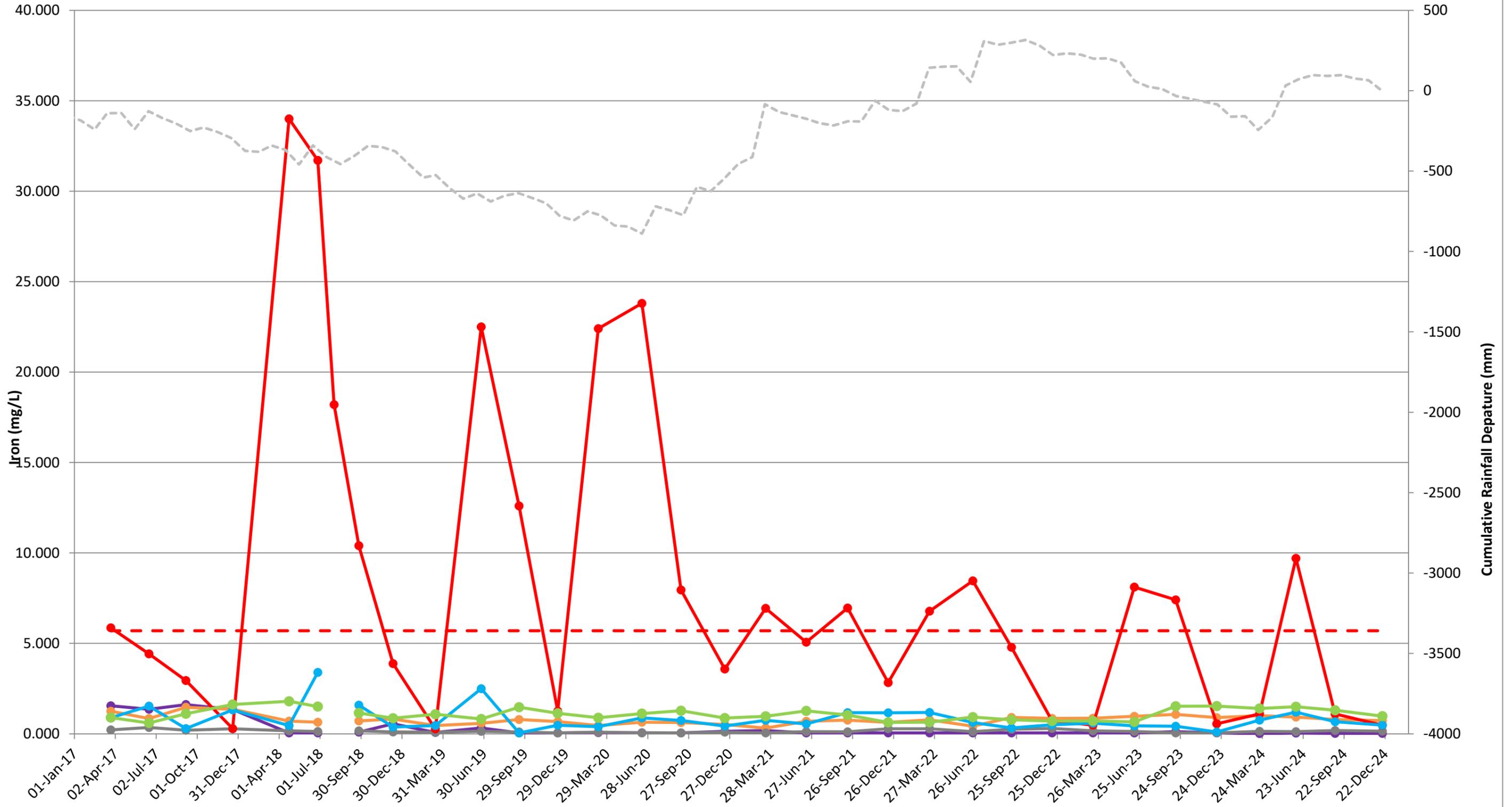
### Groundwater - Manganese (mg/L)



Note: No EPL Limit Specified  
 Results reported as 0.001 mg/L are below laboratory  
 Limit of Reporting (LoR)



### Groundwater - Iron (mg/L)



Note: No EPL Limit Specified  
 Results reported as 0.001 mg/L are below  
 laboratory Limit of Reporting (LoR)

--- SWMP Trigger    
 —●— SP1    
 —●— SP2    
 —●— SP3    
 —●— SP4    
 —●— SP5    
 —●— BL158    
 - - - Cumulative Rainfall Depature (Station 061078)