MACKA'S SAND PTY LTD

MACKAS SAND ANNUAL REVIEW 2023

January – December 2023

FINAL

March 2024

Annual Review Title Block	
Name of operation	Mackas Sand Project
Name of operator	Mackas Sand Pty Limited
Development Consent / Project Approval No.	PA 08_0142 (MOD 2)
Name of holder of development consent/project approval	Mackas Sand Pty Limited
Mining lease No.	No Mining Lease applicable to site under the Mining Act (1992).
Name of holder of mining lease	N/A
Water licence #	N/A
Name of holder of water licence	N/A
MOP/RMP start date	N/A
MOP/RMP end date	N/A
Annual Review start date	1 January 2023
Annual Review end date	31 December 2023

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 2023 to 31 December 2023 and that I am authorised to make this statement on behalf of Macka's Sand Pty Ltd.

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.

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.

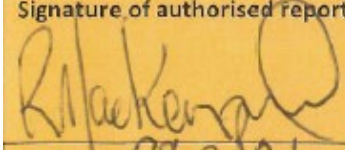
Name of authorised reporting officer:	Robert MacKenzie
Title of authorised reporting officer:	Director
Signature of authorised reporting officer:	
Date:	28-3-24

Table of Contents

Figures

Tables

Appendices

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 2023 to 31 December 2023 (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, four (4) non-compliances were identified. These four (4) 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 **Table 2.1** for further details
Environment Protection Licence EPL 13218	No – refer to **Table 1.3** for further details
EPBC Approval 2011/6214	Yes – refer to **Table 1.3** for further details
Hunter Water Corporation Regulation 2015 Clause 15(1)	Yes

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: • Potential for serious environmental consequences, but is unlikely to occur. • Potential for moderate environmental consequences but is likely to occur.
Low	**Non-compliant**	Non-compliance with: • Potential for moderate environmental consequences, but is unlikely to occur. • Potential for low environmental consequences but is likely to occur.
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	Section addressed in Report
EPL 13218 PA 08_0142	Condition M2.2 Schedule 3 Condition 13	Air monitoring is required to be undertaken at EPA Point 7 and 8 in accordance with AM-19.	Administrative Non-compliance	During the July 2023 sampling period, air monitoring samples were damaged during transit to an accredited laboratory and subsequently there were no dust monitoring results available for July 2023.	**Section 11.1**
EPL 13218 PA 08_0142	Condition M2.2 Schedule 3 Condition 13	Air monitoring is required to be undertaken at EPA Point 7 and 8 in accordance with AM-19.	Administrative Non-compliance	During the September 2023 sampling period, an air monitoring sample at EPA Point 8 was observed as damaged during field collection and was subsequently replaced. As a result, only one air monitoring sample was sent for analysis to an accredited laboratory (there was no monitoring undertaken for EPA Point 8).	**Section 11.1**
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 31 January 2024. The report is required to be submitted to BCT 31 December annually, however, was submitted to BCT on 31 January 2024 due to an administrative oversight.	**Section 11.1**

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment	Section addressed in Report
PA 08_0142	Schedule 3 Condition 33D	Failure to operate video camera at Alternative access road on 19 November 2023	Low	Non-compliance of operating video cameras adjacent to the Alternative access road occurring on 19 November 2023. An investigation into the non-compliance determined that on 19 November 2023 an external power supply fault in the Ausgrid power grid caused a power spike in the power reticulation system on the Mackas Sand site, damaging a number of electrical power transformers, power supplies and other electrical equipment, including damage to the power supply to the camera. Power was restored to the camera when the external power supply was restored to the site on 22 November 2023.	**Section 11.1**

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 of PA 08_0142 (MOD 2), Schedule 5, Condition 4. 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
4. 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
1. 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 8.0**

PA 08_0142 Condition	Section of Document
2. 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: • relevant statutory requirements, limits or performance measures/criteria • requirements of any plan, program or strategy required under this approval • monitoring results of previous years • relevant predictions in the EA and the EA (MOD 1).	**Section 6.0**
3. identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance	**Sections 1.0** , **10.0** and **11.0**
4. identify any trends in the monitoring data over the life of the project	**Sections 6.0** and **7.0**
5. 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 **7.0**
6. describe what measures will be implemented over the current calendar year to improve the environmental performance of the Project.	**Sections 6.0** and **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.

The Quarry Manager contact details are listed in **Table 2.2**.

Table 2.2 Personnel Responsible for Environmental Management during 2023

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
Jack Mackenzie	Workshop 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)

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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
Department of Environment Approval EPBC 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	Renewed annually	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 2022, the NSW EPA completed a review of the Mackas Sand EPL. As an outcome of the review, the EPA provided Mackas Sand with a revised EPL which included minor administrative changes whilst also including conditions related to the collection and reporting of additional groundwater monitoring data at the site. The actions undertaken by Mackas Sand to address these conditions are discussed in **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, the respective management plans for the Mackas Sand quarry were reviewed during 2023 following the submission of the 2022 Annual Review. Selected management plans were updated with a number of the management plans being determined to not require a revision.

Following a truck movement non-compliance in November 2022 (see **Section 11.1**), Mackas Sand updated the Driver's Code of Conduct (DCC). The DCC was submitted to DPHI on 24 February 2023 and approved by DPHI on 7 March 2023.

Table 3.2 Status of Management Plans

Management Strategy/Plan	Revision Date of the Approved Plan	Relevant Agency	Review Status
Environmental Management Strategy	July 2016	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Noise Management Plan (NMP)	November 2018	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Air Quality Management Plan (AQMP)	June 2018	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Soil and Water Management Plan	November 2021	DPHI	Updated and submitted to DPHI in November 2021. Approved by DPHI on 3 August 2022. No update was required following completion of 2022 Annual Review.
Unexploded Ordnance Management Plan (UOMP)	September 2011	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Landscape Management Plan	November 2021	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Aboriginal Cultural Heritage Management Plan (ACHMP)	July 2016	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Non-Indigenous Heritage Management Plan (IHMP)	July 2016	DPHI	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.
Drivers Code of Conduct	February 2023	DPHI	Updated and submitted to DPHI on 24 February 2023. Approved by DPHI on 7 March 2023.
Pollution Incident Response Management Plan (PIRMP)	December 2023	EPA	Reviewed following the PIRMP being tested on 21 September 2023.
EPBC Landscape Management Plan	December 2013	Commonwealth DCCEEW	Reviewed following the submission of the 2022 Annual Review on 31 March 2023. No update required.
Operations Management Procedures	January 2014 [Draft]	Hunter Water Corporation	Reviewed following the submission of the 2022 Annual Review Report on 31 March 2023. No update required.

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).

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. No sand extraction was undertaken at Lot 220. An overview of the operations for each Lot is featured below.

There were 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.

Extraction activities were primarily undertaken in the eastern portion of Lot 218, adjacent to the northern (i.e. landward) extraction boundary. 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.

An automated traffic light system at the weighbridge 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 6.10**.

4.1.2 Lot 220

Sand extraction operations in Lot 220 commenced November 2009. Sand extraction has not taken place in Lot 220 since the last extraction survey in September 2021. 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 944,765.9 tonnes of product was transported from Lot 218. No sand extraction was undertaken at Lot 220 during the reporting period. 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 2022 and 2023 reporting years and a forecast for the 2024 reporting period. The 2022 and 2023 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))	2022 Reporting Period (Actual Tonnes)	2023 Reporting Period (Actual Tonnes)	2024 Reporting Period (Forecast Tonnes)	Compliance with Approved Limit (Yes/No)
Total Saleable Product from Lot 218	1,000,000 tonnes from Lot 218	990,279	944,765.9	1,000,000	Yes
Total Saleable Product from Lot 220	1,000,000 tonnes from Lot 220	0	Nil	Nil	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).	990,279	944,765.9	1,000,000	Yes

4.3.1 Hours of Operations

Quarrying operations at Lot 220 would be undertaken between 7:00 am and 5:30 pm Monday – Friday. However, there have been no active quarrying operations present in Lot 220 since September 2021 and therefore 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 the 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 the PA 08_0142 (MOD 2). Copies of these agreements have previously been provided to the DPHI.

4.4 Construction and Demolition Activities

Road base material was imported during the reporting period for the construction of a gravel road in the Lot 218 extraction area. 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 2024 Report Period Extraction Operations

2024 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 2023.

5.0 Actions Required from Previous Annual Review

In accordance with Schedule 5, Condition 4 of PA 08_0142 (MOD 2), the 2022 Annual Review was submitted to DPHI on 31 March 2023. Mackas Sand did not receive any correspondence from DPHI regarding the 2022 Annual Review.

A summary of Mackas Sand management commitments made in the 2022 Annual Review are addressed in **Table 5.1**.

Table 5.1 Mackas Sand Response to Actions identified in 2022 Annual Review

Action	Status	Section of this Annual Review	Comment
Mackas will implement the requirements of the Mackas Sand VCA during the next reporting period. Specifically, the implementation of a weed management and disturbance regime in consultation with the Biodiversity Conservation Trust (BCT) before May 2022.	Completed	**6.5.5**	Management actions undertaken include monthly inspections of the VCA, and biodiversity monitoring and reporting. Due to scheduling issues and discussions of other management options with the BCT, no weed management works were completed in the 2023 monitoring period. An approach to weed management in the BOA is currently being discussed with the BCT to enable works to be undertaken during 2024.
Undertake the BOA management actions recommended in Table 6-22, as practicable	Ongoing	**6.4 – 6.5.6**	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 **Section 6.5**.
Mackas Sand will continue collecting artefacts from Lot 218 and Lot 220 in the next reporting period.	Ongoing	**6.6**	Artefacts collected are to be stored and collected during extraction and sand screening processes. Any artefacts are to be returned to Lot 220 as part of the site rehabilitation process.
The SWMP will be updated as required following DPHI's review of the revised MEDM submitted in February 2023	Ongoing	**7.2.2**	The EPA are currently reviewing the revised MEDM. Mackas will review the SWMP in 2024, following the EPAs response.
If elevated groundwater monitoring results are detected during future quarterly groundwater monitoring rounds, Mackas Sand will report it to the DPHI in accordance with Section 6.2 of the SWMP (Umwelt, 2014).	Completed	**7.2**	Groundwater results and reporting undertaken is detailed in **Section 7.2**.

Action	Status	Section of this Annual Review	Comment
Mackas Sand will salvage woody debris / trees and spread over rehabilitation areas.	Ongoing	**8.0**	Rehabilitation of Lot 218 and Lot 220 is an ongoing process. The status of rehabilitation is discussed in **Section 8.0**.
Mackas Sand will identify opportunities to rehabilitate areas which are no longer required for operational purposes/activities.	Ongoing	**8.0**	There was no sand extraction undertaken in Lot 220 in the reporting period. The status of rehabilitation is discussed in **Section 8.0**.
Mackas Sand will complete NC-11 in the 2023 Annual Review period. NC-11 relates to the regular update of the complaints register on the Mackas Sand website.	Completed	**9.0**	Mackas Sand updated the Community Complaints register with the register available on the Mackas Sand website (refer to **Section 9.0**).

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)

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

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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) $LA_{1,1\ minute}$.

The noise impact assessment criteria specified in the PA 08_0142 (MOD 2) Schedule 3 Condition 4 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 PA 08_0142 (MOD 2) Schedule 3 Condition 4A 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[1] $LA_{eq,15\ minute}$	Evening[1] $LA_{eq,15\ minute}$	Night[1] $LA_{eq,15\ minute}$	Night[1] $LA_{1,1\ minute}$
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
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[1] $LA_{eq,15\ minute}$	Day[1] $LA_{eq,15\ minute}$	Evening[1] $LA_{eq,15\ minute}$
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 7.00am to 6.00pm Monday to Saturday and 8.00 am to 6.00 pm Sundays and Public Holidays, evening is 6.00pm to 10.00pm (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 PA 08_0142 (MOD 2) Schedule 3, Condition 4, 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 PA 08_0142 (MOD 2), Schedule 3 Condition 7.

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

Road	Day/Evening	Night - Shoulder
Lavis Lane, Oakvale Drive	60 $LA_{eq,1\ hour}$	55 $LA_{eq,1\ hour}$
Nelson Bay Road	60 $LA_{eq,15\ hour}$	55 $LA_{eq,9\ hour}$

6.1.2 Noise Monitoring Results

During the reporting period, attended noise monitoring was undertaken between 31 July and 2 August 2023, 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 2023 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[1]	35	-	45	-
Site 6	35	Inaudible	45	Inaudible

[1]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 2023 Day Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	$LA_{eq,15\ minute}$	
	Noise criteria	Mackas Sand noise level contribution
Site 1	36	Inaudible
Site 2	36	Inaudible
Site 4	35	Inaudible
Site 5[1]	35	-
Site 6	35	Inaudible

[1]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 2023 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[1]	35	-
Site 6	35	Inaudible

[1]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 2023 Industrial Noise Levels – Alternate Access Road to Lot 218

Location	Period	LAeq,15 minute	
		Noise criteria	Mackas Sand noise level contribution
Site 5[1]	Day Time	41	-
Site 6	Day Time	40	35
Site 5[1]	Night Time/Shoulder	39	-
Site 6	Night Time/Shoulder	38	37
Site 5[1]	Evening	41	-
Site 6	Evening	40	Inaudible

[1]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 $LA_{eq,\ 1hour}$	Noise level contribution $LA_{eq,1hour}$	
			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	49
	Day	60	Inaudible	47

6.1.3 Trends in Data

The 2023 attended noise monitoring indicates that Mackas Sand was complying with the industrial and traffic noise criteria at all industrial and traffic sites in accordance with PA 08_0142, Schedule 3 Conditions 4 to 8, and EPL 13218 Condition L3.

The 2023 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 PA 08_0142, Schedule 3 Conditions 4 to 8, and EPL 13218 Condition L3.

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_{10}) and Total Suspended Particulate (TSP) monitoring are not currently undertaken. The trigger for commencing PM_{10} 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^2/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_{10}, 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^3
Particulate matter < 10 µm (PM_{10})	Annual	30 µg/m^3

Table 6.10 Short term Impact Assessment Criterion for Particulate Matter

Pollutant	Averaging period	Criterion
Particulate matter < 10 µm (PM_{10})	24 hours	50 µg/m^3

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^2/month	4 g/m^2/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**. During the month of July DDG1 and DDG2 samples were not analysed due to damage. DDG1 sample was reported as broken in field during the month of July and subsequently was not analysed. These two non-compliances are further explained in **Section 11.1**.

Table 6.12 Total Dust Deposition Levels at DDG 1 – Lot 220 (g/m^2/month)

Sample date	Exposure Period (Days)	Ash Content (g/m^2/month)	Total Insoluble Matter (g/m^2/month)
25/01/2023	31	0.2	0.3
26/02/2023	32	0.1	0.1
26/03/2023	28	0.1	0.2
26/04/2023	31	0.1	0.1
26/05/2023	30	1.5	2.6
26/06/2023	31	0.1	0.1
28/07/2023	32	-[1]	-[1]
26/08/2023	29	0.2	0.2
26/09/2023	31	N/A[2]	N/A[2]
27/10/2023	31	0.1	0.2
24/11/2023	28	0.1	0.4
22/12/2023	28	6.4	6.5
Annual Average:		**0.9**	**1.1**

Note: [1]Samples damaged during transit

[2]Sample DDG1 broken in field

Table 6.13 Total Dust Deposition Levels at DDG 2 – Lot 218 (g/m^2/month)

Sample date	Exposure Period (Days)	Ash Content (g/m^2/month)	Total Insoluble Matter (g/m^2/month)
25/01/2023	31	4.2	4.8
26/01/2023	32	0.1	0.2
26/03/2023	28	0.5	1.3
26/04/2023	31	0.1	0.1
26/05/2023	30	7.6	8.3
26/06/2023	31	0.1	0.1
28/07/2023[1]	32	-	-
26/08/2023	29	3.3	3.4

Sample date	Exposure Period (Days)	Ash Content (g/m²/month)	Total Insoluble Matter (g/m²/month)
26/09/2023	31	4.6	4.8
27/10/2023	31	13.6	14.2
24/11/2023	28	0.4	0.5
22/12/2023	28	2.4	2.5
Annual Average:		**3.4**	**3.7, adjusted 2.4[2]**

[1]Note: refer to Table 1.3 for note.

[2]Excluding October Result

6.2.3 Trends in Data

The monthly results during the reporting period for DDG1 ranged from 0.1 g/m²/month to 6.5 g/m²/month, with an annual average of 1.1 g/m²/month. The higher than average result recorded in December 2023 is likely due to a bushfire that occurred in close proximity to DDG1 during December 2023.

The monthly results for DDG2 varied from 0.1 g/m²/month to 14.2 g/m²/month, with an annual average of 3.7 g/m²/month. Agricultural activity was observed from an adjacent Lot in proximity to DDG2 during the month of October and is believed to be the cause of the high result during the month. The October result has been excluded from the annual results of DDG2, resulting in an annual average of 2.4 g/m²/month.

Table 6.14 provides a comparison of annual average deposition dust monitoring data since 2016. The 2023 DDG1 annual average has slightly increased since 2022 to 1.1 g/m²/month but is consistent with results from previous years. This is largely due to sand extraction works ceasing in Lot 220. With sand extraction in Lot 220 ramping down/ceasing entirely, annual averages for DDG1 are expected to remain low. The 2022 DDG2 annual average of 3.7 g/m²/month has increased since 2022 and is due to the high result recorded in October. When the annual results for DDG2 is adjusted to exclude the high result cause by agricultural activities, DDG2 annual average is consistent with 2022.

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 2024 reporting period.

Table 6.14 Annual Averages for Dust Deposition 2017 – 2023

Year	Total Insoluble Solids (g/m2/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[1]
2022	0.7	2.2
2023	1.1	3.7, adjusted 2.4[2]

[1]Excluding September and November results.

[2]Excluding October result.

6.2.4 Proposed Improvements or Actions for the Next Reporting Period

Mackas Sand will investigate relocating dust gauge DDG2 approximately 200 m west of its current location to avoid any air quality impacts generated from neighbouring properties. No additional management or mitigation measures are proposed to be implemented which are outside the approved AQMP (Umwelt, 2018b).

6.3 Meteorology

Meteorological data is collected on a monthly basis from the Bureau of Meteorology station at the nearby Williamtown 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 2023

Month	Rainfall (mm)	Highest Daily (mm)	Rain Days (i.e., >0.2 mm)
January	106.2	21.4	12
February	107.4	45.6	11
March	106.0	31.4	13
April	118.8	29.4	16
May	86.6	45.8	7
June	8.8	3.6	8
July	38.4	22.0	11
August	47.6	12.6	9
September	16.6	4.4	7
October	59.6	35.0	11
November	65.4	19.4	15
December	61.4	15.4	14
TOTAL	**822.8**	**286.0**	**134.0**

Figure 6.2 provides a comparison of monthly rainfall from 2019 – 2023. During the reporting period, 822.8 mm of rainfall was recorded across 124 days. Approximately 53 % of the annual recorded rainfall for 2023 was experienced during the first four months of the year; January, February, March and April.

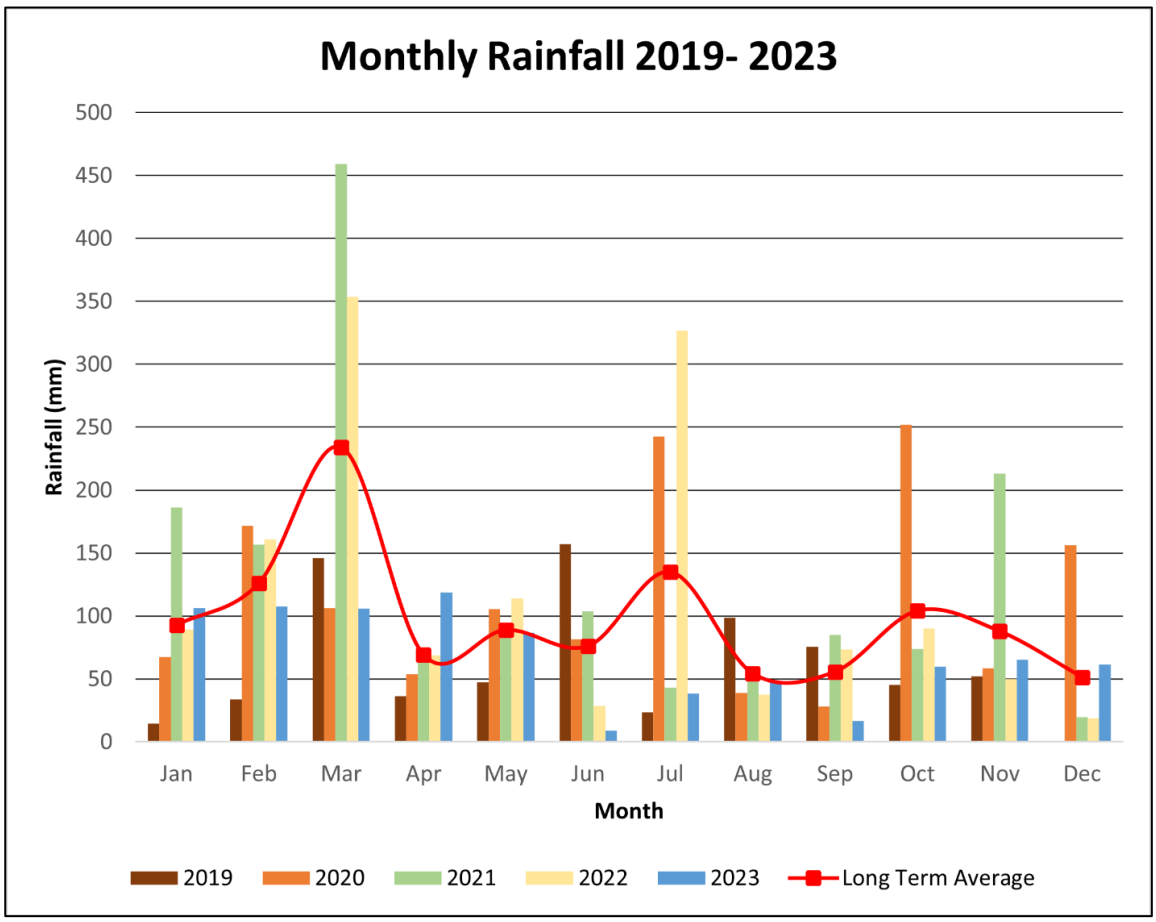


Figure 6.2 Monthly Rainfall 2019 – 2023

6.3.2 Temperature

Maximum and minimum temperature data for the reporting period is summarised below in **Table 6.16**. December was the warmest month of the year with an average maximum daily temperature of 29.2 °C. July was the coolest month of the year with an average minimum daily temperature of 7.2 °C.

Table 6.16 Monthly Minimum and Maximum Daily Temperatures during 2023

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
January	14.6	18.3	27.4	34.9
February	13.1	18.0	29.1	35.9
March	12.3	18.0	29.0	31.8
April	9.6	13.5	23.6	27.2
May	3.3	8.0	20.3	24.7
June	0.9	7.3	18.9	23.4
July	2.7	7.2	19.5	25.0
August	3.1	7.4	20.6	26.1
September	4.3	8.8	24.4	34.1
October	5.9	12.0	26.1	35.4
November	11.2	16.0	25.7	33.0

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
December	13.8	19.1	29.2	41.7

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. In accordance with correspondence Mackas Sand 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). Mackas Sand has not yet received feedback from DPHI on the draft BOS.

Annual monitoring of the Biodiversity Offset Area (BOA) was undertaken across two stages during the reporting period to coincide with the known flowering periods of the Newcastle doubletail (*Diuris praecox)* and sand doubletail (*Diuris arenaria*). Stage 1 of the annual monitoring was undertaken by an Umwelt ecologist on 24 August 2023 and Stage 2 on 8 September 2023.

The BOS monitoring report was submitted to BCT on 31 January 2024. The BOS report included recommendations to be implemented within the Biodiversity Offset Area.

The recommendations are noted below with the timing for the completion of the works discussed in **Section 12.0**):

- Ensuring fencing is adequate to exclude cattle, including regular monitoring (and evidence thereof) to ensure this is the case. Attention will be focused to ensure fencing is anchored into the ground at regular intervals (more than strainer posts only) to ensure cattle exclusion.
- Engage suitably qualified and experienced land management professionals to complete regular weed and early colonising native species management works as recommended in the BOS and in consultation with the BCT. Such works are to be undertaken during the period between and including December to April to avoid target orchid growth/flowering season. Such works should consider the most effective method of removing each target species and measures may include employing land management specialists and/or slashing/mulching methods as documented in Annexure C of the Conservation Agreement (CA). Mackas Sand will receive written permission from the BCT prior to works being undertaken and such works are to occur strictly in a manner that does not impact the threatened orchid populations. Evidence of these works will be provided after each event.
- Weed management works will be undertaken within the CA and within approximately 20 m surrounding the BOA (i.e., the weed management area) to reduce potential weed source populations.
- Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.

6.5 Environmental Assessment Predictions

A detailed ecological assessment was undertaken to support the Mackas Sand EA. 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 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 Leafless Tongue-orchid *(Cryptostylis hunteriana)*) and a number of fauna species were recommended as part of the Mackas Sand EA.

6.5.1 Impact Assessment Criteria

The rehabilitation, ecological and biodiversity impact assessment criteria are associated with following the procedures as 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.

6.5.2 Monitoring Results

6.5.2.1 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 undertook the following at Lot 220:

- Continued to add to the total area of land under rehabilitation at Lot 220. Refer to **Section 8.0** for further details.
- Locally grown tubestock tree planting occurred during 2023, refer to **Figure 8.1**.

6.5.2.2 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, monitoring was undertaken on 24 August 2023 and 8 September 2023. 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 in vegetation assemblage.
- Exotic Species Monitoring and Management – Monitoring and management of exotic species.

Orchid Monitoring

The results of the monitoring data for Newcastle doubletail (*Diuris praecox*) and Sand doubletail (*Diuris arenaria*) between 2015 and 2023 are shown in **Table 6.17** and **Table 6.18**. Baseline results recorded during 2014 and the management criteria from the BOA strategy 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*	2015	2016	2017	2018	2019	2020	2021	2022	2023
Date of survey	27/08/14	N/A	26/08/2015	26/08/16	25/08/17	7/09/18	28/08/19	01/09/2020	13/09/21	26/08/22	24/08/2023 and 7/09/2023
Number of stems	64	16	69	39	93	20	23	0	0	3	15
Maximum flowers per stem	9	N/A	10	7	8	9	6	0	0	7	6
Minimum flowers per stem	0	N/A	0	0	0	0	1	0	0	3	1
Mean flowers per stem	4.2	N/A	4.7	2.7	3.4	4.3	4	0	0	5	4.3

*25% of baseline for 3 consecutive years.

Table 6.18 Results of Diuris arenaria Searches Baseline

	2014 (Baseline)	Criteria*	2015	2016	2017	2018	2019	2020	2021	2022	2023
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	24/08/2023 and 7/09/2023
Number of stems	72	18	156	200	150	119	39	2	82	62	131
Maximum flowers per stem	7	N/A	9	7	5	6	3	2	7	7	7
Minimum flowers per stem	1	N/A	0	0	0	0	0	0	0	1	0
Mean flowers per stem	2.2	N/A	2.4	2.7	1.3	1	1	1	2.5	3.2	2.3

*25% of baseline for 3 consecutive years.

Habitat Assessment Monitoring

The results of the 2023 habitat monitoring are shown in **Table 6.19** below. The table also shows the accumulated results from 2017 – 2023 and baseline survey results from 2014.

Table 6.19 Results of Habitat Assessment for Baseline, 2017 – 2023

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022	2023
Disturbances								
Weeds (density/species)	Low Whiskey grass (*Andropogan virginicus*)	Low Whiskey grass (*Andropogon virginicus*)	Low Whiskey grass (*Andropogon virginicus*)	Low Whiskey grass (*Andropogon virginicus*)	Low Whiskey grass (*Andropogon virginicus*)	Moderate Whiskey grass (*Andropogon virginicus*), several mapped clusters as well as scattered individual occurrences throughout. Bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*) saplings scattered throughout. Low levels of fireweed (*Senecio madagascariensis*), catsear (*Hypochaeris radicata*) and quaking grass (*Briza maxima*) scattered throughout.	Low Whiskey grass (*Andropogon virginicus*), mapped clusters have decreased since 2021. Small patches recorded. Low levels of bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*) saplings scattered throughout. Low levels of fireweed (*Senecio madagascariensis*) and catsear (*Hypochaeris radicata*) scattered throughout.	Moderate Whiskey grass (*Andropogon virginicus*) relatively consistent with 2022. Low densities still present in previously mapped areas. Some new occurrences observed in previously inundated areas. Bitou bush (*Chrysanthemoides monilifera* subsp. *rotundata*) saplings scattered throughout. Low levels of fireweed (*Senecio madagascariensis*) and catsear (*Hypochaeris radicata*) scattered throughout the BOA, particularly in the SE corner.
Pests	Nil identified	Nil Identified	Nil Identified	Rabbit (*Oryctolagus cuniculus*)	Nil Identified	Rabbit (*Oryctolagus cuniculus*) – 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.
Fire	Evidence of previous	Nil during reporting year	Nil during reporting year	Nil	Nil	Nil	Nil	Nil
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.
Erosion	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Moderate (trampling exacerbated by Aeolian soils)	None identified	None identified.	None identified
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
Features (Relative Abundance)								
Fallen timber/logs	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022	2023
Stags	Nil	Nil	Nil	Nil	Scarce	Scarce	Scarce	Scarce
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.
Mistletoe	Nil	Few	Few	Few	Scarce	Scarce	Few	Scarce
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.
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
Tree Hollows								
Number of trees with hollows	12	12	12	12	12	12	12	12
Size classes present	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	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.

Vegetation Structure Assessment, Exotic Species and Photo Monitoring

The results of the 2023 vegetation structure monitoring are shown in **Table 6.20** and **Table 6.21**. The tables also show the accumulated results since 2016.

Table 6.20 Transect 1 Results of 50 m Transect Data

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

Table 6.21 Transect 2 Results of 50 m Transect Data

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

6.5.3 Trends in Data

6.5.3.1 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*). For the fourth consecutive year, surveys in 2023 identified the count of Newcastle doubletail (*Diuris praecox*) below the performance trigger threshold (16 stems, being 25% of the baseline population) which is measured across a three-year period. The monitoring record of 15 individuals in 2023 is a sign of some degree of resilience/recovery and is likely influenced by the favourable rainfall from 2020 to 2022, as well as the exclusion of cattle from the BOA after 2020. Abundant regenerating grasses and sedges are likely to reduce habitat quality and availability for this species via competition for space, light and other resources. 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).

Contrastingly, the population of Sand doubletail (*Diuris arenaria*) remains above the performance trigger, with 131 individuals identified during 2022 surveys, a substantial increase from the 62 individuals that were recorded in the 2022 monitoring and is currently higher than the original counts in 2014. The area of occupancy of this species has been variable over the years of monitoring, however 2023 results are focussed on the southeast corner of the BOA, as has typically been the case. There are a small number of outliers along the eastern boundary and only a small number recorded in the northeastern corner. Future monitoring will determine if previous numbers of this species are recorded in previously inundated areas.

Habitat Assessment

The 2023 monitoring results showed continued improvement in vegetation conditions due to the recovery from drought conditions experienced across 2018 – 2020 as well as the removal of cattle from the BOA. Due to the predominantly dry conditions experienced across NSW since 2022, the 2023 monitoring observed no areas of inundation, however, a substantial increase in native wetland associated flora species was observed in previously inundated areas. Little observable change was detected in the provision of habitat structures such as hollow bearing trees and fallen logs.

Minor dieback in the shrub layer was also observed, predominantly in young individuals and in the bracken fern, and is likely a result of dry conditions occurring during plant establishment. No dieback was observed in canopy cover.

The presence of the weed whiskey grass (*Andropogon virginicus*) has remained relatively consistent since 2022 and is evident in low density in previously mapped areas. It was also observed that whiskey grass has begun to sporadically appear in previously inundated wetland areas as they begin to die back. It is likely that the whiskey grass has spread into these areas from water transporting seeds throughout the site. Bitou bush (*Chrysanthemoides monilifera*) was identified in 2022 and is still evident in 2023, with saplings occurring at low densities uniformly throughout the BOA. Scattered individuals of the significant weed species fireweed (*Senecio madagascariensis*) and catsear (*Hypochaeris radicata*) were also identified throughout the BOA, particularly in the southeast corner. These species will be included in management works where abundance of these species is relatively low.

6.5.3.2 Vegetation Structure, Exotic Species and Photo Monitoring

In 2023 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 mid-storey and native shrub species. Results from the 2023 monitoring observed reasonable stability in native over-storey, improvements in native mid-storey, improvements in native shrub cover, and an increase in forb cover in Transect 2. Notable decreases were recorded in native grass cover (both transects) and forb cover at Transect 1.

Native sedges and rushes were observed in very high densities in areas that were observed to be inundated during the 2022 monitoring event. This is a function of the natural successional process and the density of these species will likely decrease as climatic conditions dry. Grasses and other ground cover species have also increased throughout the site, particularly in areas with high light availability. Open areas of Coastal Apple – Blackbutt Forest generally consisted of a grassy understory. Areas of Coastal Apple – Blackbutt Forest with higher canopy cover featured a shrubby understory. The regenerating shrub layer was

dominated by tree broom-heath (*Monotoca elliptica*), old-man banksia (*Banksia serrata*), Dillwynia retorta, prickly-leaved paperbark (*Melaleuca nodosa*), Sydney golden wattle (*Acacia longifolia*) and Hakea spp.

Exotic species coverage is consistent with monitoring in 2022 with whiskey grass beginning to sporadically appear in previously inundated wetland areas as they begin to die back, likely a result of water transporting seeds throughout the site. Bitou bush (*Chrysanthemoides monilifera subsp. rotundata*), remains at a low density uniformly throughout the BOA. Blady grass (*Imperata cylindrica*) and bracken fern (*Pteridium esculentum*) were identified at medium densities throughout the BOA. Some natural dieback of the bracken fern was observed because of drying soil conditions. Blady grass was observed to be increasing in density in the southeast corner of the BOA, which is known to have the highest density of both threatened orchids, despite targeted weeding occurring in this area in 2022. There was a minor level of other exotic species such as fireweed (*Senecio madagascariensis*) and catsear (*Hypochaeris radicata*) however these were observed in low levels in 2023.

The photos taken during the 2023 monitoring surveys of the Biodiversity Monitoring area were compared to those taken in 2018 (as shown in Annexure B of CA) and are accompanied by a description of vegetation (type, health, changes, and management issues). Photo monitoring in 2023 generally depicts an improvement in groundcover and shrubby vegetation, with minor evidence of dieback.

Dominant ground cover species included plume rush (*Baloskion tetraphyllum*), blady grass (*Imperata cylindrica*), bracken fern (*Pteridium esculentum*), Juncus spp., pomax (*Pomax umbellata*), kangaroo grass (*Themeda australis*) and assorted regenerating heaths. These are progressively colonising areas previously impacted by grazing. Wetland associated species such as the plume rush (*Baloskion tetraphyllum*) have a particularly high coverage in areas previously inundated over the previous three years of higher than average rainfall, however some dieback was evident around the edges of these areas.

6.5.4 Comparison of Results against Performance Indicators

To track the biodiversity value changes of the BOA, the 2023 monitoring results were compared to the relevant performance criteria within the BOS. **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 2023 BOA Monitoring Results Against Performance Criteria from the BOS

BOA Performance Criteria	Trigger Response	Further Action / Comment
Short Term Action Triggers		
Any area of Coastal Sands Apple – Blackbutt Forest identified during the revised baseline survey is cleared either by natural processes such as fire or anthropogenic processes such as clearing	**Trigger: Not triggered**	N/A

BOA Performance Criteria	Trigger Response	Further Action / Comment
Any area of specified Newcastle doubletail (*Diuris praecox*) or Sand doubletail (*Diuris arenaria*) habitat is disturbed either by natural processes such as fire or anthropogenic processes. In this instance, the approved strategic slashing is not considered to represent clearing however advice from the BCT confirms that all future disturbance must be done in consultation with the BCT and only with their written permission.	**Trigger: Trigger Activated** Disturbance to orchid habitat because of dense recruitment of colonising native species such as blady grass (*Imperata cylindrica*) and bracken fern (*Pteridium esculentum*) is occurring.	Mackas Sand will implement the following actions to encourage improvement of this population: • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C of the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.
The Newcastle doubletail (*Diuris praecox*) or Sand doubletail (*Diuris arenaria*) stem count is less than 25% of the revised baseline count for three consecutive years	**Trigger: Trigger Activated** Third year of below 25% trigger numbers for Newcastle doubletail (*Diuris praecox*) population.	The 2023 monitoring observed 15 Newcastle doubletail (*Diuris praecox*) stems within the BOA. This is an increase since 2022 (three individuals) and zero the two years prior to that (2020 and 2021). Mackas Sand will implement the following actions to encourage improvement of this population: • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C of the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.

BOA Performance Criteria	Trigger Response	Further Action / Comment
	Trigger: Not triggered Stem count is above threshold for Sand doubletail (*Diuris arenaria*).	The 2023 monitoring observed 131 sand doubletail (*Diuris arenaria*) stems within the BOA. This does not activate the 25% threshold trigger. Mackas Sand will implement the following actions for continual improvement of this population: • Continue to ensure permanent cattle exclusion and monitor to ensure effectiveness in permanently excluding stock. • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.
The diversity or density of weed species is higher than the revised baseline results for more than two consecutive years	**Trigger: Not triggered within transects but generally trending to triggered across BOA.** Density of weeds within the transects has decreased because of hand weeding. Across the BOA, weed diversity and abundance is generally increasing, with a substantial increase in the extent of the areas occupied by whiskey grass.	Hand weeding has helped to manage weed density and diversity; however, this needs to continue. Mackas Sand will implement the following actions during 2024: • Continue to ensure permanent cattle exclusion and monitor to ensure effectiveness in permanently excluding stock. • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.

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.	**Trigger: Trigger Activated** In 2023: Monitoring was undertaken to assess whether any form of disturbance regime is required to support the presence of *D. praecox* and *D. arenaria* orchids within the BOA. Weed management was undertaken in April 2022. No further disturbance activities (targeting improvement of threatened orchid habitat) was undertaken in 2023. Ongoing consultation with BCT required to determine preferred approach.	Mackas Sand will implement the following actions during 2024: • Continue to ensure permanent cattle exclusion and monitor to ensure effectiveness in permanently excluding stock. • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.
Long term triggers		
Maintain the same area of Coastal Sands Apple – Blackbutt Forest as identified in the 2014 baseline surveys	**Trigger: Not triggered** In 2023 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 (*Diuris praecox*) and sand doubletail (*Diuris arenaria*) habitat as identified in the 2014 baseline surveys	**Trigger: Trigger Activated** Monitoring in 2023 demonstrated continued decrease in the area of *D. praecox* and *D. arenaria* compared to 2014 baseline surveys	Mackas Sand will implement the following actions during 2024: • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.
Maintain or reduce the diversity and density of weed species	**Trigger: Trigger Activated** The 2023 results indicated increased levels of whisky grass. Beyond this, other key weed species commonly observed in 2022 included bitou bush (*Chrysanthemoides monilifera subsp. Rotundata*) and fireweed (*Senecio madagascariensis*).	Mackas Sand will implement the following actions during 2024: • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement. • Undertake ongoing weed management works in consultation with the BCT. • Continue to monitor weed populations. • Undertake works to minimise competition from early colonising ground layer species within the maximum mapped orchid areas. • Seek BCT written permission prior to any future disturbance.

BOA Performance Criteria	Trigger Response	Further Action / Comment
Undertake management actions listed in Item 2 of Annexure C to the Conservation Agreement from Year 11 onwards	**Trigger: Not triggered**	Not yet relevant

6.5.5 Weed and Vertebrate Pest Management in the Biodiversity Offset Area

A weed management program is implemented within the BOA as part of the annual offset monitoring program. Due to scheduling issues and discussions of other management options with the BCT, no weed management works were completed in the 2023 monitoring period. An approach to weed management in the BOA is currently being discussed with the BCT to enable works to be undertaken during 2024.

Vertebrate pest management for the BOA is in the form of a perimeter wire fence to permanently prevent cattle accessing the area. During 2023, the perimeter fence was inspected during the BOA monitoring events and was found to be intact. It was noted there were a number of areas where the fence is not anchored into the ground, noting that strainer posts are the only ones anchored.

6.5.6 2022 Biodiversity Offset Area Management Recommendation Progress

The progress on the 2022 Mackas Sand Biodiversity Offset Area management recommendations is presented in **Table 6.23**.

Table 6.23 2022 Mackas Sand Biodiversity Offset Management Recommendations

Action	Status	Comment
Ensure fencing is adequate to continue to exclude cattle, including regular monitoring (and evidence thereof) to ensure this is the case.	Ongoing	Regular monitoring of fencing is being undertaken by Mackas Sand. In 2024, attention will be focussed on fencing being anchored at regular intervals.
Engage suitably qualified and experienced land management professionals to complete weed and early colonising native species management works as recommended in Section 5.1.1 at least twice a year between May and November. Works must not be completed without written permission from the BCT and must occur strictly in a manner that does not impact the threatened orchid populations. Evidence of these works must be provided after each event.	Ongoing	Due to scheduling issues and discussions of other management options with the BCT, no weed management works were completed in the 2023 monitoring period. An approach to weed management in the BOA is currently being discussed with the BCT to enable works to be undertaken during 2024.
As per the Biodiversity Offset Strategy (Umwelt, 2023b) weed management works must 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	Due to scheduling issues and discussions of other management options with the BCT, no weed management works were completed in the 2023 monitoring period. An approach to weed management in the BOA is currently being discussed with the BCT to enable works to be undertaken during 2024.

Action	Status	Comment
Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.	Ongoing	In 2023: Monitoring was undertaken to assess whether any form of disturbance regime is required to support the presence of D. praecox and D. arenaria orchids within the BOA. Weed management was undertaken in April 2022. No further disturbance activities (targeting improvement of threatened orchid habitat) was undertaken in 2023. Ongoing consultation with BCT required to determine preferred approach.

6.5.7 Proposed Improvements or Actions for the Next Reporting Period

During the 2024 reporting period Mackas Sand will:

- 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.
- 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.
- 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.
- Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.

6.6 Aboriginal Heritage

6.6.1 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. Worimi LALC are members of the ACHG.

6.6.2 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.

6.6.3 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 Archaeological sites and PADs.
- Monitoring inspections by the ACHG.
- Analysis and interpretation of results of mitigation activities.
- Care and control of salvaged material.

6.6.4 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 was not undertaken at Lot 218 or Lot 220. ACHG members were provided an opportunity to attend, but advised Mackas Sand they were unable to attend meetings during the report period. Mackas Sand will seek to hold further ACHG meetings during 2024.

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 MFMS1 before September 2013 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.

6.6.5 Proposed Improvements or Actions for the Next Reporting Period

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

6.7 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 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.

No additional management or mitigation measures are proposed to be implemented in the 2024 reporting period.

6.8 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 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.

No additional management or mitigation measures are proposed to be implemented during the next report period which are outside the approved SWMP.

6.9 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 litter. These wastes 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 2024 reporting period.

6.10 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, and
- measures to minimise movement to site prior to 5am weekdays.

6.10.1 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.

6.10.2 Monitoring Results

6.10.2.1 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.

6.10.2.2 Road Haulage

Condition 33 of Schedule 3 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 Condition 33 of Schedule 3 during the reporting period.

6.10.2.3 Fauna Strikes

Conditions 33B and 33C of Schedule 3 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.

6.10.3 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 reporting period.

6.10.4 Proposed Improvements or Actions for the Next Reporting Period

The DCC was reviewed and updated during 2023 following the non-compliance with traffic limits in 2022. As part of this review, additional controls were included in the DCC to manage operations when the Mackas Sand weighbridge and traffic light system is not operational. No additional management or mitigation measures are proposed to be implemented in the 2024 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 hold not 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 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 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 the PA 08_0142 (MOD 2). 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 DPHI in December 2023, 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 review of the revised MEDM submitted in December 2023.

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**.

Table 7.2 Groundwater Quality Investigation Trigger Values

Parameter	Units	Minimum	Maximum
pH	pH Unit	4.5**	8.5*
Conductivity	µS/cm	NA	600**
Turbidity	NTU	NA	50**
Arsenic	mg/L	NA	0.01*
Manganese	mg/L	NA	0.1*
Iron	mg/L	NA	5.70**

*These values are based on NHMRC, NRMMC 2011.

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

Trends in Data

During the reporting period, four regular monitoring events were undertaken in accordance with the current SWMP (Umwelt, 2021b), approved by DPHI on 3 August 2022. The 2022 monitoring results are shown in **Table 7.3** to **Table 7.9.**

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 further 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 consecutive quarterly exceedances of the nominated trigger value.

Mackas Sand provided notification to the DPHI in May 2023, July 2023 and October 2023 regarding groundwater results recorded above the SWMP trigger levels. Details of these notifications are summarised below.

During the reporting period, Mackas Sand investigated elevated groundwater quality monitoring results recorded at SP2 for water level, SP3 for water level and pH, SP4 for Iron, and BL158 for Electrical Conductivity. Elevated groundwater quality monitoring results recorded at SP2 for water level during the March, June and September 2023 quarterly monitoring rounds were reported to DPHI as the results were continuous exceedances of the nominated trigger value, as required under the current SWMP (Umwelt, 2021b).

7.2.2.3 Groundwater Level

During the reporting period measured groundwater levels at SP2 exceeded the predicted maximum groundwater levels for the following months:

- March, June and September.

The groundwater level was recorded as 3.01 mAHD at SP2 during March 2023. The groundwater level at SP2 was monitored in June where it increased to 3.12 mAHD, however, this value decreased to 2.93 mAHD in September 2023. The groundwater level decreased again to 2.67 mAHD during December 2023, below the nominated groundwater level trigger level for SP2 and therefore not requiring an investigation.

The groundwater results since 2016 are shown graphically in **Appendix 2**. Groundwater levels generally show rising and falling trends over time in response to climatic conditions. The predicted maximum groundwater levels for monitoring bores SP1 – SP5 and BL158 are based on the MEDM reported by Umwelt (2011). Recently, observed groundwater levels measured at quarterly intervals during 2023 indicate an overall decrease in observed groundwater levels at all monitoring locations (SP1, SP2, SP3, SP4, SP5 and BL158).

Table 7.3 shows the recorded groundwater levels for the reporting period.

Table 7.3 Groundwater Levels (mAHD)

Sample Date	Groundwater Monitoring Bore (mAHD)					
	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 (14/03/2023)	2.29	3.01	2.71	0.87	2.05	2.42
Observed Groundwater Level (14/06/2023)	2.14	3.12	2.64	0.89	2.17	2.37
Observed Groundwater Level (14/09/2023)	1.89	2.93	2.39	0.72	2.76	2.63
Observed Groundwater Level (14/12/2023)	1.59	2.67	2.08	0.48	2.42	2.49

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

pH results for the reporting period remained within the SWMP (Umwelt, 2021b) specified trigger value range and were generally consistent with historical records; with the exception of SP3 during March and December, measuring 4.49 and 4.24 respectively.

The groundwater pH results since 2017 are shown graphically in **Appendix 2**. pH levels for SP1, SP2 and SP3 peak during the September quarterly monitoring event and fell below the calendar year average during the March and December monitoring events. SP4 showed a decreasing trend in pH across the reporting period. SP5 and BL158 peaked during September and December respectively. SP3 recorded pH results outside the SWMP trigger value range during the March and December Quarterly monitoring events, measuring 4.49 and 4.24 respectively.

SP2 recorded a pH result of 4.58 during the March quarterly monitoring event, and SP3 and SP5 recorded pH results of 4.24 and 4.70 respectively during the December quarterly monitoring event, showing a new observed groundwater pH minimum for SP2, SP3 and SP5. The pH minimum for SP3 was shadowed by a previous historical minimum of 4.49 recorded during the March quarterly monitoring event. Remaining results for the reporting period were within the historical range of results. **Table 7.4** shows the recorded pH groundwater levels for the reporting period.

Table 7.4 Groundwater Quality – pH

Sample Date	Groundwater Monitoring Bore (pH)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Minimum/Maximum	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 (14/03/2023)	4.87	4.58	4.49	5.35	5.14	4.89
Recorded pH (14/06/2023)	5.30	5.06	4.80	5.20	5.37	5.20
Recorded pH (14/09/2023)	5.56	5.23	5.35	5.27	5.40	5.01
Recorded pH (14/12/2023)	5.01	4.72	4.24	5.07	4.70	5.29

Note: Red values indicate exceedance of trigger values, refer to **Section 7.2.2.4** for discussion regarding results.

7.2.2.5 Groundwater Electrical Conductivity

BL158 recorded Electrical Conductivity results above the nominated trigger value during the September and December monitoring rounds, measuring 688 µs/cm and 684 µs/cm respectively. Remaining EC results recorded during the reporting period remained below the trigger value of 600 µS/cm.

BL158 has shown an increasing trend in EC across the reporting period with a slight decrease in EC during the December monitoring event. EC results during the reporting period are all below the historical maximum at BL158 (728 µS/cm). While quarry activities were nearby to BL158, the extraction area surveys show that extraction was being undertaken in accordance with the approved MEDM. There is no evidence to indicate that the EC exceedances at BL158 were the result of quarry operations and it is possible that the elevated EC result is a response to the dryer conditions in the latter part of 2023.

The groundwater EC results recorded since 2017 are shown graphically in **Appendix 2**. With the exception of the aforementioned EC results of BL158 during the September and December groundwater monitoring events, all results obtained during the reporting period appear generally consistent with historical trends.

Table 7.5 shows the recorded EC groundwater levels for the reporting period.

Table 7.5 Groundwater Quality – Electrical Conductivity (µs/cm)

Sample Date	Groundwater Monitoring Bore (µs/cm)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	600	600	600	600	600	600
Recorded EC (14/03/2023)	175	101	218	187	107	297
Recorded EC (14/06/2023)	144	100	231	285	66	409
Recorded EC (14/09/2022)	85	114	222	298	66	688
Recorded EC (14/12/2023)	133	105	125	183	81	684

Note: Red values indicate result above trigger values, see **Section 7.2.2.5** for discussion regarding the result.

7.2.2.6 Groundwater Turbidity

The turbidity results for all sampling locations during the reporting period remained below the specified trigger value and were generally consistent with historical records.

The groundwater turbidity results since 2017 are shown graphically in **Appendix 2**. **Table 7.6** shows the recorded NTU groundwater levels for the reporting period.

Table 7.6 Groundwater Quality – Turbidity (NTU)

Sample Date	Groundwater Monitoring Bore (NTU)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	50	50	50	50	50	50
Recorded Turbidity (14/03/2023)	7.5	13.0	1.1	4.4	12.0	4.3
Recorded Turbidity (14/06/2023)	6.8	9.7	1.3	10.1	14.3	5.0
Recorded Turbidity (14/09/2023)	18.0	8.1	0.6	12.0	13.0	1.0
Recorded Turbidity (14/12/2023)	24.0	5.2	0.7	0.6	9.3	0.8

7.2.2.7 Groundwater Arsenic

Arsenic results for all monitoring locations were recorded below the SWMP trigger value of 0.01 mg/L and are generally consistent with historical values.

The groundwater Arsenic results since 2017 are shown graphically in **Appendix 2**. Since 2017, Arsenic results have generally been well below the trigger value (0.01 mg/L). However, SP4 and SP5 have historically shown spikes in Arsenic results with SP4 exceeding trigger values in 2020, and SP5 exceeding trigger values in 2022.

Table 7.7 shows the recorded arsenic groundwater levels for the reporting period.

Table 7.7 Groundwater Quality – Arsenic (mg/L)

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	0.01	0.01	0.01	0.01	0.01	0.01
Recorded Arsenic (14/03/2023)	0.001	0.001	0.001	0.001	0.001	0.001
Recorded Arsenic (14/06/2023)	0.001	0.001	0.001	0.002	0.005	0.001
Recorded Arsenic (14/09/2023)	0.001	0.001	0.001	0.002	0.004	0.001
Recorded Arsenic (14/12/2023)	0.001	0.001	0.001	0.002	0.005	0.001

7.2.2.8 Groundwater Manganese

Manganese results for all monitoring locations were below the trigger level during the reporting period.

The groundwater manganese results since 2017 are shown graphically in **Appendix 2.** The manganese results recorded during the reporting period are generally consistent with historical observations.

Table 7.8 shows the recorded manganese groundwater levels for the reporting period.

Table 7.8 Groundwater Quality – Manganese (mg/L)

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	0.1	0.1	0.1	0.1	0.1	0.1

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Recorded Manganese (14/03/2023)	0.021	0.008	0.001	0.011	0.010	0.008
Recorded Manganese (14/06/2023)	0.034	0.011	0.001	0.032	0.009	0.010
Recorded Manganese (14/09/2023)	0.016	0.015	0.001	0.034	0.008	0.013
Recorded Manganese (14/12/2023)	0.021	0.013	0.001	0.01	0.001	0.015

7.2.2.9 Groundwater Iron

During the reporting period, Iron results for all bores were below the trigger level, with the exception of SP4 during the June (8.11 mg/L) and September (7.41 mg/L) quarterly groundwater monitoring events.

Following the receipt of the elevated result in June, Mackas Sand completed a further review into the possible cause. It was concluded that due to SP4 being located adjacent to a small drainage channel along the northern boundary of Lot 220 and the nature of operations during Q3 2023 (i.e. no sand extraction operations at Lot 220), it was possible that Iron results at SP4 may be influenced by the quality of water entering this drainage channel from other sources not related to Mackas Sand. Furthermore, Iron levels recorded at SP4 have historically been highly variable, fluctuating between 0.27 mg/L to 34 mg/L, as shown in **Appendix 2**.

The groundwater iron results since 2017 are shown graphically in **Appendix 2**, which demonstrates the highly variable and fluctuating nature of iron concentrations at SP4, especially since December 2017. This fluctuating trend continued throughout the reporting period, and appeared to return to below SWMP (Umwelt, 2021b) trigger levels after the September quarterly groundwater monitoring event.

Table 7.9 shows the recorded iron groundwater levels for the reporting period.

Table 7.9 Groundwater Quality – Iron (mg/L)

Sample Date	Groundwater Monitoring Bore (mg/L)					
	SP1	SP2	SP3	SP4	SP5	BL158
Trigger Value Maximum	5.70	5.70	5.70	5.70	5.70	5.70
Recorded Iron (14/03/2023)	0.05	0.86	0.16	0.48	0.59	0.71
Recorded Iron (14/06/2023)	0.05	0.97	0.13	8.11	0.44	0.66
Recorded Iron (14/09/2023)	0.12	1.07	0.05	7.41	0.42	1.52
Recorded Iron (14/12/2023)	0.05	0.90	0.05	0.55	0.10	1.53

Note: Red values indicate exceedance of trigger values, refer to **Section 7.2.2.9** for discussion regarding results.

7.2.3 Groundwater Model Validation

Following completion of the 2021 Mackas Sand Project Independent Environmental Audit (IEA) (James Hart Consulting, 2021) on 30 July 2021 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. Mackas Sand engaged Umwelt to undertake the revision of the MEDM for the Project.

The Umwelt review of the MEDM recommended that the MEDM was not required to be updated until additional monitoring data was collected to improve the hydrogeological understanding of the site, in particular the response of groundwater levels to rainfall events.

To improve the hydrogeological understanding of the project site, Umwelt proposed recommendations for Mackas Sand to undertake throughout the reporting period. These included:

- A physical review of the Mackas Sand groundwater monitoring bores to assess the integrity of the bores e.g., potential for leakage of surface water within the bore annulus.
- For a minimum six-month period, increase the frequency of groundwater level monitoring by way of installation of groundwater level loggers in at least three monitoring bores to monitor groundwater levels at 30-minute intervals. This was to provide a greater resolution of groundwater data that can be used to better understand how groundwater levels respond after rainfall events.
- After six months of additional data collection, undertake a further review of the data. Pending data review and bore integrity status, update the existing groundwater model and MEDM.

The EPA commenced a licence variation of EPL 13218 under s58 of the Protection of the Environment Operations Act 1997 (POEO Act) to implement the above recommendations to the licence. A notice of variation of EPL 13218 was provided to Mackas Sand on 1 November 2022.

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. To address the recommendations above, Mackas Sand completed a physical review of the boreholes on the 17 November 2022, which included reviewing the integrity of the bores utilising cameras and via external inspection, with no evidence available to confirm there was structural damage to the bore or potential for leakage of surface water within the bore annulus.

Mackas Sand also installed groundwater level loggers 22 September 2022 at three groundwater monitoring bores, SP2, SP3 and SP5, and recorded groundwater at 30-minute intervals until 15 August 2023.

In 2022, GHD was engaged by Mackas Sand to rerun the 2019 groundwater model from January 2020 to September 2022 (up to when the meteorological data and observed groundwater level data were available) to determine how groundwater model predictions align with observed groundwater levels over that period and identify whether changes are required to the MEDM. It was concluded that since there is a good match between modelled and observed groundwater levels across the model domain, recalibration of the model was not necessary (GHD, 2023a). However, the model rerun predicted an increase in the maximum groundwater levels and therefore the MEDM was updated and submitted to the DPHI on 3 February 2023 via the Major Projects website.

A further groundwater level review was also undertaken by GHD on 29 August 2023 to address condition U1.2c of the EPL (GHD, 2023c). Modelled groundwater levels were compared to observed levels at the locations of the monitoring bores. Overall, the model indicated a reasonable match between modelled and observed groundwater levels with the exception of SP2 and SP3, and there is a similar response in the modelled and observed hydrographs at each bore for wet and dry periods. Maximum observed groundwater levels at bores SP2, SP3, SP5 and BL158 exceed the maximum modelled level at these locations while maximum observed levels at SP1 and SP4 remain below the maximum modelled levels.

Predicted maximum groundwater levels have therefore not changed as a result of the current model update, and furthermore there is no update to the MEDM compared to the previous model update. The model update was provided to the EPA on 9 November 2023 in accordance with an approved extension from the EPA (refer to **Section 11.2**).

A revised report was provided by Mackas Sand to the EPA on 21 December 2023. Mackas Sand has not yet received feedback from EPA on the 2023 GHD groundwater model and MEDM update.

7.2.4 Proposed Improvement or Actions Next Reporting Period

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

- Review and assess the recommendations from the EPA in regards to the groundwater level review and model update, and if necessary, an update of the Mackas Sand SWMP.

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 western edge of the extraction area as the site is governed by the natural movement of sand into the extraction area.

As current activities occurred within the western portion of Lot 218 during 2023, 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.

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.

Active rehabilitation occurred in Lot 220 during the reporting period in the form of tubestock tree planting. Approximately 3,077 locally grown plants were planted in the southeast corner of Lot 220. Passive rehabilitation also occurred in Lot 220 in the form of wind-blown seeds and the migration of sand and/or flora across the area.

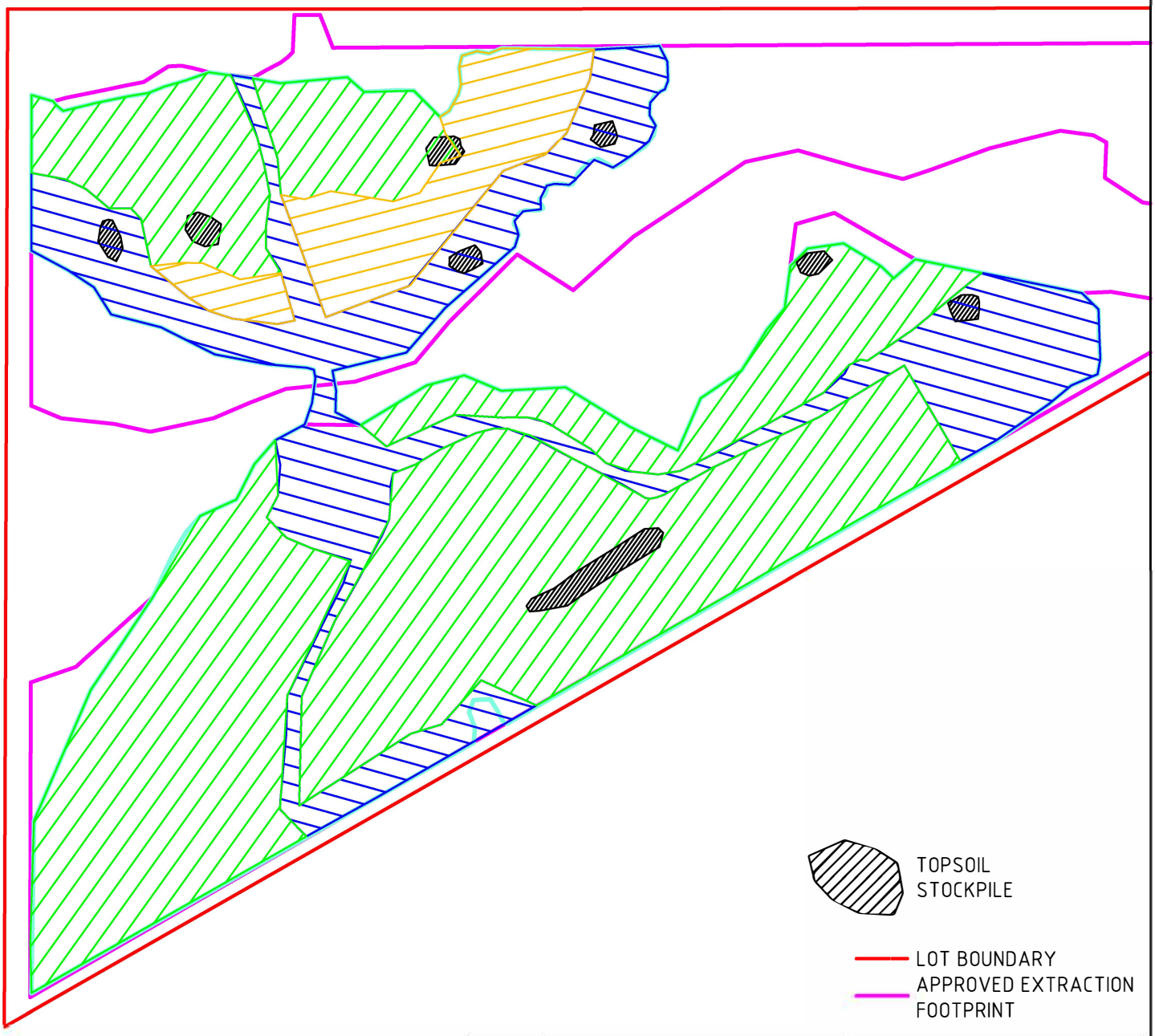
Mackas Sand has scheduled the planting of additional tube stock during 2024 as part of the next rehabilitation works program. **Table 8.1** and **Figure 8.1** show the status of rehabilitation at Lot 220.

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

	2022 Report Period (ha)	2023 Report Period (ha)	2024 Report Period (ha) (forecast)
Total Mine Footprint	36.2	36.2	38
Total Active Disturbance	11.5	9.3	12
Land being prepared for rehabilitation	3.0	3.0	1.2
Land under active rehabilitation	21.7	23.9	21.7
Completed Rehabilitation	0	0	0

CENTURION SURVEY

FIGURE 8.1 2023 REHABILITATION STATUS LOT 220



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

\\cc\cs\jobs\0014 - Macka's Sands\dwg\Annual Area Reporting\0014_CS_AREAS_20231231.dwg, 28/03/2024 9:41:27 AM

Annual Rehabilitation Inspection

Rehabilitation areas at Mackas Sand range in age from approximately 12 months to five years with the status of the rehabilitation reviewed during the 2021 Independent Environmental Audit (IEA) (James Hart Consulting, 2021). The older rehabilitation areas were noted by the auditor as progressing well with good native diversity in the canopy, mid and groundcover layers, despite the drought conditions experienced in recent years. Outcomes of the audit are included in the IEA report (James Hart Consulting, 2021). The IEA report noted that the older rehabilitation areas on site were noted by the auditor as progressing well with good native diversity in the canopy, mid and groundcover layers, despite the drought conditions experienced in recent years. The report also noted that the more recent rehabilitation areas which Mackas Sand planted in early 2020 were noted as being less diverse, with only the planted canopy and shrub species observed along with a sparse ground cover. The IEA Report noted that whilst this is to be expected in developing rehabilitation areas, ongoing monitoring was recommended to continue to review these areas to determine if any supplementary planting or seeding is required to improve the native diversity and cover to desired levels.

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 on 20 September 2023. The inspection consisted of a walkover of all rehabilitation areas in Lot 220. 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 2023 rehabilitation inspection included:

- The need to undertake a regular site wide weed management program to focus on species including Bitou bush (*Chrysanthemoides monilifera*), Paddy melon (*Cucumis myriocarpus*), Spiny burr (*Acanthospermum australe*), Lantana (*Lantana cambara*) and introduced grasses such as red natal grass (*Melinis repens*).
- The presence of reasonably good levels of natural revegetation in many areas from natural seed bank and windblown seed dispersal from surrounding undisturbed vegetation.
- The need to remove redundant infrastructure including steel pipe, concrete blocks, conveyor belt and agricultural pipe located in the rehabilitation areas.
- The presence of salvaged habitat timbers placed in rehabilitation areas.

8.2 Rehabilitation Trials and Research

No rehabilitation trials were undertaken during the report period.

8.3 Rehabilitation Bond

Following the completion of the 2021 IEA, 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. The reviewed and revised rehabilitation bond was submitted to DPHI for approval on 31 November 2021. On 19 September 2022, DPHI approved the rehabilitation bond. Within the correspondence, DPHI also noted that the revised Rehabilitation Bond was to be provided to DPHI by 19 December 2022. An extension letter was provided to DPHI on 3 April 2023 to allow Mackas Sand sufficient time to complete the administrative functions attached to establishing a new bank guarantee for the site. DPHI provided correspondence to Mackas Sand on 2 June 2023 confirming a replacement bank guarantee had been provided to DPHI.

8.4 2022 Annual Review Rehabilitation Recommendations Progress

The progress on the 2022 Mackas Sand Annual Review rehabilitation recommendations is presented in **Table 8.2**.

Table 8.2 2022 Mackas Sand Annual Review Rehabilitation Recommendations

Action	Status	Comment
Mackas Sand will continue to complete weed management across all rehabilitation areas, including topsoil stockpiles.	Ongoing	Weed management works will be undertaken within Lot 220 in conjunction with weed management works within the BOA and Lot 218.
Mackas Sand will, where possible, undertake vegetation infill works (including seeding and/or planting) in rehabilitation zones.	Ongoing	Mackas Sand conducted tubestock tree planting in 2023. Additional planting will occur in 2024 with Mackas Sand also assessing the potential for infill planting in rehabilitation areas during 2024.

8.5 Proposed Improvements or Actions for the Next Reporting Period

Rehabilitation actions proposed to be undertaken by Mackas Sand during the 2024 reporting period are presented in **Table 8.3**.

Table 8.3 Recommended Management Actions for Ongoing Rehabilitation

Recommendation	Area 1 (2019)	Area 2 (2017)	Area 3 (2019 - 2023)	Area 4 (2018 - 2019)
Re-shape existing sand stockpiles within the site to gentler and more natural looking slopes, or flatten out completely			✓	
Neatly blend in transition zones at the edge of quarry with existing undisturbed vegetation areas			✓	
Remove the gravel stockpile and nearby pad				✓
Remove all redundant infrastructure including concrete blocks, pipework, conveyor belts and signposts	✓	✓	✓	✓
Prevent any unauthorised access to the rehabilitation areas (except when authorised on designated tracks)				✓
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: Bitou bush (*Chrysanthemoides monilifera*) Pampas grass (*Cortaderia* sp.) Paddy melon (*Cucumis myriocarpus*) Stinking Roger (*Tagetes minuta*) Spiny burr (*Acanthospermum australe*) Lantana (*Lantana cambara*) Introduced grasses such as red natal grass (*Melinis repens*)	✓	✓	✓	✓
Distribute existing stockpiled salvaged habitat timber features throughout the rehabilitation area			✓	
Source local seed for propagation and undertake tube stock infill planting at higher densities than previously undertaken	✓	✓	✓	
Consider the need to undertake direct seeding and follow-up infill planting of rehabilitated areas - this would be very effective and could be undertaken at any time of the year.	✓	✓	✓	✓

9.0 Community

9.1 Community Complaints

Mackas Sand did not receive any community complaints during the 2023 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 between 2018 – 2023.

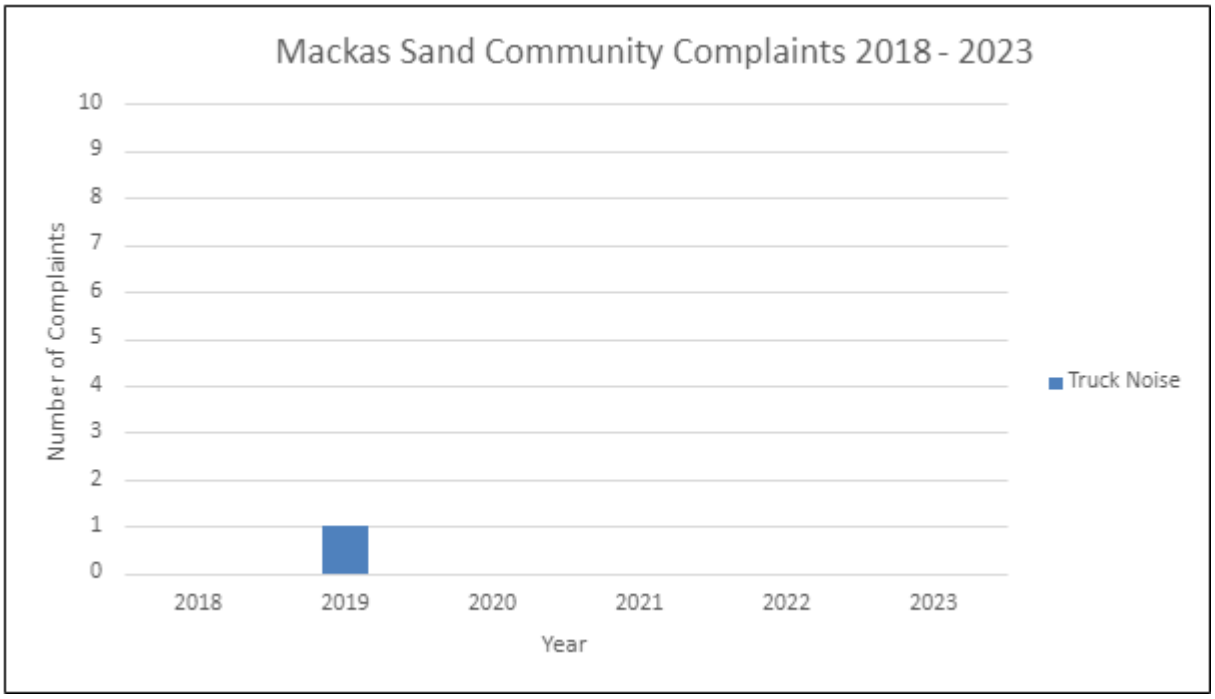


Figure 9.1 Summary of Mackas Sand Community Complaints 2018 - 2023

9.2 Community Consultative Committee

Community Consultative Committee (CCC) representatives act as a point of contact to provide feedback between Macka's Sand and the wider community. The 2023 Macka's Sand CCC was undertaken on 19 July 2023. Attendees of the 2023 Macka's Sand CCC are listed in **Table 9.1**.

Table 9.1 Macka's Sand CCC Attendees for the 2022 Report Period

Name	Organisation
Ms Margaret Macdonald-Hill	Chairperson
Mr James Mackenzie	Macka's Sand Representative
Mr Stephen Hufnagl	Community Representative
Mr Kent Sansom	Community Representative
Ms Julie Towers	Community Representative
Mr Cliff Johnson	Community/ Council Representative
Mr Chris Bonomini	Umwelt (Australia) Pty Ltd

General items discussed during the 2023 CCC meeting included:

- Mackas Sand confirmed that the approvals process for the modification to the maximum extraction depth of Lot 218 may recommence over the proceeding three to six months.
- Representative from Macka's Sand advised planning is underway to reseal the road into Lot 218 with quotes being sourced for the works. The representative also highlighted Macka's Sand is focusing on rehabilitation in Lot 220, noting existing pockets of sand have gained approval for extraction. However, as detailed in **Section 4.1** no sand extraction is proposed in Lot 220 during the 2024 reporting period. In order to assist with rehabilitation efforts, Macka's Sands has engaged a consultant to assist with managing environmental compliance.
- It was noted that there were no complaints received during the period since the last CCC meeting.
- Discussion regarding the DPHI site visit which was conducted on 17 May 2023. No formal correspondence had been received from DPHI documenting the inspection, however verbal feedback regarding inspection was positive with regard to rehabilitation efforts in Lot 220 and management of extraction depth of Lot 218.
- The chairperson highlighted the revised CCC Guidelines from the DPHI.
- It was noted amongst the committee only three complaints had been made against the project since operations began in September 2010. Acknowledging there has been no major issues, meetings have been reduced from quarterly to annual since 2018.
- It was unanimously agreed the chairperson seek Departmental 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. Chairperson suggested this to be included in the draft Terms of Reference subject to DPHI's requirements.

9.3 Community Engagement

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

- $400 donation to the K.I.D.S Foundation, a not-for-profit charity educating children and families on ways to prevent injuries and trauma associated with events that put children in dangerous situations.
- $564 donation of sand to the Newcastle Show Society.
- $500 sponsorship to the Raymond Terrace Roosters JRLFC.
- $1000 AOM sponsorship for a local community member to perform as part of an Australian Contingent in Nashville.

10.0 Independent Audit

After being endorsed by the DPHI on 7 May 2021, James Hart (lead environmental auditor), Tom Scott (rehabilitation and biodiversity specialist), and Katarina David (groundwater specialist) were engaged by Mackas Sand to undertake an IEA of the Mackas Sand Project in 2021 for the operational period from 1 January 2018 to 31 May 2021.

The IEA report was finalised, submitted, and approved by DPHI during the 2021 reporting period. The next IEA is scheduled to be undertaken during Q2 2024. The IEA action plan and recommendations report will be submitted to the Department within 1 month of completion of the IEA in accordance with *Schedule 5 Condition 6* of PA 08_0142 (MOD 2).

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 four (4) non-compliances during the 2023 reporting period. Mackas Sand has addressed the four (4) non-compliances that were identified during the reporting period, further details of which are provided in **Table 11.1.**

Table 11.1 2023 Incidents and Non-compliances

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment
EPL 13218 PA 08_0142	Condition M2.2 Schedule 3 Condition 13	Air monitoring is required to be undertaken at EPA Point 7 and 8 in accordance with AM-19.	Administrative Non-compliance	During the July 2023 sampling period, air monitoring samples were damaged during transit to an accredited laboratory and subsequently there were no dust monitoring results available for July 2023.
EPL 13218 PA 08_0142	Condition M2.2 Schedule 3 Condition 13	Air monitoring is required to be undertaken at EPA Point 7 and 8 in accordance with AM-19.	Administrative Non-compliance	During the September 2023 sampling period, an air monitoring sample at EPA Point 8 was observed as damaged during field collection and was subsequently replaced. As a result, only one air monitoring sample was sent for analysis to an accredited laboratory (there was no monitoring undertaken for EPA Point 8).
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 31 January 2024. The report is required to be submitted to BCT 31 December annually, however, was submitted to BCT on 31 January 2024 due to an administrative oversight.

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment
PA 08_0142	Schedule 3 Condition 33D	Failure to operate video camera at Alternative access road on 19 November 2023	Low	Non-compliance of operating video cameras adjacent to the Alternative access road occurring on 19 November 2023. An investigation into the non-compliance determined that on 19 November 2023 an external power supply fault in the Ausgrid power grid caused a power spike in the power reticulation system on the Mackas Sand site, damaging a number of electrical power transformers, power supplies and other electrical equipment, including damage to the power supply to the camera. Power was restored to the camera when the external power supply was restored to the site on 22 November 2023.

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 2024 Report Period

The anticipated environmental management activities for Mackas Sand during the 2024 report period are included in **Table 12.1**.

Table 12.1 Environmental Management Activities Proposed for 2024

Document Section	Area/Nature of Activity	Action Proposed
6.2.4	Air Quality	• Mackas Sand will investigate relocating dust gauge DDG2 approximately 200 m west of its current location to avoid any air quality impacts generated from neighbouring properties.
6.4	Biodiversity Offset Area	• Ensuring fencing is adequate to exclude cattle, including regular monitoring (and evidence thereof) to ensure this is the case. Attention will be focused to ensure fencing is anchored into the ground at regular intervals (more than strainer posts only) to ensure cattle exclusion. • Engage suitably qualified and experienced land management professionals to complete regular weed and early colonising native species management works as recommended in the BOS and in consultation with the BCT. Such works are to be undertaken during the period between and including December to April to avoid target orchid growth/flowering season. Mackas Sand will seek written permission from the BCT prior to works being undertaken and such works are to occur strictly in a manner that does not impact the threatened orchid populations. Evidence of these works will be provided after each event. • Weed management works will be undertaken within the CA and within approximately 20 m surrounding the BOA (i.e., the weed management area) to reduce potential weed source populations. • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.
6.5.6	Landscape and Biodiversity Offset	• 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. • 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. • 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. • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.

Document Section	Area/Nature of Activity	Action Proposed
6.6.5	Aboriginal Heritage	• Mackas Sand will continue collecting artefacts, if found, from Lot 218 and Lot 220 in the next reporting period.
7.2.4	Water Management	• Review and assess the recommendations from the EPA in regards to the groundwater level review and model update, and if necessary, an update of the Mackas Sand SWMP.
8.5	Rehabilitation	• 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.

13.0 References

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

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

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 (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 (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 (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 (2016) *Aboriginal Cultural Heritage Management Plan*. 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.

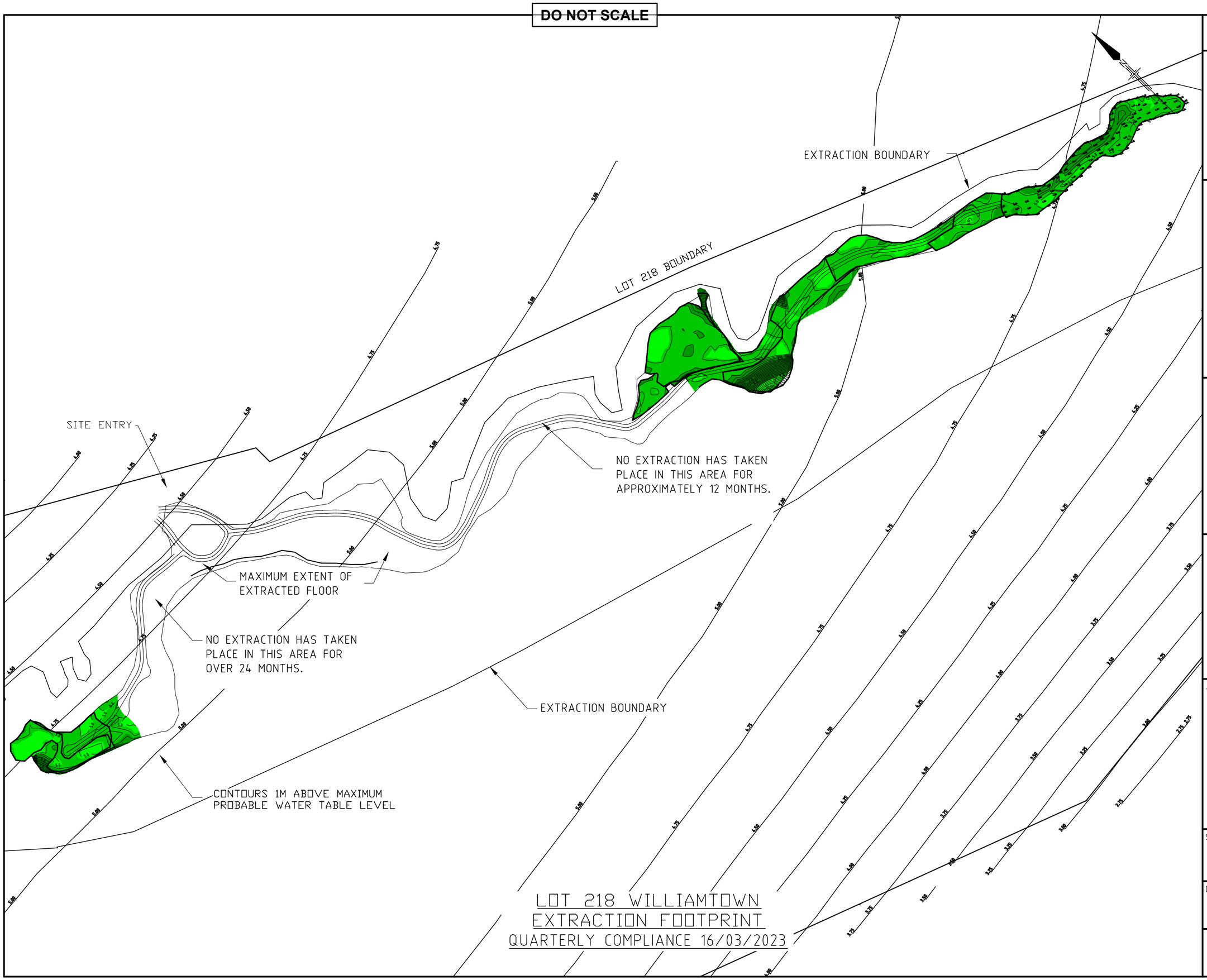
Umwelt (Australia) Pty Limited (2011) Determination of Maximum Predicted Groundwater Level and Maximum Extraction Level at Lot 218 and Lot 220, Salt Ash. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (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.

APPENDIX 1

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

DO NOT SCALE



LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 16/03/2023

SCALE: NOT TO SCALE

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DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	3/01/2023
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

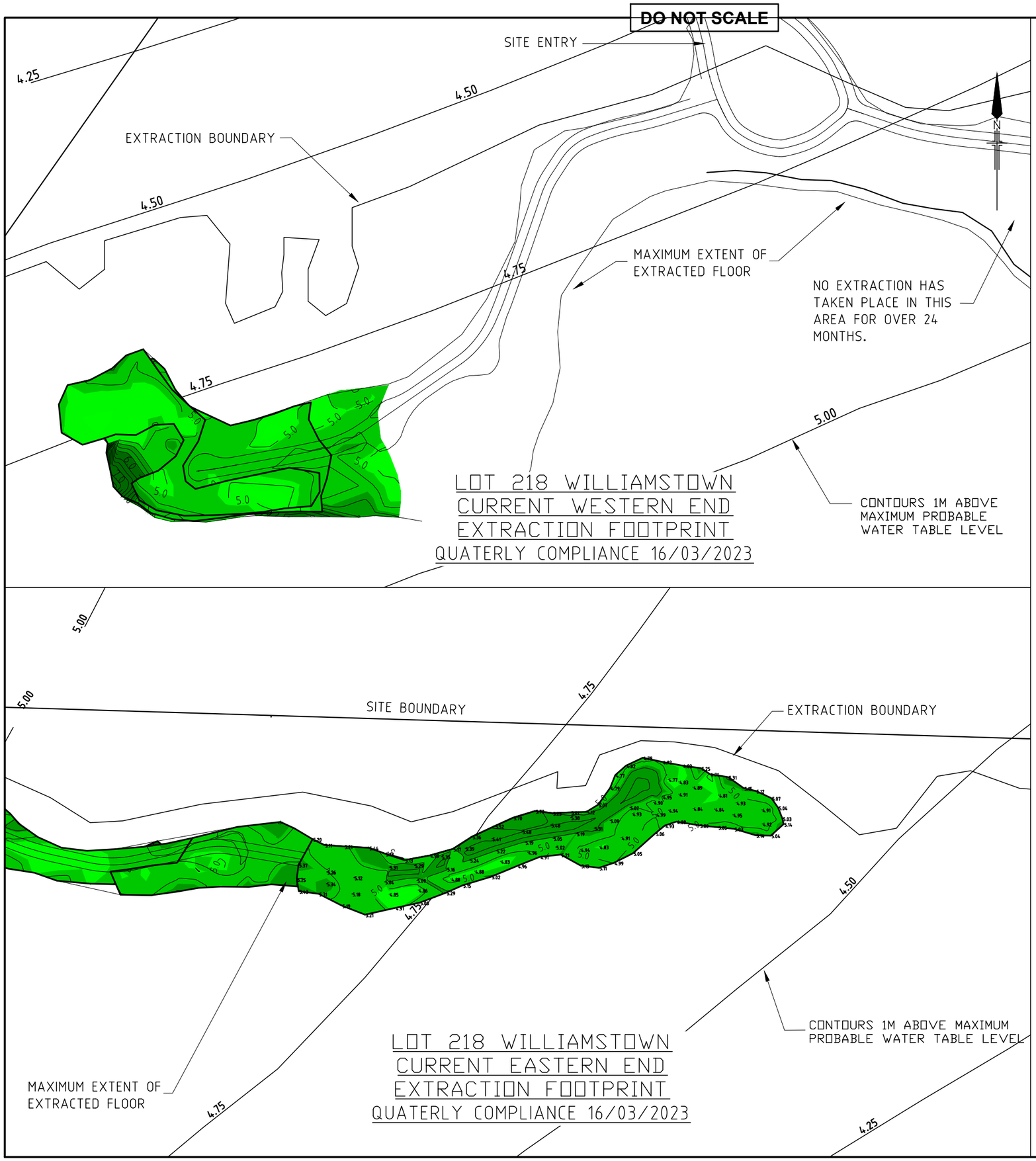
STATUS:

MARCH 2023

DRAWING NUMBER:

A3

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 IS COMPLIANT AS AT 16/03/2023.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING 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 EASTERN END FOR THE QUARTER ENDING 31/03/2023 WAS COMPLETED 16/03/2023.
5. NO EXTRACTION IN WESTERN END DURING JULY THROUGH MARCH 2023. DEPTH RANGE DATA SHOWN WAS RECORDED AFTER LAST EXTRACTION OCCURRED.

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

LOWER VALUE		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

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	05/04/2023
REVISION:	A

CLIENT & JOB:

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Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

MARCH 2023

DRAWING NUMBER:

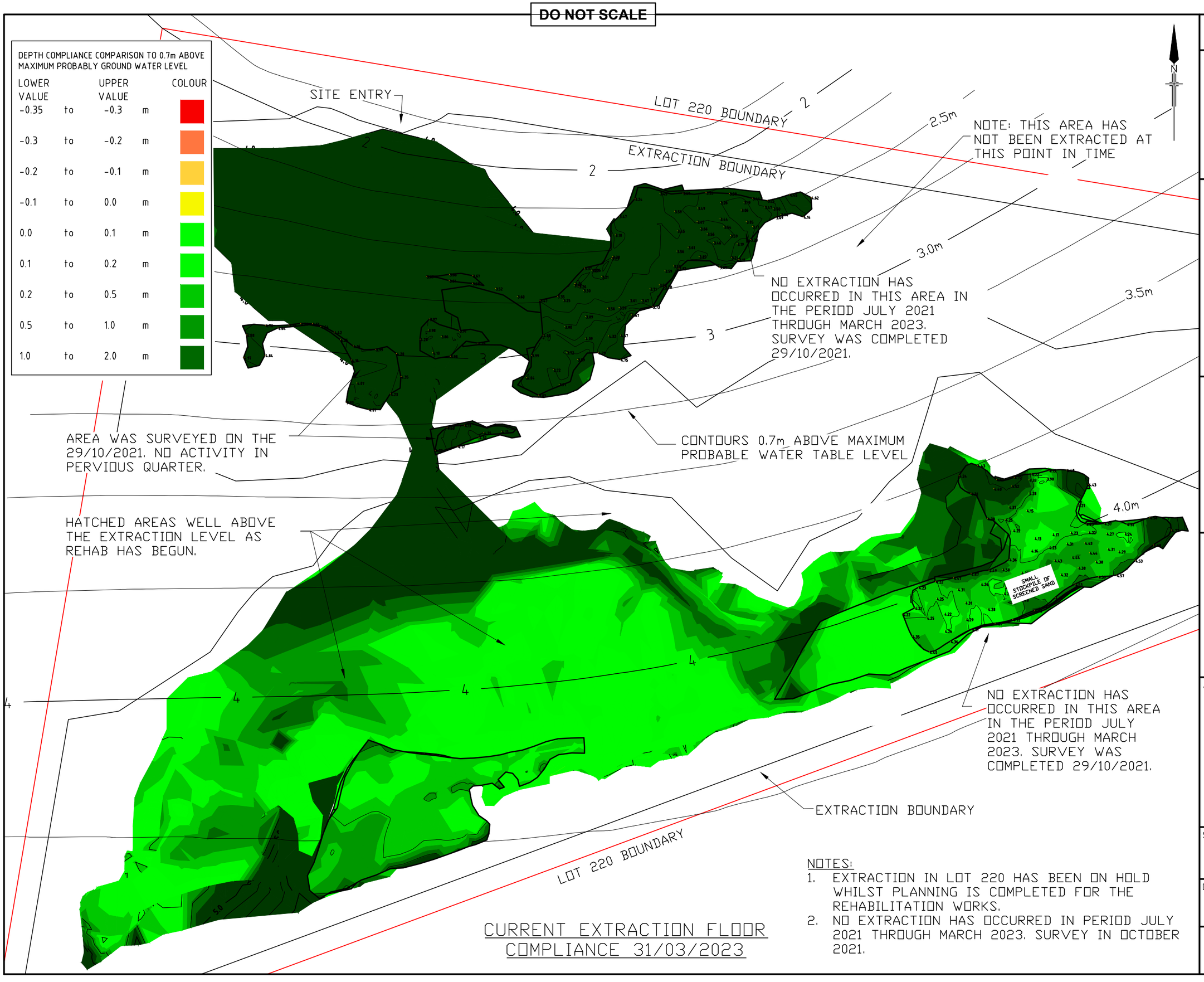
SHEET 2 OF 2 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		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	



CURRENT EXTRACTION FLOOR COMPLIANCE 31/03/2023

NOTES:

1. EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
2. NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH MARCH 2023. SURVEY IN OCTOBER 2021.

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	31/03/2023
REVISION:	A

CLIENT & JOB:

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SAND & SOIL
SALT ASH

COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

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Mayfield NSW 2304

TITLE:

LOT 220
EXTRACTION LEVEL
COMPLIANCE

STATUS:

MARCH 2023

DRAWING NUMBER:

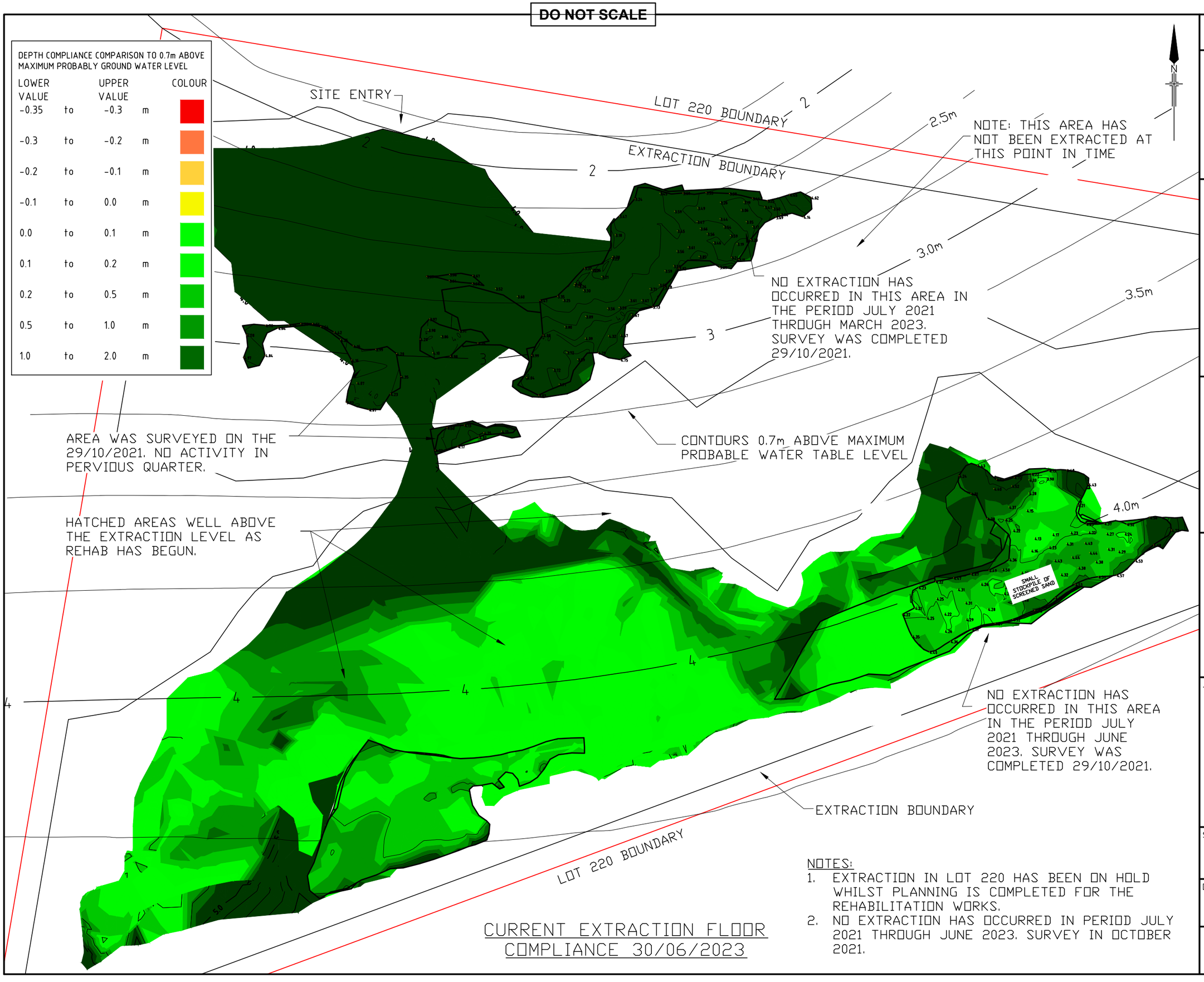
SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		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	



CURRENT EXTRACTION FLOOR COMPLIANCE 30/06/2023

NOTES:

1. EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
2. NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH JUNE 2023. SURVEY IN OCTOBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_230630.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	30/06/2023
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL
SALT ASH

COMPLIANCE REPORTING

CENTURION SURVEY PTY LTD

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Mayfield NSW 2304

TITLE:

LOT 220
EXTRACTION LEVEL
COMPLIANCE

STATUS:

JUNE 2023

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

WESTERN END
VIEW BOUNDARY

SITE ENTRY

MAXIMUM EXTENT OF
EXTRACTED FLOOR

NO EXTRACTION HAS TAKEN
PLACE IN THIS AREA FOR
OVER 24 MONTHS.

EXTRACTION BOUNDARY

WESTERN END
VIEW BOUNDARY

CONTOURS 1M ABOVE MAXIMUM
PROBABLE WATER TABLE LEVEL

LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 30/06/2023

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_230630.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	3/01/2023
REVISION:	A

CLIENT & JOB:

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REPORTING

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Mayfield NSW 2304

TITLE:

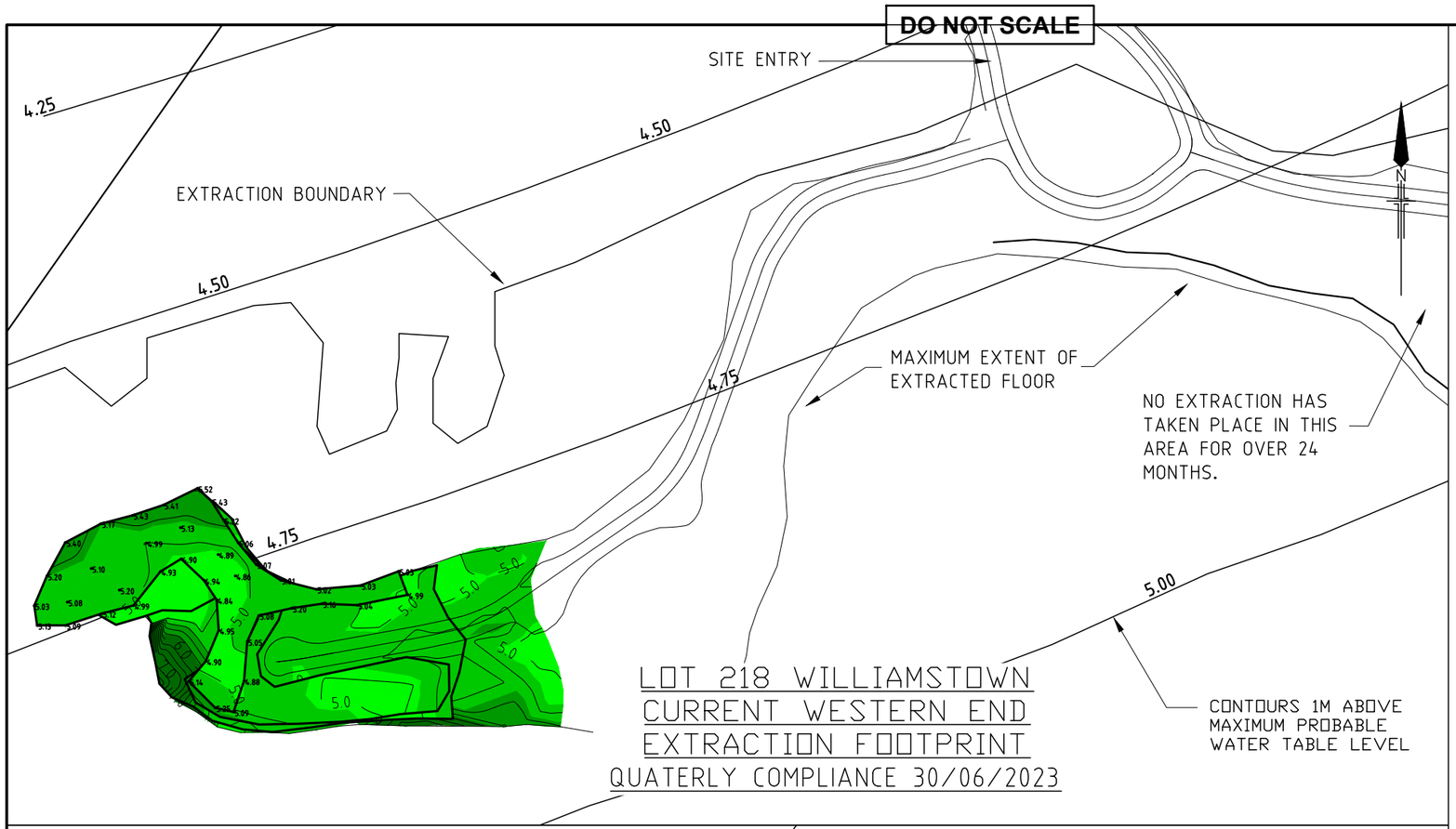
LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

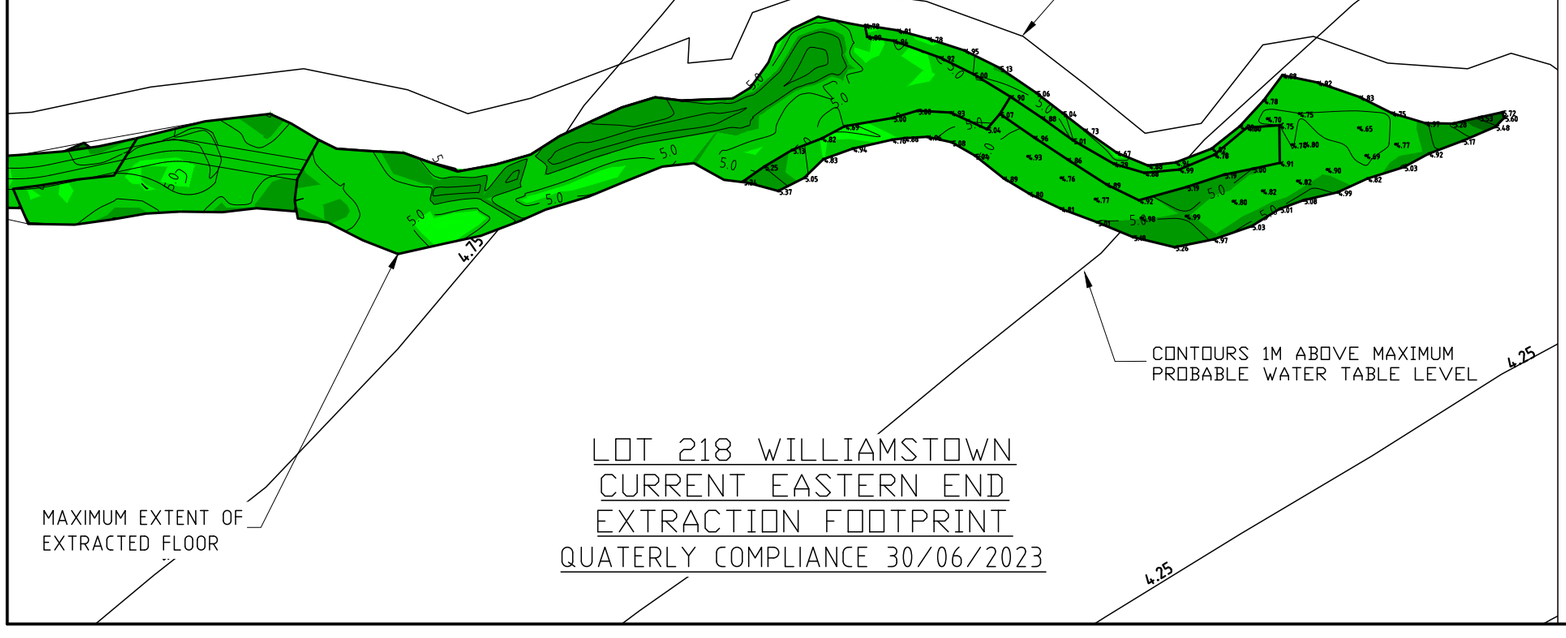
JUNE 2023

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/06/2023



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/06/2023

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 IS COMPLIANT AS AT 30/06/2023.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING 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 EASTERN END FOR THE QUARTER ENDING 30/06/2023 WAS COMPLETED 04/07/2023.
4. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 30/06/2023 WAS COMPLETED 04/07/2023.

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

LOWER VALUE		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

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ISSUE DATE:	10/07/2023
REVISION:	A

CLIENT & JOB:

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TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

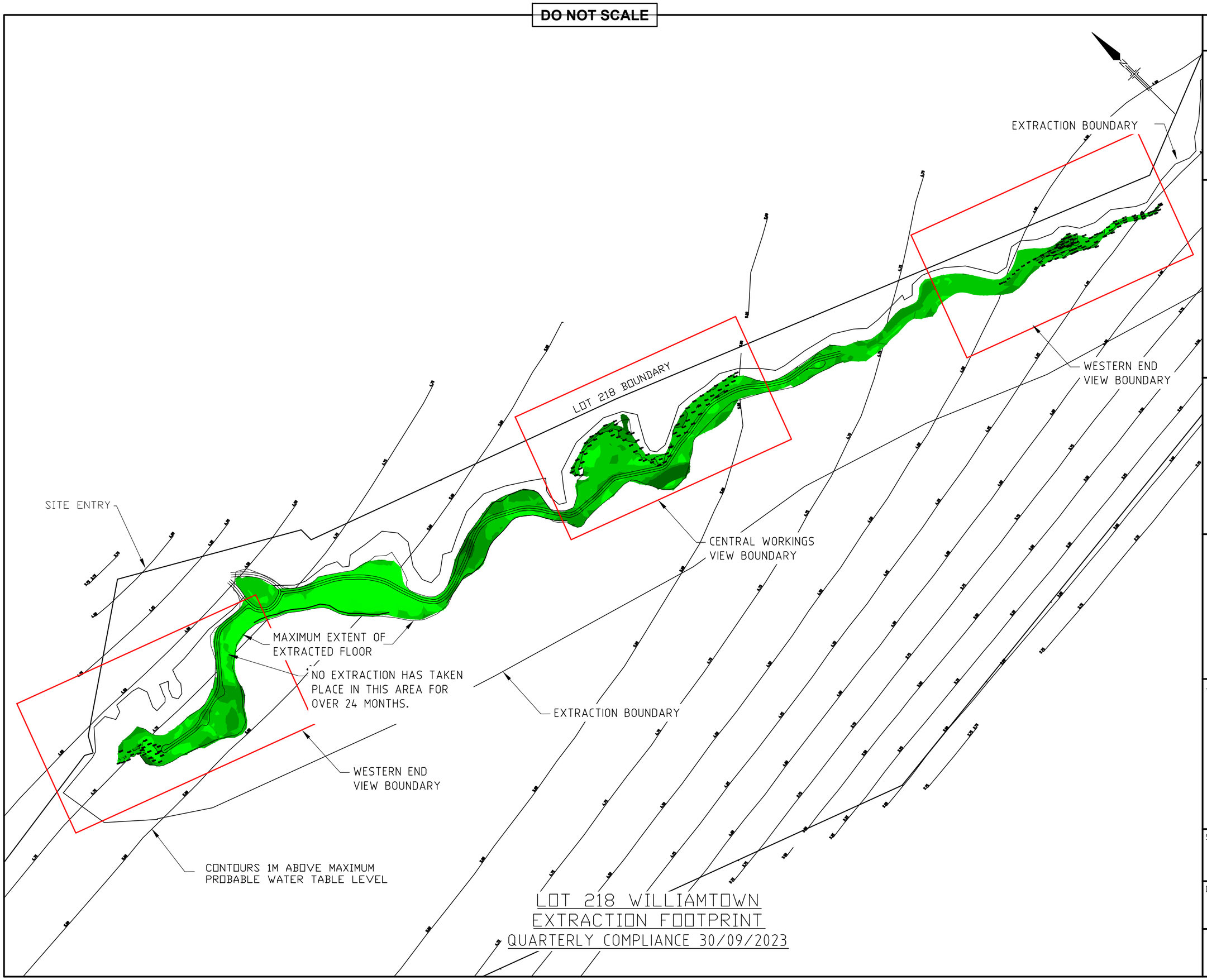
JUNE 2023

DRAWING NUMBER:

SHEET 2 OF 2 SHEETS

A3

DO NOT SCALE



LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 30/09/2023

SCALE: NOT TO SCALE

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DATUM:	AHD
ISSUE DATE:	3/01/2023
REVISION:	A

CLIENT & JOB:

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TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

SEPTEMBER 2023

DRAWING NUMBER:

SHEET 1 OF 3 SHEETS

A3

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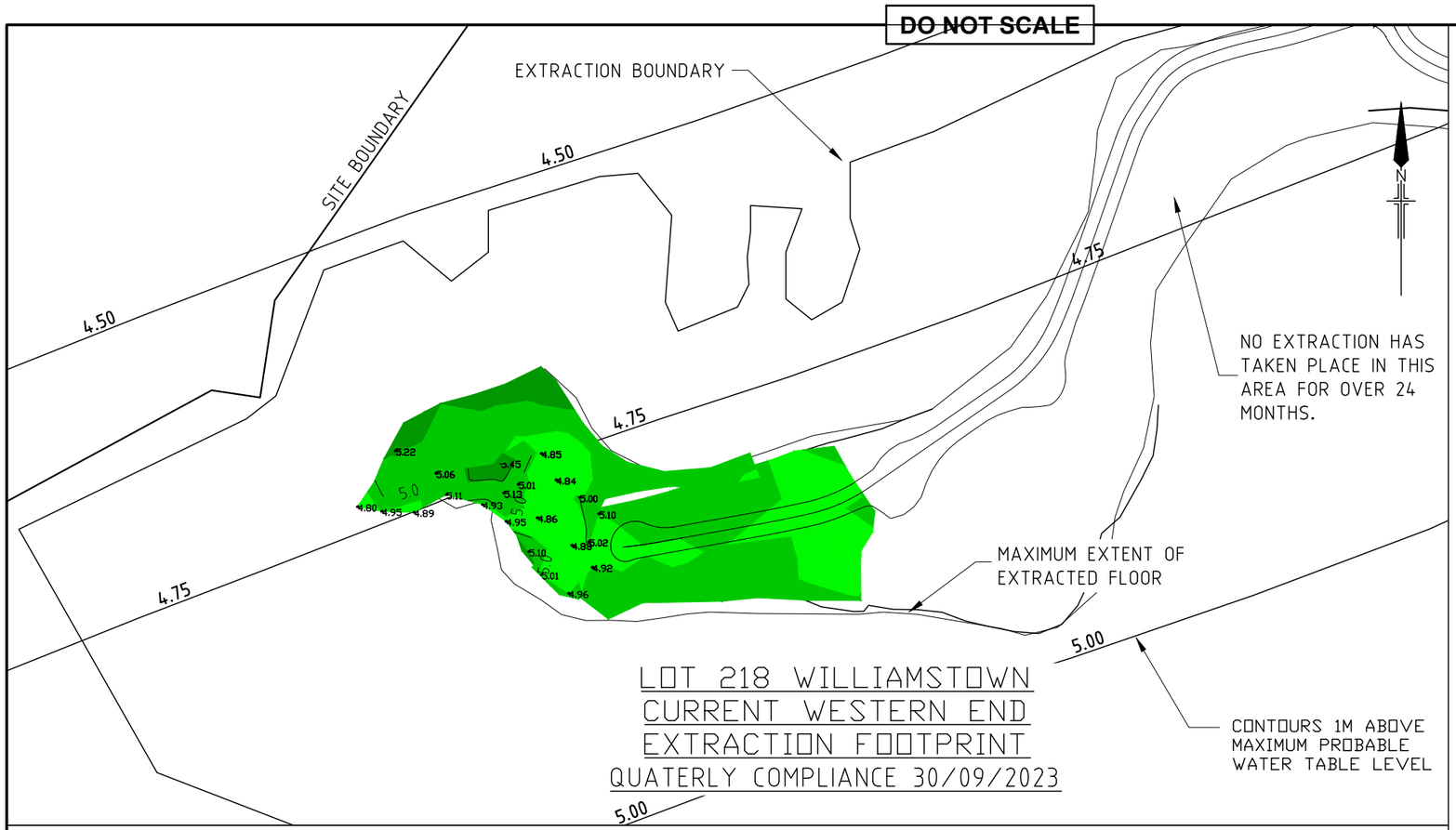
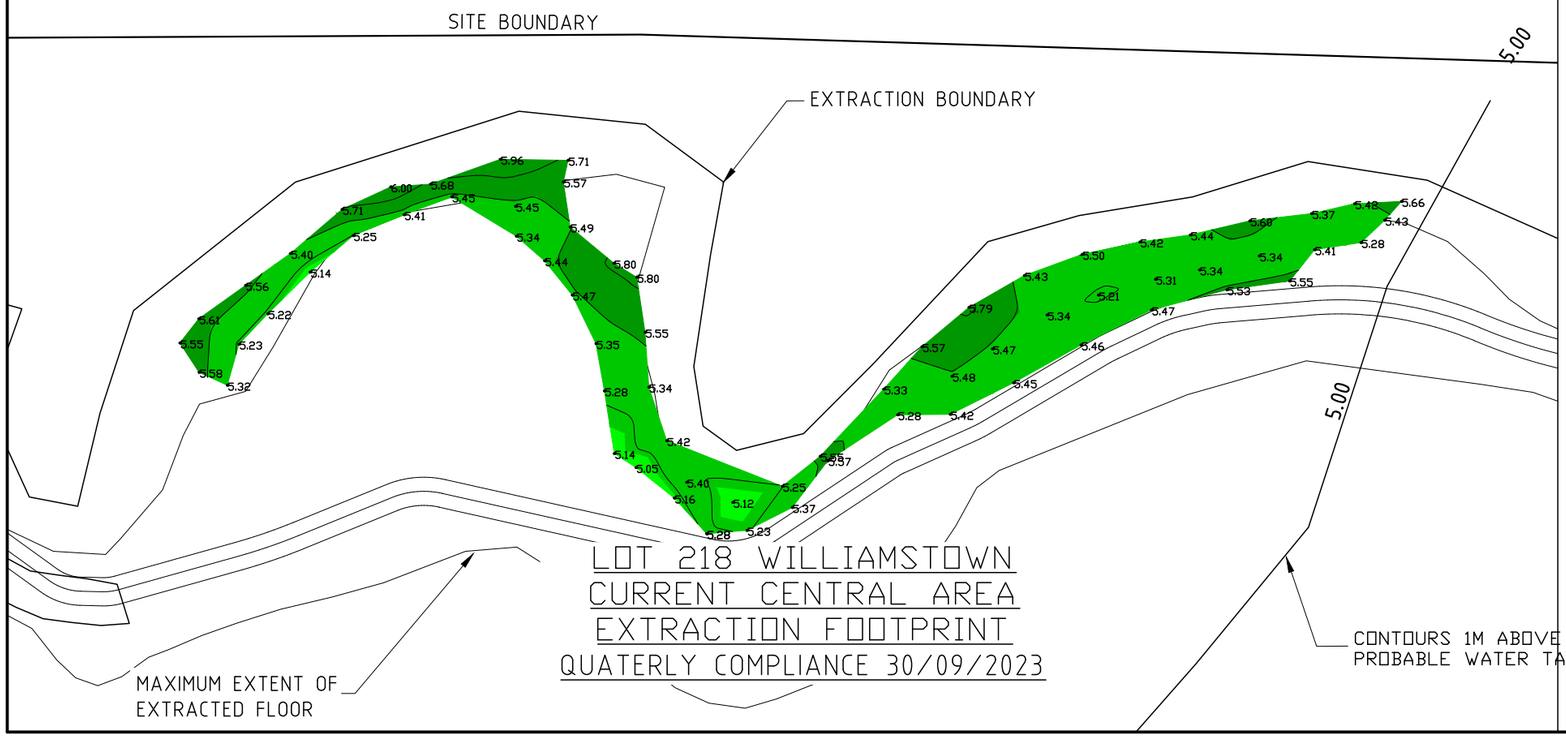


LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/09/2023



LOT 218 WILLIAMSTOWN
CURRENT CENTRAL AREA
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/09/2023

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 IS COMPLIANT AS AT 17/10/2023.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING 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 30/09/2023 WAS COMPLETED 17/10/2023.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 30/09/2023 WAS COMPLETED 17/10/2023.

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

LOWER VALUE		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

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DATUM:	AHD
ISSUE DATE:	17/10/2023
REVISION:	A

CLIENT & JOB:

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SAND & SOIL

WILLIAMTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

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Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

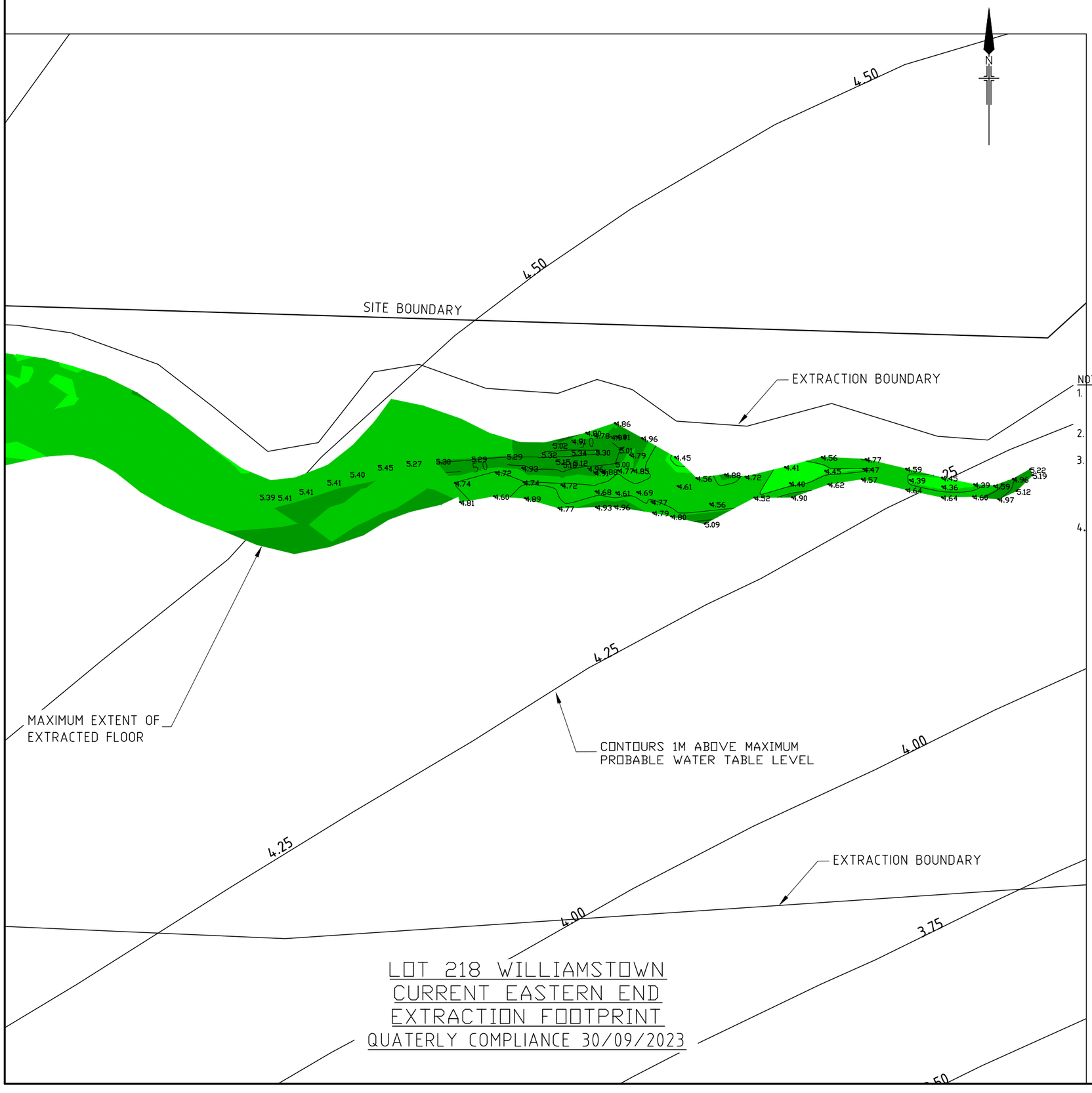
STATUS:

SEPTEMBER 2023

DRAWING NUMBER:

A3

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 IS COMPLIANT AS AT 17/10/2023.
3. SHOT HEIGHTS SHOWN ARE FOR THE CURRENT WORKING AREAS 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 EASTERN END FOR THE QUARTER ENDING 30/09/2023 WAS COMPLETED 17/10/2023.

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

LOWER VALUE		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_230930.dwg
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DATUM:	AHD
ISSUE DATE:	17/10/2023
REVISION:	A

CLIENT & JOB:

MACKAS
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COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

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

TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

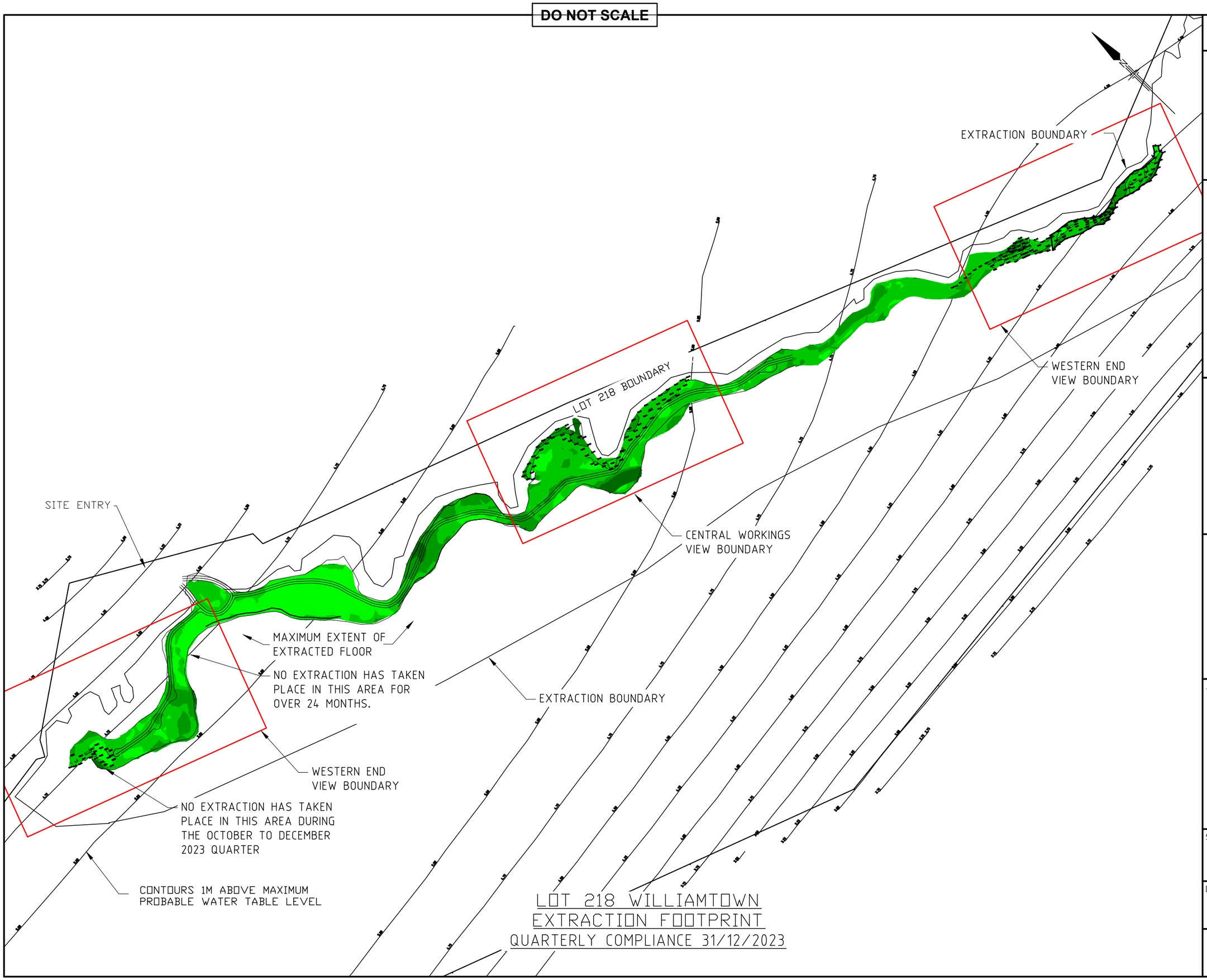
STATUS:

SEPTEMBER 2023

DRAWING NUMBER:

A3

DO NOT SCALE



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

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_231231.dwg
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DATUM:	AHD
ISSUE DATE:	10/01/2024
REVISION:	A

CLIENT & JOB:

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REPORTING

CENTURION SURVEY PTY LTD

ABN: 66 605 045 314
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Mayfield NSW 2304

TITLE:

LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

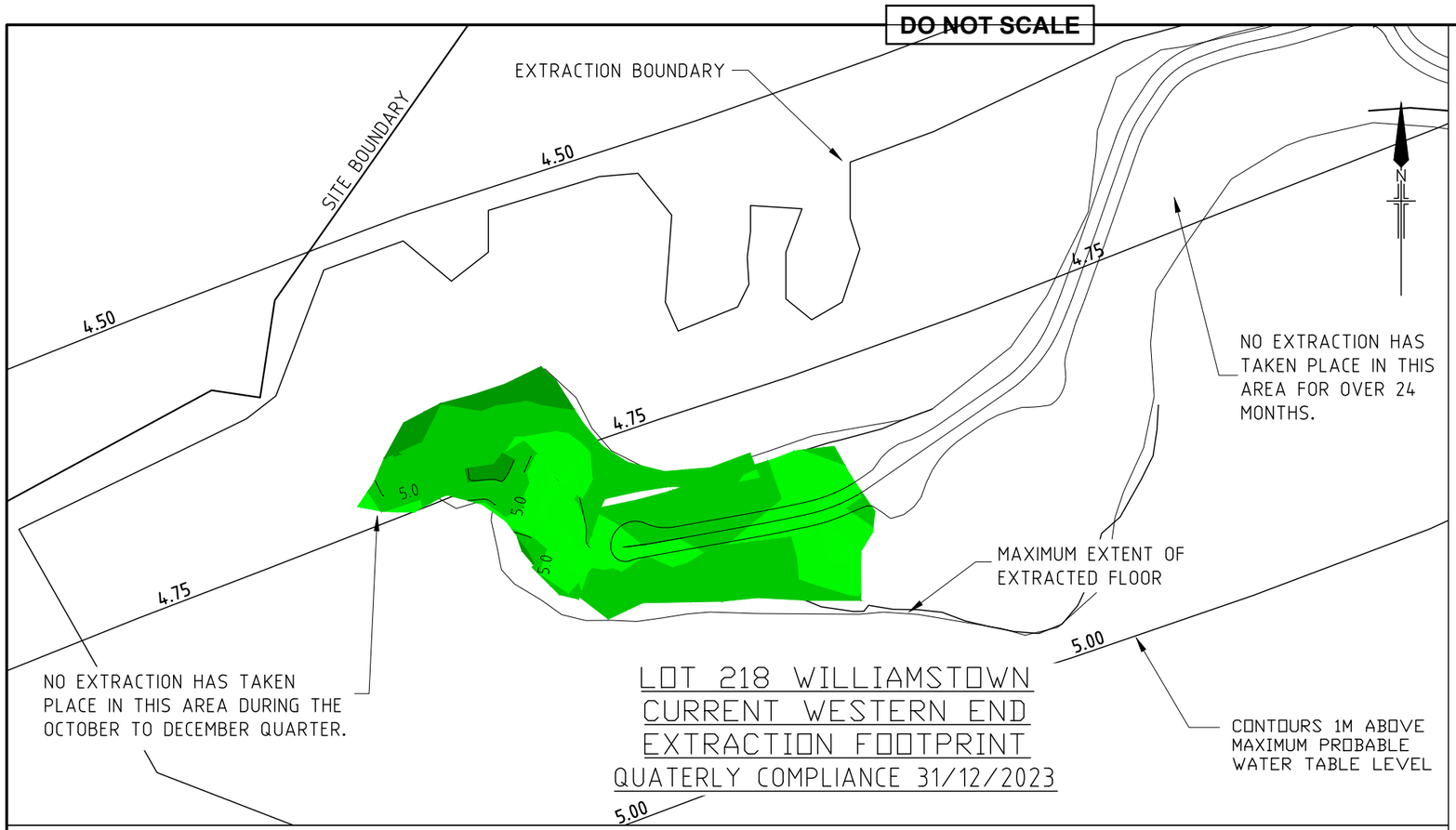
STATUS:

DECEMBER 2023

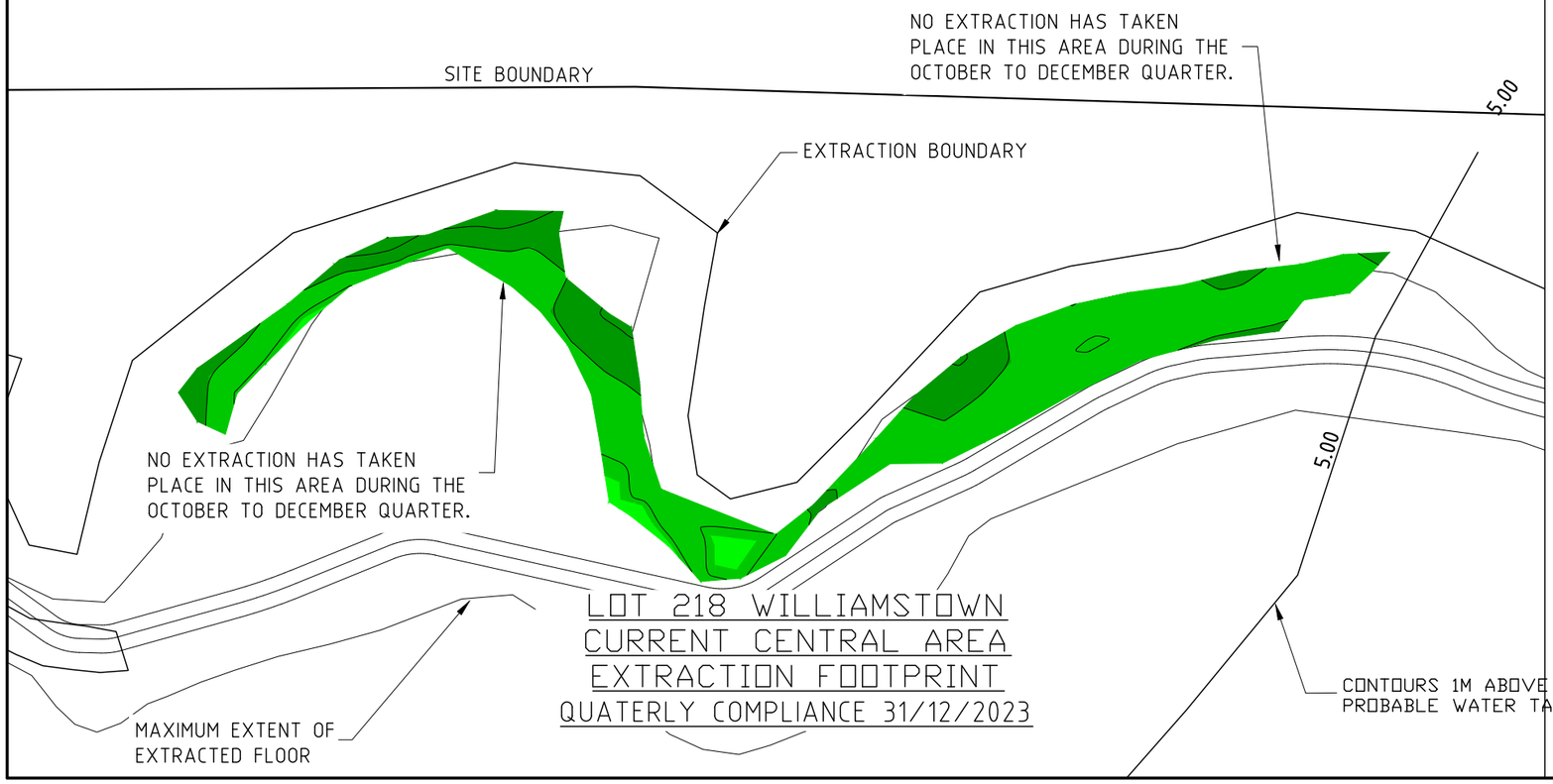
DRAWING NUMBER:

A3

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/12/2023



LOT 218 WILLIAMSTOWN
CURRENT CENTRAL AREA
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/12/2023

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 31/12/2023.
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 30/09/2023 WAS COMPLETED 17/10/2023.
5. SURVEY TO CONFIRM COMPLIANCE AT WESTERN END FOR THE QUARTER ENDING 30/09/2023 WAS COMPLETED 17/10/2023.

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

LOWER VALUE		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_231231.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

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:

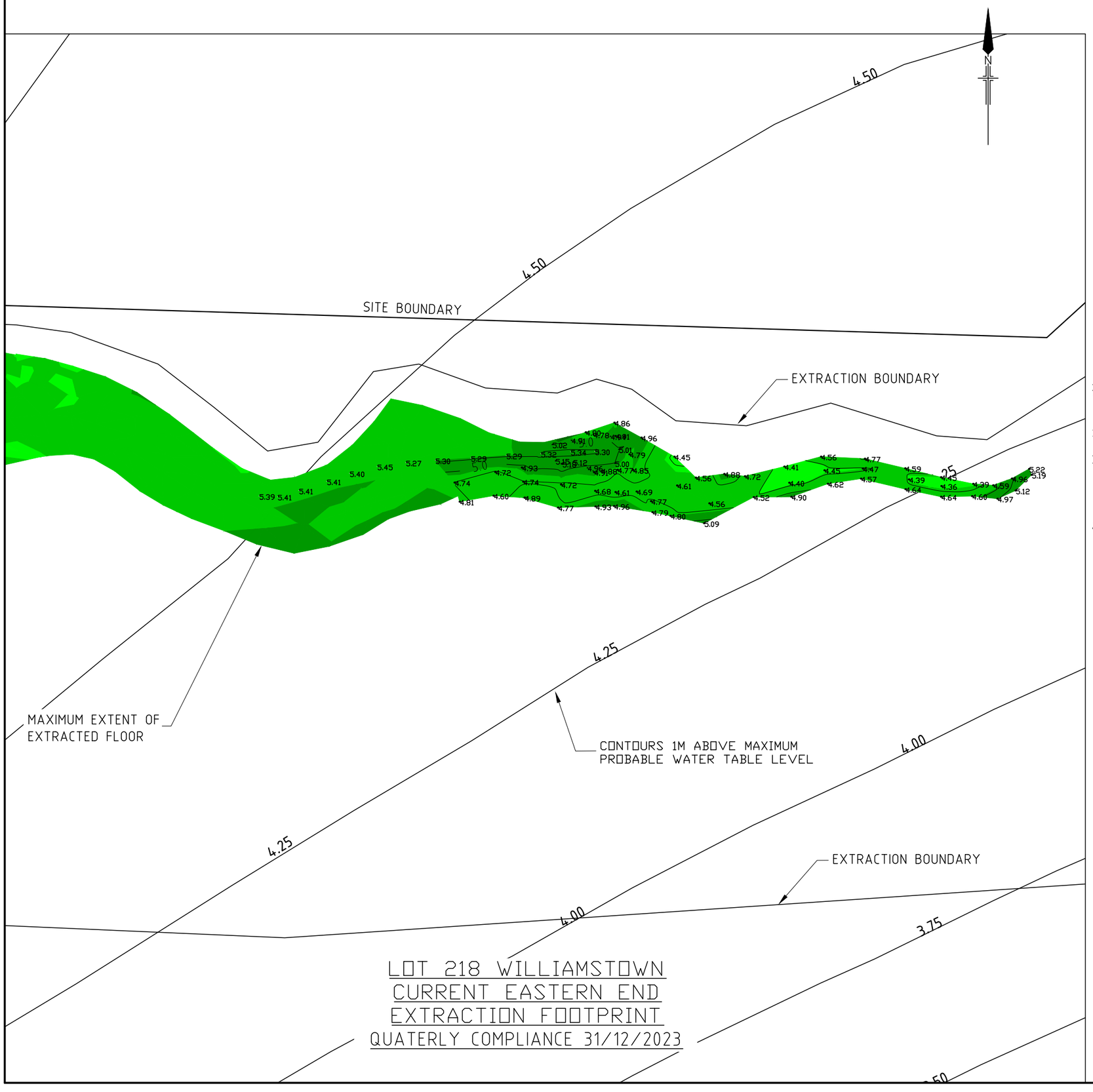
LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

DECEMBER 2023

DRAWING NUMBER:

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 08/01/2024.
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 COMPLYING 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 31/12/2023 WAS COMPLETED 08/01/2024.

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

LOWER VALUE		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_231231.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

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:

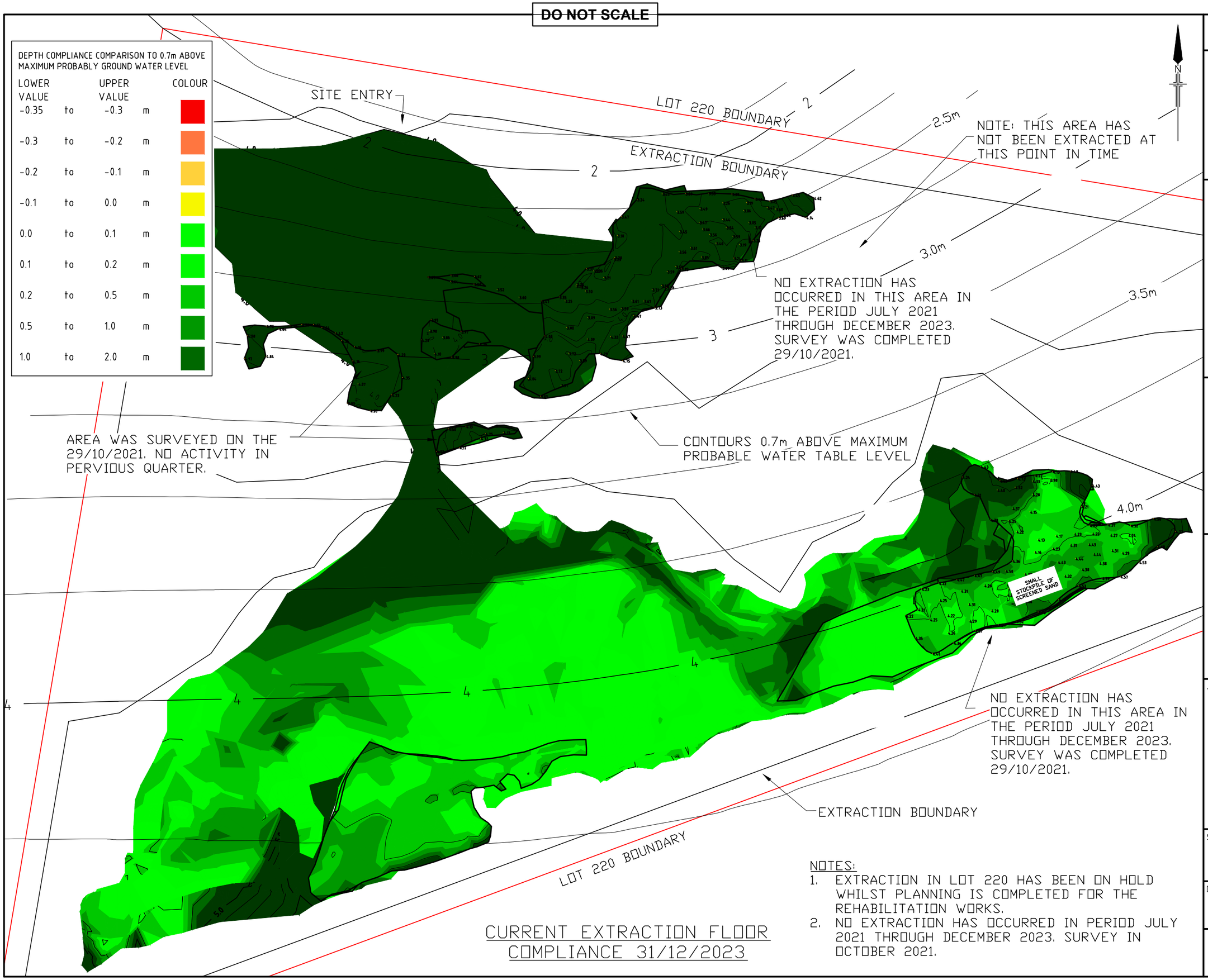
DECEMBER 2023

DRAWING NUMBER:

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		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	



CURRENT EXTRACTION FLOOR COMPLIANCE 31/12/2023

NOTES:

1. EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
2. NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH DECEMBER 2023. SURVEY IN OCTOBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_231231.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	31/12/2023
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:

DECEMBER 2023

DRAWING NUMBER:

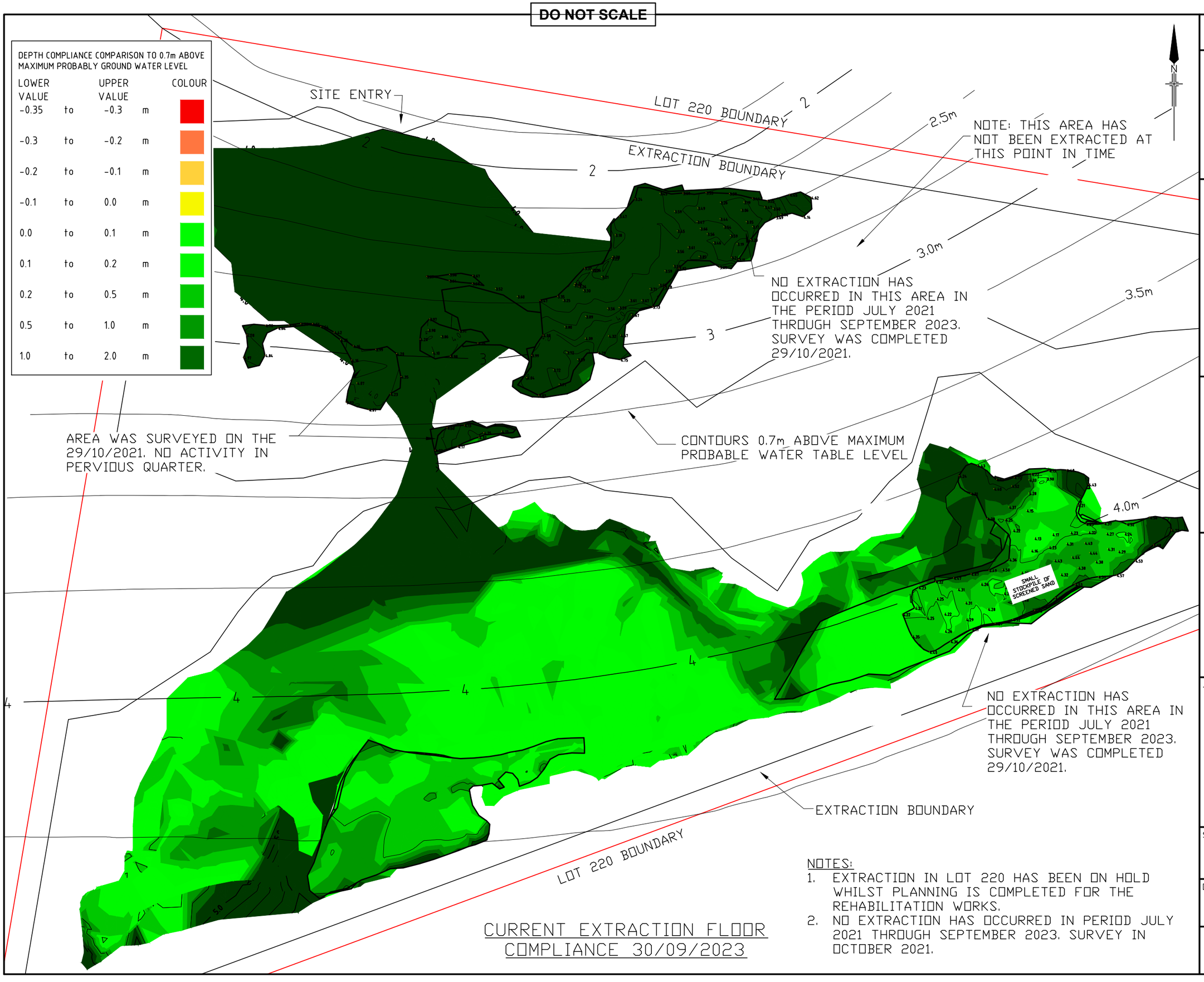
SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

DEPTH COMPLIANCE COMPARISON TO 0.7m ABOVE MAXIMUM PROBABLY GROUND WATER LEVEL

LOWER VALUE		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	



CURRENT EXTRACTION FLOOR COMPLIANCE 30/09/2023

NOTES:

1. EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
2. NO EXTRACTION HAS OCCURRED IN PERIOD JULY 2021 THROUGH SEPTEMBER 2023. SURVEY IN OCTOBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_230930.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	30/09/2023
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

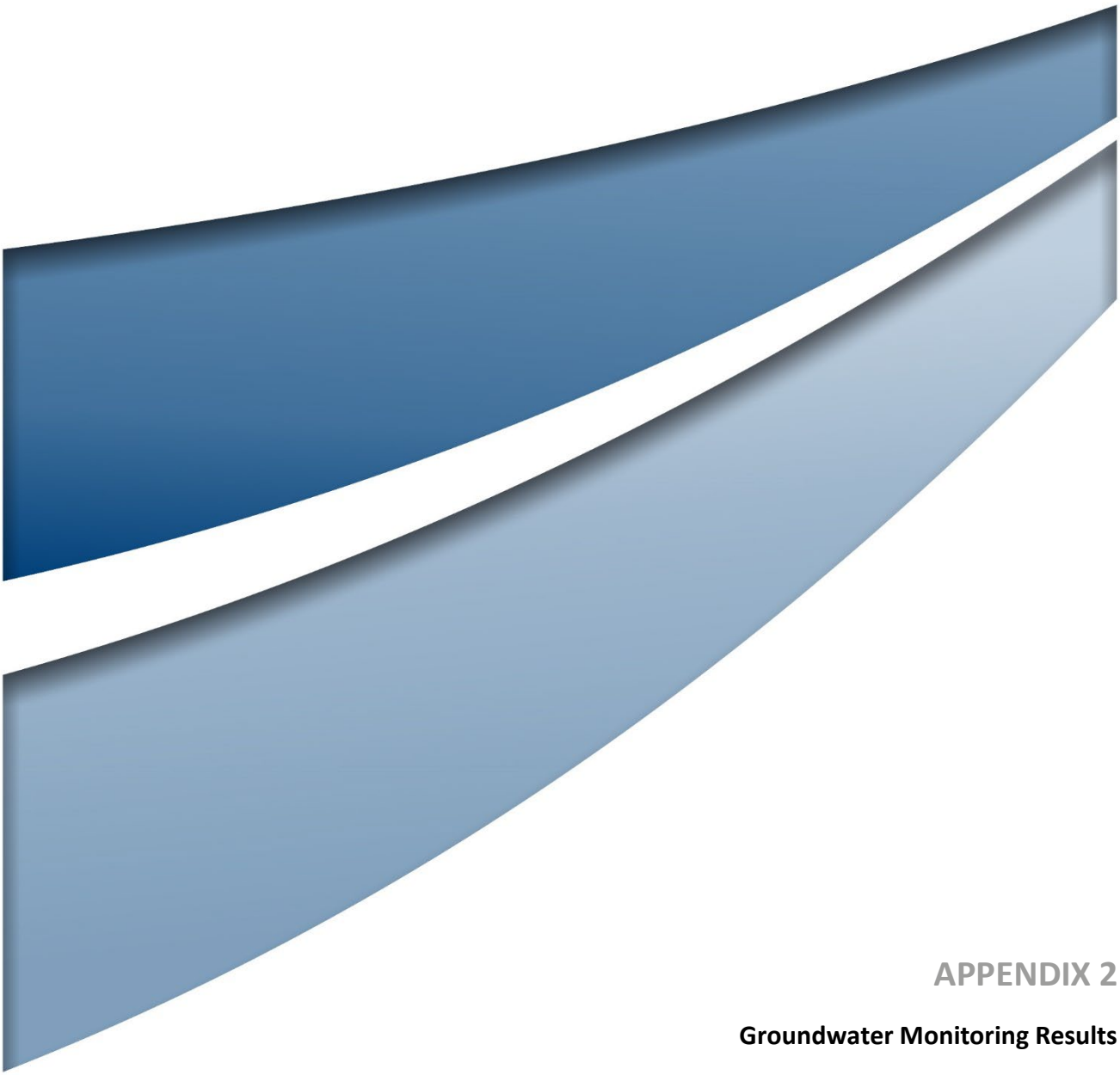
STATUS:

SEPTEMBER 2023

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3



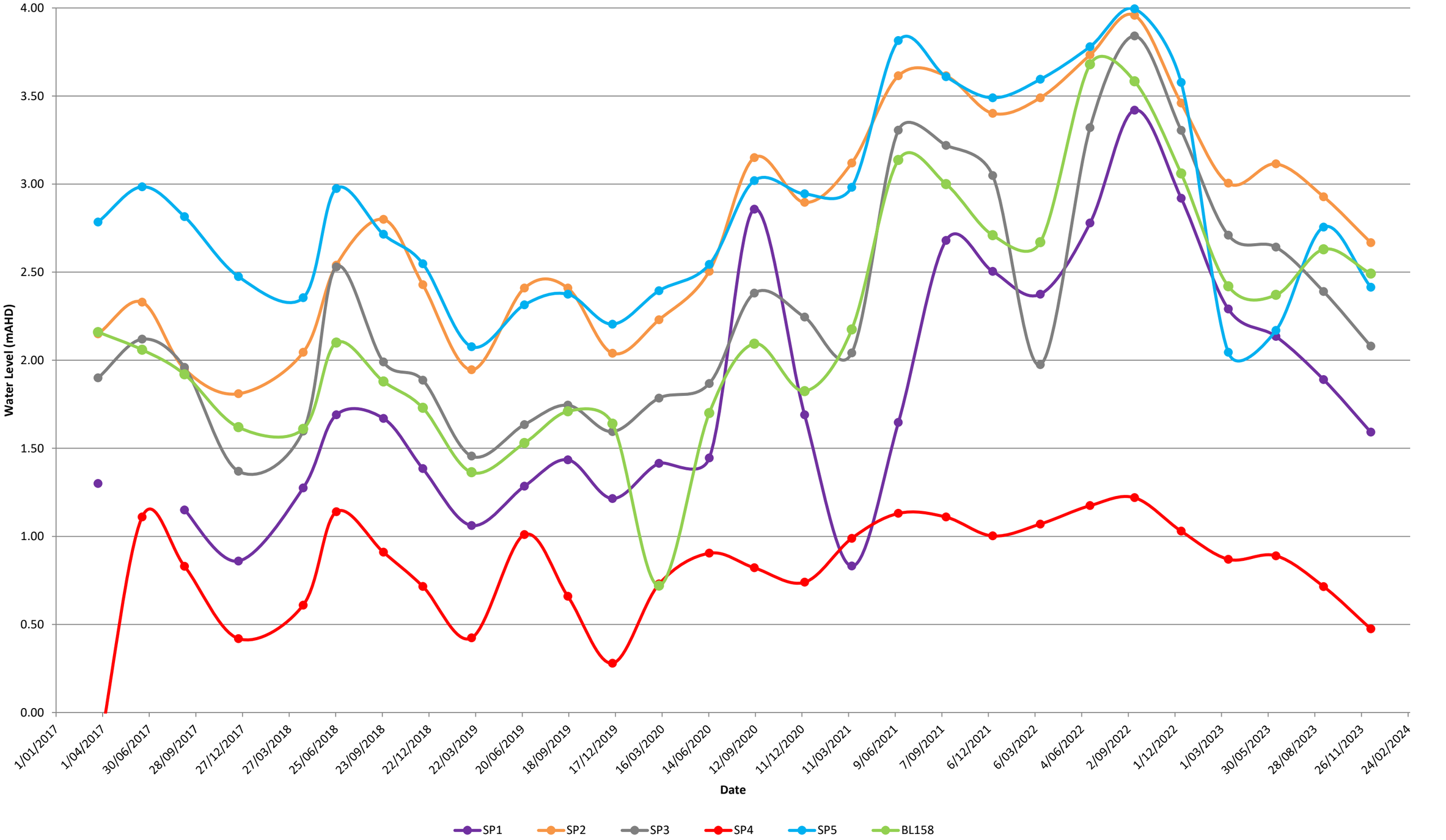
APPENDIX 2

Groundwater Monitoring Results

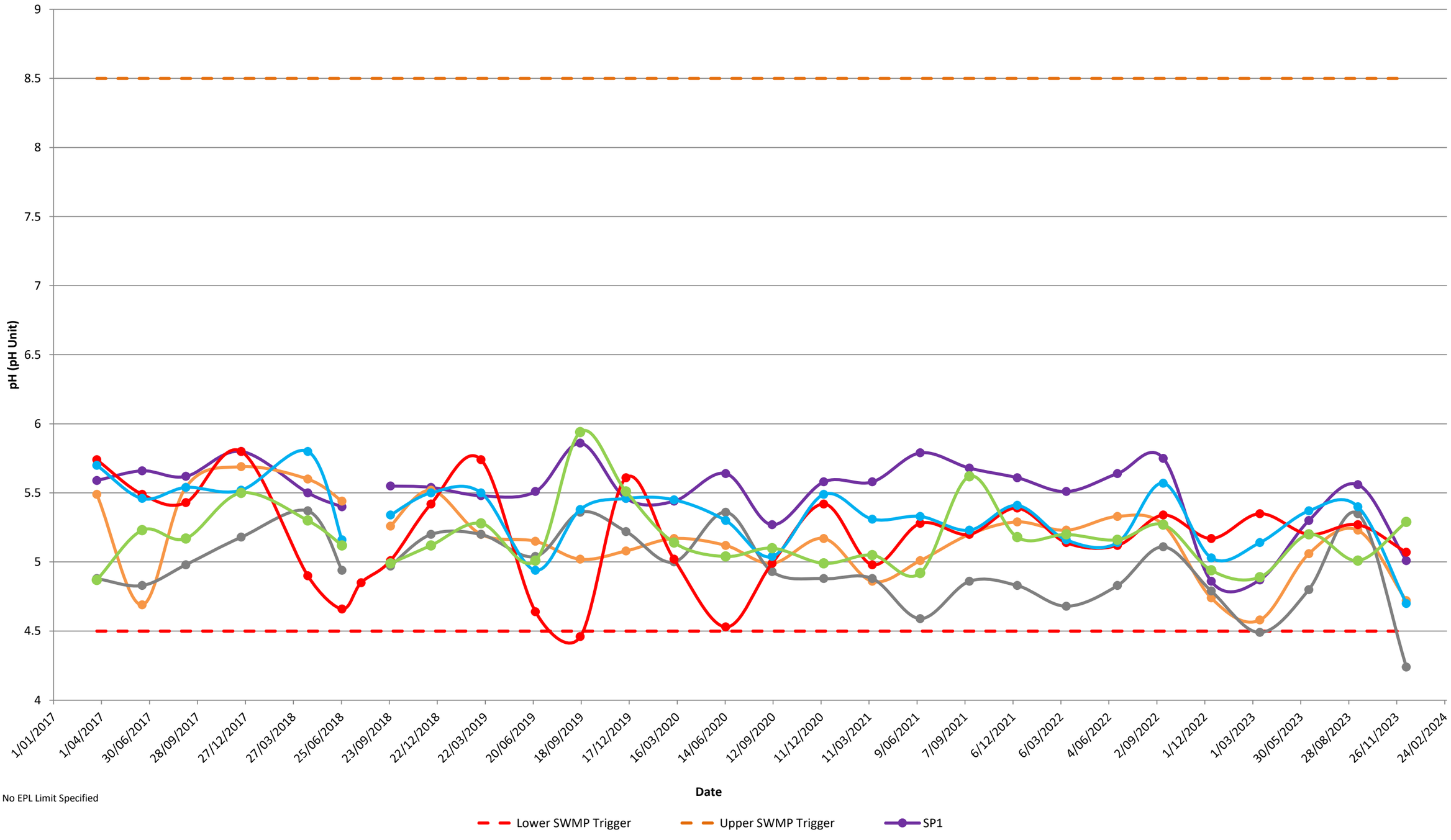
Licence Information

Environment Protection Licence (EPL) Number	13218
Licence Holder	MACKA'S SAND PTY LTD
Licensee Address	Licensee: Macka's Sand Pty Ltd 2684 Nelson Bay Rd Salt Ash NSW 2318 Premises: Macka's Sand Extraction and Processing Facility Off Nelson Bay Road Salt Ash NSW 2318
Link to the full licence on the EPA website	https://apps.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=77948&SYSUID=1&LICID=13218
Anniversary Date:	30-Jun
Information Last Obtained:	11-Jan-24
Date of Publication:	17-Jan-24

Groundwater Levels (mAHD)

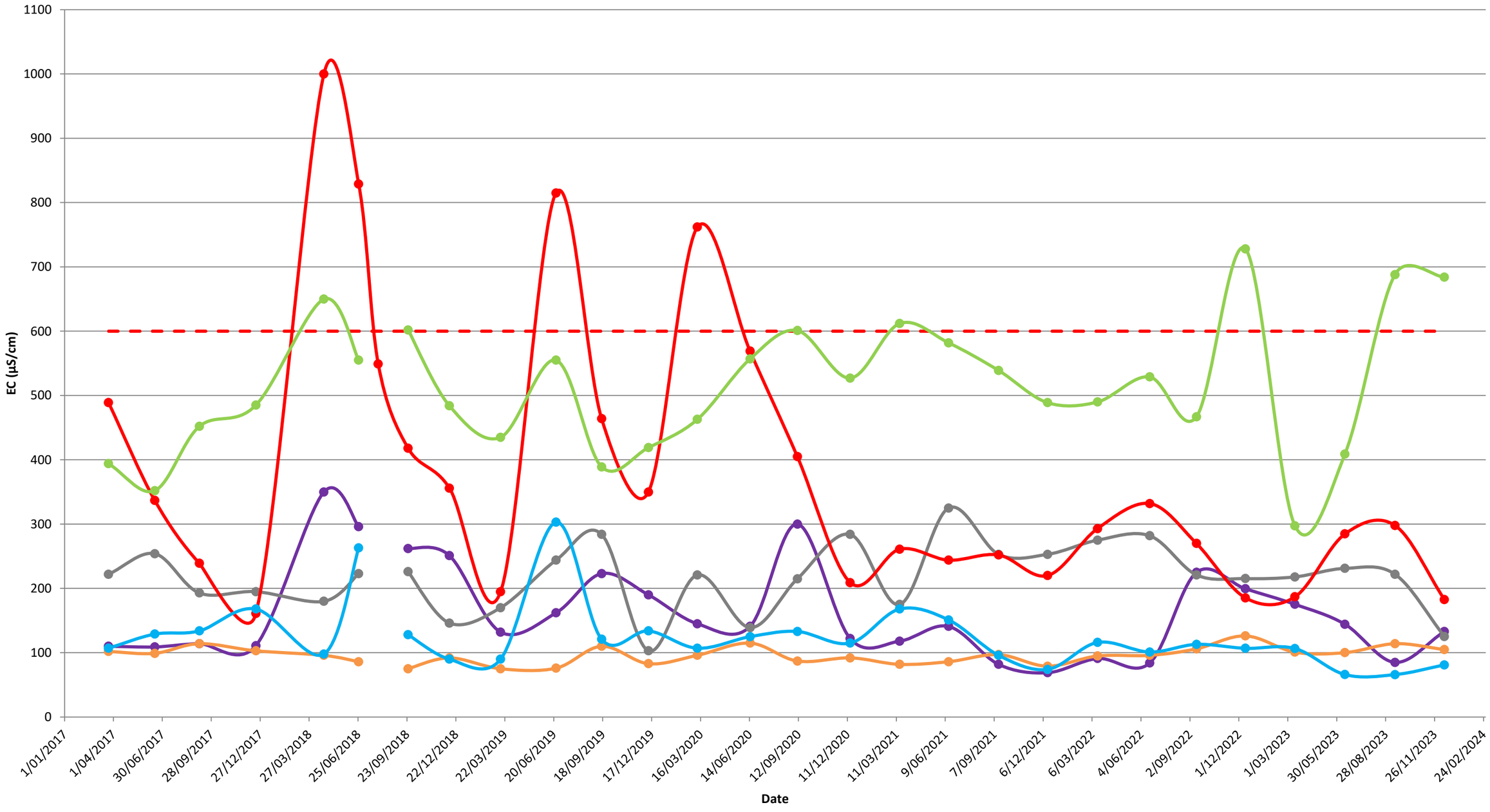


Groundwater - pH



Note: No EPL Limit Specified

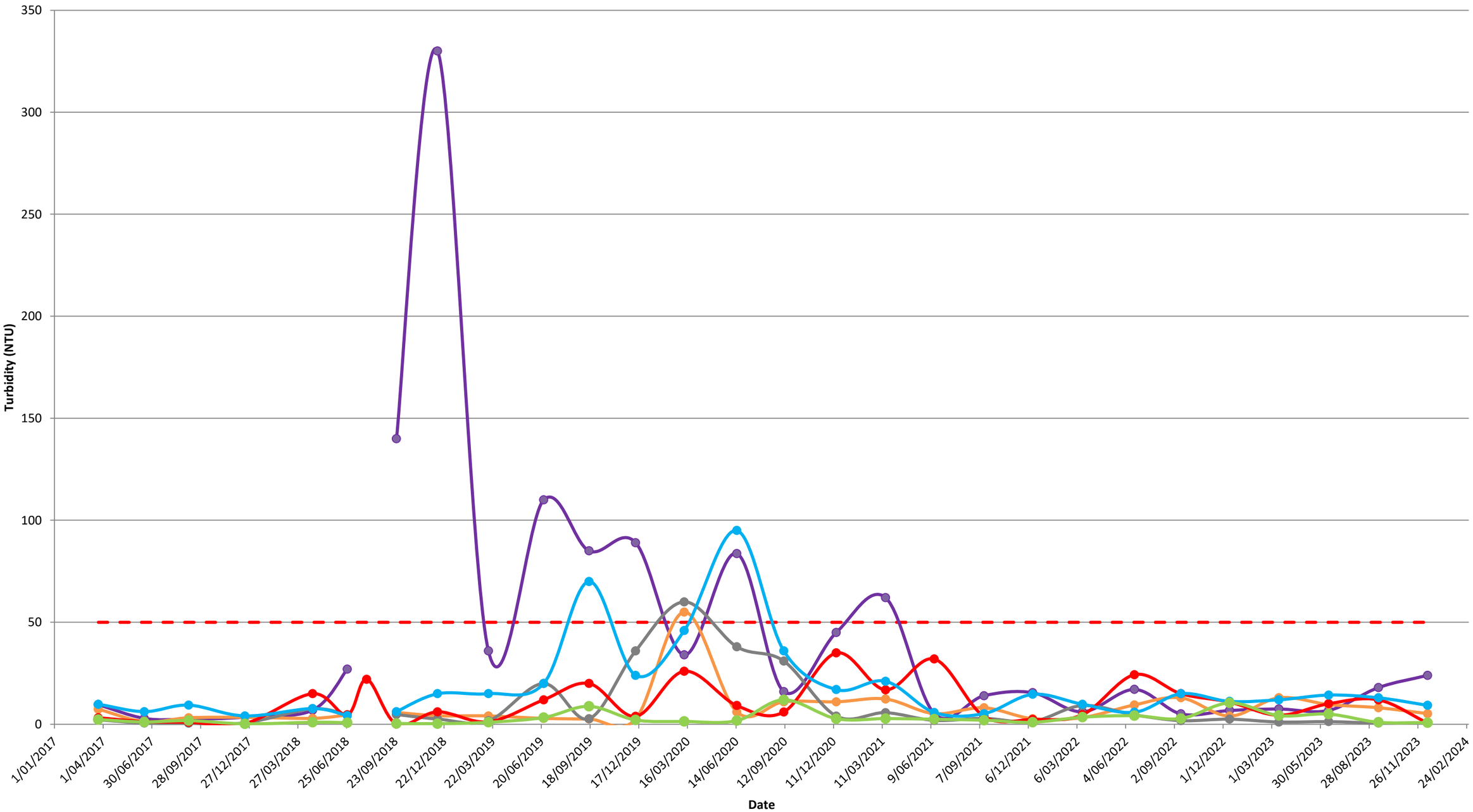
Groundwater - Electrical Conductivity (EC)



Note: No EPL Limit Specified

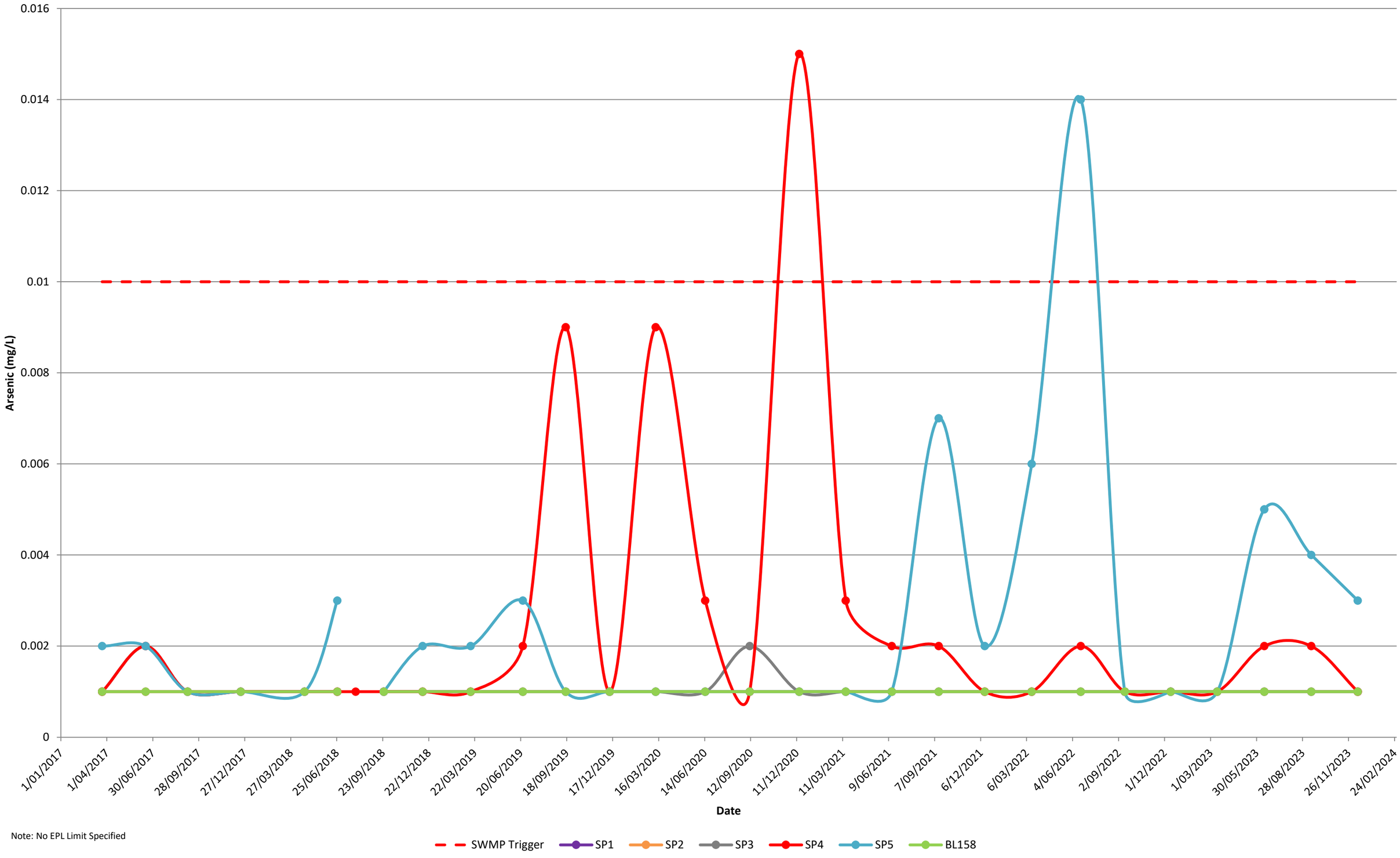
SWMP Trigger — SP1 — SP2 — SP3 — SP4 — SP5 — BL158

Groundwater - Turbidity (NTU)



Note: No EPL Limit Specified

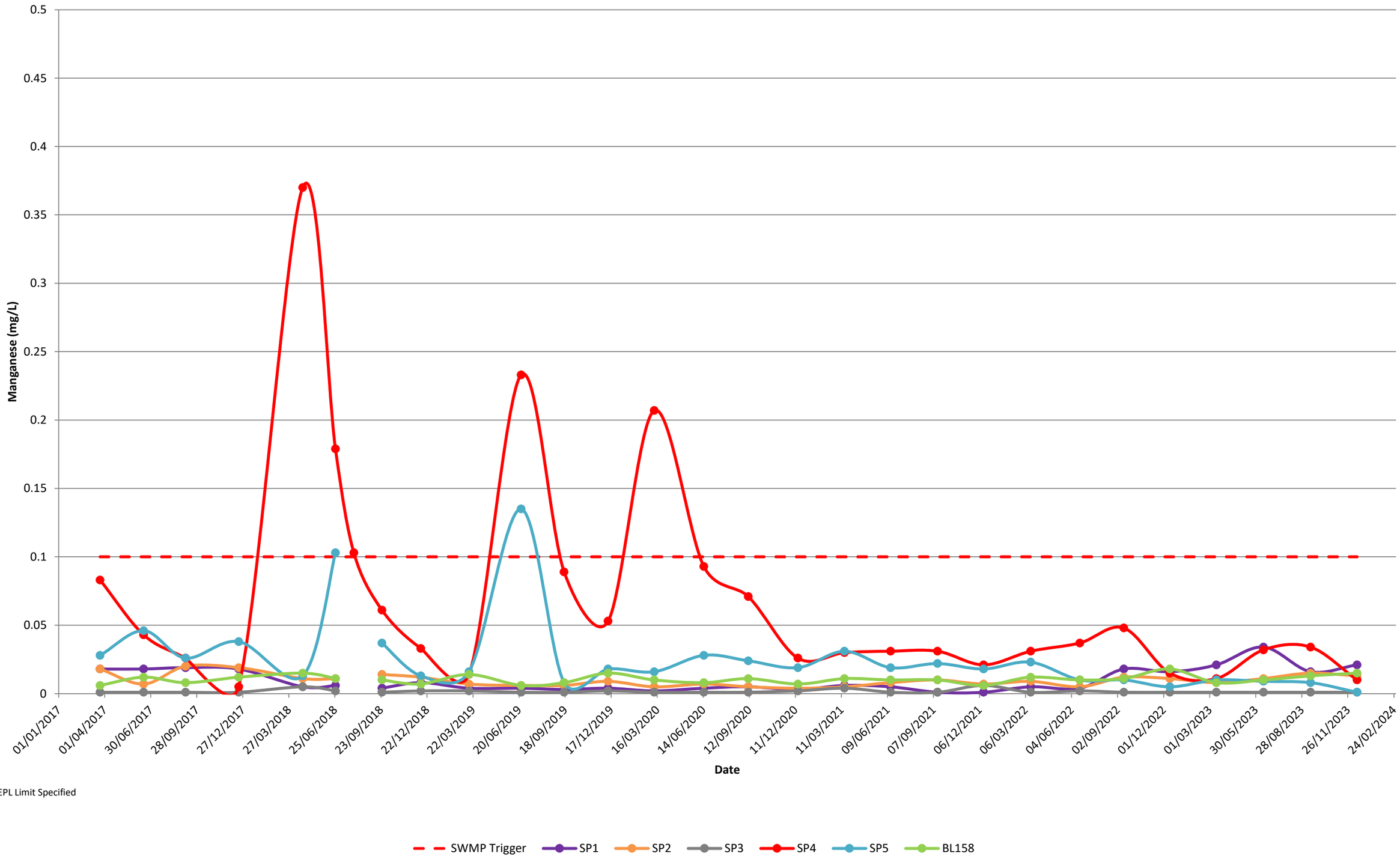
Groundwater - Arsenic (mg/L)



Note: No EPL Limit Specified

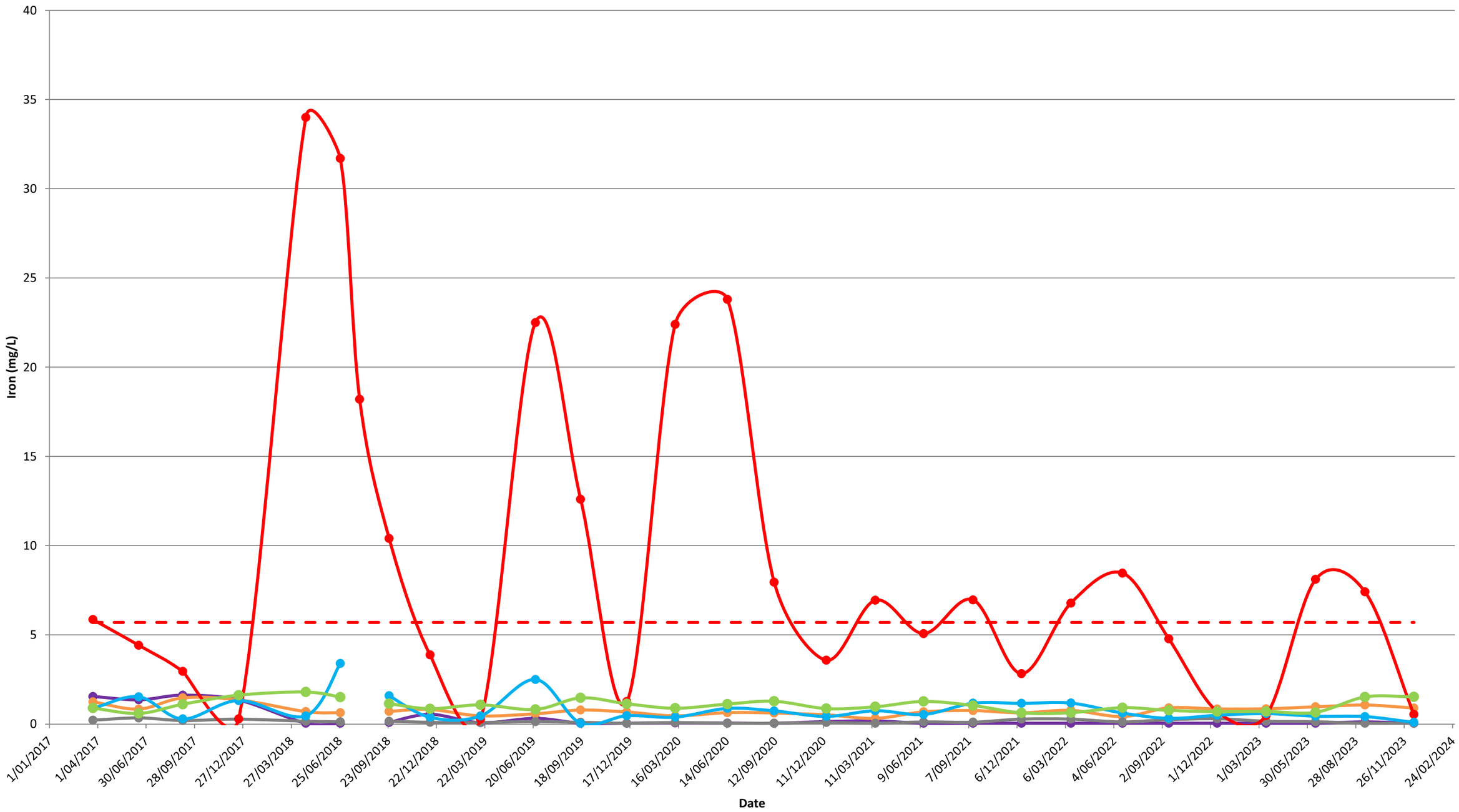
SWMP Trigger · SP1 · SP2 · SP3 · SP4 · SP5 · BL158

Groundwater - Manganese (mg/L)

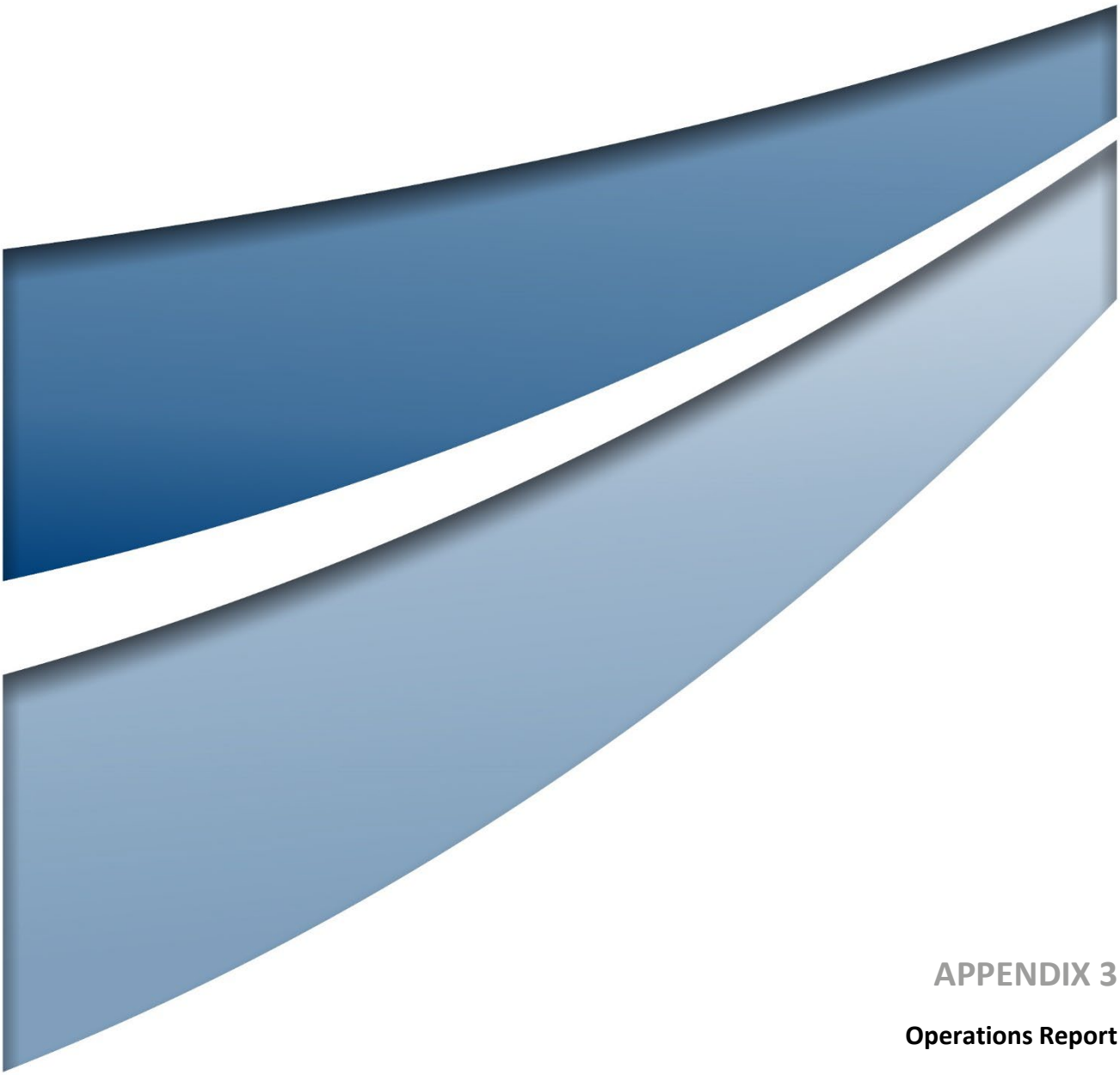


Note: No EPL Limit Specified

Groundwater - Iron (mg/L)



Note: No EPL Limit Specified



APPENDIX 3

Operations Report

MACKA'S SAND PTY LTD

OPERATIONS REPORT

Approval for Extractive Industry in the North Stockton Catchment Area

FINAL

March 2024

Table of Contents

Figures

1.0 Introduction

1.1 Project Background

Macka's Sand Pty Ltd (Macka's Sand) was granted Major Project Approval 08_0142 in 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 Salt Ash, approximately 25 kilometres (km) north-east of Newcastle, New South Wales (NSW) (refer to **Figure 1.1**).

Macka's Sand has approval to extract and process sand from Lot 218 and Lot 220. Lot 220 has an identified resource of 9.6 million tonnes (Mt) however Lot 218 has a potentially indefinite extraction life due to the ongoing movement of sand from the mobile dunes into the approved extraction area. At the time of preparing this report, sand extraction was being undertaken on both Lot 218 and Lot 220. No sand extraction was undertaken on Lot 220 during the reporting period.

Image Source: Nearmap (Mar 2023)

0 1 2 4 km

1:85 000

Legend

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

FIGURE 1.1

Locality Plan

File Name (A4): R119/1646_544.dgn
20220926 11.44

1.2 Scope

In accordance with *Condition 3* and *4* of *Clause 9* of the Hunter Water (HW) Approval under Clause 10(1) of the Hunter Water Regulation 2015, Mackas is required to submit an annual report to summarise compliance against this approval.

Conditions 3 and *4* of *Clause 9* of the HW Approval states:

(3) On the date on which the AEMR is submitted in accordance with subclause (1), the Approval Holder must also submit the following to HWC and Office of Water;

a) 'an electronic copy of the monitoring results for groundwater levels and quality during the past year collected in accordance with the Soil and Water Management Plan, and

b) A written report (Operations Report) addressing whether the Approval Holder has achieved compliance with:

i. the requirements for the method of Extractive Operations in Clause 3 of the Schedule;

ii. the Operations Management Procedure;

iii. the Hydrocarbon Spill Procedure; and

iv. the requirement for the progressive replacement of topsoil provided in Clause 6(3) of the Schedule

(4) The Operations Report must:

a) identify any non-compliance during the previous year, and

b) identify what actions were, or are being, taken to ensure compliance.

The details of compliance with the above conditions are detailed in the sections below.

This report has been prepared by Mackas Sand. The reporting requirements for Mackas Sands are outlined in the HW Approval to undertake extraction works within the North Stockton Catchment Area. This report has been prepared to provide a summary of the performance of Mackas Sand during the 2023 calendar year.

2.0 Statement of Compliance

This report has been prepared to provide a summary of the performance of the Mackas Sand operation over the period 1 January to 31 December 2023 (i.e. the compliance review period). The compliance status of the Mackas Sand operation against the HW Approval and associated operations management procedure was managed during the reporting period by Mackas Sand.

This report specifically addresses and summarises compliance in accordance with *Condition 3(b)* and *4* of *Clause 9* of the HW Approval and its associated conditions.

No non-compliances were identified during the 2023 Operations Report period.

3.0 Requirements for the Method of Extractive Operations

3.1 Laser Level Monitoring

As part of a compliance audit campaign on NSW sand quarries, The Department of Planning, Housing and Infrastructure (DPHI) (formerly Department of Planning and Environment) identified that one of the most common non-compliances related to the implementation of adequate controls to manage extraction depth.

As a result, Mackas Sand has engaged Centurion Civil to undertake quarterly surveys of the extraction area. Through the survey process, compliance with the extraction depth and area is determined. Quarterly survey plans demonstrating compliance are provided in Appendix 1 of the 2023 Annual Review.

3.2 Machinery and Equipment

As reported in previous Annual Operations Reports, Mackas Sand continues to experience difficulties operating in the soft dry sand, including significant machinery maintenance on extraction plant. The manufacturers of the Front-End-Loader advised that these failures are due to extremely harsh operating conditions (i.e. soft dry sand).

In addition, Mackas Sand reports that the PA 08_0142 (MOD2) operating depth constraints that require equipment to operate in dry sand conditions results in significantly higher fuel use of around 60 litres per hour, as opposed to the equipment specification of 23 litres per hour.

Mackas Sand continues to investigate equipment modifications, quarrying methodology and operational procedural changes to minimise the highly inefficient fuel consumption caused by the dry sand operating conditions, and the impact that these harsh operating conditions have on the loaders and the business overall.

Clause 3 (2) of the HW approval states that 'the approval holder must remove all machinery used in the Extractive Operations from the Land at the end of each day's operation'. Mackas Sand has approval to operate for 24 hours a day. However, all mobile machinery not anticipated to be in active use is to be removed from Lot 218 or Lot 220. Vehicle storage locations are located outside of the North Stockton Catchment Area.

3.3 Storage of Contaminants

During the report period, no hydrocarbon materials or other potential contaminants were stored on either Lot 218 or Lot 220, within the North Stockton Catchment Area.

3.4 Refuelling

Refuelling of vehicles occurs at the Macka's Sand and Soil administration and maintenance facility, or at the vehicle storage area at the Alternate Access Route.

Mackas Sand uses sieves and/or stackers at Lot 220 and Lot 218 that have limited mobility and are not considered to be vehicles. This relocatable plant is moved once or twice a year as the sand extraction face advances. Offsite refuelling of plant with limited mobility is not considered feasible.

As noted within *Section 4.2.1* of the Operations Management Procedure (OMP), refuelling of plant with limited mobility occurs within the extraction areas via the use of mobile refuelling equipment.

To minimise the risk of fuel spills, and the impact of spills should they occur, refuelling equipment consists of a fuel tank, spill catch tray and spill kit. An additional mobile spill kit is located within the extraction area to enable prompt clean up in the event of an accidental spill during refuelling activities.

4.0 Operations Management Procedure

The OMP outlines the standard methods and practices of utilisation of plant and equipment at the site. Works at the site were undertaken in accordance with the OMP during 2023.

4.1 Hydrocarbon Spill Procedure

No spills were recorded during 2023 and works at the site were undertaken in accordance with the Hydrocarbon Spill Procedure during the reporting period.

Any spills, should they occur, will be managed in accordance with *Section 4.3.3* of the OMP to prevent fuel from contaminating the North Stockton groundwater source.

Any contaminated material will be disposed of in accordance with relevant waste management requirements.

5.0 Rehabilitation

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

Approximately 2.2 ha of land in the southeast portion of Lot 220 commenced rehabilitation during 2023.

Prior to seeding or tube stock tree planting, land undergoing preparation for rehabilitation are required to be surveyed to ensure they comply with final landform heights as noted within the Macka's Sand Landscape Management Plan, in accordance with *Part 2 Clause 6* of the HW approval.

6.0 Non-compliance Summary

No non-compliances against the HW Approval were identified within the 2023 Operations Report period.