MACKA'S SAND PTY LTD

MACKAS SAND ANNUAL REVIEW 2022

January–December 2022

FINAL

March 2023

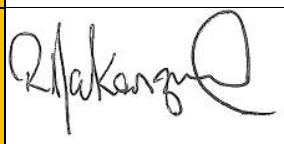
Annual Review Title Block	
Name of operation	Mackas Sand Project
Name of operator	Mackas Sand Pty Limited
Development Consent / Project Approval No.	PA 08_0142 (as modified)
Name of holder of development consent/project approval	Mackas Sand Pty Limited
Mining lease No.	No Mining Lease applicable to site 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 2022
Annual Review end date	31 December 2022

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 2022 to 31 December 2022 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.

Annual Review Title Block	
Name of operation	Mackas Sand Project
Name of authorised reporting officer:	Robert MacKenzie
Title of authorised reporting officer:	Director
Signature of authorised reporting officer:	
Date:	31 st March 2023

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1.0 Statement of Compliance

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

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

This Annual Review provides a summary of Mackas Sands' operational performance against the approvals listed in **Table 1.1** over the period 1 January to 31 December 2022 (referred to hereafter as the reporting period). The compliance status of Grafil operations (Environmental Protection Licence 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, five (5) non-compliances were identified. These five (5) 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	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	No – 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	Where addressed in Annual Review
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	Due to an administrative oversight, Mackas Sand collected June 2022 dust samples however the samples were not sent for analysis immediately after collection and subsequently there were no dust monitoring results available for June 2022 at the time of completing the EPL Annual Return. The samples were subsequently sent for analysis. The failure to analyse the sample in a timely manner after collection was reported to the EPA in the EPL Annual Return.	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 January 2022 sampling period, air monitoring samples were collected 2 days outside of the required sample period of 30 days, plus or minus 2 days. The failure to collect the sample as required by AM-19 was reported to the EPA in the EPL Annual Return.	Section **11.1**
PA 08_0142	Schedule 3 Condition 26	Mackas Sand received a penalty notice from DPE for not undertaking operations in accordance with conditions of the Project Approval.	Medium	Mackas Sand failed to implement aspects of the operations approved Landscape Management Plan (LMP), as identified in the 2021 Independent Environmental Audit (IEA). The aspects related to Section 3.5.2 (Topsoil Management) and Section 3.7.5 (Pre-clearance Surveys) of the approved plan. A Penalty Notice was provided to Mackas Sand by DPE. The penalty notice was paid by Mackas Sand.	Section **8.6, 11.1**Error! R eference source not found. and Section **11.2**

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment	Where addressed in Annual Review
PA 08_0142 EPBC Approval	Schedule 5 Condition 4A (a) Condition 5b of EPBC Approval	Truck Movement Exceedance – 9 November 2022	Low	Non-compliance of allowable truck movement occurring on 9 November 2022. An investigation into the exceedance determined that on 8 November 2022 an outbound truck driver opened their door and made contact with the weighbridge control screen, rendering it inoperable. This resulted in the traffic light system being inoperable which led to additional trucks being allowed to exit the site. The Driver's Code of Conduct (DCC) was updated as a result of this.	Section **6.10.2.1** and Section **11.1**
PA 08_0142	Schedule 3, Condition 28	Failure to submit revised rehabilitation bond to DPE by 19 December 2023.	Administrative Non-Compliance	Mackas Sand failed to submit the revised rehabilitation bond to DPE by 19 December 2022. Mackas Sand is currently in consultation with DPE to establish the revised rehabilitation bond and expect to have this in place during April 2023.	Section **8.4** and 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 and Environment (DPE). 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 (as modified), 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 (as modified) are presented in **Table 2.1**.

Table 2.1 Project Approval Conditions for the Annual Review

Project Approval Condition	
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
• 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
• 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:	Section 6.0

Project Approval Condition	
• 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).	
• 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
• identify any trends in the monitoring data over the life of the project	Sections 6.0 and 7.0
• 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
• 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 2022

Name	Position	Company	Contact Phone No.
Robert Mackenzie	Quarry Manager	Mackas Sand Pty Ltd	(w) 02 4982 6227 (m) 0408 490 911
Jack Mackenzie	Workshop Manager	Mackas Sand Pty Ltd	(w) 02 4982 6227 (m) 0400 490 911

Image Source: Nearmap (Mar 2023)

0 1 2 4 km
1:85 000

Legend

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

FIGURE 2.1

Locality Plan

File Name (A4): R119/1646_541.dgn
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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
Project Approval 08_0142 (as modified)	Sand Extraction Operations from Lots 218 and 220, Salt Ash	20 September 2009	31 December 2029	Current	DPE
Department of Environment Approval EPBC 2011/6214	Construction and use of Alternate Access Road (Lot 218)	29 November 2013	31 December 2029	Current	DAWE
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	DPE-Water

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 to be undertaken by Mackas Sand to address these conditions are discussed in **Section 7.2** and **Section 12.0**.

3.2 Management Plans

In accordance with PA 08_0142 (as modified), 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 DPE 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 2022 following the submission of the 2021 Annual Review. Following the 2021 Independent Environmental Audit (IEA), the Mackas Sand Soil and Water Management Plan (SWMP) (Umwelt, 2021) was updated to include minor changes in response to recommendations of the 2021 IEA. The SWMP was approved by DPE on 3 August 2022. Furthermore, the LMP (Umwelt, 2021a) was also updated in response to recommendations from the 2021 IEA. The LMP was approved by DPE on 19 August 2022.

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 DPE on 24 February 2023 and approved by DPE 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	DPE	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.
Noise Management Plan (NMP)	November 2018	DPE	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.
Air Quality Management Plan (AQMP)	June 2018	DPE	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.
Soil and Water Management Plan	November 2021	DPE	The plan was approved by DPE on 3 August 2022.
Unexploded Ordnance Management Plan (UOMP)	September 2011	DPE	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.
Landscape Management Plan	November 2021	DPE	The plan was approved by DPE on 19 August 2022.
Aboriginal Cultural Heritage Management Plan (ACHMP)	July 2016	DPE	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.
Non-Indigenous Heritage Management Plan (IHMP)	July 2016	DPE	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.
Drivers Code of Conduct	February 2023	DPE	Updated and submitted to DPE on 24 February 2023. Approved by DPE on 7 March 2023.
Pollution Incident Response Management Plan (PIRMP)	November 2022	EPA	Reviewed following the PIRMP being tested on 26 August 2022.

Management Strategy/Plan	Revision Date of the Approved Plan	Relevant Agency	Review Status
EPBC Landscape Management Plan	December 2013	DAFF	Reviewed following the submission of the 2021 Annual Review on 31 March 2022. No update required.
Operations Management Procedures	January 2014 [Draft]	Hunter Water Corporation	Reviewed following the submission of the 2021 Annual Review Report on 31 March 2022. No update required.

Note: All references to management plans within this Annual Review refer to the current DPE 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 Project Approval.

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 continued to progress to the east and west adjacent to the northern (i.e. landward) extraction boundary. With the extraction activities primarily undertaken at the eastern and western extremities of the extraction area, the approved sand resource has not been exhausted in either location (i.e., reached the full extent of the extraction boundary). Extraction activities are therefore continuing to progress in a linear fashion.

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 (as modified). In addition to this traffic light system, Mackas Sand completes a secondary validation process on the weighbridge logs to confirm compliance with truck movement Project Approval 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.

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 and Lot 220 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 990,279 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 (as modified).

Table 4.1 provides the annual amount of product transported for the 2021 and 2022 reporting years and a forecast for the 2023 reporting period. The 2021 and 2022 tonnages provided are based on the weighbridge data.

Table 4.1 Production Summary 2022 (Lot 218 and Lot 220)

Material	Approved Limit (Source – PA 08_0142 (as modified))	2021 Reporting Period (Actual Tonnes)	2022 Reporting Period (Actual Tonnes)	2023 Reporting Period (Forecast Tonnes)	
Total Saleable Product from Lot 218	1,000,000 tonnes from Lot 218	949,295	990,279	1,000,000	Yes
Total Saleable Product from Lot 220	1,000,000 tonnes from Lot 220	202,882	0	0	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).	1,152,177	990,279	1,000,000	Yes

4.3.1 Hours of Operations

Quarrying operations at Lot 220 would be undertaken between 7:00am and 5:30pm Monday to 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 Project Approval (as modified).

Extraction and haulage activities within the reporting period complied with the operating hours as detailed in Schedule 3, condition 9 of the Project Approval (as modified). There was one instance of additional trucks exiting the site and this is discussed in **Section 11.1**. Transport and extraction activities were however undertaken within approved operating hours.

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 Project Approval (as modified). Copies of these agreements have previously been provided to the DPE.

4.4 Construction and Demolition Activities

Mackas Sand did not undertake any construction activities or import any material (e.g. Excavated Natural Material) during the report 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 2023 Report Period Extraction Operations

2023 is expected to see a continuation of sand extraction operations at Lot 218 and reduced and/or ceased sand extraction at Lot 220. Mackas Sand does not expect any significant changes to quarrying methods during the next reporting period relative to that undertaken in 2022.

5.0 Actions Required from Previous Annual Review

In accordance with Schedule 5, Condition 4 of PA 08_0142 (as modified), the 2021 Annual Review was submitted to DPE on 31 March 2022. DPE acknowledged their satisfaction with the 2021 Annual Review on 2 May 2022 and no requests for additional information to be included in future Annual Review documents were made.

A summary of additional Mackas Sand management commitments made in the 2021 Annual Review and where these are addressed is included in **Table 5.1**.

Table 5.1 Mackas Sand Response to Actions identified in 2021 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	Weed management and disturbance works were undertaken in April 2022 by an Umwelt Senior Ecologist in targeted parts of the BOA. Approval for the works was obtained from BCT on 11 April 2022 prior to the works being undertaken.
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. 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 processes. Any artefacts are to be returned to Lot 220 as part of the site rehabilitation process.
If elevated groundwater monitoring results are detected during future quarterly groundwater monitoring rounds, Mackas Sand will report it to the DPE in accordance with Section 6.2 of the SWMP (Umwelt, 2014).	Completed	7.2.3	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 IEA Report audit report action NC-09 during the 2022 Reporting Period. This action requires "Inspections of high visibility fencing and any structures built to control public access to the sites will be undertaken every week. Maintenance or repair of any fences and structures will occur within this timeframe, as required"	Ongoing	Appendix 4	Mackas Sand undertakes regular inspections of the high visibility fencing and structures built to control access to the site. Maintenance is undertaken as required however a formal inspection record will be established in April 2023.
Mackas Sand will complete NC-11 in the 2022 Annual Review period. NC-11 relates to the regular update of the complaints register on the Mackas Sand website.	Completed	Appendix 4	Mackas Sand updated the Community Complaints register with the register available on the Mackas Sand website (refer to **Section 6.0**).

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 the Project Approval.

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

FIGURE 6.1

Mackas Sand Monitoring Locations

File Name (A4): R119/1646_542.dgn
20200331 15.56

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 Project's noise impacts. 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 (as modified). Copies of these agreements have been provided to DPE.

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 41dB(a) $L_{A1,1\ minute}$.

The noise impact assessment criteria specified in the PA 08_0142 (as modified) 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 (as modified) 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 Project Approval 08_0142 MOD 2).

As noted in PA 08_0142 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 DPE in writing of the terms of this agreement.

Road Traffic Noise

The following noise criteria 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 (as modified), 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, monitoring was undertaken on 22 and 31 August 2022, 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 Alternative 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 2022 Night Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	$LA_{eq,15\ minute}$		$LA_{1,1\ minute}$	
	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 2022 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 2022 Evening 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	35	Inaudible
Site 2	36	Inaudible
Site 4	36	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 2022 Industrial Noise Levels – Alternate Access Road to Lot 218

Location	Period	$LA_{eq,15\ minute}$	
		Noise criteria	Mackas Sand noise level contribution
Site 5[1]	Day Time	41	-
Site 6	Day Time	40	35

Location	Period	$LA_{eq,15\ minute}$	
		Noise criteria	Mackas Sand noise level contribution
Site 5[1]	Night Time/Shoulder	39	-
Site 6	Night Time/Shoulder	38	38
Site 5[1]	Evening	41	-
Site 6	Evening	40	<35

[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	48
	Day	60	Inaudible	48

6.1.3 Trends in Data

2022 attended noise monitoring indicates that Mackas Sand was 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.

The 2022 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, 2018).

6.2 Air Quality

Air quality monitoring is undertaken in accordance with the approved Air Quality Management Plan (AQMP) (Umwelt, June 2018) 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 of 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 (as modified). These criteria are used to assess the environmental performance of the Project and are represented in **Table 6.9** to **Table 6.3.**

Table 6.9 Long term Impact Assessment Criteria for Particulate Matter

Pollutant	Averaging period	Criterion
Total suspended particulate (TSP) matter	Annual	90 $\mu g/m^3$
Particulate matter < 10 µm (PM_{10})	Annual	30 $\mu g/m^3$

Table 6.10 Short term Impact Assessment Criterion for Particulate Matter

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

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

Twelve 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**.

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
27/01/2022	34*	0.2	0.2
27/02/2022	31	0.3	0.7
27/03/2022	28	2.1	3.7
27/04/2022	31	0.1	0.1
26/05/2022	29	0.2	0.3
26/06/2022	31*	0.7	1.0
26/07/2022	30	0.1	0.1
26/08/2022	31	0.1	0.1
26/09/2022	31	0.1	0.3
26/10/2022	30	0.8	1.3
25/11/2022	30	0.3	0.6
25/12/2022	30	0.2	0.2
Annual Average		0.4	0.7

*Note: refer to Table 1.3 for discussion.

Table 6.13 Total Dust Deposition Levels at DDG 2 – Lot 218 (g/m²/month)

Sample date:	Exposure Period (Days)	Ash Content g/m²/month	Total Insoluble Matter g/m²/month
27/01/2022	34*	2.7	3.2
27/02/2022	31	1.3	1.8
27/03/2022	28	0.1	0.4
27/04/2022	31	0.7	1.4
26/05/2022	29	0.6	1.0
26/06/2022	31*	2.0	2.3
26/07/2022	30	0.1	0.1
26/08/2022	31	0.1	0.1
26/09/2022	31	0.4	0.7
26/10/2022	30	9.2	11.1
25/11/2022	30	1.0	1.6
25/12/2023	30	2.0	2.1
Annual Average		1.7	2.2

*Note: refer to Table 1.3 for discussion.

6.2.3 Trends in Data

The monthly results during the reporting period for DDG1 range from 0.1 g/m²/month to 3.7 g/m²/month, with an annual average of 0.7 g/m²/ month. The monthly results for DDG2 varied from 0.1 g/m²/month to 11.1 g/m²/ month, with an annual average of 2.2 g/m²/ month.

Table 6.14 provides a comparison of annual average deposition dust monitoring data since 2016. The 2022 DDG1 annual average of 0.7 g/m²/month is the lowest recorded since 2016. 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 2.2 g/m²/month has decreased since 2021 and is consistent with other records since 2016.

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, June 2018) in the 2023 reporting period.

Table 6.14 Annual Averages for Dust Deposition 2016-2022

Year	Total Insoluble Solids (g/m2/month)	
	DDG1 (Lot 220)	DDG2 (Lot 218)
2016	1.3	1.6
2017	2.0	2.5
2018	1.6	1.7
2019	1.7	3.4
2020	0.9	5.3
2021	2.8	6.4, adjusted 3.7*
2022	0.7	2.2

*Excluding September and November results.

6.2.4 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 AQMP (Umwelt, 2018).

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 2022 is summarised in **Table 6.15**. **Figure 6-2** provides a comparison of monthly rainfall from 2018 – 2022. During the reporting period, 1411.2 mm of rainfall was recorded across 129 days. Approximately 60 % of the annual recorded rainfall for 2022 was experienced during February, March, and November.

Table 6.15 Monthly Rainfall and Number of Rain Days during 2022

Month	Rainfall (mm)	Highest Daily (mm)	Rain Days (i.e., >0.2 mm)
January	89.2	32	11
February	161	39.4	16
March	353.4	68	22
April	68.6	40.2	5
May	114	33	13
June	28.4	18.4	4
July	326.8	59.8	17
August	37.6	18.4	5
September	73.4	28	11
October	90	32.6	13
November	50	24.2	5
December	18.8	5.6	7
TOTAL	1411.2	399.6	129

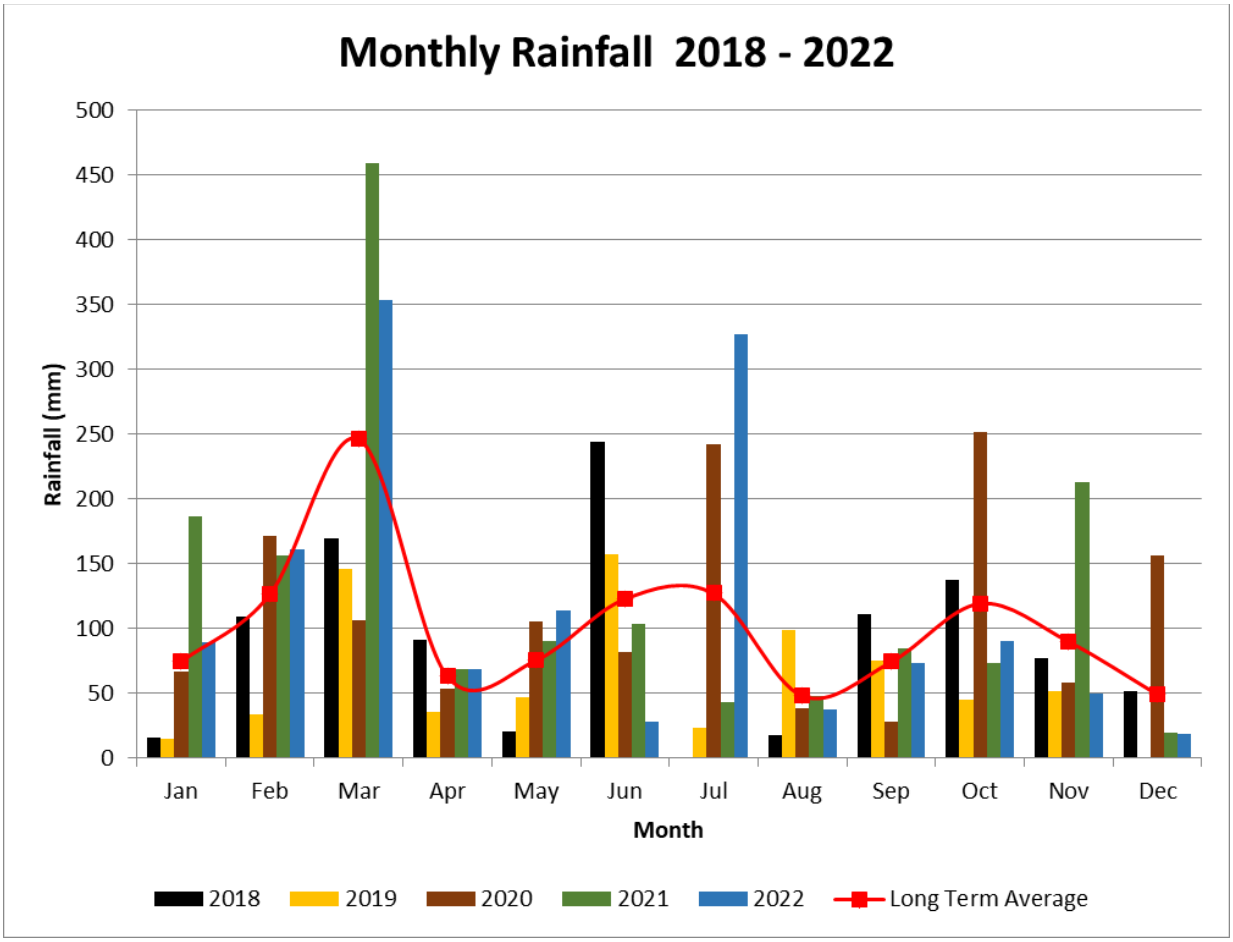


Figure 6-2 Monthly Rainfall 2018 – 2022

6.3.2 Temperature

Maximum and minimum temperature data for 2022 is summarised below in **Table 6.16**. January was the warmest month of the year with an average maximum daily temperature of 28.3 °C. June was the coolest month of the year with an average minimum daily temperature of 7.1 °C.

Table 6.16 Monthly Minimum and Maximum Daily Temperatures during 2022

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
January	14.9	19.8	28.3	23.4
February	13.3	18.1	27.5	23.7
March	14	17.9	25.0	21.1
April	7.3	12.0	23.0	15.5
May	7.1	11.6	20.6	14.4
June	2.4	7.1	17.3	14.1
July	2.9	8.4	17.1	14.1
August	4.7	8.6	19.3	15.5
September	5.4	11.3	20.5	16
October	7.1	13.6	23.0	17.2
November	8.2	13.2	24.8	20.1
December	9.5	14.9	26.0	19.6

6.4 Biodiversity Offset Strategy

In accordance with the project approval 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 DPE 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 has been reviewed by stakeholders and will be finalised by Mackas Sand and resubmitted to DPE in April 2023.

Annual monitoring of the Biodiversity Offset Area (BOA) was broken 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 26 August 2022 and Stage 2 on 16 September 2022.

Mackas Sand requested an extension on the submission date of the 2022 BOS monitoring from the Biodiversity Conservation Trust (BCT) who provided an extended report submission deadline to 31 January 2023 to allow sufficient time for Mackas Sand to review the monitoring report. The BOS monitoring report was submitted to BCT on 20 January 2023.

The BOS report included the following recommendations, which have been programmed to be completed at Mackas Sand during 2023 (refer to **Section 12**):

- Ensure fencing is adequate to continue to exclude cattle, 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 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.
- As per the BOS (Umwelt 2023 (in prep)) 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.
- 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 in prep, 2023), 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.
- Tubestock tree planting during May 2022, refer to **Figure 8-1**.
- Mackas Sand received a Penalty Notice in 2022 related to the implementation of the LMP and this is discussed further in **Section 11.0**.

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 Mackas Sand Biodiversity Offset Area (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 Leafless Tongue-orchid *(Cryptostylis hunteriana)*. During the reporting period, monitoring was undertaken on 26 August 2022 and 16 September 2022. 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 Whiskey Grass population and other exotic species.

Orchid Monitoring

The results of the monitoring data for Newcastle doubletail (*Diuris praecox*) and Sand doubletail (*Diuris arenaria*) between 2016 and 2022 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, 2016 - 2022

	2014 (Baseline)	Criteria*	2016	2017	2018	2019	2020	2021	2022
Date of survey	27/08/14	N/A	26/08/16	25/08/17	7/09/18	28/08/19	1 and 11/09/20	13/09/21	26/08/22
Number of stems	64	16	39	93	20	23	0	0	3
Maximum flowers per stem	9	N/A	7	8	9	6	0	0	7
Minimum flowers per stem	0	N/A	0	0	0	1	0	0	3
Mean flowers per stem	4.2	N/A	2.7	3.4	4.3	4	0	0	5

*25% of baseline for 3 consecutive years

Table 6.18 Results of *Diuris arenaria* Searches Baseline, 2016 - 2022

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

*25% of baseline for 3 consecutive years

Habitat Assessment Monitoring

The results of the 2022 habitat monitoring are shown in **Table 6.19** below. The table also shows the accumulated results from 2017-2022 and baseline survey results from 2014.

Table 6.19 Results of Habitat Assessment for Baseline, 2017-2021

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022
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.

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022
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.
Fire	Evidence of previous	Nil during reporting year	Nil during reporting year	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.
Erosion	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Moderate (trampling exacerbated by Aeolian soils)	None identified	None identified.

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022
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
Features (Relative Abundance)							
Fallen timber/logs	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Stags	Nil	Nil	Nil	Nil	Scarce	Scarce	Scarce

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022
Ground cover (litter)**	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.
Mistletoe	Nil	Few	Few	Few	Scarce	Scarce	Few
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.

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020	2021	2022
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
Tree Hollows							
Number of trees with hollows	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

*Vegetation removed along northern and western boundary – approx. 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 2022 vegetation structure monitoring are shown in **Table 6.20** and **Table 6.21**. The tables also show the accumulated results since 2017.

Table 6.20 Transect 1 Results of 50 m Transect Data

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

Table 6.21 Transect 2 Results of 50 m Transect Data

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

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 third consecutive year, surveys in 2022 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. Unlike surveys in 2020 and 2021, three individuals of this species were recorded, showing a sign of resilience/recovery. It is likely this recovery was influenced by substantial rainfall levels across the NSW coastal belt in 2022, and most recently in July 2022. 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 62 individuals identified during 2022 surveys. The 2022 results comprise a decrease from the 82 individuals that were recorded in the 2021 monitoring and is currently lower than the original counts in 2014. The area of occupancy of this population has further contracted since it was originally surveyed, at approximately 0.05 ha (originally assessed in 2014 at approximately 0.24 ha). In 2022, the distribution was solely confined to the southern boundary between Photo Monitoring Points 3 and 4, whereas it previously also occurred in the north-east of the BOA.

6.5.3.2 Habitat Assessment

The 2022 monitoring results showed substantial 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 high rainfall across the NSW coastal region across 2022, the 2022 BOA monitoring observed high levels of inundation in several areas within the BOA. Some dieback was observed in the midstory due to this inundation; however, no canopy species were observed to be impacted by this issue. Little observable change was detected in the provision of habitat structures such as hollow bearing trees and fallen logs.

The presence of the weed whiskey grass (Andropogon virginicus) has reduced since 2021, however small areas of this species are still evident. One new weed species was identified in 2021 and is still evident in 2022, being bitou bush (Chrysanthemoides monilifera). Numerous new saplings were identified in 2022 scattered relatively uniformly throughout the BOA. Scattered individuals of the significant weed species fireweed (Senecio madagascariensis) and catsear (Hypochaeris radicata) were also identified throughout the BOA. It is likely that these species have flourished during drought recovery in 2021. These species will be included in management works at this stage where abundance is relatively low.

6.5.3.3 Vegetation Structure, Exotic Species and Photo Monitoring

In 2022 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 some ground layer species. Results from the 2022 monitoring observed a general improvement in native diversity at both transects, however with a notable decrease in native shrubs and midstory at Transect 2.

Grasses, sedges and other ground cover species are now very dense along the eastern boundary around Transect 2 (Umwelt, 2023). This was previously an area connecting a north and south population of the threatened orchids but now is very dense with recovering ground cover. Open areas of Coastal Apple – Blackbutt Forest generally consisted of a grassy understory, areas with higher canopy cover featured an open 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 has reduced at both Transects since the baseline (2016). Both transects continue to be heavily dominated by bracken fern (Pteridium esculentum). Both Transects saw an increase in native grass coverage, along with other native groundcover groups such as forbs. As both Transects fall within the areas subject to weeding in April of 2022, it is possible that some of the changes in vegetation cover has responded to this. It is also likely that weather impacts have influenced these metrics as well. An increase in native forb cover at both transects is an example of this.

The photos taken during the 2022 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 2022 generally depicts an improvement in groundcover and shrubby vegetation.

Dominant ground cover species included blady grass (Imperata cylindrica), bracken fern (Pteridium esculentum, plume rush (Baloskion tetraphyllum), pomax (Pomax umbellata), kangaroo grass (Themeda australis) and assorted regenerating heaths. These are progressively colonising previously open areas; however grazing impacts have previously impeded the growth and cover of these species.

Mackas Sand will continue to undertake future monitoring events in accordance with relevant obligations within the Mackas Sand LMP, BOS and approved Conservation Agreement.

6.5.4 Comparison of Results against Performance Indicators

To track the biodiversity value changes of the BOA, the 2022 monitoring results were compared to their relevant performance criteria of 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. It does not directly identify as a non-compliance with the LMP performance criteria.

Table 6.22 Comparison of 2022 BOA Monitoring Results Against Performance Criteria from the LMP

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
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.	As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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 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 2022 monitoring observed three Newcastle doubletail (Diuris praecox) stems within the BOA. This follows two years of zero individuals being recorded, therefore triggering the 25% threshold trigger for the third consecutive year. As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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
	Trigger: Not triggered Stem count is above threshold for Sand doubletail (*Diuris arenaria*).	The 2022 monitoring observed 62 sand doubletail (Diuris arenaria) stems within the BOA. This does not activate the 25% threshold trigger. As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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.	Hand weeding has helped to manage weed density and diversity; however this needs to continue. As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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 2022: 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.	As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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 2022 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 2022 demonstrated continued decrease in the area of D. praecox and D. arenaria compared to 2014 baseline surveys	As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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
Maintain or reduce the diversity and density of weed species	**Trigger: Trigger Activated** The 2022 results indicated increased levels of whisky grass and bitou bush. Beyond these, other key weed species commonly observed in 2022 included fireweed (Senecio madagascariensis).	As recommended in the biodiversity monitoring reporting, during 2023 Mackas Sand will: • 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.
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. In April 2022, management works in the form of weed removal were completed by an Umwelt Senior Ecologist in targeted parts of the BOA. This was completed in response to previous monitoring recommendations and feedback from the BCT from their site audit completed on 25 May 2021. Approval to undertake the weed removal works was provided by BCT on 11 April 2022 prior to the commencement of works in the BOA.

Vertebrate pest management for the BOA is in the form of a perimeter fence (consisting of wire and electric fence sections) to permanently prevent cattle accessing the area. During 2022, 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 Proposed Improvements or Actions for the Next Reporting Period

During the 2023 reporting period Mackas Sand will:

- Ensure fencing is adequate to continue to exclude cattle, 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 between May and November. 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 the project approval 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 ACHP:

- 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 advised Mackas Sand they were unable to attend meetings during the report period. Mackas Sand will seek to hold further ACHG meetings during 2023.

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 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 2023 reporting period.

6.8 Erosion and Sediment Control

In accordance with the project approval Mackas Sand holds an approved Soil and Water Management Plan (SWMP) (Umwelt, 2021), 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 2022 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 2023 reporting period.

6.10 Traffic

Traffic Management at Mackas Sand is undertaken in accordance with the approved Drivers Code of Conduct (DCC) (Umwelt, February 2023). 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 consideration 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 (July 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 not undertaken in accordance with the hourly truck limits specified in the Project Approval during the reporting period. An exceedance of Condition 32 of Schedule 3 of Project Approval (PA 08_0142) occurred on 9 November 2022, where 11 laden trucks were recorded as exiting Lot 218 between the hours of 6:00am and 7:00 am. Further information regarding this non-compliance is included in **Section 11.0**.

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 Project Approval 08_0142 (as modified) 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 Project Approval 08_0142 (as modified) 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 the reporting period. There was one exceedance of traffic movements in 2022, refer to **Section 11.0**.

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 2023 reporting period which are outside the approved DCC (as modified in 2023).

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, 2021), 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 Project Approval, Mackas Sand holds an approved SWMP (Umwelt, 2021), 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 the Project Approval) were unchanged from the 2009 EA.

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 Project Approval (as modified). 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 an updated MEDM has been prepared based on modelling results from the existing Visual MODFLOW groundwater model using meteorological data from the Australian Bureau of Meteorology (BoM) Williamtown RAAF Base station (station no. 061078). The revised MEDM incorporates meteorological data to the end of September 2022 was submitted to DPE in February 2023, refer to **Section 7.2.4**. The groundwater levels included in **Table 7.1** are the currently approved levels presented in the SWMP (Umwelt, 2021). The SWMP will be updated as required following DPE's review of the revised MEDM submitted in February 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, 2021) 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.

7.2.3 Trends in Data

During the reporting period, four regular monitoring events were undertaken in accordance with both the previously approved SWMP (Umwelt 2014) and the current SWMP (Umwelt, 2021), which was approved by DPE 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 previously approved SWMP (Umwelt 2014) and of the current SWMP (Umwelt, 2021), if groundwater monitoring results exceed the nominated investigation trigger values, the Quarry Manager is required to further investigate.

The previous version of the SWMP (Umwelt, 2014), which was in effect until 3 August 2022, required the Quarry Manager to further interrogate and explore any reasons for results exceeding but within 10% of the nominated trigger value. For results exceeding the trigger value by greater than 10% of the nominated trigger value, the Quarry Manager was required to further interrogate and explore any reasons for the elevated result and provide a notification to DPE and relevant agencies of any findings of this investigation.

The current version of the SWMP (Umwelt, 2021), which came into effect on 3 August 2022, requires the Quarry Manager to interrogate and explore any reasons for results exceeding the nominated trigger value, however, this only requires notification to be made to DPE in the event of three consecutive quarterly exceedances of the nominated trigger value.

Mackas Sand provided notification to the DPE and other relevant agencies in March 2022 and June 2022 regarding groundwater results recorded above the SWMP trigger levels. Details of these notifications are summarised in the section below.

During the reporting period, Mackas Sand also investigated elevated groundwater quality monitoring results recorded at SP5 for Arsenic, SP4 for Iron and BL158 for Electrical Conductivity (EC). The elevated groundwater quality monitoring results recorded at SP4 for Iron during the March and June 2022 quarterly monitoring rounds were reported to the DPE in accordance with the previously approved SWMP (Umwelt, 2014), which was in effect at the time of the exceedances. Elevated groundwater quality monitoring results recorded at SP5 for Arsenic during the June 2022 quarterly monitoring round was also reported to the DPE in accordance with the previously approved SWMP (Umwelt, 2014).The elevated groundwater quality monitoring result for EC recorded at BL158 during the December 2022 quarterly monitoring round was investigated by the Quarry Manger, but not reported to the DPE as reporting of a single exceedance of the nominated trigger value is not required under the current SWMP (Umwelt, 2021).

7.2.3.1 Groundwater Level

During the reporting period measured groundwater levels at SP2, SP3 and SP5 exceeded the predicted maximum groundwater levels for the following months:

- March, June, September, and December for SP2
- June, September, and December for SP3; and
- June and September for SP5

The groundwater level was recorded as 3.49 mAHD at SP2 during the March 2022. The groundwater level at SP2 was again monitored in June 2022 where it increased to 3.73 mAHD, followed by another increase in groundwater level to 3.96 mAHD in September2022. The level then decreased to 3.5 mAHD during December 2022.

The groundwater level at SP3 was recorded at 3.32 mAHD during the scheduled quarterly monitoring event in June and increased to 3.84 mAHD during the September monitoring event and decreased to 3.3 mAHD during the scheduled quarterly groundwater monitoring event in December 2022.

The groundwater level at SP5 exceeded the predicted maximum groundwater level during the June 2022 reaching 3.78 mAHD, followed by 4.00 mAHD during September 2022 and reduced to 3.6 mAHD during December 2022.

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 2022 show a new observed maximum groundwater level at all monitoring locations (SP1, SP2, SP3, SP4, SP5 and BL158). The new maximum observed groundwater levels are a consequence of the unusually high rainfall throughout 2022 (1472.0 mm) and preceding years (1556.0 mm in 2021 and 1361.6 mm in 2021). As noted in **Section 7.2.2.1** and **Section 7.2.4**, a revised MEDM which has considered meteorological data to September 2022 has been submitted to DPE.

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 (16/03/2022)	2.38	3.49	1.98	1.07	3.60	2.67
Observed Groundwater Level (20/06/2022)	2.78	3.73	3.32	1.18	3.78	3.68
Observed Groundwater Level (14/09/2022)	3.42	3.96	3.84	1.22	4.00	3.58
Observed Groundwater Level (13/12/2022)	2.90	3.50	3.30	1.00	3.60	3.10

Note: Red values indicate exceedance of trigger values, refer to **Section 7.2.3.1** for discussion regarding results.

7.2.3.2 Groundwater pH

All pH results for the reporting period remained within the SWMP (Umwelt, 2021) specified trigger value range and were generally consistent with historical records.

The groundwater pH results since 2016 are shown graphically in **Appendix 2**. pH levels across the bores peak during the September quarterly groundwater monitoring event and drop below average during the December groundwater monitoring event.

All results for the reporting period are 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 (16/03/2022)	5.51	5.23	4.68	5.14	5.16	5.20
Recorded pH (20/06/2022)	5.64	5.33	4.83	5.12	5.14	5.16
Recorded pH (14/09/2022)	5.75	5.27	5.11	5.34	5.57	5.27
Recorded pH (13/12/2022)	4.86	4.74	4.79	5.17	5.03	4.94

7.2.3.3 Groundwater Electrical Conductivity

With the exception of the 728 µS/cm electrical conductivity (EC) result at BL158 recorded in December 2022, all EC results recorded during the reporting period remained below the trigger value of 600 µS/cm. EC results for BL158 during the March, June and September quarterly groundwater monitoring events were all below the trigger level and do not appear to show any trends in EC.

The December EC result recorded at BL158 (728 µS/cm) was a historical maximum value but not significantly higher than the previous recorded maximum of 650 µS/cm. While quarry activities were progressing toward BL158, the extraction area surveys show that extraction was being undertaken in accordance with the approved MEDM and the operation was still 450 m to the west of BL158. There is no evidence to indicate that the EC exceedance at BL158 was 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 2022.

The groundwater EC results recorded since 2016 are shown graphically in **Appendix 2**. With the exception of the aforementioned EC result during the December groundwater monitoring event, 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 – 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 (16/03/2022)	91	95	275	293	116	490
Recorded EC (20/06/2022)	84	96	282	332	101	529
Recorded EC (14/09/2022)	225	106	221	270	113	467
Recorded EC (13/12/2022)	200	126	215	185	107	728

Note: Red values indicate result above trigger values, see **Section 7.2.3** for discussion regarding the result.

7.2.3.4 Groundwater Turbidity

The turbidity results for SP1 – SP5 and BL158 during the reporting period remained below the specified trigger value and were generally consistent with historical records.

The groundwater turbidity results since 2016 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 EC (16/03/2022)	6.10	3.30	9.20	4.70	9.80	3.50
Recorded EC (20/06/2022)	17.10	9.50	4.60	24.30	5.90	4.20
Recorded EC (14/09/2022)	5.10	13.00	1.80	15.00	15.00	2.80
Recorded EC (13/12/2022)	6.80	4.00	2.50	10.90	11.20	10.50

7.2.3.5 Groundwater Arsenic

During the reporting period, arsenic results for SP5 during the June quarterly groundwater monitoring period exceeded the SWMP trigger value of 0.01 mg/L. Mackas Sand commenced an investigation of the elevated result and identified similar results historically, indicating the presence of Arsenic bearing material across the broader site. The exceedance and investigation were then notified to the DPE and relevant agencies. Since the June exceedance, Arsenic results have decreased below the laboratory limit of reporting (LoR) at SP5. Arsenic results for all other monitoring locations were recorded below the SWMP trigger value of 0.01 mg/L.

The groundwater Arsenic results since 2016 are shown graphically in **Appendix 2**. Since 2016, 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.

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 (16/03/2022)	<0.001	<0.001	<0.001	<0.001	0.006	<0.001
Recorded Arsenic (20/06/2022)	<0.001	<0.001	<0.001	0.002	0.014	<0.001
Recorded Arsenic (14/09/2022)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Recorded Arsenic (13/12/2022)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Note: Red values indicate exceedance of trigger value, see **Section 7.2.3.5** for discussion regarding result.

7.2.3.6 Groundwater Manganese

During the reporting period, manganese results for all monitoring locations were below the trigger level.

The groundwater manganese results since 2016 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
Recorded Manganese (16/03/2022)	0.005	0.009	0.001	0.031	0.023	0.012
Recorded Manganese (20/06/2022)	0.004	0.005	0.002	0.037	0.010	0.010
Recorded Manganese (14/09/2022)	0.018	0.012	0.001	0.048	0.010	0.011
Recorded Manganese (13/12/2022)	0.016	0.011	<0.001	0.015	0.005	0.018

7.2.3.7 Groundwater Iron

During the reporting period, Iron results for all bores were below the trigger level, with the exception of SP4 during the March (6.78 mg/L) and June (8.46 mg/L) quarterly groundwater monitoring events.

Following the receipt of the elevated result in March, Mackas Sand completed a review into the possible cause and notified DPE of the result. It was concluded that 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**.

Following the receipt of the elevated result in June, Mackas Sand completed a further review into the possible cause and results were notified to DPE. It was concluded that because SP4 is located adjacent to a small drainage channel along the northern boundary of Lot 220 and the nature of operations during Q2 2022 (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.

The groundwater iron results since 2016 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, 2021) trigger levels after the June 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 (16/03/2022)	<0.05	0.77	0.28	6.78	1.18	0.64
Recorded Iron (20/06/2022)	<0.05	0.42	0.12	8.46	0.62	0.92
Recorded Iron (14/09/2022)	<0.05	0.91	0.25	4.78	0.32	0.77
Recorded Iron (13/12/2022)	<0.05	0.85	0.30	0.71	0.50	0.70

Note: Red values indicate exceedance of trigger values, refer to **Section 7.2.3.7** for discussion regarding results.

7.2.4 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, a review and any subsequent update of the 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 will give 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 Maximum Extraction Depth Map.

In response to the Umwelt recommendations, Mackas Sand completed a physical review of the borehole 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.

The recommendations provided by Umwelt for additional monitoring were implemented by Mackas Sand, with the additional data collection planned to be completed in March 2023. Further, during 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, 2023). However, the model rerun predicted an increase in the maximum groundwater levels and therefore the MEDM was updated and submitted to the DPE on 3 February 2023 via the Major Projects website.

Following the additional 6 months of groundwater monitoring data being obtained (refer to actions above), GHD is to be engaged by Mackas Sand to further review the MEDM (up to when the meteorological data and observed groundwater level data are available).

7.2.5 Proposed Improvement or Actions Next Reporting Period

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

- Obtain the six months of additional data collection for groundwater levels at 30-minute intervals in at least three monitoring bores. This will give a greater resolution of groundwater data that can be used to better understand how groundwater levels respond after rainfall events.
- Following the additional 6 months of groundwater monitoring data being obtained (refer to actions above), GHD is to be engaged by Mackas Sand to further review the MEDM (up to when the meteorological data and observed groundwater level data are available).

8.0 Rehabilitation

8.1 Rehabilitation of Disturbed Land

In accordance with Schedule 3, Condition 24 of the Project Approval (as modified), 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 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 active quarrying occurred within the western portion of Lot 218 during 2022, 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.

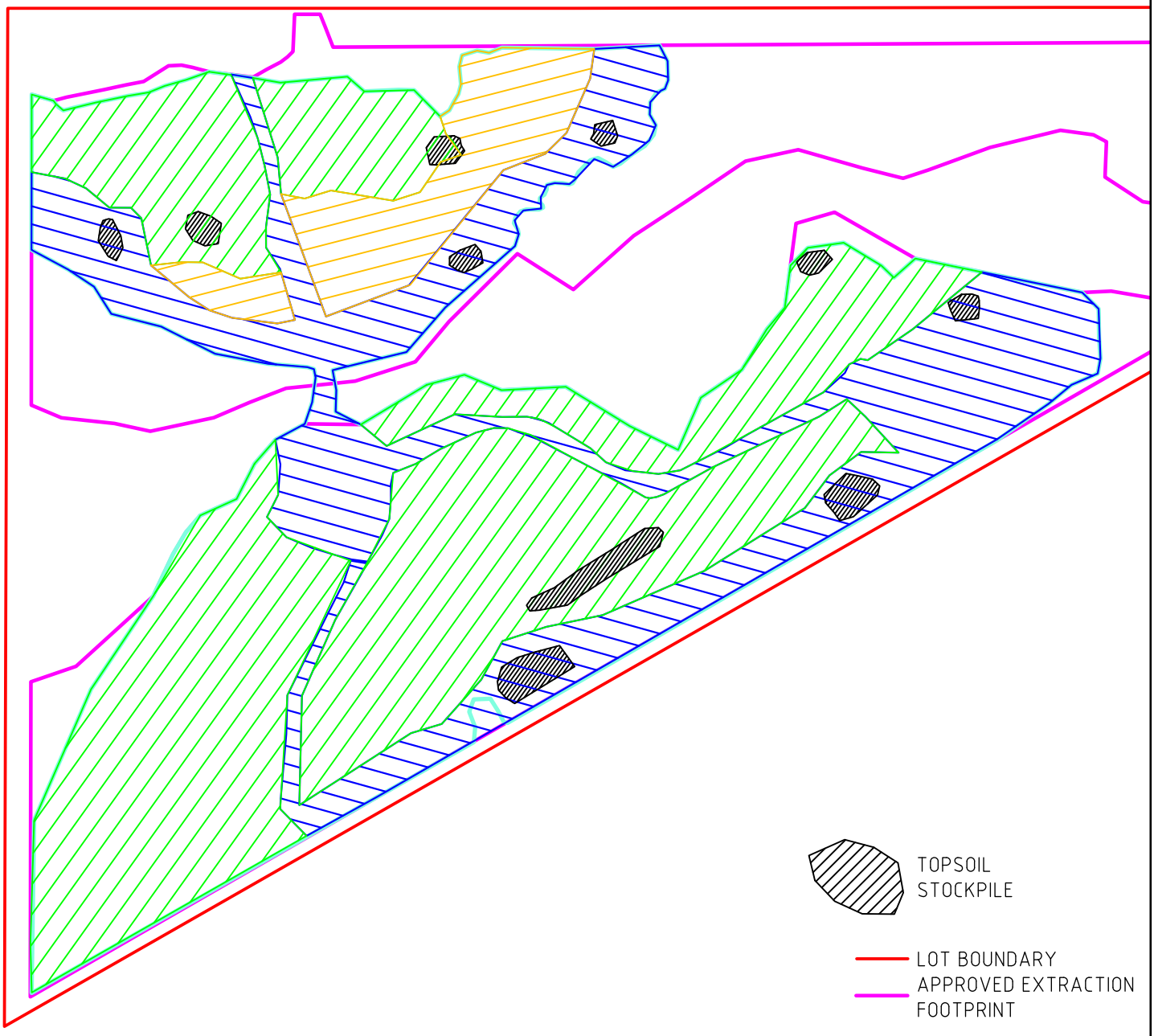
Active rehabilitation occurred in Lot 220 during the reporting period in the form of tubestock tree planting. Passive rehabilitation also occurred in Lot 220 in the form of wind-blown seeds and the migration of sand and/or flora across the area.

Mackas Sand has scheduled the planting of additional tube stock during 2023 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)

	2021 Report Period (ha)	2022 Report Period (ha)	2023 Report Period (ha) (forecast)
Total Mine Footprint	36.2	36.2	36.2
Total Active Disturbance	17.6	11.5	8.5
Land being prepared for rehabilitation	2.5	3.0	3.0
Land under active rehabilitation	16.1	21.7	24.7
Completed Rehabilitation	0	0	0

CENTURION
SURVEY



	AREA DESCRIPTION	2022 REPORT PERIOD (ha)
	TOTAL MINE FOOTPRINT	36.2
	TOTAL ACTIVE DISTURBANCE	11.5
	LAND BEING PREPARED FOR REHABILITATION	3.0
	LAND UNDER ACTIVE REHABILITATION	21.7
	COMPLETED REHABILITATION	0.0

SITE: **LOT 220 DP 1049608**	**1** DRAWING NO.		**0014** PROJECT NO.	**31/12/2022** DATE.
TITLE: **SITE REHABILITATION PLAN 31/12/2022**	**NOT TO SCALE** SCALE AT A4.	**CEJ** DRAWN.	**CEJ** CHECKED.	**A** REVISION.

8.2 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 (November 2021), 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 12 October 2022. The inspection consisted of a walkover of all rehabilitation areas, to complete a rapid condition assessment. A full floristic assessment was not undertaken as part of the assessment. The annual monitoring is undertaken to track current rehabilitation processes and to further inform any rehabilitation management actions required onsite. The rehabilitation inspection focused on all of the rehabilitation areas in Lot 220 (refer to **Figure** 8-1).

Key observations made during the 2022 rehabilitation inspection included:

- The need to undertake a regular site wide weed management program to focus on species including Bitou bush (Chrysanthemoides monilifera), Pampas grass (Cortaderia sp.), Paddy melon (Cucumis myriocarpus), Stinking Roger (Tagetes minuta), 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.

- Dominance of grasses and small shrubs (both exotic and native) in most open quarry floor areas with a general paucity of Coastal Sand Apple - Blackbutt Forest community canopy and mid-storey species and insufficient stem densities to meet the targeted vegetation community, which could be supplemented by the completion of infill planting (including seeding or planting) in rehabilitation zones.

- The need to remove redundant infrastructure including steel pipe, concrete blocks, conveyor belt and agricultural pipe located in the rehabilitation areas.

8.3 Rehabilitation Trials and Research

No rehabilitation trials were undertaken during the report period.

8.4 Rehabilitation Bond

Following the completion of the 2021 IEA, Mackas Sand reviewed and revised the rehabilitation bond associated with Lot 218 and 220 in accordance with Schedule 3, Condition 28 of PA 08_0142. The reviewed and revised rehabilitation bond was submitted to DPE for approval on 31 November 2021. On 19 September 2022, DPE approved the rehabilitation bond. Within the correspondence, DPE also noted that the revised Rehabilitation Bond was to be provided to DPE by 19 December 2022. Mackas Sand is working with DPE to establish the revised Rehabilitation Bond and expect to have this in place during April 2023, refer to **Section 11.1.**

8.5 2021 Annual Review Rehabilitation Recommendations Progress

The progress on the 2021 Mackas Sand Annual Review rehabilitation recommendations is presented in **Table 8.2**.

Table 8.2 2021 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	Mackas Sand undertook weed management works within the Biodiversity Offset Area in April 2022. Weed management works will continue within the BOA's during 2023 (following consultation with BCT) with weed management works also to be undertaken within Lot 220 and Lot 218 during 2023 as required.
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 May 2022. Additional planting will occur in 2023 (refer to **Figure 8-1**) with Mackas Sand also assessing the potential for infill planting in rehabilitation areas during 2023.

8.6 Proposed Improvements or Actions for the Next Reporting Period

Rehabilitation actions proposed to be undertaken by Mackas Sand during the 2023 reporting period include:

- Infill planting within rehabilitation areas on site.
- As noted in **Table 8.2** above, rehabilitation in Lot 220 occurred in 2022 with further planting proposed in 2023. Further planting is planned to be adjacent to rehabilitation works that occurred in 2022.

- Mackas Sand will salvage woody debris / trees and spread over rehabilitation areas.
- Mackas Sand will continue to identify opportunities to rehabilitate areas which are no longer required for operational purposes/activities.
- Mackas Sand will provide refresher training to site staff in regards to the requirements of the approved LMP.
- Mackas Sand will install signage on topsoil stockpiles.

9.0 Community

9.1 Community Complaints

Mackas Sand did not receive any community complaints during the 2022 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 – 2022.

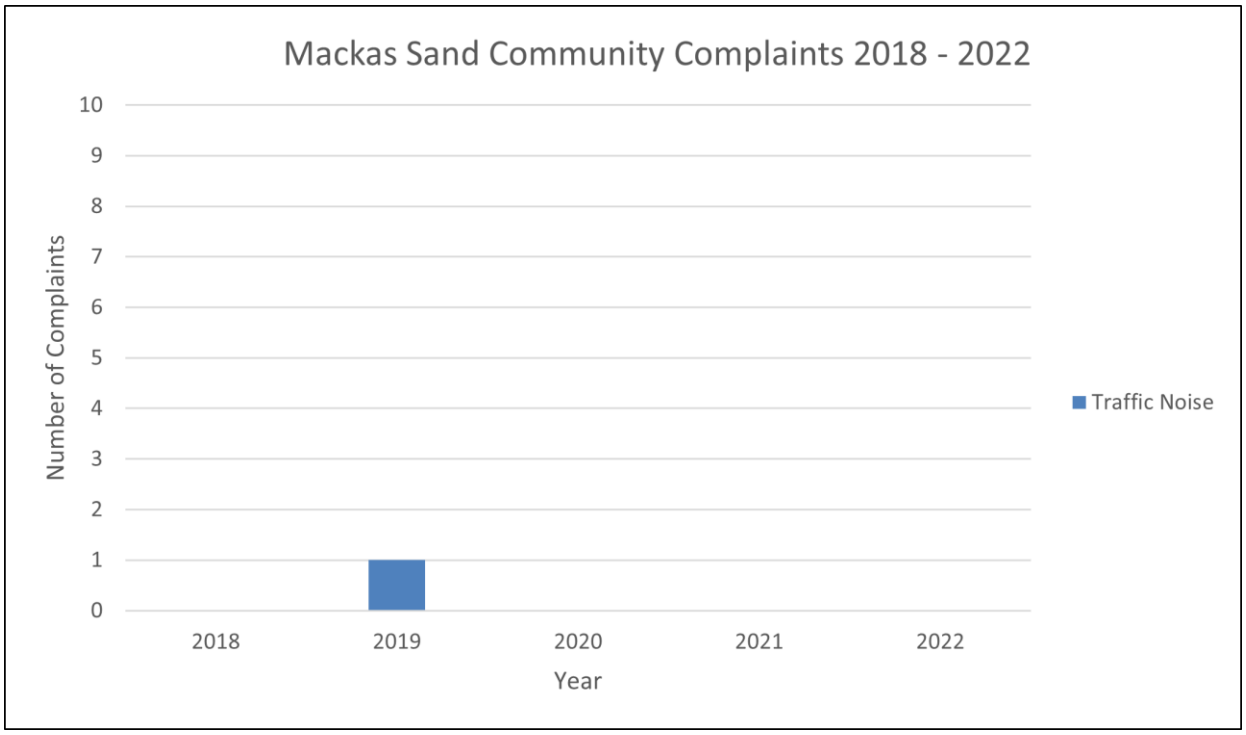


Figure 9-1 Summary of Mackas Sand Community Complaints from 2017-2022

9.2 Community Consultative Committee

Community Consultative Committee (CCC) representatives act as a point of contact to provide feedback between Mackas Sand and the wider community. The 2022 Mackas Sand CCC was undertaken on 25 May 2022. Attendees of the 2022 Mackas Sand CCC are listed in **Table 9.1**.

Table 9.1 Mackas Sand CCC Attendees for the 2022 Report Period

Name	Organisation
Ms Margaret Macdonald-Hill	Chairperson
Mr James Mackenzie	Mackas Sand
Ms Julie Towers	Community Representative

Name	Organisation
Mr Cliff Johnson	Community/Council Representative
Ms Trescinda Brown	Umwelt (Australia) Pty Ltd.

General items discussed during the 2022 CCC meeting included:

- Discussion regarding a potential EA modification to review the operating level for quarrying undertaken within Lot 218. During the CCC meeting it was noted that the CCC would be notified when the relevant reports where to be publicly exhibited. The reports were not completed during the report period.
- Mackas Sand representative advised access road and approaches to the weighbridge will be upgraded.
- It was noted that there were no complaints received during the period since the last CCC meeting.

In consultation with the Mackas Sand CCC members, the chairperson proposed the next annual meeting will take place on 3 May 2023.

9.3 Community Engagement

During the reporting period, Mackas Sand contributed to local charities including Soul Hub for the 2022 Sleepout for Soul. The project included provision of meals, food packages and essential services to support the homeless and vulnerable within the community.

10.0 Independent Audit

After being endorsed by the DPE 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 DPE during the 2021 reporting period. The IEA action plan is included as **Appendix 4**. The next IEA is scheduled to be undertaken during April 2024.

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 five (5) non-compliances during the 2022 reporting period. Mackas Sand has addressed the five (5) non-compliances that were identified during the reporting period, further details of which are provided in **Table 11.1.**

Table 11.1 2022 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	Due to an administrative oversight, Mackas Sand collected June 2022 dust samples however the samples were not sent for analysis immediately after collection and subsequently there were no dust monitoring results available for June 2022 at the time of completing the EPL Annual Return. The samples were subsequently sent for analysis. The failure to analyse the sample in a timely manner after collection was reported to the EPA in the EPL Annual Return.
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 January 2022 sampling period, air monitoring samples were collected 2 days outside of the required sample period of 30 days, plus or minus 2 days. The failure to collect the sample as required by AM-19 was reported to the EPA in the EPL Annual Return.
PA 08_0142	Schedule 3 Condition 26	Mackas Sand received a penalty notice from DPE for not undertaking operations in accordance with conditions of the Project Approval.	Medium	On 30 July 2021, Mackas Sand submitted to DPE the 2021 IEA in accordance with Condition 6, Schedule 5 of the Approval. Section 3.15 of the IEA Report identified a non-compliance (NC-04) with Schedule 3 Condition 26 of the Approval for failing to implement Section 3.5.2 (Topsoil Management) and Section 3.7.5 (Pre-clearance Surveys) of the Projects Landscape Management Plan. As noted in **Section 11.2**, following consultation with DPE Mackas Sand received a Penalty Notice which was subsequently paid by Mackas Sand. Rehabilitation works proposed to be undertaken during 2023 are discussed in **Section 8.6**.

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment
PA 08_0142	Schedule 3, Condition 28	Failure to submit revised rehabilitation bond to DPE by 19 December 2023.	Administrative Non-compliance	Mackas Sand reviewed and revised the rehabilitation bond associated with Lot 218 and 220 in accordance with Schedule 3, Condition 28 of PA 08_0142. The revised rehabilitation bond was submitted to DPE for approval on 31 November 2021. On 19 September 2022, DPE determined the revised rehabilitation bond met the requirements of the conditions of consent. Within the correspondence, DPE also noted that the revised Rehabilitation Bond was to be provided to DPE by 19 December 2022. Mackas Sand did not submit the revised rehabilitation bond to DPE by 19 December 2022 and is working with DPE to establish the revised Rehabilitation Bond and expect to have this in place during April 2023.

Relevant Approval	Condition No.	Condition Description	Compliance Status	Comment
PA 08_0142 EPBC Approval	Schedule 5 Condition 4A (a) Condition 5b of EPBC Approval	Truck Movement Exceedance – 9 November 2022	Low	During a review of the November 2022 truck data, Mackas Sand identified 11 laden trucks exiting Lot 218 between the hours of 6:00am and 7:00am on 9 November 2022 (i.e., four more than permitted under the consent. Upon becoming aware of the exceedance on 13 December 2022, Mackas Sand immediately commenced an investigation into the cause of the exceedance. Mackas Sand identified that on the 8 November 2022, an outbound truck made contact with the weighbridge control panel and outbound terminal screen, rendering it inoperable. As a result, all trucks were required to exit site via the inbound truck weighbridge. It is however noted that truck movements were captured by the system, however the traffic light system was not operable during this time. Mackas Sand reviewed the video camera footage installed in accordance with schedule 3, Condition 33D of the Project Approval. This review identified that 11 laden trucks exited the site between 6:00am and 7:00am. The below actions were implemented by Mackas Sand as a result of the event: • Mackas Sand reviewed and updated the induction to advise truck drivers to take care when opening their doors near the outbound weighbridge terminal. • Mackas Sand developed and implemented a system to ensure truck movements are manually counted by Mackas Sand staff in the event of a similar incident occurring. This system is to be implemented prior to any trucking being undertaken whilst the computer system is not operating. • A revision of the DCC in accordance with Schedule 5 Condition 4A (a) of the Project Approval was undertaken. The DCC was updated and submitted to the DPE on 24 February 2023 to define management processes to be implemented in the event that the traffic light system is inoperable. The DCC was approved by DPE on 7 March 2023.

11.2 Regulatory Correspondence

In accordance with the Annual Review Guideline (DPE, 2015) a summary of official cautions or warning letters, penalty notices or prosecution proceedings by any regulatory authority and Mackas Sand responses to the above is detailed in **Table 11.2**.

Table 11.2 Regulatory Compliance Correspondence Summary

Date	Agency	Summary	Outcome
11 March 2022	DPE	DPE provided a Notice to Furnish Information and Records (NFIR) to Mackas Sand in regard to a non-compliance identified in the 2021 IEA. The NFIR related to non-compliance with the implementation of the approved Mackas Sand Landscape Management Plan.	On 24 March 2022, Mackas Sand requested an extension of the NFIR to the 31 March 2022. Mackas Sand provided documents as requested by DPE on 31 March 2022.
3 May 2022	DPE	DPE provided Mackas Sand with a Show Cause Notice in relation to the Landscape Management Plan non-compliance.	Mackas Sand provided information to DPE on 30 May 2022.
7 July 2022	DPE	Mackas Sand received Penalty Notice from DPE for failing to comply with Schedule 3 Condition 25 of the Project Approval.	Mackas Sand subsequently paid the Penalty Notice 22 August 2022.

12.0 Activities Proposed in the 2023 Report Period

The anticipated environmental management activities for Mackas Sand during the 2023 report period are included in **Table 12.1**.

Table 12.1 Environmental Management Activities Proposed for 2023

2022 Document Section	Area/Nature of Activity	Action Proposed
6.4	Biodiversity Offset Area	• Ensure fencing continues to exclude cattle, 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 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. • As per the Biodiversity Offset Strategy (Umwelt 2023 (in prep)) 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. • Undertake appropriate vegetation management measures outlined in Item 1 of Annexure C to the Conservation Agreement.
6.5.6	Landscape and Biodiversity Offset	• 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 at least twice a year between May and November. • Undertake the BOA management actions recommended in **Table 6.22**, as practicable.
6.6.5	Aboriginal Heritage	• Mackas Sand will continue collecting artefacts, if found, from Lot 218 and Lot 220 in the next reporting period.
7.2.5	Groundwater	• Mackas Sand will undertake the actions specified in Section 7.2.5.
8.6	Rehabilitation	• Mackas will implement the actions in Section 8.6 during the next reporting period. Specifically, distributing existing stockpiled salvaged habitat timber features, propagating and undertaking tube stock infill planting or direct seeding of local species. Works will also include provision of refresher training to site staff in regards to the requirements of the approved LMP and the installation of signage on topsoil stockpiles.

13.0 References

ANZECC (2000) National Water Quality Management Strategy Vol 1.

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

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.

Umwelt (Australia) Pty Limited (2023) 2022 Annual Ecological Monitoring Lot 218 Biodiversity Offset Area Report. Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2022) *Mackas Sand Environmental Noise Monitoring Report 2022.* Prepared for Macka's Sand Pty Limited.

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

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

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

Umwelt (Australia) Pty Limited (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 (2014) *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 (2012) Environmental Assessment of Modifications to Macka's Sand Extraction Operations on Lot 218 and Lot 220, 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 the Lot 218 and 220 Extraction Area

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

SITE ENTRY

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR APPROXIMATELY 12 MONTHS.

MAXIMUM EXTENT OF EXTRACTED FLOOR

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

CONTOURS 1M ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

EXTRACTION BOUNDARY

LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 31/03/2022

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_220331.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	15/04/2022
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:

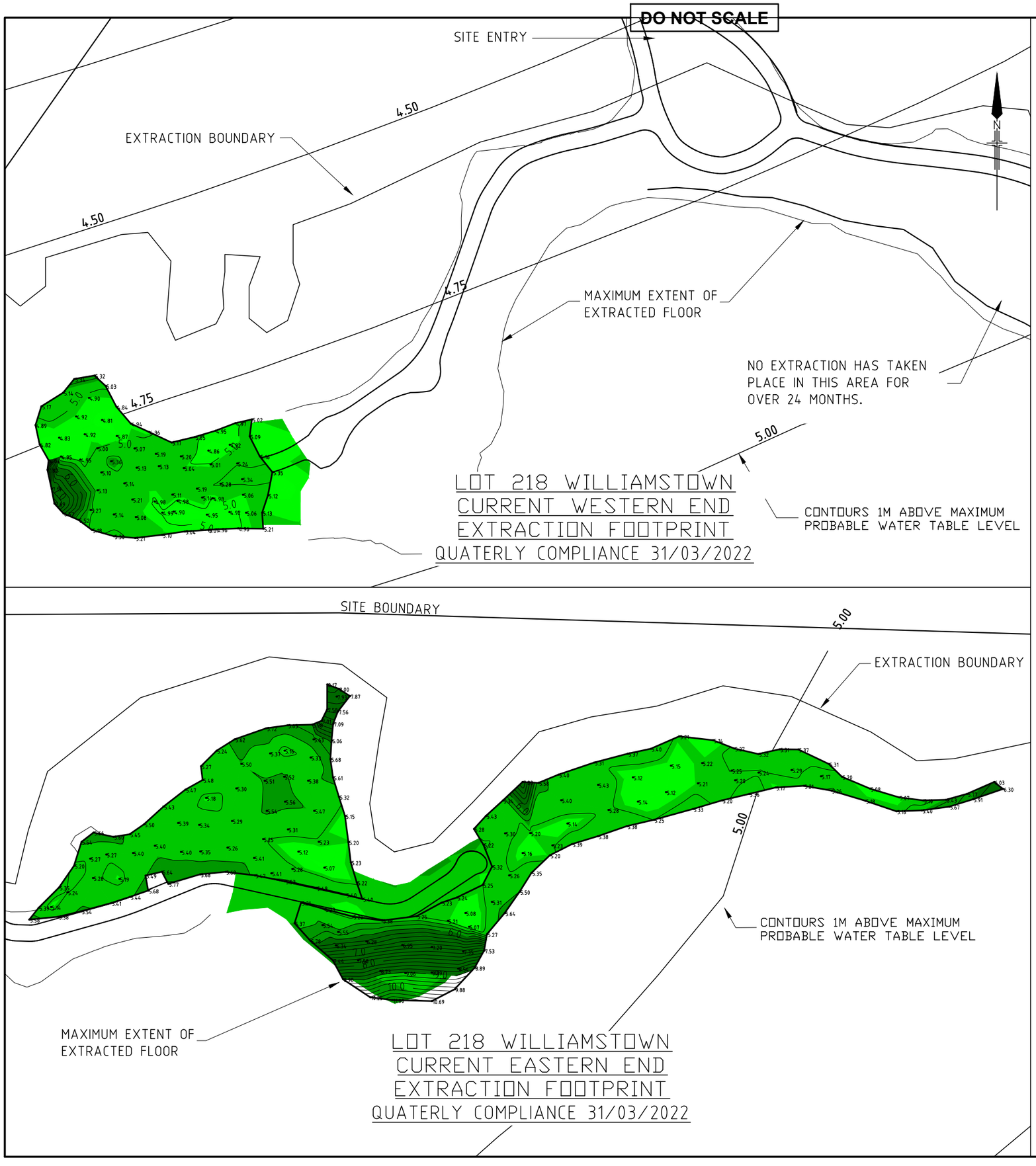
LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

MARCH 2022

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/03/2022

LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/03/2022

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 31/03/2022.
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 FOR THE QUARTER ENDING 31/03/2022 WAS COMPLETED 30/03/2022.

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_220331.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	15/04/2022
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 2022

DRAWING NUMBER:

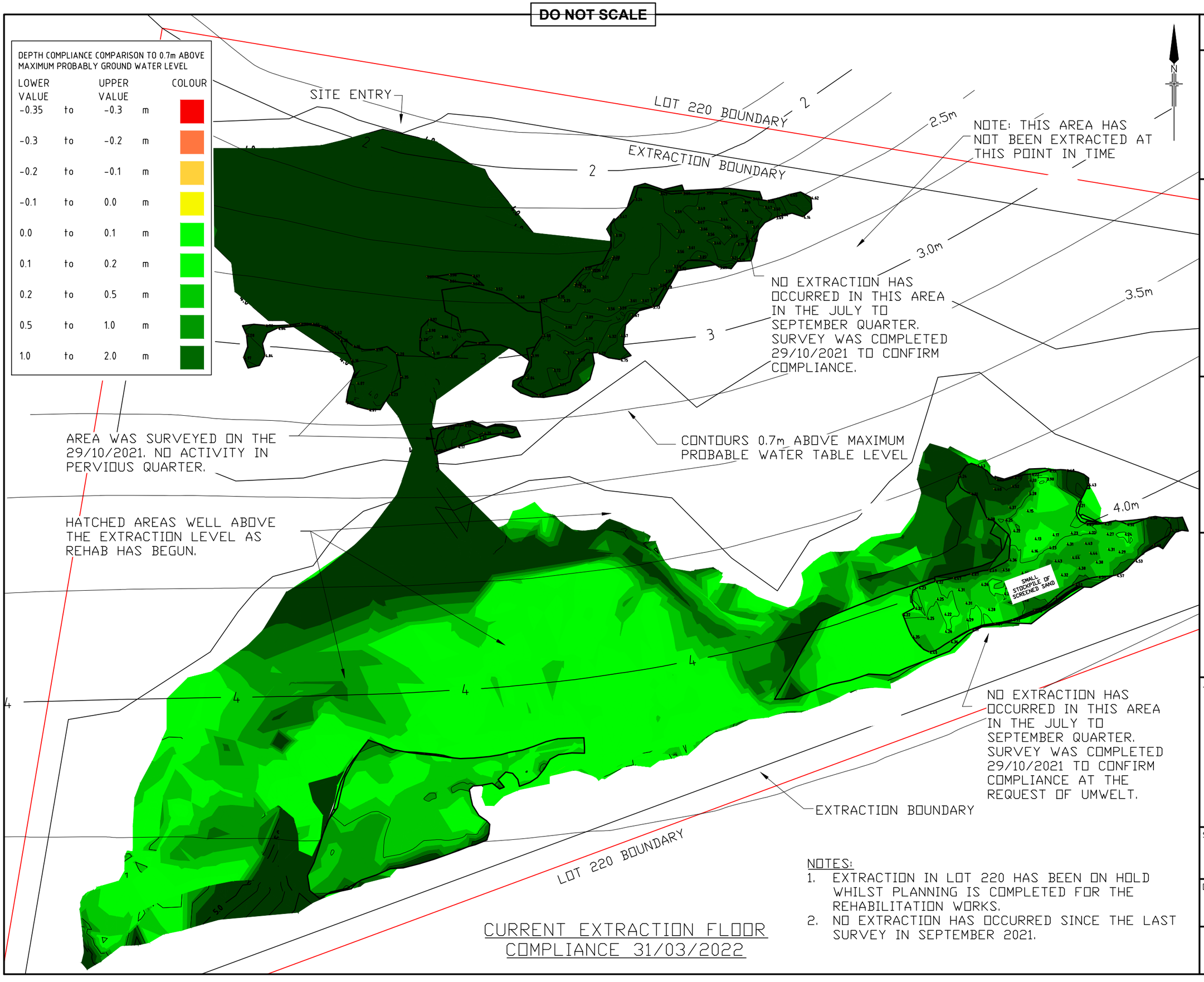
SHEET 2 OF 2 SHEETS

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 31/03/2022

NOTES:
1. EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
2. NO EXTRACTION HAS OCCURRED SINCE THE LAST SURVEY IN SEPTEMBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_220331.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	15/04/2022
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:

MARCH 2022

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

SITE ENTRY

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR APPROXIMATELY 12 MONTHS.

MAXIMUM EXTENT OF EXTRACTED FLOOR

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

EXTRACTION BOUNDARY

CONTOURS 1M ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 30/06/2022

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_220630.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	17/07/2022
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMTOWN
COMPLIANCE
REPORTING

CENTURION SURVEY PTY LTD

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

TITLE:

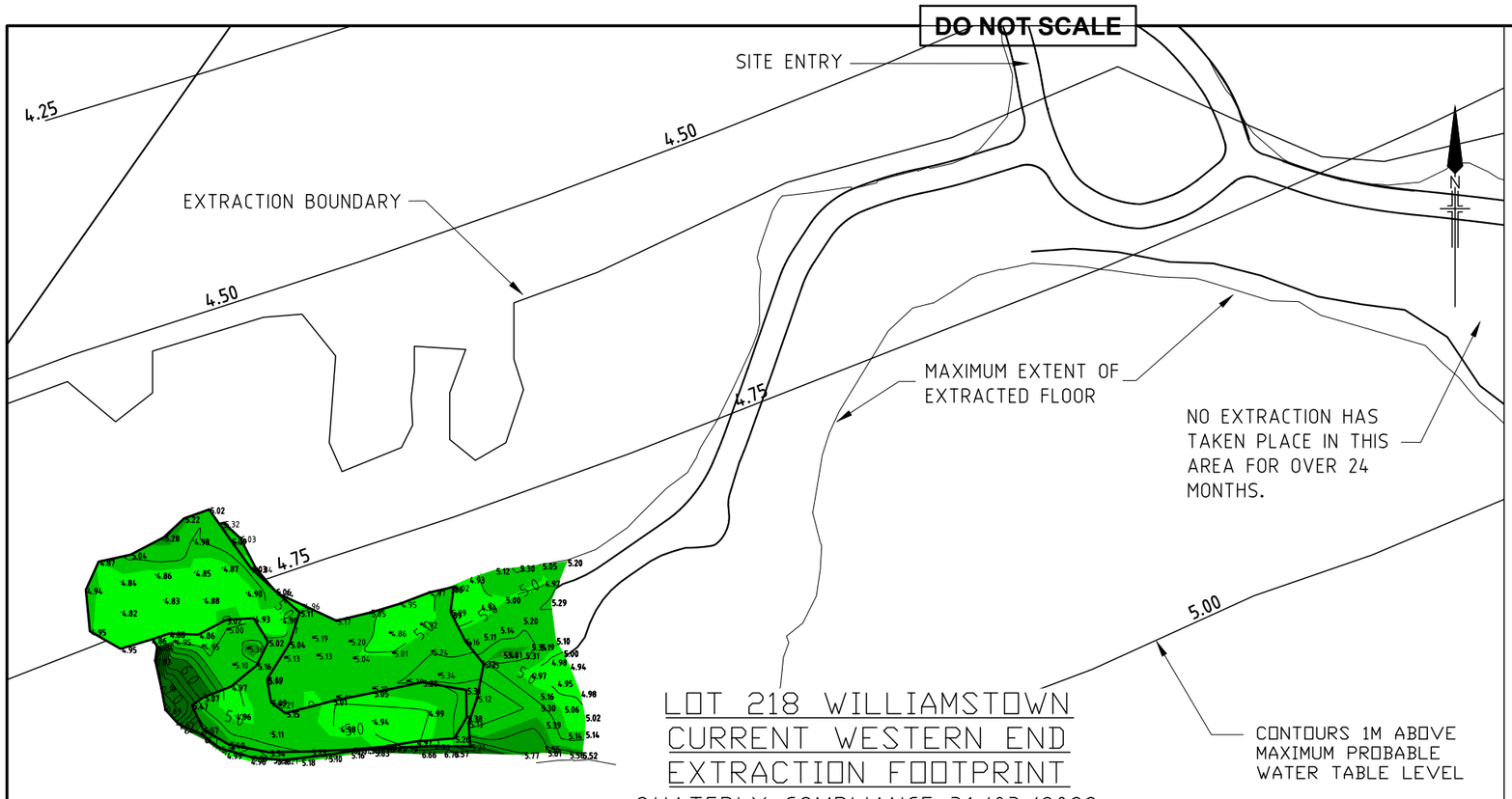
LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

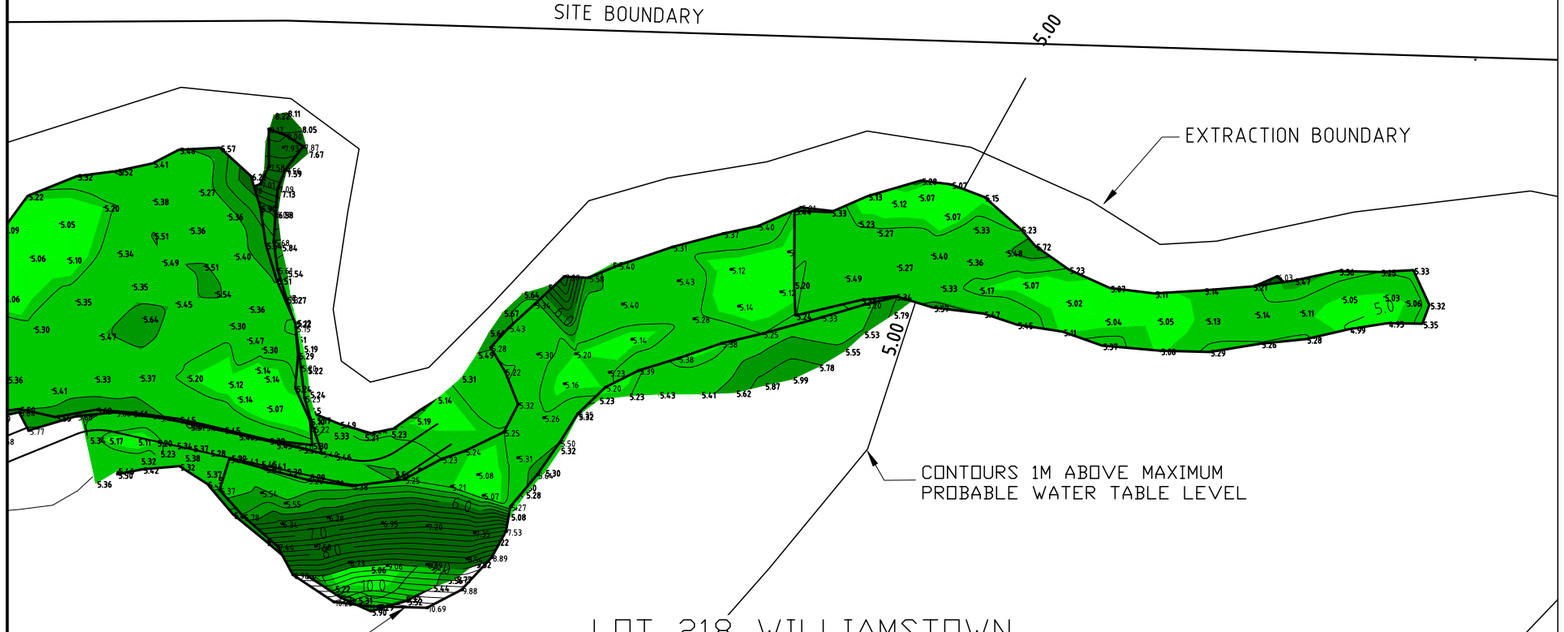
JUNE 2022

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 31/03/2022



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/06/2022

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 30/06/2022.
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 FOR THE QUARTER ENDING 30/06/2022 WAS COMPLETED 07/07/2022.

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_220630.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	17/07/2022
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 2022

DRAWING NUMBER:

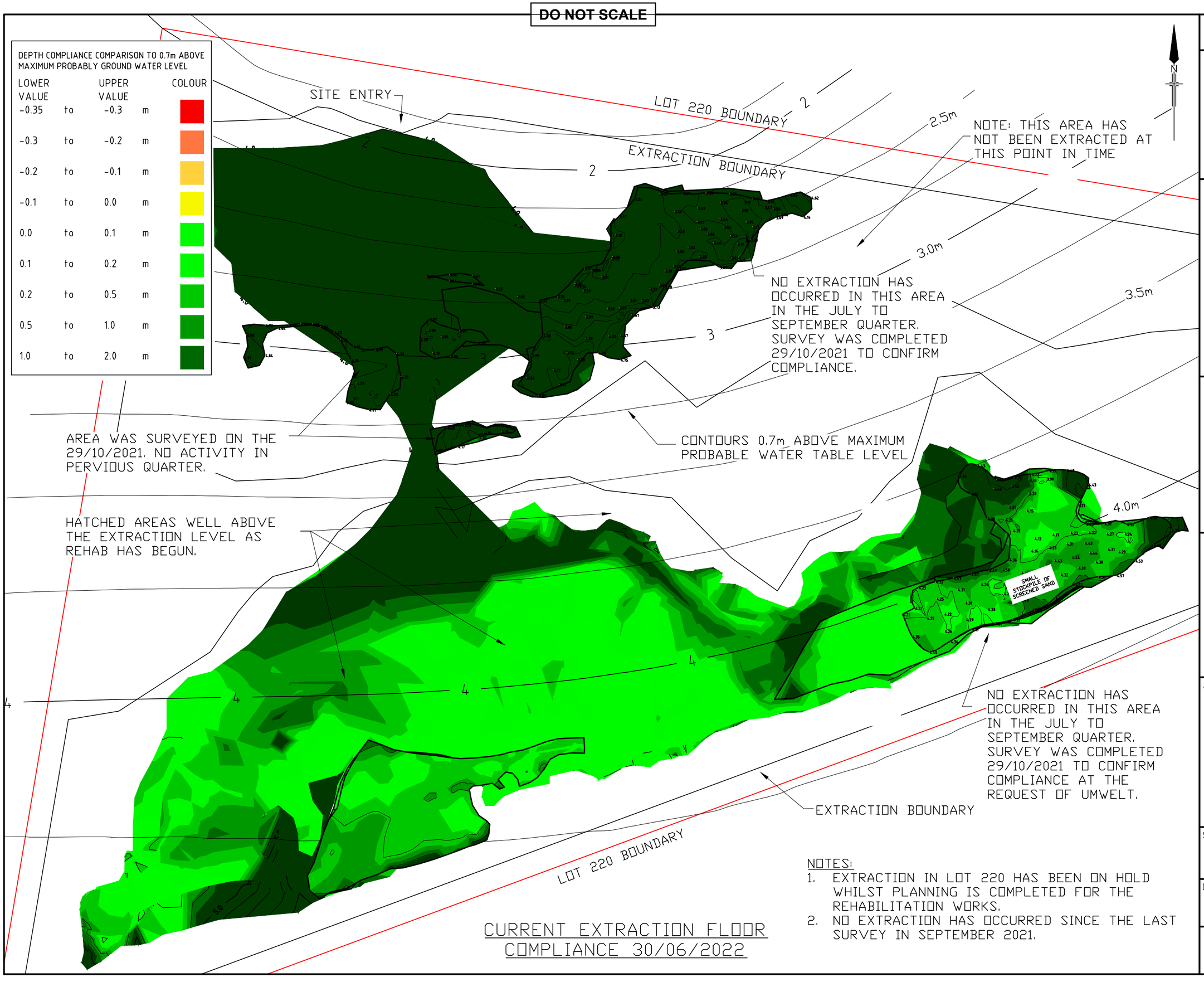
SHEET 2 OF 2 SHEETS

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 30/06/2022

NOTES:
1. EXTRACTION IN LOT 220 HAS BEEN ON HOLD WHILST PLANNING IS COMPLETED FOR THE REHABILITATION WORKS.
2. NO EXTRACTION HAS OCCURRED SINCE THE LAST SURVEY IN SEPTEMBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_220630.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	19/07/2022
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: JUNE 2022

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

EXTRACTION BOUNDARY

LOT 218 BOUNDARY

SITE ENTRY

NO EXTRACTION HAS TAKEN PLACE IN THIS AREA FOR APPROXIMATELY 12 MONTHS.

MAXIMUM EXTENT OF EXTRACTED FLOOR

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

EXTRACTION BOUNDARY

CONTOURS 1M ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 30/06/2022

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_220930.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	20/10/2022
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:

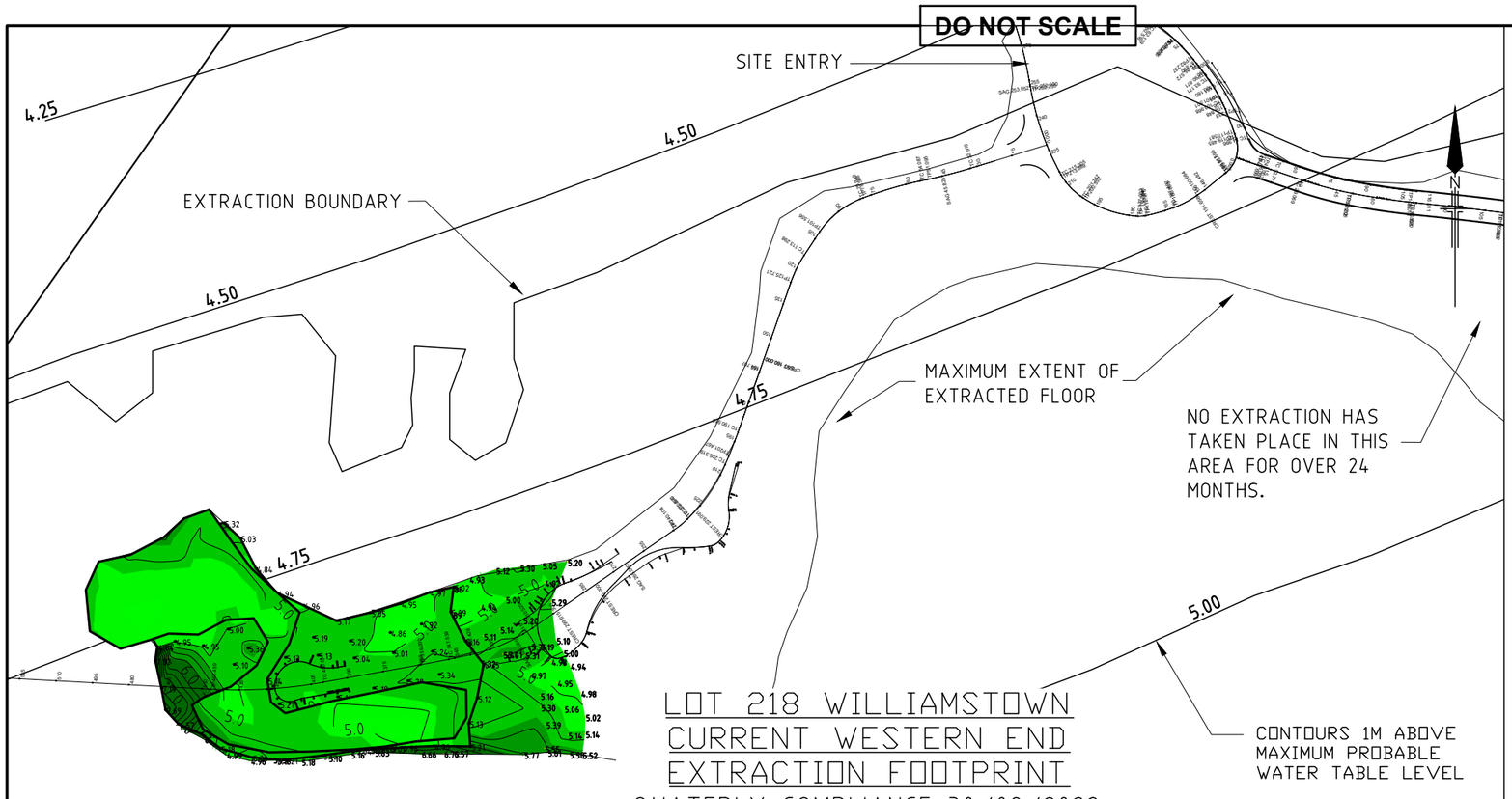
LOT 218
EXTRACTION LEVEL
QUATERLY COMPLIANCE

STATUS:

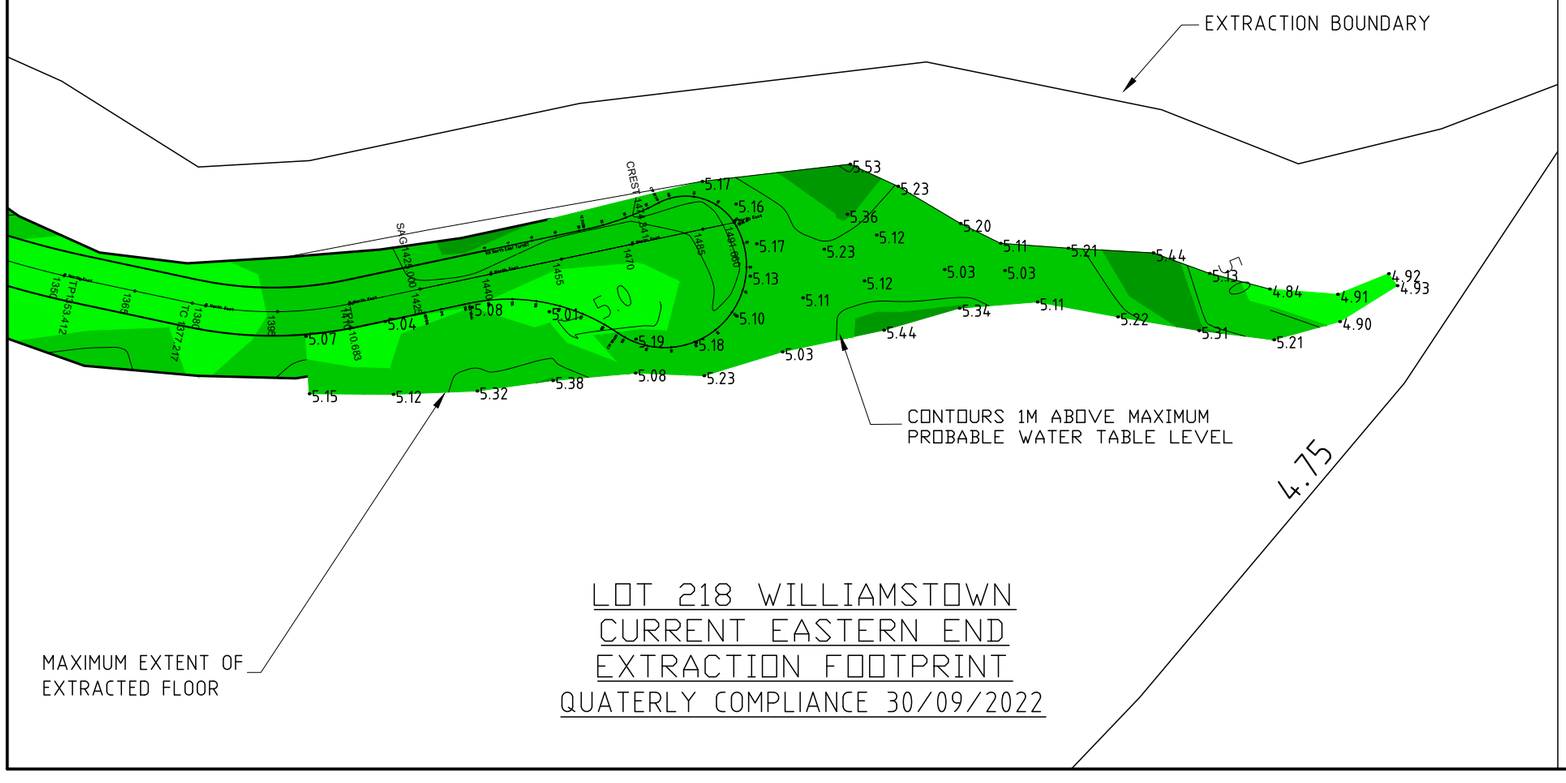
SEPTEMBER 2022

DRAWING NUMBER:

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/09/2022



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 30/09/2022

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 30/09/2022.
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 THE EASTERN FOR THE QUARTER ENDING 30/09/2022 WAS COMPLETED 20/10/2022.
5. NO EXTRACTION OCCURRED AT THE WESTERN IN THE QUARTER ENDING 30/09/2022. PREVIOUS SURVEY DATA SHOWN FOR WESTERN END.

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_220930.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	20/10/2022
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:

SEPTEMBER 2022

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	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

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

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH SEPTEMBER 2022. SURVEY WAS COMPLETED 29/10/2021.

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

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SMALL STOCKPILE OF SCREENED SAND

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH SEPTEMBER 2022. SURVEY WAS COMPLETED 29/10/2021.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 30/09/2022

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 2022. SURVEY IN OCTOBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_220930.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	06/09/2022
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:

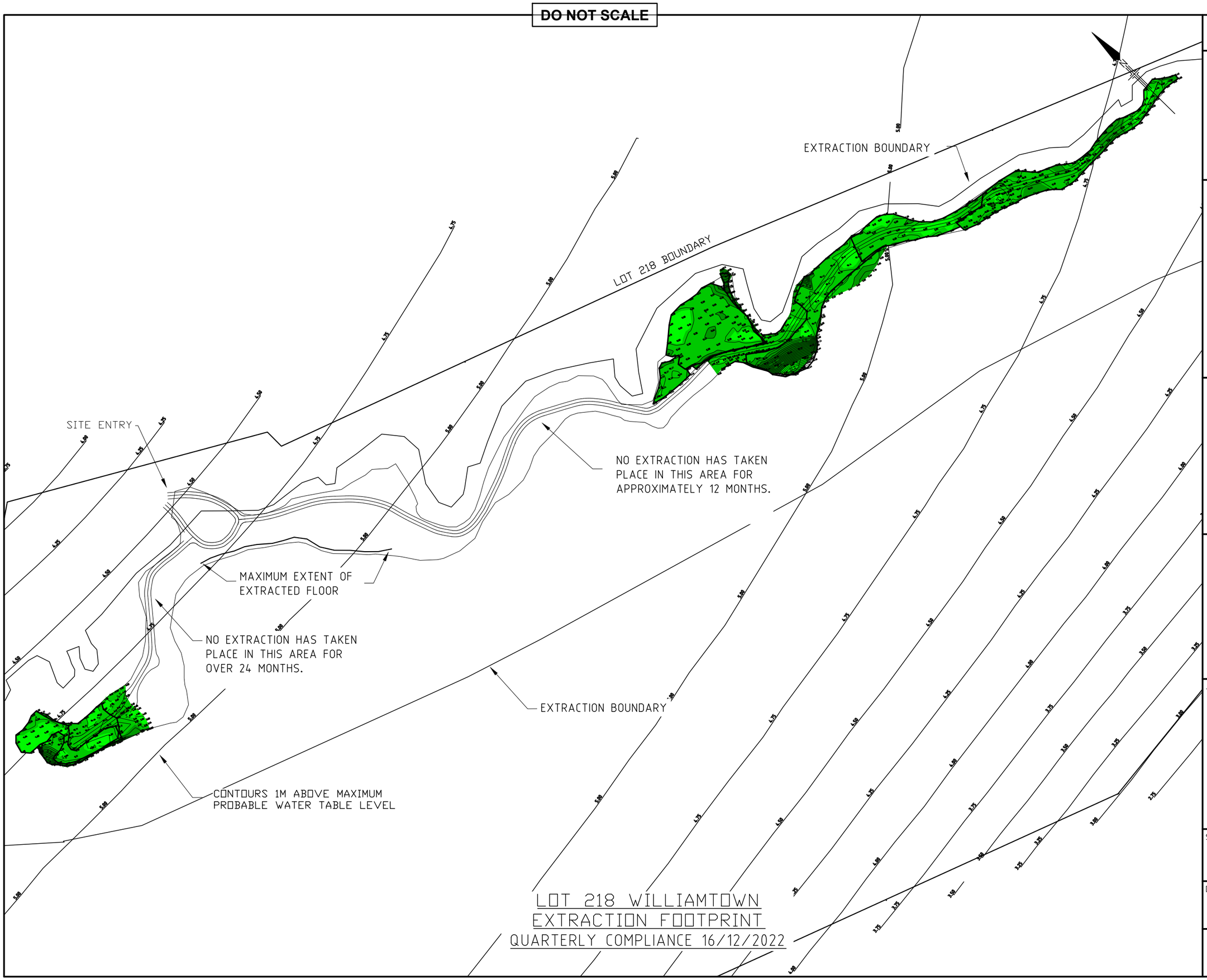
SEPTEMBER 2022

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE



LOT 218 WILLIAMTOWN
EXTRACTION FOOTPRINT
QUARTERLY COMPLIANCE 16/12/2022

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_218_Compliance_221216.dwg
SURVEYED:	CJ & LC
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:

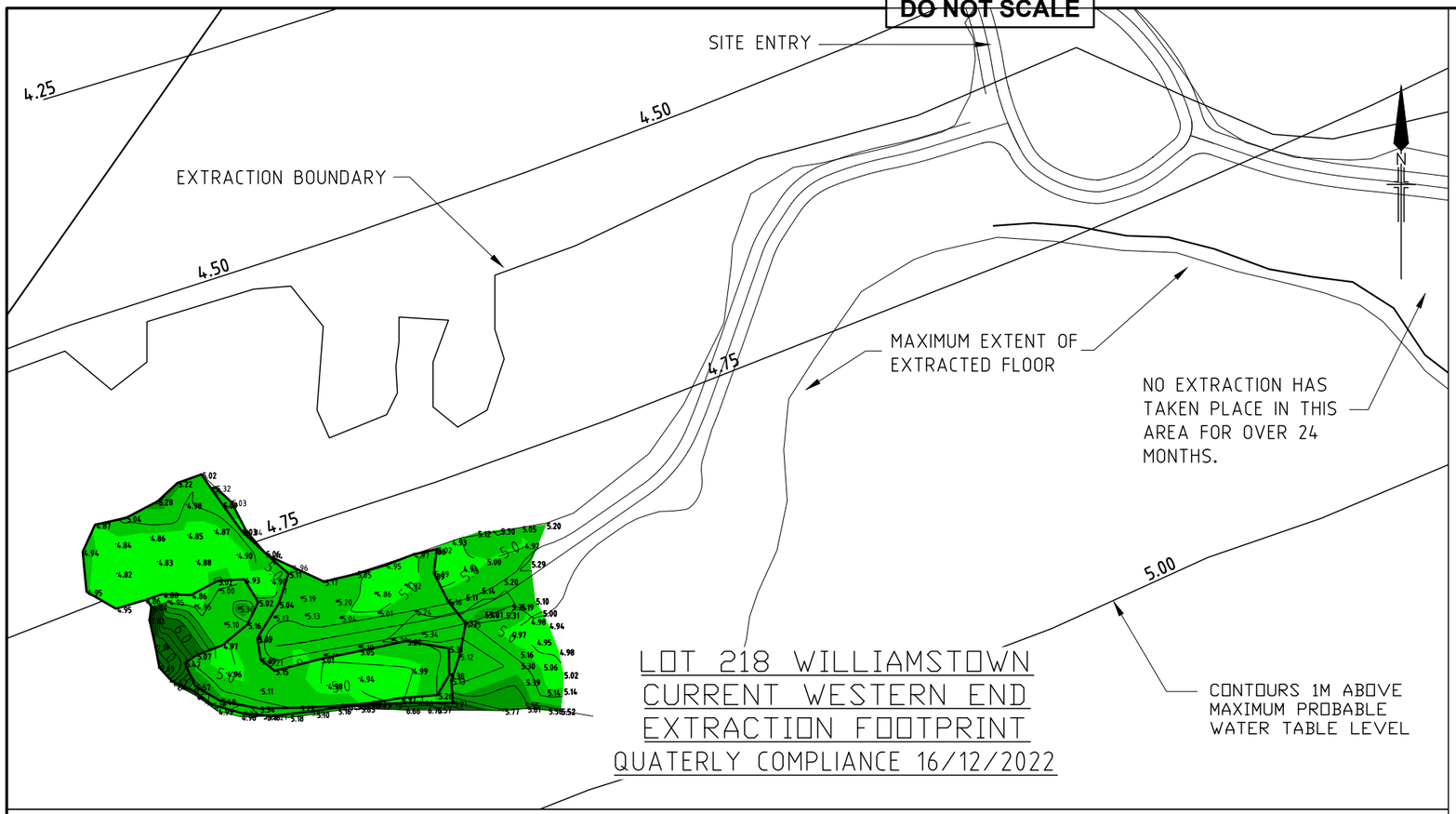
DECEMBER 2022

DRAWING NUMBER:

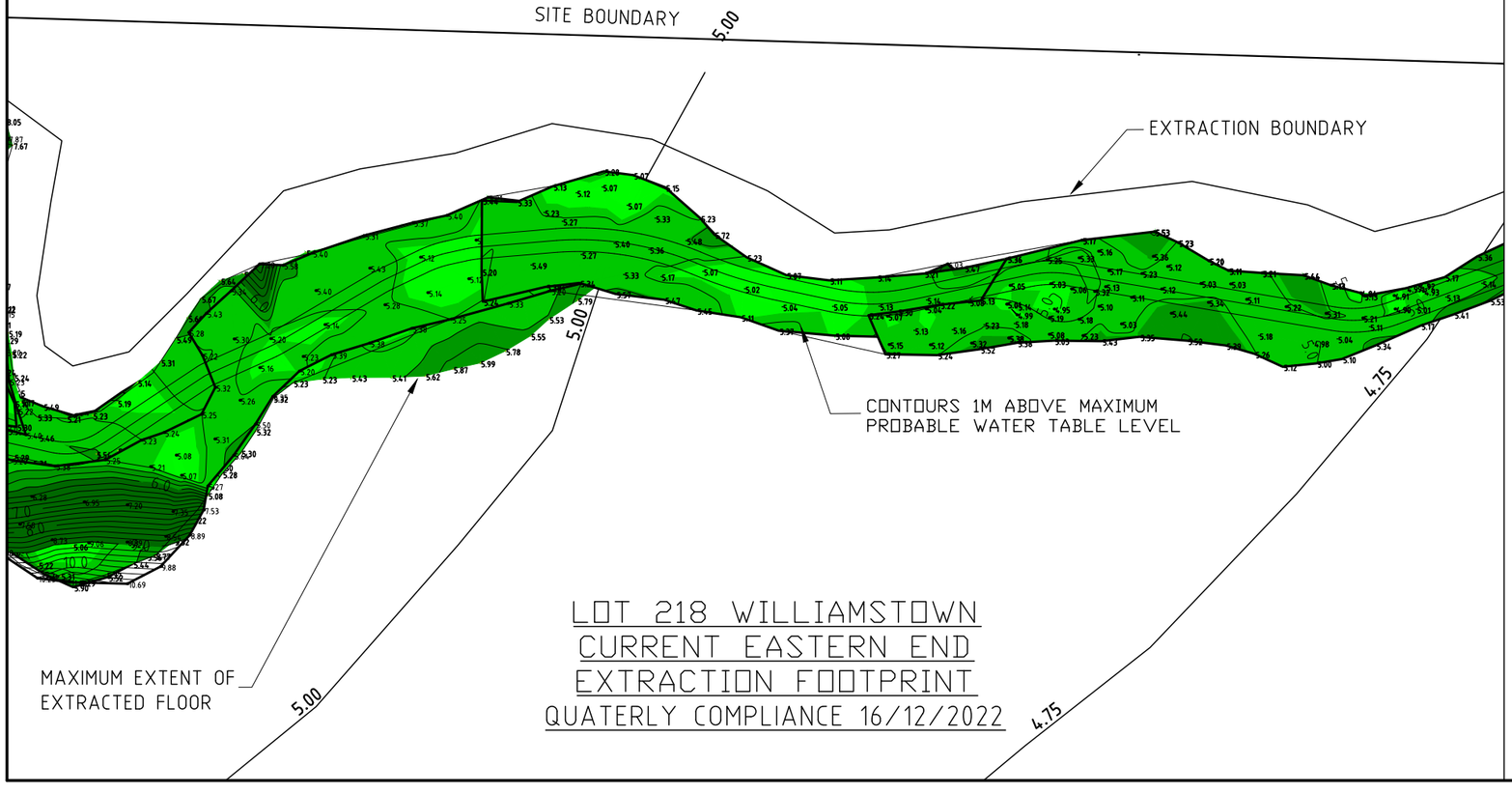
SHEET 1 OF 2 SHEETS

A3

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 16/12/2022



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
QUATERLY COMPLIANCE 16/12/2022

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 30/09/2022.
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 30/06/2022 WAS COMPLETED 16/12/2022.
5. NO EXTRACTION IN WESTERN END DURING JULY THROUGH DECEMBER 2022. 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

FILE:	0014_CS_LOT_218_Compliance_221216.dwg
SURVEYED:	CJ & LC
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	03/01/2023
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:

DECEMBER 2022

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	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

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

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH DECEMBER 2022. SURVEY WAS COMPLETED 29/10/2021.

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

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

HATCHED AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

SMALL STOCKPILE OF SCREENED SAND

NO EXTRACTION HAS OCCURRED IN THIS AREA IN THE PERIOD JULY 2021 THROUGH DECEMBER 2022. SURVEY WAS COMPLETED 29/10/2021.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 31/12/2022

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 2022. SURVEY IN SEPTEMBER 2021.

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_221231.dwg
SURVEYED:	CJ
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	12/01/2023
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

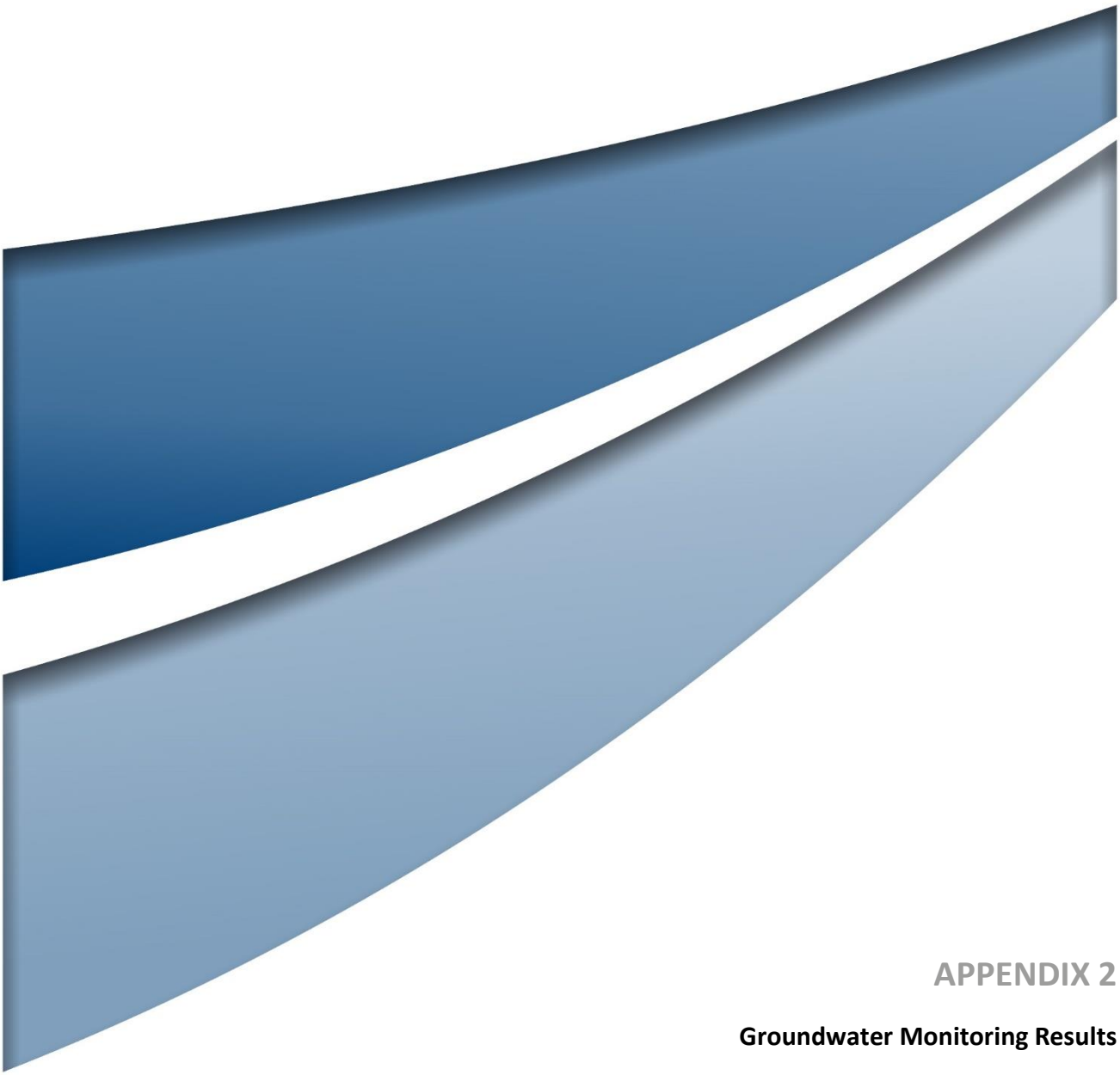
STATUS:

DECEMBER 2022

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3



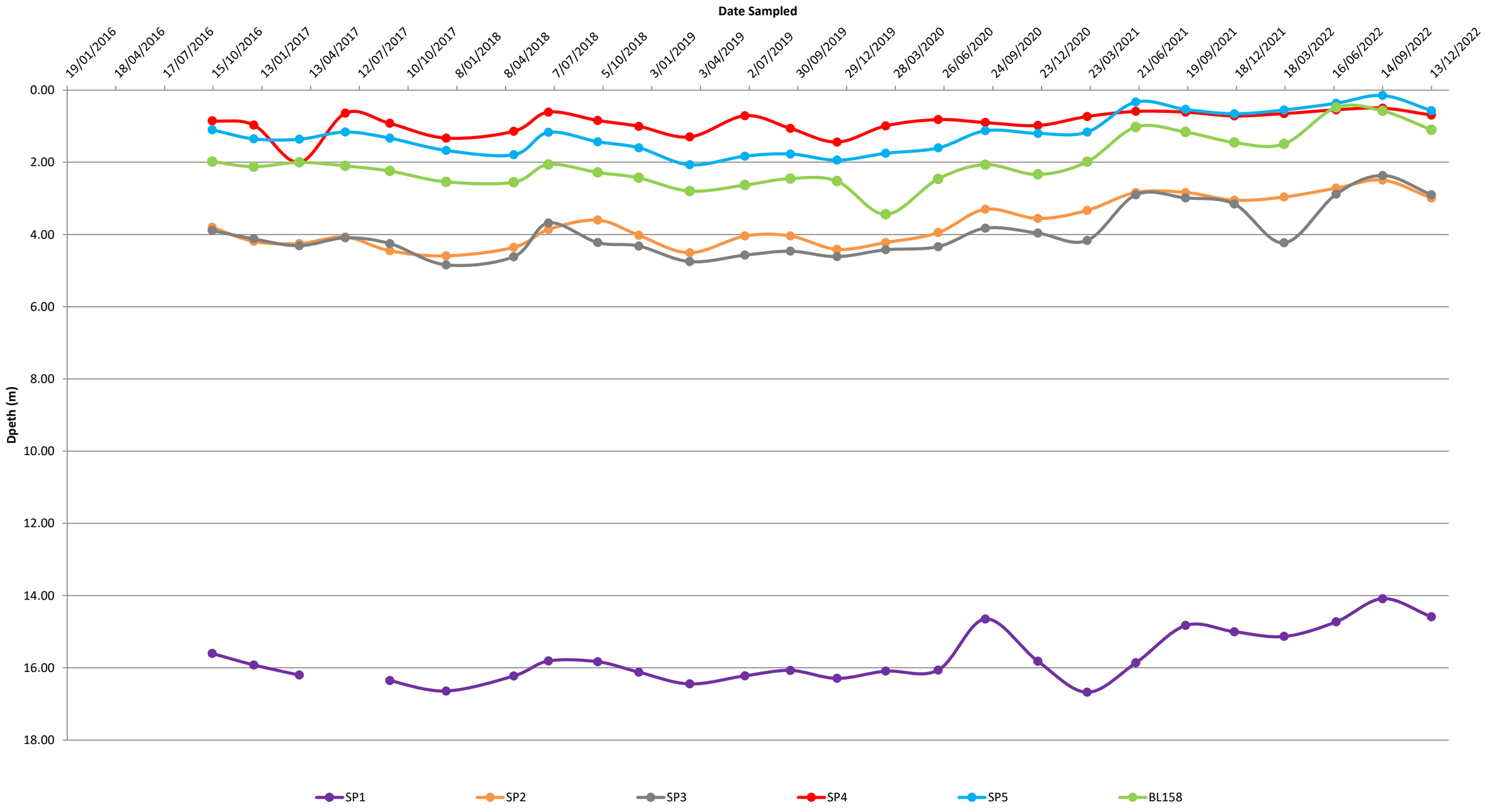
APPENDIX 2

Groundwater Monitoring Results

Licence Information

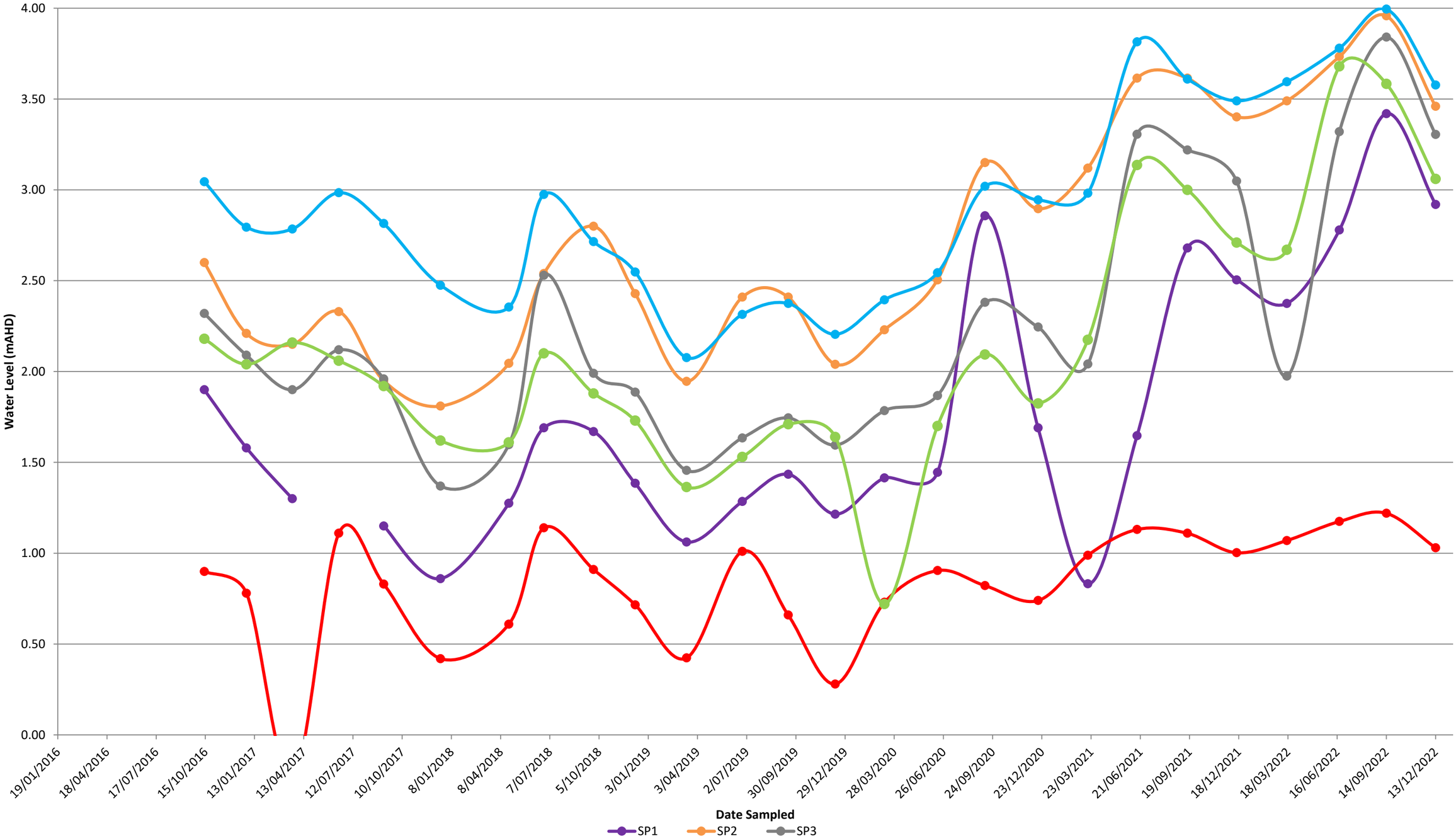
Environment Protection Licence (EPL) Number	13218
Licence Holder	MACKA'S SAND PTY LTD
Licensee Address	Licensee: Macka's Sand Pty Ltd 2684 Nelson Bay Rd Salt Ash NSW 2318 Premises: Macka's Sand Extraction and Processing Facility Off Nelson Bay Road Salt Ash NSW 2318
Link to the full licence on the EPA website	https://apps.epa.nsw.gov.au/prpoeoapp/ViewPOEOLicence.aspx?DOCID=77948&SYSUID=1&LICID=13218
Anniversary Date:	30-Jun
Information Last Obtained:	22-Dec-22
Date of Publication:	6-Jan-23

Groundwater Depths (m)

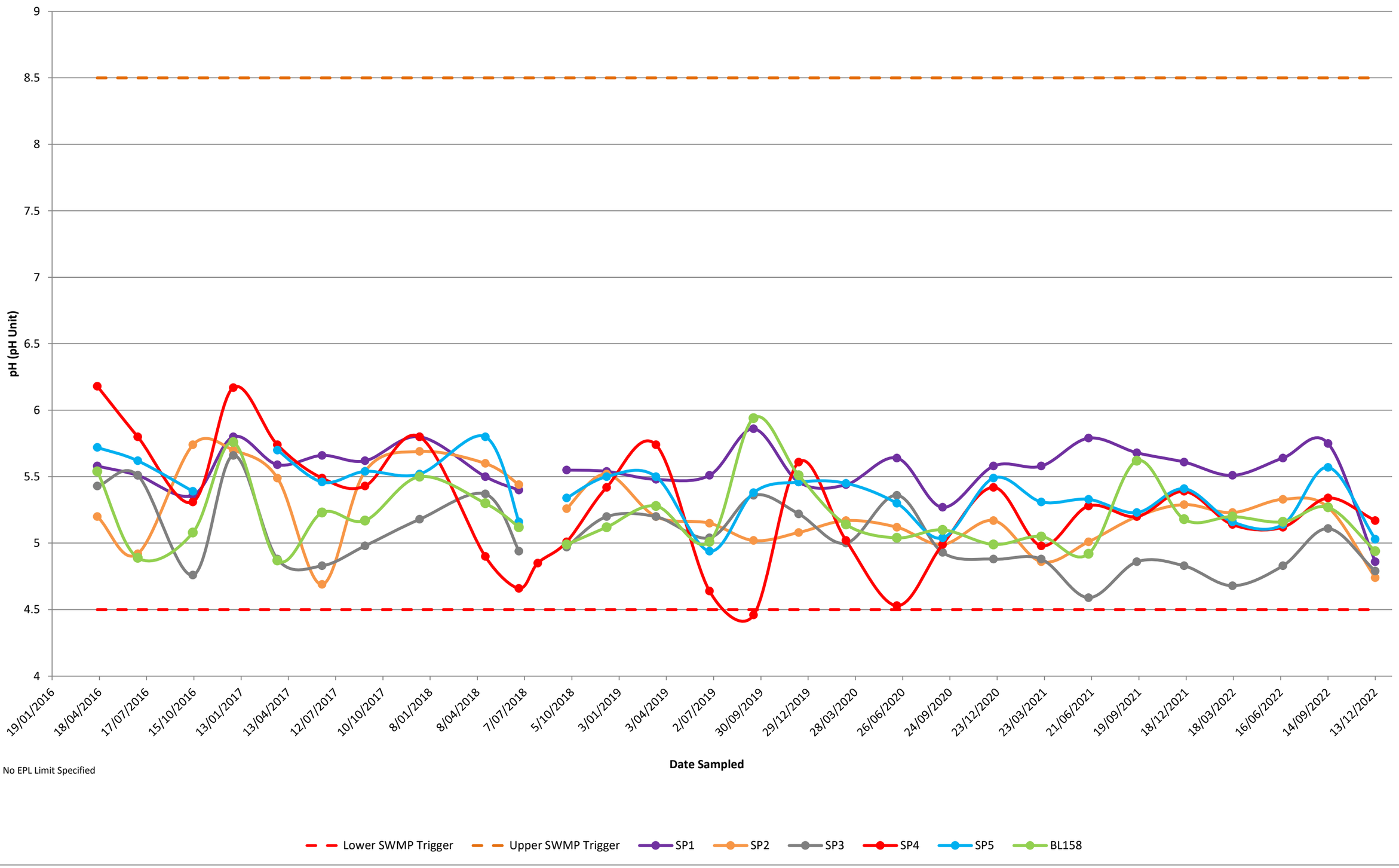


Note: No EPL Limit Specified

Groundwater Levels (mAHD)



Groundwater - pH



Note: No EPL Limit Specified

Groundwater - Electrical Conductivity (EC)

EC (µS/cm)

1100
1000
900
800
700
600
500
400
300
200
100
0

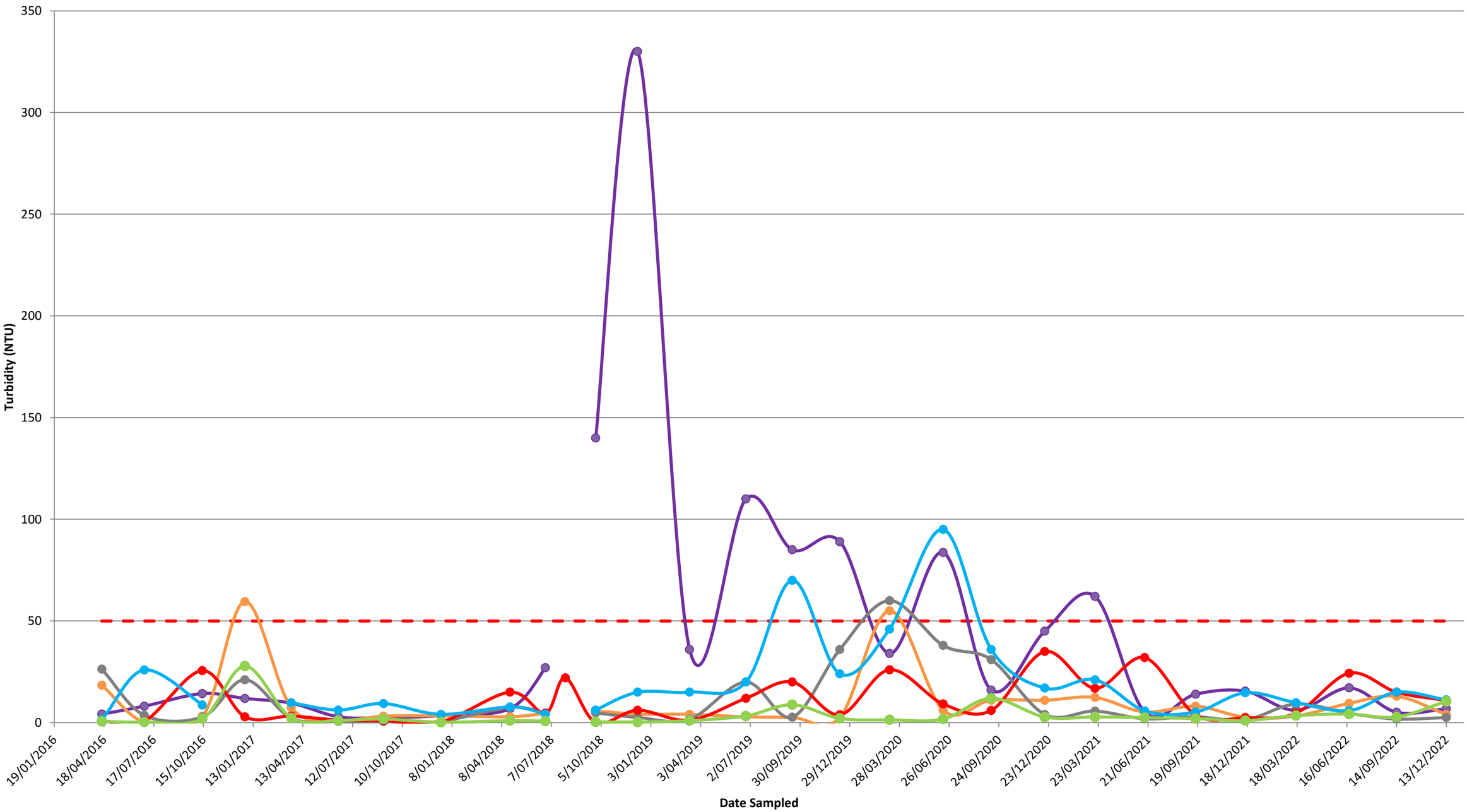
19/01/2016
18/04/2016
17/07/2016
15/10/2016
13/01/2017
13/04/2017
12/07/2017
10/10/2017
8/01/2018
8/04/2018
7/07/2018
5/10/2018
3/01/2019
3/04/2019
2/07/2019
30/09/2019
29/12/2019
28/03/2020
26/06/2020
24/09/2020
23/12/2020
23/03/2021
21/06/2021
19/09/2021
18/12/2021
18/03/2022
16/06/2022
14/09/2022
13/12/2022

Date Sampled

Note: No EPL Limit Specified

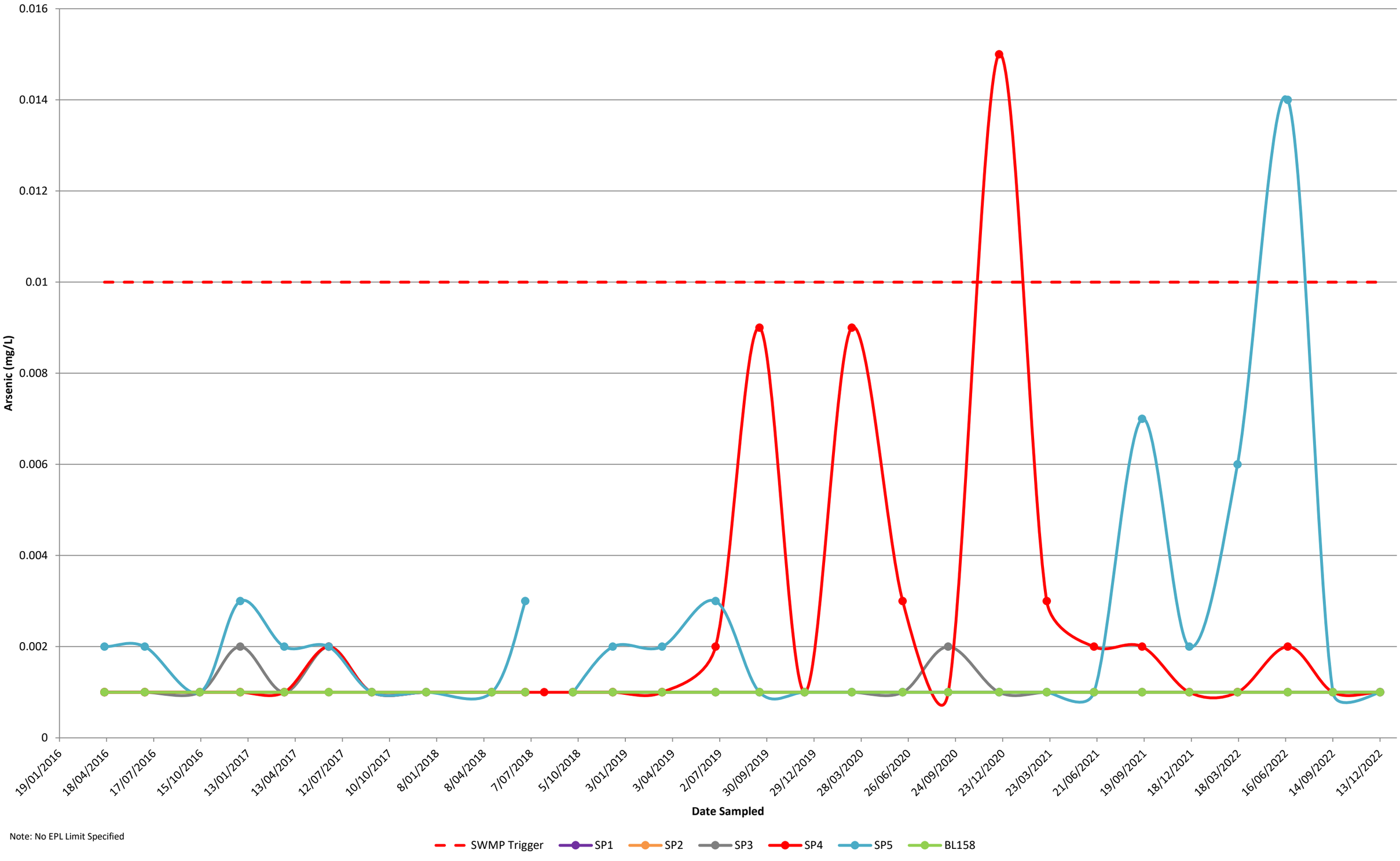
SWMP Trigger
SP1
SP2
SP3
SP4
SP5
BL158

Groundwater - Turbidity (NTU)



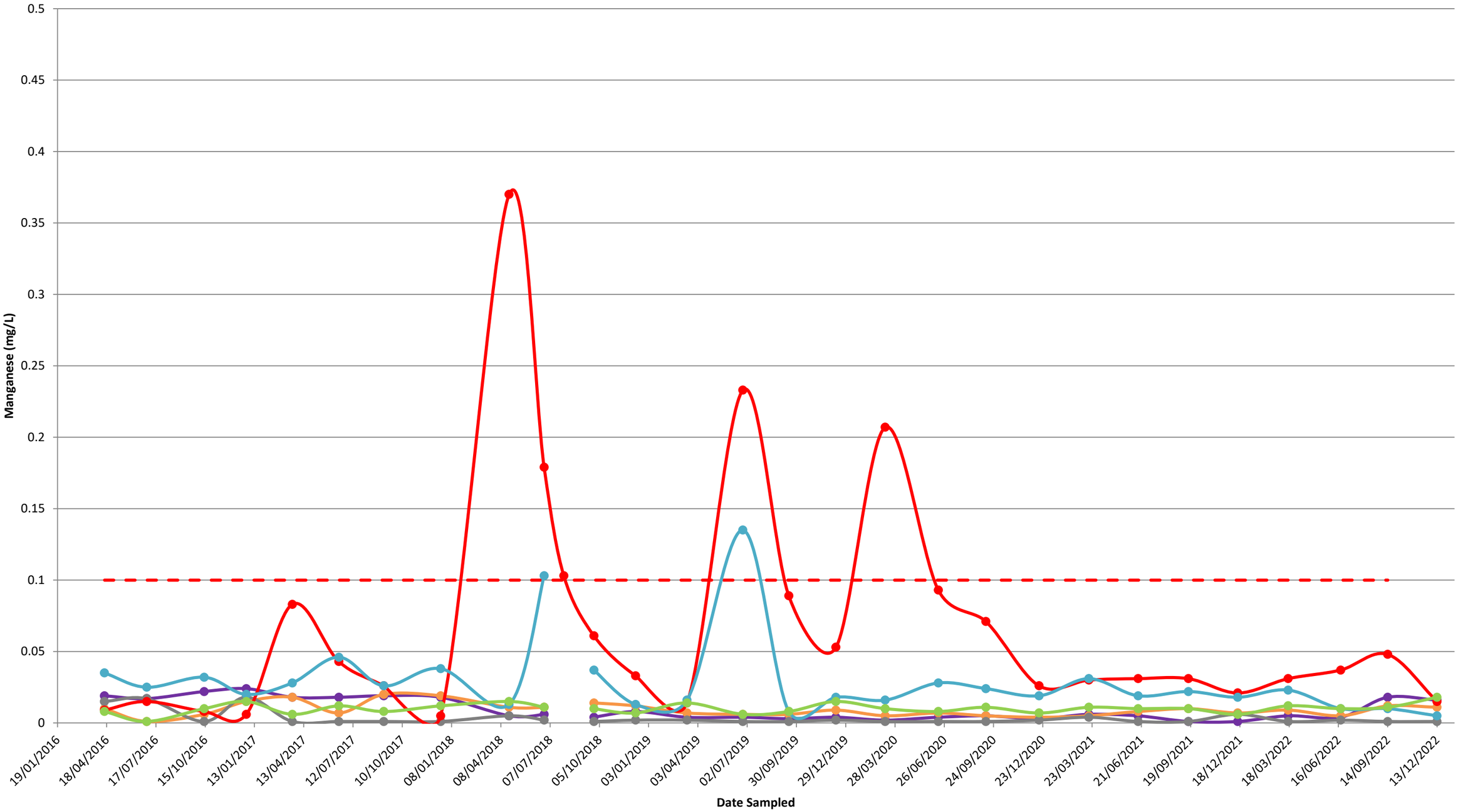
Note: No EPL Limit Specified

Groundwater - Arsenic (mg/L)



Note: No EPL Limit Specified

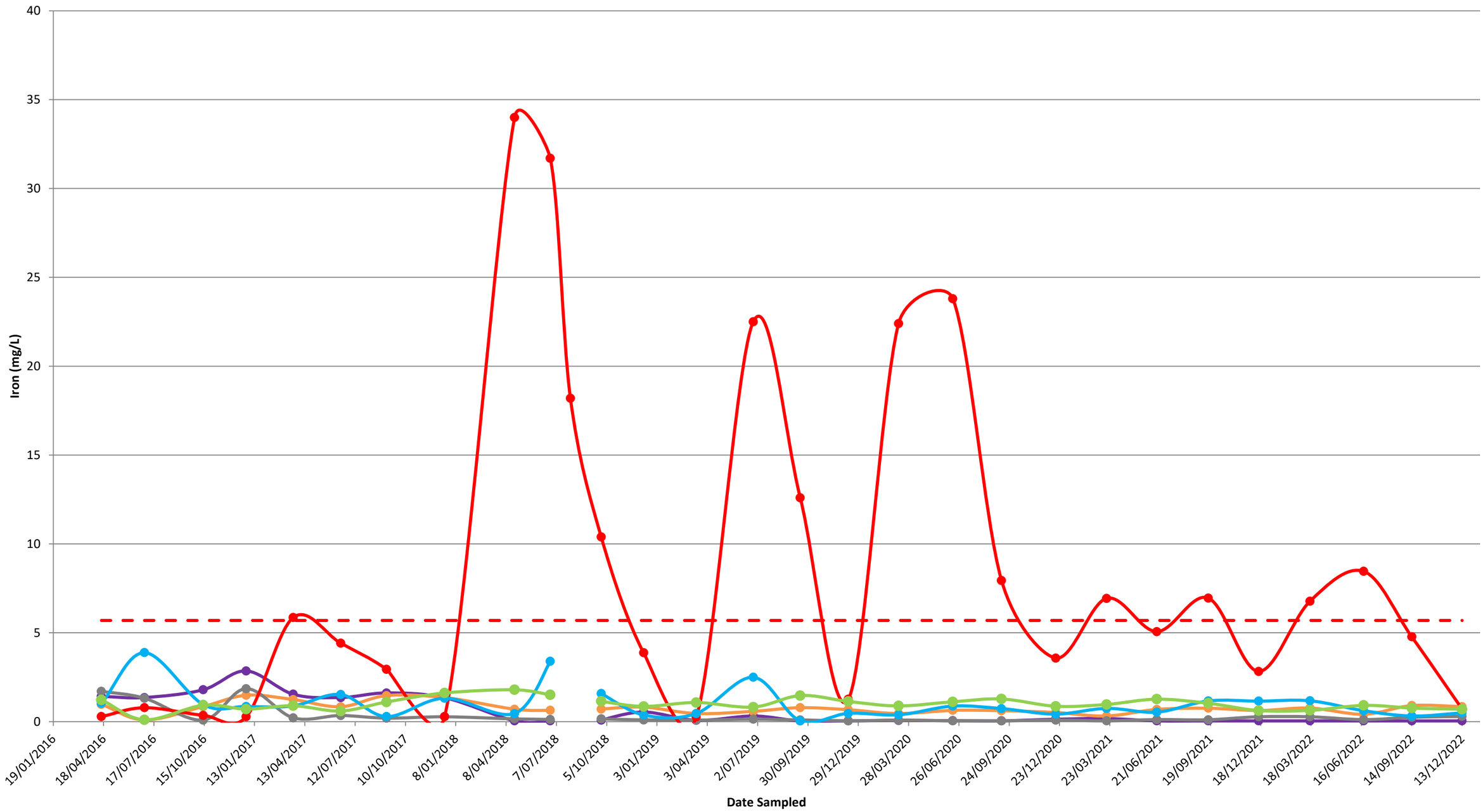
Groundwater - Manganese (mg/L)



Note: No EPL Limit Specified

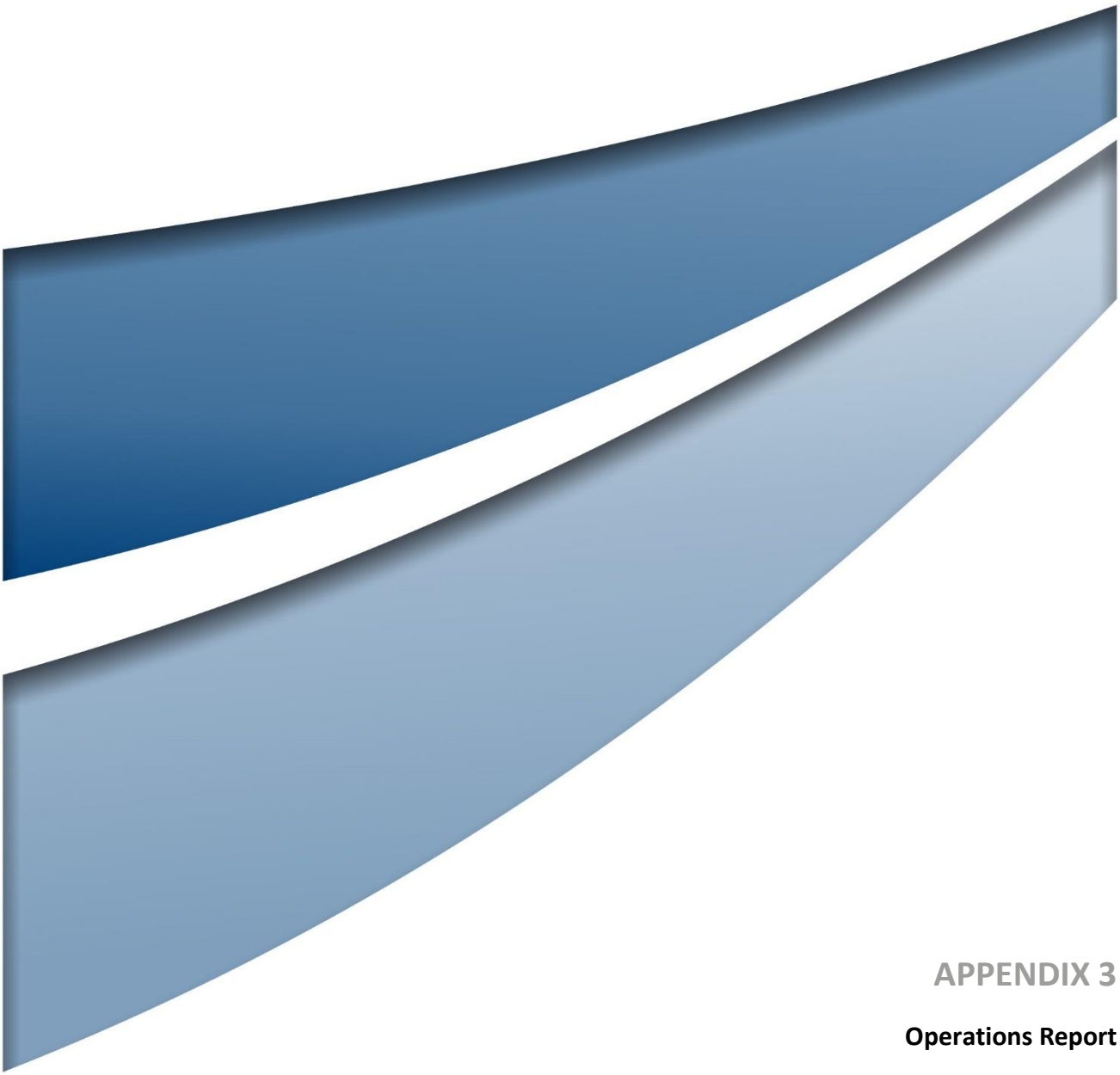
SWMP Trigger — SP1 — SP2 — SP3 — SP4 — SP5 — BL158

Groundwater - Iron (mg/L)



Note: No EPL Limit Specified

SWMP Trigger SP1 SP2 SP3 SP4 SP5 BL158



APPENDIX 3

Operations Report

MACKA'S SAND PTY LTD

OPERATIONS REPORT

Approval for Extractive Industry in the
North Stockton Catchment Area

FINAL

March 2022

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.

1.2 Scope

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

Conditions 3 and 4 of Clause 9 of the NOW 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 DPI – Water (formerly NSW Office of Water (NOW)) 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 2022 calendar year.

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

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 2022 (i.e. the compliance review period). The compliance status of the Mackas Sand operation against the NOW 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 NOW Approval and its associated conditions.

No non-compliances were identified during the 2022 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 (DPE, 2015), DPE 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 2022 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 Project Approval 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 NOW 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, 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 Operations Management Procedure 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 Operations Management Procedure during 2022.

Hydrocarbon Spill Procedure

No spills were recorded during 2022 and works at the site were undertaken in accordance with the Hydrocarbon Spill Procedure during 2022.

Any spills, should they occur, will be managed in accordance with Section 4.3.3 of the Operational Management Procedure 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

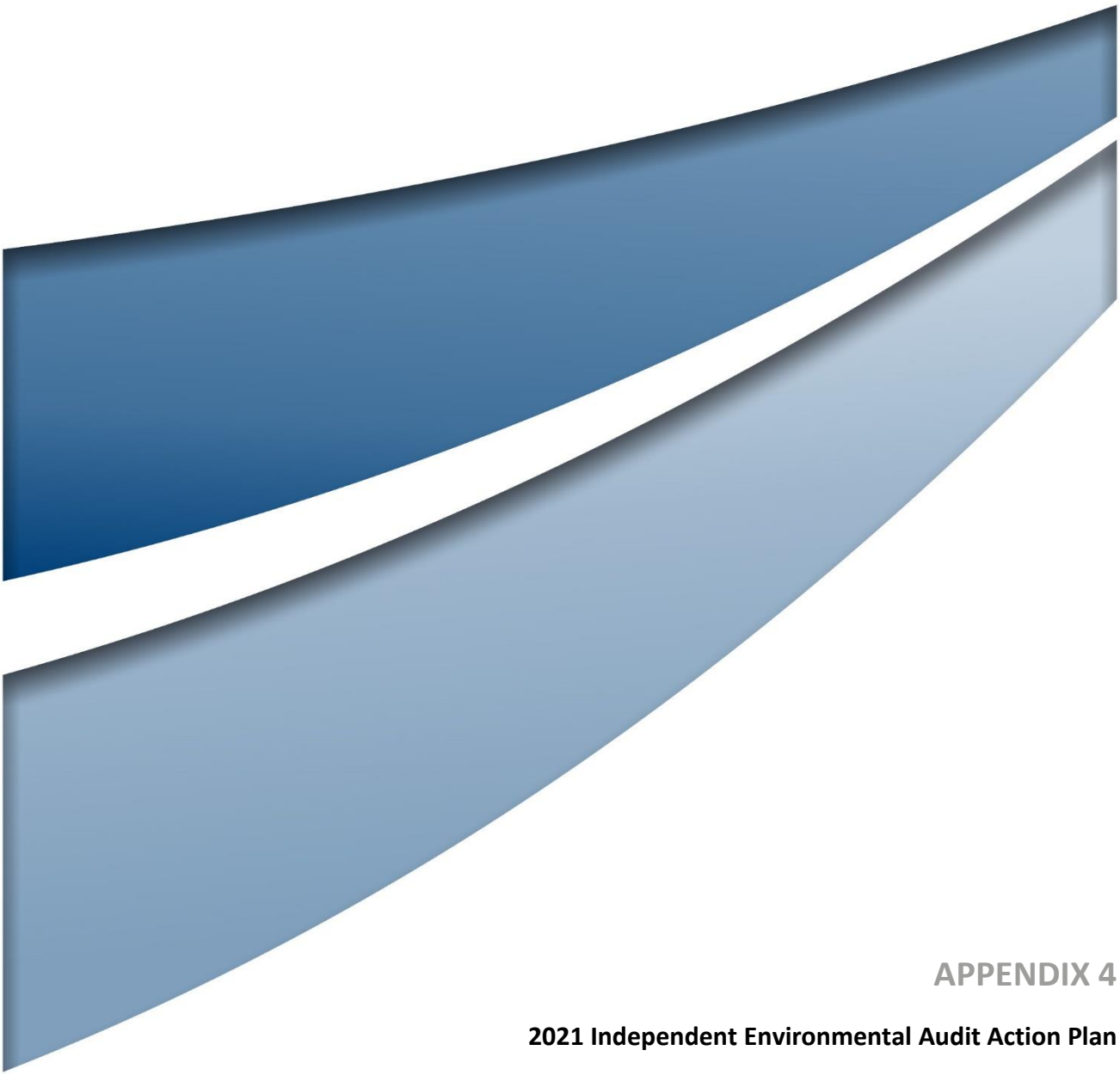
Rehabilitation at Lot 220 is being undertaken progressively as sand extraction and operating space on the active quarry floor permits.

Approximately 5.6 ha of land in the South section of Lot 220 commenced rehabilitation during 2022.

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 (Umwelt, 2021), in accordance with Part 2 Clause 6 of the Hunter Water Regulations approval.

6.0 Non-compliance Summary

No non-compliances against the NOW Approval were identified within the 2022 Operations Report period.



APPENDIX 4

2021 Independent Environmental Audit Action Plan

Appendix 4 - Table 1

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
NC-01	Schedule 2, Condition 2 PA08_0142 Statement of Commitments 1.1.1 The Proponent must carry out the project: (a) generally in accordance with the EA, EA (MOD 1), EA (MOD 2) and the project layout; and (b) in accordance with the statement of commitments and the conditions of this approval.	Seven non-compliances were raised where compliance with the conditions of consent was not demonstrated.	Mackas Sand should ensure that appropriate processes are developed and implemented to ensure compliance with the requirements of the conditions of consent.	Noted. **Action:** Mackas Sand will address associated non-compliances and auditor recommendations via the *Mackas Sand Response and Action Plan* document.	Completed - Mackas Sand will ensure that compliance with the conditions of PA 08_0142 is maintained throughout the next audit period.

NC-02	*Schedule 3 Condition 4B PA08_0142* The Proponent shall ensure, for the use of the Alternate access road, that: (a) a speed limit of 40 km/hour is applied and enforced for all vehicles; (b) trucks slowing to use the intersection of the access road and Nelson Bay Road do not use engine or compression braking systems; (c) laden truck movements exiting the site do not exceed 14 per hour during the period from 5 am to 6 am, Monday to Friday (except for Public Holidays); (d) laden truck movements exiting the site do not exceed 8 per hour during the period from 6 am to 9 am, Monday to Friday (except for Public Holidays); (e) laden truck movements exiting the site do not exceed 24 per hour during the period from 9 am to 10 pm, Monday to Friday (except for Public Holidays);	Two instances where truck movements exceeded the allowable movements for the designated period. • 15/11/18 5am-6am Two additional truck movements - computer system error occurred when three drivers used a swipe card to exit the site instead of manually entering information via the inbound and outbound weighbridge terminals. 17/10/19 – One additional truck movement as a result of an error in the weighbridge's coding following a software update.	Actions to address these issues were identified in reports to DPIE and have been implemented. No exceedances have been recorded since October 2019. No further action required.	No recommendation sought. Non-compliances closed during audit period. **Action:** No action required	Completed. Non-compliances were closed out during the audit period.

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
	(f) laden truck movements exiting the site do not exceed 5 per hour between 5 am and 6 am on Saturdays (except for Public Holidays); (g) laden truck movements exiting the site do not exceed 9 per hour between 6 am and 7 am on Saturdays (except for Public Holidays); (h) laden truck movements exiting the site do not exceed 24 per hour between 7 am and 4 pm on Saturdays (except for Public Holidays); and (i) combined laden truck movements exiting from Lots 218 and 220 do not exceed 10 per hour in total on Sundays and Public Holidays. Note: In this condition, "per hour" means within any period of 60 minutes following the change of hour.				

NC-03	*Schedule 3 Condition 22 PA08_0142* The Ground Water Monitoring Program must include: (a) detailed baseline data on ground water levels and quality, based on statistical analysis (including available HWC data); (b) groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; (c) a program to monitor groundwater levels and quality, including a groundwater core sample testing program to monitor changes in metallic species above the maximum predicted groundwater level at Lot 218, that; (i) is developed in consultation with EPA; (ii) samples to a depth at least 2 m below the proposed extraction depth of 0.7 m above the	While further groundwater modelling has been conducted (GHD, 21/08/2020); the SWMP does not include protocol for further groundwater modelling to confirm the limits to excavation depth.	Mackas Sand should ensure that a protocol for further groundwater modelling to confirm the limits to excavation depth is developed and included in the Ground Water Monitoring Program.	The review of the groundwater model is driven by Schedule 3 Condition 3 of PA08_0142 following the completion of respective Independent Environmental Audits. There is also an existing provision for further groundwater modelling made in Section 5.4 of the approved Soil and Water Management Plan. **Action:** Mackas Sand will revise the Soil and Water Management Plan to clearly outline model review requirements in plan.	Completed - A revised SWMP that outlines model review requirements in the plan was submitted to the DPE on 30/11/2021. The revised plan was approved by DPE on 3 August 2022.

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
	maximum predicted groundwater level, from at least two locations within the area proposed to be extracted within the first 3 years; and (iii) includes testing for acid forming minerals at regular depth and time intervals; (d) a protocol for further groundwater modelling to confirm the limits to excavation depth across the site permitted in accordance with condition 7 of schedule 2; and (e) a protocol for the investigation, notification and mitigation of identified exceedances of the ground water impact assessment criteria.				

NC-04	*Schedule 3 Condition 26* *PA08_0142* *Statement of Commitments 1.2.3* *LMP Cl 3.7.5* *LMP Cl 3.7.10* The Rehabilitation Management Plan must include: (a) the objectives for the site rehabilitation and site landscaping; (b) a description of the short, medium, and long term measures that would be implemented to rehabilitate and landscape the site; (c) detailed performance and completion criteria for the site rehabilitation and site landscaping; (d) a detailed description of the measures that would be implemented over the next 3 years, including the procedures to be implemented for: • progressively rehabilitating disturbed areas; • landscaping the site to minimise visual impacts;	Requirements of the LMP had not been consistently implemented. The following issues were observed: • While it was reported the Mackas Sand had engaged a local nursery for collection and stocking of seeds, records were not available to show that preclearance surveys and seed collection had been undertaken. • Records were not available to verify preclearance surveys had been completed, • Topsoil stockpiles had not been delineated or signposted to reduce the potential for inadvertent disturbance; and • Stockpiles that will not be re-	Mackas Sands should ensure that all the requirements of the LMP are understood and implemented on site, including: • Ensuring topsoil stockpiles are managed in accordance with the requirements of the LMP • Records should be maintained as evidence of completion of activities, including preclearance surveys and seed collection.	Noted. **Action:** Mackas will review and revise the LMP and site documentation to incorporate these requirements and provide training to staff in regards to the revised requirements	Completed - The Mackas Sand LMP was revised to include a section on training so that Mackas Sand staff are aware of their roles and responsibilities when implementing the requirements of the Mackas Sand LMP. The revised Landscape Management Plan was submitted to the DPE on 30/11/2021. The revised LMP was approved by DPE on 19 August 2022.

	• protecting vegetation and soil outside the disturbance areas; • preventing and/or minimising the accretion of sand dunes outside the project disturbance areas; • undertaking pre-clearance surveys; • salvaging and reusing material from the site for habitat enhancement; • managing impacts on fauna; • maintaining koala habitat linkages; • conserving and reusing topsoil; • collecting and propagating seed for rehabilitation works; • salvaging and reusing material from the site for habitat enhancement; • controlling weeds and feral pests; • controlling access; and • bushfire management; (e) a program to monitor the effectiveness of these measures, and progress	used within 3 months had not been seeded with a cover crop and/or native seed mix to prevent ingress of weed species.			

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
	against the performance and completion criteria; (f) a description of the potential risks to successful rehabilitation, and a description of the contingency measures that would be implemented to mitigate these risks; and (g) details of who would be responsible for monitoring, reviewing, and implementing the plan.				
NC-05	*Schedule 5, Condition 2 PA08_0142* Within 24 hours of detecting an exceedance of the limits/performance criteria in this approval or the occurrence of an incident that causes (or may cause) material harm to the environment, the Proponent shall notify the Department and other relevant agencies of the exceedance/incident.	Two extra truck movements exited Lot 218 during the hours of 5am and 6am on 15 November 2018. DPIE were notified of the exceedance on 6 December 2018, with a detailed report provided to DPE on 18 December 2018. Not Reported to DPIE within 24 hours.	Where non-compliances with limits/performance criteria occur, Mackas Sand should notify the Department and other relevant agencies with 24 hours of the exceedance/incident.	Noted.	Completed - where non-compliances with limits/performance criteria occur, Mackas Sand will notify the Department and other relevant agencies within 24 hours of the exceedance/incident as practically possible.

NC-06	*Schedule 5 Condition 5 PA08_0142* Within 2 years of the date of the commencement of quarrying operations, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must: (a) be conducted by a suitably qualified, experienced, and independent team of experts whose appointment has been approved by the Secretary; (b) assess the environmental performance of the project, and its effects on the surrounding environment; (c) assess whether the project is complying with the relevant standards, performance measures and statutory requirements; (d) review the adequacy of any	Previous audit conducted 24/01/2018, with the Audit report submitted April 2018. Current audit conducted 3-4/06/2021. Not completed within 3 years of completion of the previous audit.	Audits should be planned to ensure that they are commissioned within 3 years of the date of commencement of quarrying operations.	Noted. **Action:** Mackas Sand will seek Secretary's written approval should any changes to future audit schedule be required.	Completed - Mackas Sand will seek the Secretary's written approval should any changes to the future audit schedule be required.

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
	strategy/plan/program required under this approval; and, if necessary, (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy/plan/program required under this approval.				
NC-07	Schedule 5 Condition 6 PA08_0142 Within 1 month of completion of each Independent Environmental Audit, the Proponent shall submit a copy of the audit report to the Secretary and relevant agencies, with a response to any of the recommendations in the audit report.	The previous audit report was not submitted within one month of completion of the independent environmental audit.	Audit reports should be submitted to the Secretary within 1 month of the completion of the audit (date of inspection).	Noted. **Action:** Mackas Sand will seek Secretary's written approval should any changes to future audit schedule be required.	Completed - Mackas Sand will seek the Secretary's written approval should any changes to the future audit schedule be required.

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
NC-08	Statement of Commitments 1.8.2 Any refuelling of equipment used for the proposal will be undertaken by a registered contractor to remove the need for on-site storage of fuels. No maintenance of equipment or storage of chemicals will occur at either site.	Refuelling of mobile equipment undertaken off-site. Fixed equipment undertaken by Mackas Sand utilising a dedicated refuelling trailer.	Mackas Sand should consider seeking approval for refuelling to be undertaken by site staff.	Mackas Sand notes that there are no fuels stored within the operational boundary of Lot 218 or Lot 220 (i.e. operational boundaries). Mobile plant is refuelled outside the sand dune environment along the alternate access haul road (Lot 218) or other facilities outside Lot 220 boundary (R Mackenzie pers comm) Semi-static plant (i.e. plant which remain generally in-situ during operations) such as screens are re-fuelled in operational area. **Action:** Mackas Sand will review relevant plans and procedures in consultation with DPE	Completed - A revised SWMP that states equipment on-site will be refuelled by appropriately qualified personnel in accordance with the Mackas Sand Operational Management Procedure (Umwelt, 2014) with no fuel or oil being stored on-site, was submitted to the DPE on 30/11/2021. The revised SWMP was approved by DPE on 3 August 2022.

Referenced ID	Condition ID and Text	Audit Finding / Description included in audit report	Audit Recommendation	Response	Action Status
NC-09	Statement of Commitments 1.10.3 EMS 4.2 Inspections of high visibility fencing, and any structures built to control public access to the sites will be undertaken every week. Maintenance or repair of any fences and structures will occur within this timeframe, as required.	No records of inspections available. Noted that fencing is visible from the quarry.	Mackas Sand should ensure that inspections are conducted, and records of the inspections and outcomes are retained.	Noted. **Action:** Mackas Sand will review record keeping practices	Ongoing – Mackas Sand undertakes regular inspections of high visibility fencing and structures built to control public access to the site as part of day to day operations, with maintenance undertaken as required. Formal documentation of inspections will be undertaken during 2023.

NC-10	*EPL 13218 Condition O4.1* The licensee must maintain, and implement as necessary, a current Pollution Incident Response Management Plan (PIRMP) for the premises. The licensee must keep the incident response plan on the premises at all times. The incident response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. The PIRMP must be tested at least annually or following a pollution incident. The licensee must develop the Pollution Incident Response Management Plan in accordance with the requirements in Part 5.7A of the Protection of the Environment Operations (POEO) Act 1997 and POEO regulations.	Records did not show that the PIRMP had been tested at least annually. Conducted 8/12/2020. Not conducted in 2019 or 2018.	Mackas Sand should ensure that trials of the PIRMP are conducted at least annually in accordance with the re.	Noted. Mackas Sand notes this is not an ongoing non-compliance. PIRMP tests have since been undertaken during both 2019 and 2020. **Action:** No action required.	Completed - PIRMP tests have since been undertaken during 2019, 2020, 2021 and 2022.

Mackas Sand Pty Ltd

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