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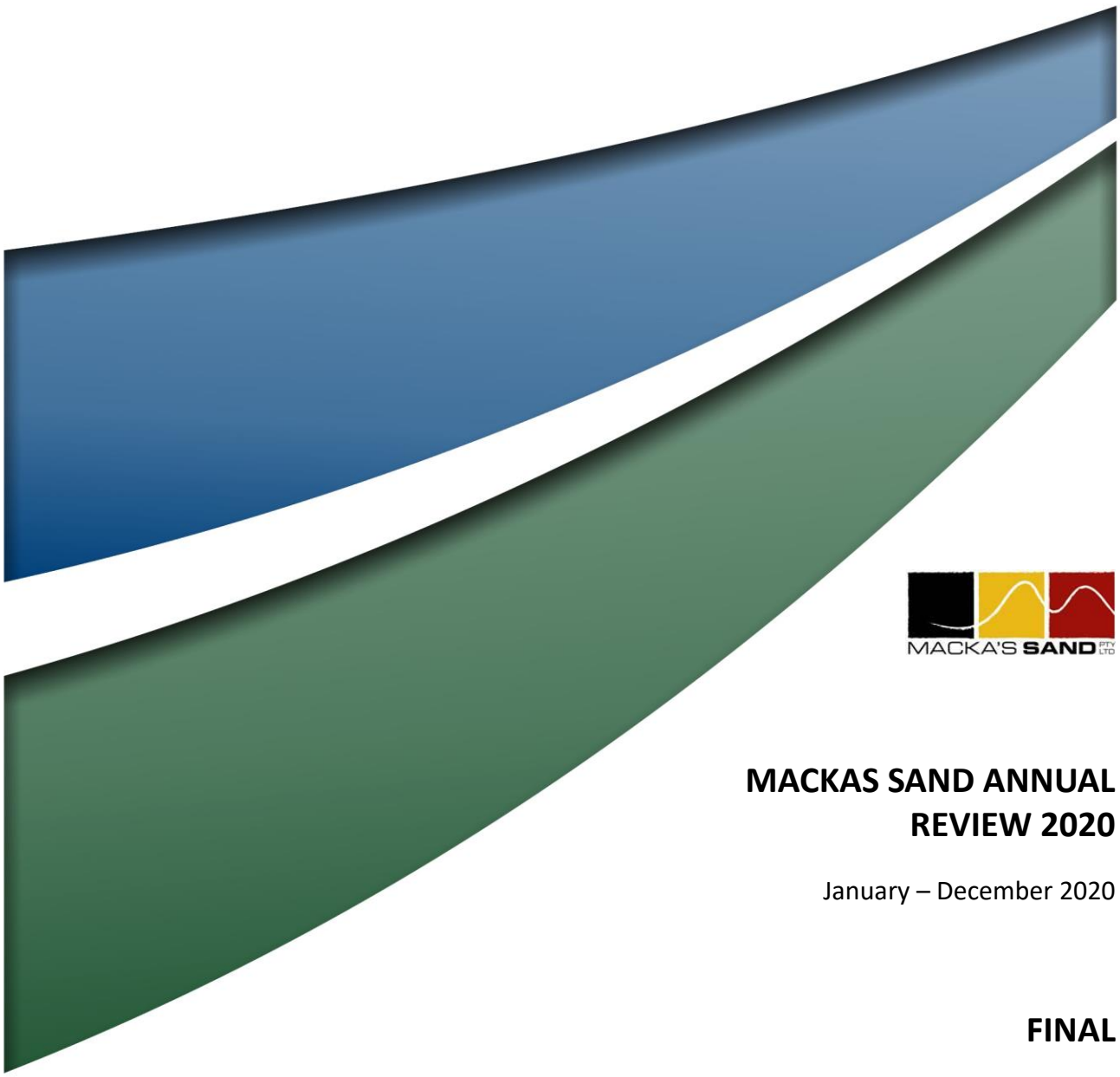

MACKA'S SAND PTY LTD

MACKAS SAND ANNUAL REVIEW 2020

January – December 2020

FINAL

March 2021

MACKAS SAND ANNUAL REVIEW 2020

January – December 2020

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Mackas Sand Pty Ltd

Project Director:	Rod Williams
Project Manager:	Rod Williams
Report No.	1646/R104
Date:	March 2021

umwelt
Environmental & Social Consultants

Newcastle

75 York Street
Teralba NSW 2284

T| 1300 793 267
E| info@umwelt.com.au

www.umwelt.com.au

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
1	Rod Williams	31 March 2021	Rod Williams	31 March 2021

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 2020
Annual Review end date	31 December 2020

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 2020 to 31 December 2020 and that I am authorised to make this statement on behalf of Macka's Sand Pty Ltd.

Note.

a) *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.*

b) *The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents – maximum penalty 2 years imprisonment or $22,000, or both.*

Name of authorised reporting officer:	Robert MacKenzie
Title of authorised reporting officer:	Director
Signature of authorised reporting officer:	
Date:	31 March 2021

Distribution Details

Distribution List
Department of Planning, Industry and Environment (DPIE)
Department of Planning, Industry and Environment – Water
Hunter Water Corporation
Mackas Sand Community Consultative Committee (after DPIE Approval)
General Public (via Mackas Sand Website after DPIE approval)

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Appendices

1.0 Statement of Compliance

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

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

This Annual Review provides a summary of Mackas Sands' operational performance against the approvals listed in **Table 1.1** over the period 1 January to 31 December 2020 (referred to hereafter as the reporting period).

The compliance of the operation against relevant approvals was managed during the reporting period by Mackas Sand and is summarised in **Table 1.1**.

The statement of compliance in **Table 1.1** is based on compliance information provided by Mackas Sand. Umwelt (Australia) Pty Limited (Umwelt) has relied on this information in combination with other information sources such as; environmental monitoring documentation, discussions with Mackas Sand personnel and our general understanding of the operation.

In preparing this report Umwelt has not sought to undertake a full compliance audit, including secondary verification of the collated documentary evidence with relevant government agency staff, operational staff, site records etc.

Non-compliances recorded during the reporting period 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 11.0**.

The most recent Independent Environmental Audit was undertaken during 2018. As of December 2020 only one recommendation which relates to the timing of the 2021 audit has not been completed. The next audit is proposed to be undertaken in April 2021. Further details of which can be found in **Section 11.0**.

Table 1.1 Statement of Compliance

Relevant approval	All conditions complied with?
Development consent PA 08_0142	No – refer to **Table 1.3** for further details
Environment Protection Licence EPL 13218	No – refer to **Table 1.3** for further details
EPBC Approval 2011/6214	Yes
Hunter Water Corporation Regulation 2015 Clause 15(1)	No – refer to **Table 1.3** for further details

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

Table 1.2 Compliance Status Key (NSW Government, 2015)

Risk Level	Colour Code	Description
High	**Non-compliant**	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	**Non-compliant**	Non-compliance with: 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 (Summary)	Compliance Status	Comment	Where addressed in Annual Review
PA 08_0142	Schedule 3 Condition 18	Mackas Sand is required to prepare and implement the Soil and Water Management Plan	**Administrative**	Groundwater monitoring parameters above levels nominated in the Soil and Water Management Plan. DPIE have been notified of the issue and no further action has been requested or undertaken.	**Section 11.0**

2.0 Introduction

Mackas Sand was granted PA08_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 NSW Planning Assessment Commission (PAC) under delegation of the Minister for the former Planning and Infrastructure (DPI), now Department of Planning, Industry and Environment (DPIE). 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 2020 following timing constraints associated with the approval of the modification.

Mackas Sand has engaged Umwelt to assist with the preparation of 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	Section of Document
4. By the end of March each year, or other timing agreed by the Secretary, the Proponent shall review the environmental performance of the Project to the satisfaction of the Secretary. This review must:	**This Document**
a) 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 8.0**
b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria • requirements of any plan, program or strategy required under this approval • monitoring results of previous years • relevant predictions in the EA and the EA (MOD 1).	**Section 6.0**
c) identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance	**Sections 1.0** and **11.0**

Project Approval Condition	Section of Document
d) identify any trends in the monitoring data over the life of the project	**Sections 6.0** and **7.0**
e) 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**
f) 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 2020

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

Image Source: Nearmap (Jan 2021)

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)

FIGURE 2.1

Locality Plan

File Name (A4): R104/1646_527.dgn
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3.0 Approvals and Management Plans

3.1 Status of Approvals, Licences and Permits

The operation of the 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 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	DPIE
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	DPIE-Water

No changes were made to the above approvals, licences and permits during the reporting period. As noted in **Section 2.0** Mackas Sand submitted MOD 3 during October 2020 which was withdrawn during January 2020 due to timing constraints associated with approving the modification.

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 Environmental Management Strategy (EMS).

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 DPIE approved environmental management plans during the reporting period.

Operations are undertaken in accordance with the approved management plans, until such time as the revised plans are approved by DPIE.

Respective management plans were reviewed during 2020 following the submission of the 2019 Annual Review and no revisions identified.

Table 3.2 Status of Management Plans

Management Strategy/Plan	Revision Date of the Approved Plan	Relevant Agency	Comment
Environmental Management Strategy (EMS)	July 2016	DPIE	
Noise Management Plan (NMP)	November 2018	DPIE	
Air Quality Management Plan (AQMP)	June 2018	DPIE	
Soil and Water Management Plan (SWMP)	November 2014	DPIE	
Unexploded Ordnance Management Plan (UOMP)	September 2011	DPIE	
Landscape and Rehabilitation Management Plan	April 2019	DPIE	
Aboriginal Cultural Heritage Management Plan (ACHMP)	July 2016	DPIE	
Non-Indigenous Heritage Management Plan (IHMP)	July 2016	DPIE	
Drivers Code of Conduct (DCoC)	December 2017	DPIE	
Pollution Incident Response Management Plan (PIRMP)	August 2017	EPA	PIRMP tested on 8 December 2020 and document finalised in March 2021
EPBC Landscape Management Plan	December 2013	DAWE	
Operations Management Procedures	January 2014 [Draft]	Hunter Water Corporation	

Note: All references to management plans within this document refer to the current DPIE approved version of the management plan unless specified

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 Mining Operations

During the reporting period, sand extraction was undertaken at both Lot 218 and Lot 220. No significant operational changes occurred during the reporting period, when compared to previous years. An overview of the operations for each Lot is below.

Mackas Sand advised there no hydrocarbon spills were recorded during the reporting period.

4.1.1 Front End Loader Breakdowns and Inefficiencies

Mackas Sand experienced six breakdowns and significant machinery maintenance on the extraction fleet during 2020, relating to gearbox and tyre issues and extra fuel usage.

The manufacturers of the Front-End-Loader have previous advised that these failures are due to extremely harsh operating conditions (i.e. soft dry sand) caused by operating at the depth constraints imposed under the Project Approval. 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, extraction 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.

4.1.2 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 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.

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.

The western operations are around 1.2 km from the nearest residential receiver at Lavis Lane.

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.

4.1.3 Lot 220

Sand extraction operations in Lot 220 commenced during November 2009.

During the reporting period, sand continued to be extracted primarily from the dune face Lot 220. A mobile screen and stacker remained in operation to process sand excavated by front end loader before being transported offsite by truck.

Active 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.

Approximately 1.6 ha of land was cleared during the reporting period at Lot 220. If not directly applied to areas being prepared for rehabilitation, topsoil is salvaged and stockpiled until required for re-use on site.

4.2 Extraction Depth and Extent Survey Control

Mackas Sand operates a GSP 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. These surveys have confirmed that the extraction activities during the reporting period remained above the maximum extraction depth and also within the extraction boundary at Lot 218 and 220.

Copies of the quarterly surveys are provided in **Appendix 1**.

4.3 Production Limits

During the reporting period a total of 992,258 tonnes of product was transported from Lot 218 and 447,809 tonnes of product were transported from Lot 220. 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 2019 and 2020 reporting years and a forecast for the 2021 reporting period. The 2019 and 2020 tonnages provided are based on the weighbridge data provided by Mackas Sand. A monthly summary of product transported from both Lots can be found in **Appendix 2**.

The DPIE conducted an inspection of Lot 218 on 22 September 2020 and noted that extraction activities were being undertaken without a GPS unit installed on operating loaders, which is a requirement of Schedule 3, Condition 1 of PA 08_0142. Following the inspection, the DPIE issued Mackas Sand with a notice under Section 9.22 of the *Environmental Planning and Assessment Act 1979* requiring the furnishment of information relating to the investigation and the monitoring of extraction boundaries at Lot 218.

Mackas Sand responded to the Section 9.22 notice on 14 October 2020. Mackas Sand informed the DPIE that a loader operating in Lot 218, fitted with a GPS device, experienced a mechanical breakdown on 21 September 2020. The 'alternative method' (whereby a loader fitted with a GPS unit is moved to Lot 218 to replace an inoperable loader to ensure extraction limit compliance monitoring is conducted) was triggered five days following the breakdown of the loader in question. Mackas Sand noted that the quarterly extraction limit surveys are recognised as the primary compliance tool, and these surveys have confirmed Mackas Sand has not operated beyond the extraction boundaries.

Table 4.1 Production Summary 2020 (Lot 218 and Lot 220)

Material	Approved Limit (Source – PA 08_0142 (as modified))	2019 Reporting Period (Actual Tonnes)	2020 Reporting Period (Actual Tonnes)	2021 Reporting Period (Forecast Tonnes)	Compliance with Approved Limit
Total Saleable Product from Lot 218	1,000,000 tonnes from Lot 218	951,510	992,258	1,000,000	Yes
Total Saleable Product from Lot 220	1,000,000 tonnes from Lot 220	699,211	447,809	400,000	Yes
Total Saleable Product from Lot 218 and 220 combined	2,000,000 tonnes of product in a calendar year (1,000,000 tonnes from Lot 218; 1,000,000 tonnes from Lot 220).	1,650,721	1,440,067	1,400,000	Yes

4.3.1 Hours of Operations

Mackas Sand confirms that the extraction and haulage activities during the reporting period complied with the operating hours as detailed Schedule 3, Condition 9 of the Project Approval (as modified).

Quarrying operations at Lot 220 are generally undertaken between 7:00am and 5:30pm Monday to Friday. 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).

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 DPIE.

4.4 Construction and Demolition Activities

Mackas Sand continued to import Excavated Natural Material (ENM) during the reporting period. ENM continues to be used onsite to construct trafficable surfaces and extension of haul routes within the Lot 218 and 220 extraction areas to:

- Allow for heavy vehicle movements; and
- Minimise trucks being bogged in the dune sand environment.

Mackas Sand expects to continue to import nominal volumes of ENM for the ongoing development of internal haul roads during the next reporting period.

Mackas Sand advised there were no demolition activities undertaken during the reporting period at Lot 218 or Lot 220.

4.5 2021 Report Period Extraction Operations

2021 is expected to see a continuation of sand extraction operations at both Lot 218 and Lot 220 in accordance with statutory approvals.

Mackas Sand does not expect any significant changes to mining methods during the next reporting period, relate to that undertaken in 2020. Mackas Sand has engaged an environmental consultant to review any potential environmental risks associated with mining deeper in Lot 218, this continues to be investigated.

5.0 Actions Required from Previous Annual Review

In accordance with Schedule 5, Condition 4 of PA 08_0142 (as modified), the 2019 Annual Review was submitted to DPIE on 31 March 2020.

DPIE acknowledged their satisfaction with the 2018 Annual Review on 26 June 2020 and requested the following be included in future Annual Review documents.

a) *Include a brief summary of any community engagement activities and/or initiatives and any community contributions for the reporting period; and*

b) *Include a comparison of complaint number to the previous five (5) reporting periods, and comment on any complaint trends in regards to the subject, timing or location of complaints.*

The above requests have addressed in **Section 9.0** of this report.

A summary of additional Mackas Sand management commitments made in the 2019 Annual Review, are provided in **Table 5.1**.

Table 5.1 Mackas Sand Response to Actions identified in 2019 Annual Review

Action	Status	Section	Comment
Mackas will consider: - **Install a permanent stockproof fence around the permitter of the Biodiversity Offset Area** - **A management period prior to winter to target recovering and colonising weed species (such as whiskey grass and bitou bush) and to assist in maintaining the habitat requirements for these orchid species.**	Completed Ongoing	Section 6.4	A permanent stock proof fence was installed surrounding the offset area during the reporting period. Weed management activities continue to be undertaken on an opportunistic basis.
Seek finalisation of Voluntary Conservation Agreement in consultation with BCT	Completed	Section 6.4	NSW Biodiversity Conservation Trust executed the Mackas Sand Biodiversity Offset Area Conservation Agreement on 30 June 2020.
Investigate elevated water quality monitoring results at SP1 and SP4.	Completed	Section 7.2.3	An investigation into elevated groundwater quality results obtained at bores SP1 and SP4 from 2018-2020 was undertaken.
Mackas Sand will engage a rehabilitation contractor to assist in the establishment, development and ongoing management of rehabilitation of Lot 220.	Completed and ongoing	Section 8	Mackas Sand has engaged to rehabilitation contractor to assist with sourcing of planting stock and general management.

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 (Jan 2021)

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

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6.1 Noise

Noise management is undertaken in accordance with the Noise Management Plan (NMP) (Umwelt, November 2018). The NMP sets out the procedures and management measures to monitor, mitigate and assess the Project's noise impacts.

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 the DPIE. Attended noise monitoring is undertaken at up to five representative receiver locations, as shown on **Figure 6.1**.

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). 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 is shown in **Table 6.2**.

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

Location	Day[1] LAeq, 15 min	Evening[1] LAeq, 15 min	Night[1] LAeq, 15 min	Night[1] LA1, 1 min
R18 – 300 Nelson Bay Road	39	39	40	45
R1 –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] LAeq, 15 min	Day [1] LAeq, 15 min	Evening[1] LAeq, 15 min
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 the Proponent has an agreement with the relevant owner/s of these residences/land to generate higher noise levels, and the Proponent has advised the Department 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 LAeq (1 hour)	55 LAeq (1 hour)
Nelson Bay Road	60 LAeq (15 hour)	55 LAeq (9 hour)

6.1.2 Noise Monitoring Results

In accordance with the NMP and EPL 13218 noise compliance monitoring is undertaken on an annual basis by a suitably qualified consultant. 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.

During the reporting period monitoring was undertaken over three days being, 26, 27 and 28 August 2020, at 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 1055:1:1997. 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 noise levels than measured at Site 6.

Table 6.4 2020 Night Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

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

Note: 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 2020 Day Time Industrial Noise Levels – Sand Extraction Activities versus Noise Criteria, dB(A)

Location	LAeq, 15 minute	
	Noise criteria	Mackas Sand noise level contribution
Site 1	36	<30
Site 2	36	Inaudible
Site 4	35	Inaudible
Site 5[1]	35	-
Site 6	35	Inaudible

Note: 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 2020 Evening Industrial Noise Levels –Sand Extraction Activities versus Noise Criteria, dB(A)

Location	LAeq, 15 minute	
	Noise criteria	Mackas Sand noise level contribution
Site 1	35	<30
Site 2	36	<35
Site 4	36	Inaudible
Site 5[1]	35	-
Site 6	35	Inaudible

Note: 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 2020 Industrial Noise Levels – Alternate Access Road to Lot 218

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

Note: 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 LAeq, 1hour	Noise level contribution LAeq,1hour	
			Cnr Oakvale Dr and Nelson Bay Rd (Site 4)	2353 Nelson Bay Road (Site 6)
Lavis Lane, Oakvale Drive as measured at corner of Oakvale and Nelson Bay Road	Night	55	Inaudible	49
	Day	60	52	49

6.1.3 Trends in Data

2020 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 2020 results are consistent with the long term trend associated with annual attended noise monitoring.

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 outside the NMP.

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 to **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 and thereby producing false positive exceedance results.

6.2.1 Environmental Assessment Predictions

An Air Quality Impact Assessment (2009) was developed in support of the Mackas Sand Project Environmental Assessment (2009) (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 PM10, 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 6.11.**

Table 6.9 Long term Impact Assessment Criteria for Particulate Matter

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

Table 6.10 Short term Impact Assessment Criterion for Particulate Matter

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

Table 6.11 Long term Impact Assessment Criteria for Deposited Dust

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

6.2.2 Air Quality Monitoring Results

Twelve depositional dust gauge samples were collected during the reporting period on approximately a monthly basis. The monthly and annual average results for DDG1 and DDG2 are shown **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
28/01/2020	32	0.7	1.1
26/02/2020	29	0.4	0.5
26/03/2020	30	0.4	0.9
25/04/2020	30	0.1	0.1
26/05/2020	31	0.2	0.4
26/06/2020	31	0.2	0.3
26/07/2020	30	0.4	0.7
25/08/2020	30	0.3	0.5
26/09/2020	32	0.8	1.5
27/10/2020	31	0.7	1.1
27/11/2020	31	2.8	3.3
27/12/2020	30	0.5	0.6
Annual Average			**0.9**

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
28/01/2020	32	2.8	3.4
26/02/2020	29	5.4	6.5
26/03/2020	30	6.8	7.7
25/04/2020	30	0.8	1.3
26/05/2020	31	1.2	1.4
26/06/2020	31	0.8	1.1
26/07/2020	30	6.8	7.0
25/08/2020	30	0.2	0.3
26/09/2020	32	4.4	5.0
27/10/2020	31	9.0	9.4
27/11/2020	31	17.1	18.8
27/12/2020	30	1.6	2.0
Annual Average			**5.3**
Annual Average (excluding November / October and November)			**4.1 / 3.57**

6.2.3 Trends in Data

The monthly results during the reporting period for DDG1 range from 0.1 g/m²/month to 3.3 g/m²/month, with an annual average 0.9. The monthly results for DDG2 varied from 0.3 g/m²/month to 18.8 g/m²/ month, with an annual average of 5.3.

Table 6.14 provides a comparison of annual average deposition dust monitoring data for the previous five years. The 2020 DDG1 annual average of 0.9 g/m²/month is the lowest recorded since 2011. The 2020 DDG2 annual average of 5.3 g/m²/month is within the historical range for the site, however, it is the second highest recorded since 2011. The DDG2 average was largely influenced by the October and November results and, to a lesser extent, elevated results in February and March. A combination of factors are suspected to have contributed to the elevated annual average. It is possible that natural aeolian transport of dune sand caused by high winds may produce false positive exceedance results at DDG2, as previously experienced (refer 2015 Mackas Sand Annual Review). Mackas Sand also notes that sand extraction activities increased in intensity at Quality Sands and Ceramics, a sand quarry adjacent to Lot 218, during Quarter 4, 2020, and may have impacted deposited dust results at DDG2. It is also possible agricultural works such as slashing on adjacent properties may have influenced the results recorded at DDG2. Given there have been no major operational changes on Lot 218 during the reporting period, the elevated results are not considered to be attributable to Mackas Sand operations. Excluding the October and November results, the 2020 annual average at DDG is 3.6 g/m2/month which is 0.2 g/m2/month above the 2019 result.

No community complaints relating to operational dust or air quality were received by Mackas Sand during the report period. Mackas Sand will continue to monitor deposited dust levels in accordance with the (AQMP) (Umwelt, June 2018) in 2021.

Table 6.14 Annual Averages for Dust Deposition 2016-2020

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

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.

6.3 Meteorology

Meteorological data is collected 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 2020 is summarised **Table 6.15.**

Figure 6.2 a comparison of monthly rainfall from 2018-2020. During the reporting period, 1,361.6 mm of rainfall was recorded across 121 rain days. Approximately 49% of the annual recorded rainfall was experienced during February, July and October 2020.

Table 6.15 Monthly Rainfall and Number of Rain Days during 2020

Month	Rainfall (mm)	Highest Daily (mm)	Rain Days (i.e. >0.2 mm)
January	67.2	37.4	8
February	171.6	66.2	12
March	106.2	24.6	14
April	53.6	17.2	8
May	105.6	38.8	12
June	81.6	26.8	10
July	242.6	133.0	12
August	38.8	18.4	8
September	28.0	12.6	7
October	252.0	128.8	7
November	58.2	30.2	7
December	156.2	48.6	16
TOTAL	**1361.6**	**133.0**	**121**

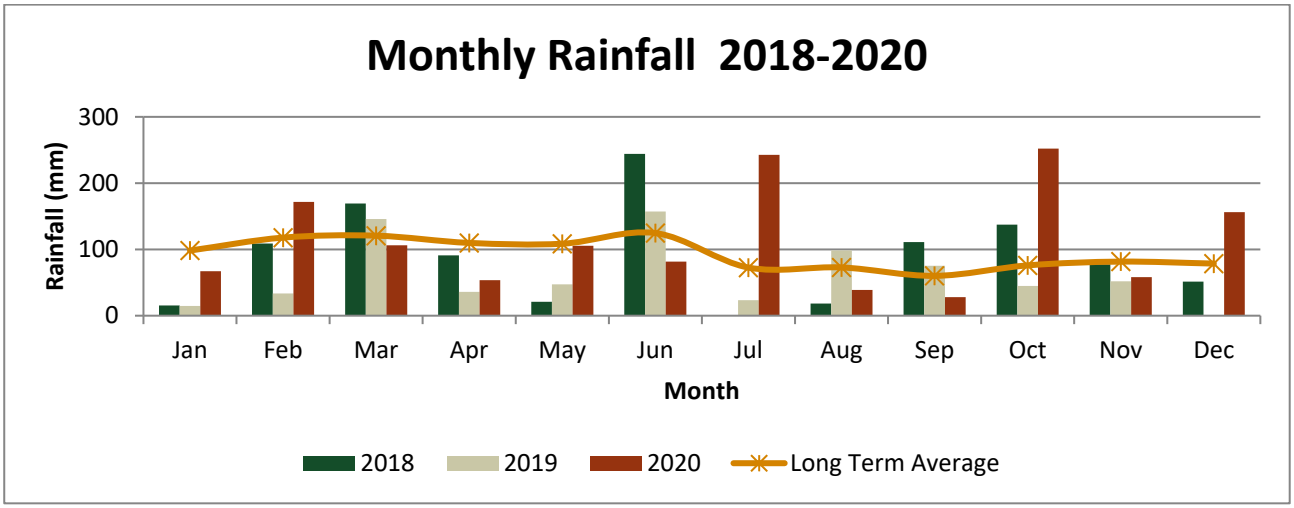


Figure 6.2 Monthly Rainfall 2018-2020

6.3.2 Temperature

2020 minimum and maximum daily and monthly average minimum and maximum temperatures are summarised below in **Table 6.16**. January was the warmest month of the year with an average maximum daily temperature of 31.1°C. August was the coolest month of the year with a minimum daily temperature of 2.0°C.

Table 6.16 Monthly Minimum and Maximum Daily Temperatures during 2020

Month	Minimum Temperature (°C)	Average Minimum Temperature (°C)	Average Maximum Temperature (°C)	Maximum Temperature (°C)
January	15.7	20.6	30.1	45.5
February	12.9	19.4	28.1	42.4
March	12.5	16.5	26.1	37.4
April	6.8	13.6	24.9	30.2
May	4.8	9.5	19.7	26.3
June	4.4	8.9	18.5	23.3
July	3.3	7.8	17.7	23.5
August	2.0	6.8	18.9	25.5
September	3.4	9.7	23.2	30.0
October	7.7	13.0	24.8	32.3
November	8.4	15.5	27.0	41.8
December	13.0	18.1	26.5	33.4

6.4 Landscape and Biodiversity Offset

In accordance with the project approval Mackas Sand holds an approved Landscape Management Plan (LMP) (Umwelt, April 2019). The LMP sets out the procedures and management requirements associated with the rehabilitation, ecological and biodiversity offset area.

6.4.1 Environmental Assessment Predictions

A detailed ecological assessment was undertaken to support of the Mackas Sand Project Environmental Assessment (2009) (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.

No threatened flora species, endangered flora populations or threatened ecological communities were observed in the study area during surveys undertaken for the ecological assessment. Four threatened fauna species were identified and fourteen threatened or endangered fauna species are considered to have potential habitat in the study area.

The ecology impacts are limited to the clearance of vegetation primarily at Lot 220, but also 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.

6.4.2 Impact Assessment Criteria

The rehabilitation, ecological and biodiversity impact assessment criteria are associated with following the procedures as detailed in the LMP, being:

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

6.4.3 Monitoring Results

6.4.3.1 Rehabilitation and Ecological

The alternate access road to Lot 218 has been constructed and 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 implemented the following land management procedures in accordance with the LMP at Lot 220:

- Ecological pre-clearance surveys
- Identified the limiting vegetation clearance in advance of the sand extractions operations
- Salvage of topsoil and woody debris for rehabilitation of the extraction area at Lot 218
- Continue to add to the total area of land under rehabilitation at Lot 220. Refer to **Section 8.0** for further details
- Monitoring the performance and progression of the rehabilitation areas.

6.4.3.2 Biodiversity Offset

In accordance with Schedule 3, Condition 28B of PA 08_0142, Mackas Sand is required to provide long-term security for the Mackas Sand Biodiversity Offset Area. On 30 June 2020, the Coordinator General, Environment, Energy and Science Group, Department of Planning, Industry and Environment executed the Mackas Sand Biodiversity Offset Area 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 1 September and later on 11 September 2020. 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 2020 are shown in **Table 6.17** and **Table 6.18**. Baseline results recorded during 2014 and LMP management criteria are also provided in **Table 6.17** and **Table 6.18** for reference.

Table 6.17 Results of *Diuris praecox* Searches Baseline, 2016 - 2020

	2014 (Baseline)	Criteria (25% of baseline for 3 consecutive years)	2016	2017	2018	2019	2020
Date of survey	27 August 2014	N/A	26 August 2016	25 August 2017	7 September 2018	28 August 2019	1 and 11 September 2020
Number of stems	64	16	39	93	20	23	0
Maximum flowers per stem	9	N/A	7	8	9	6	0
Minimum flowers per stem	0	N/A	0	0	0	1	0
Mean flowers per stem	4.2	N/A	2.7	3.4	4.3	4	0

Table 6.18 Results of *Diuris arenaria* Searches Baseline, 2016 - 2020

	2014 (Baseline)	Criteria (25% of baseline for 3 consecutive years	2016	2017	2018	2019	2020
Date of survey	10 September 2014	N/A	14 September 2016	7 September 2017	7 September 2018	28 August 2019	1 and 11 September 2020
Number of stems	72	18	200	150	119	39	2
Maximum flowers per stem	7	N/A	7	5	6	3	2
Minimum flowers per stem	1	N/A	0	0	0	0	0
Mean flowers per stem	2.2	N/A	2.7	1.3	1	1	1

Habitat Assessment Monitoring

The results of the 2020 habitat monitoring are shown in **Table 6.19** below. The table also shows the accumulated results from 2017-2020 and baseline survey results from 2014.

Table 6.19 Results of Habitat Assessment for Baseline, 2017-2020

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020
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*)
Pests	Nil identified	Nil Identified	Nil Identified	Rabbit (*Oryctolagus cuniculus*)	Nil Identified
Fire	Evidence of previous	Nil during reporting year	Nil during reporting year	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.
Erosion	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Minor (Aeolian)	Moderate (trampling exacerbated by Aeolian soils)
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.

Habitat Attribute	2014 (Baseline)	2017	2018	2019	2020
Features (Relative Abundance)					
Fallen timber/logs	Moderate	Moderate	Moderate	Moderate	Moderate
Stags	Nil	Nil	Nil	Nil	Scarce
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.
Mistletoe	Nil	Few	Few	Few	Scarce
Dieback	Nil	Nil	Minor canopy dieback	Nil	Minor canopy dieback
Loose bark on trees	Moderate	Moderate	Few	Few	Few. Some bark rubbed off by cattle.
Tree Hollows					
Number of trees with hollows	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

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

Vegetation Structure Assessment, Exotic Species and Photo Monitoring

The results of the 2020 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
Canopy Cover				
Native Over-storey	12%	6%	7%	27.5%
Native Mid-storey	4.5%	4%	6.6%	7%
Ground Cover				
Native Grass	20%	16%	41%	
Native Shrubs	24%	8%	6%	8%
Native other (eg. Forbs)	22%	10%	20%	28%
Exotic	4%	6%	2%	12%
Bare Earth	34%	62%	40%	42%

Table 6.21 Transect 2 Results of 50 m Transect Data

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

6.4.4 Trends in Data

6.4.4.1 Orchids

Table 6.17 and **Table 6.18** show that there are annual fluctuations in the monitoring data for Newcastle doubletail (*Diuris praecox*) and sand doubletail (*Diuris arenaria*), however the results from 2020 have shown a substantial decline since baseline monitoring in 2014. Two stems of sand doubletail (*Diuris arenaria*) were recorded in 2020, and no Newcastle doubletail (*Diuris praecox*) were recorded at this time.

Two locations of sand doubletail (*Diuris arenaria*) from 2020, being an isolated plant in the south western corner and the other in the north eastern corner where previous records of this species have been documented.

The monitoring results of 2020 confirm a substantial decline in records of both species since their baselines, and since 2019.

The meteorological conditions leading up to monitoring in 2020 2019 were a warm, dry autumn and winter period, like that experienced in 2019. Extended drought conditions have been experienced since December 2017 (DPI, 2021). With the drought conditions breaking officially in December 2020 after the orchid monitoring and flowering season. These meteorological conditions are not typically favourable for spring flowering orchids which can remain as underground tubers until favourable conditions trigger them to emerge. The capacity of the orchids to persist underground is reduced in periods of severe and extended drought. The conditions experienced since 2017 have likely contributed to the low emerging populations of threatened orchid species
recorded since 2017.

6.4.4.2 In addition to the weather conditions, the presence of cattle is highly likely to have impacted these species. Habitat Assessment

The 2020 monitoring results were generally consistent to previous monitoring years in regards to the provision of habitat structures such as hollow bearing trees and fallen logs. The understorey is considered highly modified and a decrease in vegetation condition and structure was observed as a result of grazing activity between 2018 and 2020 within the Biodiversity Offset Area.

The occurrence of bare earth at Transect 1 increased by 2% while at Transect 2 a decreased of 10% was observed. As expected colonising groundcovers (native and exotic species) was observed at both locations, with the percentage coverage increasing in 2020.

6.4.4.3 Vegetation Structure, Exotic Species and Photo Monitoring

In 2020 the vegetation structure is one of a highly modified understory of groundcover vegetation. On comparing to previous years the groundcover vegetation in 2020 was less sparse and illustrated an increase diversity of grasses, forbs, shrubs, sedges and rushes that were previously dominant.

The presence of weed species, such as Whiskey Grass continues to be identified within the Biodiversity Offset Area and management action is recommended for 2020.

Umwelt noted that cattle were present in the Biodiversity Offset Area during the September 2020 rounds of monitoring. Mackas Sand were immediately notified of this and actions taken.

Mackas Sand notes the perimeter of the Biodiversity Offset Area is fenced with a combination of electric and wire fencing materials. A wire fence has previously installed along eastern and southern boundaries of the offset area and electric tape fencing continues to be in place along the western and northern boundaries of the offset area. Mackas Sand advised that the electric tape fencing was replace in late 2020 with a stockproof fence (i.e. wire fence)

Mackas Sand will continue to undertake future monitoring events in accordance with relevant obligations within the Mackas Sand Landscape Management Plan and approved Conservation Agreement.

6.4.5 Proposed Improvements or Actions for the Next Reporting Period

Mackas will continue to implement the requirements of the Mackas Sand VCA during the next reporting period. Specifically the implement an active weed management program.

6.5 Aboriginal Heritage

6.5.1 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 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 members are members of the ACHG.

6.5.2 Environmental Assessment Predictions

A detailed Aboriginal Cultural Heritage Assessment (ACHA) was prepared to support of the Mackas Sand Project Environmental Assessment (2009) (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 proposal 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. Removal of vegetation on this site will also cause destruction of integral components of the Aboriginal cultural landscape.

6.5.3 Aboriginal Cultural Heritage Impact Assessment Criteria

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

1) Establishment of an Aboriginal Cultural Heritage Group (ACHG)

2) Cultural awareness training

3) The recording and salvage of Archaeological sites and PADs

4) Monitoring inspections by the ACHG

5) Analysis and interpretation of results of mitigation activities

6) Care and control of salvaged material

6.5.4 Aboriginal Cultural Heritage Results

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

An ACHG inspection was undertaken at Lot 218 and Lot 220 on 30 September 2020. Five artefacts were identified at Lot 218, all of which were found in the bagged material collected by Mackas Sand. No artefacts were found at Lot 220.

Artefacts identified during inspections are inspected and analysed by the ACHG. All artefacts which had been stored securely onsite as well as those found as part of the 30 September 2020 inspection were burial at the ACHG's nominated keeping place.

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

6.5.5 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are outside the ACHMP. The ACHG will discuss the opportunity to revise the ACHMP to more closely reflect safe artefact recovery practices that have been developed for Lot 218.

6.6 Non-Aboriginal Heritage

The Mackas Sand Environmental Assessment (2009) (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 during the reporting period.

No actions or impacts in relation to non-Aboriginal heritage occurred during the 2020 reporting period.

No additional management or mitigation measures are proposed to be implemented.

6.7 Erosion and Sediment Control

In accordance with the project approval Mackas Sand holds an approved Soil and Water Management Plan (SWMP) (Umwelt, November 2014), which sets out the procedures and management requirements.

The Mackas Sand Environmental Assessment (2009) (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. Rainwater tanks will be connected to the roofs of any permanent buildings to collect rainfall runoff.

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 and 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 2020 reporting period.

No additional management or mitigation measures are proposed to be implemented which are outside the SWMP.

6.8 Waste Management

The Mackas Sand Environmental Assessment (2009) (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 are proposed to be implemented.

6.9 Traffic

Traffic Management at Mackas Sand is undertaken in accordance with the approved Drivers Code of Conduct (DCoC) (Umwelt, December 2017). The DCoC applies to drivers of all project-related vehicles, including trucks that haul sand from Mackas Sand operations on Lot 218 and Lot 220.

The DCoC details:

- potential safety issues 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.

As part of standard site procedure, the DCoC is sent to all contracting companies for their distribution to drivers. All haulage contractors are required to read/understand the DCoC before gaining access to the site.

6.9.1 Environmental Assessment Predictions

A detailed Traffic Assessment was prepared by GHD to support a modification to the Mackas Sand Project and was included as an appendix within the Environmental Assessment (July 2015) (EA) (i.e. Modification 2). The modification allows 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 this modification.

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

6.9.2 Monitoring Results

6.9.2.1 Vehicle Movements

As part of standard site procedure, the DCoC is sent to all contracting companies.

Transport of product material was undertaken in accordance with the hourly limits specified in the Project Approval during the reporting period.

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

6.9.2.2 Road Haulage

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.

6.9.2.3 Fauna Strikes

Conditions 33B and 33C of Schedule 3 of Project Approval 08_0142 (as modified) details the requirement for the DCoC to be assessed 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 reports made to Mackas Sand management of any fauna injured or killed during the reporting period.

6.9.3 Trend in Data

Mackas Sand were compliant with its traffic movement requirements during the reporting period.

6.9.4 Proposed Improvements or Actions for the Next Reporting Period

No additional management or mitigation measures are proposed to be implemented which are outside the approved DCoC.

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 to nil, as the wash plant has not been constructed and the access roads have been sealed. As noted in Section 2.5 of the SWMP, 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 flow 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).

As this water is intermittent and reports to the local groundwater, it is considered that these areas would have water quality that is consistent with that recorded in the groundwater monitoring bores.

7.2 Groundwater

In accordance with the Project Approval, Mackas Sand holds an approved SWMP (Umwelt, November 2014), 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 Environmental Assessment (2009) 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 Project Environmental Assessment (2009). 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) are 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 for Lot 218 and Lot 220, which satisfies the requirements of Schedule 2, Conditions 7 and 7A of the Project Approval. The standing water level in the six bores is measured each quarter and compared to the predictions shown in **Table 7.1**.

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	3.6
SP2	2.8
SP3	2.6
SP4	1.25
SP5	3.6
BL158	3.7

7.2.2.2 Groundwater Quality

The SWMP 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

In accordance with Section 5.4 of the SWMP, if groundwater monitoring results exceed the nominated investigation trigger values and predictions of Table 5.5 of the approved SMWP, the Quarry Manager is required to further investigate.

If results are within 10% of the nominated trigger value, the Quarry Manager will further interrogate and explore any reasons for the elevated result. If results are greater than 10% of the nominated trigger value, the Quarry Manager will further interrogate and explore any reasons for the elevated result and provide a notification to DPIE and relevant agencies of any findings of this investigation.

Mackas Sand provided notification to DPIE and relevant agencies on 8 April 2020, 24 July 2020, 12 October 2020 and 21 January 2021 regarding groundwater results recorded above the SWMP trigger levels. Details of these notifications are summarised in **Section 7.2.3**.

During the reporting period, Mackas Sand investigated elevated groundwater quality monitoring results recorded at SP1 and SP4. This investigation involved comparing groundwater monitoring results for turbidity, electrical conductivity and iron against the recorded water level (mAHD) of each bore over the period 2018-2020 to identify any potential relationship or trend between groundwater quality and water level. The investigation indicates that there is no clear relationship or trend. As a result, no changes to the approved SWMP groundwater trigger levels have been made.

7.2.3.1 Groundwater Level

During the reporting period, the groundwater level at all locations was below the Predicted Maximum Groundwater Level, with the exception of SP2 in September and December. The groundwater level was recorded as 3.15 mAHD at SP2 during the scheduled quarterly monitoring event in September. Following the receipt of this result, groundwater levels were re-sampled at SP2 during September, which indicated a groundwater level of 2.96 mAHD. The groundwater level at SP2 was again monitored during the scheduled quarterly groundwater monitoring event in December, returning a result of 2.90mAHD.

The Mackas Sand Groundwater Model Review (GHD, 2020) undertaken during the reporting period noted that observed groundwater levels at SP2 have consistently been higher than other bores at Lot 220 since September 2011. The review concluded localised higher groundwater levels observed at SP2 are most likely due to off-site activities and not a result of landform changes associated with sand mining at Lot 220.

It is considered that recorded groundwater levels are consistent with predictions within the EA.

The groundwater results since 2016 are shown graphically in **Appendix 3**. Since 2016, the groundwater levels generally show similar rising and falling trends over time. It is noted that quantum of change between individual readings at different monitoring locations is not consistent. The cause of this variability is unclear. However, it is hypothesised that this may be due to localised topographical or vegetation influences. As Mackas Sand does not extract any groundwater for it use in the operation, it is unlikely that these changes are due to the sand extraction operations.

BL158 recorded a new minimum level of 0.72 mAHD during the reporting period, representing a decrease of approximately 0.64 m from the previous recorded minimum of 1.36 mAHD.

7.2.3.2 Groundwater pH

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

The groundwater pH results since 2016 are shown graphically in **Appendix 3**. SP4 pH levels continue to exhibit more fluctuation compared to the other monitoring bores.

All results for the reporting period are within the historical range of results.

7.2.3.3 Groundwater Conductivity

With the exception of the 762 µS/cm electrical conductivity (EC) result at SP4 recorded in March 2020, all EC results recorded during the reporting period remained below the trigger value of 600 µS/cm. SP4 EC results for June, September and December were all below the trigger level and show declining EC. This declining EC trend is from an elevated reading is consistent with observations in 2018 and 2019.

The September EC result recorded at BL158 (601 µS/cm) was within 10% of the trigger value range and as such no further investigation was undertaken.

The groundwater EC results recorded since 2016 are shown graphically in **Appendix 3**. All results obtained during the reporting period are generally consistent with historical trends.

All results for the reporting period are within the historical range of results.

7.2.3.4 Groundwater Turbidity

The turbidity results for SP4 and BL158 during the reporting period remained below the specified trigger value and were generally consistent with historical records.

Elevated turbidity results were recorded at SP2 (55.0 NTU) and SP3 (60.0 NTU) during March 2020. Mackas Sand subsequent investigation found:

- The sampling notes stated samples taken from both SP2 and SP3 were visibly clear.
- 24.6 mm of rainfall occurred in the week immediately prior to sampling.
- The SP@ and SP3 results were within the historical range.

It has been concluded that the rainfall may have influenced the results.

During the June monitoring round, elevated turbidity results were also recorded at SP1 (83.7 NTU) and SP5 (95 NTU). Both these results were within the respective historical ranges for SP1 and SP5, although it is noted the SP5 result was the second highest recorded result. Mackas Sand subsequent investigation identified in the week prior to monitoring, 65.4 mm of rainfall was recorded and concluded that this may have influenced the elevated results.

It is noted that only one elevated turbidity result was recorded at each of the bores SP1, SP2, SP3 and SP5 during the reporting period, indicating elevated results were isolated events and not a result of Mackas Sand operations influencing groundwater quality.

A summary of the investigation undertaken by Mackas Sand and actions taken as result of the ongoing investigation were provided to DPIE and relevant agencies in April, July and October 2020.

The groundwater turbidity results since 2016 are shown graphically in **Appendix 3**.

7.2.3.5 Groundwater Arsenic

During the reporting period the arsenic results for all locations were recorded below the SWMP trigger value of 0.01mg/L, with the exception of SP4 (0.015 mg/L) recorded during December 2020.

SP4 was inspected following the receipt of the elevated result in December. Operations onsite at the time of sampling were consistent with normal operations and no unusual activities were identified onsite at the time. This result was communicated to DPIE during the reporting period.

The groundwater arsenic results since 2016 are shown graphically in **Appendix 3**. The arsenic results during the reporting period were typically below the limit of detection (<0.01 mg/L), which is consistent with previous results.

7.2.3.6 Groundwater Manganese

During the reporting period, manganese results for all monitoring locations were below the trigger level, except for the March result at SP4 of 0.207 mg/L. The March result was however, within the historical range for SP4.

This result was communicated to DPIE during the reporting period.

Operations onsite at the time of sampling were consistent with normal operations and no unusual activities were identified onsite at the time. It was noted to review the next round of monitoring results to identify any trends. The manganese results for September and December returned to and continued to trend below the trigger level. No cause has been identified for this anomaly.

The groundwater manganese results since 2016 are shown graphically in **Appendix 3**. The manganese results recorded during the reporting period are generally consistent with trends observed since 2016.

7.2.3.7 Groundwater Iron

During the reporting period, the iron results for all bores were below the trigger level, with the exception of SP4 during March (22.4mg/L), June (23.8mg/L) and September 2020 (7.95mg/L).

Following the receipt of each elevated result, Mackas Sand completed a review into the possible causes. It was concluded that iron levels recorded at SP4 have historically been highly variable, fluctuating between 0.27 mg/L to 34mg/L, as shown in **Appendix 3**. All iron results obtained during the reporting period for SP4 were lower than the historical maximum. Since June 2020, iron concentrations declined steadily from 23.8mg/L to 3.58mg/L in December and have returned to concentrations below the trigger level of 5.7mg/L.

The groundwater iron results since 2016 are shown graphically in **Appendix 3**, which demonstrates the highly variable and fluctuating nature of iron concentrations at SP4, especially since December 2017. This trend continued throughout the reporting period.

7.2.4 Groundwater Monitoring Results

During the reporting period, four regular monitoring events were undertaken in accordance with the SWMP. The 2020 monitoring results are shown in **Table 7.3** to **Table 7.9.**

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

7.2.4.1 Groundwater Level

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)	**3.6**	**2.8**	**2.6**	**1.25**	**3.6**	**3.7**
10-Mar-20	1.42	2.23	1.79	0.73	2.40	0.72
15/16-Jun-20*	1.45	2.51	1.87	0.91	2.54	1.70
10-Sep-20	2.86	3.15	2.38	0.82	3.02	2.09
16/17-Dec-20*	1.69	2.90	2.25	0.74	2.95	1.83

* Monitoring conducted over two consecutive days.

7.2.4.2 Groundwater Quality

Table 7.4 to **Table 7.9** shows the recorded groundwater quality 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**
10-Mar-20	5.44	5.17	5.00	5.02	5.45	5.14
15/16-Jun-20*	5.64	5.12	5.36	4.53	5.30	5.04
10-Sep-20	5.27	4.99	4.93	4.99	5.04	5.10
16/17-Dec-20*	5.58	5.17	4.88	5.42	5.49	4.99

* Monitoring conducted over two consecutive days.

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**
10-Mar-20	145	96	221	762	107	463
15/16-Jun-20*	141	115	139	569	125	557
10-Sep-20	300	87	215	405	133	601
16/17-Dec-20*	122	92	284	209	115	527

* Monitoring conducted over two consecutive days.

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**
10-Mar-20	34.0	55.0	60.0	26.0	46.0	1.4
15/16-Jun-20*	83.7	6.1	38.0	9.2	95.0	1.8
10-Sep-20	16.0	11.0	31.0	6.0	36.0	12.0
16/17-Dec-20*	45.0	11.0	4.0	35.0	17.0	2.7

* Monitoring conducted over two consecutive days.

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**
10-Mar-20	<0.001	<0.001	<0.001	0.009	<0.001	<0.001
15/16-Jun-20*	<0.001	<0.001	<0.001	0.003	0.001	<0.001
10-Sep-20	<0.001	<0.001	0.002	<0.001	<0.001	<0.001
16/17-Dec-20*	<0.001	<0.001	<0.001	0.015	<0.001	<0.001

* Monitoring conducted over two consecutive days.

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**
10-Mar-20	0.002	0.005	0.001	0.207	0.016	0.010
15/16-Jun-20*	0.004	0.007	0.001	0.093	0.028	0.008
10-Sep-20	0.005	0.005	<0.001	0.071	0.024	0.011
16/17-Dec-20*	0.003	0.004	0.002	0.026	0.019	0.007

* Monitoring conducted over two consecutive days.

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**
10-Mar-20	0.07	0.46	0.09	22.4	0.39	0.89
15/16-Jun-20*	0.06	0.64	0.05	23.8	0.88	1.12
10-Sep-20	0.05	0.62	0.05	7.95	0.74	1.28
16/17-Dec-20*	0.14	0.52	0.09	3.58	0.43	0.87

* Monitoring conducted over two consecutive days.

Groundwater level measurements and groundwater quality monitoring data for the current and previous reporting period are provided in **Appendix 3**.

7.2.5 Groundwater Model Validation

Mackas Sand engaged GHD to undertake a review of the Mackas Sand Groundwater Model (GHD, 2020). The review included updating the groundwater model for Mackas Sand with meteorological data observed from September 2011 to December 2019 and a comparative analysis against observed groundwater levels recorded as part of the Mackas Sand groundwater monitoring program.

The outcomes of this review identified the existing groundwater model provides a reasonable match between observed and modelled groundwater levels and there is a similar response in the modelled and observed groundwater at each bore during both wet and dry periods.

The modelled maximum also remained below the maximum modelled groundwater levels developed as part of the Mackas Sand *Determination of Maximum Predicted Groundwater Level and Maximum Extraction Level at Lot 218 and 220, Salt Ash* (Umwelt, 2011).

The groundwater model report was provided to the Department during 2020. The Department noted their satisfaction with the groundwater model review report during December 2020.

7.2.6 Proposed Improvement or Actions Next Reporting Period

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

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 areas at Lot 220 is being 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 the pit during 2020, 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 being undertaken progressively as sand extraction and operating space on the active quarry floor permits. Ongoing short term rehabilitation strategies are primarily focused on maximising the availability and viability of biological resources for use in rehabilitation activities, including the salvage and reuse of material for habitat enhancement and the management of topsoil.

Approximately 1.2 ha of land in the southern section of Lot 220 and 0.5 hectares in the north section commenced rehabilitation during 2020.

Mackas Sand is targeting a Spring 2021 seeding window a part of the next rehabilitation works program.

Other works include the utilisation of vegetative material cleared ahead of sand extraction operations. No additional rehabilitation was completed during the report period. **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)

	2019 Report Period (ha)	2020 Report Period (ha)	2021 Report Period (ha) (forecast)
Total Mine Footprint	33.7	33.7	33.7
Total Active Disturbance	17.2	17.1	17.1
Land being prepared for rehabilitation	2.3	0	1
Land under active rehabilitation	12.6	16.6	16.6
Completed Rehabilitation	0	0	0

Image Source: Nearmap (Feb 2021)
Data Source: DFSI (2019)

0 100 250 500m
1:10 000

Legend

- Lot 220 LPI Boundary
- Lot 220 Approved Operational Area
- Rehabilitation Area

FIGURE 8.1

Lot 220 Rehabilitation Status

8.2 Annual Rehabilitation Inspection

The annual rehabilitation inspection of Lot 220 was undertaken during the reporting period. Monitoring is undertaken to track current rehabilitation processes and to further inform any rehabilitation management actions required onsite. The rehabilitation inspection focused on Rehabilitation Area 1, 2 and 3 and the southern and eastern areas of Rehabilitation Area 2019 (refer **Figure 8.1**).

Key observations made during the 2020 rehabilitation monitoring inspection included:

- All rehabilitation areas have recovered well in response to above average rainfall in 2020.
- Approximately half of the rehabilitation areas were dominated by weed or exotic species such as red natal grass (Melinis repens), kikuyu grass (Pennisetum clandestinum), bitou bush (Chrysanthemoides monilifera), farmer's friend (Bidens pilosa), Large-leaved Pennywort (Hydrocotyle bonariensis), Acanthospermum austral and flax leaf fleabane (Conyza bonariensis).
- Eucalyptus tubestock planted in Rehabilitation Areas 1, 2 and 3 were observed to be healthy and progressing well.
- Natural regeneration/recruitment of native species, particularly eucalyptus, was demonstrated in some areas of Rehabilitation Areas 1 and 2.
- Continued salvaging and placement of tree hollows and other woody debris was observed throughout all rehabilitation areas.

The direct topsoil placement onto Rehabilitation Area 2019 has resulted in good vegetation establishment particularly of native grasses. As noted within the LMP (April, 2019), the annual rehabilitation inspection utilises qualitative monitoring practices during the early stages of rehabilitation and typically until vegetation within the Rehabilitated Areas has reached has reached a level of maturity where a quantitative assessment is of benefit. As a result, qualitative monitoring practices continue to be undertaken across Rehabilitation Areas 1, 2 and 3 and Rehabilitation Area 2019 due to the level of maturity of the rehabilitation.

A number of recommendations were made for Rehabilitation Areas 1, 2 3 and Rehabilitation Area 2019, following the rehabilitation inspection and included:

- Weed management across all rehabilitation areas
- Undertake vegetation infill works (including seeding and/or planting) in all rehabilitation areas, but particularly in Rehabilitation Area 3 and Rehabilitation Area 2019.

Recommendations made in the 2020 rehabilitation monitoring report are consistent with the recommendations made in 2020. It is recommended that the rehabilitation areas would benefit from a program of routine weed management and infill planting.

Mackas Sand will continue to monitor the rehabilitation areas and undertake weed and supplementary planting works during 2021, as needed.

Mackas Sand will continue provide an update of the actions completed against the rehabilitation monitoring recommendations in the next annual review document.

8.3 Rehabilitation Trials and Research

No rehabilitation trials were undertaken during the report period.

8.4 Proposed Improvements or Actions for the Next Reporting Period

Mackas Sand will continue to 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.

Following the completion of the 2021 Mackas Sand Independent Environmental Audit, Mackas Sand will review and revise the rehabilitation bond associated with Lot 218 and 220 in accordance with Schedule 3, Condition 28 of PA 08_0142.

9.0 Community

9.1 Community Complaints

Mackas Sand advised that no community complaints were received during the 2020 reporting period.

As requested by DPIE, a summary of community complaints received for the last five reporting periods is displayed in **Figure 9.1**. shows that one community complaint has been received between 2016-2020.

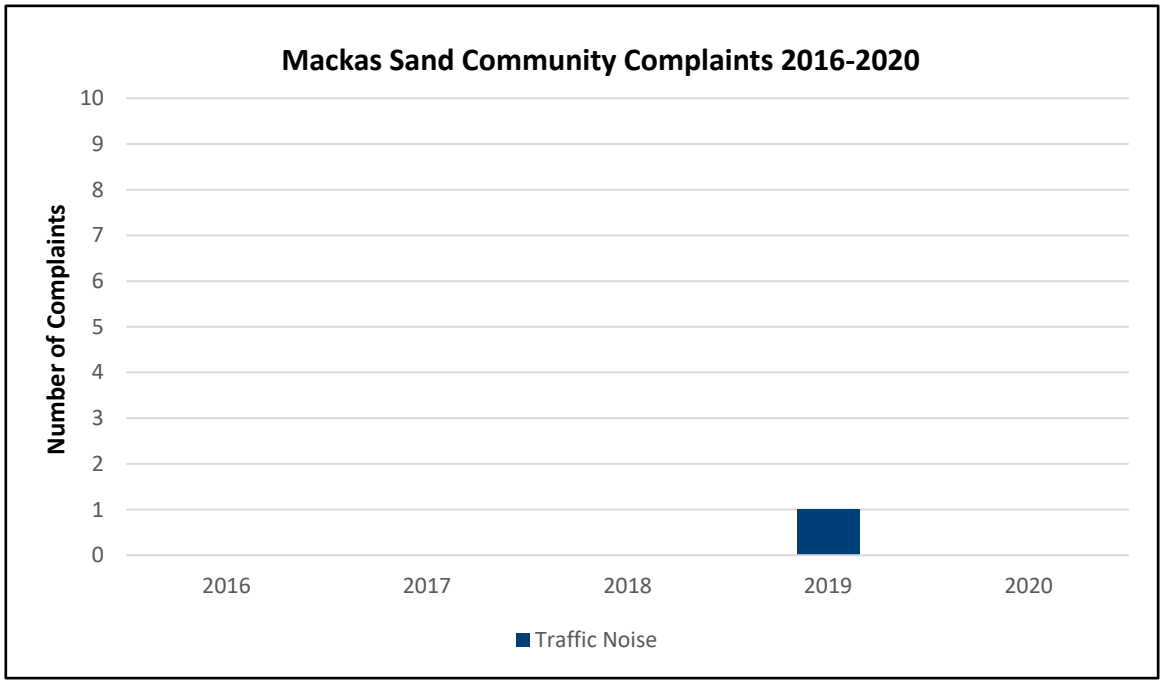


Figure 9.1 Summary of Mackas Sand Community Complaints from 2016-2020

9.2 Community Consultative Committee

Community Consultative Committee (CCC) representatives act as a point of contact to provide feedback between Mackas Sand and wider community. The 2020 Mackas Sand CCC was undertaken remotely via teleconference on 1 April 2020 due to COVID-19 restrictions.

Attendees of the 2020 Mackas Sand CCC are listed in **Table 9.2**. Mackas Sand notes that Covid-19 restrictions may have impacted attendance numbers of the 2020 Mackas Sand CCC Meeting. As a result of receiving a number of prior apologies from CCC members, Mackas Sand also provided summary information on the discussion points to the CCC prior to meeting.

Table 9.1 Mackas Sand CCC Attendees for the 2020 Report Period

Name	Organisation
Ms Margaret Macdonald-Hill	Chairperson
Mr Robert Mackenzie	Mackas Sand
Ms Julie Towers	Community Representative
Bret Jenkins	Umwelt (Australia) Pty. Ltd.

General items discussed during the 2020 CCC meeting included:

- Update provided on status of 2019 Annual Review document.
- A presentation regarding the proposed Modification to Mackas Sand Lot 218, including geomorphological information, results of soil and groundwater testing, acid sulphate soils and managing the revised operating depth.
- Upgrades to the Lemon Tree Passage/Nelson Bay Road roundabout.
- General discussion of operational matters.

A second once-off meeting was planned to take place during Quarter 3 2020 in the event face to face meetings were permitted and COVID-19 restrictions had lifted. In consultation with the Mackas Sand CCC members, the chairperson confirmed during August 2020 that the second meeting of the year would not take place as a result ongoing COVID-19 restrictions.

9.3 Community Engagement

Mackas Sand is an enthusiastic and active member of the community and has supported a diverse range of local community and charitable organisations over recent years.

During the reporting period, Mackas Sand contributed over $11,000 to the local community across a variety of organisations. These included:

- Children's Cancer Foundation
- Canteen Australia
- Westpac Rescue Helicopter Service
- Samaritans Foundation
- Aruma Disability Services
- Breast Cancer Trials
- Yacaaba Centre
- Other various community groups and events.

10.0 Independent Audit

OnSite Environmental Management was engaged by Mackas Sand to undertake an IEA of the Mackas Sand Project in 2018 for the operational period from 2015 to 2017.

The IEA report was finalised, submitted and approved by DPIE during the 2018 reporting period.

A number of the administrative and low risk non-compliances and recommendations were identified and addressed during the 2018 reporting period.

As at December 2020 only one recommendation relating to the timing of the 2021 audit has not been completed (refer to **Tables 10.1** and **10.2**).

The next IEA is scheduled to be undertaken post March 2021.

Table 10.1 Mackas Sand IEA Non-compliance Summary

Non-Compliance	Audit Finding	Status	Response
PA 08_0142 S3 C 28B	No appropriate long term security for the Biodiversity Offset Area has been agreed upon by Mackas Sand and OEH to the satisfaction of the Secretary.	Completed	NSW Biodiversity Conservation Trust executed the Mackas Sand Biodiversity Offset Area Conservation Agreement on 30 June 2020.

Table 10.2 Mackas Sand IEA Recommendations

Ref	Recommendation	Status	Response
Audit Timing	Given the large volume of data to be reviewed and the requirement to publish the Annual Review in March of the following year, it is recommended that the independent audit be scheduled to April of the following year. This would allow the review of all 3 Annual Reviews reports. The next audit would therefore be scheduled to occur in 2021 for the years 2018, 2019, 2020.	Noted - Ongoing	Noted.

11.0 Incidents and Non-compliances during the Report Period

For a full summary of non-compliances identified during the Independent Environmental Audit, reference is made to **Section 10.0** of this document.

11.1 Incidents, Notifications and Non-Compliances

As noted in **Section 1.0,** Mackas Sand identified one administrative non-compliances during the reporting period. Further details of which are provided in **Sections 11.1.1** to **11.1.4**.

11.1.1 Groundwater Water Monitoring Program Notification

Elevated electrical conductivity, turbidity, manganese and iron results were recorded as part of the routine groundwater monitoring during the reporting period. These results are restricted to primarily SP4 and to a less extent SP1, SP2, SP3 and SP5. Mackas Sand reviews and investigates all elevated groundwater monitoring data in accordance with the Mackas Sand SWMP.

11.2 Regulatory Correspondence

A summary of official regulatory correspondence received during the reporting period outside the scope of non-compliances identified in **Section 11.1** is provided in **Table 11.1**.

Table 11.1 Regulatory Compliance Correspondence Summary

Date	Agency	Summary
26/6/2020	DPIE	Mackas Sand received a letter confirming the Department's general satisfaction with the Mackas Sand 2019 Annual Review and provided actions to be implemented in the Mackas Sand 2020 Annual Review
20/7/2020	DPIE / BCT	Mackas Sand received confirmation that the Mackas Sand Biodiversity Offset Area Conservation Agreement (VC00532) was executed by the Coordinator General, Environment, Energy and Science Group, DPIE on 30 June 2020.
4/9/2020	DPIE	Mackas Sand provided the DPIE with a summary of the groundwater model review and re-run (undertaken by GHD).
28/9/2020	DPIE	Mackas Sand received a notice to furnish information and records under Section 9.22 of the Environmental Planning and Assessment Act 1979, following a site inspection undertaken by DPIE on 22 September 2020. Information was subsequently provided and no further correspondence on this matter has been received.
30/11/2020	DPIE	Mackas Sand received a notice requesting a copy of the GHD Groundwater Model Review be provided to the DPIE. Information was subsequently provided.
15/12/2020	DPIE	Mackas Sand received confirmation from the DPIE that the Groundwater Model Review satisfied the requirements for the model rerun outlined in correspondence dated June 2019.

12.0 Activities Proposed in the 2021 Report Period

The anticipated environmental management activities for Mackas Sand during the 2021 report period are included in **Table 12.1**. Additional environmental management activities may be undertaken if identified during the next reporting period.

Table 12.1 Environmental Management Activities Proposed for 2021

2020 Document Section	Area/Nature of Activity	Action Proposed
6.4	Offset	• Continue to implement the requirements of the Mackas Sand VCA.
8	Rehabilitation	• Mackas Sand will implement the rehabilitation recommendations as noted above. Progress against these recommendations will be reported in the next Annual Review document. • Mackas Sand will review the Rehabilitation Bond following the completion of the 2021 IEA.

13.0 References

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

Department of Primary Industries (2019). *Seasonal Conditions Information Portal: Combined Drought Indicator*. Accessed Thursday, 19 Dec 2019 from: https://edis.spaceport.intersect.org.au/

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

NSW Environment Protection Agency (NSW EPA) (2014) *Protection of the Environment Operations (Waste) Regulation 2014.*

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

OnSite Environmental Management (2018) *Mackas Sand Pty Ltd – MP 08_0142 Independent Environmental Audit 2015, 2016, 2017.*

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 (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 (2014) *Macka's Sand Ecological Monitoring Program for Lot 220 DP 1049608, Salt Ash.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2017) *Mackas Sand Lot 218 Offset Monitoring Report 2017.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2017) *Mackas Sand Lot 220 Rehabilitation Monitoring Report 2017.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2017) *Mackas Sand Annual Review 2017.* Prepared for Macka's Sand Pty Limited.

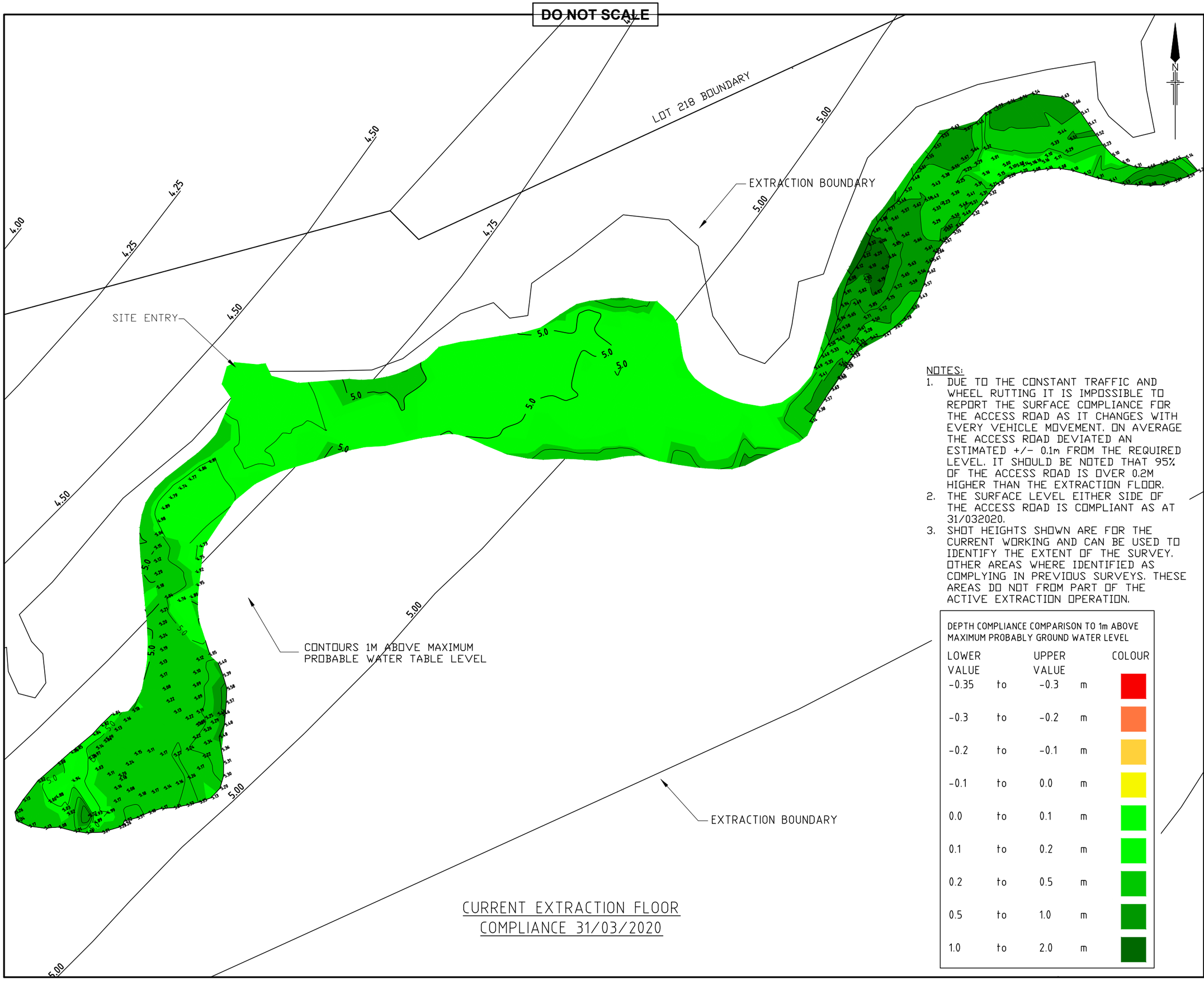
Umwelt (Australia) Pty Limited (2018) *Mackas Sand Environmental Noise Monitoring Report 2018.* Prepared for Macka's Sand Pty Limited.

Umwelt (Australia) Pty Limited (2019) *Mackas Sand EPBC 2011/6214 2018 Annual Compliance Report.* 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



CURRENT EXTRACTION FLOOR
COMPLIANCE 31/03/2020

NOTES:

1. DUE TO THE CONSTANT TRAFFIC AND WHEEL RUTTING IT IS IMPOSSIBLE TO REPORT THE SURFACE COMPLIANCE FOR THE ACCESS ROAD AS IT CHANGES WITH EVERY VEHICLE MOVEMENT. ON AVERAGE THE ACCESS ROAD DEVIATED AN ESTIMATED +/- 0.1m FROM THE REQUIRED LEVEL. IT SHOULD BE NOTED THAT 95% OF THE ACCESS ROAD IS OVER 0.2M HIGHER THAN THE EXTRACTION FLOOR.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 31/032020.
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.

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	31/03/2020
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
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
COMPLIANCE

STATUS:

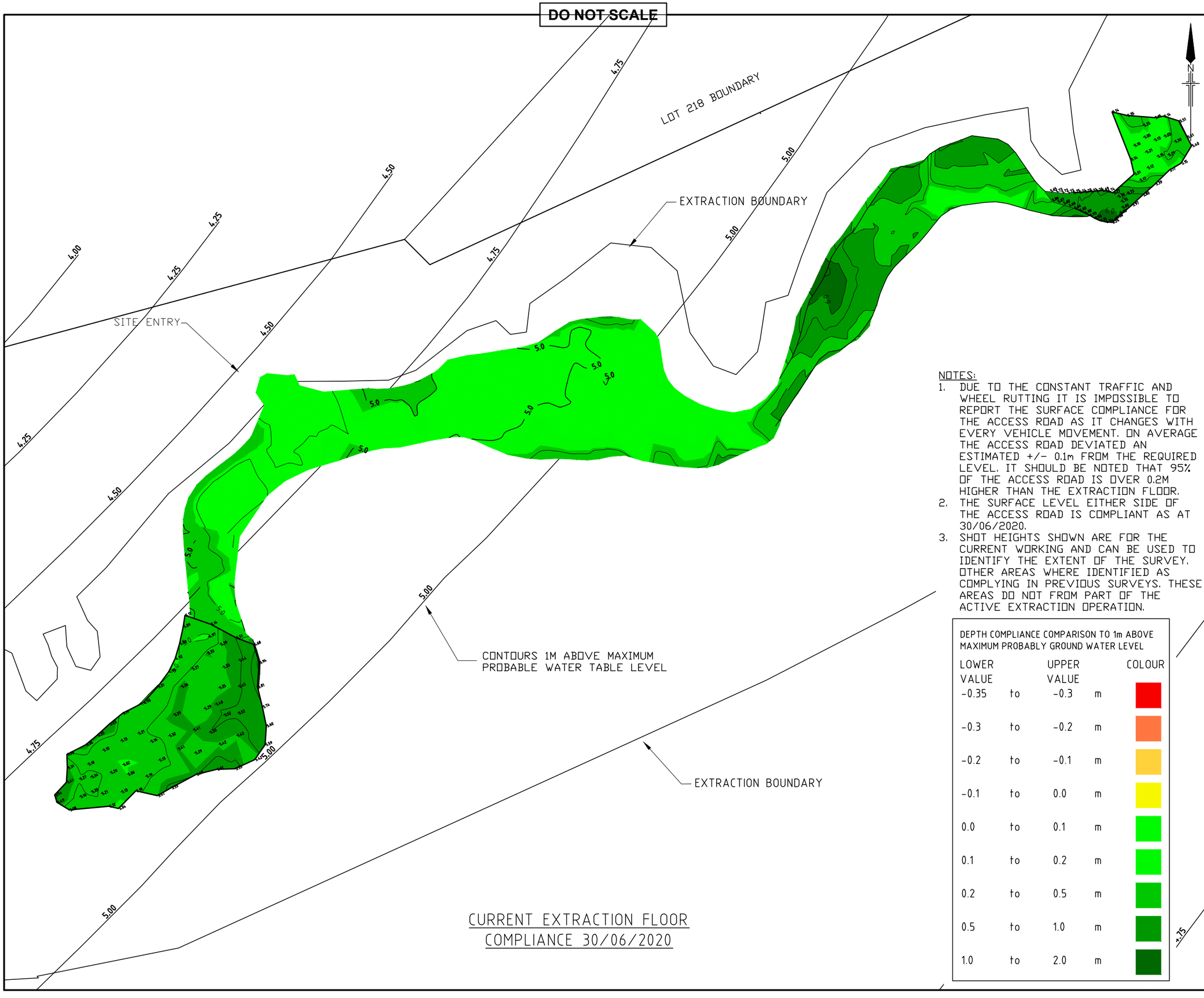
MARCH 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE



CURRENT EXTRACTION FLOOR
COMPLIANCE 30/06/2020

NOTES:

1. DUE TO THE CONSTANT TRAFFIC AND WHEEL RUTTING IT IS IMPOSSIBLE TO REPORT THE SURFACE COMPLIANCE FOR THE ACCESS ROAD AS IT CHANGES WITH EVERY VEHICLE MOVEMENT. ON AVERAGE THE ACCESS ROAD DEVIATED AN ESTIMATED +/- 0.1m FROM THE REQUIRED LEVEL. IT SHOULD BE NOTED THAT 95% OF THE ACCESS ROAD IS OVER 0.2M HIGHER THAN THE EXTRACTION FLOOR.
2. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 30/06/2020.
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.

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	30/06/2020
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
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
COMPLIANCE

STATUS:

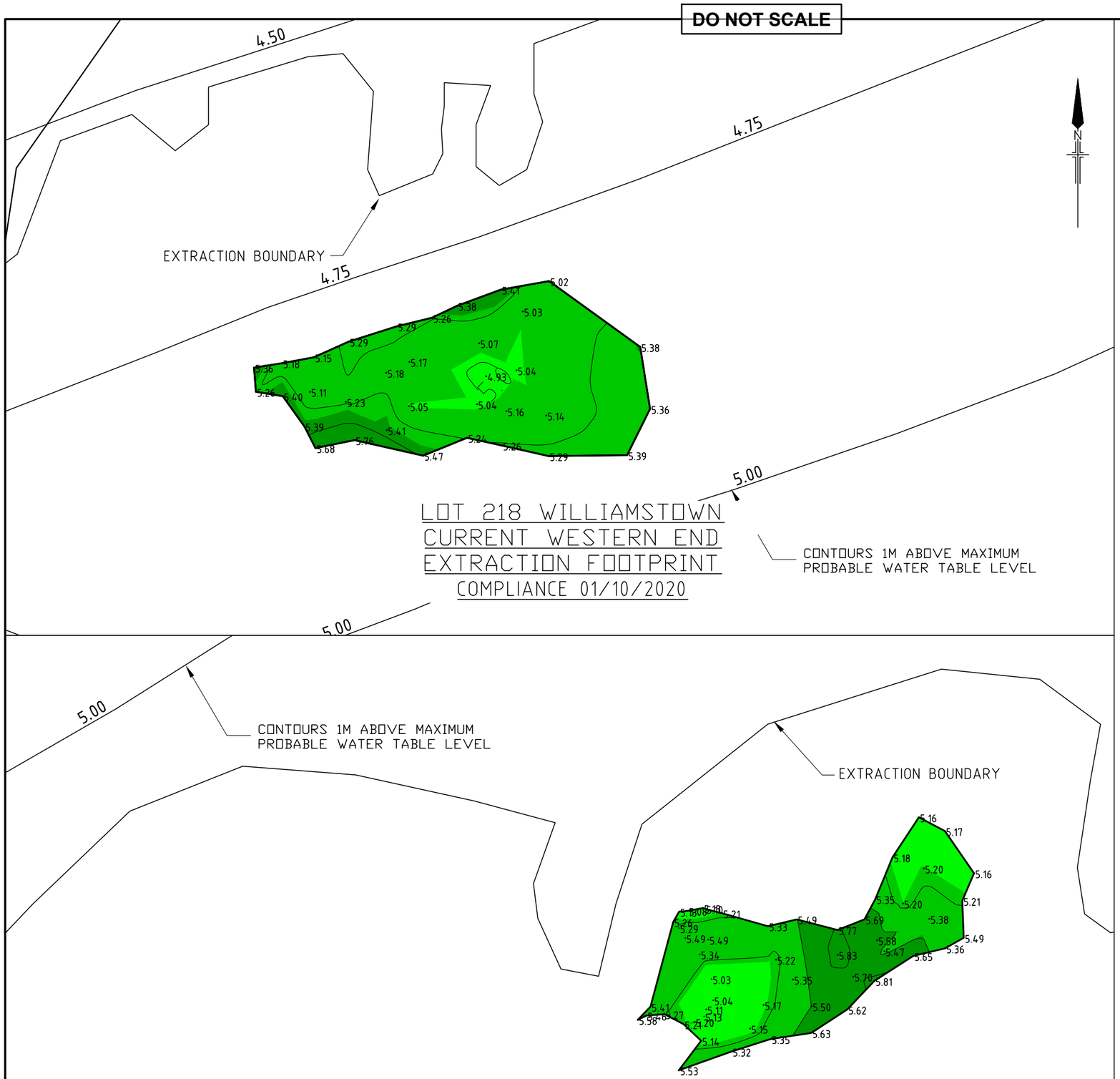
JUNE 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 01/10/2020

LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 01/10/2020

NOTES:
1. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 01/10/2020.
2. 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.

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	01/10/2020
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
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
COMPLIANCE

STATUS:

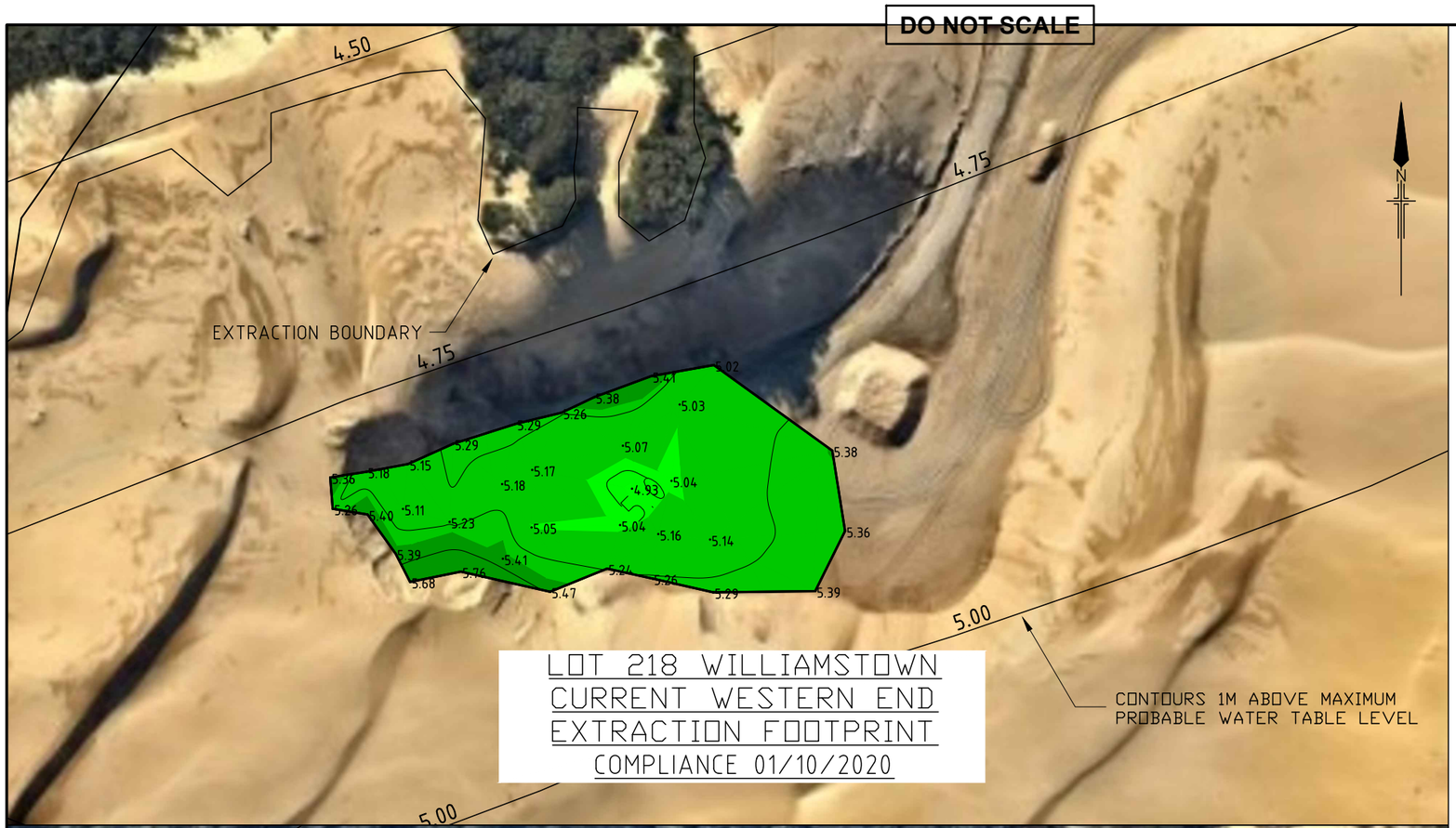
SEPTEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 01/10/2020

LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 01/10/2020

NOTES:

1. THE SURFACE LEVEL EITHER SIDE OF THE ACCESS ROAD IS COMPLIANT AS AT 01/10/2020.
2. 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.

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	01/10/2020
REVISION:	A

CLIENT & JOB:

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SAND & SOIL

WILLIAMSTOWN
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
COMPLIANCE

STATUS:

SEPTEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

SCALE: NOT TO SCALE

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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	01/10/2020
REVISION:	A

CLIENT & JOB:

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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
COMPLIANCE

STATUS:

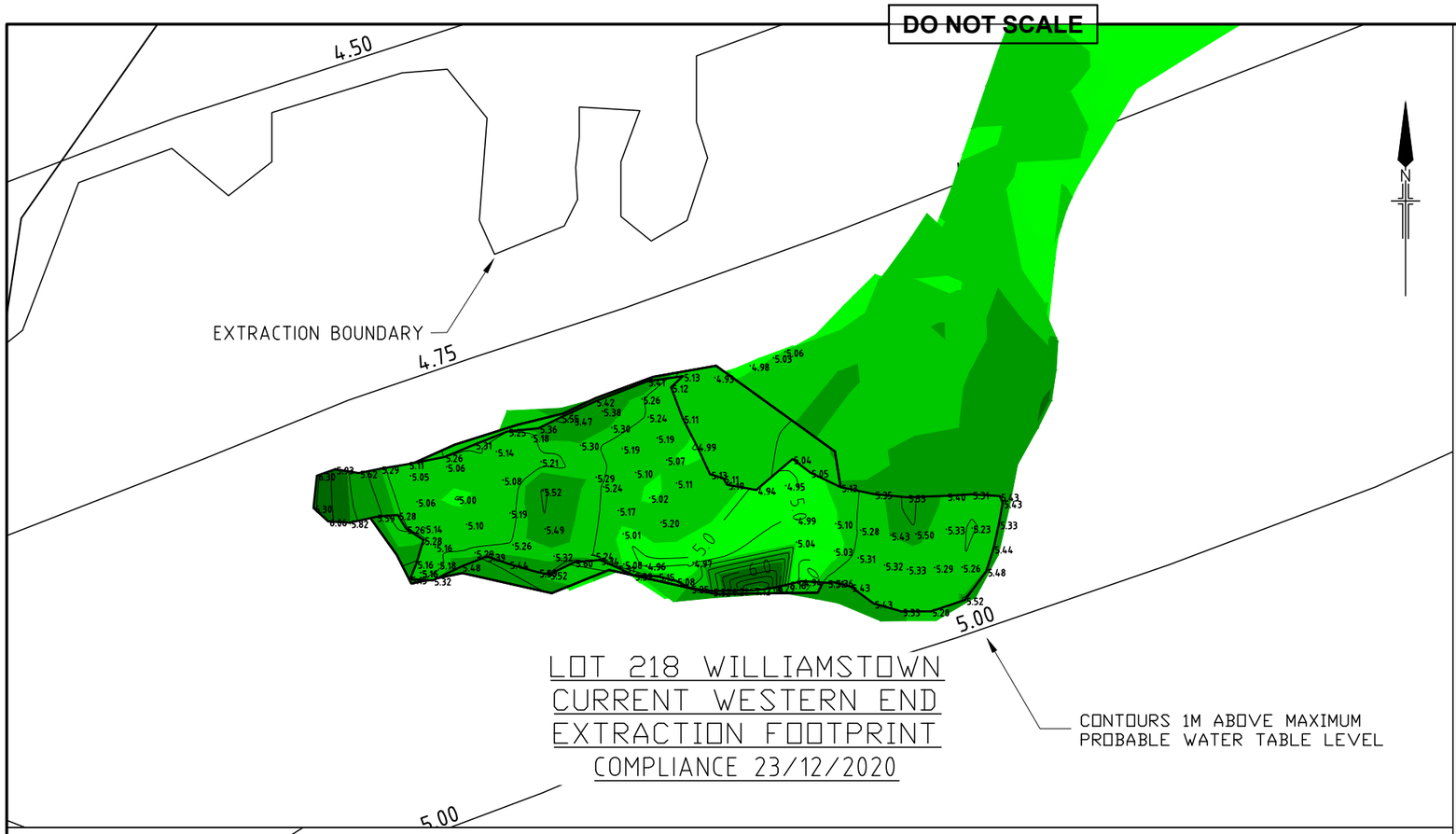
SEPTEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

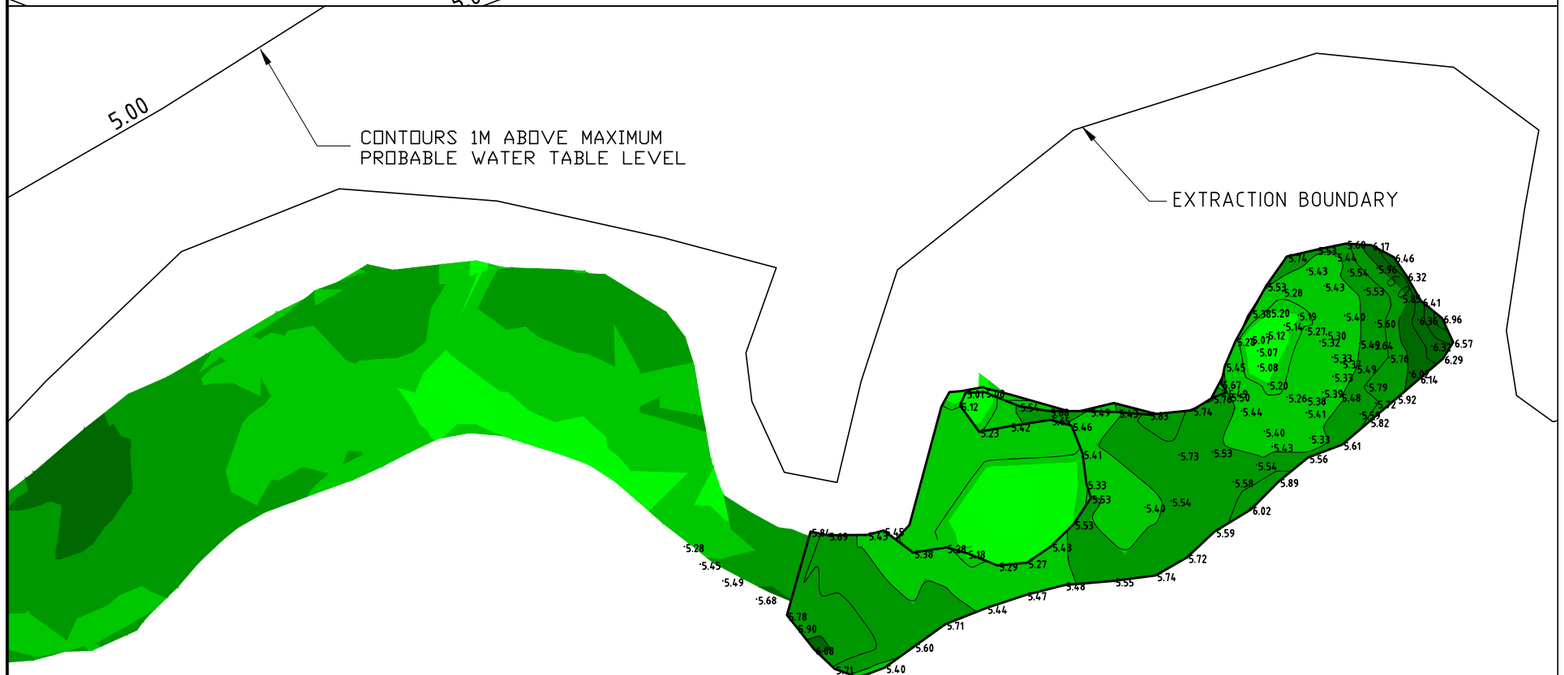
A3

DO NOT SCALE



LOT 218 WILLIAMSTOWN
CURRENT WESTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 23/12/2020

CONTOURS 1M ABOVE MAXIMUM
PROBABLE WATER TABLE LEVEL



LOT 218 WILLIAMSTOWN
CURRENT EASTERN END
EXTRACTION FOOTPRINT
COMPLIANCE 23/12/2020

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 23/12/2020.
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.

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_201223.dwg
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DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	31/12/2020
REVISION:	A

CLIENT & JOB:

MACKAS
SAND & SOIL

WILLIAMSTOWN
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
COMPLIANCE

STATUS:

DECEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

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

2.5m

3.0m

3.5m

4.0m

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

STOCKPILE OF SCREENED SAND

STOCKPILE OF SCREENED SAND

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 31/03/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 31/03/2020

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_200331.dwg
SURVEYED:	CJ & MH
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	31/03/2020
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 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

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

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 26/06/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

STOCKPILE OF SCREENED SAND

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 26/06/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

EXTRACTION BOUNDARY

LOT 220 BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 26/06/2020

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_200626.dwg
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CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	30/06/2020
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 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

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

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 01/10/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 01/10/2020.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

AREAS WELL ABOVE THE EXTRACTION LEVEL AS REHAB HAS BEGUN.

STOCKPILE OF SCREENED SAND

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 26/06/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT. CHECK SHOTS TAKEN CONFIRMED NO SIGNIFICANT ACTIVITY IN LAST QUARTER

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 01/10/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

CURRENT EXTRACTION FLOOR COMPLIANCE 26/06/2020

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_201001.dwg
SURVEYED:	LC & MH
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	01/10/2020
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:

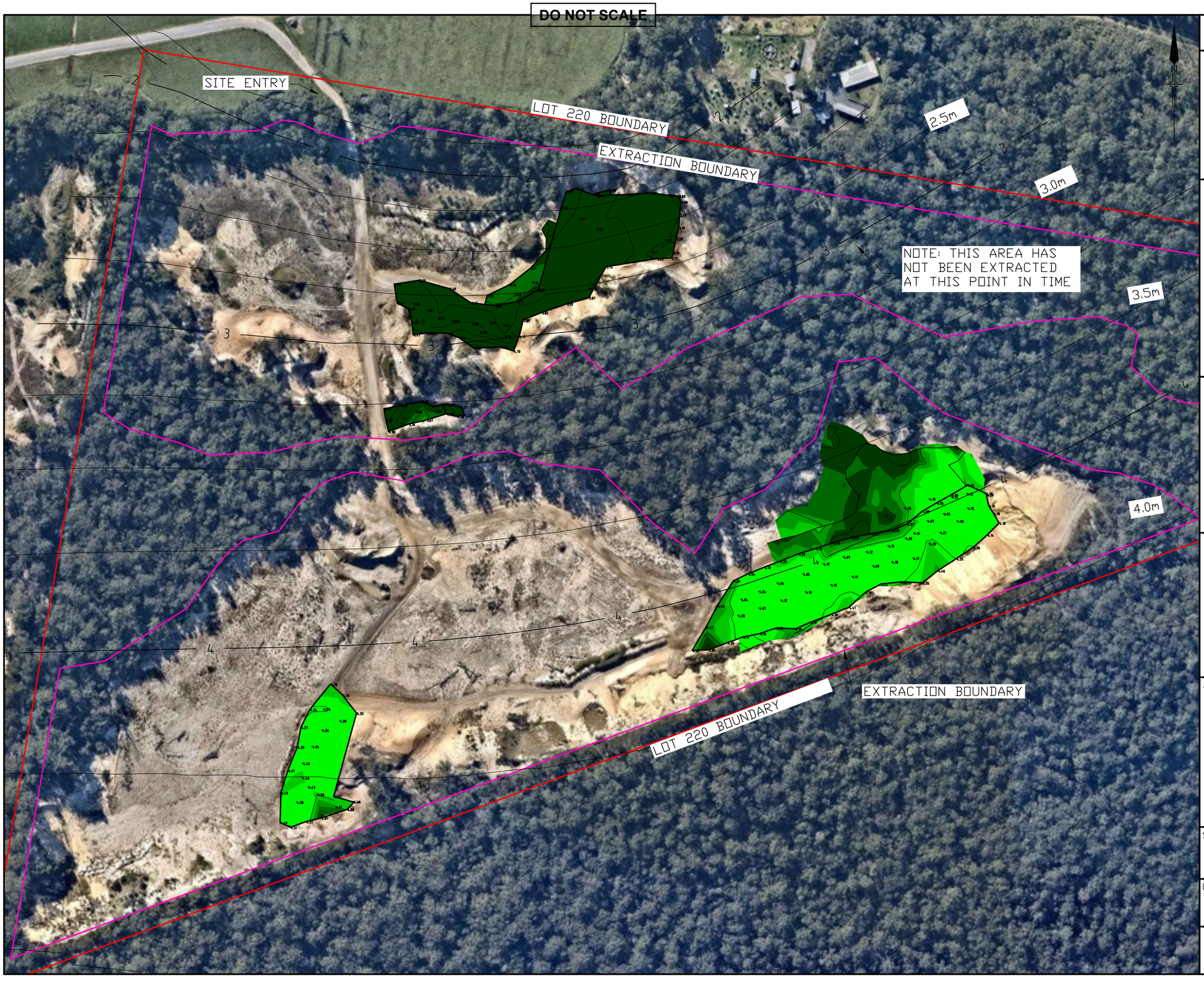
SEPTEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE



SCALE: NOT TO SCALE

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SURVEYED:	LC & MH
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	01/10/2020
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
(IMAGE UNDERLAY)

STATUS:

SEPTEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3

DO NOT SCALE

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

LOWER VALUE		UPPER VALUE		COLOUR
-0.35	to	-0.3	m	
-0.3	to	-0.2	m	
-0.2	to	-0.1	m	
-0.1	to	0.0	m	
0.0	to	0.1	m	
0.1	to	0.2	m	
0.2	to	0.5	m	
0.5	to	1.0	m	
1.0	to	2.0	m	

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

SITE ENTRY

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

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

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 24/12/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

AREA WAS SURVEYED ON THE 01/10/2020. NO ACTIVITY SINCE.

CONTOURS 0.7m ABOVE MAXIMUM PROBABLE WATER TABLE LEVEL

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

STOCKPILE OF SCREENED SAND

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 24/12/2020. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

LOT 220 BOUNDARY

EXTRACTION BOUNDARY

SPOT LEVEL IDENTIFY ACTIVE AREA WHICH WAS SURVEYED ON THE 24/12/2020. NO SIGNIFICANT ACTIVITY IN LAST QUARTER IN OTHER AREAS. ALL OTHER AREA ARE UNDER ACTIVE REHABILITATION AND WERE WELL ABOVE THE EXTRACTION LIMIT.

CURRENT EXTRACTION FLOOR COMPLIANCE 24/12/2020

SCALE: NOT TO SCALE

FILE:	0014_CS_LOT_220_Compliance_201224.dwg
SURVEYED:	LC & MH
DRAWN:	CJ
CHECKED:	CJ
DATUM:	AHD
ISSUE DATE:	31/12/2020
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

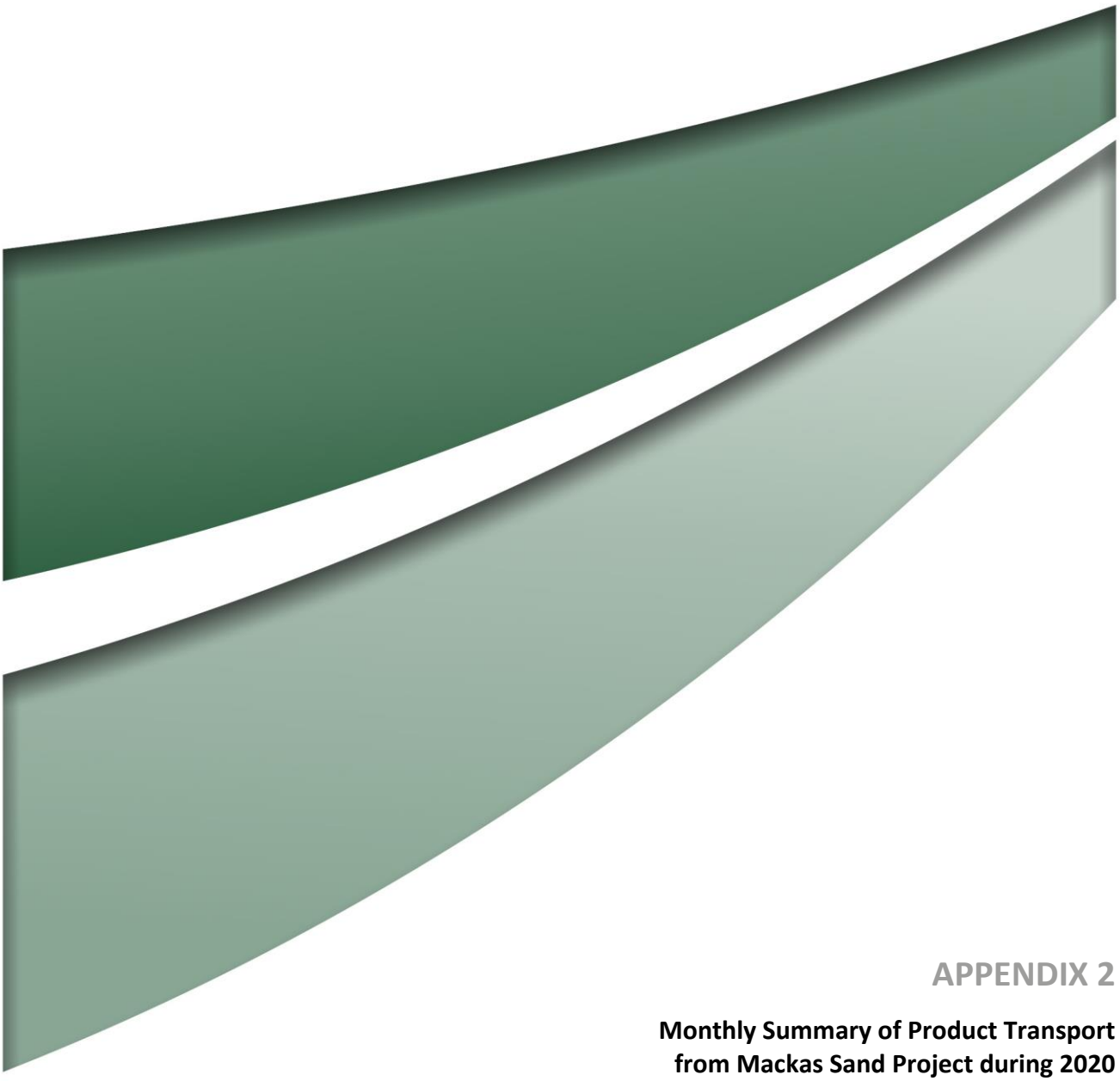
STATUS:

DECEMBER 2020

DRAWING NUMBER:

SHEET 1 OF 1 SHEETS

A3



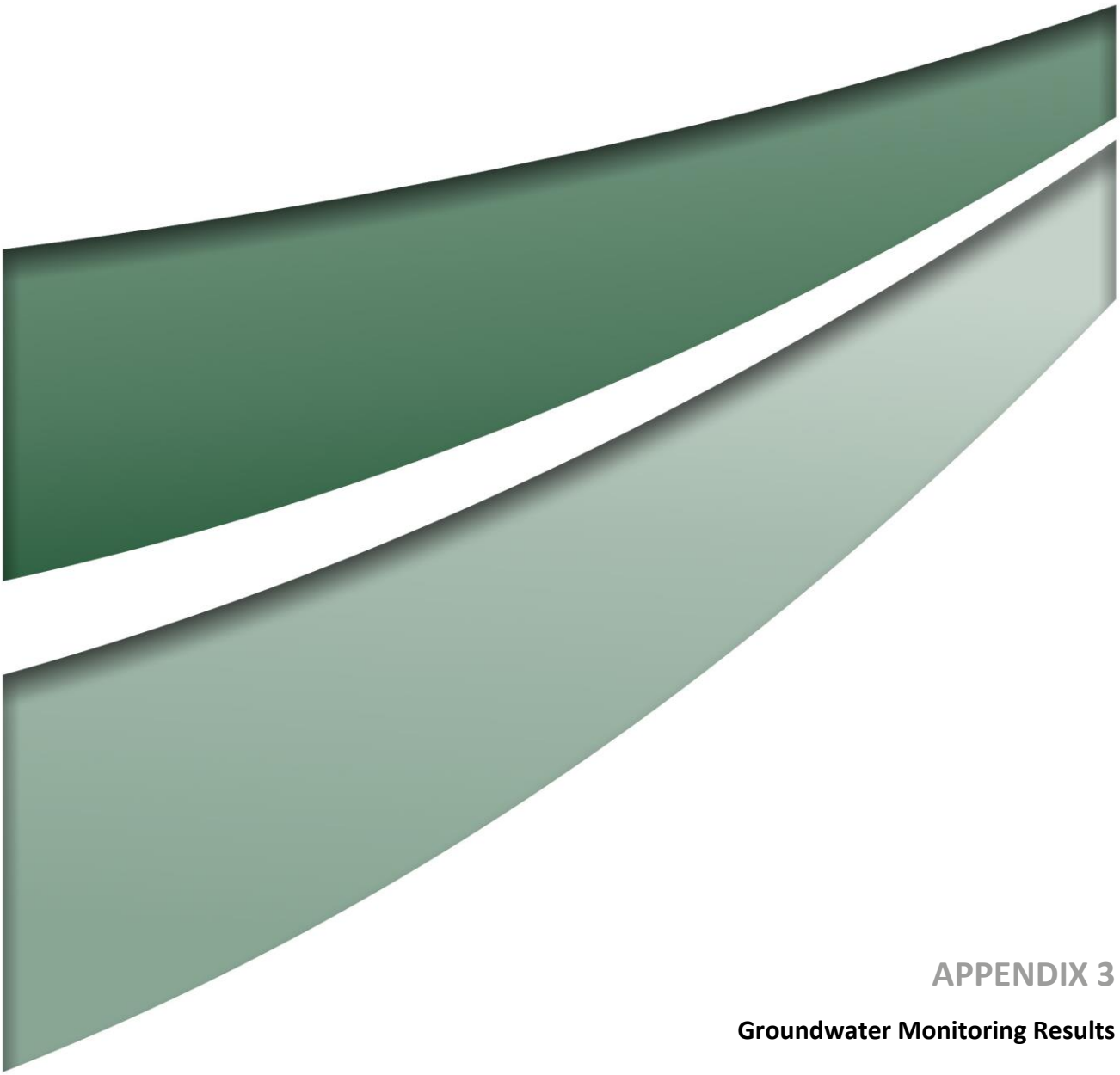
APPENDIX 2

Monthly Summary of Product Transport from Mackas Sand Project during 2020

2020 Transport Summary

Table 1.1 2020 Monthly Transport Summary

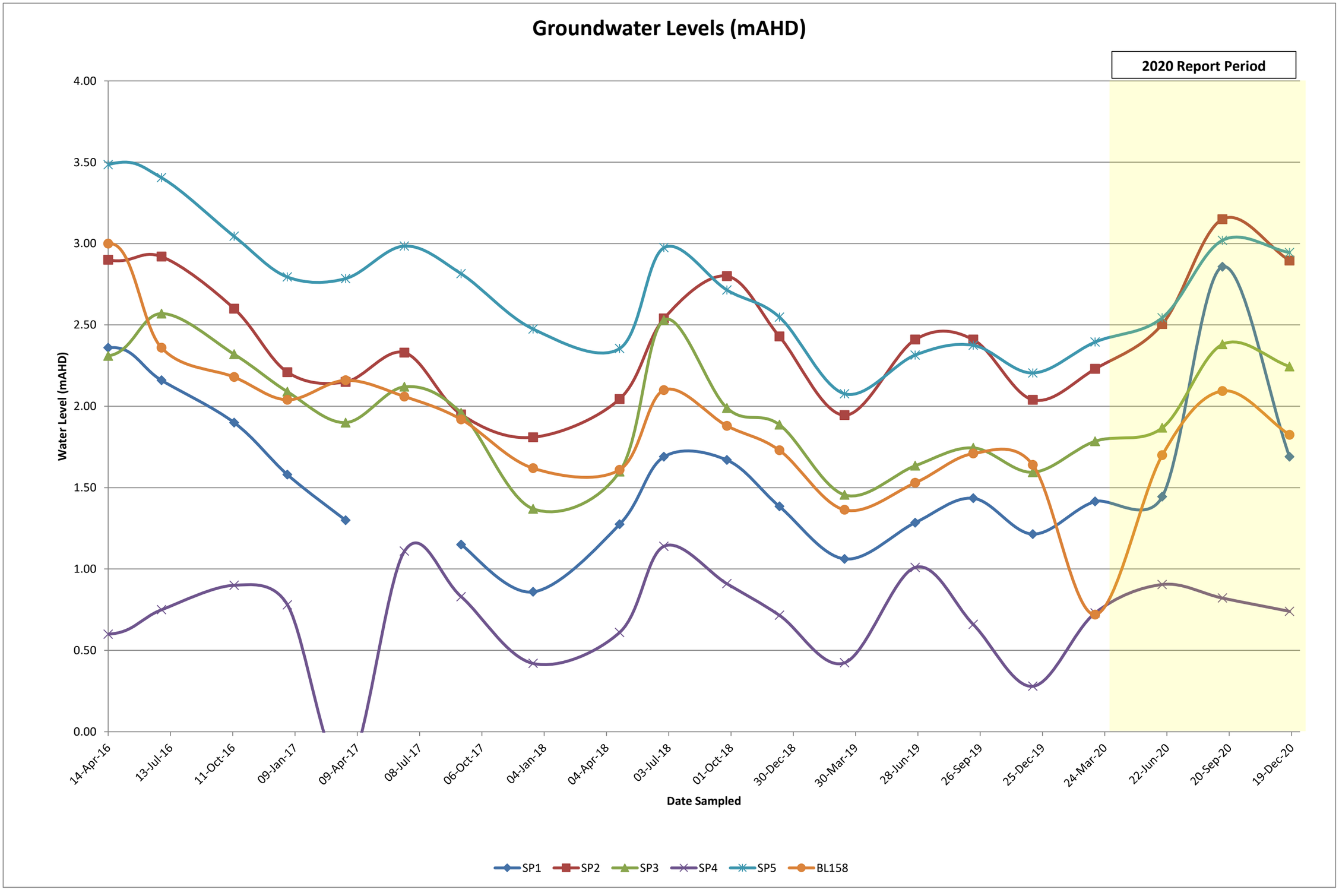
Month	Lot 218 (tonnes)	Lot 220 (tonnes)
January	70,535.02	31,314.14
February	91,432.00	33,454.28
March	103,713.90	36,391.75
April	95,478.16	32,943.92
May	101,630.16	33,734.68
June	103,589.36	36,615.34
July	99,580.15	33,885.53
August	102,433.30	34,591.66
September	107,654.94	37,767.06
October	76,245.06	36,775.64
November	22,614.40	42,431.73
December	17,351.44	57,903.76
Total	992,257.89	447,809.49



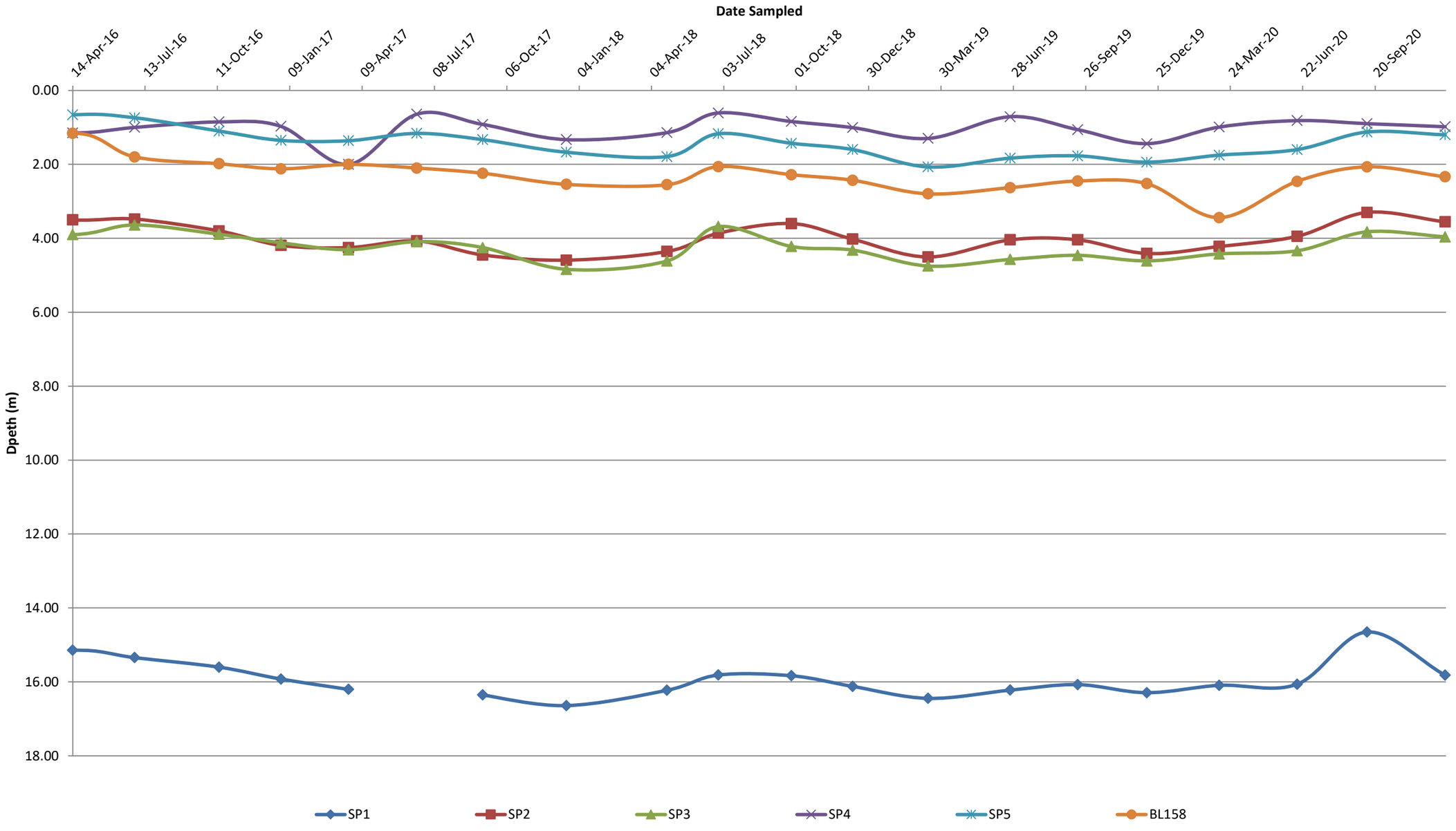
APPENDIX 3

Groundwater Monitoring Results

Groundwater Levels (mAHD)

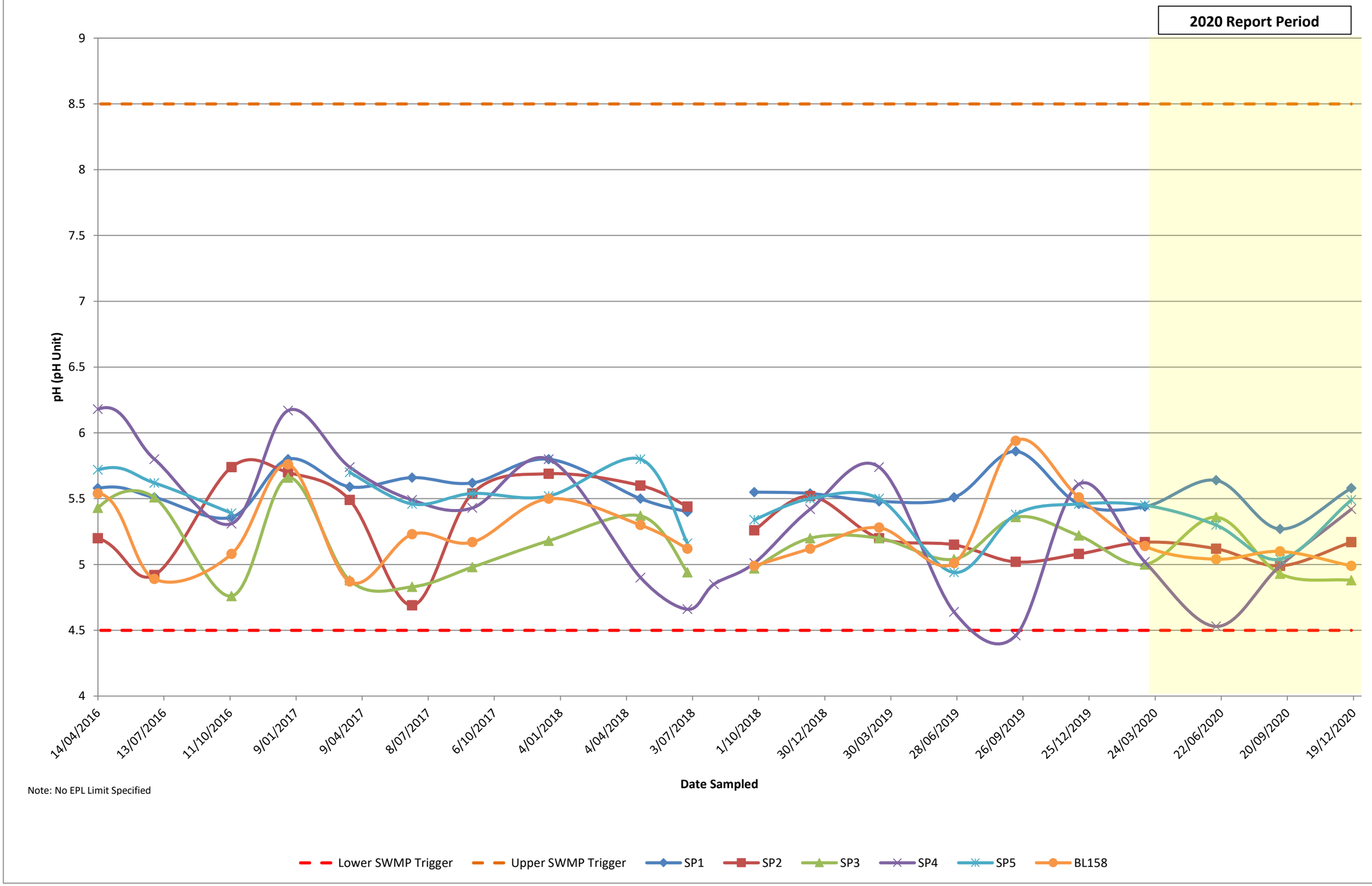


Groundwater Depths (m)



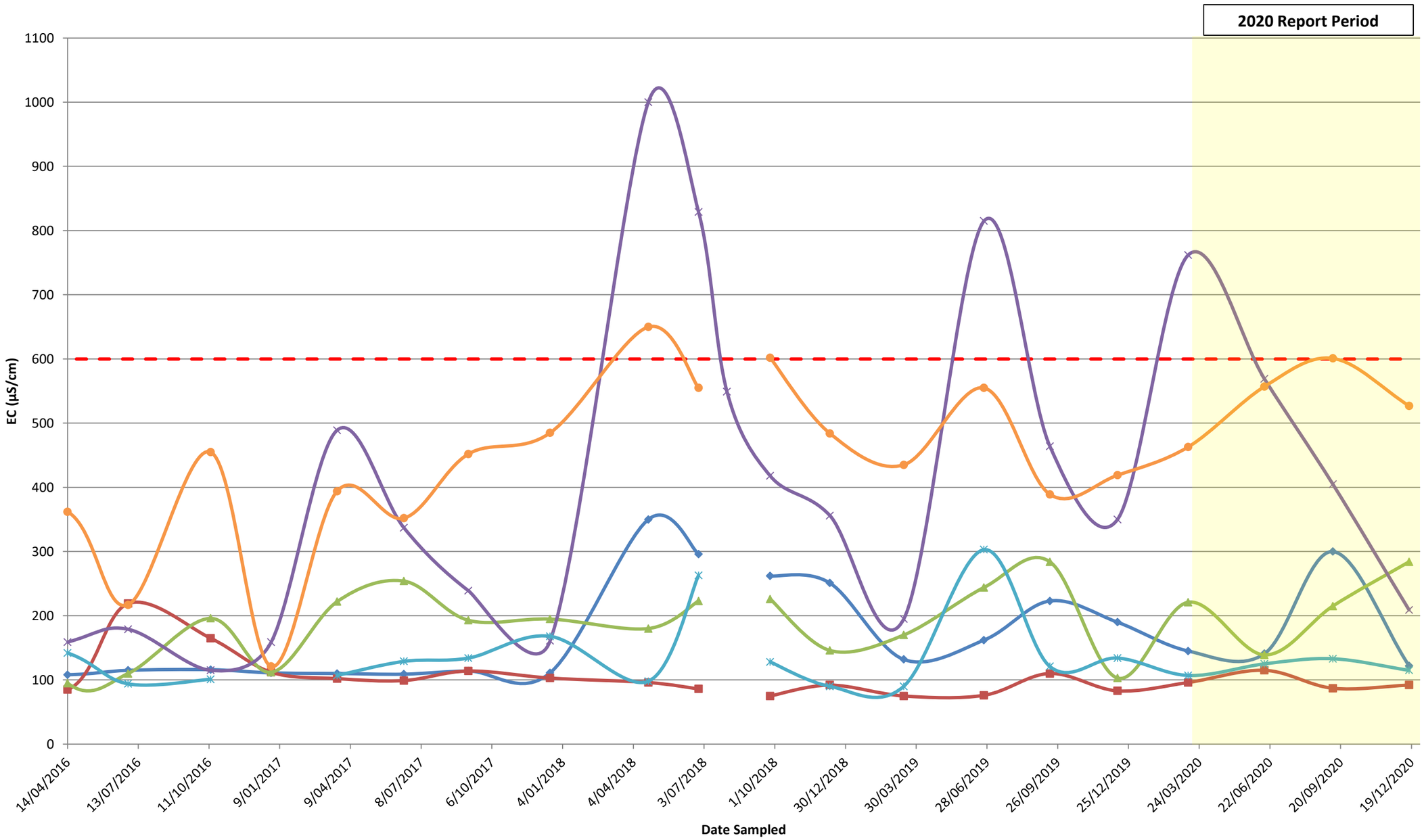
Note: No EPL Limit Specified

Groundwater - pH



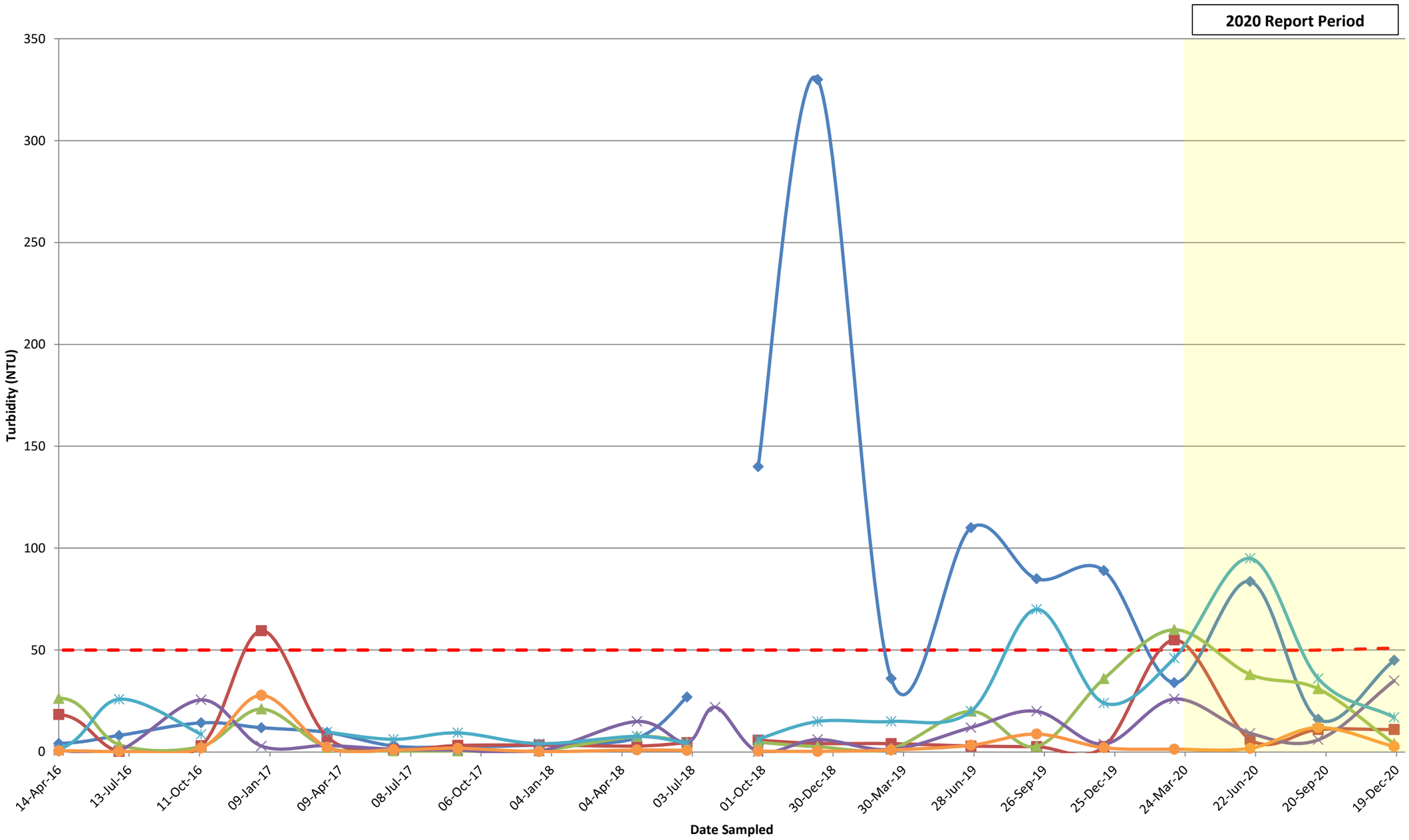
Note: No EPL Limit Specified

Groundwater - Electrical Conductivity (EC)



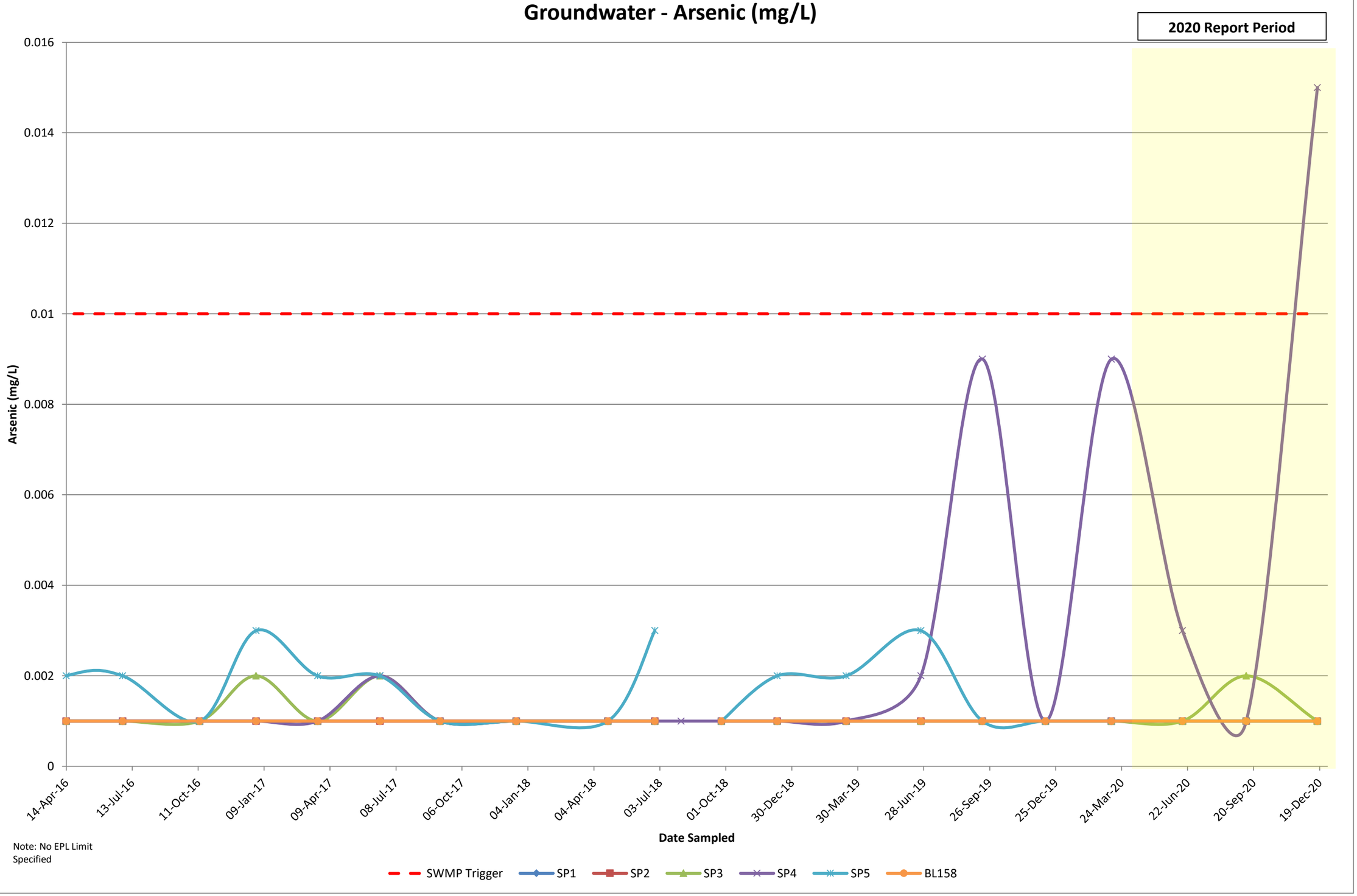
Note: No EPL Limit Specified

Groundwater - Turbidity (NTU)



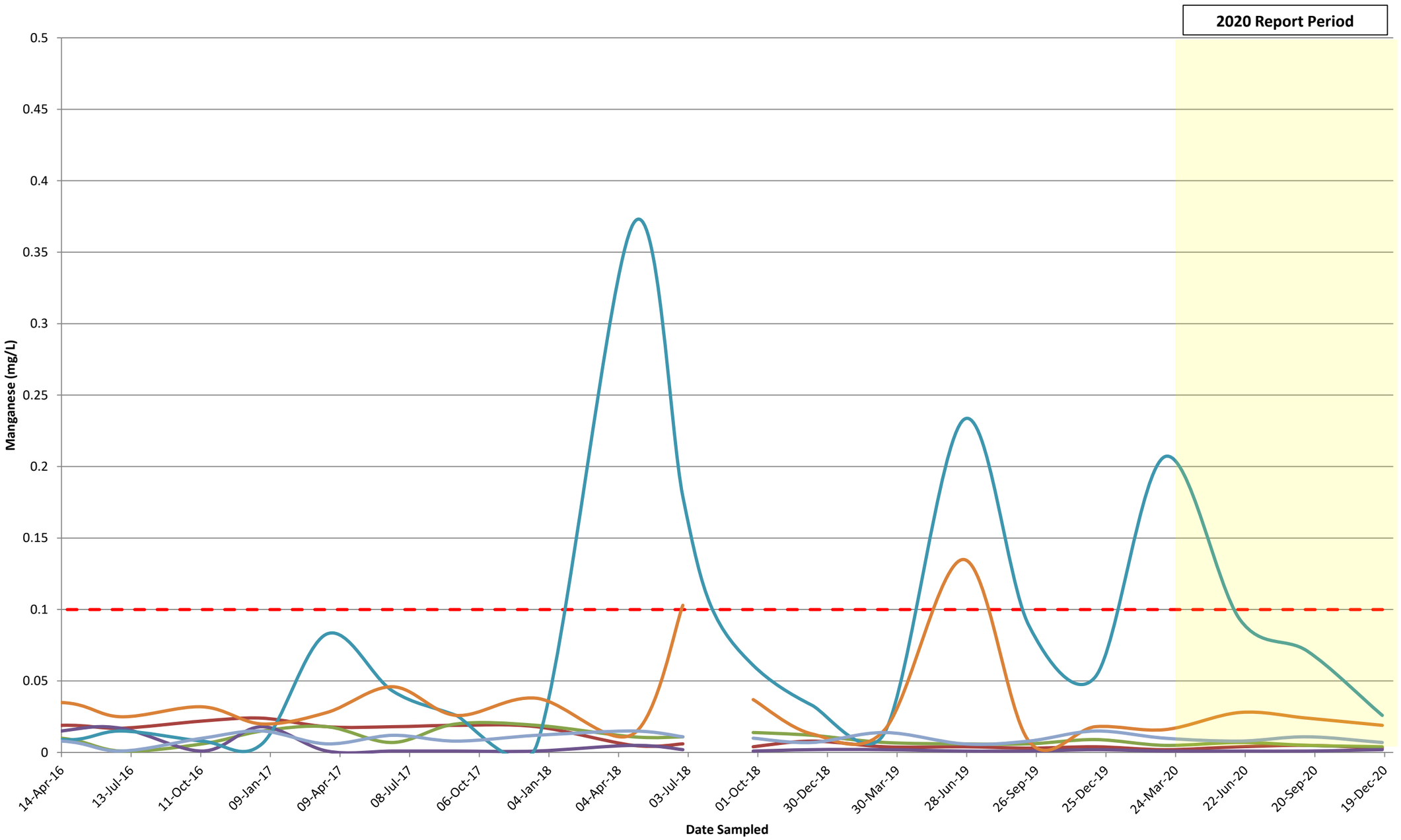
Note: No EPL Limit Specified

Groundwater - Arsenic (mg/L)



Note: No EPL Limit Specified

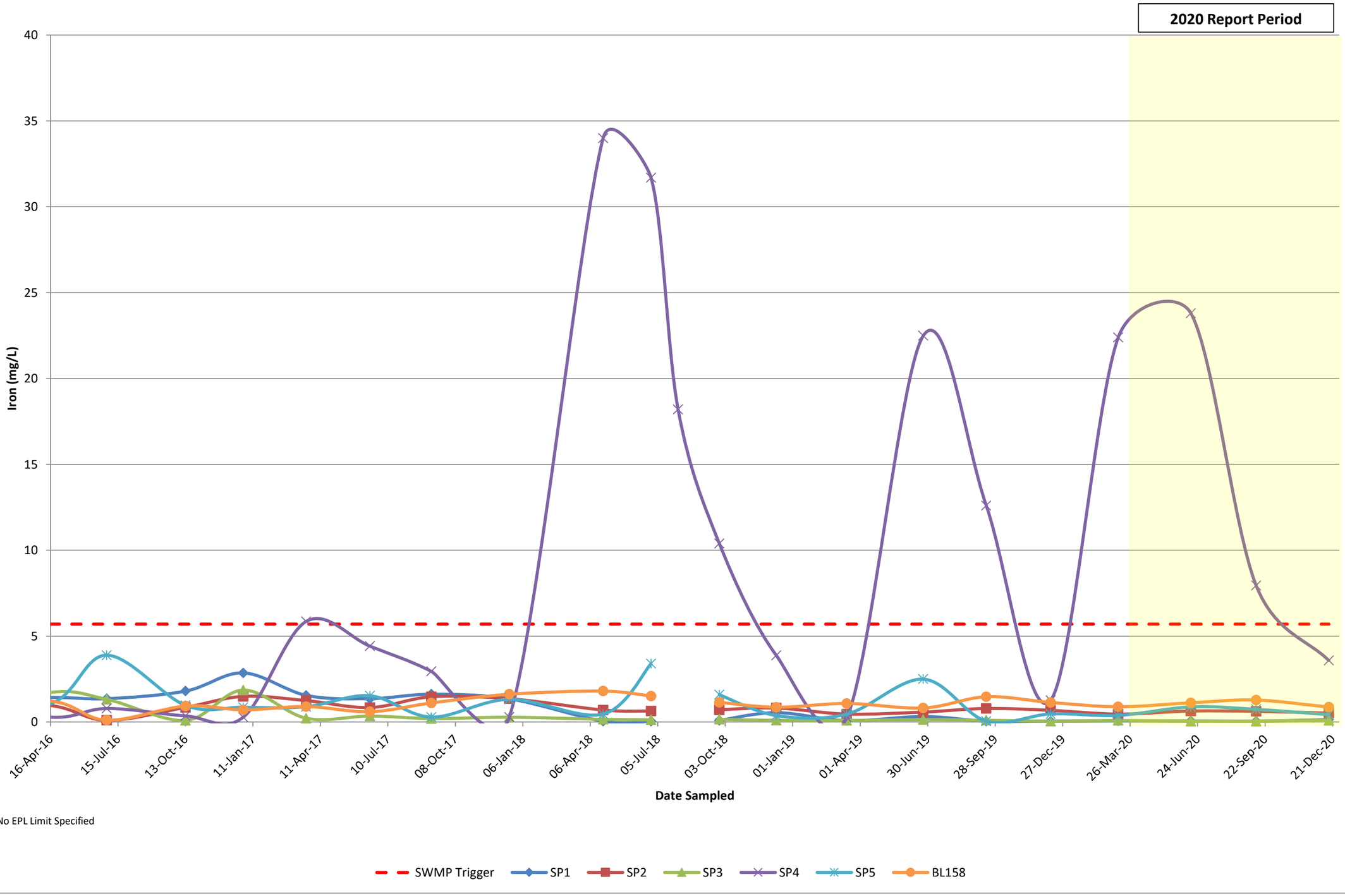
Groundwater - Manganese (mg/L)



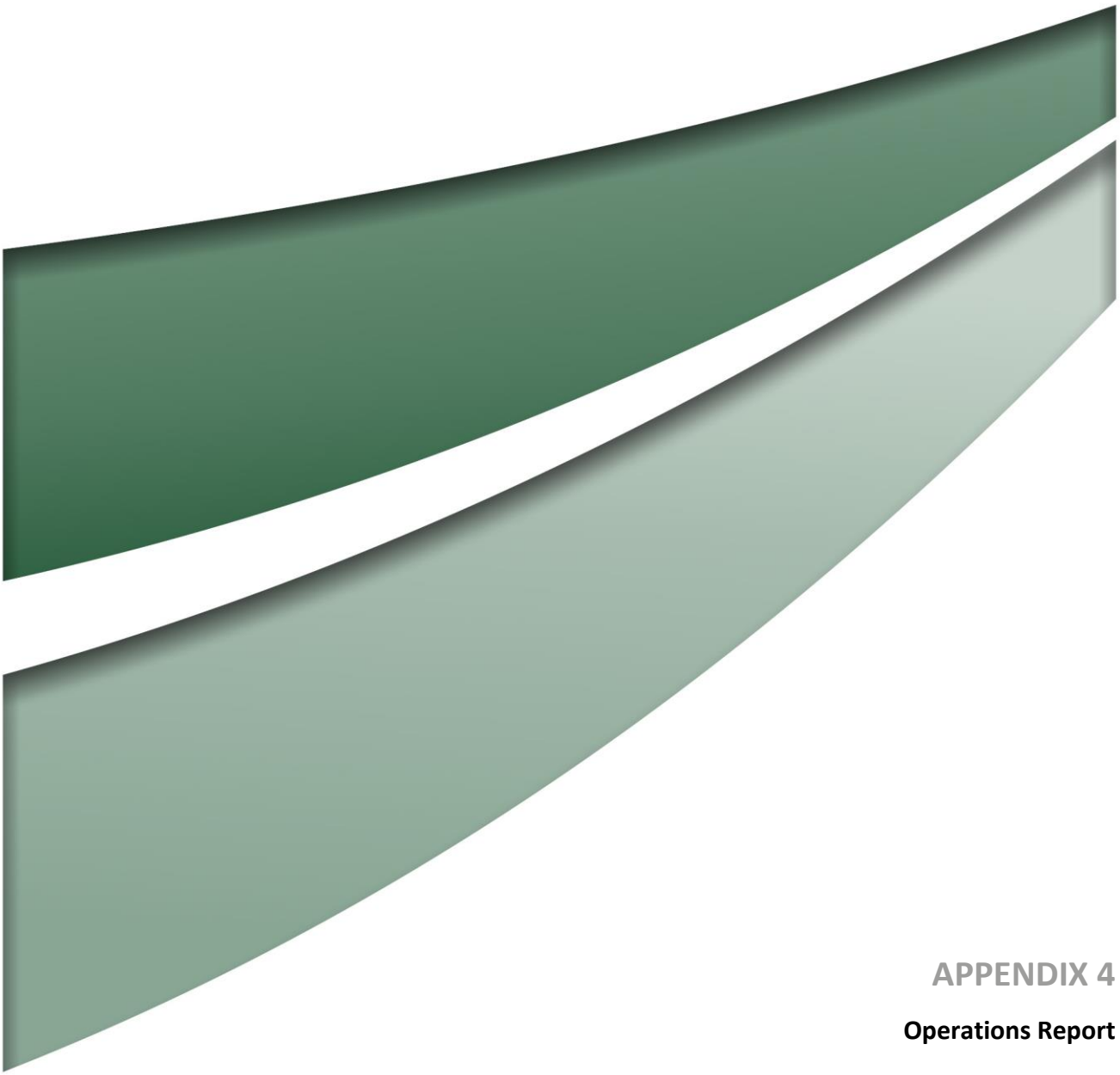
Note: No EPL Limit Specified

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

Groundwater - Iron (mg/L)



Note: No EPL Limit Specified



APPENDIX 4

Operations Report

umwelt
Environmental & Social Consultants

MACKA'S SAND PTY LTD

OPERATIONS REPORT

Approval for Extractive Industry in the
North Stockton Catchment Area

FINAL

March 2021

OPERATIONS REPORT

Approval for Extractive Industry in the North Stockton Catchment Area

FINAL

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Mackas Sand Pty Ltd

Project Director:	Rod Williams
Project Manager:	Rod Williams
Report No.	1646/R104
Date:	March 2021

Newcastle

75 York Street
Teralba NSW 2284

T| 1300 793 267
E| info@umwelt.com.au

www.umwelt.com.au

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
1	Rod Williams	23 March 2021	Rod Williams	23 March 2021

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 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 Umwelt (Australia) Pty Limited (Umwelt) on behalf of Macka's Sand. The reporting requirements for Macka's 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 Macka's Sand during the 2020 calendar year.

Image Source: Nearmap (Jan 2021)

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)

FIGURE 1.1

Locality Plan

File Name (A4): R104/1646_531.dgn
20200330 10.30

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 2020 (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.

The statement of compliance is based on compliance information provided by Mackas Sand. In preparing this report, Umwelt has relied on the information provided in combination with other information sources such as environmental monitoring documentation, discussions with Mackas Sand representatives, and our general understanding of the operation. Umwelt has not sought to undertake a full compliance audit, including secondary verification of the collated documentary evidence with relevant government agency staff, construction personnel or operational staff, site records, etc.

No non-compliances were identified the 2020 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 2020 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, mining 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

Mackas Sand has advised that 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. Macka's Sand has advised that the works at the site were undertaken in accordance with the Operations Management Procedure during 2020.

Hydrocarbon Spill Procedure

Macka's Sand has advised that the works at the site were undertaken in accordance with the Hydrocarbon Spill Procedure during 2020. No spills were recorded during 2020.

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 to be disposed of will be done so 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 1.2 ha of land in the southern section and 0.5 ha in the northern section of Lot 220 was undergoing landform establishment preparations (i.e. topsoil placement) for rehabilitation as at the end of the reporting period.

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

Activities undertaken during the reporting period were generally consistent with the Landscape Management Plan.

6.0 Non-compliance Summary

No non-compliances were identified within the 2020 Operations Report period.

umwelt
Environmental & Social Consultants

Newcastle | Perth | Canberra | Brisbane | Sydney | Orange

T| 1300 793 267 E| info@umwelt.com.au www.umwelt.com.au