



March
2022

**Annual Review and Compliance
Report for
Maroota Sand Quarry
DA 267-11-99
Year Ending 31st December 2021**



COPYRIGHT

© VGT Environmental Compliance Solutions Pty Ltd
and
© Hodgson Quarries & Plant Pty Ltd

All intellectual property and copyright reserved.

Apart from any fair dealing for the purpose of the private study, research, criticism or review, as permitted under the Copyright Act 1968, no part of this report may be reproduced, transmitted, stored in a retrieval system or adapted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without written permission. Enquiries should be addressed to VGT Environmental Compliance Solutions Pty Ltd.

DISCLAIMER

This report was prepared in accordance with the scope of services set out in the contract between VGT Environmental Compliance Solutions Pty Ltd (VGT) ABN 26 621 943 888 and the Client and is not to be reproduced except in full. To the best of our knowledge, the report presented herein accurately reflects the Client's intentions when the document was printed. However, the application of conditions of approval or impacts of unanticipated future events could modify the outcomes described in this document. In preparing the report, VGT used data, surveys, analyses, designs, plans and other information provided by individuals and organisations referenced herein. While checks were undertaken to ensure that such materials were the correct and current versions of the materials provided, except as otherwise stated, VGT did not independently verify the accuracy or completeness of these information sources.

Maroota Sand Quarry

Annual Review and Compliance Report 2021

Name of operation	Roberts Rd, Maroota Sand Quarry
Name of operator	Hodgson Quarries and Plant Pty Ltd
Development consent / project approval #	DA 267-11-99
Name of holder of development consent / project approval	Dr L. S. Martin
Annual Review start date	01/01/2021
Annual Review end date	31/12/2021

I, Lisa Thomson, certify that, to the best of my knowledge, this audit report is a true and accurate record of the compliance status of Roberts Rd, Maroota Sand Quarry for the period 1/1/2021 to 31/12/2021 and that I am authorised to make this statement on behalf of Hodgson Quarries and Plant 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	Lisa Thomson
Title of authorised reporting officer	Environmental Consultant
Signature of authorised reporting officer	

Revision Table

Date	Version	Author	Reviewed	Approved
30/3/22	D0	LT/SK	LT	SR/MH
30/3/22	F0	LT/SK	LT	

Contents

1	Executive Summary	1
2	Statement of Compliance	2
2.1	Actions to Address Non-compliances	3
2.1.1	MEG Annual Quarry Data	3
2.1.2	Water Management Plan Updates	3
2.1.3	Conservation Bond	3
2.1.4	Notification of Incidents	3
2.2	Actions Required from Previous Reports	3
3	Introduction	6
3.1	Project Site	6
3.2	Background	6
3.3	Quarry Contacts	6
4	Approvals	8
4.1	Department of Planning, Industry and Environment	8
4.1.1	Development Application Changes	8
4.1.2	Report Requirements	9
4.2	Environmental Protection Authority (EPA)	10
4.3	Water NSW, NSW Department of Planning, Industry & Environment - Water (DPIE-W) and National Resources Access Regulator (NRAR)	10
5	Operations Description	12
5.1	Operations 2021 Calendar Year	12
5.2	Transport and Truck Movements	12
5.3	Complaints and Community Consultation	17
5.4	Proposed Operations 2022 Calendar Year	17
6	Environmental Management	20
6.1	Waste Management	20
6.2	Climate Summary	20
6.3	Air Quality	21
6.3.1	Requirements and Predictions	21
6.3.2	Monitoring Results Compliance and Trends	22
6.3.3	Interpretation and Effectiveness of Controls	27
6.3.4	Measures Proposed for Improvement	28
6.4	Surface Water, Sediment and Erosion	28
6.4.1	Requirements and Predictions	28
6.4.2	Monitoring Results Compliance and Trends	30
6.4.3	Interpretation and Effectiveness of Controls	40
6.4.4	Measures Proposed for Improvement	40
6.5	Groundwater	40
6.5.1	Requirements and Predictions	40
6.5.2	Monitoring Results Compliance and Trends	40
6.5.3	Wet Weather High Groundwater Level	52
6.5.4	Interpretation and Effectiveness of Controls	54
6.5.5	Measures Proposed for Improvement	54
6.6	Site Water Balance	57
6.6.1	Requirements and Predictions	57
6.6.2	Monitoring Results Compliance and Trends	57
6.6.3	Interpretation and Effectiveness of Controls	58
6.6.4	Measures Proposed for Improvement	59
6.7	Process Water Dam	59
6.7.1	Requirements and Predictions	59
6.7.2	Monitoring Results Compliance and Trends	59
6.7.3	Interpretation and Effectiveness of Controls	60
6.7.4	Measures Proposed for Improvement	60
6.8	Noise and Road Noise	60
6.8.1	Requirements and Predictions	60
6.8.2	Monitoring Results Compliance and Interpretation	61
6.8.3	Trends and Effectiveness of Controls	63

6.8.4	Measures Proposed for Improvement	63
6.9	Flora and Fauna	64
6.9.1	Requirements and Predictions	64
6.9.2	Monitoring Results Compliance and Trends	64
6.9.3	Interpretation and Effectiveness of Controls	64
6.9.4	Measures Proposed for Improvement	65
6.10	Rehabilitation	66
6.10.1	Requirements and Predictions	66
6.10.2	Monitoring Results Compliance and Trends	75
6.10.3	Interpretation and Effectiveness of Controls	75
6.10.4	Measures Proposed for Improvement	75
7	Management Targets and Strategies for Future Stages	76
8	Opportunities for Improvement	77
8.1	Water Management Plan Updates	77
8.2	Transport Management Plan	77
8.3	Rehabilitation Conservation Bond	77
8.4	2020 Independent Audit	77
8.5	Actions and Improvements Planned for 2022	78

Tables

Table 1.	Statement of Compliance	2
Table 2.	Summary of Non-Compliances	2
Table 3.	Additional Information Required from Previous Annual Review Correspondence	3
Table 4.	Rehabilitation Inspection Response	4
Table 5.	Previous Approvals vs Mod 4 Approved Components*	8
Table 6.	Review Requirements	9
Table 7.	Relevant Water Licences Summary	11
Table 8.	Operational Hours	12
Table 9.	Monthly Production 2021	13
Table 10.	Annual Production Last 5 Years	13
Table 11.	Rainfall Summary Last Five Years	20
Table 12.	Air Quality Criteria	21
Table 13.	Dust Deposition Gauge Results: D1 Office	22
Table 14.	Dust Deposition Gauge Results: D2 North East Corner	23
Table 15.	Dust Deposition Gauge Results: D3 North Bundwall	24
Table 16.	Particulate Matter Annual Averages	25
Table 17.	Max 24 Hour Particulate Matter Averages	25
Table 18.	24Hr Exceedances	25
Table 19.	Effectiveness of Air Quality Management Controls	27
Table 20.	Monitoring and Maintenance from the WMP 2018	29
Table 21.	Surface Water Quality Results Dam 1 - Process	31
Table 22.	Surface Water Quality Results Dam 2 – Tailings	32
Table 23.	Surface Water Quality Results Dam 3 – Nursery	33
Table 24.	Surface Water Quality Results Dam 4 - Farm	34
Table 25.	Groundwater Level Monitoring	40
Table 26.	Groundwater Quality Results – MW1	43
Table 27.	Groundwater Quality Results – MW6	44
Table 28.	Groundwater Quality Results – MW7	45
Table 29.	Groundwater Quality Results – MW8	46
Table 30.	Groundwater Quality Results – MW9	47
Table 31.	Groundwater Quality Results – MW10	48
Table 32.	Groundwater Quality Results – MW11	49
Table 33.	Groundwater Quality Results – MW12	50
Table 34.	Groundwater Quality Results – MW13	51
Table 35.	Groundwater Depth Changes with Rainfall Event	52
Table 36.	Operational Noise Criteria	60
Table 37.	Noise-related Conditions	61
Table 38.	Predicted Noise Impacts, 2015 LAeq,15min (dBA)	61
Table 39.	Predicted Noise Impacts, Mod 4 LAeq,15min (dBA)	61
Table 40.	Operator-Attended Noise Survey Results	62

Table 41.	Road Noise Survey Results	62
Table 42.	Sound Power of Equipment	62
Table 43.	Effectiveness of Noise Management Controls	63
Table 44.	Flora and Fauna Management Conditions	64
Table 45.	Flora and Fauna Management Objectives and Targets	64
Table 46.	Recommended Weed Control	65
Table 47.	Rehabilitation Performance Indicators and Completion Criteria	67
Table 48.	Rehabilitation Status	75
Table 49.	Future Targets	76
Table 50.	Independent Audit Actions	77
Table 51.	Summary of Proposed Improvements	78

Figures

Figure One.	Location	7
Figure Two.	Sequence of Extraction	14
Figure Three.	Site Monitoring Locations	15
Figure Four.	Site Layout	16
Figure Five.	Domains 2021	18
Figure Six.	Proposed Domains 2022	19
Figure Seven.	Wet Weather High Groundwater Level – A	55
Figure Eight.	Wet Weather High Groundwater Level – B	56

Appendices

Appendix A	Compliance Review
Appendix B	Consolidated Development Consent Conditions Mod 2
Appendix C	Notice of Modification and draft Consolidated Consent Conditions Mod 4
Appendix D	Environmental Protection Licence 6535
Appendix E	Water Licence Conditions
Appendix F	Complaints Register
Appendix G	Weather Data Summaries
Appendix H	Air Monitoring Results
Appendix I	Pumping Records
Appendix J	Noise Monitoring Results
Appendix K	Flora Monitoring Results
Appendix L	Weed Management Reports
Appendix M	Induction Checklist
Appendix N	Correspondence

1 Executive Summary

This Annual Review and Conditions Compliance Report has been prepared on behalf of Hodgson Quarries and Plant Pty Ltd (the Operator). The Roberts Rd Maroota Sand Quarry, located on Roberts Road near Old Northern Road, Maroota, NSW has been extracting sand and gravels in accordance with Development Approval conditions 267-11-99, Environment Protection Licence 6535 and Water Access Licence 24163 since the 1990s.

On the 13th August, 2021 the project received notification that an application for modification (Mod 4) had been approved. The modification allows for the importation of VENM and ENM to create a landform that better integrates with the surrounds. To assist with this implementation, there was an increase in traffic numbers (from 100 daily to 140), an extension to the period of approval (from 2025 to 2030), and removal of a condition limiting the exposed and active area. This report audits the compliance of the site to the Mod 2 conditions from the 1st January 2021 until the 13th August, then the Mod 4 conditions from 14th August to 31st December 2021.

A draft consolidated consent available from the DPIE Major Projects portal numbers the conditions in Schedule 2 differently to that in Mod 2 and the Notification of Modification for Mod 4. This report therefore adopts the numbering convention given in the Notification of Modification rather than the draft Consolidated Consent in that it aligns more closely with existing conditions. It is hoped that the errors in the draft will shortly be rectified.

There were five DA conditions with non-compliances.

1. Annual quarry production data for the 2021 calendar year has not been provided to Department of Regional NSW - Mining, Exploration and Geoscience (MEG) to date as the MEG form requires financial year data not calendar year as per the consent condition. It is hoped that this will be rectified when the final consent conditions are issued.
2. The site Water Management Plan has not been updated during the reporting period; the previous submission is awaiting approval from DPIE.
3. The conservation bond will be calculated during 2022 using latest survey and submitted for approval.
4. Particulate Matter less than 2.5 μm in diameter (PM_{10}) exceeded the Mod 4 24-hour criteria on one occasion in October 2021 during a local grass fire. This result does not represent a non-compliance as it was not due to site activities, however this incident was not reported. Particulate Matter less than 2.5 μm in diameter ($\text{PM}_{2.5}$) for the 2021 report period was below the Mod 4 annual limit, despite the elevated result in October. If exceedances are measured in the future these will be reported as incidents to ensure compliance.
5. The condition regarding all conditions be complied with is also non-compliant.

Noise monitoring during the year showed compliance with requirements in both early morning and daytime production times. No new equipment has been operational on site.

No VENM has been imported in the reporting period.

2 Statement of Compliance

This report audits the compliance of the site to the conditions approved March 2016 (Mod 2) from the 1st January 2021 until the 13th August, then the conditions approved August 2021 (Mod 4) from 14th August to 31st December 2021. This report adopts the numbering convention given in the Notification of Modification for modification 4 rather than the draft Consolidated Consent, in that it aligns more closely with existing conditions. It is hoped that several numbering and administrative errors can be corrected before issuing the final Consolidated Consent conditions.

Table 1. Statement of Compliance

Were all conditions of the relevant approvals(s) complied with?	
Development Consent # 267-11-99 as modified	No, see Table 2 and <i>Appendix A</i>
Environmental Protection License 6535	Yes, see Table 2 and <i>Appendix A</i>
NSW Office of Water Licenses	Yes

Table 2. Summary of Non-Compliances

Reference	Condition Description (Summary)	Compliance status comments	Action
DA S2 C2b	The Applicant shall: (b) comply with the conditions of this consent	Not all conditions compliant	
DA S317A & 17B	The Applicant shall provide MEG with annual quarry production data, covering a full calendar year by no later than 30 January using the relevant form	MEG has informed VGT that their current method involved forms that cover financial year, not calendar year. MEG have contacted DPIE to resolve. Awaiting for MEG/DPIE response for how they would like production data submitted.	Awaiting correspondence from MEG/DPIE.
DA S2 C42	The Applicant shall prepare a Water Management Plan.....updated on an annual basis	WMP has been reviewed annually but not updated in consultation with DPIE and DPI-Water. Specifically the reason for not requiring the Process Dam engineering is not explained within the WMP	WMP is waiting on DPIE approval. No update during 2021.
DA S2 C61	The Applicant shall lodge a Conservation Bond with the Department	Bond calculation not submitted to date.	A letter was posted to the DPIE on 23 rd October 2020 requesting instructions on how to lodge the conservation bond (<i>Appendix N</i>). The approval of expert was received 2 nd Nov 2021, and the expert was engaged in January 2022. A drone survey was undertaken on the 24 th Feb 2022. Survey results have been received and calculation is expected to be submitted in 2022.

Reference	Condition Description (Summary)	Compliance status comments	Action
DA S2 C68	The Applicant must immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing via the Major Projects Website and identify the development (including the development application number and name) and set out the location and nature of the incident.	24-hour PM2.5 exceeded 25 µg/m3 on one occasion during the reporting period. In October 2021, the high reading was due to a local grass fire, not due to development operations therefore not a non-compliance.	Not reported as an incident.

2.1 ACTIONS TO ADDRESS NON-COMPLIANCES

2.1.1 MEG Annual Quarry Data

A form that covers the calendar year 2021 has not been provided to date. The latest form available covers July 1st 2020 – June 30th 2021.

MEG requires that this data be supplied on a financial year basis rather than calendar year. It is hoped that this condition can be revised in consultation with MEG and DPIE prior to the final consolidated consent conditions being issued for Mod 4.

2.1.2 Water Management Plan Updates

An updated Water Management Plan has been submitted but not yet approved by DPIE. NRAR and DPIE will be approached to review whether annual updates are still required, given the extended review time.

2.1.3 Conservation Bond

Rehabilitation Bond calculations will be commenced in 2022 as recent survey has been delivered.

2.1.4 Notification of Incidents

A high 24-hour PM2.5 reading in September 2021 caused by local grassfire was not reported as an incident as it was not considered caused by site operations. Future exceedances will be reported to ensure compliance with Mod 4.

2.2 ACTIONS REQUIRED FROM PREVIOUS REPORTS

The 2020 Annual Review and Conditions Compliance Report was submitted to DPIE on 26th March 2021 through the Major Projects Portal. Acknowledgement was received from DPIE on 26th March 2021. Additional information requested in the letter from DPIE are summarised below.

Table 3. Additional Information Required from Previous Annual Review Correspondence

Action No	Action Description	Where Addressed in this report
1	Details of any landscape rehabilitation that was carried out for reporting period, and details of rehabilitation proposed to be carried out over the next reporting period.	6.10
2	Details of weed control management measures implemented at the site for the reporting period and details of the effectiveness of those measures.	Table 4, Table 46, Appendix L

Action No	Action Description	Where Addressed in this report
3	List all relevant statutory requirements, limits or performance measures and criteria for rehabilitation of the site and detail how these have been satisfied.	Section 6.10, Performance Indicators and Completion Criteria are listed in LRMP dated March 2018, no criteria have been achieved to date.
4	A comprehensive review of the monitoring results of the development for the reporting period, including a comparison of these results against the EIS, Modification 1 and Modification 2	Section 6
5	Identify any trends in the monitoring data for the life of the development, with particular focus on previous 5-year period.	Section 6. Graphs produced throughout report from 2017 where available.

An inspection of the site was undertaken on 2nd June 2021 as part of the DPIE's rehabilitation review of select quarries across NSW. A letter was sent via email to the Environmental Officer dated 29/07/2021 requesting actions as summarised in the following table.

Table 4. Rehabilitation Inspection Response

Action No	VGT Ref	Action Description	Tasks Undertaken
1	11337	Remove all waste from the site. Should you wish to retain any waste on the site, provide details of the waste type, and purpose for waste retention. For waste remaining on the site, waste should be stored in a single location in a neat and tidy manner. Provide photographic evidence noting before and after waste removal, and /or storage of waste	A letter outlining actions was submitted and received 24/8/21 – DA267-11-99-PA12. The actions undertaken are described in section 6.1 . No further action has been requested.
2	11338	Submit the updated WMP for consultation with the Department as required under Condition 42 of the Consent	The updated WMP was submitted for consultation in February, April and August 2021 (DA267-11-99-PA-11) as documented in submitted response number DA267-11-99-PA-13. An email request to NRAR for comment was sent again on 12/10/21 with a response received 26/10/21 that the matter is currently being reviewed. NRAR and DPI-Water responded on 2 nd Nov 2021 via the Major Projects portal that they had no comment. The WMP was then submitted to DPIE via the Major Projects Portal. There has been no approval or further information required at this stage.

Action No	VGT Ref	Action Description	Tasks Undertaken
3	11339	<p>Reference is made to your letter dated 23 October 2020, in which you requested instructions from the Department on the process for submission of the Bond. The Department did not respond to this matter as the Department was not in receipt of said letter. I advise that the Bond and supplementary documentation (as required under Condition 61 (a) and (b)) is to be hand delivered to the Department by the Proponent, or sent via secure post, to the Department. However, due to Covid-19 restrictions currently in place, the Department's mailroom is currently closed. As such, it is please email the Department's Mailroom: Admin_PlanningServices@planning.nsw.gov.au prior to delivery of the Bond to the Department, to ensure that Departmental staff will be available to receive the delivery. Please also copy compliance@planning.nsw.gov.au into the email.</p>	<p>Details of communications regarding this matter were included in submitted response number DA267-11-99-PA-14.</p> <p>On the 5/10/21 a request for approval of the expert and method for calculating the bond was submitted DA267-11-99-PA-16. A request for more information was received 25/10/21 and was replied to 28/10/21. The approval was received 2nd Nov 2021, and the expert was engaged in January 2022.</p> <p>A drone survey was undertaken on the 24th Feb 2022. Once the results are received, the calculations for the bond will be undertaken during 2022.</p>
4	11340	<p>Conduct a weed survey of the site, and provide evidence of compliance to the Department with the following:</p> <ol style="list-style-type: none"> 1) Section 7, Table 33 of the approved Landscape and Rehabilitation Plan (LRP) - Rehabilitation Objectives and Completion Criteria, with specific reference to weed cover and weed prevention percentages present on the site; 2) Section 8.7 of the LRP - The Monitoring and Maintenance Schedule for weeds on the site; 3) Section referenced: 8 Appendix, Appendix D of the Annual Biodiversity Monitoring Report 2020 (at Appendix J of the Annual Review 2020 - Flora Monitoring Results) which tables the recommended weed control methods for the site for each month of the year. 	<p>A Biodiversity Report was prepared in October 2021 including assessment of weeds, and uploaded to the portal on 23/08/2021, DA267-11-99-PA-15. A request for further information was received via the Portal. Further information was supplied in Oct 21 (PA19) and Nov 21 (PA 20). A request for further information was received regarding PA20, which was addressed on 6th Dec 2021. A message considering these details satisfactory was received 13/12/21.</p> <p>The weed management activities are addressed in section 6.9 and management reports for Oct, Nov and Dec 2021 are included in Appendix L</p>

3 Introduction

3.1 PROJECT SITE

This Annual Review and Conditions Compliance Report has been prepared by VGT Environmental Compliance Solutions Pty Ltd (VGT) on behalf of Hodgson Quarries and Plant Pty Ltd (the Operator). The Roberts Rd Maroota Sand Quarry is located on Roberts Road near Old Northern Road, Maroota, NSW. Maroota is approximately 50 kilometres north-west of Sydney (see [Figure One](#)). The Operator extracts sand and gravels from the site according to Development Approval conditions 267-11-99.

3.2 BACKGROUND

The Maroota area is known for the production of sand from a paleochannel system and represents a valuable resource to the building industry. The sand is obtained from two main sources, the Maroota Sand which overlies the weathered profiles of the Hawkesbury Sandstone. Clay beds deposited by the meandering of the paleochannels are common throughout the Maroota Sand formation.

The Roberts Rd site has been operational since the 1990's and construction of a water supply dam commenced in or around the 1970's. Consent was granted for extraction and processing of sand, clay and pebble material in 2000 and the continued construction of the dam which is located on the northern boundary of the site. The client took over operations on the site in 2004.

This Annual Review and Conditions Compliance Report covers the period 1st January 2021 to 31st December 2021 and has been conducted against the Modification 2 approved on 18/3/2016 and, where appropriate the Modification 4 approved on 13th August 2021.

3.3 QUARRY CONTACTS

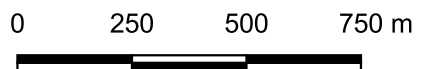
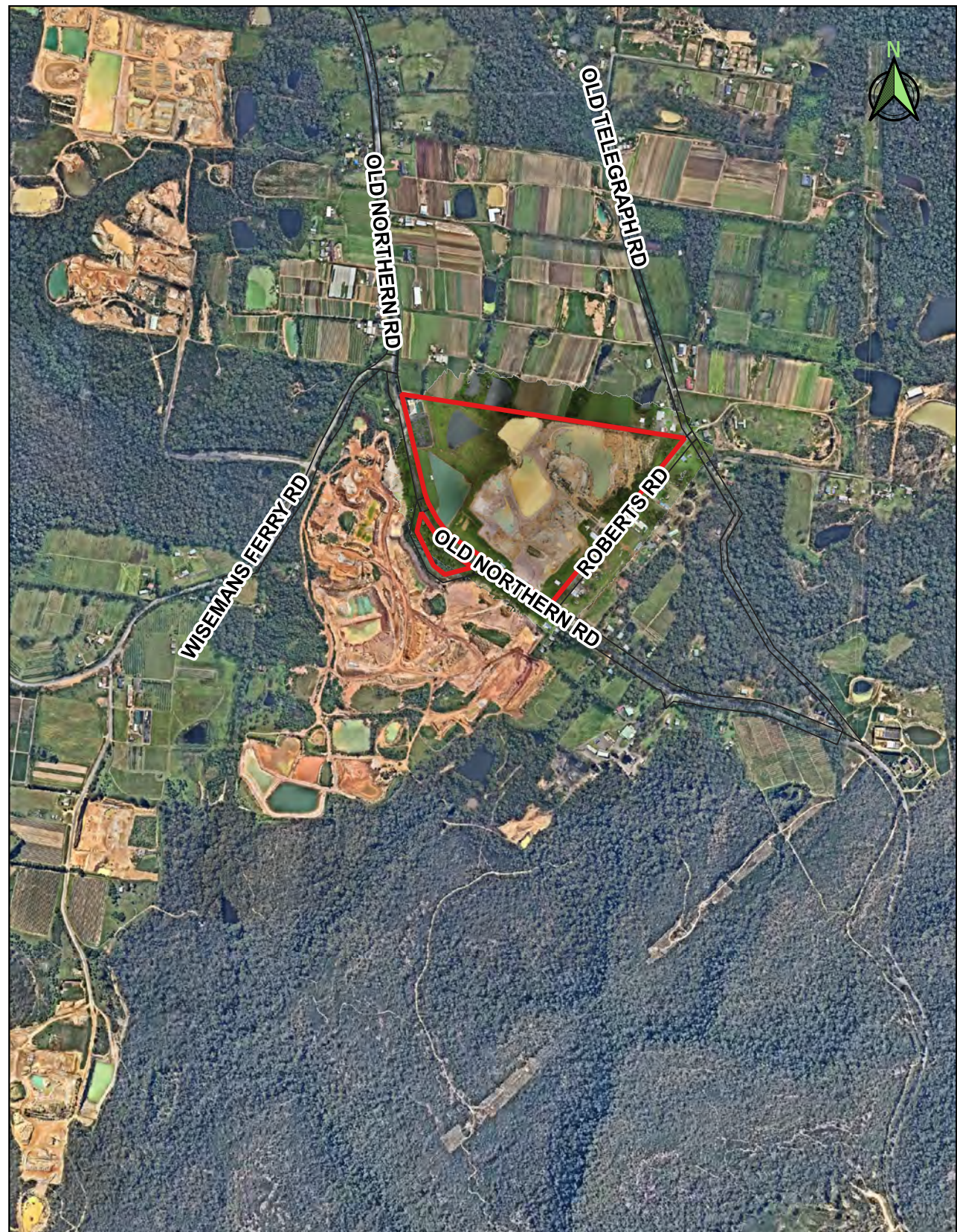
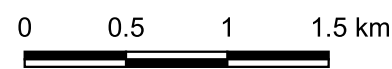
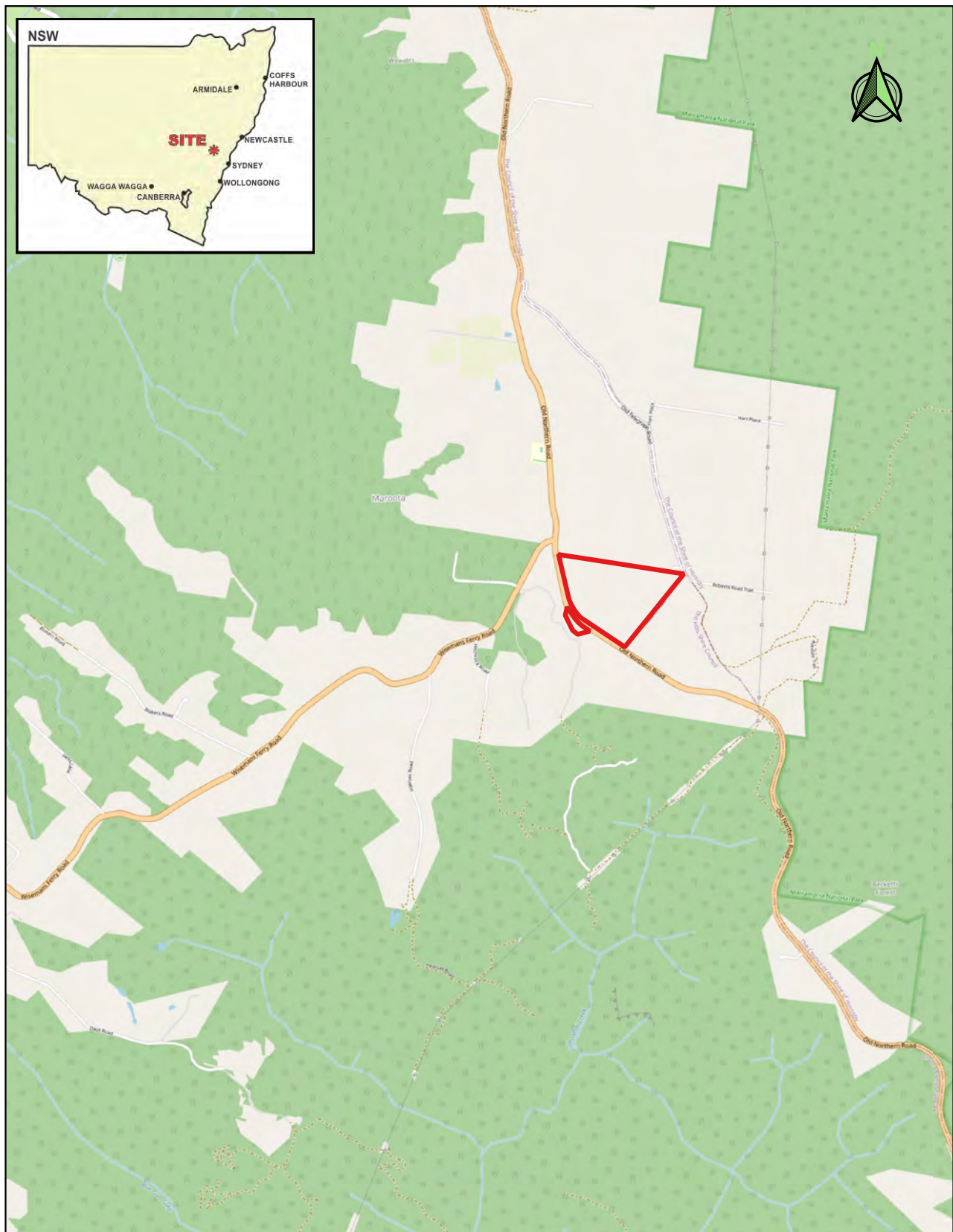
	Production Manager	Environmental Officer
	Martin Hodgson	Stuart Reed
	Hodgson Quarry and Plant Pty Ltd	Hodgson Quarry and Plant Pty Ltd
Address	PO Box 1778, Gosford NSW 2250	PO Box 1778, Gosford NSW 2250
Mobile	0408 251 393	0418 277 871
Phone	(02) 4372 1649	(02) 4372 1649
Email	hodgsonquarries@gmail.com	hodgsonquarries@gmail.com

Figure One. Location

Plan of:	Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Site Location	Location:	Maroota Quarry, Roberts Road, Maroota, NSW	Source:	Google Maps & nearmap - Image Date 18/03/2020 Fyfe - Image Date 24/2/2022	Plan By:	SK/JD
Figure:	ONE	Council:	Hills Shire Council	Survey:	Not Applicable	Project Manager:	LT
Version/Date:	15/03/2022	Tenure:	Not Applicable	Projection:	GDA2020/MGA Zone 56 EPSG:7856	Office:	Thornton
Our Ref:	12173_HMA_ARC2021_Q001_V0_F1	Client:	Hodgson Quarries & Plant Pty Ltd	Contour Interval:	Not Applicable		



This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Legend

Property Boundary

4 Approvals

This section details the approvals and licenses held for the site, as well as relevant legislative requirements that the owner, operator and site workers should be aware of. This chapter will be reviewed annually to ensure information remains up to date with legislative and policy changes.

4.1 DEPARTMENT OF PLANNING, INDUSTRY AND ENVIRONMENT

Development approval (DA267-11-99), with conditions of consent was first issued by the then Department of Urban Affairs and Planning on the 31st of May 2000. The first modification to S98/00772 was issued on the 29th of November 2000 (Mod 1). In view of the imminent expiry of the consent in May 2015, a further Modification to Consent (Mod 3) was submitted to the DPE to extend the life of the quarry to permit continued operations whilst Mod 2 was under consideration by the DPE. This was approved on the 18th of August 2015 with an expiry of the 31st of May 2016.

A Modification to Consent (Mod 2) to both regularise the existing extraction operation and to extend the life of the approved extraction was submitted to the Department of Planning and Environment (DPE) in May 2015. The DPE made requests for further information and an amended Modification to Consent document addressing those issued was submitted in September 2015 and approved on 18th March 2016. The consolidated consent for Mod 2 is given in *Appendix B*.

A Modification to Consent (Mod 4) was submitted by GQP in November 2019. Mod 4 was granted 13th August 2021, see *Appendix C*. A summary of the changes from previously approved operations is shown in Table 5 below.

4.1.1 Development Application Changes

Table 5. Previous Approvals vs Mod 4 Approved Components*

Component	Previously Approved Operations	Mod 4 Change (from 14/8/21)
Quarry Life	31/05/2025	31/05/2030
Production Limit	No specified limit but limited by maximum transport movements which HQP asserts equates to an estimated maximum of 480,000 tpa	480,000 TPA
Production Truck Movements	Up to 50 laden trucks (100 movements) per day and up to 20 movements per hour	Up to 70 laden trucks (140 movements) per day and up to 20 movements per hour (includes the material import truck movements)
Importation Truck Movements	-	Up to 40 truck movements per day for importation of VENM and ENM (included in the overall truck movement rate being sought)
Virgin Excavated Natural Material (VENM)/Excavated Natural Material (ENM) Importation Rate	-	200,000 - 320,000 tpa
Total VENM/ENM Importation	-	2 – 3 million tonnes
Extraction Sequence	As shown in Figure 3*	Change to the extraction sequence to account for the importation of fill.

Component	Previously Approved Operations	Mod 4 Change (from 14/8/21)
Final Landform	Approved Final Landform in Figure 4 *	HQP has proposed two revised conceptual final landforms based on two different scenarios of backfill material availability. The approved vs proposed final landforms are shown in Figures 5a-5b* .
Hours of Operation	<p>Construction 7.00 am – 6.00 pm Monday to Friday No change</p> <p>Extraction and Processing 7.00 am – 6.00 pm Monday to Friday 7.00 am – 1.00 pm Saturday</p> <p>Vehicle Loading 6.00 am – 6.00 pm Monday to Friday 6.00 am – 1.00 pm Saturday</p>	No change

*Source: NSW DPIE Aug 2021 Assessment Report VENM / ENM Importation and Extension of Life State Significant Development Modification Assessment (DA 267-11-99 MOD 4)

4.1.2 Report Requirements

This Review is required under condition 6 (Conditions Compliance Report) and 66 (Annual Review) of the consolidated consent. Permission to consolidate the two reviews required was obtained from the Department of Planning and Environment on 30/6/16.

Table 6. Review Requirements

Consent Condition No	Condition Text	Where addressed in this report
6	The Applicant will submit a Conditions Compliance Report to the Secretary prior to the commencement of extraction in areas that are not currently subject to extraction. Subsequent reports will be submitted annually for the first three years of extraction in areas not currently subject to extraction. Further reports shall be submitted as required by the Secretary.	This report and <i>Appendix A</i>
6 (a)	To enable ready comparison with the EIS's predictions, diagrams and tables, the Conditions Compliance Reports shall include, but not be limited to, the following matters:(a) a compliance audit of the performance of the project against conditions of Consent and statutory approvals	<i>Appendix A</i>
6 (b)	(b) a review of the effectiveness of the environmental management of the development	Section 6
6 (c)	(c) the results of environmental monitoring required under this Consent or other approvals, including interpretations and discussion by a suitably qualified person;	Section 6
6 (d)	(d) a listing of any variations obtained to approvals applicable to the DA since the last report;	Section 4.1.1
6 (e)	(e) a record of all complaints and the actions taken to mitigate all such complaints;	Section 5.3
6 (f)	(f) a report detailing the rehabilitation measures undertaken since the last report; and	Section 6.10

Consent Condition No	Condition Text	Where addressed in this report
6 (g)	(g) environmental management targets and strategies for stages of the development yet to be completed.	Section 7
66	By the end of March each year (or as otherwise agreed by the Secretary), the Applicant shall review the environmental performance of the development for the previous calendar year to the satisfaction of the Secretary. This review must:	Submitted March 2022
66 (a)	(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 current calendar year;	Sections 5 , Section 6.10
66 (b)	(b) include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the: <ul style="list-style-type: none"> • relevant statutory requirements, limits or performance measures/criteria; • monitoring results of previous EIS years; and • relevant predictions in the EIS, Modification 1 and Modification 2; 	Section 6
66 (c)	(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 2 , <i>Appendix A</i>
66 (d)	(d) identify any trends in the monitoring data over the life of the development;	Section 6
66 (e)	(e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6
66 (f)	(f) describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 6

4.2 ENVIRONMENTAL PROTECTION AUTHORITY (EPA)

Environmental Protection License 6535 (see *Appendix D*) has been issued under the *Protection of the Environmental Operations Act* for Crushing, Grinding or Separating Works and Dredging Works. It is renewed annually on the 12th of March and requires monitoring for noise impacts (see Section [6.8.2](#) for results). There have been no changes during the report period.

Condition 26 of Mod 4 granted during the reporting period has permitted importation of VENM and ENM. At the time of preparing this report no VENM or ENM has been imported therefore an update will be provided in the next reporting period.

4.3 WATER NSW, NSW DEPARTMENT OF PLANNING, INDUSTRY & ENVIRONMENT - WATER (DPIE-W) AND NATIONAL RESOURCES ACCESS REGULATOR (NRAR)

The site holds a number of licenses issued under the *Water Management Act 2000*, for the operation of groundwater bores and dams. Location of these bores and dams can be found on [Figure Three](#). A summary table of those relevant to the development consent and their current status can be found in [Table 7](#). Water licenses and their conditions have been included in *Appendix E*. Compliance with these conditions is included in *Appendix A*.

Table 7. Relevant Water Licences Summary

Identification	Licence when Registered	Water Access Licence Number (WAL)	Water Approval No'/ Reference Number	Purpose	Allocation	Expiry	Bore Status	Comments
PT84PB1	10BL159748 (converted to WAL)	WAL 24163	10WA114817 10AL114816	Extraction	45.0 ML per year	14/06/2025	Converted to WAL	Can extract at a rate of 3L/sec.
	10SL045324 (converted to WAL)	WAL 26163	10CA104888 10AL104887	Irrigation	264.0 ML per year	16/02/2026	Converted to WAL	2 pumps and 2 Bywash Dams. Allocation to be transferred
PT84MW1	10BL158808	NR	NR	Monitoring	-	perpetuity	In use for water sampling	Installed 20/10/1998. Located near nursery.
PT84MW5	10BL158808	NR	NR	Monitoring	-	perpetuity	Not in use	Collapsed. Replaced by MW8
PT84MW6	10BL605696	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed January 2015. To replace PT84MW4
MW7	10BL605799	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016
MW8	10BL605799	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016
MW9	10BL605799	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016
MW10	10BL605798	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016
MW11	10BL605797	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016
MW12	10BL605799	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016
MW13	10BL605799	NR	NR	Monitoring		perpetuity	In use for water sampling	Installed December 2016

NR = Not required: used for monitoring only

5 Operations Description

The site has approval (Mod 4) to extract sand and gravels at the rate of up to 70 incoming and 70 outgoing trucks per day and a maximum of 10 incoming and 10 outgoing truck movements per hour.

Extraction of the sand is contingent upon a water supply dam in order to wash the clay from the material won. The material is loaded onto a belt feeder which introduces the sand into a mixing tank. An electric pump at the water storage dam pumps water to the mixing tank via a pipeline. The sand slurry is drawn out of the mixing tank by a slurry pump and pumped to the processing plant. The processing plant washes and screens material, using water primarily from the existing water supply dam adjacent to the northern boundary (Process Dam 1). After washing and screening, material is stockpiled adjacent to the plant area prior to transportation off-site by truck. Trucks are loaded using a front-end-loader. Washing and screening forms a residual clay/silt slurry which is piped to designated drying areas in a previously extracted cell where it will be spread in thin layers to dry. Liberated water is drained to the water dam for re-use in the processing plant.

5.1 OPERATIONS 2021 CALENDAR YEAR

The site layout is illustrated in [Figure Four](#). The operation restricts activities to between the hours in [Table 8](#).

Table 8. Operational Hours

Days of the week	Activity	Hours
Monday to Friday	Construction	7.00am to 6.00pm
Monday to Friday	Extraction and processing of material	7.00am to 6.00pm
Saturdays	Extraction and processing of material	7.00am to 1.00pm
Monday to Friday	Vehicle loading	6.00am to 6.00pm
Saturdays.	Vehicle loading	6.00am to 1.00pm
Sundays & Public Holidays	No works permitted	

These hours were not exceeded during the report period, although it is site practice to open the gates at 5:30am to prevent trucks from parking on Roberts Rd. There was no extraordinary maintenance works or atypical operations during the report period.

Approximately 96,000 tonnes of material was sold during the report period, which was higher than 2020. A condition was introduced in Mod 4 limiting the site to process or dispatch no more than 480,000 tonnes per calendar year.

5.2 TRANSPORT AND TRUCK MOVEMENTS

At no time during the report period did the number of laden trucks exceed 50 per day or 10 per hour or the increased Mod 4 limit of 70 incoming trucks per day. The weighbridge is not capable of logging movements per hour. The maximum laden trucks per day was 34 in December 2021, which equates to an average of 3.1 movements per hour. Each truck takes 6-8 minutes to load, therefore no more than 10 laden movements per hour is possible.

Section 94A contributions are paid monthly.

Table 9. Monthly Production 2021

Month	Tonnes	Truck Movements per Month	Max Trucks per Day this Month	Limit Trucks per Day (Mod3)	Limit Trucks per Day (Mod4)
January	2320	75	14	50	70
February	4446	140	11	50	70
March	4300	139	15	50	70
April	3053	103	12	50	70
May	5304	167	17	50	70
June	9327	282	34	50	70
July	7383	219	27	50	70
August	8836	265	21	50	70
September	12624	368	25	50	70
October	12516	362	27	50	70
November	12622	369	27	50	70
December	13256	389	34	50	70
Total	95988	2878	34	50	70

Table 10. Annual Production Last 5 Years

Cal Year	Tonnes	Limit T per Cal Year	Truck Movements per Year	Max of Truck Movements per Day	Limit Trucks per Day (Mod3)	Limit Trucks per Day (Mod4)
2017	142633	480000	3937	26	50	70
2018	123858	480000	3361	24	50	70
2019	106907	480000	2916	28	50	70
2020	56894	480000	1638	21	50	70
2021	95988	480000	2878	34	50	70

Graph 1. Daily Production Trends Last 5 Years

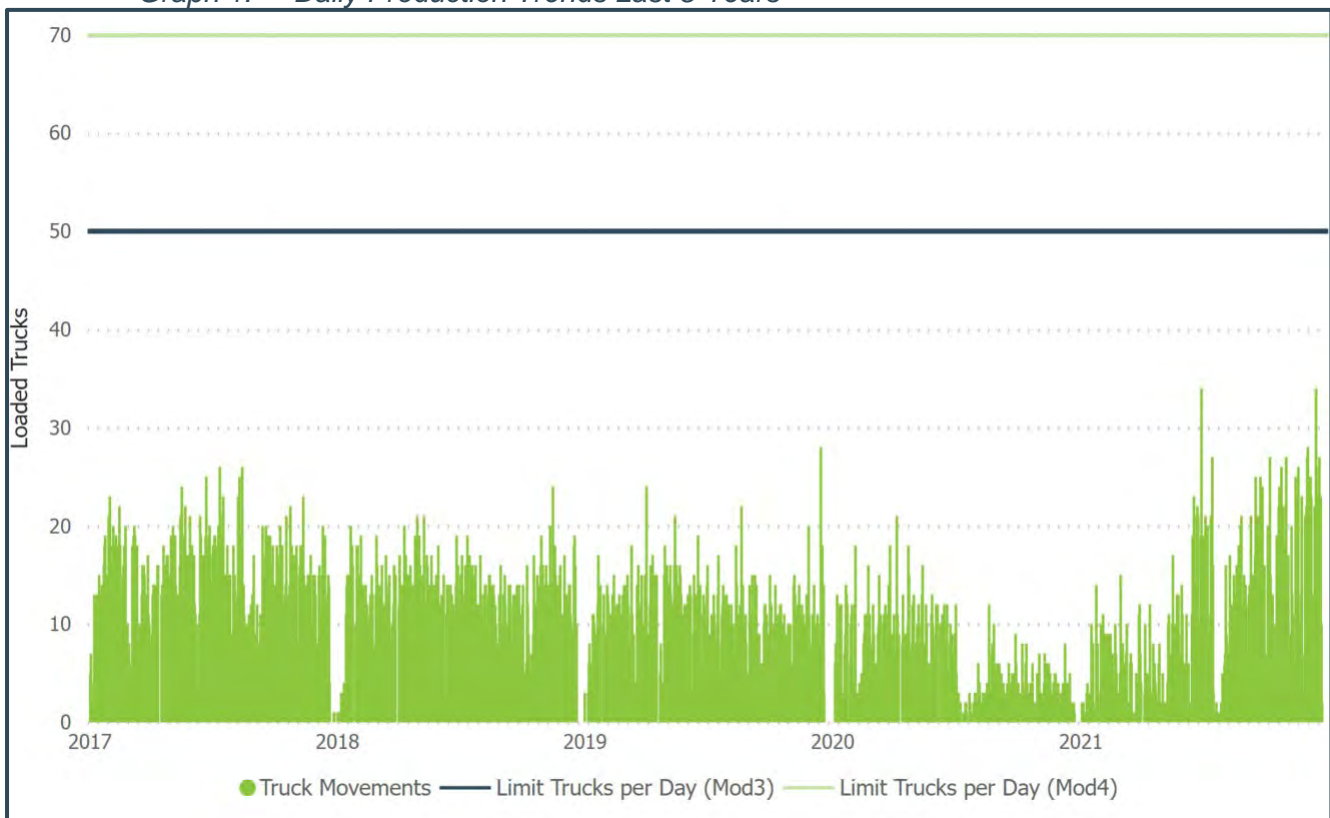


Figure Two. Sequence of Extraction

Plan of: Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Sequence of Extraction

Figure: TWO

Version/Date: V0 15/03/2022

Our Ref: 12173_HMA_ARC2021_Q002_V0_F2

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe Quarry Photo - Image Date 24/02/2022
Nearmap surrounding photo - Image Date 18/03/2020 Zone MGA 56


Survey: Not Applicable

Projection: GDA2020/MGA Zone 56 EPSG:7856

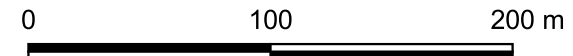
Contour Interval: Not Applicable

Plan By: SK/JD

Project Manager: LT



This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Legend

- Property Boundary
- Monitoring Wells
- Water Sampling
- Years 1-2 (2015-2017)**
- Phase 1
- Phase 3
- Phase 5
- Phase 2
- Phase 4
- Phase 6

Note: Phases and Years are indicative only, and are dependent on market demand and product mixing requirements.

Figure Three. Site Monitoring Locations

Plan of: Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Environmental Monitoring Locations

Figure: THREE

Version/Date: V0 15/03/2022

Our Ref: 12173_HMA_ARC2021_Q003_V0_F3

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe - Quarry Image Date 24/02/2022 Zone MGA 94
nearmap - Surrounds Image Date 18/03/2020 Zone MGA 56

Survey: Not Applicable

Projection: GDA2020/MGA Zone 56 EPSG:7856

Contour Interval: Not Applicable

Plan By: SK/JD

Project Manager: LT

vgt environmental compliance solutions and laboratories

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Note:

Dam No.	Dam Catchment	Dam Area (m ²)	Estimated Average Depth (m)	Estimated Volume (m ³)
1	Processing Dam	-	Ranging from 0.1-3m*	1,240*
2	Holding Dam	12,200	1	12,200
3	Northern Nursery Dam	7,500	2	15,000
4	Southern Nursery Dam	14,500	2	29,000
Total Volume Held				57,440

* Volume calculated from 12D software to RL 187.2 from modelled contours.
All dams will be incorporated into the final landform.

- Legend**
- [Red Outline] Property Boundary
 - [Red Circle] Monitoring Wells
 - [Pink Square] Dust & HVAS
 - [Green Diamond] Attended Noise
 - [Blue Square] Road Noise Monitoring
 - [Blue Diamond] Water Sampling
 - [Pink Circle] Dust Gauge
 - [Yellow Triangle] Weather Station
 - [Blue Star] Sprinkler

Figure Four. Site Layout

Plan of: Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Site Layout

Figure: FOUR

Version/Date: V0 15/03/2022

Our Ref: 12173_HMA_ARC2021_Q004_V0_F4

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe - Quarry area survey nearmap - Surrounding imagery Date 18/03/2020 Zone MGA 56

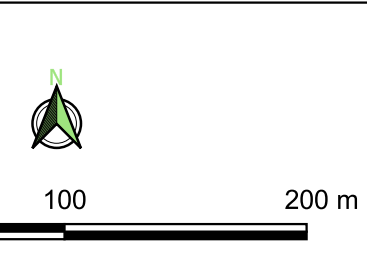
Survey: Fyfe - Quarry Area flown 24/2/2022 NSW Spatial Services for surrounds dated May 2017

Projection: GDA2020/MGA Zone 56 EPSG:7856

Contour Interval: 1m

Plan By: SK/JD

Project Manager: LT



vgt environmental compliance solutions and laboratories

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Legend

Property Boundary

Contours

— 5m

5.3 COMPLAINTS AND COMMUNITY CONSULTATION

The client advertises a community complaints and enquiries phone number in the white pages, on their website (www.vgt.com.au/hodgsons), and in prominent signage on the front gate. All monitoring results, approved management plans and compliance reports, as well as relevant consent and approval documents are also available on the website. The complaints procedure is outlined in the Operational Environmental Management Plan. All complaints are recorded and actioned within 24 hours where possible. There have been no complaints received by the client during the reporting period. The complaints register and form is included in *Appendix F*.

Regular, informal consultation is undertaken verbally with neighbours.

5.4 PROPOSED OPERATIONS 2022 CALENDAR YEAR

Operations are proposed to remain similar in 2022. The active cells are proposed to be phases 3 and 4 as illustrated on *Figure Two*.

Emplacement of VENM, once commenced, is proposed to take place in the southern end of Process Area Dam 1.

Figure Five. Domains 2021

Plan of: Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Domains at 2021

Figure: FIVE

Version/Date: V1 30/03/2022

Our Ref: 10418_HMA_ARC21_Q005_V1_F5

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe - Quarry area flown 24/02/2022 nearmap - Surrounding imagery Date 18/03/2020 Zone MGA 56


Survey: Not Applicable

Projection: GDA2020/MGA Zone 56 EPSG:7856

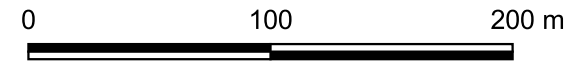
Contour Interval: Not Applicable

Plan By: SK/JD

Project Manager: LT



This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Legend

Property Boundary	Domain Type	Access Tracks & Haul Roads (Unsealed)	Infrastructure Area (Sealed)	Overburden Emplacement
2018 Vegetation	Exposed and Active (1.7 Ha)	Areas Not Actively Creating Dust	Water Management	Land Being Prepared for Rehabilitation
Active Extraction Area		Stripped Ahead of Mining	Bundwalls (Including Topsoil)	

Figure Six. Proposed Domains 2022



Plan of: Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Domains at 2022

Figure: SIX

Version/Date: V1 30/03/2022

Our Ref: 12173_HMA_ARC2021_Q006_V1_F6

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe - Quarry area flown 24/02/2022
nearmap - Surrounding imagery Date 18/03/2020 Zone MGA 56


Survey: Not Applicable

Projection: GDA2020/MGA Zone 56 EPSG:7856

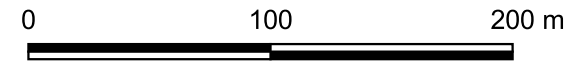
Contour Interval: Not Applicable

Plan By: SK/JD

Project Manager: LT



This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.



Legend

Property Boundary	Domain Type	Access Tracks & Haul Roads (Unsealed)	Infrastructure Area (Sealed)	Overburden Emplacement
2018 Vegetation	Exposed and Active (1.7 Ha)	Areas Not Actively Creating Dust	Water Management	Land Being Prepared for Rehabilitation
Active Extraction Area		Stripped Ahead of Mining	Bundwalls (Including Topsoil)	

6 Environmental Management

6.1 WASTE MANAGEMENT

Unused pallets, IBC's and other waste were removed from the site in accordance with requirements from the DPIE following a Rehabilitation Inspection on the 2nd June 2021. A report detailing the activities was submitted to the Major Projects Portal on 24th August 2021 reference DA267-11-99-PA12. In summary, a pile of unused waste was removed from areas near the front gate, and empty chemical containers and drums were returned to the suppliers. Photographic evidence of the removal was supplied in the report.

Recycling practices on the site were discussed at a toolbox meeting during the report period and containers for recyclable materials are present on the site.

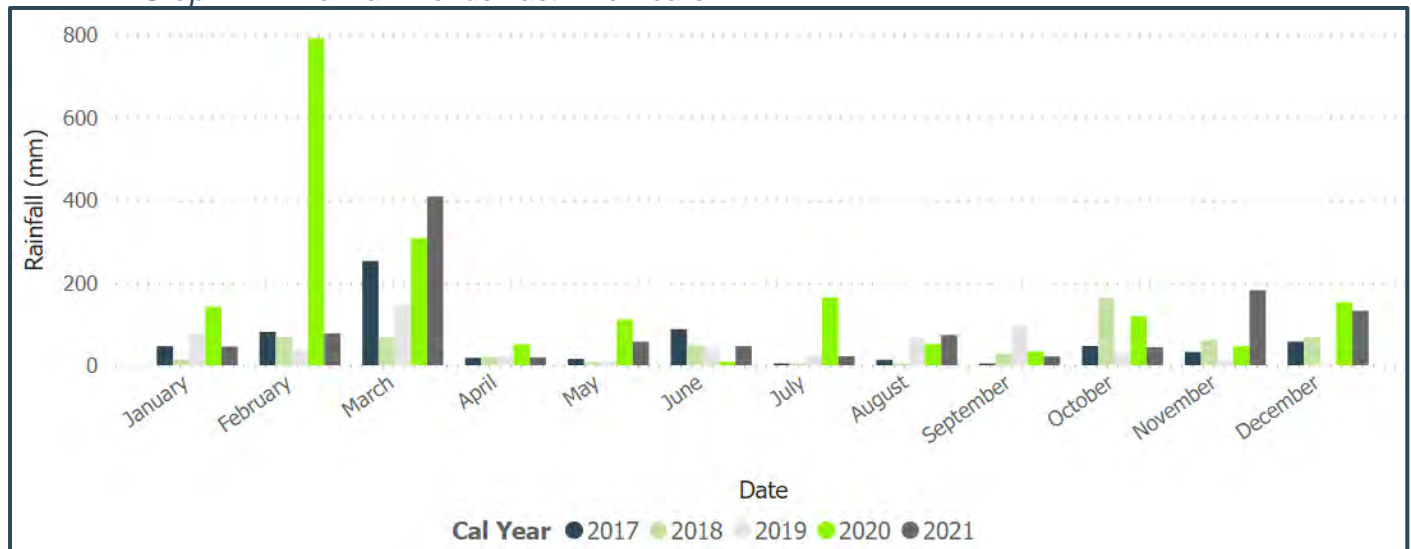
6.2 CLIMATE SUMMARY

Weather data is collected on site and downloaded monthly. This data is used to inform the water balance and assist in interpreting dust and groundwater impacts.

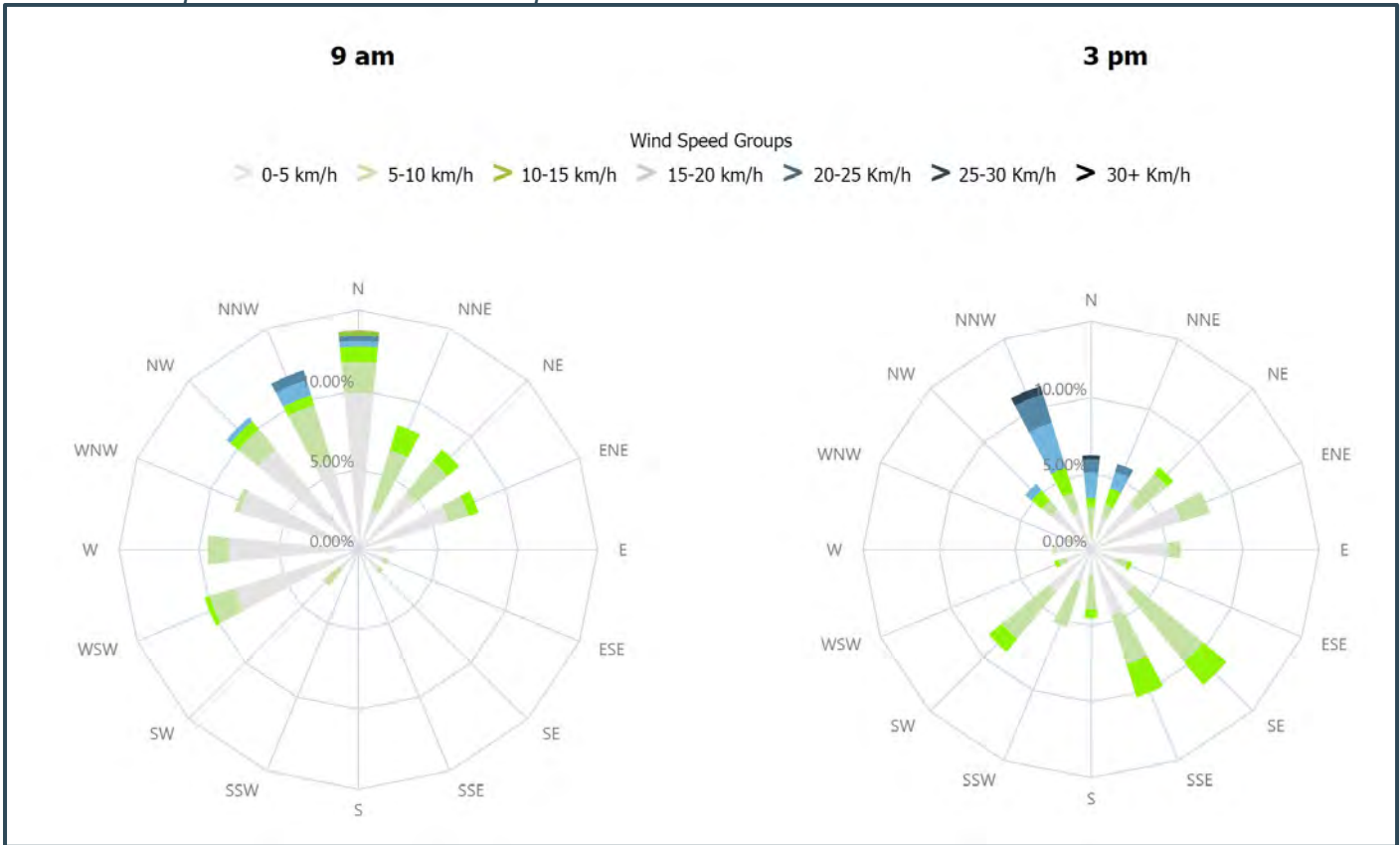
Table 11. Rainfall Summary Last Five Years

Cal Year	January	February	March	April	May	June	July	August	September	October	November	December	Total
2017	46.2	80.8	252.6	18.0	15.4	87.6	0.8	13.2	1.6	46.6	32.2	57.2	652.2
2018	14.4	69.0	66.2	20.2	7.6	49.2	3.0	3.8	28.6	163.0	61.6	70.4	557.0
2019	76.2	37.2	146.2	22.2	7.4	42.2	24.6	64.8	94.6	30.6	13.0	0.4	559.4
2020	141.6	792.0	308.0	50.8	111.2	8.6	164.6	51.8	33.2	118.4	46.4	152.8	1,979.4
2021	45.6	77.2	408.8	19.2	57.0	46.4	22.0	73.4	21.4	43.8	181.8	132.2	1,128.8

Graph 2. Rainfall Trends Last Five Years



Graph 3. Wind Roses for Report Period



6.3 AIR QUALITY

6.3.1 Requirements and Predictions

The consent and Air Quality Management Plan specifies the following Air Quality Criteria:

Table 12. Air Quality Criteria

Parameter	Averaging Period	Consent Limit prior to 18/08/21	Consent Limit after to 18/08/21	Prediction ^a Max at Residences	Prediction ^b Max at Residences after 18/08/2021 Mod 4
Total Suspended Particulates (TSP) $\mu\text{g}/\text{m}^3$	Annual	90	90	57	43
PM₁₀ $\mu\text{g}/\text{m}^3$	24 hours	50	50	49	Not predicted
PM₁₀ $\mu\text{g}/\text{m}^3$	Annual	30	25	15	22
PM_{2.5} $\mu\text{g}/\text{m}^3$	24 hours		25	Not predicted	Not predicted
PM_{2.5} $\mu\text{g}/\text{m}^3$	Annual		8	Not predicted	14.0
Insoluble Solids $\text{g}/\text{m}^2/\text{month}$	Annual	4	4	1.7	2.8

Note ^a: The Air Quality Impact Assessment prepared for the Environmental Assessment for Mod 2 (Nexus Environmental Planning Pty Ltd, September 2015) predicted these impacts at the boundary.

Note ^b: The Air Quality Impact Assessment prepared for Mod 4 SoEE (Jacobs Group Australia Pty Ltd, 2019) predicted these impacts at the residents.

The EPL specifies no limits on air quality.

6.3.2 Monitoring Results Compliance and Trends

All air quality monitoring results are given in *Appendix H* and are summarised below.

Table 13. Dust Deposition Gauge Results: D1 Office

Deposited Matter g/m²/month

Date	Insoluble Solids	Rolling Annual Average Insol Solids	Limit-Annual Insol Solids	Ash	Combustible Matter
11/1/2021	1.4	1.5	4	1.1	0.3
3/2/2021	0.7	1.4	4	0.4	0.3
3/3/2021	0.4	0.8	4	0.2	0.2
8/4/2021	0.4	0.8	4	0.4	0.0
4/5/2021	1.0	0.8	4	0.6	0.4
2/6/2021	0.3	0.8	4	0.2	0.1
2/7/2021	0.7	0.7	4	0.5	0.2
30/7/2021	0.7	0.8	4	0.7	0.0
1/9/2021	1.1	0.8	4	0.9	0.2
1/10/2021	2.2	0.9	4	1.9	0.3
1/11/2021	1.4	1.0	4	1.2	0.2
1/12/2021	24.7	2.8	4	23.1	1.6

Graph 4. Dust Deposition Trends: D1

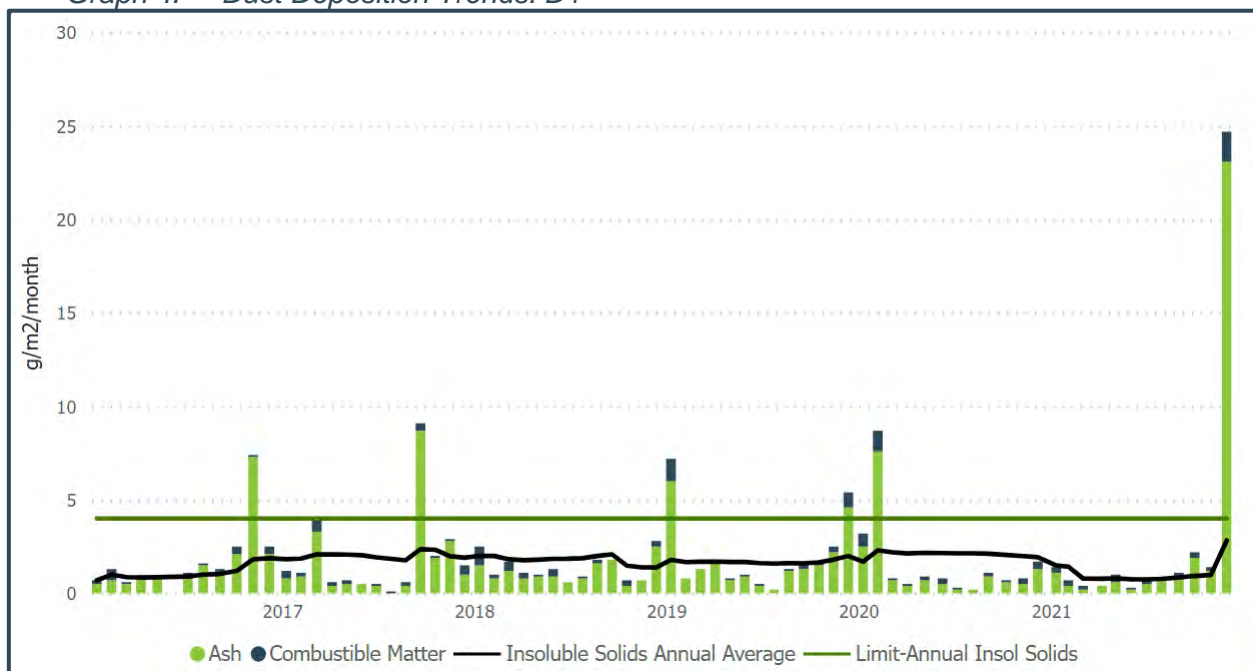


Table 14. Dust Deposition Gauge Results: D2 North East Corner

Deposited Matter g/m²/month

Date	Insoluble Solids	Rolling Annual Average Insol Solids	Limit-Annual Insol Solids	Ash	Combustible Matter
11/1/2021	0.7	1.3	4	0.3	0.4
3/2/2021	1.5	1.3	4	0.7	0.8
3/3/2021	0.5	0.9	4	0.4	0.1
8/4/2021	0.8	0.9	4	0.5	0.3
4/5/2021	1.0	0.9	4	0.6	0.4
2/6/2021	0.6	0.8	4	0.4	0.2
2/7/2021	0.3	0.8	4	0.2	0.1
30/7/2021	0.3	0.8	4	0.2	0.1
1/9/2021	0.9	0.8	4	0.5	0.4
1/11/2021	1.4	0.8	4	0.9	0.5
1/12/2021	1.4	0.9	4	0.8	0.6

Trees encroach on the collection zone of the gauge. These trees are within the protection zone required by the flora management plan and cannot be removed. Trimming of branches is undertaken where possible. The site of this gauge does not meet AS3580.10.1, however an alternative location near the sensitive receptor is not available.

Graph 5. Dust Deposition Trends: D2

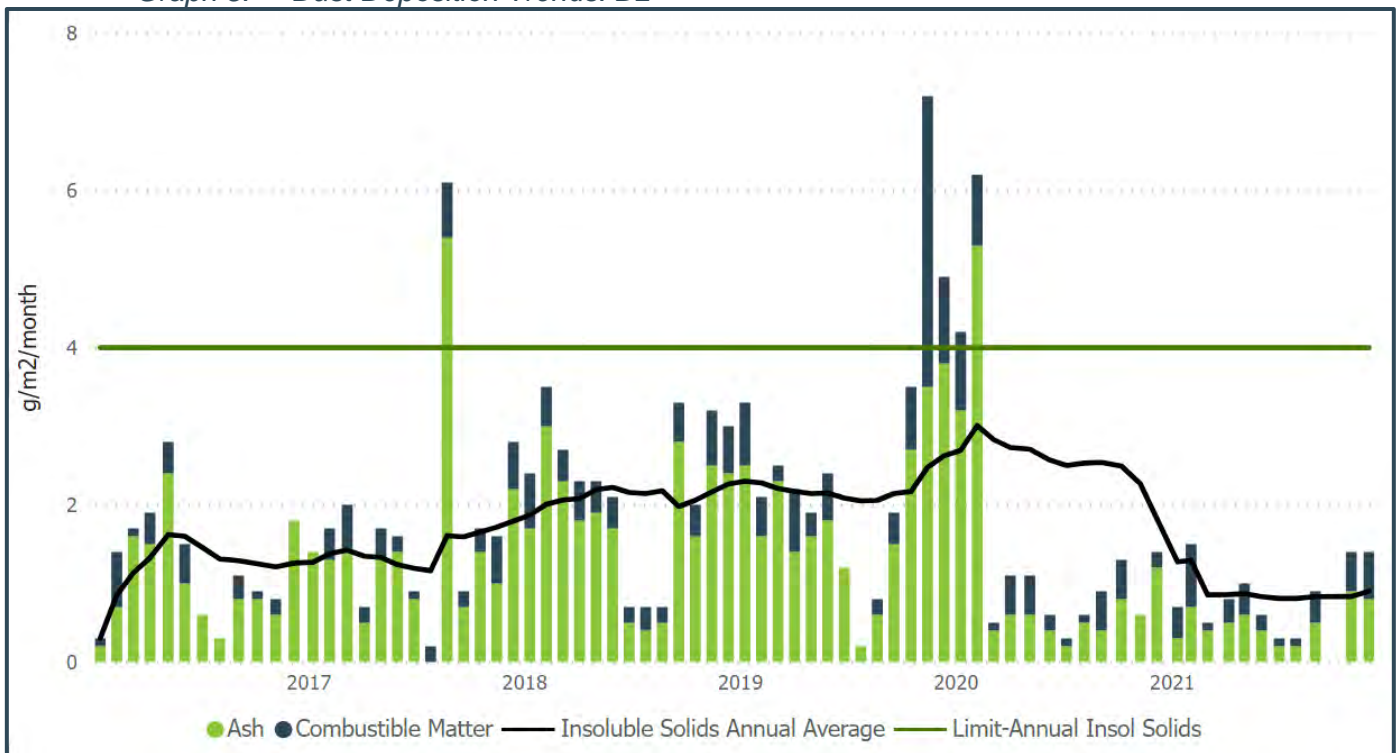


Table 15. Dust Deposition Gauge Results: D3 North Bundwall

Deposited Matter g/m²/month

Date	Insoluble Solids	Rolling Annual Average Insol Solids	Limit-Annual Insol Solids	Ash	Combustible Matter
11/1/2021	0.8	1.4	4	0.5	0.3
3/2/2021	1.3	1.4	4	0.7	0.6
3/3/2021	0.2	0.9	4	0.1	0.1
8/4/2021	0.3	0.8	4	0.1	0.2
4/5/2021	0.6	0.8	4	0.3	0.3
2/6/2021	0.2	0.7	4	0.2	0.0
2/7/2021	0.3	0.7	4	0.2	0.1
30/7/2021	0.4	0.7	4	0.2	0.2
1/9/2021	0.6	0.7	4	0.4	0.2
1/10/2021	0.7	0.8	4	0.5	0.2
1/11/2021	0.8	0.7	4	0.4	0.4
1/12/2021	1.0	0.7	4	0.6	0.4

Graph 6. Dust Deposition Trends: D3

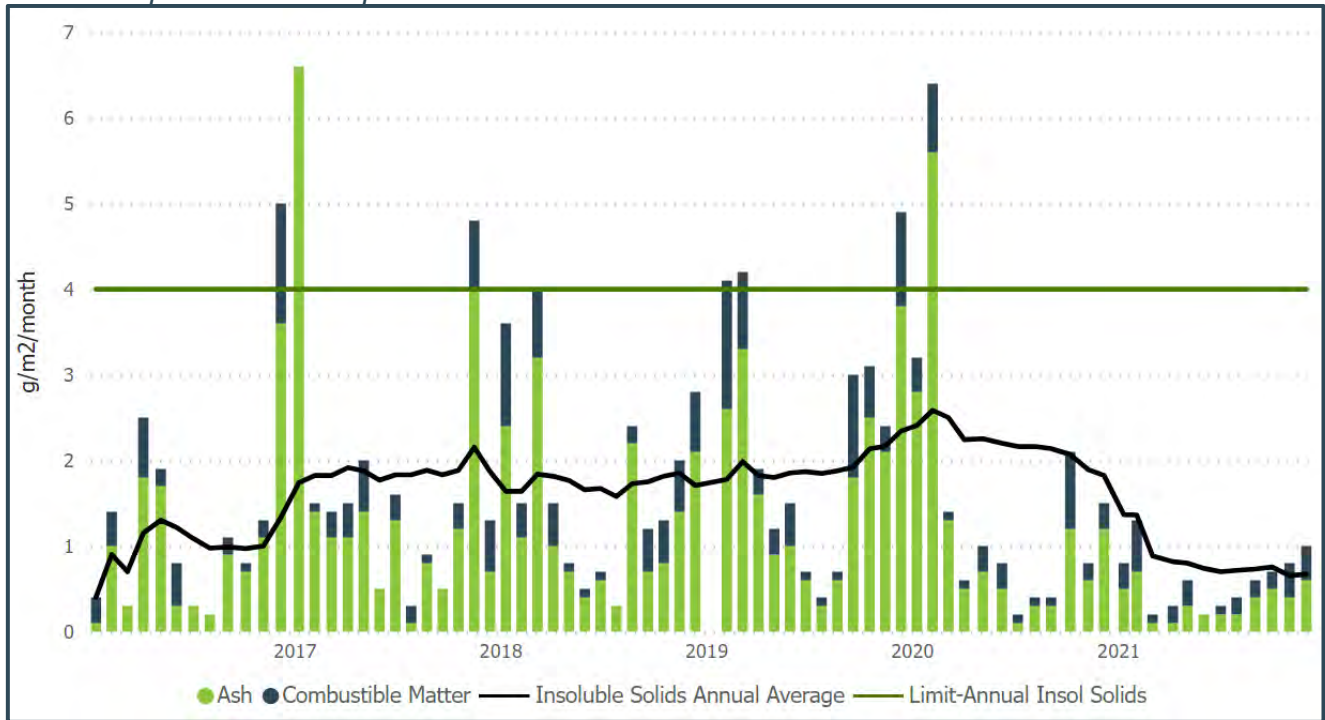


Table 16. Particulate Matter Annual Averages

Annual Averages	TSP $\mu\text{g}/\text{m}^3$	PM10 $\mu\text{g}/\text{m}^3$	PM2.5 $\mu\text{g}/\text{m}^3$
2021	15.4	8.8	6.1
Compliant with DA	Yes	Yes	Yes
Criteria	90	30 / 25	N/A / 8
Prediction	57 (Mod 2) 43 (Mod 4)	15 (Mod 2) 22 (Mod 4)	N/A (Mod 2) 14 (Mod 4)
2020	21	11	7.8
2019	48	32	26
2018	36	19	14
2017	29	15	12

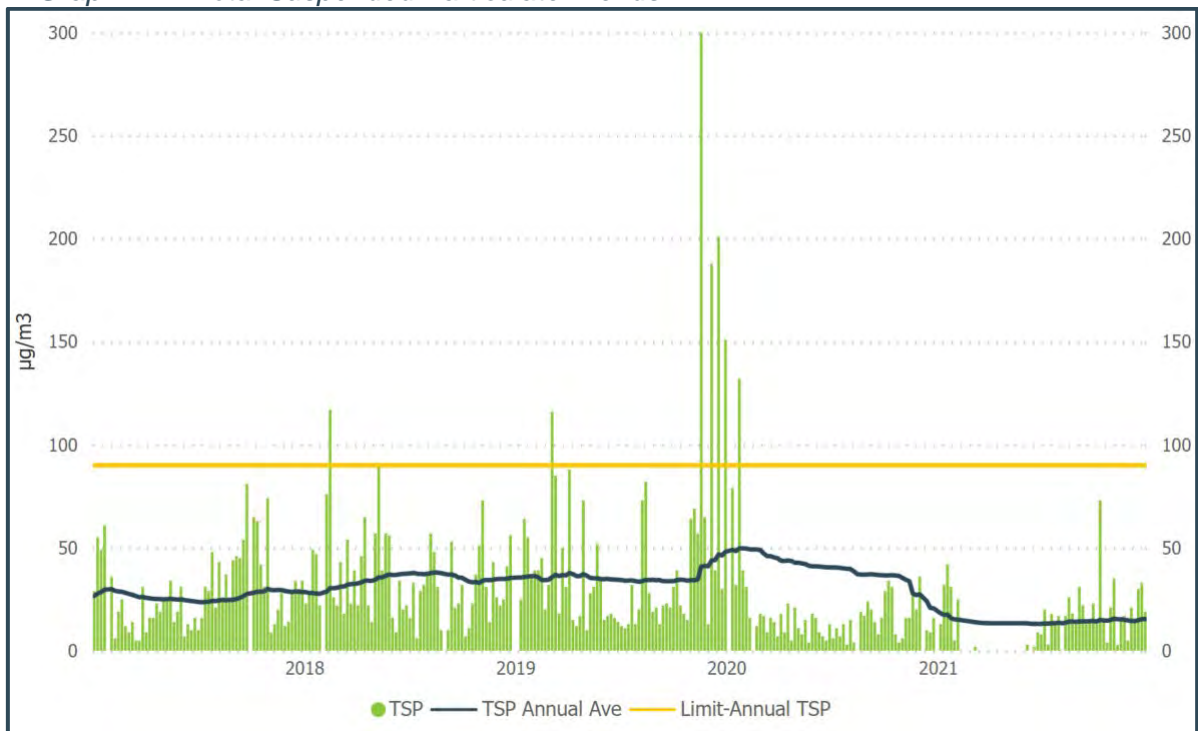
Table 17. Max 24 Hour Particulate Matter Averages

Max 24hr Averages	TSP $\mu\text{g}/\text{m}^3$	PM10 $\mu\text{g}/\text{m}^3$	PM2.5 $\mu\text{g}/\text{m}^3$
2021	73	48	37
Compliant with DA	Yes	Yes	No
Criteria	N/A	50	N/A / 25

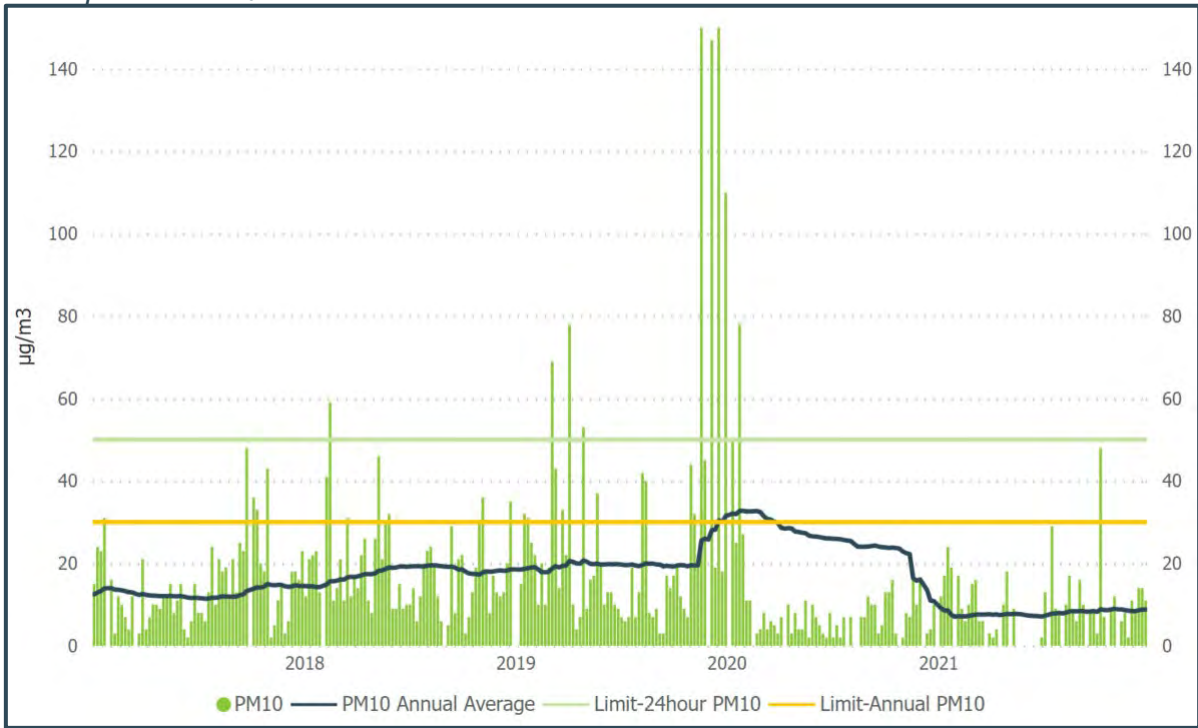
Table 18. 24Hr Exceedances

Date	PM2.5 $\mu\text{g}/\text{m}^3$	Criteria	Comments
9/10/2021	37	25	Local grass fire

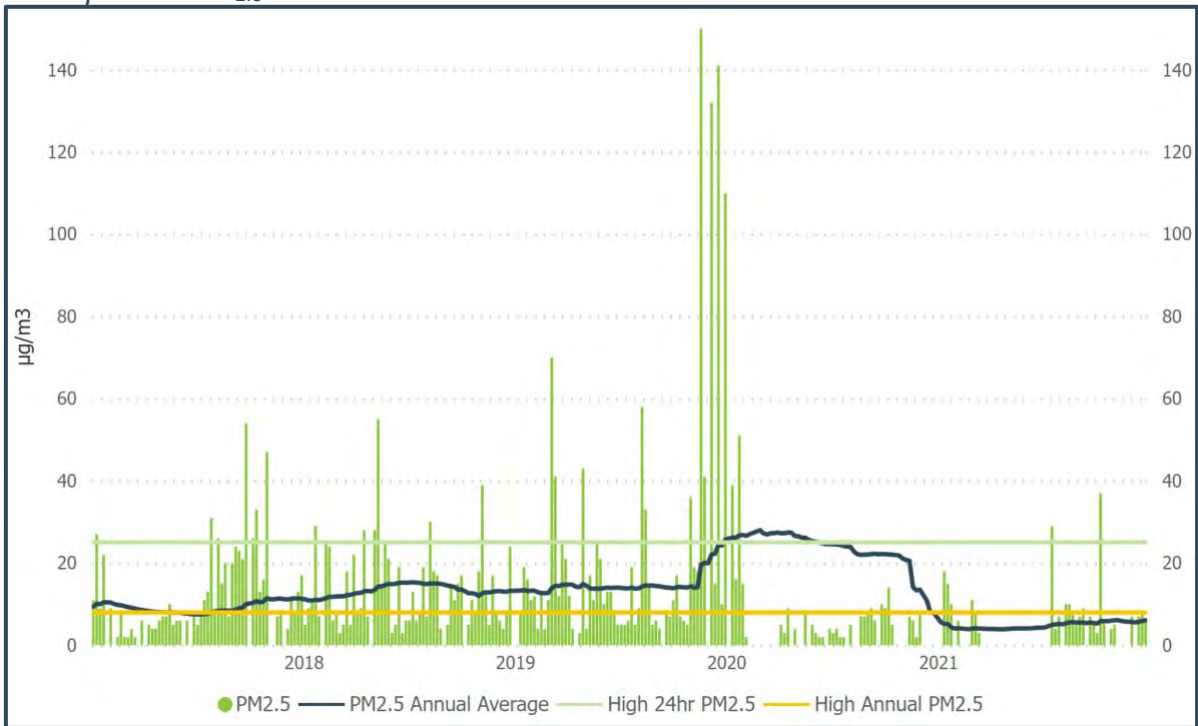
Graph 7. Total Suspended Particulate Trends



Graph 8. PM_{10} Trends



Graph 9. $PM_{2.5}$ Trends



6.3.3 Interpretation and Effectiveness of Controls

6.3.3.1 Interpretation of Monitoring Results

Dust deposition (Insoluble Solids), Total Suspended Particulates (TSP) and PM_{2.5} and PM₁₀ Annual Averages for 2021 were compliant with DA criteria. Particulate Matter less than 2.5 µm in diameter (PM₁₀) exceeded the Mod 4 24-hour criteria on one occasion in October 2021 during a local grass fire. This does not represent a non-compliance as it was not due to site activities.

Particulate Matter less than 2.5 µm in diameter (PM_{2.5}) for the 2021 report period was below the Mod 4 annual limit, despite the elevated result in October.

All air quality monitoring results show the results as fairly stable when compared with the previous reporting period. Dust Gauge 1A Site Office results have stabilised since the December 2021 elevated reading and continue to have a 12-month average under 4g/m²/month.

6.3.3.2 Potential Sources of Dust

Sources of dust from the site activities are:

- Dozers ripping sandstone,
- Loading and unloading of raw material using dump trucks,
- Loading the hopper,
- Screening,
- Loading processed material into trucks,
- Traffic on unsealed haul road, and
- Wind erosion from extraction and processing areas.

Background sources of dust include:

- Wind erosion from surrounding farmland and quarries,
- Mowing and ploughing activities on adjacent farmland,
- Earth-moving activities on nearby quarries,
- Traffic, particularly diesel-powered trucks on Old Northern Rd, and
- Bushfire, burning off, and domestic wood-fired heating.

6.3.3.3 Effectiveness of Air Quality Management Controls

Table 19. Effectiveness of Air Quality Management Controls

Control	Interpretation	Effective?
Increase use of water-cart in dry weather	Dust results do not increase with truck movements, nor on high wind days. Examination of wind direction during monitoring shows sources are off site.	Yes
Delaying non-essential earth-moving activities during periods of high wind	Dust results do not increase with truck movements, nor on high wind days. Examination of wind direction during monitoring shows sources are off site.	Yes
Reducing truck speeds	Dust results do not increase with truck movements	Yes
No more than 3 hectares exposed and active at any one time	Dust results do not increase on high wind days. Examination of wind direction during monitoring shows sources are off site.	Yes, condition removed under Mod 4.

Control	Interpretation	Effective?
Damping down	Dust results do not increase with truck movements, nor on high wind days. Examination of wind direction during monitoring shows sources are off site.	Yes
Installation of a mobile sprinkler in 2019	Sprinklers are installed. Dust results do not increase on high wind days. Examination of wind direction during monitoring shows sources are off site.	Yes
Trucks covered when entering and leaving the site	Dust results do not increase with truck movements	Yes

6.3.4 Measures Proposed for Improvement

Air quality management controls have been effective for the 2021 calendar year and will be maintained during 2022. A sprinkler distributes water to disturbed areas that the water cart has difficulty accessing. Dust will continue to be monitored using high volume air samplers and dust deposition gauges.

Relocation of the monitors adjacent to the office was investigated previously and a lack of power and security makes the relocation not feasible.

A review of the Air Quality Management Plan was undertaken after the modification and minor editorial changes are required. This will be completed in 2022.

The Mod 4 consent requires a review of the air monitoring results. An application to approve an expert to undertake this review was submitted to the DPIE and accepted in March 2022, see *Appendix N*.

6.4 SURFACE WATER, SEDIMENT AND EROSION

The Water Management Plan (version July 2018) was submitted to the (then) DoI Water and DPE to comply with the conditions of consent (Mod 2) and was approved by DPE on 22nd August 2018. An update was undertaken in December 2020 and was submitted via the Major Projects Portal for consultation in February, April and August 2021 (DA267-11-99-PA-11) as documented in submitted response number DA267-11-99-PA-13. An email request to NRAR for comment was sent again on 12/10/21 with a response received 26/10/21 that the matter was being reviewed. NRAR and DPI-Water responded on 2nd Nov 2021 via the Major Projects portal that they had no comment. The WMP was then submitted to DPIE via the Major Projects Portal. There has been no approval or further information required at this stage. Due to the protracted nature of this consultation process, the WMP has not been updated again in 2021.

The water depth monitoring shows that all surface water bodies are above the level of the groundwater in both Maroota Sands and Hawkesbury Sandstone aquifers.

There was no water discharged from the site during the report period.

The surface level is monitored in the Process Dam using an automated logger that is downloaded monthly. Rainfall is monitored using the onsite weather station, and evaporation is collected from the local BOM data.

6.4.1 Requirements and Predictions

6.4.1.1 Water Testing

There are no quality parameters for water testing within the consent conditions or the EPL. Requirements regarding surface water monitoring in the Mod 2 consent condition 42 (b) are given below:

[The Surface Water Management Plan includes] a program to monitor:

- o the effectiveness of the water management system;
- o site discharge water quality; and
- o surface water level and quality in the Process Water Dam, including the quantification of rainfall inflow, groundwater inflow and evaporation;

6.4.1.2 WMP Monitoring and Maintenance

Table 20. Monitoring and Maintenance from the WMP 2018

Parameter	Source	Compliance	Comments
Topsoil stripping to be visually monitored to check moisture content of soil and depth of stripping.	WMP 2018-Section 11	Yes	
Stockpiles to be visually assessed at time of forming to check they do not exceed three metres high.	WMP 2018-Section 11	Yes	
Visual check of stability and operation of all banks, ponds, channels and spillways to be undertaken monthly. Effecting any necessary repairs.	WMP 2018-Section 11	Yes	
Removal of spilled sand or other materials from hazard areas, including lands closer than five metres from areas of likely concentrated or high velocity flows, especially waterways and access roads.	WMP 2018-Section 11	Yes	
Removal of trapped sediment whenever less than design capacity remains for the sediment basins.	WMP 2018-Section 11	Yes	Sediment dams meet required storm event capacity
Ensuring rehabilitated lands have effectively reduced the erosion hazard and initiate upgrading or repair as appropriate	WMP 2018-Section 11	Yes	Not yet applicable
Constructing additional erosion and/or sediment control works as might become necessary to ensure the desired water control is achieved.	WMP 2018-Section 11	Yes	Not yet applicable
Automatic data loggers to monitor the dam levels to assist in the water balance modelling.	WMP 2018-Section 11	Yes	Loggers installed in all surface dams
All on-site dams to be sampled and water quality tested on a quarterly basis to determine if there is a relationship to the groundwater and to ascertain the water quality. This will continue for a two year period. Following this period the monitoring frequency will be reviewed.	WMP 2018-Section 11	Yes	See Section 6.4.4
Water quality will be compared to the ANZECC Irrigation Water criteria	WMP 2018-Section 11	Yes	This criteria is not suitable as a performance criteria due to the naturally low pH in the groundwater

6.4.2 Monitoring Results Compliance and Trends

6.4.2.1 Water Quality Results

Surface water quality was tested 3 times during 2021 with the aim of assessing the relationship between surface water and groundwater. There was limited access to the site during the Covid lockdown and 4 visits was not possible. There are no approved limits against which to compare these levels. The pH is naturally low in the groundwater, and since the surface water has such low buffering capacity, the water from the bore water used in the processing plant (PB1) has a high influence on the pH of the Process Dam and Dam 2. Dams 3 and 4 show little similarity to the groundwater, with pH closer to neutral. Dams 3 and 4 are influenced by surface inflows.

Table 21. Surface Water Quality Results Dam 1 - Process

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
Dam 1 - Process	7/1/2021	4.7	140	88	31	2	0.7	2.2	14	1.5
Dam 1 - Process	12/4/2021	4.6	158	99	33	5	1.1	2.9	16	2.4
Dam 1 - Process	14/10/2021	4.2	251	157	52	4	1.0	5.4	23	5.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
Dam 1 - Process	2017	4.5	134	90	25	4	0.0	2.0	16	2.0
Dam 1 - Process	2018	4.6	179	112	43	3	0.7	2.6	22	3.2
Dam 1 - Process	2019	4.5	151	94	33	3	0.1	2.1	16	2.8
Dam 1 - Process	2020	4.3	258	161	55	16	0.8	4.2	27	3.5
Dam 1 - Process	2021	4.5	183	115	39	4	0.9	3.5	18	3.0

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
Dam 1 - Process	2017	4.5	134	90	25	4	0.0	2.0	16	2.0
Dam 1 - Process	2018	4.4	100	63	23	2	0.6	1.1	11	2.0
Dam 1 - Process	2019	4.4	127	79	26	2	0.0	1.6	11	1.8
Dam 1 - Process	2020	4.0	126	79	26	3	0.6	2.0	12	2.5
Dam 1 - Process	2021	4.2	140	88	31	2	0.7	2.2	14	1.5

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
Dam 1 - Process	2017	4.5	134	90	25	4	0.0	2.0	16	2.0
Dam 1 - Process	2018	4.9	229	143	57	4	0.8	3.7	29	4.3
Dam 1 - Process	2019	4.6	167	104	41	3	0.5	3.2	19	4.3
Dam 1 - Process	2020	4.4	479	299	100	29	1.0	6.2	45	5.9
Dam 1 - Process	2021	4.7	251	157	52	5	1.1	5.4	23	5.0

Table 22. Surface Water Quality Results Dam 2 – Tailings

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
Dam 2 - Tailings	7/1/2021	4.3	134	84	29	2	0.0	1.7	13	1.7
Dam 2 - Tailings	12/4/2021	4.4	123	77	25	5	0.6	2.2	13	1.8
Dam 2 - Tailings	14/10/2021	4.2	202	126	44	8	1.0	5.0	19	4.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
Dam 2 - Tailings	2017	4.5	139	75	25	4	0.0	2.0	17	3.0
Dam 2 - Tailings	2018	4.5	208	130	43	5	0.7	2.6	22	3.2
Dam 2 - Tailings	2019	4.5	155	97	33	2	0.0	2.0	17	2.9
Dam 2 - Tailings	2020	4.3	300	188	62	22	1.1	4.8	30	4.0
Dam 2 - Tailings	2021	4.3	153	96	33	5	0.5	3.0	15	2.5

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
Dam 2 - Tailings	2017	4.5	139	75	25	4	0.0	2.0	17	3.0
Dam 2 - Tailings	2018	4.3	112	70	24	2	0.5	1.2	12	2.1
Dam 2 - Tailings	2019	4.4	119	74	27	0	0.0	1.3	11	1.6
Dam 2 - Tailings	2020	4.0	112	70	23	3	0.6	2.0	11	2.3
Dam 2 - Tailings	2021	4.2	123	77	25	2	0.0	1.7	13	1.7

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
Dam 2 - Tailings	2017	4.5	139	75	25	4	0.0	2.0	17	3.0
Dam 2 - Tailings	2018	4.7	254	159	57	8	0.9	3.7	30	4.1
Dam 2 - Tailings	2019	4.5	169	106	41	3	0.0	3.1	19	4.3
Dam 2 - Tailings	2020	4.5	523	327	100	47	1.6	6.7	46	6.3
Dam 2 - Tailings	2021	4.4	202	126	44	8	1.0	5.0	19	4.0

Table 23. Surface Water Quality Results Dam 3 – Nursery

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
Dam 3 - Nursery	7/1/2021	7.7	165	103	25	14	5.1	4.1	13	3.6
Dam 3 - Nursery	12/4/2021	6.9	148	92	21	10	6.5	4.8	11	5.6
Dam 3 - Nursery	14/10/2021	8.9	159	99	24	17	7.4	5.8	12	3.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
Dam 3 - Nursery	2017	6.6	133	77	20	9	3.0	3.0	13	4.0
Dam 3 - Nursery	2018	7.3	189	118	34	17	4.7	4.8	17	5.5
Dam 3 - Nursery	2019	7.5	188	117	32	14	4.5	4.2	16	5.1
Dam 3 - Nursery	2020	7.7	186	116	26	15	5.5	4.5	14	6.3
Dam 3 - Nursery	2021	7.8	157	98	23	14	6.3	4.9	12	4.1

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
Dam 3 - Nursery	2017	6.6	133	77	20	9	3.0	3.0	13	4.0
Dam 3 - Nursery	2018	7.0	165	103	32	11	4.2	4.1	16	5.1
Dam 3 - Nursery	2019	6.9	156	97	28	13	4.0	3.5	15	4.2
Dam 3 - Nursery	2020	6.9	167	104	21	5	5.3	4.2	12	5.0
Dam 3 - Nursery	2021	6.9	148	92	21	10	5.1	4.1	11	3.0

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
Dam 3 - Nursery	2017	6.6	133	77	20	9	3.0	3.0	13	4.0
Dam 3 - Nursery	2018	7.8	223	139	36	21	5.3	5.3	17	6.0
Dam 3 - Nursery	2019	7.8	214	134	35	16	5.2	4.6	17	5.9
Dam 3 - Nursery	2020	9.1	237	148	35	23	5.6	4.9	18	8.1
Dam 3 - Nursery	2021	8.9	165	103	25	17	7.4	5.8	13	5.6

Table 24. Surface Water Quality Results Dam 4 - Farm

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
Dam 4 - Farm	7/1/2021	6.5	126	79	28	4	1.4	2.4	13	1.7
Dam 4 - Farm	12/4/2021	6.7	101	63	22	4	2.2	2.5	10	3.1
Dam 4 - Farm	14/10/2021	7.0	112	70	23	5	2.0	3.0	12	1.0

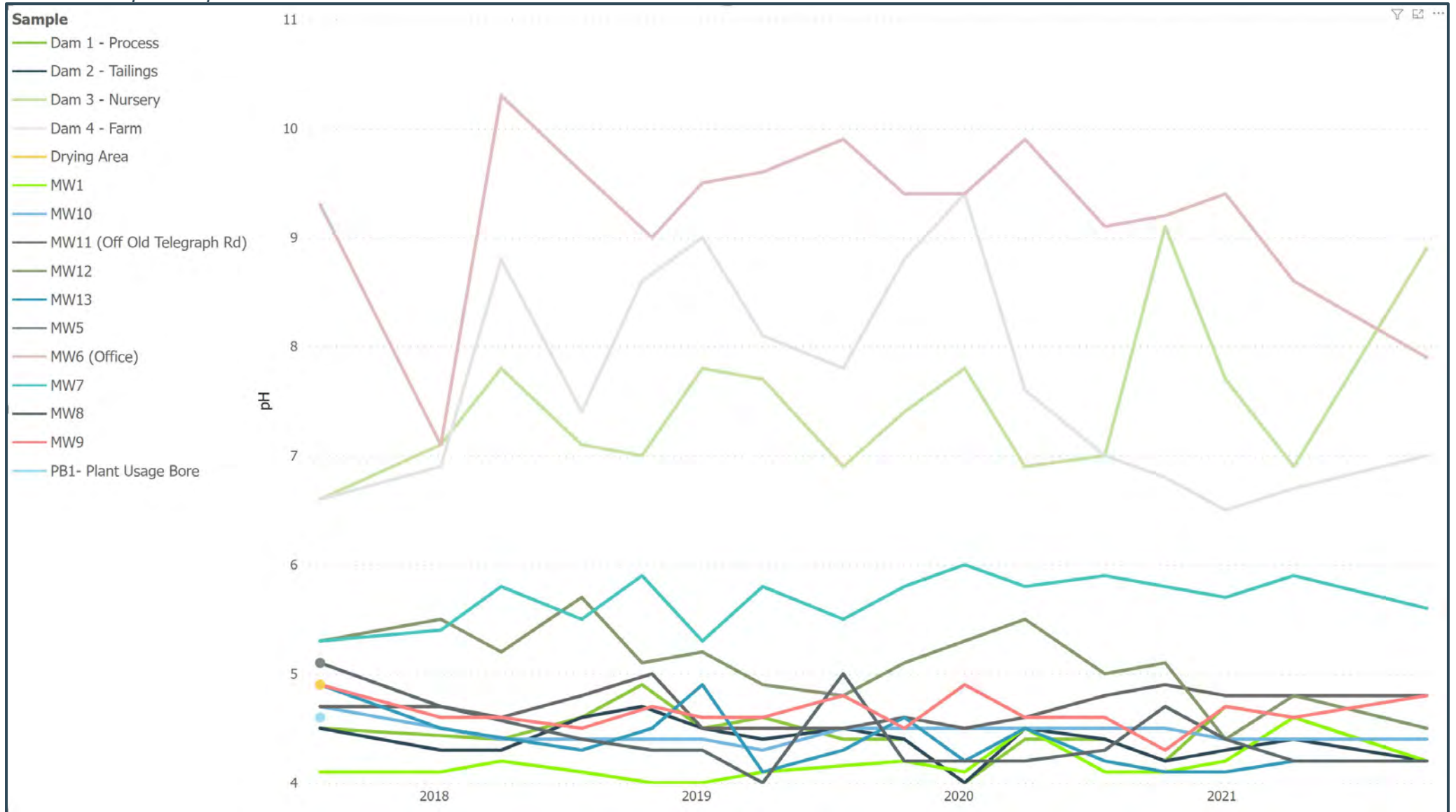
Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
Dam 4 - Farm	2017	6.6	116	63	20	3	2.0	3.0	13	2.0
Dam 4 - Farm	2018	7.9	158	99	29	8	2.3	3.8	16	2.7
Dam 4 - Farm	2019	8.4	138	86	26	7	2.6	3.4	14	3.0
Dam 4 - Farm	2020	7.7	136	85	22	4	2.0	3.0	13	2.9
Dam 4 - Farm	2021	6.7	113	71	24	4	1.9	2.6	12	1.9

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
Dam 4 - Farm	2017	6.6	116	63	20	3	2.0	3.0	13	2.0
Dam 4 - Farm	2018	6.9	138	86	26	7	1.9	2.9	14	2.4
Dam 4 - Farm	2019	7.8	117	73	18	3	1.8	2.7	11	2.1
Dam 4 - Farm	2020	6.8	113	70	17	3	1.6	2.6	10	1.7
Dam 4 - Farm	2021	6.5	101	63	22	4	1.4	2.4	10	1.0

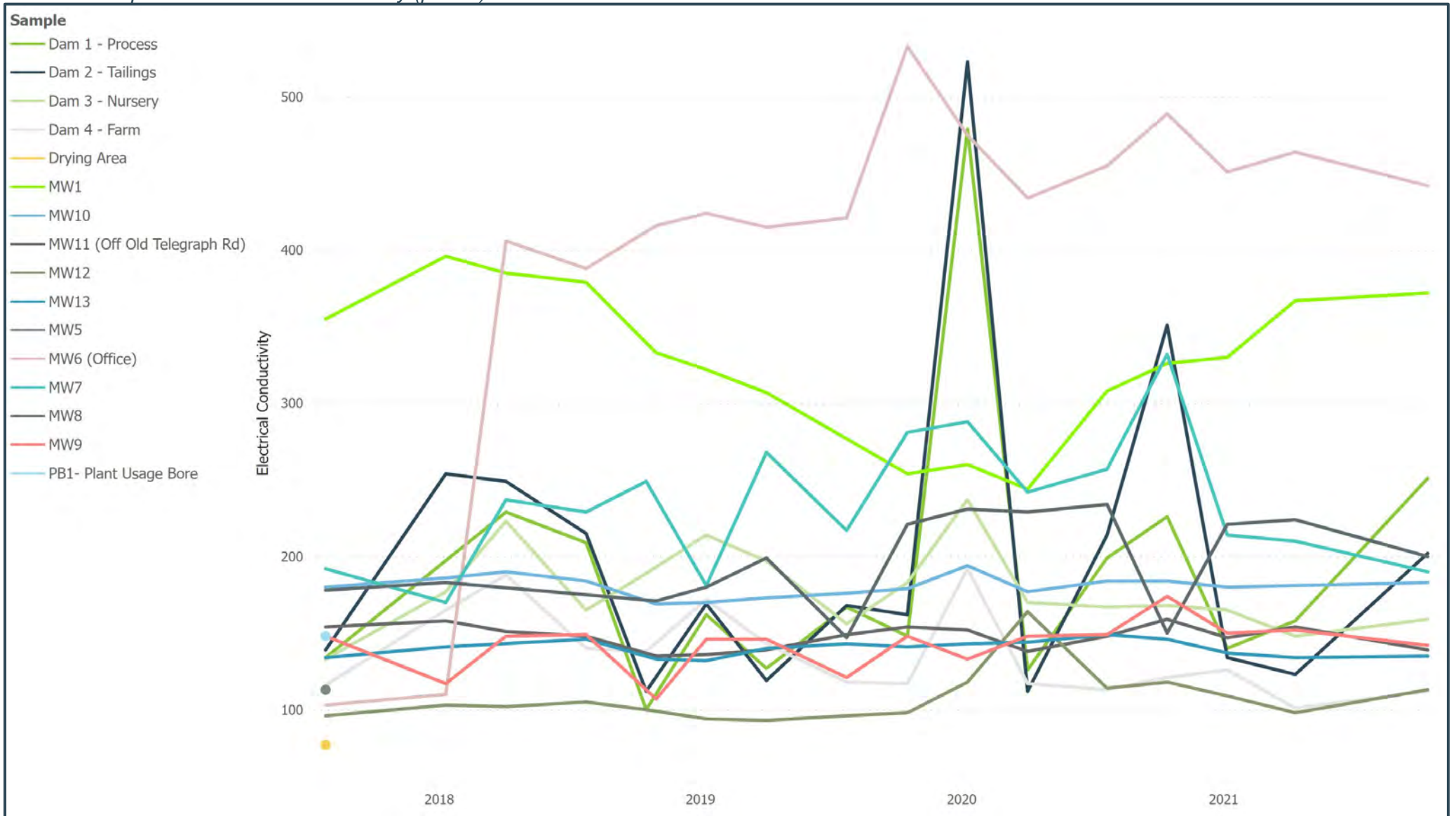
Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
Dam 4 - Farm	2017	6.6	116	63	20	3	2.0	3.0	13	2.0
Dam 4 - Farm	2018	8.8	188	117	32	8	2.8	4.4	18	3.0
Dam 4 - Farm	2019	9.0	172	107	29	13	4.0	4.3	17	4.2
Dam 4 - Farm	2020	9.4	192	120	30	5	2.8	3.8	17	3.6
Dam 4 - Farm	2021	7.0	126	79	28	5	2.2	3.0	13	3.1

6.4.2.2 Water Quality Trends

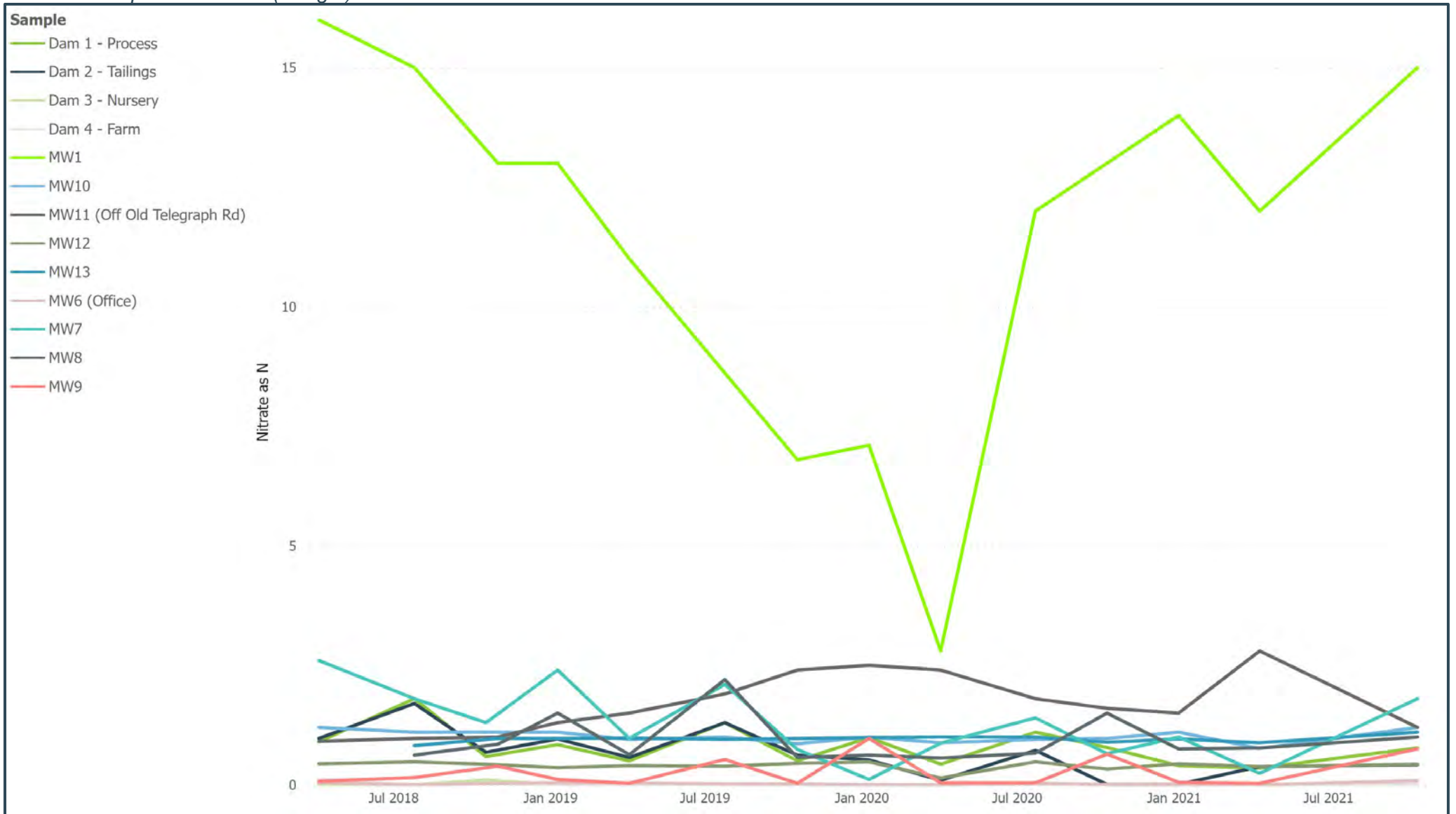
Graph 10. pH Trends



Graph 11. Electrical Conductivity ($\mu\text{S}/\text{cm}$) Trends



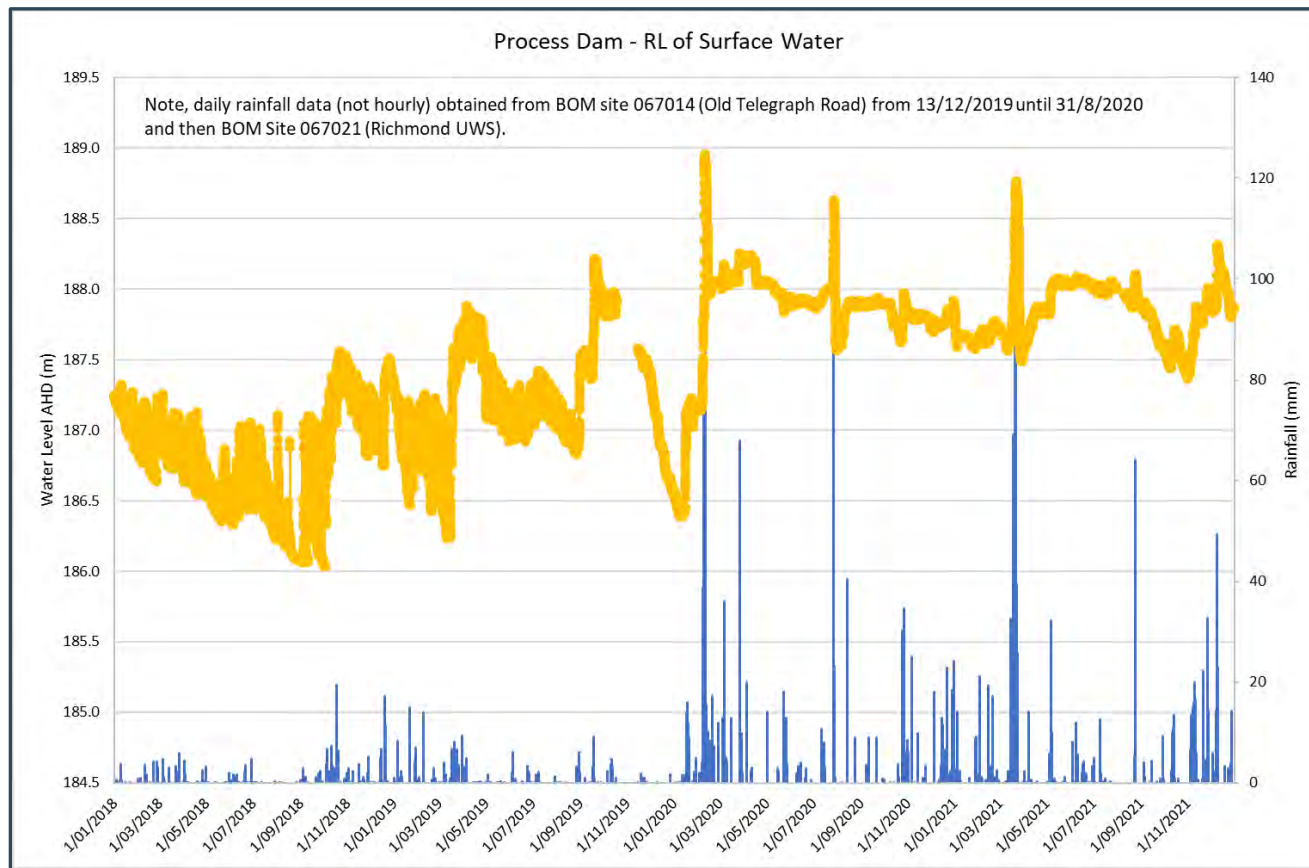
Graph 12. Nitrate (N mg/L) Trends



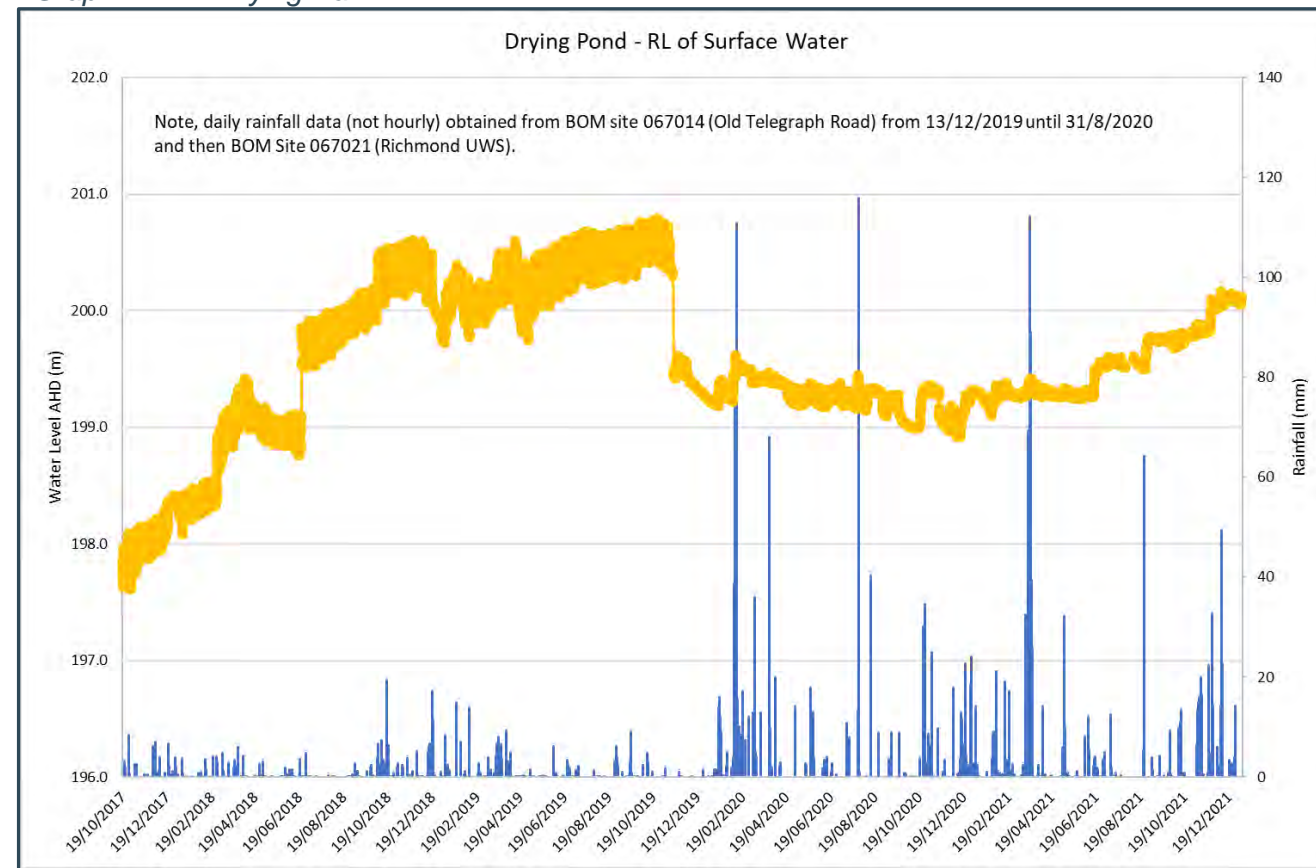
6.4.2.3 Water Depth

The extraction of sand on the site relies on an adequate supply of water for washing and screening of material. After processing, residual clay/silt is delivered to the designated drying areas and liberated water is drained into a holding dam (currently Drying Dam 2) to settle sediment entrained in the process. Water from the holding dam is then released back into the process dam (Dam 1) for re-use. Release from Dam 2 to Dam 1 is through a riser pipe that can be manually adjusted to maximise the water draining to Dam 1. During processing Dam 2 fills with sediment as well as water resulting in the upward displacement of water in the dam. The overall effect is that whilst a nominal small volume is held at all times in Dam 2, virtually all processing water makes its way back to Dam 1 overnight.

Graph 13. Process Dam Water Level



Graph 14. Drying Dam 2



6.4.3 Interpretation and Effectiveness of Controls

The primary consideration in assessing the effectiveness of the surface water controls is that the downstream environment is not adversely affected by discharged waters. In this regard the controls are effective as the site has more than sufficient capacity to contain surface water for the design storm event and no uncontrolled discharges have occurred.

The sediment and erosion controls are considered effective in terms of preventing sediment from leaving the site. Within the excavation there is evidence of erosion however all eroded soils and sediment are contained within the pit. Untouched areas are covered with pasture or tree stands and are not prone to erosion.

The water depth monitoring shows that all surface water bodies are above the level of the groundwater in both Maroota Sands and Hawkesbury Sandstone aquifers.

6.4.4 Measures Proposed for Improvement

The following measures will be instigated during the next reporting period.

- Erosion on internal walls will be regularly monitored, as recommended in the IEA 2020.
- The Water Management Plan will be updated in consultation with NRAR and DPIE.

Check with Stuart whether this happened

6.5 GROUNDWATER

A Groundwater Study, Groundwater Management Plan (GWMP) and Groundwater Monitoring Program was submitted to the then DPE and DoI-W to comply with the conditions of consent, and approved by the DPE in August 2018.

6.5.1 Requirements and Predictions

Groundwater level monitoring is required under the consent conditions 42-44. It is not possible to measure depth within PT84PB1 due to the attached infrastructure; the pumping records are supplied in *Appendix I*. PT84PB2 is owned and operated by the landowner; the quarry operators have no use or access.

Table 25. Groundwater Level Monitoring

Parameter	Criteria	Units	Source
Groundwater Level	Monitored continuously	Metres AHD	Consent sched 2 cond 43
Depth of Extraction	Extraction does not take place below a level 2 metres above the wet weather high groundwater level of the regional aquifer, as measured and mapped on the site	Contours in metres AHD	Consent sched 2 cond 17

6.5.2 Monitoring Results Compliance and Trends

Groundwater level monitoring results from the continuous automatic data loggers are corrected for barometric pressure and calibrated to manual measurements undertaken each month. Groundwater levels are currently monitored in eight boreholes located on the site. MW1 logger was installed prior to 2015; the remaining loggers were installed in 2017. Following anomalous readings from the MW5 logger during 2017, the bore was investigated and discovered to have collapsed. The logger was relocated to a functioning bore and MW5 abandoned and replaced by nearby MW8.

Loggers in MW1 and MW12 were reinstated in November 2018 following repairs undertaken between May/June 2018 and October 2018. During this time manual readings continued. MW13 stopped functioning in February 2020 and has yet to be replaced or repaired. MW9 has been decommissioned due to expansion of the quarry in November 2021. MW1 logger stopped functioning in November 2021 and may be replaced during 2022.

There are no performance criteria for groundwater quality parameters within the consent conditions or the EPL. Quality is monitored quarterly to assist with predicting any interactions between surface and ground waters.

The groundwater quality results and trends are shown below.

Graph 15. Groundwater Depth Trends

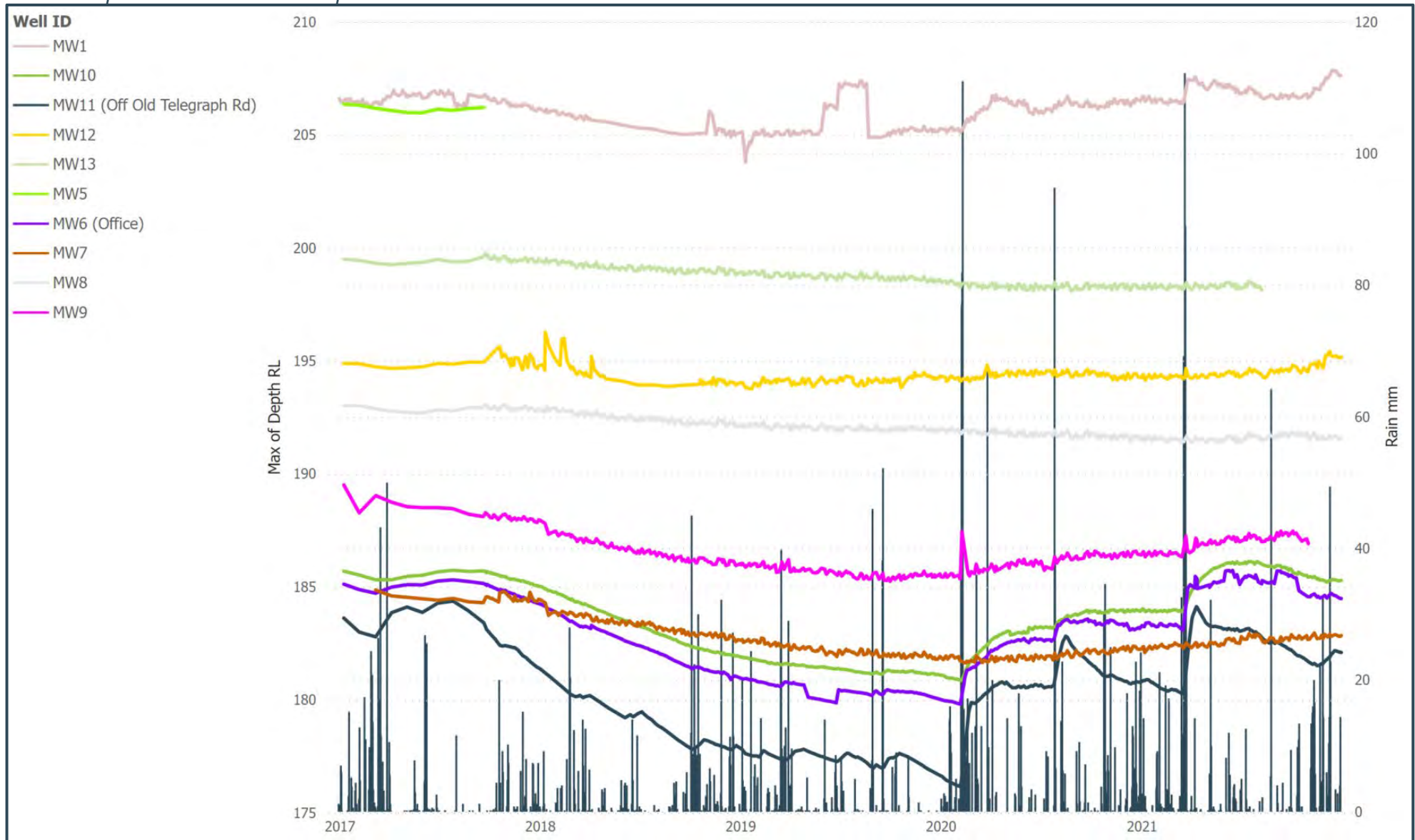


Table 26. Groundwater Quality Results – MW1

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW1	7/1/2021	4.2	330	206	51	6	4.9	13.0	23	2.8
MW1	12/4/2021	4.6	367	229	56	8	6.6	17.0	27	3.5
MW1	14/10/2021	4.2	372	232	48	9	6.0	17.0	20	4.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW1	2017	4.1	355	247	47	4	5.0	14.0	25	4.0
MW1	2018	4.1	373	233	61	25	5.6	16.3	19	3.6
MW1	2019	4.1	294	184	47	6	3.4	11.7	17	3.8
MW1	2020	4.2	285	178	45	33	4.1	10.7	19	3.3
MW1	2021	4.3	356	222	52	8	5.8	15.7	23	3.4

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW1	2017	4.1	355	247	47	4	5.0	14.0	25	4.0
MW1	2018	4.0	333	208	57	5	4.5	14.0	16	3.4
MW1	2019	4.0	254	159	41	4	2.9	10.0	15	3.4
MW1	2020	4.1	244	152	41	9	3.5	7.9	18	2.3
MW1	2021	4.2	330	206	48	6	4.9	13.0	20	2.8

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW1	2017	4.1	355	247	47	4	5.0	14.0	25	4.0
MW1	2018	4.2	396	247	63	61	7.0	18.0	24	3.9
MW1	2019	4.2	322	201	51	8	3.6	13.0	19	4.5
MW1	2020	4.5	326	204	47	64	4.5	13.0	20	4.7
MW1	2021	4.6	372	232	56	9	6.6	17.0	27	4.0

Table 27. Groundwater Quality Results – MW6

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW6 (Office)	7/1/2021	9.4	451	282	94	0	1.2	0.0	76	1.4
MW6 (Office)	12/4/2021	8.6	464	290	94	1	4.5	2.5	73	2.8
MW6 (Office)	14/10/2021	7.9	442	276	85	0	6.3	3.0	70	2.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW6 (Office)	2017	9.3	103	55	18	0	2.0	1.0	12	5.0
MW6 (Office)	2018	9.0	330	206	66	10	0.8	0.3	78	1.2
MW6 (Office)	2019	9.6	448	280	83	3	0.5	0.0	82	1.1
MW6 (Office)	2020	9.4	463	290	95	4	0.9	0.2	77	1.2
MW6 (Office)	2021	8.6	452	283	91	0	4.0	1.8	73	2.1

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW6 (Office)	2017	9.3	103	55	18	0	2.0	1.0	12	5.0
MW6 (Office)	2018	7.1	110	69	49	2	0.0	0.0	71	1.2
MW6 (Office)	2019	9.4	415	259	75	1	0.0	0.0	59	0.9
MW6 (Office)	2020	9.1	434	271	89	2	0.0	0.0	69	1.0
MW6 (Office)	2021	7.9	442	276	85	0	1.2	0.0	70	1.4

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW6 (Office)	2017	9.3	103	55	18	0	2.0	1.0	12	5.0
MW6 (Office)	2018	10.3	416	260	84	21	1.6	0.8	84	1.3
MW6 (Office)	2019	9.9	533	333	88	5	0.7	0.0	110	1.2
MW6 (Office)	2020	9.9	489	306	99	6	1.2	0.7	84	1.4
MW6 (Office)	2021	9.4	464	290	94	1	6.3	3.0	76	2.8

Table 28. Groundwater Quality Results – MW7

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW7	7/1/2021	5.7	214	134	32	11	0.0	0.0	37	0.0
MW7	12/4/2021	5.9	210	131	31	5	0.0	0.0	42	0.6
MW7	14/10/2021	5.6	190	119	28	6	0.0	0.0	28	0.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW7	2017	5.3	192	215	29	9	0.0	0.0	59	0.0
MW7	2018	5.7	221	138	31	21	0.0	0.0	47	0.0
MW7	2019	5.6	237	148	33	21	0.0	0.0	46	0.2
MW7	2020	5.9	280	175	43	19	0.5	0.0	51	0.4
MW7	2021	5.7	205	128	30	7	0.0	0.0	36	0.2

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW7	2017	5.3	192	215	29	9	0.0	0.0	59	0.0
MW7	2018	5.4	170	106	30	18	0.0	0.0	40	0.0
MW7	2019	5.3	181	113	28	17	0.0	0.0	27	0.0
MW7	2020	5.8	242	151	30	17	0.0	0.0	43	0.0
MW7	2021	5.6	190	119	28	5	0.0	0.0	28	0.0

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW7	2017	5.3	192	215	29	9	0.0	0.0	59	0.0
MW7	2018	5.9	249	156	34	23	0.0	0.0	52	0.0
MW7	2019	5.8	281	176	45	24	0.0	0.0	62	0.6
MW7	2020	6.0	332	207	77	20	1.8	0.0	65	0.9
MW7	2021	5.9	214	134	32	11	0.0	0.0	42	0.6

Table 29. Groundwater Quality Results – MW8

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW8	7/1/2021	4.4	221	138	52	0	1.4	3.1	24	0.0
MW8	12/4/2021	4.2	224	140	49	2	0.0	3.8	24	0.0
MW8	14/10/2021	4.2	200	125	40	1	0.0	3.0	20	0.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW8	2017	5.1	178	116	37	2	4.0	3.0	26	0.0
MW8	2018	4.5	176	110	48	4	0.4	2.9	18	0.0
MW8	2019	4.4	187	117	39	2	1.0	2.0	23	0.0
MW8	2020	4.4	211	132	48	22	1.1	3.1	23	0.0
MW8	2021	4.3	215	134	47	1	0.5	3.3	23	0.0

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW8	2017	5.1	178	116	37	2	4.0	3.0	26	0.0
MW8	2018	4.3	171	107	46	2	0.0	2.2	17	0.0
MW8	2019	4.0	147	92	25	1	0.7	0.5	17	0.0
MW8	2020	4.2	150	94	36	1	0.6	1.9	22	0.0
MW8	2021	4.2	200	125	40	0	0.0	3.0	20	0.0

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW8	2017	5.1	178	116	37	2	4.0	3.0	26	0.0
MW8	2018	4.7	183	114	49	5	0.8	3.5	19	0.0
MW8	2019	5.0	221	138	47	3	1.1	3.1	27	0.0
MW8	2020	4.7	234	146	55	83	1.7	3.7	26	0.0
MW8	2021	4.4	224	140	52	2	1.4	3.8	24	0.0

Table 30. Groundwater Quality Results – MW9

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW9	7/1/2021	4.7	150	94	33	0	0.7	2.1	16	0.5
MW9	12/4/2021	4.6	152	95	33	4	1.3	2.6	16	2.5
MW9	14/10/2021	4.8	142	89	28	4	1.0	2.0	17	3.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW9	2017	4.9	148	96	24	2	3.0	2.0	16	0.8
MW9	2018	4.6	130	81	31	5	1.9	1.5	17	0.0
MW9	2019	4.6	140	88	30	3	0.7	2.0	17	0.3
MW9	2020	4.6	151	95	31	5	1.5	2.0	18	0.5
MW9	2021	4.7	148	93	31	3	1.0	2.2	16	2.0

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW9	2017	4.9	148	96	24	2	3.0	2.0	16	0.8
MW9	2018	4.5	107	67	29	2	1.0	0.8	14	0.0
MW9	2019	4.5	121	76	23	2	0.0	0.8	15	0.0
MW9	2020	4.3	133	83	23	2	1.0	1.5	14	0.0
MW9	2021	4.6	142	89	28	0	0.7	2.0	16	0.5

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW9	2017	4.9	148	96	24	2	3.0	2.0	16	0.8
MW9	2018	4.7	149	93	32	8	3.1	1.9	20	0.0
MW9	2019	4.8	148	92	35	5	1.3	3.3	20	0.5
MW9	2020	4.9	174	109	36	9	1.9	2.3	21	0.8
MW9	2021	4.8	152	95	33	4	1.3	2.6	17	3.0

Table 31. Groundwater Quality Results – MW10

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW10	7/1/2021	4.4	180	112	41	0	0.0	4.2	17	0.8
MW10	12/4/2021	4.4	181	113	41	0	0.0	5.4	18	1.0
MW10	14/10/2021	4.4	183	114	38	0	0.0	5.0	18	1.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW10	2017	4.7	180	108	39	0	0.6	4.0	27	0.6
MW10	2018	4.4	182	114	46	1	0.3	2.6	21	0.4
MW10	2019	4.4	175	109	40	0	0.2	3.9	18	0.6
MW10	2020	4.5	185	116	42	3	0.4	4.4	19	0.8
MW10	2021	4.4	181	113	40	0	0.0	4.9	18	0.9

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW10	2017	4.7	180	108	39	0	0.6	4.0	27	0.6
MW10	2018	4.4	169	106	43	0	0.0	0.0	16	0.0
MW10	2019	4.3	170	106	38	0	0.0	3.0	17	0.5
MW10	2020	4.5	177	111	38	0	0.0	3.9	17	0.7
MW10	2021	4.4	180	112	38	0	0.0	4.2	17	0.8

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW10	2017	4.7	180	108	39	0	0.6	4.0	27	0.6
MW10	2018	4.5	190	119	49	3	0.8	4.2	24	0.6
MW10	2019	4.5	179	112	44	0	0.6	4.4	18	0.8
MW10	2020	4.5	194	121	48	11	1.0	4.6	21	0.9
MW10	2021	4.4	183	114	41	0	0.0	5.4	18	1.0

Table 32. Groundwater Quality Results – MW11

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW11 (Off Old Telegraph Rd)	7/1/2021	4.8	147	92	29	4	1.3	2.6	14	2.1
MW11 (Off Old Telegraph Rd)	12/4/2021	4.8	154	96	30	11	6.6	4.1	15	4.4
MW11 (Off Old Telegraph Rd)	14/10/2021	4.8	139	87	27	2	1.0	3.0	16	2.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW11 (Off Old Telegraph Rd)	2017	4.7	154	90	32	0	0.0	2.0	19	1.0
MW11 (Off Old Telegraph Rd)	2018	4.8	148	93	37	1	1.0	2.8	16	1.5
MW11 (Off Old Telegraph Rd)	2019	4.5	145	90	31	0	0.0	2.8	16	1.3
MW11 (Off Old Telegraph Rd)	2020	4.7	149	94	28	4	0.9	3.1	16	1.7
MW11 (Off Old Telegraph Rd)	2021	4.8	147	92	29	6	3.0	3.2	15	2.8

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW11 (Off Old Telegraph Rd)	2017	4.7	154	90	32	0	0.0	2.0	19	1.0
MW11 (Off Old Telegraph Rd)	2018	4.6	135	85	36	0	0.0	2.3	14	1.5
MW11 (Off Old Telegraph Rd)	2019	4.5	136	85	28	0	0.0	1.9	15	1.1
MW11 (Off Old Telegraph Rd)	2020	4.5	138	86	27	1	0.5	2.9	14	1.3
MW11 (Off Old Telegraph Rd)	2021	4.8	139	87	27	2	1.0	2.6	14	2.0

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW11 (Off Old Telegraph Rd)	2017	4.7	154	90	32	0	0.0	2.0	19	1.0
MW11 (Off Old Telegraph Rd)	2018	5.0	158	99	39	2	3.0	3.1	19	1.6
MW11 (Off Old Telegraph Rd)	2019	4.6	154	96	33	1	0.0	3.3	16	1.4
MW11 (Off Old Telegraph Rd)	2020	4.9	159	100	29	7	1.9	3.3	18	2.4
MW11 (Off Old Telegraph Rd)	2021	4.8	154	96	30	11	6.6	4.1	16	4.4

Table 33. Groundwater Quality Results – MW12

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW12	7/1/2021	4.4	109	68	19	9	0.9	1.1	11	0.0
MW12	12/4/2021	4.8	98	61	17	8	1.4	1.2	13	0.0
MW12	14/10/2021	4.5	113	71	19	6	1.0	2.0	12	0.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW12	2017	5.3	96	72	13	7	2.0	0.9	12	0.0
MW12	2018	5.4	103	64	16	11	1.0	0.2	16	0.0
MW12	2019	5.0	95	60	36	13	1.2	0.5	12	0.0
MW12	2020	5.2	129	80	16	12	3.2	1.4	13	1.6
MW12	2021	4.6	107	67	18	8	1.1	1.4	12	0.0

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW12	2017	5.3	96	72	13	7	2.0	0.9	12	0.0
MW12	2018	5.1	100	63	14	9	0.0	0.0	13	0.0
MW12	2019	4.8	93	58	13	8	0.6	0.0	11	0.0
MW12	2020	5.0	114	71	15	8	1.3	0.7	11	0.0
MW12	2021	4.4	98	61	17	6	0.9	1.1	11	0.0

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW12	2017	5.3	96	72	13	7	2.0	0.9	12	0.0
MW12	2018	5.7	105	66	18	13	1.5	0.6	20	0.0
MW12	2019	5.2	98	61	100	24	1.8	0.7	13	0.0
MW12	2020	5.5	164	102	18	23	8.7	2.6	15	6.2
MW12	2021	4.8	113	71	19	9	1.4	2.0	13	0.0

Table 34. Groundwater Quality Results – MW13

Sample	Date	pH	Electrical Conductivity	Total Dissolved Solids	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium
MW13	7/1/2021	4.1	137	85	26	0	0.0	1.8	12	0.0
MW13	12/4/2021	4.2	134	84	27	2	0.0	2.3	13	0.0
MW13	14/10/2021	4.2	135	84	24	0	0.0	2.0	13	0.0

Sample	Cal Year	Average of pH	Average of Electrical Conductivity	Average of Total Dissolved Solids	Average of Chloride	Average of Sulphate	Average of Calcium	Average of Magnesium	Average of Sodium	Average of Potassium
MW13	2017	4.9	134	92	27	1	2.0	2.0	16	0.0
MW13	2018	4.4	140	87	32	4	0.8	0.8	19	0.3
MW13	2019	4.5	139	87	30	2	1.3	1.8	15	0.2
MW13	2020	4.3	146	91	29	6	0.5	1.9	16	0.0
MW13	2021	4.2	135	84	26	1	0.0	2.0	13	0.0

Sample	Cal Year	Min of pH	Min of Electrical Conductivity	Min of Total Dissolved Solids	Min of Chloride	Min of Sulphate	Min of Calcium	Min of Magnesium	Min of Sodium	Min of Potassium
MW13	2017	4.9	134	92	27	1	2.0	2.0	16	0.0
MW13	2018	4.3	133	83	28	3	0.0	0.0	14	0.0
MW13	2019	4.1	132	82	28	1	0.7	1.4	13	0.0
MW13	2020	4.1	143	90	27	1	0.0	1.9	14	0.0
MW13	2021	4.1	134	84	24	0	0.0	1.8	12	0.0

Sample	Cal Year	Max of pH	Max of Electrical Conductivity	Max of Total Dissolved Solids	Max of Chloride	Max of Sulphate	Max of Calcium	Max of Magnesium	Max of Sodium	Max of Potassium
MW13	2017	4.9	134	92	27	1	2.0	2.0	16	0.0
MW13	2018	4.5	146	91	36	4	1.6	1.6	23	0.6
MW13	2019	4.9	143	89	32	2	2.3	2.0	16	0.8
MW13	2020	4.5	149	93	31	13	1.1	1.9	18	0.0
MW13	2021	4.2	137	85	27	2	0.0	2.3	13	0.0

6.5.3 Wet Weather High Groundwater Level

As the limit on the depth of extraction is defined to be 2m above the Wet Weather High Groundwater level, groundwater monitoring is essential to determine this limit. The consent defines the Wet Weather high groundwater level as 'the rolling average of all recorded groundwater level measurements at any monitoring location on the site, as the first recorded following any rainfall event of at least 50mm over any 24hour period, and as contour mapped using this data'. Rainfall data is also required to assist in the determining of the limit of extraction. The site received greater than 50mm on four 24 hour periods during 2021.

Table 35. Groundwater Depth Changes with Rainfall Event

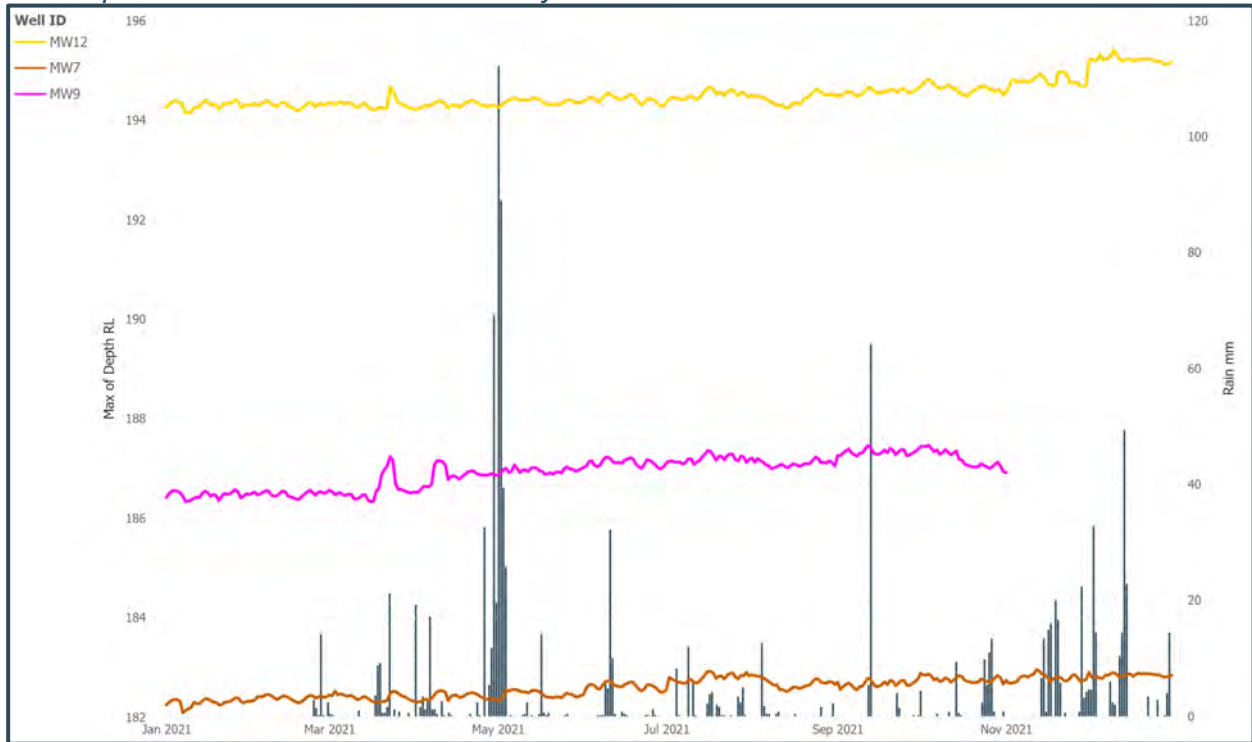
Well ID	Aquifer	Max of Depth RL after latest >50mm/day rainfall event (2021)	#Average Peak water level after >50mm/day rainfall event (2018)	Wet Weather High Groundwater RL (2021)	#Wet Weather High Groundwater RL (2018)	Lowest Level in Quarry at nearest location
MW12	Hawkesbury Sandstone	194.6	194.7	196.6	196.7	
MW7	Hawkesbury Sandstone	182.8	184.3	184.8	186.3	
MW9	Hawkesbury Sandstone	187.2	188.3	189.2	190.3	
MW10	Maroota Sands	185.9	185.2	187.9	187.2	189.0
MW11	Maroota Sands	182.6	183.1	184.6	185.1	
MW6	Maroota Sands	185.2	184.8	187.2	186.8	188.0

Data from Groundwater Study Report (Dundon Consulting, April 2018)

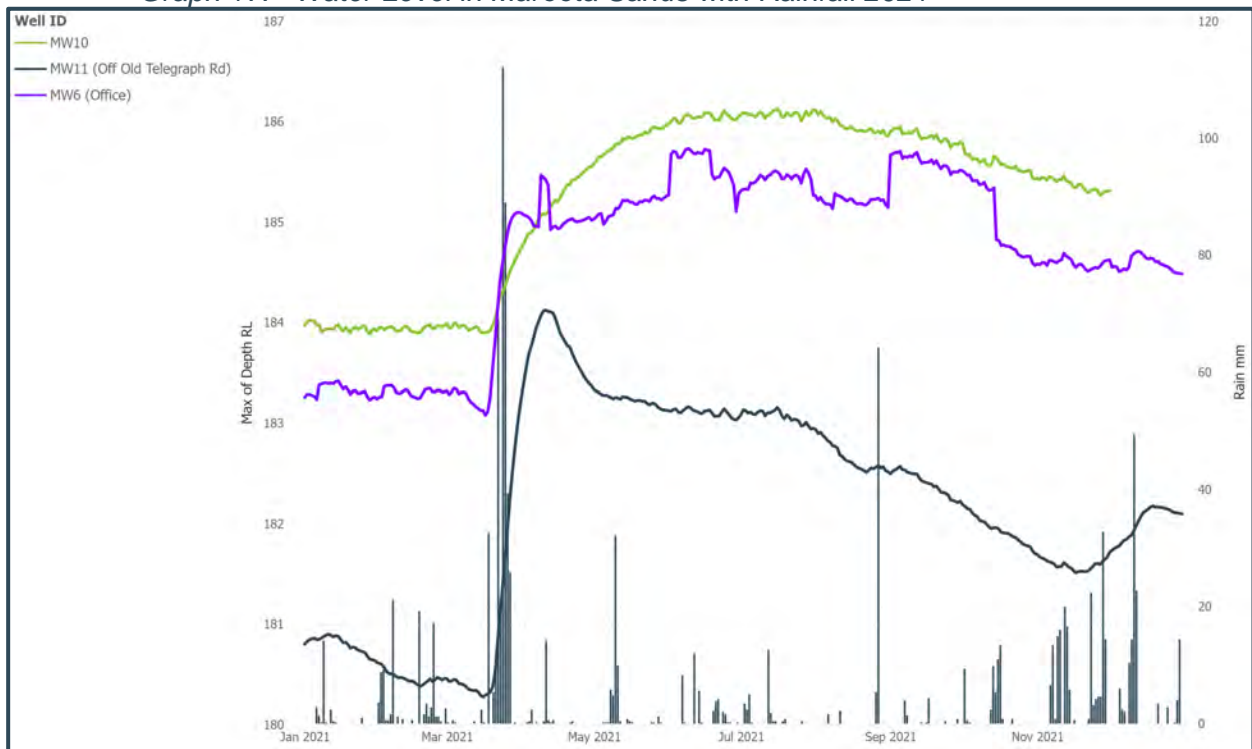
The above table illustrates that all current groundwater levels are below or near that modelled in 2018 for the Groundwater Study, and that the quarry floor is above the Wet Weather High Groundwater Level.

The quarry floor levels are 2 metres above the Wet Weather High Groundwater Level, therefore the quarry floor is compliant.

Graph 16. Water Level in Hawkesbury Sandstone with Rainfall 2021



Graph 17. Water Level in Maroota Sands with Rainfall 2021



6.5.4 Interpretation and Effectiveness of Controls

Groundwater Levels have risen across the site during 2021 in response to higher rainfall. The largest rise was in March after some steady rainfall, and levels have been slowly rising since then. The Maroota Sands channel has risen to levels approximately equal and slightly higher than those used in 2018 for the original groundwater modelling. The Hawkesbury Sandstone regional aquifer has also remained at approximately similar levels. These are illustrated on *Figure Seven*.

The quarry floor levels are 2 metres above the Wet Weather High Groundwater Level, therefore the quarry floor is compliant.

6.5.5 Measures Proposed for Improvement

Specific monitoring improvements to be investigated are as follows.

- Continue groundwater and surface water level monitoring and report in accordance with the approved Groundwater Monitoring Program and Groundwater Management Plan.
- Review loggers on site and replace faulty loggers if required.
- Undertake water quality monitoring and reporting in accordance with the approved Groundwater Monitoring Program and Water Management Plan.

Figure Seven. Wet Weather High Groundwater Level – A

Plan of: Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Wet Weather High Groundwater Level Maroota Sands (2021)

Figure: SEVEN-A

Version/Date: V0 15/03/2021

Our Ref: 12173_HMA_ARC2021_Q007_V0_F7A

Location: Maroota Quarry, Roberts Road, Maroota, NSW

Council: Hills Shire Council

Tenure: Not Applicable

Client: Hodgson Quarries & Plant Pty Ltd

Source: Fyfe Quarry Photo - Image Date 24/02/2022
Nearmap surrounding photo - Image Date 18/03/2020 Zone MGA 56

Survey: Fyfe Quarry Contours 24/02/2022
NSW Spatial Services ELVISDEM Surrounding Contours Dated May 2017

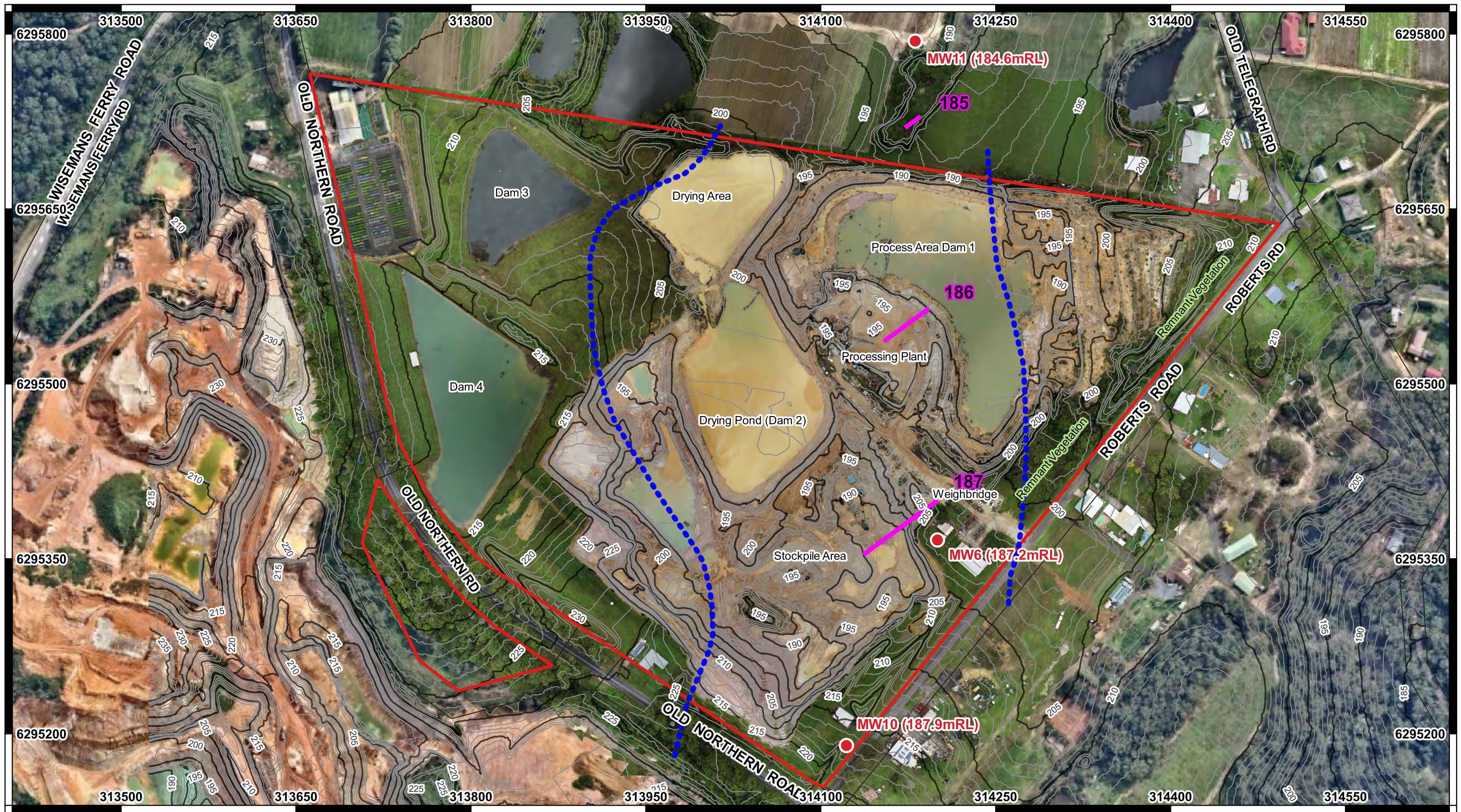
Projection: GDA2020/MGA Zone 56 EPSG:7856

Contour Interval: 1m

Plan By: SK/JD

Project Manager: LT

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.


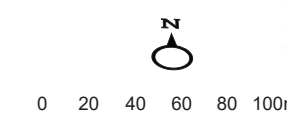
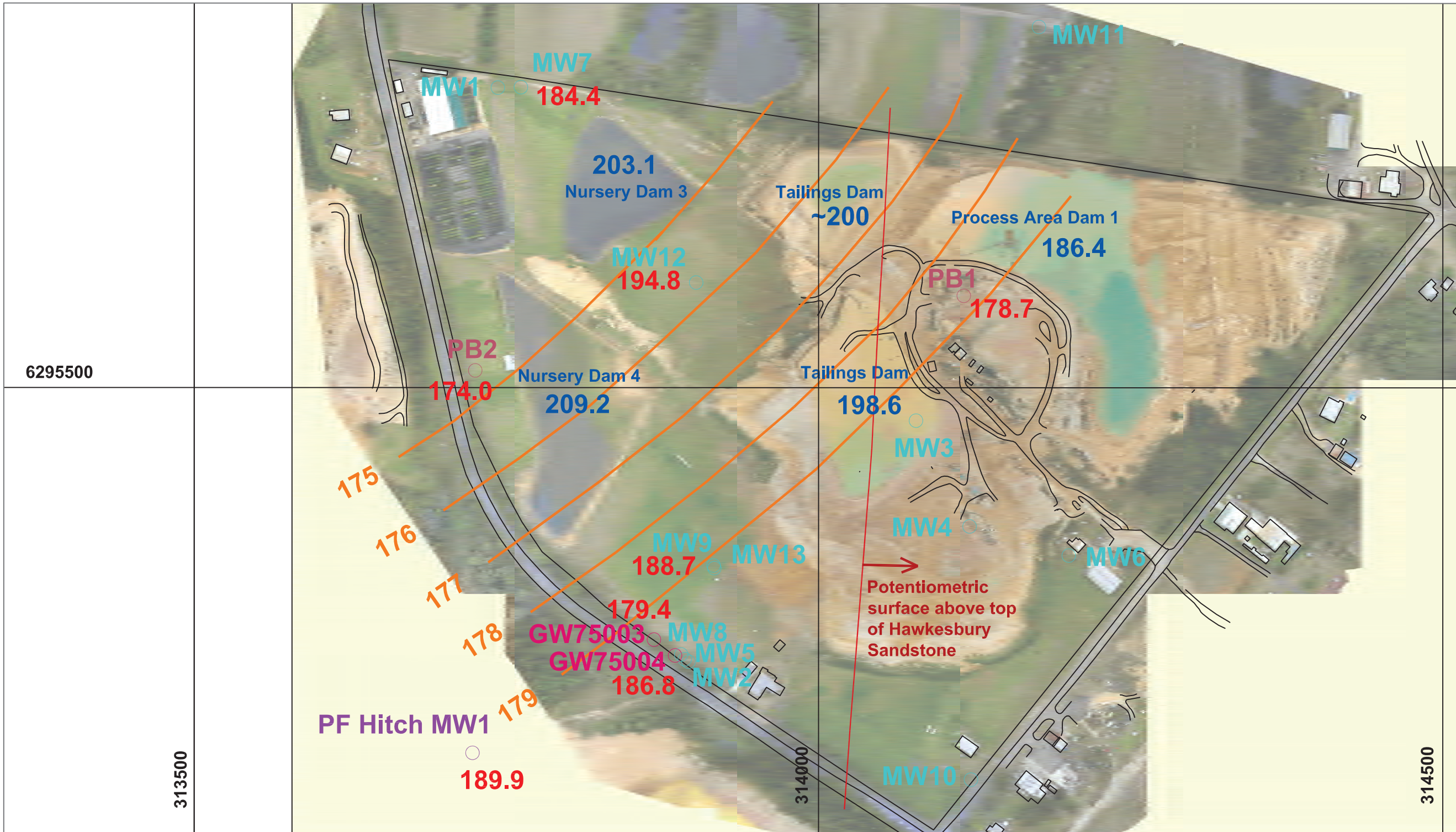


- Legend**
- Property Boundary
 - - - Edge of Saturated Maroota Sands
 - - - Contours of Wet Weather High GW Level
 - Groundwater Monitoring Well Location
 - Contours
 - 5m
 - 1m

Figure Eight. Wet Weather High Groundwater Level – B

Plan of:	Annual Review & Compliance Report 2021 for Roberts Road Maroota Sand Quarry - Wet Weather High Groundwater Level Hawkesbury Sandstone (Feb 2018)	Location:	Maroota Quarry, Roberts Road, Maroota, NSW	Source:	Dundon Consulting Pty Ltd Figure 16 Dwg No. 06-0318-021d 08/03/2018	Our Ref:	10418_HMA_ARC2021_C007_V0_F7B.cdr
Figure:	SEVEN-B	Council:	Hills Shire Council	Survey:	Dundon Consulting Pty Ltd 08/03/2018	Plan By:	LT/JD
Sheet:	2 of 2	Tenures:	N/A	Projection:	MGA	Project Manager:	LT
Version/Date:	V0 24/03/2022	Client:	Hodgson Quarries & Plant Pty Ltd	Contour Interval:	1m	Office:	Thornton

This figure may be based on third party data which has not been verified by vgt and may not be to scale. Unless expressly agreed otherwise, this figure is intended as a guide only and vgt does not warrant its accuracy.

LEGEND:

- Hodgson monitoring bore
- Hodgson production bore
- 174.0 Hawkesbury Sandstone water level
- Contours of wet weather high GW level
- Potentiometric surface above top of HS

DATE: 8 March 2018 **SCALE:**

PROJECT NO: 06-0318 **AUTHOR:** PD

DRAWING NO: 06-0318-021d **REVISION:** D

Dundon Consulting Pty Ltd

Hodgson Quarry and Plant Pty Ltd

ROBERTS ROAD MAROOTA SAND QUARRY

Wet Weather High Groundwater Level

Hawkesbury Sandstone (February 2018)

Figure 16

6.6 SITE WATER BALANCE

The Water Management Plan (version July 2018) was submitted to the (then) DoI Water and DPE to comply with the conditions of consent (Mod 2) and was approved by DPE on 22nd August 2018. An update was undertaken in December 2020 and was submitted via the Major Projects Portal for consultation in February, April and August 2021 (DA267-11-99-PA-11) as documented in submitted response number DA267-11-99-PA-13. An email request to NRAR for comment was sent again on 12/10/21 with a response received 26/10/21 that the matter was being reviewed. NRAR and DPI-Water responded on 2nd Nov 2021 via the Major Projects portal that they had no comment. The WMP was then submitted to DPIE via the Major Projects Portal. There has been no approval or further information required at this stage. Due to the protracted nature of this consultation process, the WMP has not been updated again in 2021.

6.6.1 Requirements and Predictions

Condition 42 (a) of the consent states:

[The Surface Water Management Plan includes]:

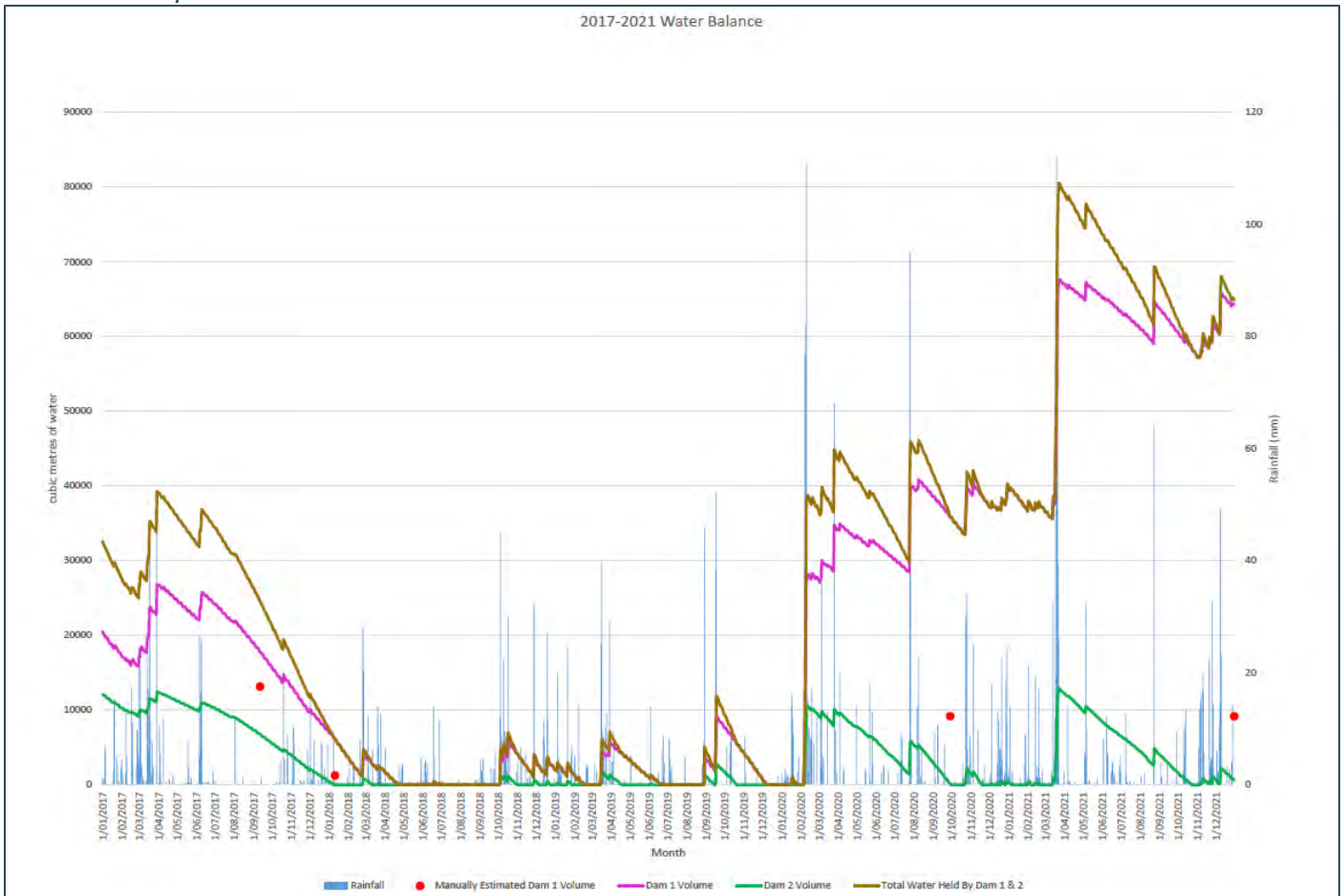
Site Water Balance that:

- *includes details of:*
- *sources and security of water supply, including contingency planning;*
- *water use on site;*
- *water management on site, including groundwater inflows to the quarry voids and site discharges; and*
- *audit and reporting procedures, including comparisons of the site water balance each calendar year; and*
- *describes the measures that would be implemented to minimise clean water use on site and maximise recycling opportunities.*

6.6.2 Monitoring Results Compliance and Trends

Monitoring of water depths is discussed in [Sections 6.4 and 6.5](#). The Site Water Balance for 2021 is shown below.

Graph 18. Site Water Balance 2021



6.6.3 Interpretation and Effectiveness of Controls

The water balance has focused on the currently disturbed catchments and Dams 1 and 2. Dams 3 and 4 are not controlled by the operator and usage/pumping rates are unknown. At present they play no part in the site operations and therefore are not included in the water balance. Rainfall from data obtained onsite and from the BOM observations over 2021 was used to correlate site observations and measured dam water levels.

A level logger was installed in Dam 1 in late September 2017 and data obtained during 2021 has been applied to the model. At the time the logger was installed, the RL of the water in Dam 1 was recorded. Measurements were taken over the area of the dam to determine the depth of water to the base of the silt. The dam was found to be only up to 0.5m deep over the vast majority of its extent with the exception of a deeper void (up to 3m deep) around the pump intake. This data was used to project an approximate contour model of the base of the dam. From the model, the volume of the water within the dam has been estimated at various depths (RLs). These volumes have then been correlated with the monthly average depth recorded by the logger and plotted against the volume of water held predicted by the water balance to assess its reliability. No dissipation from the dams has been accounted for in the amended assumptions.

From the plot of the predicted water balance, based on actual rainfall data, pumping rates and truck tonnages, it can be seen that the high rainfall replenished supplies of water in the dam. The added rainfall, coupled with lower production meant that there were no plant stoppages due to lack of water this report period.

It is surmised that the silt residing below the base of the dam holds a large quantity of water which is unable to be measured and this accounts for the discrepancy between the water balance calculation and the volume estimated from 12D modelling.

6.6.4 Measures Proposed for Improvement

The following measures will be instigated during the next reporting period.

- The Site Water Balance will be updated again for the 2022 Annual Review.

6.7 PROCESS WATER DAM

The Water Management Plan (version July 2018) was submitted to the (then) DoI Water and DPE to comply with the conditions of consent (Mod 2) and was approved by DPE on 22nd August 2018. An update was undertaken in December 2020 and was submitted via the Major Projects Portal for consultation in February, April and August 2021 (DA267-11-99-PA-11) as documented in submitted response number DA267-11-99-PA-13. An email request to NRAR for comment was sent again on 12/10/21 with a response received 26/10/21 that the matter was being reviewed. NRAR and DPI-Water responded on 2nd Nov 2021 via the Major Projects portal that they had no comment. The WMP was then submitted to DPIE via the Major Projects Portal. There has been no approval or further information required at this stage. Due to the protracted nature of this consultation process, the WMP has not been updated again in 2021.

6.7.1 Requirements and Predictions

6.7.1.1 Consent Conditions

The following conditions are from the consent schedule 2:

38. *The Applicant shall not extract:*

(a) *below a depth of 182 m AHD in the footprint of the Process Water Dam, if not already extracted as at the date of Modification 2*

42 (b) *[The Surface Water Management Plan includes]*

- *a detailed description of design and construction criteria for the Process Water Dam based on a feasibility study of:*
 - *capacity to construct multiple cells within the overall dam footprint (ie a two stage or three stage dam);*
 - *whether the dam floor and walls are able to be effectively lined with compacted clay (especially for multiple cells);*
 - *whether effective hydraulic separation can be achieved between such cells;*
 - *rehabilitating such cells to create a single dam within the final landform; and*
 - *the appropriateness of diverting runoff received from off-site around the dam;*

45. *The Applicant must ensure that the Process Water Dam is designed and constructed in a manner that satisfies the design and construction criteria for the Process Water Dam as developed under the Surface Water Management Plan (see condition 42(b) above).*

6.7.1.2 2015 EA Requirements and Predictions

The Environmental Assessment, September 2015 section 2.2.1 discusses construction of a dam in three stages down to a depth of 178m RL or firm base.

6.7.2 Monitoring Results Compliance and Trends

The deepest point of the dam remains approximately 185 m AHD in the vicinity of the pump. The remainder of the top of the sediment remains at approximately 187 m AHD. This is compliant with all relevant criteria.

6.7.3 Interpretation and Effectiveness of Controls

The current Process Water Dam has proved effective in preventing uncontrolled discharge off-site. It is also providing sufficient supply of suitable water to the processing plant, with supplementation from the processing bore required.

As discussed in the Surface Water Management Plan and Rehabilitation and Landscape Plan, the three-stage construction of the dam to a depth of 178m AHD or firm base is no longer relevant, and the current monitoring shows that the base of the Process Dam is 2 m above the Wet Weather High Groundwater Level, therefore no changes will be made to the Process Dam.

6.7.4 Measures Proposed for Improvement

The Process Dam will continue to be monitored in accordance with the Surface Water Management Plan.

6.8 NOISE AND ROAD NOISE

6.8.1 Requirements and Predictions

The annual noise monitoring was undertaken in October 2021 against the Mod 4 conditions which specifies the following Noise Impact Criteria:

Condition 47: *The Applicant must ensure that the noise generated by the development does not exceed the criteria in Table [1] at any residence on privately-owned land.*

Table 36. Operational Noise Criteria

Receiver	Day (7am to 6pm) LAeq(15min)	6am-7am LA1(1min)	6am-7am LAeq(15min)
B	44	50	40
All other receivers	43	50	40

Noise generated by the development is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy (as may be updated or replaced from time-to-time).

Condition 47:

- (a) *The excavator to be used is to be fitted with acoustic mufflers to achieve a noise level of approximately 76dB(A) when measured at 7 metres.*
- (b) *The on-site generator is to be fitted with an acoustic enclosure to ensure that noise levels less than 44dB(A) at 30m are achieved.*
- (c) *A noise compliance investigation is to undertaken within one month of the installation of the equipment to demonstrate compliance with the noise level limits stated in Conditions 47(a) and 47(b). The results of the compliance investigation are to be provided for the approval of the Secretary within 14 days of the completion of the investigations.*

Condition 48: *The Applicant shall ensure that traffic noise from the development does not exceed (L Aeq(1 hr)) 55 dB(A) between 7 am and 10 pm and 50 dB(A) between 10 pm and 7 am at any affected residence under adverse weather conditions. Where ambient Leq levels already exceed these criteria, the Applicant shall ensure that traffic noise from the development does not result in an increase of more than 2 dB(A).*

Note: Adverse weather conditions means in the presence of winds up to 3 metres per second and/or temperature inversions of up to 4 degrees Centigrade per 100 metres.

The EPL specifies the following noise related limits:

Table 37. Noise-related Conditions

Condition	Description
L2.1	Noise from the premises must not exceed the sound pressure level expressed as LA10 (15 minute) of 45dB(A), except as expressly provided by this licence
L2.2	Noise from the premises is to be measured or computed at any point within one metre of any residential boundary, or at any point within 30 metres of the dwelling where the dwelling is more than 30 metres from the boundary, to determine compliance with the noise level limits in Condition L2.1

The Noise Impact Assessment prepared for the Environmental Assessment for Mod 2 (Nexus Environmental Planning Pty Ltd, September 2015) made the following commitments.

Table 38. Predicted Noise Impacts, 2015 LAeq, 15min (dBA)

Scenario	All Locations
Typical Operations	43

The Mod 4 Predicted Noise Levels at Receivers LAeq, 15 min dB(A) predicted an exceedance by 1dB(A) at Receiver RR10 when VENM emplacement and extraction are undertaken in Stage 1A and 5A combined. It was stated that “As the noise predictions of Table 7.22 are based on worst-case site noise emissions, it is expected that compliance with noise limits will be achievable by adherence to the ongoing noise control strategies in the Quarry Operational and Road Noise Management Plan (ORNMP) (MAC, 2016).”

Table 39. Predicted Noise Impacts, Mod 4 LAeq, 15min (dBA)

Scenario	All Locations
Typical Operations	43*

*Except for minor 1dB(A) exceedances at Receiver B (Receiver RR10). (Umwelt (Australia) Pty Limited, 2019)

6.8.2 Monitoring Results Compliance and Interpretation

Results of operational and road noise monitoring undertaken in October 2021 are given in *Appendix J*. The report states:

Attended monitoring has identified that operational and road noise emissions generated by the quarry comply with relevant statutory noise limits. Furthermore, project related noise emissions are generally masked by extraneous non-quarry sources.

Further details and interpretation of results are given in the attached report.

Table 40. Operator-Attended Noise Survey Results

Location	LA10	LAeq	LA90	Quarry LAeq 15 min	Criteria LAeq 15 min	Comment
Day Time Attended Monitoring Results – 19/10/2021						
A	55	62	40	<30	43	Compliance achieved
B	51	54	36	<30	44	Compliance achieved
C	47	45	39	Inaudible	43	Compliance achieved
Morning Shoulder Attended Monitoring Results – 19/10/2021						
A	49	49	39	<35	40	Compliance achieved
B	54	55	37	34	40	Compliance achieved
C	50	47	42	<30	40	Compliance achieved
2020	All sites compliant					
2019	All sites compliant					
2018	All sites compliant					
2017	All sites compliant					

Table 41. Road Noise Survey Results

Period	No of Quarry Trucks	Overall LAeq(1hr)	Project Truck Contribution	Criteria
6am to 7am	10	68	50	50
7am to 8am	2	68	44	55
2020	Compliant			
2019	Compliant			
2018	Compliant			
2017	Compliant			

Sound Power Levels were not tested on the site plant and equipment this year. Sound Power levels of existing machinery are given in Table 42. There was no new equipment purchased and no atypical works undertaken.

Table 42. Sound Power of Equipment

Plant	Overall Sound Power (dBA)	Criteria in Sound Power dBA	Comment
PC350 Komatsu Excavator	101	101 *	Compliance achieved.
L180G Volvo Loader	103	N/A	
Sand Plant, conveyors, log wash and stacker	100	N/A	
PC400 Komatsu Excavator – commissioning test only	105	101 *	This excavator was under repair for the majority of the year. Once re-commissioned, the Sound Power level will be re-checked.

Plant	Overall Sound Power (dBA)	Criteria in Sound Power dBA	Comment
Total Fleet Sound Power	109	113 #	Compliance with expected modelling achieved.

* Condition 47a states: 'The excavator to be used is to be fitted with acoustic mufflers to achieve a noise level of approximately 76dBA when measured at 7m.' (This equates to a sound power level of 101dBA.)

'Typical Scenario and Plant Numbers' assessed in the Mod 2 Acoustic Assessment.

6.8.3 Trends and Effectiveness of Controls

6.8.3.1 Noise Trends

[Table 40](#) and [Table 41](#) summarises 2021 attended noise monitoring results during quarry operations and past noise compliance status. Noise measured at the nominated residences during quarry operations in the reporting period were compliant with Mod 4 criteria.

6.8.3.2 Effectiveness of Noise Management Controls

Table 43. Effectiveness of Noise Management Controls

Control	Interpretation	Effective?
Perimeter Bunds	Noise measured at residences complies with requirements and predictions	Yes
Temporary bunds when extracting in close proximity to residences	Temporary bunds are in place around the current extraction area. Noise measured at residences complies with requirements and predictions. Noise measured at residences lower than previous monitoring.	Yes
Training and awareness for employees and truck drivers	Noise measured at residences complies with requirements and predictions. Road noise attributed to the site complies with requirements and predictions.	Yes
Mufflers on excavators	Sound power levels were measured on two excavators; one did not comply, however off-site noise remains inaudible.	Yes
New equipment purchased checked by qualified noise consultant for compliance prior to commissioning	Total fleet sound power levels remain less than modelled	Yes

6.8.4 Measures Proposed for Improvement

As seen from the previous section, the current controls and mitigation measures in place are effective. Any new equipment purchased after the annual noise monitoring event will be tested during the next round.

Should atypical works be undertaken, extraction outside of temporary bunds (surface extraction), or a dozer ripping sandstone during initial topsoil and overburden extraction, a suitably qualified noise consultant will be commissioned to undertake attended noise monitoring during this time.

6.9 FLORA AND FAUNA

6.9.1 Requirements and Predictions

The consent specifies the following requirements with regard to flora and fauna management:

Table 44. Flora and Fauna Management Conditions

Condition number	Condition Summary	Details of compliance status	Compliant
55	The Applicant shall prepare a Flora and Fauna Management Plan as part of the EMP. The Plan shall be prepared in consultation with National Parks and Wildlife Service and Council, (further detail in consent)	Flora and Fauna Management Plan has been prepared and updated in 2016. OEH (NPWS) was consulted but declined to make comments. Council comments have been included in report	Yes
56	The Applicant shall maintain the revegetated areas for the duration of the Consent. Maintenance may include: (details in consent)	Limited rehabilitation has been undertaken on the site due to the cell staging that has been required. All bundwalls are vegetated and stable.	Yes

Objectives and targets from the Flora and Fauna Management Plan:

Table 45. Flora and Fauna Management Objectives and Targets

Objective / Target	Compliance Status
To protect known threatened flora species on the site and ensure correct procedures are applied in the event of other threatened flora or fauna species being located on the site.	Known species identified, baseline monitoring undertaken in Jan 2018. Monitoring is undertaken annually.
Inspections of site flora and fauna to show minimal impacts from operations.	Trends over time show minimised impacts.
Consider the post extraction land use in the management and maintenance of conserved and rehabilitated vegetation.	Conserved vegetation is managed in accordance with Landscape and Rehabilitation Plan

6.9.2 Monitoring Results Compliance and Trends

Monitoring of the remnant vegetation was undertaken in October 2021, in accordance with the Flora and Fauna Management Plan. A full report is supplied in the Biodiversity Report in *Appendix K*.

A program of planting was undertaken in October – November 2020 with the aim of improving the vegetation buffer on the perimeter of the site. Low shrubs including bottlebrush species were planted on the Old Northern Rd perimeter bund where pruning by utilities companies has caused severe damage in the past. The 2021 Biodiversity Report states that “the bund walls have good coverage of native vegetation with reproduction maturity demonstrated by most species during this monitoring period.”

6.9.3 Interpretation and Effectiveness of Controls

The Annual Biodiversity Monitoring Report produced by South East Environmental noted that:

- “The site does appear to be recovering from the dry weather conditions which persisted from mid 2017 and into early 2020. Evidence of some die back, particularly of large shrubs is still apparent although juvenile growth is reasonably prolific. Forbs and ferns which were not well represented in the previous monitoring period are now present. Native grasses are making a strong comeback in the native vegetation areas, particularly along Roberts Road.”

- “Natural native regeneration from the soil seed bank is occurring throughout much of the remnant native vegetation areas. Fencing to exclude livestock has most likely assisted in the ability for natural regeneration to occur undisturbed. Fencing has also taken place in planted areas along the northern property boundary where planting success is high.”

6.9.4 Measures Proposed for Improvement

The Biodiversity report recommended a monthly weed control plan given in Appendix D of the Biodiversity Report which is reproduced below. In response to requested actions by DPIE, a weed management plan is produced monthly, with examples given in [Appendix L](#).

Table 46. Recommended Weed Control

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
African Lovegrass	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide				Herbicide	Herbicide	Herbicide	Herbicide
Blackberry	Herbicide	Herbicide	Herbicide						Herbicide	Herbicide	Herbicide	Herbicide
Cobblers Pegs	Hand removal	Hand removal	Hand removal	Hand removal					Herbicide	Herbicide	Herbicide	Hand removal
Crofton Weed	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide				Herbicide	Herbicide	Herbicide	Herbicide
Fireweed	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal
Lantana	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide				Herbicide	Herbicide	Herbicide	Herbicide
Paspalum	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide			Herbicide	Herbicide	Herbicide	Herbicide
Rhodes Grass	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide	Herbicide
Whiskey Grass	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Hand removal	Herbicide	Herbicide	Herbicide	Hand removal

Herbicide – Foliar spray with an appropriate product as per the instructions on the label. Foliar spray should be carried out during active growing season.
 Hand removal – Necessary when targeted species have reached flowering maturity. Entire plant can be removed or flowering heads may be cut. Removed material should be immediately bagged to prevent spread of seed and appropriately disposed of.

This table should be considered a guide for appropriate treatment during different months of the year. It does not indicate a specified work schedule.

6.10 REHABILITATION

The Landscape and Rehabilitation Management Plan (LRMP) was submitted to the DPE in March 2018 and approved in August 2018.

6.10.1 Requirements and Predictions

Performance indicators and completion criteria were provided in the LRMP and are presented in *Table 47*. None of these criteria have yet been achieved. The LRMP will require updating to the Mod 4 final landforms presented in *Appendix C*.

Table 47. Rehabilitation Performance Indicators and Completion Criteria

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 1 - Decommissioning						
Domain 1 - Infrastructure						
All infrastructure and services not suitable for the final landuse will be removed.	Services not required for final landuse are disconnected.	Relevant services disconnected by qualified contractors	Report from qualified contractors	Upon decommissioning completion	EIS/LRMP	Not commenced/ Post extraction completion
	Infrastructure not required for final land use is removed	Relevant infrastructure removed.	Inspection and report	Upon decommissioning completion	EIS/LRMP	Not commenced/ Post extraction completion
All roads and hardstand areas to be retained for the final landuse will be reduced in width/size to that suitable for the final landuse.	Roads not required for final landuse are removed.	Roads removed unless specified to be retained	Inspection and report	Upon decommissioning completion	EIS/LRMP	Not commenced/ Post extraction completion
	Roads required for final landuse are reduced in width (if required)	Roads reduced in width to that suitable for final land use.	Inspection and report	Upon decommissioning completion	EIS/LRMP	Not commenced/ Post extraction completion
	Hardstand areas reduced to a size required for the final landuse	Hardstand areas reduced in size to that suitable for final landuse.	Inspection and report	Upon decommissioning completion	EIS/LRMP	Not commenced/ Post extraction completion
Sediment runoff to be contained	Sediment retained in water management structures	Sediment Dams will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains will be designed for the 1 in 10 year design storm event.	Existing dams currently meet capacity specifications (see SWMP). Final water body is designed to exceed the required capacity and will be assessed once complete. Inspection for capacity by quarry manager.	For the final water body, on construction completion and monthly until completion.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Temporary dams are in place. Final Water Body construction not commenced/ Post extraction completion
Domain free from hazardous materials	No hazardous material remain	All hazardous material removed	Contamination report prepared by qualified person. Register of Hazardous Material.	Following decommissioning with follow up validation testing as required.	LRMP	Not commenced/ Post extraction completion
All remaining stockpiles will be removed and/or reused in the establishment of the final landform.	No remaining stockpiles	All remaining stockpiles are removed.	Inspection and report	Upon decommissioning completion	EIS/LRMP	Not commenced/ Post extraction completion

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 1 – Decommissioning (continued)						
Domain 3 - Water Management						
Sediment dams to be retained in the final landform are converted to clean water dams.	No sediment laden water enters the remaining clean water dam system.	<ul style="list-style-type: none"> Final water body has been desilted, if required to increase capacity and minimise sediment entrainment in discharged water. The catchment areas for the final water body is sufficiently rehabilitated so as to only contain clean water runoff. 	Inspection by quarry manager and suitably qualified person.	On construction completion and monthly until completion	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Final Water Body construction not commenced/ Post extraction completion
	Sediment dam discharge due to overtopping does not entrain sediment.	Final water body will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains will be designed for the 1 in 10 year design storm event and do not re-entrain sediment. The dam spillway will be designed for the 1 in 100 year design storm event.		For the final water body, on construction completion and monthly until completion.		DECC- Managing Urban Stormwater, EIS, SWMP and LRMP
Domain 4 – Overburden Emplacement Area						
All overburden will be removed and reused in the establishment of the final landform.	No remaining overburden stockpiles	All overburden stockpiles are removed and or incorporated into the final landform.	Inspection and report	Upon decommissioning completion	EIS, and LRMP	Not commenced/ Post extraction completion
Sediment runoff to be contained.	Sediment retained in water management structures	Final water body will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains will be designed for the 1 in 10 year design storm event and do not re-entrain sediment. The dam spillway will be designed for the 1 in 100 year design storm event.	Existing dams currently meet capacity specifications (see SWMP). Final water body is designed to exceed the required capacity and will be assessed once complete. Inspection by quarry manager and suitably qualified person.	On construction completion and monthly until completion.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Final Water Body construction not commenced/ Post extraction completion
Domain 6 - Open Cut Void						
No activities within this domain are required during this phase						
Domain 9 - Native Vegetation Conservation Area						
No activities within this domain are required during this phase						

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 2 - Landform Establishment						
Domain 1 – Infrastructure						
Domain landform is safe, stable and non-polluting, fit for the purpose of the intended final land use.	Final landform contours similar to proposed final landform contours.	<ul style="list-style-type: none"> Slope lengths in rehabilitated areas shall not exceed 20m for a 3H: 1V batter i.e. an earth bank shall be installed. Slope lengths in rehabilitated areas shall not exceed 30m for a 4H: 1V batter i.e. an earth bank shall be installed. Slope lengths in rehabilitated areas shall not exceed 40m for batters >4H: 1V i.e. an earth bank shall be installed. 	Survey on completion by registered surveyor.	Upon completion of landform establishment phase.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Not commenced/ Post extraction completion
	Suitable sediment and erosion controls in place.	Final water body will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains will be designed for the 1 in 10 year design storm event and do not re-entrain sediment. The dam spillway will be designed for the 1 in 100 year design storm event.	Final water body is designed to exceed the required capacity and will be assessed once complete. Inspection by quarry manager and suitably qualified person.	Visual Inspection on construction completion and monthly until completion.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Final Water Body construction not commenced/ Post extraction completion
Domain 3 - Water Management						
Final water body is non-polluting and fit for the purpose of the intended final land use.	Final water body is constructed to the engineer's design specification.	The dam dimensions, location and walls construction will be to the engineer's design specification (yet to be determined). The dam spillway will be designed for the 1 in 100 year design storm event.	Inspection by quarry manager and suitably qualified person.	During construction as determined by the engineer	DECC- Managing Urban Stormwater and engineers plans	Final Water Body construction not commenced/ Post extraction completion
	Final water body is not a pollution hazard to the downstream environment.	Final water body will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. The dam spillway will be designed for the 1 in 100 year design storm event.	Final water body is designed to exceed the required capacity post establishment and will be assessed once complete. Inspection by quarry manager and suitably qualified person.	Visual Inspection on construction completion and monthly until completion.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Final Water Body construction not commenced/ Post extraction completion
Domain 4 - Overburden Emplacement Area						
Ensure overburden emplacement areas has been battered/shaped to the final landform.	Final landform contours similar to proposed final landform contours.	<ul style="list-style-type: none"> Slope lengths in rehabilitated areas shall not exceed 20m for a 3H: 1V batter i.e. an earth bank shall be installed. Slope lengths in rehabilitated areas shall not exceed 30m for a 4H: 1V batter i.e. an earth bank shall be installed. Slope lengths in rehabilitated areas shall not exceed 40m for batters >4H: 1V i.e. an earth bank shall be installed. 	Survey on completion by registered surveyor.	Upon completion of landform establishment phase.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Not commenced/ Post extraction completion
Sediment runoff to be contained.	Sediment retained in water management structures	Final water body will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains will be designed for the 1 in 10 year design storm event and do not re-entrain sediment. The dam spillway will be designed for the 1 in 100 year design storm event.	Existing dams currently meet capacity specifications (see SWMP). Final water body is designed to exceed the required capacity and will be assessed once complete. Inspection by quarry manager and suitably qualified person.	Visual Inspection on construction completion and monthly until completion.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Final Water Body construction not commenced/ Post extraction completion

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 2 - Landform Establishment (continued)						
Domain 6 - Open Cut Void						
Domain landform is safe, stable and non-polluting, fit for the purpose of the intended post-mining land use(s)	Final landform contours similar to proposed final landform contours.	<ul style="list-style-type: none"> Slope lengths in rehabilitated areas shall not exceed 20m for a 3H: 1V batter i.e. an earth bank shall be installed. Slope lengths in rehabilitated areas shall not exceed 30m for a 4H: 1V batter i.e. an earth bank shall be installed. Slope lengths in rehabilitated areas shall not exceed 40m for batters >4H: 1V i.e. an earth bank shall be installed. 	Survey on completion by registered surveyor.	Upon completion of landform establishment phase.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Not commenced/ Post extraction completion
Domain landform is effectively drained and protected from erosion	Landform drains towards water management domain	Final water body will be designed to Best Practice according to the 'Blue Book' Criteria for a 5 day 90th percentile storm event. All drains will be designed for the 1 in 10 year design storm event and do not re-entrain sediment. The dam spillway will be designed for the 1 in 100 year design storm event..	Existing dams currently meet capacity specifications (see SWMP). Final water body is designed to exceed the required capacity and will be assessed once complete. Inspection by quarry manager and suitably qualified person.	Visual Inspection on construction completion and monthly until completion.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Final Water Body construction not commenced/ Post extraction completion
Access tracks to be retained	Tracks suitable for private access or pedestrian usage	Slopes of major tracks <10° or have cross drains/banks installed. Where unsuitable soils are present, tracks to be stabilised with crushed bricks, concrete, gravel or similar.	Survey on completion by registered surveyor. Stabilisation methods to be recorded and reported by Site Contractor to the quarry manager.	Upon completion of landform establishment phase.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Not commenced/ Post extraction completion
Materials (including topsoils of the disturbed areas) are recovered, appropriately managed and used efficiently as resource in the rehabilitation	Available topsoils are stockpiled appropriately and reused on the site	Available topsoil is spread over final landform	Site contractor to record growth medium management procedures in to the quarry manager. Records to include amounts stripped, locations and depths re-spread.	As required during construction.	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Not commenced/ Post extraction completion
Domain 9 - Native Vegetation Conservation Area						
No activities within this domain are required during this phase						

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 3 - Growth Medium Development						
Domain A - Infrastructure						
No revegetation is to occur in this domain, therefore no activities are required during this phase						
Domain B - Water Management						
No revegetation is to occur in this domain, therefore no activities are required during this phase						
Domain C & D - Rehabilitation Area – Grassland/Woodland						
Establish soil/growing medium suitable for establishment of grassland or woodland vegetation community	Compacted surfaces deep ripped to 300mm along contour.	Photographs of ripped areas	Inspection by quarry manager and suitably qualified person.	Following Deep ripping	EIS and LRMP	Not commenced/ Post landform establishment
	Hydromulch Area- <ul style="list-style-type: none"> Minimum 300mm of subsoil emplaced over deep ripped surface. Minimum of 100mm of topsoil emplaced over subsoil layer. 	Small 'test pits' dug and photographed to show final media depth, report indicates required thicknesses achieved.	Photographs of test pits reported by quarry manager and/or suitably qualified person	Following spreading of soils.	EIS and LRMP	Not commenced/ Post landform establishment
	Buffer Setbacks and Embankments with 1V:3H Grade- <ul style="list-style-type: none"> Minimum 300mm of subsoil emplaced over deep ripped surface. Minimum of 100mm of topsoil emplaced over subsoil layer. Minimum of 75mm of organic mulch emplaced over topsoil. 	Small 'test pits' dug and photographed to show final media depth, report indicates required thicknesses achieved.	Photographs of test pits reported by quarry manager and/or suitably qualified person	Following spreading of soils.	EIS and LRMP	Not commenced/ Post landform establishment
	Embankments Steeper than 1V:3H Grade- <ul style="list-style-type: none"> Minimum 300mm of subsoil emplaced over deep ripped surface. Minimum of 100mm of topsoil emplaced over subsoil layer. Jute matting pinned to topsoiled bank. Minimum of 75mm of organic mulch emplaced over topsoil. 	Small 'test pits' dug and photographed to show final media depth and presence of jute matting, report indicates required thicknesses achieved.	Photographs of test pits reported by quarry manager and/or suitably qualified person	Following spreading of soils.	EIS and LRMP	Not commenced/ Post landform establishment
	Permanent Bundwalls- <ul style="list-style-type: none"> Minimum 300mm of topsoil emplaced over deep ripped surface. Jute matting pinned to topsoiled bank. Minimum of 75mm of organic mulch emplaced over topsoil. 	Small 'test pits' dug and photographed to show final media depth and presence of jute matting, report indicates required thicknesses achieved.	Photographs of test pits reported by quarry manager and/or suitably qualified person	Following spreading of soils.	EIS and LRMP	Not commenced/ Post landform establishment
Domain J - Native Vegetation Conservation Area						
No activities within this domain are required during this phase						

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 4 - Ecosystem and Land use Establishment						
Domain A - Infrastructure						
No revegetation is to occur in this domain, therefore no activities are required during this phase						
Domain B - Water Management						
Wetlands water management structure to remain therefore no activities required during this phase						
Domain C & D - Rehabilitation Area – Grassland/Woodland						
Re-establishment of a grassland/woodland community with a similar composition to the pre-disturbance community i.e. Shale-Sandstone Transition Forest.	Revegetation species mix applied as suggested in Rehabilitation Management Plan	<ul style="list-style-type: none"> A target coverage factor of 70% will be subject to further refinement. Low mortality of plants used in progressive revegetation with 75% becoming established 3 years. 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EIS and Rehabilitation Management Plan	Not commenced/Ongoing
	The rehabilitated area does not constitute an erosion hazard.	Total projected foliage cover is greater than or equal to 70%.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	DECC- Managing Urban Stormwater, EIS, SWMP and LRMP	Not commenced/Ongoing
	Weeds not preventing revegetation from establishing	Weed cover no more than 25% over a 3 year monitoring period within any given areas where revegetation has occurred. Note that non-native species purposefully planted to control erosion are excluded from this target.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EIS and Rehabilitation Management Plan	Not commenced/Ongoing
	Grazing by native and domestic fauna not adversely impacting on ecosystem development	Rural fences and gates installed around disturbed area to prevent grazing of domestic stock. Feral animal controls will be implemented if required.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EIS and Rehabilitation Management Plan	Not commenced/Ongoing
	Branches and logs of any trees cleared on the site are to be spread within the rehabilitation areas to provide habitat for ground fauna	<ul style="list-style-type: none"> Evidence of logs and other fallen timber spread over re rehabilitated areas. Ground fauna species of similar diversity to adjacent areas of similar habitat. 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EIS and Rehabilitation Management Plan	Not commenced/Ongoing
Domain J - Native Vegetation Conservation Area						
Ensure that the conservation areas are progressing towards the Shale-Sandstone Transition Forest vegetation community.	The rehabilitated area does not constitute an erosion hazard.	Total projected foliage cover is greater than or equal to 70%.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	DECC- Managing Urban Stormwater EIS	Not commenced/Ongoing
	Weeds not overtaking existing vegetation	Monitoring confirms that after 2 years the non-native/non-target species (weeds) represents less than 20% of projected foliage cover or equivalent to surrounding vegetation not disturbed by mining activities.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EIS and Rehabilitation Management Plan	Not commenced/Ongoing
	Grazing by native and domestic fauna not adversely impacting on ecosystem development	Rural fences and gates installed around disturbed area to prevent grazing of domestic stock. Feral animal controls will be implemented if required.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EIS and Rehabilitation Management Plan	Not commenced/Ongoing

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 5 - Ecosystem and Land use Sustainability						
Domain A - Infrastructure						
No activities are required during this phase						
Domain B - Water Management						
Water contained in the final landform is consistent with the baseline ecological, hydrological and geomorphic conditions of the surrounding environment	Water quality monitoring results show that the final water body is non-polluting should it overtop and is suitable for stock water.	Water Quality meets the objective of Section 120 of the Protection of the Environment Operations Act 1997: and Water Quality meets the objective of the ANZECC Guidelines for 90% protection of freshwater ecosystems.	Water to be monitored for pH, Turbidity, Oil & Grease and TSS on a once off basis. NATA laboratory	Once off basis.	EA and Rehabilitation Management Plan	Not commenced/ Post completion
Domain C & D - Rehabilitation Area – Grassland/Woodland						
Re-establishment of a grassland/woodland community with a similar composition to the pre-disturbance community i.e. Shale-Sandstone Transition Forest.	Vegetation self-sustaining.	Monitoring confirms: <ul style="list-style-type: none"> Evidence of new growth of endemic species. Evidence of successive generations of endemic species No further active weed control required (beyond that considered necessary at analogue sites). 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EA and Rehabilitation Management Plan	Not commenced/ Ongoing
	Rehabilitated areas to be linked to existing and future areas of vegetation where possible to form a network of wildlife corridors	<ul style="list-style-type: none"> Connectivity between current and future rehabilitated areas are established adjacent to existing and future areas of vegetation where possible. Patches are not be separated by more than 10 metres where possible. 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EA and Rehabilitation Management Plan	Not commenced/ Ongoing
	Rocks of varying sizes are to be spread over rehabilitated areas to provide ground fauna habitat and refuge.	<ul style="list-style-type: none"> Evidence of varying sized rocks between 20 mm and greater than 200 mm spread over rehabilitated areas. Ground dwelling fauna species of similar diversity to adjacent areas of similar habitat. 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EA and Rehabilitation Management Plan	Not commenced/ Ongoing
	The provision of nest boxes for a range of arboreal fauna to be installed during the establishment of final rehabilitation areas	On completion of the rehabilitation, a suitably qualified ecologist determines the requirement on whether nest boxes are required. If nest boxes are required to be installed a nest box management plan will be prepared.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	On installation	EA and Rehabilitation Management Plan	Not commenced/ Ongoing

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 5 - Ecosystem and Land use Sustainability (continued)						
Domain J - Native Vegetation Conservation Area						
Conservation area is established and self-sustaining	Vegetation self-sustaining.	Monitoring confirms: <ul style="list-style-type: none"> Evidence of new growth of endemic species. Evidence of successive generations of endemic species No further active weed control required (beyond that considered necessary at analogue sites). 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EA and Rehabilitation Management Plan	Not commenced/Ongoing
	Conservation area to be linked to existing and future areas of vegetation where possible to form a network of wildlife corridors	<ul style="list-style-type: none"> Connectivity between conservation areas are established adjacent to existing and future areas of vegetation where possible. Patches are not be separated by more than 10 metres where possible. 	Monitoring including photography to be conducted by suitably qualified person and reported annually.	Monthly for the first 6 months, then 6 monthly until completion criteria achieved	EA and Rehabilitation Management Plan	Not commenced/Ongoing
	The provision of nest boxes for a range of arboreal fauna to be installed during the establishment of final rehabilitation areas	On completion of the rehabilitation, a suitably qualified ecologist determines the requirement on whether nest boxes are required. If nest boxes are required to be installed a nest box management plan will be prepared.	Monitoring including photography to be conducted by suitably qualified person and reported annually.	On installation	EA and Rehabilitation Management Plan	Not commenced/Ongoing

Objective	Performance Indicator	Completion Criteria	Monitoring Methodology and Responsibility	Monitoring Frequency	Justification /Source	Current Progress and Expected Completion
Phase 6 - Relinquishment						
All Domains						
Relinquishment	Demonstrated compliance with all completion criteria	Outlined above	Completion Report to be prepared by suitably qualified person describing compliance with all criteria.	-	-	Not commenced

6.10.2 Monitoring Results Compliance and Trends

Table 48. Rehabilitation Status

Mine Area Type	2016 Ha	2017 Ha	2018 Ha	2019 Ha	2020 Ha*	2021 Ha^	2022#
Exposed and Active	3.9	3.1	3.1	2.7	2.9	1.7	1.7
Active extraction area	2.5	2.4	2.2	2.1	2.2	0.5	0.5
Access tracks and haul roads (unsealed)	1.4	0.7	0.9	0.6	0.8	1.2	1.2
Areas not Actively Creating Dust							
Stripped ahead of mining (accessed < once per month)	0.6	2.4	2.5	2.8	3.0	4.3	4.3
Water Management	4.0	3.8	4.3	4.3	4.3	4.3	4.3
Overburden Emplacements / Machinery Storage	1.5	1.8	1.1	1.1	1.1	1.2	1.2
Land Being Prepared for Rehabilitation	1.9	1.9	1.8	1.8	1.8	1.8	1.8
Topsoil Stockpiles / Bunds / Land under active Rehabilitation (ie vegetated)	0.7	1.7	2.4	2.5	2.4	2.1	2.1
Total Active Disturbance	12.6	14.6	15.2	15.2	15.5	15.5	15.5
Infrastructure area (sealed)	1.5	1.5	2.3	2.3	2.3	2.3	2.3
Total Mine Footprint	14.1	16.2	17.5	17.1	17.9	17.8	17.8

* Hectares estimated from Google Earth and Nearthmaps

^Hectares re-estimated from Fyfe Survey 2022

Predicted

Note that these 2021 areas have been interpolated from air photography taken February 2022 via QGIS software, and are not survey accurate. A Statement of Accuracy can be supplied on request. The areas are illustrated on the attached [Figure Five](#) and [Figure Six](#).

6.10.3 Interpretation and Effectiveness of Controls

The perimeter bundwalls have been revegetated with grass and shrub species and are stable and not prone to erosion. The perimeter bund walls are providing effective visual screening from the site operations despite the absence of mature trees. The general compliance of the dust and noise monitoring results indicates that this control measure is effective. Internal bunds and topsoil stockpiles are generally well covered with pasture species.

Progressive rehabilitation in the extraction cells has not occurred on the site to date due to the lack of finished faces. Although this results in erosion on the internal faces of the extraction area, sediment is captured within the pit void and does not impact on surrounding land or waterways.

The 10m buffer on the northern boundary has been reinstated and the bund wall vegetated with native species.

The remaining areas on the site, outside the extraction footprint are well vegetated with pasture species and are stable and protected from erosion impacts.

6.10.4 Measures Proposed for Improvement

During the next report period the following activities will be undertaken towards development of the final landform:

- Monitor and maintain perimeter vegetation.
- Revegetation activities will continue on perimeter bunds.

- Monthly weed management.
- Submission of the Conservation Calculation and Bond will be undertaken.

7 Management Targets and Strategies for Future Stages

The targets and strategies for future stages have been outlined in the Environmental Management Plan and each individual sub-plan. They are summarised in the table below.

Table 49. Future Targets

Aspect	Target	Criteria
Air Quality	To receive no reasonably preventable complaints from members of the public or statutory authorities regarding air quality emissions from the site, and for monitoring to show that air quality criteria are being met	Air quality criteria outlined in 6.3.1
Water	To ensure there is no reasonably preventable impact on surface water external to the site or regional groundwater	Water quality criteria outlined in Sections 6.4 , 6.5 , and 6.7
Sediment and Erosion	To control erosion on the site to as to reasonable prevent impacts off site	Sediment and erosion criteria are outlined in 6.4
Noise	To receive no reasonably preventable complaints from members of the public or statutory authorities regarding noise or road noise impacts from the site, and for monitoring to show that noise criteria are being met	Noise and road noise criteria are outlined in 6.8.1
Flora and Fauna	Inspections of site flora and fauna to show minimal impacts from operations. Consider the post extraction land use in the management and maintenance of conserved and rehabilitated vegetation.	Performance and completion criteria are detailed in the FFMP 2016
Rehabilitation	To ensure that temporary and permanent rehabilitation activities are undertaken in accordance with the Rehabilitation Plan	Performance and completion criteria are detailed in the LRMP 2018.

8 Opportunities for Improvement

8.1 WATER MANAGEMENT PLAN UPDATES

Schedule 2, Condition 44 of the consent states:

44. The Applicant shall prepare a Water Management Plan for the development to the satisfaction of the Secretary. This plan must be prepared in consultation with DPIE Water by suitably qualified and experienced person/s whose appointment has been approved by the Secretary, and be submitted to the Secretary for approval by 31 December 2016. The plan must be updated on an annual basis in consultation with DPIE Water for three years from the date of approval of Modification 2 and thereafter as agreed with by the Secretary.

NRAR and DPIE will be approached as per the above condition to review whether annual updates are required.

8.2 TRANSPORT MANAGEMENT PLAN

As per Condition 50A(e), an Operational Traffic Management Plan (TMP)

An extension was granted to 10th December 2021 and TMP was submitted prior to the due date, however the authors were not approved. An updated TMP by an approved author, Pavey Consulting Services, has been submitted March 2022 to DPIE with the request for TfNSW for consultation as well as submitted to Council.

No response has been received to date. Once consultation is completed the TMP will be submitted to DPIE for approval.

8.3 REHABILITATION CONSERVATION BOND

VGT has been approved to prepare the Conservation and Rehabilitation Bond via letter dated 02/11/2021, see *Appendix N*. Calculations will be undertaken using recent survey and submitted for approval during 2022.

8.4 2020 INDEPENDENT AUDIT

Table 50. Independent Audit Actions

Opportunity	Actions	Date Achieved
Regular inspection and maintenance of screen plantings	Inspection to be added to quarterly environmental management checklist	3 months after new plantings installed
Regular inspection and maintenance of areas of erosion	Inspection to be added to quarterly environmental management checklist	31st October 2020.
Provision of additional spill kits in operational areas in the event of a hydrocarbon spill or leak	Additional spill kits will be purchased and placed in relevant mobile plant. Their use and location will be discussed at a regular toolbox meeting.	31st December 2020.
Further onsite segregation of wastes to allow for better recycling opportunities	Recycling opportunities will be added to the regular toolbox meetings.	Ongoing

8.5 ACTIONS AND IMPROVEMENTS PLANNED FOR 2022

Table 51. Summary of Proposed Improvements

Aspect	Improvement
Air Quality	<p>A mobile sprinkler is used to water disturbed areas that the water cart has difficulty accessing. Dust will continue to be monitored using high volume air samplers and dust deposition gauges.</p> <p>Relocation of HVAS monitored will be investigated.</p>
Water	Updated Water Management Plan to be submitted following consultation and implemented.
Noise	Undertake attended operational and road traffic noise monitoring, including compliance with conditions 47 (a) and (b). Any newly purchased equipment to tested for Sound Power compliance.
Flora and Fauna	<p>Biodiversity monitoring will be undertaken during the calendar year.</p> <p>Weed control and monthly reports as per Biodiversity Report schedule will be undertaken as recommended in Section 6.9.4.</p> <p>Additional plantings will be undertaken on perimeter bunds.</p>
Rehabilitation	Monitor and maintain perimeter vegetation.
Administrative	Environmental Management Strategy and sub-plans to be reviewed and revised following submission of this ARCR.

References

- Dundon Consulting. (April 2018). *Roberts Rd Maroota Sand Quarry Groundwater Study Report*.
- Dundon Consulting. (July 2018). *Roberts Rd Maroota Sand Quarry Groundwater Management Plan*.
- Dundon Consulting. (July 2018). *Roberts Rd Maroota Sand Quarry Groundwater Monitoring Program*.
- Holmes Air Sciences. (October 1999). *Air Quality Impact Assessment, Proposed Sand Extraction Operations, Roberts Rd Maroota, NSW*.
- Jacobs Group Australia Pty Ltd. (2019). *Roberts Road Quarry Air Quality Impact Assessment for Proposed Modification 4*.
- National Environment Protection Council. (February 2016). *National Environment Protection (Ambient Air) Measure*.
- Nexus Environmental Planning Pty Ltd. (May 2015). *Environmental Assessment Section 75W Mod 3*.
- Nexus Environmental Planning Pty Ltd. (November 1999). *Environmental Impact Statement*.
- Nexus Environmental Planning Pty Ltd. (September 2015). *Environmental Assessment Section 75W Mod 2*.
- NSW Department of Planning and Environment. (March 2016). *DA 267-11-99*.
- NSW EPA. (2015). *Environment Protection Licence 6535*.
- Umwelt (Australia) Pty Limited. (2019). *Robert Road Quarry Modification 4 Statement of Environmental Effects*. Teralba.
- Wilkinson Murray Pty Ltd. (June 2015). *Air Quality Impact Assessment*.