September 2026

Boral Dunmore Hard Rock Quarry Annual Review

1 July 2025 – 30 June 2026



Document Control Sheet

Document Control				
Ref	Prepared by	Approved by	Date	Distribution
V1.0	Ionut Ciobanu Oprea	Lauren Sibigtroth	30/09/2026	• Department of Planning, Housing and Infrastructure • Environmental Protection Authority • Shellharbour City Council • Dunmore Quarry CCC • Online at https://www.boral.com.au/locations/boral-dunmore-operations

Dunmore Hard Rock Quarry Annual Review Title Block

Name of operation	Boral Dunmore Hard Rock Quarry
Name of operator	Boral Resources (NSW) Pty Ltd
Development consent	DA-470-11-2003
Name of holder of development consent	Boral Resources (NSW) Pty Ltd
Water licence number	WAL#25152 Ref# 10AL103610
Name of holder of water licence	Boral Resources (NSW) Pty Ltd
Name of holder of EPL	Boral Resources (NSW) Pty Ltd
Annual Review start date	1 July 2025
Annual Review end date	30 June 2026
I, Greg Johnson, certify that this audit is a true and accurate record of the compliance statues of the Dunmore Hard Rock Quarry for the period of the 2026 Financial Year and that I am authorised to make this statement on behalf of Boral Resources (NSW) Pty Ltd. Note The annual review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual $250,000.	
Name of authorised reporting officer	Greg Johnson
Title of authorised reporting officer	Senior Environmental Business Partner
Signature	
Date	30/09/2026

Contents

1. Purpose and Scope 9
1.1. Statement of Compliance 11
1.2. Contacts Relevant to Dunmore Quarry Operations 13
2. Dunmore Quarry Operations 14
2.1. Operations the last 12 months 15
2.2. Operations the next 12 months 15
2.3. Licences and Approvals 15
3. Production, Sales and Transport 15
3.1. Transport Dispatch Data 17
3.1.1. Transport Options Review 17
4. Actions Required from Previous Annual Review 18
5. Environmental Performance 18
5.1. Meteorological Monitoring 19
5.1.1. Meteorological Monitoring Long Term Analysis and Trends 19
5.1.2. Meteorological Monitoring Summaries and Opportunity for Improvement 19
5.2. Air Quality Monitoring 19
5.2.1. Deposited Dust Monitoring Assessment Criteria 21
5.2.2. Deposited Dust Monitoring FY26 Performance Review 21
5.2.3. Particulate Monitoring Assessment Criteria 24
5.2.4. Particulate Monitoring FY26 Performance Review 25
5.2.5. Air Quality Monitoring Long Term Analysis and Assessment 26
5.2.6. Air Quality Monitoring Summary and Opportunities for Improvement 27
5.3. Blast Monitoring 27
5.3.1. Blast Monitoring Impact Assessment Criteria 28
5.3.2. Blast Monitoring FY26 Performance Review 28
5.3.3. Blast Monitoring Long Term Analysis and Trends 29
5.3.4. Blast Monitoring Summary and Opportunities for Improvement 31
5.4. Noise Monitoring 31
5.4.1. Noise Monitoring Impact Assessment Criteria 31
5.4.2. Noise Monitoring FY26 Performance Review 33
5.4.3. Noise Monitoring Long Term Analysis and Trends 34
5.4.4. Noise Monitoring Summary and Opportunities for Improvement 38
5.5. Surface Water Monitoring 38
5.5.1. Surface Water Quality Impact Assessment 39
5.5.2. Surface Water Quality FY26 Performance Review 40
5.5.3. Surface Water Long Term Analysis and Trends 45

5.5.4. Water Balance and Consumption 46
5.5.5. Surface Water Quality Summary and Opportunities for Improvement 48
5.6. Ground Water Monitoring 49
5.6.1. Groundwater Monitoring Impact Assessment Criteria 50
5.6.2. Groundwater Monitoring FY26 Performance Review 50
5.6.3. Groundwater Monitoring Summary and Opportunities for Improvement 51
5.7. Flora and Fauna Management and Rehabilitation 52
5.7.1. Flora and Fauna Impact and Rehabilitation Assessment Criteria 54
5.7.2. Flora and Fauna and Rehabilitation FY26 Performance Review 54
5.7.3. Flora and Fauna and Rehabilitation Summary and Opportunities for Improvement 56
5.8. Heritage Conservation 56
5.9. Waste Minimisation 56
5.9.1. Waste Tracking Register 56
5.9.2. Waste Minimisation Opportunities for Improvement 58
5.10. Incident and Emergency Response 58
5.11. Dangerous and Hazardous Goods Storage 58
6. Community 59
6.1. Environmental Complaints Management 59
6.2. Summary of Regulatory Notifications 60
7. Activities to be completed by the Next Reporting Period 61
8. Conclusion 62
9. Appendix A Meteorological Monitoring Locations Data and Graphs 63
10. Appendix B Air Quality Monitoring Additional Data and Graphs 72
11. Appendix C MAC Noise Monitoring Annual Compliance Report 79
12. Appendix D Blast Monitoring Tables 80
13. Appendix E EMM Ground Water Monitoring 81
14. Appendix F Goodbush Report 82

Tables

Table 1 Annual Review Consent Requirements 9
Table 2 Statement of Compliance 11
Table 3 Non-Compliances Risk Assessment 11
Table 4 Contacts Relevant to Dunmore Quarry Operations 13
Table 5 Relevant Licences and Approvals 15
Table 6 FY25 Annual review actions 18
Table 7 Deposited Dust Impact Assessment Criteria 21
Table 8 Deposited Dust Monitoring Summary 21

Table 9 Particulate Monitoring Impact Assessment Criteria 24
Table 10 Summary of Particulate Monitoring Data 25
Table 11 Blast Monitoring Parameters 28
Table 12 Blast Monitoring Parameters – MacParlands Residence 28
Table 13 Noise Monitoring Impact Assessment Criteria 31
Table 14 Attended noise monitoring results 33
Table 15 Water quality monitoring results at GS-1, GS-4/EPL#8, GS-2 and GS-3 over the reporting period 41
Table 16 Wet Weather Discharge Monitoring 42
Table 17 Proposed Water Management System Improvements 48
Table 34 Benny Residence FY26 Blast Monitoring Data 132

Figures

Figure 1 Dunmore Site Layout 14
Figure 2 Air Quality Monitoring Locations 20
Figure 3 DQ1 Deposited Dust Results 22
Figure 4 DQ2 Deposited Dust Results 22
Figure 5 DQ3 Deposited Dust Results 23
Figure 6 DQ4 Deposited Dust Results 23
Figure 7 PM_{10} Measurements – FY26 25
Figure 8 Historical Dust Monitoring Data 26
Figure 9 Historical PM_{10} Monitoring Data 27
Figure 10 Blast Monitoring Locations 27
Figure 11 FY26 Overpressure Data 29
Figure 12 FY26 Ground Vibration Data 29
Figure 13 Historical Overpressure Data 30
Figure 14 Historical Ground Vibration Data 30
Figure 15 Noise Monitoring Locations 32
Figure 16 Long term noise monitoring at NM-1 results since 2007 35
Figure 17 NM-1 Noise monitoring results since MOD-9 35
Figure 18 NM-2 Noise monitoring results since MOD-9 36
Figure 19 NM-3 Noise monitoring results since MOD-9 36
Figure 20 NM-4 Noise monitoring results since MOD-9 37
Figure 21 NM-5 Noise monitoring results since MOD-9 37
Figure 22 Surface water monitoring points 39
Figure 23 Lower Dam Annual pH Averages 45
Figure 24 Lower Dam Annual TSS Averages 45
Figure 25 Lower Dam Annual Turbidity Averages 46
Figure 26 Lower Dam Annual Conductivity Averages 46
Figure 27 Water Storage Locations 47
Figure 28 Existing water management system: typical wet year water balance 48
Figure 29 Groundwater Monitoring Bores 50
Figure 30 Hydroseeding cover and trees over Croome West Bund 52
Figure 31 Conservation Areas 53
Figure 31.1 Translocation area 1 53
Figure 37 July 2025 Wind Rose 65
Figure 48 Dunmore Seasonal Wind Rose Data 100
Figures 49-52 Historical Deposited Dust Trends 102

List of Abbreviations

ACHMP	Aboriginal and Cultural Heritage Management Plan
ANZECC	Australian and New Zealand Environment Conservation Council
AQMP	Air Quality Management Plan
AR	Annual review
AS	Australian Standard
BFMP	Bushfire Management Plan
BMP	Blast Management Plan
BOS	Biodiversity Offset Strategy
CCC	Community Consultative Committee
DA 470-11-2003	The development application for the Dunmore Hard Rock Quarry operated by Boral Resources (NSW) Pty Ltd
DO	Dissolved Oxygen
DPHI	Department of Planning, Housing and Infrastructure
DRG	NSW Division of Resources and Geoscience
EPA	Environmental Protection Authority
EPA&A Act	Environmental Planning and Assessment Act 1979
EPL 77	Environmental Protection Licence 77 for the Dunmore Hard Rock Quarry operated by Boral Resource (NSW) Pty Ltd
FFMP	Flora and Fauna Management Plan
FY26	Financial Year 2026 (1 July 2025 – 30 June 2026)
HVAS	High Volume Air Sampler
IEA	Independent Environmental Audit
LOR	Limit of Reporting
ML	Megalitres
MSDS	Material Safety Data Sheet
NATA	National Association of Testing Authorities
NMP	Noise Management Plan
NRAR	Natural Resource Access Regulator
NTU	Nephelometric Turbidity Units
OEH	Office of Environment and Heritage
PIRMP	Pollution Incident Response Management Plan

PM10	Particulate Matter (10 microns in diameter)
PM2.5	Particulate Matter (2.5 microns in diameter)
POEO Act	*Protection of the Environment Operations Act 1997*
RIC	Rail Infrastructure Corporation
S5.C9	Used to refer to a particular condition in DA-470-11-2003 (in this case Schedule 5, Condition 9).
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
WMP	Water Management Plan
WQO	Water Quality Objectives
$\mu g/m^3$	Micrograms per cubic metre

1. Purpose and Scope

In addition to determining compliance of the operation, DA 470-11-2003 Schedule 5 Condition 9 (S5.C9) requires that the AR reports on specific components of the operation.

S5.C9 and all other relevant conditions required to be addressed as part of the AR are outlined in Table 1 with reference to the section of this report where each has been addressed. The timeframe for the annual review is the 2026 Financial Year which is 1 July 2025 –30 June 2026.

Table 1 Annual Review Consent Requirements

Condition	Condition Requirements	Location within this report
S4.C29	In each Annual Review, the Applicant must:	
	(a) recalculate the site water balance for the development; and	Section 5.5.4
	(b) provide information on evaporative losses, dust suppression, dam storage levels and implications of obtaining any water supplies from off-site; and	Section 5.5.4
	(c) evaluate water take against licensing requirements	Section 5.5.4
S4.C50	The Applicant must include a progress report on the implementation of the Flora and Fauna Management Plan in the Annual Review.	Section 5.7, Appendix F
S4.C57	The Applicant must implement the Rehabilitation Strategy approved by the Planning Secretary.	Section 5.7, Appendix F
S4.C72	The Applicant must describe what measures have been implemented to minimise the amount of waste generated by the development in the Annual Review	Section 5.9
S4.C87	The Applicant must:	
	a. provide annual production data to the MEG using the standard form for that purpose; and	Section 3
	b. include a copy of this data in the Annual Review.	Section 3

Condition	Condition Requirements	Location within this report
S5.C9	By the end of September each year, or other timing as may be agreed by the Secretary, the Applicant must submit a report to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. The review must: a) Describe the development (including rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year; b) Include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, which includes a comparison of these results against the: • Relevant statutory requirements, limits or performance measures/criteria; • Requirements of any plan or program required under this consent; • Monitor results of previous years; and • Relevant predictions in the document listed in condition 2 of schedule 3; c) Identify any non-compliance over the last financial year, and describe what actions were (or are being) taken to ensure compliance; d) Identify any trends in the monitoring data over the life of the development; e) Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and f) Describe what measures will be implemented over the current financial year to improve the environmental performance of the development. The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 6 of Schedule 5) and any interested person upon request.	Section 5.7, Appendix F Section 5, Section 6.1 Section 1.1 Section 5 Section 5 Section 5

1.1. Statement of Compliance

The statement of compliance for the FY26 reporting period (1 July 2025 – 30 June 2026) is contained in Table 2 below.

Table 2 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
DA-470-11-2003	YES

The non-compliances identified in the reporting period are detailed in Table 3. Each non-compliance has been risk assessed as per the DPHI Annual Review Guidelines Compliance Status key outlined in Table 3.

Table 3 Non-Compliances Risk Assessment

Condition #	Condition Description	Compliance Status	Comments	Section addressed
DA 470-11-2003		Non-compliant Administrative		

Risk Assessment of Non-Compliances

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; • potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative	Non-compliant	Only to be applied where the non-compliance does not result in any risk of

Risk Level	Colour Code	Description
		environmental harm (eg submitting a report to government later than required under approval conditions)

Copies of the AR will be submitted to the DPIE and made available to the public at on the Dunmore Quarry website.

https://www.boral.com.au/locations/boral-dunmore-operations

1.2. Contacts Relevant to Dunmore Quarry Operations

Key contacts associated with the management of the Quarry operations, environment, safety and stakeholder relationships are provided in Table 4.

Table 4 Contacts Relevant to Dunmore Quarry Operations

Contact	Position	Contact Details
Brodie Bolton	Dunmore Quarry Manager	Tel: (02) 4237 2000 Email: brodie.bolton@boral.com.au
Angus Shedden	Metropolitan Operations Manager NSW/ACT	(02) 4237 2000 Email: angus.shedden@boral.com.au
Ionut Ciobanu Oprea	Environment and Stakeholder Advisor-Dunmore Operations	Tel: (02) 4237 8414 Email: ionut.ciobanuoprea@boral.com.au
Kate Woodbridge	Stakeholder Relations Manager	Tel: (02) 4237 8414 Email: kate.woodbridge@boral.com.au

2. Dunmore Quarry Operations

The Dunmore Hard Rock Quarry, owned and operated by Boral Resources (NSW) Pty Ltd, is located at Tabbita Road Dunmore, approximately 12 kilometres north-west of Kiama in the Shellharbour Local Government Area. The Quarry produces hard rock from Bumbo Latite Member, a fine-grained intermediate volcanic rock similar to basalt, which is crushed to produce coarse aggregates, road construction materials and fines.

Development Consent (DA 470-11-2003), issued 19 November 2004 by the Minister for Infrastructure and Planning, allows Boral to produce up to 2.5 million tonnes of quarry product a calendar year (Mtpa), and transport it offsite by road and rail to local and regional markets.

Dunmore Hard Rock Quarry (the site) covers approximately 248 hectares and is surrounded by private property, predominantly agricultural grazing land and tracts of remnant native vegetation, to the south, north and west (The Boral owned and operated Dunmore Lakes Sand Project adjoins the site to the east).

The extraction method involves drilling and blasting to produce broken rock, that is transported to the primary crusher feed bin. The primary-crushed rock is further reduced in size in a series of crushers, before being conveyed to the tertiary screen house where the crushed rock is sized according to product specifications. The sized products are then stockpiled within the various stockpile areas on site, until they are transported to local and regional markets.

Approval of the most recent modification, MOD 13, was granted in June 2024. Extraction of the approved area under MOD13, known as the RIC, commenced in the previous reporting period as of March 2025. Notification of commencement was submitted to DPHI. The site layout is shown below in Figure 1.

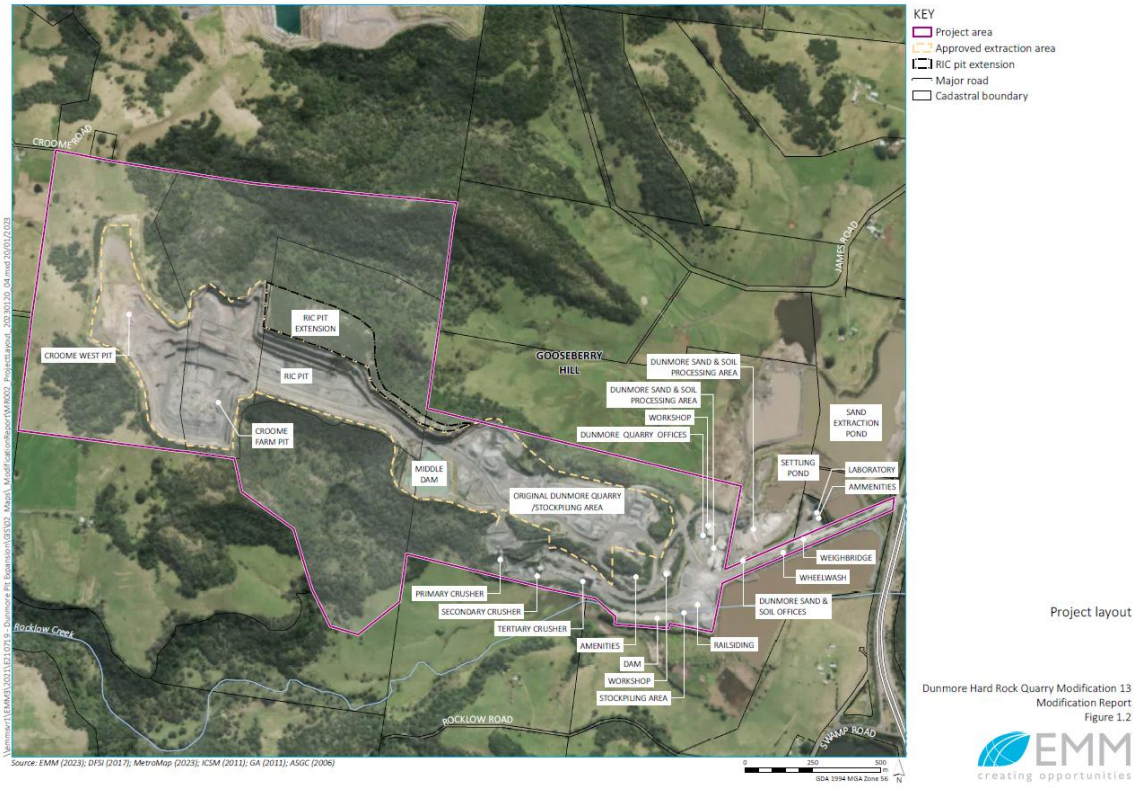


Figure 1 Dunmore Site Layout

2.1. Operations the last 12 months

Blasting and load and haul operations from the RIC reserve. DQ has been supplying material to the Mt Ousley upgrade over the first half of the FY. DQ received a new Cat 980 Wheel loader for sales in November. The new machines provide improved operational efficacy. A new HP400 crusher was installed.

Works have continued towards establishment of the Biodiversity Stewardship Agreement with EMM Consulting.

2.2. Operations the next 12 months

Access to the RIC reserve will continue in the next 12 months including translocation of material to translocation areas. Work will continue on the Biodiversity Stewardship Agreement. This will include a second aerial drone footage done during the flowering season to identify areas with high Zieria density. This was a part of the ABS request during discussions regarding the proposed methodology.

The period will be focused around Ballast supply for BHP and gabion stone supply for external markets.

2.3. Licences and Approvals

Dunmore Quarry operates under a number of regulatory approvals and licences which are summarised in Table 5 below.

Table 5 Relevant Licences and Approvals

Approval	Detail	Regulatory Authority
DA 470-11-2003 Modification 13	Approved in June 2024, MOD13 covered a 8ha extension of the RIC pit to allow for further extraction until 2043.	NSW Department of Planning, Housing and Infrastructure
EPL 77	The EPL is issued for the scheduled activity of: Crushing, Grinding, Separation and Extractive activities for tonnages up to 2 million tonnes per annum as defined by the EPA anniversary date 01 July.	NSW Environmental Protection Authority
Water Access Licence WAL#25152 WSW# 10AL103610	Extraction of water from the Lower Dam. This allows for 227 ML per annum to be extracted from Rocklow Creek. Since 2008 the Lower Dam has been taken offline from Rocklow Creek as part of MOD 2	Water NSW
Water Access Licence WAL#44509	Extraction of water from the Greater Sydney Basin. This allows for 250 ML per annum to be extracted.	Water NSW

A copy of DA 470-11-2003 and EPL 77 is available on request or can be accessed through the Boral Dunmore website:

https://www.boral.com.au/locations/boral-dunmore-operations

3. Production, Sales and Transport

Production was forecast to be lower than expected following the finalisation of MT. Oulsy, airports and Project Storm projects.

Table 6 and Table 7 detail the production data in both a monthly breakdown and the format submitted to DRG as required by S4.C77.

Table 6 Production data

Month	Production (t)	Sales (t)
		Road
Jul-2025	97,994	83,556
Aug-2025	91,995	68,962
Sep-2025	104,078	117,832
Oct-2025	86,883	176,101
Nov-2025	65,132	196,109
Dec-2025	58,208	114,491
Jan-2026	56,931	97,362
Feb-2026	77,459	126,519
Mar-2026	85,032	103,802
Apr-2026	80,759	79,807
May-2026	90,465	72,782
Jun-2026	79,973	89,825
FY 26 Total	974,909	1,327,148

Table 7 Sales data for FY26 period

Total Sales/Disposals			
Product	**Type of Material**	**Quantity (Tonnes)**	**$ Value of Sale***
Virgin Materials			
Crushed Coarse Aggregates			
Over 75mm	Latite		*
Over 30mm to 75mm	Latite		*
5mm to 30mm	Latite		*
Under 5mm	Latite		*
Natural sand			*
Manufactured Sand	Latite		*
Construction Sand			*
Prepared Road Base & Sub Base	Latite		*
Other Unprocessed Materials	Latite		*
Total		974,909	*

Note: This data is an approximation of FY26 production data and is subject to change.

*This information is commercially sensitive and has been omitted.

3.1. Transport Dispatch Data

Transport numbers are extracted from the transport monitoring system, which uses a docket tracking system to calculate the dispatch number, which is then automatically migrated over to the transport dispatch monitoring sheet.

No exceedances occurred with respect to the limit of 400 laden trucks from the site per day during the reporting period. The highest number of trucks leaving site on any given day was 356.

3.1.1. Transport Options Review

A transport options review is required within three years of determination of Modification 11 and every five years after as per SC.C60C. The review has been completed and is available in Appendix E.

4. Actions Required from Previous Annual Review

Table 8 details the actions required from the FY25 Annual review and where each item is discussed.

Table 6 FY25 Annual review actions

Reference	Description of Action	Actions Completed	Section Addressed
AR1	Planning for the Lower Dam upgrade will commence, with the aim of progressing to design and developing a proposal for approval.		
AR2	Monitoring and maintenance of translocation sites.	Translocation area 1 fully established. Area 2 partially covered.	
AR3	On-going establishment of Biodiversity Stewardship Site.	Progress towards establishment of the BSA has been made.	
AR 4	On-going review of real-time dust monitors and site training.	Real-time dust monitoring network assessed against the HVAS PM10 with positive results. Site staff inducted on alert system and action plans.	5.2
AR 5	Consultation and submission of Rehabilitation Management Plan and Rehabilitation Strategy.	Rehabilitation Management Plan and Rehabilitation Strategy submitted to DPHI. RMP approved in June 2026.	
AR 6	Update of Transport Management Plan and submission to DPHI.	Transport Management Plan submitted and approved by DPHI.	
AR 7	Update of Water Management Plan following consultation and submission to DPHI.	Water Management Plan updated, submitted and approved by DPHI.	

5. Environmental Performance

Dunmore Quarry has comprehensive management and monitoring programs which collect information and data for the assessment of environmental impacts, regulatory compliance and performance against continual improvement objectives. Specific Management Plans define the framework for measuring environmental performance and compliance with statutory requirements for each relevant aspect of environmental performance

5.1. Meteorological Monitoring

An onsite weather station is located at Dunmore, which collects a range on meteorological parameters. This system was upgraded as part of the transition to real time air quality monitoring. The location of the weather station is shown in Appendix A.

There is no prescribed impact assessment criteria and meteorological monitoring is used to provide background information for management of the site. A detailed summary of the FY26 and historical rainfall data can be found in Appendix A.

5.1.1. Meteorological Monitoring Long Term Analysis and Trends

The FY26 period was close to the regional average with 1204.8 mm falling over the reporting period. Rain events resulted in significant rainfall in short timeframes which contributed to exceeding the design capacity. There were five notable rain events during the reporting period, all of which exceeded the design capacity of the lower dam (90.7 mm over 5 days):

- 1-3 July 2025: 139 mm.
- 31 July - 4 August 2025: 105.2 mm.
- 19-23 August 2025: 156 mm.
- 10-11 September 2025: 121.4 mm.
- 15-20 January 2026: 171.6 mm.

Typically winds during the reporting period originated from the west and west-north-west for the majority of the year. In summer, prevailing winds were also from the west-north-west. These results are slightly different from historic trends and generally had a greater concentration of winds from the west and north-west.

5.1.2. Meteorological Monitoring Summaries and Opportunity for Improvement

The weather station is capable of providing real time data via download which is an upgrade from the previous station. The next reporting period will focus on continuing the processes established during the current reporting period.

5.2. Air Quality Monitoring

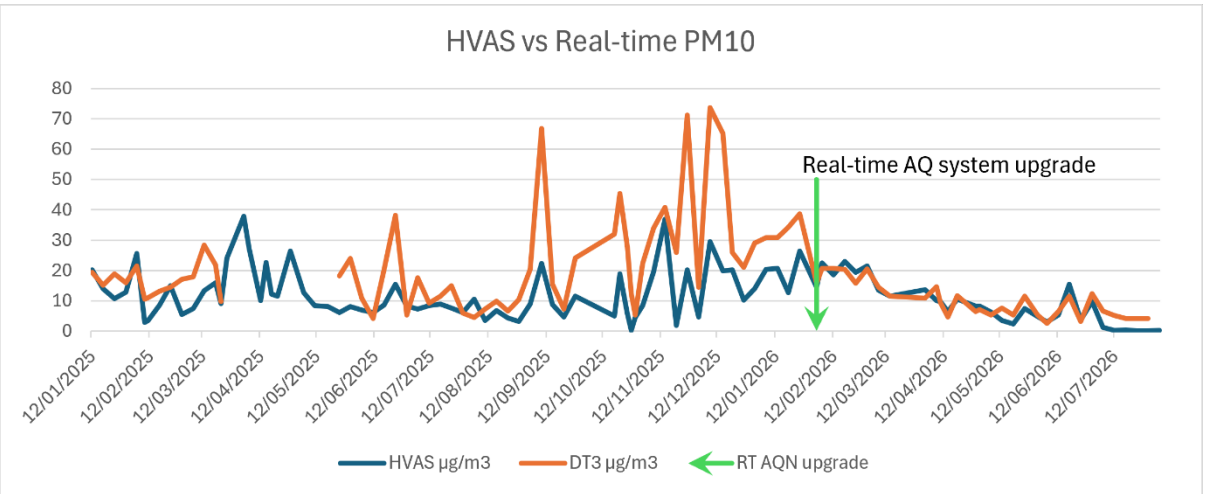
Three methods of monitoring air quality are used at Dunmore Quarry. Deposited dust gauges are used to measure deposited dust every 30 days (+/- 2 days). A High Volume Air Sampler (HVAS) is used to measure the fine particulate matter under 10 microns (PM_{10}) every 6 days. In parallel there is a real-time air quality monitoring system that tests continuous for PM10 and PM2.5. This system is capable of sending alerts when dust levels are exceeded, making it possible to take control measures in real time.

During the reporting period, 61 samples were collected from the High-Volume Air Sampler (HVAS – PM10). However, 1 sample was invalidated due to a HVAS instrument malfunction. The same filter was used across two sampling attempts in an effort to achieve the required 24-hour sampling period; however, the instrument ceased operation on both occasions. As a result, the filter accumulated only 57 minutes of total run time and did not meet the minimum sampling duration requirements. The sample was therefore deemed invalid and excluded from assessment.

Under the currently approved AQMP, the real-time monitoring network is proposed to eventually replace the deposited dust and HVAS monitoring once the transitional phase is complete. During the transition phase, the existing HVAS monitor would continue to be operated and be used to validate real-time monitoring network and assess the compliance of

the project. The alert system was tested on several occasions during the reporting period. These tests helped optimising the system, in accordance with the TARP plan implemented in June 2025. It was also included in the EPL license variation 3 September 2025.

In January 2026 the real-time air quality system was upgraded. This has resulted in a more stable and reliable monitoring. Results against the High-Volume Air Sampler confirm the benefits of the upgrade.



The location of air quality monitoring equipment is shown below in Figure 2.

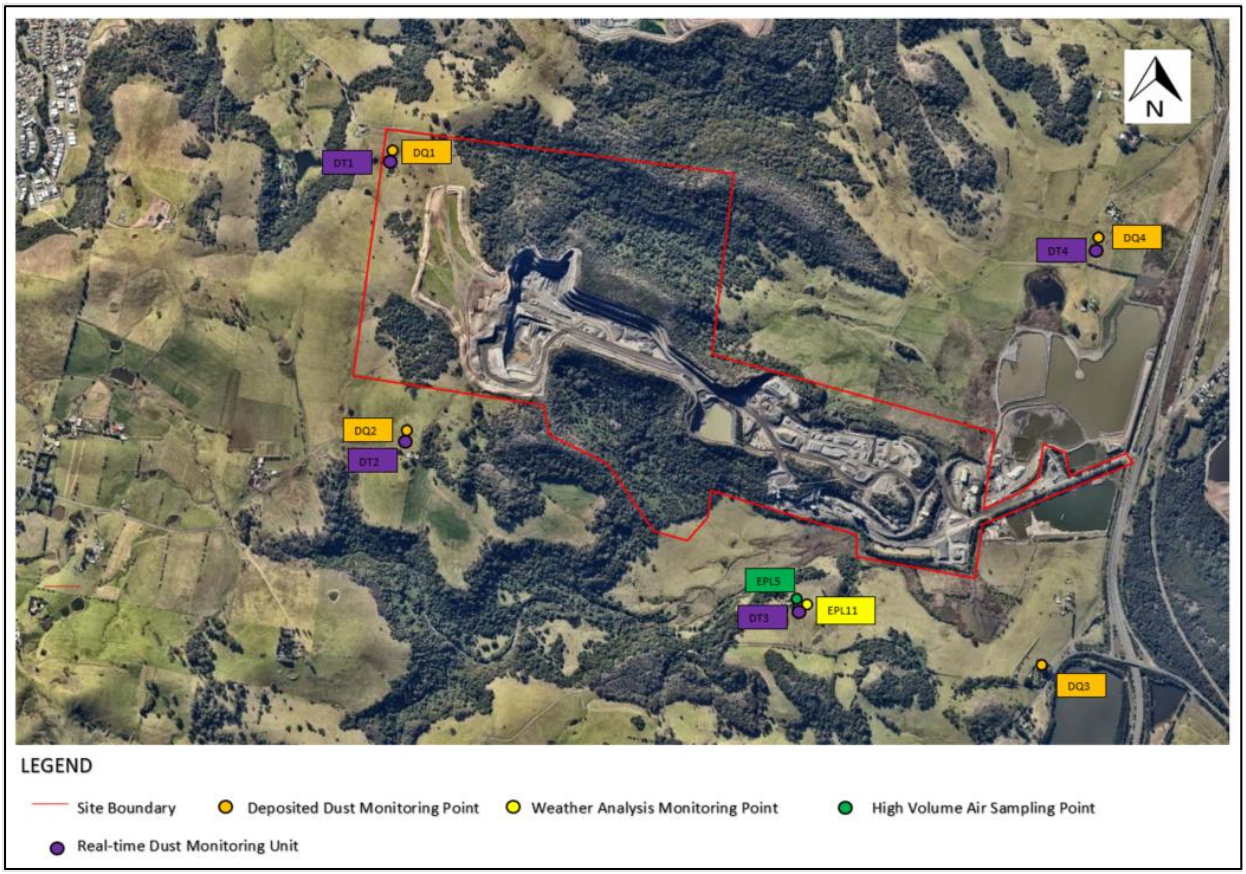


Figure 2 Air Quality Monitoring Locations

5.2.1. Deposited Dust Monitoring Assessment Criteria

The relevant deposited dust impact assessment criteria apply to a residence on privately owned land. Monitoring points 1, 2 and 4 are not located in direct vicinity of residences. It is important to note that the assessment criteria refer to an annual averaging period (i.e. a monthly average over the last 12 months). Impact assessment criteria is shown in Table 9 below.

Table 7 Deposited Dust Impact Assessment Criteria

Pollutant	Averaging Period	Criterion	
Deposited dust[c]	Annual	2g/m2/month[b]	4g/m^2/month[a,d]

[a] Cumulative impacts (ie increases in concentration due to development plus all other sources)

[b] Incremental impact (ie increases in concentration alone, with zero allowable exceedances of criteria over the life of the development.

[c] Deposited dust is defined as insoluble solids

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity as agreed by the Secretary.

5.2.2. Deposited Dust Monitoring FY26 Performance Review

All monitoring points were below the required assessment criteria of rolling annual average of 4g/m^2/month for dust measured as insoluble solids during the reporting period.

All sites also were below 4g/m^2/month for ash fraction which excludes the organic (combustible) component of the sample such as vegetation, bird droppings and insects. These organic contaminants within the sample are typically representative of the surrounding wetlands and farmland which the monitors are located within.

A summary of results for each monitoring location is shown in Table 8 below. A monthly breakdown of each site and summary graphs is located in Figures 3 to 6.

Table 8 Deposited Dust Monitoring Summary

	Site 1 grams/m^2/month		Site 2 grams/m^2/month		Site 3 grams/m^2/month		Site 4 grams/m^2/month	
	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	As4h
FY26Average	2.31	1.27	2.24	1.00	1.87	1.03	1.78	1.01
Criterion	4	-	4	-	4	-	4	-

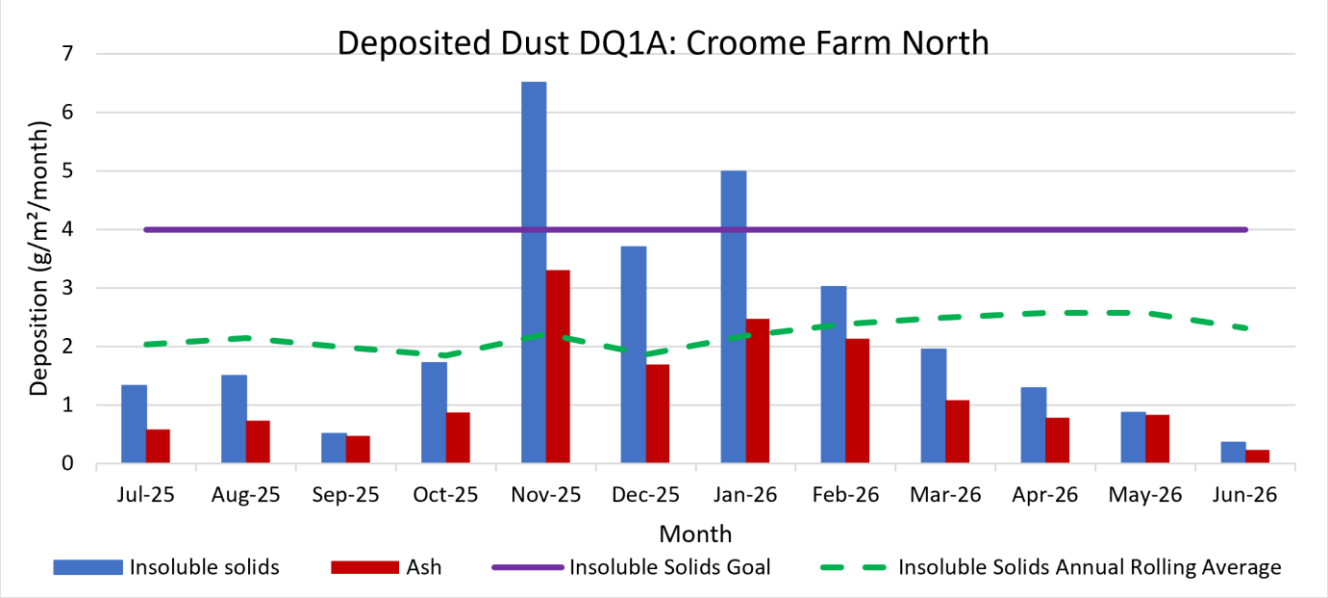


Figure 3 DQ1 Deposited Dust Results

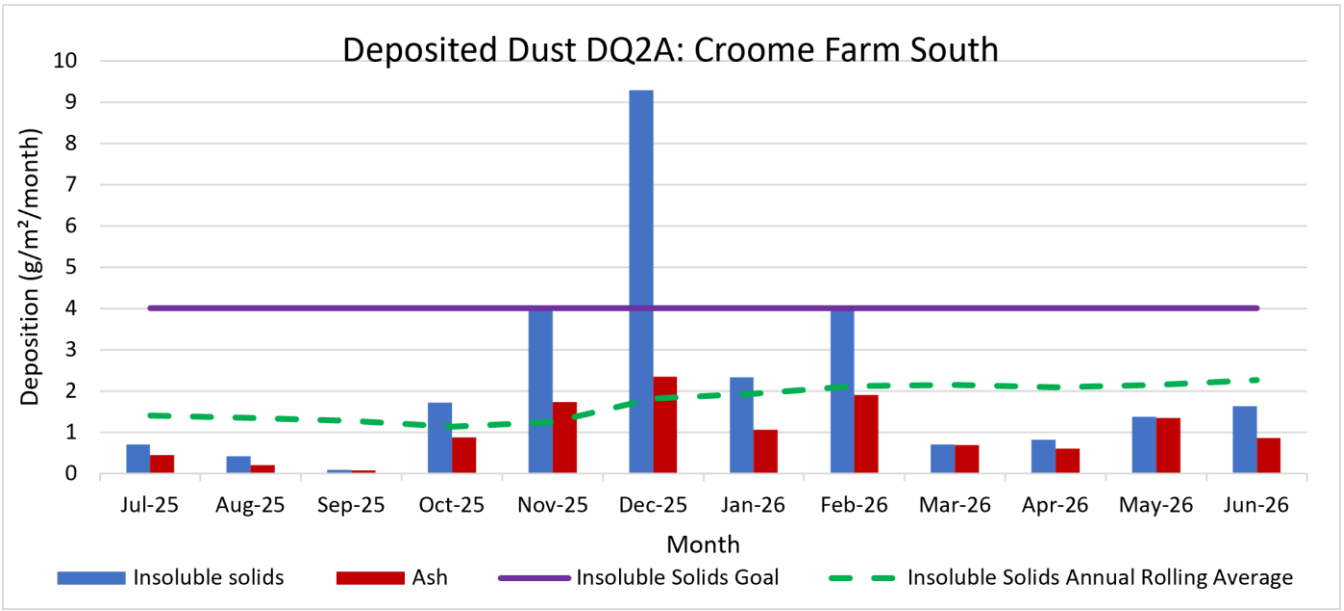


Figure 4 DQ2 Deposited Dust Results

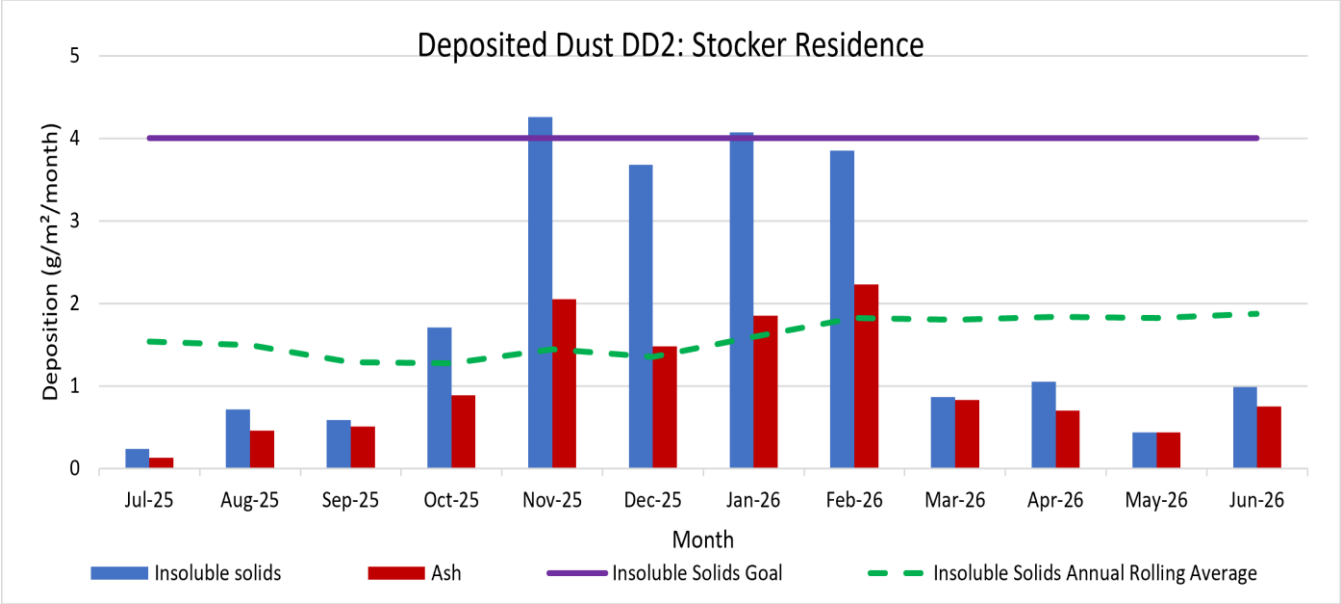


Figure 5 DQ3 Deposited Dust Results

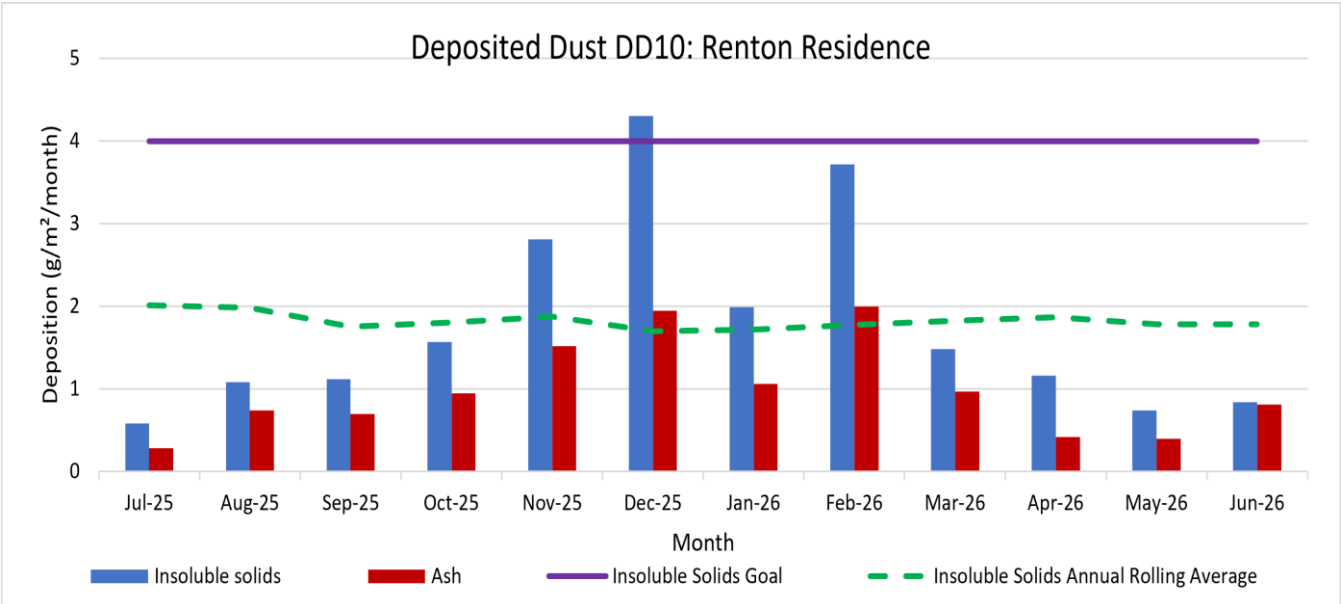


Figure 6 DQ4 Deposited Dust Results

5.2.3. Particulate Monitoring Assessment Criteria

The impact assessment criteria for Particulate Monitoring is provided below in Table 9.

Table 9 Particulate Monitoring Impact Assessment Criteria

Pollutant	Averaging Period	Criterion
PM_{10}	Annual	[a,d] 25 µg/m³
PM_{10}	24 hour	[b]50 µg/m³
TSP	Annual	[a,d] 90 µg/m³
$PM_{2.5}$*	Annual	[a,d] 8 µg/m³

[a] Cumulative impact (i.e increases in concentration due to development plus all other sources)

[b] Incremental impact (i.e increases in concentration alone, with zero allowable exceedances of criteria over the life of the development.

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity as agreed by the Secretary.

5.2.4. Particulate Monitoring FY26 Performance Review

The PM_{10} readings from FY26 can be seen below in Figure 7.

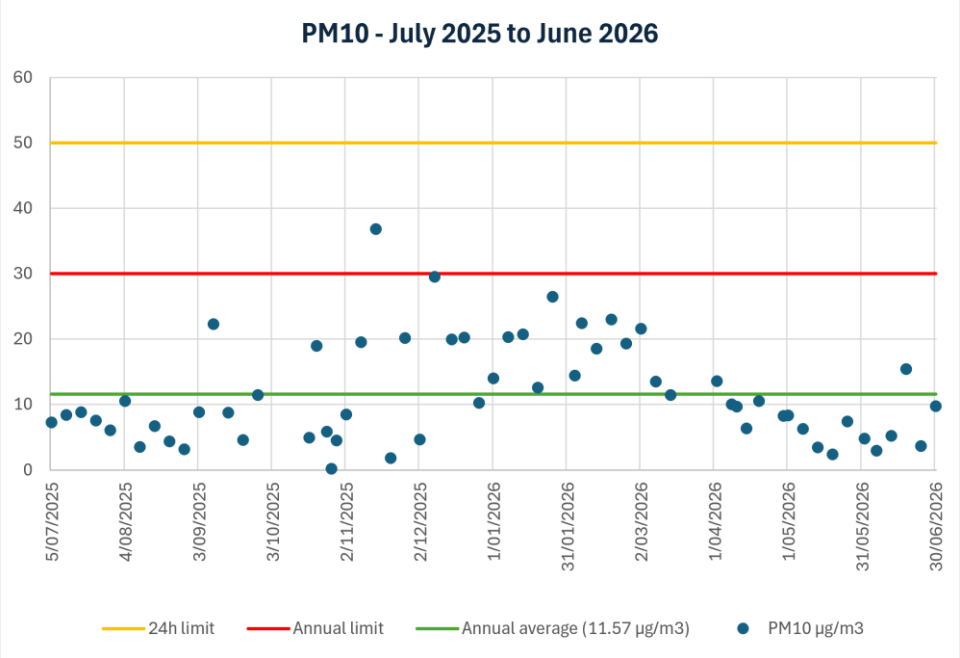


Figure 7 PM_{10} Measurements – FY26

The annual average PM_{10} measurement for the reporting period was below the impact assessment criteria of 25 µg/m³ for PM_{10} and 90 µg/m³ for TSP. The PM_{10} measurements were also similar to the Albion Park South air quality monitoring station's annual averages.

There were no readings recorded as occurring above the long-term criteria for PM_{10} of 50µg/m³ during the reporting period.

TSP concentrations are not measured in the vicinity of the quarry, however annual average TSP concentrations can be derived based on typical ratios of PM_{10}: TSP. Rural areas (such as DQ), typically experience a PM_{10}: TSP ratio of 0.4. This ratio has been applied to the annual average PM_{10} concentrations to derive a representative TSP background concentration in µg/m³. This methodology is in-line with the method used by Ramboll in the MOD 9 Environmental Assessment for the Dunmore Quarry.

Table 10 Summary of Particulate Monitoring Data

Pollutant	Dunmore Quarry FY26 Average (µg/m³)	Albion Park FY26 Average(µg/m³)	Dunmore Quarry Long Term Average (µg/m³)
Measured PM10	11.57	14.3	12.43
Derived TSP	28.93	35.75	31.08
Real time monitor TSP	18.95	-	-
Real time monitor PM10	17.45	-	-
Real time monitor PM2.5	7.06	-	-

5.2.5. Air Quality Monitoring Long Term Analysis and Assessment

The DQ site has been collecting deposited dust data since 2002. A graph of long-term trends can be found in Figure 8 below and shows that deposited dust has typically decreased over time.

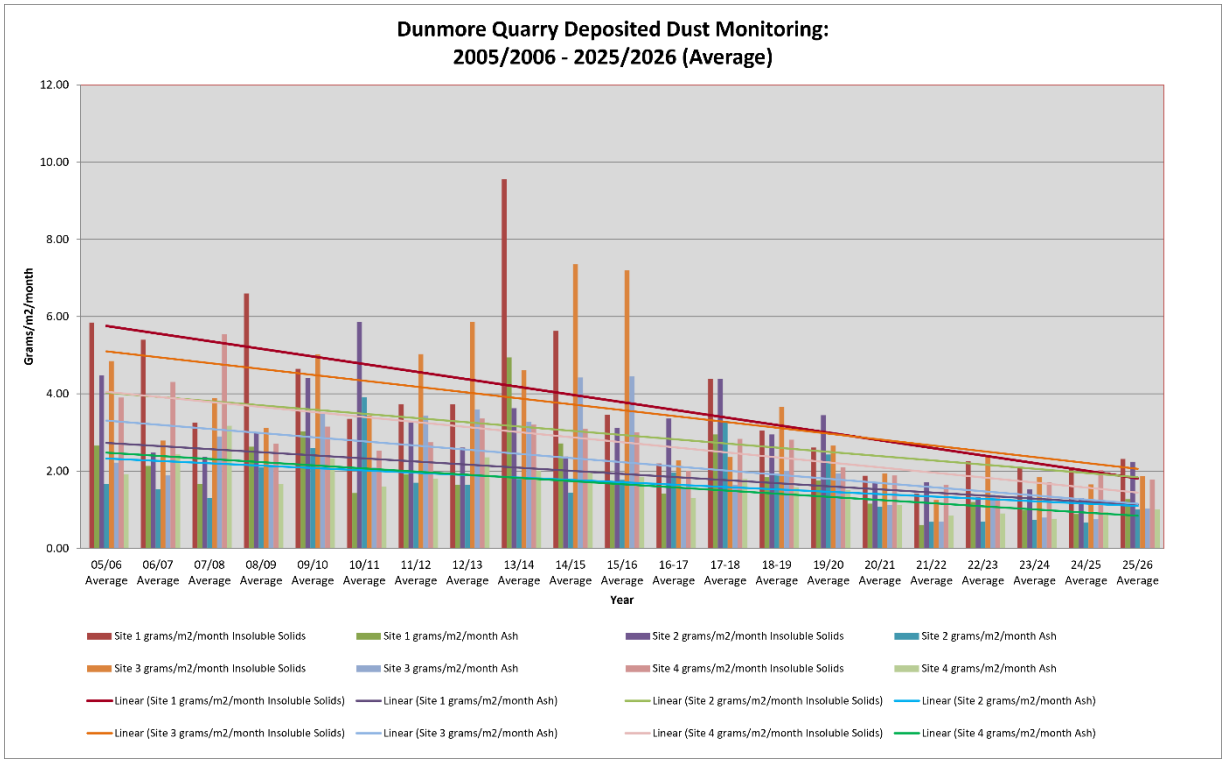


Figure 8 Historical Dust Monitoring Data

A general trend that has been observed is that measured deposited dust is typically higher in dry summer months than winter months, which is to be expected. This trend is also confirmed with the PM_{10} measurements and is generally reflective of regional conditions as a whole.

Figure 9 shows a 90 day average in black, which illustrates a seasonal fluctuation of measured PM_{10} values. A trend can be observed that PM_{10} values are typically higher during summer dry periods and are lower during the winter periods.

This fluctuation is mirrored in the Office of Environment and Heritage's (OEH) Albion Park PM_{10} measurements available on the OEH website (https://www.dpie.nsw.gov.au/air-quality/air-quality-data-services/data-download-facility)

These trends indicate the measured PM_{10} and deposited dust values are typically influenced by ambient local conditions rather than development operations at DQ.

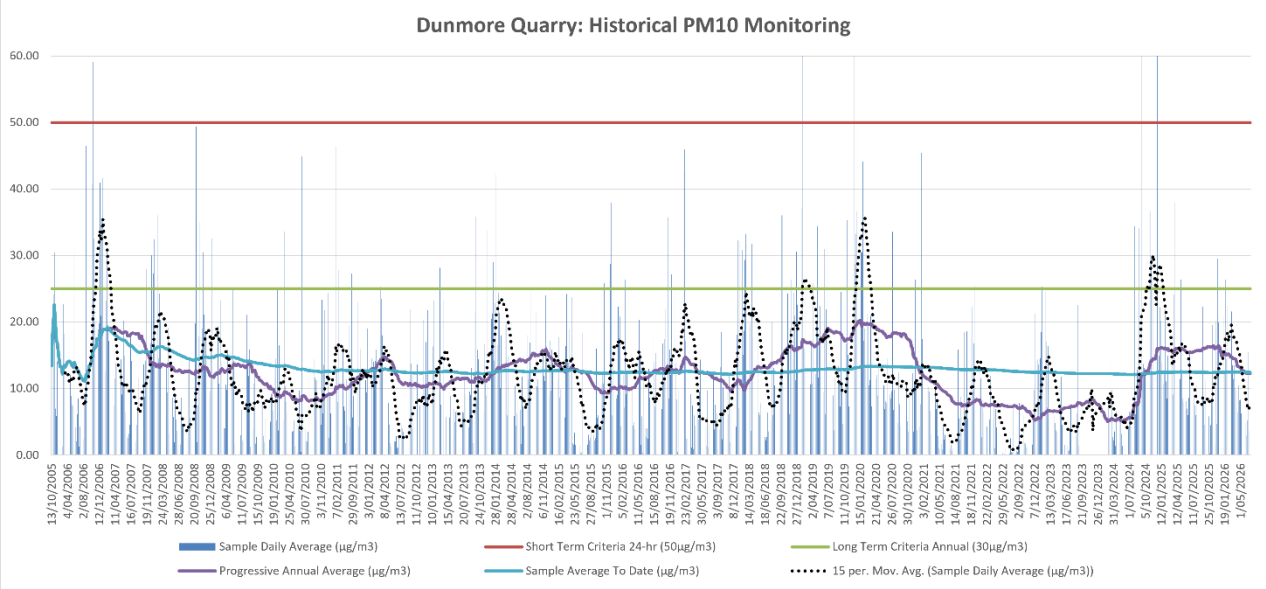


Figure 9 Historical PM_{10} Monitoring Data

5.2.6. Air Quality Monitoring Summary and Opportunities for Improvement

The site is currently operating in accordance with TARP and real-time alerting systems. The alerting system has been redesigned to a web-based format to allow greater access to data for operational staff. The next reporting period will focus on fine tuning alerting systems along with continuing the operation of the real time monitoring units.

5.3. Blast Monitoring

S4C16 and S4.C17 outline the blast monitoring parameters which are assessed at the nearest receiver, the Benny Residence. Monitoring at the Benny residence indicated compliance with all relevant blast parameters during the reporting period. Monitoring Points are shown in Figure 10.

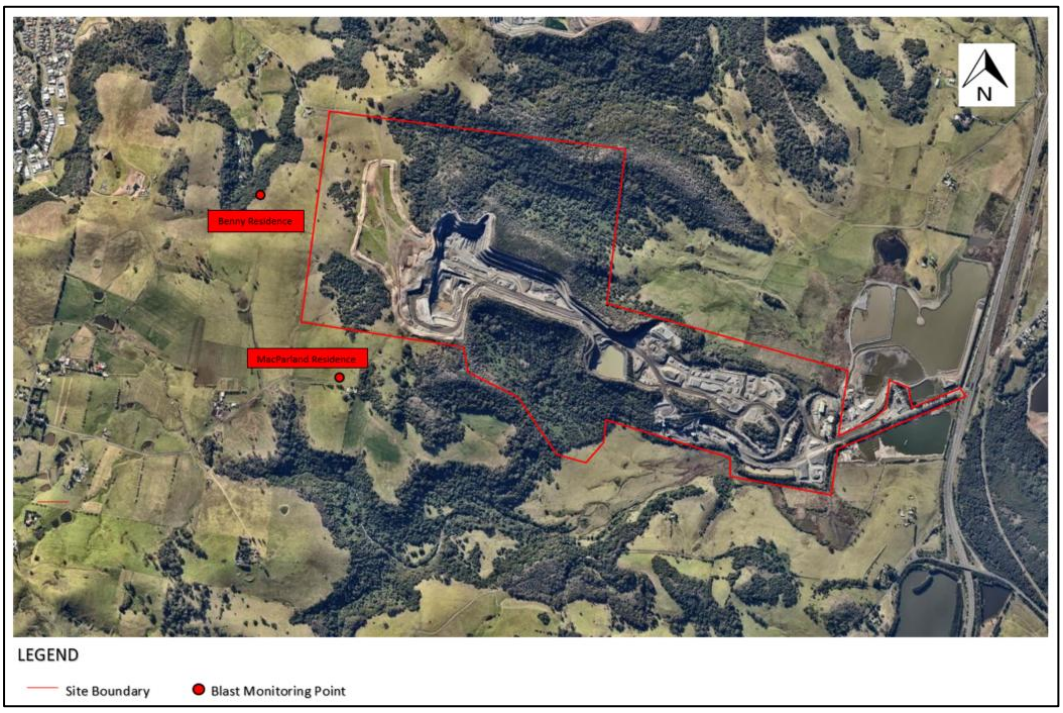


Figure 10 Blast Monitoring Locations

5.3.1. Blast Monitoring Impact Assessment Criteria

S4C16 and S4.C17 outline the blast monitoring parameters which are assessed at the nearest receiver at the Benny Residence. These parameters are reproduced below in Table 13.

Table 11 Blast Monitoring Parameters

Airblast Overpressure	Allowable exceedances
120 ((dB(Lin Peak))	0 (absolute limit)
115 ((dB(Lin Peak))	5% of the total number of blasts over a period of 12 months
Ground Vibration	**Allowable exceedances**
10mm/s	0 (absolute limit)
5mm/s	5% of the total number of blasts over a period of 12 months

In total there were nine (9) blasts undertaken during the reporting period, and therefore no more than one (1) blast is allowable over the 95th percentile limits of 115 (dB (Lin Peak)) and 5 mm/s for airblast overpressure and ground vibration respectively at the Benny Residence to ensure compliance with the criteria.

In addition, the approved Blast Management Plan outlines monitoring which will be undertaken to preserve the heritage value of the old flour mill at the McParland residence. The following blast parameters were adopted.

Table 12 Blast Monitoring Parameters – MacParlands Residence

Airblast Overpressure	Allowable exceedances
130 ((dB(Lin Peak))	5% of the total number of blasts over a period of 12 months
Ground Vibration	**Allowable exceedances**
30mm/s	5% of the total number of blasts over a period of 12 months

A dilapidation report was commissioned, detailing the condition of the MacParland Residence. Specifically, the condition of the structures of heritage value such as the flour mill, butter mill, hay shed and the primary residence. Baseline monitoring was conducted in FY20. Previous monitoring indicated no change to any of the observed structures on the property. The next dilapidation survey will be conducted in the next months, subject to contractor availability.

5.3.2. Blast Monitoring FY26 Performance Review

Figure 11 and Figure 12 details a visual representation of the blast monitoring in FY26. A number of blasts did not trigger and therefore aren't represented in the figures below. The data table associated with these can be found in Appendix D.

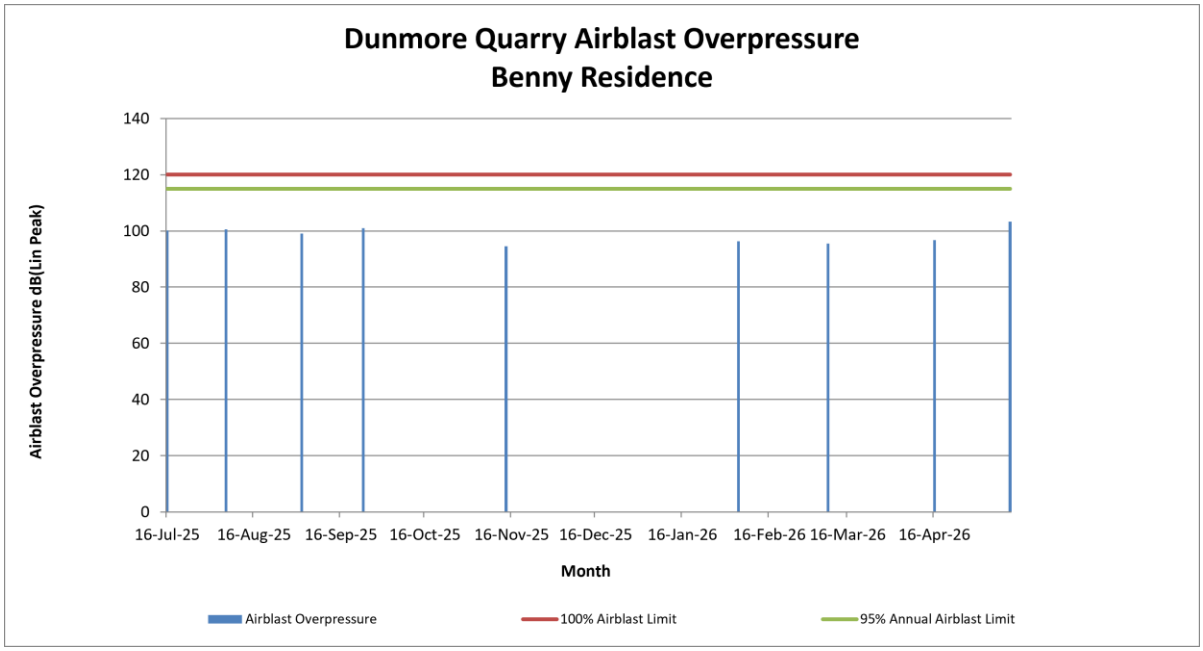


Figure 11 FY26 Overpressure Data

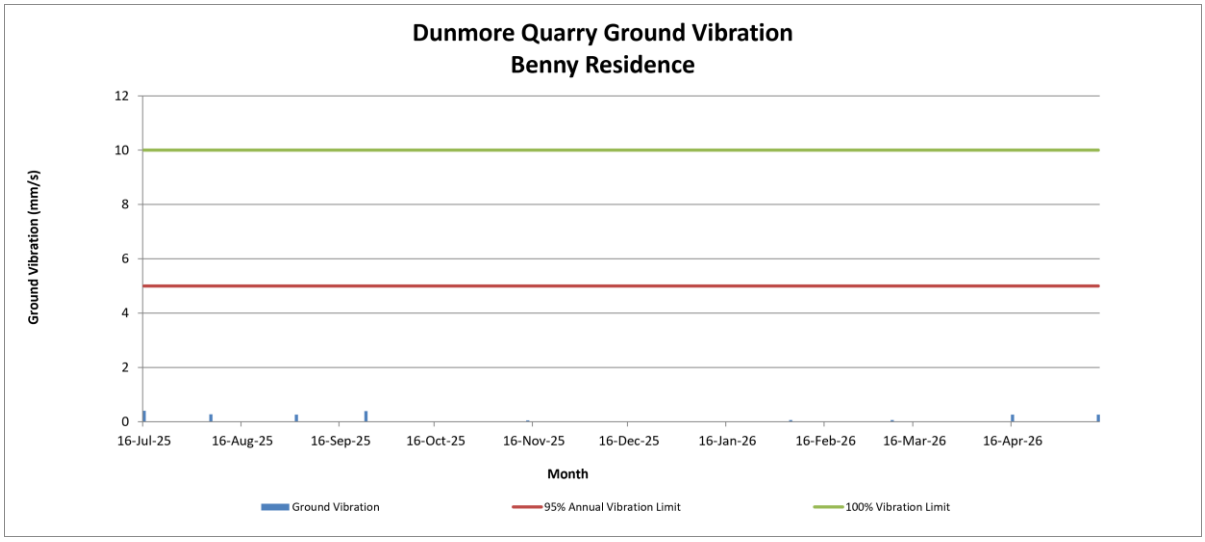


Figure 12 FY26 Ground Vibration Data

There were no blasts above the prescribed limits during the FY26 reporting period.

5.3.3. Blast Monitoring Long Term Analysis and Trends

A visual representation of historical blast monitoring data can be seen below in Figures 13 and 14.

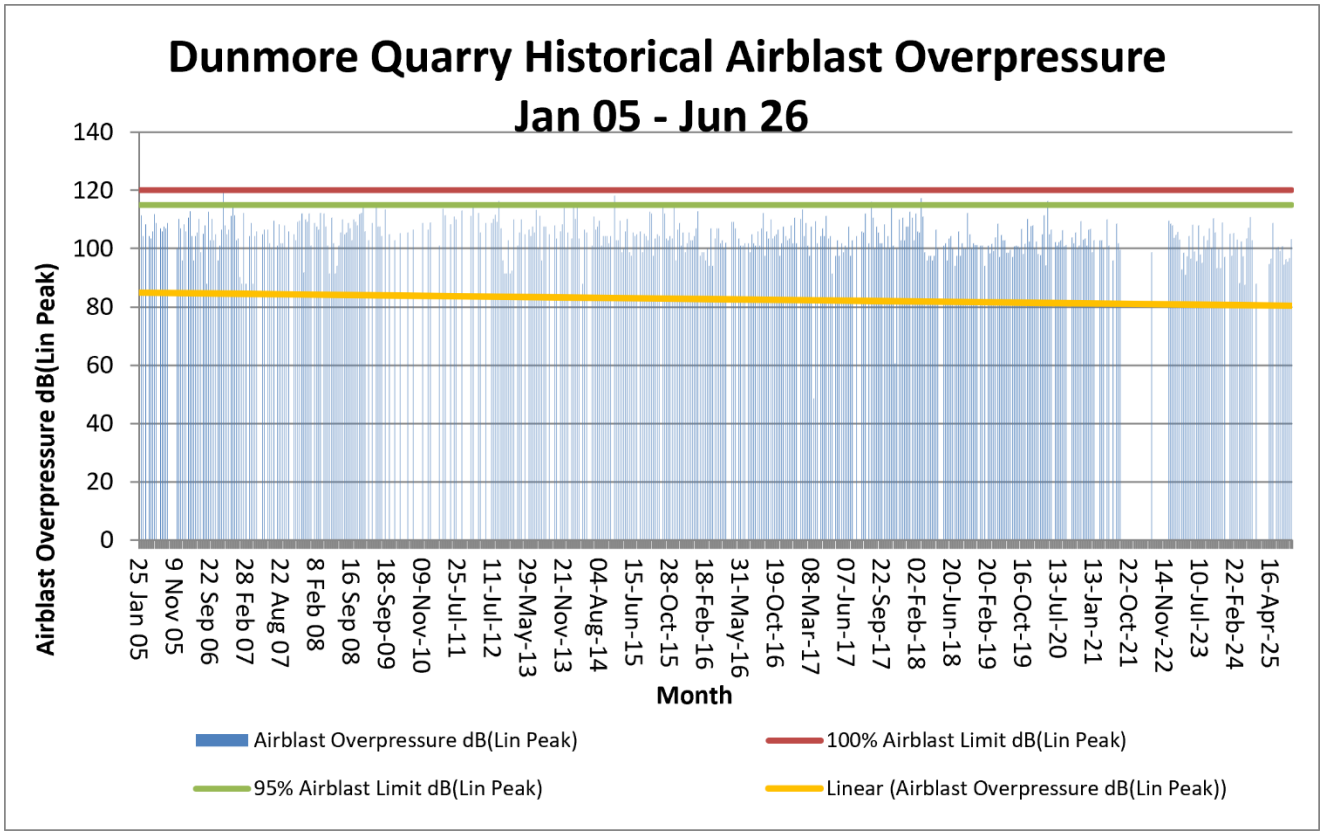


Figure 13 Historical Overpressure Data

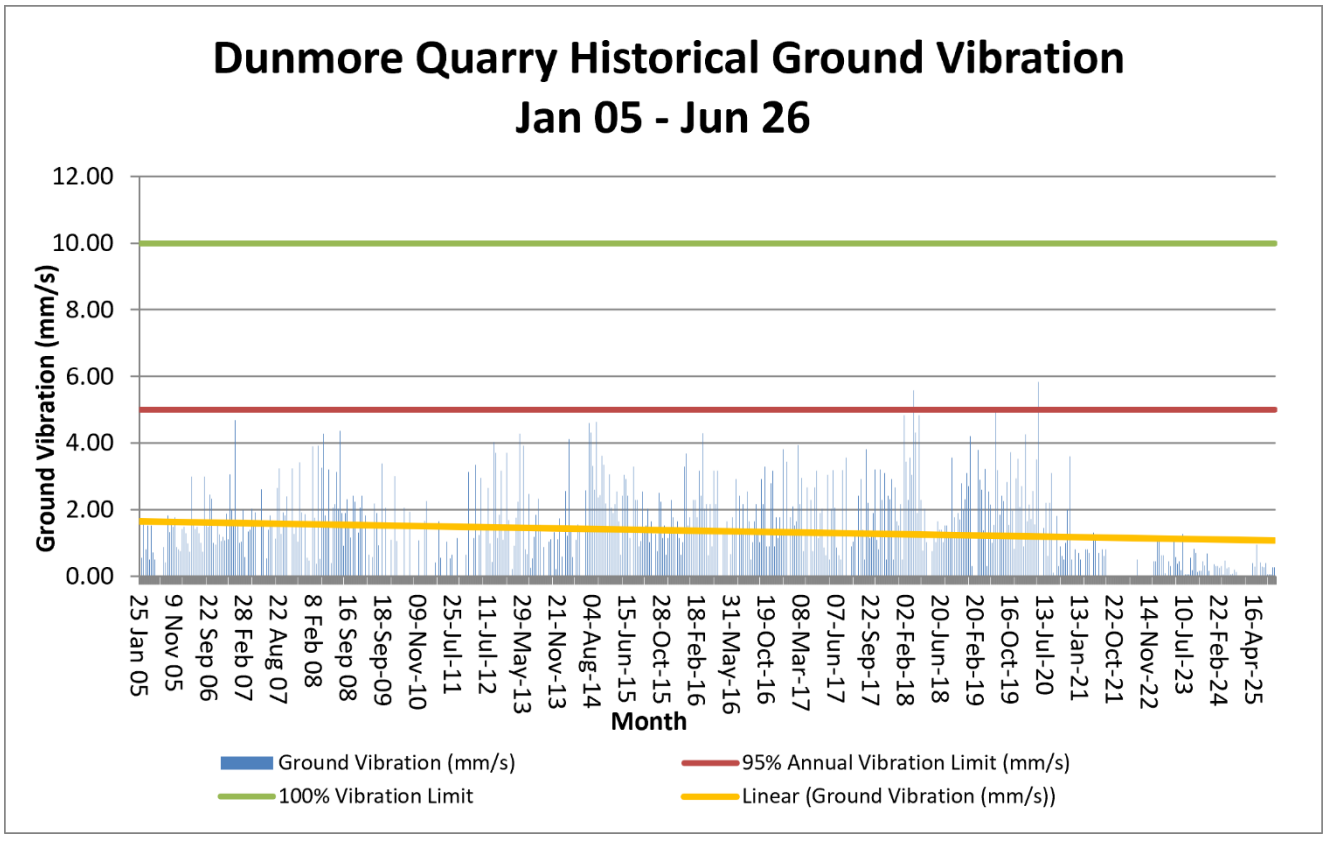


Figure 14 Historical Ground Vibration Data

5.3.4. Blast Monitoring Summary and Opportunities for Improvement

The blast data has confirmed compliance with the required assessment criteria but also indicate that blast management over recent years has resulted in an overall reduction in both overpressure and ground vibration at the nearest residential receptors. No additional blast management initiatives are therefore considered necessary.

5.4. Noise Monitoring

Annual Noise Monitoring is undertaken annually in winter to determine quarry contribution to noise at private residences. Monitoring results demonstrated compliance with prescribed assessment criteria during all monitored time periods.

5.4.1. Noise Monitoring Impact Assessment Criteria

S4.C4 outlines the relevant noise assessment criteria to be adopted for the annual monitoring, shown in Table 15 below. The locations of these monitoring points are represented by NM-1 to NM-5 as displayed in Figure 15.

Noise monitoring is generally completed in July each year which typically represents the worst-case meteorological conditions for noise propagation.

Table 13 Noise Monitoring Impact Assessment Criteria

Receiver Location	Noise Limits dB (A)					
	LA_{eq} (15 minute)				LA_{eq} (1 minute)	
	Day (7am - 6pm)	Evening (6pm - 10pm)	Night (10pm - 7am)	Morning Shoulder (6am - 7am)	Night (10pm - 7am)	Morning Shoulder (6am - 7am)
Location K Stocker Residence	49	44	38	47	48	55
Location O Dunmore Lakes	49	44	38	47	48	55
Location J Creagan Residence	Negotiated Agreement in Place					
Location AA	38	38	38	38	45	45
Locations AB and T	36	36	36	36		
Location D, F, G and Z	40	40	40	40		
Location S	37	37	37	37		
Other privately owned residence	35	35	35	35		

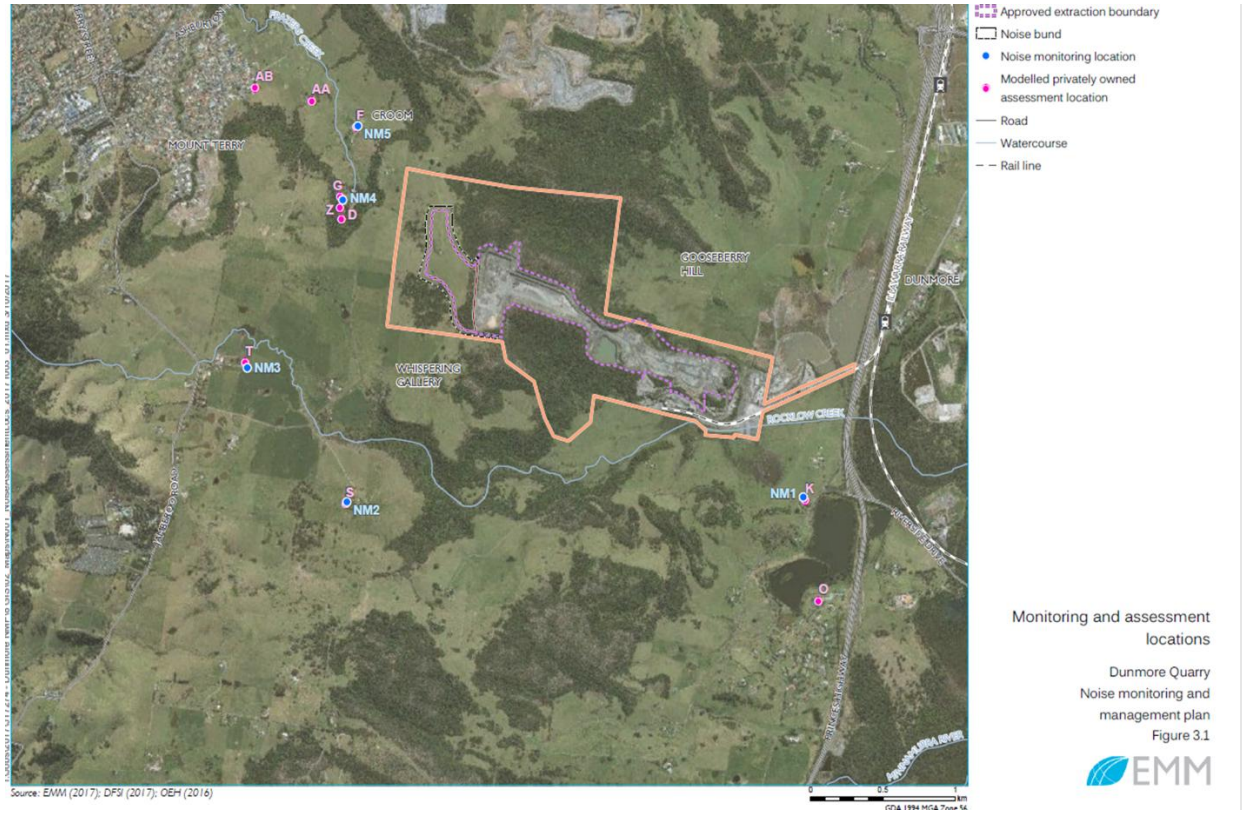


Figure 15 Noise Monitoring Locations

5.4.2. Noise Monitoring FY26 Performance Review

A summary of the attended noise monitoring results against the modelled MOD 9 quarry operations is shown below in Table 16. Noise monitoring is conducted each year in July-August period, consistent with previous review periods, dependant on the weather conditions and quarry downtimes.

Table 14 Attended noise monitoring results

Post Modification 9 Noise Monitoring Results NM1 (representative of resident K and O)				
	Day	Evening	Morning Shoulder	
Noise	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(1min)}$
Limit	49	44	47	55
Predicted	35	35	35	
2018	40	40	40	50
2019	45	41	47	55
2020	49	44	47	55
2021	45	40	40	45
2022	40	36	40	47
2023	45	40	45	55
2024	49	44	47	55
2025	<49	<44	<47	<55
2026	<42	<44	44	45
Post Modification 9 Noise Monitoring Results NM2 (representative of resident S)				
	Day	Evening	Morning Shoulder	
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(1min)}$
Limit	37	37	37	45
Predicted	35	35	35	
2018	30	30	30	32
2019	33	30	32	40
2020	36	35	37	45
2021	35	30	35	40
2022	33	31	31	45
2023	35	30	30	45
2024	37	37	37	45
2025	<37	<37	<37	<45
2026	<37	<37	<37	<45
Post Modification 9 Noise Monitoring Results NM3 (representative of resident T)				
	Day	Evening	Morning Shoulder	
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(1min)}$
Limit	36	36	36	45
Predicted	35	35	35	
2018	35	35	35	40
2019	32	30	31	40
2020	35	35	35	45
2021	35	30	30	35
2022	30	30	30	45
2023	35	30	30	45
2024	36	36	36	45
2025	<36	<36	<36	<45
2026	<36	<36	<36	<45
Post Modification 9 Noise Monitoring Results NM4 (representative of resident G,D,Z)				

	Day	Evening	Morning Shoulder	
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(1min)}$
Limit	40	40	40	45
Predicted	35	35	35	
2018	30	30	30	30
2019	33	30	31	40
2020	35	35	35	45
2021	35	30	30	35
2022	40	40	40	45
2023	35	30	30	45
2024	40	40	40	45
2025	<40	<40	<40	<45
2026	<40	<40	<40	<45
Post Modification 9 Noise Monitoring Results NM5 (representative of resident F, AA,AB)				
	Day	Evening	Morning Shoulder	
	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(15min)}$	dB $LA_{eq(1min)}$
Limit	40	40	40	45
Predicted	35	35	35	
2018	30	30	30	30
2019	35	30	34	40
2020	40	35	40	45
2021	30	30	30	35
2022	30	30	33	45
2023	30	30	35	45
2024	40	40	40	45
2025	<40	<40	<40	<45
2026	<40	<40	<40	<45

During the reporting period monitoring points were denoted as compliant during all time windows. Prior to MOD 9, location K and O (now monitored under NM-1) had been monitored separately. The land Location A was acquired by Boral in 2016 and as such is no longer monitored.

5.4.3. Noise Monitoring Long Term Analysis and Trends

There have been eight years of monitoring under the current monitoring program post MOD 9 operations and over time trends will become more apparent. NM-1 has been monitored for a number of years as part of the previously approved monitoring program. The trends of NM-1 over the last 19 years can be seen below in Figure 16. A summary of the noise monitoring results post MOD 9 can be seen in Figures 17 to 21. The monitoring data, which is attached as Appendix C, demonstrates compliance with the noise assessment criteria.

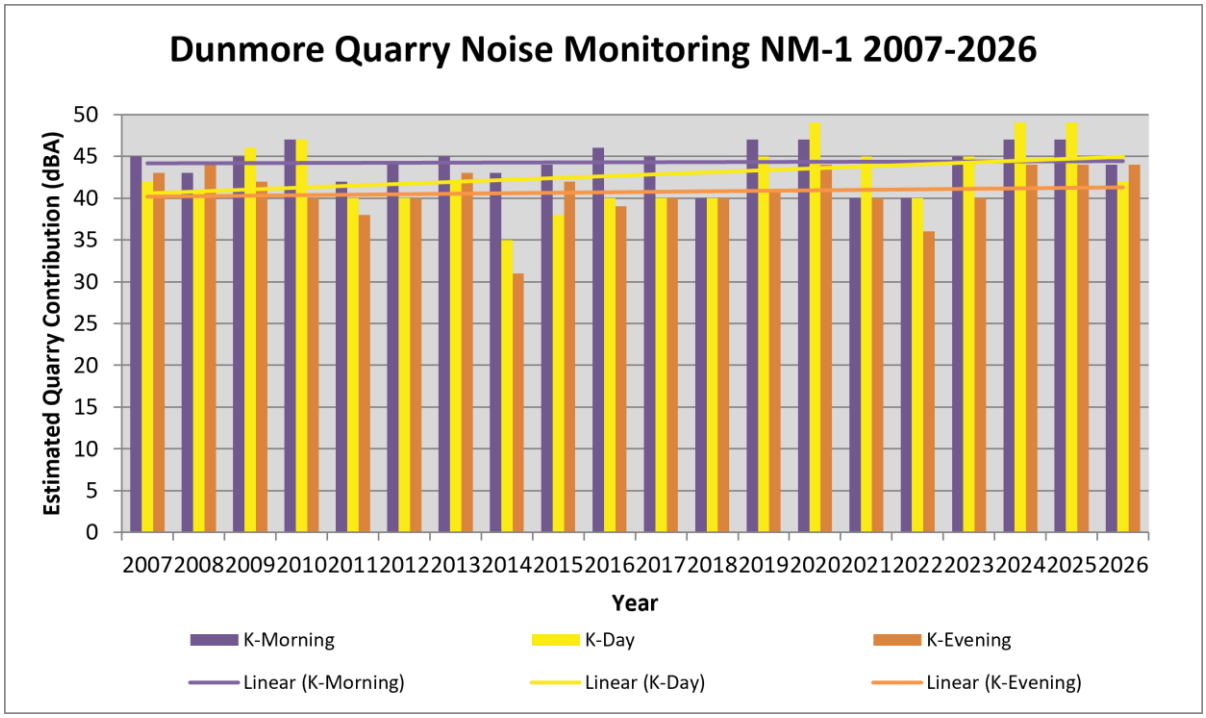


Figure 16 Long term noise monitoring at NM-1 results since 2007

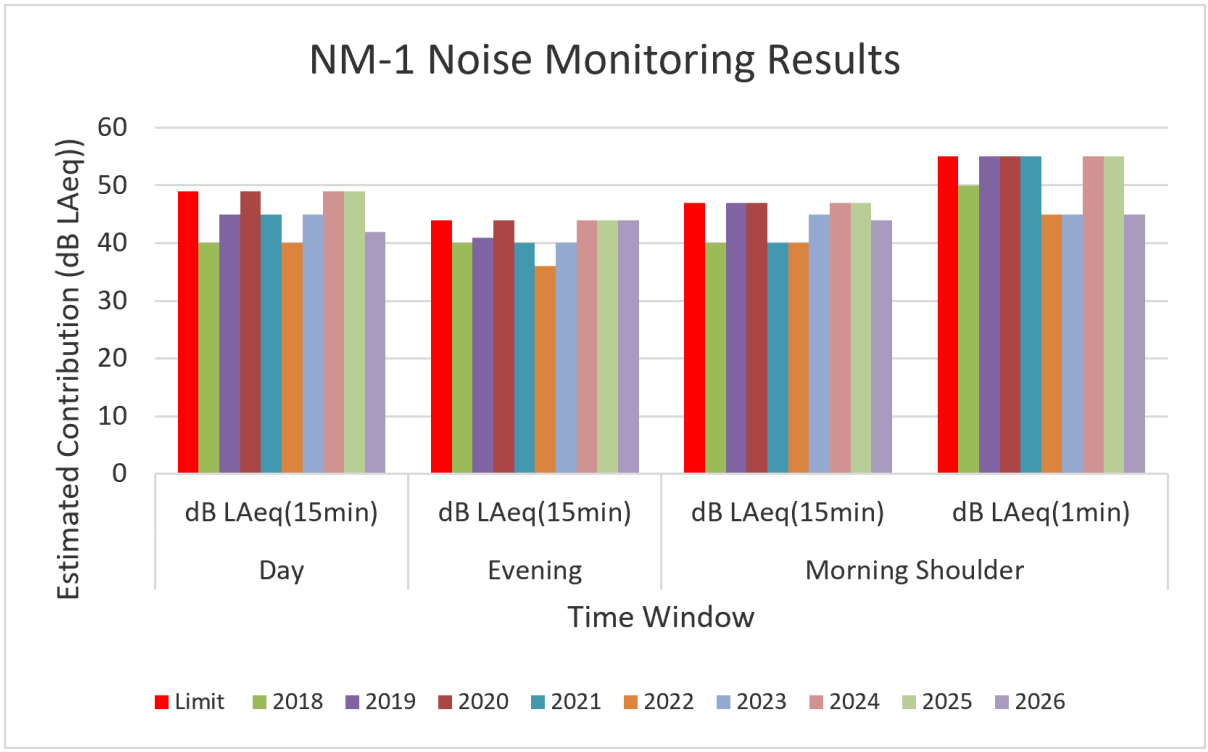


Figure 17 NM-1 Noise monitoring results since MOD-9

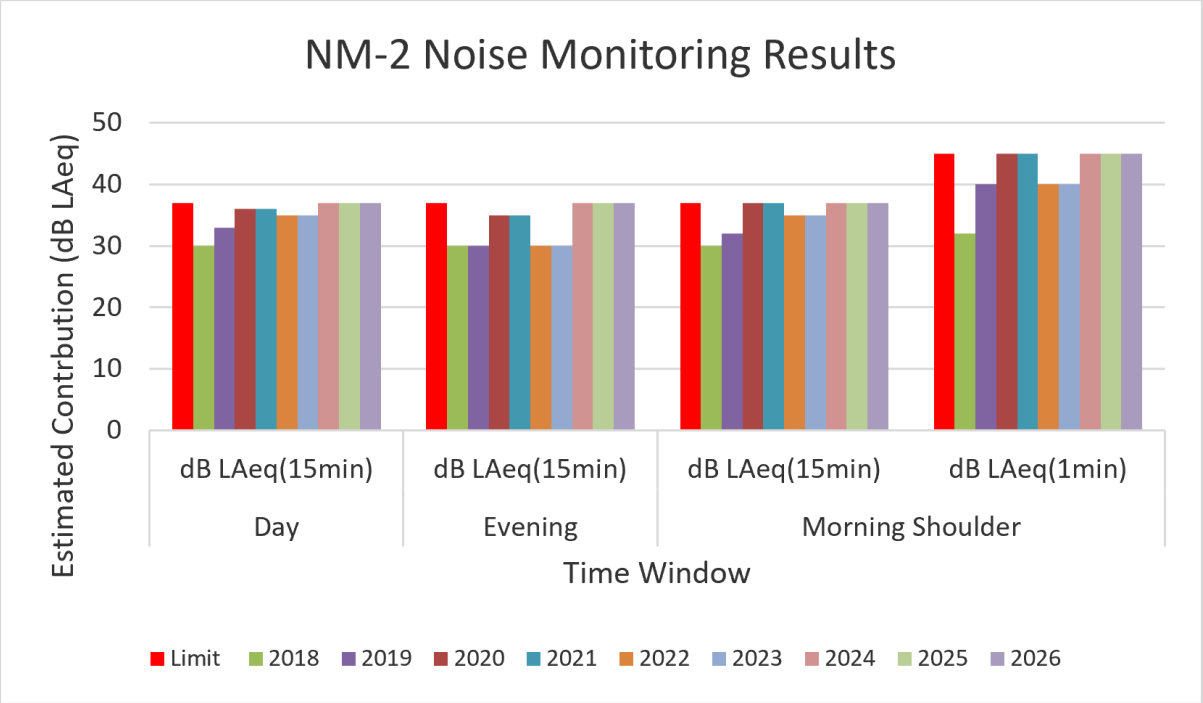


Figure 18 NM-2 Noise monitoring results since MOD-9

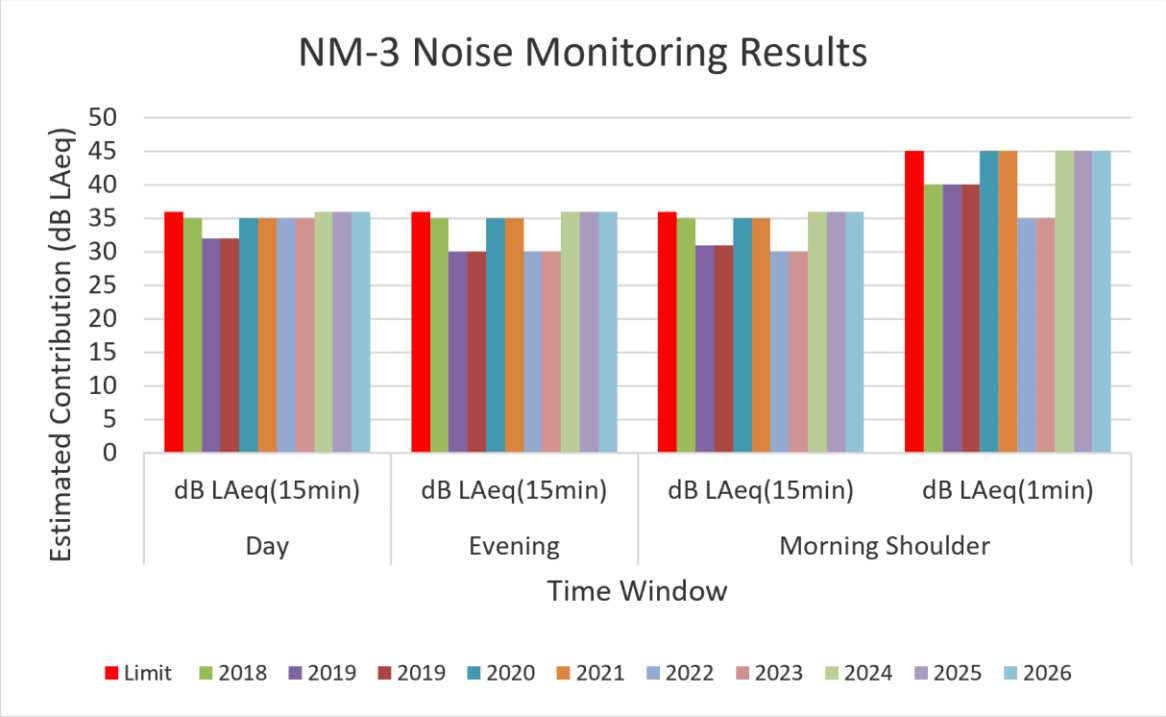


Figure 19 NM-3 Noise monitoring results since MOD-9

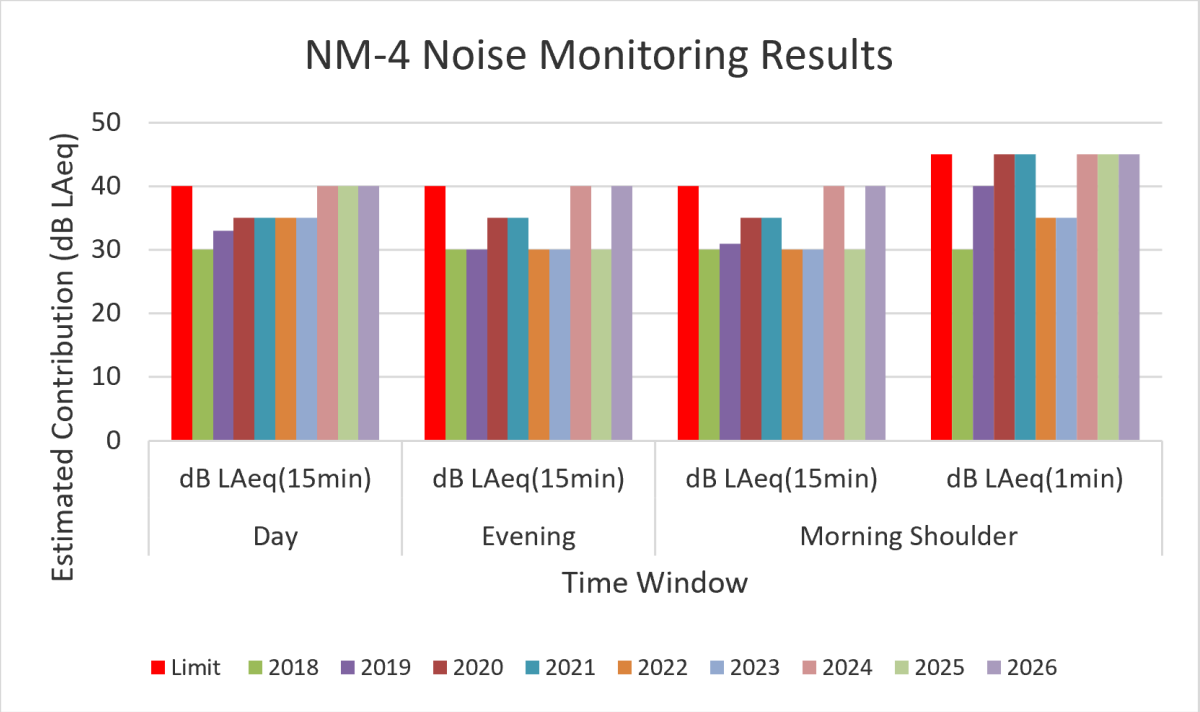


Figure 20 NM-4 Noise monitoring results since MOD-9

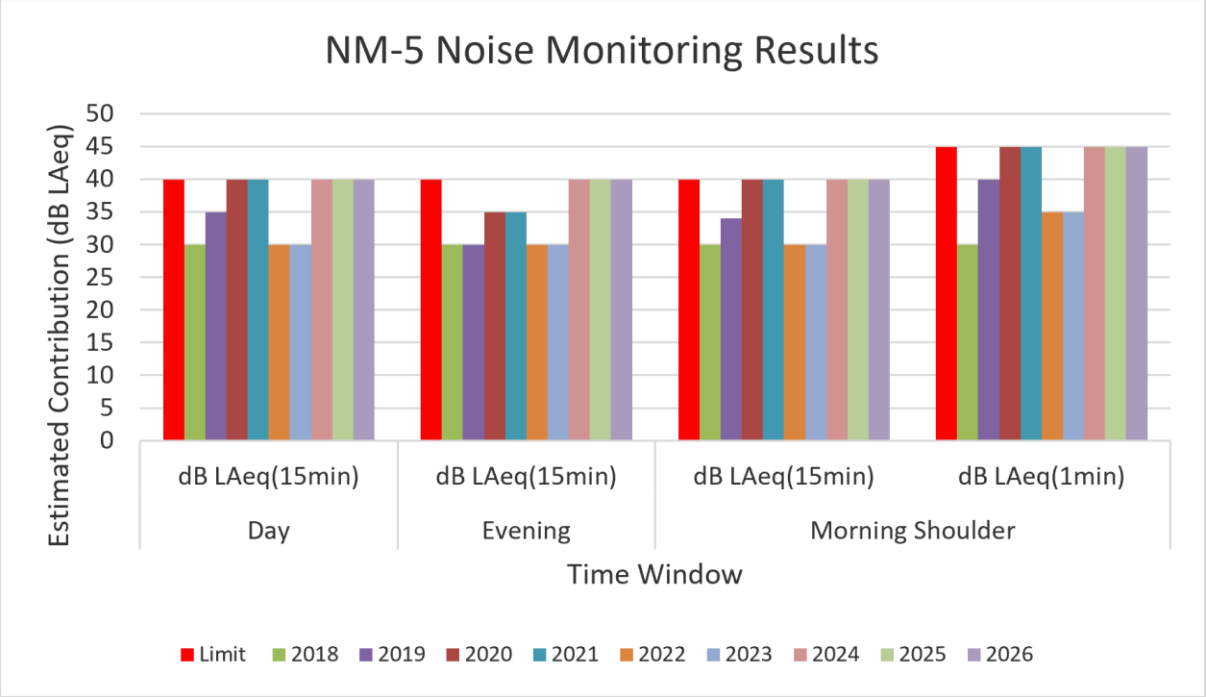


Figure 21 NM-5 Noise monitoring results since MOD-9

Typically noise measurements have decreased or remained stable over time at NM-1. Noise monitoring results at NM-1 to NM-5 were similar to the previous years and within compliance limits.

5.4.4. Noise Monitoring Summary and Opportunities for Improvement

As previously discussed, all monitoring points were measured below relevant limits. Noise monitoring will continue to be conducted annually.

5.5. Surface Water Monitoring

Dunmore Quarry operates under a well-established water management system which incorporates separation of clean water, largely through natural topographic features and the control of dirty water through a series of pollution control structures. The main pollution control structure is the Upper Dam which receives runoff from most of the extraction area. This is an in-pit sump constructed on the quarry floor and can only discharge via pumping to the Middle Dam. The Middle Dam discharges internally via channels and culverts to the Lower Dam which is licensed (EPL7) to discharge into Rocklow Creek.

Under normal weather conditions, the water management system is a closed circuit with contained water being recycled for quarry uses such as dust suppression. Excess water is only discharged through the licensed discharge point following prolonged rainfall events. The license also recognises that during prolonged wet weather or intense storm events, discharges will occur into Rocklow Creek and that additional background monitoring within the creek is required in order to determine if any offsite impacts occur. The additional monitoring occurs on a daily basis during such discharges.

Figure 22 outlines the current monitoring points. There are three offsite discharge points for the operation as described below:

- EPL6 which is a controlled discharge from the Lower Dam using a biofiltration swale to treat water prior to entering Rocklow Creek.
- EPL7 which is the spillway of the Lower Dam which only discharges during high rainfall events.
- EPL10 which is the upper emergency spillway of Middle Dam. Water spilling from the main spillway of Middle Dam flows into the Lower Dam.

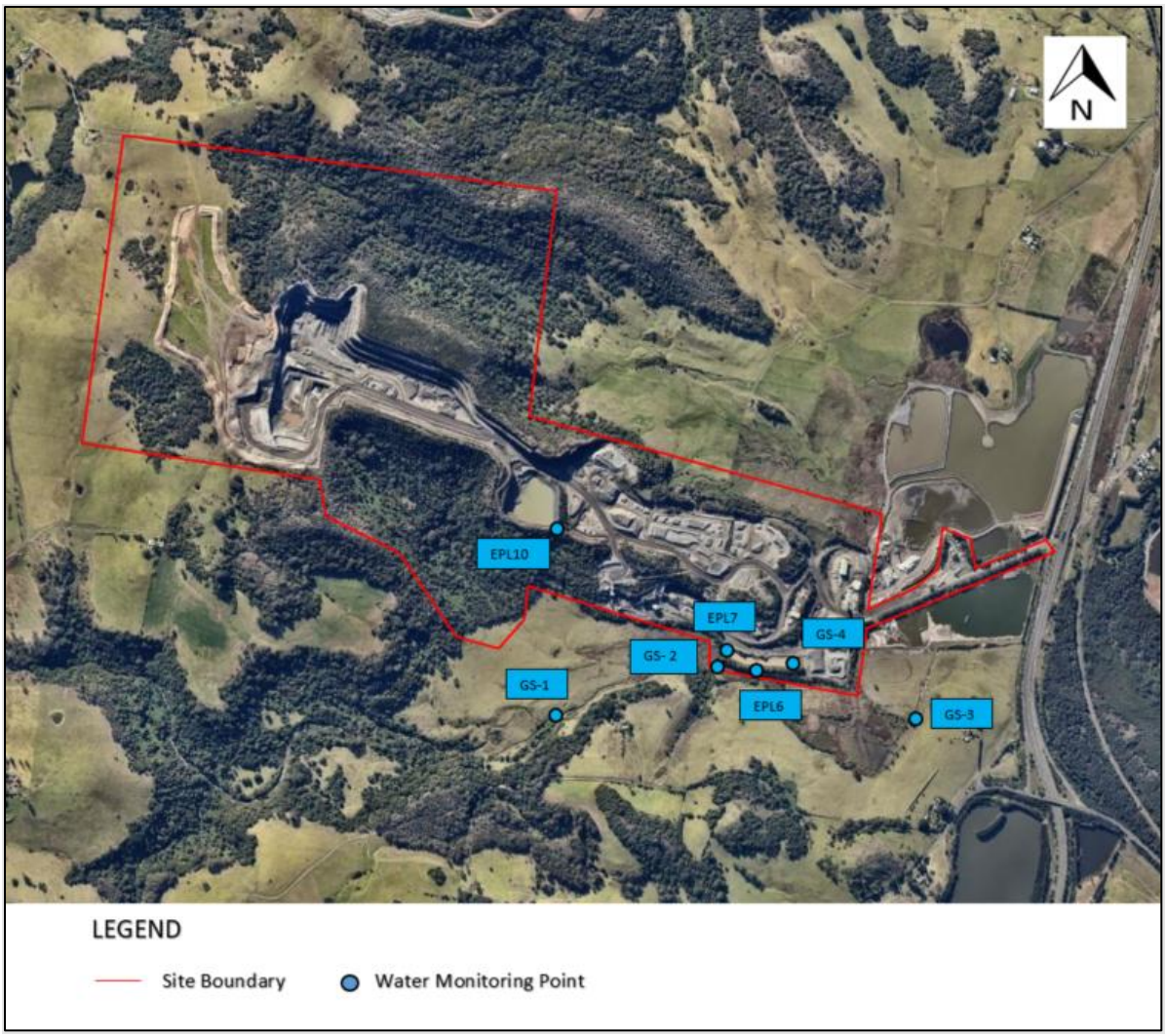


Figure 22 Surface water monitoring points

5.5.1. Surface Water Quality Impact Assessment

S4.C28 refers discharge limits to the limits imposed by EPL 77. This states that the site will comply with discharge limits from condition L2.4 and Section 120 of the *POEO Act*. EPL 77 describes discharge limits at the licenced discharge point for controlled discharge at the site via the bio-filtration swale at monitoring location EPL6. Total Suspended Solids must not exceed 50mg/L at this point.

A second discharge point is nominated in EPL 77 for uncontrolled discharge at the spillway at the Lower Dam at monitoring location EPL7. No TSS limits apply for EPL7 as it is a spillway, which only typically discharges if the dam design capacity (designed to hold 90.7mm in 5 days) is exceeded.

Monthly monitoring is undertaken at the Lower Dam at GS-1, GS-2 and GS-3 at Rocklow Creek to determine ambient conditions upstream, in the immediate vicinity of the Lower Dam spillway and downstream respectively.

Monitoring is also undertaken daily during any discharge event via either the licenced discharge mechanism at EPL6, or via uncontrolled discharge via the Lower Dam spillway at EPL7. Upstream and downstream monitoring points at Rocklow Creek at GS3 are also sampled to determine if any impacts to water quality have occurred.

5.5.2. Surface Water Quality FY26 Performance Review

Monthly ambient water quality monitoring of the Lower Dam at GS-4/EPL#8 is shown below in Table 17. For comparison, monitoring points upstream (GS-1) and downstream (GS-2) of the Lower Dam are also shown to indicate the typical water quality along Rocklow Creek. Please note there are no discharge limits applicable to the ambient water quality of the dam as it is offline to Rocklow Creek during normal operations.

Monthly monitoring results at Rocklow Creek indicate the following:

- Ambient conditions upstream of the Lower Dam at GS-1 are generally lower values when compared to the WQOs and discharge limits. Despite this, the area is associated with water bodies that are impacted by active cattle grazing. Cattle tend to stir up water during grazing and are often observed within Rocklow Creek during monthly sampling events, especially during drought conditions.
- Ambient conditions in the vicinity of the mixing zone at GS-2 are typically within discharge limits. Occasional elevations can occur during high intensity flood events. Water levels can be low or dry during extended dry spells/drought.
- Ambient conditions at GS-3 downstream of Rocklow Creek are generally within the discharge parameters with the exception of TSS. This location is sometimes dry and affected by saline tidal inflow as well as being impacted by cattle grazing. During dry periods, water level tends to be quite low. Cattle tend to stir up water during grazing and are often observed within Rocklow Creek during monthly sampling events.

Table 15 Water quality monitoring results at GS-1, GS-4/EPL#8, GS-2 and GS-3 over the reporting period.

GS-1 Upstream of Rocklow					EPL#8 Lower Dam			
Month	pH	Turbidity (NTU)	EC (µS/cm)	TSS (mg/l)	pH	Turbidity (NTU)	EC (µS/cm)	TSS (mg/l)
Jul-25	7.51	1.7	284	<5	8.12	90.4	527	48
Aug-25	7.52	13.5	247	7	8.01	24.8	464	106
Sep-25	7.32	6.9	328	<5	7.89	143	500	88
Oct-25	7.2	2.4	270	<5	8.2	263	554	118
Nov-25	7.56	10.6	307	10	8.38	241	621	215
Dec-25	7.46	7.8	314	11	8.04	363	504	155
Jan-26	7.51	21	323	46	8.09	140	598	68
Feb-26	7.69	6.4	358	7	8.37	211	508	84
Mar-26	7.36	3	408	<5	7.97	182	465	52
Apr-26	7.54	1.5	390	<5	8.34	163	500	98
May-26	7.46	3.9	375	<5	7.94	211	484	76
Jun-26	7.36	0.9	424	<5	7.94	198	572	44
FY26 Av	7.5	6.6	335.7	16.2	8.1	185.9	524.8	96.0

GS-2 Downstream of Rocklow Mixing Zone					GS-3 Downstream of Rocklow at Property Boundary			
Month	pH	Turbidity (NTU)	EC (µS/cm)	TSS (mg/l)	pH	Turbidity (NTU)	EC (µS/cm)	TSS (mg/l)
Jul-25	7.46	4.7	322	<5	7.67	34.8	352	25
Aug-25	7.44	15.3	254	6	7.53	17.3	266	5
Sep-25	7.61	34.1	373	16	7.66	22.9	378	14
Oct-25	7.54	13.7	334	9	7.69	65.9	413	29
Nov-25	7.56	15.8	595	14	7.78	23.4	546	22
Dec-25	7.92	61.3	549	28	7.85	11.3	577	32
Jan-26	7.73	25.5	558	32	7.48	49.5	503	112
Feb-26	7.86	17.1	409	21	8.04	3.8	735	<5
Mar-26	7.46	18	443	<5	7.36	37.3	458	58
Apr-26	7.69	16.4	471	26	7.81	36.7	514	92
May-26	7.95	89.3	477	48	7.48	17.4	456	11
Jun-26	7.59	21.7	487	6	7.61	42.7	474	59
FY26 Av	7.7	27.7	439.3	20.6	7.7	30.3	472.7	41.7

There were five major rain events in the reporting period which led to discharge from the Lower Dam via the spillway at EPL7. These events include:

- 1-3 July 2025: 139 mm.
- 31 July - 4 August 2025: 105.2 mm.
- 19-23 August 2025: 156 mm.
- 10-11 September 2025: 121.4 mm.
- 15-20 January 2026: 171.6 mm.

These events were outside the dam design capacity, which are designed to hold a 95th percentile 5-day rainfall event (90.7mm). During instances where sampling points were inaccessible due to site flooding, sampling was delayed due to safety and access concerns, and the EPA were notified and satisfied with the arrangements.

The results of wet weather discharge monitoring over the reporting period, is summarised in Table 16.

Table 16 Wet Weather Discharge Monitoring

Sample ID	Date	pH	Turbidity (NTU)	TSS (mg/L)	Conductivity (µS/cm)
EPL#7	2/07/2025	7.94	926	407	265
EPL#9	2/07/2025	Site unreachable due to flood and road closure			
GS-1	2/07/2025	7.58	44.2	17	143
EPL#7	3/07/2025	7.6	543	231	273
EPL#9	3/07/2025	7.4	37.1	10	167
GS-1	3/07/2025	7.35	26.6	5	167
EPL#7	4/07/2025	7.69	375	166	300
EPL#9	4/07/2025	7.18	26.3	8	198
GS-1	4/07/2025	7.15	19.3	<5	194
EPL#7	5/07/2025	7.26	368	153	311
EPL#9	5/07/2025	6.8	22	13	217
GS-1	5/07/2025	6.34	16.6	8	197
EPL#7	6/07/2025	7.65	311	140	338
EPL#9	6/07/2025	7.14	19.1	10	239
GS-1	6/07/2025	7.05	13	7	212
EPL#7	3/08/2025	7.95	580	299	341
EPL#9	3/08/2025	7.21	53.1	31	199
GS-1	3/08/2025	6.92	32.1	13	199
EPL#7	4/08/2025	7.97	425	164	345
EPL#9	4/08/2025	7.19	37.4	10	221
GS-1	4/08/2025	7.15	28.4	<5	219
EPL#7	5/08/2025	7.71	319	120	357
EPL#9	5/08/2025	7.4	26.7	8	243
GS-1	5/08/2025	7.19	19.9	<5	224
EPL#7	6/08/2025	7.94	283	109	373
EPL#9	6/08/2025	7.34	21.3	7	266
GS-1	6/08/2025	7.15	16.3	<5	230

Sample ID	Date	pH	Turbidity (NTU)	TSS (mg/L)	Conductivity (µS/cm)
EPL#7	7/08/2025	7.98	182	106	393
EPL#9	7/08/2025	7.62	15.6	<5	262
GS-1	7/08/2025	7.5	12.6	<5	236
EPL#7	21/08/2025	7.9	475	145	305
EPL#9	21/08/2025	Site flooded			
GS-1	21/08/2025	Site flooded			
EPL#7	22/08/2025	7.91	571	304	275
EPL#9	22/08/2025	7.2	48.2	16	145
GS-1	22/08/2025	7.21	42.3	16	141
EPL#7	23/08/2025	7.51	152	62	240
EPL#9	23/08/2025	7.22	39.7	12	182
GS-1	23/08/2025	7.03	25.5	<5	166
EPL#7	24/08/2025	7.08	130	86	340
EPL#9	24/08/2025	6.47	28.2	7	223
GS-1	24/08/2025	7.18	19.5	<5	182
EPL#7	25/08/2025	7.22	86.6	17	316
EPL#9	25/08/2025	7.21	24.9	10	246
GS-1	25/08/2025	6.5	16.8	<5	202
EPL#7	12/09/2025	7.08	89.3	54	196
EPL#9	12/09/2025	7.09	45.7	20	174
GS-1	12/09/2025	6.76	25.9	<5	162
EPL#7	13/09/2025	7.45	51.4	23	218
EPL#9	13/09/2025	7.47	34.1	14	215
GS-1	13/09/2025	6.99	21.5	<5	194
EPL#7	14/09/2025	7.95	280	150	314
EPL#9	14/09/2025	7.27	37.7	30	217
GS-1	14/09/2025	7.14	16.3	<5	178
EPL#7	15/09/2025	8.04	278	173	372
EPL#9	15/09/2025	7.39	37.5	29	236
GS-1	15/09/2025	7.26	14.8	<5	206
EPL#7	16/09/2025	7.96	211	109	417
EPL#9	16/09/2025	7.26	32.3	30	262
GS-1	16/09/2025	7.13	7.7	<5	245
EPL#7	18/01/2026	7.98	245	346	290
EPL#9	18/01/2026	7.15	48.5	33	380
GS-1	18/01/2026	7.25	13.9	14	269
EPL#7	19/01/2026	8.12	492	246	308
EPL#9	19/01/2026	7.32	16.7	9	303
GS-1	19/01/2026	7.64	6.7	<5	283
EPL#7	20/01/2026	7.53	270	164	327
EPL#9	20/01/2026	7.03	11.1	8	321

Sample ID	Date	pH	Turbidity (NTU)	TSS (mg/L)	Conductivity (µS/cm)
GS-1	20/01/2026	7.12	4.5	<5	293
EPL#7	21/01/2026	7.64	22.4	17	331
EPL#9	21/01/2026	7.17	4.6	7	336
GS-1	21/01/2026	7.52	3.3	<5	299
EPL#7	22/01/2026	7.59	3.9	5	325
EPL#9	22/01/2026	7.6	3.2	<5	355
GS-1	22/01/2026	7.49	2.8	<5	304
EPL#7	23/01/2026	7.64	7.9	10	331
EPL#9	23/01/2026	7.61	2.8	<5	365
GS-1	23/01/2026	7.4	2.3	<5	307

Elevated TSS levels occurred after all significant rainfall events at EPL#7 as indicated in Table 16. As noted above all flood events were well above the dam holding capacity of 90.7mm causing discharge via the designed spillway. The spillway is designed with gabion rock and riparian zone reeds in the immediate vicinity. Downstream water levels at GS-3 were similar to upstream levels during all spillway discharge events. No breach of consent condition occurred as the rainfall event was outside of the design capacity of the dam as denoted by S4.C30.

5.5.3. Surface Water Long Term Analysis and Trends

The Lower Dam (GS-4/EPL#8) ambient water quality for FY26 exhibited readings that were above average for pH, above average for TSS, same as the average for Turbidity and below average for Conductivity. These trends are attributed to above average rainfall and extreme flooding events experienced throughout the reporting period. These trends are visible in Figures 23 to Figure 26 below.

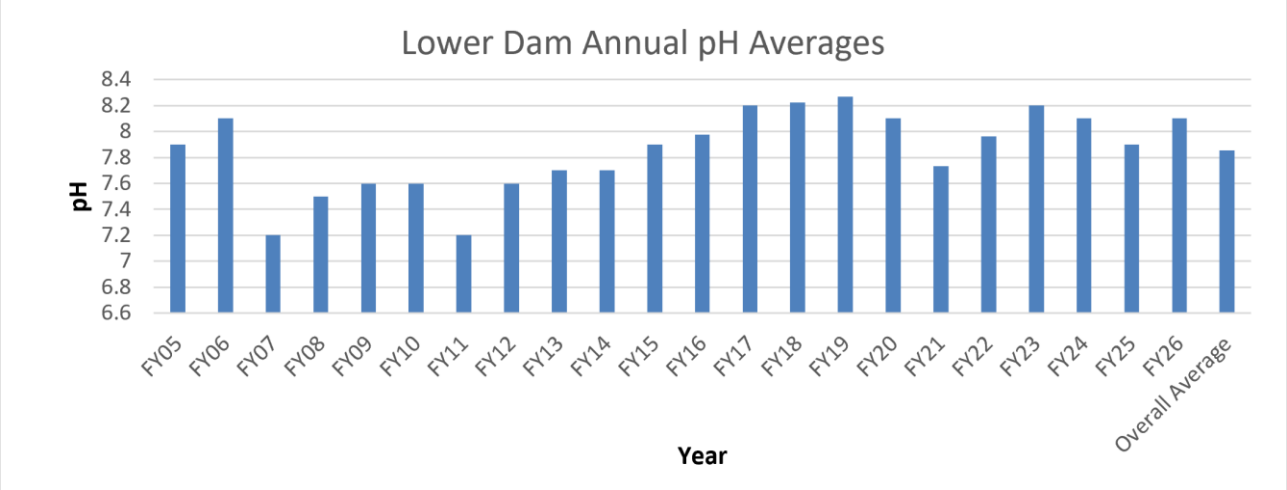


Figure 23 Lower Dam Annual pH Averages

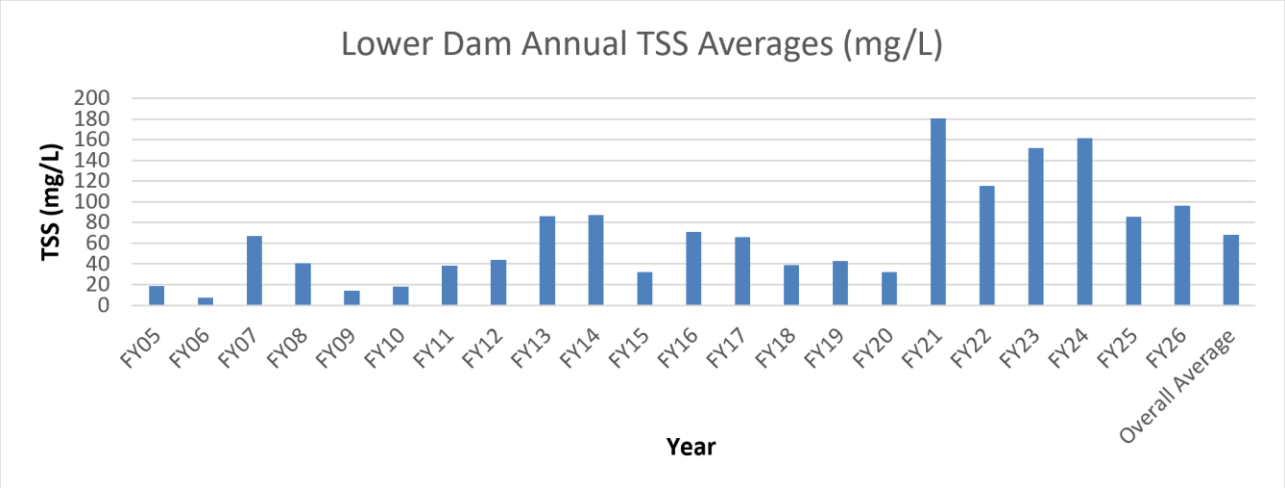


Figure 24 Lower Dam Annual TSS Averages

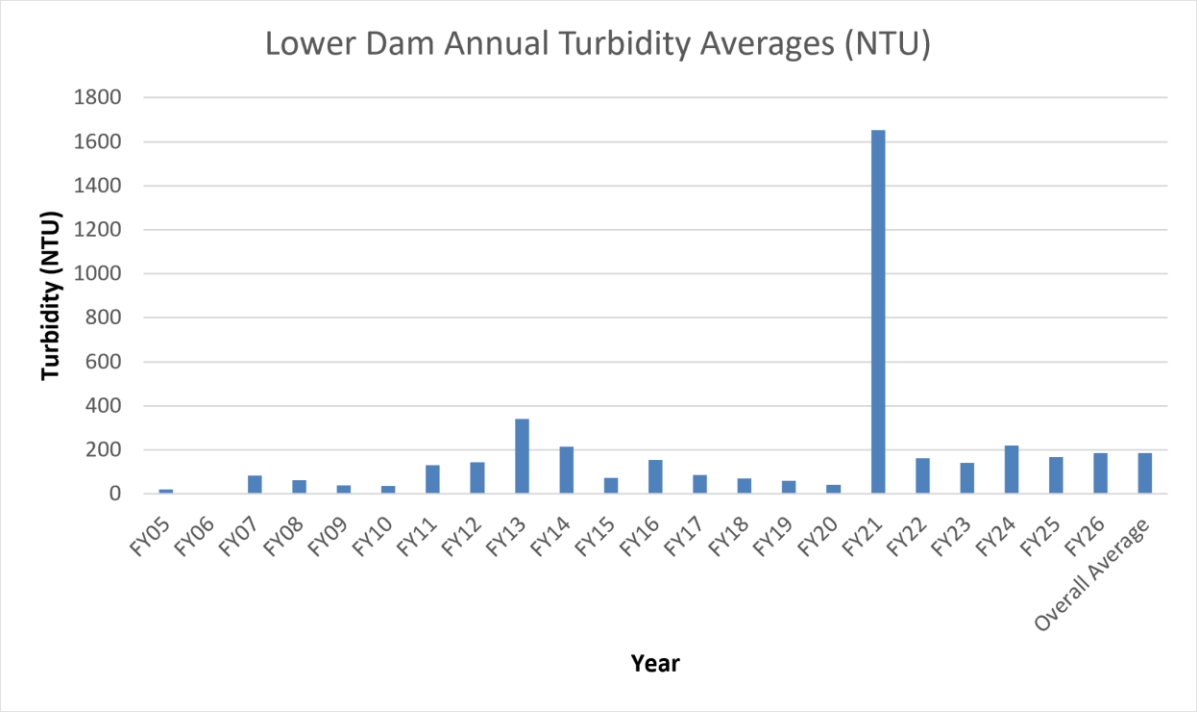


Figure 25 Lower Dam Annual Turbidity Averages

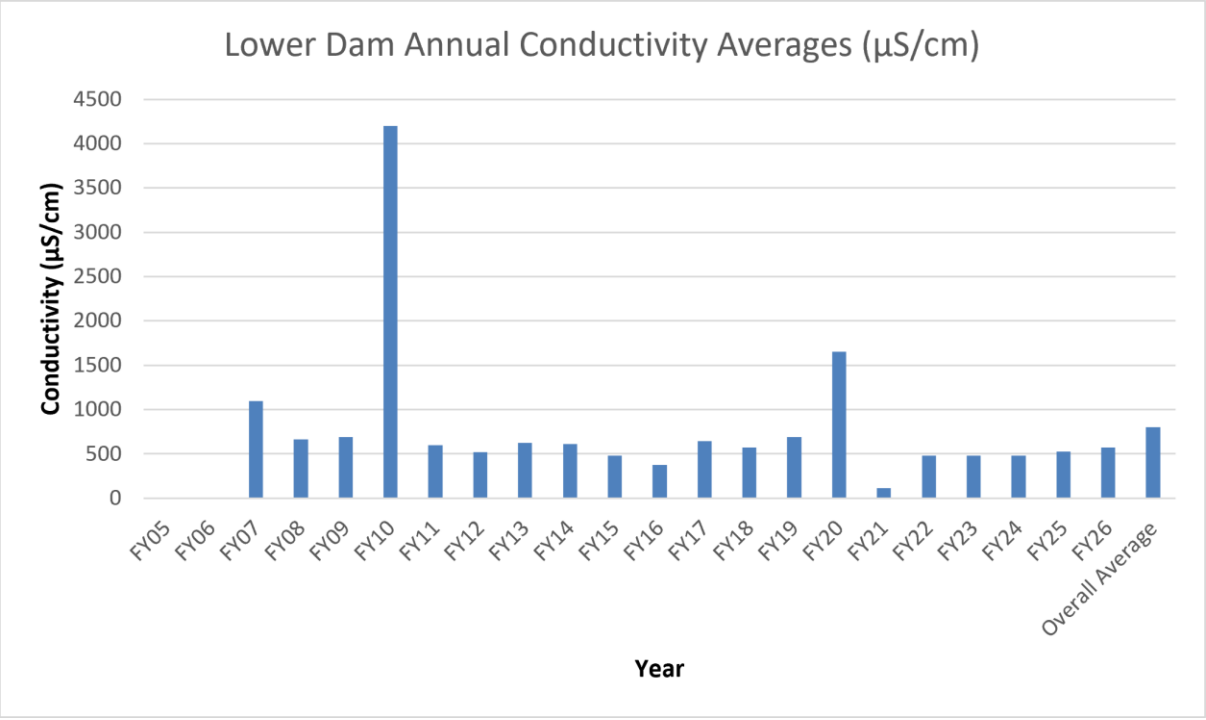


Figure 26 Lower Dam Annual Conductivity Averages

5.5.4. Water Balance and Consumption

The majority of surface water runoff from the quarry is captured in the sites' water management dams. Captured surface water runoff is either used as process water within the quarry operations (e.g. for dust suppression), lost to evaporation or seepage, or discharged to receiving waters.

The quarry is licenced to take surface water from Rocklow Creek. This allocation, under WAL#25152, is 227ML/year and is extracted via a 100mm centrifugal pump. No water take was initiated from Rocklow Creek during the reporting period.

All process water was sourced by either the Lower Dam, Middle Dam or Croome Sumps, which are offline from Rocklow Creek as per water management upgrades undertaken in 2008 under MOD 4. The Location of water storage infrastructure is shown below in Figure 27.



Figure 27 Water Storage Locations

The updated WMP outlines a range of water balance scenarios based on different climate conditions. The median rainfall scenario (1063mm rainfall) best reflects rainfall for the FY26 period (annual rainfall was 1204.8 mm) as shown in Figure 28. As a result, the process water use was modelled to be 114.7ML for the reporting period with a change of storage of +1ML over the year within the three dam storages, indicating that water take was well within licenced volumes.

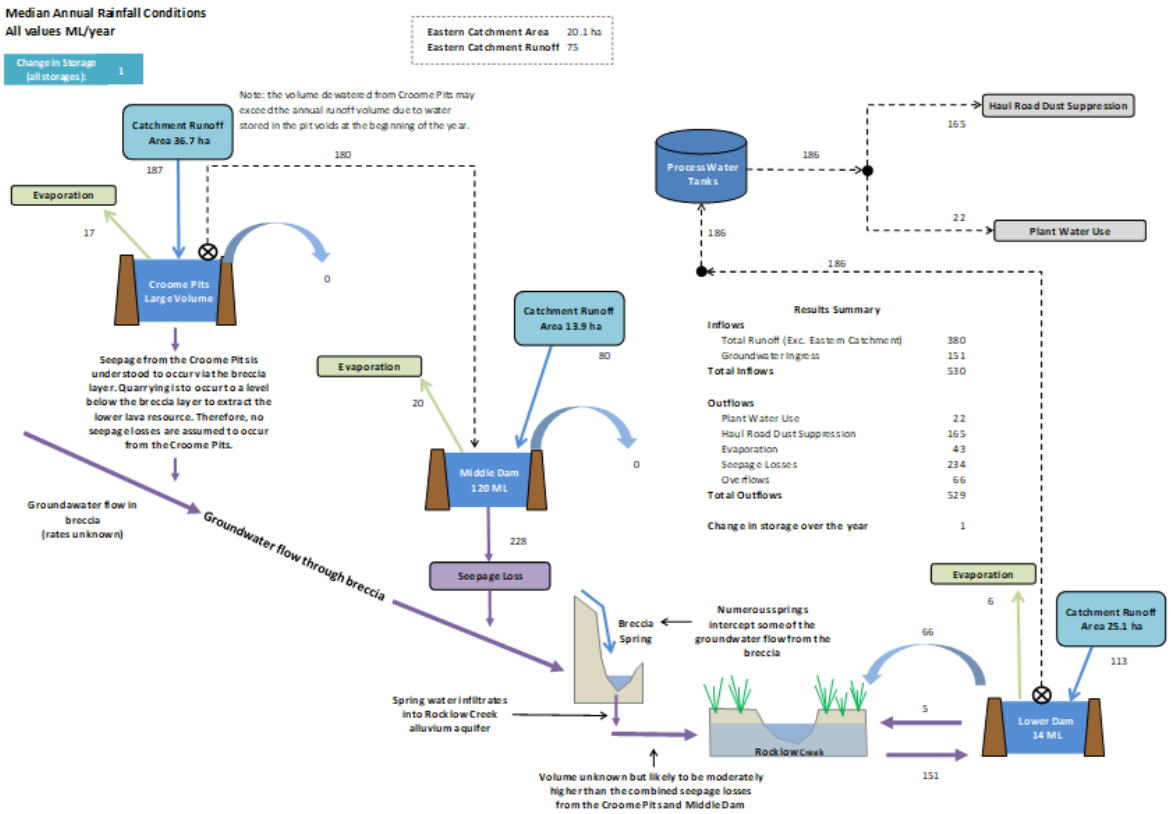


Figure 28 Existing water management system: typical wet year water balance

5.5.5. Surface Water Quality Summary and Opportunities for Improvement

The water management system has been progressively updated over the past few years. The main changes have included:

- An increase in storage capacity of the Middle Dam and the improved spillway arrangement;
- An upgraded drainage system between the Middle Dam and the Lower Dam;
- An upgraded water recycling ability for the quarry;
- An extended ambient water quality program.

The improvements to the water management system outlined in the updated WMP will reduce the instances where Rocklow Creek inundates the Lower Dam causing it to fill up. A summary of these improvements is reproduced in Table 17 below and have been addressed in the updated WMP. The Lower Dam improvement upgrade[1] is still in progress.

Table 17 Proposed Water Management System Improvements

Proposed Modification	Outcome
Relocate spillway to south-east side of the dam where Rocklow Creek levels are expected to be lower during large runoff events.	• Significantly reduce the frequency of uncontrolled inflows from Rocklow Creek inundating the Lower Dam.

[1] Not to be confused with the Lower Dam upgrade – Schedule 4 Conditions 32 - 34 (Offline Dam) which was completed in 2008.

Relocate primary sedimentation chamber to western end of dam. Raise embankment at existing spillway location from 2.8 to 4.0 m AHD. Lower Dam upgrade to include all the above.	• Improve water treatment function of Lower Dam during Rocklow Creek flood events. • Inflows will occur at the opposite end of the dam to outflows, resulting in longer residence time and improved sediment treatment function. • Provide vehicle access to primary sedimentation chamber to allow for sediment removal as required.
Extend the dam footprint to the east by approximately 1,600m^2 and excavate to 2.0 m AHD.	• Provide an additional 1.1 ML of storage above 2.0 m AHD. • Establish a macrophyte zone near the dam outlet.
The relocated spillway will have an invert level of 3.1 m AHD1, which will be 300 mm higher than the existing level (2.8 m AHD).	• Reduce the frequency of Rocklow Creek floodwaters inundating the Lower Dam. • Provide an additional 2.0 ML of storage above 2.0 m AHD.
Establish macrophyte zone within extended dam footprint area.	• Provide beneficial water quality treatment during significant rainfall (discharge) events.

5.6. Ground Water Monitoring

An annual groundwater monitoring report has been prepared by EMM Consulting Pty Ltd, in accordance with condition 40. This report is included in full within Appendix E. The monitoring program uses the established down gradient bores at Dunmore Sand and Soil (DG-31, DG-21 and DG-17) and four established up gradient bores at Dunmore Quarry (GW-1, GW-2, GW-3 and GW-4). Location of Groundwater monitoring bores are shown below in Figure 29.

Annual groundwater sampling, for background sites, was conducted by EMM in December 2025 and June 2026.

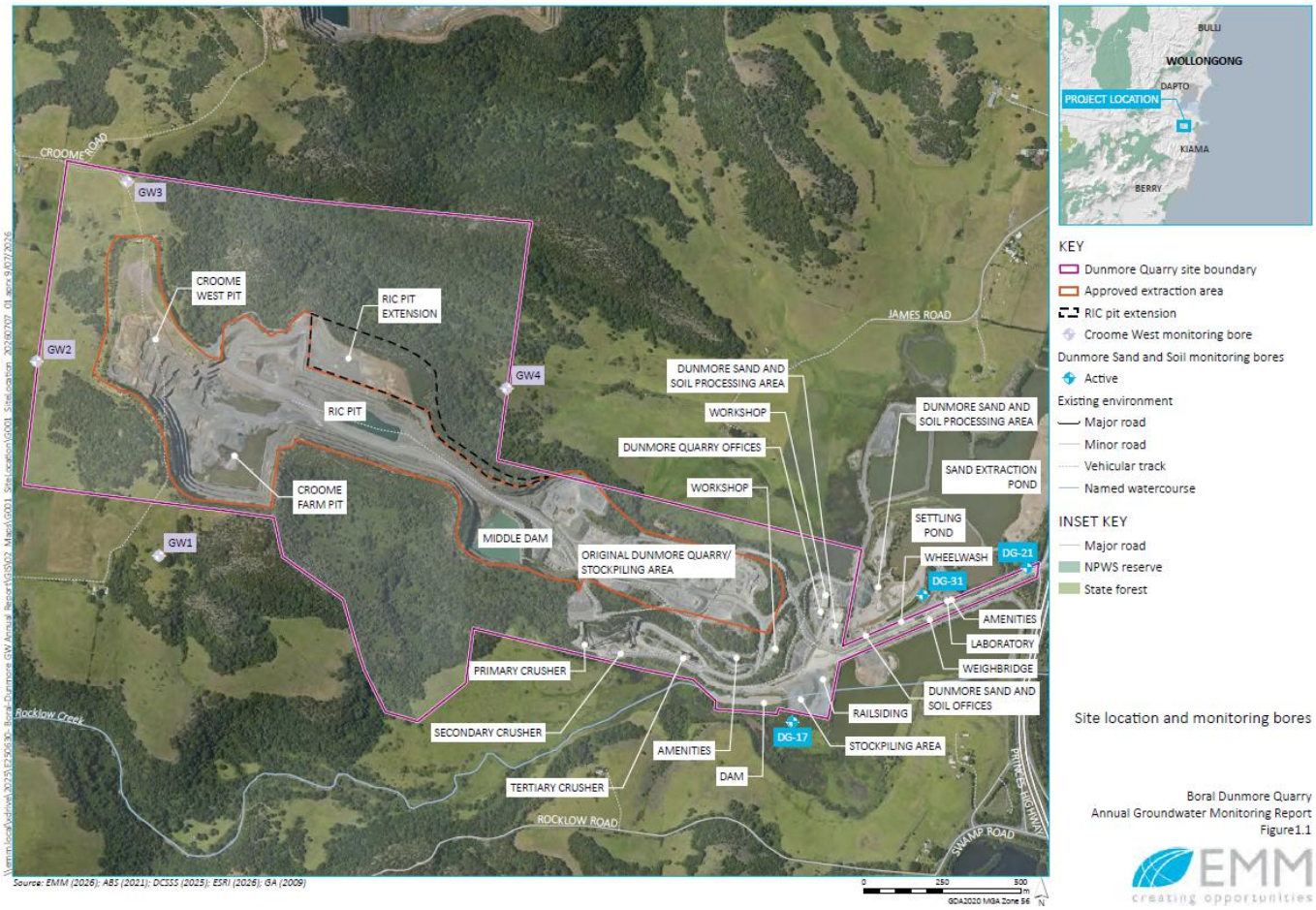


Figure 29 Groundwater Monitoring Bores

The monitoring bores are located up hydraulic gradient from current quarrying activities and are therefore considered representative of baseline conditions (both water levels and quality). Groundwater monitoring for the up-gradient bores includes six-hourly groundwater level measurements and typically consist of six-monthly groundwater sampling events. Testing was conducted in December 2025 and June 2026.

5.6.1. Groundwater Monitoring Impact Assessment Criteria

Groundwater impacts relating to quality and water levels downgradient are assessed in relation to the up-gradient (baseline) conditions located in bores GW-1, GW-2, GW-3 and GW-4 and against the site conceptual model which was formulated as part of the MOD 9 Croome West Expansion.

5.6.2. Groundwater Monitoring FY26 Performance Review

Groundwater levels are recorded every six-hours allowing water level trends to be identified in the alluvium and the Bumbo Latite. Continued six monthly sampling of water quality at the Croome West sites and quarterly sampling at the DSS sites has also established useful trends.

The main findings for the FY26 monitoring year regarding water levels are:

- Groundwater level trends in the alluvium (DG-31, DG-21 and DG-17) are comparable to the previous monitoring period. These shallow alluvial monitoring bores shows a direct and immediate response to rainfall events with DG-21 and DG-31 showing the most pronounced responses. The highest groundwater level increase was observed

at DG-31 (approximately 1.5 m following significant rainfall events). During the reporting period, the water levels fluctuated corresponding to the prevailing rainfall conditions and were within historical observations.

- GW1 recorded a water level decline (approximately 12 m) between August 2025 to June 2026 coinciding with a period of average to below average monthly rainfall following a period of significantly above average rainfall. The groundwater level recorded a low of 100.5 mAHD in May 2026 which was still within the SSTVs.
- GW2 recorded stable groundwater levels and is within the SSTVs. The logger data prior to August 2025 is erroneous and not representative.
- GW3 groundwater levels display a sightly declining trend corresponding to prevailing average to below average rainfall conditions. Groundwater levels are within the SSTVs.
- GW4 groundwater levels are generally stable trend aligning with prevailing rainfall conditions. Groundwater levels recorded a slight downward trend between July 2025 to March 2026 and a slight upward trend from April 2026. Groundwater levels are within the SSTVs. The periodic drawdown at GW4 is a result of purging prior to groundwater quality sampling by Boral and is not representative of natural groundwater conditions.

Groundwater chemistry findings for the reporting period are:

- For the Bumbo Latite bores, during the reporting period EC is comparable to the previous monitoring period with the exception of GW2 which was an outlier. The pH at the latite bores ranges between slightly acidic to slightly alkaline during the monitoring period and shows a slight decrease compared to the previous reporting period.
- EC in the alluvium shows a large range and high variability during the 2025/2026 monitoring period. The high salinity at these bores can be attributed to their proximity to the tidally influenced Rocklow creek. A drop in EC around August 2025 across the alluvial bores may be attributed discharges and seepages from onsite storage dams through the breccia from the significantly above average rainfall period between July to September 2025. The pH in the alluvium was generally slightly acidic during the monitoring period, in line with historical trends. There is a slight decreasing trend in pH from August 2025.
- Major ion concentrations measured at GW1 to GW4 are comparable to previous monitoring year. The more chloride dominant water type at GW4 compared to GW1 to GW3 may be influenced by rainfall recharge in a coastal environment where sea spray is depositing salt in the environment.
- Major ion concentrations measured at the alluvial monitoring sites show some changes compared to the previous year. DG-17 and DG-21 remains sodium bicabonate dominant. DG-31 shows fluctuations between a calcium bicarbonate type and a calcium sulfate water type.
- The results for the reporting period are consistent with historical observations. There were no changes to groundwater levels or water quality observed in the groundwater monitoring bores during the reporting period that could be associated with the RIC pit activities.

5.6.3. Groundwater Monitoring Summary and Opportunities for Improvement

As per S4.C43: *on the provision of two years of monitoring data that shows negligible impact on the regional groundwater network the Secretary may agree to suspend monitoring of*

regional groundwater levels and/or quality. The two-year groundwater monitoring period has shown negligible impact to the monitored groundwater system.

However, in the interest of collecting additional groundwater site data and continuing groundwater monitoring whilst Boral are still continuing extraction in the Croome West pit, it is proposed to continue with the current monitoring regime at the quarry.

5.7. Flora and Fauna Management and Rehabilitation

Most areas of the site are currently operational and as such rehabilitation is not able to commence on the majority of areas within the quarry until the completion of extraction activities. When practical, progressive rehabilitation of the site will be undertaken in conjunction with on-going quarrying works.



Figure 30 Hydroseeding cover and trees over Croome West Bund

Rehabilitation activities undertaken to date have been in accordance with the updated Flora and Fauna Management by EMM (2019) and Rehabilitation Management Plan prepared by Cambium in 2025 and the latest version approved in June 2026

There are three (3) designated conservation areas for Dunmore Quarry as shown in Figure 31 below. These areas are referred to as the Compensatory Habitat Area (CHA), Remnant Vegetation Conservation Area (RCVA), and Offset Area (OA). Works in the last reporting period focussed on the CHA and OA and are summarised in the Annual Monitoring report located in Appendix E.

In addition, following the approval of Modification 13, a Biodiversity Stewardship Agreement (BSA) is in the process of being set up, which will generate a new rehabilitation corridor. The

exact parameters and completion criteria are currently being determined with assistance from an appropriate consultant. Compensatory Habitat Area (CHA) and Offset Area (OA) will be included in the upcoming Rocklow BSA for a consistent management across all conservation and offset areas.

In the last 12 months, no rehabilitation occurred within the quarry. However, vegetation maintenance has continued on the Croome West amenity bund and other areas around the quarry footprint.

Native vegetation was established in the area 1 of the translocation sites, in accordance with the Vegetation Translocation Plan, following Mod13 commencement.

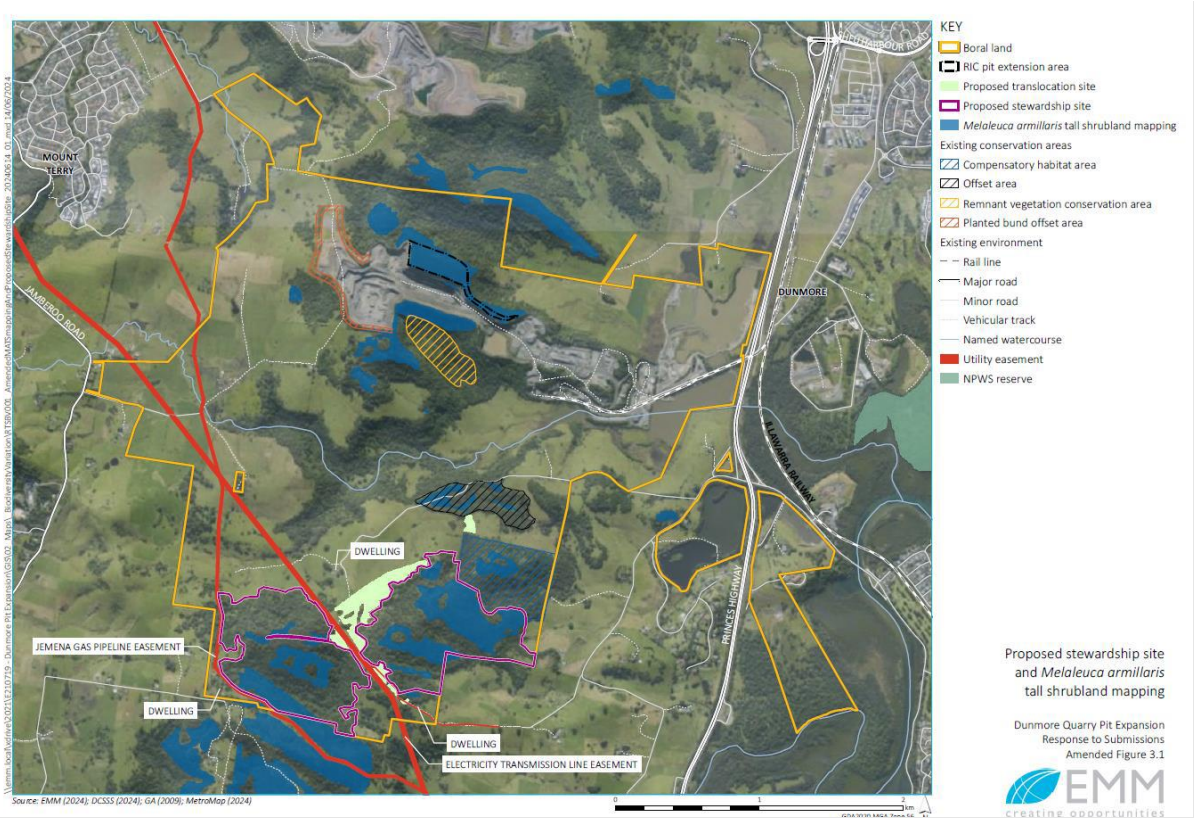


Figure 31 Conservation Areas



Figure 32.1 Translocation area 1

5.7.1. Flora and Fauna Impact and Rehabilitation Assessment Criteria

Completion criteria were designed in the updates to the FFMP, which was approved June 2019.

The following completion criteria are outlined for the Compensatory Habitat Area (CHA):

- establishment of a dominant native canopy cover across the Compensatory Habitat Area, as per below:
    - midstory canopy cover of 50% for areas of Melaleuca Armillaris Tall Shrubland; and
    - overstory canopy cover of 15% for areas of Illawarra Lowlands Grassy Woodland;
- removal of woody weeds across the Compensatory Habitat Area; and
- reduction in exotic groundcover to less than 30% over five consecutive monitoring periods.

Once these completion criteria have been met, no further management of this area is required under this FFMP and Conditions 50(a) and 48 are deemed to have been satisfied.

The following completion criteria are outlined for the Remnant Vegetation Conservation Area (RCVA):

- maintenance of high-quality intact remnants, with no significant change in cover of native species;
- establishment of a dominant native canopy cover of 15% in the lower (south-eastern) portion of the Remnant Vegetation Conservation Area; and
- Establishment of a predominantly native (>50%) groundcover, with maintenance of this native groundcover over five consecutive monitoring periods.

Once these completion criteria have been met, no further management of this area is required under this FFMP, and Conditions 49 and 45(b) are deemed to have been satisfied.

There are no completion criteria set for the Offset Area (OA) as the area is managed via an in-perpetuity arrangement via a Conservation Agreement. A Conservation Agreement between the Minister administering the *National Parks and Wildlife Act (1974)* and Boral Resources for Dunmore Quarry was signed by NSW Minister for the Environment on February 2011. The NSW Minister for the Environment confirmed signing the Dunmore Quarry Conservation Agreement and acknowledged that the Conservation Agreement satisfied condition 46A of DA 470-11-2003, for the long term security of the Offset Area. However, this area will be integrated into the forthcoming Biodiversity Stewardship Agreement, Condition 45F(b), and managed through the BSA management plan.

5.7.2. Flora and Fauna and Rehabilitation FY26 Performance Review

A summary of the bushland regeneration works undertaken within the three active bushland restoration zones is outlined in Bushland Restoration Project Final Report contained in Appendix F.

5.7.2.1. Zone 1 Remnant Vegetation Conservation Area

Zone 1 consists of a large gully with a south easterly aspect and a drainage line that forms part of the Rocklow Creek catchment. The 15 hectare site contains a subtropical rainforest with a diverse range of canopy species including Sassafras (*Doryphora sassafras*), Myrtle Ebony (*Diospyros pentamera*) and all five of the local Fig (*Ficus sp.*) species. An abundance

of vines also exist within this remnant vegetation area including Round Vine (*Legnephora moorei*), Kangaroo Grape (*Cissus Antarctica*) and Milk Vine (*Marsdenia spp.*), and many species of ferns are present as epiphytes, lithophytes and within the ground layer. Large amounts of woody weeds and Lanatana have invaded this area. Works within this zone consisted of primary weed control targeting woody weeds throughout established approximately 20 year old revegetation. Large amounts of Wild Tobacco and Lantana were dominating the revegetation areas on the southern side of the creek while encroachment of Kikuyu was impacting the plantings on the northern side of the creek

No works were carried out within this zone due to inaccessibility of the site during wet periods and cattle accessing the site where fencing is inadequate. Fencing repair to be scheduled within the next reporting period.

5.7.2.2. Zone 2 Offset Area

Works within this zone focused on regeneration of the endangered ecological communities (EEC's) Illawarra Grassy Woodland, Illawarra Subtropical Rainforest and Melaleuca armillaris Tall Shrubland. Secondary weed control and maintenance works were carried out within this zone throughout all previously worked areas to treat re-growth from woody weeds and invasive vines. Additional primary weed control was carried out at the eastern extent of this zone covering approximately 2,150m². Additional populations of the threatened species White Wax Flower (Cynanchum elegans) were observed at the eastern extent of the work area and bush regeneration works were carried out within this area to protect and enhance the populations of this threatened species.

5.7.2.3. Zone 3 Compensatory Habitat Area

The CHA zone is located south of Rocklow Road and consists of a large bushland remnant on a hilltop with a small ephemeral creek line within a gully to the south of the hill. The total site area of this zone covers approximately 23.1 hectares. The majority of this zone is perched on the rocky hillside and supports the *Melalecua armillaris* tall shrubland vegetation community. The gully drops at the southern end of the zone, which is well defined by the presence of rainforest species and some very impressive land large Moreton Bay Fig (*Ficus macrophylla*) trees.

Extensive revegetation has been carried out within this zone within the southern gully and on the eastern and western edges of the zone. Hundreds of thousands of trees have been planted within this zone and are now reaching maturity. Many open areas that have been cleared of vegetation also exist within this zone with the majority of these clearings occurring on the rocky hill tops.

Works within this zone focused on regeneration of the endangered ecological communities (EEC's) Illawarra Grassy Woodland, Illawarra Subtropical Rainforest and Melaleuca armillaris Tall Shrubland. Secondary weed control and maintenance works were carried out within this zone throughout all previously worked areas to treat re-growth from woody weeds and invasive vines. Additional primary weed control was carried out at the eastern extent of this zone covering approximately 2,150m². Additional populations of the threatened species White Wax Flower (Cynanchum elegans) were observed at the eastern extent of the work area and bush regeneration works were carried out within this area to protect and enhance the populations of this threatened species.

5.7.3. Flora and Fauna and Rehabilitation Summary and Opportunities for Improvement

Works will continue in line with the completion criteria thresholds during the next reporting period.

Working towards establishment of the Biodiversity Stewardship Agreement will continue in the next reporting period.

Fencing of translocation areas, following MOD13, has been partially completed and will continue in the next reporting period. Currently area 1 and 2 have been completely fenced with wildlife friendly fencing.

Mulch and topsoil from the RIC Pit extension will continue to be translocated. Further planting to be scheduled to supplement natural recruitment.

5.8. Heritage Conservation

Dunmore Quarry operate under an Aboriginal Cultural Heritage Management Plan which details the required Aboriginal heritage management and mitigation measures. The plan was prepared in consultation with OEH and Registered Aboriginal Parties and is available on the Boral Dunmore website. Archaeological salvage excavation and mitigation measures have been completed.

5.9. Waste Minimisation

Boral is committed to continuing non-production waste management minimisation in accordance with the waste hierarchy and minimising the amount of waste sent to landfill. To achieve this, all liquid and solid wastes are classified and sorted so they can be appropriately re-used or recycled. Waste is managed by appropriately licenced sub-contractors and entered into a waste tracking register.

To deter illegal dumping, Shellharbour Council installed cameras around the surrounds of Dunmore Quarry and Dunmore Sand and Soil. Council indicated that two prosecutions have resulted from investigations aided by the installation of the cameras.

Boral is committed to ensuring its extraction and processing activities produces minimal waste rock material. Approximately 30% of the hard rock processed at Dunmore Quarry becomes material of less than 4mm in diameter, which are known as quarry fines. In the past, quarry fines were considered a product waste and stockpiled due to having no steady market, however the material is now used in manufactured sand (as opposed to natural sand) production.

5.9.1. Waste Tracking Register

A detailed breakdown of the waste collected on-site during the reporting period is shown below in Table 27. Yearly trends are shown in Table 28.

Table 27 Waste Tracking Data

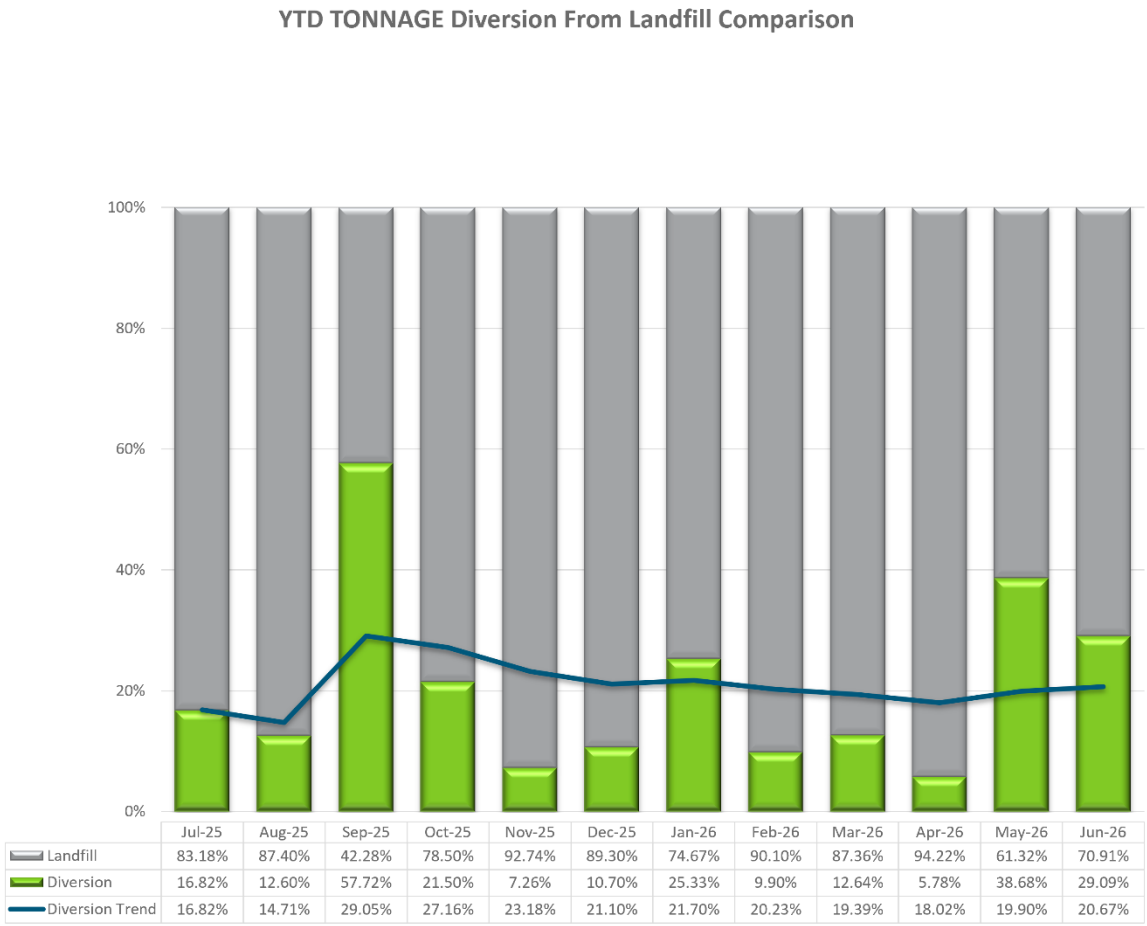
Month	General Waste (t)	Cardboard (t)	Commingle (t)	Timber (t)	Scrap Metal (t)	Oil & Oily Water (L)	Grease (t)	Filter (t)	Rags (t)
Jul-25	1.36	0.057	0.013	0	0	0	0	0.205	0

Aug-25	9.866	0.118	0.034	0.86	0	0	0	0.41	0
Sep-25	1.297	0.098	0.0328	0	0	0	1.64	0	0
Oct-25	1.234	0.077	0.056	0	0	0	0	0.205	0
Nov-25	16.84	0.088	0.025	1	0	0	0	0.205	0
Dec-25	1.065	0.079	0.0486	0	0	0	0	0	0
Jan-26	3.596	0.1	0	1.12	0	0	0	0	0
Feb-26	1.088	0.08	0.0396	0	0	0	0	0	0
Mar-26	0.896	0.09	0.0396	0	0	0	0	0	0
Apr-26	1.755	0.06	0.0476	0	0	0	0	0	0
May-26	3.162	0.13	0.0396	1.62	0	0	0	0.205	0
Jun-26	3.663	0.078	0.0594	1.16	0	0	0	0.205	0
Total	**45.822**	**1.055**	**0.4352**	**5.76**	**0**	**0**	**1.64**	**1.435**	**0**

Table 28 Historical Waste Data

Waste Classification		FY20	FY21	FY22	FY23	FY24	FY25	FY26
Solid Waste	General Waste (t)	34.398	37.237	36.951	55.89	40.10	30.87	45.822
	Cardboard Tonnes (t)	3.355	2.32	1.623	1.44	1.07	1.02	1.055
	Timber Tonnes (t)	10.24	10.24	1.16	4.60	8.64	2.22	5.76
	Comingle Recycling (t)	3.825	0.255	0.266	0.42	0.45	0.47	0.4352
	Used Oil Filters/ Rags (t)	1.072	2.46	8.2	12.07	7.49	4.19	1.435
	Scrap Metal (t)	79.64	557.46	0	0	0	0	0
Liquid Waste	Oil/Oily Water Litres (L)	68,883	41,900	17,280	53,000	45,000	9,200	0
	Effluent Litres (L)	190,000	170,208	11,111	303,500	243,480		
	Other Litres (L)	0	0	0	0	0	0	0

The quantity of waste in FY26 was consistent with historical results across all categories, in accordance with Table 28.



	Jul-25	Aug-25	Sep-25	Oct-25	Nov-25	Dec-25	Jan-26	Feb-26	Mar-26	Apr-26	May-26	Jun-26
Landfill	83.18%	87.40%	42.28%	78.50%	92.74%	89.30%	74.67%	90.10%	87.36%	94.22%	61.32%	70.91%
Diversion	16.82%	12.60%	57.72%	21.50%	7.26%	10.70%	25.33%	9.90%	12.64%	5.78%	38.68%	29.09%
Diversion Trend	16.82%	14.71%	29.05%	27.16%	23.18%	21.10%	21.70%	20.23%	19.39%	18.02%	19.90%	20.67%

Figure 34 Waste diversion FY26

5.9.2. Waste Minimisation Opportunities for Improvement

Further work will continue with subcontractors to optimise the record keeping for waste collection data. Work will continue to consolidate the recycling improvements undertaken in FY26. A centralised waste management contract has been established with Cleanaway, which will assist in the tracking and reporting of waste.

5.10. Incident and Emergency Response

The following management actions were undertaken in regard to incident and emergency response.

- The Pollution Incident Response Management Plan was reviewed and updated in June 2026. The current version is available online at https://www.boral.com.au/locations/boral-operations-dunmore/boral-quarries-dunmore.

5.11. Dangerous and Hazardous Goods Storage

Storage of dangerous goods and hazardous material have continued as per established operations. All dangerous goods and chemicals are handled and transported in accordance with the AS1940 and AS1596 and the Dangerous Goods Code and S4.C82.

6. Community

The Dunmore Quarry Community Consultative Committee (CCC) continues to serve as a valuable dialogue between Boral and the local community with valuable input and feedback being provided by the community regarding quarry operations and plans. The CCC is run as per S5.C6 and the Departments Community Consultative Committee Guidelines for State Significant Developments (2016).

Members include:

- An independent chairperson.
- At least 2 representatives from Boral (typically the environmental co-ordinator and quarry manager).
- A member from Shellharbour City Council.
- Three local community representatives.

Members are informed of the environmental performance of the site, provided with an update on operations, and given a chance to tour the site and ask questions they may have regarding the operation. CCC members have also been diligent in disseminating the information from the meetings to other interested community members in the local area. The minutes of each meeting are published on the Boral website.

https://www.boral.com.au/locations/boral-operations-dunmore/boral-quarries-dunmore.

The CCC met twice during the FY26 reporting period (August 2025 and March 2026).

6.1. Environmental Complaints Management

No complaints were received during the reporting period.

A graph showing the community complaints over time can be seen in Figure 35.

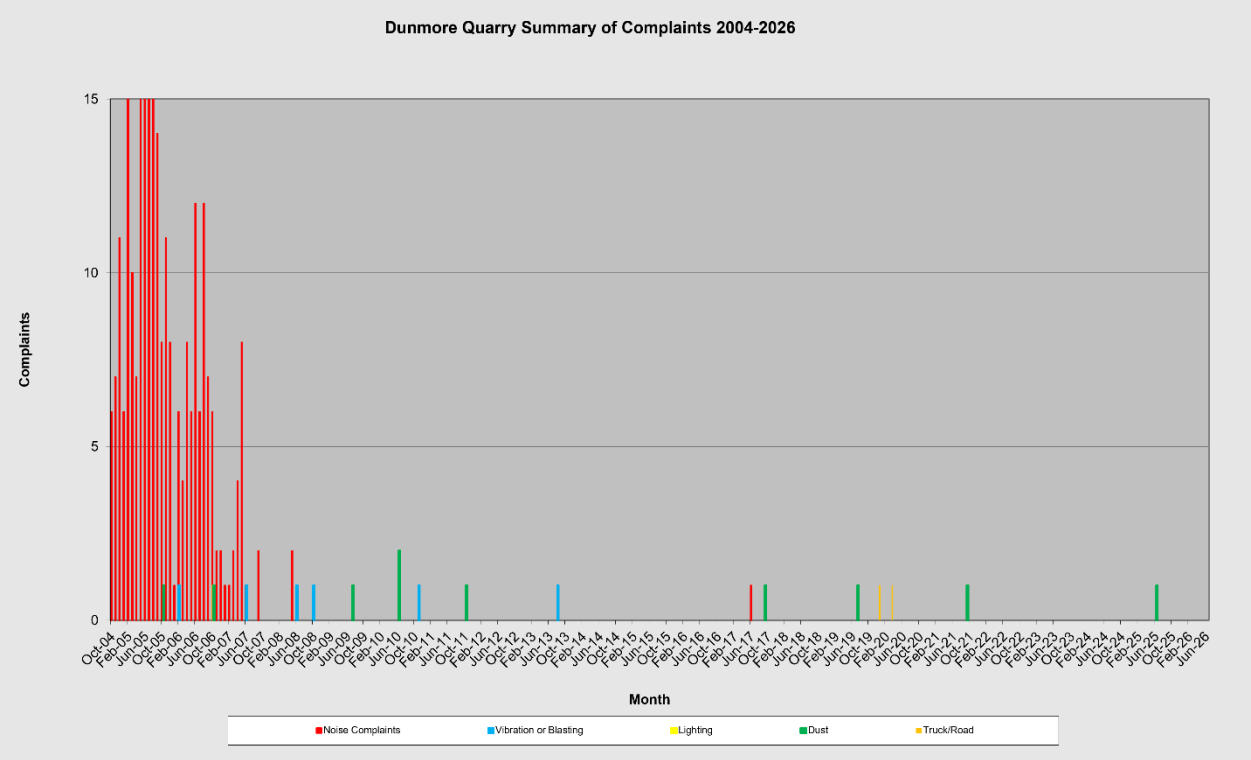


Figure 35 Historical Community Complaints

6.2. Summary of Regulatory Notifications

Zero regulatory notifications were received during the FY26 reporting period.

7. Activities to be completed by the Next Reporting Period

Table 29 Activities to be Completed by the Next Reporting Period (FY26)

Reference	Description of Action
AR 1	Planning for the Lower Dam upgrade will commence once funding has been approved, with the aim of progressing to design and developing a proposal for approval.
AR 2	Monitoring and maintenance of translocation sites. With additional planting to occur in autumn 2027.
AR 3	On-going establishment of Biodiversity Stewardship Site.
AR 4	On-going review of real-time dust monitors and site training.

8. Conclusion

Dunmore Quarry has continued to focus on ensuring the environment and neighbouring community are not adversely impacted by quarry operations. Throughout this reporting period extraction and processing of quarry materials has remained consistent with previous years.

The FY26 period had a strong focus on maintaining regulatory compliance and optimising management actions established in the FY25 reporting period.

The next reporting period will continue to focus on continuing to ensure compliance and optimising processes to allow this.

9. Appendix A Meteorological Monitoring Locations Data and Graphs

The location of the onsite weather station is shown Figure 36 below.

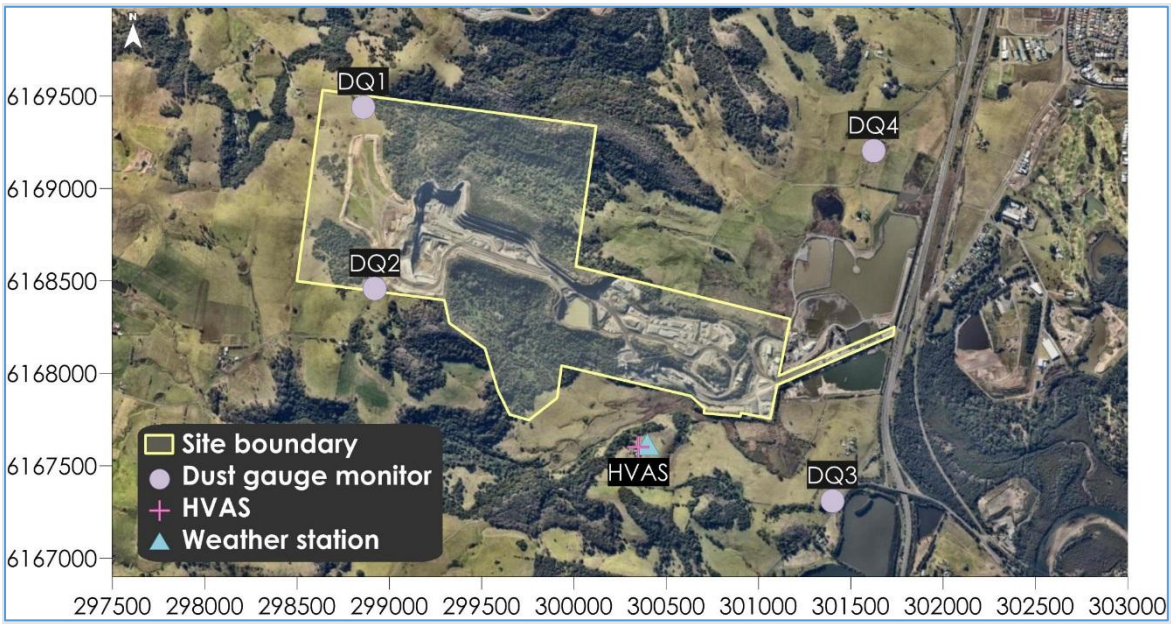


Figure 36 Meteorological Monitoring Locations

A monthly review of weather data is undertaken by the environmental co-ordinator. Important meteorological conditions assessed are rainfall, wind speed direction and atmospheric stability.

Rainfall data has been collected since FY2003. A summary of the rainfall measured from the Dunmore Quarry weather station is shown below in Table 32. Values shown in red relate to periods where rainfall was above the regional average.

Table 30 Rainfall Data Summary

Rainfall (mm)			
Month	**Current Reporting Period**	**Site Average**	**Regional Average**
July	175.8	77.9	49
August	267.4	67.7	53.5
September	129	52.1	42.7
October	31.8	75.1	64.5
November	53.6	98.4	83.1
December	52.8	85.7	67
January	180.4	90.5	72.9
February	97	147.1	140.5
March	92	163.4	122.3
April	15.2	99.3	73.8
May	90.8	93.7	55.8
June	19	105.3	93.7
Total	1204.8	1156.1	925.6

Table 31 Historical Rainfall Data

	Rainfall (mm)																								
Month	**FY03**	**FY04**	**FY05**	**FY06**	**FY07**	**FY08**	**FY09**	**FY10**	**FY11**	**FY12**	**FY13**	**FY14**	**FY15**	**FY16**	**FY17**	**FY18**	**FY19**	**FY20**	**FY21**	**FY22**	**FY23**	**FY24**	**FY25**	**FY26**	**Site Average**	**Regional Average**
July	20	23.5	54.2	41	96	30.5	63.5	35.5	78	194	39	61.7	5	48	97.5	25	6	20.5	264.2	14.8	450	56.8	67.8	175.8	77.9	49
August	13.5	38.5	23	3	42.5	58.5	39	0.5	72	85.5	4.5	17	252	327	76	39	31	39	187.1	73.4	39.4	67.6	27	267.4	67.7	53.5
September	14	7.5	40.6	33	101	39	56	19.5	146	58.5	11.5	85.5	48.7	82	51	1	41.5	59.5	11.3	46.37	145.2	53.4	45.8	129	52.1	42.7
October	6.5	49	245	48	0	17	79	126	126	125	83.5	6.5	103	36.5	32	14.5	128	38.5	114.4	61.85	243.8	22.4	21.2	31.8	75.1	64.5
November	17	150	127	145	39.5	162	46.5	65	198	164	25	173	24	48	33	85	92	25.5	83	164.1	61.2	216.2	122.4	53.6	98.4	83.1
December	70	40.5	136	36.5	54	120	113	80.5	148	63	32	70.5	234	117	58	53	90.5	2.5	83.8	78.36	41.8	207.4	41.6	52.8	85.7	67
January	68	30.5	129	90	0	65.5	9.5	79	59.5	50.5	183	43.5	193	156	32.5	36	144	65	189.3	151	125	57.4	125.8	180.4	90.5	72.9
February	112	70	180	87.1	187	352	108	198	48	258	143	59	113	29.5	283	129	35.5	272.5	88.4	295.8	225.4	71.8	41.2	97	147.1	140.5
March	121	84	118	43.5	67.5	36.5	39	74	363	196	23.5	326	57	145	441	41.5	157	65.5	278.5	670.6	153	80.8	177	92	163.4	122.3
April	91.5	200	24.4	8	145	90.5	106	63	37.4	87.5	136	64.5	305	37.5	40.5	26.1	48.5	85	5.9	216.8	140.4	261	63.8	15.2	99.3	73.8
May	428	43.5	85.6	65.5	23	8	20	80.5	58.3	9.5	81	13	53.5	35.5	51.5	44	13.5	52	206.1	202.8	77.6	296	207.8	90.8	93.7	55.8
June	74.5	42	84.4	124	319	85.5	67	52	92	89	239	34	76	429	57	134	103	35	44	1.8	12.6	225	2.6	19	105.3	93.7
Total	1036	779	1248	724	1074	1064	746	873	1425	1379	1001	954	1462	1490	1253	627	890	760.5	1556	1978	1715	1616	944	1205	1156.1	925.6

Monthly wind roses and seasonal wind roses are shown in Figure 42 to Figure 53. Please note calm is defined as winds averaging less than 0.3m/s over the averaging period.

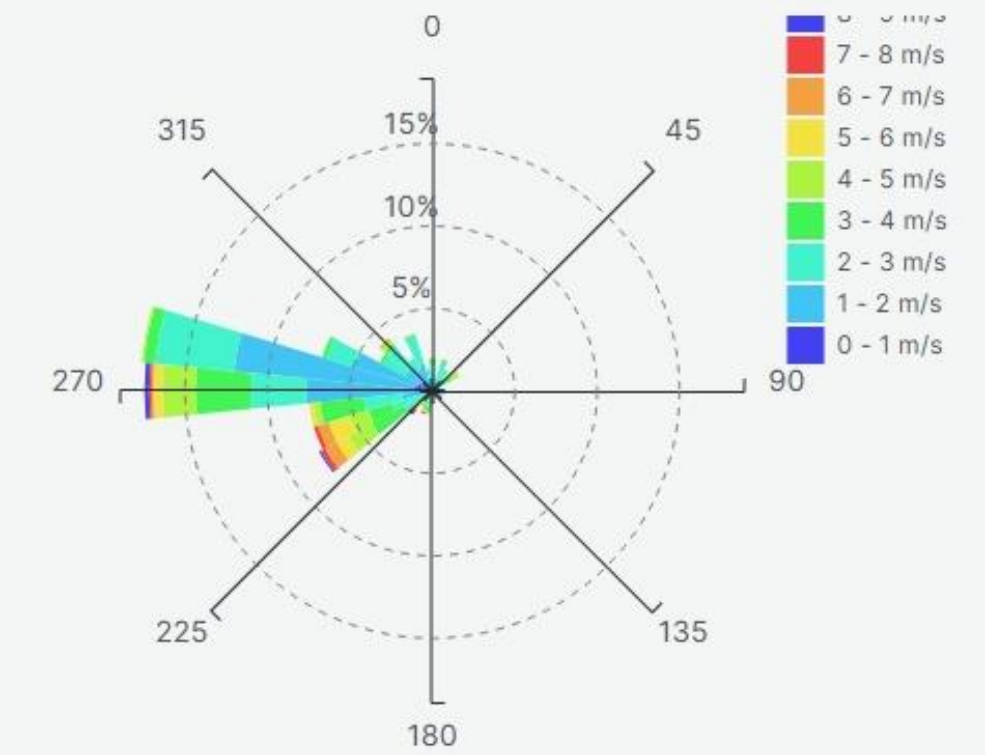


Figure 337 July 2025 Wind Rose

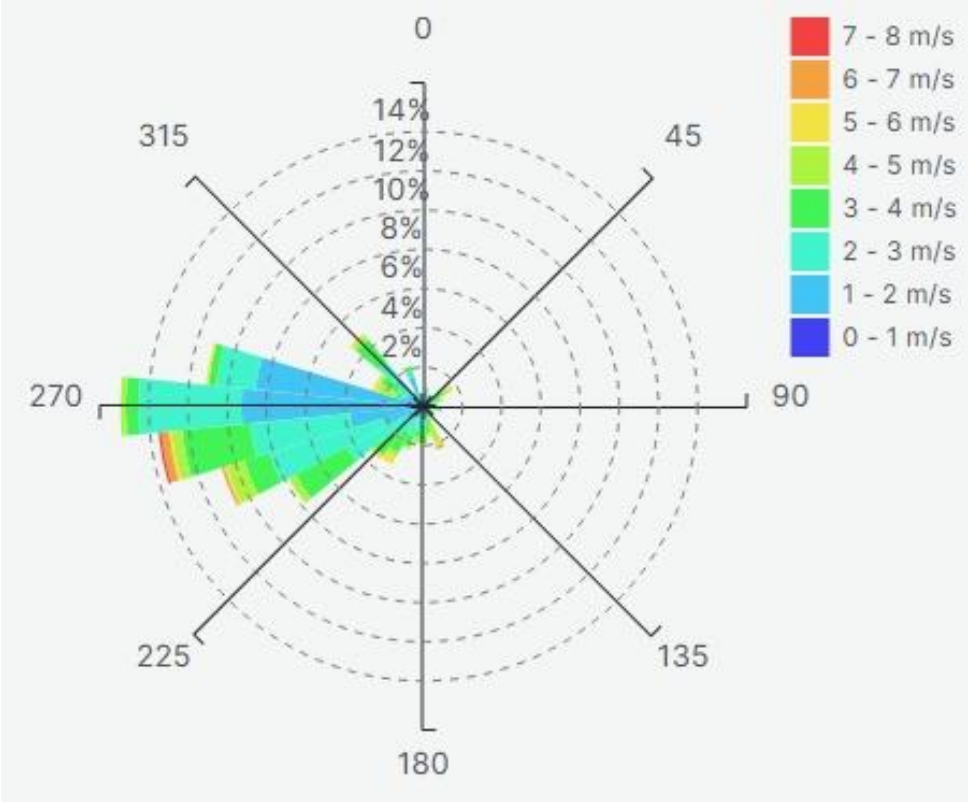


Figure 38 August 2025 Wind Rose

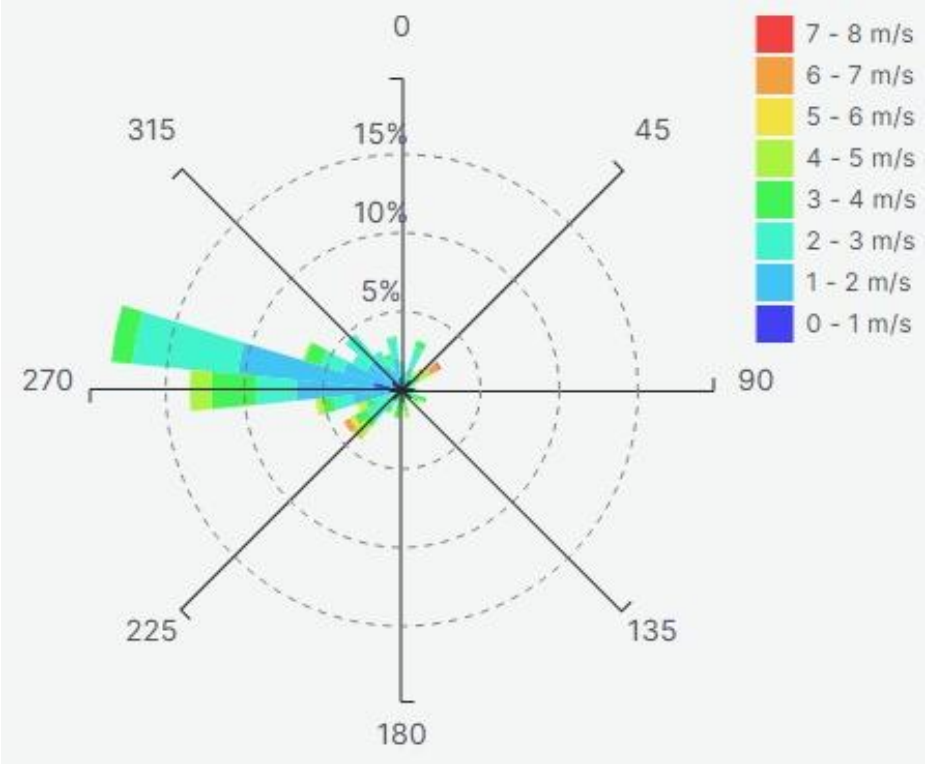


Figure 39 September 2025 Wind Rose

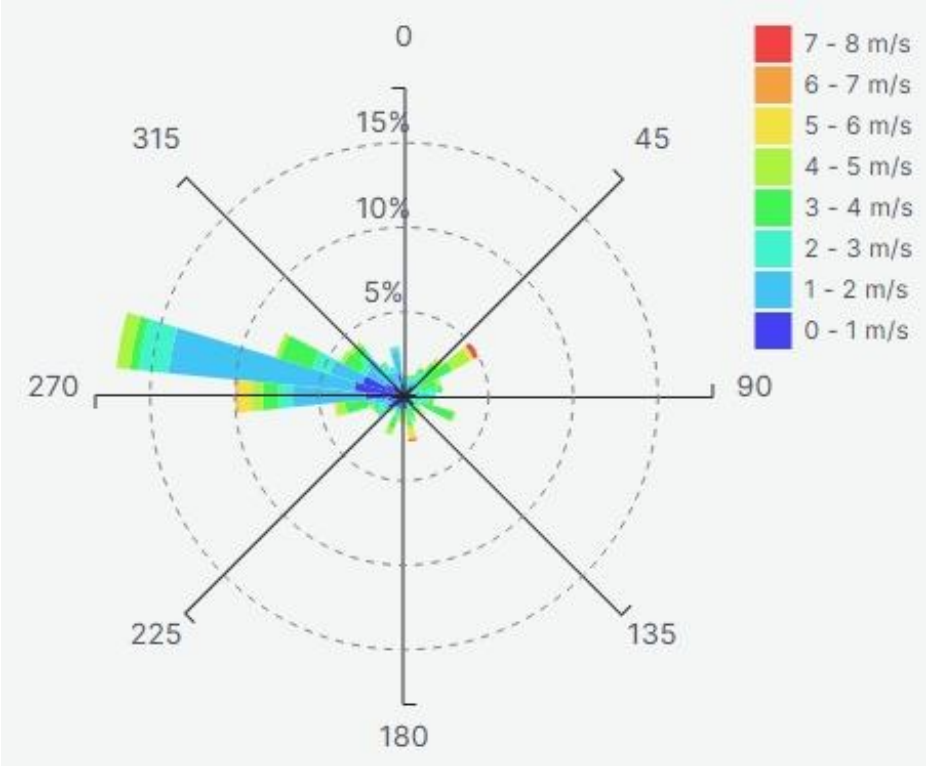


Figure 40 October 2025 Wind Rose

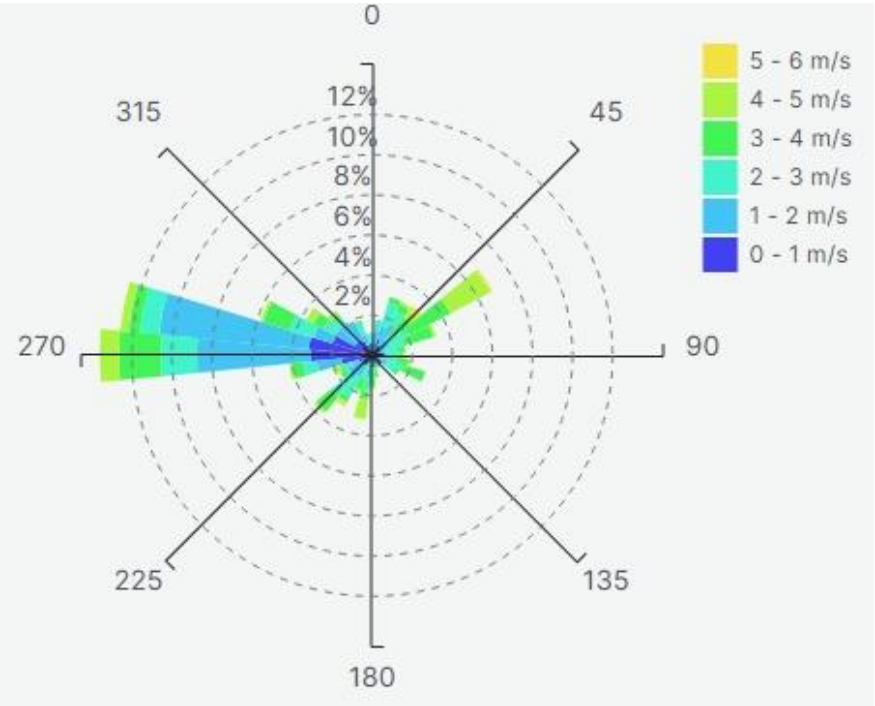


Figure 41 November 2025 Wind Rose

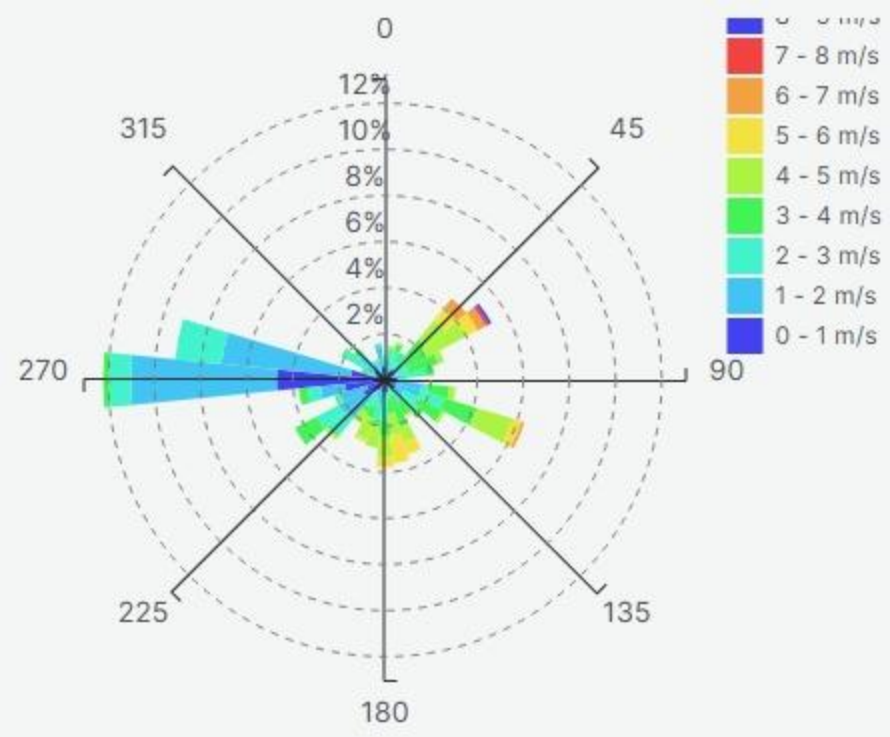


Figure 42 December 2025 Wind Rose

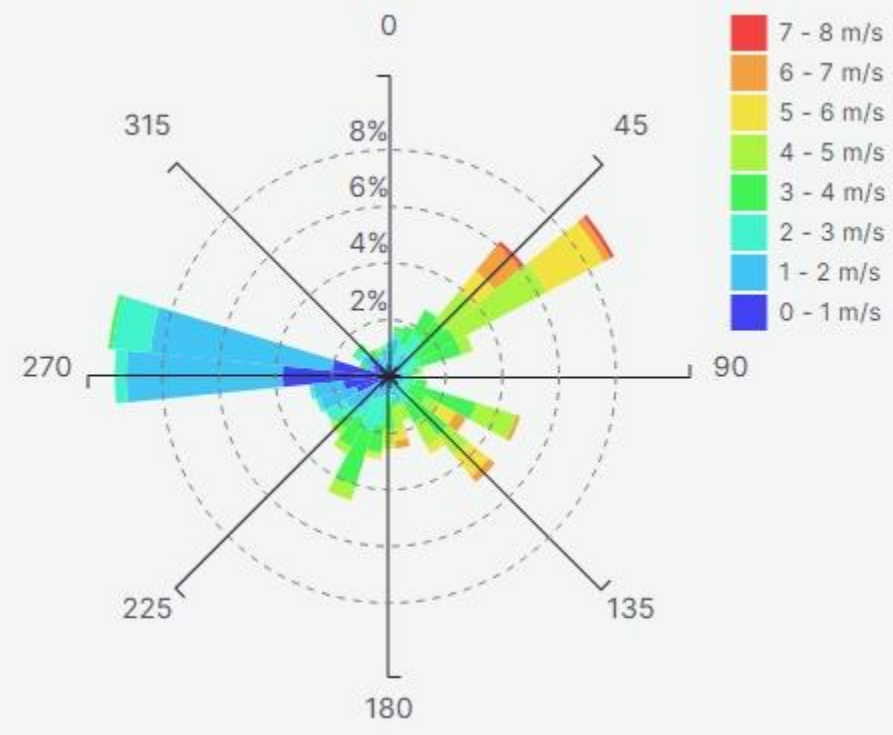


Figure 43 January 2026 Wind Rose

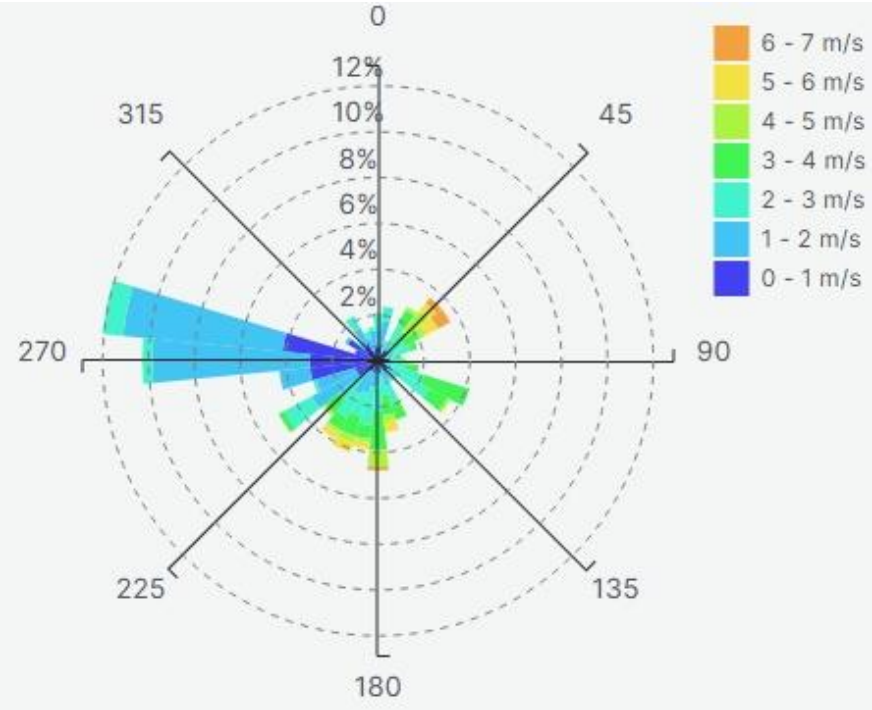


Figure 44 February 2026 Wind Rose

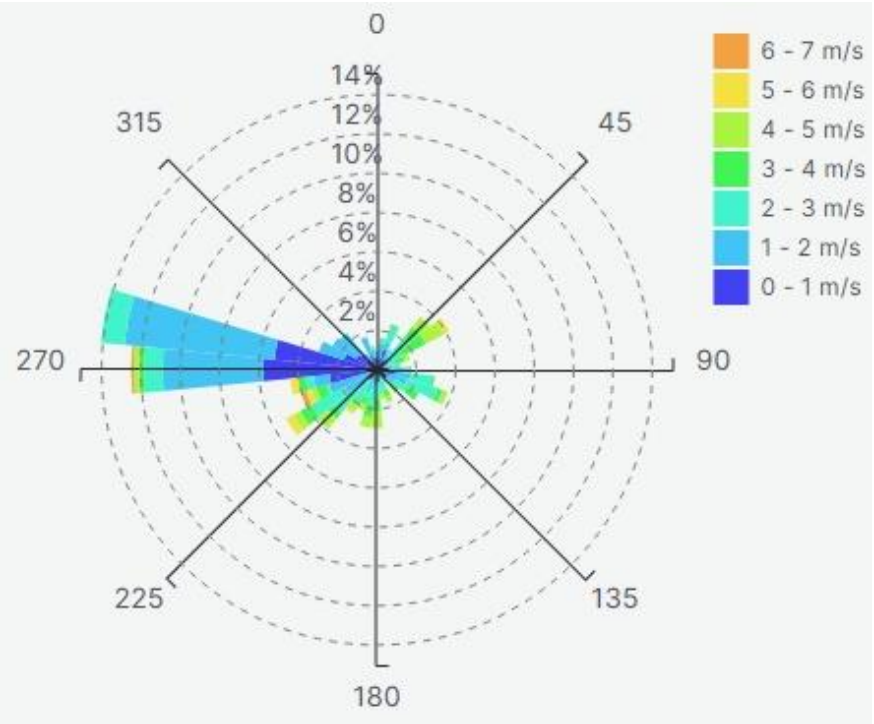


Figure 45 March 2026 Wind Rose

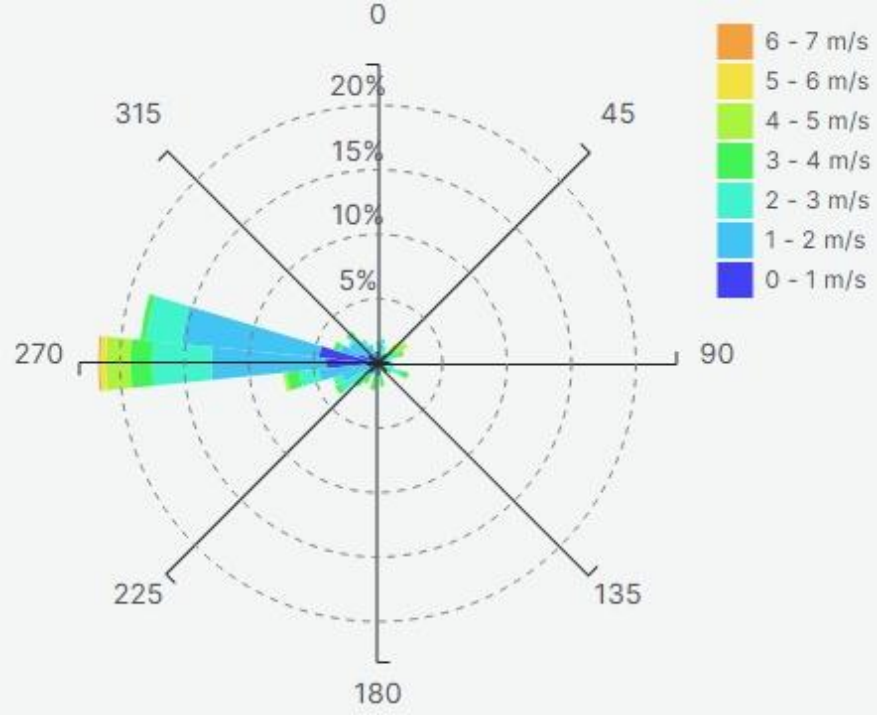


Figure 46 April 2026 Wind Rose

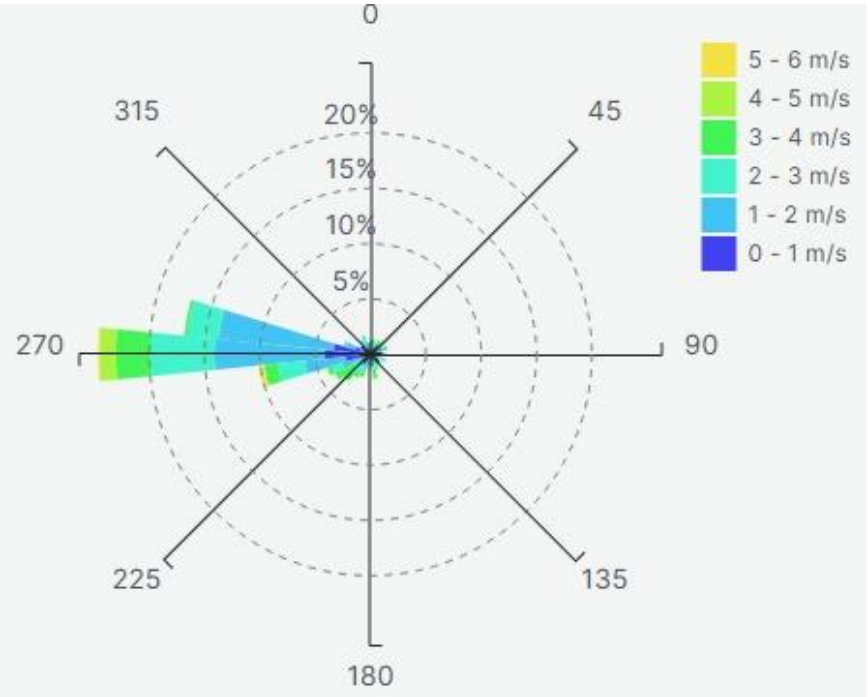


Figure 47 May 2026 Wind Rose

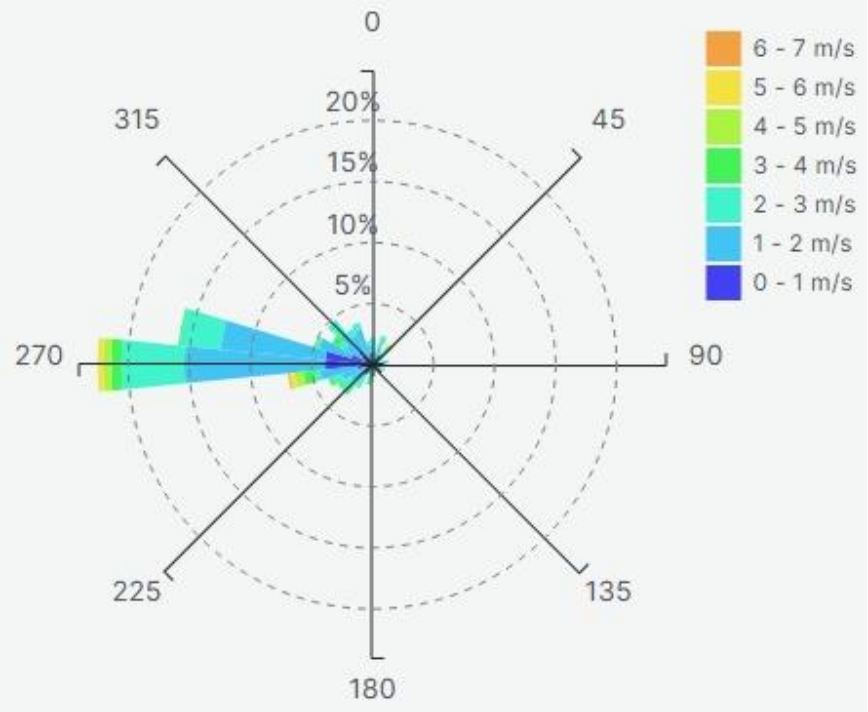


Figure 48 June 2026 Wind Rose

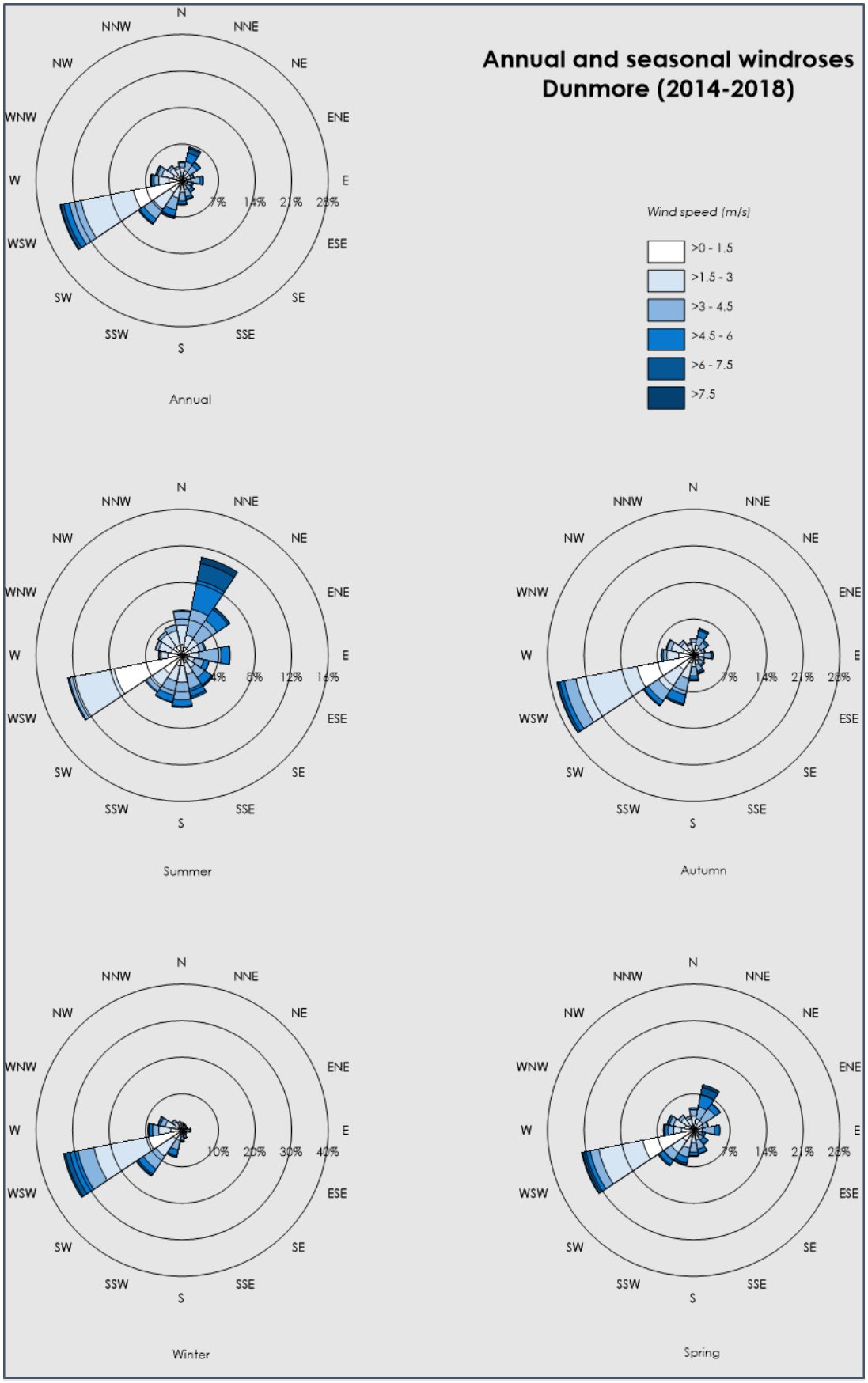


Figure 49 Dunmore Seasonal Wind Rose Data

10. Appendix B Air Quality Monitoring Additional Data and Graphs

Monthly breakdown of deposited dust monitoring is shown in Table 34. Dominant wind directions and production data are also shown within this table.

Table 32 Historical Deposited Dust Results

Month	Site 1 grams/m^2/month		Site 2 grams/m^2/month		Site 3 grams/m^2/month		Site 4 grams/m^2/month		Production Tonnes
	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash	Insoluble Solids	Ash	(t)
FY06 Average	5.85	2.66	4.48	1.67	4.85	2.22	3.9	1.92	106,583
FY07 Average	5.4	2.13	2.48	1.53	2.79	1.89	4.31	2.44	101,776
FY08 Average	3.26	1.67	2.37	1.3	3.89	2.9	5.55	3.17	98,983
FY09 Average	6.6	2.63	3.01	2.1	3.12	2.17	2.71	1.66	71,105
FY10 Average	4.65	3.03	4.41	2.6	5.02	3.49	3.15	2.33	72,892
FY11 Average	3.35	1.43	5.86	3.92	3.43	2.09	2.53	1.6	88,790
FY12 Average	3.74	1.92	3.28	1.7	5.03	3.44	2.75	1.81	102,395
FY13 Average	3.73	1.65	2.61	1.65	5.87	3.6	3.36	2.36	128,094
FY14 Average	9.56	4.94	3.63	1.79	4.61	3.28	3.2	2	127,787
FY15 Average	5.63	2.72	2.38	1.44	7.36	4.42	3.1	1.98	81,871
FY16 Average	3.46	1.66	3.12	1.77	7.2	4.45	3.01	1.84	120,595
FY17 Average	2.2	1.42	3.36	1.96	2.28	1.56	2.01	1.3	152,743
FY18 Average	2.93	2	4.2	3.14	2.36	1.65	2.84	1.79	152,404
FY19 Average	3.05	1.84	2.95	1.92	3.66	2.01	2.81	1.59	156,165
FY20 Average	2.61	1.76	3.45	2.43	2.66	1.94	2.1	1.51	104,737
FY21 Average	1.88	1.16	1.70	1.08	1.94	1.12	1.97	1.10	108,894
FY22 Average	1.42	0.61	1.71	0.69	1.25	0.70	1.64	0.85	92,333
FY23 Average	2.26	1.20	1.32	0.69	2.39	1.39	1.32	0.90	130,988
FY24 Average	2.11	0.99	1.53	0.74	1.84	0.80	1.71	0.76	108,222
FY25 Average	2.09	0.89	1.30	0.67	1.66	0.75	2.03	0.95	85,978
Jul-25	1.33	0.59	0.70	0.45	0.24	0.13	0.58	0.28	122,386
Aug-25	1.50	0.74	0.42	0.20	0.72	0.46	1.08	0.74	85,453
Sep-25	0.51	0.48	0.09	0.08	0.59	0.51	1.12	0.70	89,602
Oct-25	1.72	0.88	1.46	0.75	1.71	0.89	1.57	0.95	91,377
Nov-25	6.51	3.30	4.05	1.73	4.26	2.05	2.81	1.52	71,675
Dec-25	3.70	1.70	9.29	2.35	3.68	1.48	4.30	1.95	65,551
Jan-26	4.99	2.48	2.34	1.07	4.07	1.85	1.99	1.06	65,632
Feb-26	3.02	2.14	4.05	1.90	3.85	2.23	3.72	2.00	71,712
Mar-26	1.95	1.09	0.70	0.69	0.87	0.83	1.48	0.97	81,665
Apr-26	1.29	0.79	0.82	0.61	1.05	0.70	1.16	0.68	69,578
May-26	0.87	0.84	1.38	1.35	0.44	0.44	0.74	0.40	110,660
Jun-26	0.36	0.24	1.63	0.87	0.99	0.75	0.84	0.81	106,447
FY26 Average	**2.31**	**1.27**	**2.24**	**1.00**	**1.87**	**1.03**	**1.78**	**1.01**	**85,978**

A graph of the historical deposited dust values compared to production is shown in green for each deposited dust site in Figures 55 to 58.

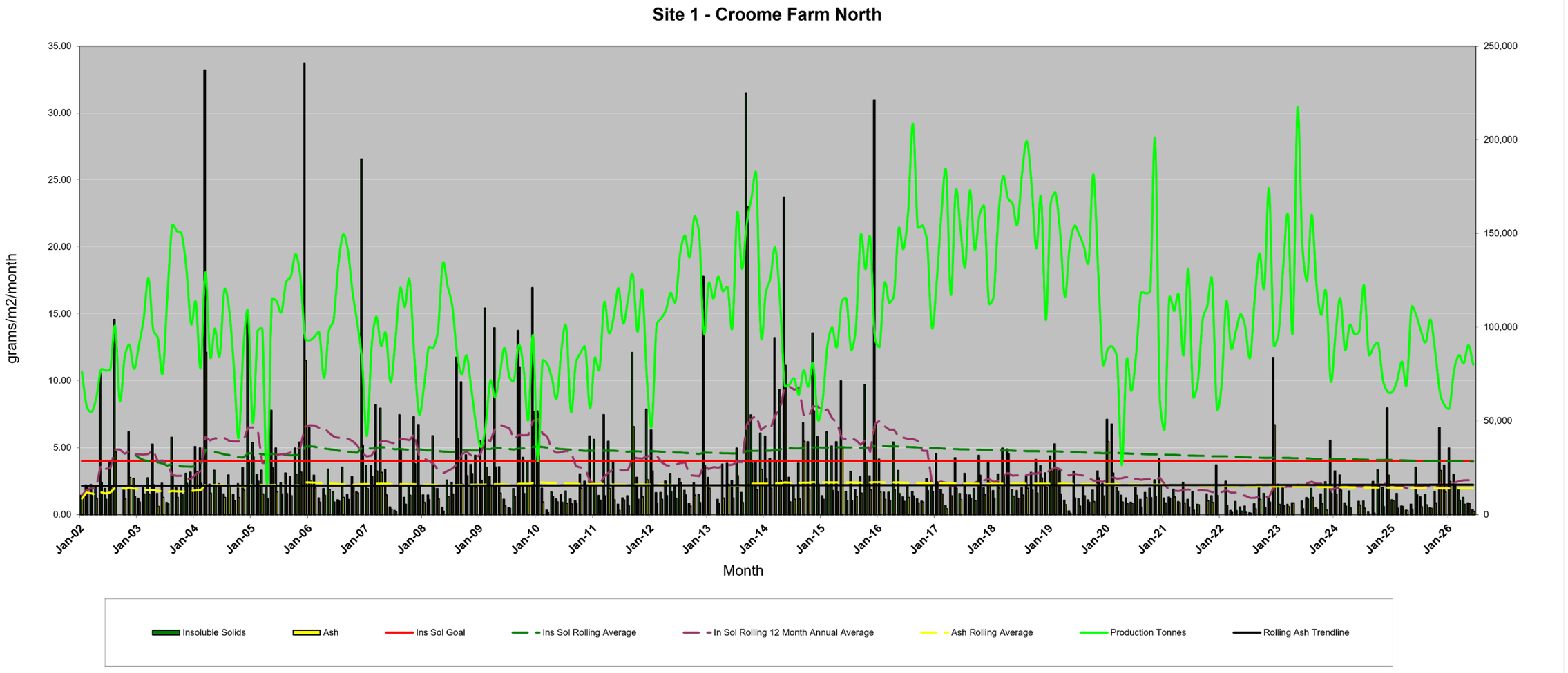


Figure 50 Historical Deposited Dust Values – DQ1

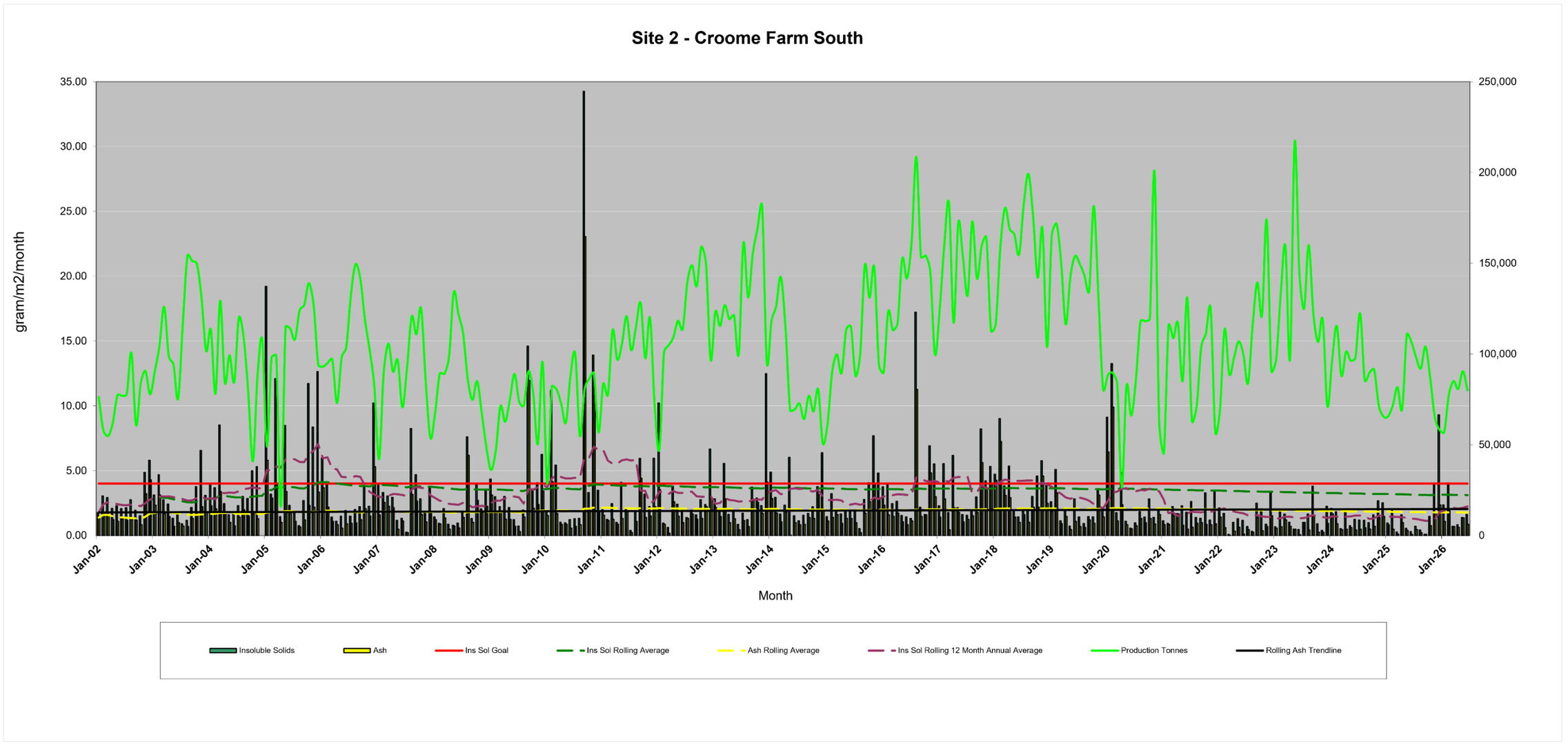


Figure 51 Historical Deposited Dust Values – DQ2

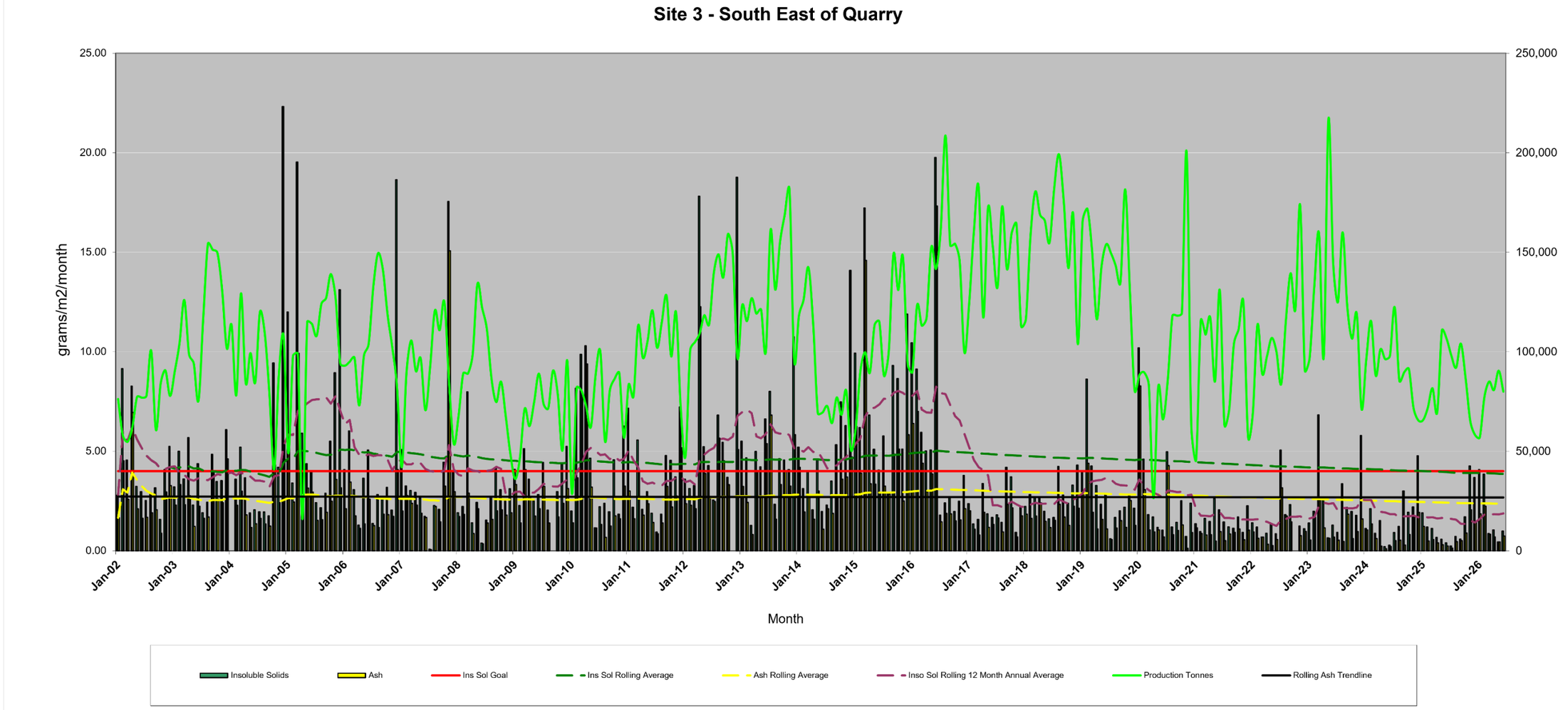


Figure 52 Historical Deposited Dust Values – DQ3

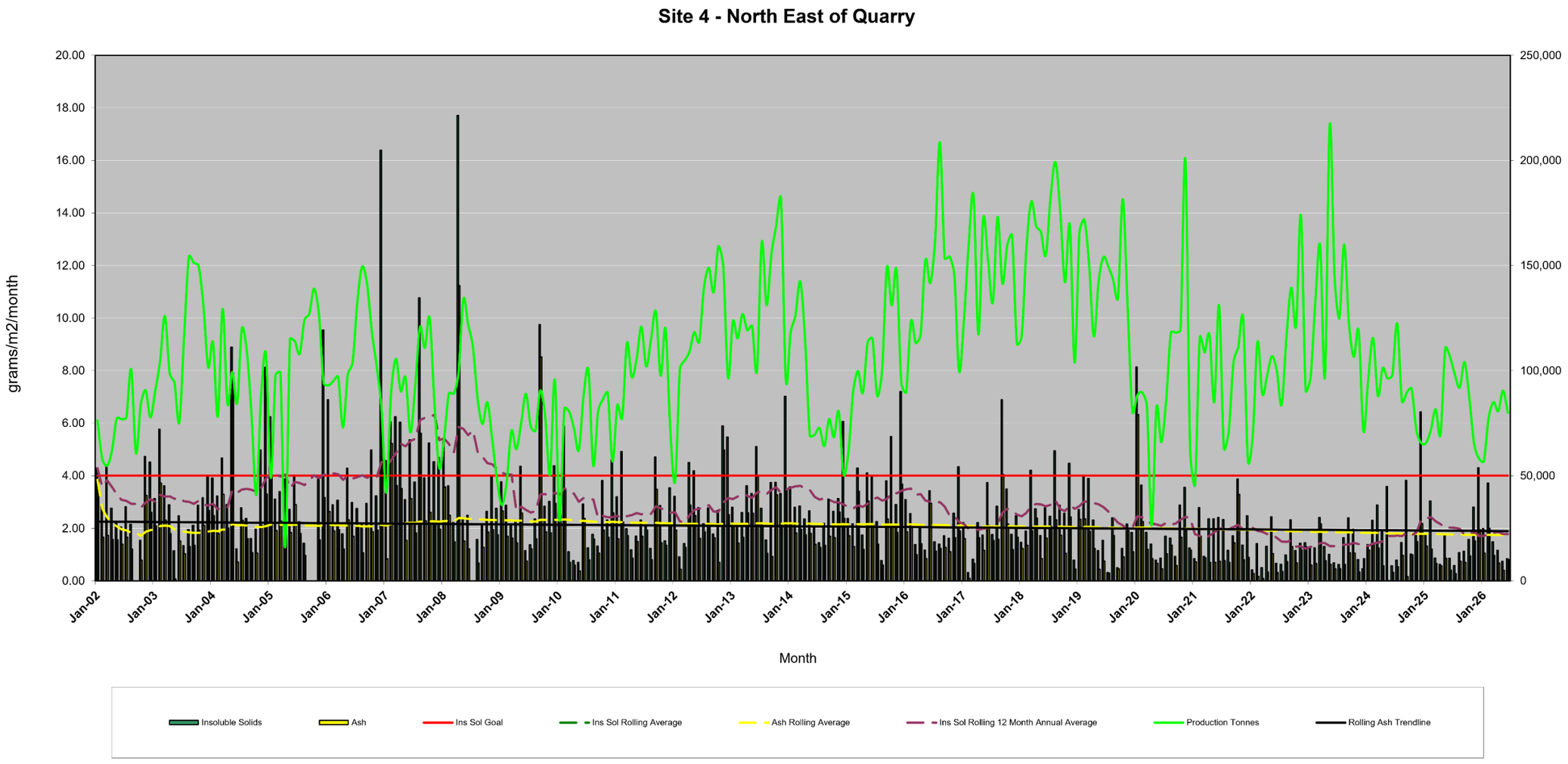


Figure 53 Historical Deposited Dust Values – DQ4

Table 33 Particulate Monitoring PM10

Date	Sample Daily Average (µg/m^3)	Short Term Criteria 24-hr (50µg/m^3)	Long Term Criteria Annual (30µg/m^3)	Progressive Annual Average (µg/m3)
5/07/2025	7.3	50	25	15.40
11/07/2025	8.42	50	25	15.47
17/07/2025	8.84	50	25	15.55
23/07/2025	7.53	50	25	15.60
29/07/2025	6.05	50	25	15.66
4/08/2025	10.5	50	25	15.71
10/08/2025	3.5	50	25	15.70
16/08/2025	6.7	50	25	15.72
22/08/2025	4.33	50	25	15.70
28/08/2025	3.14	50	25	15.67
3/09/2025	8.84	50	25	15.75
9/09/2025	22.3	50	25	16.01
15/09/2025	8.72	50	25	16.10
21/09/2025	4.57	50	25	15.99
27/09/2025	11.45	50	25	16.10
18/10/2025	4.93	50	25	16.15
21/10/2025	18.95	50	25	16.33
25/10/2025	5.82	50	25	16.35
27/10/2025	0.18	50	25	16.27
29/10/2025	4.52	50	25	16.24
2/11/2025	8.44	50	25	16.30
8/11/2025	19.55	50	25	16.38
14/11/2025	36.84	50	25	16.41
20/11/2025	1.78	50	25	15.99
26/11/2025	20.14	50	25	16.17
2/12/2025	4.63	50	25	16.13
8/12/2025	29.53	50	25	16.35
15/12/2025	19.92	50	25	16.45
20/12/2025	20.26	50	25	16.27
26/12/2025	10.22	50	25	15.79
1/01/2026	14.02	50	25	14.92
7/01/2026	20.33	50	25	15.02
13/01/2026	20.74	50	25	15.11
19/01/2026	12.6	50	25	15.10
25/01/2026	26.44	50	25	15.29
3/02/2026	14.44	50	25	15.05
6/02/2026	22.46	50	25	15.14
12/02/2026	18.54	50	25	15.18
18/02/2026	22.99	50	25	15.01
24/02/2026	19.31	50	25	14.79
2/03/2026	21.57	50	25	14.69
8/03/2026	13.49	50	25	14.70
14/03/2026	11.47	50	25	14.51
2/04/2026	13.56	50	25	14.51
8/04/2026	10.05	50	25	14.45

Date	Sample Daily Average (µg/m^3)	Short Term Criteria 24-hr (50µg/m^3)	Long Term Criteria Annual (30µg/m^3)	Progressive Annual Average (µg/m3)
10/04/2026	9.69	50	25	14.10
14/04/2026	6.36	50	25	13.36
19/04/2026	10.52	50	25	13.33
29/04/2026	8.26	50	25	13.24
1/05/2026	8.32	50	25	13.07
7/05/2026	6.24	50	25	12.90
13/05/2026	3.45	50	25	12.77
19/05/2026	2.38	50	25	12.67
25/05/2026	7.43	50	25	12.60
1/06/2026	4.82	50	25	12.39
6/06/2026	2.97	50	25	12.29
12/06/2026	5.23	50	25	12.25
18/06/2026	15.45	50	25	12.26
24/06/2026	3.62	50	25	12.24
30/06/2026	9.74	50	25	12.26

11. Appendix C MAC Noise Monitoring Annual Compliance Report

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August 2026

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Document Information

Annual Noise Monitoring Assessment 2026

Dunmore Quarry

Dunmore, NSW

August 2026

Prepared for: Boral Resources (NSW) Pty Ltd

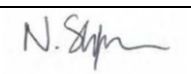
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CONTENTS

1 INTRODUCTION 5

2 NOISE CRITERIA 7

3 METHODOLOGY 9

3.1 LOCALITY 9

3.2 ASSESSMENT METHODOLOGY 10

4 RESULTS 13

5 DISCUSSION AND COMPLIANCE ASSESSMENT 19

5.1 DISCUSSION OF RESULTS - LOCATION NM1 19

5.2 DISCUSSION OF RESULTS - LOCATION NM2 19

5.3 DISCUSSION OF RESULTS - LOCATION NM3 19

5.4 DISCUSSION OF RESULTS - LOCATION NM4 20

5.5 DISCUSSION OF RESULTS - LOCATION NM5 20

6 CONCLUSION 23

APPENDIX A – GLOSSARY OF TERMS

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Boral Resources (NSW) Pty Ltd for Dunmore Quarry (the quarry), Tabbita Road, Dunmore, NSW.

The monitoring has been conducted in accordance with the Dunmore Quarry Noise Management Plan (NMP V4, December 2017) during August 2026 and forms the annual noise monitoring program to address conditions outlined in the Development Consent (Ref: 470-11-2003).

This report summarises the operator-attended noise monitoring results measured at five receivers in comparison to the relevant noise limits contained in the Development Consent and NMP.

The assessment has been conducted in general accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Dunmore Quarry Noise Management Plan V4 (NMP), 2017 (EMM Consulting);
- Discussion Paper - Validation of Inversion Strength Estimation Method (EPA) 2014;
- NSW Environment Protection Authority (EPA's), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022; and
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

The Dunmore Quarry Noise Management Plan (NMP) outlines the applicable noise criteria for residential receivers surrounding the quarry and are presented in **Table 1**.

Table 1 Noise Limits

Description	Day (7am - 6pm)	Evening (6pm - 10pm)	Night (10pm - 7am)		Morning Shoulder (6am - 7am)	
	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	dB $L_{Aeq(15min)}$	dB $L_{A1(1min)}$	dB $L_{Aeq(15min)}$	dB $L_{A1(1min)}$
Location K Stocker	49	44	38	48	47	55
Location O Dunmore Lakes	49	44	38	48	47	55
Location J Creagan	Negotiated Agreement in place					
Location AA	38	38	38	45	38	45
Location AB and T	36	36	36	45	36	45
Locations D, F, G and Z	40	40	40	45	40	45
Location S	37	37	37	45	37	45

Source: Table 2 of Dunmore Quarry NMP.

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3 Methodology

3.1 Locality

The quarry is located at Dunmore near Shellharbour, NSW. Receivers in the locality surrounding the quarry are primarily considered rural residential. The quarry is surrounded by rural properties to the west, with the Princes Highway situated to the east of the site. Highway traffic is a dominant noise source for those receivers east of the quarry along with rural noise. The representative noise monitoring locations identified in Table 4.1 of the NMP with respect to the quarry are presented in the locality plan in **Figure 1.** **Table 2** presents the noise limits for each receiver as per the EPL.

Table 2 Attended Monitoring Locations and EPL Noise Limits

ID	Description	Day[1]	Evening[1]	Night[1]		Morning Shoulder[1]	
		dB, $L_{Aeq(15min)}$	dB, $L_{Aeq(15min)}$	dB, $L_{Aeq(15min)}$	dB, $L_{A1(1min)}$	dB, $L_{Aeq(15min)}$	dB, $L_{A1(1min)}$
NM1	Location K Stocker 40 Swamp Road Dunmore	49	44	38	48	47	55
NM2	Location S 86 Croome Vale Road Croom	37	37	37	45	37	45
NM3	Location T 1338 Jamberoo Road Croom	36	36	36	45	36	45
NM4	Location G[2] 318 Croome Road Croom	40	40	40	45	40	45
NM5	Location F[3] 316 Croome Road Croom	40	40	40	45	40	45

Note 1: Morning Shoulder – the period from 6am to 7am; Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Representative location for western residences G, D, Z.

Note 3: Representative location for northwestern residences F, AA, AB.

3.2 Assessment Methodology

The attended noise measurements were conducted in general accordance with the procedures described in Standards Australia AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the Dunmore Quarry NMP. Noise measurements of 15-minutes in duration were conducted at five locations (NM1-NM5) using a Svantek Type 1, 971 noise analyser between Wednesday 5 August 2026 and Friday 7 August 2026 to satisfy the requirements of the NMP. All acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019- Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ±0.5dBA.

To understand meteorological conditions during calm conditions, direct measurement of temperature profile was undertaken at James Road, Dunmore on Wednesday 5 August 2026 and Thursday 6 August 2026 and Croome Vale Road, Croome on Friday 7 August 2026, at 2m above ground level and at 50m above ground level with a calibrated temperature device.

The results of the temperature measurements were used to determine the temperature lapse rate in general accordance with the Validation of Inversion Strength Estimation Method (2014). These measurements, in combination with the onsite weather station provide a reference to validate the relevant meteorological conditions under which compliance is assessed.

Extraneous noise sources were excluded from the analysis to determine the dB $LA_{eq(15min)}$ quarry noise contribution for comparison against the relevant criteria. In the event of quarry attributed noise being above criteria, prevailing meteorological conditions for the monitoring period are sourced from the onsite meteorological station and analysed in accordance with Fact Sheet A4 of the NPI to determine the stability category present at the time of each attended measurement.

Where the quarry is inaudible, the contribution is estimated to be at least 10dBA below the ambient noise level.



FIGURE 1

Locality Plan

MAC180747

Dunmore Quarry

KEY

- Noise Monitoring Locations
- Weather Monitoring Location
- Dunmore Quarry

0 200 400 600 800 m

N

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4 Results

A summary of the operator attended measurements at location NM1 to NM5 are presented **Table 3** to **Table 7** and provide the following information:

- Monitoring location;
- Date, time and assessment period;
- Observed Wind Speed (WS, m/s), Wind Direction (WD) and Temperature (Temp) in °C at 1.5m above the ground measured at the monitoring location;
- Measured Temperature (Temp) in °C at 2m and 50m above ground level at a representative location;
- Average Wind Speed (WS, m/s), Wind Direction (WD) and Temperature (Temp) in °C at 10m above ground level at the on-site weather station;
- Atmospheric stability class derived from the on-site weather station;
- Calculated temperature inversion strength;
- Ambient measured noise levels $LA_{eq(15min)}$ and $LA_{90(15min)}$ in dB re 20µPa;
- Quarry $LA_{eq(15min)}$ and $LA_{1(1min)}$ noise level contribution; and
- Noise Limit $LA_{eq(15min)}$ and $LA_{1(1min)}$.

Results of the attended noise survey identified that the quarry was generally inaudible during the measurement periods at all but one location (NM4) during the day measurement period, however extraneous sources such as traffic, insects, aircraft, birds, livestock and frogs were audible during the survey period and dominated the results.

Table 3 NM1 - Attended Noise Monitoring Summary													
Date & Period	Time (hrs)	1.5m WS WD Temp°C[3]	Descriptor		EPL Limits	Observed Meteorology							Description and SPL, dBA
			L_{Aeq}	L_{A90}	$L_{Aeq\ (15min)}$/ $L_{A1\ (1min)}$	WS (m/s)[1]	WD[1]	2m Temp°C	50m Temp°C	Delta Temp°C	Lapse Rate °C/100m[2]	Stability Class	
06/08/2026	06:00 (Morning Shoulder)	0.4m/s NW 11°C	54	45	47/55	2.9	W	10.3	10.9	0.6	1.2	E	Traffic 42-79 Birds 46-50 Quarry – Reverse Alarm 41-45 (3 minutes) Quarry – Processing 43-45 (10 minutes)
Quarry Contribution													44dB $L_{Aeq(15min)}$ 45dB $L_{A1(1min)}$
05/08/2026	08:45 (Day)	1.2m/s W 12°C	63	47	49	1.2	W	N/A	N/A	N/A	N/A	E	Traffic 44-80 Birds 45-68 Quarry – Reverse Alarm <44 (30 seconds) Quarry – Processing <42
Quarry Contribution													<42dB $L_{Aeq(15min)}$
05/08/2026	18:04 (Evening)	0.7m/s W 14°C	60	43	44	1.2	W	N/A	N/A	N/A	N/A	E	Traffic 41-80 Windblown vegetation 42-48 Quarry Inaudible
Quarry Contribution													<44dB $L_{Aeq(15min)}$

Note 1: Data from on-site weather station.

Note 2: Calculated from 2m and 50m temperature.

Note 3: At operator position as per AS1055.

Table 4 NM2 - Attended Noise Monitoring Summary													
Date & Period	Time (hrs)	1.5m WS WD Temp°C[3]	Descriptor		EPL Limits	Observed Meteorology							Description and SPL, dBA
			L_{Aeq}	L_{A90}	$L_{Aeq\ (15min)}$/ $L_{A1\ (1min)}$	WS (m/s)[1]	WD[1]	2m Temp°C	50m Temp°C	Delta Temp°C	Lapse Rate °C/100m[2]	Stability Class	
07/08/2026	06:03 (Morning Shoulder)	0.5m/s W 7°C	35	32	37/45	1.1	WNW	6.7	8.6	1.9	3.8	G	Traffic 27-43 Birds 27-47 Insects 27-36 Operator noise 59 Quarry Inaudible
Quarry Contribution													<37dB $L_{Aeq(15min)}$ <45dB $L_{A1(1min)}$
05/08/2026	13:25 (Day)	1.5m/s SW 19°C	43	36	37	4.0	W	n/a	n/a	n/a	n/a	B	Traffic 30-39 Aircraft 30-56 Windblown vegetation 32-50 Insects 30-38 Quarry Inaudible
Quarry Contribution													<37dB $L_{Aeq(15min)}$
05/08/2026	19:36 (Evening)	1.5m/s SW 9°C	41	34	37	3.9	W	n/a	n/a	n/a	n/a	E	Insects 30-35 Traffic 30-39 Windblown vegetation 32-50 Aircraft 30-56 Quarry Inaudible
Quarry Contribution													<37dB $L_{Aeq(15min)}$

Note 1: Data from on-site weather station.

Note 2: Calculated from 2m and 50m temperature.

Note 3: At operator position as per AS1055.

Table 5 NM3 - Attended Noise Monitoring Summary													
Date & Period	Time (hrs)	1.5m WS WD Temp°C[3]	Descriptor		EPL Limits	Observed Meteorology							Description and SPL, dBA
			LA_{eq}	LA_{90}	LA_{eq} (15min)/ LA_1 (1min)	WS (m/s)[1]	WD[1]	2m Temp°C	50m Temp°C	Delta Temp°C	Lapse Rate °C/100m[2]	Stability Class	
07/08/2026	06:24 (Morning Shoulder)	0.5m/s W 7°C	48	34	36/45	1.5	W	8.5	9.8	1.3	2.6	F	Traffic 27-60 Birds 25-66 Aircraft 25-51 Quarry Inaudible
Quarry Contribution													<36dB LA_{eq}(15min) <45dB LA_1(1min)
05/08/2026	13:06 (Day)	2.0m/s SW 17°C	60	43	36	2.8	WSW	n/a	n/a	n/a	n/a	D	Traffic 30-71 Birds 30-78 Windblown vegetation 33-56 Quarry Inaudible
Quarry Contribution													<36dB LA_{eq}(15min)
05/08/2026	09:19 (Evening)	2.0m/s W 10°C	54	34	36	3.8	W	n/a	n/a	n/a	n/a	E	Traffic 30-69 Aircraft 30-69 Windblown vegetation 31-60 Quarry Inaudible
Quarry Contribution													<36dB LA_{eq}(15min)

Note 1: Data from on-site weather station.

Note 2: Calculated from 2m and 50m temperature.

Note 3: At operator position as per AS1055.

Table 6 NM4 - Attended Noise Monitoring Summary

Date & Period	Time (hrs)	1.5m WS WD Temp°C[3]	Descriptor		EPL Limits	Observed Meteorology							Description and SPL, dBA
			L_{Aeq}	L_{A90}	$L_{Aeq\ (15min)}$/ $L_{A1\ (1min)}$	WS (m/s)[1]	WD[1]	2m Temp°C	50m Temp°C	Delta Temp°C	Lapse Rate °C/100m[2]	Stability Class	
07/08/2026	06:00 (Morning Shoulder)	0.1m/s NW 10°C	34	29	40/45	1.3	W	6.7	8.6	1.9	3.8	G	Birds 27-47 Traffic 26-37 Insects 26-32 Livestock 30-40 Quarry Inaudible
Quarry Contribution													<40dB $L_{Aeq(15min)}$ <45dB $L_{A1(1min)}$
05/08/2026	14:11 (Day)	1.0m/s SW 19°C	38	32	40	2.9	W	n/a	n/a	n/a	n/a	C	Birds 27-38 Traffic 30-58 Aircraft 30-41 Livestock 30-39 Windblown vegetation 27-43 Quarry Inaudible
Quarry Contribution													<40dB $L_{Aeq(15min)}$
05/08/2026	20:24 (Evening)	3.0m/s SW 8°C	43	36	40	5.3	W	n/a	n/a	n/a	n/a	D	Traffic 30-35 Aircraft 30-51 Windblown vegetation 33-66 Quarry Inaudible
Quarry Contribution													<40dB $L_{Aeq(15min)}$

Note 1: Data from on-site weather station.

Note 2: Calculated from 2m and 50m temperature.

Note 3: At operator position as per AS1055.

Table 7 NM5 - Attended Noise Monitoring Summary													
Date & Period	Time (hrs)	1.5m WS WD Temp°C[3]	Descriptor		EPL Limits	Observed Meteorology							Description and SPL, dBA
			L_{Aeq}	L_{A90}	$L_{Aeq\ (15min)}$/ $L_{A1\ (1min)}$	WS (m/s)[1]	WD[1]	2m Temp°C	50m Temp°C	Delta Temp°C	Lapse Rate °C/100m[2]	Stability Class	
7/08/2026	06:19 (Morning Shoulder)	0.2m/s NW 10°C	51	35	40/45	0.6	W	8.5	9.8	1.3	2.6	F	Birds 33-69 Traffic 32-44 Aircraft 35-43 Quarry Inaudible
Quarry Contribution													<40dB $L_{Aeq(15min)}$ <45dB $L_{A1(1min)}$
05/08/2026	13:53 (Day)	1.0m/s SW 19°C	44	37	40	3.7	W	n/a	n/a	n/a	n/a	E	Traffic 34-44 Birds 30-45 Residential noise 30-73 Windblown vegetation 30-40 Quarry Inaudible
Quarry Contribution													<40dB $L_{Aeq(15min)}$
05/08/2026	20:06 (Evening)	2.0m/s SW 8°C	48	39	40	4.8	W	n/a	n/a	n/a	n/a	E	Traffic 35-73 Windblown vegetation 37-61 Livestock 35-40 Quarry Inaudible
Quarry Contribution													<40dB $L_{Aeq(15min)}$

Note 1: Data from on-site weather station.

Note 2: Calculated from 2m and 50m temperature.

Note 3: At operator position as per AS1055.

5 Discussion and Compliance Assessment

The compliance assessment summary for each monitoring location is presented in Table 8 for all assessment periods.

5.1 Discussion of Results - Location NM1

The noise monitoring survey identified that the acoustic environment at this location is dominated by road traffic noise from the Princes Highway, approximately 350m to the east. During the survey, quarry reverse alarms and processing noise was audible during the morning shoulder and day monitoring periods. Quarry noise remained inaudible during the evening period. Quarry noise contributions were estimated (during short breaks in traffic) to be at or below the relevant noise criteria for all periods.

Extraneous sources audible during the survey included traffic, windblown vegetation and birds.

5.2 Discussion of Results - Location NM2

The noise monitoring survey identified that the acoustic environment at this location is dominated by natural sounds such as insects and bird noise, windblown vegetation and agricultural noise such as livestock. Occasional aircraft or local traffic on Jamberoo Road, approximately 350m to the west was audible for short periods. During the survey, quarry noise emissions were inaudible, and quarry contributions were calculated to be below the relevant noise criteria for all periods.

5.3 Discussion of Results - Location NM3

Due to access restrictions at the NM3 location, measurements were conducted at the front fence line of the location approximately 300m to the west of the receiver. The noise monitoring survey identified that the acoustic environment at this location is dominated by natural sounds such as insects, and bird noise, and agricultural noise such as livestock. Aircraft or occasionally traffic on Jamberoo Road, to the west was audible for short to medium periods. During the survey, quarry noise emissions were inaudible during all measurement periods. Quarry contributions were calculated to be below the relevant noise criteria for all periods.

5.4 Discussion of Results - Location NM4

The noise monitoring survey identified that the quarry remained inaudible during all monitoring periods. The acoustic environment at these locations is dominated by natural sounds such as insects, windblown vegetation and birds, and agricultural noise such as livestock. Aircraft and occasional distant traffic on the East-West Link Road, approximately 2km to the north was audible for short periods. During the survey, quarry contributions were calculated to be below the relevant noise criteria for all periods.

5.5 Discussion of Results - Location NM5

The noise monitoring survey identified that the acoustic environment at these locations is dominated by natural sounds such as bird noise, and agricultural noise such as livestock and residential noise. Aircraft and occasional distant traffic on the East-West Link Road, approximately 2km to the north was audible for short periods. During the survey, quarry noise emissions were inaudible, and quarry contributions were calculated to be below the relevant noise criteria for all periods.

Table 8 Noise Compliance Assessment Summary

Location	Estimated Quarry Noise Contribution[1]				Noise Limit[1]				Demonstrated Compliance			
	Day	Evening	Morning Shoulder		Day	Evening	Morning Shoulder		Day	Evening	Morning Shoulder	
			$L_{Aeq(15min)}$	$L_{A1(1min)}$			$L_{Aeq(15min)}$	$L_{A1(1min)}$			$L_{Aeq(15min)}$	$L_{A1(1min)}$
NM1	<42	<44	44	45	49	44	47	55	Yes	Yes	Yes	Yes
NM2	<37	<37	<37	<45	37	37	37	45	Yes	Yes	Yes	Yes
NM3	<36	<36	<36	<45	36	36	36	45	Yes	Yes	Yes	Yes
NM4	<40	<40	<40	<45	40	40	40	45	Yes	Yes	Yes	Yes
NM5	<40	<40	<40	<45	40	40	40	45	Yes	Yes	Yes	Yes

Note 1: All levels are dBA.

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6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Boral Resources (NSW) Pty Ltd for Dunmore Quarry (the quarry), Tabbita Road, Dunmore, NSW.

Attended noise monitoring was undertaken between Wednesday 5 August 2026 and Friday 7 August 2026 at five representative monitoring locations. The assessment has identified that noise emissions generated by Dunmore Quarry were generally just audible during the morning shoulder and day period at NM1. The quarry was inaudible during all other remaining measurements. Notwithstanding, quarry contributed noise emissions were below the relevant noise criteria at all locations during all measurement periods, thus satisfying the relevant noise limits.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

Table A1 Glossary of Acoustical Terms

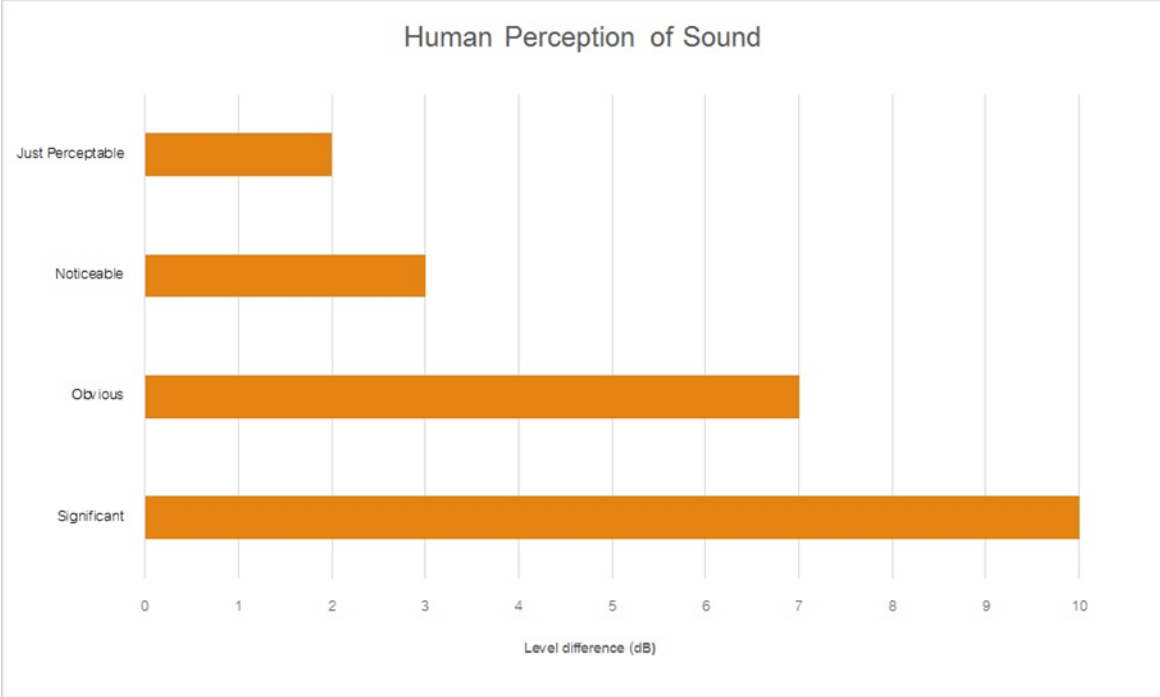
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmax	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by 10.log10 (W/Wo). Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



[redacted]

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12. Appendix D Blast Monitoring Tables

Table 34 Benny Residence FY25 Compliance Blast Monitoring Results

Date	Time	Airblast Overpressure *dB(Lin Peak)*	100% Airblast Limit *dB(Lin Peak)*	95% Annual Airblast Limit *dB(Lin Peak)*	Ground Vibration *(mm/s)*	95% Annual Vibration Limit *(mm/s)*	100% Vibration Limit *(mm/s)*
16-Jul-25	13:45	100.2	120.0	115	0.41	5	10
06-Aug-25	13:38	100.5	120.0	115	0.28	5	10
02-Sep-25	13:46	99.1	120.0	115	0.27	5	10
24-Sep-25	12:54	100.9	120.0	115	0.39	5	10
14-Nov-25	10:30	94.5	120.0	115	0.05	5	10
05-Feb-26	11:00	96.3	120.0	115	0.06	5	10
09-Mar-26	15:00	95.5	120.0	115	0.06	5	10
16-Apr-26	14:00	96.7	120.0	115	0.26	5	10
13-May-26	12:20	103.3	120.0	115	0.27	5	10
2-Jul-26	13:14	96.3	120.0	115	0.34	5	10
27-Jul-26	14:10	93.9	120.0	115	0.32	5	10

13. Appendix E EMM Ground Water Monitoring

Annual Groundwater Monitoring Report 2025 - 2026

Dunmore Quarry

Prepared for Boral Resources (NSW) Pty Ltd

July 2026

Annual Groundwater Monitoring Report 2025 - 2026

Dunmore Quarry

Boral Resources (NSW) Pty Ltd

E250630 RP2

July 2026

Version	Date	Prepared by	Reviewed by	Comments
1	22 July 2026	Q Bui	J Radford	Draft for client review
2	27 July 2026	Q Bui	J Radford	Final

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TABLE OF CONTENTS

1 Introduction 1

1.1 Site operations 1

1.2 Approvals history 1

1.3 Scope of works 2

1.4 Monitoring network changes 2

2 Environmental setting 4

2.1 Site setting 4

2.2 Climate 4

2.3 Surface water 6

2.4 Geology 6

2.5 Hydrogeology 7

3 Groundwater monitoring program 10

3.1 Monitoring network design 10

3.2 Groundwater monitoring overview 11

3.3 Sampling methodology 11

3.4 Laboratory analysis 12

3.5 Groundwater levels 13

4 Groundwater levels 14

4.1 Alluvium 14

4.2 Bumbo Latite 14

5 Groundwater quality 18

5.1 Field parameters 18

5.2 Major ions 20

5.3 Dissolved metals 21

5.4 Nutrients 23

6 Conclusions and recommendations 25

6.1 Recommendations 25

References 26

Appendices

Appendix A	Groundwater hydrographs	A.1
Appendix B	Laboratory documents	B.1
Appendix C	Metals time series charts – GW1 to GW4	C.1

Tables

Table 3.1	Groundwater monitoring bore construction details	10
Table 3.2	Groundwater monitoring overview	11
Table 3.3	Water quality suite of analysis	12
Table 3.4	Groundwater site-specific trigger values	13
Table 5.1	Mean measured field parameters for monitoring period	18

Figures

Figure 1.1	Site locality and groundwater monitoring bore location	3
Figure 2.1	Cumulative deviation from long-term monthly mean rainfall	5
Figure 2.2	Monthly rainfall for July 2025 to June 2026 compared to average	5
Figure 2.3	Surface geology	9
Figure 4.1	Groundwater levels in the alluvium	16
Figure 4.2	Groundwater levels in the Bumbo Latite	17
Figure 5.1	EC timeseries for all monitoring bores	19
Figure 5.2	pH timeseries for all monitoring bores	19
Figure 5.3	Piper plot for all monitoring bores (2025/2026 reporting period)	21
Figure 5.4	Dissolved metal concentrations for the 2025/2026 monitoring year	22
Figure 5.5	Nitrate concentration time series	23
Figure 5.6	Total phosphorus concentration time series	24
Figure 5.7	Ammonia concentration time series	24

1 Introduction

Boral Resources (NSW) Pty Ltd (Boral) owns and operates the Dunmore Hard Rock Quarry (the quarry) at the end of Tabbita Road. The quarry is approximately 8 kilometres (km) north-west of Kiama (Figure 1.1), in the Shellharbour local government area. The quarry supplies construction hard rock materials to markets in the Illawarra, Southern Highlands and Sydney regions. Quarry operations, comprising hard rock extraction from the Bumbo Latite commenced in the early 20th century.

EMM Consulting Pty Limited (EMM) were engaged by Boral to complete groundwater monitoring for the quarry, supporting Boral's own internal groundwater monitoring activities. Routine groundwater monitoring is completed to detect any potential impacts to groundwater resources from quarry operations.

This annual groundwater monitoring report has been prepared as per the Dunmore Hard Rock Quarry Water Management Plan (WMP) (EMM 2024) in compliance with condition 43 (c) of the quarry's approved Development Consent (DA 470-11-2003). The groundwater monitoring program (GPM) is required to monitor regional groundwater levels and quality, groundwater impact assessment criteria, and groundwater inflows for the monitoring period (1 July 2025 to 30 June 2026).

1.1 Site operations

The quarry comprises one elongated open cut pit with an approved disturbance area of approximately 100 hectares (ha) (Figure 1.1). The extraction area contains four pits; the Original Dunmore Quarry, Croome Farm Pit, Croome West Pit and Rail Infrastructure Corporation (RIC) Pit. Site infrastructure includes a crushing and screening plant, product stockpiles, workshop and site offices located to the east of the pit. East of the pit is the processing plant, the Dunmore concrete batching plant (CBP), and the Dunmore sand and soil quarry (DSS quarry). The blending plant is located between the processing plant and CBP. Currently, all production is from the RIC Pit.

Water management at the quarry comprises of a series of dams to control surface water runoff. Captured runoff is directed into dedicated water management dams for storage and subsequent treatment. Stored water is utilised for site operations such as dust suppression. Excess water within the excavated quarry pits is pumped to the Middle Dam, which has a holding capacity of 120 to 150 megalitres (ML) (EMM 2020).

Extraction occurred in the RIC pit extension area during the reporting period.

1.2 Approvals history

The quarry is currently under Development Consent DA 470-11-2003. In 2017, approval was granted to expand extractive activities within the Croome West Pit. Due to a lower than expected resource volume, a modification was proposed to extend the life of the quarry and maintain operations. The proposed modification (MOD 13) to the Development Consent includes:

- increasing the approved extraction area by approximately 7.8 ha – the RIC Pit extension
- increasing the depth of approved extraction area
- increasing the approved period for quarry operations from 2034 to 2043.

Additionally, a revised (version 6) Water Management Plan (WMP) (EMM 2024) was issued in September 2024, detailing additional requirements relevant to groundwater management. These requirements included Site-specific Trigger Values (SSTVs) for groundwater levels and the proponent's responsibility to monitor the private landholder bore GW026848 if access permission could be gained by Boral.

1.3 Scope of works

The monitoring program includes analysis and interpretation of groundwater quality and groundwater level data from the monitoring network in accordance with the WMP. The monitoring network consists of eight groundwater monitoring bores. Four monitoring bores (GW1–GW4) installed up gradient within the Bumbo Latite, three installed down gradient within alluvium (DG-17, DG-21, DG-31) and one private landholder bore GW026848.

The scope of works as defined in the WMP are to:

- complete a six-monthly groundwater sampling events at the Bumbo Latite monitoring bores monitoring bores
- analyse and interpret groundwater level and groundwater quality data collected.

This report also includes a review of the current monitoring network design and provides any recommendations for ongoing monitoring.

1.4 Monitoring network changes

- No network changes in the current reporting period.





KEY

- Dunmore Quarry site boundary
- Approved extraction area
- RIC pit extension
- Croome West monitoring bore

Dunmore Sand and Soil monitoring bores

- Active

Existing environment

- Major road
- Minor road
- Vehicular track
- Named watercourse

INSET KEY

- Major road
- NPWS reserve
- State forest

Site location and monitoring bores

Boral Dunmore Quarry
Annual Groundwater Monitoring Report
Figure1.1

Source: EMM (2026); ABS (2021); DCSSS (2025); ESRI (2026); GA (2009)

0 250 500 m
GDA2020 MGA Zone 56
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EMM creating opportunities

2 Environmental setting

2.1 Site setting

The project area (Figure 1.1) is surrounded by small agricultural plots, with cattle and horse grazing, and rural residential properties. Historically the area has been used for dairy farming. Remnant native vegetation lines the top of the prominent ridge line and persists in isolated pockets in the lower lying areas.

The quarry is set on a north south-west trending range. The peak is named Locking Hill and is partially incised by the existing pit. The ridge extends along the current western quarry highwall and has an elevation of approximately 164 metres Australian Height Datum (mAHD). The elevation of the south-east processing area is 10 mAHD. The DSS quarry and the CBP are east of the quarry. Quaternary alluvial sediments associated with the Minnamurra River system are extracted and processed at the DSS quarry.

Other quarries are located near the project. Approximately 1.5 km to the north is the Cleary Bros Bombo Pty Ltd (Cleary Bros) Albion Park Quarry. The Cleary Bros quarry is approved to produce 900,000 tonnes per annum and has extracted and processed hard rock from the Bumbo Latite since the 1950s (MMJ 2013). Holcim Australia Pty Ltd (Holcim) operates the Readymix Albion Park Quarry immediately west of the Cleary Bros Albion Park Quarry. This quarry also extracts a hard rock resource from the Bumbo Latite.

2.2 Climate

The project area is part of the Illawarra region, which is characterised by a mild and temperate climate described as warm and humid. Rainfall and climate data was downloaded from the SILO Long Paddock database for Albion Park weather station (Bureau of Meteorology (BoM): 068241), which is situated approximately 10 km north of the quarry. Rainfall data has been collected at this monitoring station since 1999.

Evaporation data at this site has been interpolated by SILO from nearby weather stations.

The average annual rainfall is 1,015.9 millimetres (mm) (BoM 068241) with the most significant rainfall events generally experienced in February and March and the lowest rainfall in August and September.

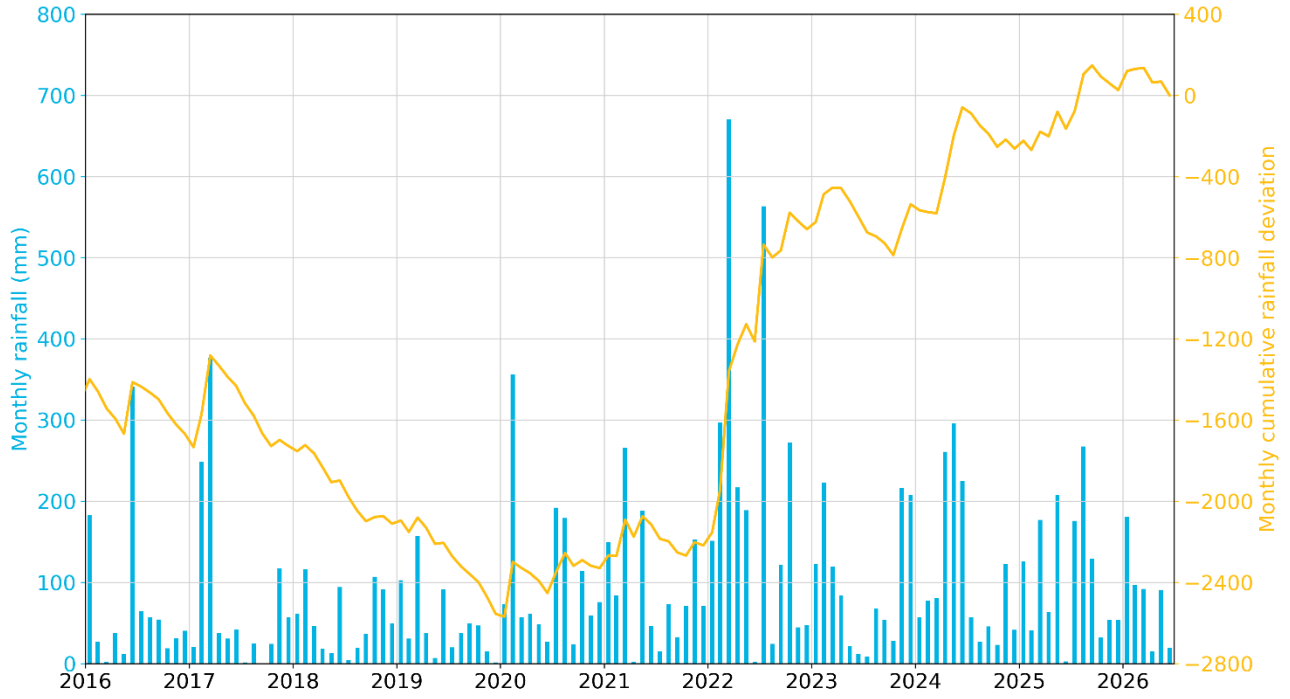
The average annual evaporation is 1,456.6 mm (BoM 068241) which exceeds average annual rainfall. Evaporation follows a seasonal trend with the highest rates of evaporation occurring between October to February.

The cumulative deviation of monthly rainfall from the mean (CDFM) from 1999 to mid-2026 is presented in Figure 2.1. The long-term CDFM is generated by subtracting the long-term average monthly rainfall for the recorded period from the actual monthly rainfall and then accumulating these residuals over the assessment period. Periods of below average rainfall are represented by downward trending slopes while periods of above average rainfall are upward trending slopes.

The cumulative deviation plot for Albion Park shows a period of predominantly below average rainfall between 2017 to mid-2020. From July 2020 to the current reporting period (June 2026) the overall long term rainfall trend has been average to above average.

The monthly rainfall over the 2025 to 2026 monitoring period is presented in Figure 2.2. During the reporting period 1205.4 mm of average annual rainfall was recorded, compared to the annual average of 1,015.9 mm.

Monthly rainfall was significantly above average between July to September 2025. Between October 2025 to June 2026, rainfall was average to below average with sporadic above average months.



Source: Data sourced from SILO at BoM station 068241 (Albion Park – Shellharbour Airport)

Figure 2.1 Cumulative deviation from long-term monthly mean rainfall

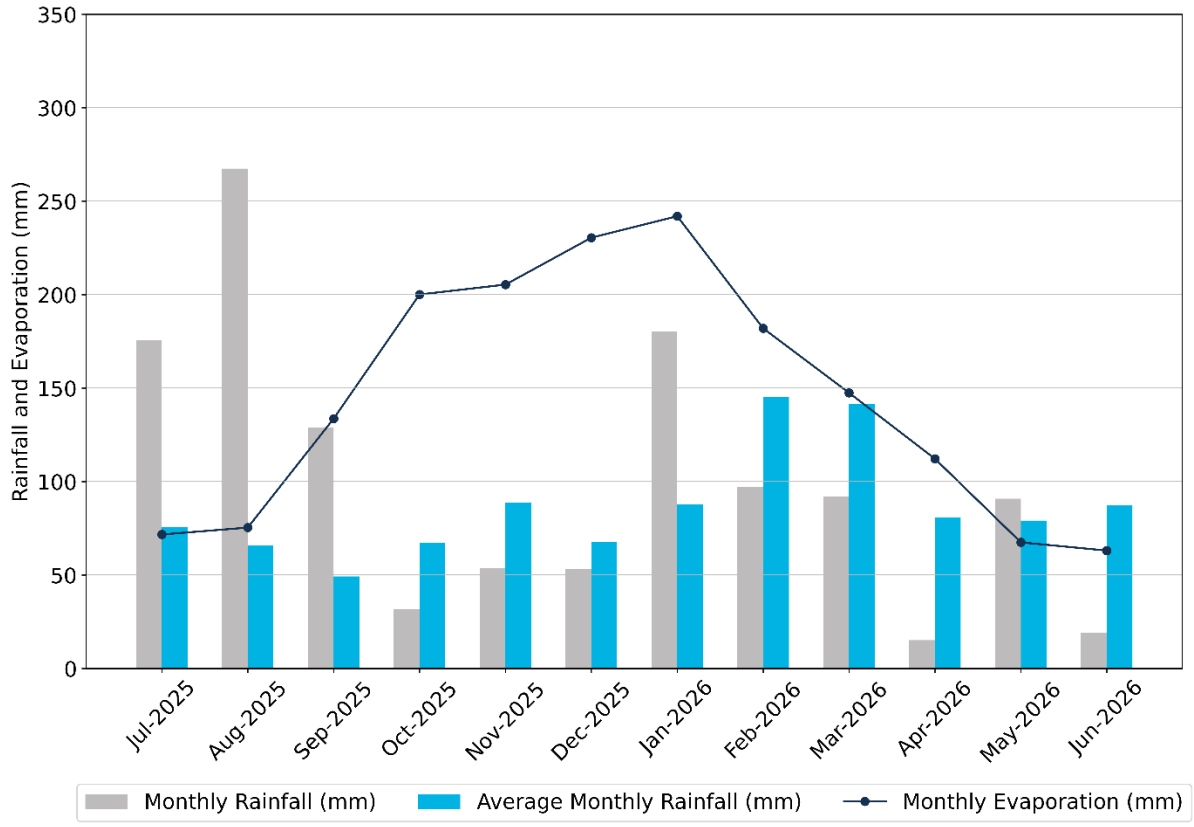


Figure 2.2 Monthly rainfall for July 2025 to June 2026 compared to average

2.3 Surface water

The quarry is located within the Rocklow Creek catchment area, which forms part of the Minnamurra River Catchment. Rocklow Creek is located to the south of the quarry, flowing to the east and draining to the Minnamurra River. The Minnamurra River discharges into the Pacific Ocean approximately 8 km south-east of the project area.

The Rocklow Creek catchment has an area of 21 km^2 and originates in the Illawarra Range, approximately 3 km west of the project area (Arcadis 2016). All clean water runoff from the project area flows into Rocklow Creek. Boral have a current surface water access licence (WAL 25152) to extract up to 227 ML per year of water from Rocklow Creek.

To the north of the project area is the Frasers Creek catchment area which drains to Lake Illawarra. Frasers Creek is an ephemeral system and forms disconnected pools during dry periods.

2.4 Geology

The project area is situated in the south-eastern corner of the Permo-Triassic Sydney Basin. The Sydney Basin predominantly comprises Permian and Triassic aged sedimentary rocks. Near the quarry, the Triassic and Late Permian sedimentary rocks have been eroded exposing the older early Permian aged Gerringong Volcanics of the Shoalhaven Group (Geology of the Wollongong, Kiama and Robertson 1:50,000 Sheet, Department of Mines 1974). The surface geology across the project area is presented on Figure 2.3.

Volcanic activity in the area has produced a series of flat lying lava flows interspersed with volcaniclastic sandstone members and breccias. The thickness of each successive flow decreases with distance from the volcanic origin, assumed to be off the current coastline to the south (Cohen 2006). At the quarry all geological units exhibit a gentle dip in an easterly direction (Evans and Peck 2006; MMJ 2013).

The Gerringong Volcanics facies comprise nine latite members and three volcanic sandstones or tuff members. The Gerringong Volcanics were deposited in a shallow marine environment, which was then uplifted above sea level. The area has since been eroded via river action to form the present landscape (Cohen 2006).

The Bumbo Latite is the areas greatest and most persistent lava flow and is the predominant geological unit at the quarry and has a maximum thickness of 150 metres (m). The Bumbo Latite Member is divided into three flows: upper, middle, and lower. The Bumbo Latite is a grey to dark grey, very hard dense rock with light coloured phenocrysts of feldspar (Cohen 2006). Weathered latite is generally softer with a brownish, yellow colour. The latite can be jointed and fractured, with the dominant jointing close to vertical, however jointing is not widespread (MMJ 2013). The Bumbo Latite Member overlies the Kiama Sandstone Member which outcrops to the west of the quarry.

A breccia layer was deposited between the middle and lower Bumbo Latite Member flows. This breccia layer, also comprising volcanic material, ranges in thickness between 5 to 22 m (Cohen 2006). It comprises a softer layer of fragmental, angular materials cemented in a fine grained matrix (Department of Mines 1974).

Further east, the low-lying floodplain area is dominated by Quaternary Alluvium, deposited during flooding events associated with the Minnamurra River and its tributaries. This alluvium comprises unconsolidated to loosely consolidated gravels, sands, silts and clays.

2.5 Hydrogeology

2.5.1 Overview

The regional groundwater system, within the Kiama Sandstone aquifer, flows south-east, controlled by the dip of the strata and topography (Cohen 2006). Recharge to the Kiama Sandstone is by rainfall where it outcrops and subcrops and by leakage from overlying sedimentary units to the west of the project area. The Kiama Sandstone aquifer discharges to the Pacific Ocean (Cohen 2006).

Local groundwater systems are present within the Bumbo Latite along the elevated ridgeline (Walker *et al* 2003). These systems are isolated and have limited connection to the regional flow system. The Bumbo Latite is characterised as 'tight' with a low primary and low to moderate secondary porosity (Cohen 2006) controlling groundwater flow. Groundwater flow within the Bumbo Latite is minimal, predominantly occurring along fractures and at contacts between volcanic rock and the underlying sandstone (MMJ 2013).

The local groundwater systems are recharged by rainfall with infiltration higher in areas where the Bumbo Latite outcrops on the ridgelines and hilltops of the landscape (i.e. areas with limited soil profile). Discharge from the local groundwater system occurs in the valleys and includes ephemeral springs.

There is no history of dewatering at the quarry and there is no visual evidence of groundwater seepages to the Croome Farm Pit with the rockface remaining dry throughout the year (Arcadis 2016). Cohen (2006) and Clearly Bros (2019) reports that there is no active mine dewatering at the two Albion Park quarries which also intersect the Bumbo Latite.

Information from Boral suggests that the breccia layer is partially saturated and more permeable than the surrounding Bumbo Latite. Breccia generally exhibits a variable porosity with areas of higher permeability common however they are generally limited in their extent.

The Quaternary alluvial sediments associated with the surface water courses form unconfined groundwater systems of varying storage. These systems are recharged by leakage from surface water courses during wet periods. The alluvial systems are depleted during dry periods and are not recharged by underlying porous and fractured rocks (Cohen 2006).

2.5.2 Conceptual hydrogeological model

i Groundwater flows

Groundwater within the Bumbo Latite flows from areas of high relief towards the valleys and low-lying plains where it discharges to the alluvium and surface watercourses. The bulk rock mass has a low primary permeability with groundwater flow occurring primarily through fractures and along the contacts between the latite flows and breccia. Hydraulic testing results indicate an average hydraulic conductivity of $5.5x10^{-7}$ metres per day (m/day) (EMM 2014) which is comparable to the reported hydraulic conductivity in fractured igneous rocks: $8x10^{-9}$ to $3x10^{-4}$ m/day (Domenico & Schwartz 1990).

In the vicinity of the quarry, groundwater flow is generally towards the south-east, discharging to Rocklow Creek and the Minnamurra estuary system. To the north of the quarry the landscape gives way to steep valleys that shed surface water and provide limited potential for groundwater recharge.

The deep groundwater system associated with the Kiama Sandstone typically flow along bedding planes towards the east and are coincident with the dip of the strata.

ii Recharge and discharge

The local groundwater systems within the Bumbo Latite are recharged by rainfall with infiltration in higher areas where the Bumbo Latite outcrops on the ridgelines and hilltops of the landscape (i.e. areas with limited soil profile).

The regional groundwater system is recharged by infiltration from overlying sedimentary units west of the project area and losses from surface watercourses. The steep relief increases runoff with a smaller percentage of rainfall infiltration in this steeper terrain.

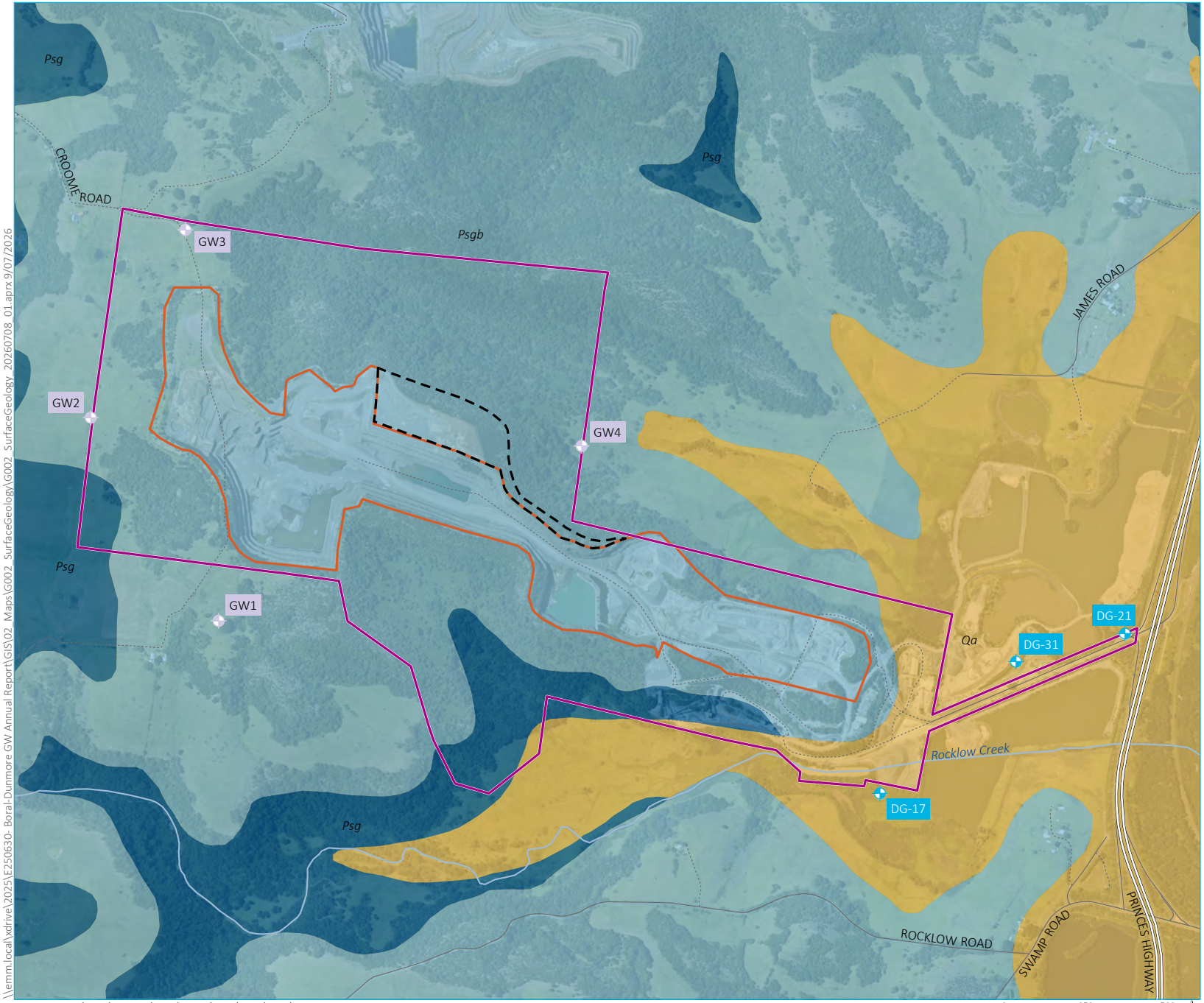
Groundwater from the shallow latite is largely thought to discharge to the Minnamurra River and Rocklow Creek, which form the main drainage systems in the vicinity of the quarry.

iii Groundwater-surface water connection

The surface watercourses in the elevated parts of the landscape are ephemeral in nature with the upper reaches drying out during periods of low rainfall. This ephemeral nature indicates that the surface watercourses are losing streams and are not fed by the underlying fractured rock groundwater systems.

The surface water systems to the east of the quarry in the lower parts of the landscape (Illawarra River, Minnamurra River and Rocklow Creek) are connected to shallow, marginal groundwater systems within surficial alluvial systems. Direct rainfall and surface water runoff recharges these shallow systems during wet periods which rapidly deplete during the drier periods, providing an important temporary source of baseflow for the surface watercourses.

Although groundwater within the shallow Bumbo Latite flows through to the alluvium in the east, the volume of this flux is likely to be insignificant in comparison to the recharge from the overlying rivers, restricted by the groundwater flow properties of the ‘tight’ rock matrix.



KEY

- Dunmore Quarry site boundary
- Approved extraction area
- RIC pit extension
- Croome West monitoring bore

Dunmore Sand and Soil monitoring bores

- Active

Existing environment

- Major road
- Minor road
- Vehicular track
- Named watercourse

Lithology

- Psg | Shoalhaven Group, undifferentiated siltstone
- Psgb | Shoalhaven Group, Bumbo Latite
- Qa | Quaternary Alluvium

Source: EMM (2026); DCSSS (2025); ESRI (2026); GA (2009)

0 250 500 m

GDA2020 MGA Zone 56

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Surface geology

Boral Dunmore Quarry
Annual Groundwater Monitoring Report
Figure 2.3

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3 Groundwater monitoring program

3.1 Monitoring network design

The groundwater monitoring network has been designed to satisfy the requirements of Condition 40, Schedule 4 of the approved Development Consent. Four groundwater monitoring bores are installed into the fractured rock outside the quarry area, with a further three bores are installed into the alluvium outside the DSS dredge pond (refer Figure 1.1 and Table 3.1). One private bore (GW026848) is also part of the monitoring network. In summary:

- GW4 was installed in February 2022 as part of the proposed northern extension into the RIC area. GW4 is screened across the base of the latite and up gradient of current quarrying activities
- three deep monitoring bores (GW1, GW2 and GW3) targeting the Bumbo Latite (EMM 2014), were installed in July 2014. GW1 is screened across latite and the top of the underlying sandstone, GW2 is screened across latite, and GW3 is screened across latite and breccia. These bores are located up hydraulic gradient from current quarrying activities
- DSS installed and monitor three bores as part of their operations. These are shallow monitoring bores (DG-17, DG-31 and DG-21) screened in the alluvium overlying the regional fractured rock groundwater system
- DG-59, which targeted the alluvium, was part of the 2018/2019 monitoring program but was demolished in August 2019 due to further expansion of the DSS dredge pond. DG-21 has been added to the network as a replacement to DG-59
- GW026848, a private landholder bore approved for stock use located approximately 1 km to the west of the quarry. Access permission has not been granted at this bore to date.

Table 3.1 Groundwater monitoring bore construction details

Bore ID	Easting MGA z55	Northing MGA z55	Ground level (mAHD)[2]	Total depth (mbgl)[1]	Screened interval (mbgl)[1]	Screened formation	Monitoring duration
GW1	298931	6168274	131.44[3]	78.0	72.0–78.0	Bumbo Latite and Kiama Sandstone	July 2014 - present
GW2	298541	6168894	135.70[3]	86.0	79.0–85.0	Bumbo Latite	July 2014 - present
GW3	298830	6169468	147.25[3]	80.0	68.0–80.0	Bumbo Latite and Breccia	July 2014 - present
GW4	300040	6168808	57[4]	29.0	20–26	Bumbo Latite	February 2022 - present
DG-17	300950	6167746	3.49	6.0	2.8–6.0	Alluvium	November 2018 - present
DG-21	301698	6168235	2.12	5.0	2.0–5.0	Alluvium	November 2018 - present
DG-31	301366	6168150	3.05	5.5	2.5–5.5	Alluvium	May 2016 - present
GW026848	297884	6168941	unknown	unknown	unknown	unknown	NA

Bore ID	Easting MGA z55	Northing MGA z55	Ground level (mAHD)[2]	Total depth (mbgl)[1]	Screened interval (mbgl)[1]	Screened formation	Monitoring duration
BH-F (decommissioned)	-	-	2.23	5.2	2.1–5.2	Alluvium	July 2014 - March 2018
DG-59 (decommissioned)	301126	6167722	1.763	8.69	unknown	Alluvium	February 2017 - August 2019

Notes: 1. mbgl = metres below ground level
2. mAHD = metre Australian Height Datum
3. Surveyed elevation
4. Elevation sourced from hand held device

3.2 Groundwater monitoring overview

The objectives of the groundwater monitoring plan are to:

- validate groundwater level modelling predictions
- monitor groundwater quality to inform the assessment of the quarry's surface water management system.

The WMP (EMM 2024) states that due to the minor groundwater inflow expected to enter the quarry pit, no formal monitoring of groundwater inflow is proposed. Monitoring status is summarised in Table 3.2.

Table 3.2 Groundwater monitoring overview

Monitoring bores	Monitoring frequency	Monitored by	Reporting period comments
GW1	• Manual water level measurements and logger download to occur six monthly • Water quality sampled six monthly	EMM	• GW4 was part of the Boral monthly and quarterly monitoring program
GW2			
GW3			
GW4			
DG-17	• Manual water level measurements and in-situ field parameters to occur monthly • Water quality sampled quarterly	Boral	• Monthly groundwater level measurements were conducted by Boral
DG-21			
DG-31			
GW026848	• Manual water level measurements to occur six monthly if permitted	-	• The bore was not accessed during the reporting period due to access permissions

3.3 Sampling methodology

Physicochemical parameters (pH, electrical conductivity (EC), temperature, oxygen (DO) and oxidation reduction potential (ORP)) were measured for the sampled water using a calibrated hand-held water quality meter. The Bumbo Latite monitoring bores (GW1 to GW4) were purged with a decontaminated stainless steel double-check bailer until field parameters stablised within ±10% for EC and ±0.1 for pH. The sample was taken from within the screened interval of the monitoring bore.

Where field measurements of total dissolved solids (TDS) were not available, TDS has been calculated based upon the EC correlation, assuming a conversion factor (k) of 0.8 due to the higher CaCO3 concentration.

Groundwater quality data for DG-17, DG-21 and DG-31 was collected by Boral.

3.4 Laboratory analysis

Groundwater quality samples for GW1 to GW4 were analysed for a general laboratory suite as detailed in Table 3.3. The suite allows groundwater systems to be differentiated by chemical signatures. The analytical suite has been reduced as per the revised WMP (EMM 2024) which removed some analytes that were consistently below the laboratory detection limits.

Table 3.3 Water quality suite of analysis

Grouping	Parameter
Physicochemical parameters (field)	EC, pH, DO, Temperature, ORP, TDS
Major ions	Calcium, Magnesium, Sodium, Potassium, Chloride, Total hardness, Sulphate
Dissolved metals	Arsenic[1], Boron[1], Chromium[1], Copper[1], Iron, Nickel[1], Zinc[1]
Nutrients	Ammonia, Nitrate, Nitrite, Organic nitrogen[1], Total nitrogen, Reactive[1] and Total phosphorus

Note: 1. Not analysed in the shallow monitoring bores (DG-17, DG-31 and DG-21). These bores are monitored under a different program

The samples collected were analysed by Australian Laboratory Services Limited (ALS) in Sydney, NSW. All laboratories used for analysis are NATA accredited. All samples were collected in bottles provided by the laboratory, with appropriate preservation where required. Samples undergoing dissolved metal analysis were field filtered using 0.45 micron (µm) filters.

3.4.1 Quality assurance and quality control (QA/QC)

Field sampling procedures conformed to EMM's QA/QC protocols to prevent cross-contamination and preserve sample integrity. The following QA/QC procedures were applied:

- Samples were collected in clearly labelled laboratory supplied bottles with appropriate preservation solutions.
- Samples were placed into chilled eskies and delivered to the laboratories within the specified holding times.
- Decontamination of bailer between sampling locations.
- Unstable parameters were analysed in the field (physiochemical parameters).
- An intralab duplicate sample is collected in the field for every ten samples collected to assess sampling and laboratory analysis accuracy.

3.4.2 Laboratory QA/QC

The laboratories conduct their own internal QA/QC program to assess the repeatability of the analytical procedures and instrument accuracy. These programs include analysis of laboratory sample duplicates, spike samples, certified reference standards, surrogate standards/spikes and laboratory blanks.

3.5 Groundwater levels

Following the installation and development of GW1 to GW4, pressure transducers (Solinst level loggers) and a barometer were installed to record a groundwater level every six hours. During monitoring events, groundwater levels are also gauged using an electronic dip meter to validate the level logger data. Logger water level data is barometrically corrected.

Level loggers were installed by Environmental Earth Sciences (EES) in monitoring bores DG-17, DG-21 and DG-31. These level loggers were programmed to record water levels every hour. Groundwater level data for these alluvial bores was supplied to EMM by Boral.

3.5.1 Trigger Levels

Site specific trigger values (SSTVs) were developed in the WMP (EMM 2024) to capture any groundwater level changes that exceed those predicted in the *Groundwater Assessment Dunmore Hard Rock Quarry Modification 13* (EMM 2022). The SSTVs were developed based on predicted drawdown impacts and a statistical analysis of baseline data and presented in Table 3.4.

The SSTV was determined by the following calculation:

SSTV = mean groundwater level – (natural variability + predicted drawdown)

Where:

Natural variability = (standard deviation from mean x 2) x 120%

Baseline data is not yet available for GW026848 due to access permissions.

Table 3.4 Groundwater site-specific trigger values

Bore ID	Mean groundwater level (m AHD)	Standard deviation from mean (m)	Natural variability (m)	Predicted drawdown (m)[1]	SSTV (m AHD)
GW1	105.2[2]	3.5	8.4	22	74.8
GW2	128.3[2]	0.4	1.0	21	106.3
GW3	104.4[2]	0.4	1.0	14	89.4
GW4	53.8[3]	1.9	4.6	9	40.2
GW026848	-	-	-	5	More than 2 m drawdown observed

Notes

1. Predicted drawdown obtained from *Groundwater Assessment Dunmore Hard Rock Quarry Modification 13* (EMM 2022)
2. Calculated using baseline data from 2015 to 2018
3. Calculated using baseline data from 2022 to 2024

4 Groundwater levels

Hydrographs showing groundwater levels and rainfall from the start of monitoring until 30 June 2026 are presented in Figure 4.1 and Figure 4.2 for the alluvium and latite monitoring bores respectively. Individual hydrographs for the latite monitoring bores are included in Appendix A.

During the 2020/2021 monitoring period, GW1 and GW2 level loggers malfunctioned from December 2020 and June 2020, respectively. These level loggers were replaced in June 2021. The manual groundwater level measurements confirmed no significant changes to long-term groundwater levels at GW1 or GW2.

Between late 2023 to August 2025 the level logger data recorded at GW2 has not matched manual dips due to significant logger drift. The malfunctioning logger along with a faulty barometric logger was replaced in the August 2025 monitoring event.

4.1 Alluvium

Groundwater level trends in the alluvium (DG-31, DG-21 and DG-17) are comparable to the previous monitoring period (Figure 4.1). These shallow alluvial monitoring bores shows a direct and immediate response to rainfall events with DG-21 and DG-31 showing the most pronounced responses. The highest groundwater level increase was observed at DG-31 (approximately 1.5 m following significant rainfall events). During the reporting period, the water levels fluctuated corresponding to the prevailing rainfall conditions and were within historical observations.

4.2 Bumbo Latite

During the reporting period, there were no observable groundwater impacts in the fractured rock monitoring bores from quarrying activities.

Groundwater elevations in the latite monitoring bores at GW1, GW2 and GW3 ranged between 100 and 130 mAHD (Figure 4.2). Groundwater elevations at GW4, which is located down hydraulic gradient and screened at the base of the latite, ranged between 54 and 56 mAHD.

The groundwater levels in monitoring bores GW2, GW3 and GW4 show a more muted response to rainfall recharge compared to GW1. The groundwater level at GW1 has historically responded to recharge during periods of above average rainfall with correlation to the CDFM. GW1 is partially screened within the Kiama Sandstone member which responds well to recharge via rainfall and leakage from overlying sedimentary units. GW2, GW3 and GW4 are screened in the Bumbo Latite member has a more muted response to recharge due the steep valley slopes limiting recharge and the latite member which has limited connectivity to the regional system.

A summary of the groundwater levels during the monitoring period are as follows:

- GW1 recorded a water level decline (approximately 12 m) between August 2025 to June 2026 coinciding with a period of average to below average monthly rainfall following a period of significantly above average rainfall. The groundwater level recorded a low of 100.5 mAHD in May 2026 which was still within the SSTVs.
- GW2 recorded stable groundwater levels and is within the SSTVs. The logger data prior to August 2025 is erroneous and not representative.
- GW3 groundwater levels display a sightly declining trend corresponding to prevailing average to below average rainfall conditions. Groundwater levels are within the SSTVs.

- GW4 groundwater levels are generally stable trend aligning with prevailing rainfall conditions. Groundwater levels recorded a slight downward trend between July 2025 to March 2026 and a slight upward trend from April 2026. Groundwater levels are within the SSTVs. The periodic drawdown at GW4 is a result of purging prior to groundwater quality sampling by Boral and is not representative of natural groundwater conditions.

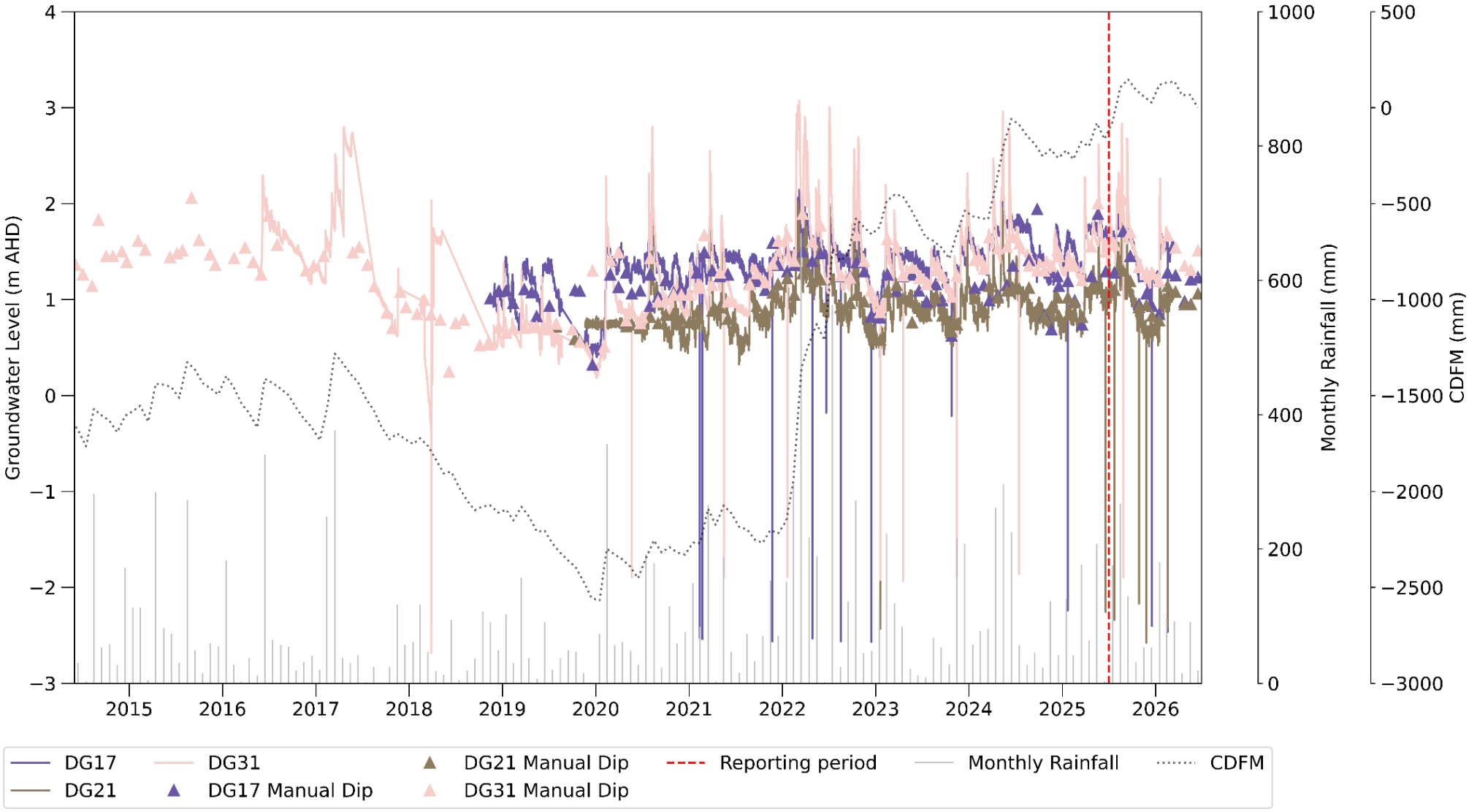


Figure 4.1 **Groundwater levels in the alluvium**

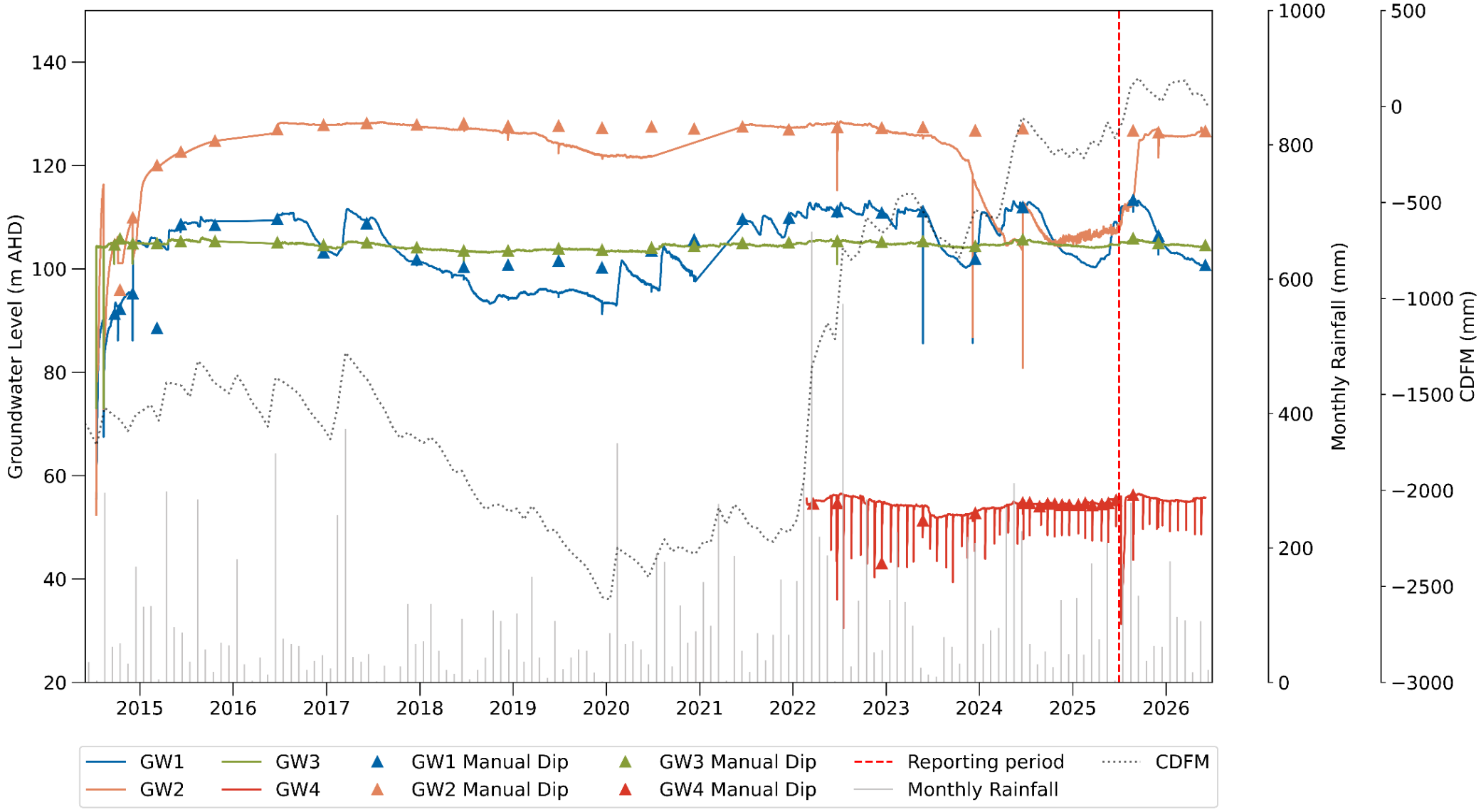


Figure 4.2 **Groundwater levels in the Bumbo Latite**

5 Groundwater quality

Water quality results and timeseries for pH, EC and nutrients for the reporting period are summarised below. The full laboratory results for the monitoring sites and supporting laboratory documents are presented in Appendix B. The water quality timeseries for the monitoring bores (GW1 to GW4) are presented in Appendix C. Field parameters at DG-17, DG-21, DG-31, and GW4 were collected monthly by Boral between July 2025 to June 2026.

The WMP states that groundwater will flow into the pit so therefore the extraction process is not expected to impact local groundwater quality. Groundwater quality monitoring is ongoing to inform the assessment of the quarry's surface water management system and SSTVs are not required to be developed

5.1 Field parameters

Based on the sampling events, the mean groundwater EC and pH for the monitoring period is summarised in Table 5.1. Groundwater Electrical conductivity (EC) and pH in the alluvium at DG-17, DG-21, DG-31 were overall comparable to previous monitoring year. Groundwater Electrical conductivity (EC) from the Bumbo latite bores, GW1 to GW4, was significantly lower compared to previous year, while pH was comparable. Time series of field EC and pH are presented in Figure 5.1 and Figure 5.2.

Table 5.1 Mean measured field parameters for monitoring period

Bore	Number of samples	Mean electrical conductivity (µS/cm) 2024/25	Mean electrical conductivity (µS/cm) 2025/26	Mean pH (pH units) 2023/24	Mean pH (pH units) 2025/26
GW1	2	820	842	7.43	6.95
GW2	2	62	867	7.72	7.49
GW3	2	354	330	7.21	6.56
GW4	14	890	911	7.41	7.38
DG-17	12	1,546	2150	7.48	6.86
DG-21	12	783	773	6.90	6.88
DG-31	12	720	426	7.06	7.15

Note: Concentrations at GW1, GW2 and GW3 are single values recorded on 25 August 2025.

For the Bumbo Latite bores, during the reporting period EC is comparable to the previous monitoring period with the exception of GW2 which was an outlier. The pH at the latite bores ranges between slightly acidic to slightly alkaline during the monitoring period and shows a slight decrease compared to the previous reporting period.

EC in the alluvium shows a large range and high variability during the 2025/2026 monitoring period. The high salinity at these bores can be attributed to their proximity to the tidally influenced Rocklow creek. A drop in EC around August 2025 across the alluvial bores may be attributed discharges and seepages from onsite storage dams through the breccia from the significantly above average rainfall period between July to September 2025. The pH in the alluvium was generally slightly acidic during the monitoring period, in line with historical trends. There is a slight decreasing trend in pH from August 2025.

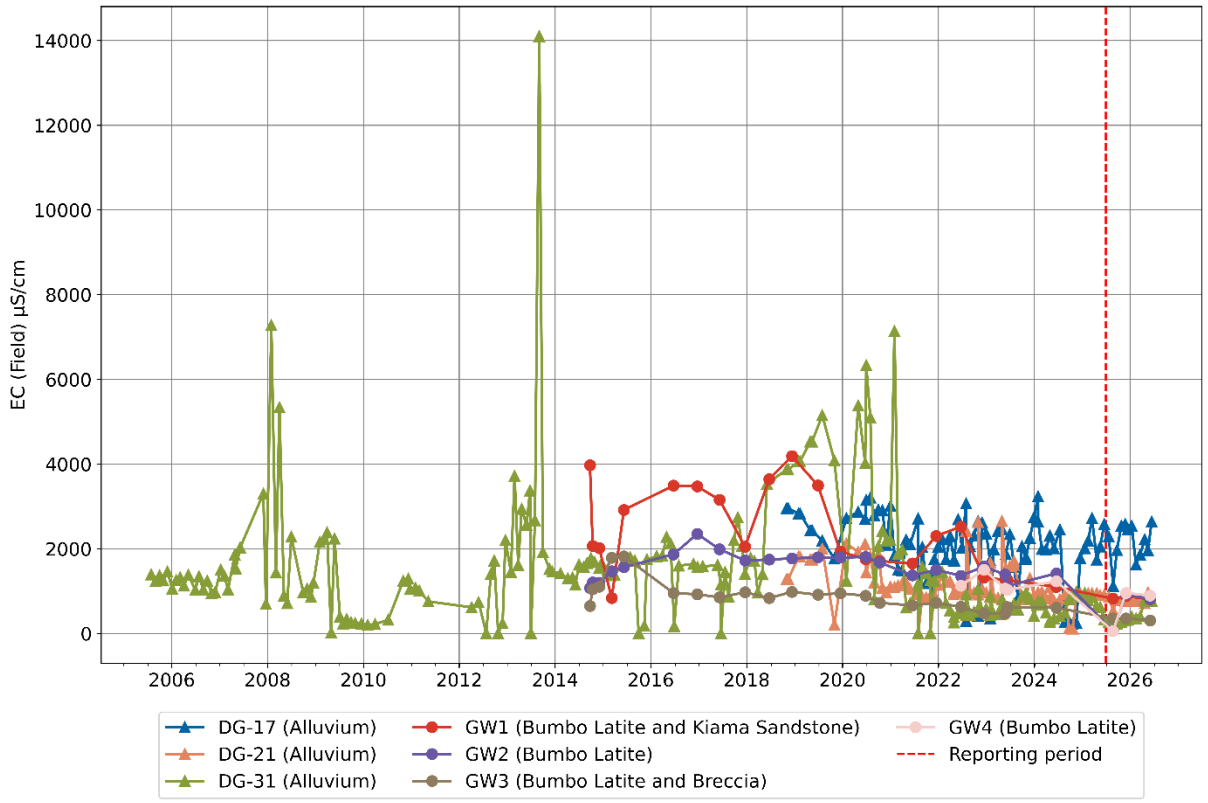


Figure 5.1 **EC timeseries for all monitoring bores**

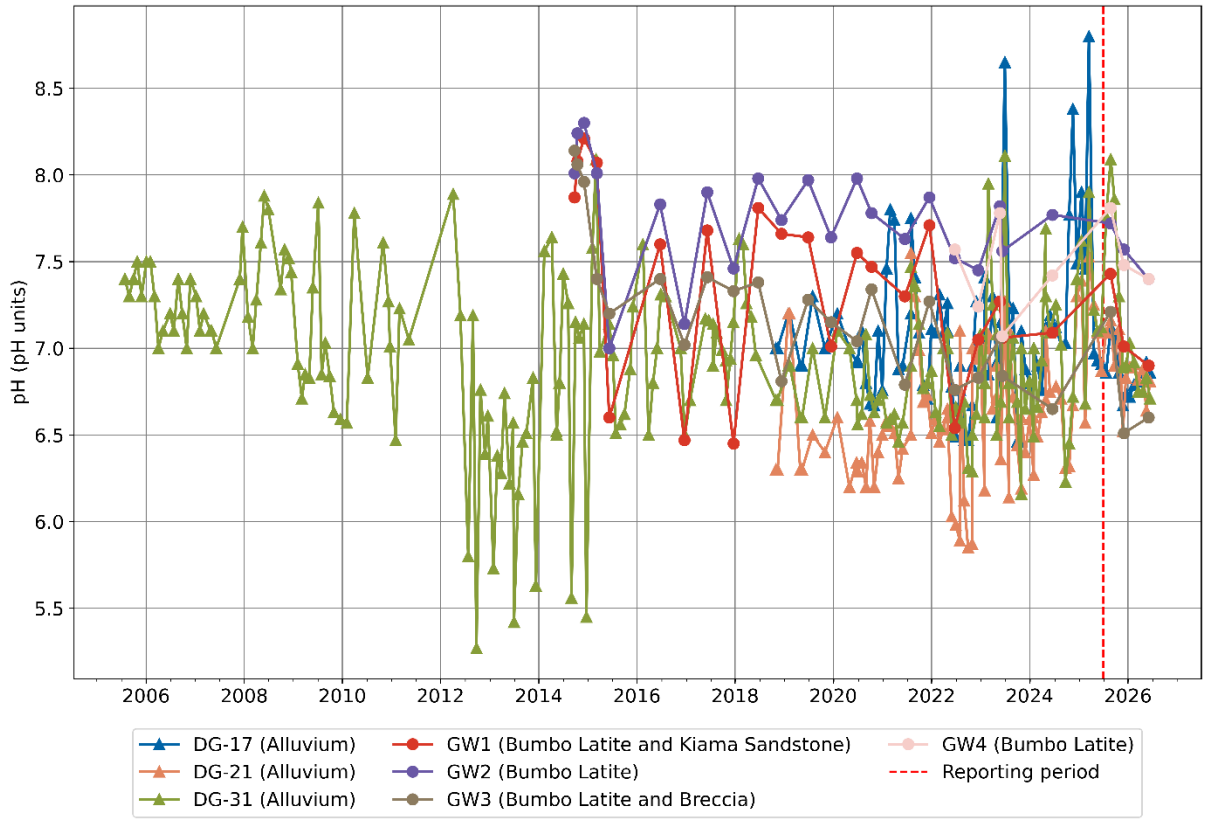


Figure 5.2 **pH timeseries for all monitoring bores**

5.2 Major ions

The major ion characteristics of groundwater samples for the monitoring sites for the reporting period are shown in a piper diagram in Figure 5.3. A piper diagram is a graphical representation of the relative concentrations of major ions (Ca^{2+}, Mg^{2+}, Na^{+}, K^{+}, Cl^{-}, HCO_3^{-}, CO_3^{2-} and SO_4^{2-}).

Groundwater chemistry from GW1 to GW4 (latite bores) shows some minor variation in water type:

- Based on the anion triangle, GW1 to GW3 bores are bicarbonate dominant, while GW4 is chloride dominant.
- Based on the cation triangle, GW1 and GW2 are sodium and potassium dominant, GW4 is sodium and potassium dominant but with a higher calcium and magnesium component, GW3 has no dominant type.

Major ion concentrations measured at GW1 to GW4 are comparable to previous monitoring year. The more chloride dominant water type at GW4 compared to GW1 to GW3 may be influenced by rainfall recharge in a coastal environment where sea spray is depositing salt in the environment.

Groundwater chemistry at DG-17, DG-21 and DG-31 (alluvial monitoring site) some minor variation in water type:

- Based on the anion triangle, DG-17 is bicarbonate dominant, DG-21 is spread between bicarbonate and chloride dominant, while DG-31 is spread between bicarbonate and sulfate dominant.
- Based on the cation triangle, DG-17 and DG-21 are sodium dominant, while DG-31 is calcium dominant. The sodium type at DG-17 and DG-17 may be attributed to the tidal infleunces at nearby Rocklow Creek.

Major ion concentrations measured at the alluvial monitoring sites show some changes compared to the previous year. DG-17 and DG-21 remains sodium bicabonate dominant. DG-31 shows fluctuations between a calcium bicarbonate type and a calcium sulfate water type.

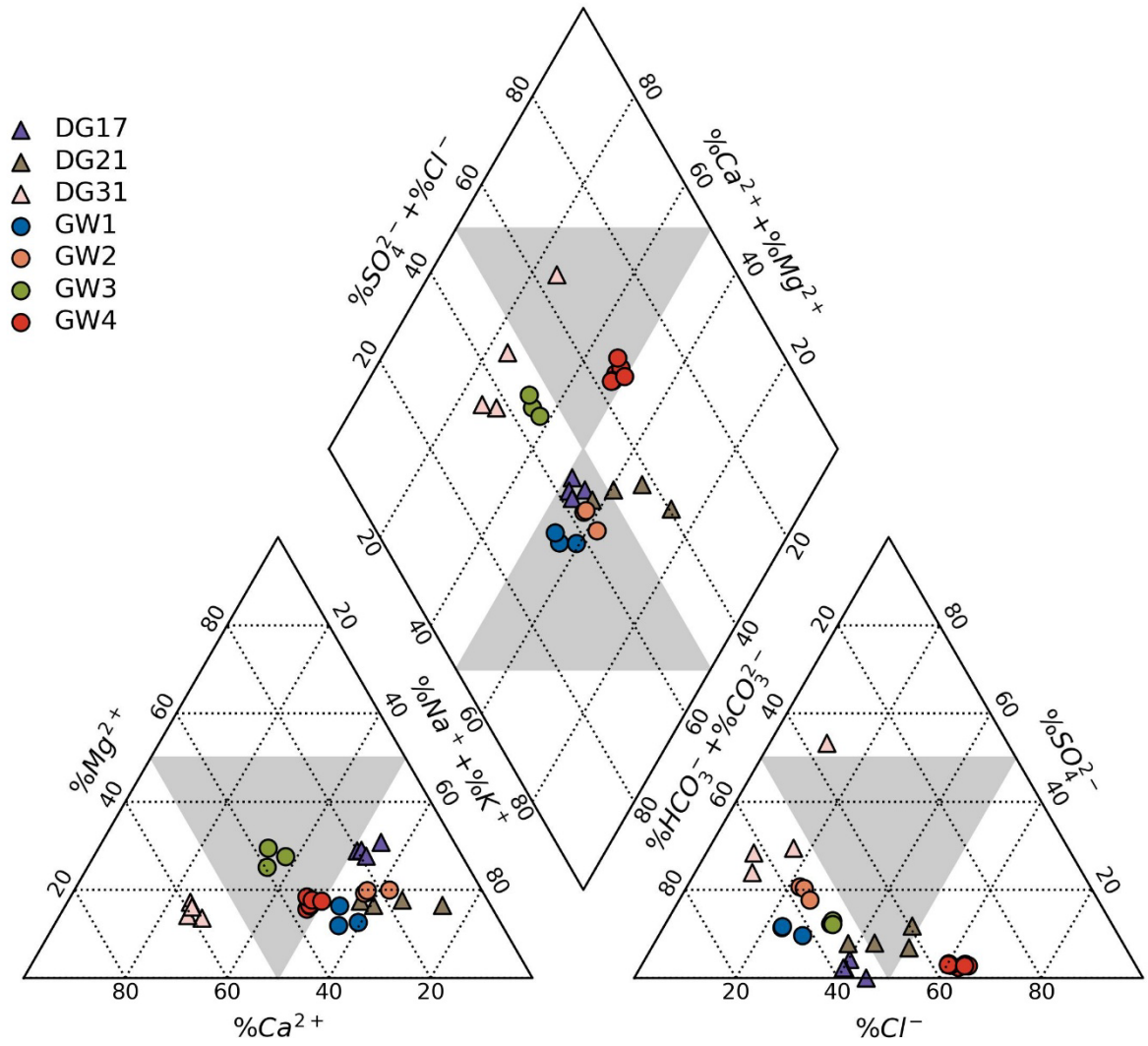


Figure 5.3 Piper plot for all monitoring bores (2025/2026 reporting period)

5.3 Dissolved metals

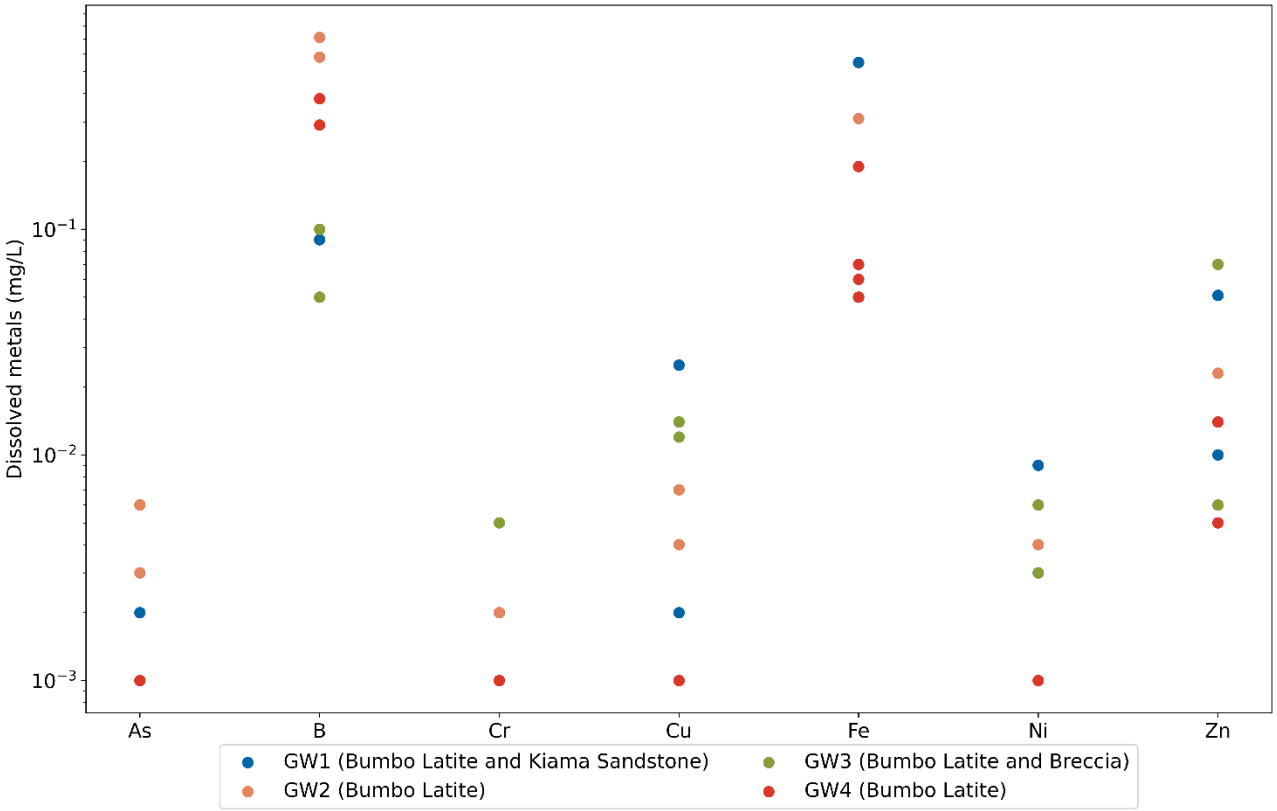
Concentrations of dissolved metals from the groundwater samples collected during the 2025/26 reporting period are presented in Figure 5.4.

The suite of dissolved metals analysed for the GW1 to GW4 monitoring sites are presented in Figure 5.4, with timeseries shown in Appendix C. The metals suite for the alluvial monitoring sites (DG-17, DG-21 and DG-31) was analysed for total iron and is not comparable.

The main findings for dissolved metals are as follows:

- Dissolved metals at GW1 to GW4 show concentrations within the same order of magnitude as the previous years.
- Arsenic concentrations are below the limit of reporting (LOR) (0.001 milligrams per litre (mg/L)) at GW3, and GW4. Arsenic concentrations are close to LOR at GW1 and GW2 (ranging between 0.002 to 0.006 mg/L) and show an ongoing decrease between December 2025 to June 2026.

- Boron concentrations at GW1 to GW4 show an increasing trend. Boron was added to the analyte list in 2025 so there is limited historical data to compare.
- Chromium concentrations were below the LOR (0.001 mg/L) at GW4. Concentrations at GW1 to GW3 are close to the LOR ranging between 0.001 to 0.002 mg/L except for a spike at GW3 in June 2026 (0.005 mg/L).
- Copper concentrations were below the LOR (0.001 mg/L) at GW4, and stable with concentrations at GW1, GW2 and GW3. A maximum concentration of 0.025 mg/L was recorded at GW1 in December 2025.
- Iron concentrations are close to or below the LOR (0.05 mg/L) at all sites, except during December 2025 when a spike in concentrations were recorded at GW1 and GW2.
- Nickel concentrations were below the LOR (0.001 mg/L) at GW4. Concentrations at GW1, GW2 and GW3 are stable and ranged between 0.001 to 0.009 mg/L.
- Zinc concentrations were elevated compared to the historical range. GW1, GW3 and GW4 recorded a historic high concentrations at 0.051, 0.071 and 0.014 mg/L respectively. GW2 was within historical observations.



Note: Concentrations below the Estimated Quantitation Limit (EQL) are presented as half the EQL

Figure 5.4 Dissolved metal concentrations for the 2025/2026 monitoring year

5.4 Nutrients

Time series of nitrate, total phosphorus and ammonia concentrations are presented in Figure 5.5, Figure 5.6, and Figure 5.7, respectively. Generally, nutrient concentrations were comparable to the previous monitoring year Observations for nutrients in the monitoring period are as follows:

- Nitrate measurements at GW3 are typically an order of magnitude higher than all the other bores (both the Bumbo Latite and alluvial bores). GW1 was observed to have elevated concentrations of nitrate in the first half of the reporting period.

- Total phosphorus concentrations displayed a generally stable trend in the reporting period. The total phosphorous concentrations at DG-17 continues to be an order of magnitude higher when compared with the other alluvial monitoring bores. The elevated concentration at DG-17 may be attributed to water management processes at the nearby Middle dam.

- Ammonia concentrations at GW1 and GW2 are an order of magnitude higher than the other Bumbo Latite monitoring bores. The concentration of ammonia at GW2 has been decreasing since 2020.
  The alluvial bores concentrations which generally measure close to or below the limit of reporting have measured a significant increase compared to historical trends, in particular DG-17 and DG-21.

The elevated and variable nutrient concentrations are not unexpected as these bores are located on or adjacent to farmlands and the groundwater chemistry is likely to be influenced by localised land use practices.

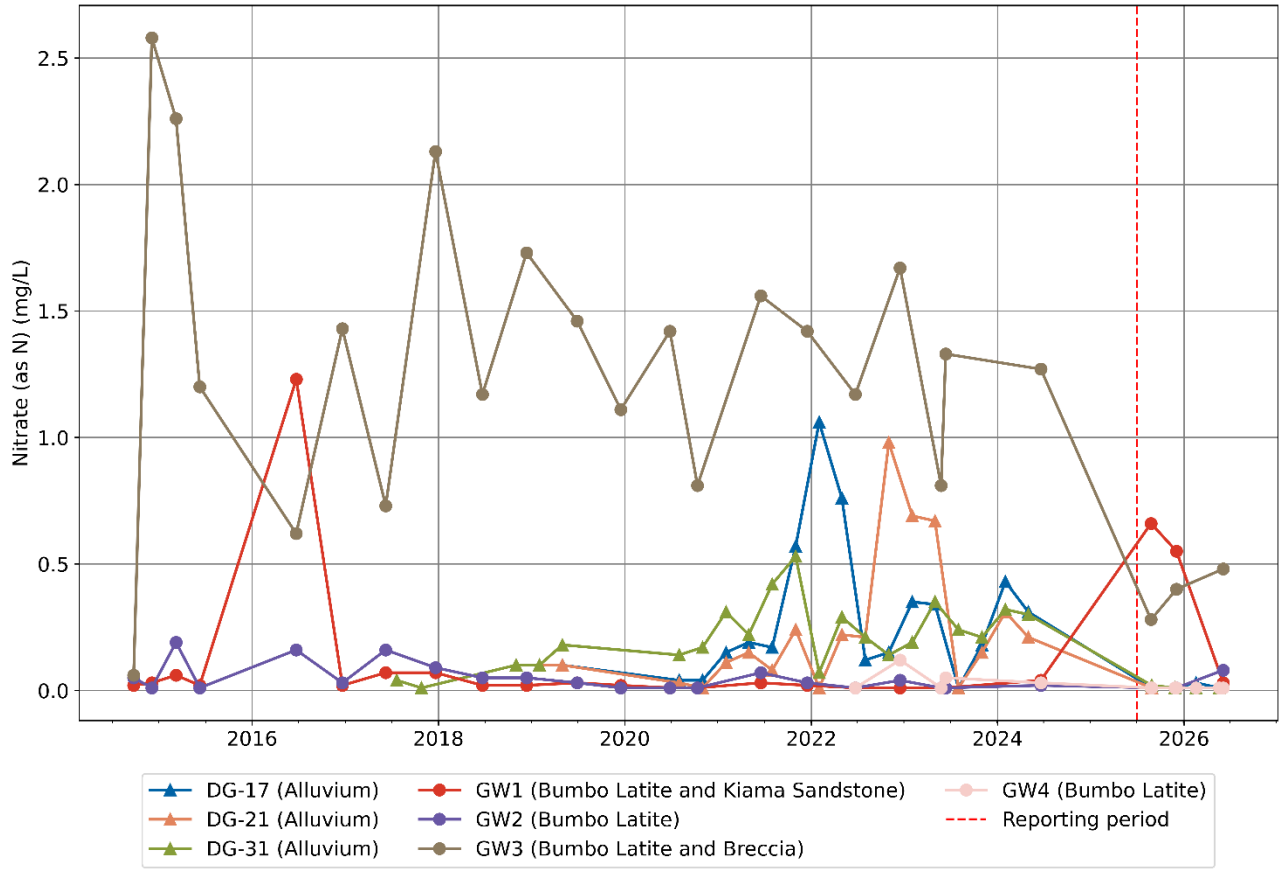
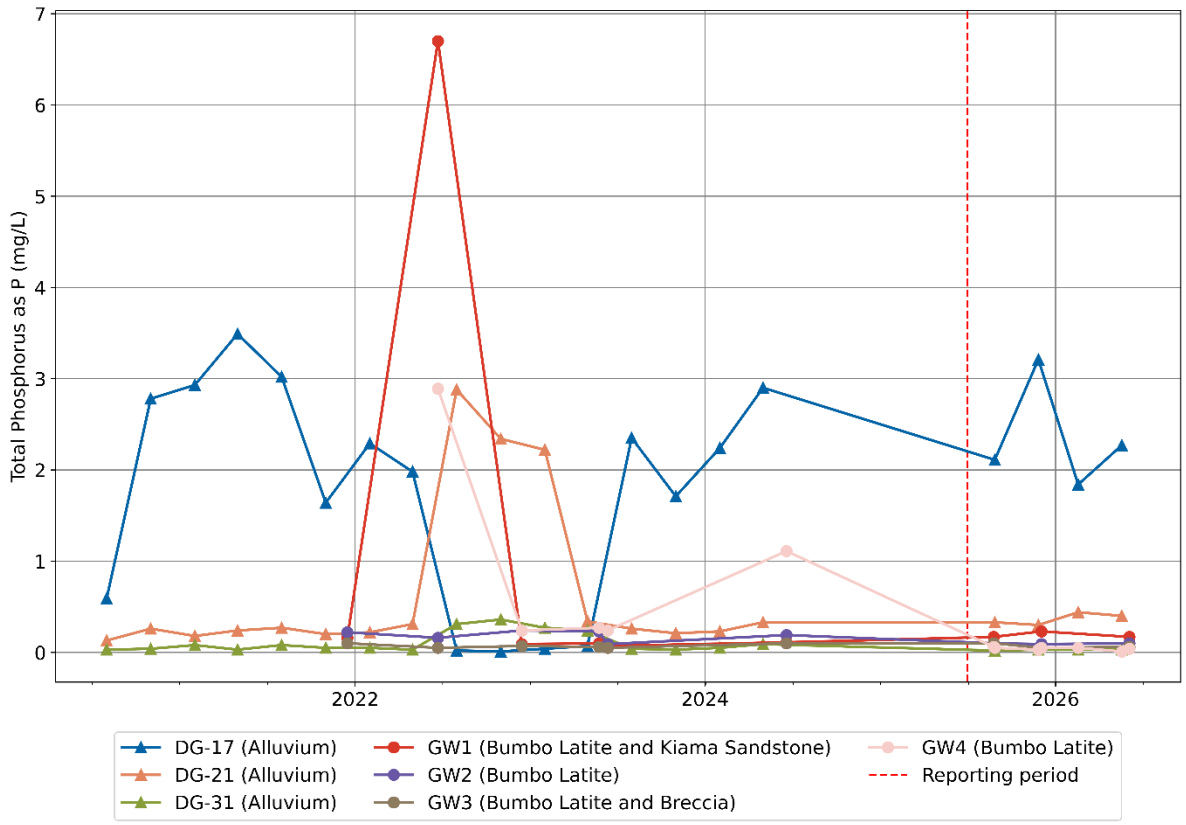


Figure 5.5 Nitrate concentration time series



Note: The figure presents total phosphorus for the alluvium bores and total phosphate as P for the Bumbo Latite bores

Figure 5.6 Total phosphorus concentration time series

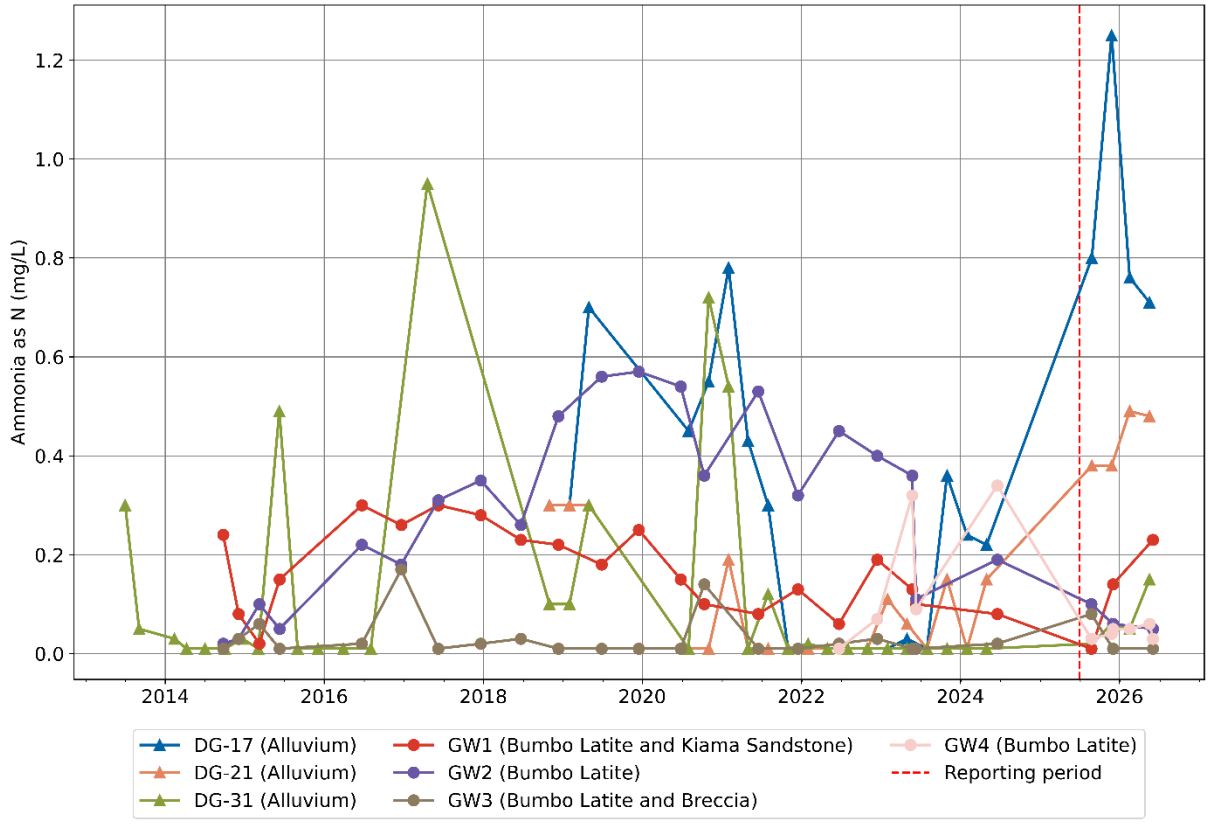


Figure 5.7 Ammonia concentration time series

6 Conclusions and recommendations

The main findings for the 2025/26 reporting period regarding groundwater levels are as follows:

- No observable groundwater level impacts from quarrying activities associated with groundwater depressurisation were identified at the monitoring bores. The groundwater levels at GW1 to GW4 were within the SSTVs.
- Groundwater levels in the alluvium and Kiama Sandstone (GW1) show a response to rainfall recharge, while the Bumbo Latite shows a more muted rainfall recharge response.

The main findings for the 2025/26 reporting period regarding groundwater quality are as follows:

- Groundwater quality at the monitoring sites was generally consistent with historical data. The above rainfall recorded between July and September 2025 may have contributed to the temporary decrease in EC observed in the alluvial monitoring bores.
- The variable nutrient concentrations are not unexpected as these bores are located on or adjacent to farmlands with livestock and the groundwater chemistry has possibly been altered by land use practices. Elevated nitrate concentrations were observed at GW1 in the first half of the reporting period. Elevated concentrations of ammonia compared to historical values were observed across all the alluvial bores, this will continue to be evaluated in future monitoring.

The results for the reporting period are generally consistent with historical observations. There was very limited change to groundwater levels or water quality observed in the groundwater monitoring bores during the reporting period that could be associated with the RIC pit activities.

6.1 Recommendations

The Development Consent conditions, issued on 11 March 2019, note: *on the provision of two years of monitoring data that shows negligible impact on the regional groundwater network the Secretary may agree to suspend monitoring of regional groundwater levels and/or quality*. In the interest of being proactive in minimising potential impact whilst Boral is extracting in the RIC Pit, it is proposed that monitoring should continue in accordance with the WMP.

Monitoring at private landholder bore GW026848 should be attempted again to obtain a baseline water level.

References

Arcadis 2016, *Dunmore Hard Rock Quarry Project Water Management plan*, NSW– November 2016. Prepared for Boral, dated 29 November 2016.

Clearly Bros (Bombo) 2019, *Scoping report for the Albion Park Quarry Extraction Area Stage 7 extension.* August 2019

Cohen 2006, *Shellharbour/Kiama regional hard rock resource review groundwater assessment study*, NSW Government – Department of Planning.

Department of Mine 1974, *Geology of the Wollongong, Kiama and Robertson 1:50,000 Sheets*.

EES 2017, *Annual report on groundwater level monitoring at the Swamp Road Quarry*, Dunmore NSW – May 2016 to May 2017. Prepared for Boral Dunmore Sand and Soils Pty Ltd, dated 16 June 2017.

EMM 2014, *Boral Dunmore Quarry Groundwater Monitoring-Monitoring well installation and groundwater assessment,* prepared for Boral, dated 21 November 2014

EMM 2016, *Groundwater Monitoring Program for Dunmore Hard Rock Quarry*, prepared for Boral Dunmore Quarry, dated 18 November 2016.

EMM 2022, *Groundwater Assessment Dunmore Hard Rock Quarry, Modification 13*, prepared for Boral Resources (NSW) Pty Limited, dated 1 November 2022.

EMM 2024, *Dunmore Hard Rock Quarry: Water Management Plan*, prepared for Boral Dunmore Quarry, dated 24 September 2024.

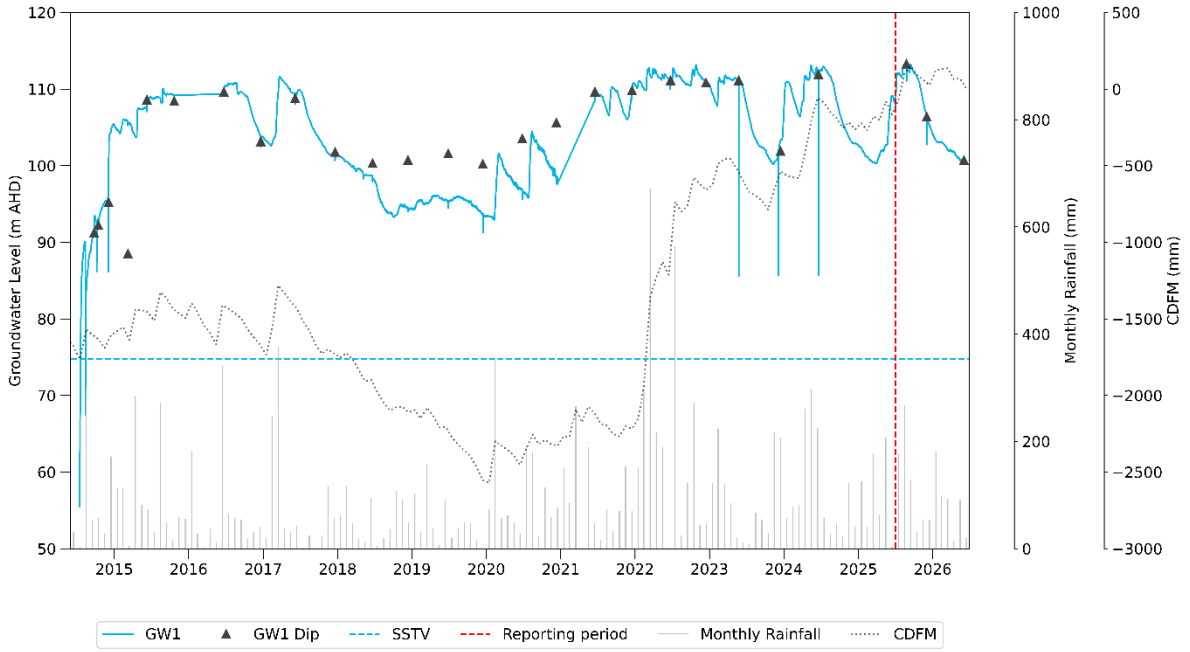
Evans and Peck 2006, *Statement of Environmental Effects, Section 4 Water Management*, Dunmore Hardrock Quarry extension.

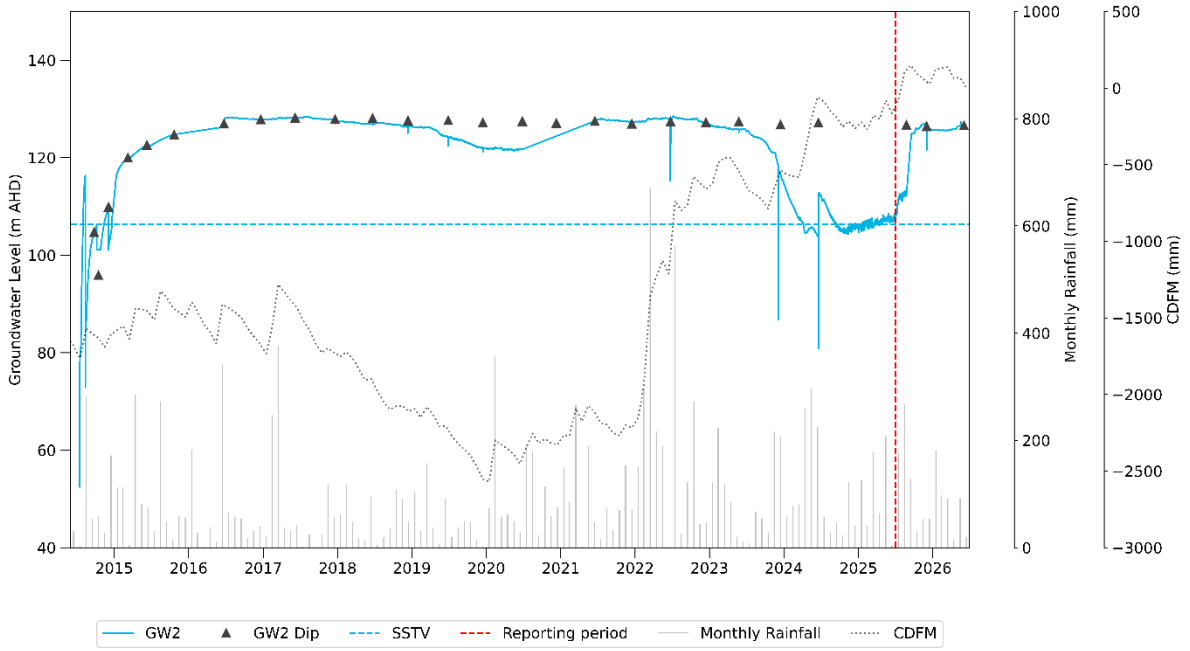
MMJ Wollongong (MMJ) 2013*, Environmental Assessment, Modification of Development Consent 10639 of 2005 Albion Park Quarry.*

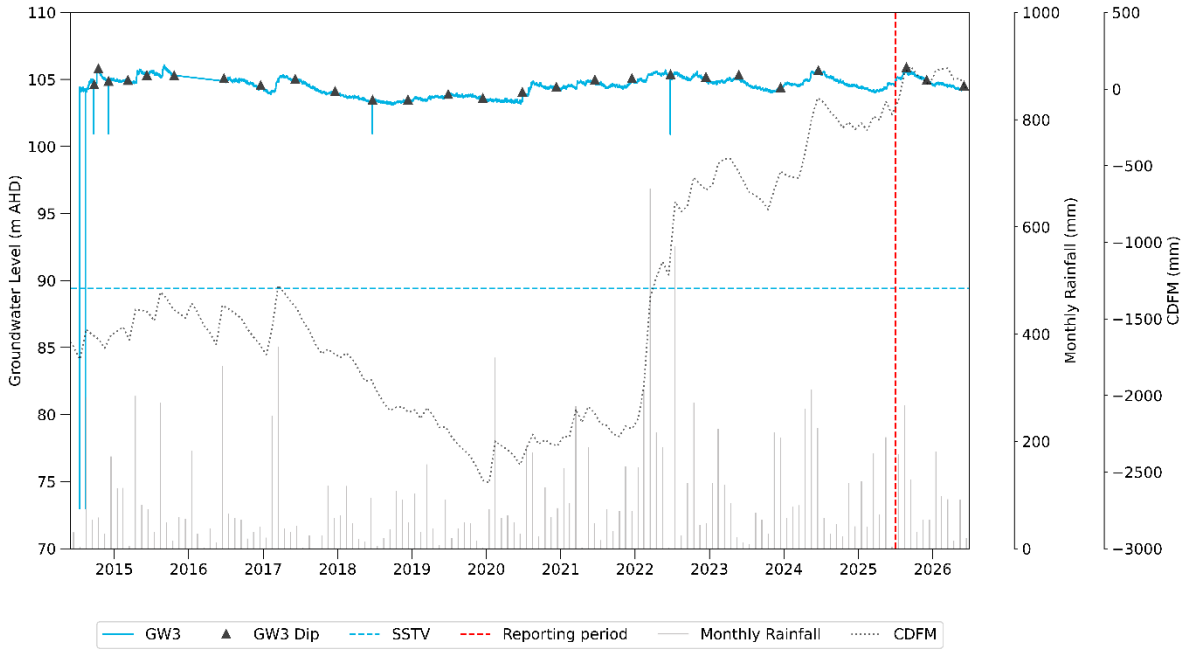
Walker G., Gilfedder M., Evans R., Dyson P., Stauffacher M. 2003*, Groundwater Flow Systems Framework – Essential Tools for Planning Salinity Management*, Murray Darling Basin Commission and CSIRO Land and Water.

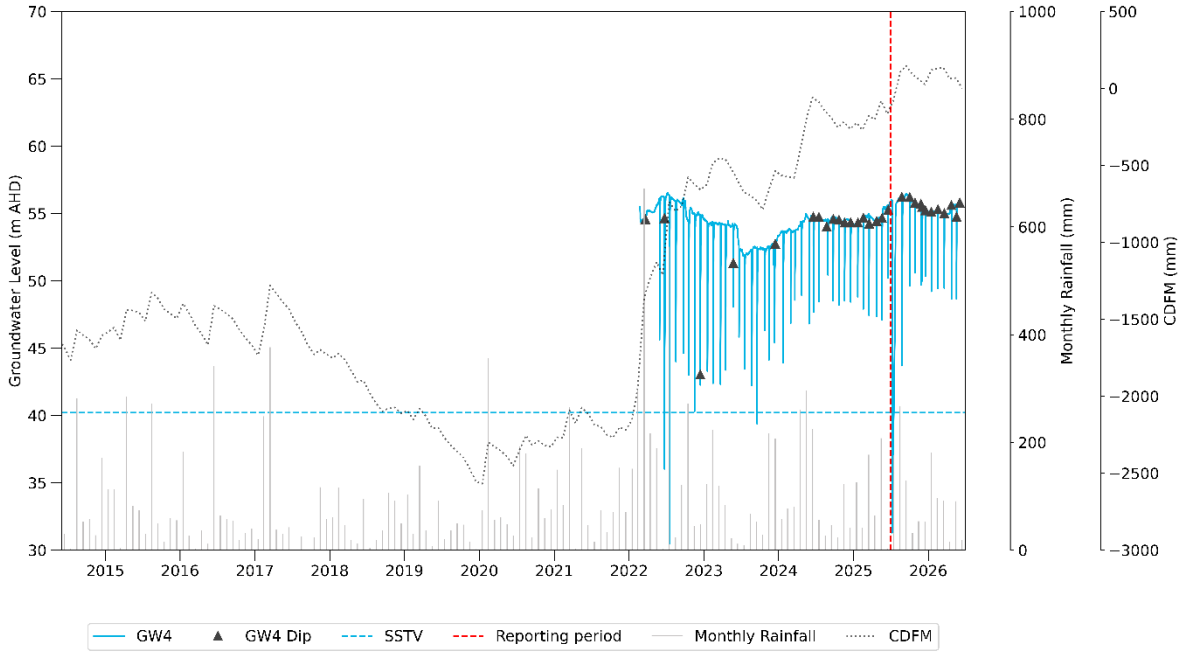
Appendix A
Groundwater hydrographs

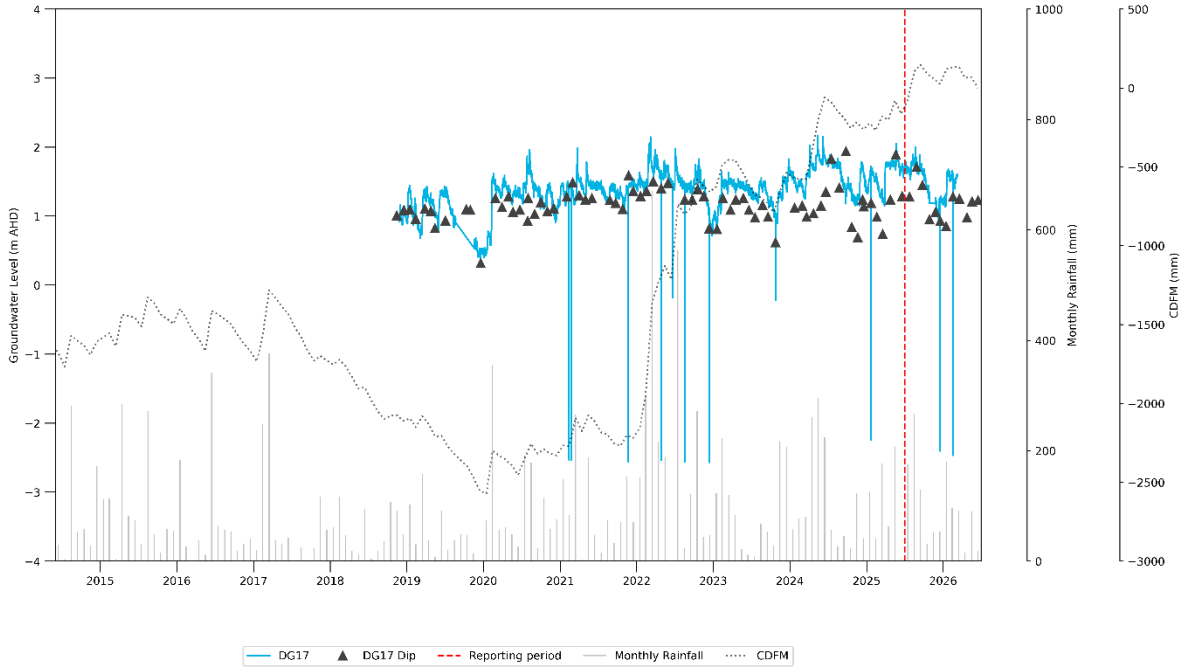
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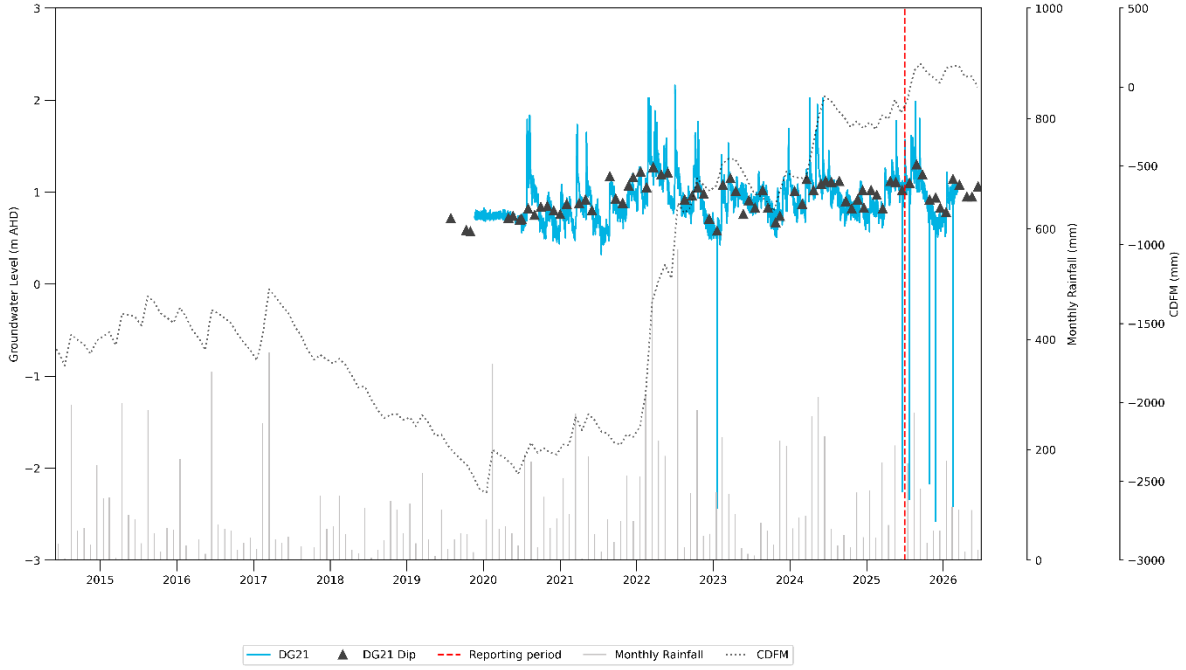

Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
GW1
GW1 Dip
SSTV
Reporting period
Monthly Rainfall
CDFM

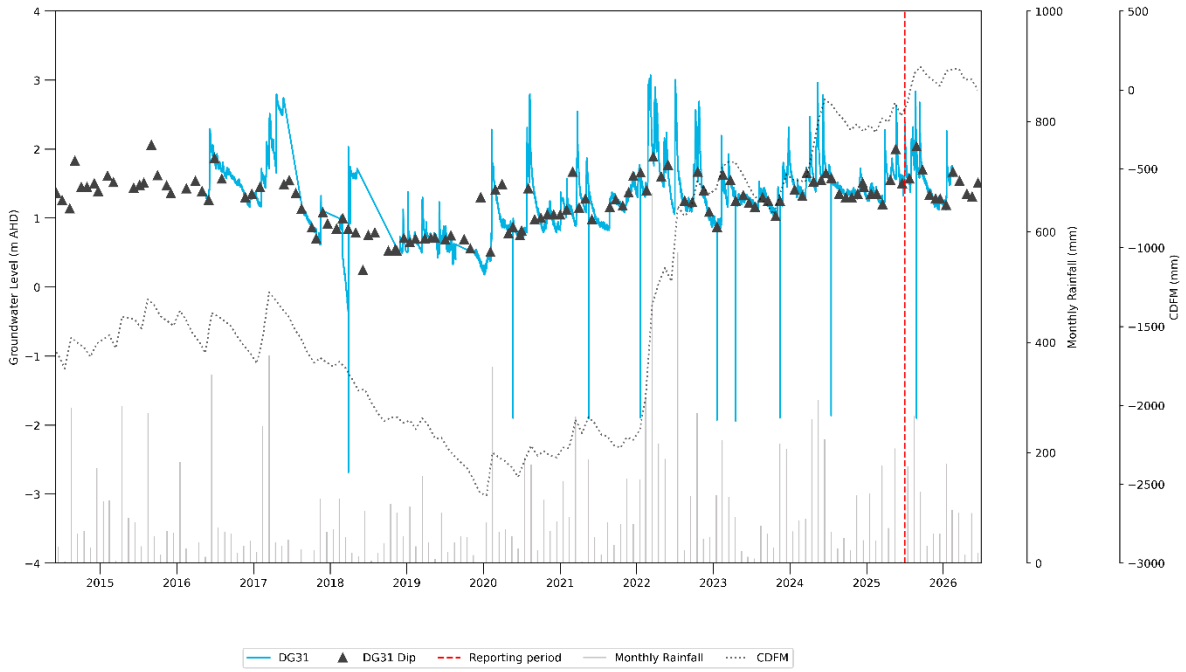

Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
GW2
GW2 Dip
SSTV
Reporting period
Monthly Rainfall
CDFM


Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
GW3
GW3 Dip
SSTV
Reporting period
Monthly Rainfall
CDFM


Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
GW4
GW4 Dip
SSTV
Reporting period
Monthly Rainfall
CDFM


Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
DG17
DG17 Dip
Reporting period
Monthly Rainfall
CDFM


Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
DG21
DG21 Dip
Reporting period
Monthly Rainfall
CDFM


Groundwater Level (m AHD)
Monthly Rainfall (mm)
CDFM (mm)
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
DG31
DG31 Dip
Reporting period
Monthly Rainfall
CDFM

Appendix B
Laboratory documents

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CERTIFICATE OF ANALYSIS

Work Order	: **ES2538164**	Page	: 1 of 4
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Quan Bui	Contact	: Lianna Taing
Address	: The Forum Level 10 201 Pacific Highway St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 9493 9582	Telephone	: +61-2-8784 8555
Project	: E250630 Dunmore	Date Samples Received	: 02-Dec-2025 15:00
Order number	: ----	Date Analysis Commenced	: 03-Dec-2025
C-O-C number	: ----	Issue Date	: 08-Dec-2025 16:23
Sampler	: Quan Bui		
Site	: ----		
Quote number	: EN/111		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GW1	GW2	GW3	GW4	QC1
				Sampling date / time	02-Dec-2025 00:00	02-Dec-2025 00:00	02-Dec-2025 00:00	02-Dec-2025 00:00	02-Dec-2025 00:00
Compound	CAS Number	LOR	Unit		ES2538164-001	ES2538164-002	ES2538164-003	ES2538164-004	ES2538164-005
					Result	Result	Result	Result	Result
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		**232**	**202**	**112**	**246**	**243**
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		**307**	**291**	**99**	**182**	**183**
Total Alkalinity as CaCO3	----	1	mg/L		**307**	**291**	**99**	**182**	**183**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		**44**	**83**	**19**	**13**	**13**
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		**64**	**70**	**35**	**176**	**194**
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		**60**	**43**	**25**	**67**	**66**
Magnesium	7439-95-4	1	mg/L		**20**	**23**	**12**	**19**	**19**
Sodium	7440-23-5	1	mg/L		**123**	**125**	**25**	**103**	**101**
Potassium	7440-09-7	1	mg/L		**3**	**1**	<1	<1	<1
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		**0.006**	**0.006**	<0.001	<0.001	<0.001
Chromium	7440-47-3	0.001	mg/L		**0.002**	**0.002**	**0.001**	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L		**0.025**	**0.007**	**0.012**	<0.001	<0.001
Nickel	7440-02-0	0.001	mg/L		**0.009**	**0.001**	**0.003**	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L		**0.010**	<0.005	**0.006**	<0.005	<0.005
Boron	7440-42-8	0.05	mg/L		**0.05**	**0.58**	<0.05	**0.29**	**0.32**
Iron	7439-89-6	0.05	mg/L		**0.55**	**0.31**	<0.05	**0.07**	**0.07**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.14**	**0.06**	<0.01	**0.05**	**0.05**
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	GW1	GW2	GW3	GW4	QC1
			Sampling date / time	02-Dec-2025 00:00	02-Dec-2025 00:00	02-Dec-2025 00:00	02-Dec-2025 00:00	02-Dec-2025 00:00
Compound	CAS Number	LOR	Unit	ES2538164-001	ES2538164-002	ES2538164-003	ES2538164-004	ES2538164-005
				Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.55**	<0.01	**0.40**	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.55**	<0.01	**0.40**	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**0.5**	**0.3**	**0.3**	**0.2**	**0.2**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**1.0**	**0.3**	**0.7**	**0.2**	**0.2**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**0.23**	**0.09**	**0.05**	**0.05**	**0.06**
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	**0.17**	**0.09**	**0.03**	**0.02**	**0.02**
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**8.86**	**9.52**	**3.36**	**8.87**	**9.40**
ø Total Cations	----	0.01	meq/L	**10.1**	**9.50**	**3.32**	**9.39**	**9.25**
ø Ionic Balance	----	0.01	%	**6.40**	**0.08**	**0.57**	**2.82**	**0.80**

QUALITY CONTROL REPORT

Work Order	: **ES2538164**	Page	: 1 of 7
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Quan Bui	Contact	: Lianna Taing
Address	: The Forum Level 10 201 Pacific Highway St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 9493 9582	Telephone	: +61-2-8784 8555
Project	: E250630 Dunmore	Date Samples Received	: 02-Dec-2025
Order number	: ----	Date Analysis Commenced	: 03-Dec-2025
C-O-C number	: ----	Issue Date	: 08-Dec-2025
Sampler	: Quan Bui		
Site	: ----		
Quote number	: EN/111		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 7052433)									
EN2520305-013	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	736	714	3.0	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	736	714	3.0	0% - 20%
EN2520305-016	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	823	800	2.9	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	823	800	2.9	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 7051424)									
ES2538106-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	3	0.0	No Limit
ES2538164-001	GW1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1 (10)*	mg/L	44	42	5.3	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 7051422)									
ES2538106-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	6	11	50.0	0% - 50%
ES2538164-001	GW1	ED045G: Chloride	16887-00-6	1	mg/L	64	65	1.8	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 7052480)									
ES2538162-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	110	124	11.8	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	74	83	11.1	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1210	1360	12.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	357	401	11.7	0% - 20%
ES2538181-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	58	57	2.0	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED093F: Dissolved Major Cations (QC Lot: 7052480) - continued									
ES2538181-003	Anonymous	ED093F: Magnesium	7439-95-4	1	mg/L	71	70	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	1080	1060	1.5	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	7	6	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 7053821)									
ES2538080-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	4	4	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	6	6	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES2538327-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	10	10	0.0	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	6	6	0.0	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	7	7	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 7052481)									
ES2538162-003	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.096	0.108	11.5	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.701	0.811	14.5	0% - 20%
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.007	0.008	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.098	0.105	7.4	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.178	0.197	10.1	0% - 20%
		EG020A-F: Boron	7440-42-8	0.05	mg/L	2.31	2.39	3.5	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	6.60	7.51	12.9	0% - 20%
ES2538181-003	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.031	0.033	4.5	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.006	0.002	86.1	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.011	0.009	14.6	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.25	0.16	46.5	No Limit
		EG020A-F: Iron	7439-89-6	0.05 (0.01)*	mg/L	0.66	0.61	8.5	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 7053820)									
ES2538146-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.09	0.08	0.0	No Limit
ES2538080-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 7053820) - continued									
ES2538080-001	Anonymous	EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	<0.05	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.62	0.64	2.0	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 7056146)									
ES2538113-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.0	No Limit
ME2501727-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.08	25.2	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 7051423)									
ES2538106-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2538164-001	GW1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 7056147)									
ES2538126-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EW2505927-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.14	0.14	0.0	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 7056143)									
ES2538126-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
EW2505928-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 7056142)									
ES2538126-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	0.0	No Limit
EW2505928-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.0	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 7051426)									
ES2538273-016	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2538164-001	GW1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.17	0.17	0.0	0% - 50%

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 7052433)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	88.7	81.0	115
				----	50 mg/L	97.6	80.0	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 7051424)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	98.9	82.0	122
				<1	500 mg/L	101	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 7051422)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	105	80.9	127
				<1	1000 mg/L	95.1	80.9	127
ED093F: Dissolved Major Cations (QCLot: 7052480)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	105	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	111	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	111	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	107	85.0	113
ED093F: Dissolved Major Cations (QCLot: 7053821)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	102	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	102	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	100.0	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 7052481)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	85.0	114
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	105	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	104	81.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.5	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	99.3	85.0	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82.0	112
EG020F: Dissolved Metals by ICP-MS (QCLot: 7053820)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.1	85.0	114
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	91.8	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.2	81.0	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EG020F: Dissolved Metals by ICP-MS (QCLot: 7053820) - continued								
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.3	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.3	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	86.6	85.0	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	91.0	82.0	112
EK055G: Ammonia as N by Discrete Analyser (QCLot: 7056146)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	101	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 7051423)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 7056147)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.8	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 7056143)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	89.4	69.0	123
				<0.1	2.5 mg/L	85.1	70.0	123
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 7056142)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	97.4	71.3	126
				<0.01	0.5 mg/L	82.5	71.3	126
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 7051426)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	85.0	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 7051424)							
ES2538164-001	GW1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	# Not Determined	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 7051422)							
ES2538164-001	GW1	ED045G: Chloride	16887-00-6	250 mg/L	113	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 7052481)							
ES2538162-004	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	104	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	106	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	97.6	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*Concentration*	*MS*	*Low*	*High*
EG020F: Dissolved Metals by ICP-MS (QCLot: 7052481) - continued							
ES2538162-004	Anonymous	EG020A-F: Nickel	7440-02-0	1 mg/L	104	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	106	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 7053820)							
EN2520206-010	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	89.7	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	92.9	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.9	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.8	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	91.8	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 7056146)							
ES2538113-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	124	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 7051423)							
ES2538164-001	GW1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	110	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 7056147)							
ES2538126-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	117	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 7056143)							
ES2538126-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.3	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 7056142)							
ES2538126-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	83.9	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 7051426)							
ES2538164-001	GW1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2538164**	Page	: 1 of 7
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Quan Bui	Telephone	: +61-2-8784 8555
Project	: E250630 Dunmore	Date Samples Received	: 02-Dec-2025
Site	: ----	Issue Date	: 08-Dec-2025
Sampler	: Quan Bui	No. of samples received	: 5
Order number	: ----	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **Matrix Spike outliers exist - please see following pages for full details.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	ES2538164--001	GW1	**Sulfate as SO4 - Turbidimetric**	14808-79-8	Not Determined	----	**MS recovery not determined, background level greater than or equal to 4x spike level.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) GW1, GW2	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	30-Dec-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F) GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**05-Dec-2025**	30-Dec-2025	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	16-Dec-2025	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	30-Dec-2025	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	30-Dec-2025	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
GW1, GW2	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	30-Dec-2025	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**05-Dec-2025**	30-Dec-2025	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GW1, GW2	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	31-May-2026	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**05-Dec-2025**	31-May-2026	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**05-Dec-2025**	30-Dec-2025	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	04-Dec-2025	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**05-Dec-2025**	30-Dec-2025	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**05-Dec-2025**	30-Dec-2025	✓	**05-Dec-2025**	30-Dec-2025	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**05-Dec-2025**	30-Dec-2025	✓	**05-Dec-2025**	30-Dec-2025	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
GW1, GW2, GW3, GW4, QC1	**02-Dec-2025**	**----**	----	----	**04-Dec-2025**	04-Dec-2025	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	37	**10.81**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	38	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	38	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	37	**5.41**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. Auto Titrator) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

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ALS Environmental

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❑GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
❑MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
❑PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com
❑WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: portkembla@alsglobal.com

CLIENT: EMM Consulting	TURNAROUND REQUIREMENTS : (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	Standard TAT (List due date):
OFFICE: Level 10, 201 Pacific Highway, St Leonards NSW 2065		☐ Non Standard or urgent TAT (List due date):
PROJECT: Dunmore	ALS QUOTE NO.:	
ORDER NUMBER: E250630		
PROJECT MANAGER: Quan Bui	CONTACT PH: 0412 580 712	
SAMPLER: QB	0412 580 712	
COC emailed to ALS? No	EDD FORMAT (or default): ESdat	
Email Reports to : qbui@emmconsulting.com.au; emmconsulting@esdat.net		
Email Invoice to: finance@emmconsulting.com.au; qbui@emmconsulting.com.au		

Client Drop-off

Yes No (N/A)

Yes No N/A

10.6°C, 11.2 °C 13.1°C

1 x Esky

RELINQUISHED BY:

Quan Bui

DATE/TIME: 2/12/25 3pm

25/08/2025

RECEIVED BY: ALS Bulent (CROWS NEST)

DATE/TIME: 2/12/25 3:00pm

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION						Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	NT1D, NT2	NT8-A	EG020F(As,B, Cr, Cu, Fe, Ni, Zn)		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	GW1	2/12/25	W		4	x	x	x		Metals have been field filtered
2	GW2		W		4	x	x	x		Metals have been field filtered
3	GW3		W		4	x	x	x		Metals have been field filtered
4	GW4		W		4	x	x	x		Metals have been field filtered
5	QC1		W		4	x	x	x		Metals have been field filtered
				TOTAL						

Environmental Division Sydney
Work Order Reference
ES2538164

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Rec: [illegible] 2/12/25 1915.

CERTIFICATE OF ANALYSIS

Work Order	: **ES2617978**	Page	: 1 of 4
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Quan Bui	Contact	: Lianna Taing
Address	: The Forum Level 10 201 Pacific Highway St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 9493 9582	Telephone	: +61-2-8784 8555
Project	: Dunmore	Date Samples Received	: 04-Jun-2026 14:48
Order number	: E250630	Date Analysis Commenced	: 05-Jun-2026
C-O-C number	: ----	Issue Date	: 12-Jun-2026 18:09
Sampler	: Jordan de Boer		
Site	: ----		
Quote number	: EN/111		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GW1	GW2	GW3	GW4	QC1
				Sampling date / time	04-Jun-2026 12:15	04-Jun-2026 10:15	04-Jun-2026 11:15	04-Jun-2026 08:45	04-Jun-2026 00:00
Compound	CAS Number	LOR	Unit		ES2617978-001	ES2617978-002	ES2617978-003	ES2617978-004	ES2617978-005
					Result	Result	Result	Result	Result
EA065: Total Hardness as CaCO3									
Total Hardness as CaCO3	----	1	mg/L		211	204	121	249	209
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	----	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		316	298	107	194	301
Total Alkalinity as CaCO3	----	1	mg/L		316	298	107	194	301
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		39	74	19	13	81
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		84	79	38	215	83
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		58	39	27	65	39
Magnesium	7439-95-4	1	mg/L		16	26	13	21	27
Sodium	7440-23-5	1	mg/L		140	152	33	113	151
Potassium	7440-09-7	1	mg/L		2	1	<1	<1	1
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	0.001	mg/L		0.002	0.003	<0.001	<0.001	0.003
Chromium	7440-47-3	0.001	mg/L		0.002	0.002	0.005	<0.001	0.002
Copper	7440-50-8	0.001	mg/L		0.002	0.004	0.014	<0.001	0.003
Nickel	7440-02-0	0.001	mg/L		0.003	0.004	0.006	<0.001	0.004
Zinc	7440-66-6	0.005	mg/L		0.051	0.023	0.070	0.014	0.038
Boron	7440-42-8	0.05	mg/L		0.09	0.71	0.10	0.38	0.74
Iron	7439-89-6	0.05	mg/L		<0.05	<0.05	<0.05	0.07	<0.05
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		0.23	0.05	<0.01	0.03	0.05
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	GW1	GW2	GW3	GW4	QC1
				Sampling date / time	04-Jun-2026 12:15	04-Jun-2026 10:15	04-Jun-2026 11:15	04-Jun-2026 08:45	04-Jun-2026 00:00
Compound	CAS Number	LOR	Unit		ES2617978-001	ES2617978-002	ES2617978-003	ES2617978-004	ES2617978-005
					Result	Result	Result	Result	Result
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		**0.03**	**0.08**	**0.48**	<0.01	**0.07**
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		**0.03**	**0.08**	**0.48**	<0.01	**0.07**
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.7**	**0.4**	**0.5**	<0.1	**0.3**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.7**	**0.5**	**1.0**	<0.1	**0.4**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.17**	**0.10**	**0.06**	**0.04**	**0.09**
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		**0.16**	**0.08**	**0.03**	**0.02**	**0.07**
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**9.50**	**9.72**	**3.61**	**10.2**	**10.0**
ø Total Cations	----	0.01	meq/L		**10.4**	**10.7**	**3.85**	**9.89**	**10.8**
ø Ionic Balance	----	0.01	%		**4.32**	**4.89**	**3.32**	**1.61**	**3.46**

QUALITY CONTROL REPORT

Work Order	: **ES2617978**	Page	: 1 of 5
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Quan Bui	Contact	: Lianna Taing
Address	: The Forum Level 10 201 Pacific Highway St Leonards NSW NSW 2065	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 9493 9582	Telephone	: +61-2-8784 8555
Project	: Dunmore	Date Samples Received	: 04-Jun-2026
Order number	: E250630	Date Analysis Commenced	: 05-Jun-2026
C-O-C number	: ----	Issue Date	: 12-Jun-2026
Sampler	: Jordan de Boer		
Site	: ----		
Quote number	: EN/111		
No. of samples received	: 5		
No. of samples analysed	: 5		

Accreditation No. 825
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This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Dian Dao	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC
* = The final LOR has been raised due to dilution or other sample specific cause; adjusted LOR is shown in brackets. The duplicate ranges for Acceptable RPD% are applied to the final LOR where applicable.

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 7459217)									
ES2617962-004	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
ES2617980-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	----	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	5	8	51.4	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	62	66	6.6	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	66	74	10.6	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 7461117)									
ES2617978-001	GW1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	39	41	2.6	0% - 20%
ES2618039-002	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	193	173	10.8	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 7461116)									
ES2618018-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1	1	0.0	No Limit
ES2617978-001	GW1	ED045G: Chloride	16887-00-6	1	mg/L	84	73	13.3	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 7461732)									
ES2617907-016	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	275	274	0.4	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	203	204	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	589	581	1.4	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	28	28	0.0	0% - 20%
ES2618064-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	86	87	1.3	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED093F: Dissolved Major Cations (QC Lot: 7461732) - continued									
ES2618064-001	Anonymous	ED093F: Magnesium	7439-95-4	1	mg/L	51	51	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	466	466	0.0	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	14	14	0.0	0% - 50%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 7461733)									
ES2617907-016	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.008	0.008	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.186	0.180	3.1	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	1.11	1.10	1.3	0% - 20%
		EG020A-F: Boron	7440-42-8	0.05	mg/L	1.20	1.24	3.4	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05 (1.00)*	mg/L	577	562	2.6	0% - 20%
ES2618064-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
		EG020A-F: Boron	7440-42-8	0.05	mg/L	0.09	0.09	0.0	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.01	1.02	0.0	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 7471264)									
ES2617959-013	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.0	No Limit
ES2618065-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	<0.01	0.0	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 7461115)									
ES2617978-001	GW1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2618039-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.46	0.47	2.2	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 7471263)									
ES2617959-013	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.45	0.45	0.0	0% - 20%
ES2618065-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	1.95	1.91	1.8	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 7471260)									
ES2617959-013	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.3	0.0	No Limit
ES2618065-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.3	2.2	0.0	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 7471259)									
ES2617959-013	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.05	0.0	No Limit
ES2618065-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.07	13.8	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 7461118)									
ES2617978-001	GW1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.16	0.18	12.2	0% - 50%
ES2618039-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.0	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED037P: Alkalinity by PC Titrator (QCLot: 7459217)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.3	81.0	115
				----	50 mg/L	101	80.0	128
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 7461117)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	95.8	82.0	122
				<1	500 mg/L	100	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 7461116)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	95.0	80.9	127
				<1	1000 mg/L	90.6	80.9	127
ED093F: Dissolved Major Cations (QCLot: 7461732)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	97.6	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	106	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	118	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	104	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 7461733)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.2	85.0	114
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	106	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.3	81.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.2	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.8	81.0	117
EG020A-F: Boron	7440-42-8	0.05	mg/L	<0.05	0.5 mg/L	95.8	85.0	115
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	111	82.0	112
EK055G: Ammonia as N by Discrete Analyser (QCLot: 7471264)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	104	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 7461115)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 7471263)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 7471260)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	102	69.0	123
				<0.1	2.5 mg/L	103	70.0	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	LCS: Spike Recovery (%)	Acceptable Limits (%): Low	Acceptable Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 7471259)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	96.1	71.3	126
				<0.01	0.5 mg/L	76.8	71.3	126
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 7461118)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	99.0	85.0	117

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 7461117)							
ES2617978-001	GW1	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	72.7	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 7461116)							
ES2617978-001	GW1	ED045G: Chloride	16887-00-6	250 mg/L	116	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 7461733)							
ES2617962-004	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	88.3	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	102	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	92.5	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.9	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.2	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 7471264)							
ES2617959-013	Anonymous	EK055G: Ammonia as N	7664-41-7	0.5 mg/L	98.9	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 7461115)							
ES2617978-001	GW1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 7471263)							
ES2617959-013	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	112	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 7471260)							
ES2617959-014	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	104	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 7471259)							
ES2617959-014	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	83.3	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 7461118)							
ES2617978-001	GW1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2617978**	Page	: 1 of 7
Client	: **EMM CONSULTING PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: Quan Bui	Telephone	: +61-2-8784 8555
Project	: Dunmore	Date Samples Received	: 04-Jun-2026
Site	: ----	Issue Date	: 12-Jun-2026
Sampler	: Jordan de Boer	No. of samples received	: 5
Order number	: E250630	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, where applicable to the methodology, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **NO Quality Control Sample Frequency Outliers exist.**

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA065: Total Hardness as CaCO3							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**09-Jun-2026**	02-Jul-2026	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**05-Jun-2026**	18-Jun-2026	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**05-Jun-2026**	02-Jul-2026	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**05-Jun-2026**	02-Jul-2026	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**09-Jun-2026**	02-Jul-2026	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**09-Jun-2026**	01-Dec-2026	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**11-Jun-2026**	02-Jul-2026	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**05-Jun-2026**	06-Jun-2026	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**11-Jun-2026**	02-Jul-2026	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**10-Jun-2026**	02-Jul-2026	✓	**10-Jun-2026**	02-Jul-2026	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**10-Jun-2026**	02-Jul-2026	✓	**10-Jun-2026**	02-Jul-2026	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
GW1, GW2, GW3, GW4, QC1	**04-Jun-2026**	**----**	----	----	**05-Jun-2026**	06-Jun-2026	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	12	**16.67**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	12	**8.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Matrix Spikes (MS) - Continued							
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. Auto Titrator) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125, USEPA SW 846 - 6010 and 6020, Cations are determined by ICP-MS. Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3).
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030E. This method is compliant with NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)

HT

Environmental Division
Sydney
Work Order Reference
ES2617978

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ALS Environmental

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GLADSTONE 46 Callemondah Drive Clinton QLD 4680 Ph: 07 7471 5600 E: gladstone@alsglobal.com
MACKAY 78 Harbour Road Mackay QLD 4740 Ph: 07 4944 0177 E: mackay@alsglobal.com
MELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com
MUDGEE 27 Sydney Road Mudgee NSW 2850 Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com
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NOWRA 4/13 Geary Place North Nowra NSW 2541 Ph: 024423 2063 E: nowra@alsglobal.com
PERTH 10 Hod Way Malaga WA 6090 Ph: 08 9209 7655 E: samples.perth@alsglobal.com

thfield NSW 2164 sglobal.com
le QLD 4818 ental@alsglobal.com
longong NSW 2500 bal.com

CLIENT: EMM Consulting	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g.. Ultra Trace Organics)	Standard TAT **(List due date):**	
OFFICE: Level 10, 201 Pacific Highway, St Leonards NSW 2065		☐ Non Standard or urgent TAT **(List due date):**	
PROJECT: Dunmore	**ALS QUOTE NO.:**		
ORDER NUMBER: E250630			
PROJECT MANAGER: Quan Bui	**CONTACT PH:** 0412 580 712		
SAMPLER: Jordan de Boer	0415 944 930	**RELINQUISHED BY:**	**RECEIVED BY:**
COC emailed to ALS? No	**EDD FORMAT (or default):** ESdat	*Jordan de Boer*	Vaishnavi
Email Reports to : qbui@emmconsulting.com.au; jdeboer@emmconsulting.com.au; emmconsulting@esdat.net		DATE/TIME:	DATE/TIME:
Email Invoice to: finance@emmconsulting.com.au; qbui@emmconsulting.com.au		4/06/2026 14:48	4/6/26 2:48

No N/A
No N/A
°C

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE	SAMPLE DETAILS MATRIX: SOLID (S) WATER (W)			CONTAINER INFORMATION						Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL CONTAINERS	NT1D, NT2	NT8-A	EG020F(As,B, Cr, Cu, Fe, Ni, Zn)		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	GW1	4/6/26 12:15	W		4	x	x	x		Metals have been field filtered
2	GW2	4/6/26 10:15	W		4	x	x	x		Metals have been field filtered
3	GW3	4/6/26 11:15	W		4	x	x	x		Metals have been field filtered
4	GW4	4/06/26 8:45	W		4	x	x	x		Metals have been field filtered
5	QC1	4/6/26	W		4	x	x	x		Metals have been field filtered
				TOTAL						

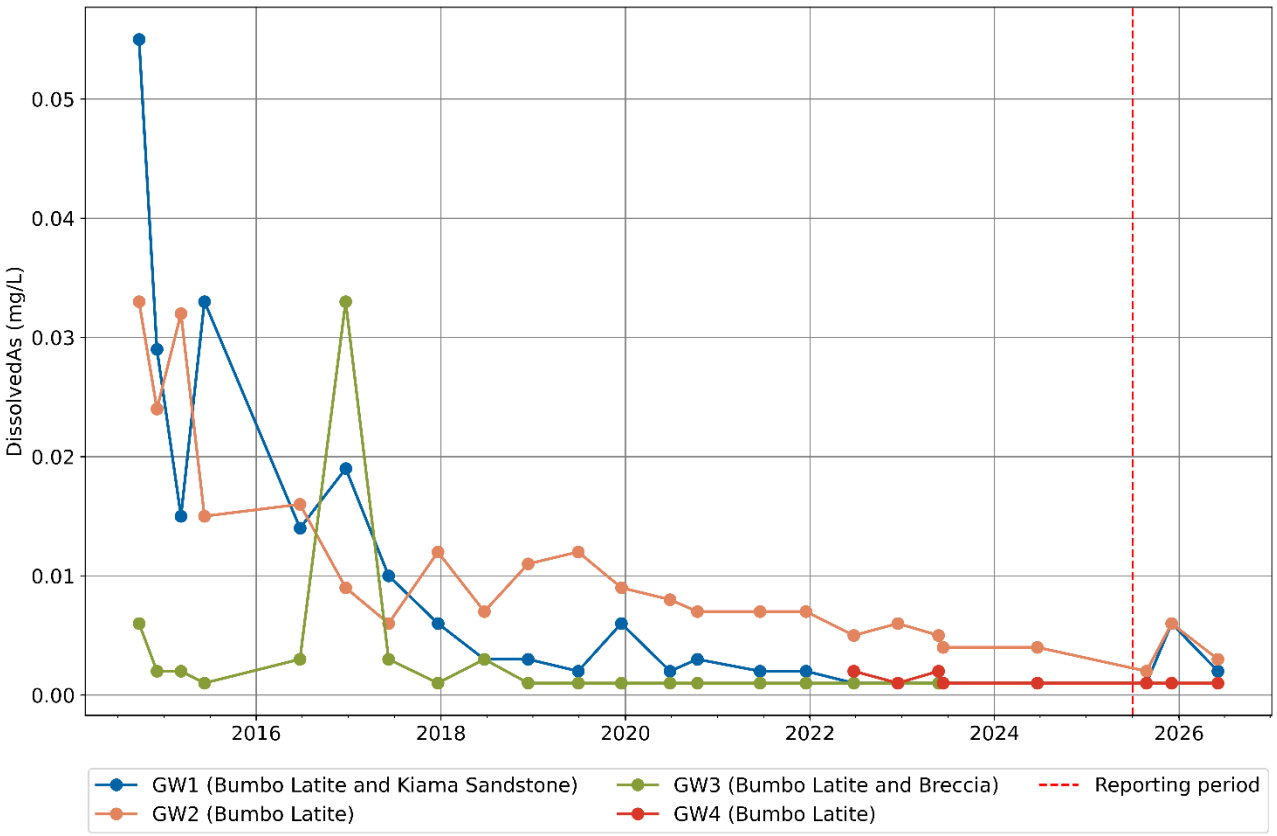
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
= VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

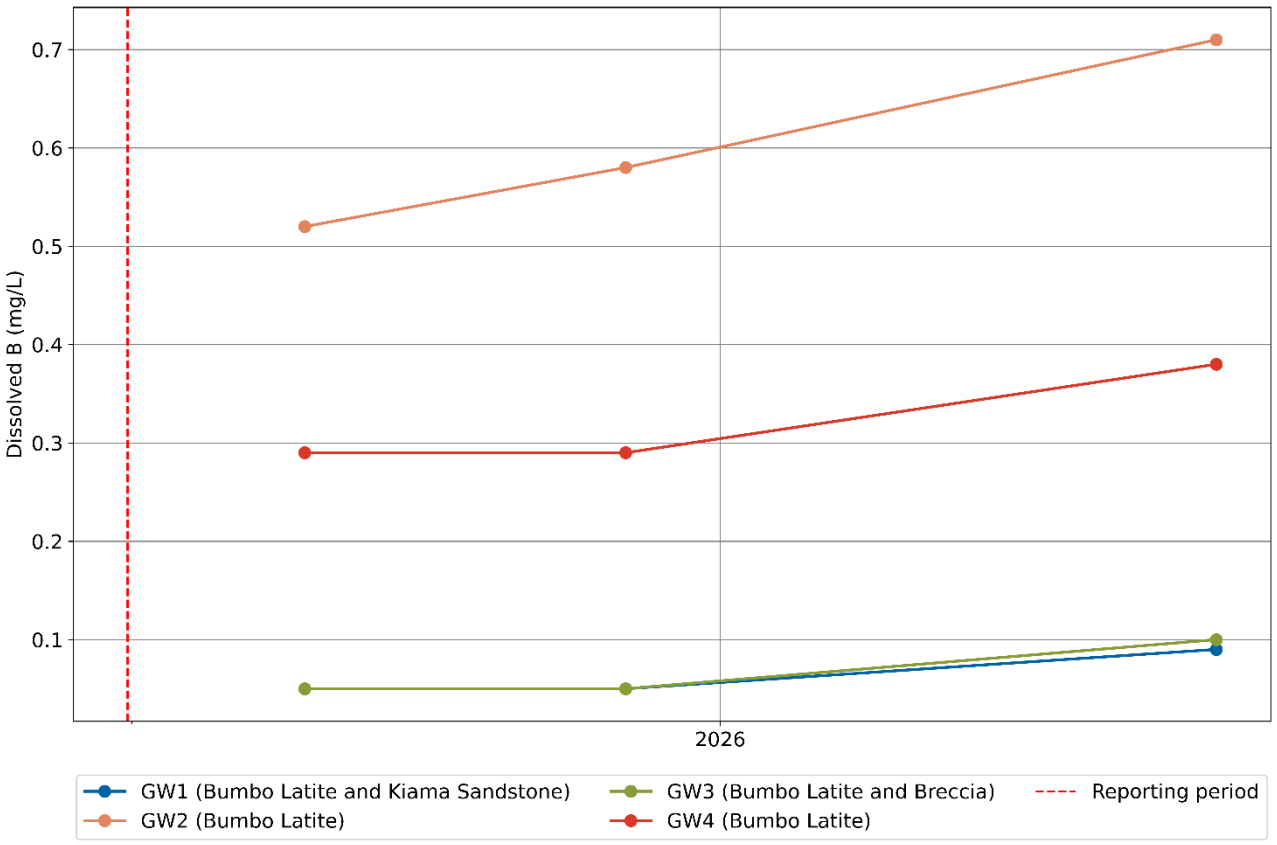
Rec

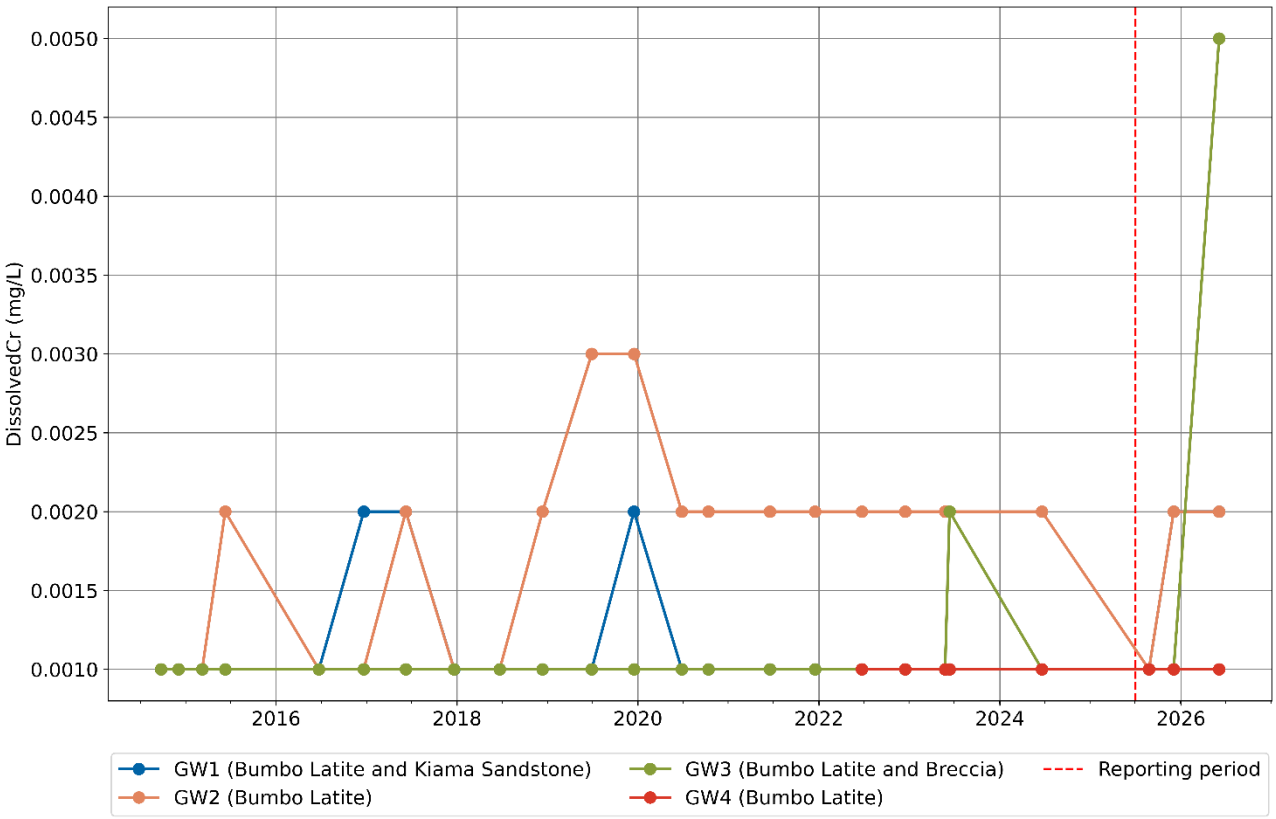
Appendix C

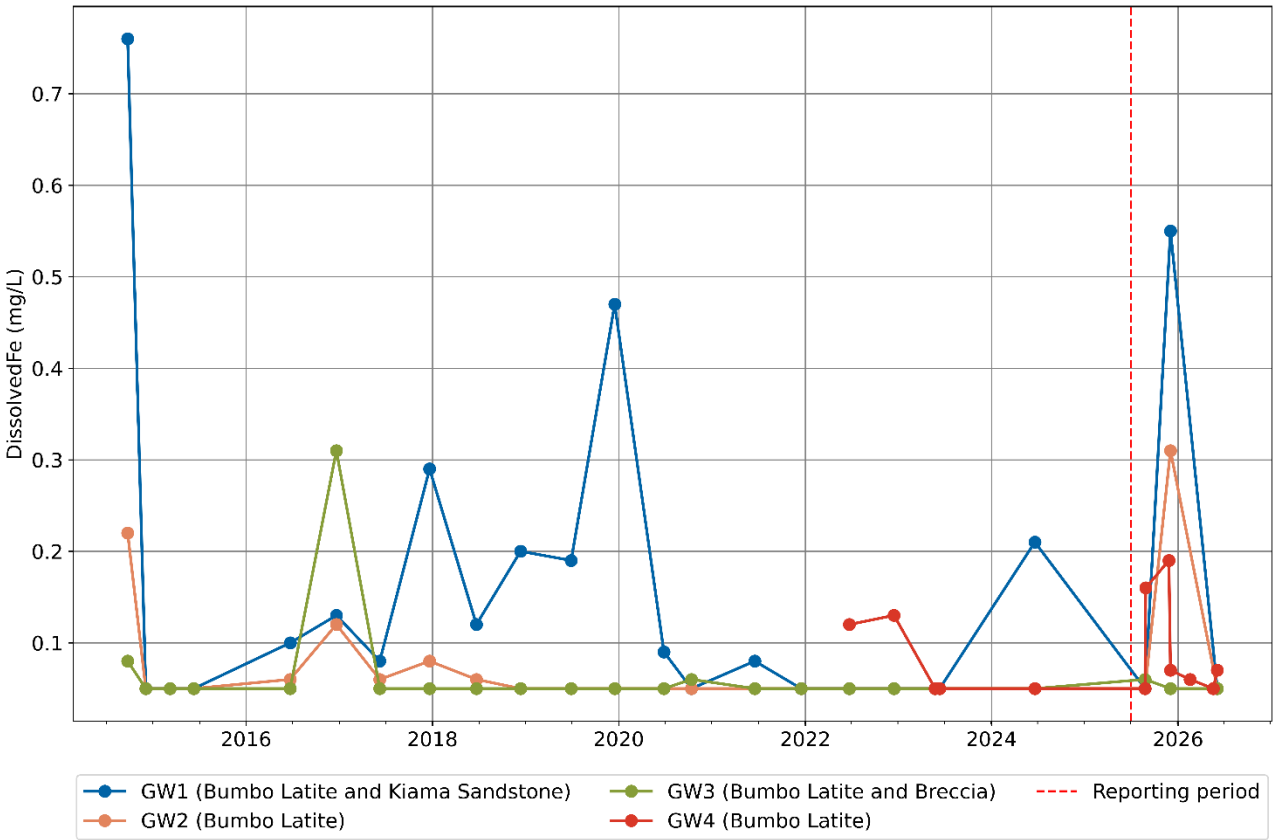
Metals time series charts – GW1 to GW4

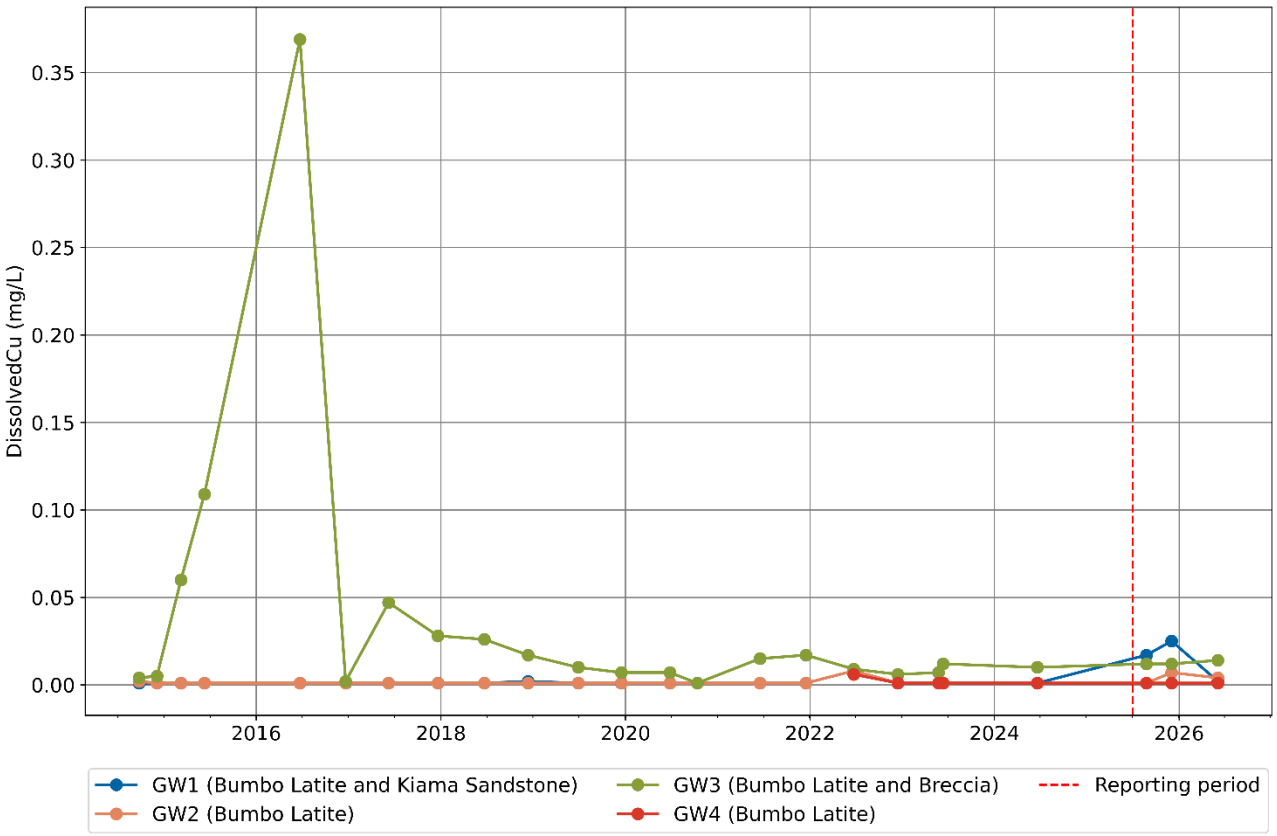
EMM
creating opportunities

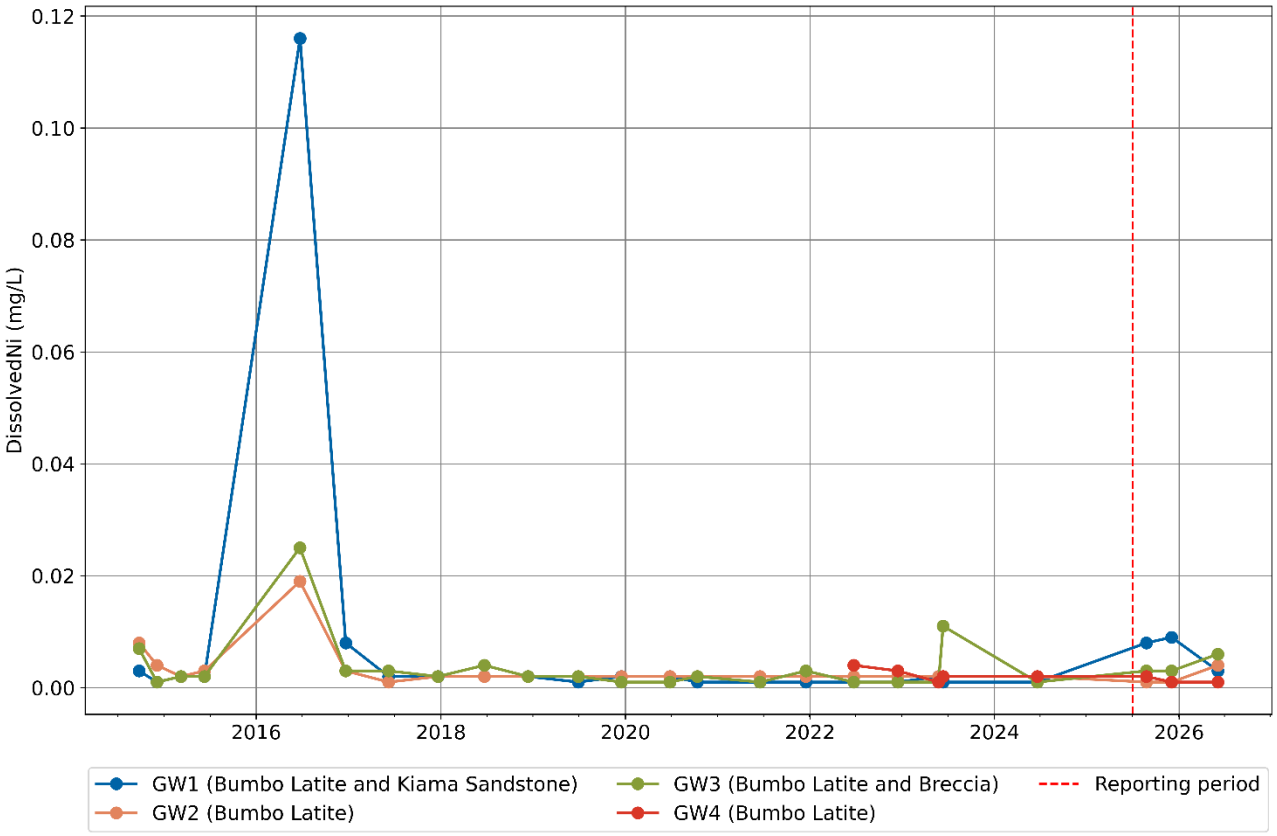

DissolvedAs (mg/L)
0.05
0.04
0.03
0.02
0.01
0.00
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

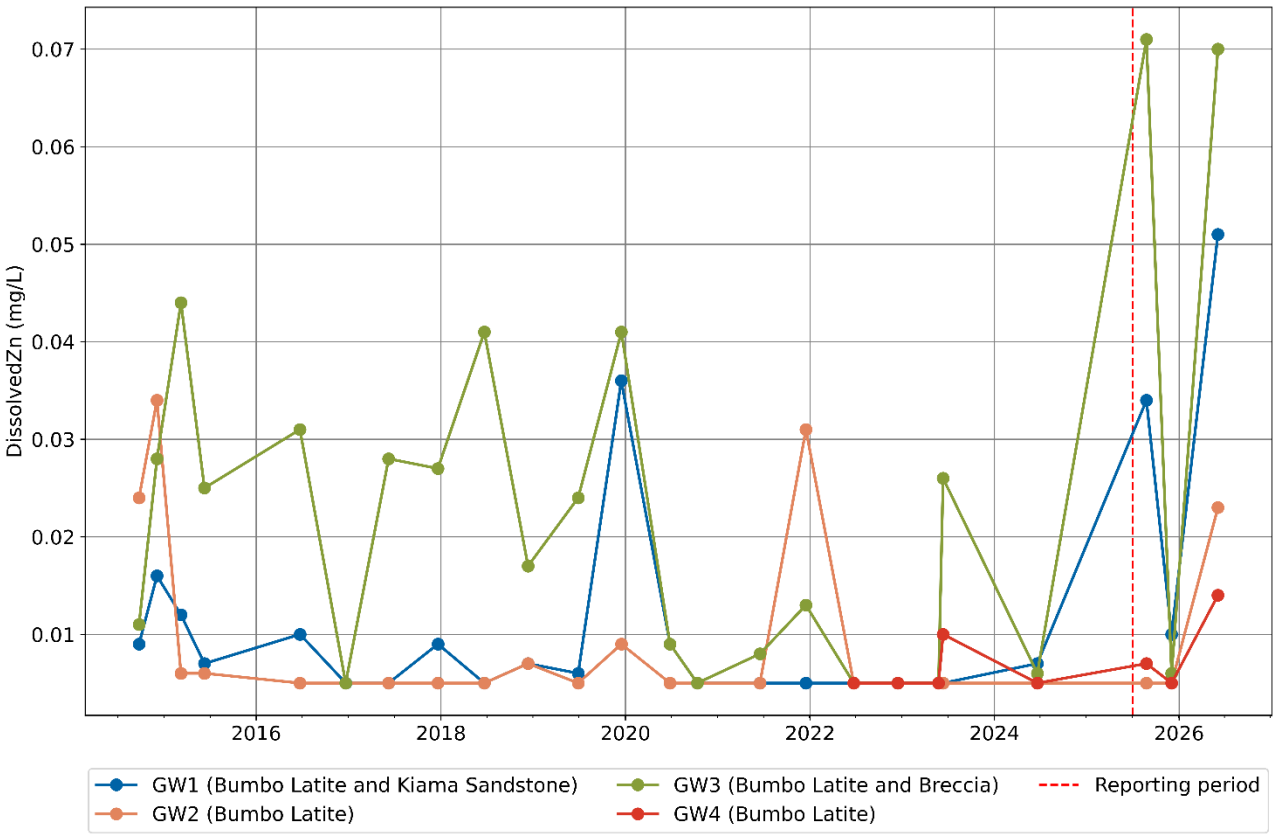

Dissolved B (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

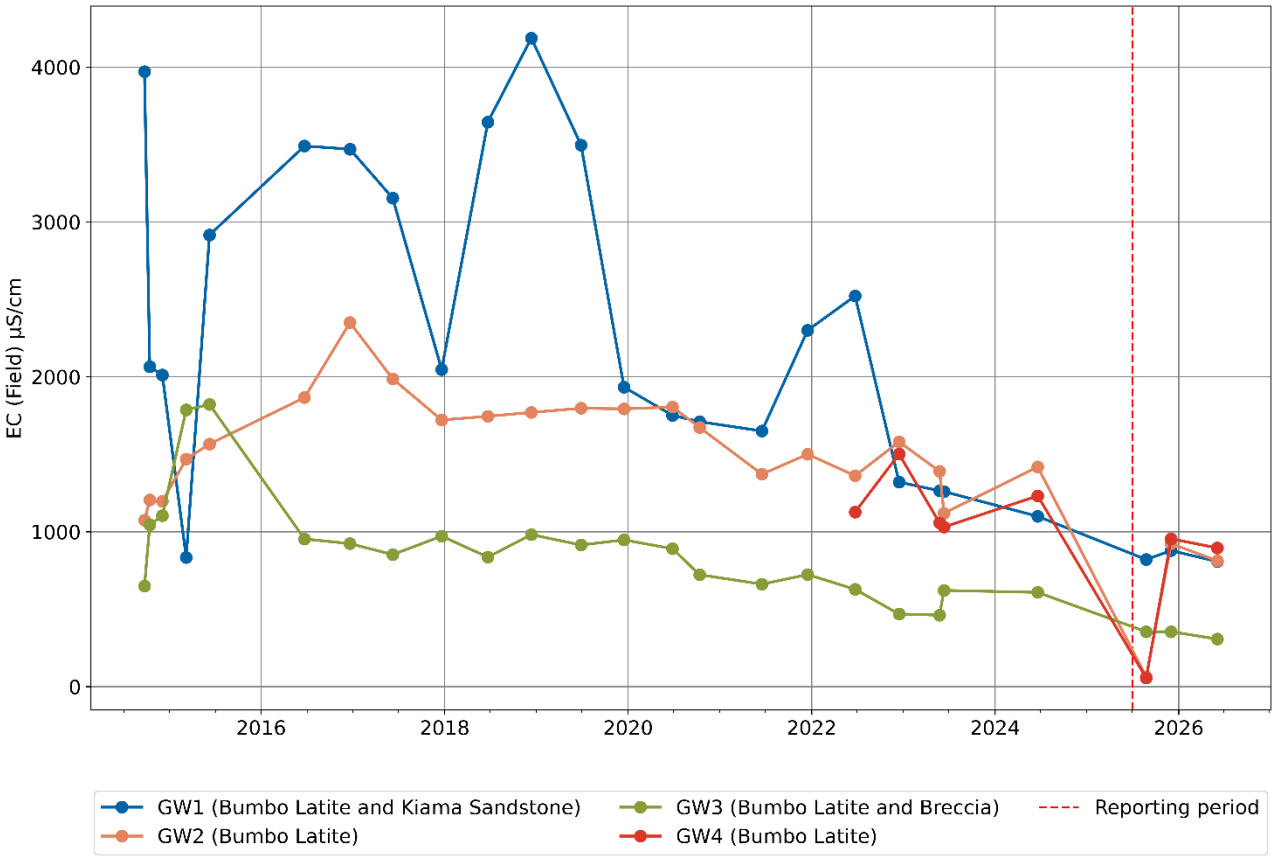

DissolvedCr (mg/L)
0.0050
0.0045
0.0040
0.0035
0.0030
0.0025
0.0020
0.0015
0.0010
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

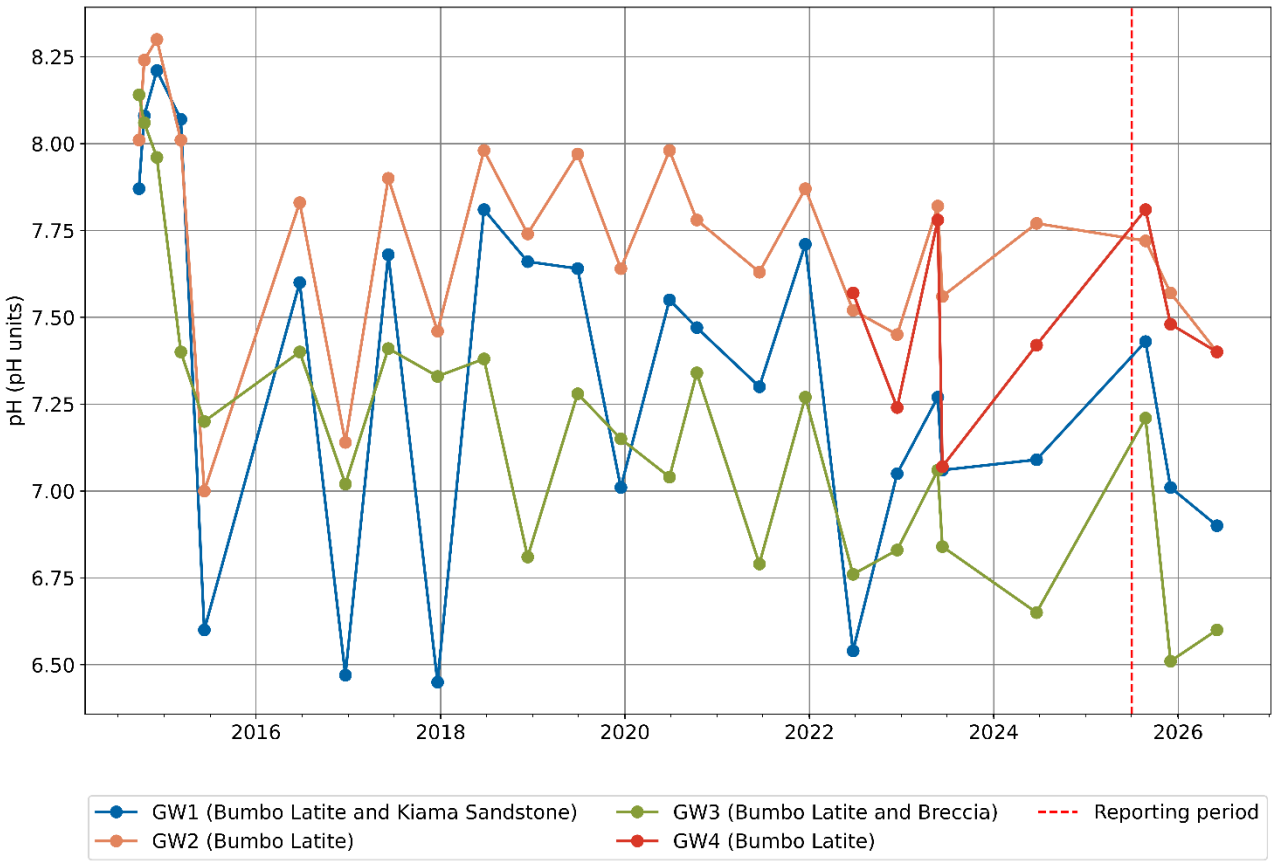

DissolvedFe (mg/L)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

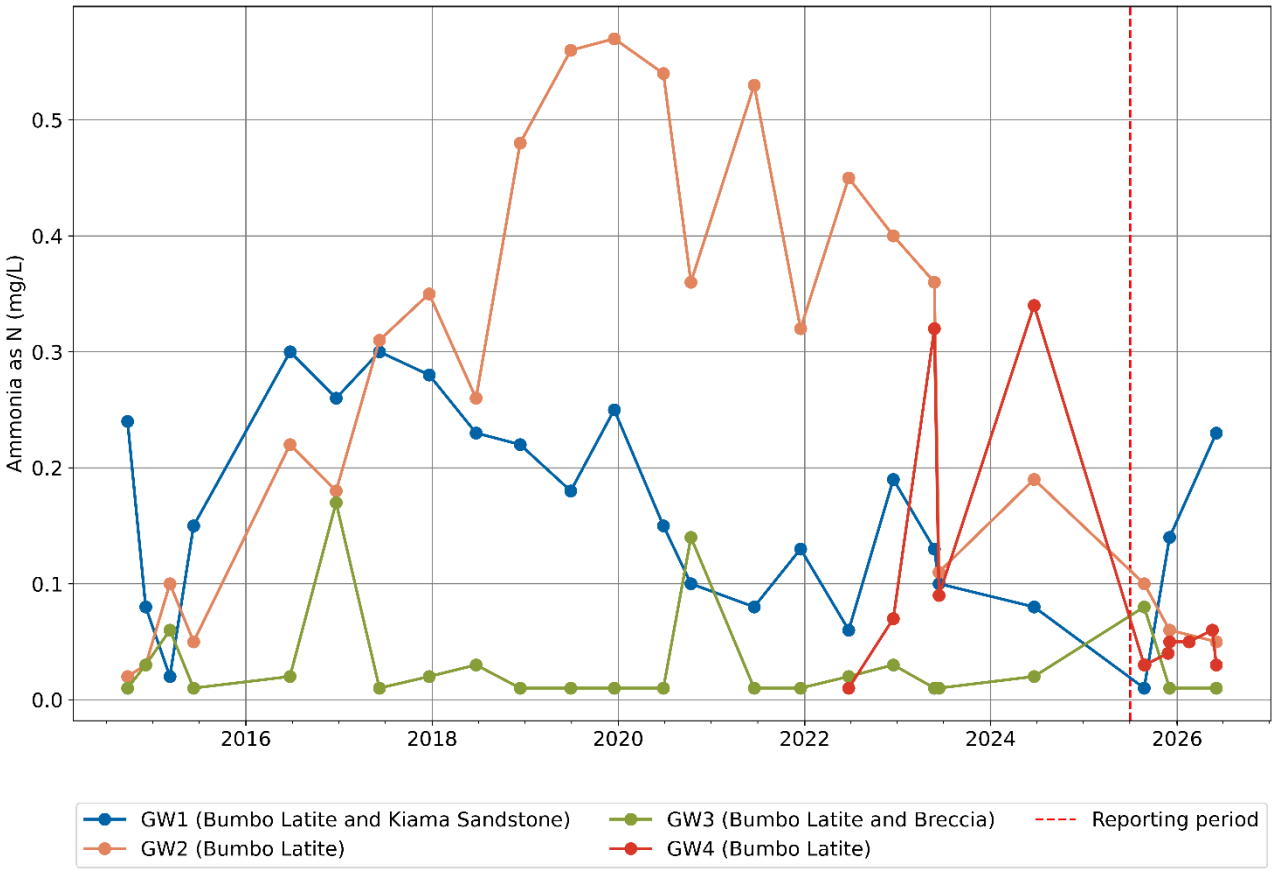

DissolvedCu (mg/L)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

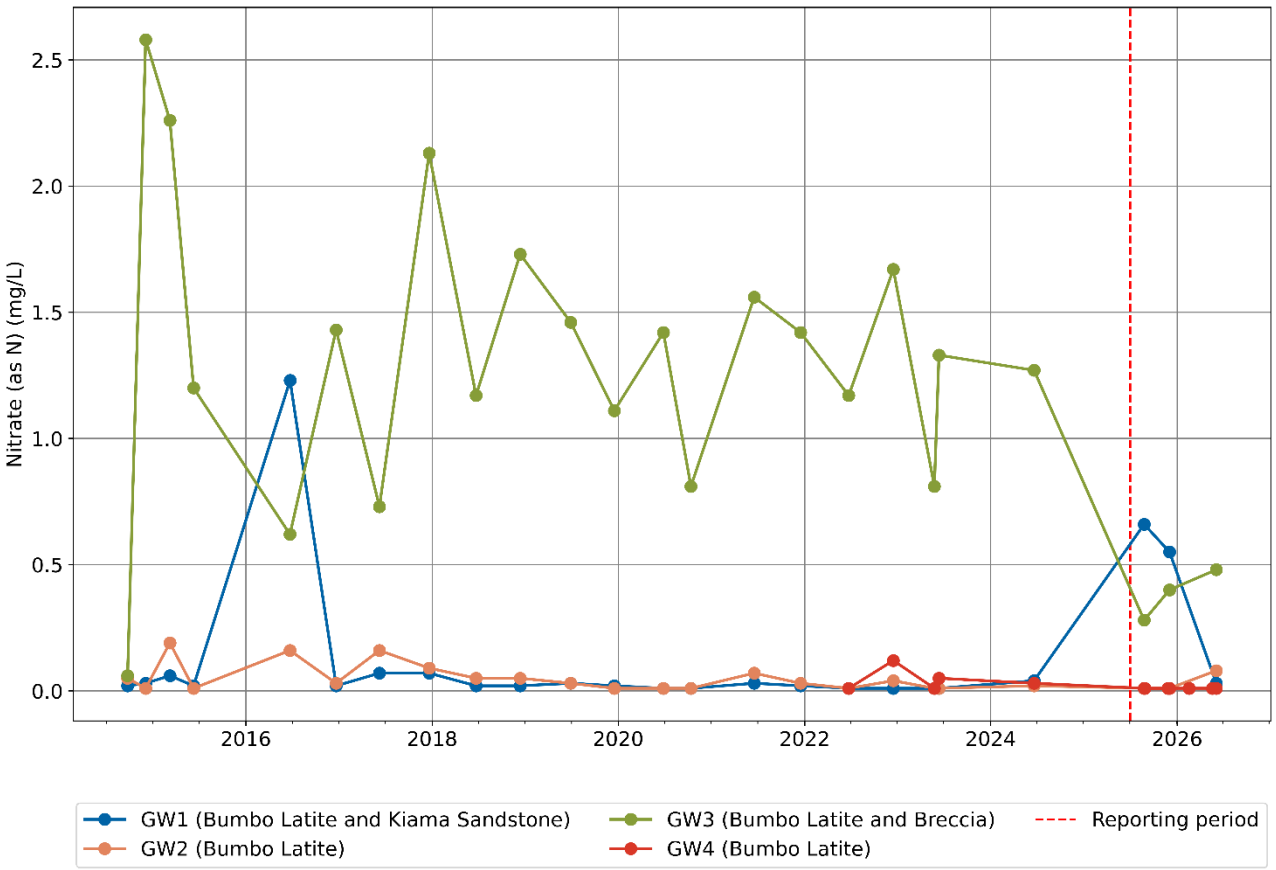

DissolvedNi (mg/L)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

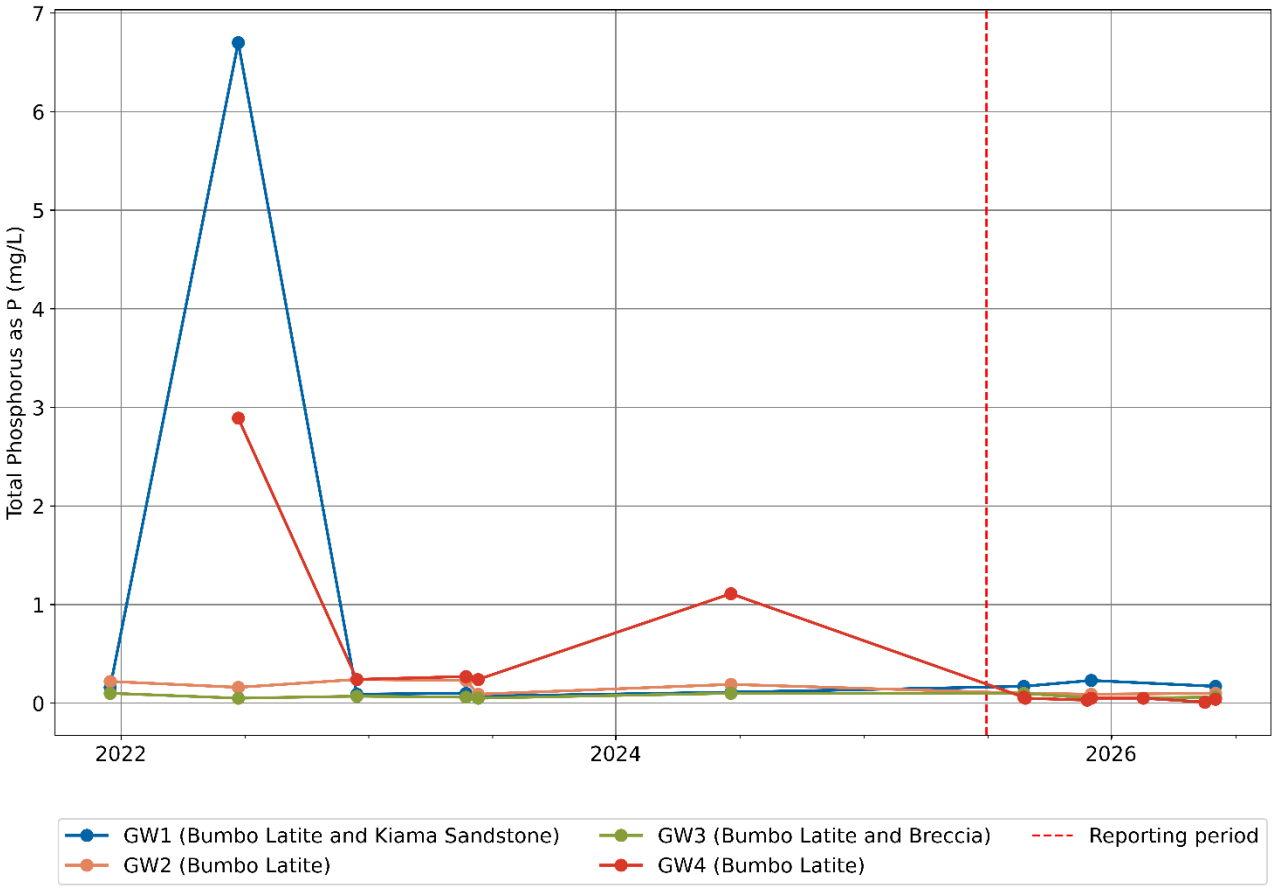

DissolvedZn (mg/L)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period


EC (Field) µS/cm
4000
3000
2000
1000
0
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period


pH (pH units)
8.25
8.00
7.75
7.50
7.25
7.00
6.75
6.50
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period


Ammonia as N (mg/L)
0.5
0.4
0.3
0.2
0.1
0.0
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period


Nitrate (as N) (mg/L)
2.5
2.0
1.5
1.0
0.5
0.0
2016
2018
2020
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period


Total Phosphorus as P (mg/L)
7
6
5
4
3
2
1
0
2022
2024
2026
GW1 (Bumbo Latite and Kiama Sandstone)
GW2 (Bumbo Latite)
GW3 (Bumbo Latite and Breccia)
GW4 (Bumbo Latite)
Reporting period

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14. Appendix F Goodbush Report



Bushland Restoration Final Report

Boral: Rocklow Road, Dunmore

Good Bush Pty Ltd

CONTRACT PERIOD: August 2025 - March 2026

REPORT PREPARED BY: Marcus Burgess and Stefan Mursic

DATE COMPLETED: 28th September 2026



Introduction

This final report is for bushland and riparian restoration works carried out by Good Bush Pty Ltd at Boral Metro Quarries, Rocklow Road, Dunmore from August 2025 to March 2026.

The works carried out at this site are based on the recommendations outlined in the 'Boral Dunmore Vegetation Assessment 29/04/2017'.

Objectives

The objective of these works was to undertake bushland restoration works in order to:

- Protect and enhance the remnants of the existing vegetation communities: Illawarra Dry Subtropical Rainforest, Illawarra Grassy Woodland and Melaleuca armillaris Tall Shrubland,
- reduce the area of Boral Dunmore Quarry natural areas impacted by WoNs and environmental invasive weeds,
- treat significant woody weeds throughout establishing 20-year-old revegetation areas to assist development and establishment,
- improve connectivity between local remnant bushland fragments through weed control activities and assisted regeneration,
- assist natural regeneration by removing significant weed species using bush regeneration techniques and methods, and
- monitor works, progress and completing using visual based documentation.



Map [1]: Illustrating location of all Zones within this restoration project

Zone 1 – Remnant Vegetation Conservation Area

Zone 2 – Offset Area

Zone 3 – Compensatory Habitat Area

Summary of Works (for all zones)

A total of 756 hours have been carried out within the three zones during the period from August 2025 to March 2026 resulting in a total cost of $45,360.00 (Ex GST) for this period

The following table is a summary of all hours carried out within the three work zones:

Site	Hours Worked	Cost
Zone 1 Remnant Vegetation Conservation Zone	No hours	$0.00
Zone 2 Offset Area	431	$25,860.00
Zone 3 Compensatory Habitat Area	154	$9,240.00
Gorse Control	157	$9,420.00
Translocation Site Spray Preparation	14	$840.00
Total	**756**	**$45,360.00**

Works this year focused on maintaining previously worked areas and continuing primary weed control with the Zone 2 and Zone 3 work areas to protect and enhance natural vegetation within the bushland remnants as well as carrying out spray work for the translocation project and treatment of Gorse

The following summaries demonstrate the success of these works:

Zone 1 Remnant Vegetation Conservation Zone: No works were carried out within this zone due to inaccessibility of the site during wet periods and cattle accessing the site where fencing is inadequate.

Zone 2 Offset Area: Works within this zone focused on regeneration of the endangered ecological communities (EEC's) Illawarra Grassy Woodland, Illawarra Subtropical Rainforest and Melaleuca armillaris Tall Shrubland. Secondary weed control and maintenance works were carried out within this zone throughout all previously worked areas to treat re-growth from woody weeds and invasive vines. Additional primary weed control was carried out at the eastern extent of this zone covering approximately 2,150m². Additional populations of the threatened species White Wax Flower *(Cynanchum elegans)* were observed at the eastern extent of the work area and bush regeneration works were carried out within this area to protect and enhance the populations of this threatened species.

Zone 3 Compensatory Habitat Area: Works within this zone focused on regeneration of the endangered ecological communities (EEC's) Illawarra Subtropical Rainforest and Melaleuca armillaris Tall Shrubland. Secondary weed control and maintenance works were carried out within this zone throughout all previously worked areas to treat re-growth from woody weeds and invasive vines. Additional primary weed control was carried out within subtropical rainforest remnants around the populations of the threatened species Illawarra Socketwood *(Daphnandra johnsonii)* and Illawarra Zieria *(Zieria granulata)* with the Melaleuca armillaris Tall Shrubland remnants covering approximately 2,150m². The latter readily regenerated within areas where weed control works were carried out.

Translocation Spraying: This work involved spray treatment of several designated areas to prepare for the translocation of topsoils and leaf litter generated from the expansion of the quarry pit. A high volume spray unit was used to treat several very large areas in preparation for the translocation but a wet August has stalled the movement of trucks into this area and some of these areas have regenerated to weeds.

Gorse Program: Treatment of Gorse during this period was carried out over 2 days in October and December and again in July and September of 2025.
Gorse work was scheduled to be carried out in 2025 over the two months from July and August but August was a particularly wet season and access to the flat at the Mayfield property was not possible due to the wet conditions and potential for getting vehicles bogged and destroying cow pastures. The recent Gorse work has been very successful at treating Gorse in the Mayfeild, Bowhunters Club and Croome Vale areas and loads of Gorse was effectively treated which should provide a much better outcome for Gorse Inspections by IDWA in July 2026.

See below for descriptions of all of the above works

Zone 1 - Remnant Conservation Area

Site Description

This site consists of a large gully with a south easterly aspect with a drainage line that forms part of the Rocklow Creek catchment. The total site area of this zone is approximately 15 hectares. The gully is framed by basalt cliffs on the northern and western boundaries and large basalt boulders dominate the ground layer throughout much of this gully. The southeastern corner at the lower end of the gully has been cleared for pasture and grazing and a waterfall exists at the high end within the north western corner. Immediately west of the waterfall the Dunmore hard rock quarry dominates the landscape.

The basalt at this site erodes to a fine grained highly fertile soil that supports a diverse subtropical rainforest remnant that has remained largely intact despite the clearing of vegetation that was carried out here and within the surrounding areas in the mid 1800's.

The vegetation at this site consists of subtropical rainforest within the deep shaded and wet areas at the top of the gully and planted woodland at the lower end of the gully.

The subtropical rainforest within this zone consists of diverse rainforest remnants that have remained intact due to the rocky nature of the site, difficulty of removing timber species and low value of timber species present. A diverse range of canopy species exists within this gully including Sassafras *(Doryphora sassafras),* Myrtle Ebony *(Diospyros pentamera)* and all five of the local Fig *(Ficus sp.)* species. An abundance of vines exist within this remnant including Round Vine *(Legnephora moorei),* Kangaroo Grape *(Cissus antarctica)* and Milk Vine *(Marsdenia spp.)* and many species of ferns are present as epiphytes, lithophytes and within the ground layer.

Where gaps in the canopy occur, the gully has been invaded by woody weeds and a large percentage of the open areas on the slopes of the gully are dominated by Lantana.

The lower end of the gully has been revegetated within the last ten years using a range of local native tree species, some of which are not entirely relevant to this site. The revegetated areas are also subjected to grazing by cattle and woody weeds have colonised these areas.

Summary of Works

Historically works within this zone have consisted of primary weed control targeting woody weeds throughout established approximately 20 year old revegetation. Large amounts of Wild Tobacco and Lantana were dominating the revegetation areas on the southern side of the creek while encroachment of Kikuyu was impacting the plantings on the northern side of the creek. A total of 25,000m² of primary weed control had been carried out within this zone.

Infill planting was scheduled for this zone but the fencing has fallen into disrepair. Cattle have accessed this site on a number of occasions. The hardwood stakes installed to monitor the photo points were removed and lost and cow pats litter the floor throughout the worked areas.

The following hours worked and square metres covered were carried out within this site:

Date	Hrs	Weed Control	Primary (m²)
* No weed control activity undertaken within this zone due to wet weather restricting access and disruption due to cattle access within the work areas.			

Description of Works

- No works were carried out within this area during this period due to the lack of fencing surrounding the site. Work will recommence within this area once the fencing has been repaired.

- Treatment of Gorse was carried out during the flowering period to break the seed cycle of Gorse plants aiming for eradication of this species over the long term

Zone 2 - Offset Area Works

Site Description

This zone is located south of Rocklow Road and consists of a large bushland remnant with a creek line flowing through the middle. The total site area of this zone covers approximately 18.3 hectares. The majority of this zone is perched on the rocky hillside immediately adjacent to Rocklow Road and supports the 'Melaleuca armillaris tall shrubland' vegetation community. The creekline drops toward the eastern end of the site forming a gully which is well defined by the presence of the rainforest tree species and is identified as the 'Illawarra Subtropical Rainforest' vegetation community. The creek flows close to Rocklow Road at one point where dumping of rubbish and weed material has introduced several highly invasive weed species. Recent improvements to the fencing has been helpful in reducing the rubbish dumping within this area. On the southern side of the gully a tall intact canopy of Forest Red Gum *(Eucalyptus tereticornis)* exists that defines the 'Illawarra Grassy Woodland' vegetation community on site.

The Offset Area has been divided into three zones based on the three different vegetation communities found within this zone. Each of the three vegetation communities have had primary and secondary weed control works targeting woody weeds and invasive vines. The three zones with the Offset Area are as follows:



Map [2]: Zone 2 area denoting subzones 2a, 2b and 2c

Zone 2a: Melaleuca armillaris Tall Shrubland

Zone 2b: Illawarra Subtropical Rainforest

Zone 2c: Illawarra Grassy Woodland

Summary of Works

This contract period bush regeneration works focused on secondary and primary weed control within the woodland and rainforest remnants and the rainforest ecotone at the eastern extent of this zone. Regeneration of native canopy species within these areas this year has been rapid and a connected sub-canopy exists within the RF remnant.

Primary weed control was carried out at the eastern extent of this zone during this contract period. Additional populations of the threatened plant species White Wax Flower *(Cynanchum elegans)* were located within the ecotone between the rainforest and woodland remnants. Mass regeneration of Illawarra Zieria *(Zieria granulata)* has been observed within some areas and *Homalanthus stillingiifolius* has emerged within the site and is regenerating naturally and secondary populations of this regionally rare plant can be found throughout the site.

The following hours worked and square metres covered were carried out within the three zones at this site:

Date	Zone/Area	Weed Control	Hrs	Area (m²)
04/08/2025	2c	Secondary weed control starting from the feeder creek heading west through to the Melaleuca armillaris Tall Shrubland then moving east from pulpit rock through Lowland Grassy Woodland. Cut and Paint of Lantana, Cotton Bush and African Olive regrowth using 50/50 Roundup Biactive and water. Minimal processing of lantana to prevent stem fragment regrowth. Obvious deer damage recorded within the ecotone with rutted white cedars, Lantana growth common to deer trafficked areas and scats identified.	56	36,076
11/08/2025	2b	Conducted a secondary weed control sweep throughout the rainforest ecotone, targeting Lantana, Wild Tobacco and Cape Ivy. Primary Weed Control in the woodland pushing the boundary further east clearing an area of approximately 500m^2 Cut and paint treatment of large woody weeds including Wild Tobacco, African Olive and Lantana. Hand removal of Cape Ivy, rafting all material securely off-ground to prevent self-propagation.	59	7,500
18/08/2025	2c	Commenced primary weed control pushing east linking up previously worked areas covering an approximate area of 521m^2. Cut and paint treatment of large woody weeds including Wild Tobacco, African Olive and Lantana using 50/50 Roundup Biactive + Water and processing material on site.	62	521
15/09/2025	2c	Primary weed control continuing and completing the Lantana thicket that was worked on last visit, clearing an area of approximately 100m^2 Secondary weed control and maintenance of surrounding areas that were heavily infested with Cape Ivy Hand removal and cut and paint treatment of Lantana and African Olive.	61	1100

		Hand removal of Moth Vine, White Passionfruit and Cape Ivy, rafting any species or plant parts that could regrow off-ground.		
16/10/2025	2c	Continued primary control of Lantana (L. camara), advancing east from previously treated areas and covering approximately 1,500 m². Scattered clumps of Lantana were treated along the way before reaching a wall of Lantana at the eastern edge of today's work area. Wild Tobacco (Solanum mauritianum), African Olive (Olea europaea subsp. cuspidata) and Lantana were using the cut-and-paint method. Woody weed materials were processed and left to break down on site. The final hour of the day was spent targeting Cape Ivy (Delairea odorata), following on from maintenance works completed during a previous visit. Cape Ivy was hand-reeled, and all vegetative material was securely rafted on site. A juvenile Cynanchum elegans was recorded, and care was taken to avoid disturbance.	56	1900
05/12/2025	2b	Secondary weed control sweep throughout the rainforest ecotone, targeting Lantana, Wild Tobacco and Cape Ivy. Madeira was found growing along the creek and was hand removed and bagged, this area will need further monitoring and efforts to address the larger population further downstream need to be made.	45	8,452
09/03/2026	2b 2a	Secondary weed control through previously cleared areas targeting woody weeds and ascending vines. Hand removal of Moth Vine (Araujia sericifera) and White Passionfruit (Passiflora subpeltata) that was ascending into the canopy. Hand removal and cut and paint of re-emerging woody weeds including Wild Tobacco, Lantana, African Olive, Inkweed, Senna etc. Primary weed control through a remnant Melaleuca armilaris woodland south of the rainforest cut and paint of Lantana and Senna then processed materials to break down on site.	92	3,746
TOTAL			**431**	**59,295**

Work Areas Map

The following map identifies the approximate areas worked within the three zones:



Map [3]: Zone 2 - Offset Area Works for 2025/26

Progress Photographs



Photo [1]: Cynanchum elegans on site, 4th August 2025 | Photo [2]: (right) Pterostylis curta 18th August 2025



Photo [3] and [4]: Before and After Primary Weed Removal (Photo bearing NW)



Photo [5] and [6]: Before and After Primary Weed Removal (Photo bearing N)





Photos [7] and [8]: Before and After Primary Weed Control 18th August 2025





Photos [9] and [10]: Before and After Primary Weed Control 18th August 2025





Photos [11] and [12]: Before and After Primary Weed Control 16th October 2025

Zone 3 - Compensatory Habitat Area

Site Description

This zone is located south of Rocklow Road and consists of a large bushland remnant on a hilltop with a small ephemeral creek line within a gully to the south of the hill. The total site area of this zone covers approximately 23.1 hectares. The majority of this zone is perched on the rocky hillside and supports the Melaleuca armillaris tall shrubland vegetation community. The gully drops at the southern end of the zone which is well defined by the presence of rainforest species and some very impressive land large Moreton Bay Fig (Ficus macrophylla) trees.

Extensive revegetation has been carried out within this zone within the southern gully and on the eastern and western edges of the zone. Hundreds of thousands of trees have been planted within this zone and are now reaching maturity. Many open areas that have been cleared of vegetation also exist within this zone with the majority of these clearings occurring on the rocky hill tops.

Works within this zone have focused on treating woody weeds within the establishing revegetation along the western boundary of the zone.

Vegetation community boundaries within the compensatory habitat zone are as follows:



Map [4]: Work Area for Zone 3

Summary of Works

Works within this contract period focused heavily on secondary weed control throughout established revegetation areas. Works commenced for the northern fence line that defines this zone and have continued south covering over 2ha. The western fence line defined the boundary of this work area and an old dry-stone wall that divides the revegetation areas from the natural bushland was defining the eastern boundary.

The following hours worked and square metres covered were carried out within this site:

Date	Weed Control	Hrs	Area (m^2)
28/01/2026	Conducted a sweep targeting secondary growth of woody weeds and ascending vines from the gate to zone 3 down to the Daphnandra johnsonii Hand removal of Moth Vine and White Passionfruit growing into canopy of native species, rafting roots off-ground Hand removal and cut and paint treatment of a variety of re-emerging woody weeds including Wild Tobacco, Lantana, African Olive, Inkweed, Senna etc.	77	15,000
16/02/2026	Conducted a sweep targeting secondary growth of woody weeds and ascending vines from The Daphnandra johnsonii working through the Melaleuca armilaris shrubland towards the large Fig. Hand removal of Moth Vine (Araujia sericifera) and White Passionfruit (Passiflora subpeltata) that was ascending into the canopy. Hand removal and cut and paint of re-emerging woody weeds including Wild Tobacco, Lantana, African Olive, Inkweed, Senna etc.	77	20,264
TOTAL		**154**	**35,264**

Work Areas Map

The following map identifies the approximate areas worked within this contract period:



Map [5]: Areas treated for Zone 3 between August 2025 and March 2026

Progress Photographs



Photo [13]: Secondary growth of Wild Tobacco shown here on the 28th January 2026



Photo [14]: Team conducting secondary and maintenance weed control through the dense habitat compensatory area. 28th January 2026





Photos [15] and [16]: Before and After Primary weed control at Zone 3. 16th February 2026





Photos [17] and [18]: Before and After Secondary weed control at Zone 3. 16th February 2026

Gorse Treatment

Gorse populations have been treated in previous years by Good Bush. Illawarra District Weeds Authority (IDWA) have previously treated these populations using spray controls. This treatment method, while effective in the initial treatment allowed plants to regrow from the base after a period of four or five months showing the spraying method to be a largely ineffective treatment method.

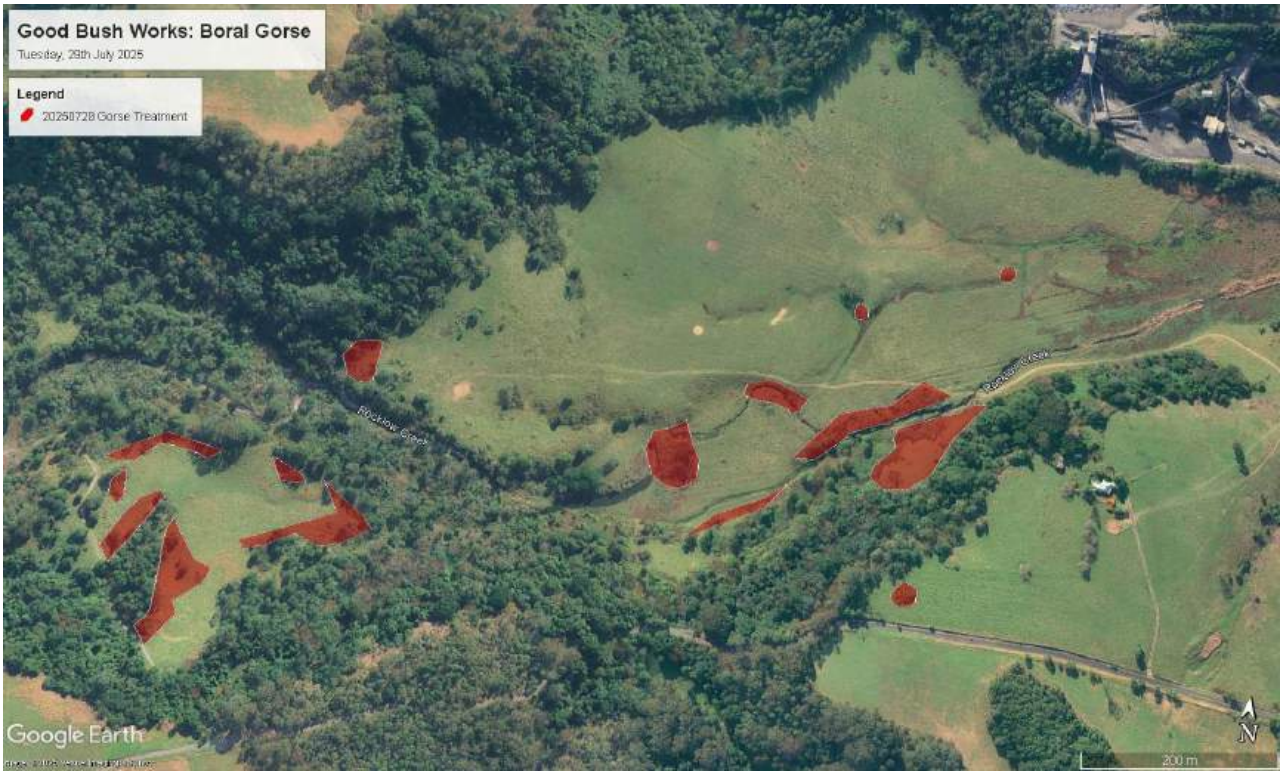
Gorse control works have been conducted in the October and December 2024 and again in July and September 2025 contract period. Very thorough Gorse works were carried out within this work period and it is anticipated that only minor seed growth will be observed in the coming years and an overall reduction of Gorse control works can be anticipated in future.

Summary of Works:

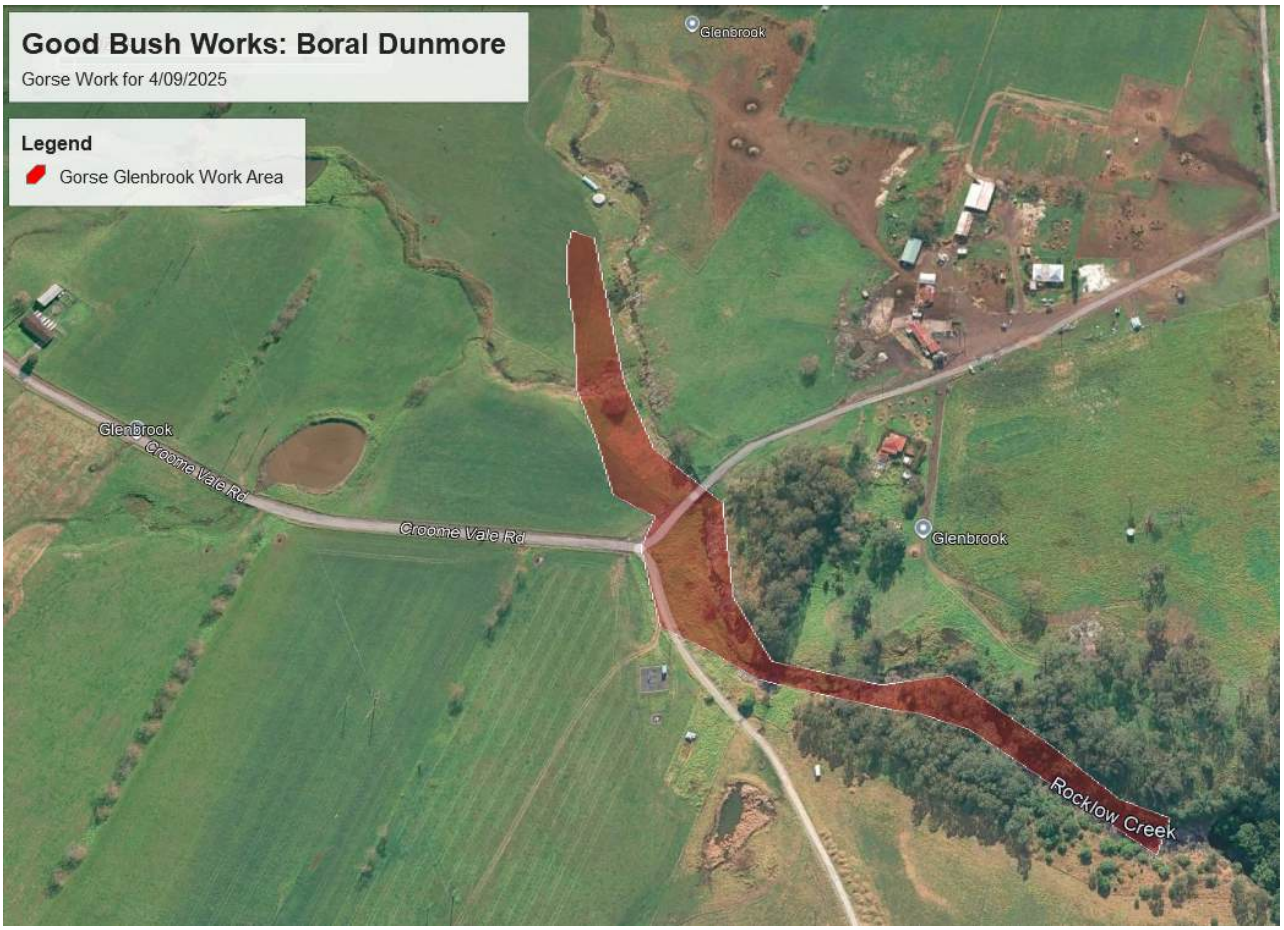
All Gorse plants treated during these works used the cut and paint method to ensure success of the weed treatments. Materials were not processed or removed from site as there was no seed present during the treatment period. All Gorse plants treated at this time were in full flower which is the optimum time for treatment to break the seed cycle and ensure no additional seeds were borne this year. Follow work will be required over consecutive years to treat the flush of seed stored in the soil and it is anticipated after a period of approximately five years the Gorse plants should be effectively eradicated from this site.

Date	Hrs	Weed Control	Primary (m^2)
29/07/2025	73	Secondary / Follow-up weed control targeting Gorse in areas where it was present, ensuring that regrowth is managed and reinfestation does not occur. Cut and paint treatment of Gorse. Materials left to break down on site.	40,000
04/09/2025	84	Drive in the Bowhunters club gate and conduct toolbox talk Commence cut and paint treatment of Gorse within areas identified in the IDWA map Total Gorse treatment area for the Bowhunters Club site of approximately 26,000m^2 Drive around to Croome Vale Road and commence Gorse treatment upstream of the bridge at the Glenbrook Property Large population of previously sprayed Gorse exists within this area resulting in short stunted plants with large bases All plants treated using the cut and paint method Continue downstream of the bridge and treat Gorse plants using the curt and paint method Continued downstream further than the pink tape marked plants and found many additional plants that were also treated A small population of Montpellier Broom (Genista monspessulana) consisting of approximately 10 stems also treated at the Glenbrook site. Total Gorse treatment area for the Glenbrook site of approximately 15,000m^2	41,000

Work area maps for Gorse treatment below:







Map [6], [7] and [8]: Boral Dunmore Gorse Treatment Areas across 29th July and 4th September 2025

Photographs:



Photo [19]: Gorse Treatment on 29th July 2025



Photo [20]: Gorse Treatment on 29th July 2025



Photo [21]: Gorse Treatment on 29th July 2025



Photo [22] and [23]: Before and After Gorse Treatment on 29th July 2025





Photo [24] and [25]: Before and After Gorse Treatment on 29th July 2025



Photo [26]: Gorse Treatment on 4th September 2025



Photo [27]: Gorse Treatment on 4th September 2025



Photo [28]: Gorse Treatment on 4th September 2025



Photo [29]: Gorse Treatment on 4th September 2025



Photo [30]: Gorse Treatment on 4th September 2025



Photo [31]: Gorse Treatment on 4th September 2025