MANGOOLA
OPEN CUT

GLENCORE

Annual Review 2024

1 January to 31 December 2024

Title Block

Name of Operation	Mangoola Open Cut
Name of Operator	Mangoola Coal Operations Pty Ltd
Development Consent	SSD 8642
Name of holder of Development Consent/ Project Approval	Mangoola Coal Operations Pty Ltd
Mining lease #	ML 1626, ML 1747, ML 1815, ML 1817
Name of holder of mining lease	Mangoola Coal Operations Pty Ltd
Water licence #	Various (refer Section 3.4)
Name of holder of water licence	Mangoola Coal Operations Pty Ltd
RMP Commencement date	2 July 2022
Annual Review start date	1 January 2024
Annual Review end date	31 December 2024

I, Sam Palmer, certify that this audit report is a true and accurate record of the compliance status of Mangoola Open Cut for the period 1 January 2024 to 31 December 2024 and that I am authorised to make this statement on behalf of Mangoola Open Cut.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

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

Name of authorised reporting officer	Sam Palmer
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	31 March 2025

1. Table of Contents

1. Statement of Compliance 7
2. Introduction 9
2.1 Mining Operations 9
2.2 Mine Contacts 11
3. Approvals 13
3.1 Development Consent 13
3.2 Mining Titles 13
3.3 Licences 13
3.3.1 Environment Protection Licence 13
3.3.2 Surface Water Licences 14
3.3.3 Groundwater Licences 16
3.3.4 Radiation Licence 18
3.3.5 Sewerage Management System Licence 18
3.4 Other Approvals 18
3.4.1 Rehabilitation Management Plan 18
3.4.2 Compliance with EIS Predictions 19
4. Operations During the Reporting Period 20
4.1 Mining Operations 20
4.1.1 Overview 20
4.1.2 Exploration 20
4.1.3 Land Preparation 20
4.1.4 Mining 20
4.2 Other Operations 23
4.2.1 Coal Processing 23
4.2.2 Coal Transport 23
4.2.3 Construction 23
4.2.4 Waste Management 23
4.3 Next Reporting Period 24
4.3.1 Mining 24
4.3.2 Exploration 24
4.3.3 Construction 24
4.3.4 Tailings Disposal 24
5. Actions Required from Previous Annual Review 25
6. Environmental Performance 26
6.1 Meteorology 26
6.2 Air Quality 30
6.2.1 Environmental Management 30
6.2.2 Environmental Monitoring Results 33

6.2.2.1 Results from the Reporting Period 33
6.2.2.2 Comparison with Predictions 35
6.2.2.3 Long Term Trend Analysis 36
6.2.3 Key Performance and/or Management Issues 36
6.2.4 Proposed Improvements 37
6.3 Noise 37
6.3.1 Environmental Management 37
6.3.2 Environmental Monitoring Results 41
6.3.2.1 Results from the Reporting Period 41
6.3.2.2 Comparison with Predictions 48
6.3.2.3 Long Term Trend Analysis 48
6.3.3 Key Performance and/or Management Issues 49
6.3.4 Proposed Improvements 49
6.4 Blasting and Vibration 49
6.4.1 Environmental Management 49
6.4.2 Environmental Monitoring Results 52
6.4.2.1 Results from the Reporting Period 52
6.4.2.2 Comparison with Predictions 56
6.4.2.3 Long Term Trend Analysis 56
6.4.3 Key Performance and/or Management Issues 56
6.4.4 Proposed Improvements 57
6.5 Erosion and Sediment Control 57
6.5.1 Environmental Management 57
6.5.2 Environmental Monitoring Results 57
6.5.3 Key Performance and/or Management Issues 58
6.5.4 Proposed Improvements 58
6.6 Biodiversity 58
6.6.1 Environmental Management 58
6.6.2 Biodiversity Offset Areas – Overview 59
6.6.3 Environmental Monitoring Results 62
6.6.3.1 Flora 62
6.6.3.2 Fauna 63
6.6.3.3 Threatened Species 63
6.6.3.4 Conservation Agreement Monitoring 64
6.6.3.5 Nest Box Monitoring 68
6.6.3.6 Threatened Terrestrial Orchid Monitoring 68
6.6.3.7 Groundwater Dependent Ecosystems 70
6.6.3.8 Offset and Infill Tree Planting 2024 70
6.6.4 Key Performance and/or Management Issues 72
6.6.5 Proposed Improvements 73
6.7 Weed and Pest 73
6.7.1 Environmental Management 73

6.7.1.1 Weed Management Activities 73
6.7.1.2 Feral and Pest Animal Management Activities 74
6.7.2 Key Performance and/or Management Issues 74
6.7.3 Proposed Improvements 74
6.8 Visual Mitigation 74
6.8.1 Environmental Management 74
6.8.2 Environmental Monitoring Results 75
6.8.3 Key Performance and/or Management Issues 75
6.8.4 Proposed Improvements 75
6.9 Aboriginal Heritage 75
6.9.1 Environmental Management 75
6.9.2 Environmental Monitoring Results 76
6.9.3 Key Performance and/or Management Issues 76
6.9.4 Proposed Improvements 76
6.10 European Heritage 77
6.10.1 Environmental Management 77
6.10.2 Environmental Monitoring Results 77
6.10.3 Key Performance and/or Management Issues 77
6.10.4 Proposed Improvements 77
6.11 Spontaneous Combustion 77
6.11.1 Environmental Management 77
6.11.2 Environmental Monitoring Results 78
6.11.3 Key Performance and/or Management Issues 78
6.11.4 Proposed Improvements 78
6.12 Bushfire 78
6.12.1 Environmental Management 78
6.12.2 Environmental Monitoring Results 78
6.12.3 Key Performance and/or Management Issues 78
6.12.4 Proposed Improvements 78
6.13 Hydrocarbon Management 79
6.13.1 Environmental Management 79
6.13.2 Environmental Monitoring Results 79
6.13.3 Key Performance and/or Management Issues 79
6.13.4 Proposed Improvements 79
6.14 Public Safety 79
6.14.1 Environmental Management 79
6.14.2 Environmental Monitoring Results 80
6.14.3 Key Performance and/ or Management Issues 80
6.14.4 Proposed Improvements 80
6.15 Greenhouse Gas Energy 80
6.15.1 Environmental Management 80
6.15.2 Environmental Monitoring Results 81

6.15.2.1 Results from the Reporting Period 81
6.15.2.2 Comparison with Predictions 81
6.15.3 Key Performance and/or Management Issues 81
6.15.4 Proposed Improvements and Abatement Measures 82
6.16 Traffic Management 82
7. Water Management 83
7.1 Water Balance 83
7.2 Salt Balance 84
7.3 Saline Material, Water Management and Minimisation 84
7.4 Water Take 86
7.4.1 Changes to Licences 88
7.5 Hunter River Salinity Trading Scheme Discharges 88
7.6 Surface Water Monitoring 88
7.6.1 Environmental Management 88
7.6.2 Environmental Monitoring Results 91
7.6.2.1 Results from the Reporting Period 91
7.6.2.2 Comparison with Predictions 96
7.6.2.3 Long Term Trend Analysis 97
7.6.3 Key Performance and/or Management Issues 97
7.6.4 Proposed Improvements 98
7.7 Groundwater Management 98
7.7.1 Environmental Management 98
7.7.1.1 Summary of the Groundwater Monitoring Network 98
7.7.2 Environmental Monitoring Results 101
7.7.2.1 Results from Reporting Period 101
7.7.2.2 Groundwater and quality monitoring 104
7.7.2.3 Comparison with Predictions 106
7.7.3 Key Performance and or Management Issues 106
7.7.4 Proposed Improvements 106
8. Rehabilitation 107
8.1 Rehabilitation of Disturbed Land 107
8.2 Removal of Buildings 110
8.2.1 Key Issues Affecting Rehabilitation 110
8.2.2 Post Rehabilitation Land Use 111
8.3 Rehabilitation Trials and Research 115
8.4 Actions for the Next Reporting Period 115
9. Community 116
9.1 Community Engagement Activities/Initiatives 116
9.1.1 Community Consultative Committee 116
9.1.2 Annual Community Event 117
9.1.3 Community Tours 117

9.1.4 Other Consultation 118
9.1.5 SIMP Community Management Program Performance Summary 118
9.1.5.1 Community Mitigation Measures 118
9.1.5.2 Communicating Environmental Performance 119
9.1.5.3 Implementation of Management Plan Commitments 119
9.1.5.4 Recruitment Initiatives 119
9.1.5.5 Other 119
9.1.6 Website 120
9.2 Community Contributions 120
9.2.1 Voluntary Planning Agreement 120
9.2.2 Smarty Grants 120
9.2.3 Community Enhancement Program/Fund 121
9.3 Community Complaints 122
9.3.1 2024 Complaints Summary 123
9.3.2 Analysis of Complaints 123
9.3.3 Actions in Response to Complaints 127
10. Independent Environmental Audit 129
11. Incidents and Non-Compliances 131
12. Activities to be Completed During Next Reporting Period 134
12.1 Management Plan Review 134
12.2 2025 Actions 136
13. References 137
Appendix A - Annual Rehabilitation Report and Forward Program and 2024 Disturbance and Rehabilitation Plan 138
Appendix B - Long Term Trend Graph: Rainfall 141
Appendix C - Long Term Trend Graphs: Air Quality 142
Appendix D - Long Term Trend Graphs: Blasting 145
Appendix E - Long Term Trend Graphs: Surface water 148
Appendix F - Groundwater Report 152
Appendix G - Annual Train Movements 2024 153

1. Statement of Compliance

A summary of compliance at Mangoola Open Cut during 2024 is provided in ***Table 1-1***.

Table 1-1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes/No
Development Consent (SSD 8642)	No
Environment Protection Licence (EPL) 12894	No
EPBC 2018/8280	Yes
Mining Lease 1626	Yes
Mining Lease 1747	Yes
Mining Lease 1817	Yes
Mining Lease 1815	Yes
Assessment Lease 9	Yes
Exploration Licence 5552	Yes

A summary of the non-compliances during the reporting period have been summarised in ***Table 1-2***. The non-compliances during the 2024 reporting period are discussed further in ***Section 11***.

Table 1-2 Non-Compliance During 2024

Relevant Approval	Condition Number	Description Summary	Compliance Status	Comment	Where Addressed
EPL	M4.1	Weather Monitoring Requirements	Non-compliant	Failure to continuously monitor (15min averaging periods) at EPL monitoring point 5 and monitoring point 18 for numerous instances throughout 2024	Section 6.1 and Section 11
EPL	M2.2	PM10 monitoring must be undertaken continuously	Non-compliant	Failure to continuously monitor PM10 at EPL Monitoring Point 19 and Monitoring Point 20 due to breakdowns and maintenance throughout 2024	Section 6.2 and Section 11
EPL	E1.3	Exceedance of the hourly volume discharge limit for: River block 2022-219(1)(2) on 5 August 2022, for every hour between 18:00 and 20:00 River block 2022-298(1)(2) on 23 October 2022, for every hour between 15:00 and 00:00, and 24 October 2022, for every hour between 00:00 and 08:00.	Non-compliant	Formal Warning issued to Mangoola on 15 July 2024 noting the exceedances contravene Licence condition E1.3 which are potential offences under Section 64(1) of the Protection of the Environment Operations Act 1997	Section 11

Table 1-3 Compliance Status Categories

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; or • 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-compliance	Non-compliant	Non-compliance which does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

2. Introduction

2.1 Mining Operations

Mangoola Open Cut (Mangoola) is owned and operated by Mangoola Coal Operations Pty Ltd which is a Glencore managed operation. Mangoola is located near Wybong, New South Wales (NSW), approximately 20 kilometres (km) west of Muswellbrook and approximately 10 km north of Denman in the Muswellbrook Local Government Area (LGA). A locality plan is presented in ***Figure 2-1***. This Annual Review has been prepared for the 12-month reporting period of 1 January 2024 to 31 December 2024 (herein referred to as the reporting period).

Mangoola was approved as a Major Project under the now repealed Section 75J Part 3A of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act) in June 2007 (PA 06_0014). PA 06_0014 has since been declared a State Significant Development (SSD) under Clause 6 of Schedule 2 of the NSW Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017 (PA 06_0014 which then became referred to as MP 06_0014). MP 06_0014 approved the construction of an open cut coal mine and associated infrastructure in the Wybong area. The mine, then owned by Centennial Coal and known as the Anvil Hill Project, was approved to extract up to 10.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal. Since April 2014, Mangoola has been approved to extract up to 13.5 Mtpa ROM coal under MP 06_0014. The Site also operates a Coal Handling and Preparation Plant (CHPP) and Train Loading Facility. During the reporting period, mining operations continued in the Main Pit and South Pit areas south of Wybong Road.

On 26 April 2021, the NSW Independent Planning Commission (IPC) approved with conditions, the Development Application for the Mangoola Coal Continued Operations (MCCO) Project under Part 4 of the EP&A Act. The State Significant Development (SSD) 8642 approval provides for the continuation of open cut mining immediately north of the existing mine at Mangoola Coal Operations. This will enable Glencore to extract a further 52 million tonnes of coal through to the end of 2030. During the reporting period, construction continued in the MCCO Project Area north of Wybong Road. The mining phase was triggered on 1 December 2022 with the commencement of vegetation removal associated with mining.

During the reporting period, mining operations continued in the Main Pit and South Pit areas south of Wybong Road, as well as north of Wybong Road within the MCCO Project area, otherwise known as Wybong Pit. Mining operations officially commenced in Wybong Pit on 1 December 2022 with the first blast conducted on 19 January 2023 and first coal extracted on 28 August 2023.

On 21 November 2022, Mangoola surrendered MP 06_0014 in accordance with Schedule 2, Condition A15 of SSD 8642. This Annual Review reports against SSD 8642 and MP06_0014 conditions where they applied during the reporting period.

This Annual Review has been prepared in accordance with:

- Condition D11 of SSD 8642.
- Mining Lease 1626 (ML 1626).
- Mining Lease 1747 (ML 1747).
- Mining Lease 1815 (ML 1815).
- Mining Lease 1817 (ML 1817).
- The NSW Government Annual Review Guideline (October 2015).
- Department of Planning, Housing and Industry (DPHI) 2023 Annual Review feedback.

Copies of and/or a link to this Annual Review will be made available to the Department of Planning, Housing and Infrastructure (DPHI), the Department of Regional NSW – Resources Regulator (Resources Regulator), the Biodiversity Conservation Division (BCD), the Natural Resources Access Regulator (NRAR), the Department of Climate Change, Energy, the Environment and Water (DCCEEW), NSW Biodiversity Conservation Trust (BCT), and the Environment Protection Authority (EPA). As per Condition D11 of SSD 8642 copies of and/or a link to the company website will also be provided to the Muswellbrook Shire Council and members of the Mangoola Community Consultative Committee (CCC). A copy will also be made available on the Mangoola website in accordance with SSD 8642 for any member of the public to access or be provided at the request of any interested person.

2.2 Mine Contacts

The relevant mine contacts for Mangoola are listed in ***Table 2-1***.

Table 2-1 Mine Contacts

Contacts	Details
Operations Manager	Jacob Hundertmark
Environment and Community Manager	Sam Palmer
Mailing Address	PO Box 495 Muswellbrook NSW 2333
Phone Number	(02) 6549 5500
Fax Number	(02) 6549 5655
24 Hour Community Hotline	1800 014 339
Website	*Mangoola Open Cut* (www.glencore.com.au/operations-and-projects/coal/current-operations/mangoola-open-cut)
General Enquiries Email	mangoolaenquiries@glencore.com.au

Figure 2-1 Regional Context

3. Approvals

Operations at Mangoola are regulated by a range of leases, licences and approvals, which are summarised in the following sections.

3.1 Development Consent

SSD 8642 allows for the extraction, processing and transportation of up to 13.5 Mtpa through to the end of 2030. The approval supersedes the, now surrendered, MP 06_0014 and incorporates the existing operations in Main and South Pits as well as the continuation of open cut mining immediately north of the existing mine at Mangoola Coal Operations known as Wybong Pit. ***Table 3-1*** summarises the details of this approval.

Table 3-1 SSD 8642 Summary

Approval	Title	Date Granted	Expiry
SSD 8642	Mangoola Coal Continued Operations Project	26 April 2021	31 December 2030

3.2 Mining Titles

Mangoola currently holds six active titles as shown in ***Table 3-2***.

Table 3-2 Mining Tenements

Title	Date Granted	Expiry
Mining Lease 1626	20 November 2008	20 November 2029
Mining Lease 1747	24 August 2016	5 December 2037
Mining Lease 1815	29 September 2021	29 September 2042
Mining Lease 1817	27 October 2021	27 October 2042
Assessment Lease 9	8 November 2004	8 November 2030*
Exploration Licence 5552	8 May 2006	7 November 2025

**Renewal of AL9 approved on the 25th of March 2025.*

3.3 Licences

3.3.1 Environment Protection Licence

Mangoola operates under EPL 12894, with an anniversary date of 7 July. Monitoring results are reported to the EPA as part of the Mangoola EPL Annual Return and monitoring data is available on the Mangoola website.

The environmental reporting and monitoring activities undertaken at Mangoola as required under EPL 12894, are discussed in ***Section 6*****.**

There were no EPL variations in the 2024 reporting period.

3.3.2 Surface Water Licences

Mangoola currently holds the following surface water licences, as detailed in ***Table 3-3***.

Table 3-3 Surface Water Licences

WAL No.	DPHI Water Reference Number	Share Allocation (ML)	Water Source	WAL No.	DPHI Water Reference number	Share Allocation (ML)	Water Source
503	20AL200112	159	Hunter Regulated River	6571	20AL201639	111	Hunter Regulated River
644	20AL200456	3	Hunter Regulated River	6572	20AL201640	8	Hunter Regulated River
645	20AL200457	432	Hunter Regulated River	6576	20AL201869	600	Hunter Regulated River
691	20AL200578	50	Hunter Regulated River	6577	20AL201870	8	Hunter Regulated River
692	20AL200579	8	Hunter Regulated River	7291*	20AL202589	63	Wybong Creek
735	20AL200676	72	Hunter Regulated River	7292*	20AL202610	44	Wybong Creek
822	20AL200912	3	Hunter Regulated River	9061	20AL203156	6	Hunter Regulated River
823	20AL200913	310	Hunter Regulated River	9062	20AL203157	18	Hunter Regulated River
824	20AL200915	175	Hunter Regulated River	9343*	20AL203174	25	Wybong Creek
830	20AL200933	306	Hunter Regulated River	9344*	20AL203206	164	Wybong Creek
831	20AL200934	8	Hunter Regulated River	9986	20AL203182	5	Hunter Regulated River
895	20AL201081	8	Hunter Regulated River	9987	20AL203183	82	Hunter Regulated River

WAL No.	DPHI Water Reference Number	Share Allocation (ML)	Water Source	WAL No.	DPHI Water Reference number	Share Allocation (ML)	Water Source
897	20AL201085	55	Hunter Regulated River	9988	20AL203184	8	Hunter Regulated River
898	20AL201086	8	Hunter Regulated River	11085*	20AL203320	128	Wybong Creek
933	20AL201156	43	Hunter Regulated River	11216	20AL203370	86	Hunter Regulated River
1000	20AL201324	3	Hunter Regulated River	13083	20AL203454	100	Hunter Regulated River
1001	20AL201325	334	Hunter Regulated River	13228	20AL202591	0	Wybong Creek
1057	20AL201469	509	Hunter Regulated River	13229	20AL202592	77	Wybong Creek
1159	20AL201722	159	Hunter Regulated River	18689	20AL209242	15	Muswellbrook
1239	20AL203080	40	Hunter Regulated River	18701	20AL209198	28	Muswellbrook
1349	20AL202949	8	Hunter Regulated River	18712	20AL209241	5	Muswellbrook
1387	20AL202878	40	Hunter Regulated River	20343	20AL204331	48	Wybong Creek
6260*	20AL202522	36	Wybong Creek	37027*	20AL213134	30	Wybong Creek
6261	20AL202524	1	Wybong Creek	37028*	20AL213135	96	Wybong Creek
6262*	20AL202525	8	Wybong Creek	6294*	20AL202631	39	Wybong Creek
6264*	20AL202531	30	Wybong Creek	6296*	20AL202639	86	Wybong Creek
6272*	20AL202554	50	Wybong Creek	6298*	20AL202643	39	Wybong Creek

WAL No.	DPHI Water Reference Number	Share Allocation (ML)	Water Source	WAL No.	DPHI Water Reference number	Share Allocation (ML)	Water Source
6276*	20AL202562	12	Wybong Creek	6304	20CA202655	5	Wybong Creek
6278*	20AL202569	117	Wybong Creek	6305	20CA202656	74	Wybong Creek
6306*	20AL202658	52	Wybong Creek	7495	20AL202699	27	Wybong Creek

**WAL covered under water use approval 20MW065001 (Miscellaneous Works Approval for licence of harvestable rights).*

3.3.3 Groundwater Licences

Mangoola currently holds the following groundwater licences shown in ***Table 3-4*.**

Table 3-4 Groundwater Licences

WAL No.	Works Approval No.	Share Allocation (ML)	Type of Works	WAL No.	Works Approval No.	Share Allocation (ML)	Type of Works
6316	20CA202449	175	Well	-	20BL172827	0	Test bore
6317	20CA202451	19	Well		20BL171778	0	Test bore
6322	20CA202463	5	Well	-	20BL171860	0	Test bore
6327	20CA202482	30	Well		20BL171861	0	Test bore
18068	20CA208143	5	Bore	-	20BL171862	0	Test bore
18136	20CA208033	596	Bore		20BL171864	0	Test bore
18170	20CA207847	219	Well	-	20BL171865	0	Test bore
18214	20CA208151	218	Well		20BL171867	0	Test bore
18219	20CA208171	5	Bore	-	20BL172567	0	Test bore
18232	20CA208179	5	Bore		20BL172568	0	Test bore
18690	20CA209155	10	Bore/Well	-	20BL172569	0	Test bore

WAL No.	Works Approval No.	Share Allocation (ML)	Type of Works	WAL No.	Works Approval No.	Share Allocation (ML)	Type of Works
18695	20CA209151	131	Well		20BL172570	0	Test bore
18696	20CA209157	53	Well	-	20BL172573	0	Test bore
18701	20CA209199	28	Bore		20BL172788	0	Test bore
18718	20CA209147	151	Well/Bore	-	20BL172789	0	Test bore
30247	20CA212344	98	Well		20BL172790	0	Test bore
41561	WAL 41561	700	Excavation	-	20BL172806	0	Test bore
-	20WA216010	1	Bore		20BL172808	0	Test bore
-	20WA207550	0	Bore	-	20BL172809	0	Test bore
-	20WA214821	0	Bore		20BL172811	0	Test bore
-	20WA207593	0	Well	-	20BL172812	0	Test bore
-	20WA207594	0	Well		20BL172813	0	Test bore
-	20WA209128	0	Bore	-	20BL172814	0	Test bore
-	20WA215330	0	Bore		20BL168135	0	Test bore
-	20WA207651	0	Bore	-	~~20BL168414~~	~~0~~	~~Test bore~~
-	20WA215537	0	Bore		20BL168696	0	Test bore
-	20WA207655	0	Well	-	20BL168743	0	Test bore
-	20WA207668	0	Well		20WA216315	0	Bore

WAL No.	Works Approval No.	Share Allocation (ML)	Type of Works	WAL No.	Works Approval No.	Share Allocation (ML)	Type of Works
-	20WA209113	0	Bore	-	20WA207700	0	Well
-	20WA212410	0	Bore		20WA209139	0	Spear points
-	20WA209136	0	Bore	-	20WA207718	0	Well
-	20WA209112	0	Bore		20WA215573	0	Well
-	20WA215016	0	Bore	-	20WA215826	0	Well
-	20WA215082	0	Bore		20BL167003	0	Bore
-	20WA215502	0	Bore	-	20CA211849	0	Well
-	20WA207649	0	Bore		-	-	-

3.3.4 Radiation Licence

Mangoola holds Radiation Licence 5063445 which expires 28 April 2025. This annual licence was renewed during the reporting period.

3.3.5 Sewerage Management System Licence

Mangoola Coal holds an approval to operate an onsite sewerage management system (licence number WTA5/2010) in accordance with the requirements of the Muswellbrook Shire Council and EPL 12894. The licence expires on 29 July 2026. All monitoring results required under EPL 12894 are published on the Mangoola Coal website. If monitoring results exceed the criteria as outlined within the council approval, the results are reported directly through to council.

3.4 Other Approvals

3.4.1 Rehabilitation Management Plan

As of 2 July 2022, Mangoola Coal operates under a Rehabilitation Management Plan (RMP) in accordance with the Resources Regulator guidelines. The RMP covers aspects including mine closure planning and execution, stakeholder consultation, environmental management, post mining land use, status of closure, performance indicators and rehabilitation objectives, criteria, and implementation. The Rehabilitation Management Plan (RMP) has been prepared in accordance with B91 of SSD 8642 and the Mining Act 1992.

3.4.2 Compliance with EIS Predictions

In accordance with the *Annual Review Guideline* (DPHI, 2015), this Annual Review compares the predictions made in the SSD 8642 Environmental Impact Statement (EIS) with the environmental monitoring results from the 2024 reporting period where they applied during the reporting period. ***Table 3-5*** details the location of these prediction comparisons.

Table 3-5 Comparison Against Predictions

Environmental Aspect	Section Reference
Air Quality	**Section 6.2.2**
Noise	**Section 6.3.2**
Blasting and Vibration	**Section 6.4.2**
Biodiversity	**Section 6.6.2**
Heritage	**Section 6.9.3**
Surface Water	**Section 7.6.2**
Groundwater	**Section 7.7.2**

4. Operations During the Reporting Period

4.1 Mining Operations

4.1.1 Overview

Open cut mining continued at Mangoola's Main Pit and South pit located south of Wybong Road during the reporting period. Minig operations officially commenced under SSD8642 on 1 December 2022 in the MCCO project area (Wybong Pit). During the reporting period, Mangoola continued operations in Wybong Pit, with the first blast conducted on 19 January 2023 and first coal extracted on 28 August 2023.

Truck and excavator mining methods are used to handle overburden and coal, following pre-strip and drilling and blasting activities. Product coal is loaded and transported to market via the rail loop connected to the Muswellbrook – Ulan railway. The mine operates 24 hours a day, seven days a week, and currently employs 463 full time equivalent employees (with approval for 480 employees). The general site layout is presented in ***Figure 4-1*****.** Activities undertaken during the reporting period included open cut mining, coal processing, coal transport, and construction works which are detailed in the following sections.

4.1.2 Exploration

Throughout the reporting period, 51 exploration holes were drilled within the Wybong Pit area of ML 1817 and 3 exploration holes were drilled within the AL9 area.

4.1.3 Land Preparation

Land clearing is undertaken in accordance with the Mangoola Environmental Management System (EMS). Areas are assessed prior to clearing to minimise potential ecological, water management, sediment and erosion, and cultural heritage impacts in accordance with pre-clearing requirements.

4.1.4 Mining

Open cut mining operations continued during the reporting period, with 11.47 million tonnes (Mt) of ROM coal being extracted. Mining operations during the reporting period continued in the Main Pit, South Pit and Wybong Pit. Approximately 34.98 million bank cubic metres (BCM) of overburden were moved.

The 2024 production summary is presented in ***Table 4-1***.

Table 4-1 2024 Production Summary

Material	Approved Limit	2023 Reporting Period (Actual)	2024 Reporting Period (Actual)	2025 Reporting Period (Forecast)
Waste Rock/ Overburden (BCM)	No limit	34,301,895	34,985,068	36,867,110
ROM Coal (t)	13,500,000	10,093,439	11,473,234	11,940,349

Material	Approved Limit	2023 Reporting Period (Actual)	2024 Reporting Period (Actual)	2025 Reporting Period (Forecast)
Coarse reject (t)	No limit	1,165,885	1,184,615	1,562,000
Fine reject (Tailings) (t)	No limit	642,642	957,806	1,080,000
Saleable product (t)	No limit	8,205,387	9,109,048	9,002,210

During 2024, three additional haul trucks were added to the mining fleet to manage the coal haulage from the Wybong Pit and no gravel crushing operations occurred.

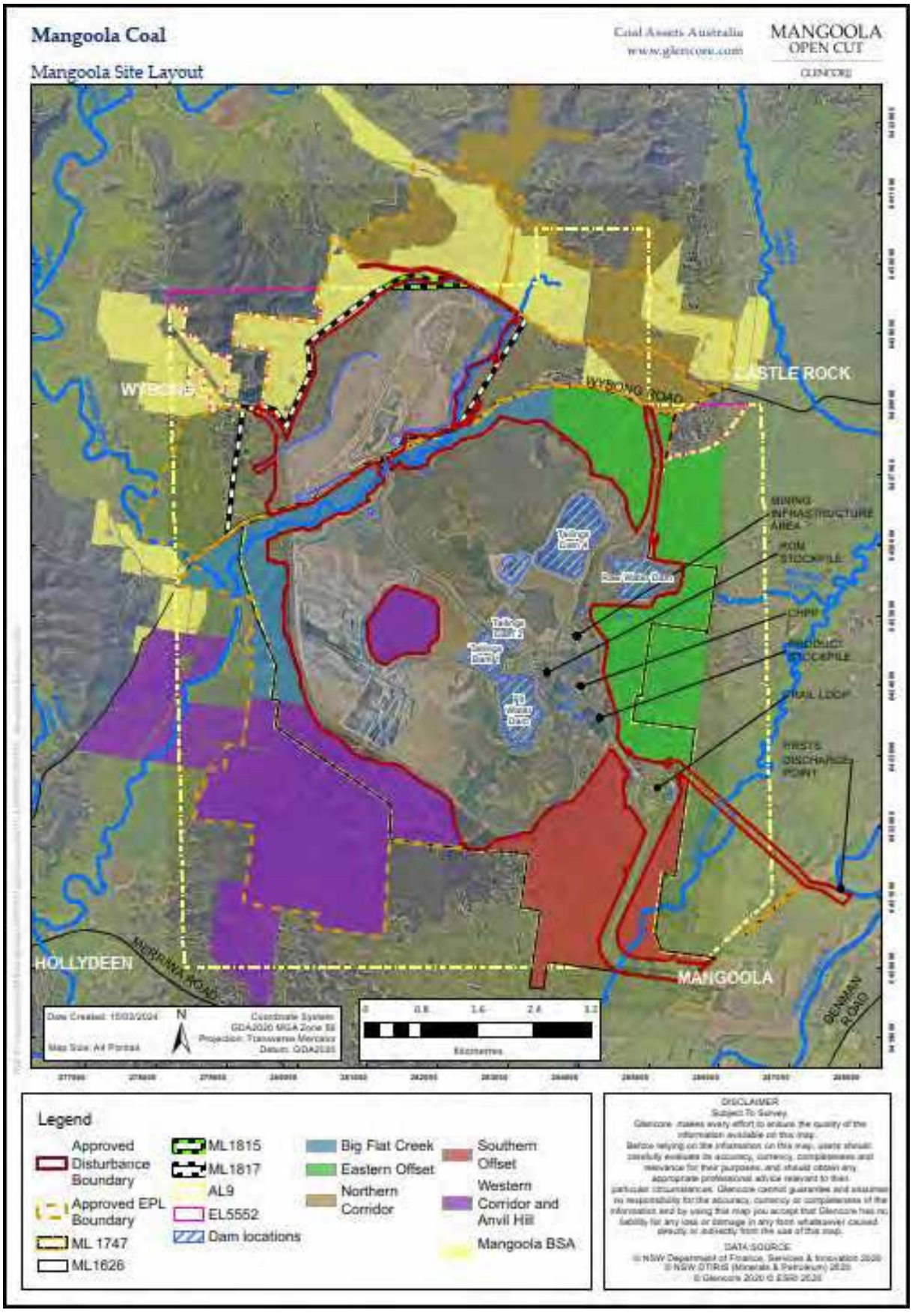


Figure 4-1 Mangoola Site Layout

4.2 Other Operations

4.2.1 Coal Processing

During the reporting period approximately 9.1 Mt of product coal, 0.96 Mt of tailings and 1.18 Mt of coarse rejects were produced from the CHPP. The CHPP washed or bypassed all coal produced at Mangoola, with Tailings Dam 4 used for fine rejects disposal.

Tailings Dam 4 has sufficient capacity for Life-Of-Mine. There was 1.5 Hectares of Tailings Dam 1 capping completed in 2024, with 168,296 cubic meters of material being placed on the dams.

Capping works progressing ahead of plan

4.2.2 Coal Transport

During the reporting period there were 2074 train movements from the Mangoola rail loader, which transported approximately 9.1 Mt of coal. Each train consists of two movements (one movement into the loop and one movement out of the loop). This equates to an average of 5.66 daily train movements generated by Mangoola, with a maximum of 16 train movements in one day. This is within the 20 train movements per day limit stipulated in Condition B93 of SSD 8642. No coal was transported other than by rail during the reporting period.

Annual train movements are included in ***Appendix G***.

4.2.3 Construction

Works associated with the MCCO Project commenced with preliminary site establishment works on 6 December 2021, before broader construction activities commenced in early January 2022. During 2023, all of the remaining construction works and quality assurance reviews were completed and the construction site compound was demobilised. An ancillary infrastructure bund was constructed in 2024 which directs overland flows (clean water) to the upgraded culvert set on Wybong road.

4.2.4 Waste Management

Waste at Mangoola is managed in accordance with the EMS (incorporating waste reuse and recycling). The EMS has been developed in accordance with the requirements of the *Protection of the Environment Operations Act 1997* (POEO Act).

A licensed waste contractor undertakes the collection, transport and recording of waste material, with as much material as possible being recycled. During the reporting period 2451.76 tonnes of waste was disposed of offsite with 2,076 tonnes of that being recycled (84.67% recycled). This represents an overall increase of 1,406 tonnes in total waste disposal compared to 2023 (2,185 tonnes). This increase was primarily due to the continuation of mining within Wybong Pit whereby some old sheds and structures had to be demolished for mining progression.

The major waste streams during the reporting period were waste oil (900.95 tonnes), effluent (633.32 tonnes), scrap steel (371.16 tonnes) and mixed solid waste (351.70 tonnes).

A summary of waste disposal from 2016 to 2024 is presented in ***Figure 4-2***.

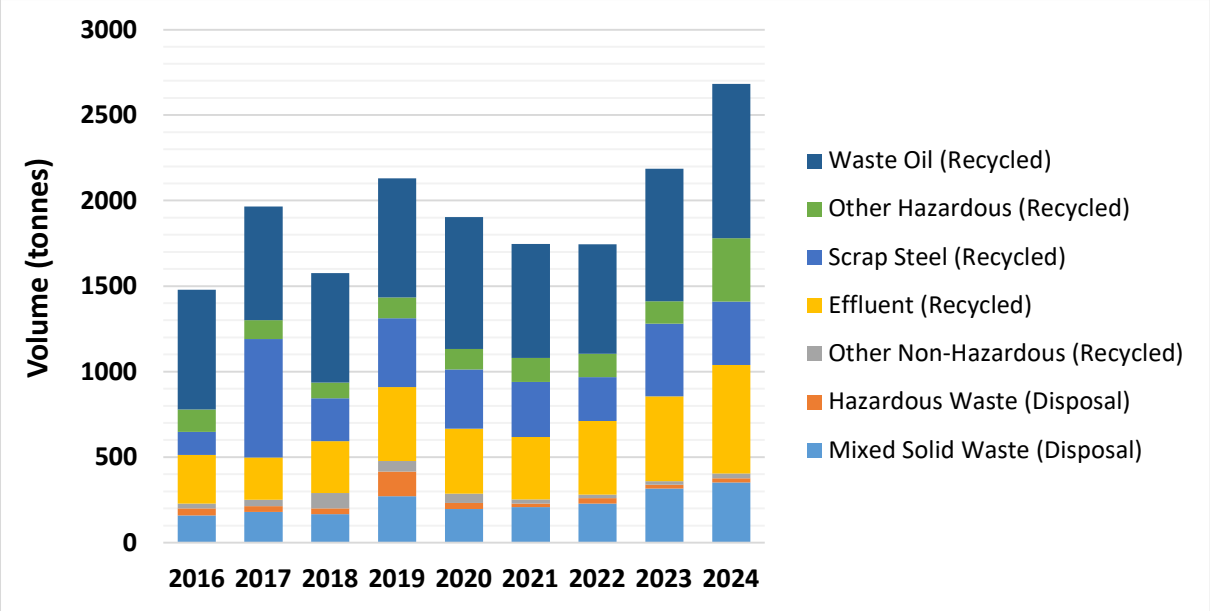


Figure 4-2 2016-2024 Waste Streams Generated

4.3 Next Reporting Period

4.3.1 Mining

During 2025, coal extraction will continue in the Main Pit, South Pit, and Wybong Pit (to the north of Wybong Road). Forecast production for 2025 is 11.9 Mt of ROM coal and 9.0 Mt of product coal. There are no proposed changes to mining equipment, personnel or mining techniques in 2025. Construction works are now complete.

Wybong Pit houses three of the five primary excavators, with the remaining two servicing the operations within the Main Pit and South Pit areas.

4.3.2 Exploration

Approximately two boreholes remain to be drilled in AL9, with three Piezometer holes and 22 Sill definition holes to be drilled in ML 1817 Wybong Pit area.

4.3.3 Construction

The project construction is now complete, no further construction is planned.

4.3.4 Tailings Disposal

During 2025, tailings will be disposed of in Tailings Dam 4, which has sufficient capacity for Life-of-Mine.

5. Actions Required from Previous Annual Review

Mangoola received a letter from DPHI on 22 October 2024 stating the Mangoola 2022 Annual Review was found to generally satisfy the requirements of the consents and the Departments *Annual Review Guideline* dated October 2015. However, DPHI requested additional information to be included in future Annual Reviews, which has been captured as an action in ***Table 5-1***.

The Resources Regulator advised that the Annual Review had been received and was subject to review to comply with the Mangoola mining authorisations and conditions of the Mining Act. No further correspondence was received.

Table 5-1 Actions Required From 2023 Annual Review

Action Required from Previous Annual Review	Due Date	Action Taken by Mangoola	Where Discussed
Section 7.7 – Groundwater Management. This section must include all relevant details and not simply refer to an appendix for all information.	31 March 2025	Mangoola has included relevant groundwater details within the body of the Annual Review (Refer to Section 7.7). Appendix F houses the full Groundwater Report.	***Section 7.7***
Section 10 – Independent Environmental Audit. This section must include a status update for all actions from the previous audit, including amended timeframes where required. Where the action has been completed, please list it as such.	31 March 2025	Mangoola has included a table within Section 10 outlining the actions and completion status of the findings from the last IEA audit (2022)	***Section 10***

6. Environmental Performance

6.1 Meteorology

In accordance with Condition B35 of SSD 8642 and Condition P1.1 of EPL 12894, Mangoola continued to operate at two meteorological monitoring stations across the site during the reporting period. These details are summarised in ***Table 6-1*** and illustrated on ***Figure 6-6***. Meteorological data recorded during the reporting period is available on the Mangoola website.

Table 6-1 Summary of Weather Stations in 2024

Weather Station	Location Description
Northern Meteorological Station (WSN1)	Located to the north of the site, along Wybong PO Road.
Southern Meteorological Station (WSS)	Located to the south of the site, adjacent to the CHPP.

As shown in ***Figure 6-1***, total rainfall during 2024 was considered to be 'average'. WSN1 recorded 653.4 mm of rainfall in 2024. WSS recorded 675.2 mm of rainfall during 2024, considerably higher than the 2023 total of 419 mm. The highest monthly rainfall total was recorded in April at WSS (135.6 mm) while the lowest was recorded in January at WSN1 (22.6 mm). Long-term rainfall data is presented in ***Appendix B***, which shows that rainfall recorded during 2024 was lower than most years since 2010.

As shown in ***Figure 6-4*** the daily minimum and maximum 2 metre above surface level temperatures at WSN1 ranged from -0.5 °C to 41.6°C in 2024 respectively, with an average daily maximum of 24.7 °C, which is on average with the 2023 daily average of 25.9 °C. Relative humidity during 2024 ranged from 7.5% to 100%.

In 2024, there were several occasions of failure to monitor weather continuously as shown in Table 111. Note these dates do not necessarily indicate outages for the entire date specified, rather it indicates missing 15-minute average values occurring during the specified period.

Failure to continuously monitor weather in accordance with Condition M4.1 EPL monitoring point 5 and monitoring point 18 for various 15-minute increments throughout 2024:

17/02/2024, 18/02/2024, 19/02/2024, 17/05/2024, 18/05/2024, 19/05/2024, 20/05/2024, 1/06/2024, 29/06/2024, 7/07/2024, 22/07/2024, 6/10/2024, 15/11/2024, 31/12/2024, 1/01/2024, 3/01/2024, 6/01/2024, 15/01/2024, 22/01/2024, 23/01/2024, 30/01/2024, 31/01/2024, 2/02/2024, 7/02/2024, 8/02/2024, 23/02/2024, 27/02/2024, 28/02/2024, 10/03/2024, 15/03/2024, 16/03/2024, 17/03/2024, 18/03/2024, 20/03/2024, 21/03/2024, 27/03/2024, 4/04/2024, 20/04/2024, 8/05/2024, 9/05/2024, 1/06/2024, 3/06/2024, 8/06/2024, 11/06/2024, 19/06/2024, 3/07/2024, 6/07/2024, 7/07/2024, 15/07/2024, 16/07/2024, 17/07/2024, 17/07/2024, 18/07/2024, 20/07/2024, 21/07/2024, 22/07/2024, 31/07/2024, 21/08/2024, 22/08/2024, 23/08/2024, 6/10/2024, 6/10/2024, 15/10/2024 and 16/10/2024.
There were no recognisable adverse effects of the non-compliance and data capture for the reporting period of Monitoring Point 5 and 18 remained above 95% in 2024 (99.7% for both monitoring points 5 and 18).

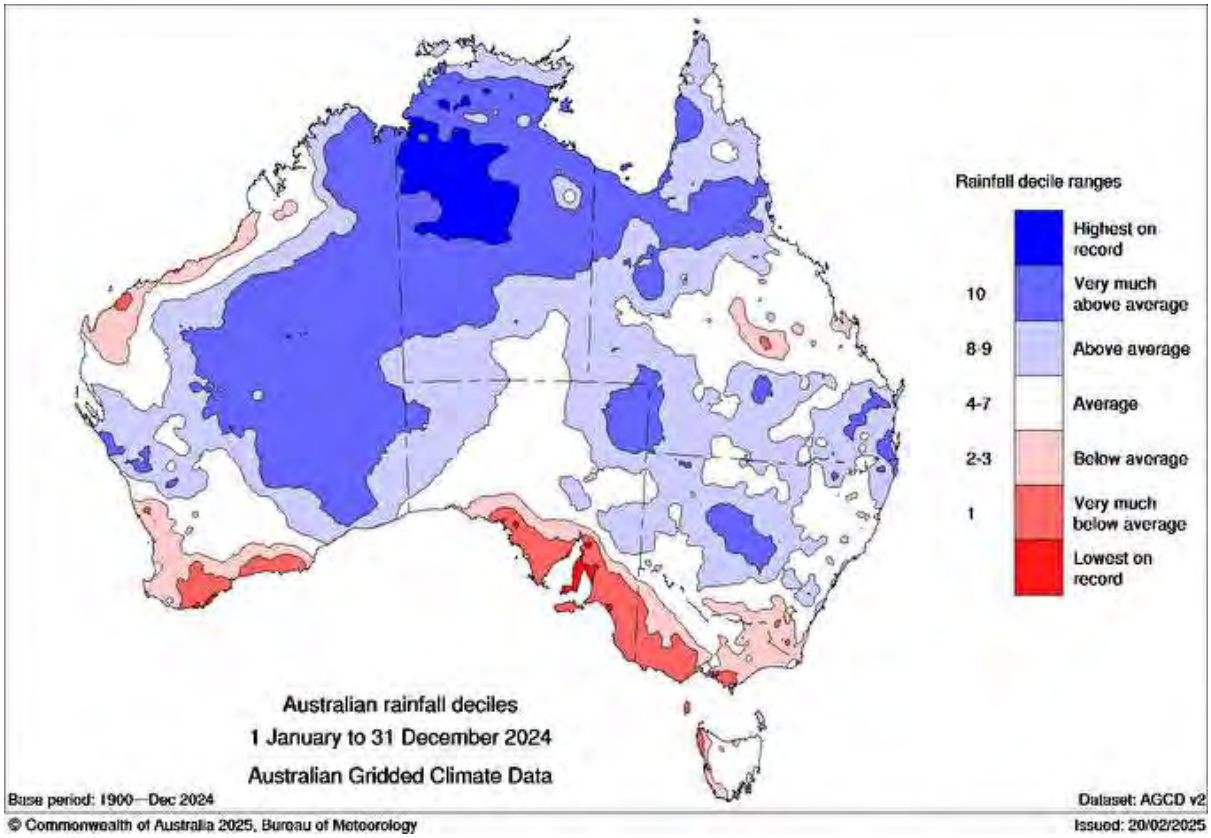


Figure 6-1 12-month Rainfall Deficiency for 2024 (BOM, 2024)

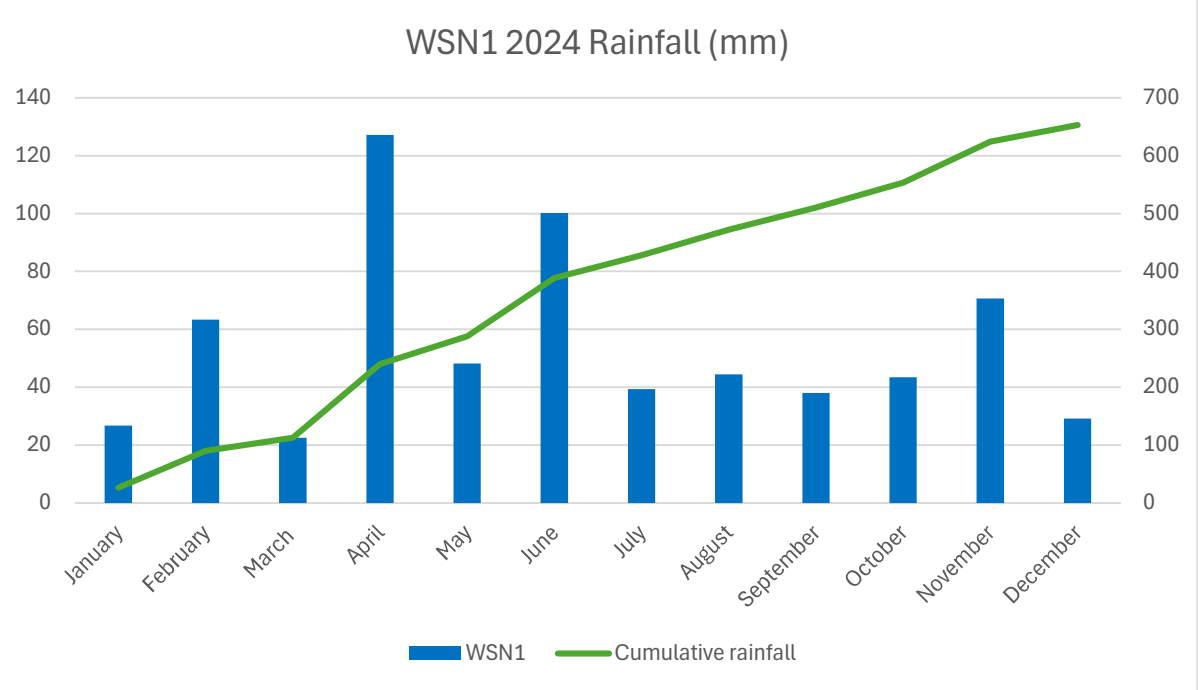


Figure 6-2 WSN1 2024 Rainfall Data

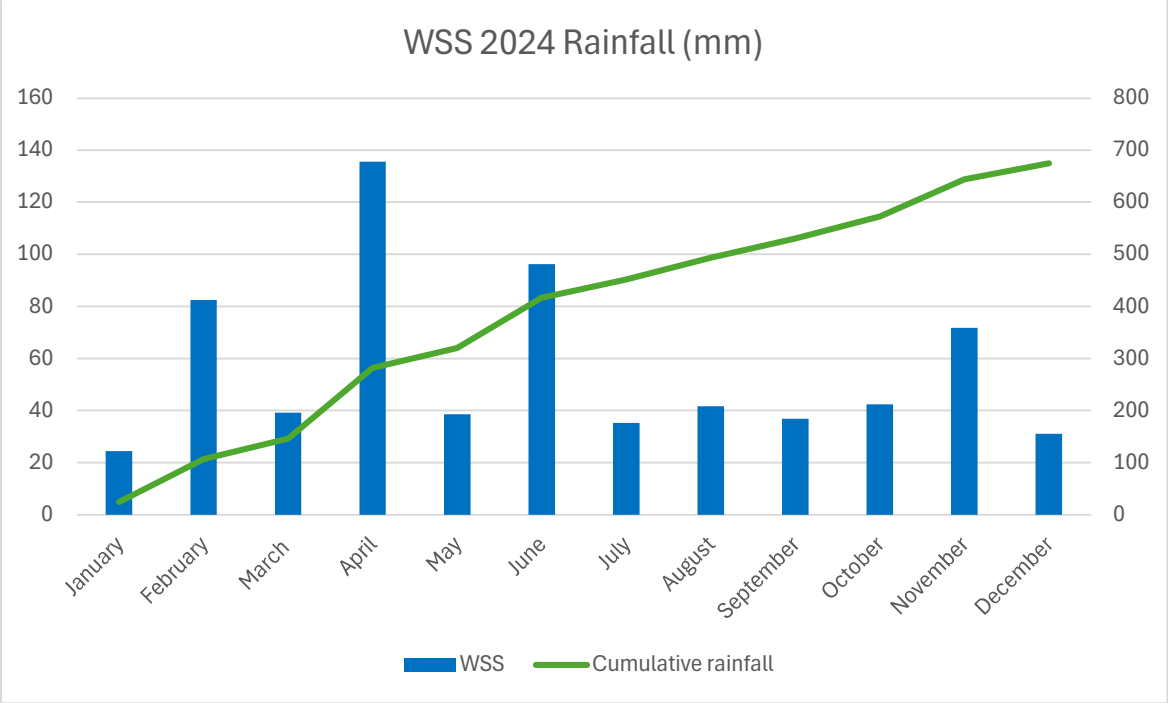


Figure 6-3 WSS 2024 Rainfall Data

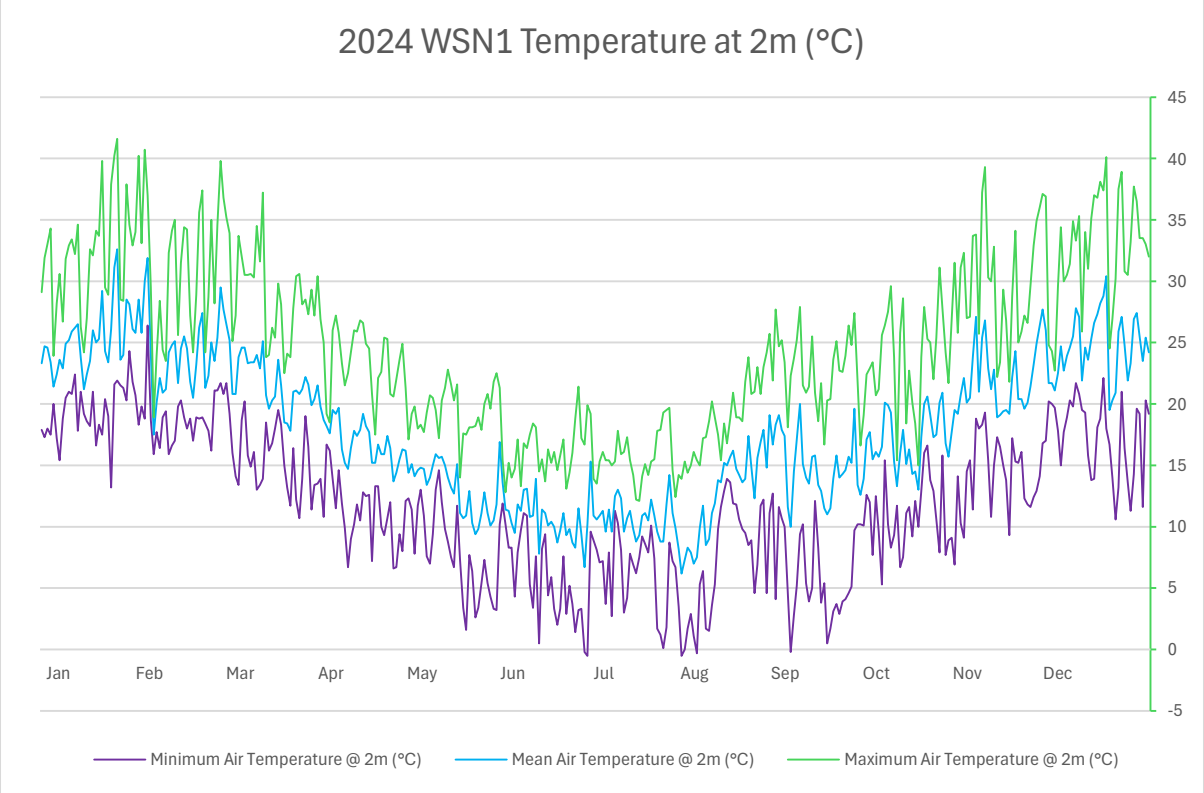


Figure 6-4 WSN1 2024 2 m Temperature Data

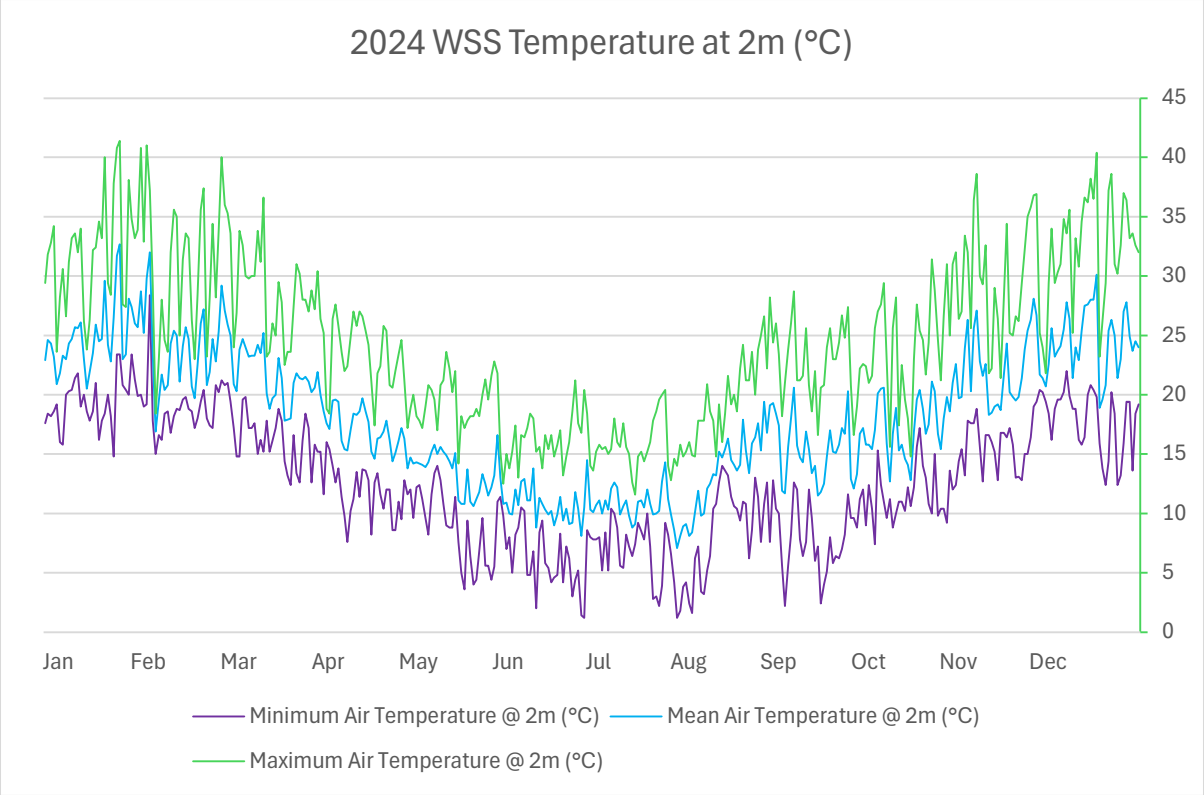


Figure 6-5 WSS 2024 2 m Temperature Data

6.2 Air Quality

6.2.1 Environmental Management

Mangoola operated in accordance with the approved Air Quality and Greenhouse Gas Management Plan (AQGGMP) aligning with the monitoring requirements under SSD 8642. No amendments were made to the air quality monitoring network during the reporting period.

The current air quality monitoring program consists of:

- Five Tapered Element Oscillating Microbalance (TEOM) dust monitors continuously measuring PM_{10} known as D02-DC to D06-DC (D02-DC, D04-DC and D06-DC measure $PM_{2.5}$ as well as PM_{10}).
- Two PM_{10} E-Sampler Particulate Monitors continuously measuring PM_{10} known as D9-DC (formerly known as D7-DC before relocation) and D8-DC (EPL Monitoring Points 19 and 20 respectively).
- Three High Volume Air Sampler (HVAS) dust monitors measuring Total Suspended Particulates (TSP) over one 24-hour period every six days, known as D02-TSP to D04-TSP.
- Four HVAS dust monitors measuring PM_{10} over one 24-hour period every six days, known as D01-PM10, D06-PM10, D08-PM10, and D09-PM10.

SSD 8642 stipulates criteria for PM2.5, PM10 and TSP, as presented in ***Table 6-2***.

Table 6-2 SSD 8642 Air Quality Criteria that applied during the reporting period

Pollutant	Averaging Period	Criterion
Short Term Impact Assessment Criteria for Particulate Matter		
PM_{10}	24-hour Average	[1] 50 μg/m^3
$PM_{2.5}$	24-hour Average	[1] 25 μg/m^3
Long Term Impact Assessment Criteria for Particulate Matter		
TSP	Annual Average	[2, 3] 90 μg/m^3
PM_{10}	Annual Average	[2, 3] 25 μg/m^3
$PM_{2.5}$	Annual Average	[2, 3] 8 μg /m^3

1 – Incremental impact (i.e. incremental increase in concentrations due to the development on its own).
2 – Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations sure to all other sources).
3 – Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Planning Secretary.

Mangoola currently implements a Dust Management Trigger Action Response Plan (TARP) developed in line with the Dust Assessment Handbook (NSW EPA, 2019).

Mangoola implements best practice for the management of air quality including the implementation of reasonable and feasible measures to minimise/mitigate offsite odours. Mangoola will continue to implement all controls in the Spontaneous Combustion Management Plan, Blast Fume Management Plan and the AQGGMP.

In addition, Mangoola also implements key operational controls as described in Section 4.2 of the AQGGMP. These controls include, but are not limited to, predictive meteorological forecasting, water carts, chemical dust suppressants, progressive rehabilitation and dust suppression sprays on stockpiles and conveyors.

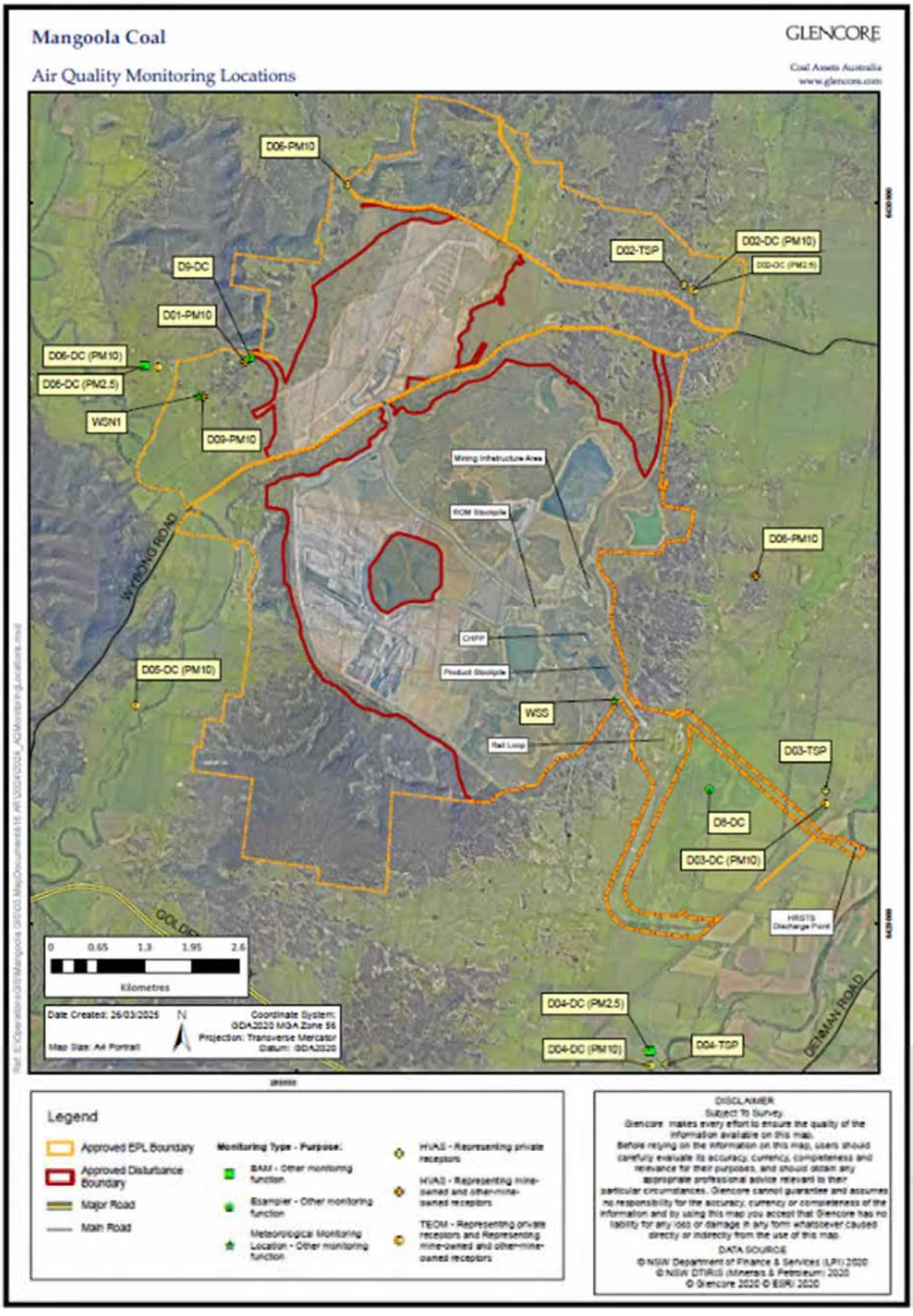


Figure 6-6 Air Quality and Meteorological Locations

6.2.2 Environmental Monitoring Results

6.2.2.1 Results from the Reporting Period

TEOM and E-Sampler (PM_{10})

TEOM and E-Sampler results for PM_{10} concentrations are available on the Mangoola website and are summarised in ***Table 6-3***.

Table 6-3 2024 PM_{10} 24-hr Average Results

Gauge	Location Description	Minimum (µg/m³)	Annual Average# (µg/m³)	Maximum 24 hr (µg/m³)^
D02-DC	96 Ridgelands Rd	3.9	17.1	**50.2^^**
D03-DC	830 Mangoola Rd	4.5	18.1	44.4
D04-DC	22 Bells Lane	4.2	15.2	40.4
D05-DC	2909 Wybong Rd	0.6	9.9	38.5
D06-DC	393 Wybong PO Rd	3.2	15.3	44.0
D9-DC*	Wybong PO Rd	0.0	14.8	70.3
D8-DC*	CHPP	0.1	11.9	43.3

**EPL monitoring points 19 and 20 (D9-DC and D8-DC respectively) have no compliance criteria against either EPL 12894 or SSD8642.*
#PM_{10} Annual Average Criterion 30 µg/m³ until the commencement of Development under SSD 8642 occurred on 6 December 2021. Following commencement of Stage 2 – PM_{10} annual average criterion reduced from 30 µg/m³ to 25 µg/m³ as listed in Table 14. TSP Annual Average Criterion 90 µg/m³.
^PM_{10} 24h Max Criteria 50 µg/m³.
^^Results above 50 µg/m3 reflects total contributions. Incremental site contribution determined to be less than 50 µg/m³

There were no exceedances of the 25 µg/m³ annual average or 50 µg/m3 24h max criterion at any of the applicable monitoring locations throughout the reporting period. There was one instance of PM10 concentration over a 24-hr averaging period which required further investigation to determine site incremental contribution against the 50 µg/m³ criterion.

- D02-DC on the 15th of December 2024 (50.2 µg/m³) it was noted that the predominant wind direction for the 24-hr period indicated that the source of the dust was coming from offsite. Through investigation site incremental contribution was determined to be lower than the 50ug/m³ criteria.

BAM ($PM_{2.5}$)

BAM results for $PM_{2.5}$ concentrations are available on the Mangoola website and are summarised in ***Table 6-4***.

Table 6-4 2024 $PM_{2.5}$ 24-hr and Annual Average Results

Gauge	Location Description	Minimum (µg/m³)	Annual Average# (µg/m³)	Maximum (µg/m³)^
D02-DC	96 Ridgelands Rd	0	4.5	17.7
D04-DC	22 Bells Lane	0.4	4.1	10.8
D06-DC	393 Wybong PO Rd	0	5.0	14.8

 # $PM_{2.5}$ Annual Average Criterion 8 µg/m³
^$PM_{2.5}$ 24h Max Criteria 25 µg/m³.
^^ Results above 25 µg/m³ due to offsite contributions.

There were no exceedances of the $PM_{2.5}$ annual average criteria of 8 µg/m³ and no exceedances of the 24-hr maximum criteria of 25 µg/m³ at any of the monitoring locations throughout the reporting period.

High Volume Air Sampler (HVAS) TSP and PM_{10}

HVAS results for TSP and PM_{10} concentrations are available on the Mangoola website and are summarised in ***Table 6-5***.

Table 6-5 2024 PM_{10} and TSP 24-hr Average Results

Monitoring Point	Minimum (µg/m³)	Annual Average (µg/m³)*	Maximum (µg/m³)**
TSP			
D02-TSP#	2.2	42.1	135
D03-TSP#	5.2	47.1	122
D04-TSP#	3	33.6	101
PM_{10}			
D01-PM_{10}^	0.1	15.2	48.0
D08-PM_{10}^#	0.1	14.3	40.0
D06-PM_{10}^	0.4	16.4	39.2
D09-PM_{10}^	0.1	12.1	34.5

** PM_{10} Annual Average Criterion 25 µg/m³, TSP Annual Average Criterion 90 µg/m³;*
*** PM_{10} 24hr Criterion 50 µg/m³; no 24hr µg/m³ Criterion for TSP*
^ Monitor located on Mine Owned Land; and
 # Representative of private receptors.

There were no exceedances of the respective criteria for TSP and PM_{10} throughout the reporting period.

Odour

In accordance with, SSD 8642 and EPL 12894, no odour monitoring is required at Mangoola. No complaints have been received during the reporting period in relation to odour. No incidents have been reported in relation to odour.

6.2.2.2 Comparison with Predictions

An Air Quality Impact Assessment (Jacobs, 2019) was completed as part of the MCCO Project.

A comparison of 2024 dust data against the relevant MCCO Air Quality Impact Assessments has been made in ***Table 6-6***.

Table 6-6 Comparison of 2020 to 2024 Dust Emissions

Dust Monitor	Closest Privately Owned Residence	2022 Prediction (SSD 8642)	2020 Annual Average	2021 Annual Average	2022 Annual Average	2023 Annual Average	2024 Annual Average
TEOM (PM_{10}) Monitoring Sites (µg/m³)							
D02-DC	111	12.0	12.3	12.8	12.8	17.4	17.1
D03-DC	125D, E and F	12.0	17.2	15.4	13.3	20.1	18.1
D04-DC	184	11.0	13.6	13.2	11.2	16.3	15.2
D05-DC	176	13.0	10.5	9.2	7.6	11.0	9.9
D06-DC	110	15.0	14.6	12.3	12.0	16.5	15.3
TEOM ($PM_{2.5}$) Monitoring Sites (µg/m³)							
D02-DC	111	5.0	-	-	5.3	7.3	4.5
D04-DC	184	5.0	-	-	3.4	3.6	4.1
D06-DC	110	6.0	-	-	7.3	5.2	5.0
E-Samplers (PM_{10}) (µg/m³)							
D9-DC	130	28.0	8.7	11.1	9.9	15.4	14.8
D8-DC	125	13.0	11.9	8.9	8.4	11.9	11.9
HVAS (PM_{10} and TSP) Monitors (µg/m³)							
D02-TSP	111	51	34.5	27.8	28.0	45.7	42.1
D03-TSP	125D, E and F	51	42.1	30.3	27.2	50.51	47.1

Dust Monitor	Closest Privately Owned Residence	2022 Prediction (SSD 8642)	2020 Annual Average	2021 Annual Average	2022 Annual Average	2023 Annual Average	2024 Annual Average
D04-TSP	184	50	32.9	23.8	23.3	37.8	33.6
D01-PM_{10}	110	-	13.3	10.2	9.2	15.7	14.9
D06-PM_{10}	130	-	15.6	10.9	10.8	18.6	16.4
D07-PM_{10}	190	-	14.1	9.5	14.8	N/A	N/A
D08-PM_{10}^ (from 22/04/22)	139/157	-	-	-	7.9	13.7	14.3
D09-PM_{10}^ (from 22/04/22)	130	-	-	-	7.4	14.3	12.1

^ Full year of data unavailable due to monitor relocation

As shown in ***Table 6-6***, the 2024 annual averages for air quality were generally in accordance with the predicted levels form the air quality assessment completed for the MCCO Project Area.

6.2.2.3 Long Term Trend Analysis

A long-term trend analysis of air quality monitoring results at Mangoola has been undertaken using data from July 2010 to December 2024 to identify any trends in the monitoring data over the life of the project. These graphs are presented in ***Appendix C***. Increased rainfall in 2020 resulted in lower results than the previous few years (refer ***Appendix B***). 2022 saw results slightly higher than those in 2021 with 2023 and 2024 results increasing slightly, on average, likely due to below average rainfall.

The annual average HVAS TSP data has shown a gradual increase from 2010 to 2014, then declining in 2015, remaining low in 2016 and 2017, before rising again in 2018 and 2019. The results from 2018 and 2019 saw an increase in TSP results due to prolonged period of drought and increased bushfire activity. Due to increased rain in 2020, results decreased to be consistent with results from 2015 to 2017. The 2022 average TSP results decreased further, likely a result of the consistent rain during the period with 2023 results increasing in line, and likely attributable to below average rainfall. 2024 average TSP results saw a decrease from the 2023 results.

The 24hr maximum TEOM data show seasonal peaks in the summer months. The annual average TEOM results have remained consistent with results from 2011 through to 2017 and results have been generally increasing during 2018-2019 which correlates with low rainfall and the ongoing drought conditions. Increased rain during 2020 decreased results to be consistent with those from 2015 to 2017. Ongoing rain during 2022 saw 24hr maximum TEOM (averages) remain consistent with those in 2021 with 2023 results increasing in line, and likely attributable to below average rainfall. 2024 results saw a slight decrease from 2023 levels.

6.2.3 Key Performance and/or Management Issues

PM10 monitoring is required continuously in accordance with Condition M2.2 of EPL 12894 at Point 19 (D9-DC) and Point 20 (D8-DC). While the continuous emissions monitoring captured >98% data (the

minimum is 90% as per EPA website) EPL19 had a unit failure between 1/4/2024 and 4/4/2024. The unit did not collect sufficient data due to a technical fault. A field service rectified the issue on the 4/04/2024.

EPL 20 had a technical failure whereby there was insufficient data (flow failure) on 26/04/2024, and then again on the 29/04/2024, and 30/11/2024-4/12/2024. On each instance an in-field service was completed and the unit recommenced operation. It is to be noted that relevant data loss will be reported in the next Annual Return.

Continuous monitoring at other PM_{10} and $PM_{2.5}$ units was in accordance with the approved AQGGMP. All units captured more than 93% data and an average of 97.76% overall. Where outages did occur, they were quickly identified and responded to and due to unplanned power outages/interruptions, monitor breakdowns and servicing/calibration.

There were 12 community complaints received by Mangoola during the reporting period relating to air quality, which is an increase from the previous reporting period. Further detail on the complaints received in 2024 is provided in **Section 9.3**.

6.2.4 Proposed Improvements

There are no proposed improvements for air quality for 2025.

6.3 Noise

6.3.1 Environmental Management

During the reporting period Mangoola has operated in accordance with the approved Noise Management Plan (NMP) required under SSD 8642, which is available on the Mangoola website. Attended noise monitoring was completed as per the requirements of SSD 8642 and EPL 12894. All noise monitoring undertaken during the reporting period is summarised as follows:

- Attended monthly monitoring occurred during the night period at thirteen locations representative of privately-owned residences and the Anglican Church (NM4, NM8, NM10, NM13–22) as per the NMP.
- Continuous unattended noise monitoring was undertaken at six permanent locations (NC02, NC03, NC05, NC06, NC09 and NC10). Three mobile units were also utilised and relocated as needed. This monitoring is used for proactive and reactive management of day-to-day operations at Mangoola Open Cut, not to monitor compliance.

The attended and permanent unattended noise monitoring locations are shown in ***Figure 6-7***.

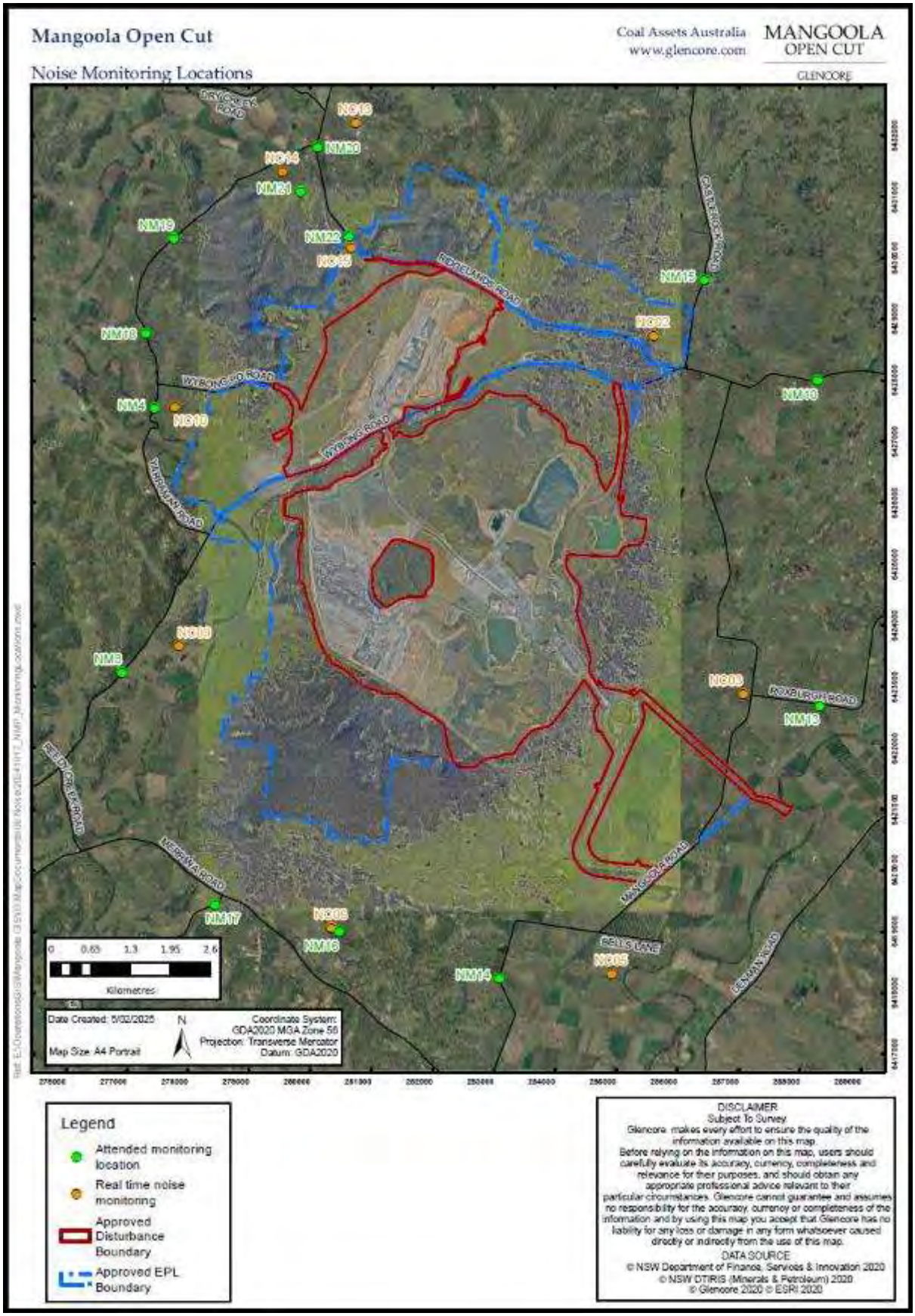


Figure 6-7 Noise Monitoring Locations

Noise Impact Assessment Criteria

Mangoola's noise limits are specified in Table 1, Condition B1 of Schedule 2 of SSD 8642 and Condition L3.2 of the EPL and are reproduced in ***Table 6-7*** and ***Table 6-8***.

Table 6-7 SSD 8642 – Noise Impact Assessment Criteria

Noise Assessment Location	Day $L_{Aeq(15\ minute)}$ Years 1 & 2	Day $L_{Aeq(15\ minute)}$ Year 3 onward	Evening $L_{Aeq(15\ minute)}$	Night $L_{Aeq(15\ minute)}$	Night $L_{A1(1minute)}$
171, 176, 144	40	40	40	40	52
25, 128, 154, 193, 125A, 182B	40	40	38	38	52
261	42	40	38	38	52
54, 79, 114, 141, 151, 192, 206, 321, 125C, 182A, 241A, 241C, 190, 157	40	40	37	37	52
165, 177, 106B, 104, 166, 178, 251, 253, 260, 112B, 183C, 184A, 147, 112A, 112C, 240, 241B	40	40	36	36	52
134A	44	40	39	39	52
109A-F	43	40	39	39	52
263	42	40	39	39	52
164^	40	40	35	39	52
Other privately-owned residences^	40	40	35	35	52
Wybong Hall and Anglican Church	48	48	48	48	-

^*The Applicant has a written agreement in place with the owners of* Property ID*'s* 132, 130 *and 164 and the Department was notified of this in writing of this*.

Table 6-8 EPL 12894 – Noise Impact Assessment Criteria

Attended Noise Monitoring Location	EPL ID Number	Representative Residences	Night $L_{Aeq\ (15\ minute)}$	Night $L_{A1\ (1minute)}$
NM4	23	109A, 109B, 109C, 109D, 109E, 109F	41	54
NM8	26	176	40	52
NM10	27	251	35	551
NM13	29	125A, 125C, 190, 240, 241A, 241B, 241C, 182A, 182B	38	50
NM14	30	184A	37	53
NM15	22	154	34	48
NM16	34	79, 177, 178, 147, 253, 141, 151	37	52
NM17	35	54, 114, 166, 112A, 112B, 112C, 106B	36	51
NM18	36	134A	39	52
NM19	37	165	35	51
NM20	38	206, 260, 261, 263, 321	38	51
NM21	39	144, 128	40	49
NM22	40	157, 171	46	58

The approved NMP adopts 13 attended NM locations for night period operations that are representative of residences outlined in SSD 8642 and consistent with those provided in the EPL. Noise criteria only apply in specific meteorological conditions in accordance with EPL 12894. Under SSD 8642, noise criteria increase by 5 dB (compared to the standard noise criteria) during 'very noise-enhancing' conditions (i.e. not 'standard' or 'noise-enhancing' conditions).

Where several assessment locations are in one NM catchment, representative noise criteria have been adopted to ensure that the lowest (most stringent) criteria within the NM catchment can be achieved. Additionally, in accordance with the Noise Policy for Industry (NPfI) (EPA, 2017), relevant modifying factor adjustments apply when assessing the characteristics of Mangoola mine noise emissions.

Cumulative Noise Criteria

Cumulative noise criteria are not included in SSD-8642 therefore there is no requirement to monitor or assess cumulative mine noise.

Management and Mitigation Measures

In addition to conducting noise monitoring, Mangoola continues to implement several mitigation measures with regard to the management of noise to minimise potential noise impact on nearby receivers, and to comply with the conditions of SSD 8642. Mitigation measures are implemented as per the NMP and include, but are not limited to:

- Consideration of noise impacts during mine planning.
- Controlling mine noise at the source using equipment with appropriate sound attenuation fitted, where practical.
- Maintaining mining equipment in a proper and efficient manner.
- Restricting, where possible, operations on outer dump faces or elevated dumps in sensitive areas during adverse weather conditions.
- Restricting, where possible trucks operating during the nighttime in operational areas above the maximum elevation of the overburden emplacement areas.
- Using real-time noise monitors that incorporate automatic alarms so that proactive control can be implemented.

6.3.2 Environmental Monitoring Results

6.3.2.1 Results from the Reporting Period

EPL 12894 and SSD 8642 Noise Monitoring

During 2024, monthly attended surveys were undertaken at 13 representative locations during the night period to measure operational noise, in accordance with SSD 8642 and EPL 12894. These locations have been outlined in ***Section 6.3.1***.

During 2024, Mangoola was compliant with all noise criteria set out in SSD 8642 and EPL 12894. A summary of results is presented in ***Table 6-9*** and ***Table 6-10.*** Where the meteorological conditions did not apply (for EPL 12894) or were 'very noise-enhancing' (for SSD 8642), these cells have been bolded.

All noise monitoring results are available in full on the Mangoola website.

Table 6-9 Attended noise monitoring results and comparison against MCCO predictions ($L_{Aeq,15minute}$, dB)

	NM4	NM8	NM10	NM13	NM14	NM15	NM16	NM17	NM18	NM19	NM20	NM21	NM22	Compliance against criteria
EA property reference	109A, 109B, 109C, 109D, 109E, 109F	176	251	125A, 125C, 190, 240, 241A, 241B, 241C, 182A, 182B	184A	154	79, 177, 178, 147, 253, 141, 151	54, 114, 166, 112A, 112B, 112C, 106B	134A	165	206, 260, 261, 263, 321	144, 128	157, 171	
$L_{Aeq,15minute}$ criteria	41	40	35	38	37	34	37	36	39	35	38	40	46	
$L_{Aeq,15minute}$ Year 3 prediction	39[1], 39[2], 39[3], 39[4], 39[5], 39[6]	39	35	37[7], 37[8], 37[9], 36[10], 36[11], 36[12], 37[13], 37[14], 37[15]	35	38	36[16], 35[17], 34[18], 34[19], 34[20], 35[21], 35[22]	34[23], 35[24], 34[25], 34[26], 34[27], 34[28], 35[29]	39	36	36[30], 35[31], 36[32], 37[33], 35[34]	39[35], 38[36]	37[37], 38[38]	
January	**<30**	28	IA	IA	<24	IA	<20	29	**29**	**<20**	**<25**	<25	26	Yes
February	21	25	IA	31	25	IA	28	27	<22	IA	<20	<20	31	Yes
March	31	25	IA	IA	28	20	29	29	29	<30	29	27	34	Yes
April	34	27	IA	IA	IA	IA	23	27	30	<25	26	32	36	Yes

	NM4	NM8	NM10	NM13	NM14	NM15	NM16	NM17	NM18	NM19	NM20	NM21	NM22	Compliance against criteria
May	31	26	IA	IA	IA	IA	IA	IA	29	<25	29	29	38	Yes
June	28	IA	32	<25	22	30	<20	IA	32	26	29	<25	33	Yes
July	**IA**	**IA**	**IA**	**NM**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	Yes
August	**<20**	IA	**33**	32	IA	31	IA	IA	<20	<20	<25	**IA**	26	Yes
September	37	33	IA	IA	IA	IA	24	25	33	30	31	28	37	Yes
October	**35**	**30**	**IA**	**IA**	**IA**	**IA**	<20	**26**	**IA**	**30**	**IA**	**31**	**39**	Yes
November	28	**32**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	<25	**<20**	**36**	**<25**	**<30**	Yes
December	**<30**	**<25**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**26**	**<25**	**<25**	**26**	**27**	Yes

1. EA reference 109A *2. EA reference 109B* *3. EA reference 109C* *4. EA reference 109D* *5. EA reference 109E* *6. EA reference 109F*
7. EA reference 125A *8. EA reference 125C* *9. EA reference 190* *10. EA reference 240* *11. EA reference 241A* *12. EA reference 241B*
13. EA reference 241C *14. EA reference 182A* *15. EA reference 182B* *16. EA reference 79* *17. EA reference 177* *18. EA reference 178*
19. EA reference 147 *20. EA reference 253* *21. EA reference 141* *22. EA reference 151* *23. EA reference 54* *24. EA reference 114*
25. EA reference 166 *26. EA reference 112A* *27. EA reference 112B* *28. EA reference 112C* *29. EA reference 106B* *30. EA reference 206*
31. EA reference 260 *32. EA reference 261* *33. EA reference 263* *34. EA reference 321* *35. EA reference 144* *36. EA reference 128*
37. EA reference 157 *38. EA reference 171* *IA = Inaudible* *NM= Not measurable*

Note: Bolded results denote that a positive 5 dB adjustment was applied to the specified noise limit to account for 'very noise enhancing' weather conditions at the time of the measurement

Note: Red results denote a measured result that is above the predicted noise level for that location.

Table 6-10 Attended noise monitoring results and comparison against MCCO predictions (L_{Amax}, dB)

	NM4	NM8	NM10	NM13	NM14	NM15	NM16	NM17	NM18	NM19	NM20	NM21	NM22	Compliance against criteria
EA property reference	109A, 109B, 109C, 109D, 109E, 109F	176	251	125A, 125C, 190, 240, 241A, 241B, 241C, 182A, 182B	184A	154	79, 177, 178, 147, 253, 141, 151	54, 114, 166, 112A, 112B, 112C, 106B	134A	165	206, 260, 261, 263, 321	144, 128	157, 171	
L_{Amax} criteria	54	51	50	53	48	52	54	51	52	51	51	49	58	
L_{Amax} Year 1 prediction	40[1], 40[2], 40[3], <40[4], 40[5], <40[6]	<40	<40	<40[7], <40[8], <40[9], <40[10], <40[11], <40[12], <40[13], <40[14], <40[15]	<40	<40	<40[16], <40[17], <40[18], <40[19], <40[20], <40[21], <40[22]	<40[23], <40[24], <40[25], <40[26], <40[27], <40[28], <40[29]	<40	<40	<40[30], <40[31], <40[32], 40[33], <40[34]	43[35], <40[36]	<40[37], <40[38]	
January	**<30**	31	IA	IA	<24	IA	<20	35	**32**	**<20**	**<25**	26	38	Yes
February	24	27	IA	35	28	IA	32	33	<22	IA	23	<25	38	Yes
March	36	28	IA	IA	31	20	40	33	32	<30	32	30	36	Yes
April	39	29	IA	IA	IA	IA	24	29	34	28	30	41	43	Yes

	NM4	NM8	NM10	NM13	NM14	NM15	NM16	NM17	NM18	NM19	NM20	NM21	NM22	Compliance against criteria
May	39	30	IA	IA	IA	IA	IA	IA	35	<25	35	42	48	Yes
June	33	IA	35	28	24	35	<20	IA	35	36	33	<25	38	Yes
July	**IA**	**IA**	**IA**	**NM**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	Yes
August	**<25**	IA	**38**	38	IA	35	IA	IA	<25	<20	34	**IA**	33	Yes
September	39	42	IA	IA	IA	IA	28	32	39	41	38	30	40	Yes
October	**35**	**35**	**IA**	**IA**	**IA**	**IA**	20	**27**	**IA**	**34**	**IA**	**34**	**45**	Yes
November	32	**40**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	27	**29**	**41**	**27**	**38**	Yes
December	**33**	**<25**	**IA**	**IA**	**IA**	**IA**	**IA**	**IA**	**35**	**28**	**29**	**32**	**43**	Yes

1. EA reference 109A *2. EA reference 109B* *3. EA reference 109C* *4. EA reference 109D* *5. EA reference 109E* *6. EA reference 109F*
7. EA reference 125A *8. EA reference 125C* *9. EA reference 190* *10. EA reference 240* *11. EA reference 241A* *12. EA reference 241B*
13. EA reference 241C *14. EA reference 182A* *15. EA reference 182B* *16. EA reference 79* *17. EA reference 177* *18. EA reference 178*
19. EA reference 147 *20. EA reference 253* *21. EA reference 141* *22. EA reference 151* *23. EA reference 54* *24. EA reference 114*
25. EA reference 166 *26. EA reference 112A* *27. EA reference 112B* *28. EA reference 112C* *29. EA reference 106B* *30. EA reference 206*
31. EA reference 260 *32. EA reference 261* *33. EA reference 263* *34. EA reference 321* *35. EA reference 144* *36. EA reference 128*
37. EA reference 157 *38. EA reference 171* *IA= Inaudible* *NM= Not measurable* *For assessment purposes the L_{Amax} and the $L_{A1,1minute}$ are interchangeable.*

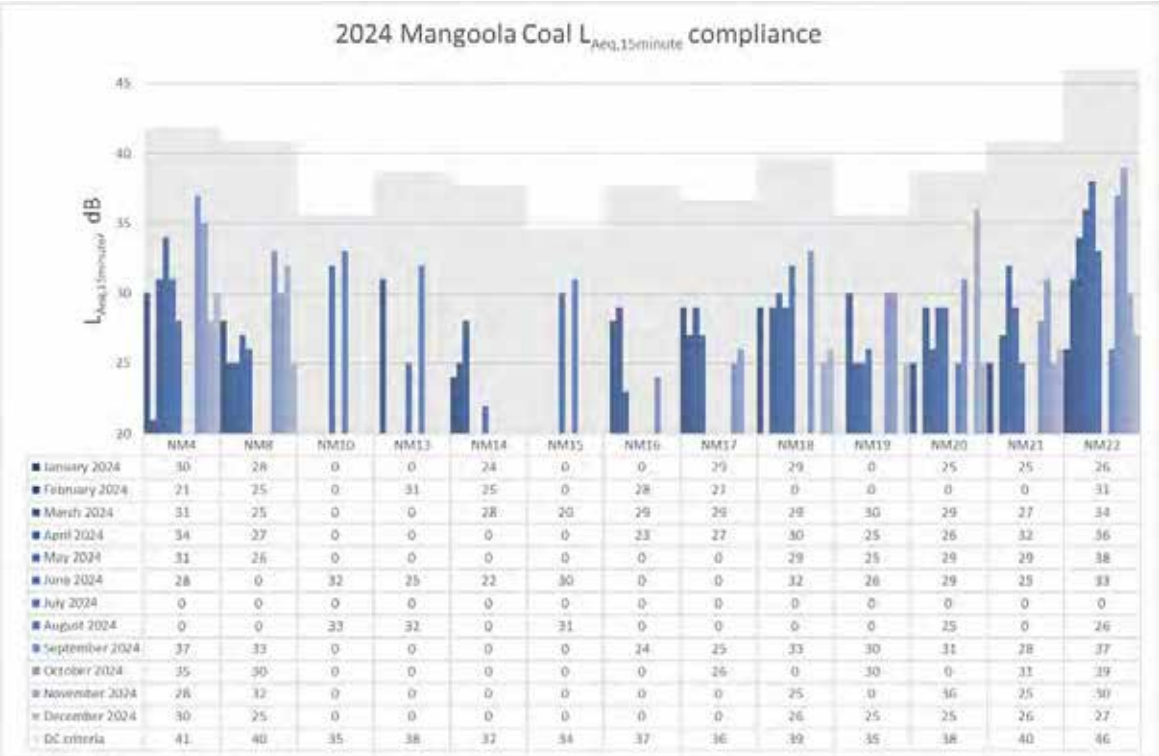
Note: Bolded results denote that a positive 5 dB adjustment was applied to the specified noise limit to account for 'very noise enhancing' weather conditions at the time of the measurement
Note: Red results denote a measured result that is above the predicted noise level for that location.

As shown in ***Table 6-9***, the noise levels recorded at Mangoola from January–December 2024 were compared against the Year 3 noise predictions presented in the MCCO Noise Impact Assessment (Global Acoustics, 2019) and relevant SSD 8642 LAeq,15minute criteria. Two monitoring locations recorded at least one result above the Year 3 L_{Aeq},15minute predictions, with one result above the predicted levels at NM20 and four results above the predicted levels at NM22. However, these levels were well below the relevant criterion. All other results were lower than predicted levels.

Table 6-10 compares the January–December 2024 Mangoola LAmax noise against MCCO Noise Impact Assessment Year 3 predictions and SSD 8642 LA1,1minute criteria. Five monitoring locations recorded at least one result above the Year 3 LAmax predictions, with one result above the predicted levels at NM8, NM19 and NM20, two results above the predicted levels at NM21, and five results above the predicted level at NM22. All other measured LAmax were below predicted levels.

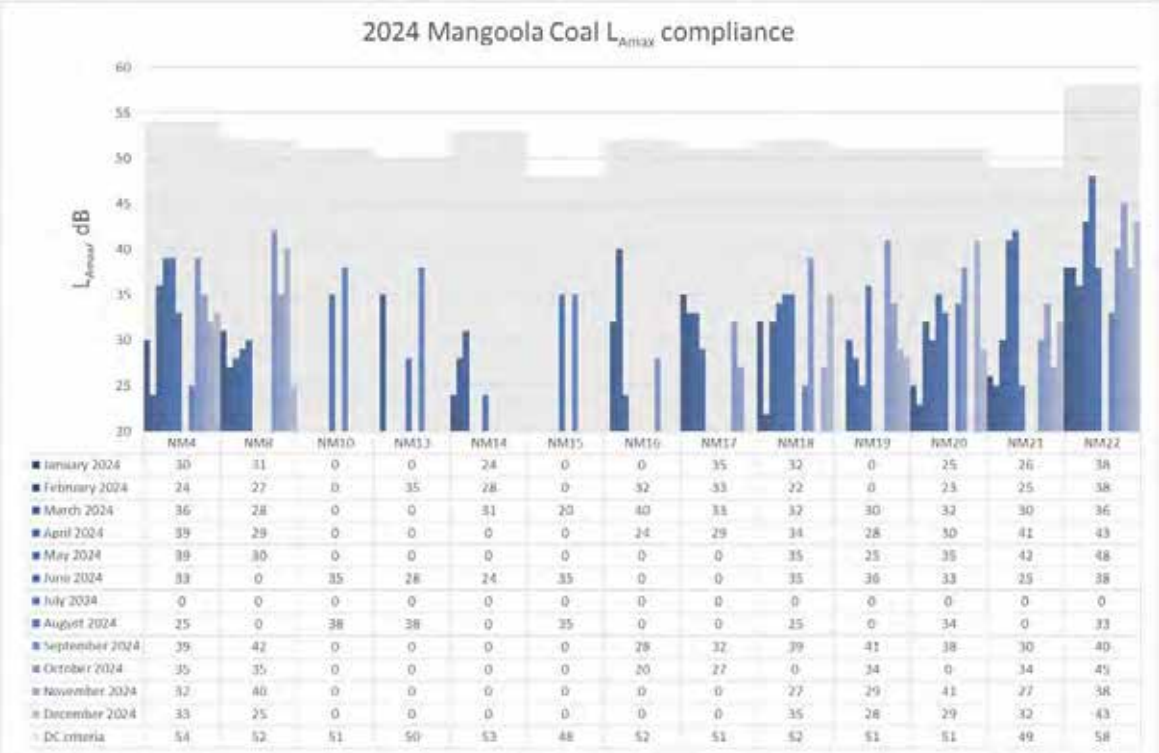
Possible reasons for a difference between modelled noise levels and those measured are differences in modelling scenario assumptions compared to actual operations, or specific weather conditions at the time (only a finite set of meteorological conditions can be modelled). The former primarily relates to features such as mine topography and locations of plant and equipment. Importantly, measured Mangoola noise levels did not exceed any LAeq,15minute or LAmax noise criterion during 2024.

Figure 6-8 and ***Figure 6-9*** compare the 2024 noise levels recorded at Mangoola with relevant approval criteria.



	NM4	NM8	NM10	NM13	NM14	NM15	NM16	NM17	NM18	NM19	NM20	NM21	NM22
January 2024	30	28	0	0	24	0	0	29	29	0	25	25	26
February 2024	21	25	0	31	25	0	28	21	0	0	0	0	31
March 2024	31	25	0	0	28	20	29	29	28	30	29	27	34
April 2024	34	27	0	0	0	0	23	27	30	25	26	32	36
May 2024	31	26	0	0	0	0	0	0	29	25	29	29	38
June 2024	28	0	32	25	22	30	0	0	32	26	29	25	33
July 2024	0	0	0	0	0	0	0	0	0	0	0	0	0
August 2024	0	0	33	32	0	31	0	0	0	0	25	0	26
September 2024	37	33	0	0	0	0	24	25	33	30	31	28	37
October 2024	35	30	0	0	0	0	0	26	0	30	0	31	29
November 2024	28	32	0	0	0	0	0	0	25	0	36	25	30
December 2024	30	25	0	0	0	0	0	0	26	25	25	26	27
DC criteria	41	40	35	38	37	34	37	36	39	35	38	40	46

Figure 6-8 Annual Review Attended Noise Monitoring Compliance Results (LAeq(15minute))



	NM4	NM8	NM10	NM13	NM14	NM15	NM16	NM17	NM18	NM19	NM20	NM21	NM22
January 2024	30	31	0	0	24	0	0	35	32	0	25	26	38
February 2024	24	27	0	35	28	0	32	33	22	0	23	25	38
March 2024	36	28	0	0	31	20	40	33	32	30	32	30	36
April 2024	39	29	0	0	0	0	24	29	34	28	30	41	43
May 2024	39	30	0	0	0	0	0	0	35	25	35	42	48
June 2024	33	0	35	28	24	35	0	0	35	36	33	25	38
July 2024	0	0	0	0	0	0	0	0	0	0	0	0	0
August 2024	25	0	38	38	0	35	0	0	25	0	34	0	33
September 2024	39	42	0	0	0	0	28	32	39	41	38	30	40
October 2024	35	35	0	0	0	0	20	27	0	34	0	34	45
November 2024	32	40	0	0	0	0	0	0	27	29	41	27	38
December 2024	33	25	0	0	0	0	0	0	35	28	29	32	43
DC criteria	54	52	51	50	53	48	52	51	52	51	51	49	58

Figure 6-9 Annual Review Attended Noise Monitoring Compliance Results (LAmax)

6.3.2.2 Comparison with Predictions

The MCCO Noise Impact Assessment (Global Acoustics, 2019) predicted the 90th percentile $L_{Aeq,15minute}$ and L_{Amax} operational noise levels at private receptors in Years 1, 3, 5 and 8. As MCCO was approved in 2021, a comparison of 2024 noise data against the Year 3 predictions has been made in ***Table 6-9*** and ***Table 6-10***.

Any measured level which exceeds that predicted (and meteorological conditions were relevant) has been bolded in red.

6.3.2.3 Long Term Trend Analysis

Exceedances of SSD 8642 and EPL 12984 criteria have decreased over the years. During 2024 there were no occasions when measured Mangoola mine noise levels exceeded SSD 8642 or EPL 12894 criteria. These results represent a continuation of the zero exceedances reported in 2020, 2021, 2022 and 2023.

6.3.3 Key Performance and/or Management Issues

There are eight properties eligible for acquisition (Property IDs 25, 66, 83, 110, 130, 139, 148 and 205) as per Table 10, Condition C1 of SSD 8642. These properties are also eligible for additional mitigation under Condition C2 of SSD 8642. It is noted some have already had mitigation installed and there were no further requests by these landowners in 2024. In addition, none of these properties were acquired by Mangoola under Condition C1 of SSD8642 in 2024.

There are 22 properties eligible for additional mitigation upon request (noise) (Property IDs 128, 144, 154, 171, 176, 193, 261, 263, 109A, 109B, 109C, 109D, 109E, 109F, 125A, 134A, 182B, 164, 177, 251, 174A and 174B) as per Table 11, Condition C2 of SSD 8642. During 2024, three property IDs received additional noise mitigation.

The properties identified in Table 2, Condition B6 of SSD 8642 (Property ID's 246, 249 and 251) have mitigation rights for road traffic noise however it is noted that Property 246 previously had mitigation works completed under MP 06_0014, and 251 also has mitigation rights under Table 11 of SSD8642. During 2024, no properties eligible for road traffic noise mitigation triggered those rights.

All private property owners with rights to mitigation or acquisition were notified of the SSD 8642 approval and their rights under this approval within 1 month of the date of consent.

During 2024, there was one new impact mitigation and compensation agreement (Property ID 130). The existing impact agreements were maintained and as such, the SSD 8642 noise criteria relevant to those properties cease to apply.

A total of 35 noise related complaints were received during 2024, which is an increase from 30 noise related complaints received during the 2023 reporting period. These were predominately from residences to the north-west of operations. In response to an increase in complaints in this area, weekly attended noise monitoring was once again conducted over the winter period. Monitoring results indicated that site noise was below noise compliance levels. Complaints are further discussed in ***Section 9****Error! Reference source not found.*.

6.3.4 Proposed Improvements

In response to any future changes to property ownership around the operation, Mangoola will review the noise monitoring network to determine whether continuous noise monitoring units can be relocated to provide better coverage around the mining operations.

6.4 Blasting and Vibration

6.4.1 Environmental Management

Blasting at Mangoola is undertaken in accordance with the Blast Management Plan (BMP). The Blast Fume Management Procedure is also implemented, which defines practises to reduce the potential for fume generation and therefore reduce the impact of fume on the environment and community.

Prior to blasting and in accordance with the BMP, predictive and current meteorological data is reviewed to ensure that blasting is undertaken in appropriate weather conditions. Wind speed, wind direction and the presence of temperature inversions are analysed prior to initiating blasting activities.

Blast overpressure and vibration was monitored at eleven monitoring locations during 2024, known as BM03, BM07, BM08, BM09, BM10, BM11, Anvil Rock, the closest rock formation to the blast, transmission line powerline pylons (where necessary), public road (where necessary) and the Castle Hill Slab Hut. Blasting within proximity to the powerline easement is undertaken as per a written agreement between the mining company and the electricity infrastructure owner.

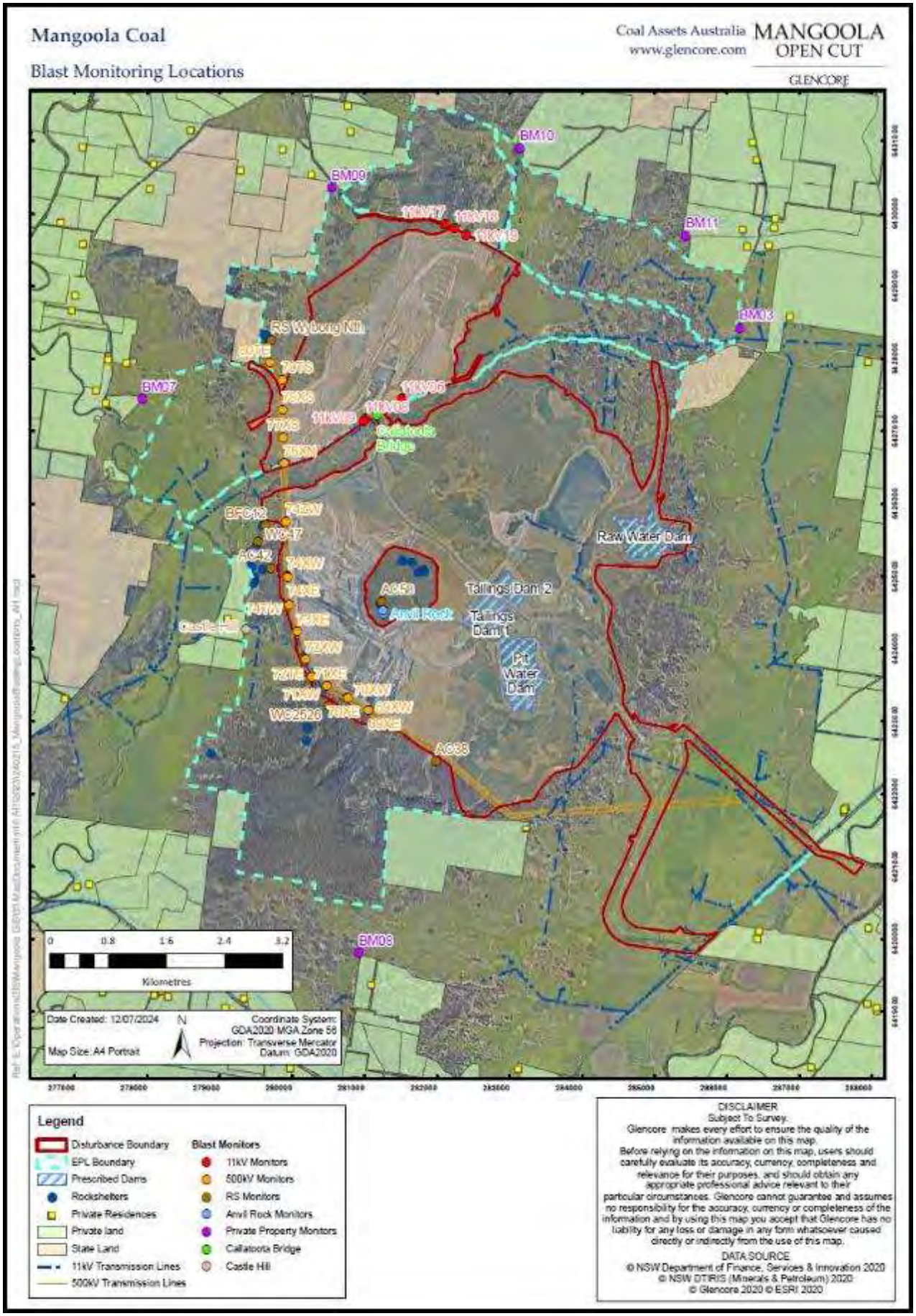


Figure 6-10 Blast Monitoring Locations

6.4.2 Environmental Monitoring Results

6.4.2.1 Results from the Reporting Period

During the reporting period there was an average of 2.6 blast events per week, which is compliant with Condition B14 of SSD 8642, which allow a maximum of 6 blasts per week, averaged over a calendar year. A total of 137 blast events occurred during the reporting period and no more than 2 blast events per day which is compliant with Condition B14 of SSD 8642, as shown by ***Figure 6-11***.

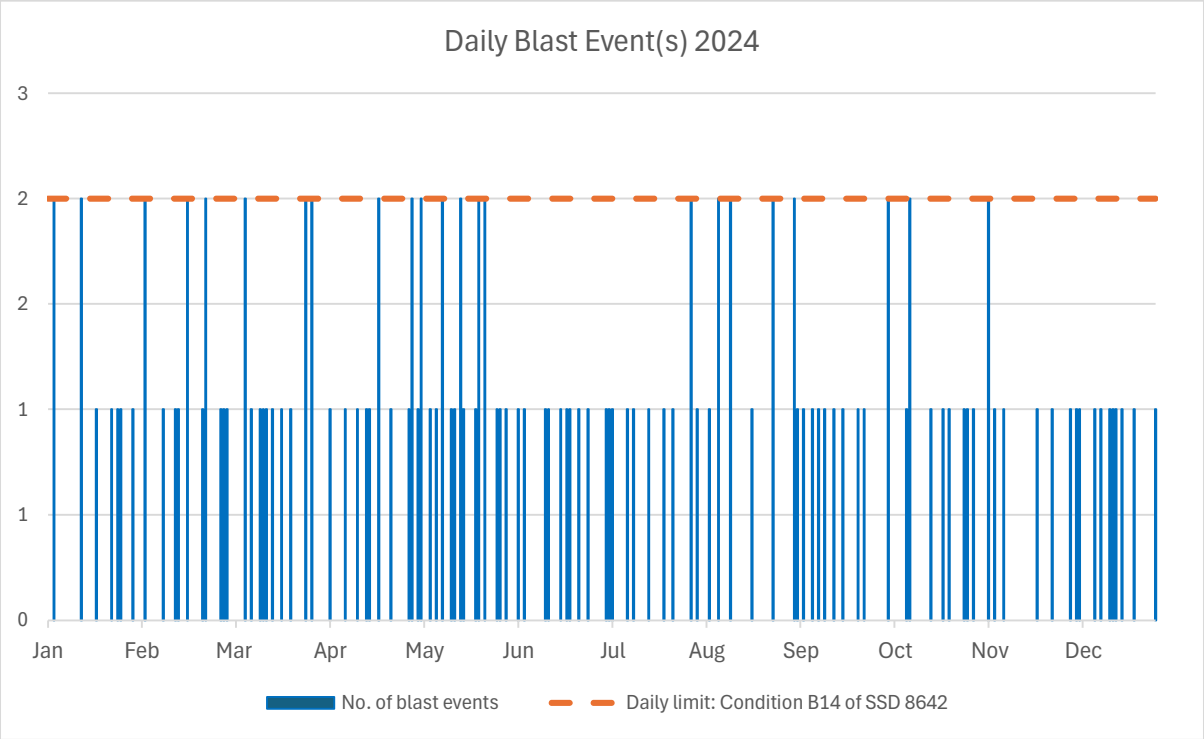


Figure 6-11 Daily Blast Events

Condition B11 of SSD 8642, as well as Condition L4 of EPL 12894, provide the criteria for allowable air blast overpressure and ground vibration as measured at any privately owned residence. Additional ground vibration limits apply to the electricity transmission pylons in accordance with the agreement with TransGrid as the asset owner.

Table 6-11 summarises the blasting criteria, as defined in SSD 8642 and EPL 12894, and other compliance monitoring requirements as defined in the approved BMP and Historic Heritage Management Plan (HHMP) for Mangoola.

Table 6-11 Compliance Monitoring Location Summary and Adopted Criterion

Monitoring Requirement	Monitoring Site (MP or DC / EPL ID)	Airblast Overpressure Limit	Ground Vibration Limit	Comments
DC[1]: Residence on privately owned land. **EPL[2]: At monitoring points 16, 21 and 32.**	Private Property NW (BM07/21)	115 dB (Lin Peak) (allowable exceedance of 5% over 12 months); and 120 dB (Lin Peak) absolute limit.	5 mm/s (peak particle velocity (PPV)) (allowable exceedance of 5% over 12 months); and 10 mm/s (PPV) absolute limit.	Blast monitoring is conducted at the nearest residence on privately owned land to the blast zone (or representative locations on mine-owned land that is not further than the nearest residence). Locations may change over the life of the mine as properties are acquired and the mining progresses. Criteria applies to the nearest privately owned residence (as per SSD 8642 and EPL definition). The EPL requires blast monitoring at monitoring points 16, 21 and 32 as per Condition M7.1. BM03 represents Point 16, BM07 represents Point 21 and BM08 represents Point 32.
	Church NE (BM03/16)			
	Private Property S (BM08/32)			
DC[1]: Residence on privately owned land.	Private Property NW (BM09)			
	Private Property N (BM10)			
	Private Property E (BM11)			
DC[1]: 500 kV Transmission Line	Pylon 64X through to Pylon 80T	N/A (not measured)	[3]60 mm/s for tension towers [3]150mm/s for suspension towers	Monitoring requirements and limits apply as per agreement with the infrastructure owner (TransGrid).

Monitoring Requirement	Monitoring Site (MP or DC / EPL ID)	Airblast Overpressure Limit	Ground Vibration Limit	Comments
DC[1]: Rock Formations	Anvil Hill The Book Rockshelter sites	N/A (not measured)	50 mm/s under DC.	Representative blast monitoring of Anvil Hill to inform vibration monitoring. The closest rock formation is monitored for every blast if not Anvil Hill.
DC[1]: Historic Heritage	Castle Hill Slab Hut	N/A (not measured)	*Safe blasting limit as determined by specialist analysis under DC. 20 mm/s.*	Representative blast monitoring for all blasts south of Wybong Road.
DC[1]: Infrastructure	Public roads, under-ground cables. 11 kV line	N/A (not measured)	*Safe blasting limit as determined by specialist analysis under DC. 100 mm/s.*	Representative blast monitoring for all blasts north of Wybong Road, within 300m of infrastructure.

[1] A requirement of Mangoola's SSD 8642 (Conditions B11, B12 and B71).
[2]EPL: A requirement of Mangoola's EPL 12894 (condition L4.1, L4.2, L4.3 and L4.4 and M7.1).
[3]As per TransGrid Agreement - Tower limits were increased on 17 September 2020 via agreement with TransGrid and DPHI.

The above criteria reflect the updated compliance limits which came into force during 2023, to align with the requirements of SSD 8642 through the BMP. The BMP was approved by DPHI on 19 October 2022 and the relinquishment of Project Approval (MP 06_0014) occurred on 21 November 2022.

Airblast Overpressure

Airblast overpressure results at all monitoring locations for the reporting period are available on the Mangoola website, with the results recorded at the nearest privately owned residences and sensitive location summarised in ***Table 6-12***.

Table 6-12 Airblast Overpressure Summary

Location	Minimum (dBL)	Average (dBL)	Maximum (dBL)	#Blasts between 115 – 120 dBL	% Blasts between 115 – 120 dBL	Exceedances (Y/N)
BM03	74	92.12	111.1	0	0.0 %	N
BM07	83.5	95.19	114.6	0	0.0 %	N
BM08	71.1	88.52	107.1	0	0.0 %	N

Location	Minimum (dBL)	Average (dBL)	Maximum (dBL)	#Blasts between 115 – 120 dBL	% Blasts between 115 – 120 dBL	Exceedances (Y/N)
BM09	68.8	94.33	119	0	0.7 %	N
BM10	75.2	92.34	113.9	0	0.0 %	N
BM11	71.9	89.5	104.6	0	0.0 %	N

All monitored blast events were compliant with the airblast over pressure limit of 115 dBL; or within the 5% exceedance allowance of between 115 and 120 dBL.

Ground Vibration

Ground vibration monitoring data for the reporting period is available on the Mangoola website and is summarised in ***Table 6-13***.

Table 6-13 Ground Vibration Summary

Location	Minimum (mm/s)	Average (mm/s)	Maximum (mm/s)	Compliance Limit (mm/s)	Exceedances (Y/N)
Residences					
BM03	0.01	0.064	0.26	5	N
BM07	0.01	0.068	0.32	5	N
BM08	0.01	0.065	0.36	5	N
BM09	0.0	0.13	0.66	5	N
BM10	0.01	0.13	1.08	5	N
BM11	0.01	0.11	1.28	5	N
Historic Heritage					
Castle Hill Slab Hut	0.01	0.672	6.04	20	N
Rock Formations					
Anvil Rock	0.02	5.52	0.626	50	N
Closest Rock Formation (where Anvil Rock is not the closest)	<0.1	1.49	16.47	50	N
Infrastructure					
Transmission Line Pylon (tension)	<0.1	1.4	35.19	60[1]	N

Location	Minimum (mm/s)	Average (mm/s)	Maximum (mm/s)	Compliance Limit (mm/s)	Exceedances (Y/N)
Transmission Line Pylon (suspension)	<0.1	2.2	121.22	150	N
11 kV line pole (WP blasts only)	0.55	4.5	12.2	100	N
Road/cabling (WP blasts only)	<0.55	4.5	12.2	100	N

[1]As per agreement with infrastructure owner TransGrid, results of >60mm/s are not considered an exceedance of criteria. Mangoola targets 60mm/s at a 95% confidence interval.

[2]As per agreement with infrastructure owner TransGrid and in accordance with Condition B12, a limit of 150mm/s has been set for suspension pylons.

During 2024, all monitored blast events were compliant with the relevant ground vibration criteria.

6.4.2.2 Comparison with Predictions

The Environmental Assessment completed for the MCCO project included a Noise and Vibration Assessment which assessed the impacts of blasting. This assessment determined the limiting factors to the blast design with respect to the relevant blast criteria.

There were no exceedances of blast overpressure or ground vibration criteria, and therefore the results were largely consistent with predictions made.

These findings were then reviewed and reassessed by Enviro Strata Consulting (2019) in accordance with ANZECC Guidelines and the relevant Australian and British Standards as part of the EIS for the MCCO Project which formed the basis of the compliance limits imposed under SSD 8642 to achieve the desired performance measures.

6.4.2.3 Long Term Trend Analysis

In accordance with SSD 8642, a long-term trend analysis of blast monitoring results at Mangoola has been undertaken using data from July 2010 to December 2024 (refer ***Appendix D***).

Ground vibration monitoring results have remained generally consistent since monitoring commenced, with no increasing trends developing in the data. All blast vibration monitoring results at private residences have been below the SSD 8642 criteria since monitoring commenced. All results have been below the 10 mm/s criteria, and while some results have exceeded the 5 mm/s criteria, these were within the allowable 5% frequency.

Airblast overpressure monitoring results at private residences (BM03, BM07, BM08, BM09, BM10 and BM11) have remained generally constant at all locations since monitoring began.

6.4.3 Key Performance and/or Management Issues

There were no exceedances of the 50 mm/s safe limit for Anvil Rock (or other closest rock formations) or the 20 mm/s Castle Hill Slab Huts limit. There were no exceedances of the 120 dB or 10 mm/s criteria for private receptors. Additionally, there was no exceedance of the 5 mm/s (or associated 5% exceedance allowance) for private receptors. The 5% allowance for blast events with overpressure between 115 and 120 dB was not exceeded. There was however one occasion in which the 115 dB criteria was exceeded.

Mangoola Coal recorded one blast event (in Wybong Pit) that exceeded the 115 dB overpressure criteria at BM09 on the 11th of March 2024 (119 dB). An investigation commenced which included reviewing the current blast monitor locations and their proximity to the nearest representative private landowner residences.

As a result of the investigation Mangoola Coal submitted an updated Blast Management Plan to DPHI in December 2024 which considers the effect attenuating factors would have had on the overpressure levels experienced at the private residence. This blast management plan was approved on the 23rd of January 2025.

Thirteen complaints were received in relation to blasting during the reporting period, which is an increase from the three complaints received in 2023. All complaints were relating to blast vibration/overpressure. Further detail on complaints is provided in ***Section 9.3.***

6.4.4 Proposed Improvements

In 2025 Mangoola Coal will propose to relocate BM09 further North to be more representative of the two closest private receptors, thus mitigating the impact of attenuating factors and providing a more accurate measure of compliance for blast events.

Additionally, Mangoola Coal is investigating the use of a portable meteorological station that would allow for more accurate modelling of the effect of atmospheric conditions on blast overpressure and fume.

6.5 Erosion and Sediment Control

6.5.1 Environmental Management

Mangoola manages erosion and sediment on site in accordance with the approved Erosion and Sediment Control Plan (ESCP), which is included as Appendix C of the Water Management Plan (WMP).

Prior to land disturbance for any aspect of the mine, appropriate erosion and sediment controls are designed and constructed according to the ESCP as well as the guidelines *Managing Urban Stormwater: Soils and Construction* (Landcom 2004) (the Blue Book) *Volume One and Volume 2E Mines and Quarries* (DECC 2008).

Site erosion and sediment controls are inspected at least monthly, and within 5 days of a high rainfall event (i.e. greater than 20 mm in 24 hours). Regular maintenance is undertaken as required to replace damaged sediment control structures and maintain other temporary measures. Annual channel stability monitoring is also undertaken at Mangoola to identify any erosion and sedimentation issues on surrounding creeks and drainage lines. The outcomes are reported in the Annual Channel Stability Report in accordance with SSD 8642.

6.5.2 Environmental Monitoring Results

Monitoring of erosion and sediment control structures was completed in accordance with the requirements of the approved ESCP.

The 2024 Annual Inspection saw no observed changes in the Ephemeral Stream Assessments for existing reaches of Big Flat Creek and Sandy Creek as compared to previous assessments. A new section of Big Flat Creek was included in the assessment (reach 7, 8 and 9) and Reach 0 and 1 of the newly reinstated Anvil Creek. These reaches will continue to be included in the annual assessment.

6.5.3 Key Performance and/or Management Issues

There were no issues with erosion and sediment control during the reporting period. The effect of the reduction of sediment previously being contributed into Big Flat Creek from Anvil Creek will be monitored in future assessments. Mangoola will review and implement if required any remedial measures as per the recommendations of the 2024 Annual Channel Stability Report, as provided in Table 6- 14. Remedial actions will be implemented as required following onsite erosion and sediment control inspections completed routinely and following rainfall events.

Table 6-14 2024 Annual Channel Stability Report Recommendations

Recommendation	Mangoola Response
Big Flat Creek: **Continue to manage stock access.**	This area is in Mangoola grazing land and is only lightly stocked due to the low carrying capacity. The area adjacent to Big Flat Creek was fenced off to exclude stock previously during 2021. Revegetation of adjacent offset areas is undertaken in accordance with the Biodiversity Offset Management Plan and Strategy (BOMPS).
Big Flat Creek: **Undertake weed control.**	Weed management works continue to be undertaken regularly across all buffer land and offset areas. These works are prioritised based on weed type and numbers present. Revegetation across offset areas is undertaken in accordance with the BOMPS.
Sandy Creek: **Manage stock access along Sandy Creek.**	This area is associated within several Mangoola offset areas and grazing land surrounding Sandy Creek. Fencing of offset areas to exclude cattle will continue to be maintained as per the BOMPS. Grazing is restricted due to low carrying capacity. The area will continue to be monitored and further stock reductions undertaken if required.
Sandy Creek: **Repair active erosion points.**	The area identified has a low stocking rate and any erosion in this grazing land area will continue to be monitored and remediation works undertaken if necessary.
Sandy Creek: **Native revegetation and continue to manage weeds.**	Weed management works continue to be undertaken regularly across all buffer land and offset areas. These works are prioritised based on weed type and numbers present. Revegetation across offset areas is undertaken in accordance with the BOMPS.

6.5.4 Proposed Improvements

The ESCP was updated in 2023 to include the establishment of a water diversion bund to direct clean water to a suitably sized culvert under Wybong Road and into Big Flat Creek to prevent flooding of Wybong Road during heavy rainfall event.

At this stage, no further improvements to the erosion and sediment controls are planned for the 2025 period, however, this will be reviewed as required following the progression of mining activities and impacts from extreme weather events should Mangoola experience these.

6.6 Biodiversity

6.6.1 Environmental Management

Flora and fauna are managed in accordance with the BOMPS. The BOMPS was approved by DPHI on 10 August 2022. The BOMPS is due for review in 2025 and is available on the Mangoola website.

Clearing activities at Mangoola have been designed to minimise impacts to any threatened flora and fauna species and vegetation communities. Suitably qualified personnel inspect all disturbance areas in accordance with site procedures and processes to manage approved impacts on threatened species of flora and fauna. Any fauna found during clearing activities are captured (where possible) and relocated by suitably qualified persons.

Two threatened terrestrial orchids and an endangered population of epiphytic orchid are present on lands at Mangoola, being *Diuris tricolor, Prasophyllum sp aff petilum* (Wybong) and *Cymbidium canaliculatum*. A Translocation Management Plan is in place to salvage and relocate threatened orchid species affected by the progression of mining activities. The document, titled "Translocation of Threatened Flora Species Management Plan" was updated and approved during 2024 and is available on the Mangoola website.

6.6.2 Biodiversity Offset Areas – Overview

Mangoola Coal has seven land-based offsets including five existing Conservation Agreement (CA) areas and two new Biodiversity Stewardship Agreement (BSA) areas (Figure 6-12). The five CA's, Big Flat Creek CA; Eastern CA; Northern Corridor CA; Southern CA; Western Corridor and Anvil Hill CA, were executed in 2019 and are available on the Mangoola website. The two BSA's, Mangoola BSA and Wybong Heights BSA were executed in 2024. Credits generated by these two BSA's were retired in 2024 to meet part of the biodiversity credits required under Condition B53 of SSD8642 and Condition 9 of EPBC 2018/8280. Key dates for the two BSA's are detailed below in ***Table 6-15***.

Table 6-15 Biodiversity Stewardship Agreements

BSA	Executed	Credits Retired	Anniversary	Report Due
Mangoola	19 April 2024	24 June 2024	22 August 2024	5 September
Wybong Heights	14 February 2024	17 June 2024	5 August 2024	19 August

Remaining credits required under Condition B53 of SSD8642 and Condition 9 of EPBC 2018/8280 were met using a combination of credits retired from land-based offsets managed by another operation, Mangrove BSA and Highfields BSA, in accordance with the offset strategy outlined in the BOMPS and payment to the NSW Biodiversity Conservation Fund for the fauna species credits required. The credit requirement set out in Condition B53 of SSD8642 and Condition 9 of EPBC 2018/8280 were required to be converted via a reasonable equivalence process by the Credit Supply Taskforce (CST) which required extensions to the agreed timeframes under the listed conditions. Extensions were granted to allow sufficient time for applications to be made and processed by CST.

Mangoola managed land-based offsets total over 4700 hectares. An overview is provided in ***Table 6-16.*** The NSW Biodiversity Conservation Trust (BCT) monitors the Biodiversity Offset Areas (BOA's), both CA's and BSA's via annual reports and inspections. BCT visited all BOA's during 2024, performing an audit on all CA's and undertaking initial inspections for the newly executed BSA's.

Table 6-16 Biodiversity Offset Areas

Biodiversity Offset Area	Approximate Size (Ha)	BCT Report Due
Big Flat Creek CA	307	20 January
Eastern CA	641	20 January
Northern Corridor CA	480	20 January
Southern CA	439	20 January
Western Corridor and Anvil Hill CA	1161	20 January
Mangoola BSA	993	5 September
Wybong Heights BSA	751	19 August

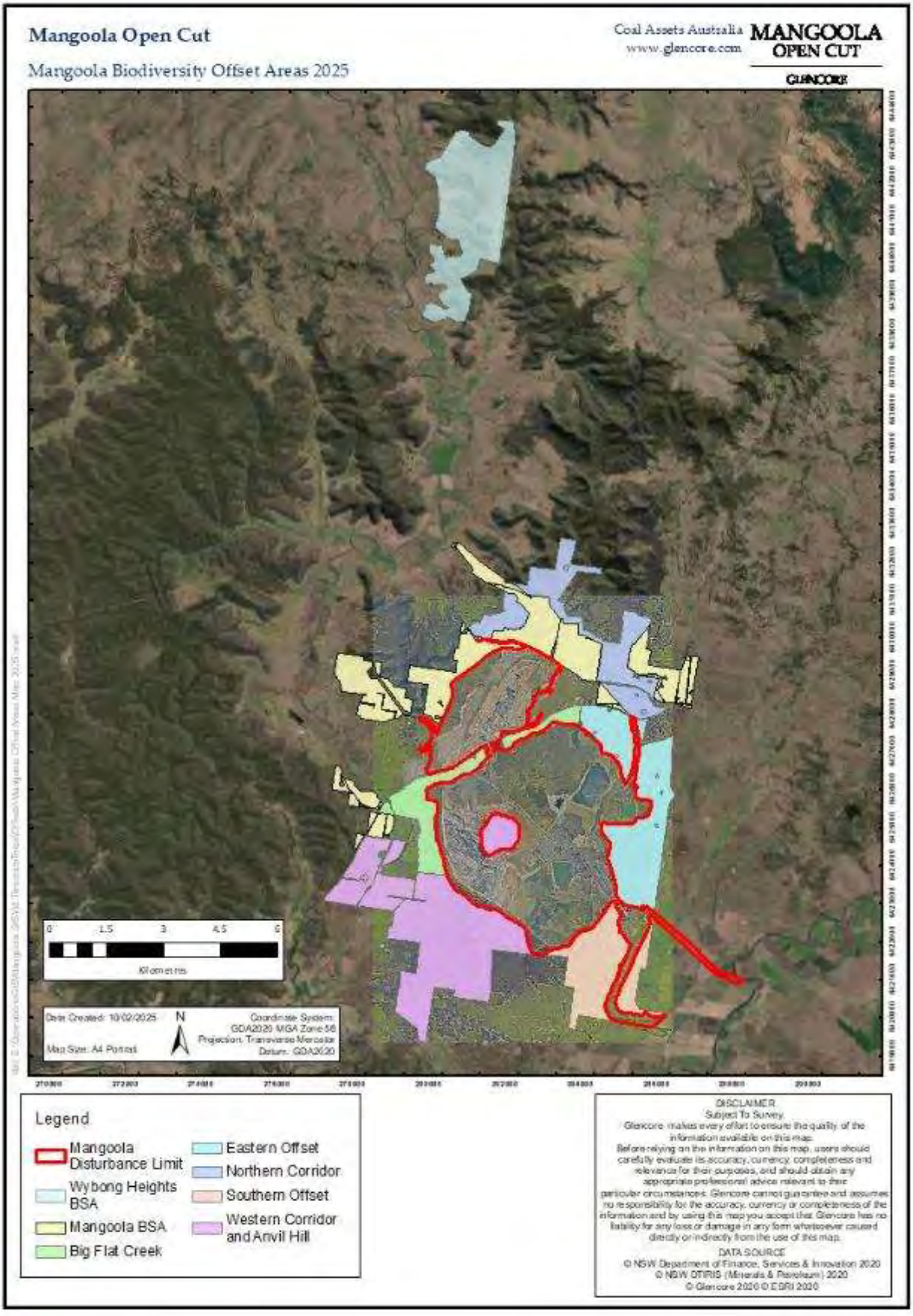


Figure 6-12 Biodiversity Offset Areas Managed by Mangoola Coal

6.6.3 Environmental Monitoring Results

The BOMPS monitoring program was updated in 2024 to include Biodiversity Report Card (BRC) monitoring in line with GCAA requirements. CA annual monitoring was undertaken in accordance with the CA monitoring requirements and BSA baseline monitoring was undertaken in accordance with Mangoola and Wybong Heights BSA's. Monitoring included:

- Fauna monitoring
- Flora monitoring
- Groundwater dependent ecosystem monitoring
- Nest box monitoring
- Photo monitoring

6.6.3.1 Flora

A scope change for flora monitoring occurred in 2024 to add monitoring required by the newly executed Mangoola and Wybong Heights BSA's. Mangoola also added new monitoring for Biodiversity Offset Areas (BOA'S) in accordance with GCAA requirements for a Biodiversity Report Card (BRC). This monitoring included plot-based flora monitoring in accordance with the Biodiversity Assessment Methodology (BAM), photo monitoring and walk through monitoring assessing vegetation condition, composition, structure and function.

This new monitoring was added to the existing flora monitoring scope which includes monitoring in accordance with the Conservation Agreements (CA's) and Groundwater Dependent Ecosystem (GDE) Monitoring.

CA monitoring is undertaken in accordance with the requirements of the five CA's and includes annual photo point, quadrat floristic and walk through monitoring by a suitably qualified person. Quadrat and photo point locations are included in the CA's with annual monitoring compared to baseline data collected in 2016. Results from CA monitoring are discussed in Section 6.6.3.4

BSA monitoring is undertaken in accordance with the requirements of the two BSA's and includes annual photo point monitoring, five-yearly full floristic vegetation integrity monitoring using the BAM methodology. Wybong Heights BSA monitoring includes 20 permanent monitoring sites for both photo and floristic monitoring. Mangoola BSA monitoring includes 41 permanent monitoring sites for both photo and floristic monitoring, 8 of which are monitored annually for ground orchids *Diuris tricolor* and *Prasophyllum petilum*, and one permanent photo monitoring site for epiphytic orchid *Cymbidium canaliculatum* to be monitored every five years. 2024 was the baseline monitoring year. All monitoring was undertaken in accordance with the BSA's. Annual monitoring reports for the BSA's are due to BCT at the completion of the first year of monitoring and maintenance actions (August/September 2025).

BRC monitoring was introduced in 2024 which extended the existing BOA monitoring to include further BAM monitoring plots in all BOA's. This monitoring included comparison of baseline data collected at BSA and CA monitoring sites as well as new sites established in 2024 for BRC monitoring purposes. BSA sites will be monitored on a three-yearly basis with sites split into zones based on vegetation type. Baseline monitoring was conducted in 2024 in accordance with GCAA requirements and calculations will be used to compare BOA performance across the GCAA group.

6.6.3.2 Fauna

Fauna monitoring in 2024 was undertaken by Ecological Australia (ELA) in accordance with the approved management plans. Monitoring was undertaken across 27 general fauna monitoring sites located within the Biodiversity Offset Areas (BOAs) and rehabilitation areas.

A total of 140 native fauna species were identified across Mangoola, including 10 threatened fauna species. Low numbers of unidentified molluscs and no threatened mollusc species were recorded. Microbat numbers are consistent with previous years with 14 species confirmed across the monitoring sites, and a further 10 species identified as potentially present. ELA observed that monitoring sites which recorded two or less species of amphibians or reptiles generally lacked suitable habitat.

As per the BOMPS (Appendix E, Table 4) the results were classified into amphibian, bird, mammal, reptile, and niche specialist classes for analysis against previous years. Fluctuations in diversity and abundance observed are considered consistent with seasonal variations and field survey methodology. Additionally, the years of fauna monitoring for each site differs across the BOAs, therefore comparison across years of data may be inconclusive.

Nest box monitoring was included as part of the fauna monitoring program for 2024. In total, 420 nest boxes were inspected to record the condition and contents. Survey results concluded that 92% of the nest boxes are in OK condition and the remaining 8% are damaged or have been removed. A total of 11% of the nest boxes had native fauna species present at the time of inspection. The highest recorded species were Brushtail Possums (*Trichosurus vulpecula*) and Eastern Rosella (*Platycercus eximius*). Additionally, 37% of the nest boxes recorded were showing signs of native fauna use. The remaining nest boxes either contained feral/introduced species (7%) or were unoccupied with no evidence of use (46%). ELA did not recommend action to remove feral/introduced species where observed.

Fauna monitoring sites are shown in ***Figure 6-14*.**

6.6.3.3 Threatened Species

Fauna

A 2024 Fauna Monitoring Report was prepared by Ecological (ELA) in December 2024 including a Microbat Ultrasonic Call Identification Report reviewed by RA Environmental Consultants.

At the time of this report, the following fauna species identified are listed as threatened under *the Biodiversity Conservation Act 2016* and/or the *Environment Protection and Biodiversity Conservation Act 1999:*

- South-eastern Glossy Black-Cockatoo
- Speckled Warbler.
- Brown Treecreeper
- Varied Sittella
- Grey-crowned Babbler.
- Diamond Firetail
- Squirrel Glider
- Large-eared pied-bat.
- Large Bent- winged Bat.
- Yellow-bellied Sheathtail-bat

Flora

The BSA monitoring included targeted threatened flora species surveys of eight ground orchid plots and one epiphytic orchid photo point in the Mangoola BSA.

Threatened species are considered during due diligence inspections prior to vegetation clearing. In 2024, pre-clearance inspections identified approximately 355 *Diuris tricolor* for salvage and translocation in the north pit rehabilitation. Further detail is provided in Section 6.6.3.6.

Translocated terrestrial orchids are monitored annually by Eastcoast Flora Survey. Further information is provided in Section 6.6.3.6.

6.6.3.4 Conservation Agreement Monitoring

CA monitoring includes walk through monitoring of all CA areas, quadrat-based flora monitoring and photo point monitoring in accordance with the CA's. Reporting includes monitoring and management actions for each CA and is required to be completed by 30 December annually. Reports are due to BCT by 20 January (21 days from receipt) in accordance with the CA's. CA monitoring, management and reporting requirements were completed as required during the reporting period.

BCT conducted an audit of the five CA's which included inspections of each CA undertaken 19 and 20 June 2024. Audit reports for each of the five CA's were issued, confirming that management actions for each CA had been satisfactorily completed. Recommendations from the audit were accounted for in the annual report for 2024 and included:

- Continue to work with Local Land Services (LLS) to manage pests
- Manage woody weeds (African Boxthorn) and high threat exotic grass (Coolatai Grass and African Lovegrass)
- Provide additional detail in future annual reports on significant habitat augmentation progress that has been completed (Nest Boxes)
- Limit revegetation areas to that which can be managed until plants have established.

In 2024, CA monitoring was undertaken by Biodiversity Australia between 4 and 7 November. Overall, natural canopy regeneration and an increase in groundcover, midstory cover and canopy cover was noted across numerous plots, likely to be a result of improved environmental conditions following continued above average rainfall throughout 2024. Despite minute reductions in some biometric conditions, the overall vegetation condition of the Mangoola CA offsets have improved since baseline. Generally exotic vegetation has remained stable throughout the 2024 period with multiple sites seeing a reduction in exotic cover in response to native species growth and regeneration under favourable conditions.

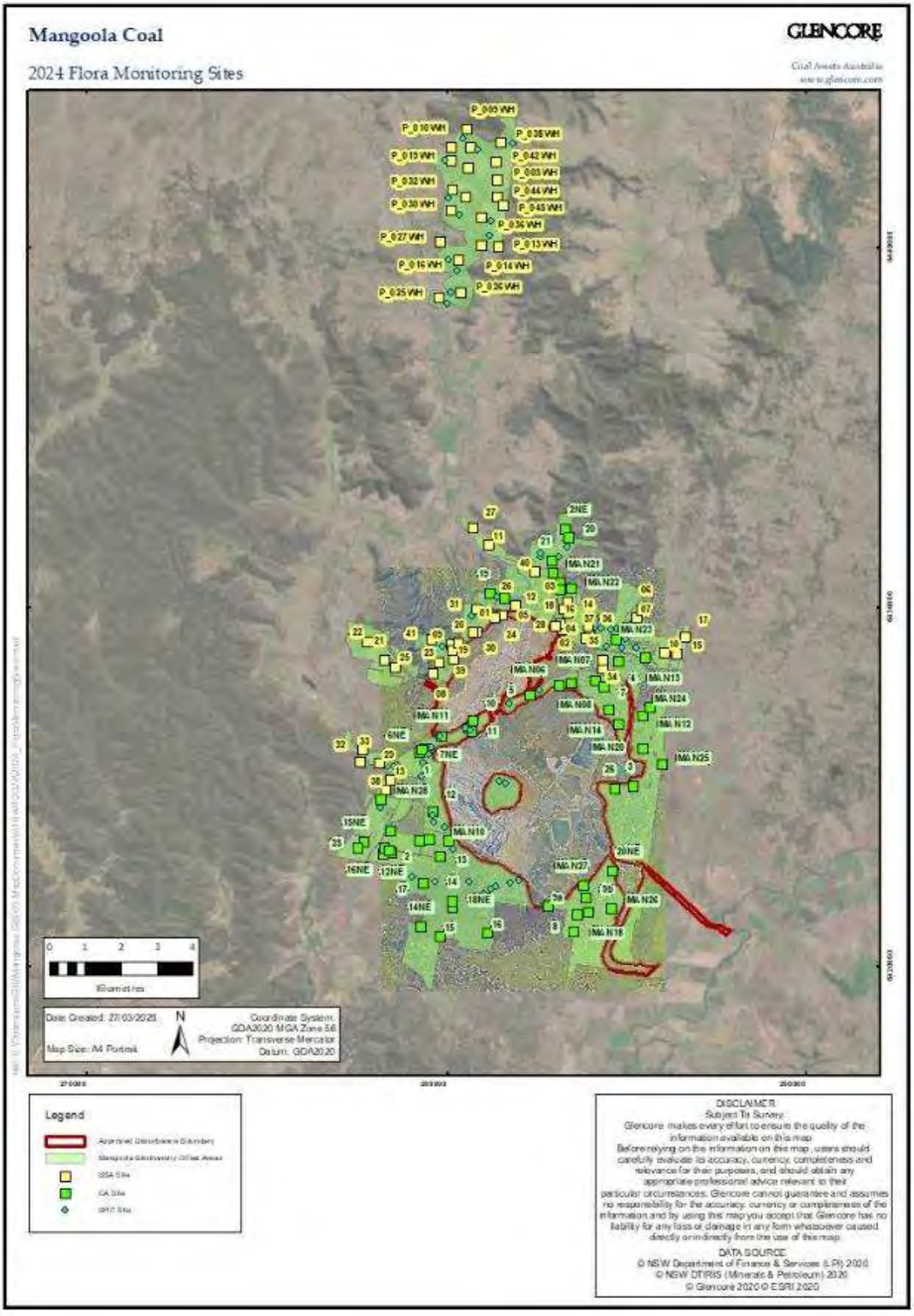


Figure 6-13 Flora Monitoring Locations

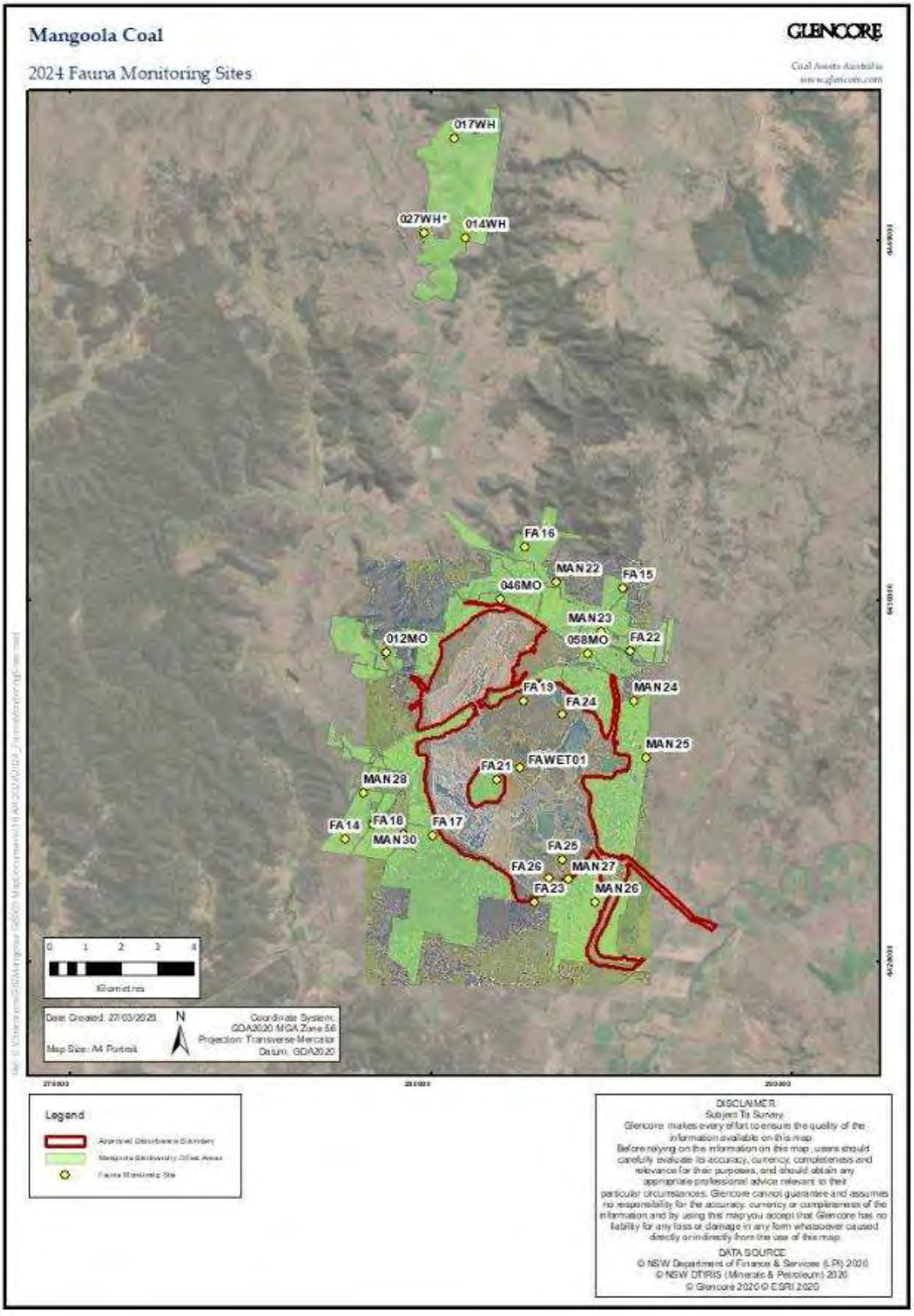


Figure 6-14 Fauna Monitoring Locations

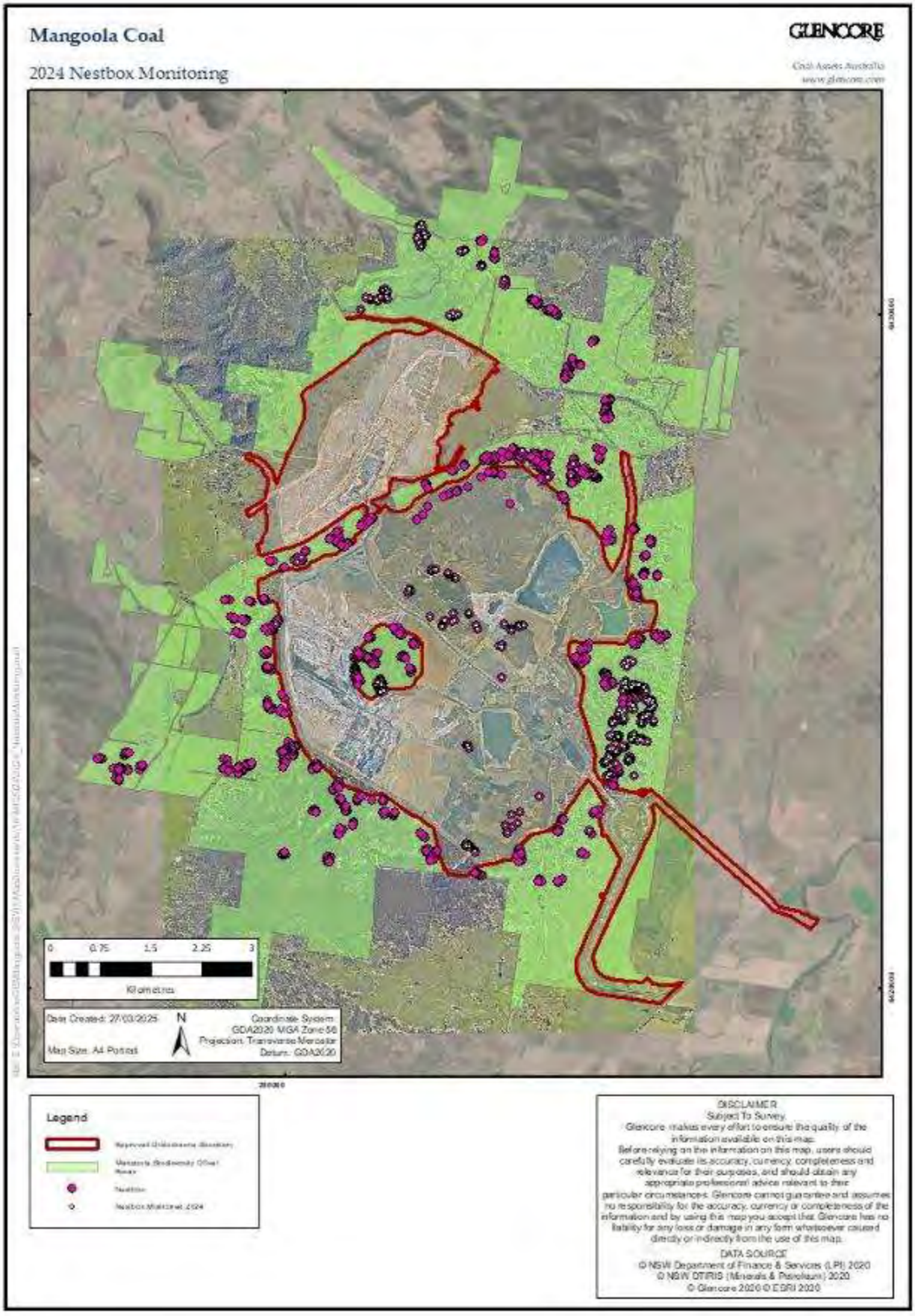


Figure 6-15 Nest Box Monitoring Locations

6.6.3.5 Nest Box Monitoring

A total of 420 nest boxes were provided Mangoola to be inspected by ELA during the winter and spring fauna surveys. The inspections were completed using an inspection camera (GoPro Hero7) and light mounted on an extendable fibreglass pole. The camera was connected and controlled via Bluetooth where the surveyor could take photographs and video. As per the BOMPS, details recorded included the condition of the nest box and the content within the nest box using ArcGIS field collector apps on a mobile device.

The results show that out of the 420 next boxes inspected, 92% are in OK condition and can be utilised by targeted threatened and native fauna species. The details of nest boxes which were recorded as damaged, not found, or removed, these conditions trigger corrective action under the BOMPS. If located, some of these nest boxes could not be checked due to the lid being damaged.

A total of 11% of nest boxes had a 'target species or native species present' at the time of inspection. The highest occurring species being Brushtail Possums (Trichosurus vulpecula) which occurred in 29 next boxes, this includes 13 nest boxes where an adult and a joey were observed. This was followed by 12 nest boxes with the presence of Eastern Rosella (Platycercus eximius) which included 9 nest boxes with nestlings. A total of 37% of nest boxes were recorded as showing 'signs of target or native species use' where other evidence of use was observed. This included but was not limited to the presence of feathers, eggs or broken eggs, nests, scats, and scratch marks. Note that broken eggs and scratch marks may also indicate predator use of nest boxes, particularly Lace monitors (Varanus varius), which were opportunistically observed within the Mangoola offset areas. A low number of nest boxes (7%) were recorded with having 'non-target or pest species use' which was mainly comprised of wasps or other insect occupation which may deter target species (mammals, bats, and birds) from utilisation once fully established. The 2024 nest box results do not indicate there is a requirement for removal of pest species at this stage but to continue monitoring in 2026.

The remaining 46% of nest boxes were recorded as unoccupied with no evidence of use (checked-empty), knowingly removed by Mangoola as part of operations (removed), or unable to be located with at the GIS reference provided (not found).

6.6.3.6 Threatened Terrestrial Orchid Monitoring

Nearly all translocation Recipient Plots displayed an increase in orchid numbers in 2024 relative to 2023 data, the best for several seasons and approaching or exceeding that seen in 2021. Average winter rainfall likely triggered such good emergence, which in 2023 was well below average. At between 9 and 14 seasons since translocation, new recruitment in many of the Recipient Plots is now leading to difficulties in distinguishing originally translocated individuals. This is a good result and confirms that both Diuris and Prasophyllum respond well to translocation, and that new populations can be created in both Offsets and (for Diuris) Rehabilitation. Within Control Plots, there remain 66 Diuris and 54 Prasophyllum across all four plots acting as reference. Ongoing tracking of these individuals over time is delivering important emergence and ecological data for these species that, in addition to providing a measure against translocated orchids, can be used to inform surveys for these species elsewhere.

Considered together, detectability of Diuris and Prasophyllum for most Recipient Plots in 2024 was between 1 and 32%. For Diuris, all plots returned rates of between 8 and 50%, with one of the rehabilitation plots (Rehab 4B) again showing the best results (50%). Offset plots recorded rates of 8-42% over 9-14 years for Diuris, with the longest running plot (Translocation #2; 14 years) showing an increase from <1% in 2023 to 8% in 2024. The low 2023 result followed the biomass burn at this plot in May 2022, but after two years post-burn recovery has been good (see Section 6.6). In mine rehabilitation, Diuris detection ranged from 0 to 50% after 9-10 years for five plots, and evidence of exceptional recruitment was again seen in one of these. Prasophyllum has not performed as strongly

as Diuris in 2024, although it has improved on 2023 results. Offset plots returned detection rates of between 0 and 30% over 9-14 years, but once again no detection of Prasophyllum occurred in Rehabilitation plots in 2024. Apart from 2.5% emergence in 2022, there has been no Prasophyllum within Rehab plots since 2020, all but confirming that this species does not persist in rehabilitated lands.

Evidence for new recruitment first confirmed in Rehabilitation plots in 2020 has continued from 2021 to 2024. Initially, the 29 new Diuris individuals (8 in Rehab Plot 4A, 21 in Rehab Plot 4B) observed in 2020 increased to 114 (29 in Plot 4A and 85 in Plot 4B) in 2021, irrespective of the biomass reduction burn undertaken in Plot 4A four months prior in May 2021. In 2024, 53 new Diuris recruits were evident in these two plots, including 5 in the burnt Rehab 4A. This provides some evidence of resilience despite the May 2021 burn occurring too late in the growing season. Translocated orchids have been in place within these plots for between 9 and 14 years, and relatively regular annual flowering in most of them would have dispersed seed into the immediate surroundings. Recruitment of Diuris has now been detected in 10 of the 14 Recipient Plots that continue to be monitored, including three of the five plots located in mine rehabilitation. Prasophyllum recruitment has been less successful but has been observed in 4 of the 14 plots, but none of these are in mine rehabilitation. Results such as these strongly support the notion that translocation of these orchids into both offset and (for Diuris) rehabilitated mine lands has been successful.

Permanently tagged orchids within the four control plots were censused for the 9th year in 2024, and with the changing weather patterns year-to-year is now yielding important emergence and detection data for both species. In 2024, just 14 (19%) of the 74 (27 Diuris, 47 Prasophyllum) orchids tagged in 2016 emerged. Five new individual orchids were detected and marked in 2024, leading to a total of 46 (39 Diuris and 7 Prasophyllum) newly emerged orchids that have been added to the 74 tagged at commencement in 2016 (120 in total). This means that over the course of nine years, nearly one-third the number of new orchids has emerged from the same four plots as were originally detected in 2016.

The 2021 orchid monitoring report presented a new monitoring regime for the Mangoola translocation project, closely linked to the introduction of fire into these fenced habitats to control biomass accumulation and replace annual brush-cutting. However, given the difficulties in regularly organizing biomass reduction burns in summer (the ideal time for orchids) due to seasonal conditions, and the uncertain impacts burns have on orchid persistence and emergence, it is recommended that the systematic burning program across all Recipient Plots be postponed. Good levels of recruitment from translocated orchids in many plots also suggest a postponement of burning while these individuals are at a vulnerable life stage (tubers will be closer to the soil surface, so may suffer damage even from a low intensity burn). In its place, a return to annual brush cutting of plots in April should occur.

Additionally, consideration should be given to the opening up of Recipient Plot gates between mid-December and March to reduce biomass through macropod grazing. At the completion of flowering and fruiting in 2024, macropod grazing was trialed in Translocation #7 (Rehab 3C) where few orchids have been detected in recent years and where heavy herb (mostly weeds) and grass growth is present. If effective, regular December-March macropod grazing may potentially replace annual brush cutting within plots.

In November 2024 pre clearing was undertaken in the Wyong Pit Area were 350 *Diuris Tricolor* were and translocated by Toolijooa under the supervision of Stephen Bell (Eastcoast Flora Survey). A translocation grid was used to ensure sufficient spacing between translocated orchid tubers. This additional translocation area will be captured within the 2025 monitoring of translocated threatened orchids.

6.6.3.7 Groundwater Dependent Ecosystems

Groundwater Dependent Ecosystem (GDE) monitoring was undertaken at site RTR-SPR-17 and control site RTR-SPR-NEW2021, both located along Big Flat Creek. The purpose of this monitoring was to identify if floristic data reflects any substantial negative changes that may have resulted from groundwater depressurisation associated with groundwater inflows.

Monitoring at the GDE sites followed the same methodology used for the floristic monitoring.

Site RTR-SPR-NEW2021 is used as a reference site against which changes at RTR-SPR-17 can be compared. The reference site assists in identifying other potential factors of change such as climactic conditions.

Groundwater quantitative data is collected at one site (MP17-B) along Big Flat Creek and in proximity to RTR-SPR-17. Flow in this bore moves in a south-westerly direction. In 2012, baseline depth to water (DtW) level for MP17-B was recorded at 2.96 m. This level would have been within the root zone of treed vegetation or at least within a zone where soil capillary action allows groundwater to influence soil moisture and thus be available to surface vegetation.

Ongoing monitoring identified MP17-B as being dry for numerous years (from late 2017), until December 2021 when depth to water was recorded as recovering to 2.52 m. Water level declined again throughout 2023 and DtW was approximately 8.26 m in August 2023. This is most likely attributed to the drought conditions experienced in 2023. Throughout 2024, water levels continued to decline with the DtW recorded at 3.2 m in July 2024 and has since been recorded as dry.

The GDE monitoring site showed signs of regeneration in the various types of groundcover, with evidence of native recruitment. Overstory vegetation appeared to be healthy and regeneration of mid and overstory species was observed. The only haying off or dieback observed during the inspection were Galenia (*Galenia pubescens*) and African boxthorn (*Lycium ferocissimum*). The same observations were reflected at the control site RTR-SPR-NEW2021, indicating this change is most likely a result of wet and humid conditions leading to dieback and weed treatment rather than groundwater depressurisation.

Monitoring site RTR-SPR-17 (within the depressurisation zone) and RTR-SPR-2021NEW (outside the depressurisation zone and acting as a reference) will continue to be monitored as part of the ongoing program.

6.6.3.8 Offset and Infill Tree Planting 2024

Revegetation activities are undertaken in the biodiversity offset areas in accordance with the BOMPS to extend and enhance vegetated areas and create habitat corridors linking offset areas and rehabilitation with remnant vegetation to the north and west of Mangoola mine.

Due to tube stock supply and environmental conditions, direct seeding was implemented in 2024 rather than planting. Excess propagated tube stock is intended to be utilised for supplementary planting of previous (2022-2023) planting areas, and of the 2024 revegetation area as required.

In accordance with the BOMPS priority areas for revegetation, an area of 45.3 ha was assessed for planting suitability in 2024:

- 15.3 ha of Forest Red Gum Riparian woodland in ACHO-5; and
- 30.0 ha of Ironbark woodland Complex in SO-1.

Due to identified Indigenous artefact scatters across ACHO-5, revegetation works did not occur in this area. Approximately half of SO-1 was also omitted due to artefact presence, intersection by the TransGrid 500 kV line, presence of *Acacia pendula* (weeping myall) and overlap with previous

revegetation areas. After due diligence, inspections, and preparation of the areas for seeding, the approximate area sown in 2024 was:

- 14 ha canopy and understory Ironbark woodland complex species.

Seeding occurred with a trailer tree seeder after mechanical ground preparation (ripping) to prepare the soil for planting. The offset area revegetated in late 2024 and will be subject to future monitoring.

Photo 6-1 Seed mix.

Photo 6-2 Trailer tree seeder used after mechanical ground preparation.

6.6.4 Key Performance and/or Management Issues

During the reporting period there were no reportable incidents, performance or management issues relating to flora and fauna. Management issue recommendations related to biodiversity monitoring are:

- Recommendations from the 2024 BOA Monitoring Reports (Biodiversity Australia, 2025) include:
  - Continue to undertake ongoing maintenance and monitoring of weed species in line with the identified areas of concern and within the revegetation areas where exotic species are dominating.
  - Continue vertebrate pest control programs.
  - Undertaken rubbish removal.
  - Maintain integrity of boundary fences.
- Recommendations for future nest box activities include:
  - Repair or replace nest boxes which were identified as having damage or being removed.
- Recommendations from the Rehabilitation Monitoring Report (Ausecology, 2025) and Rehabilitation Report Card (RRC) include:

- Ongoing management of weeds.
- Erosion control works.
- Thinning of canopy trees and shrubs at select sites.
- Infill planting of key eucalypt species at selected sites.

Mangoola will review and implement these recommendations where appropriate.

6.6.5 Proposed Improvements

No improvements are considered necessary in the 2025 biodiversity monitoring program.

6.7 Weed and Pest

6.7.1 Environmental Management

6.7.1.1 Weed Management Activities

During the reporting period, contractors were engaged to undertake weed management works at the mine, within rehabilitation and offset areas. Priority weeds for the Hunter (NSW DPI), Weeds of National Significance (WONS) and High Threat Exotic (NSW BAM) weeds were prioritised with environmental weeds treated opportunistically according to priority. A summary of the weed management and control activities undertaken during the reporting period is listed below:

- High and low volume spraying was conducted across all offset areas targeting *Echium plantagineum* (Patterson's Curse), *Eragrostis curvula* (African Love Grass), *Galenia pubescens* (Galenia), *Opuntia stricta*(Prickly Pear), *Auramtiaca monacantha* (Tiger Pear), *Heliotropium amplexicaule - Perforatum* (Blue Heliotrope), *Lycium ferocissimum* (African Boxthorn), *Anredera cordifolia* (Madeira Vine), *Ligustrum lucidum* (Large-Leaf Privet), *Robinia pseudoacacia* (Black Locust), *Pyrus communis* (Common Pear), *Juncus acutus* (Sharp Rush), *Bryophyllum delagoense* (Mother of Millions), *Hypericum perforatum* (St John's-wort), *Hyparrhenia hirta* (Coolatai Grass) Rubus sp. (Blackberry), *Senecio madagascariensis* (Fire Weed), *Sida rhombifolia* (Paddy's Lucerne), *Verbena bonariensis* (Purple Top), and *Cestrum parpui* (Green Cestrum).
- Primary control areas were along powerlines, tracks, creek lines, rip lines and within revegetation areas.
- Cut-and-paint works with chainsaws and hand tools were conducted throughout site targeting *Lycium ferocissimum* (African Boxthorn).
- Cut-and-paint works with chainsaws and hand tools were conducted around the old farm houses and creek lines within the offsets.
- Widespread high and low volume weed control throughout all mine rehabilitation areas, primarily targeting *Verbena bonariensis* (Purple top verbena), Thistle (various), *Conyza Species* (Fleabane), *Brassica juncea* (Mustard Weed), , *Heterotheca grandiflora* (Telegraph Weed), *Gomphocarpus fruiticoses* (Cotton Bush), *Hyparrhenia hirta* (Coolatai Grass), *Onopordum acanthium* (Scotch Thistle), *Galenia pubescens* (Galenia), *Heliotrope amplexicaule* (Blue Heliotrope), *Erigeron bonariensis* (Fleabane), *Hypericum perforatum* (St Johns Wort), and *Senecio madagascariensis* (Fire Weed).
- Hand weeding was conducted within the Orchid translocation compounds. Slashing was conducted in and around Orchid monitoring compounds. Biomass was raked and removed from the compounds. Low volume herbicide application was conducted around the edges of

some plots targeting *Verbena sp* (Purple Top), *Conyza sp* (Fleabane) and *Galenia pubescens* (Galenia).

- Hand weeding was conducted in the *Pomaderris reperta* planting compounds targeting *Bidens Pilosa* (Farmers Friends), *Chloris virgata* (Feathery Rhodes Grass), *Hyparrhenia hirta* (Coolatai Grass) and *Verbena bonariensis* (Purple Top).
- Slashing and low volume herbicide application was conducted around mining infrastructure areas, dams and monitoring points.

6.7.1.2 Feral and Pest Animal Management Activities

Mangoola is a member of the Wybong Wild Dog Association and co-ordinates vertebrate pest control activities with regional neighbours to provide maximum program efficiency.

During 2024, 1080 baiting was completed in autumn and spring targeting wild dogs and foxes. Two rounds of pig trapping were completed in response to high numbers of pigs and pig sign observed during monitoring and routine operations. Ground shooting was conducted throughout the year targeting pigs, fallow deer, goats, kangaroos and wild dogs.

Outside of offset areas, kangaroos are targeted both by commercial harvesting and via a licence to harm issued by NSW National Parks and Wildlife Service.

Mangoola feral and pest animal management activities resulted in removal of 4 wild dogs; 74 foxes; 88 goats; 61 pigs; 32 fallow deer; 2 cats; and 70 kangaroos from the local populations, in addition to the LLS numbers.

6.7.2 Key Performance and/or Management Issues

No reportable incidents, performance or management issues regarding weeds and feral animal management occurred during the reporting period.

6.7.3 Proposed Improvements

There are no proposed improvements to weed and pest management during 2025.

6.8 Visual Mitigation

6.8.1 Environmental Management

All works occurring onsite are undertaken in a manner which ensures that there is minimal impact on visual amenity in accordance with *AS 4282-1997 Control of the Obtrusive Effects of Outdoor Lighting*. Mangoola is committed to minimising ongoing visual impacts from its operations. To ensure visual impacts are minimised a variety of methods are implemented, including tree screen planting, visual bunds, building placement, light shielding and lighting direction to prevent light spillage.

Construction of visual controls required for the MCCO Project commenced and were completed in 2023. The Mangoola Visual Impact Management Plan (VIMP) was approved by the DPHI on 28 September 2022.

No new tree screen areas were established across the operation in 2024. An acceptable level of survivorship was observed across 2024 of individuals planted in the 2023 Ridgelands Rd tree screen, attributable to the installation of protective fencing and supplementary watering during establishment.

Additional visual mitigation occurred in 2024 with the installation of two stretches of shade cloth fence line along Ridgelands Rd. The purpose of this fence was to provide additional mitigation for the Wybong pit operational area and address concerns about the possibility of traffic parking in an unsafe manner along the roadside, which may have been in worsened by the exposed nature of sections which have now been fenced.

The first rehabilitation area in Wybong pit was established in late 2024. This area provides significant shielding of the operation from Wybong Rd. Subsequent abutting sections of rehabilitation will be established as operations progress.

6.8.2 Environmental Monitoring Results

On the 12 December 2023, a visual inspection was undertaken (1st Year) since completion of visual controls. There were no identified non-compliances in the management of lighting and visual impacts at Mangoola based on works completed to the time of inspection.

Lighting inspections are undertaken as required by Mining Supervisors to monitor mobile lighting impacts from external viewing points. In 2023, mining moved further to the west for South pit and South for North pit leading to work progressing further behind the Anvil Hill Offset Area. This offered more protection from obtrusive lighting and lessened the requirement for lighting inspections which are not conducted unless there is a greater risk of impact to the community.

6.8.3 Key Performance and/or Management Issues

There were no performance or management issues regarding visual mitigation or lighting during the reporting period.

There was one lighting complaint received 08 March 2024 \This was investigated by the Mining Supervisor who noted casting light was visible from the road. The lighting plant was not in use, and was shut down

There were no non-compliances associated with visual amenity or lighting during the reporting period.

6.8.4 Proposed Improvements

There were no proposed improvements to visual impact management during 2024.

6.9 Aboriginal Heritage

6.9.1 Environmental Management

The management of activities relating to Aboriginal cultural heritage at Mangoola is undertaken in accordance with the Aboriginal Cultural Heritage Management Plan (ACHMP), relevant other guidelines and legislation. The ACHMP was reviewed and updated in 2024 in accordance with requirements of SSD8642. This was approved by DPHI in February 2025.

A number of Aboriginal archaeological sites are recorded within or adjacent to the Mangoola project area. To assist with the management of Aboriginal cultural heritage, Mangoola maintains spatial information regarding all identified Aboriginal archaeological sites within the operational geographical information system (GIS). The GIS information is utilised to inform the GDP process.

6.9.2 Environmental Monitoring Results

Aboriginal heritage monitoring and inspections undertaken in 2024 have been summarised in ***Table 6-17***.

Table 6-17 Aboriginal Heritage Monitoring and Inspections

Monitoring / Inspection	Dates	Attendees	Notes
2024 Annual Offset Monitoring	23 – 25 July 2024	Stephanie Rusden (OzArk - Archaeologist), Carla Gray (Mangoola Environment and Community Officer) and a representative from a RAP.	Throughout 2024 Mangoola ensured that visitation to rockshelters and other Aboriginal Cultural Heritage Offset Areas (ACHOAs) was kept to a minimum. Visitation to these locations was undertaken to conduct the required monitoring and measurements in line with approved management plans and statutory approvals. A summary of the report outcomes was presented at the annual cultural heritage consultation meeting held on 11 December 2024. Further information is available at the request of RAPs.

6.9.3 Key Performance and/or Management Issues

On 22 March 2023, in accordance with Condition 10, Part D of the Development Consent SSD8642, Mangoola provided notification of a potential non-compliance with Condition 65, Part B to the DPHI via the major projects planning portal. Following an investigation that was completed by DPHI, it was determined that no breach or non compliance had occurred. Mangoola was notified of this via letter dated 18 October 2024.

Actions captured in the 2024 Annual Stakeholder Review Meeting have been enacted.

6.9.4 Proposed Improvements

As an outcome of the 2024 annual cultural heritage consultation meeting, Mangoola will continue to provide to the attendees at the upcoming meetings a detailed 'interactive' view into the management and scope of work that is completed annually at the rock shelters as part of the annual ACHOA monitoring. Many RAPs have expressed interest in learning more about the rock shelters and the management controls Mangoola has in place to monitor impacts of blasting at these locations, but due to the steep terrain are unable to attend the rock shelters in person.

In 2023 Mangoola restructured the annual ACHOA monitoring incorporating a 'low risk' day whereby monitoring locations that are on flat terrain and easily accessible by vehicle is offered to RAP groups to attend. This structure continued in 2024 and will continue in 2025.

Maintenance and update to the GIS layers will continue throughout 2025 including the addition of any new artefacts and/or sites found as part of due diligence works as well as creating buffer polygons around valid registered sites.

6.10 European Heritage

6.10.1 Environmental Management

European heritage is managed at Mangoola in accordance with the plan Historic Heritage Management Plan.

As required by Condition B71(c) of SSD 8642, the Historic Heritage Management Plan (HHMP) replaced and superseded the Conservation Management Strategy to include the current Approved Project Area for Mangoola which includes the area south of Wybong Road and the MCCO Additional Project Area, north of Wybong Road

A copy of the HHMP is available on the Mangoola website. Specifically, the HHMP identifies known European Heritage sites at Mangoola and any relevant monitoring required to be completed to assess potential impacts (primarily from blasting or clearing activities).

6.10.2 Environmental Monitoring Results

During the reporting period ground vibration monitoring at key heritage sites, such as Anvil Rock, was maintained.

No blast events have exceeded the vibration limit of 20 mm/s at the Castle Hill site in 2024 and results from other blast monitors and structural monitoring undertaken has demonstrated that no damage has occurred to any sites.

6.10.3 Key Performance and/or Management Issues

No reportable incidents regarding European heritage occurred during the reporting period.

Mangoola will continue to undertake ground vibration and physical monitoring in 2025 on Anvil Rock and the Book Rock Formations to inform the adequacy of blasting controls and management of these structures.

6.10.4 Proposed Improvements

There are no proposed improvements in this area in 2024.

6.11 Spontaneous Combustion

6.11.1 Environmental Management

Management of spontaneous combustion is undertaken in accordance with the Mangoola Spontaneous Combustion Principal Hazard Management Plan (SCPHMP). This management plan details the monitoring and control measures implemented by Mangoola to reduce the incidence and impacts of spontaneous combustion, including stockpile inspections, staff training, priority processing

of areas that are heating, and track rolling/battering down stockpiles that will be stored for greater than three months.

6.11.2 Environmental Monitoring Results

No significant instances of spontaneous combustion were detected at Mangoola during the reporting period. Implementation of the SCPHMP has been effective in preventing spontaneous combustion on site to date.

6.11.3 Key Performance and/or Management Issues

There were no reportable incidents, performance or management issues involving spontaneous combustion during the reporting period.

6.11.4 Proposed Improvements

There are no proposed improvements in this area in 2025.

6.12 Bushfire

6.12.1 Environmental Management

Potential risks associated with bushfire are managed through the implementation of monitoring and control strategies as documented in the Mangoola Bushfire Management Plan. This management plan was originally developed in consultation with the NSW Rural Fire Service, Muswellbrook Shire Council, and both the Mangoola and Wybong Rural Fire Brigades. In 2022, a revised Bushfire Management Plan was submitted to the DPHI and other relevant agencies (including NSW Rural Fire Service) in accordance with the conditions of SSD 8642.

6.12.2 Environmental Monitoring Results

Mangoola continued to implement the bushfire hazard reduction program which included:

- Maintaining Asset Protection Zones (APZ) - mowing and slashing
- Maintaining site access roads and tracks
- Bushfire awareness training
- Mapping and signage for main access gates and tracks

6.12.3 Key Performance and/or Management Issues

There were no performance or management issues relating to bushfires during the reporting period.

6.12.4 Proposed Improvements

The Bushfire Management Plan will be updated in accordance with the requirements of SSD 8642 in consultation with RFS.

6.13 Hydrocarbon Management

6.13.1 Environmental Management

Bulk fuel facilities are managed in accordance with *AS1940-2017 The Storage and Handling of Flammable and Combustible Liquids*. All permanent fuel facilities are fully bunded, with emergency measures in place to manage spills.

All hydrocarbon spills which occur are reported via the sites incident reporting system, and investigations carried out as required. When spills occur, they are managed with one of the spill kits available onsite or treated through oily-water separators.

There is also an active bioremediation area which was constructed within the mining area in 2018 and utilised as required during 2024.

6.13.2 Environmental Monitoring Results

During the reporting period, there were 13 hydrocarbon spills which were reported internally. All spills were contained on site within the active mining area and no offsite pollution or environmental harm occurred because of these spills. Consequently, none of these incidents required external reporting to any government agencies.

In response to each spill, the following tasks were generally implemented:

- Source of the spill controlled (pumping/machinery stopped).
- Spill contained and cleaned up with absorbent material.
- Contaminated material taken to bioremediation area, where appropriate.
- Incident reported and investigation commenced where required.
- Machinery repaired, where required.
- Where required, procedures were updated, and staff and contractors received additional training on adequate management of hydrocarbons or spills.

6.13.3 Key Performance and/or Management Issues

There were no key performance and/or management issues relating to hydrocarbon management in 2024.

6.13.4 Proposed Improvements

There are no proposed improvements in this area in 2025.

6.14 Public Safety

6.14.1 Environmental Management

Mangoola is committed to preventing risks to public safety as a result of operations at the mine. Ongoing reviews of potential public safety issues are undertaken on a regular basis around the mine area and associated public roads.

Day-to-day monitoring of public safety at Mangoola is undertaken through a variety of methods, including:

- All site visitors are directed to the main office and are required to report and logon to an electronic visitors' book.
- Implementation of a security system to ensure public and employee safety is maintained in accordance with the relevant requirements under the *Coal Work Health and Safety Act 2011*, *Mining Act 1992* and the mining tenements.
- During hazardous activities such as blasting, sentries are posted throughout the site, and if required, public road, to prevent unauthorised entry into the blasting zone.
- Site boundary fencing surround the perimeter of the site.
- Security patrols.
- Upgrade of local roads in accordance with Conditions B94-B97 of SSD 8642.
- Restrictions of local road use in accordance with Conditions B98-B101 of SSD 8642.
- Employee and contractor inductions regarding mine safety and environmental management issues prior to commencement of work at the site.

6.14.2 Environmental Monitoring Results

Wybong PO Road has been closed and entry secured in accordance with SSD 8642.

6.14.3 Key Performance and/ or Management Issues

There were no public safety incidents, performance or management issues in 2024.

6.14.4 Proposed Improvements

There are no proposed improvements in this area in 2025.

6.15 Greenhouse Gas Energy

6.15.1 Environmental Management

Energy consumption (electricity, diesel and liquefied petroleum gas) at Mangoola is monitored and reported in accordance with Glencore requirements and the *National Greenhouse and Energy Reporting Act 2007* (NGER Act).

Mangoola operates in accordance with the approved AQGGMP. The AQGGMP has been produced to comply with Condition B31 of SSD 8642. Mangoola continually assesses the viability of initiatives to improve energy efficiency and reduce greenhouse emissions from proposed operations.

The AQGGMP identifies opportunities at Mangoola to reduce greenhouse gas emissions and energy consumption, as well as specifying actions to realise these opportunities.

Mangoola minimises emissions from diesel and electricity consumption by:

- Optimisation of mining practices e.g. haulage planning, blast design, conveying arrangements.
- Optimisation of engine performance e.g. studies undertaken in collaboration with OEMs to enhance fuel efficiency and emissions reduction.
- New fleet is purchased with the most fuel-efficient engines available.
- Ongoing monitoring of potential biofuel and fuel additive opportunities.
- Ongoing monitoring and assessment of emerging technologies.

6.15.2 Environmental Monitoring Results

6.15.2.1 Results from the Reporting Period

Mangoola reports greenhouse gas emissions (GHG) in accordance with NGER legislation. Each financial year Mangoola is required to submit to the federal government the emissions from their NGERs registered facility. The NGERs reporting year is based on a financial year, not a calendar year such as this Annual Review. To prevent incompatible public reporting, the values in this report also cover a financial year. The following table contains the Scope 1 (direct emissions from the mining activities during the year), and Scope 2 emissions (electricity consumption by the mine during the year). Data relating to electricity consumption, fossil fuel usage and the associated greenhouse gas emissions, during the 2023/2024 reporting period is presented in ***Table 6-18***. In 2023/2024, the total emissions produced by Mangoola were 155,297 t CO2-e which represents a ~2.8% increase from 2022/2023 (151,045 t CO2-e).

Table 6-18 Greenhouse Gas Data

Emissions Source	2022/2023 T CO_2-e	2023/2024 T CO_2-e	Year 2-9 Scope Total T CO_2-e – Prediction (MOD 6)
Total Scope 1 Emissions (Direct)	117,312	122,216	136,358[1]
Total Scope 2 Emissions (Indirect)	33,733	33,081	63,962
TOTAL EMISSIONS (SCOPE 1 & 2)	**151,045**	**155,297**	**200,320**

[1] Scope total made up of diesel use, explosive use and fugitive emissions – MOD 6 greenhouse gas assessment breakdown, current annual broken down more accurately than initial assessment.

6.15.2.2 Comparison with Predictions

The MOD 6 Environmental Assessment included an Air Quality Impact Assessment (Todoroski Air Sciences, 2013) which predicted greenhouse gas emissions for years 1, 2 - 9 and 10 of the Project. As MOD 6 was approved in 2014, 2024 can be considered Year 11 of the modified operations. The Year 2-10 greenhouse gas emissions predictions are presented in ***Table 6-18***.

The data shown in ***Table 6-18*** represents the average annual predicted CO2-e emissions for Years 2 - 9 of the modified operations. As shown in ***Table 6-18***, the total emissions for 2023/2024 were 155,297 t CO2-e. This is 32.5% less than the 200,320 t CO2-e predicted in the Environmental Assessment for Years 2-9 (Todoroski Air Sciences, 2013) for Scope 1 (Direct) and 2 (Indirect) emissions.

A Greenhouse Gas and Energy Assessment was prepared by Umwelt (2019) to support the MCCO Project. The MCCO Project is expected to increase annual Scope 1 and Scope 2 emissions by 407,000 t CO2-e and 51,000 t CO2-e, respectively (Umwelt, 2019). Whilst mining associated with MCCO has commenced, the results demonstrate that Mangoola are below the forecast emissions.

No reportable incidents regarding greenhouse gas and energy occurred during the reporting period.

6.15.3 Key Performance and/or Management Issues

Greenhouse gas is incorporated into the AQGGMP as required by SSD 8642.

Mangoola is a part of the wider coal assets held by Glencore across Australia. GCAA are themselves a part of the global Glencore mining portfolio. In line with the ambitions of the 1.5^{o}C scenarios set out by the IPCC, Glencore targets a short-term reduction of 15% by 2026 and a medium-term 50% reduction of our total (Scope 1, 2 and 3) emissions by 2035 on 2019 levels. Post 2035, Glencore's ambition is to achieve, with a supportive policy environment, net zero total emissions by 2050.

Glencore incorporates energy costs and our carbon footprint into our annual planning process. Commodity departments, such as GCAA, are required to provide energy and greenhouse gas emissions forecasts for each asset over the forward planning period and provide details of emissions reduction projects.

In the case of Mangoola, this includes involvement with GCAA when considering available greenhouse gas abatement technology and mine planning to optimise efficiency (which usually translates into reduced fuel consumption).

6.15.4 Proposed Improvements and Abatement Measures

Mangoola undertook no additional abatement measures for the annual report period of 2023, as no reasonable and feasible measures were identified.

For the upcoming 2024 improvements and abatement measures Mangoola had an independent review of the Air Quality and Greenhous Gas Management Plan as directed by the DPHI to review it against best practice greenhouse gas abatement measures. This was undertaken Katestone Environmental Pty Ltd who were engaged by the DPHI to complete the review.

Mangoola has reviewed the recommendations of the Katestone review and, where reasonable and feasible have included the recommendations into the AQGGMP update which was approved by DPHI on 26 March 2025.

6.16 Traffic Management

Traffic Management at Mangoola is undertaken in alignment with the EIS. Workforce were below approved operational workforce numbers and production was also below maximum rate of production.

There was no construction traffic within the reporting period with all MCCO project construction activities completed in 2023.

There were no breaches in relation to traffic within the reporting period. There was however one community complaint. This was concerning blast road closure notification signage along Wybong and Ridgeland's Road which do not display the time of the blast. Further detail is provided in ***Section 9.3.***

7. Water Management

Mangoola manages water on site in accordance with the approved Mangoola Water Management Plan (WMP) which is available on the Mangoola website. The WMP was reviewed to align with the progress of the MCCO project and was resubmitted and approved in 2022. Mangoola implements the following hierarchy of water supply to meet demand and reduce water take:

1. On-site runoff from within the saline water system is preferentially used for dust suppression and CHPP process water.
2. On-site runoff from within the dirty water system is preferentially used for dust suppression and CHPP process water.
3. Groundwater inflows into the open cut pits are preferentially used for dust suppression and CHPP process water.
4. Clean water incidentally collected from undisturbed areas of the site is preferentially used for dust suppression and CHPP process water in accordance with the Harvestable Rights provisions.
5. Water extracted from the Hunter River utilising existing water access licences or purchased on the open market.

7.1 Water Balance

Mangoola operates a comprehensive and calibrated site water balance to inform water management at the site. Water held and captured onsite at Mangoola by the water management system during the calendar year reporting period is shown in ***Table 7-1***. The Mangoola water balance is generated from a calibrated model, with an error margin of 8.1%.

Table 7-1 2024 Water Balance (Calendar Year)

Aspect	Volume (ML)
INFLOWS	
Rainfall Runoff	2,734
Hunter River Raw Water Supply	402
Groundwater Inflow	46
Spoil Seepage	1,292
Tailings Bleed Water	1,180
Total	**5,663**
OUTFLOWS	
Evaporation	1,479
CHPP Supply	2,387

Aspect	Volume (ML)
Water Cart Usage	648
Wash Bay / Stockpile	91
Hunter Release	0
Spill	0
Total	**4,605**
Inflow – Outflow	**1,058**
Recorded Stored on Site at Start of Annual Review Period	3,092
Recorded Stored on Site and End of Annual Review Period	2,295
Change in Storage	**226**
Error	**8.1%**

7.2 Salt Balance

As required by Condition B50 (ii) of SSD 8642, a salt Balance was conducted for the 2024 reporting period. Saline material is any material moved on site that has the potential to generate saline water. Salt can be released when saline material is exposed to the surface, via weathering. The salt then has the potential to be transported by water.

Key sources of saline material at Mangoola include:

- Overburden material.
- ROM Coal.
- Product Coal.
- Coal Rejects.

Key sources of saline water at Mangoola include:

- Direct rainfall onto the surface of water storage dams.
- Runoff – where salt on the surface of soils / saline material is dissolved by rainfall and transported in the system through runoff.
- Water imported from the Hunter River.
- Groundwater inflow into the open cut pits.

7.3 Saline Material, Water Management and Minimisation

The measures to manage saline material and minimise the discharge of saline water from site include:

- Store ROM coal and product coal in stockpiles that are contained within the mine Water Management System (WMS).

- Store coal rejects in emplacement dumps which are constructed such that runoff is contained in the mine WMS.
- Separation of different water qualities to reduce the volume saline water.
- Discharge saline water in accordance with the HRSTS once infrastructure is in place.
- Calibrated water balance model to better understand the likely water volumes and qualities to be managed.
- Water use for dust suppressions to reduce the volume of saline water in storages.
- Out of pit storages to reduce the volume of saline water in the pit.

Table 7-2 Salt Sources and Balance

Salt Source	EC (uS/cm)	TDS (mg/L)
Rainfall	54	30
Hardstand Catchment Runoff	4,000	2,235
Pit Catchment Runoff	1,500	838
Tailings Catchment Runoff	5,000	2,793
Active Waste Catchment Runoff	5,000	2,793
Stockpile Catchment Runoff	6,000	3,352
Rehabilitation Catchment Runoff	1,000	559
Natural Catchment Runoff	200	112
Groundwater Inflow	8,000	4,469
Hunter River Imports	500	279
Aspect		**Salt (T)**
INFLOWS		
Rainfall Runoff		**3,039**
Hunter River Raw Water Supply		**112**
Groundwater Inflow		**4,682**[1]
Spoil Seepage		**-**
Tailings Bleed Water		**2,746**
OUTFLOWS		
Evaporation		**-**
CHPP Supply		**7,362**[2]
Water Cart Usage		**648**

Wash Bay/Stockpile	**0**
Hunter Release	**0**
Spill	**0**
Total	**9,404**
Inflow-Outflow	**2,734**
Recorded Stored on Site at Start of Annual Review Period	**7,588**
Recorded Stored on Site at End of Annual Review Period	**8,847**
Change in storage	**1,259**
Error	**6.8%**

[1] Combined groundwater and seepage.

[2] Combined dust suppression and wash bay / stockpile

7.4 Water Take

Mangoola currently operates two water extraction pumps within one pump station (20WA211008) to provide additional water for its operations, as required, from the Hunter River in accordance with its water extraction permits. The extraction limit for the Mangoola Hunter River Licences is 2,758 ML. The water allocation for the Hunter River changes throughout the year and the water allocation has been at 100% for General Security during the reporting period. With the addition of the Colinta Licences, extraction limit is 3,600 ML.

The total Hunter River water extracted by Mangoola during the 2023-2024 water year was approximately 632 ML (including both Mangoola and Colinta licences) which was within the allowable extraction limit. This represents an increase from the 328 ML extracted from the Hunter River during the previous 2022-2023 water year.

Water taken by the operation during water year (1 July 2023 to 30 June 2024) for Mangoola and Colinta licences has been summarised in ***Table 7-3***.

Table 7-3 2023-2024 Water Take (Water Year)

Water Licence #	Water Sharing Plan, Source and Management Zone (as applicable)	Entitlement (ML) 100%	Entitlement (ML) 125%	Allocation Used (ML) (Previous Water Year)
Mangoola Licences				
503	Hunter Regulated River (zone 1A)	159	198.75	100
645	Hunter Regulated River (zone 1A)	432	540	100
691	Hunter Regulated River (zone 1A)	50	62.5	0
735	Hunter Regulated River (zone 1A)	72	90	0
823	Hunter Regulated River (zone 1A)	310	387.5	0
824	Hunter Regulated River (zone 1A)	175	218.75	0
830	Hunter Regulated River (zone 1A)	306	382.5	0
897	Hunter Regulated River (zone 1A)	55	68.75	0
933	Hunter Regulated River (zone 1A)	43	53.75	13
1159	Hunter Regulated River (zone 1A)	159	198.75	100
6571	Hunter Regulated River (zone 1A)	111	138.75	100
6576	Hunter Regulated River (zone 1A)	600	750	0
9062	Hunter Regulated River (zone 1A)	18	22.5	0
9987	Hunter Regulated River (zone 1A)	82	102.5	0
11216	Hunter Regulated River (zone 1A)	86	107.5	0
13083	Hunter Regulated River (zone 1A)	100	125	0
Hunter River Licences Sub-Total		**2,758**	**3447.5**	**413**
Colinta Licences				

Water Licence #	Water Sharing Plan, Source and Management Zone (as applicable)	Entitlement (ML) 100%	Entitlement (ML) 125%	Allocation Used (ML) (Previous Water Year)
1001	Hunter Regulated River (zone 1A)	334	417.5	102
1057	Hunter Regulated River (zone 1A)	509	636.25	117
Colinta Licences Sub-Total		**843**	**1035.75**	**219**
Groundwater Inflows				
WAL41561	Excavation Groundwater	700	-	343.4
6308	Wybong Creek Water Source	96	-	0
6270	Wybong Creek Water Source	30	-	0
11085	Wybong Creek Water Source	128	-	0
Groundwater Licences Sub-Total		**954**	**-**	**343.4**
TOTAL		**4,555**	**-**	**975.4**

7.4.1 Changes to Licences

No changes to surface water licences occurred in 2024. The water take under the Harvestable Rights provision is in line with 2019 Harvestable Rights assessment by Engeny and the reducing clean water catchment area of Anvil Creek. This harvestable rights provision was reviewed as part of the MCCO EIS.

7.5 Hunter River Salinity Trading Scheme Discharges

There were no discharges via the Hunter River Salinity Trading Scheme (HRSTS) within 2024.

7.6 Surface Water Monitoring

7.6.1 Environmental Management

Surface water quality continued to be monitored onsite at Mangoola and in the surrounding waterways during the reporting period in accordance with the Surface Water Management Plan. Surface water monitoring locations are shown on ***Figure 7-1*** and comprise of 16 sites (SW01 – 07 and SW09 – 17) which are sampled monthly for pH, Electrical Conductivity (EC), Total Suspended Solids (TSS), Total Dissolved Solids (TDS) and flow conditions by observation. Water monitoring is also undertaken monthly as a requirement of EPL 12894. Monitoring is completed at surface water monitoring points SW16, SW03, SW04 and SW07 representing EPL monitoring point number 7, 8, 9 and 31, respectively.

There is no surface water monitoring criteria limit listed in EPL 12894. Surface water monitoring criteria is described in the approved Surface Water Management Plan (SWMP).

In 2023 Mangoola developed an EPBC Water Resource Plan as required to meet Condition 4a, b and c of EPBC 2018/8280. This was approved by the Department of Climate Change, Energy, the Environment and Water (DCCEWW) of on 21 June 2023. This plan is available on the Mangoola Coal website and is implemented in conjunction with the approved SWMP and associated TARPs.

Note – Mangoola has a consolidated single Surface Water Management Plan which was approved October 2023 to satisfy the conditions of SSD 8642.

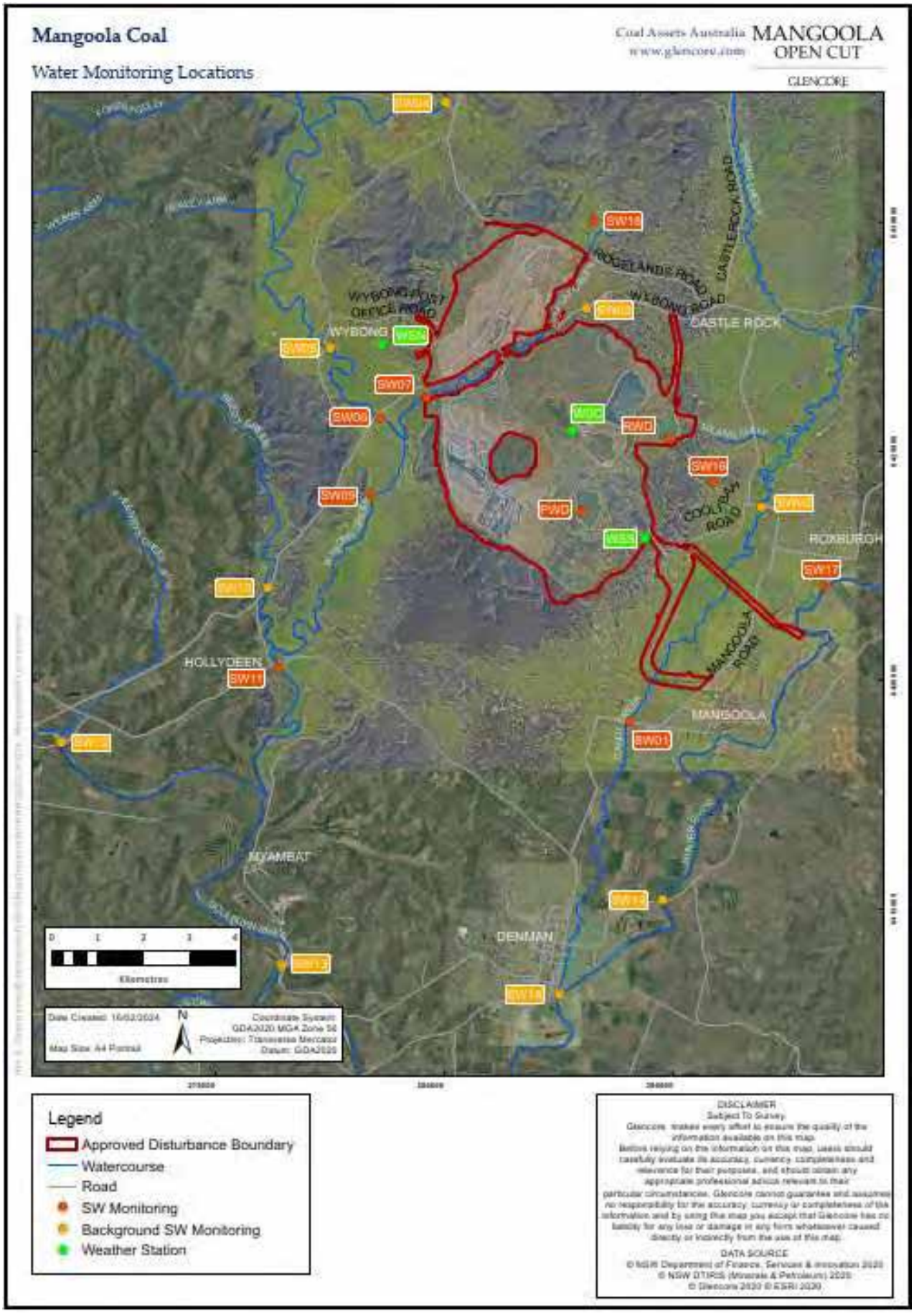


Figure 7-1 Surface Water Monitoring Locations

7.6.2 Environmental Monitoring Results

7.6.2.1 Results from the Reporting Period

The pH and EC monitoring results for the reporting period have been summarised in ***Table 7-4*****.** In accordance with the TARPs as outlined within the Surface Water Management Plan (which was updated and approved during 2023), exceedances of surface water monitoring criteria are not reported to DPHI unless three consecutive elevated results at a monitoring location is recorded, and an incident is deemed to have occurred. Detailed results of surface water quality monitoring collected during the reporting period are available on the Mangoola website.

Table 7-4 Surface Water Monitoring Results – pH and EC

Site	pH Results					EC Results (µS/cm)				No. of Samples and Flow Conditions
	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Criteria	
SW01	7.46	8.0	8.58	**7.3**	**8.1**	324	1661	3200	**5063**	*12 in Total Flow (8) No Flow (4)*
SW02	7.57	8.0	8.23	**7.3**	**8.1**	3310	4484	5580	**5063**	*12 in Total Flow (12) No Flow (0)*
SW03	7.57	8.1	8.5	**6.7**	**8.3**	1510	10150	24200	**22600**	*12 in Total Flow (8) No Flow (4)*
SW04	8.06	8.4	8.73	**7.7**	**8.3**	950	1168	1580	**2910**	*12 in Total Flow (12) No Flow (04)*
SW05	8.3	8.43	8.59	**7.7**	**8.3**	1030	1321	1900	**2910**	*12 in Total Flow (12) No Flow (0)*
SW06	8.23	8.39	8.54	**7.7**	**8.3**	1070	1390	2060	**2910**	*12 in Total Flow (12) No Flow (0)*
SW07	7.58	7.76	8.16	**6.7**	**8.3**	1210	1673	1960	**22600**	*12 in Total Flow (6) No Flow (6)*
SW09	8.18	8.4	8.53	**7.7**	**8.3**	1070	1438	2200	**2910**	*12 in Total Flow (12) No Flow (0)*
SW10	6.96	7.15	7.3	**N/A**	**N/A**	598	638	697	**N/A**	*12 in Total Flow (4) No Flow (8)*
SW11	8.13	8.36	8.49	**7.7**	**8.3**	1080	1439	2060	**2910**	*12 in Total Flow (12) No Flow (0)*
SW12	8.32	8.48	8.58	**7.9**	**8.4**	625	975	1190	**1340**	*12 in Total Flow (12) No Flow (0)*
SW13	8.31	8.46	8.57	**7.9**	**8.4**	817	1045	1300	**1340**	*12 in Total Flow (12) No Flow (0)*
SW14	8.1	8.25	8.62	**7.8**	**8.1**	498	688	954	**657**	*12 in Total Flow (12) No Flow (0)*

Site	pH Results					EC Results (µS/cm)				No. of Samples and Flow Conditions
	Min	Ave	Max	Lower Criteria	Upper Criteria	Min	Ave	Max	Criteria	
SW15	8.0	8.15	8.54	**7.8**	**8.1**	511	709	990	**657**	*12 in Total Flow (12) No Flow (0)*
SW16	7.05	7.71	9.06	**7.3**	**8.1**	129	238	411	**5063**	*12 in Total Flow (9) No Flow (3)*
SW17	8.0	8.22	8.63	**7.8**	**8.1**	482	669	952	**657**	*12 in Total Flow (12) No Flow (0)*

Note that shaded sites are monitored to establish background conditions upstream or separate of mining operations and used in the investigation of exceedance of impact assessment criteria at locations directly downstream of mining operations.

Surface water pH levels were slightly alkaline across the site, ranging from 7.05 to 9.06, with an average pH of 8.14 which is slightly lower than the 2023 average pH of 8.28.

pH results which fell outside the pH adopted performance criteria for both upstream and downstream monitoring locations included:

- SW01 during July (8.25), August (8.58), September (8.25), and November (8.19).
- SW02 during April (8.12), June (8.21), July (8.11), August (8.23), and September (8.14).
- SW03 during September (8.5), and November (8.46).
- SW04 during March (8.38), April (8.54), May (8.33), June (8.47), July (8.4), August (8.48), September (8.73), October (8.5), November (8.41), and December (8.36).
- SW05 during January (8.39), February (8.33), March (8.33), April (8.45), May (8.3), June 8.49), July (8.41), August (8.59), September (8.55), October (8.48), November (8.46), and December (8.41).
- SW06 during January (8.36), April (8.4), June (8.46), July (8.36), August (8.54), September (8.48), October (8.46), November (8.38), and December (8.43).
- SW09 during January (8.34), March (8.37), April (8.35), May (8.33), June (8.46), July (8.42), August (8.51), September (8.53), October (8.48), November (8.4), and December (8.37).
- SW11 during January (8.31), February (8.13), March (8.33), April (8.35), May (8.28), June (8.44), July (8.39), August (8.49), September (8.45), October (8.44), November (8.39), and December (8.35).
- SW12 during January (8.43), March (8.49). April (8.43), June (8.47), July (8.44), August (8.56), September (8.56), October (8.58), November (8.52), and December (8.54).
- SW13 during January (8.43), February (8.42), March (8.47), June (8.46), July (8.41), August (8.54), September (8.49), October (8.57), November (8.53), and December (8.52).
- SW14 during January (8.23), February (8.17), March (8.24), April (8.2), May (8.1), June (8.22), July (8.1), August (8.3), September (8.27), October (8.62), November (8.34), and December (8.24).
- SW15 during January (8.1), February (8.1), April (8.12), August (8.24), September (8.2), October (8.54), November (8.2), and December (8.1).

- SW16 during April (7.2), May (7.22), July (7.05), August (7.24), October (8.52), and November (9.06).
- SW17 during January (8.31), February (8.13), March (8.1), April (8.12), August (8.25), September (8.31), October (8.52), November (8.63), and December (8.17).

EC results across the site ranged from 129 µS/cm to 24,200µS/cm, with an average of 1,855 µS/cm which is higher than the 2022 average of 1,708 µS/cm.

EC results which fell outside the EC adopted performance criteria for both upstream and downstream monitoring locations included:

- SW02 during February (5540 µS/cm), March (5440 µS/cm), and May (5580 µS/cm).
- SW03 during September (24200 µS/cm).
- SW14 during April (726 µS/cm), August (704 µS/cm), September (858 µS/cm), October 764 µS/cm), November 944 µS/cm), and December (954 µS/cm).
- SW15 during January (683 µS/cm), April (756 µS/cm), August (715 µS/cm), September (873 µS/cm), October (785 µS/cm), November (987 µS/cm), and December (990 µS/cm).
- SW17 during April (661 µS/cm), August (711 µS/cm), September (864 µS/cm), October (751 µS/cm), November (952 µS/cm), and December (819 µS/cm).

As per the surface water quality TARP outlined within Section 7.3.3 of SWMP an investigation into monitoring results that are above the impacted assessment criteria (for three consecutive sampling events) occurred to determine if an incident and/or non-compliance occurred and the likely causes. On all of the instances of investigations undertaken, the monitoring results were due to fluctuating climatic conditions and not attributable to mining impacts and therefore and no incident and/or non compliance was recorded or reported.

Assessment of Surface Water Quality

In accordance with the Surface Water Management Plan, speciation monitoring is undertaken annually at Mangoola surface water monitoring locations in June. There is no speciation monitoring criteria in the Surface Water Management Plan. A summary of the surface water results for 2024 are presented in ***Table 7-5***.

Table 7-5 Annual Surface Water Speciation Results

Parameter	SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW09	SW10	SW11	SW12	SW13	SW14	SW15	SW16	SW17
Flow	No Flow	Flow	No Flow	Flow	flow	Flow	Flow	Flow	Dry	Flow	Flow	Flow	Flow	Flow	No Flow	Flow
pH	7.62	8.21	7.95	8.47	8.49	8.46	7.73	8.46	-	8.44	8.47	8.46	8.22	8	7.39	8
EC (µS/cm)	761	4770	13900	1070	1130	1140	1210	1150	-	1170	882	932	624	628	156	648
TSS (mg/L)	<5.0	<5.0	<5.0	<5.0	<5.0	5	<5.0	<5.0	-	<5.0	<5.0	<5.0	<5.0	5	10	<5.0
TDS (mg/L)	466	2710	8830	576	612	618	684	614	-	628	471	488	370	360	308	356
Nitrite (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrate (mg/L)	<0.01	<0.01	0.03	0.02	<0.01	0.02	<0.01	<0.01	-	<0.01	0.06	0.06	0.38	0.41	<0.01	0.5
TKN (mg/L)	1.8	0.5	0.8	0.2	0.2	0.3	0.6	0.3	-	0.3	0.2	0.3	0.3	0.4	3	0.4
Total Nitrogen as N (mg/L)	1.8	0.5	0.8	0.2	0.2	0.3	0.6	0.3	-	0.3	0.3	0.4	0.7	0.8	3	0.9
Total Phosphorus as P (mg/L)	0.12	0.03	0.04	0.15	0.16	0.17	0.02	0.14	-	0.15	0.06	0.08	0.04	0.06	0.31	0.05F
Sulphate (mg/L)	40	128	596	16	20	20	93	64	-	21	41	50	40	37	4	40
Calcium (mg/L)	36	130	200	57	57	57	24	56	-	57	39	43	46	49	8	47
Magnesium (mg/L)	32	146	376	61	61	61	32	60	-	61	45	48	27	28	4	28
Sodium (mg/L)	96	626	2140	82	93	96	155	96	-	100	75	80	45	44	20	46
Potassium (mg/L)	14	8	19	3	3	3	9	3	-	3	5	5	2	2	10	2

Parameter	SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW09	SW10	SW11	SW12	SW13	SW14	SW15	SW16	SW17
Iron (mg/L)	1.26	0.44	0.11	<0.05	0.25	0.3	0.56	0.37	-	0.24	0.24	0.17	0.19	0.23	6.8	0.27
Arsenic (mg/L)	0.002	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.004	<0.001
Boron (mg/L)	<0.05	0.1	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium (mg/L)	0.081	0.212	0.456	0.008	0.01	0.01	0.07	0.01	-	0.011	0.029	0.027	0.016	0.015	0.073	0.016
Cadmium (mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper (mg/L)	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001
Manganese (mg/L)	0.041	0.158	0.176	0.009	0.018	0.027	0.092	0.024	-	0.027	0.028	0.031	0.025	0.028	0.119	0.03
Chloride (mg/L)	244	1220	4670	171	262	222	336	226	-	232	162	146	55	56	21	58
Selenium (mg/L)	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead (mg/L)	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
Silver (mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Zinc (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	<0.005	<0.005	<0.005	<0.005	<0.005	0.018	<0.005
Mercury (mg/L)	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Fluoride (mg/L)	0.2	0.4	0.2	0.2	0.2	0.2	<0.1	0.2	-	0.2	0.2	0.2	0.2	0.1	0.1	0.1
Bicarbonate (mg/L)	106	531	447	320	302	302	53	304	-	301	216	226	197	196	35	195

Stream Health Monitoring

Biosis (2024) undertook stream health monitoring surveys during autumn and spring in 2024. The stream health monitoring program encompasses nine potential impact sites (monitoring sites) across four major waterways that traverse the Mangoola Open Cut site – Big Flat Creek, Wybong Creek, Sandy Creek and the Hunter River. The program also includes seven control sites with catchments similar to the monitoring sites to differentiate potential mining impacts from environmentally driven variations due to natural processes.

The control sites are located across two waterways – Cuan Creek, Wybong Creek (upstream of the mine site) and the Hunter River. The monitoring program assesses macroinvertebrate community structures, water quality and overall catchment-riparian health using NSW AUSRIVAS and Signal2 sampling and analyses, HABSCORE assessments, and physicochemical surface water quality testing.

HABSCORE assessments during 2024 surveys indicated slight decrease in stream health conditions when compared with 2023, although the results still clustered within the marginal and sub-optimal categories, a pattern consistent with previous years. The AUSRIVAS and SIGNAL 2 analysis showed that, while sites have been in poor condition since the commencement of baseline monitoring, the macroinvertebrate assemblages have remained consistent over previous years. Year to year, minor fluctuations in these metrics are observed across both monitoring and control sites and therefore likely associated with changes in water availability and environmental conditions.

The Hunter River control and monitoring sites recorded SIGNAL 2 scores that indicated stream health was generally severely impaired, similar to the other survey sites in the Mangoola Stream Health Program. Overall, there was no substantial difference in the AUSRIVAS results between the control and monitoring sites and the water quality results, HABSCOREs and the riparian vegetation remained relatively consistent between sites. Therefore, it is unlikely that the HRDP is significantly impacting upon the Hunter River at this time. As such no detailed further inspection is required for these sites at this stage.

Stream health criteria have been established for major waterways identified as being potentially subject to impacts associated with mining activities. The assessment of the 2024 monitoring results against these criteria did not trigger the need for any further investigation with the results above the relevant trigger values. Overall, the monitoring and control sites have improved slightly over previous years but are generally still in the same poor condition observed at the commencement of the stream health monitoring project in 2009. As such it is concluded that no impacts to stream health associated with mine operation have been detected in 2024.

7.6.2.2 Comparison with Predictions

A detailed water balance assessment, integrating the MCCO Project with the existing operations was completed as part of the Surface Water Assessment for the EIS (2019).

The high water demand scenario was based on 13.5 Mtpa of ROM coal washed through the CHPP, and the low water demand scenario was based on 8.0 Mtpa of ROM coal washed through the CHPP and 5.5 Mtpa of ROM coal processed as bypass coal (i.e. unwashed).

In the 2024 reporting year, the predictions against the MCCO project EIS (SSD 8642) water usage data is compared against actuals and are shown in ***Table 7-6.***

Table 7-6 Comparison of 2024 Water Usage with the 2019 EIS (SSD 8642) Predictions

Aspect of Water Management System	2024 Data (ML)	EIS (2019) Prediction (ML/annum)
CHPP water use	2,387	3,012.5
Haul Road Dust Suppression	648	1,166.5
Pipeline Water (Hunter River)	402	1,212.6
Hunter River Salinity Trading Scheme Offsite (HRSTS) Release	0	191.2

As shown ***Table 7-6***, all water consumption and lawful discharge parameters are within the predictions made in the EIS (2019).

7.6.2.3 Long Term Trend Analysis

In accordance with SSD 8642, a long-term trend analysis of surface water monitoring results at Mangoola has been undertaken using data from 2010 to 2024 to identify any trends in the monitoring data over the life of the project. Long term monitoring results for pH, EC, TDS and TSS are presented in ***Appendix E***.

The results indicate:

- The pH of surface water monitoring locations has remained relatively stable since mining operations commenced in 2010.
- EC has generally remained stable from 2010-24 with the exception of monitoring locations SW01, SW02, SW03, and SW07, which have been periodically elevated. SW02 and SW03 are located upstream of the Mangoola Mining Lease boundary, and therefore the elevated salinity cannot be attributed to operations at Mangoola.
- Similarly, SW07, and SW01, while located within the Mangoola Mining Lease boundary, are downstream of SW03 and SW02 respectively. Monitoring locations SW01, SW02, SW03, and SW07 were dry for most of 2017-19 due to drought conditions. An increase in rain during 2020 to 2022 allowed most sites to be sampled during that period with rainfall decreasing throughout 2023 and 2024 resulting in some dry sampling sites throughout the reporting period.

7.6.3 Key Performance and/or Management Issues

As previous mentioned, in accordance with the SWMP (updated and approved during 2023) and its associated TARPs, exceedances of surface water monitoring criteria for three consecutive sampling events are only required to be externally reported if investigations determine that an incident has occurred. During 2024 elevated results were investigated and reported internally, as the investigations determined that the background/ upstream water monitoring locations were also experiencing elevated monitoring results (fluctuating climatic conditions) and were not attributable to mining impacts and therefore not externally reportable to DPHI.

However, as per Condition 7 of EPBC Approval 2018/8280, the approval holder (Mangoola) must notify the Department of Climate Change, Energy, the Environment and Water (DCCEEW) of the exceedance of any trigger levels which are specified in the approved SWMP as required by Condition B50 of SSD8642 within 5 business days of detecting or predicting the exceedance. Mangoola provided notification to DCCEEW of monitoring results that had exceeded trigger levels stated within the SWMP

throughout 2024. As the investigations completed as per the TARP (within the approved SWMP) did not deem an incident had occurred, no further investigation or reporting under EPBC Approval 2018/8280 was required.

7.6.4 Proposed Improvements

In line with an EPL variation received in 2023, infrastructure at the Raw Water Dam was set up during 2024 to allow water discharge under the Hunter River Salinity Trading Scheme (HRSTS).

Throughout 2023 Mangoola developed a dam maintenance program which was implemented in 2024. This program reviews sediment loads within the dams as outlined within the site Operational Water Management Plan (OWMP) using bathymetric surveys. This maintenance program will continue in 2025.

7.7 Groundwater Management

7.7.1 Environmental Management

Mangoola monitors groundwater quality and levels within and surrounding the site in accordance with the Groundwater Monitoring Plan (GWMP). This was consolidated with the Groundwater Response Plan and last updated and approved by DPHI in December 2022 in accordance with Condition B50 of the
MCCO Development Consent (SSD-8642). The new GWMP (dated 2022) was implemented in Q2 of 2023, and subsequently in place for 2024 forming the basis of this chapter in the Annual Review.

As stated in the approved GWMP (2022) the validity of the groundwater model predictions will be independently reviewed every three years against water level and mine inflow data to determine if the model is providing useful predictions (Condition B50(v)(#8) of SSD-8642). The currently approved GWMP was reviewed and updated (AGE, 2024e) in response to a review and recalibration of the numerical groundwater flow model which was completed in 2024 to satisfy Condition B50(e) (v) of SSD8642 and Section 9.4 of the GWMP. This updated GWMP was submitted for approval (via the DPHI portal) in December 2024. Once approved, this will replace the 2022 GWMP.

7.7.1.1 Summary of the Groundwater Monitoring Network

A network of uPVC (standpipe) groundwater monitoring bores and vibrating wire piezometers (VWPs) have been installed at Mangoola to monitor the influence of approved mining activities on the groundwater regime. The number of monitoring bores utilised at the site changes over time as new monitoring bores are installed to collect data in future mining areas, and sites within the approved mining footprint go dry, and/or are gradually removed as mining passes through.

Groundwater monitoring locations are shown in Figure 7-2. The monitoring frequency adopted is:

- daily recording at nine VWPs sites that record pore pressures using data loggers – these sites have the prefix “VW”;
- monthly measurement of water level at 10 sites;
- bi-monthly (every two months) measurement at 49 sites of water levels and field water quality parameters of pH, and EC;
- half yearly measurement at 17 sites of water level, field parameters and laboratory analysis of major ions;
- quarterly private bore groundwater level logger downloads; and

- annual measurement at 7 sites of water level, field parameters and a full laboratory analysis of major ions and metal.

The groundwater impact assessment prepared for MCCO concluded that a number of additional groundwater monitoring locations should be added to the monitoring network to assess baseline conditions as per the MCCO EIS (Umwelt 2019a). Due to excessive wet weather posing safety during the installation period, these bores were installed between late 2022 and mid 2023. No monitoring bores were installed in 2024.

Condition B39 of SSD-8642 requires that prior to commencing construction of the MCCO Project, the owners of the private water supply bores listed in Table 5 may request Mangoola monitor the groundwater level within their bore to determine if there are any impacts from mining activities over time. If monitoring records indicate drawdown of more than 2 m as a result of mining, Mangoola must provide compensatory water in accordance with SSD-8642 conditions B41 to B45.

On 17 May 2021 Mangoola offered monitoring to owners of the bores listed in Table 5 in accordance with the requirements of SSD-8642. Monitoring is occurring at these locations as per planned developed.

Bore ID*	Receiver ID*	Predicted Groundwater Drawdown (m)[#]	Bore inspected and monitoring plan developed **
Bore 1	R261	0.3	Non-responsive landholder.
Bore 2	R157	5.9	Landholder response in March 2025.
Bore 3	R130	1.5	Yes, Aug 2021.
GW080507	R144	0.05	Yes, May 2022.
GW201589	R144	0.1	Yes, May 2022.
GW078502	R83	24.1	Non-responsive landholder.

Notes:

* The receiver IDs and bore locations are presented in SSD 8642 Appendix 3.

[#] Originally outlined in the MCCO Project EIS (Umwelt 2019a) and as updated in the MCCO Project RTS (Umwelt 2019b). The drawdown predictions were updated after the 3-year model calibration in 2024 (AGE, 2024b).

** As per SSD 8642

For further information refer to Appendix F, Mangoola's Annual Groundwater Review Report for 2024.

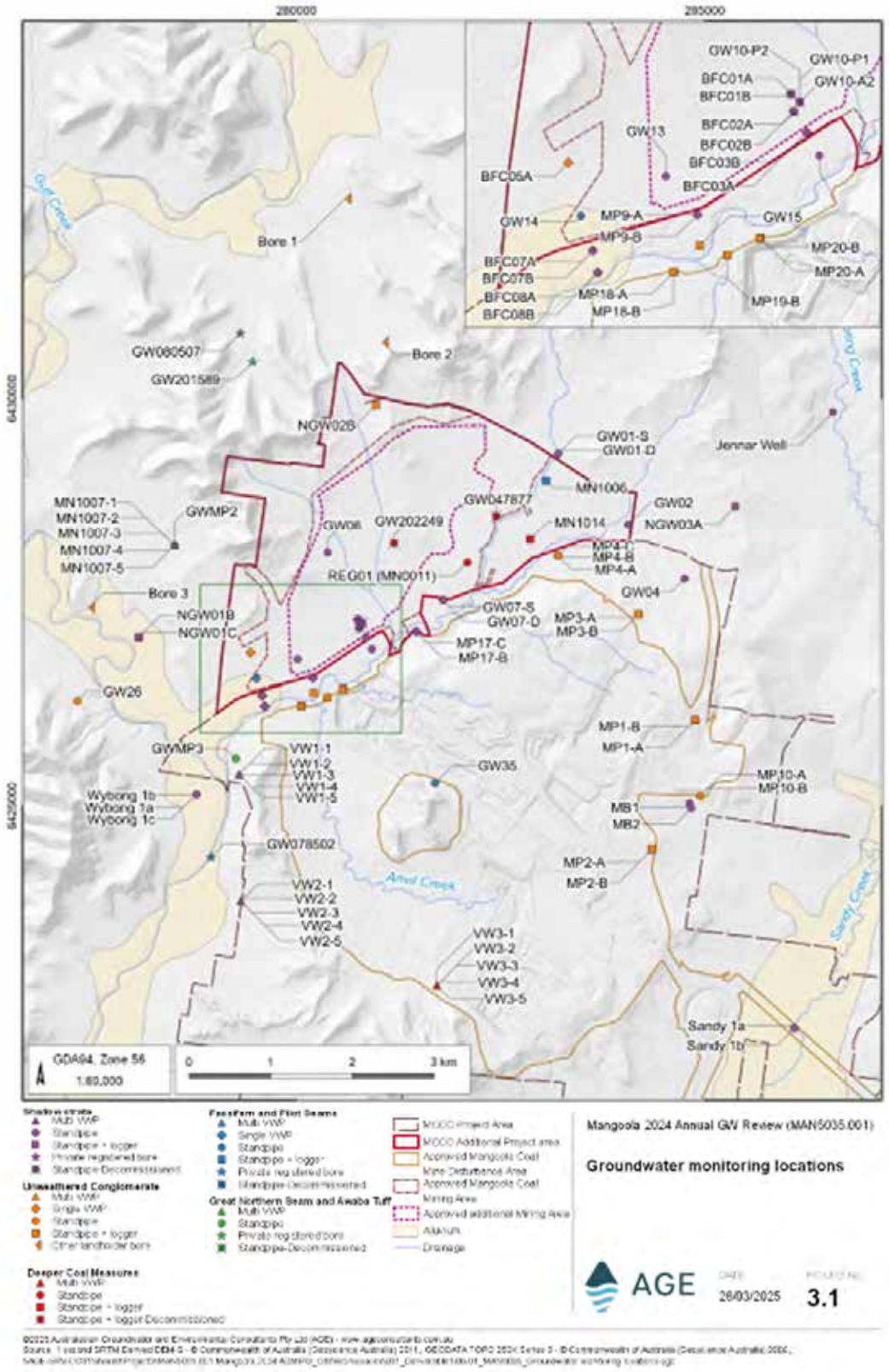


Figure 7-2 Groundwater Monitoring Locations

7.7.2 Environmental Monitoring Results

7.7.2.1 Results from Reporting Period

Groundwater Levels

Natural fluctuations in groundwater levels occur in response to a range of stresses. These stresses can range from short term events, such as rainfall recharge events, or long-term events, such as multi-year drought. To capture the range of stresses, groundwater levels/pressures are measured both manually over longer time frames, and automatically over shorter time frames with pressure transducers and data loggers.

Rainfall

Monthly patched point rainfall data was obtained from the Long Paddock website on 22 Jan 2025 (DES, 2025) for a point adjacent to the mine (longitude 150.70° latitude -32.30°). The SILO data interpolates rainfall and evaporation records from available stations to the selected location. The cumulative rainfall departure (CRD) from the monthly mean was calculated and illustrates wetter or dryer periods compared to long-term average rainfall. **Error! Reference source not found.** shows both monthly rainfall and the CRD. Wetter than average periods are indicated by increasing slopes, and dryer periods shown as declining slopes. Notable recent features shown on **Error! Reference source not found.** are the short but intense drought period from March 2017 to February 2020, followed by above average rainfall and La Nina periods from 2020 to 2022. Between 2022 and early 2024 rainfall has been below average. For the reporting period (2024) rainfall was generally above average. At the time of writing the NSW Department of Primary Industries (DPI) classifies the area as being 'non-drought affected' (NSW DPI, February 2025).

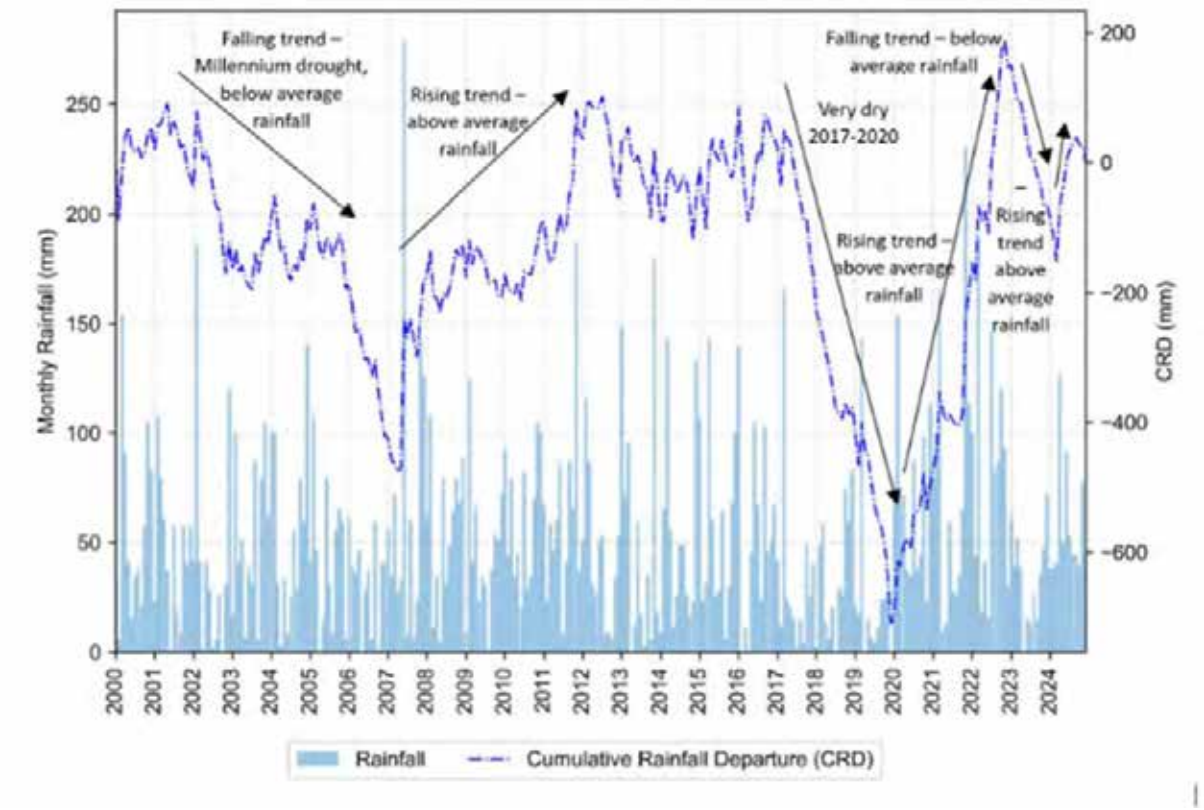


Figure 7-3 Monthly SILO rainfall and CRD (AGE 2025)

Hydrostratigraphic unit monitoring and mapping

Groundwater levels recorded in the monitoring bore network were plotted against time for each hydrostratigraphic unit present at Mangoola presented in Appendix F. The groundwater levels are also plotted along with the CRD to indicate where water level trends are correlated with climate, and where other factors such as mining may be influencing groundwater levels. Groundwater level data were used to prepare contour maps for May 2024 conditions, covering each hydrostratigraphic unit that had at least one water level measurement per bore within that unit. These maps are included with F.

Shallow Strata / Weathered Conglomerate

Generally, groundwater levels demonstrate that fluctuations reflect climatic conditions and rainfall. During the 2024 reporting period groundwater levels have increased in most of the monitoring bores as a result of an above average rainfall phase experienced in 2024.

Consistent with previous reporting periods, groundwater levels remain a general reflection of topography, with no significant influence evident due to mining activities.

Unweathered Conglomerate

Deeper unweathered conglomerate groundwater levels tend to be less influenced by climatic conditions. Groundwater appears to flow generally north to south with the monitoring bores at the northernmost and southeasternmost extents, NGW02B and Sandy 1b, recording the lowest and highest water levels, respectively. This pattern follows a stepped southward groundwater gradient that mirrors the region's topography. The monitoring bores GW15, and historically MP18-B, MP19-B and MP20-B, which are located close to the mine footprint, show a potential mining activity impact. VW1-4, located 1.4 km southwest of the bore cluster, has shown the most significant potential response to regional climatic and rainfall conditions, recharging 18.96 m between December 2023 and December 2024. Groundwater levels here have returned to levels last recorded in 2016, following a consistent drawdown since November 2015. Groundwater levels at monitoring bore GW26, which is located approximately 3.5 km west of the mining lease, continues to record a slow decline since July 2016.

Great Northern Seam and Awaba Tuff

The Great Northern Seam and Awaba Tuff groundwater level time series are shown in **Error! Reference source not found.** of Appendix F. The majority of the bores were installed in the first quarter of 2023, resulting in limited time series data. Initial observations indicate some alignment with regional CRD dynamics during this period, but additional data is needed to validate these patterns. The lack of sufficient spatial data did not allow meaningful groundwater contours to be produced.

Fassifern and Pilot Seams

Similar to the deeper unweathered conglomerate groundwater system, the Fassifern and Pilot Seams groundwater levels tend to be less influenced by climatic conditions. As expected, some monitoring bores within the coal seams which are located close to the Main Pit West area (i.e. GW14, MP18-A and MP20-A), have recorded a decline in groundwater levels attributed to mining as shown in **Error! Reference source not found.** and in **Error! Reference source not found.**. The groundwater levels in these monitoring bores have stabilised since the last reporting period.

Deeper Coal Measures

Monitoring bores recording groundwater levels within the deeper coal measures have recorded a relatively stable trend within mining influence from climatic conditions. The lack of sufficient spatial data did not allow groundwater contours to be prepared.

Water level results from reporting period

Table 7-7 presents the 2024 groundwater monitoring results of depth to groundwater at selected monitoring bores to provide insight into the groundwater dynamics of the monitored sites for the year 2024. The table summarises the minimum, average, and maximum values measured against the Tier 1 and Tier 2 triggers when applicable to assess groundwater level variations throughout the monitoring period.

Table 7-7 2024 Groundwater Monitoring Results – Groundwater Level

Monitoring Bores	Depth to Groundwater Results (mBGL)			Tier 1	Tier 2
	Min	Ave	Max		
BFC05	14.94	15.18	15.54	14.9[1]	16.9
Bore 3 (R130)	12.98	13.81	13.93	tbd	2m drawdown
GW02	3.66	3.87	4.33	-	-
GW04	11.47	11.50	11.53	-	-
GW06	0.59	0.82	1.32	-	-
GW13	0.95	1.96	4.39	-	-
GW14	33.93	34.15	34.37	-	-
GW15	20.5	20.53	20.55	-	-
GW26	18.05	18.16	18.31	17.4	17.5[2]
GW080507 (R144)	0.75	1.40	2.38	tbd	2m drawdown
GW201589 (R144)	6.64	13.36	28.23	tbd	2m drawdown
MP1-A	9.22	9.32	9.46	-	-
MP1-B	12.45	13.04	13.42	-	-
MP9-A	12.55	13.00	13.32	-	-
MP10-A	16.12	16.66	17.3	-	-
MP10-B	9.18	9.54	9.80	-	-
MP15-B	No data	No data	No data	-	-
MP16-B	10.82	11.51	11.86	-	-
MP17-B	3.2	4.22	5.24	-	-
MP18-A	48.44	48.46	48.48	-	-
MP19-A	42.81	43.02	43.36	-	-
MP2-A	37.29	37.86	38.28	-	-
MP2-B	21.85	21.93	22.04	-	-
MP20-A	33.29	33.74	37.45	34*	43.2

Monitoring Bores	Depth to Groundwater Results (mBGL)			Tier 1	Tier 2
	Min	Ave	Max		
MP3-A	28.05	28.24	28.41	-	-
MP3-B	25.66	25.73	25.81	-	-
MP4-A	0.46	0.83	1.14	-	-
MP4-B	1.61	1.88	2.05	-	-
MP4-C	3.78	4.06	4.46	5.2	6.6
MP9-B	25.54	28.02	30.49	29.9*	40.4
NGW01B	14.2	14.25	14.31	15.4	16.8
NGW02B	6.56	6.91	7.18	7.8	12.9
Sandy 1a	7.15	15.65	18.81	tbd	tbd
Sandy 1b	15.54	15.78	16.04	tbd	tbd
VW1-4	9.82	26.36	35.83	37.7	44.1
VW2-2	18.22	19.17	21.75	13.1[1]	31.2
VW2-4	22.64	23.32	24.12	22.2[1]	40.5
VW3-2	60.55	61.02	61.60	65.1	66.7
Wybong 1a	13.01	13.15	13.25	tbd	tbd
Wybong 1b	17.80	18.08	19.20	tbd	tbd
Wybong 1c	19.20	19.84	20.12	tbd	tbd

Notes: Tbd = to be determined following 12 months of monitoring data. This occurred within 2024 and as such triggers have been added to the updated GWMP currently submitted to DPHI for review and approval.

[1] Tier 1 trigger exceedance and investigation was undertaken (AGE, 2023a; AGE, 2023b; AGE, 2023c; AGE, 2024a; AGE, 2024c).

[2] Tier 2 trigger exceedance and investigation was undertaken (AGE, 2023a; AGE, 2023b; AGE, 2023c; AGE, 2024a; AGE, 2024c).

* Recorded a single exceedance that did not involve three consecutive events and thus did not trigger a TARP as per GWMP (2022).

7.7.2.2 Groundwater and quality monitoring

Groundwater samples collected from the Mangoola monitoring network are analysed for:

- pH;
- Electrical Conductivity (EC);
- Total Dissolved Solids (TDS);
- major ions; and
- dissolved metals.

pH and electrical conductivity (EC)

Table 7-8 presents the 2024 groundwater monitoring results for pH and electrical conductivity (EC) at selected monitoring bores to provide insight into the overall hydrochemical characteristics of the monitored sites for the reporting period. The table summarises the minimum, average, and maximum values for each parameter measured against Tier 1 and Tier 2 triggers where appropriate, to provide insight into groundwater quality variations throughout the monitoring period.

Table 7-8 2024 Groundwater Monitoring Results – pH, EC

Monitoring Bores	pH Results					EC Results (µS/cm)				
	Min	Ave	Max	Tier 1	Tier 2	Min	Ave	Max	Tier 1	Tier 2
GW02	7.00	7.98	9.18	-	-	13,100	18,440	23,500	-	-
GW04	7.09	7.18	7.37	-	-	6,840	7,366	7,520	-	-
GW06	6.55	7.51	8.00	6	9	191	235	261	333	7,500
GW13	7.32	7.64	7.89	-	-	172	248	312	-	-
GW14	7.06	7.15	7.27	-	-	5,660	6,194	6,650	6,712	7,500
GW15	6.83	6.97	7.13	-	-	12,200	13,940	15,100	11,483	-
GW26	7.06	7.24	7.42	6	9	1,350	1,497	1,634	2,742	7,500
GW080507 (R144)	5.86	6.25	7.31	tbd	tbd	147	189	247	tbd	tbd
GW201589 (R144)	6.41	6.69	7.36	tbd	tbd	160	194	227	tbd	tbd
MP1-A	7.73	7.83	7.97	6	9	4,810	5,160	5,380	6,716	7,500
MP1-B	8.24	8.30	8.41	-	-	5,850	5,966	6,140	-	-
MP9-A	6.62	6.76	6.92	-	-	10,300	12,433	14,100	-	-
MP10-A	7.69	7.80	7.93	-	-	5,510	5,584	5,730	-	-
MP10-B	11.09	11.22	11.49	-	-	12,500	12,900	13,200	-	-
MP15-B	No data	-	-	6	9	No data	-	-	16,887	-
MP16-B	6.86	6.99	7.11	-	-	12,270	14,067	15,500	-	-
MP17-B	6.36	6.62	6.88	6	9	1,686	2,155	2,625	22,797	-
MP18-A	7.06	7.18	7.52	-	-	7,670	8,022	8,270	-	-
MP19-A	6.76	6.83	6.94	-	-	9,490	9,756	10,000	-	-
MP2-A	7.43	7.49	7.62	6	9	13,500	16,560	16,600	17,596	-
MP2-B	6.81	6.94	7.2	-	-	18,100	18,400	18,800	-	-
MP3-A	7.66	7.74	7.8	6	9	7,140	7,425	7,860	10,540	-
MP3-B	7.16	7.24	7.38	-	-	10,200	10,540	10,900	-	-
MP4-A	7.53	7.79	8.26	-	-	8.560	8,882	9,410	-	-
MP4-B	7.86	8.11	8.44	-	-	6,210	6,346	6,630	-	-
MP4-C	6.61	6.83	7.12	-	-	20,280	23,322	24,900	-	-
NGW01B	7.48	7.79	8.07	6	9	3,360	3,476	3,740	5,356	7,500
NGW02B	7.31	7.36	7.41	6	9	3,380	3,486	3,570	5,584	7,500
Sandy 1a	6.64	6.83	7.37	6	9	2,690	3,172	3,530	-	7,500
Sandy 1b	7.28	7.43	7.59	6	9	1,485	1,620	1,823	-	7,500
Wybong 1a	7.06	7.20	7.43	6	9	2,176	2,369	2,658	-	7,500
Wybong 1b	10.71	11.43	11.94	6	9[2]	2,450	3,596	4,200	-	7,500

Monitoring Bores	pH Results					EC Results (µS/cm)				
	Min	Ave	Max	Tier 1	Tier 2	Min	Ave	Max	Tier 1	Tier 2
Wybong 1c	11.70	11.96	12.35	6	9[2]	3,850	4,662	5,650	-	7,500

Notes: Tbd = to be determined following 12 months of monitoring data. This occurred within 2024 and as such triggers have been added to the updated GWMP currently submitted to DPHI for review and approval.

[2] Tier 2 trigger exceedance and investigation was undertaken (AGE, 2024d).

7.7.2.3 Comparison with Predictions

Engeny (2025) has developed a spoil seepage and pit water balance model that is used to provide quarterly estimates of groundwater inflow to Main Pit West, South Pit and Wybong Pit. The estimated hardrock and colluvial/alluvial ingress to Main Pit West, South Pit and Wybong Pit for each quarter in 2024 was approximately 31.1 ML/year (Engeny, 2024a; Engeny, 2024b; Engeny, 2024c; Engeny, 2025).

Groundwater modelling for the original Environmental Assessment was undertaken by Mackie Environmental Research (MER) in 2006 (Mackie, 2006). Since then, the progressive three yearly updates to the numerical groundwater model updates were completed by MER in 2010 (Mackie, 2010), 2013 (Mackie, 2013) and AGE in 2016 (AGE, 2016). The numerical groundwater model was further validated and recalibrated in 2024 (AGE, 2024) as part of the Mangoola Coal Continued Operations (MCCO) approval condition. Despite slight divergences between the observed and modelled datasets, groundwater inflow volumes estimated by AGE for the 2024 reporting period (i.e. 125 ML: AGE, 2024e) were in accordance with the groundwater inflows from quarterly reviews.

Engeny concluded that the estimate is not considered to be a significant inflow and is in line with model predictions, therefore does not trigger enactment of the trigger actions response plans (TARPs) outlined in the Mangoola GWMP (Engeny, 2025). The total cumulative estimated hardrock and colluvial ingress is significantly lower than Mangoola Coal's licensed annual take of 700 ML under WAL41561 (Converted in 2021 – previously 20BL172598).

For further information refer to Appendix F, Mangoola's Annual Groundwater Review Report for 2024

7.7.3 Key Performance and or Management Issues

Where the criteria were exceeded for three consecutive monitoring events, the response protocol was enacted as per measures prescribed in the trigger action response plans (TARPs) of the approved GWMP (2022). Following an exceedance, initial steps of the protocol require review of the results and an investigation to determine if an incident has occurred that could cause environmental harm. AGE was engaged to investigate the exceedances and report on findings. As per the TARPS, exceedances of trigger values are only reportable if an investigation determined that an incident had occurred. The AGE trigger level exceedance review reports concluded that the groundwater level exceedances posed low potential for material environmental harm, and therefore no incidents were considered to have occurred.

7.7.4 Proposed Improvements

As noted, the three-yearly review of the numerical groundwater model (AGE 2024e) for Mangoola was completed during 2023 and finalised in 2024. The updated model has been calibrated with available groundwater monitoring data, in line with the GWMP. The revised findings on the magnitude and timing of groundwater impacts have been subsequently incorporated into the updated GWMP which was submitted for review and approval to DPHI in December 2024. The next validation and review of the groundwater model will be in 2026.

As also indicated earlier, additional monitoring bores have satisfied the criteria for establishing triggers and have been fully integrated into the monitoring system, with their locations and triggers included in the updated GWMP, submitted for review and approval to DPHI in December 2024.

8. Rehabilitation

Mangoola aims to develop rehabilitation of mined land that returns the site to a condition where the landforms, soils, hydrology, flora and fauna are self-sustaining and compatible with the surrounding land uses. Rehabilitation of the overburden emplacement areas is conducted progressively over the life of mine, as an integral component of mining operations.

8.1 Rehabilitation of Disturbed Land

Rehabilitation at Mangoola was undertaken in accordance with the Rehabilitation Management Plan (RMP). The RMP was updated in 2024 and approved 14 January 2025. A copy of the current RMP is available on the Mangoola website. A total of 1047ha of rehabilitation has been undertaken to 31 December 2024. All rehabilitation areas 3 years old or less are classified as being in the Ecosystem and Land Use Establishment Phase. Rehabilitation areas greater than 3 years old which are not likely to be disturbed during the rehabilitation of adjacent infrastructure or tailings dams are classified as being in the Ecosystem and Land Use Development Phase. A summary of rehabilitation during 2023 and 2024, and the projected rehabilitation for 2025, is provided in ***Table 8-1*****.**

Table 8-1 Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual) (Ha)	This Reporting Period (Actual) (Ha)	Next Reporting Period (Forecast) (Ha)
A. Total mine footprint[1]	2455	2584	2623
B. Total active disturbance[2]	1488	1533	1577
Infrastructure Areas	811	718	718
Active Mining Areas	276	331	385
Waste Emplacements	195	272	176
Tailings Dams	117	117	117
Water Management	90	95	95
C. Land being prepared for Rehabilitation[3]	0	0	0
D. Land under active Rehabilitation[4]	966	1047	1147
E. Completed rehabilitation[5]	0	0	0

1 Total mine footprint includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities.

2 Total active disturbance includes all areas ultimately requiring rehabilitation except areas listed under C, D or E.

3 Land being prepared for rehabilitation – includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE RMP Guidelines).

4 Land under active rehabilitation - includes areas under rehabilitation and being managed to achieve relinquishment.

5 Completed rehabilitation – requires formal sign-off by DRE that the area has successfully met the rehabilitation land use objectives and completion criteria.

Topsoil is being managed to maximise the viability of soil biota. Topsoil management measures on site include varying stripping depths for different soil types, incorporation of mulched vegetation material

into the topsoil resource, limiting topsoil storage stockpiles to a maximum of three metres in height, minimising any compaction of stockpiles, and seeding topsoil stockpiles with a cover crop.

Mangoola has continued with the natural landform design project and will implement this design in all final rehabilitation. The natural landform design has been integrated into the RMP. All rehabilitation undertaken is guided by the completion criteria outlined in the RMP.

A general overview of the 2024 rehabilitation process is presented below:

- After shaping is completed, topsoil is applied at a nominal depth of 100 mm in thickness. Direct topsoil placement from recently mulched and stripped areas is prioritised, where possible.
- Gypsum is applied as a soil ameliorant for incorporation into the topsoil.
- Ground timber and stag trees are placed, with the density depending on available resources.
- Frog ponds and aquatic habitat areas are shaped with habitat structures added.
- Topsoiled rehabilitation areas are double pass ripped, across the contour, to a depth ranging from 200 mm to 600 mm (steeper slopes).
- Rehabilitation areas are seeded by hand. This provides more detail for targeted vegetation communities, such as riparian areas and eco-tonal changes based on soil type and aspect. Seed mixes are comprised of endemic Ironbark woodland complex species sourced from adjoining offset and buffer lands.

In addition to the natural landform created at Mangoola, plant species compositions have been selected based on vegetation types of the surrounding natural landforms, e.g. Forest Gum woodland or Rough-barked Apple woodland in the drainage lines or Ironbark woodland along the ridges and Spotted Gum Forest on the ridge tops. An example of seed mixes used at Mangoola is provided in the RMP.

During the reporting period, no rehabilitation areas received sign-off from the Resources Regulator as all rehabilitation criteria have not been met.

A Revegetation TAP was undertaken by the Resources Regulator on 12 November 2024. Further information was requested by RR via email on 6 and 10 December 2024. This information was provided via email on 13 December 2024 with no further feedback received during the reporting period.

Due to the unprecedented rainfall experienced during late 2021 and early 2022 TD2 was required to be used as a short-term water storage option. This unfortunately prevented the planned 2021 commencement of TD1 capping (due to the seepage from TD2) and the subsequent timing of TD2's capping. TD1 trial of the 6 species evaluation for dewatering capacity of tailings by vegetation continued across 20243 due to the delay in planned capping works.

Construction of the capping layer will commence progressively, from the upper beach of TD1 in the northeast of the dam. With regards to TD2, the tailings strength will continue to be routinely monitored by use of the shear vane apparatus, until tailings strengths develop to those similar to TD1, when construction of the capping layer commences in 2025. Throughout this process any surface water will be kept to a minimum on TD1 and TD2 (once TD2 is emptied of its short-term water storage) to maximise the effect of solar desiccation.

The following were undertaken as part of the rehabilitation monitoring program:

- 51 long term monitoring (LTM) sites
- 40 initial establishment monitoring (IEM) sites
- 8 reference sites

Rehab Monitoring Sites for 2024 are shown in ***Figure 8-1.***

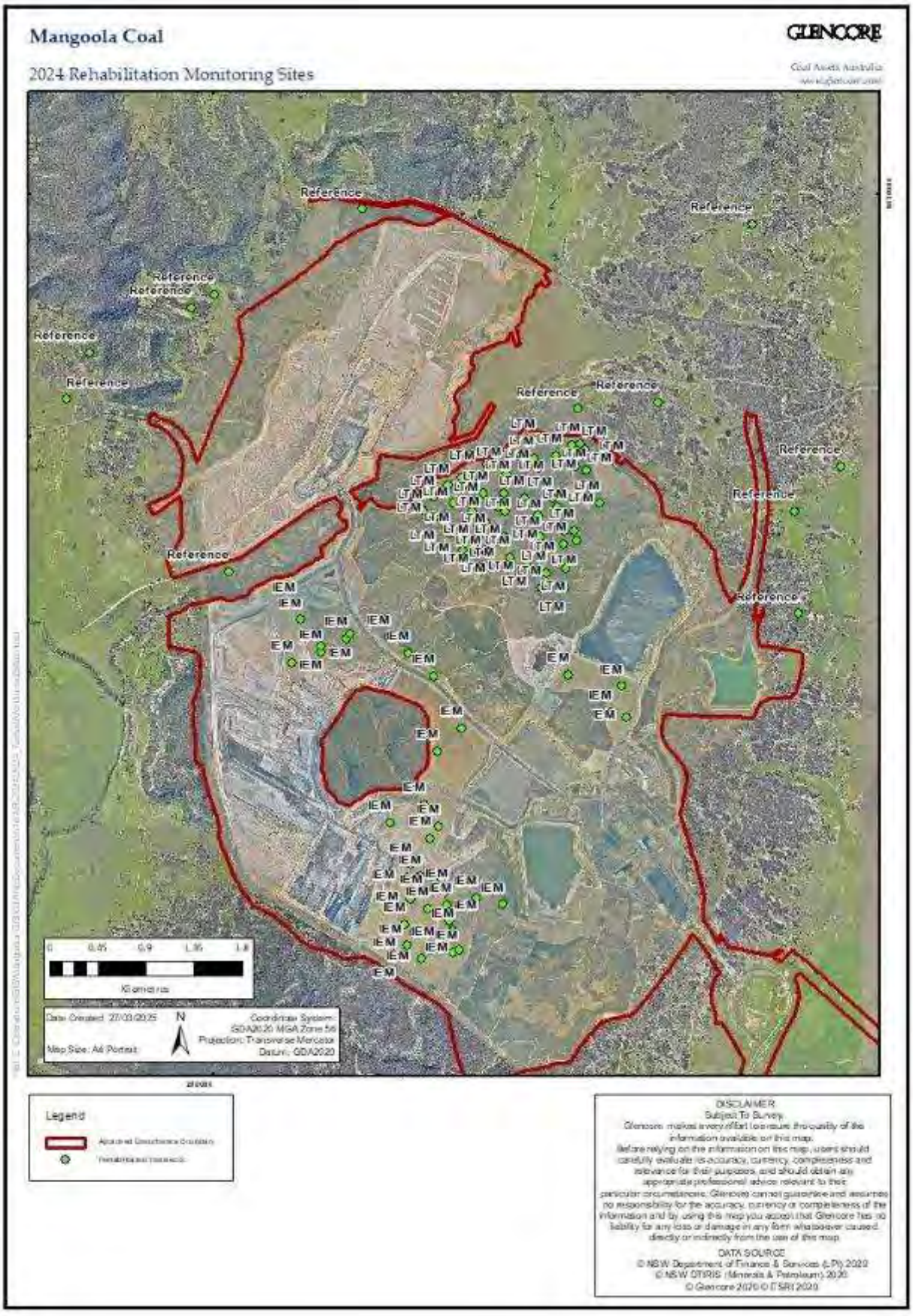


Figure 8-1 2024 Rehabilitation Monitoring Sites

Forecast and mapping of rehabilitation and disturbance areas are included in the Annual Rehabilitation Report and Forward Program, which are attached in ***Appendix A***.

8.2 Removal of Buildings

During 2024, no buildings or other infrastructure were removed or renovated.

8.2.1 Key Issues Affecting Rehabilitation

During December 2024, a walkthrough rehabilitation inspection audit was completed by a specialist consultant to review and report on the condition of mine rehabilitation and highlight areas where maintenance action is required. An updated methodology has been adopted since the 2020 rehabilitation walkover inspection. Due to the size of the area that is under rehabilitation at Mangoola Coal, a change to a biennial schedule has been adopted with the North Pit rehabilitation inspected in even years and the South Pit and Main Pit rehabilitation in odd years. As such, the North Pit rehabilitation was inspected in 2024. The North Pit rehabilitation consists of 14 blocks totalling 539ha.

Three (3) occurrence of rill/gully erosion with the potential to impact rehabilitation were observed. None of these were considered to require intervention to stabilise. A further 1 occurrence of a water retention feature (small dam) that had not been completed and required topsoil to be spread was recorded.

No continuous areas of recalcitrant bare ground >400m2 in size were identified in the walkover inspection. Topsoil management including consistent spreading and ripping is evident across the rehabilitation blocks assessed.

Eight weeds considered to have potential to impact on the development of target vegetation communities were identified:

- Galenia
- African Lovegrass
- Zig-zag wattle
- Silver-leaved ironbark
- Sharp rush
- Common pear
- Telegraph weed
- African Boxthorn

Minimal evidence of feral animal species was encountered during the walkover inspection. It is recommended that control measures currently in place for feral animals are continued. The impacts of other species across the Mangoola rehab should continue to be monitored and control measures taken if noticeable increases in environmental impacts are observed.

A diversity of artificial/ salvaged habitat features are present across all areas of the Mangoola Coal rehabilitation. In particular, constructed drainage lines using a diversity of stag trees, logs, rocks and chains of ponds are looking promising. Utilisation of these features has been recorded including mammals, reptiles, amphibians, birds and invertebrates. The success of these habitat features deserves commendation.

Senescence of pioneer shrubs has been observed in rehabilitation older than 9 years resulting in an open, grassy woodland vegetation structure. The diversity of shrub non-pioneer shrub species in these areas was identified as a potential area for improvement. A diversity of species and growth forms have been recommended for planting. Establishment of exotic perennial grasses has been identified as a

threat to these areas and focusing on identifying and removing these species before they establish will be important in preserving the quality pf the rehab moving forward.

All rehabilitation blocks are generally trending towards completion criteria consistent with what could be expected for the age of each rehabilitation block.

Some threats to the rehabilitation as identified in the Rehabilitation Management Plan (RMP) have been partially triggered, mainly presence of minor erosion and a high cover of weed species in rehabilitation established since 2021.

Overall, the Mangoola Open Cut rehabilitation works in Northern rehabilitation, most of which are beyond the establishment phase, to date remains highly successful and are generally progressing towards the completion criteria listed in the RMP. Native diversity across all rehabilitation domains of sufficient age to assess was generally high. Most areas exhibited appropriate species for the target vegetation community in all layers.

8.2.2 Post Rehabilitation Land Use

As outlined in the RMP, the post-rehabilitation land use will be self-sustaining locally occurring vegetation communities, which emulate the pre-mining environment, enhance local and regional ecological linkages and provide for a sustainable final land use option. It has been developed with consideration of the inherently low land capability of the existing land (Class VI) across most of the site. The final void will remain onsite and will be appropriately rehabilitated and fenced to prevent access. Rehabilitation will establish a range of grassland, woodland and forest communities in addition to the offset area which surrounds the site.

Mangoola will establish native woodland and approximately 700 ha of native grassland across the site at closure.

Vegetation communities within the native woodland areas include:

- Forest Redgum Riparian Woodland.
- Ironbark Woodland Complex.
- Paperbark Woodland.
- Sheltered Grey gum Woodland.
- Slaty Box Woodland.
- Spotted Gum Open Forest.
- Weeping Myall Woodland.

In addition to the above, Mangoola is monitoring rehabilitation against relevant completion criteria. ***Table 8-2*** provide a summary of progress to date against relevant criteria for the stage of rehabilitation onsite, which has been undertaken on rehabilitated waste emplacement areas. Further updates against criteria will be provided in future Annual Reviews as relevant criteria are triggered.

Many of the completion criteria listed in the RMP are not yet relevant, as they relate to stages of rehabilitation that have not yet been reached or triggered. The annual ecological monitoring program, rehabilitation walkover inspection and annual bushfire hazard inspection have assessed the relevant criteria, specifically landform stability, floristic diversity, vegetation health, weed presence, structural fauna habitat, management of pest species and bushfire management.

Table 8-2 Comparison of the 2024 Rehabilitation Walkover Inspection Results with RMP Completion Criteria

Performance Indicator	Objective	Completion criteria	Walkover Inspection Result
Development of native ecosystems as per the final land use	Floristic diversity is progressing towards the ecosystems planned in the final land use	Native plant species richness assessed for each growth form	Native species composition is returning mixed results in monitoring. The RRC returns most LTM blocks as acceptable or monitor when compared to reference sites. Annual walkover inspections generally note diversity as good.
	Strata development is progressing towards the ecosystems planned in the final land use	**For Grassland**: -0-20% canopy -60-90% Groundcover	All areas targeted to be native grassland were representative of woodland PCT's (a mix of 1655 and 1691) when verified on ground during 2024 monitoring. Even where historic thinning and mulching has been undertaken, the abundance of Acacia species in the surrounding areas is creating such a strong seed bank that colonisation of these species is unavoidable. Succession into woodland is inevitable without constant and labour-intensive management.
		For Woodland: -20-60% canopy -10-60% understorey - 40-80% groundcover	Few (4 of 51) LTM sites monitored in 2024 meet all criteria. Of the LTM sites monitored in 2024 that are not meeting criteria, most are above the 60% canopy and understory criteria (woodland is denser than required) and below the 40% minimum groundcover criteria.

Performance Indicator	Objective	Completion criteria	Walkover Inspection Result
			This is likely due to Mangoola's strategic inclusion of dense colonising shrubs (Acacia sp.) in the woodland seed mixes to supress weed growth and develop soil function. Acacia species are observed in the walkover inspections to be senescing over time to open the canopy, allowing groundcover species to develop.
		For Woodland: Minimum total tree/shrub densities to be 400 stems/ha	Densities of trees and shrubs exceed the minimum number across woodland rehabilitation areas.
	Weeds are not a major component of the planned ecosystems	Less than 30% weeds	18 of the 51 LTM sites monitored in 2024 returned higher than 30% weed coverage.
	No signs of ill health and stalling of canopy strata	More than 75% of trees are healthy and growing	No instances of significant dieback noted.
	The rehabilitation is self-sustainable	**For Woodland:** Signs of flowering and seeds or second generation seedlings for trees and shrubs	Second generation seedlings observed during annual walkover inspections. Most blocks contain shrub seedlings and blocks over ten years old are observed to contain eucalypt seedlings.

Performance Indicator	Objective	Completion criteria	Walkover Inspection Result
Fauna diversity is progressing towards the ecosystems planned in the final land use	Rehabilitation areas provide a range of structural habitats similar to pre-mining fauna communities.	Evidence of a range of structural habitats in rehabilitation areas. 1-10 boxes or hollows per ha	All rehabilitation blocks contain stag trees, and many areas contain logs and ponds. Vegetation consistent with wet areas is developing. A diversity of fauna species were observed using the rehabilitation.
	Fauna pest species are managed and controlled (where possible)	Evidence of pest fauna usage of rehabilitation	Deer, hare and rabbit signs were observed during the walkover inspection at very low frequency. No evidence of damage to the rehab was observed.

8.3 Rehabilitation Trials and Research

Mangoola is undertaking a long-term orchid translocation trial for the threatened species *Diuris tricolor* and *Prasophyllum petilum*. Orchids were translocated to new areas and the survival rates have been monitored annually since 2010. The results of the 2024 orchid translocation monitoring are presented in ***Section 6.6.3.6***.

Invertebrate habitat "bee and bug hotels" were introduced into the rehabilitation during 2019. These structures are being used by invertebrates, but no analysis has been carried out to identify particular species.

Mangoola is partnering with NSW BCD on a large-scale translocation project of the critically endangered *Pomaderris reperta*. The aim of the project is to evaluate the effectiveness of propagation and translocation on this species as a means of extending its distribution within the natural range of the species. Two 12 m x 12 m translocation plots have been established within establishing Mangoola rehabilitation, and two identical sized plots located in Mangoola offset land. Ongoing monitoring is showing very favourable results overall and data is being collected regarding the impact of differing ground preparation methods on plant survival rates.

Translocation projects including *Cymbidium canaliculatum, Xanthorrhoea johnsonii* and *Macrozamia communis* continue to be undertaken throughout the rehabilitation areas where opportune.

Mangoola has undertaken and is planning to undertake further trial ecological cool burns in areas of rehabilitation. No burns were undertaken in the 2024 calendar year.

8.4 Actions for the Next Reporting Period

Rehabilitation activities proposed for the 2025 reporting period include the continuation of the rehabilitation research and trials for threatened flora species translocation, continued use of seed mix with increased species diversity, mulching and treatment of some rehabilitation areas to achieve the desired grassland vegetation communities, creating additional complexity in aquatic habitat features, and a focus on achieving the rehabilitation targets as outlined in the RMP.

9. Community

9.1 Community Engagement Activities/Initiatives

Mangoola continued to engage with our local community during 2024 in accordance with our Social Impact Management Plan, required by Condition B108 of SSD-8642, and our site Social Performance Management Plan.

In summary, Mangoola:

- Met with Community Consultative Committee (CCC) quarterly.
- Held the Annual Community Event (17th October) with local community/key stakeholders.
- Met with Community Enhancement Program (CEP) working group (7th February and 13th November).
- Offered/hosted mine tours.
- Distributed community newsletter/handed out other printed resources at community events).
- Maintained our company website with up-to-date information.
- Continued to liaise/meet with local community members as required (e.g. discuss environmental management aspects, arrange tank cleaning/other works as per the Social Impact Management Plan, discuss community projects and events).

9.1.1 Community Consultative Committee

The Community Consultative Committee (CCC) met four times during the reporting period and operates in accordance with the Community consultative committee guideline for State Significant Projects (Department of Planning and Environment, 2023). Meeting agendas, minutes and presentations are available on the website (*www.mangoolamine.com.au* under 'Documents'/'Community documents').

Meetings generally include:

- Welcome/introductions including acknowledgement of country.
- Apologies/declarations.
- Business arising from previous meeting.
- Correspondence report.
- Project reports (approvals update, mine and project updates, environmental update including monitoring summary, review of incidents, rehabilitation and offsets updates etc, community update including land ownership update, complaints summary, tours held, community contributions/event summary). New initiatives/feedback opportunities are also discussed in project reports.
- General Business.

A tour was held prior to the August meeting so CCC members could see the progress of the Mangoola Coal Continued Operations Project additional mining area (north of Wybong Road).

Photo 9-3 CCC Members visit the new mining area (north of Wybong Road) for the Mangoola Coal Continued Operations Project, August 2024.

9.1.2 Annual Community Event

Mangoola's Annual Community Event was held 17th October, 2024 at the Wybong Public Hall. Local community members from within 4km of the operation were invited to attend as well as people with mitigation/other rights under SSD 9642, CCC and Community Enhancement Program (CEP) working group members and Wybong Public Hall Committee Members. The format of the event was:

- Optional mine tour
- Presentation – operational update
- Poster presentation/Hand outs
- Q&A (one on one with mine personnel)
- Community Survey
- General discussion over canapes.
- Topics generally included mine and rehabilitation updates, offset area/land management, environmental monitoring, community funding/support/mitigation, exploration updates, career opportunities and other information.

9.1.3 Community Tours

Mangoola hosted the following community tours in 2024:

- School tours(x4) through the Upper Hunter Mining Dialogue (students from public schools and a homeschool group).
- HunterWISE student tour August 2024.
- CCC members toured mine rehabilitation during the Quarter 3 meeting.
- Annual Community Event tour 17th October 2024.
- Merton Living Tour of CHPP in Glencore donated cars.

Tours will again be offered in 2025 through the Community Newsletter and other community interactions.

Photo 9-2 Year 8 students visit Mangoola as part of the HunterWISE program which aims to encourage year 8 girls to participate in Science, Technology, Engineering and Mathematics (STEM) subjects in their school study.

9.1.4 Other Consultation

Mangoola continued to meet with local landholders / stakeholders as per the site's Social Performance Management Plan (internal document) with communications/outcomes recorded using site-based systems.

Two community newsletters and an Exploration Drilling Fact Sheet (summarising the AL9 exploration program details) were distributed in 2024 (with another Q4 newsletter being developed for Q1 2025 distribution). Newsletters are published to our website and distributed to local residents within up to 6-10km radius of the mine and hard copies are also available at Denman locations (in 2024, these were the Denman Rural (CRT), Denman Library and Denman and Districts Men Shed). Other handouts were also provided at community events and posters displayed at the Annual Community Event.

Consultation relating to exploration activity within AL9 continued during 2024 (all drilling is on mine-owned land) and Community Consultation Reports for EL5552 and AL9 published to the company website under reporting documents (*www.mangoolamine.com.au* under 'Documents', 'Reporting Documents').

Mangoola continued to notify community members in the blast notification register of upcoming blasts, as well as advertising of road closures for blasting in local newspapers and on the MSC website. There were no Hunter River discharges in 2024 under the Hunter River Salinity Trading Scheme so no notifications to landholders within 2km of discharge were necessary.

9.1.5 SIMP Community Management Program Performance Summary

All Community Management Program activities as per Table 3.5 of Social Impact Management Plan were met in 2024. Many of these commitments are ongoing and thus may be further discussed elsewhere in this document. The below is a summary of the performance grouped by action/commitment theme:

9.1.5.1 Community Mitigation Measures

Mangoola re-communicated the air quality mitigation rights afforded to qualifying receptors within 0-4km and 4-6km from the active mining area through the Community Newsletter and at the Annual Community Event. 5 new residences were each added to tank cleaning schedule, 6 to first flush/filter

system maintenance program (and one pending installation) and 3 added to solar panel cleaning programs during the reporting period. In 2024, 114 water tanks were cleaned (annual program, 2-yearly t not due in 2024), 8 residences had their solar panels cleaned/inspected every 4 months (with 2 more added to the program commencing in November), 6 new residential properties were fitted with first flush/filter systems and 233 first flush systems were serviced, and 102 filters replaced each quarter.

Mitigation and inspection rights under SSD 8642 have been previously communicated and those with rights were invited to the Annual Community Event. A community feedback survey was also completed with questions relating to satisfaction of mitigation measures. Households receiving mitigation were satisfied with measures/contractor performance. Where additional comments were provided, they related to the helpfulness, friendliness and professionalism of contractors as well as good communication. Additional comments about noise mitigation are included in section 6.3.

9.1.5.2 Communicating Environmental Performance

During 2024, Mangoola re-communicated to the CCC and through Community Newsletter (e.g. Issue 33), our website link to the Annual Review report on our website that summarises our environmental performance for the year and air quality mitigation rights. Environmental monitoring updates, complaint review and Annual Review link (and hard copy) are also provided to members of our CCC.

9.1.5.3 Implementation of Management Plan Commitments

The operation continued to implement measures identified in our Noise Management Plan, Air Quality and Greenhouse Gas Management Plan, Visual Impact Management Plan and Rehabilitation Strategy and Management Plan (see updates provided in relevant sections of this Annual Review).

9.1.5.4 Recruitment Initiatives

In addition to recruitment and tender campaigns, Mangoola also had an HR display at the Annual Community Event in October 2024 and also communicated vacation/graduate and apprentice opportunities through our Community Newsletter as well as a feature story on Glencore's First Nations Pathway Program with two of our trainees providing their experience with the program. This was also communicated at the Annual Aboriginal Stakeholder meeting. High school students toured the mine through the Upper Hunter Mining Dialogue and HunterWISE programs with career opportunities discussed. Members of the Denman Chamber of Commerce and Muswellbrook Chamber of Commerce and Industry are on Mangoola's CCC.

9.1.5.5 Other

The following commitments were also either met or non-applicable for the reporting period:

- Maintained workforce communication to reinforce positive employee and contractor behaviour on and off-site.
- There were no Project-related community safety-issues during the reporting period however Mangoola will continue to collaborate with emergency service providers to develop emergency response, where necessary. Some instances of theft/trespassing that impacted the mine were discussed with the CCC. The Bushfire Management Plan review and road closures are performed in consultation with relevant emergency services.
- Continued to participate in Government and industry initiatives relevant to regional development and/or cumulative impact management and implement the Stakeholder Engagement Program. Encouraged CCC participation in a community engagement event arranged by the Upper Hunter Mining Dialogue.

- The requirement to review the SIMP 3 years prior to mine closure and adequately consider social impacts in the mine closure planning process is not yet triggered.

9.1.6 Website

Mangoola operates a website (*www.mangoolamine.com.au*) where members of the community can access information about the site, including the latest reports, management plans and environmental monitoring data, including previous Annual Reviews. An audit of the website was completed in March 2025 and identified that the website was compliant with the requirements of the development consent.

9.2 Community Contributions

9.2.1 Voluntary Planning Agreement

Mangoola implemented the Voluntary Planning Agreement (VPA) under Condition A17 of SSD-8642 with Muswellbrook Shire Council. The VPA is designed to provide financial contributions commensurate with the terms set out in SSD-8642. Mangoola is committed to meeting its obligations under the VPA with over $913K paid in 2024 for the following:

- Wybong Road Maintenance.
- General mine affected road maintenance.
- Council environmental management and monitoring.
- Additional environmental and community projects.

Under the VPA, Mangoola also has a commitment to make reasonable attempts to recruit 6 apprentices from the Muswellbrook LGA/Aberdeen areas. During 2024, apprenticeship, and other career opportunities, were advertised through GCAA using social and local media avenues (as well as brochures/website updates). Mangoola had promoted how to register for job/apprenticeship alerts at the end 2023 and this was re-communicated at the 2024 Annual Community Event. During 2024 we welcomed 3 new apprentices from the Muswellbrook, Scone and Cessnock areas.

9.2.2 Smarty Grants

Each year Mangoola contributes to community projects through our Community Development Program with funding applications managed through the Smarty Grants platform. This is focussed on eligible projects within the Muswellbrook, Sandy Hollow, Wybong and Denman areas. Projects supported cover themes such as health, education, enterprise development (e.g. event to promote local community spend) and other local need. In 2024, $85,000 was spent on community projects which included:

- Upper Hunter Show – Young Woman of the Year (and other competitions)
- Upper Hunter Education Fund
- Upper Hunter Homeless Support (kitchen packs, shared life skills workshops)
- Several local primary and high schools have benefited with projects including end of year awards, Ipads, NAIDOC week celebrations, recycling bins, play equipment and books.
- Denman Wine, Food and Film Affair
- Swim Coach subsidised training
- Eating area equipment for Muswellbrook Child Care Centre
- Wybong Public Hall – insurance.

- Bureen RFS light bar and automatic door upgrades.

Mangoola also worked with Glencore on a project to deliver two new cars to Merton Living in Denman. There was also in-kind support through volunteering to help at Upper Hunter Show, donation of refreshments and auction prizes to the Sandy Hollow Charity Horse Ride and mowing of the Wybong Cemetery and Hall. Our workforce also got together to donate food, toys and other items during the Christmas in July (site initiative) and Blackroo Christmas Food and Toy Appeal. These donations benefited families in need throughout the Upper Hunter Valley.

Mangoola personnel met with potential community investment partners in 2024 to promote and discuss opportunities.

Photo 9-4 *Glencore's Tracey Snedden and Mangoola's Sam Palmer pictured with Merton Living's Shani Mitchell and support staff with one of two new cars.*

9.2.3 Community Enhancement Program/Fund

In 2023 Mangoola established a Community Enhancement Program (CEP) including establishing an annual funding allocation (separate to Community Development Program and VPA funds) and a working group to administer funding decisions/implementation in accordance with Table 3.7 CEP Commitments Register in the Social Impact Management Plan. All actions that were required to be completed within the first 12 months of commencement of mining activities under SSD 8642 were completed.

In 2024, Mangoola continued to implement the CEP in consultation with the CEP working group and communicate outcomes through CCC Meetings and Community Newsletters. Two CEP working group meetings were held (February and November 2024). Outcomes included finalising 2023 projects/payment and deciding upon 2024 projects (paid in November). 2023 project implementation was progressed in 2024 and reported at November meeting:

- Road signs for directions to Wybong Hall (street blades) – complete/installed.
- New furniture/equipment for Wybong Hall – order completed/(2025 delivery)
- First Aid Training workshop – one workshop completed.
- Feral animal traps purchased with a workshop to be scheduled in 2025 (subject to participant registration).
- New signage for Wybong cemetery (includes map and historical information). Signs printed. To be erected in 2025.
- Chainsaw Course (still subject to interest/registration) or other initiative to be voted upon.
- These projects are aimed at building sense of community, coordinated land management and emergency preparedness, celebrating/communicating the historical aspects of area, and improving public assets.
- The agreed 2024 projects are mainly aimed at investigating ways to make the one public venue in the area which funds apply to, the Wybong Public Hall, more sustainable into the future. The projects will further enhance the hall's venue potential and also provides potential income avenue through hire out of equipment or sausage sizzle fundraisers.
- 2 bay lock up shed for hall (and associated costs)
- Outdoor furniture
- Fire trailer (1000L pod/pump/hose on trailer) for spot control or hire out.
- Mobile kitchen for hall events or markets/hire out.

Progress of projects will be reported in the next Annual Review at February 2025 meeting as well as 2025 project ideas.

All CEP commitments outlined in Table 3.7 of the Social Impact Management Plan were met as applicable during the reporting period. These mainly related to the establishment of the committee, governance documents, fund establishment and other associated actions. These were completed by the required date. Updates will be provided in further Annual Reviews as projects are implemented.

9.3 Community Complaints

Mangoola manages all complaints in accordance with the Mangoola Complaints Management Procedure, which details the process for receiving and responding to complaints. Complaints are received via a dedicated Community Response Line, in person, facsimile, email, letter or general telephone.

Mangoola continues to advertise the Blasting and Community Complaints hotline at least monthly via digital local newspaper and the hard copy Hunter River Times. It is also advertised on our company website and in newsletters.

9.3.1 2024 Complaints Summary

A total of 64 community complaints were received by Mangoola during the reporting period. A summary of 2024 complaints by month and type is included in ***Table 9-1***.

Table 9-1 Summary of Complaints in 2024

Month	Noise	Dust	Lighting	Blasting	Traffic	Other	Total
January	2	2	0	1	0	0	**5**
February	3	4	0	4	0	0	**11**
March	2	2	1	3	0	0	**8**
April	3	0	0	1	0	1	**5**
May	6	0	0	3	0	0	**9**
June	5	0	0	1	0	0	**6**
July	3	0	0	0	0	0	**3**
August	3	0	0	0	0	0	**3**
September	6	0	0	0	0	0	**6**
October	3	0	0	0	0	0	**3**
November	0	2	0	0	0	0	**2**
December	0	2	0	0	1	0	**3**
Total	**36**	**12**	**1**	**13**	**1**	**1**	**64**

9.3.2 Analysis of Complaints

Complaint Type and Quantity

As shown in ***Table 9-1*** a total of 64 community complaints were received by Mangoola during the reporting period.

The three main types of complaints received in 2024 were noise (56.3%), blast (20.3%) and dust (18.8%). This varies from 2023 where complaints were predominantly noise complaints (73.2%). There was an overall increase in complaint numbers from 41 (2023) to 64 (2024). Noise complaints increased from 30 (2023) to 36 (2024) while blast and dust related complaints increased from 3 to 13 and from 6 to 12 respectively.

Figure 9-1 shows the number of community complaints received during 2024 compared to previous years. It shows that whilst the number of complaints increased from 2023, the complaint numbers have generally decreased since the early years of mining 2010-2014. A review of complaints from 2007 to 2023 found that complaints peaked in 2011 (717 complaints) which represented the first full calendar year of operations.

The nominated date for "commencement of mining" in the MCCO Project additional mining area north of Wybong Road was 1 December 2022. In practical terms, the first blasting commenced in the 'Wybong Pit' on 19th January 2023 and the first excavator walked over in April 2023. During 2024, the additional mining area continued to develop as mining operations continued in its second year. Mangoola will continue to implement our systems to minimise impacts.

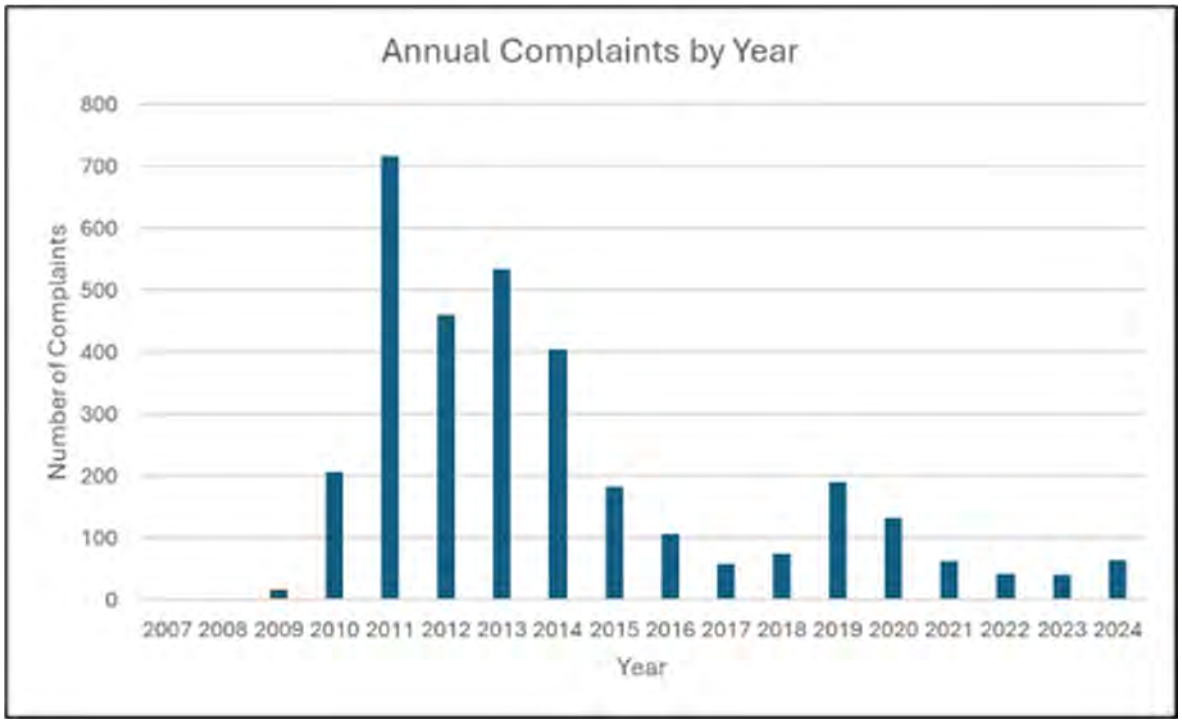


Figure 9-1 Annual complaints by Year

Complaint Timing

Figure 9-2 shows the time of day that complaints were made during 2024. Analysis of this data shows that noise complaints were generally made from evening to mid-morning, whereas blast related complaints were generally made from 10am to early afternoon, which coincides with most of our blasting activities, and air quality complaints were mostly in the afternoon/early evening (morning calls were generally relating to events from previous evening or a general concern).

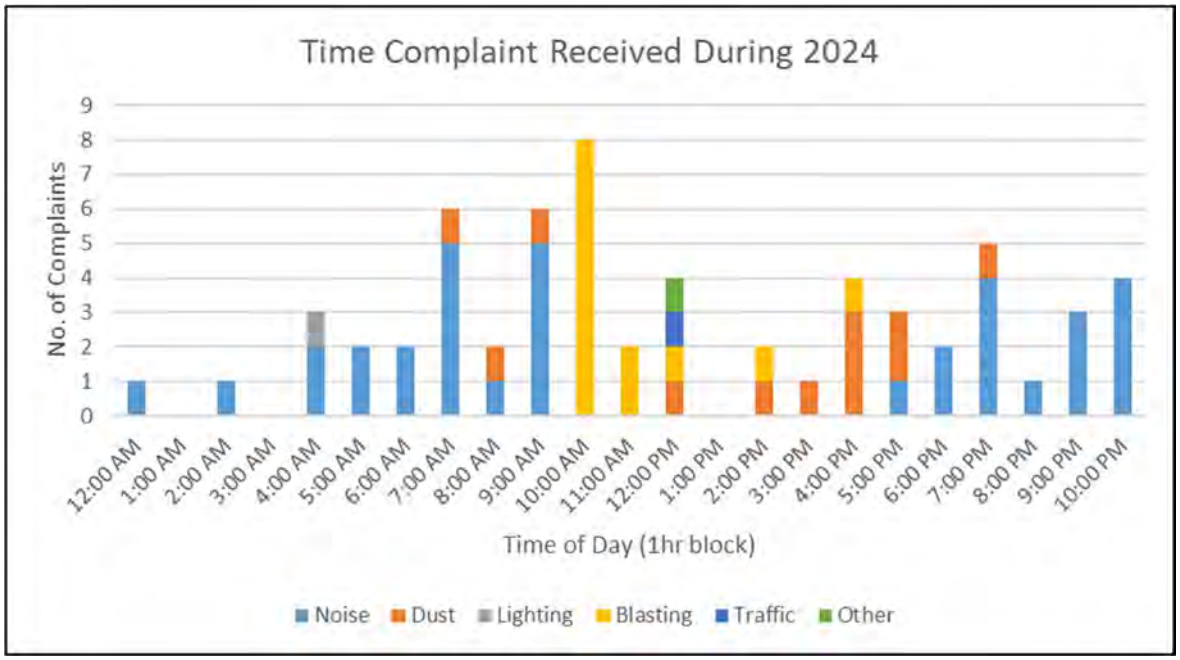


Figure 9-2 Time of Complaint Receipt During 2024 (1 hour block starting with allocated time).

Complainants

Figure 9-3 shows the number and type of complaints made by each complainant during 2024. The 64 complaints were made by 19 individuals during 2024 and approximately 56% of all complaints (36) were made by four complainants.

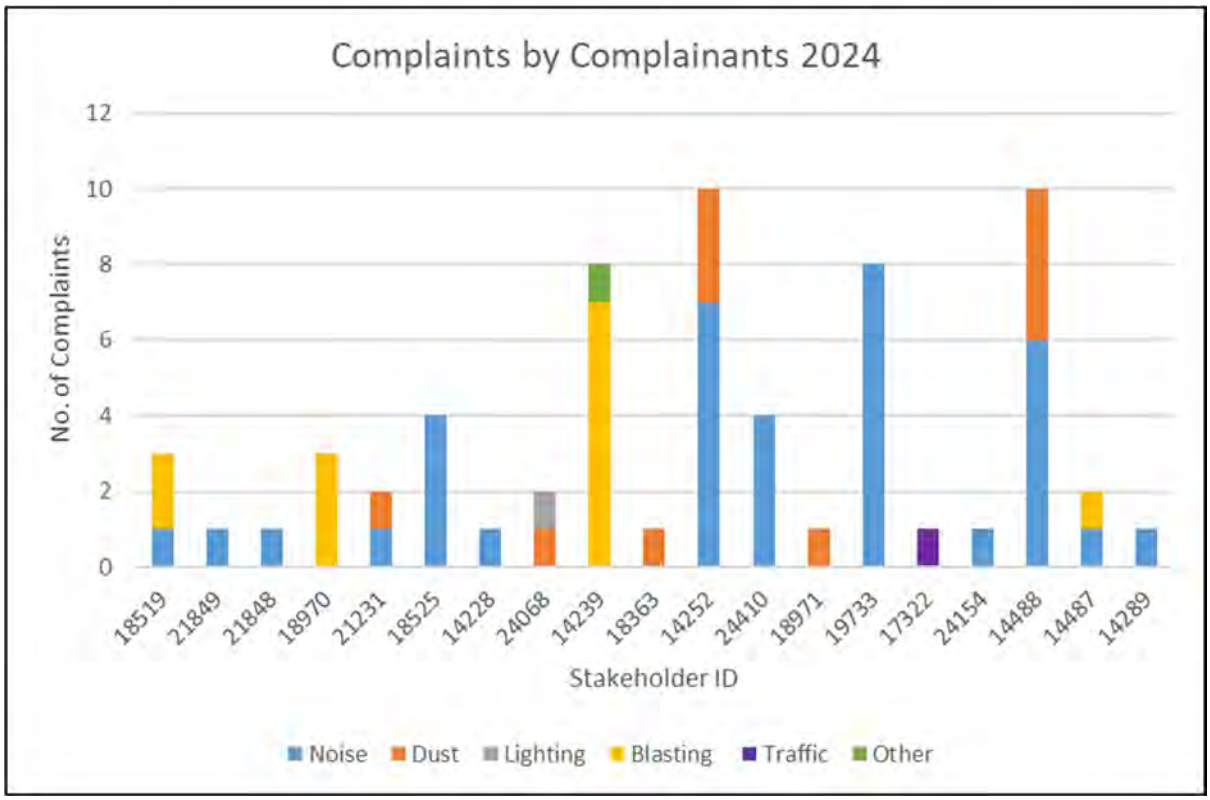


Figure 9-3 2024 number and type of complaints lodged by complainant

Figure 9-3 shows 2024 complainant location in relation to the mine with the majority of complaints received from complainants in the north to north-west sector (~94%). The mining operations are progressing further north as the 'Wybong Pit', north of Wybong Road (i.e. the additional mining area for the MCCO Project), continues to develop. Existing mine operations, and associated activities to the south of Wybong Road, are also ongoing.

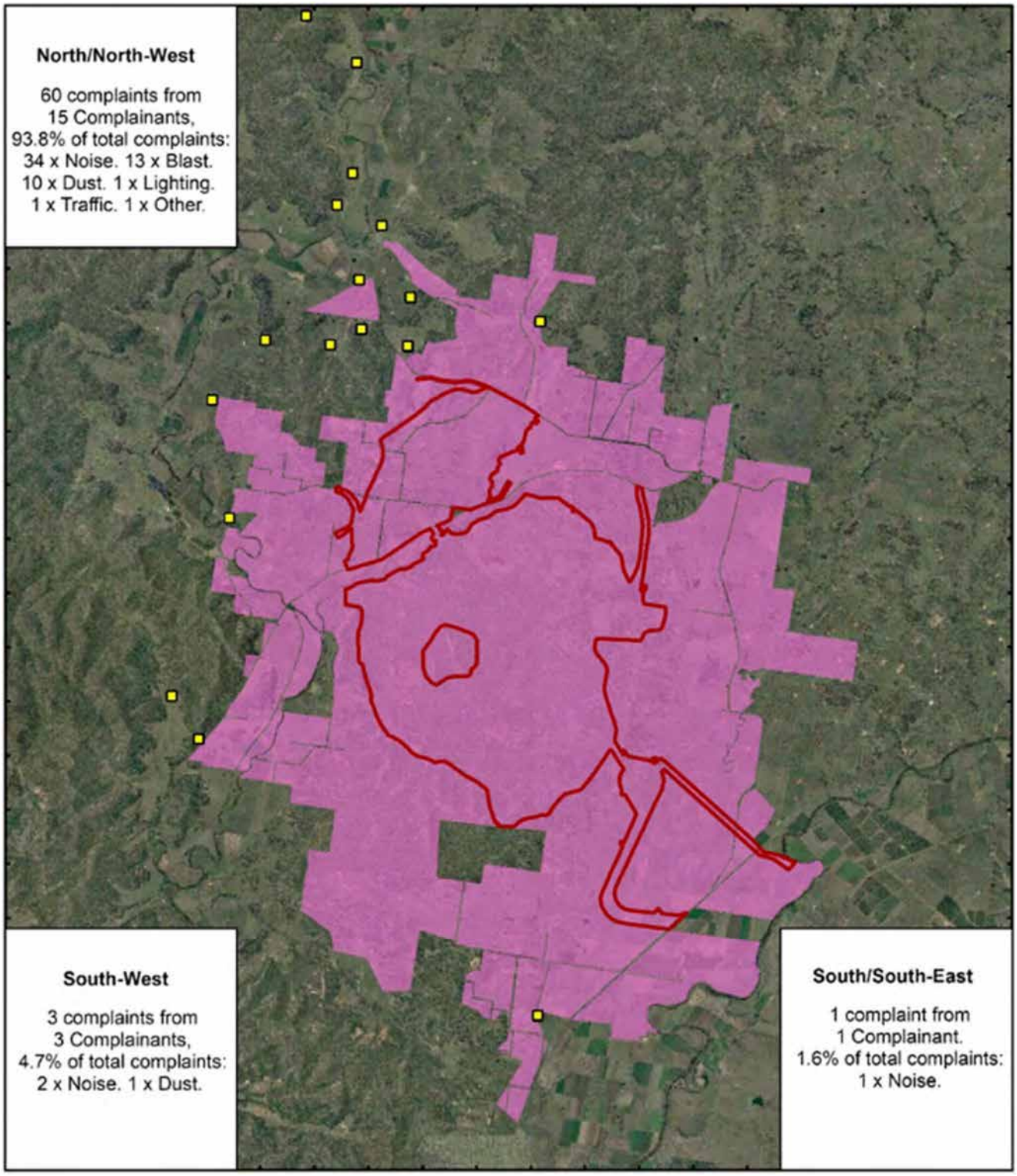


Figure 9-4 Location of 2024 complainants in relation to mine (note, there may be more than one complainant per residential location).

9.3.3 Actions in Response to Complaints

Details on management and mitigation measures that were implemented during the reporting period related to minimising noise, blasting and air quality impacts are provided in Sections 6.3.3, 6.4.3 and 6.2.3.

In response to complaints received in 2024, the following responses were undertaken, depending on the nature of the complaint. Complaints and outcomes of investigations are discussed with complainants where they have requested a call back.

Noise

- Following receipt of each noise complaint, the real time noise monitors were reviewed, and noise alarms were reviewed to see if any were received prior to the complaint.
- Operational noise management controls were reviewed by the Mining Supervisor or CHPP Supervisor.
- Where noise alarms were received and the Mining/CHPP Supervisor verified activities from our operation to be the source, the operation was reviewed with changes made as required to reduce noise levels, e.g. parking up equipment.
- Supplementary weekly attended noise monitoring was undertaken at an additional five locations at a further distance northwest of site as per previous years from June to August 2024. No elevated results were recorded. Attended compliance noise monitoring was also conducted monthly during 2024 with no non-compliances were measured during this monitoring.

Blast

- Depending on the nature of the blast complaint, the following are reviewed:
- Blast monitoring results.
- The video recording of the blast.
- Pre-blast assessment to confirm meteorological conditions at time of blasting.
- Air quality monitoring results (not applicable in 2024).
- Other blasting activity or earthquakes in region (where blast time did not correlate with a Mangoola blast).
- All blast overpressure and ground vibration results confirmed to be within compliance limits and discussed with complainant where relevant.
- There was one elevated result at blast monitor BM09 on 11th March 2024 which resulted in the receipt of 3 complaints. This was reported to DPHI as a precaution while being investigated. The overpressure results for the nearest private receptor were found to be compliant however there was some weaker surface geology discovered in a section of the pattern that led to the unintentional release of some energy to atmosphere instead of into ground fragmentation. Mangoola has amended practices to remove material of this nature mechanically prior to drill and blast processes. The blast monitoring locations are also being reviewed in consultation with relevant landholders to see if monitors can be moved further away from the mine and onto their land. Alternatively, the calibration factor will be specified to model the nearest receptor levels.
- One complainant requested additional monitoring at residence over concerns about vibration and cracking. They felt the nearest monitors, BM07 and BM09, may not be representative. A portable blast monitor was set up for 10 blast events over 25th July to 19th September. It did not trigger a result for any of the events (results less than threshold of 1mm/s ground vibration). The fixed monitors recorded 0.01 – 0.44mm/s. It was considered an additional monitor was unnecessary and recorded levels have consistently been well below levels where property damage could result.

Dust

- Following receipt of a dust complaint, a review of alarms and the operational air quality management controls was undertaken by the Mining Supervisor, CHPP Supervisor or Environment and Community personnel (in consultation with operations).
- Modifications to operations were made as required (e.g. additional water cart called up, workforce communication regarding use of less frequented light vehicle roads - call up water cart/drive to conditions).
- Meteorological conditions and other relevant monitoring systems (such as the Upper Hunter Air Quality Monitoring Network) were also reviewed.
- Complainants contacted as requested to discuss complaint detail, outcomes of investigation and any additional actions implemented in response to alarms.
- Monitoring results were within air quality monitoring criteria. Controls being implemented at the time and any additional action taken (if triggered) were discussed with complainant where possible.
- One landholder requested additional monitoring be undertaken closer to their property. In agreeance with DPHI this was undertaken during 2024 ceasing early 2025. The the results were found to be lower than for Mangoola's fixed representative dust monitors so it was determined that an additional fixed monitor was not required. A formal report is being collated.

Lighting

- One lighting complaint was received regarding light visible from public road. The Mining Supervisor responded and attended the location to inspect and action. It was confirmed that the casting light was visible from the road. The lighting plan was then shut down as it was no longer needed.

Traffic

- Complaint received via hotline, concerning blasting road closure notification signage along Wybong/Ridgelands Rd not displaying the time of blast. Complainant was advised that due to uncertainty in meteorological conditions, blast times cannot be accurately determined until the morning of the blast. Complainant was invited to register their contact details to receive Mangoola road closure notifications, which are issued 2 days in advance, and also provide a reminder on the day of the blast with a more accurate estimate of the predicted blast time, once meteorological conditions have been analysed.

All other complaints were investigated and handled on a case by cases basis with the aim of mitigating impacts (where required) and responding to community members.

10. Independent Environmental Audit

In accordance with Condition D13 of SSD 8642, an Independent Environmental Audit (IEA) is required every three years from the initial IEA that was conducted. The initial IEA for the first year of commencement was conducted in July 2022 and thereafter is now required every 3 years.

Submission of the 2019-2022 IEA report was completed on the 6 October 2022. The IEA received approval from the Department of Planning, Housing and Infrastructure (DPHI) and Mangoola published the results on the public website with associated key audit outcomes reported in the subsequent 2022 Annual Review.

The next audit will be in 2025 to cover the 3-year period starting from 23 July 2022 with corresponding 2025 Annual Review to providing key audit outcomes.

Table 10-1 Independent Environmental Audit Actions

Action	Due Date	Completion Status
Provide updated record of change to Mining Lease on project website.	31/07/2023	Completed
Change land label from "Sustainable Agriculture Offset Area" to a more suitable description of the intended land use to reduce confusion in future Annual Reviews	13/03/2024	Completed
Mangoola will further investigate the suitability of water from rehabilitated areas for off-site release. This process will include identifying required dam improvement works and regulator consultation.	06/07/2023	Completed
Mangoola to include a link to the NSW Health - Mine blast fume and you factsheet *https://www.health.nsw.gov.au/* environment/factsheets/Pages /mine-blast-fumes.aspx in the Community Newsletter to be distributed in Spring/ Summer 2022.	30/09/2023	Completed
Update Mangoola Site Familiarisation Induction to include reference to SSD8642.	31/07/2023	Completed
Mangoola will review and update the sites "Post 20mm rainfall Inspection Form" to include an inspection of the bunded fuel fill up point.	19/10/2023	Completed
Consult with Blast Monitor maintenance provider to ensure equipment lifespan estimates are included as a part of regular inspections.	06/07/2023	Completed
Investigate a method to determine if the mining operations have potentially affected landowners for the loss of surface water in Sandy Creek, Big Flat Creek or Wybong Creek downstream of the project. If an appropriate method is identified, include in the SWGWRP.	21/07/2023	Completed
Mangoola will review the requirement to include RWD trace lines, and photographic records of hydrocarbon and tailings inspections for the 2022(2023) Annual Review.	14/02/2024	Completed

Action	Due Date	Completion Status
Mangoola will review the site Rehabilitation Management Plan to include further detail on the installation of nest boxes (above 3m) and orchid translocation (fencing/ height) where possible.	01/12/2024	Completed
Mangoola will consult with waste management provider to ensure waste receptacles are fit for purpose and in good working condition.	31/10/2023	Completed
Mangoola is currently investigating possible improvements to the management of the Sandy Creek Farm Dams to reduce the risk of saline water discharge events.	29/08/2024	Completed

11. Incidents and Non-Compliances

All 2024 Incidents, non-compliances and exceedances related to the SSD 8642 and relevant management plans are summarised in ***Table 11-1***.

Table 11-1 Incidents, Non-Compliances and Exceedances

Date	Summary	Non-Compliance	Details/Response
2024	Failure to Monitor Weather Continuously	EPL 12894 (Condition M4.1)	Failure to continuously monitor weather in accordance with Condition M4.1 EPL monitoring point 5 and monitoring point 18 for various 15 minute increments throughout 2024: 17/02/2024, 18/02/2024, 19/02/2024, 17/05/2024, 18/05/2024, 19/05/2024, 20/05/2024, 1/06/2024, 29/06/2024, 7/07/2024, 22/07/2024, 6/10/2024, 15/11/2024, 31/12/2024, 1/01/2024, 3/01/2024, 6/01/2024, 15/01/2024, 22/01/2024, 23/01/2024, 30/01/2024, 31/01/2024, 2/02/2024, 7/02/2024, 8/02/2024, 23/02/2024, 27/02/2024, 28/02/2024, 10/03/2024, 15/03/2024, 16/03/2024, 17/03/2024, 18/03/2024, 20/03/2024, 21/03/2024, 27/03/2024, 4/04/2024, 20/04/2024, 8/05/2024, 9/05/2024, 1/06/2024, 3/06/2024, 8/06/2024, 11/06/2024, 19/06/2024, 3/07/2024, 6/07/2024, 7/07/2024, 15/07/2024, 16/07/2024, 17/07/2024, 17/07/2024, 18/07/2024, 20/07/2024, 21/07/2024, 22/07/2024, 31/07/2024, 21/08/2024, 22/08/2024, 23/08/2024, 6/10/2024, 6/10/2024, 15/10/2024, 16/10/2024 There were no recognisable adverse effects of the non-compliance and data capture for the reporting period of Monitoring Point 5 and 18 remained above 95% in 2024 (99.7% for both monitoring points 5 and 18) *Note: dates above do not necessarily indicate outages for the entire date specified, rather it indicates missing 15 minute average values occurring during the specified period.*
1/4/2024-4/4/2024 **26/4/2024** **29/4/2024** **30/11/2024-4/12/2024**	Failure to Monitor PM10 Continuously	EPL 12894 (Condition M2.2)	PM10 monitoring is required continuously in accordance with Condition M2.2 of EPL 12894 at Point 19 (D9-DC) and Point 20 (D8-DC). While the continuous emissions monitoring captured >98% data (the minimum is 90% as per EPA website) EPL19 had a unit failure between 1/04/2024 and 4/04/2024. The unit did not collect sufficient data due to a technical fault. A field service rectified the issue on the 4/04/2024 EPL 20 suffered a technical failure whereby there was insufficient data (flow failure) on 26/04/2024, again on the 29/04/2024, and then 30/118/2024-4/12/2024. On each instance an in-field service was completed and the unit recommenced operation. These instances of data loss will be reported in the next Annual Return

Date	Summary	Non-Compliance	Details/Response
15/07/2024	Formal Warning Letter received from Environment Protection Agency (EPA) on 15 July 2024 for exceedances of the hourly discharge limit in respect of discharges from Mangoola associated with the following two River Blocks in August and October of 2022.	EPL Condition E1.3	A warning letter from the EPA was received on 15 July 2024 for exceedances of the hourly discharge limit in respect of discharges from Mangoola associated with the following River Blocks: - 2022-219(1)(2) on 5 August 2022, for every hour between 18:00 and 20:00; and - 2022-298(1)(2) on 23 October 2022, for every hour between 15:00 and 00:00, and 24 October 2022, for every hour between 00:00 and 08:00, These exceedances were noted by the EPA to have contravened Licence condition E1.3, which are potential offences under Section 64 (1) of the Protection of the Environment Operations Act 1997. Mangoola did not provide a response to the EPA after receiving the Formal Warning Letter.

12. Activities to be Completed During Next Reporting Period

12.1 Management Plan Review

In accordance with Condition D8 of SSD 8642 the following strategies, plans and programs will be reviewed and/or revised in 2024 as necessary, as listed in ***Table 12-1***.

Table 12-1 Revision of Strategies, Plans and Programs

Document	2025 Review	Comment
Aboriginal Cultural Heritage Management Plan	No	No changes are required as a result of the 2024 Annual Review.
Air Quality and Greenhouse Gas Management Plan	Yes	No changes are required as a result of the 2024 Annual Review.
Biodiversity Offset Management Plan and Strategy	Yes	The Biodiversity Offset Management Plan and Strategy (BOMPS) will be reviewed and updated in accordance with requirements of SSD 8642 (to reflect execution of Mangoola and Wybong heights BSA) however no changes are required as a result of the 2024 Annual Review.
Blast Management Plan	No	No changes are required as a result of the 2024 Annual Review.
Blast Fume Management Procedure	No	No changes are required as a result of the 2024 Annual Review.
Closing Public Roads – Mining Procedure	No	No changes are required as a result of the 2024 Annual Review.
Environmental Management Strategy	Yes	No changes are required as a result of the 2024 Annual Review.
Historic Heritage Management Plan	Yes	No changes are required as a result of the 2024 Annual Review.
Noise Management Plan	No	No changes are required as a result of the 2024 Annual Review.
Water Management Plan	Yes	No changes are required as a result of the 2024 Annual Review.
Surface Water Management Plan	No	No changes are required as a result of the 2024 Annual Review.

Document	2025 Review	Comment
Groundwater Monitoring Plan	Yes	The Groundwater Monitoring Plan will be reviewed and updated in accordance with the requirements of SSD8642 and in response to the validation and review of the numerical groundwater model.
Erosion and Sediment Control Plan	No	No changes are required as a result of the 2024 Annual Review.
Site Water Balance	Yes	Completed annually.
Annual Rehabilitation Report and Forward Program	Yes	Completed annually.
Rehabilitation Management Plan	No	No changes are required as a result of the 2024 Annual Review.
Social Impact Management Plan	Yes	No changes are required as a result of the 2024 Annual Review.
Translocation Management Plan	No	No changes are required as a result of the 2024 Annual Review
Traffic Management Plan	No	No changes are required as a result of the 2024 Annual Review.
Visual Impact Management Plan	Yes	No changes are required as a result of the 2024 Annual Review.
EPBC Water Resource Plan	No	No changes are required as a result of the 2024 Annual Review.
Rehabilitation Strategy	Yes	No changes are required as a result of the 2024 Annual Review.

12.2 2025 Actions

Table 12-2 outlines the actions to be implemented during the 2025 reporting period.

Table 12-2 2024 Actions

Action	Due Date
Complete 100 hectares of new rehabilitation	31/12/2025
Action findings from IEA audit	As per agreed action plan
Review and update archaeological layers within Mangoola's GIS system to create a 'buffer polygon' around registered sites	31/12/2025
Complete Stage 1 capping of TD1 and TD2.	31/12/2025

13. References

AGE, 2025. Annual Groundwater Review report for 2024, March 2025.

Biosis 2025. 2024 Stream Health Monitoring Program, February 2024.

DPHI, 2015. Annual Review Guideline. October 2015.

East Coast Flora Survey 2025. 2024 Monitoring of translocated threatened orchids report, October 2024.

Ecological 2025. 2024 Fauna Montoring Report, March 2024.

EMM, 2013. Mangoola Coal Project – Modification 6: Noise and Vibration Assessment. May 2013.

Engeny 2025. 2024 Annual Review Water and Salt Balance, February 2025.

Engeny, 2023. 2022/2023 Quarter 4 Review of Mangoola Groundwater Ingress. February 2023.

Engeny, 2024. 2023/2024 Quarter 2 Review of Mangoola Groundwater Ingress. August 2024.

Enviro Strata Consulting, 2019. Blasting Impact Assessment for Mangoola Coal Continued Operations Project. May 2019.

Global Acoustics, 2019. Mangoola Coal Continued Operations Project Noise Impact Assessment. May 2019.

HLM, 2024. Annual Channel Stability Report (Year 17). December 2024.

Jacobs, 2019. Mangoola Coal Continued Operations Project Air Quality Impact Assessment. June 2019.

Landcom, 2004. Managing Urban Stormwater: Soils and Construction. March 2004.

NSW EPA, 2017. Noise Policy for Industry. October 2017.

NSW EPA, 2019. Dust Assessment Handbook. December 2019.

Todoroski Air Sciences, 2013. Air Quality and Greenhouse Gas Assessment. May 2013

Umwelt, 2019. Greenhouse Gas and Energy Assessment. May 2019.

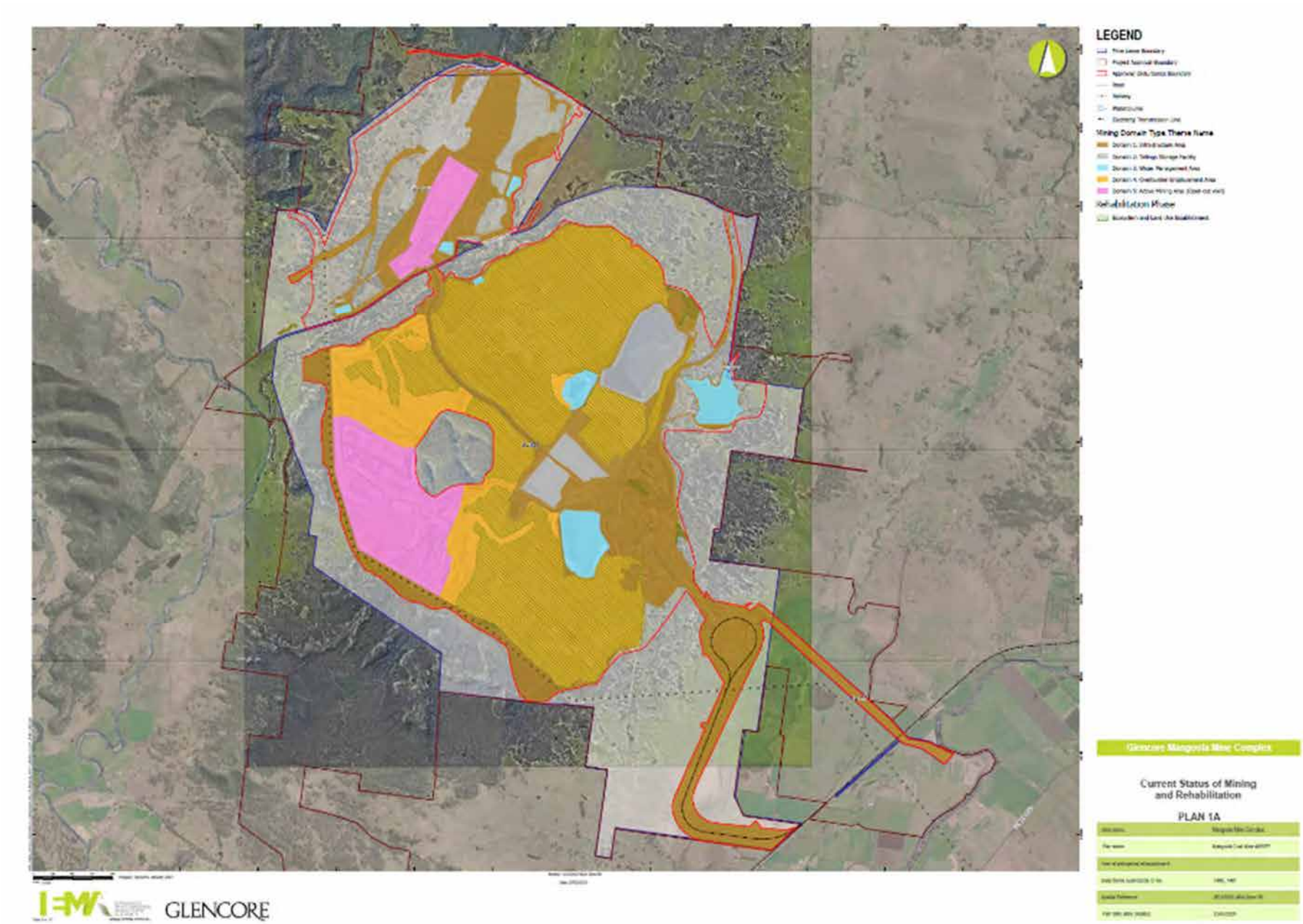
Umwelt, 2024a. 2024 Ecological Monitoring Report. February 2025.

Umwelt, 2024b. 2024 Rehabilitation Monitoring Report. February 2025.

WRM, 2013. Mangoola Coal Modification to Project Approval Surface Water Assessment. April 2013.

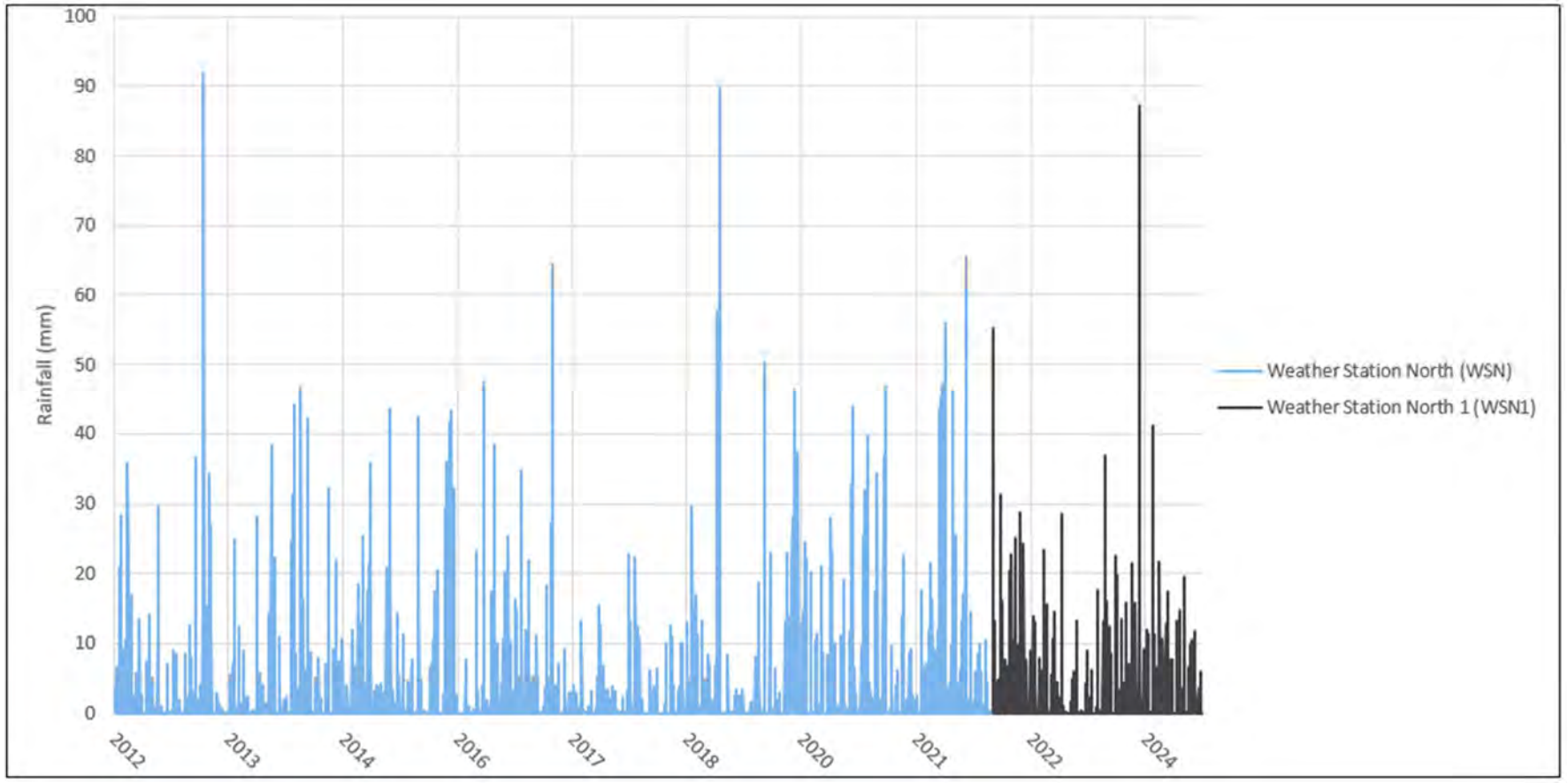
Appendix A - Annual Rehabilitation Report and Forward Program and 2024 Disturbance and Rehabilitation Plan

Note – The Annual Rehabilitation Report and Forward Program will be available on the Mangoola website following submission to the NSW Resources Regulator mine rehabilitation portal: https://www.glencore.com.au/operations-and-projects/coal/current-operations/mangoola-open-cut/management-plans


LEGEND
Mining Domain Type Theme Name
Rehabilitation Phase
Glencore Mangoola Mine Complex
Current Status of Mining and Rehabilitation
PLAN 1A
GLENCORE

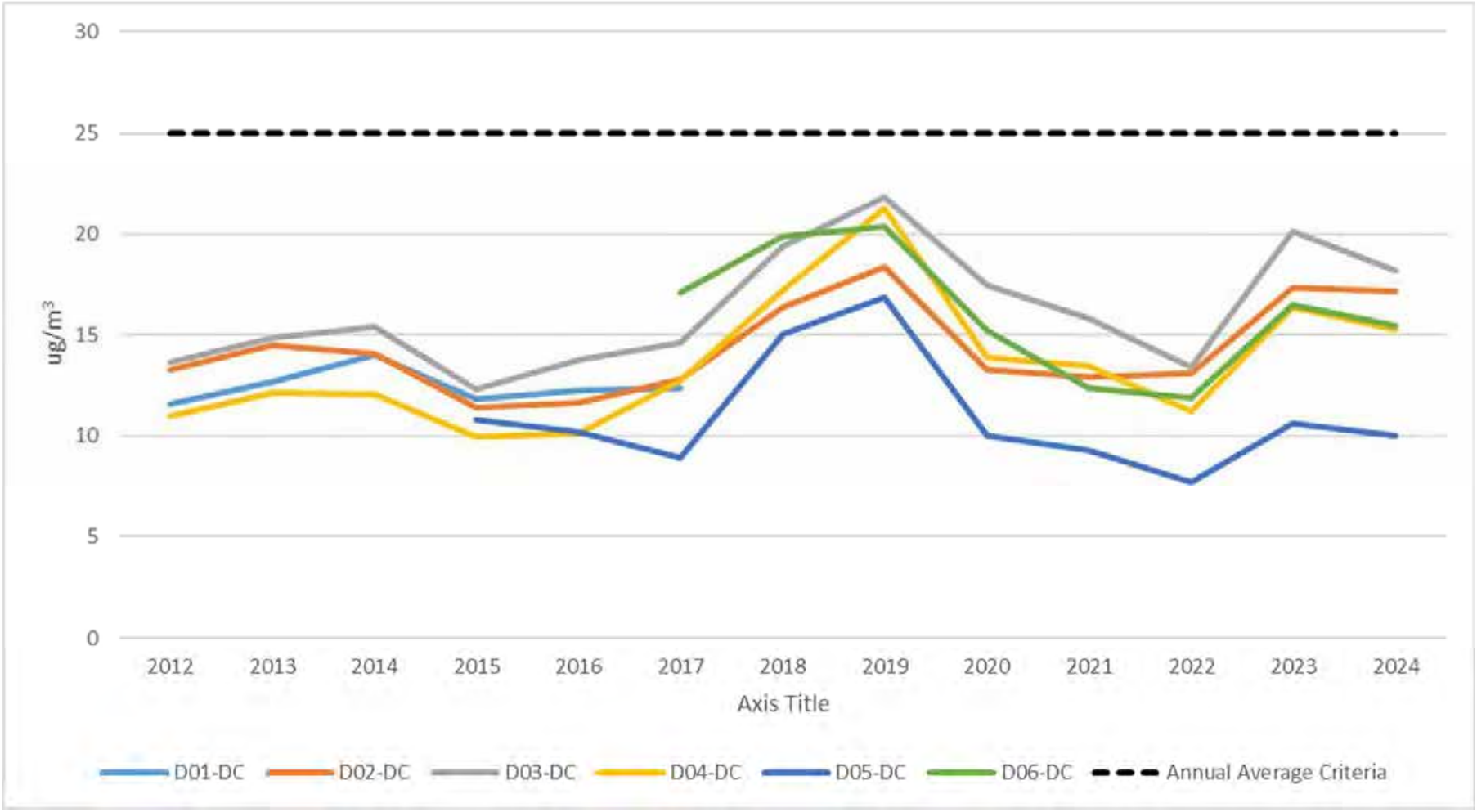

LEGEND
Current Landform Contours
PLAN 1B

Appendix B - Long Term Trend Graph: Rainfall

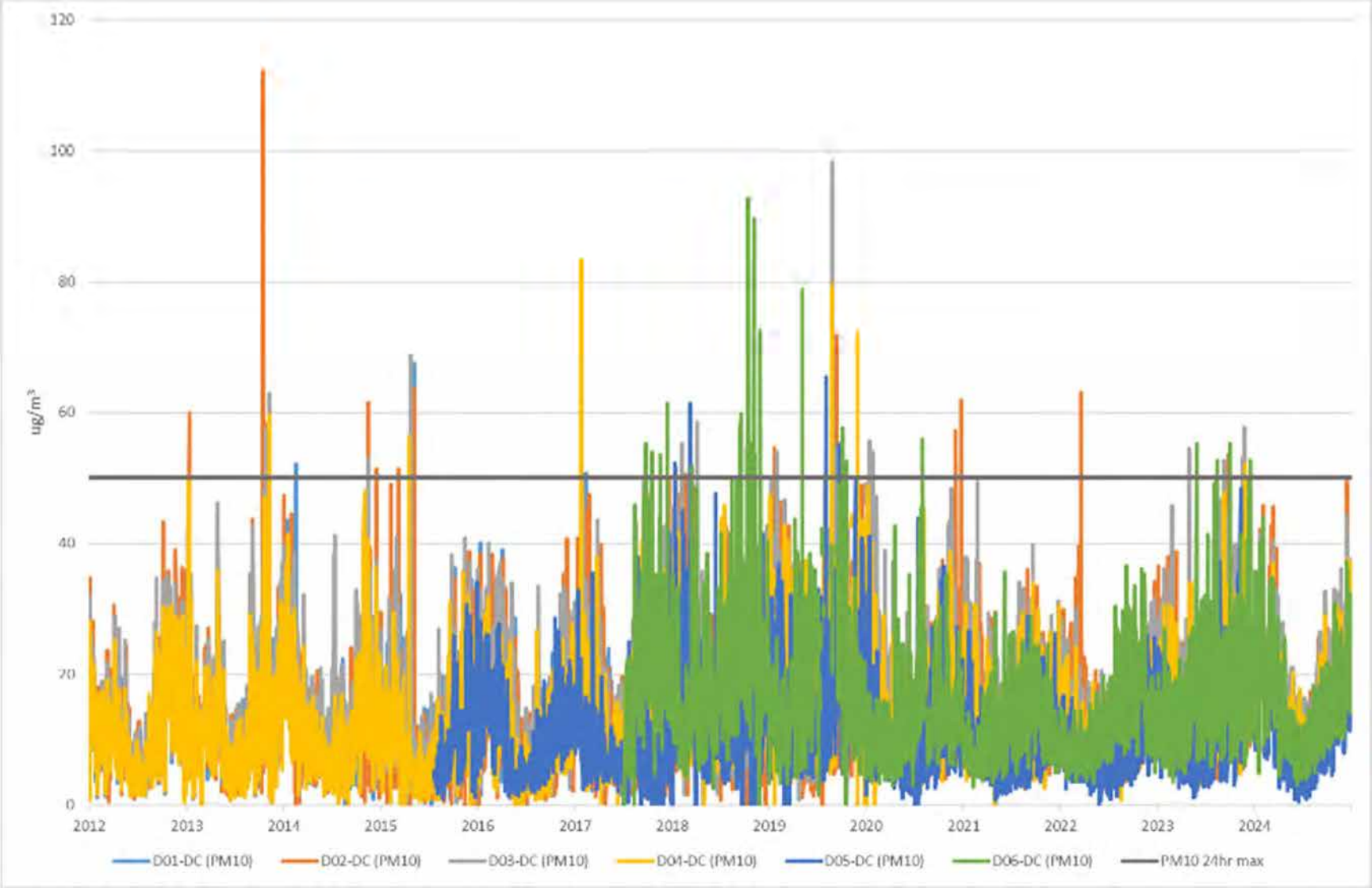


Long Term Daily Rainfall Data at WSN/WSN1 – 2013 to 2024

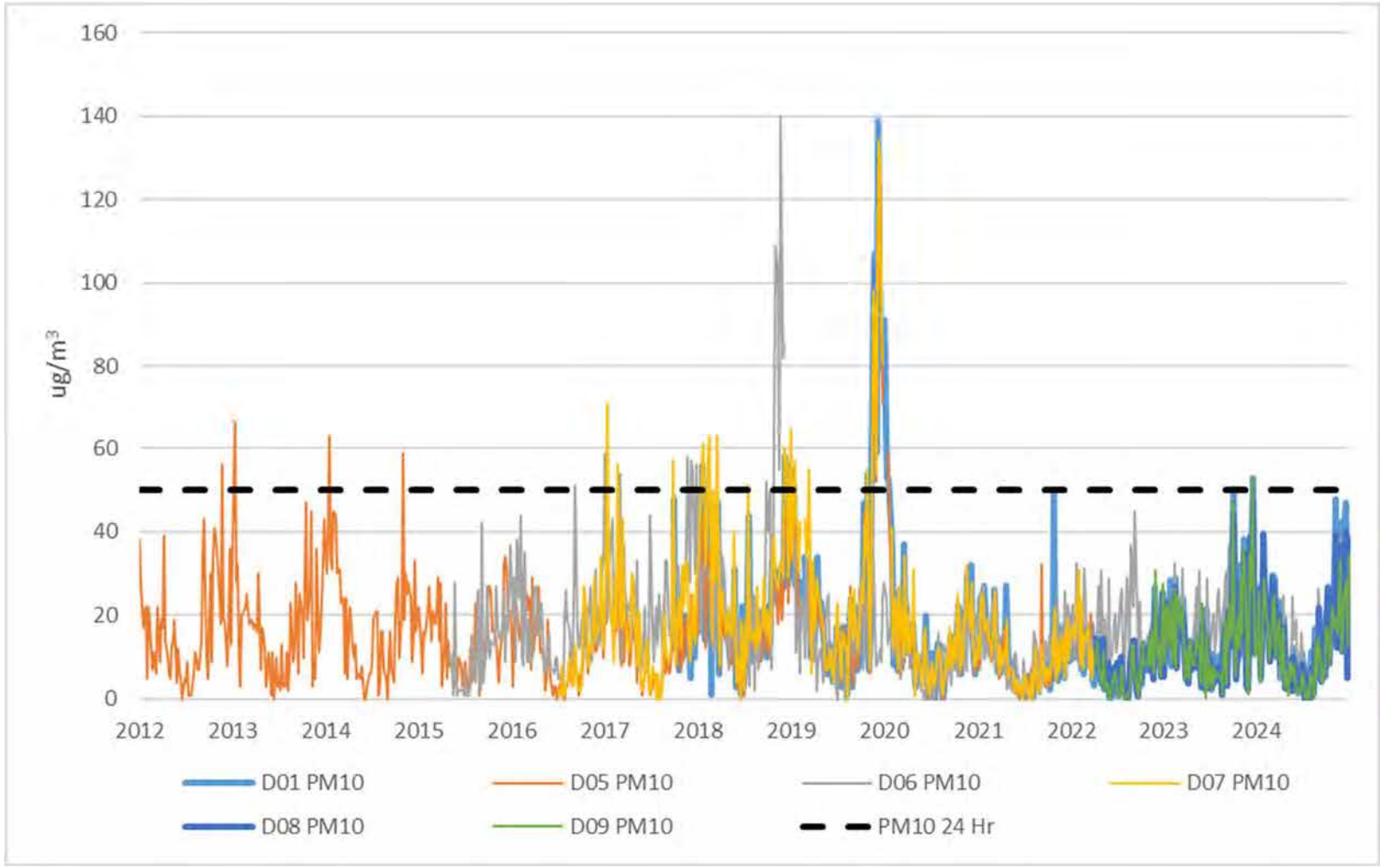
Appendix C - Long Term Trend Graphs: Air Quality



Long Term Annual Average PM10 TEOM Monitoring Results – 2012 to 2024

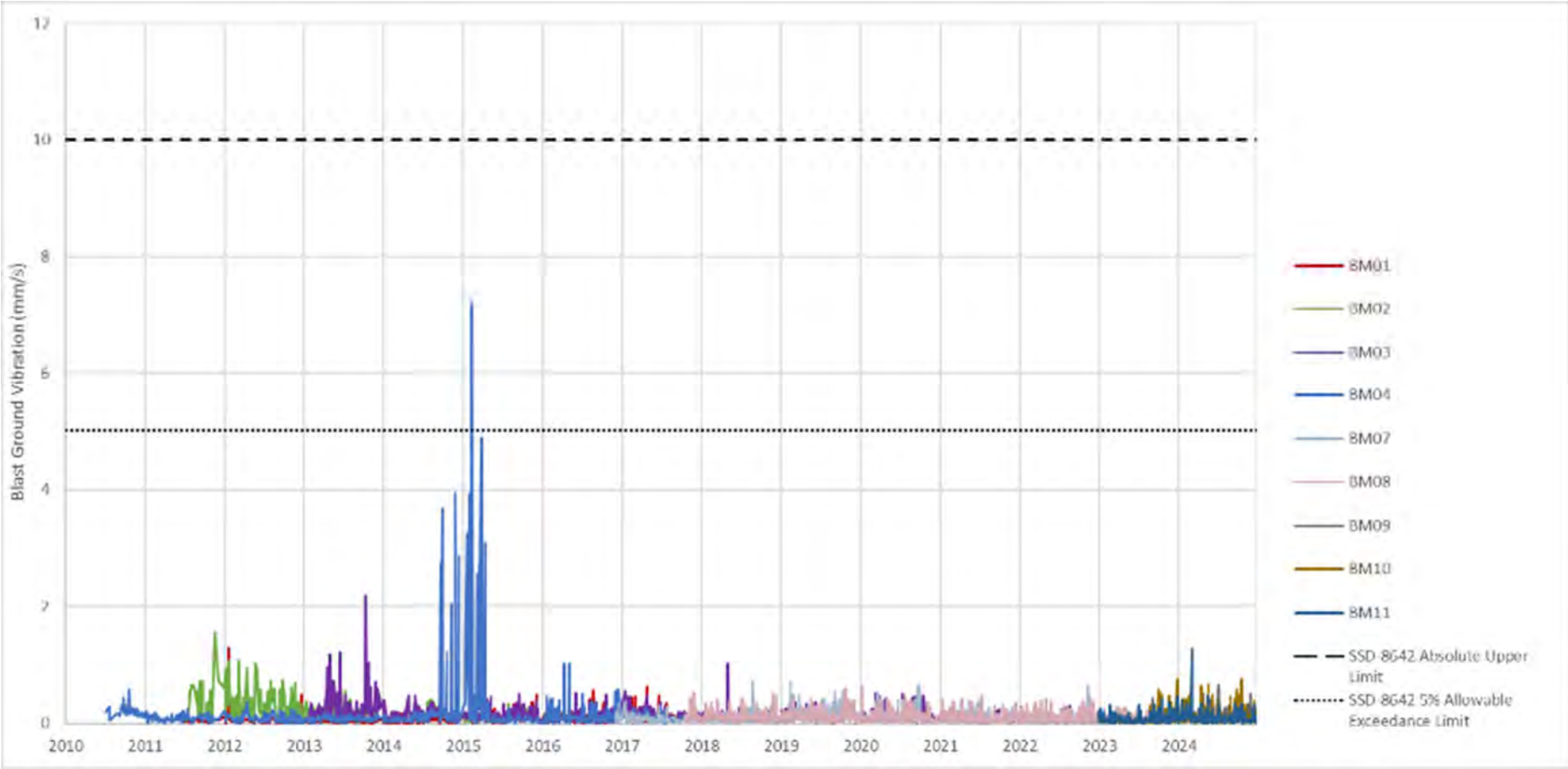


Long Term 24hr PM10 TEOM Monitoring Results – 2012 to 2024

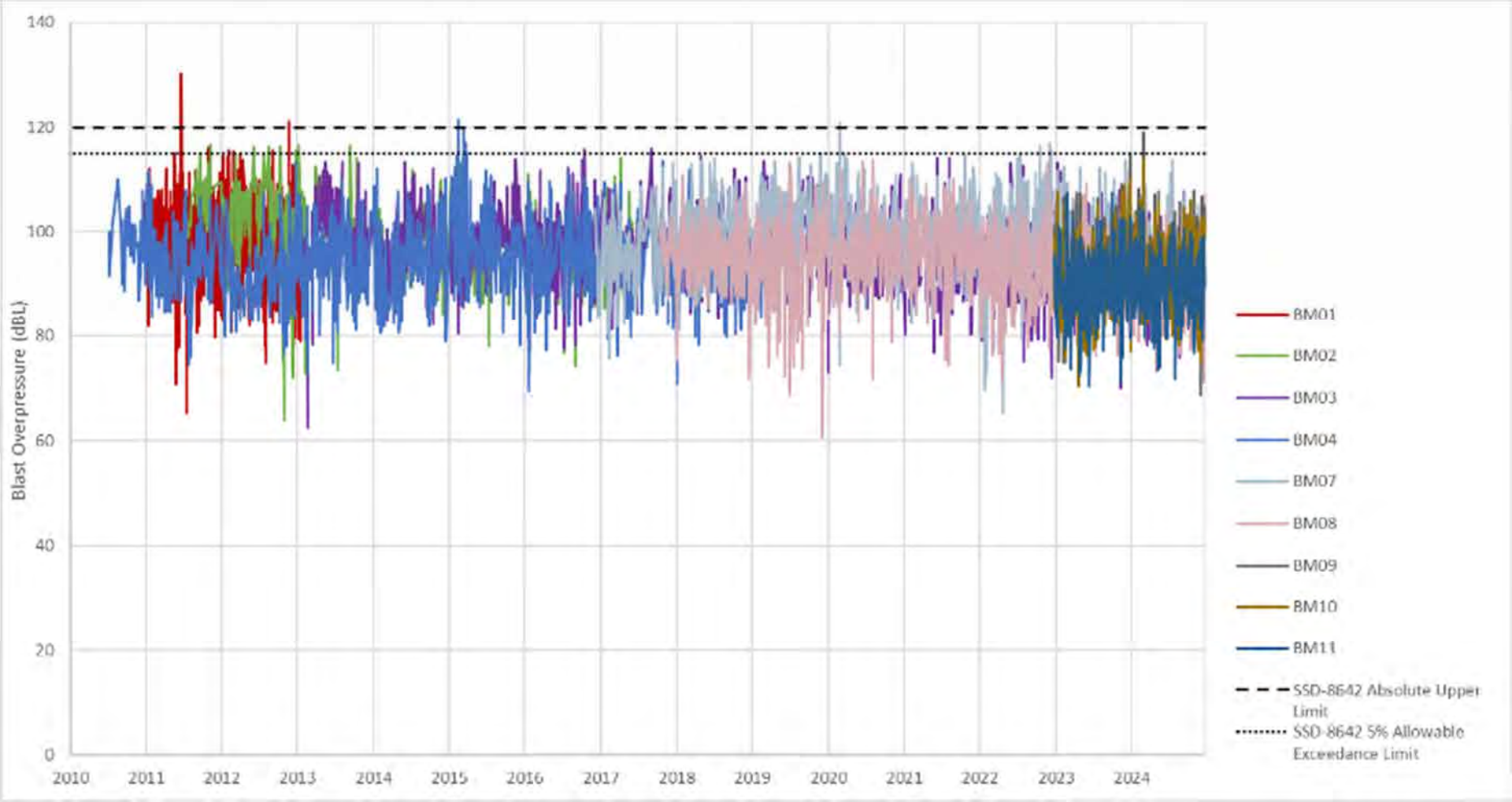


Long Term HVAS Monitoring Results – 2013 to 2024

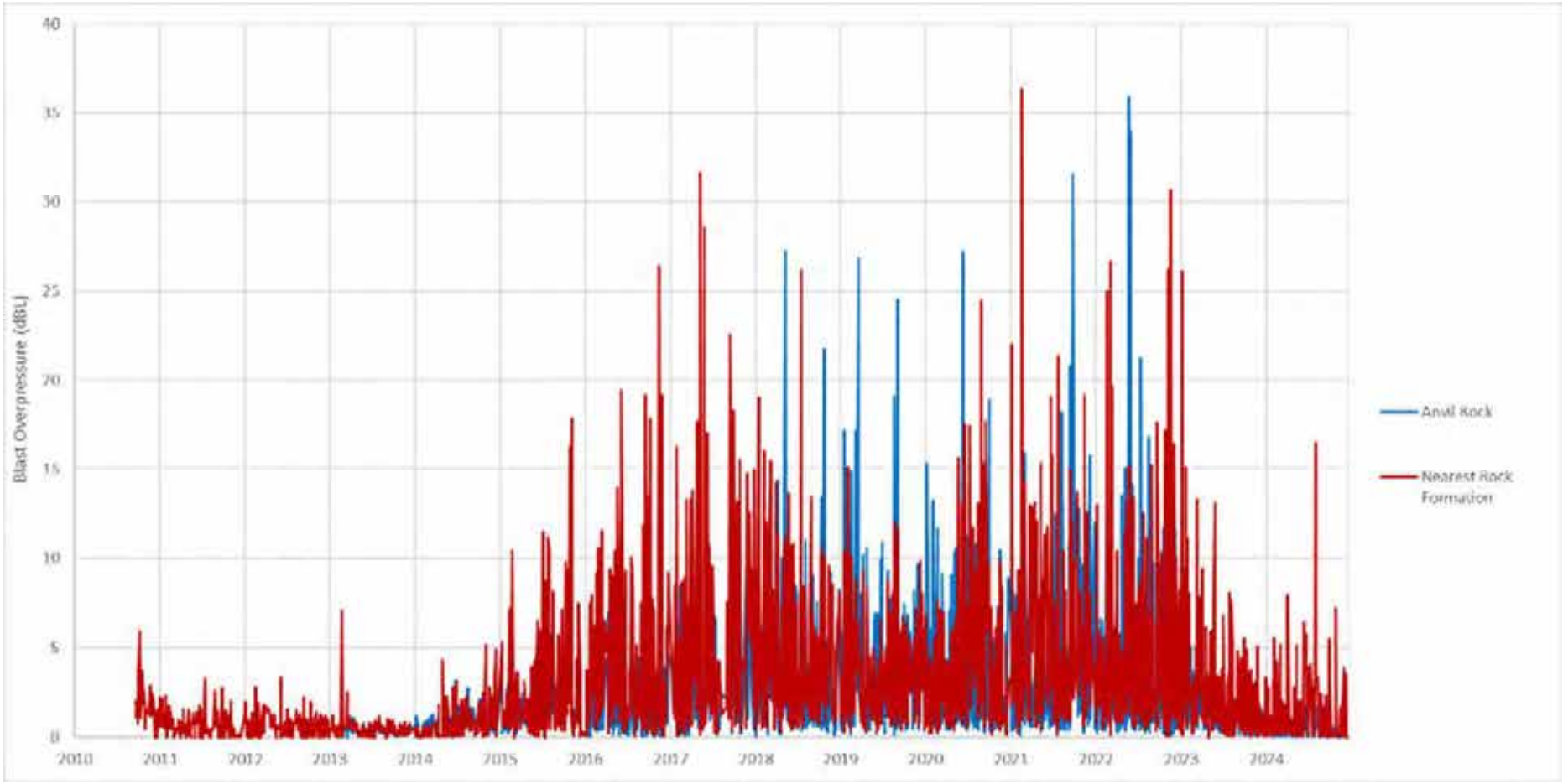
Appendix D - Long Term Trend Graphs: Blasting



Long Term Blast Vibration Monitoring – 2010 to 2024 at BM01 to BM04, BM07, BM08 & BM09 to BM11

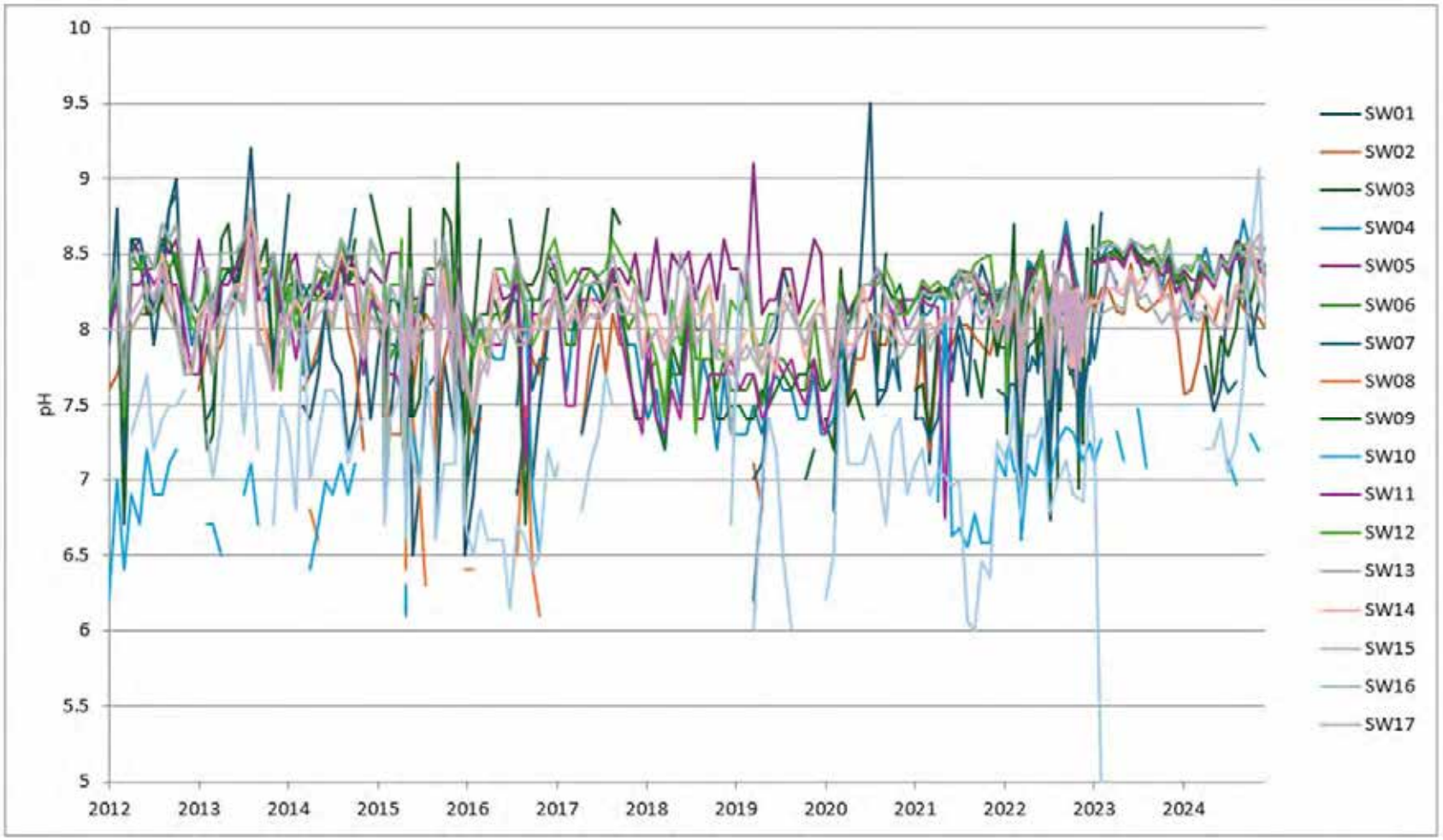


Long Term Blast Overpressure Monitoring – 2010 to 2024 at BM01 to BM04, BM07, BM08 & BM09 to BM11

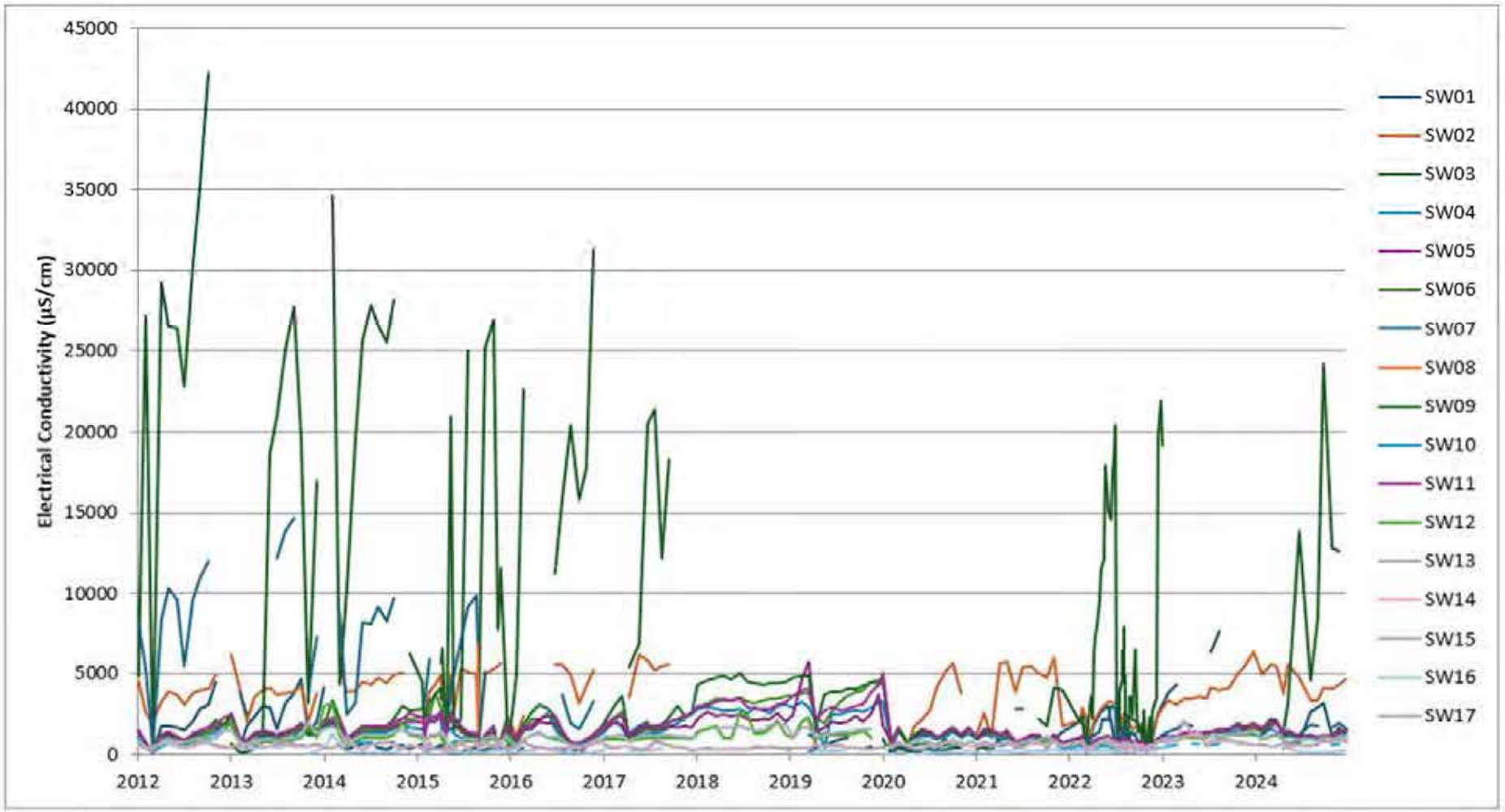


Long Term Blast Vibration Monitoring – 2010 to 2024 at Representative Locations of Anvil Rock and the Nearest Rock Formation

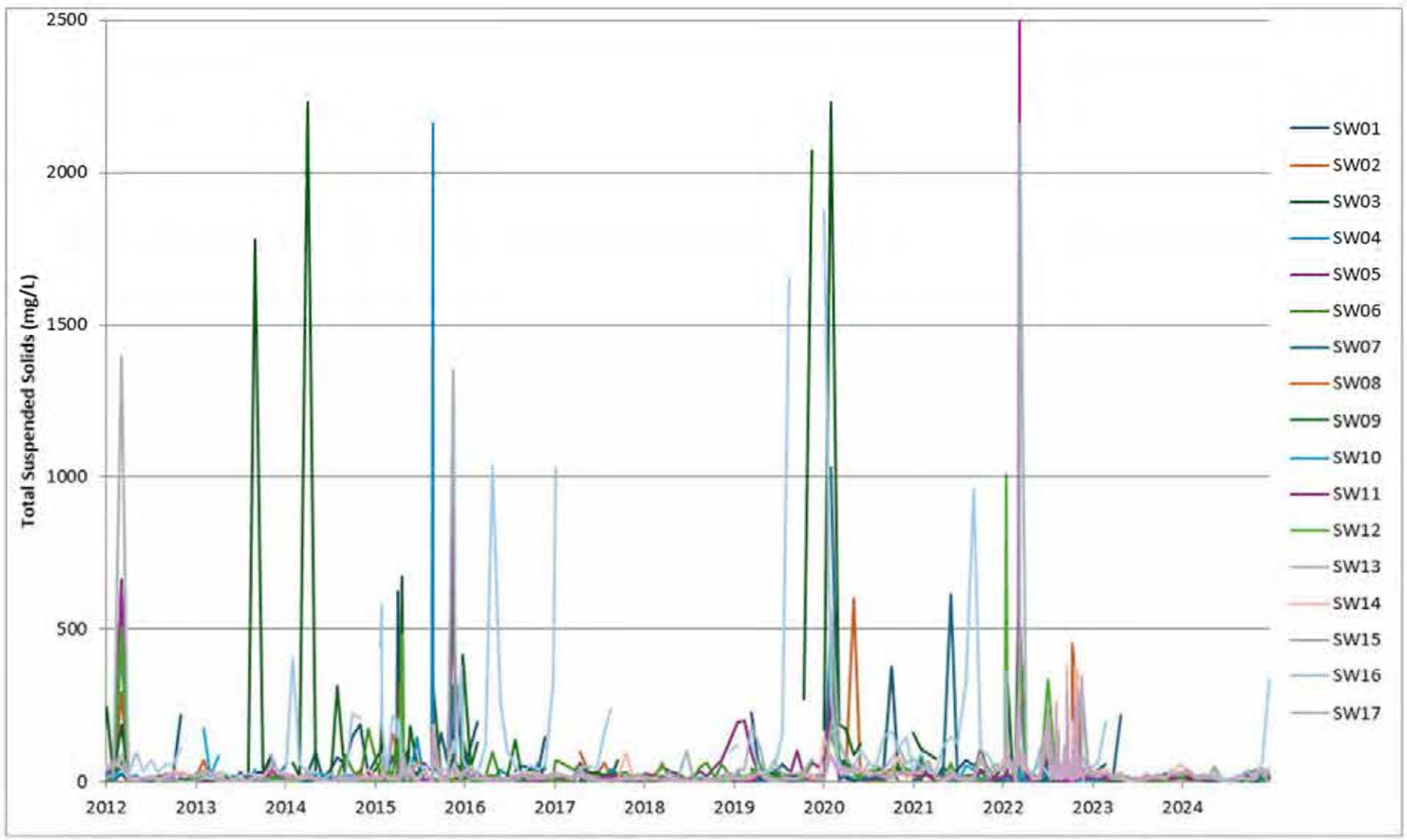
Appendix E - Long Term Trend Graphs: Surface water



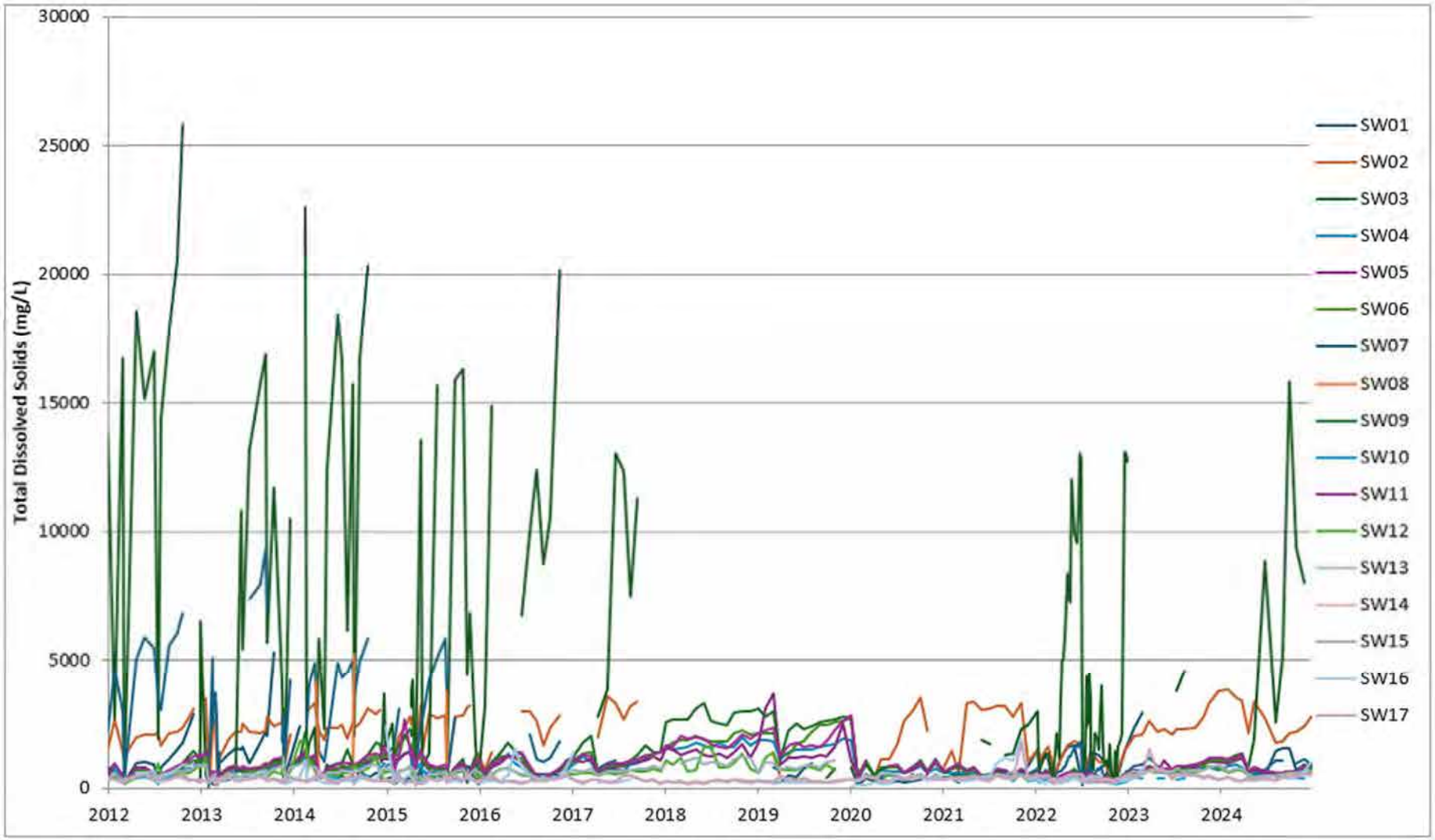
Long Term Surface Water pH Results – 2012 to 2024



Long Term Surface Water Electrical Conductivity Results – 2012 to 2024



Long Term Surface Water Total Suspended Solids – 2012 to 2024



Long Term Surface Water Total Dissolved Solids – 2012 to 2024

Appendix F - Groundwater Report

Australasian Groundwater & Environmental Consultants

Report on

Mangoola Mine – Annual Groundwater Review Report for 2024

Prepared for
Mangoola Coal Operations Pty Limited

Project No. MAN5035.001
March 2025

ageconsultants.com.au

ABN 64 080 238 642

Document details and history

Document details

Project number	MAN5035.001
Document title	Mangoola Mine – Annual Groundwater Review Report for 2024
Site address	Mangoola Coal, Glencore, 1971 Wybong Road, Muswellbrook NSW 2333
File name	MAN5035.001.Mangoola_Annual_Groundwater_Review_Report_2024_v03.01.docx

Document status and review

Edition	Comments	Author	Authorised by	Date
v01.01	Draft for client revision	GV	AW	21/03/2025
V02.01	Draft for client review	GV	PL	26/03/2025
V03.01	Final version	GV	PL	26/03/2025

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Table of contents

1 Introduction 1

2 Objectives and scope of work 3

3 Environmental management 4

3.1 Summary of the Groundwater Regime 4

3.2 Summary of the Monitoring Network 4

3.2.1 Additional Monitoring Sites 5

3.2.2 Private groundwater users 5

3.3 Groundwater triggers values 8

3.3.1 Groundwater level triggers 8

3.3.2 Groundwater quality triggers 11

4 Results from the monitoring period 14

4.1 Groundwater levels 14

4.1.1 Rainfall 14

4.1.2 Hydrostratigraphic unit monitoring and mapping 15

4.1.3 Groundwater level assessment against triggers 17

4.1.4 Private bores monitoring 18

4.2 Groundwater quality and monitoring 18

4.2.1 Quality monitoring overview 18

4.3 Groundwater quality assessment against triggers 23

5 Mine Inflow and Comparison with Predictions 24

6 Key Performance and Management Issues 25

7 Proposed Improvements 26

8 References 27

Table of contents

List of figures

Figure 1.1 Project Location 2
Figure 3.1 Groundwater monitoring locations 7
Figure 3.2 Groundwater level trigger bore locations 9
Figure 3.3 Groundwater quality trigger bore locations 12
Figure 4.1 Monthly SILO rainfall and CRD 14

List of tables

Table 3.1 Additional monitoring bores installed between late 2022 and mid 2023 and added to the groundwater monitoring program 5
Table 3.2 List of potentially impacted private groundwater bores 6
Table 3.3 Mangoola GWMP groundwater level triggers 10
Table 3.4 Mangoola GWMP groundwater quality triggers 13
Table 4.1 2024 Groundwater Monitoring Results - Groundwater Level 16
Table 4.2 2024 Groundwater Monitoring Results - pH, EC 18
Table 4.3 Annual Groundwater Major Ions Results 2024 21
Table 4.4 Annual Groundwater Speciation Results 2024 21
Table 4.5 Construction details of Wybong 1b and Wybong 1c 23

List of appendices

Appendix A Hydrographs by geological unit
Appendix B Groundwater contours – May 2024
Appendix C Private land owner monitoring bore hydrographs
Appendix D Groundwater level trigger bores – hydrographs with CRD and trigger values
Appendix E Groundwater quality – Piper plot
Appendix F Groundwater quality trigger bore – stacked chart

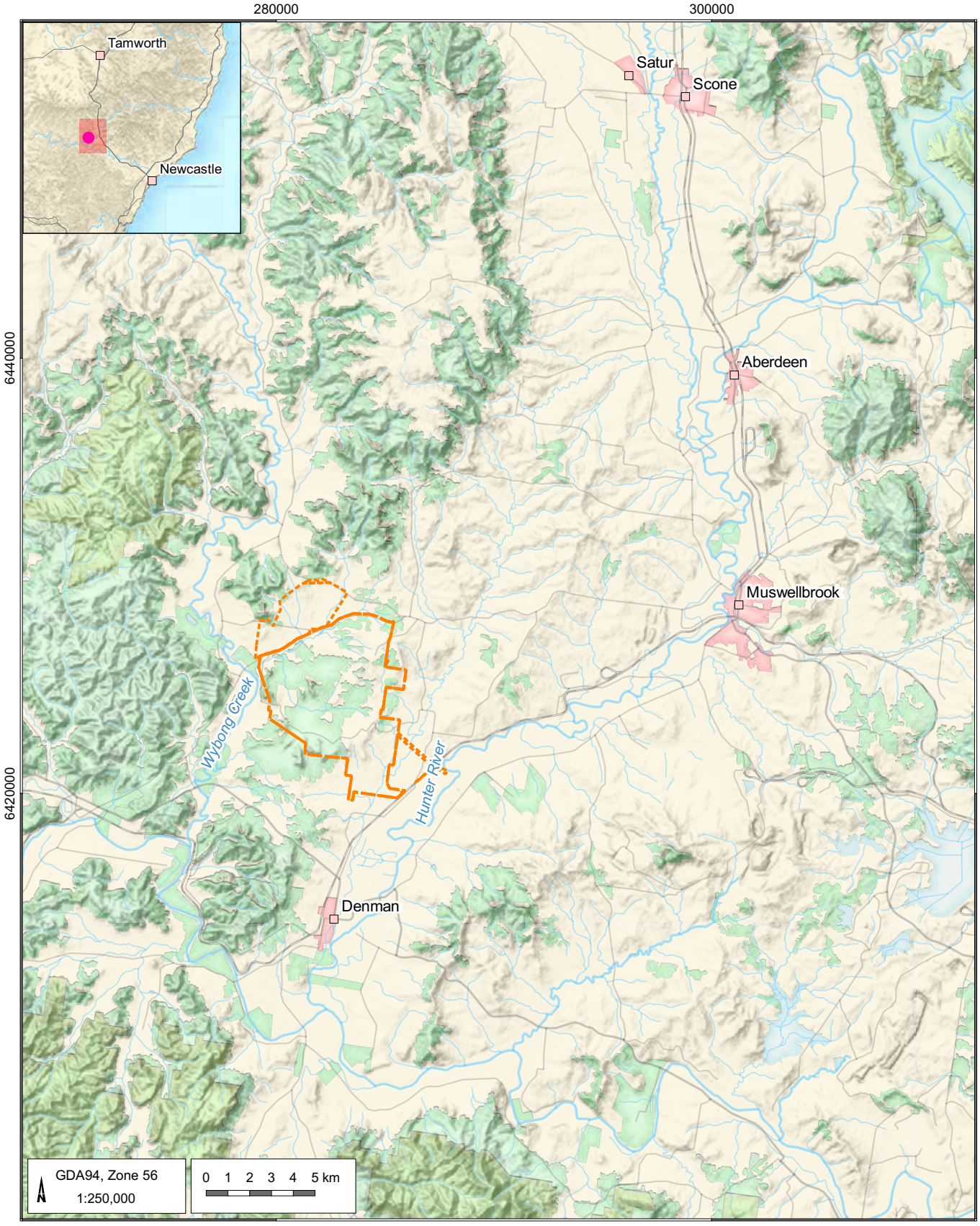
Mangoola Mine – Annual Groundwater Review Report for 2024

1 Introduction

Mangoola Open Cut (Mangoola) is owned and operated by Mangoola Coal Operations Pty Ltd (Mangoola Coal), which is a Glencore managed operation. Mangoola is located near Wybong, New South Wales (NSW), approximately 20 kilometres (km) west of Muswellbrook and approximately 10 km north of Denman in the Muswellbrook Local Government Area (LGA). A locality plan is presented in Figure 1.1. Project Approval 06_0014 was granted in June 2007 for the construction of the open cut coal mine and associated infrastructure, with mining commencing in September 2010. In April 2021, State significant development (SSD) consent SSD 8642 was granted for the Mangoola Coal Continued Operations (MCCO) Project. On 21 November 2022, Mangoola surrendered MP 06_0014 in accordance with Schedule 2, Condition A15 of SSD-8642.

Routine groundwater monitoring is undertaken at Mangoola as required by Condition B50 of SSD8642. The groundwater monitoring program is outlined in the Mangoola Groundwater Management Plan (GWMP) that was last updated in December 2022 (Glencore, 2022) and implemented in Q2 of 2023.

Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) was commissioned by Mangoola Coal to prepare the Mangoola Annual Groundwater Review in 2023 which formed as an appendix to the 2023 Annual Review (a requirement under Condition D11 of SSD8642). AGE was commissioned by Mangoola Coal to prepare the groundwater section which is intended to be incorporated within the Mangoola Annual Review in 2024 (this report). The annual groundwater review has been prepared to address the reporting requirements in the GWMP and conditions of SSD8642.



LEGEND

- Populated place
- Study area location
- Mining lease
- Built up area
- Water area
- Reserve
- Vegetation
- Road
- Road major
- Rail
- Watercourse major
- Watercourse

Mangoola 2024 Annual GW Review (MAN5035.001)

Project location

AGE

DATE 26/03/2025

FIGURE No: **1.1**

Source: 1 second SRTM Derived DEM-S - © Commonwealth of Australia (Geoscience Australia) 2011.; GEODATA TOPO 250K Series 3 - © Commonwealth of Australia (Geoscience Australia) 2006.;
\\AGE-SRV-DC01\shared\Projects\MAN5035.001 Mangoola 2024 AGMR\3_GIS\Workspaces\001_Deliverable1\01.01_MAN5035_Project location.qgz

2 Objectives and scope of work

The GWMP describes a program of groundwater monitoring to address the conditions of approval for Mangoola. This includes monitoring within the mining lease and at bores located off site and on adjacent private properties. Monitoring tasks undertaken over the 2024 calendar year period included:

- manual measurement of groundwater levels in the monitoring network;
- downloading of electronic water level loggers; and
- collection of groundwater samples for field and laboratory analysis.

This report provides a review and analysis of the groundwater monitoring data collected over the 2024 calendar year as required by the Environment Protection Licence (EPL) 12894 and SSD8642 conditions.

3 Environmental management

Mangoola monitors groundwater quality and levels within and surrounding the site in accordance with the Groundwater Monitoring Plan (GWMP). This was consolidated with the Groundwater Response Plan and last updated and approved by DPHI in December 2022 in accordance with Condition B50 of the MCCO Development Consent (SSD-8642). The new GWMP (dated 2022) was implemented in Q2 of 2023, and subsequently in place for 2024 forming the basis of this chapter in the Annual Review.

The 2022 and approved GWMP was reviewed in 2024 and an updated version (January 2025) is currently in its final review stages and it is planned to replace the 2022 version sometime in 2025.

As stated in the approved GWMP (2022) the validity of the groundwater model predictions will be independently reviewed every three years against water level and mine inflow data to determine if the model is providing useful predictions (Condition B50(v)(#8) of SSD-8642). The currently approved GWMP was reviewed and updated (AGE, 2024e) in response to a review and recalibration of the numerical groundwater flow model which was completed in 2024 to satisfy Condition B50(e) (v) of SSD8642 and Section 9.4 of the GWMP. This updated GWMP was submitted for approval (via the DPHI portal) in December 2024. Once approved, this will replace the 2022 GWMP.

3.1 Summary of the Groundwater Regime

The regional groundwater regime is comprised of; a shallow unconfined aquifer associated with alluvial deposits along the main drainages of Wybong Creek and Sandy Creek, a shallow colluvial and weathered zone minor aquifer along Big Flat Creek, and a deeper confined system primarily associated with the coal seams. The wider coal measures strata provide limited groundwater storage and transmission capacity, and the interburden and overburden lithologies possess very low hydraulic conductivities.

Groundwater recharge to the Permian strata occurs via rainfall to the ground surface infiltrating into the formations through the soil cover and weathered profile. The alluvial and colluvial sediments are also recharged by seepage through creek beds when these are flowing. Groundwater-surface water interactions occur along Wybong Creek and Sandy Creek, but not along Big Flat Creek where the water table is below the bed of the creeks and the colluvium is largely unsaturated occurring as a surficial capping of limited thickness (AGE, 2019a). Groundwater flow directions prior to mining were a subdued reflection of topography and aligned with the major drainage lines in the area.

Groundwater is typically brackish to saline in quality in all areas except within the alluvium along Wybong Creek and Sandy Creek. The salinity is the main constraint to beneficial use of groundwater in the region with all bedrock geological units having a water quality that is often unsuitable for aquatic ecosystems, irrigation, or potable consumption (AGE 2019a).

3.2 Summary of the Monitoring Network

A network of uPVC (standpipe) groundwater monitoring bores and vibrating wire piezometers (VWPs) have been installed at Mangoola to monitor the influence of approved mining activities on the groundwater regime. The number of monitoring bores utilised at the site changes over time as new monitoring bores are installed to collect data in future mining areas, and sites within the approved mining footprint go dry, and/or are gradually removed as mining passes through.

Currently groundwater monitoring is undertaken at 65 monitoring locations where Figure 3.1 shows the location of the monitoring sites in context of the mine. The monitoring frequency adopted is:

- daily recording at nine VWPs sites that record pore pressures using data loggers – these sites have the prefix “VW”;
- monthly measurement of water level at 10 sites;
- bi-monthly (every two months) measurement at 49 sites of water levels and field water quality parameters of pH, and EC;

- half yearly measurement at 17 sites of water level, field parameters and laboratory analysis of major ions;
- quarterly private bore groundwater level logger downloads; and
- annual measurement at 7 sites of water level, field parameters and a full laboratory analysis of major ions and metal.

3.2.1 Additional Monitoring Sites

The groundwater impact assessment prepared for MCCO concluded that a number of additional groundwater monitoring locations should be added to the monitoring network to assess baseline conditions as per the MCCO EIS (Umwelt 2019a). The locations of the newly installed groundwater monitoring sites are shown in Figure 3.1 with a summary of the construction details for each site provided in Table 3.1. Due to excessive wet weather posing safety during the installation period, these bores were installed between late 2022 and mid 2023. No monitoring bores were installed in 2024.

Table 3.1 Additional monitoring bores installed between late 2022 and mid 2023 and added to the groundwater monitoring program

Bore ID	Easting (m)	Northing (m)	Target geology	Nominal Depth (m)
Wybong1a *	278777	6425143	Alluvium	20
Wybong1b *	278777	6425143	Unweathered conglomerate	40
Wybong1c *	278777	6425143	Great Northern Seam	50
Sandy 1a *	286099	6422280	Alluvium	20
Sandy 1b *	286099	6422280	Permian non-coal inter-burden	70
GWMP1a	277913	6422707	Alluvium	20
GWMP1b	277913	6422707	Great Northern Seam	30
GWMP2	278509	6428191	Great Northern Seam	140
GWMP3	279259	6425580	Great Northern Seam	69
GW26A **	277367	6426593	Weathered rock or alluvium	25
NGW01_D **	278062	6427044	Conglomerate	33
NGW01_E **	278060	6427042	Conglomerate	112

Notes: Coordinates GDA94/MGA Zone 56.

* Groundwater level trigger and quality triggers derived for these bores.

** The additional sites above (GW26A and NGW01_D and NGW01_E) have been added to ensure the monitoring network provides sufficient data to determine if the project performance measures are being met.

3.2.2 Private groundwater users

The majority of registered bores and wells within the predicted groundwater impact zone are situated on Mangoola Coal landholdings. There are a small number of water supply bores located on private properties at the locations on Figure 3.1.

In addition to the monitoring above, Mangoola also installed the following bores to further verify drawdown impacts;

- one standpipe cluster (three individual bores, Wybong 1a, b and c) in the Wybong Creek alluvial and shallow coal measures; and
- one standpipe cluster (two individual bores, Sandy 1a and b) into Sandy Creek alluvium and underlying coal measures.

Water levels in these bores have been monitored on a monthly basis since early 2023 to collect baseline data before transitioning to a bimonthly frequency.

Condition B39 of SSD 8642 requires that prior to commencing construction of the MCCO Project, the owners of the private water supply bores listed in Table 3.2 may request Mangoola Coal monitor the groundwater level within their bore to determine if there are any impacts from mining activities over time. If monitoring records drawdown of more than 2 m as a result of mining, Mangoola Coal must provide compensatory water in accordance with SSD 8642 conditions B41 to B45.

On 17 May 2021 Mangoola Coal offered monitoring to owners of the bores listed in Table 3.2 in accordance with the requirements of SSD 8642. Quarterly bore-specific monitoring plans have been developed according to the time frames provided in Table 3.2. Groundwater level loggers have been installed at three of the six landholder bores where landholders approved the installation of measuring infrastructure to continuous monitoring levels and to download the data quarterly. The landholder of Bore 2 responded in March 2025 and will be incorporated into the 2025 monitoring program pending the installation of the necessary infrastructure for logger installation.

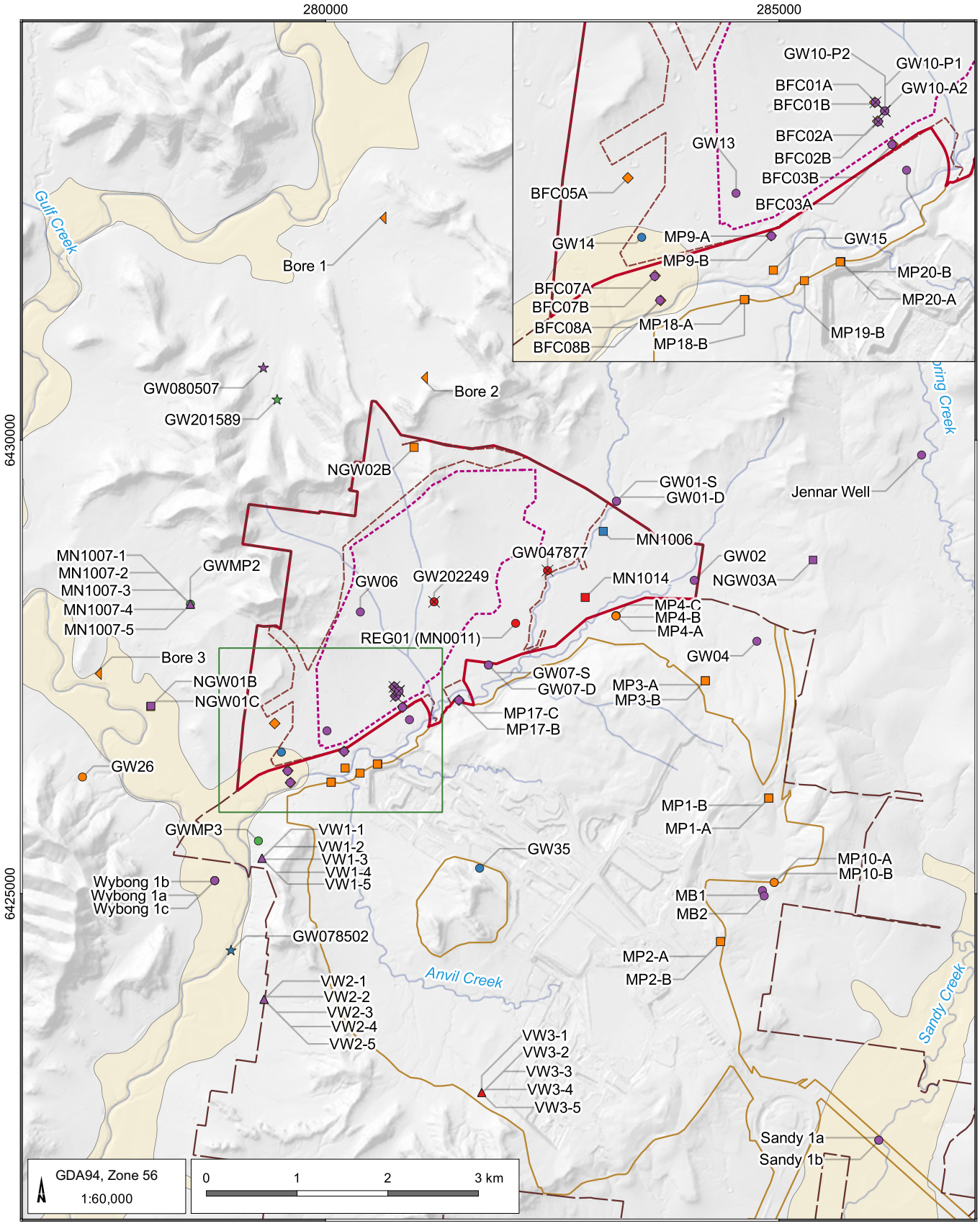
Table 3.2 List of potentially impacted private groundwater bores

Bore ID*	Receiver ID*	Predicted Groundwater Drawdown (m)#	Bore inspected and monitoring plan developed **
Bore 1	R261	0.3	Non-responsive landholder.
Bore 2	R157	5.9	Landholder response in March 2025.
Bore 3	R130	1.5	Yes, Aug 2021.
GW080507	R144	0.05	Yes, May 2022.
GW201589	R144	0.1	Yes, May 2022.
GW078502	R83	24.1	Non-responsive landholder.

Notes: * The receiver IDs and bore locations are presented in SSD 8642 Appendix 3.

Originally outlined in the MCCO Project EIS (Umwelt 2019a) and as updated in the MCCO Project RTS (Umwelt 2019b). The drawdown predictions were updated after the 3-year model calibration in 2024 (AGE, 2024b).

** As per SSD 8642.



Shallow strata
- Multi VWP
- Standpipe
- Standpipe + logger
- Private registered bore
- Standpipe-Decommissioned

Unweathered Conglomerate
- Multi VWP
- Single VWP
- Standpipe
- Standpipe + logger
- Other landholder bore

Deeper Coal Measures
- Multi VWP
- Standpipe
- Standpipe + logger
- Standpipe + logger-Decommissioned

Fassifern and Pilot Seams
- Multi VWP
- Single VWP
- Standpipe
- Standpipe + logger
- Private registered bore
- Standpipe-Decommissioned

Great Northern Seam and Awaba Tuff
- Multi VWP
- Standpipe
- Private registered bore
- Standpipe-Decommissioned

- MCCO Project Area
- MCCO Additional Project area
- Approved Mangoola Coal Mine Disturbance Area
- Approved Mangoola Coal Mining Area
- Approved additional Mining Area
- Alluvium
- Drainage

Mangoola 2024 Annual GW Review (MAN5035.001)

Groundwater monitoring locations

AGE

DATE 26/03/2025

FIGURE No: 3.1

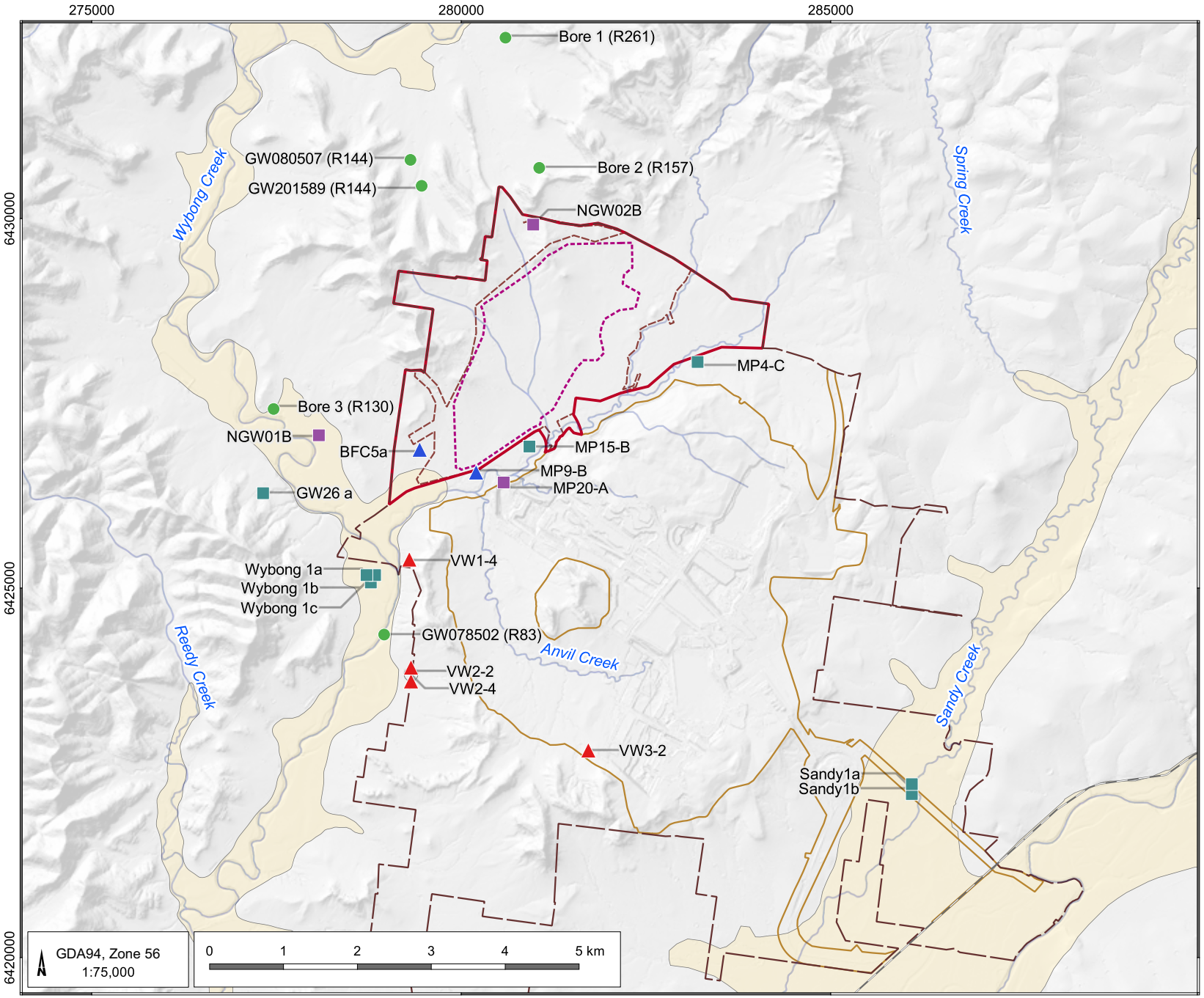
Source: 1 second SRTM Derived DEM-S - © Commonwealth of Australia (Geoscience Australia) 2011.; GEODATA TOPO 250K Series 3 - © Commonwealth of Australia (Geoscience Australia) 2006.;
\\AGE-SRV-DC01\shared\Projects\MAN5035.001 Mangoola 2024 AGMR\3_GIS\Workspaces\001_Deliverable1\05.01_MAN5035_Groundwater monitoring locations.qgz

3.3 Groundwater triggers values

3.3.1 Groundwater level triggers

The GWMP provides groundwater level thresholds for selected bores that trigger further review and investigation of monitoring datasets. The GWMP describes two tiers of triggers for groundwater levels being the Lower Available Limit (LAL) and the Lower Cut-off Level (LCL). The Lower Available Limit (LAL), or the Tier 1 threshold is based on the 5th percentile of all groundwater level data collected until January 2022. When water levels are below the Tier 1 threshold for three consecutive measurements, it indicates a declining trend in groundwater levels that must be internally reviewed. The Lower Cut-off Level (LCL) is the Tier 2 threshold and based on maximum drawdown predicted by the most recent groundwater modelling. The trigger level is set at 2 m below the predicted maximum drawdown at identified locations to account for uncertainty in model predictions as well as climatic variability. According to the TARP (Glencore, 2022) a detailed investigation is required for three consecutive exceedances of the LCL.

Figure 3.2 shows the locations of the bores with groundwater level trigger thresholds. The water level trigger values are provided in Table 3.3.



LEGEND

- MCCO Project Area
- MCCO Additional Project area
- Approved Mangoola Coal Mine Disturbance Area
- Approved Mangoola Coal Mining Area
- Approved additional Mining Area
- Alluvium
- Drainage

Groundwater Level Trigger bores

- Private production bore
- Standpipe
- Standpipe + logger
- Single VWP
- Multi VWP

Mangoola 2024 Annual GW Review (MAN5035.001)

Groundwater level trigger bore locations

DATE
26/03/2025

AGE

FIGURE No:
3.2

\\AGE-SRV-DC01\shared\Projects\MAN5035.001 Mangoola 2024 AGMR\3_GIS\Workspaces\001_Deliverable1\05.02_MAN5035_Groundwater level trigger bore locations.qgz

Table 3.3 Mangoola GWMP groundwater level triggers

Monitoring Location	Easting	Northing	Geology	Tier 1 Trigger Limit (mAHD)	Tier 2 Trigger Limit (mAHD)
MP15-B	280924.5	6426917	Shallow Strata / Weathered Conglomerate	135.4	133.4
NGW01B	278073	6427068	Shallow Strata / Weathered Conglomerate	130.6	129.2
BFC05A	279438	6426875	Unweathered Conglomerate	135.3	113
GW26	277318	6426284	Unweathered Conglomerate	144.1	144
MP4-C	283200	6428060	Unweathered Conglomerate	163.4	162
MP9-B	280202	6426567	Unweathered Conglomerate	113.6	103.1
NGW02B	280975	6429919	Unweathered Conglomerate	208.5	203.4
VW1-4	279298	6425390	Unweathered Conglomerate	108.3	101.9
VW2-4	279321	6423834	Unweathered Conglomerate	122.9	104.6
MP20-A	280574	6426429	Fassifern and Pilot Seams	111.7	102.5
VW2-2	279321	6423834	Fassifern and Pilot Seams	132	113.9
VW3-2	281721	6422804	Deeper Coal Measures	134.7	133.1
Sandy 1a	286099	6422280	Shallow strata / Weathered conglomerate	tbd	-
Sandy 1b	286099	6422280	Unweathered Conglomerate	tbd	-
Wybong 1a	278777	6425143	Shallow strata / Weathered conglomerate	tbd	-
Wybong 1b	278777	6425143	Unweathered Conglomerate	tbd	-
Wybong 1c	278777	6425143	Great Northern Seam and Awaba Tuff	tbd	-
Bore 1	280599	6432450	Unweathered Conglomerate	tbd	2m drawdown[1]
Bore 2	281056	6430688	Unweathered Conglomerate	tbd	2m drawdown[1]
Bore 3	277461	6427424	Unweathered Conglomerate	tbd	2m drawdown[1]
GW080507	279313	6430796	Shallow strata / Weathered conglomerate	tbd	2m drawdown[1]
GW078502	278957	6424371	Fassifern and Pilot Seams	tbd	2m drawdown[1]
GW201589	279464	6430445	Great Northern Seam and Awaba Tuff	tbd	2m drawdown[2]

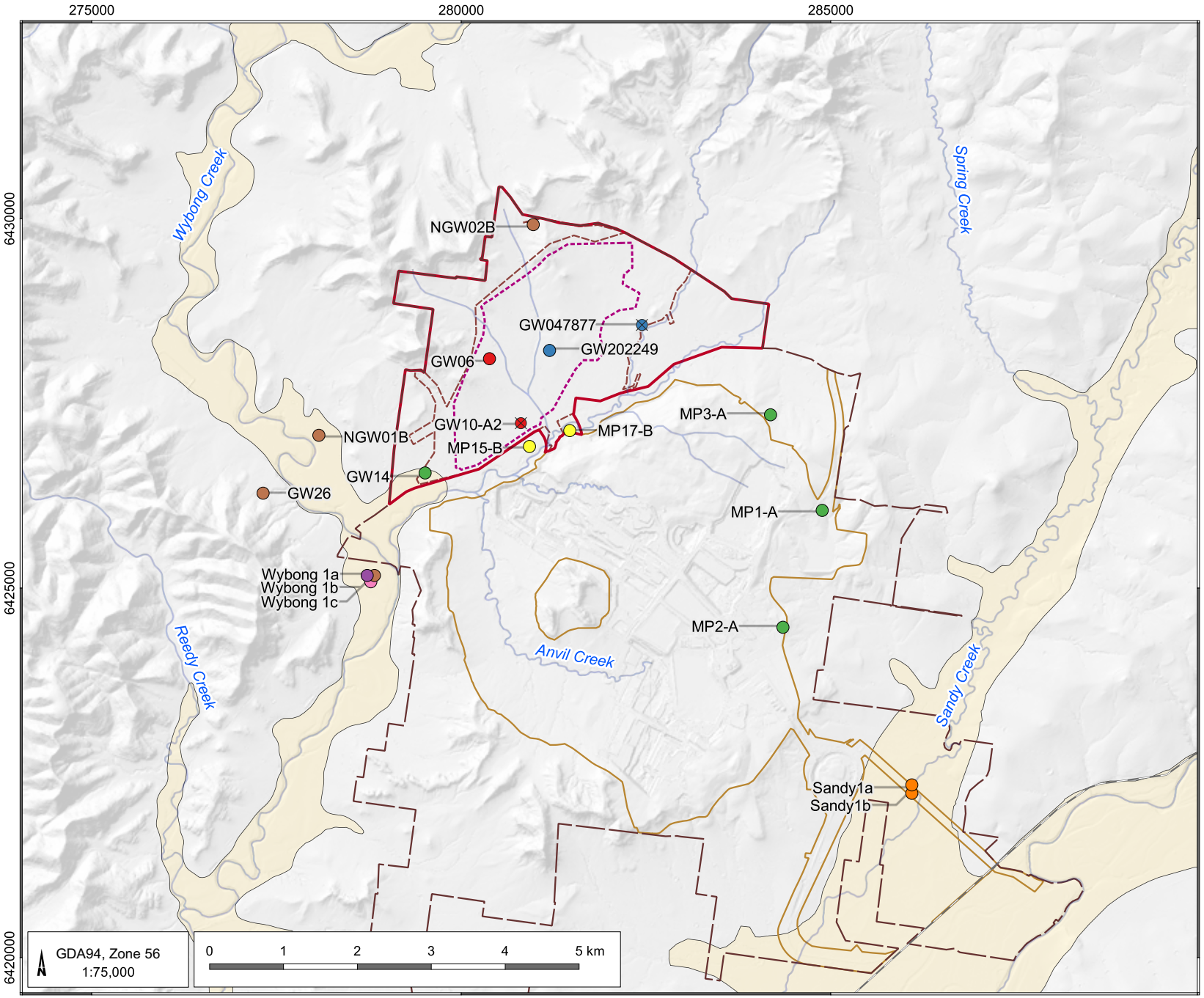
Notes: Tbd = to be determined following 12 months of monitoring data. This occurred within 2024 and as such triggers have been added to the updated GWMP currently submitted to DPHI for review and approval.
[1] Predicted drawdown is less than 2m at these private bores: trigger set at 2m drawdown.
[2] Predicted drawdown is 7.5m at this bore: trigger set at 2m drawdown, consistent with performance criteria.

3.3.2 Groundwater quality triggers

Similar to groundwater levels, the GWMP outlines a two-tier approach for groundwater quality trigger thresholds. The Upper Allowable Limit (UAL) or the Tier 1 trigger is based on the 95th percentile for electrical conductivity (EC) for all groundwater quality data collected until December 2021. The UAL indicates a potential trend towards higher salinity, but potentially not a reduction in environmental value or beneficial use. According to the TARP (Glencore, 2022) an internal review is required for three consecutive exceedances to overcome unnecessary duplication of analysis and graphing. A Tier 1 trigger threshold was not calculated for pH since pH levels are generally within and very close to the Tier 2 thresholds of pH 6 to pH 9.

The Upper Cut-off Limit (UCL) or Tier 2 limit is the beef cattle guideline limit of 7,500 uS/cm for EC and pH is pH 6 to pH 9. Again, a detailed investigation is required for three consecutive exceedances of Tier 2. Four of the selected trigger bores yield groundwater with high salinity that naturally exceeds the beef cattle guideline value and, in this case, only the Tier 1 trigger value is applied.

Figure 3.3 shows the locations of the bores selected for groundwater quality trigger thresholds. The trigger thresholds are summarised in Table 3.4.



LEGEND

- MCCO Project Area
- MCCO Additional Project area
- Approved Mangoola Coal Mine Disturbance Area
- Approved Mangoola Coal Mining Area
- Approved additional Mining Area
- Alluvium
- Drainage

Groundwater quality Trigger Bores

- Big Flat Creek area coverage
- Shallow Strata/ weathered conglomerate
- Unweathered conglomerate
- Fassifern and Pilot seams
- Great northern seam
- Permian non-coal interburden
- Deeper coal measures
- Wybong Creek alluvium
- Deeper coal measures-decommissioned
- Shallow Strata/ weathered conglomerate-decommissioned

Mangoola 2024 Annual GW Review (MAN5035.001)

Groundwater quality trigger bore locations

DATE
26/03/2025

AGE

FIGURE No:
3.3

\\AGE-SRV-DC01\shared\Projects\MAN5035.001 Mangoola 2024 AGMR\3_GIS\Workspaces\001_Deliverable1\05.03_MAN5035_Groundwater quality trigger bore locations.qgz

Table 3.4 Mangoola GWMP groundwater quality triggers

Monitoring Location	Easting	Northing	Geology	Tier 1 pH trigger	Tier 2 pH trigger	Tier 1 EC trigger	Tier 2 EC trigger
GW06	280383	6428105	Shallow Strata / Weathered Conglomerate	6	9	333	7500
MP15-B	280924.5	6426917	Shallow Strata / Weathered Conglomerate	6	9	16887	-
MP17-B	281469.7	6427132.6	Shallow Strata / Weathered Conglomerate	6	9	22797	-
NGW01B	278073.8	6427068.6	Shallow Strata / Weathered Conglomerate	6	9	5356	7500
GW26	277318.8	6426284.9	Unweathered Conglomerate	6	9	2742	7500
NGW02B	280975.3	6429919.9	Unweathered Conglomerate	6	9	5584	7500
GW14	279512	6426559	Fassifern and Pilot Seams	6	9	6712	7500
MP1-A	284886.2	6426052.2	Fassifern and Pilot Seams	6	9	6716	7500
MP2-A	284354.8	6424470.2	Fassifern and Pilot Seams	6	9	17596	-
MP3-A	284186.8	6427346.1	Fassifern and Pilot Seams	6	9	10540	-
Sandy 1a	286099	6422280	Shallow strata / Weathered conglomerate	6	9	-	7500
Sandy 1b	286099	6422280	Unweathered Conglomerate	6	9	-	7500
Wybong 1a	278777	6425143	Shallow strata / Weathered conglomerate	6	9	-	7500
Wybong 1b	278777	6425143	Unweathered Conglomerate	6	9	-	7500
Wybong 1c	278777	6425143	Great Northern Seam and Awaba Tuff	6	9	-	7500

4 Results from the monitoring period

4.1 Groundwater levels

Natural fluctuations in groundwater levels occur in response to a range of stresses. These stresses can range from short term events, such as rainfall recharge events, or long-term events, such as multi-year drought. To capture the range of stresses, groundwater levels/pressures are measured both manually over longer time frames, and automatically over shorter time frames with pressure transducers and data loggers.

4.1.1 Rainfall

Monthly patched point rainfall data was obtained from the Long Paddock website on 22 Jan 2025 (DES, 2025) for a point adjacent to the mine (longitude 150.70° latitude -32.30°). The SILO data interpolates rainfall and evaporation records from available stations to the selected location. The cumulative rainfall departure (CRD) from the monthly mean was calculated and illustrates wetter or dryer periods compared to long-term average rainfall. Figure 4.1 shows both monthly rainfall and the CRD. Wetter than average periods are indicated by increasing slopes, and dryer periods shown as declining slopes. Notable recent features shown on Figure 4.1 are the short but intense drought period from March 2017 to February 2020, followed by above average rainfall and La Nina periods from 2020 to 2022. Between 2022 and early 2024 rainfall has been below average. For the reporting period (2024) rainfall was generally above average. At the time of writing the NSW Department of Primary Industries (DPI) classifies the area as being 'non-drought affected' (NSW DPI, February 2025).

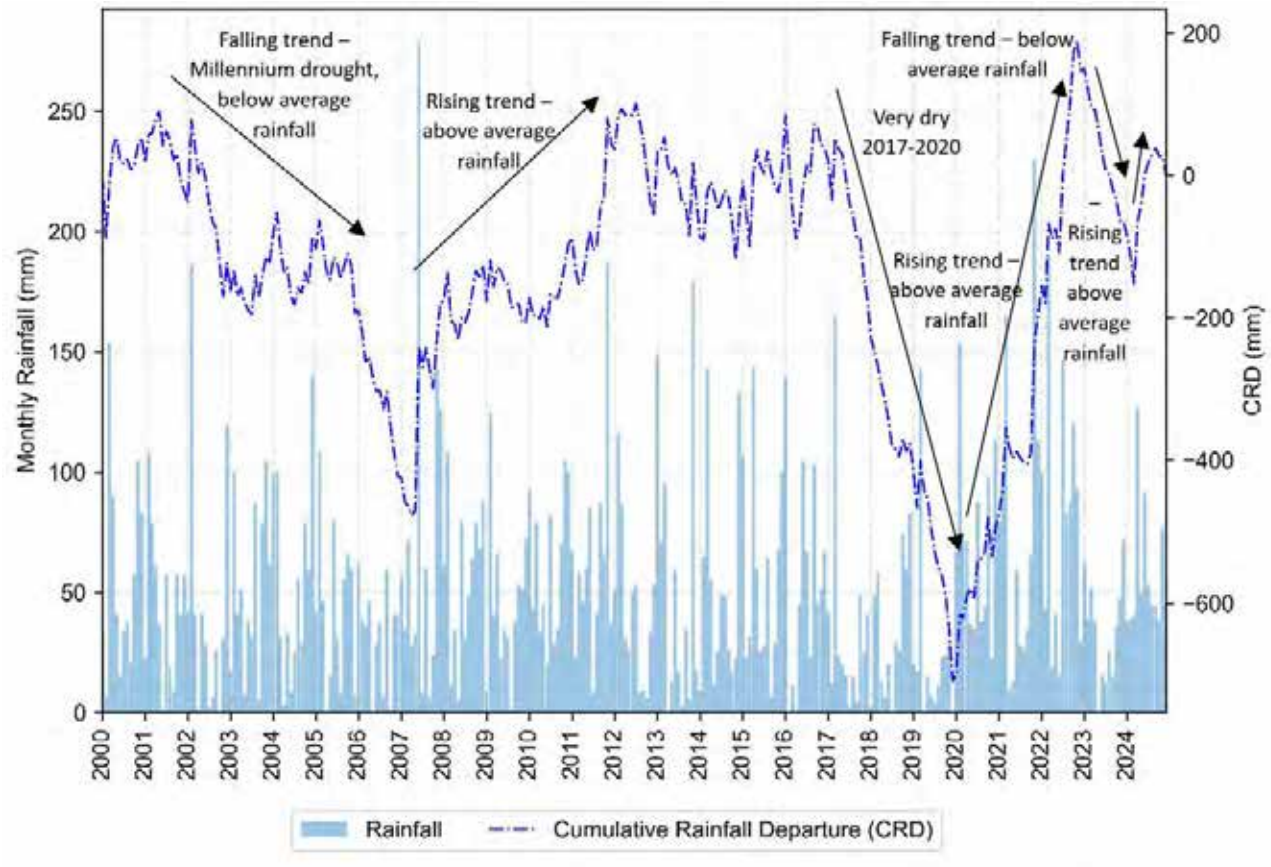


Figure 4.1 Monthly SILO rainfall and CRD

4.1.2 Hydrostratigraphic unit monitoring and mapping

Groundwater levels recorded in the monitoring bore network were plotted against time for each hydrostratigraphic unit present at Mangoola presented in Appendix A. The groundwater levels are also plotted along with the CRD to indicate where water level trends are correlated with climate, and where other factors such as mining may be influencing groundwater levels. Groundwater level data were used to prepare contour maps for May 2024 conditions, covering each hydrostratigraphic unit that had at least one water level measurement per bore within that unit. These maps are included with Appendix B.

4.1.2.1 Shallow Strata / Weathered Conglomerate

Groundwater levels recorded within the monitoring bores screened in the shallow strata/weathered conglomerate are presented in Figure A 1. Generally, groundwater levels demonstrate that fluctuations reflect climatic conditions and rainfall. During the 2024 reporting period groundwater levels have increased in most of the monitoring bores as a result of an above average rainfall phase experienced in 2024.

Consistent with previous reporting periods,

Figure B 1 shows that groundwater levels remain a general reflection of topography, with no significant influence evident due to mining activities.

4.1.2.2 Unweathered Conglomerate

Figure A 2 shows the deeper unweathered conglomerate groundwater levels tend to be less influenced by climatic conditions. Groundwater appears to flow generally north to south with the monitoring bores at the northernmost and southeasternmost extents, NGW02B and Sandy 1b, recording the lowest and highest water levels, respectively. This pattern follows a stepped southward groundwater gradient that mirrors the region's topography. The monitoring bores GW15, and historically MP18-B, MP19-B and MP20-B, which are located close to the mine footprint (Table 3.1), show a potential mining activity impact. VW1-4, located 1.4 km southwest of the bore cluster, has shown the most significant potential response to regional climatic and rainfall conditions, recharging 18.96 m between December 2023 and December 2024. Groundwater levels here have returned to levels last recorded in 2016, following a consistent drawdown since November 2015. Groundwater levels at monitoring bore GW26, which is located approximately 3.5 km west of the mining lease, continues to record a slow decline since July 2016 indicating a potential mining impact.

Figure B 2 illustrates an area of drawdown influencing groundwater levels west of the Main Pit.

4.1.2.3 Great Northern Seam and Awaba Tuff

The Great Northern Seam and Awaba Tuff groundwater level time series are shown in Figure A 3. The majority of the bores were installed in the first quarter of 2023, resulting in limited time series data. Initial observations indicate some alignment with regional CRD dynamics during this period, but additional data is needed to validate these patterns. The lack of sufficient spatial data did not allow meaningful groundwater contours to be produced.

4.1.2.4 Fassifern and Pilot Seams

Similar to the deeper unweathered conglomerate groundwater system, the Fassifern and Pilot Seams groundwater levels tend to be less influenced by climatic conditions. As expected, some monitoring bores within the coal seams which are located close to the Main Pit West area (i.e. GW14, MP18-A and MP20-A), have recorded a decline in groundwater levels attributed to mining as shown in Figure A 4 and in

Figure B 3. The groundwater levels in these monitoring bores have stabilised since the last reporting period.

4.1.2.5 Deeper Coal Measures

Monitoring bores recording groundwater levels within the deeper coal measures have recorded a relatively stable trend within mining influence from climatic conditions, as shown in Figure A 5. The lack of sufficient spatial data did not allow groundwater contours to be prepared.

4.1.2.6 Water level results from reporting period

Table 4.1 presents the 2024 groundwater monitoring results of depth to groundwater at selected monitoring bores to provide insight into the groundwater dynamics of the monitored sites for the year 2024. The table summarises the minimum, average, and maximum values measured against the Tier 1 and Tier 2 triggers when applicable to assess groundwater level variations throughout the monitoring period.

Table 4.1 2024 Groundwater Monitoring Results - Groundwater Level

Monitoring Bores	Depth to Groundwater Results (mBGL)			Tier 1	Tier 2
	Min	Ave	Max		
BFC05	14.94	15.18	15.54	14.9[1]	16.9
Bore 3 (R130)	12.98	13.81	13.93	tbd	2m drawdown
GW02	3.66	3.87	4.33	-	-
GW04	11.47	11.50	11.53	-	-
GW06	0.59	0.82	1.32	-	-
GW13	0.95	1.96	4.39	-	-
GW14	33.93	34.15	34.37	-	-
GW15	20.5	20.53	20.55	-	-
GW26	18.05	18.16	18.31	17.4	17.5[2]
GW080507 (R144)	0.75	1.40	2.38	tbd	2m drawdown
GW201589 (R144)	6.64	13.36	28.23	tbd	2m drawdown
MP1-A	9.22	9.32	9.46	-	-
MP1-B	12.45	13.04	13.42	-	-
MP9-A	12.55	13.00	13.32	-	-
MP10-A	16.12	16.66	17.3	-	-
MP10-B	9.18	9.54	9.80	-	-
MP15-B	No data	No data	No data	-	-
MP16-B	10.82	11.51	11.86	-	-
MP17-B	3.2	4.22	5.24	-	-
MP18-A	48.44	48.46	48.48	-	-
MP19-A	42.81	43.02	43.36	-	-
MP2-A	37.29	37.86	38.28	-	-
MP2-B	21.85	21.93	22.04	-	-
MP20-A	33.29	33.74	37.45	34*	43.2
MP3-A	28.05	28.24	28.41	-	-
MP3-B	25.66	25.73	25.81	-	-
MP4-A	0.46	0.83	1.14	-	-
MP4-B	1.61	1.88	2.05	-	-
MP4-C	3.78	4.06	4.46	5.2	6.6
MP9-B	25.54	28.02	30.49	29.9*	40.4

Monitoring Bores	Depth to Groundwater Results (mBGL)			Tier 1	Tier 2
	Min	Ave	Max		
NGW01B	14.2	14.25	14.31	15.4	16.8
NGW02B	6.56	6.91	7.18	7.8	12.9
Sandy 1a	7.15	15.65	18.81	tbd	tbd
Sandy 1b	15.54	15.78	16.04	tbd	tbd
VW1-4	9.82	26.36	35.83	37.7	44.1
VW2-2	18.22	19.17	21.75	13.1[1]	31.2
VW2-4	22.64	23.32	24.12	22.2[1]	40.5
VW3-2	60.55	61.02	61.60	65.1	66.7
Wybong 1a	13.01	13.15	13.25	tbd	tbd
Wybong 1b	17.80	18.08	19.20	tbd	tbd
Wybong 1c	19.20	19.84	20.12	tbd	tbd

Notes: Tbd = to be determined following 12 months of monitoring data. This occurred within 2024 and as such triggers have been added to the updated GWMP currently submitted to DPHI for review and approval.

[1] Tier 1 trigger exceedance and investigation was undertaken (AGE, 2023a; AGE, 2023b; AGE, 2023c; AGE, 2024a; AGE, 2024c).

[2] Tier 2 trigger exceedance and investigation was undertaken (AGE, 2023a; AGE, 2023b; AGE, 2023c; AGE, 2024a; AGE, 2024c).

[*] Recorded a single exceedance that did not involve three consecutive events and thus did not trigger a TARP as per GWMP (2022).

4.1.3 Groundwater level assessment against triggers

As outlined in Table 3.4, the GWMP provides two tiers of trigger threshold for groundwater levels.

During the 2023 monitoring period Tier 1 trigger events occurred at piezometers BFC05, VW2-2 and VW2-4, and a Tier 2 trigger exceedance at monitoring bore GW26, requiring TARP assessment per the GWMP (2022). These triggers, originally established based on the 2019 model's predictions (AGE, 2019b), were evaluated through investigations (AGE, 2023a; AGE, 2023b; AGE, 2023c; AGE, 2024a; AGE, 2024c), which attributed declining groundwater levels to mining induced groundwater depressurisation. Following the model recalibration, the updated triggers and predictions will be incorporated within the framework of the updated GWMP, which was submitted for review and approval to DPHI in December 2024.

In contrast, the 2024 monitoring results indicate that the above-mentioned monitoring points – BFC05, VW2-2, VW2-4, and GW26 – continued to exceed the trigger levels established in the 2022 GWMP. Appendix C contains hydrographs of the groundwater level trigger bores and groundwater trigger levels which demonstrates that groundwater levels have stabilised or improved relative to the 2023 observations for the majority of these monitoring bores, where the water level recorded in GW26 continues to decline at a consistent rate. This maintains consistency with the earlier conclusion that there is no significant environmental risk associated with these boreholes. Continued monitoring is recommended to ensure long-term stability and to validate the ongoing influence of mining-induced depressurisation on regional groundwater dynamics. Particularly, the numerical groundwater model, recalibrated in 2023/2024 (AGE, 2024e), adjusted GW26's trigger, which will be reflected in the updated GWMP and unlikely to be exceeded.

The data displayed in Appendix D for the Mangoola site plot two different datasets: the Environmental Monitoring Database (EMD), which is available online, and a historical dataset held by AGE, which is a spreadsheet used for previous annual groundwater review reports and contains data only for a limited subset of monitoring bores. Due to some slight differences between these two datasets, charts in Appendix D show both.

4.1.4 Private bores monitoring

Figure C 1, Figure C 2 and Figure C 3 show groundwater levels monitored by Mangoola at Bore 3, GW080507 and GW201589 respectively through 2024. The observed declines at GW080507 and GW201589 are likely due to below average rainfall and local abstraction, and no clear mining impacts are identified. Bore 3 shows minor recharge fluctuations correlated closely to localised rainfall events with fast recoveries (AGE, 2023d; AGE, 2023e; AGE, 2024b; AGE, 2024f; AGE, 2024g; AGE, 2024h; AGE, 2024i; AGE, 2025a; AGE, 2025b). Ongoing monitoring will refine these trends as the database expands throughout 2025.

4.2 Groundwater quality and monitoring

4.2.1 Quality monitoring overview

Groundwater samples collected from the Mangoola monitoring network are analysed for:

- pH;
- Electrical Conductivity (EC);
- Total Dissolved Solids (TDS);
- major ions; and
- dissolved metals.

4.2.1.1 pH and electrical conductivity (EC)

Table 4.2 presents the 2024 groundwater monitoring results for pH and electrical conductivity (EC) at selected monitoring bores to provide insight into the overall hydrochemical characteristics of the monitored sites for the reporting period. The table summarises the minimum, average, and maximum values for each parameter measured against Tier 1 and Tier 2 triggers where appropriate, to provide insight into groundwater quality variations throughout the monitoring period.

Table 4.2 2024 Groundwater Monitoring Results - pH, EC

Monitoring Bores	pH Results					EC Results (µS/cm)				
	Min	Ave	Max	Tier 1	Tier 2	Min	Ave	Max	Tier 1	Tier 2
GW02	7.00	7.98	9.18	-	-	13,100	18,440	23,500	-	-
GW04	7.09	7.18	7.37	-	-	6,840	7,366	7,520	-	-
GW06	6.55	7.51	8.00	6	9	191	235	261	333	7,500
GW13	7.32	7.64	7.89	-	-	172	248	312	-	-
GW14	7.06	7.15	7.27	-	-	5,660	6,194	6,650	6,712	7,500
GW15	6.83	6.97	7.13	-	-	12,200	13,940	15,100	11,483	-
GW26	7.06	7.24	7.42	6	9	1,350	1,497	1,634	2,742	7,500
GW080507 (R144)	5.86	6.25	7.31	tbd	tbd	147	189	247	tbd	tbd
GW201589 (R144)	6.41	6.69	7.36	tbd	tbd	160	194	227	tbd	tbd
MP1-A	7.73	7.83	7.97	6	9	4,810	5,160	5,380	6,716	7,500
MP1-B	8.24	8.30	8.41	-	-	5,850	5,966	6,140	-	-
MP9-A	6.62	6.76	6.92	-	-	10,300	12,433	14,100	-	-
MP10-A	7.69	7.80	7.93	-	-	5,510	5,584	5,730	-	-
MP10-B	11.09	11.22	11.49	-	-	12,500	12,900	13,200	-	-

Monitoring Bores	pH Results					EC Results (µS/cm)				
	Min	Ave	Max	Tier 1	Tier 2	Min	Ave	Max	Tier 1	Tier 2
MP15-B	No data	-	-	6	9	No data	-	-	16,887	-
MP16-B	6.86	6.99	7.11	-	-	12,270	14,067	15,500	-	-
MP17-B	6.36	6.62	6.88	6	9	1,686	2,155	2,625	22,797	-
MP18-A	7.06	7.18	7.52	-	-	7,670	8,022	8,270	-	-
MP19-A	6.76	6.83	6.94	-	-	9,490	9,756	10,000	-	-
MP2-A	7.43	7.49	7.62	6	9	13,500	16,560	16,600	17,596	-
MP2-B	6.81	6.94	7.2	-	-	18,100	18,400	18,800	-	-
MP3-A	7.66	7.74	7.8	6	9	7,140	7,425	7,860	10,540	-
MP3-B	7.16	7.24	7.38	-	-	10,200	10,540	10,900	-	-
MP4-A	7.53	7.79	8.26	-	-	8.560	8,882	9,410	-	-
MP4-B	7.86	8.11	8.44	-	-	6,210	6,346	6,630	-	-
MP4-C	6.61	6.83	7.12	-	-	20,280	23,322	24,900	-	-
NGW01B	7.48	7.79	8.07	6	9	3,360	3,476	3,740	5,356	7,500
NGW02B	7.31	7.36	7.41	6	9	3,380	3,486	3,570	5,584	7,500
Sandy 1a	6.64	6.83	7.37	6	9	2,690	3,172	3,530	-	7,500
Sandy 1b	7.28	7.43	7.59	6	9	1,485	1,620	1,823	-	7,500
Wybong 1a	7.06	7.20	7.43	6	9	2,176	2,369	2,658	-	7,500
Wybong 1b	10.71	11.43	11.94	6	9[2]	2,450	3,596	4,200	-	7,500
Wybong 1c	11.70	11.96	12.35	6	9[2]	3,850	4,662	5,650	-	7,500

Notes: Tbd = to be determined following 12 months of monitoring data. This occurred within 2024 and as such triggers have been added to the updated GWMP currently submitted to DPHI for review and approval.

[2] Tier 2 trigger exceedance and investigation was undertaken (AGE, 2024d).

4.2.1.2 Major ions

The ionic balance of all major ions analyses was received. All samples showed an ionic charge balance error[1] less than ± 10% (NSW DPI, 2012). The proportions of the major anions and cations were used to determine the hydro-chemical facies of the groundwaters sampled over the 2024 monitoring period. The results of these are displayed in both Table 4.3 and Table 4.4. The anion-cation composition for the 2024 samples are displayed in Piper diagrams in Appendix E in Figure E 1 and the entire EMD dataset including data from both 2023 and 2024 are shown on the Piper diagram in Figure E 2. In summary, the following predominant hydro-chemical facies characterised groundwater systems in the Mangoola area:

- Shallow Strata and Unweathered Conglomerate generally exhibit a Sodium/Potassium and Chloride type water; and
- Fassifern and Pilot Seams generally exhibits a Sodium/Potassium and Bicarbonate type water.

[1] Ionic charge-balance error (CBE). When all the major cations (such as Ca2+, Mg2+, Na+, K+) and anions (such as Cl-, SO42-, and HCO3 -) have been analysed carefully, the sum of cations in equivalents should equal the sum of anions in equivalents.

4.2.1.3 Dissolved metals

Section 4.1 of the GWMP requires annual comprehensive water quality monitoring at ten sites for water level, field parameters and a full laboratory analysis of major ions and metals. Collection of the required annual samples was scheduled and completed in November 2024 by third party contractor: CBased Environmental (CBased). Two water samples were collected during 2024 from MP9a to satisfy Condition 19 of EPBC Approval 2018/8280 and Condition 10, Part D of SSD 8642. Two water samples were also collected from monitoring bores GW04, GW14 and MP19-A. Single samples were collected from GW02 and GW26. GW07-D could not be sampled throughout the year as it was either dry, too low, or muddy. Results from these analyses are displayed in Table 4.4.

Table 4.3 Annual Groundwater Major Ions Results 2024

Parameter	Units	GW04 (May)	GW04 (Dec)	GW06	MP10-A	MP10-B	MP18-A	MP2-A	MP2-B	MP3-A	MP4-C
TDS	mg/L	4,600	4,760	132	3,630	9,440	5,270	9,480	12,600	4,960	16,900
Hydroxide	mg/L	<1	<1	<1	<1	3.74	<1	<1	<1	<1	<1
Carbonate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate	mg/L	1,854.4	1,634.8	68.32	1,915.4	<1	2,171.6	2,867	1,549.4	2,086.2	1,184.62
Sulfate	mg/L	<1	86	7	178	456	<1	<1	1,850	33	863
Chloride	mg/L	1,520	1,340	24	916	4,200	1,590	3,280	4,940	1,540	7,120
Dissolved Calcium	mg/L	45	33	6	15	1300	34	42	134	18	487
Dissolved Magnesium	mg/L	15	13	9	19	2	42	24	153	8	444
Dissolved Sodium	mg/L	1,840	1,760	19	1,350	1,580	1,840	3,100	4,210	1,970	4,810
Dissolved Potassium	mg/L	11	10	2	11	50	20	21	38	9	45
Total Phosphorous	mg/L	1.76	1.2	-	0.16	0.02	0.06	0.14	0.04	0.15	-

Table 4.4 Annual Groundwater Speciation Results 2024

Parameter	Units	GW02	GW26	GW04 (May)	GW04 (Nov)	GW14 (May)	GW14 (Nov)	MP9-A (May)	MP9-A (Nov)	MP19-A (May)	MP19-A (Nov)
TDS	mg/L	14,800	764	4,600	4,760	3,680	4,060	16,100	10,700	5,970	5,990
Hydroxide	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate	mg/L	158.6	422.12	1,854.4	1634.8	824.72	761.28		885.72	1,256.6	1,156.56

Parameter	Units	GW02	GW26	GW04 (May)	GW04 (Nov)	GW14 (May)	GW14 (Nov)	MP9-A (May)	MP9-A (Nov)	MP19-A (May)	MP19-A (Nov)
Sulfate	mg/L	6	47	<1	86	57	105	178	289	404	456
Chloride	mg/L	7,960	295	1,720	1,550	1,600	1,580	4,180	4,420	2,660	2,880
Dissolved Calcium	mg/L	66	28	45	33	111	106	200	130	121	131
Dissolved Magnesium	mg/L	379	62	15	13	191	201	556	676	244	243
Dissolved Sodium	mg/L	3,950	213	1,840	1,760	1,030	1,030	1,610	2,130	1,830	1,700
Dissolved Potassium	mg/L	49	12	11	10	27	28	49	84	29	28
Total Phosphorous	mg/L	0.1	0.18	1.76	1.2	0.51	0.34	<0.2	<0.1	0.84	0.25
Dissolved Aluminum	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10
Dissolved Arsenic	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dissolved Barium	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	238	228
Dissolved Boron	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	190	240
Dissolved Iron	mg/L	12,000	<50	50	-	50	<1	13,800	<50	60	270
Dissolved Lithium	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	54	55
Dissolved Manganese	mg/L	989	<1	80	<1	377	<1	172	147	333	307
Dissolved Rubidium	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	55	50
Dissolved Selenium	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	<10	<10
Dissolved Silicon	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	8,460	9,340
Dissolved Strontium	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	6,480	7,670
Dissolved Zinc	mg/L	<1	<1	<1	<1	<1	<1	<1	<1	16	11

4.3 Groundwater quality assessment against triggers

Groundwater quality monitoring data collected during 2024 was compared to trigger values outlined in Table 3.4. Monitoring sites Wybong 1b and Wybong 1c recorded groundwater pH trigger events in 2024. Monitoring sites Wybong 1b and Wybong 1c were installed in March 2023 as part of the additional groundwater monitoring sites to assess baseline conditions as per the MCCO EIS (Umwelt 2019). A summary of the construction details for each site is provided in Table 4.5.

Table 4.5 Construction details of Wybong 1b and Wybong 1c

Bore ID	Easting (m)	Northing (m)	Target Geology	Depth (m)
Wybong 1b	278777	6425143	Unweathered conglomerate	35
Wybong 1c	278777	6425143	Great Northern Seam and Awaba Tuff	65

The pH trigger exceedances required assessment against the TARP outlined in the GWMP (2022). The results of the investigation (AGE, 2024d) concluded the exceedances were associated with leakage of cement grout used to seal the annulus of the borehole, rather than related to mining operations.

Appendix F contains stacked charts displaying groundwater levels, pH and EC values for each groundwater quality trigger bore. As noted previously, two different datasets are available with some slight historical differences.

5 Mine Inflow and Comparison with Predictions

Engeny has developed a spoil seepage and pit water balance model that is used to provide quarterly estimates of groundwater inflow to Main Pit West, South Pit and Wybong Pit. The estimated hardrock and colluvial/alluvial ingress to Main Pit West, South Pit and Wybong Pit for each quarter in 2024 was approximately 31.1 ML/year (Engeny, 2024a; Engeny, 2024b; Engeny, 2024c; Engeny, 2025).

Groundwater modelling for the original Environmental Assessment was undertaken by Mackie Environmental Research (MER) in 2006 (Mackie, 2006). Since then, the progressive three yearly updates to the numerical groundwater model updates were completed by MER in 2010 (Mackie, 2010), 2013 (Mackie, 2013) and AGE in 2016 (AGE, 2016). The numerical groundwater model was further validated and recalibrated in 2024 (AGE, 2024) as part of the Mangoola Coal Continued Operations (MCCO) approval condition. Despite slight divergences between the observed and modelled datasets, groundwater inflow volumes estimated by AGE for the 2024 reporting period (i.e. 125 ML: AGE, 2024e) were in accordance with the groundwater inflows from quarterly reviews.

Engeny concluded that the estimate is not considered to be a significant inflow and is in line with model predictions, therefore does not trigger enactment of the trigger actions response plans (TARPs) outlined in the Mangoola GWMP (Engeny, 2025). The total cumulative estimated hardrock and colluvial ingress is significantly lower than Mangoola Coal's licensed annual take of 700 ML under WAL41561 (Converted in 2021 – previously 20BL172598).

6 Key Performance and Management Issues

Where the criteria were exceeded for three consecutive monitoring events, the response protocol was enacted as per measures prescribed in the trigger action response plans (TARPs) of the approved GWMP (2022). Following an exceedance, initial steps of the protocol require review of the results and an investigation to determine if an incident has occurred that could cause environmental harm. AGE was engaged to investigate the exceedances and report on findings. As per the TARPS, exceedances of trigger values are only reportable if an investigation determined that an incident had occurred. The AGE trigger level exceedance review reports concluded that the groundwater level exceedances posed low potential for material environmental harm, and therefore no incidents were considered to have occurred.

7 Proposed Improvements

As noted above, the three-yearly review of the numerical groundwater model (AGE 2024e) for Mangoola was completed during 2023 and finalised in 2024. The updated model has been calibrated with available groundwater monitoring data, in line with the GWMP. The revised findings on the magnitude and timing of groundwater impacts have been subsequently incorporated into the updated GWMP which was submitted for review and approval to DPHI in December 2024. The next validation and review of the groundwater model will be in 2026.

As also indicated earlier, additional monitoring bores have satisfied the criteria for establishing triggers and have been fully integrated into the monitoring system, with their locations and triggers included in the updated GWMP, submitted for review and approval to DPHI in December 2024.

8 References

Australasian Groundwater and Environmental Consultants Pty Ltd (AGE), 2016. "*Review of Big Flat Creek Alluvium Groundwater Conditions Mangoola Mine*", report prepared for Mangoola Coal Operations Pty Limited.

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2019. "*Mangoola Coal Continued Operations Groundwater Impact Assessment*", Report prepared for Mangoola Coal.

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2019b. "*Mangoola Coal Mine – Groundwater Model Three-year Inflow and Impact Prediction Verification*", Report prepared for Mangoola Coal.

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2022. "*Mangoola Coal Mine Review of Annual Monitoring Bore Exceedance 2022*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2023a. "*Mangoola Coal Mine Groundwater Level Exceedance Investigation March 2023*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2023b. "*GW26 Groundwater Level Exceedance Investigation June 2023*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2023c. "*GW26 Groundwater Level Exceedance Investigation August 2023*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2023d. "*R144 - Quarter 2, 2023 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2023e. "*R144 - Quarter 2, 2023 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024a. "*Mangoola Coal Mine Groundwater Level Exceedance Investigation October 2023*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024b. "*R144 - Quarter 4, 2023 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024c. "*Mangoola Coal Mine Groundwater Level Exceedance Investigation January 2024*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024d. "*Mangoola - pH Trigger Exceedence in Wybong 1b and Wybong 1c Investigation*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024e. "*Mangoola Mine Groundwater Model Validation".*

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024f. "*R144 - Quarter 2, 2024 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024g. "*R130 - Quarter 2, 2024 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024h. "*R144 - Quarter 3, 2024 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2024i. "*R130 - Quarter 3, 2024 Groundwater Monitoring Report*".

Department of Environment and Science, 2023. "*SILO Australian climate data from 1889 to yesterday"*, Downloaded from https://www.longpaddock.qld.gov.au/silo/ on 22 January 2025.

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2025a. "*R144 - Quarter 4, 2024 Groundwater Monitoring Report*".

Australian Groundwater and Environmental Consultants Pty Ltd (AGE), 2025b. "*R130 - Quarter 4, 2024 Groundwater Monitoring Report*".

Engeny, 2024a. "*2023/2024 Quarter 3 Review Of Mangoola Groundwater Ingress*".

Engeny, 2024b. "*2023/2024 Quarter 4 Review Of Mangoola Groundwater Ingress*".

Engeny, 2024c. "*2024/2025 Quarter 1 Review Of Mangoola Groundwater Ingress*".

Engeny, 2025. "*2024/2025 Quarter 2 Review Of Mangoola Groundwater Ingress*".

Glencore, 2022. "*Groundwater Management Plan*", Mangoola Open Cut.

Glencore, 2023. "*Annual Review 2022 – 1 January to 31 December 2022*", Mangoola Open Cut.

Mackie Environmental Research (MER), 2006. "*Anvil Hill Project: Groundwater Management Studies"*.

Mackie Environmental Research (MER), 2010. "*Long term water levels in the modified Mangoola pit shell.*"

Mackie Environmental Research (MER), 2013. "*Mangoola Coal: Regional Groundwater Model Update*", Report prepared for Mangoola Coal Pty Limited.

Mackie Environmental Research (MER), 2016. "*Main Pit West – Barrier Wall Hydrogeological Issues*", Report prepared for Mangoola Coal Pty Limited.

New South Wales Department of Primary Industries (DPI), 2012. "NSW Aquifer Interference Policy", Policy document prepared by the NSW Government.

New South Wales Department of Primary Industries (DPI), 2025. "*NSW State Seasonal Update*". Website accessed 3 February 2025: https://edis.dpi.nsw.gov.au/.

Umwelt, 2019. "*Mangoola Coal Continued Operations Project Environmental Impact Statement*", Report prepared for Mangoola Coal.

Appendix A

Hydrographs by geological unit

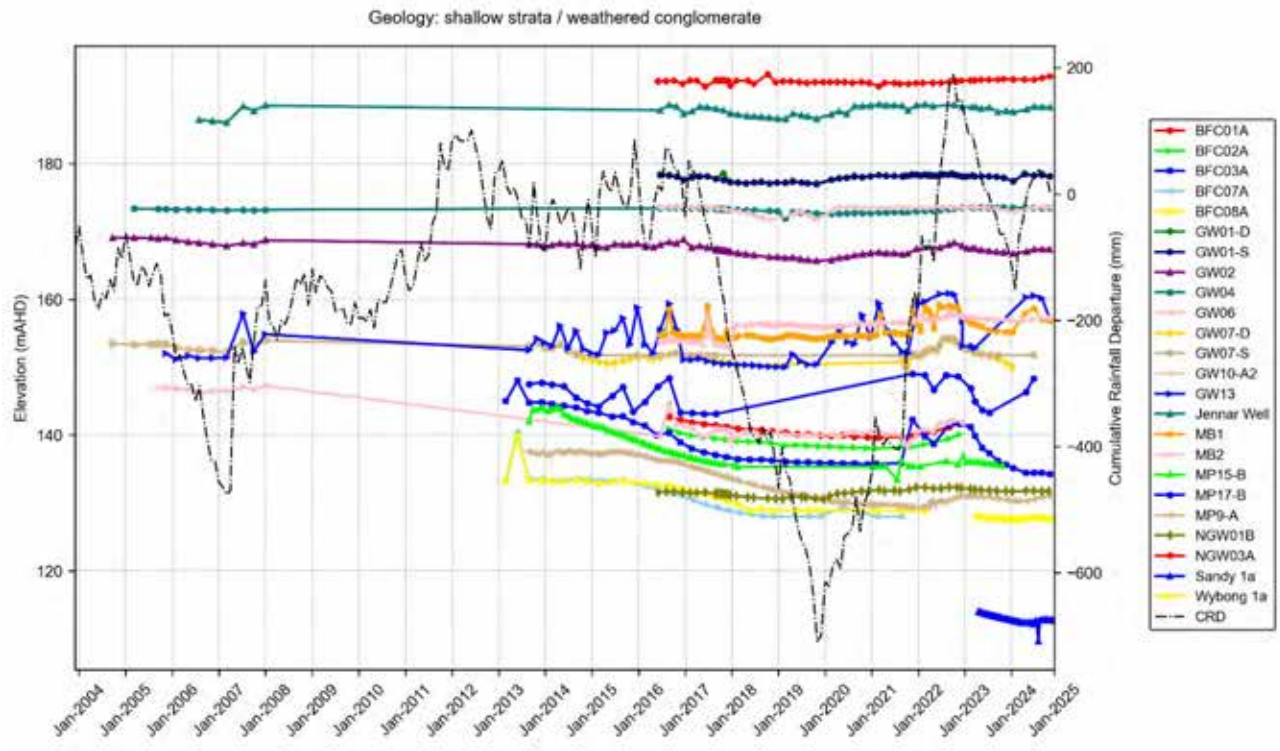


Figure A 1 Hydrographs of Shallow Strata / Weathered Conglomerate bores

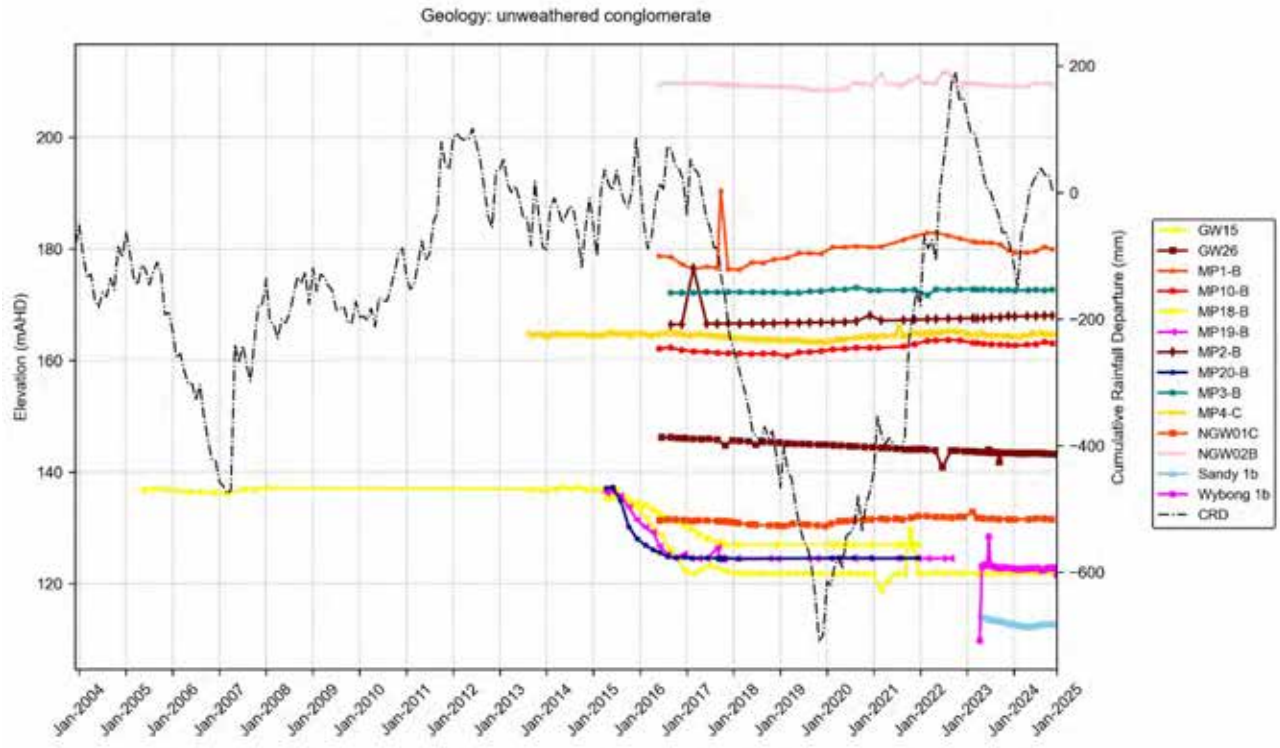


Figure A 2 Hydrographs of Unweathered Conglomerate bores

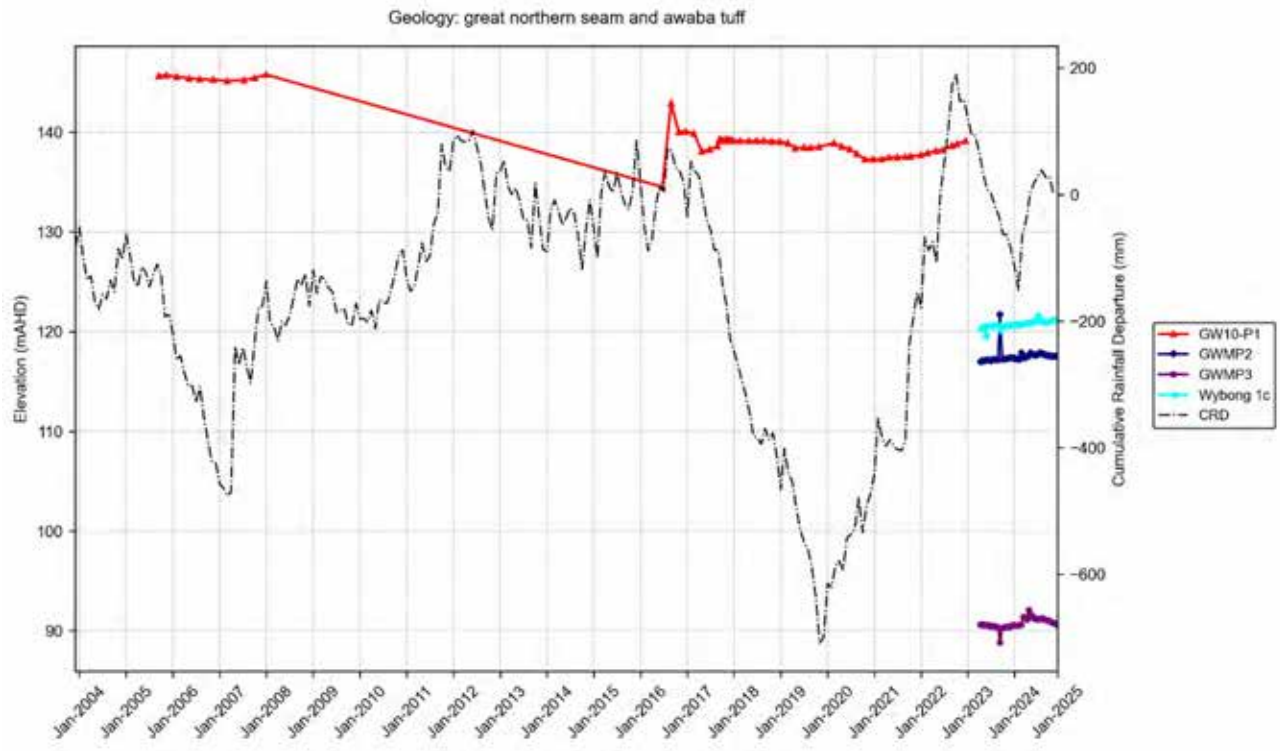


Figure A 3 Hydrographs of Great Northern Seam and Awaba Tuff bores

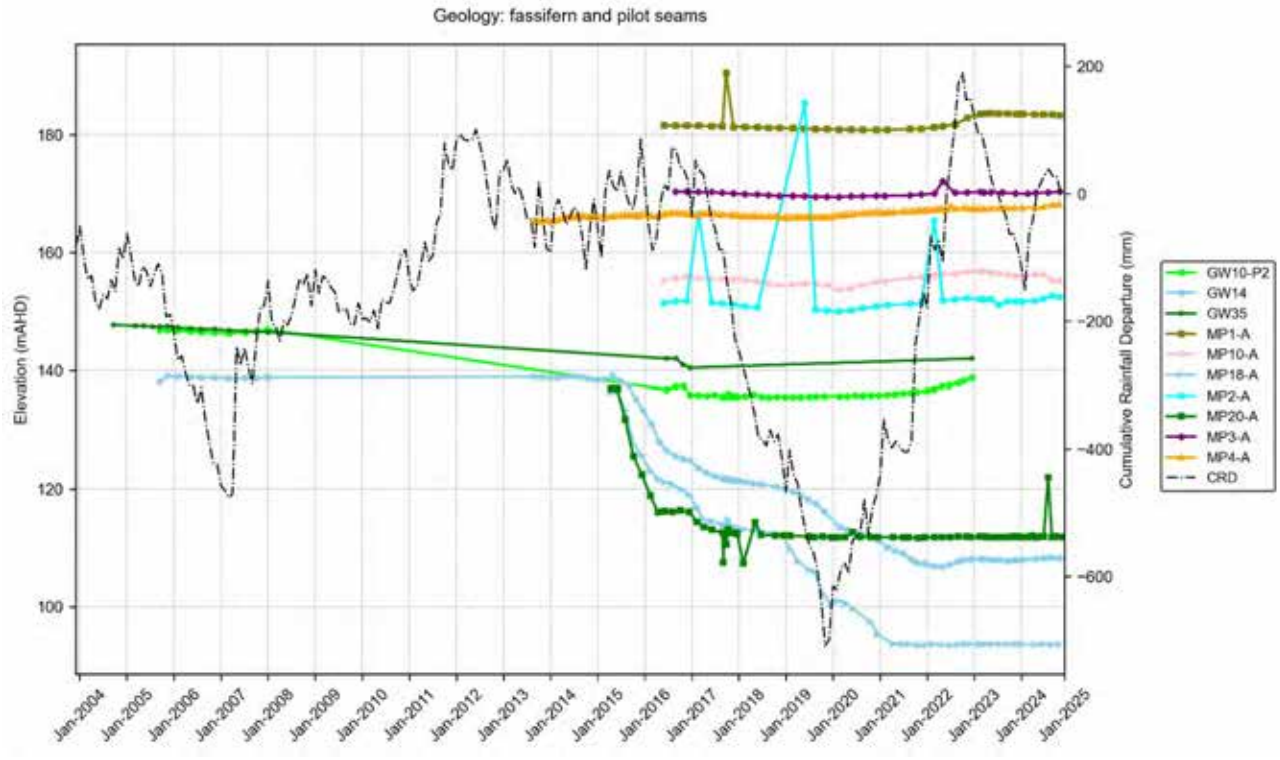


Figure A 4 Hydrographs of Fassifern and Pilot Seams bores

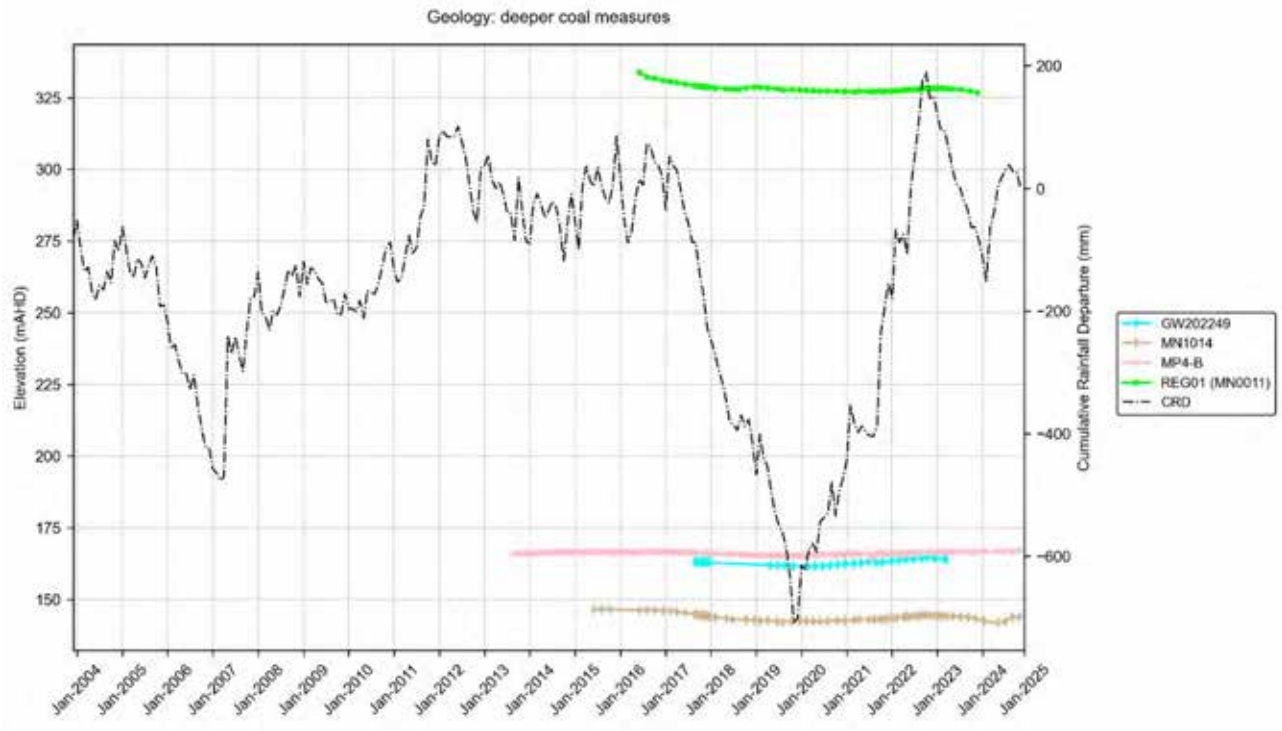


Figure A 5 Hydrographs of Deeper Coal Measures bores

Appendix B

Groundwater contours – May 2024

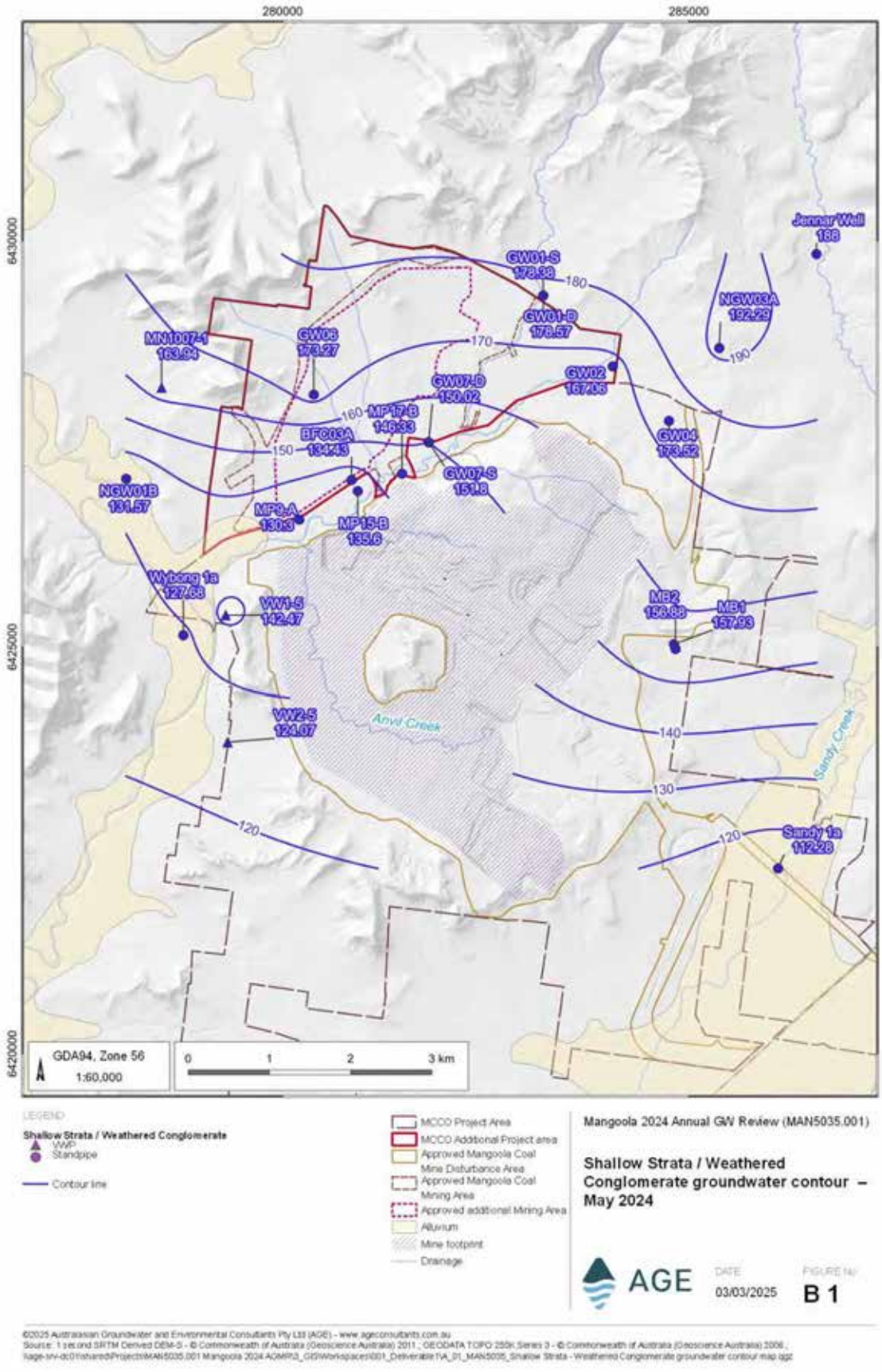


Figure B 1 Shallow Strata / Weathered Conglomerate groundwater contour – May 2024

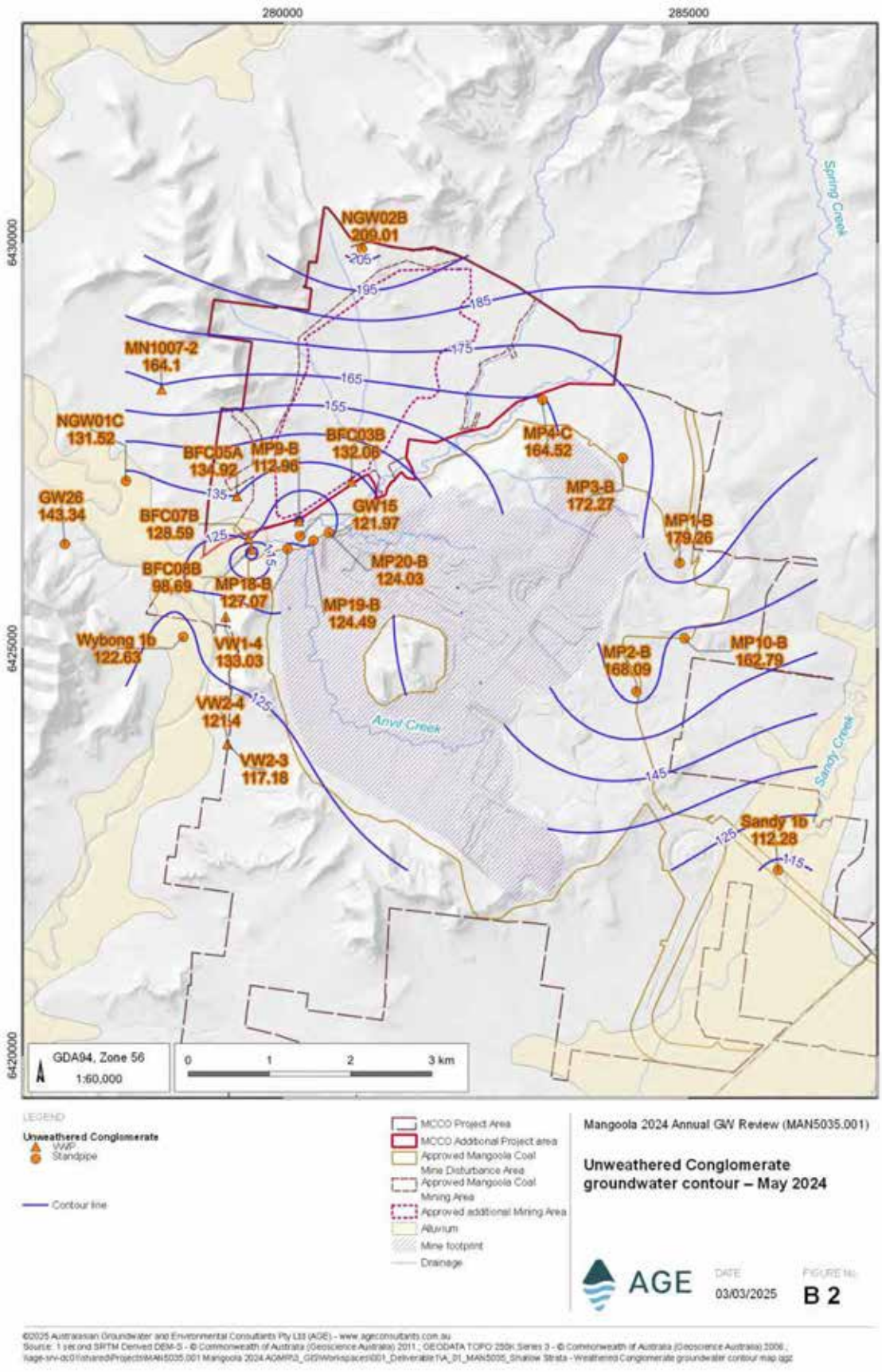


Figure B 2 Unweathered Conglomerate groundwater contour – May 2024

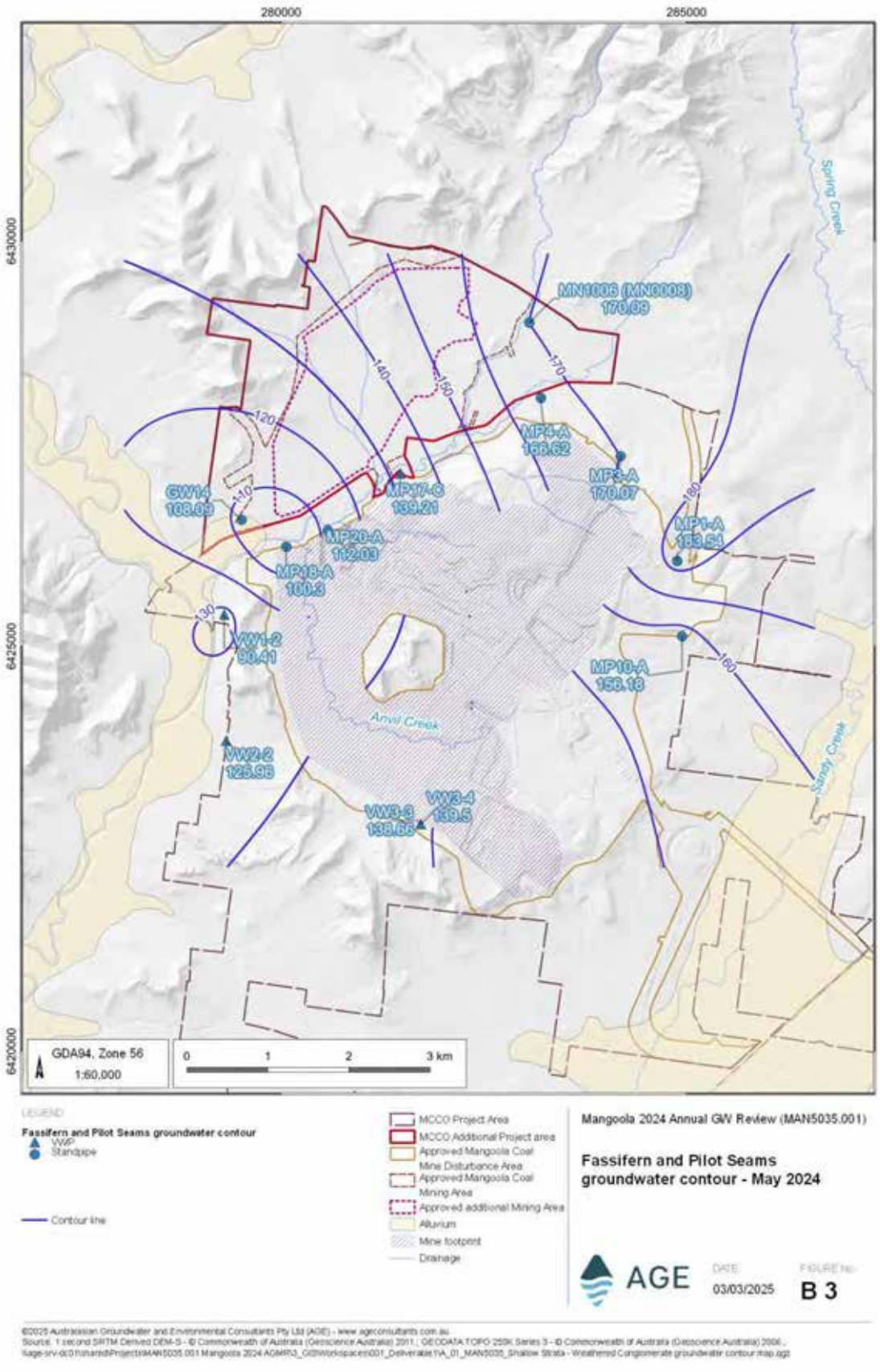


Figure B 3 Fassifern and Pilot Seams groundwater contour – May 2024

Appendix C

Private land owner monitoring bore hydrographs

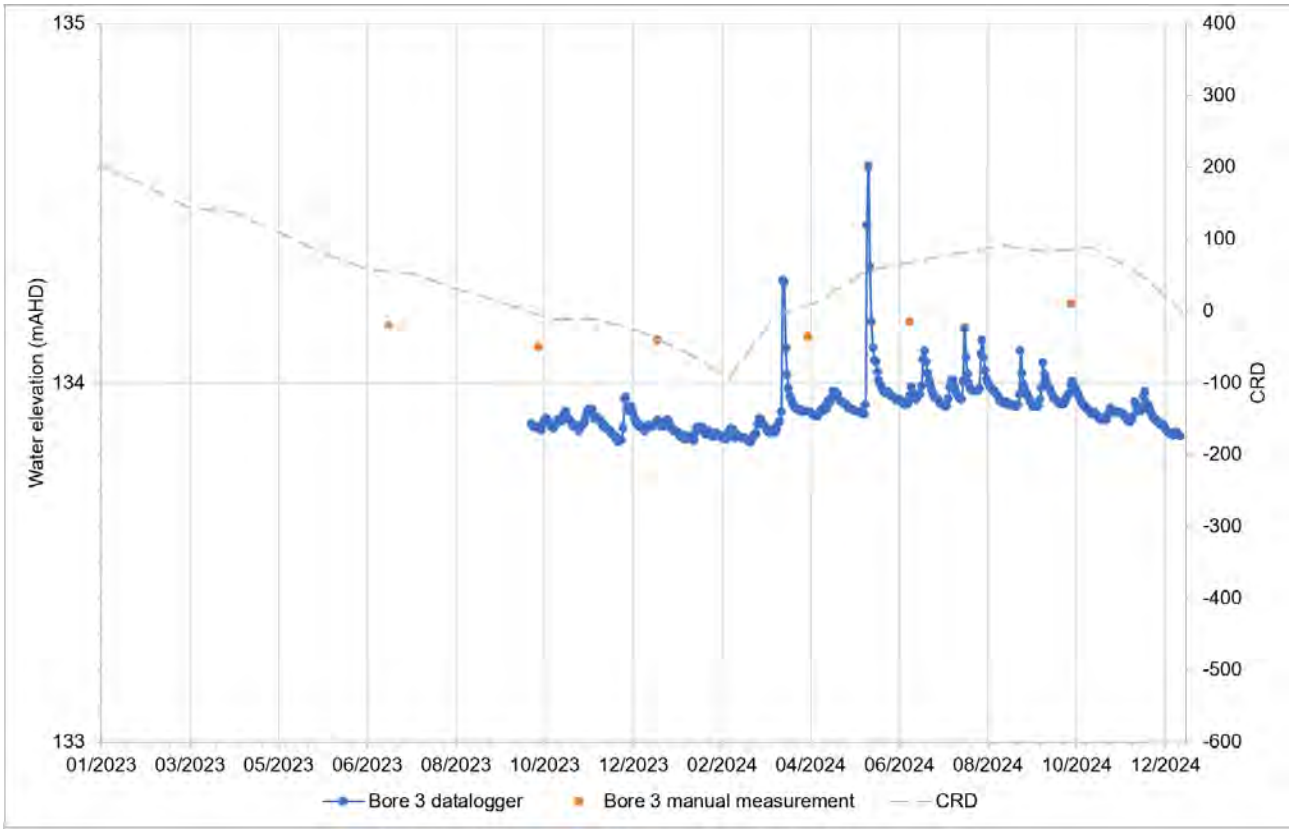


Figure C 1 Bore 3 hydrograph

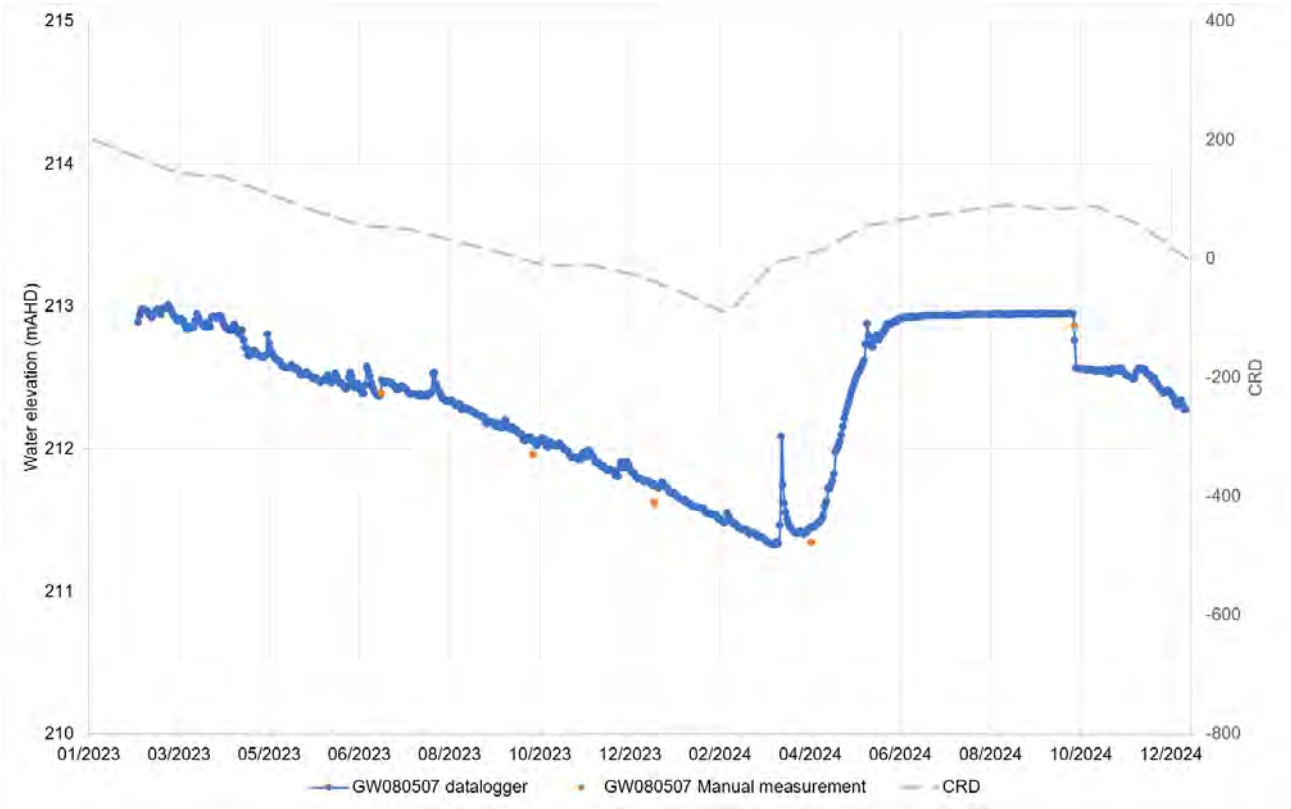


Figure C 2 GW080507 hydrograph

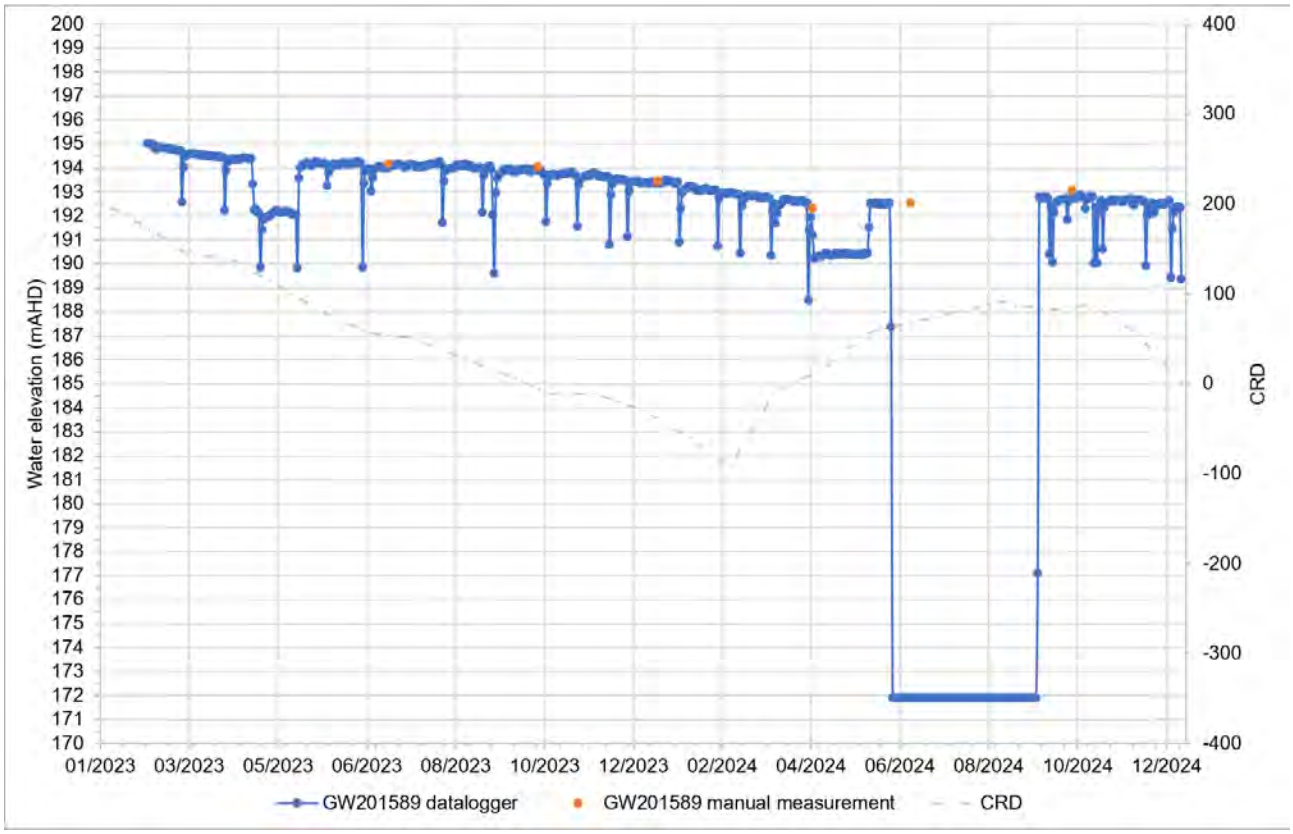


Figure C 3 GW201589 hydrograph

Appendix D

Groundwater level trigger bores – hydrographs with CRD and trigger values

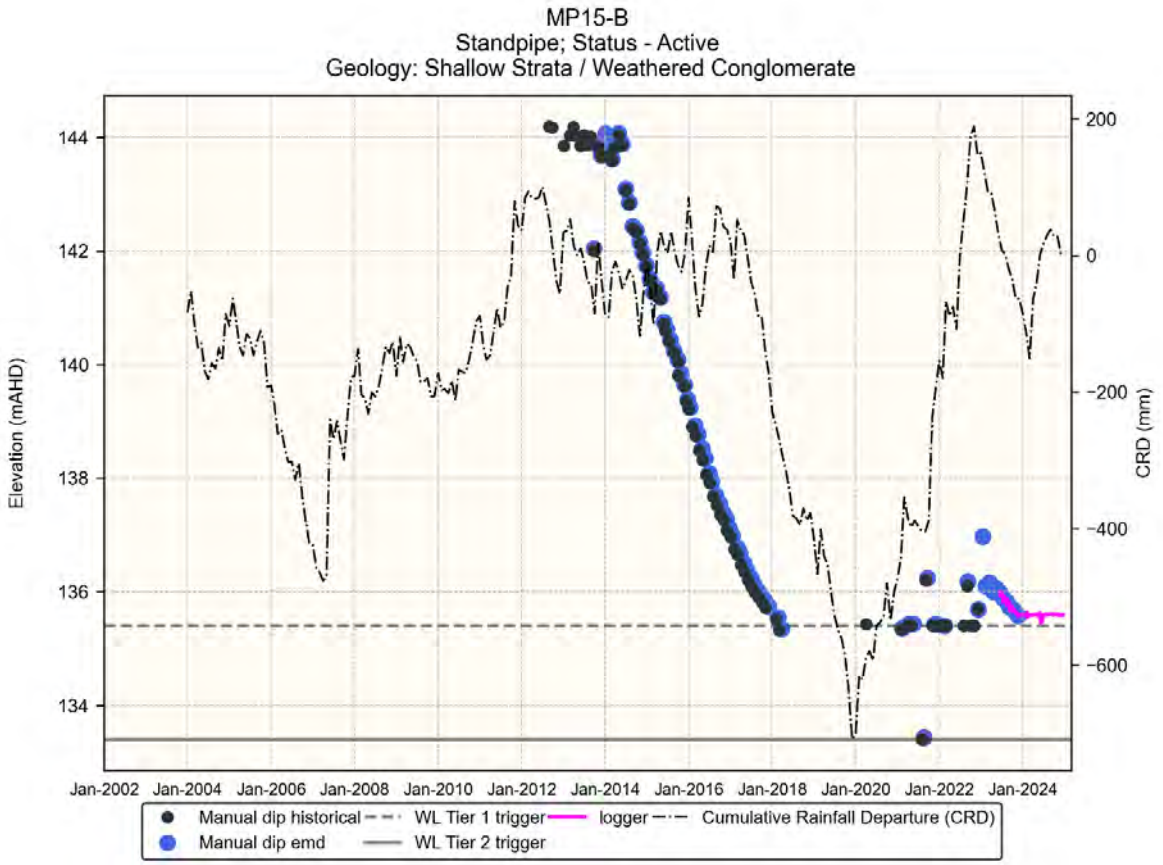


Figure D 1 MP15-B hydrograph

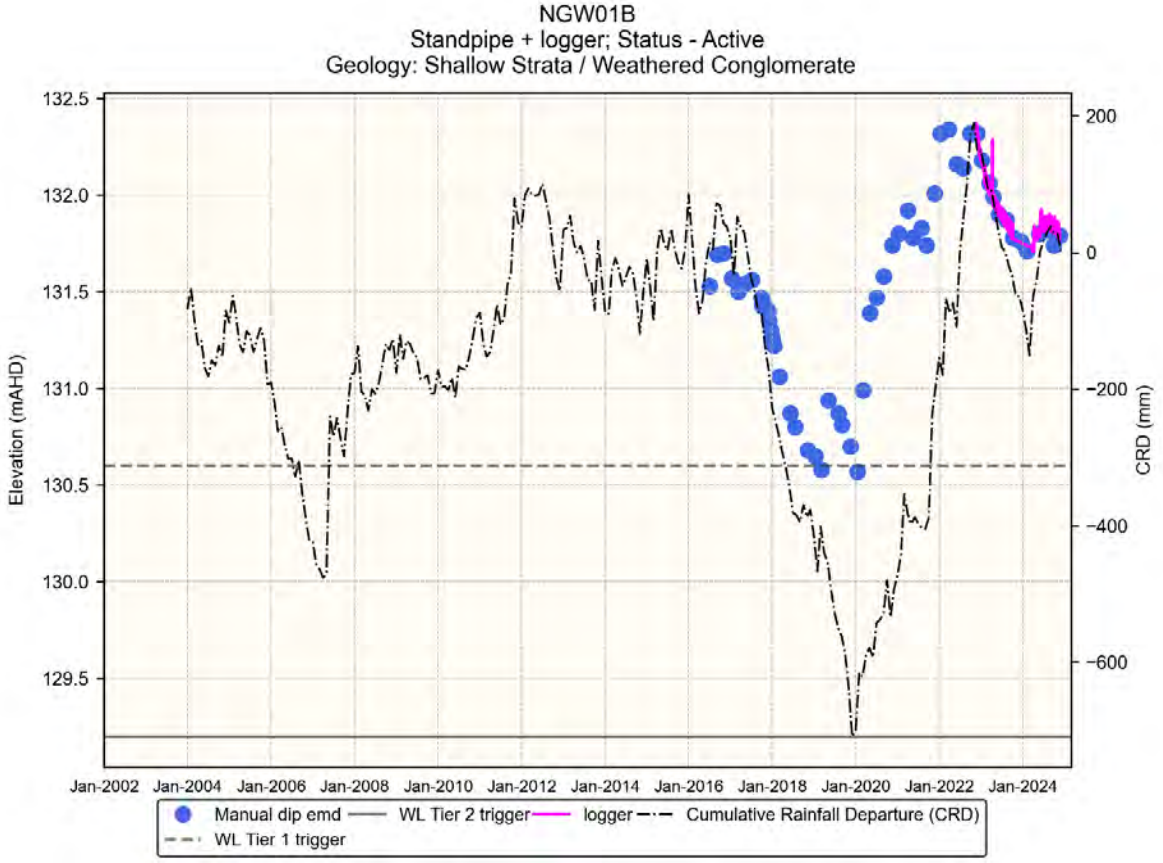


Figure D 2 NGW01B hydrograph

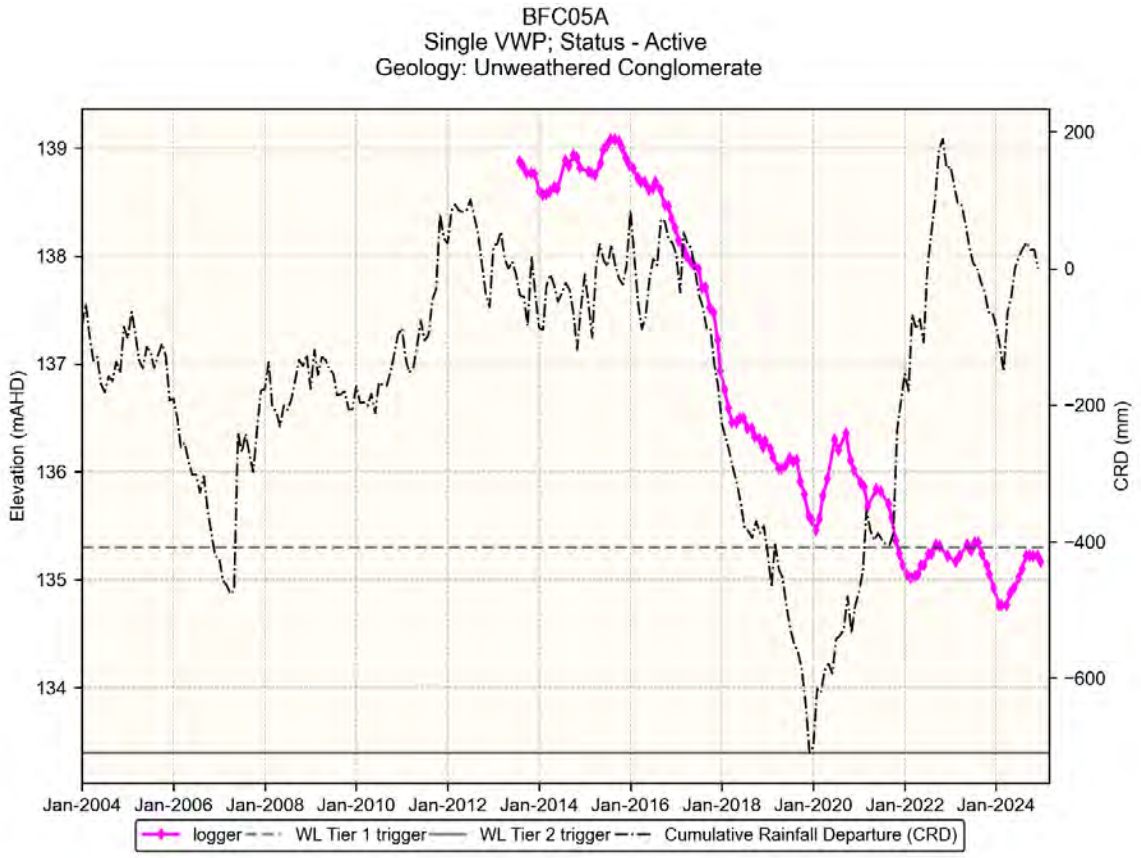


Figure D 3 BFC05A hydrograph

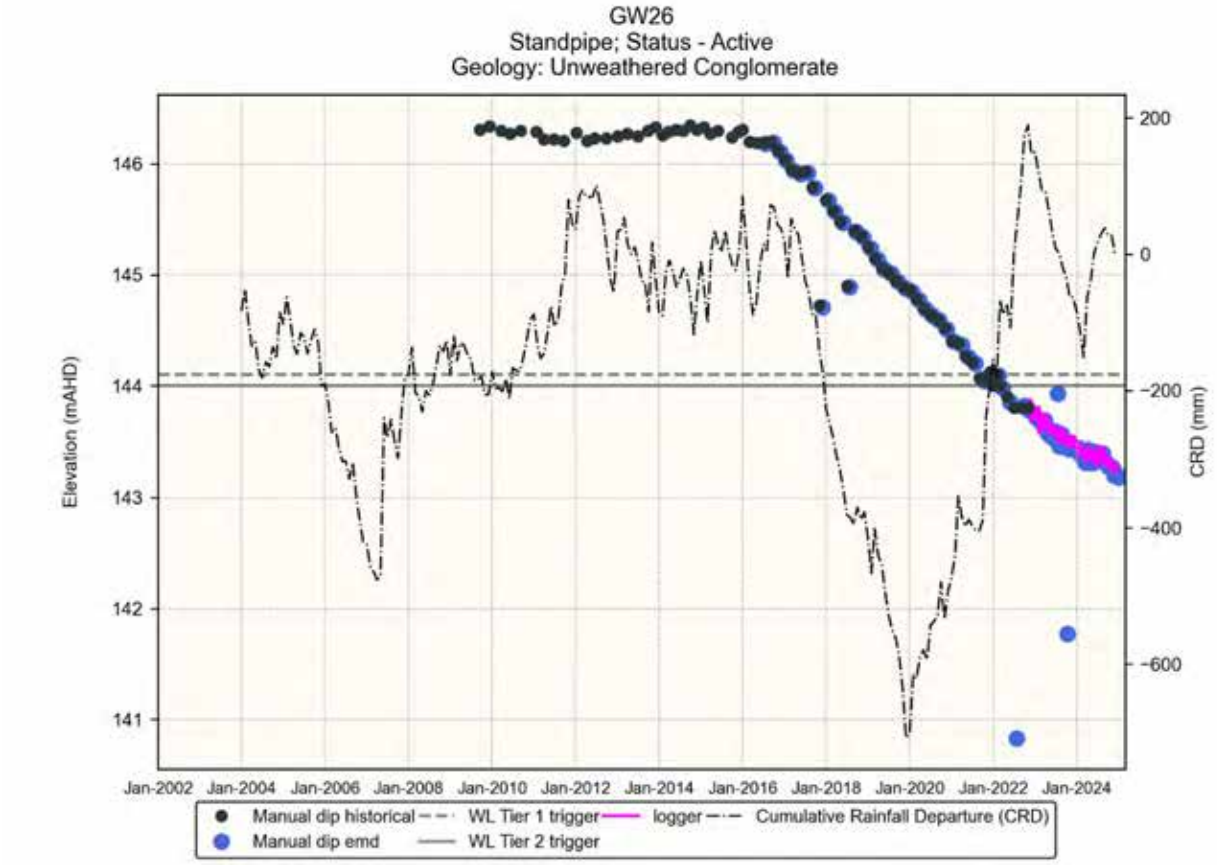


Figure D 4 GW26 hydrograph

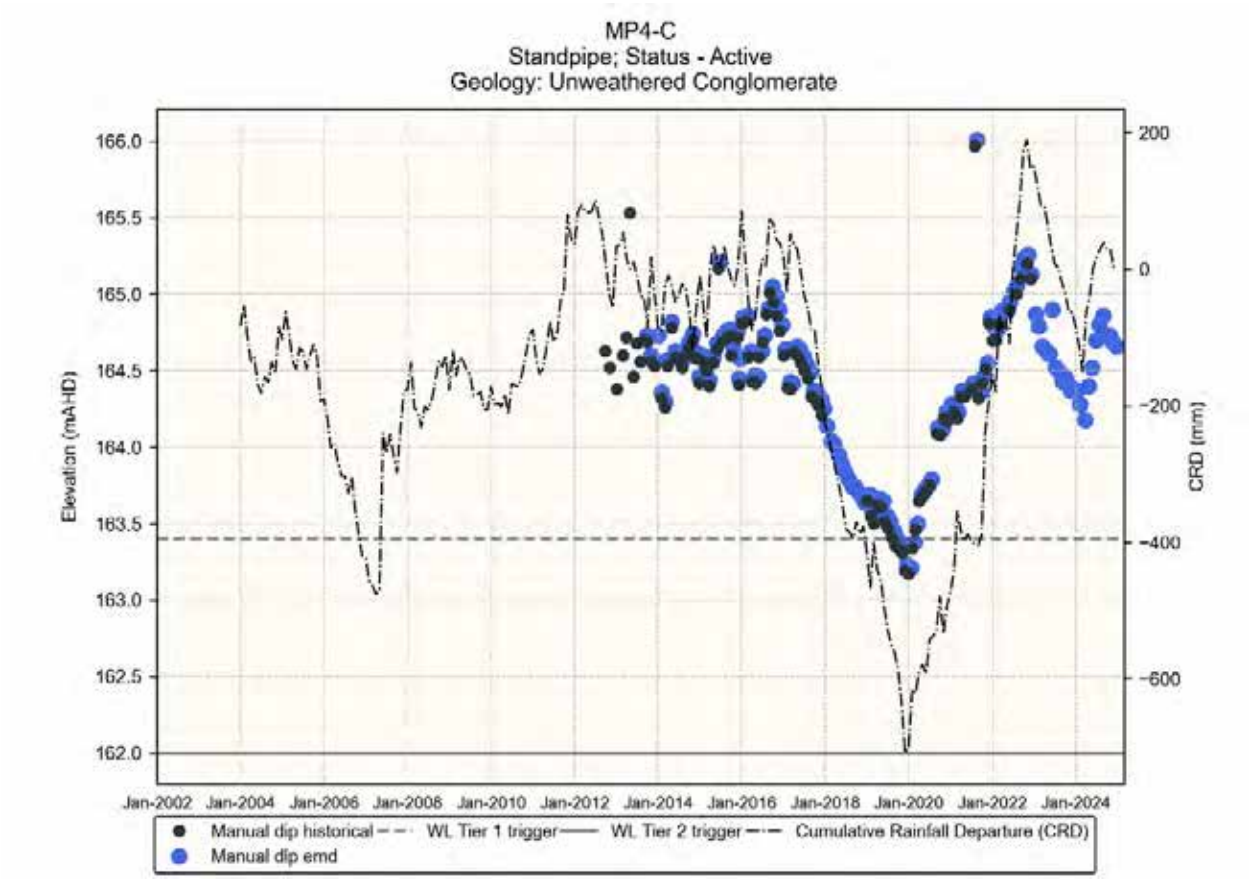


Figure D 5 MP4-C hydrograph

Figure D 6 MP9-B hydrograph

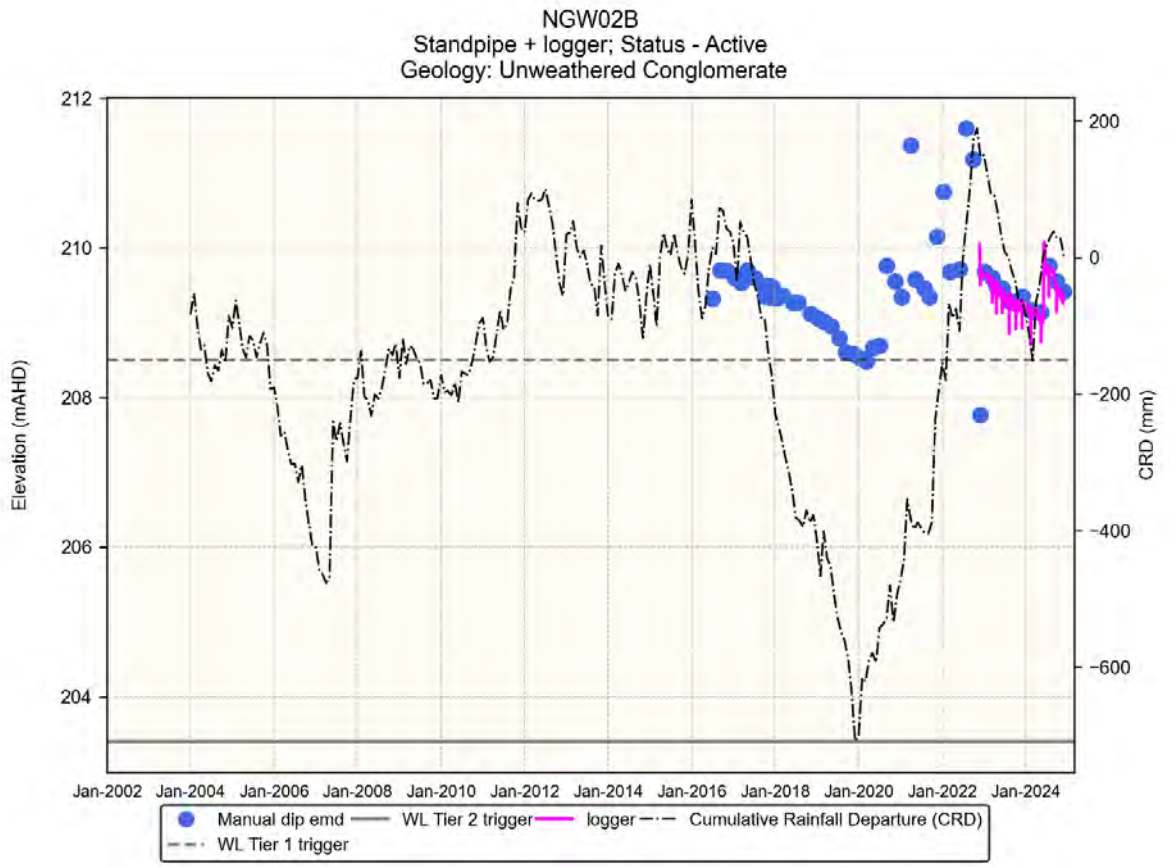


Figure D 7 NGW02B hydrograph

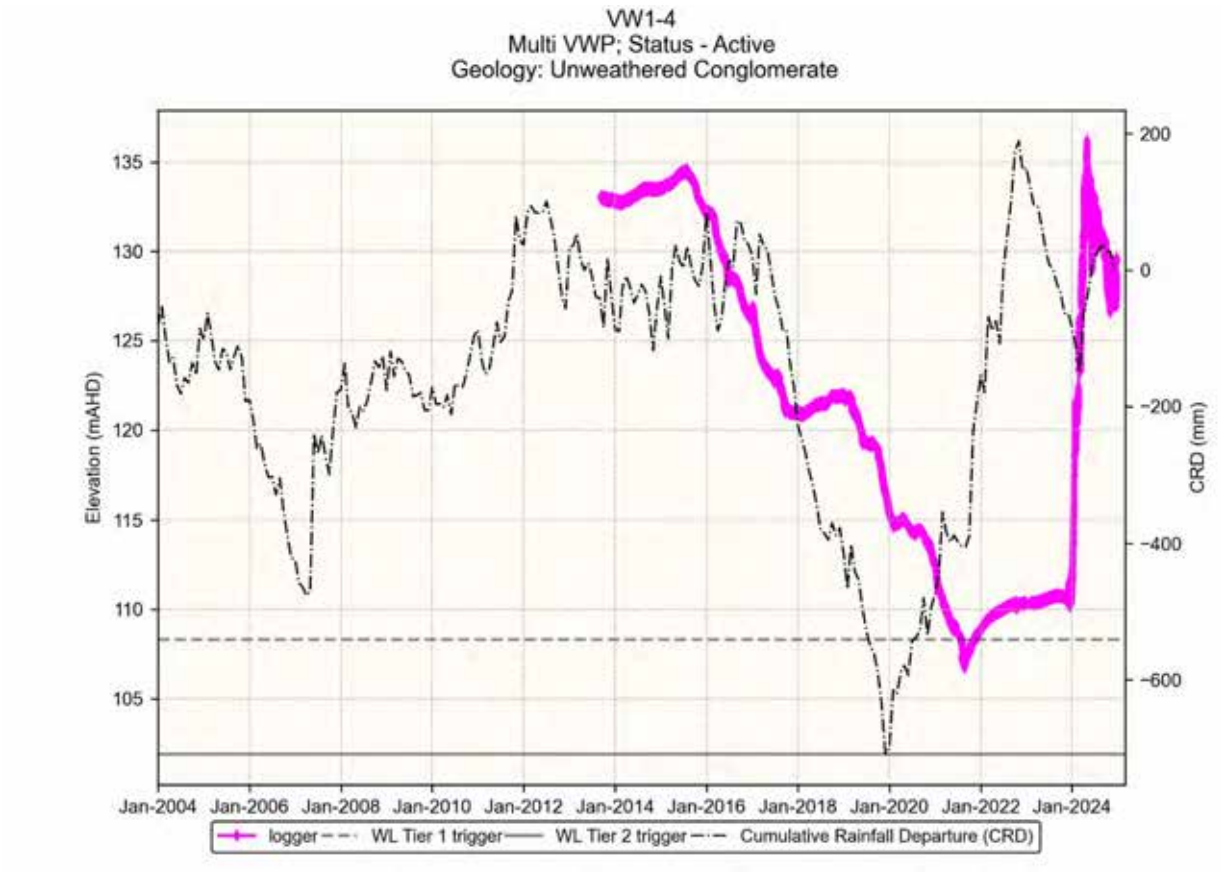


Figure D 8 VW1-4 hydrograph

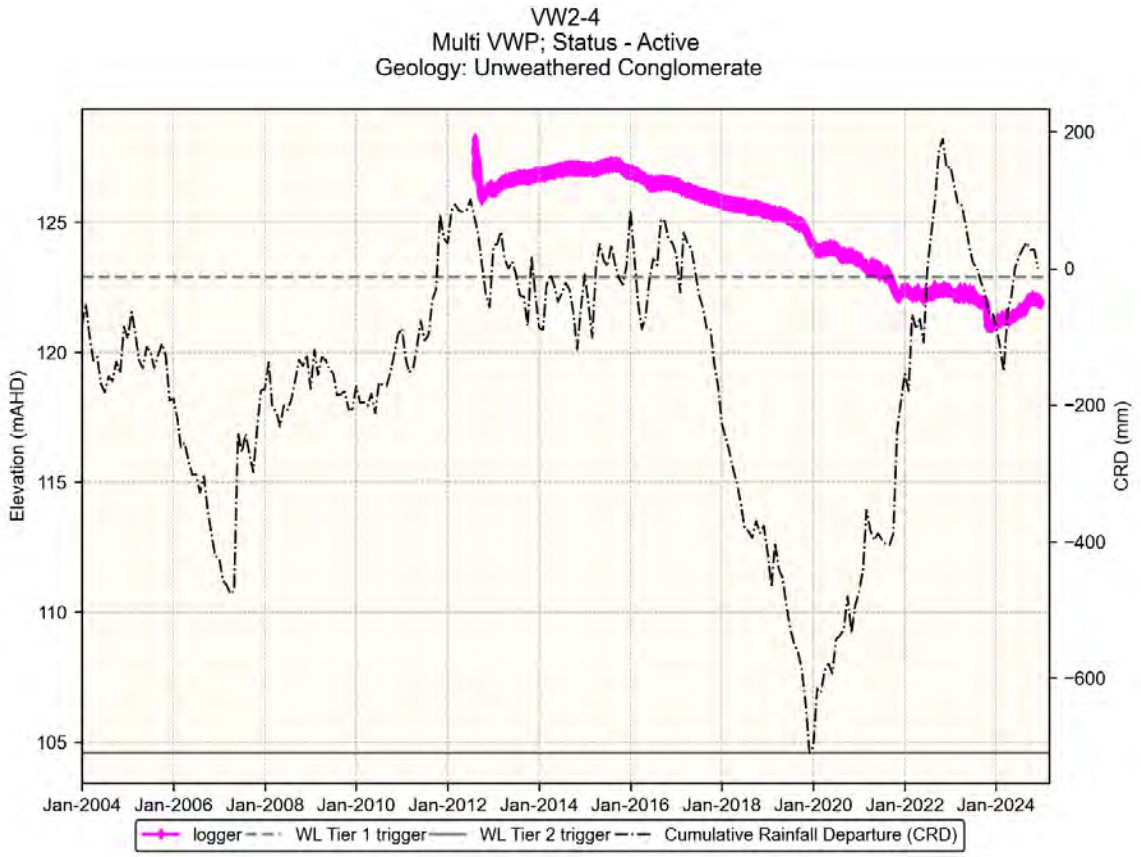


Figure D 9 VW2-4 hydrograph

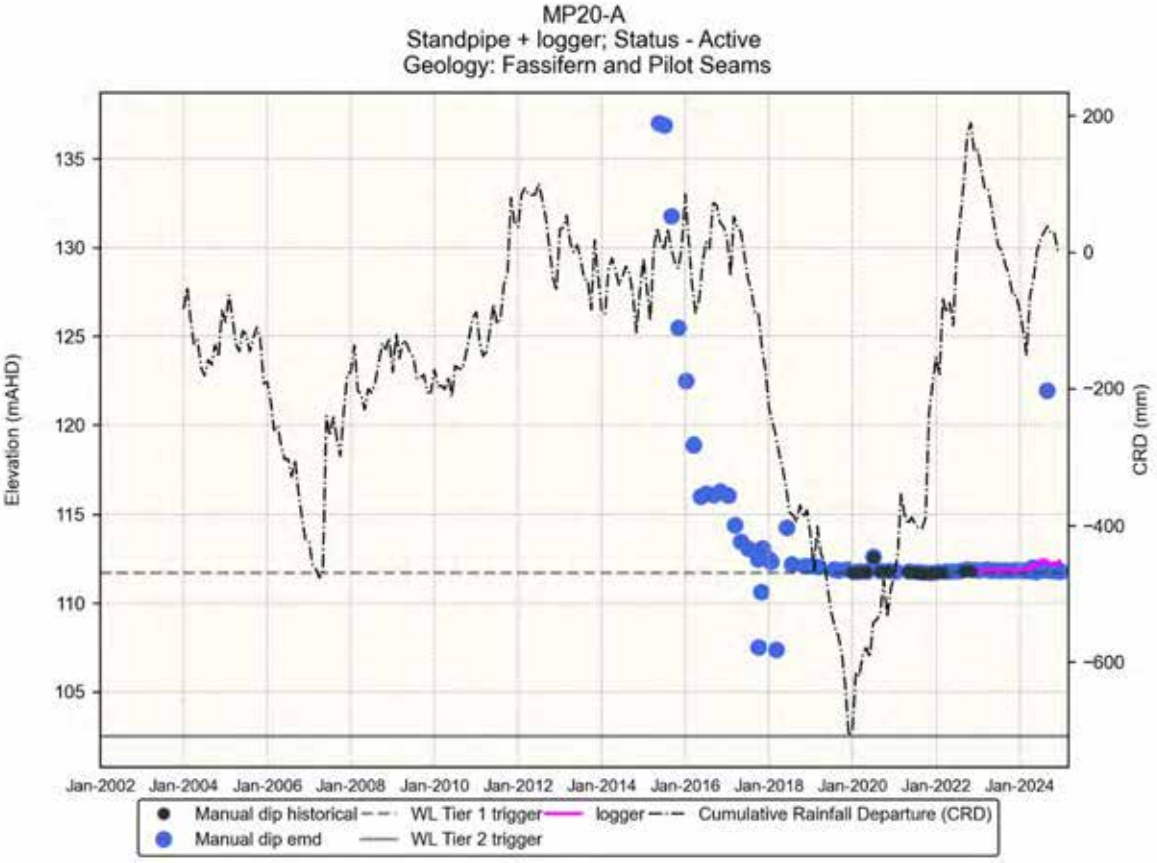


Figure D 10 MP20-A hydrograph

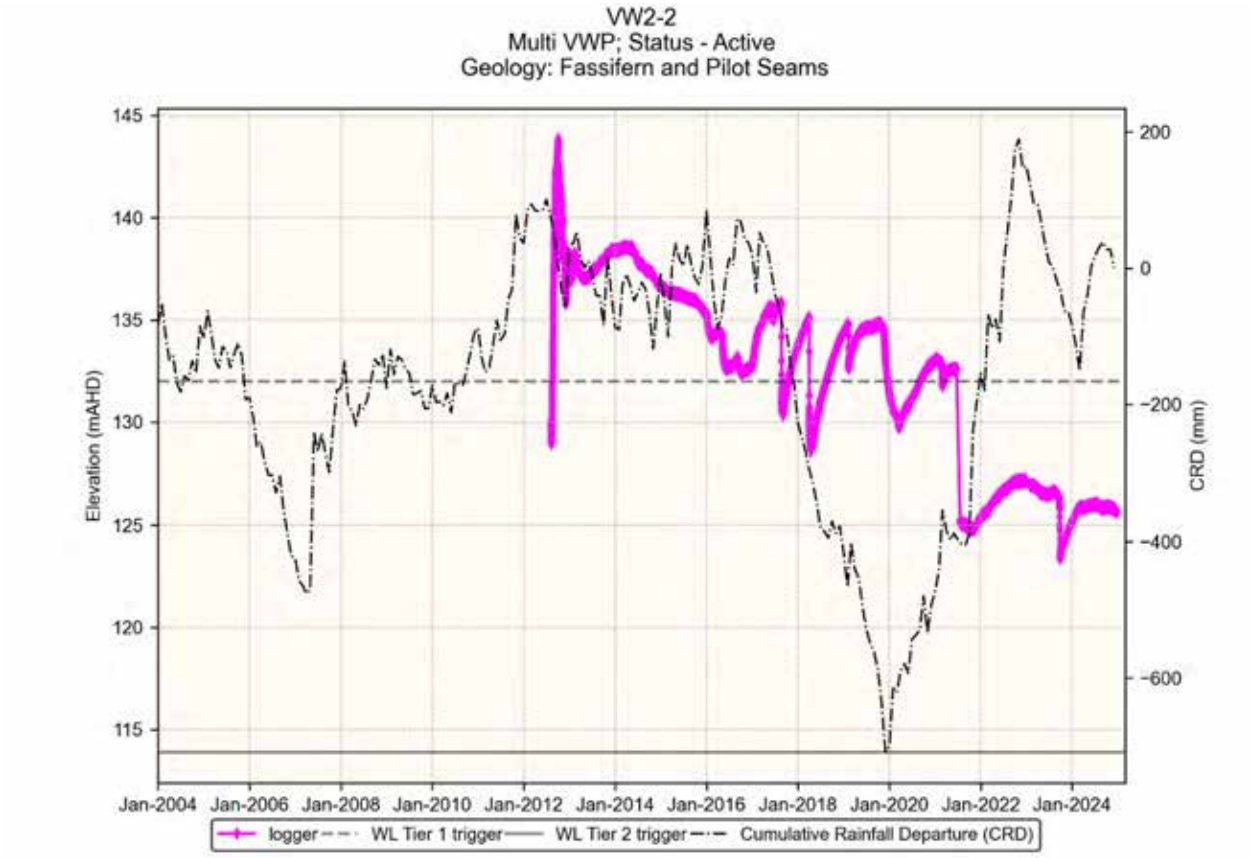


Figure D 11 VW2-2 hydrograph

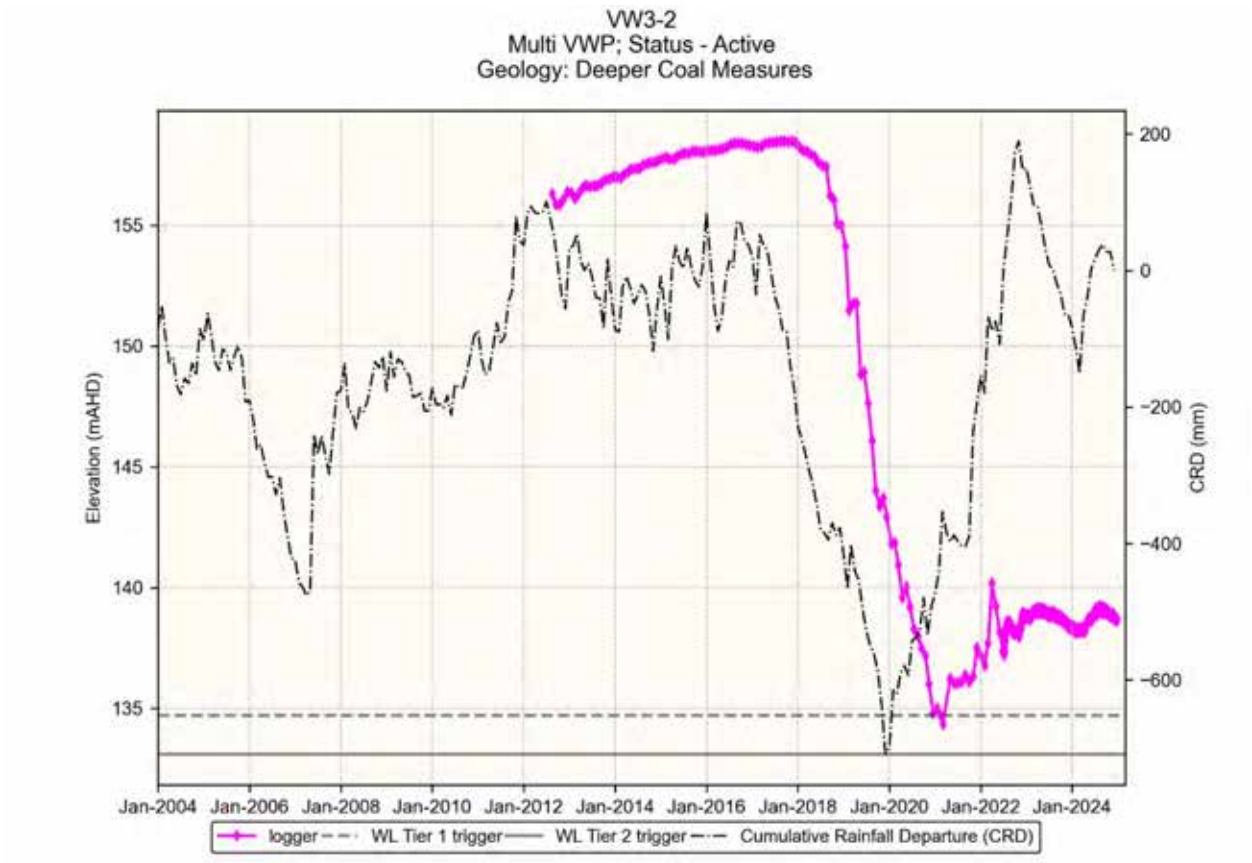


Figure D 12 VW3-2 hydrograph

Appendix E

Groundwater quality – Piper plot

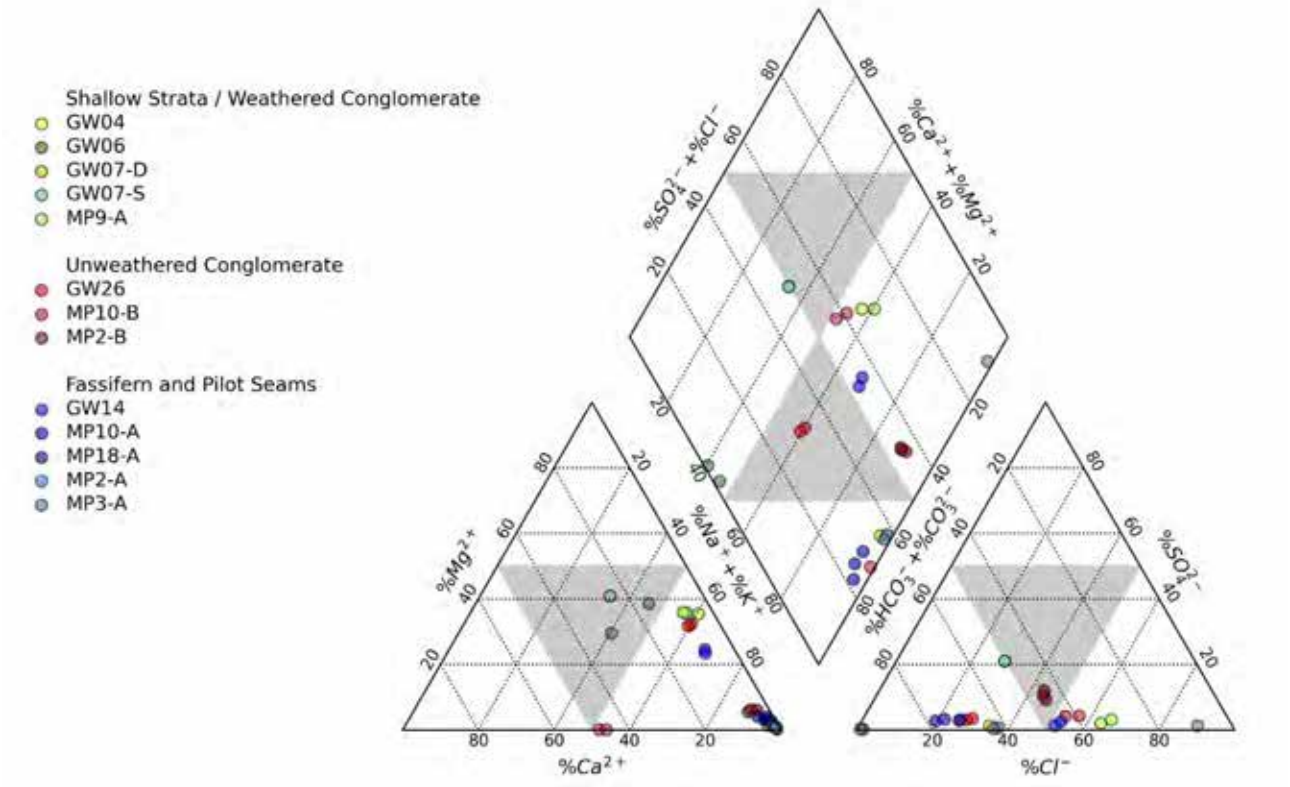


Figure E 1 Mangoola 2024 Piper Plot

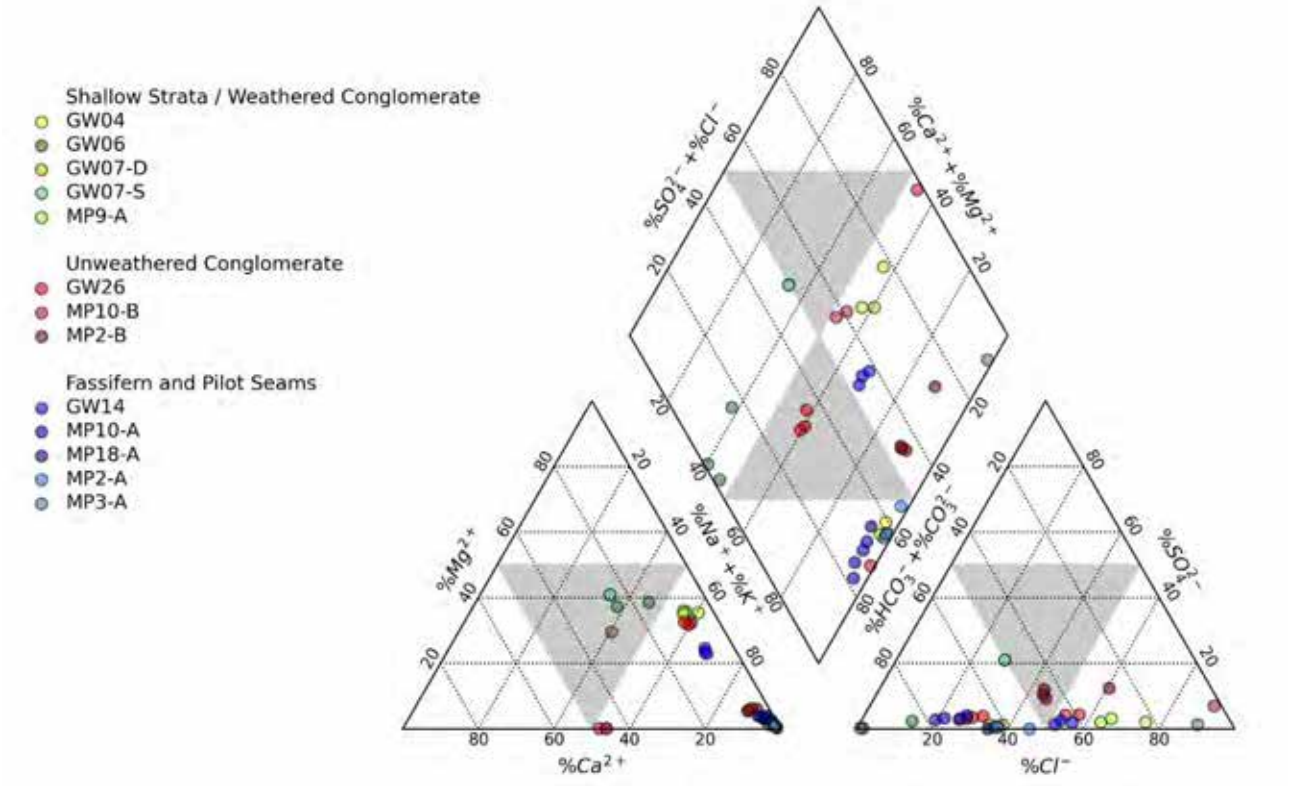


Figure E 2 Mangoola total EMD (2023-2024) Piper Plot

Appendix F

Groundwater quality trigger bore – stacked charts

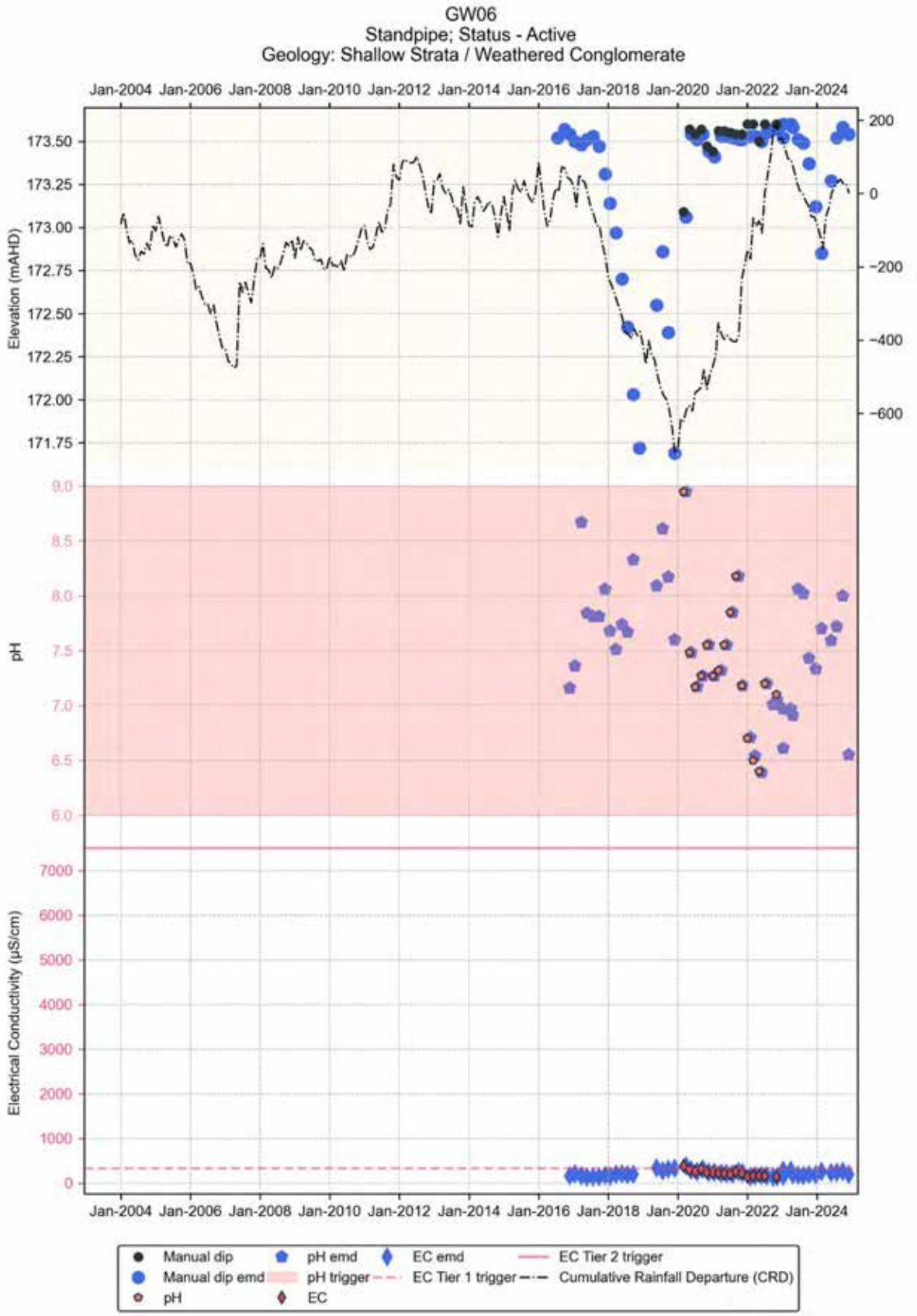


Figure F 1 GW06 groundwater quality triggers chart

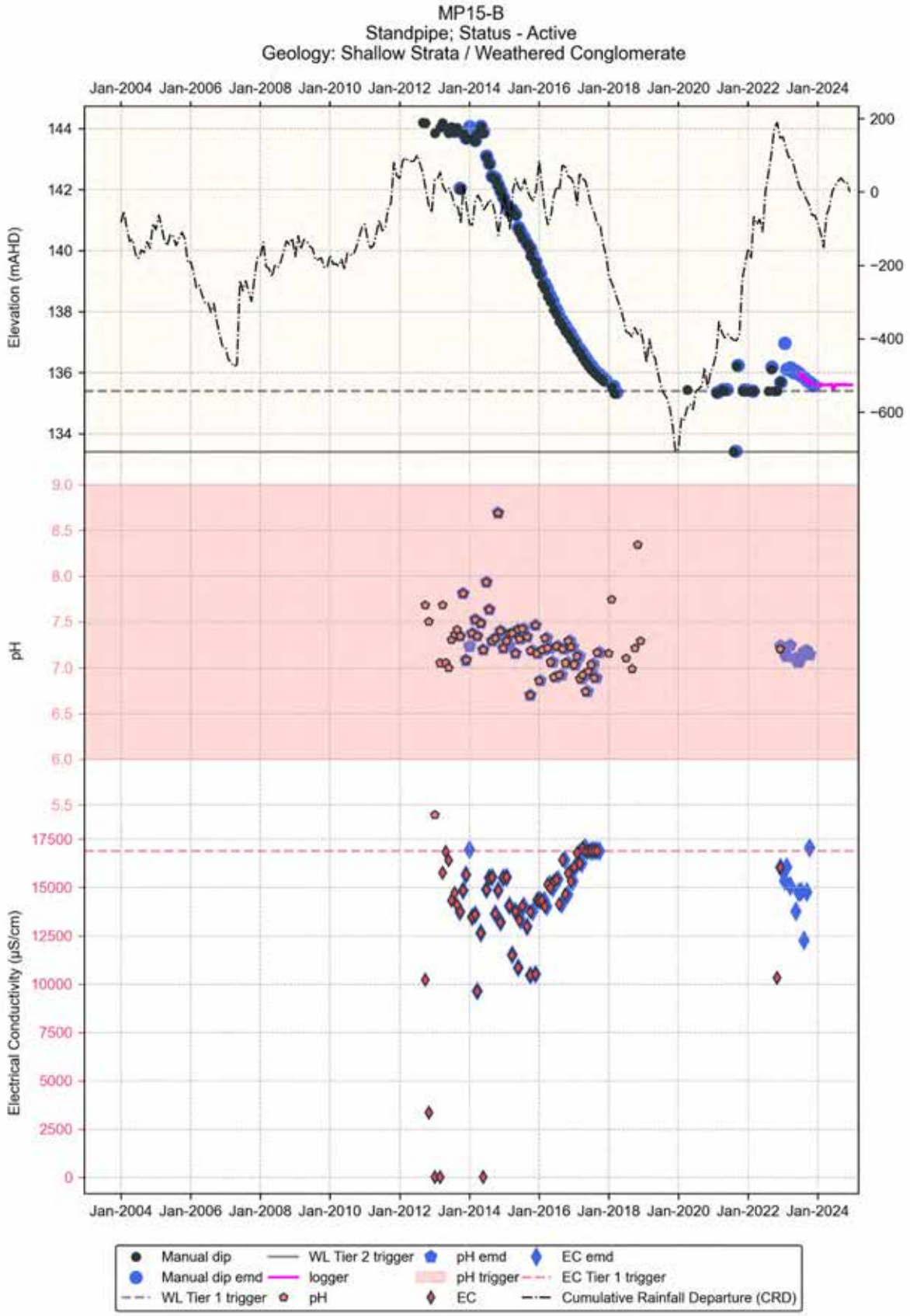


Figure F 2 MP15-B groundwater quality triggers chart

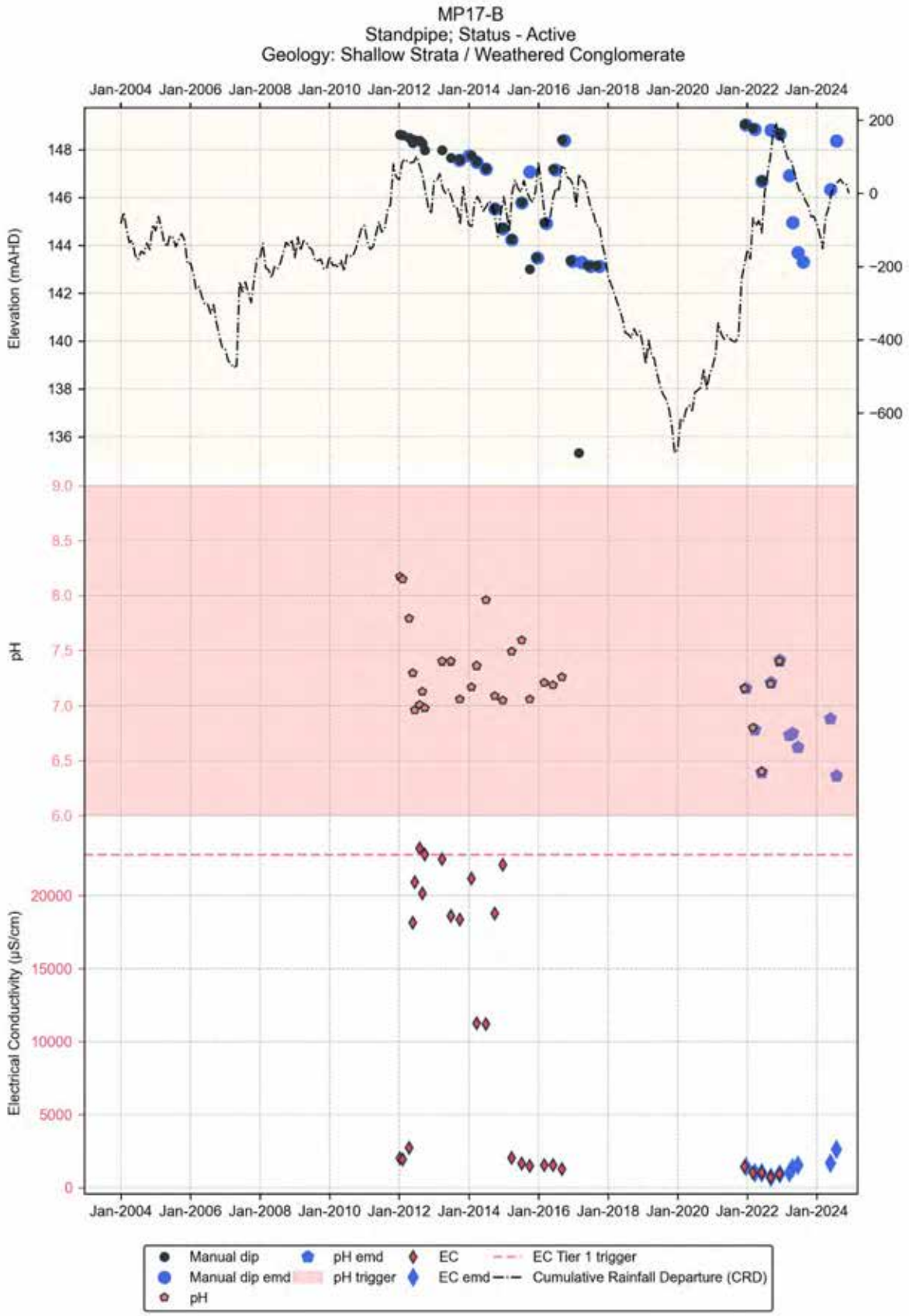


Figure F 3 MP17-B groundwater quality triggers chart

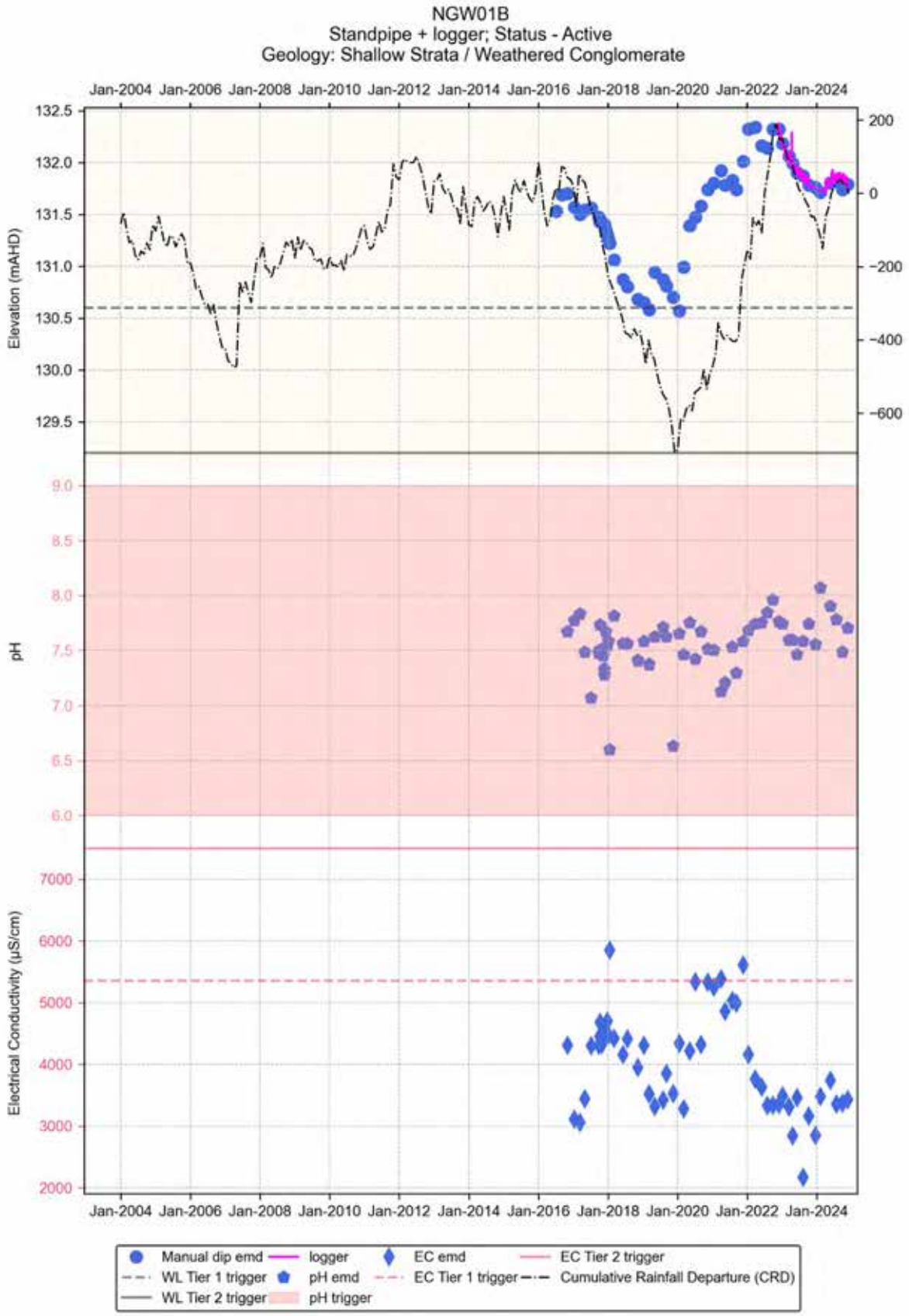


Figure F 4 NGW01B groundwater quality triggers chart

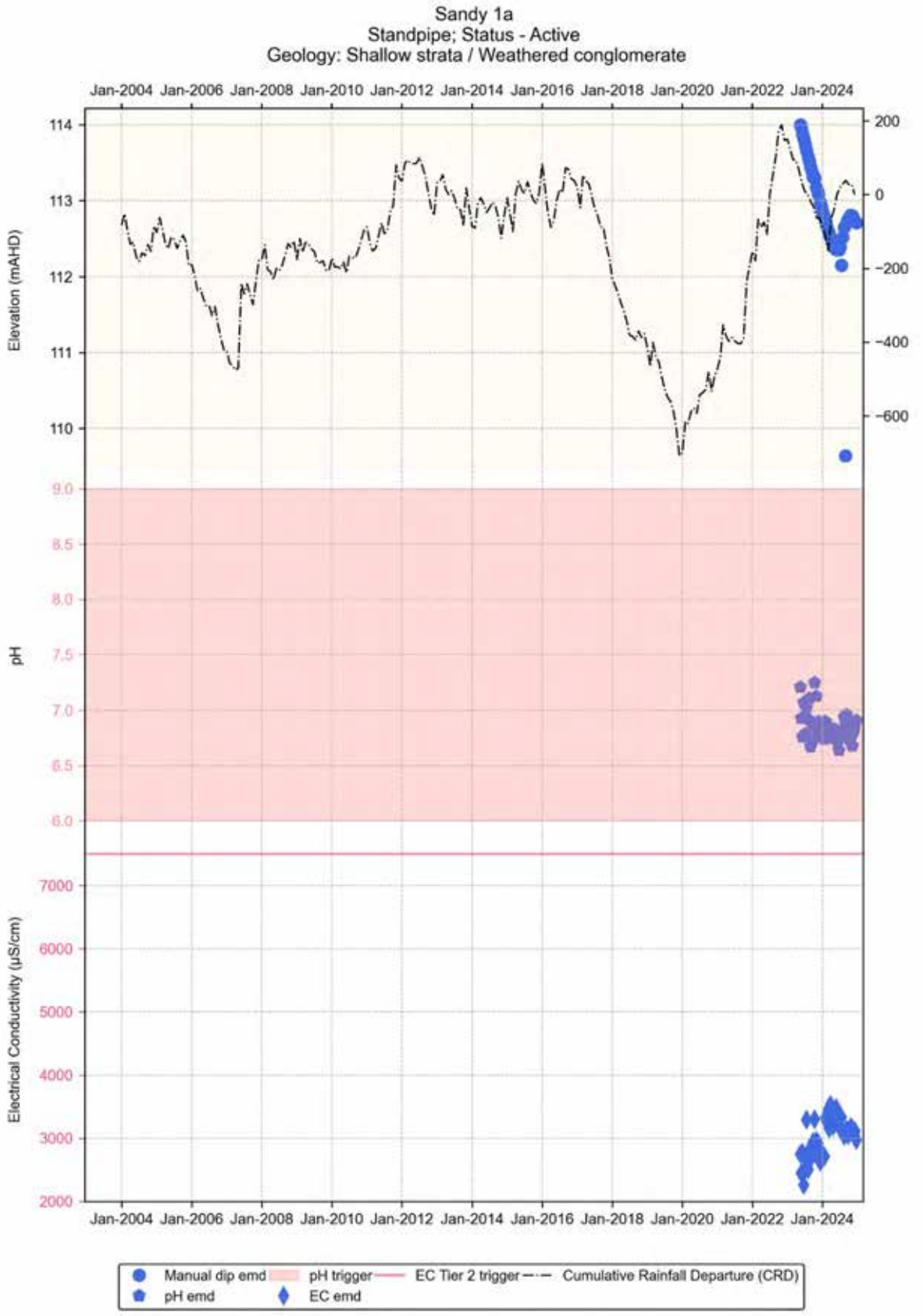


Figure F 5 Sandy 1a groundwater quality triggers chart

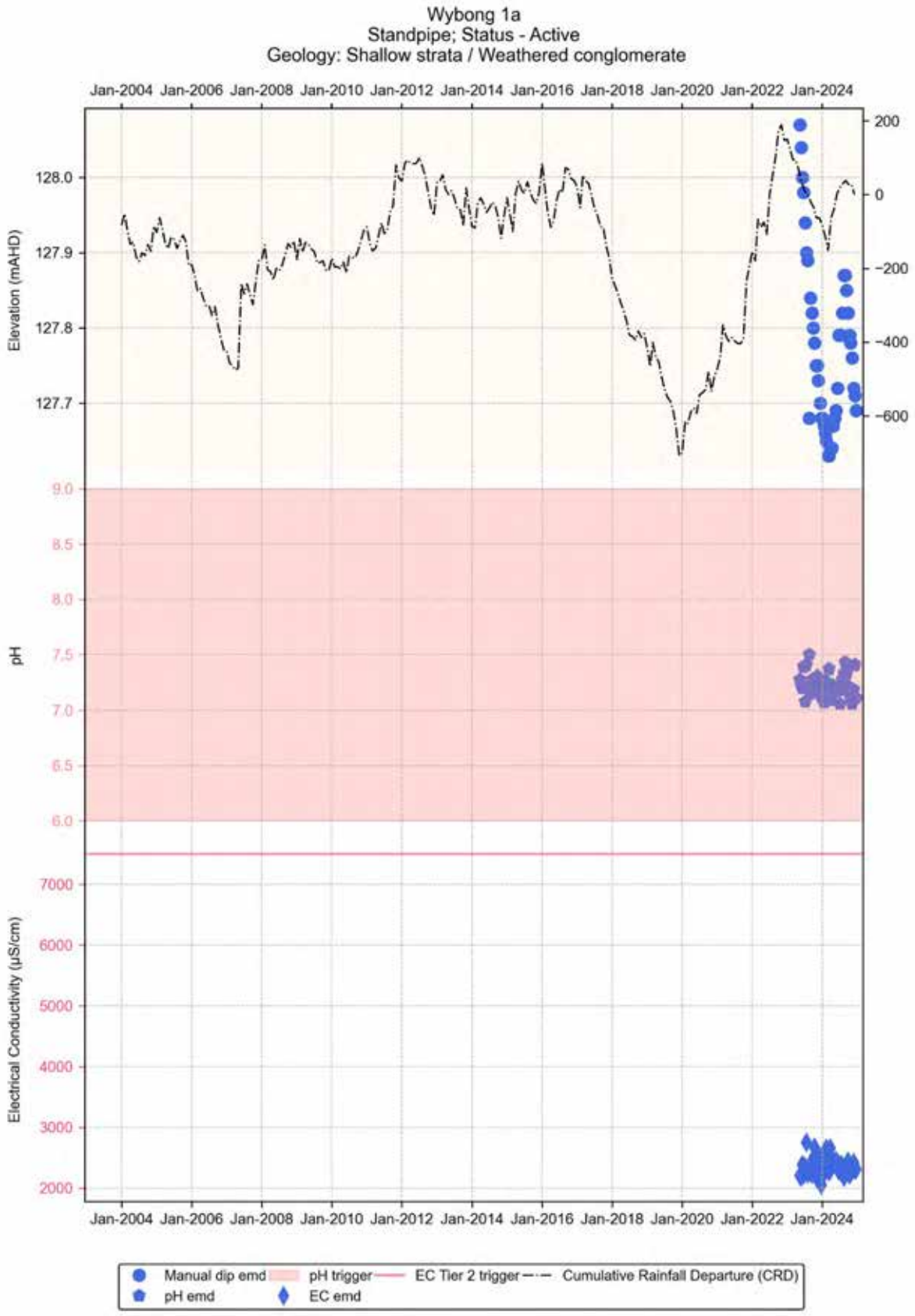


Figure F 6 Wybong 1a groundwater quality triggers chart

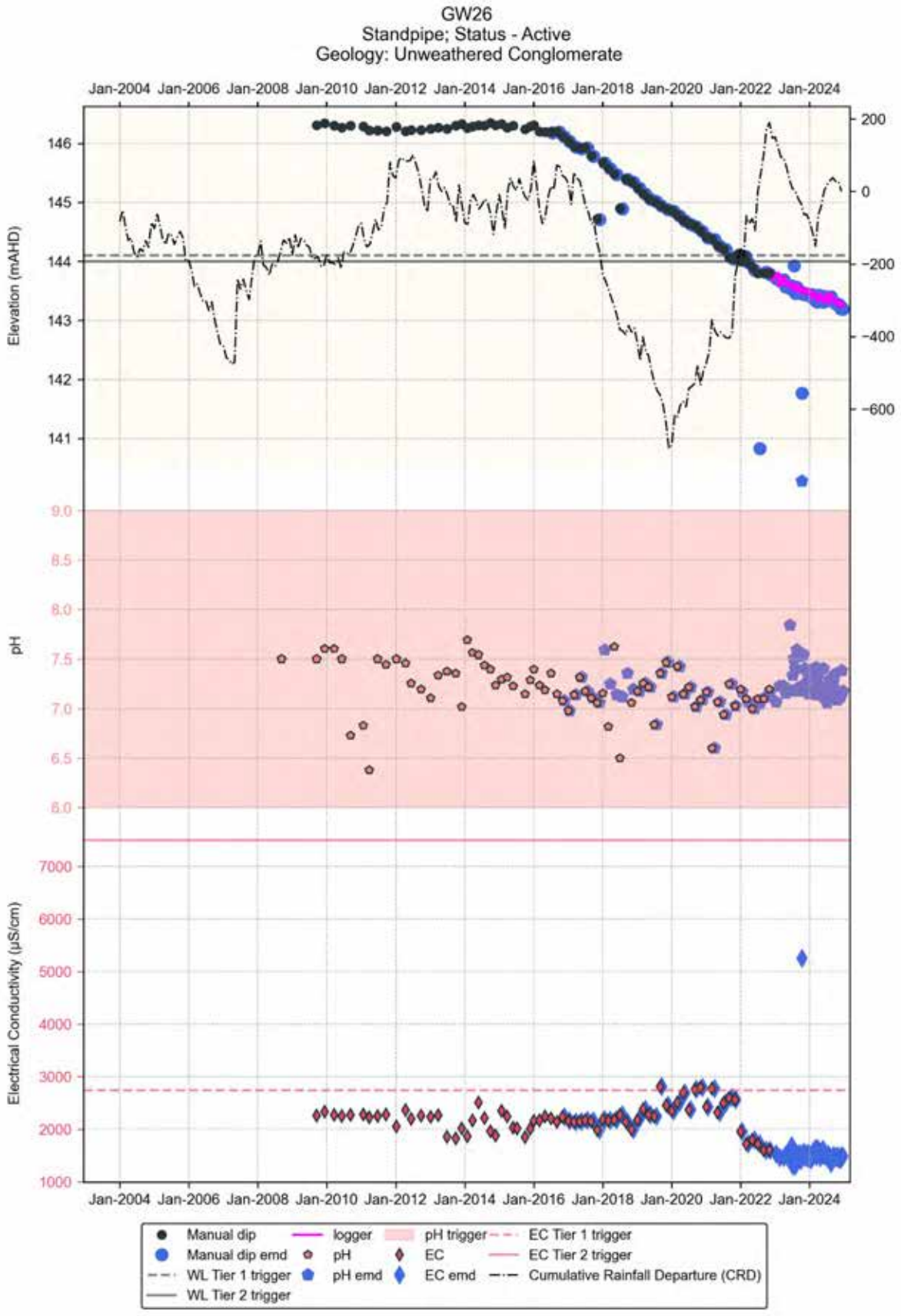


Figure F 7 GW26 groundwater quality triggers chart

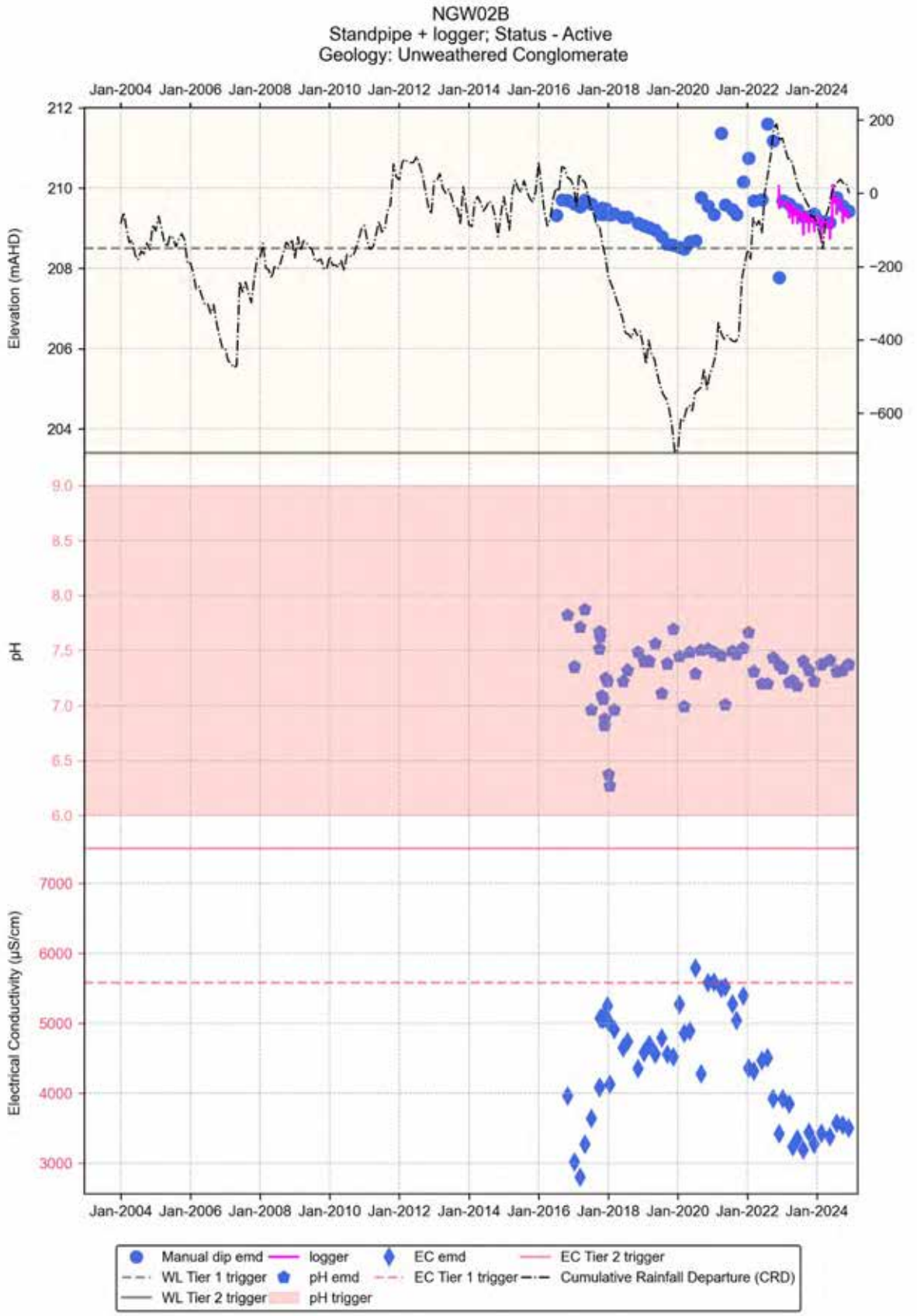


Figure F 8 NGW02B groundwater quality triggers chart

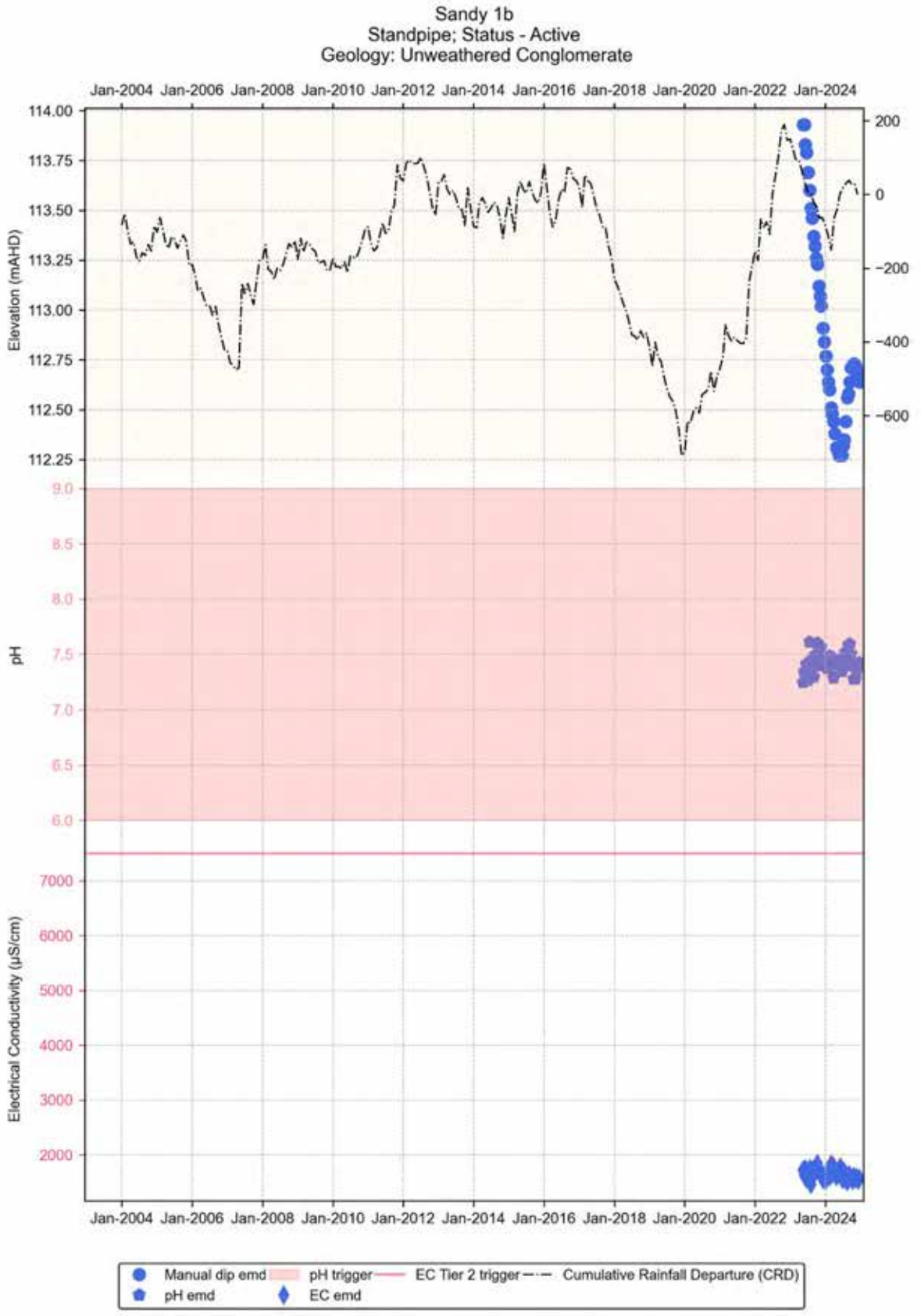


Figure F 9 Sandy 1b groundwater quality triggers chart

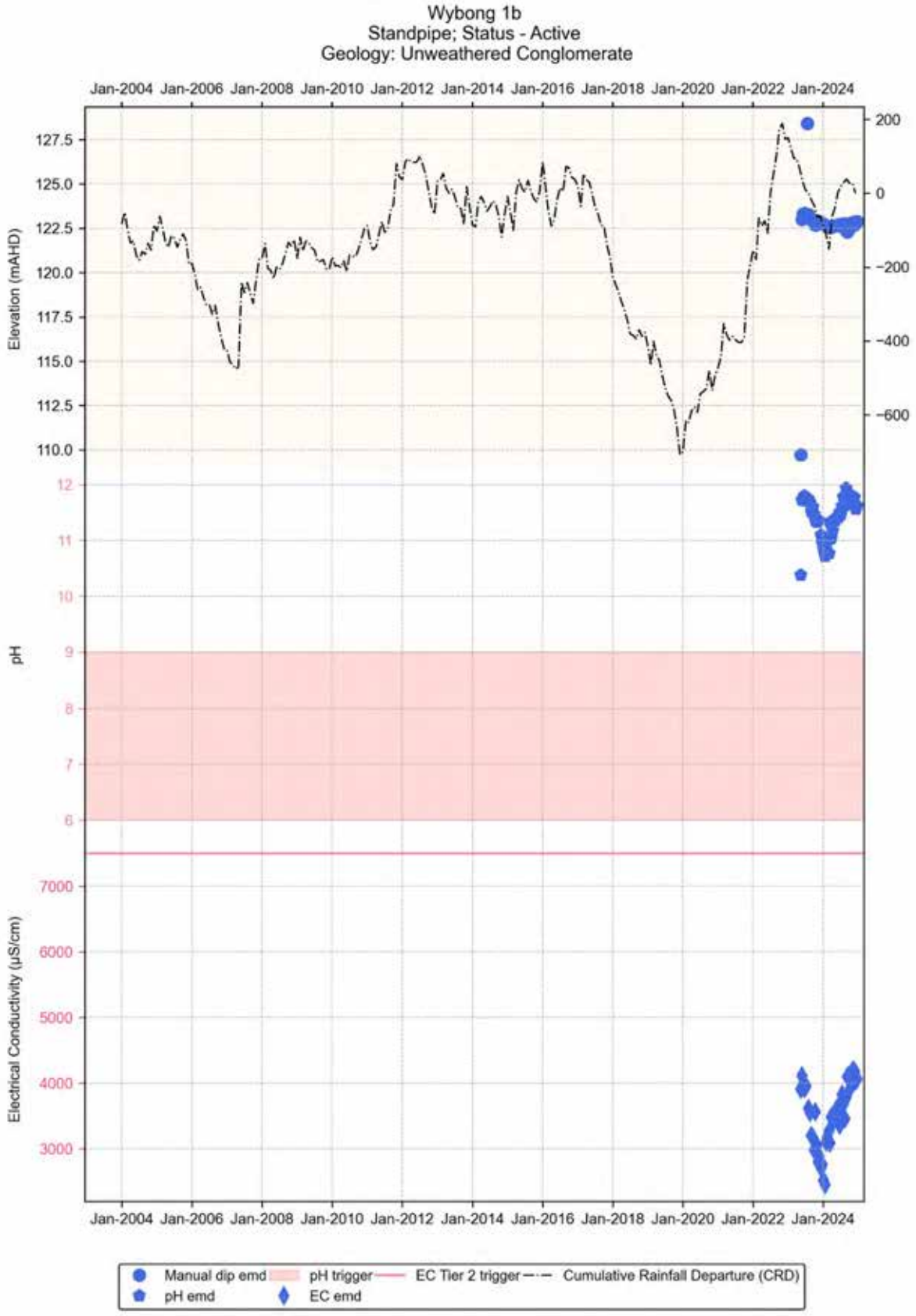


Figure F 10 Wybong 1b groundwater quality triggers chart

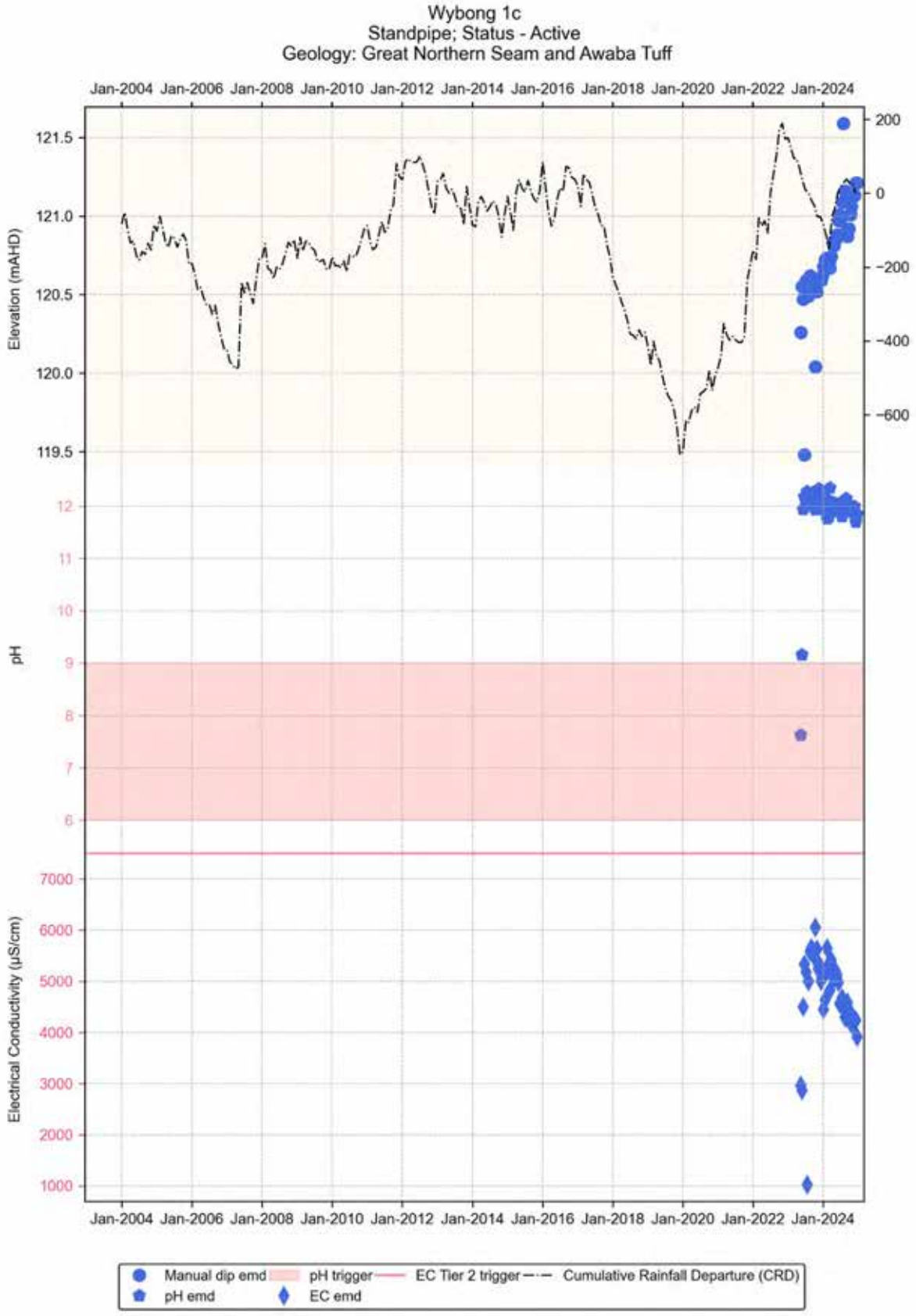


Figure F 11 Wybong 1c groundwater quality triggers chart

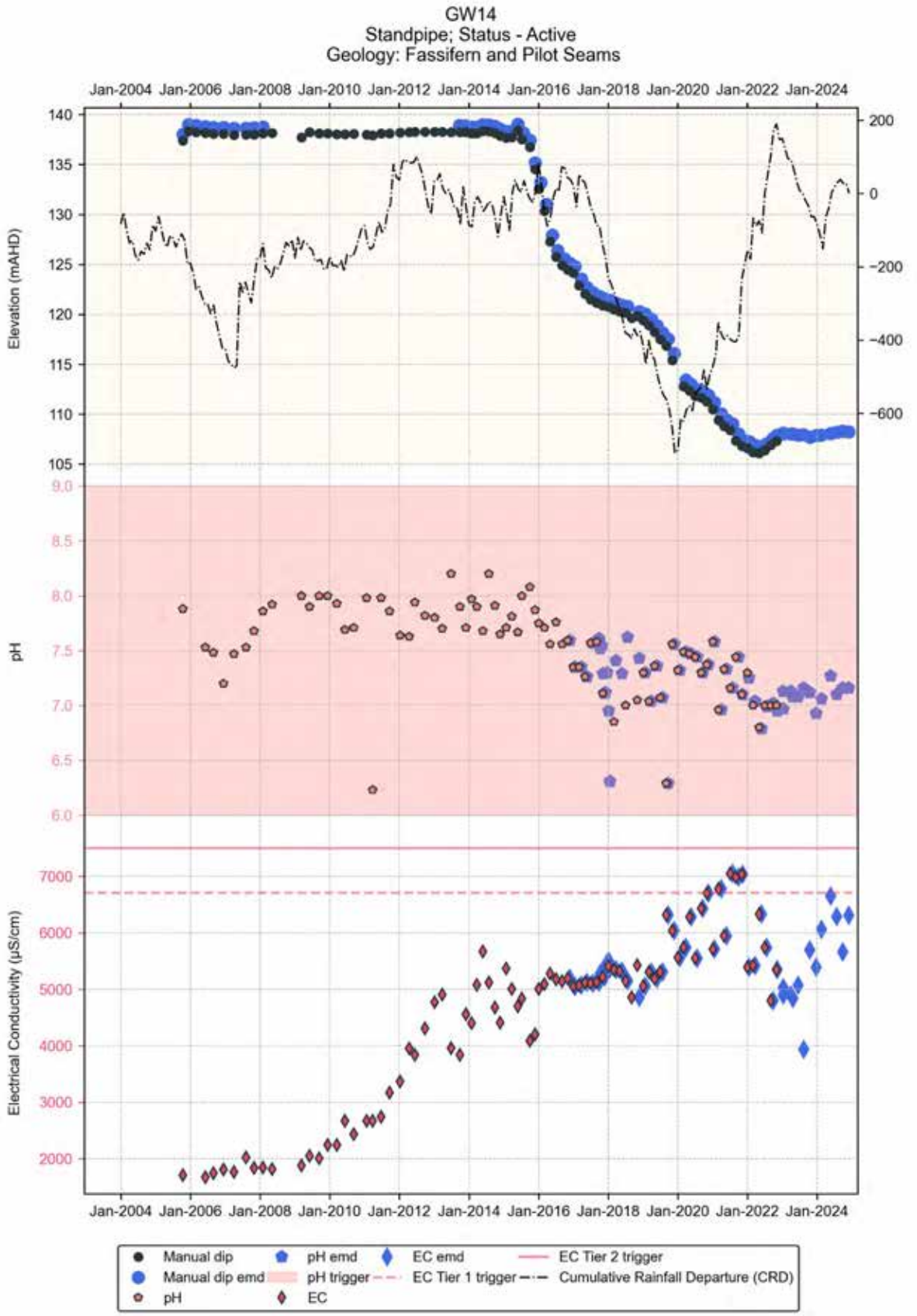


Figure F 12 GW14 groundwater quality triggers chart

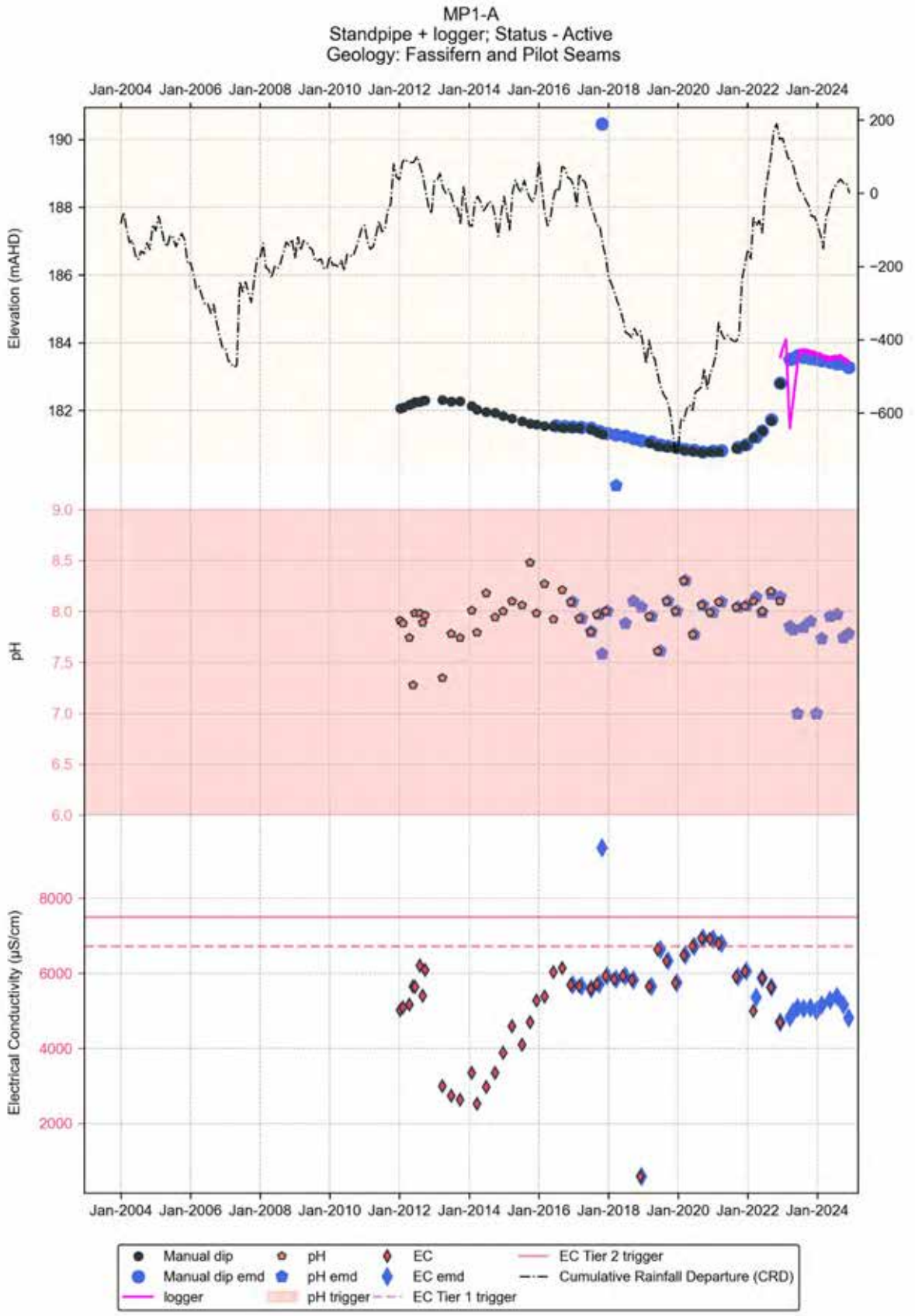


Figure F 13 MP1-A groundwater quality triggers chart

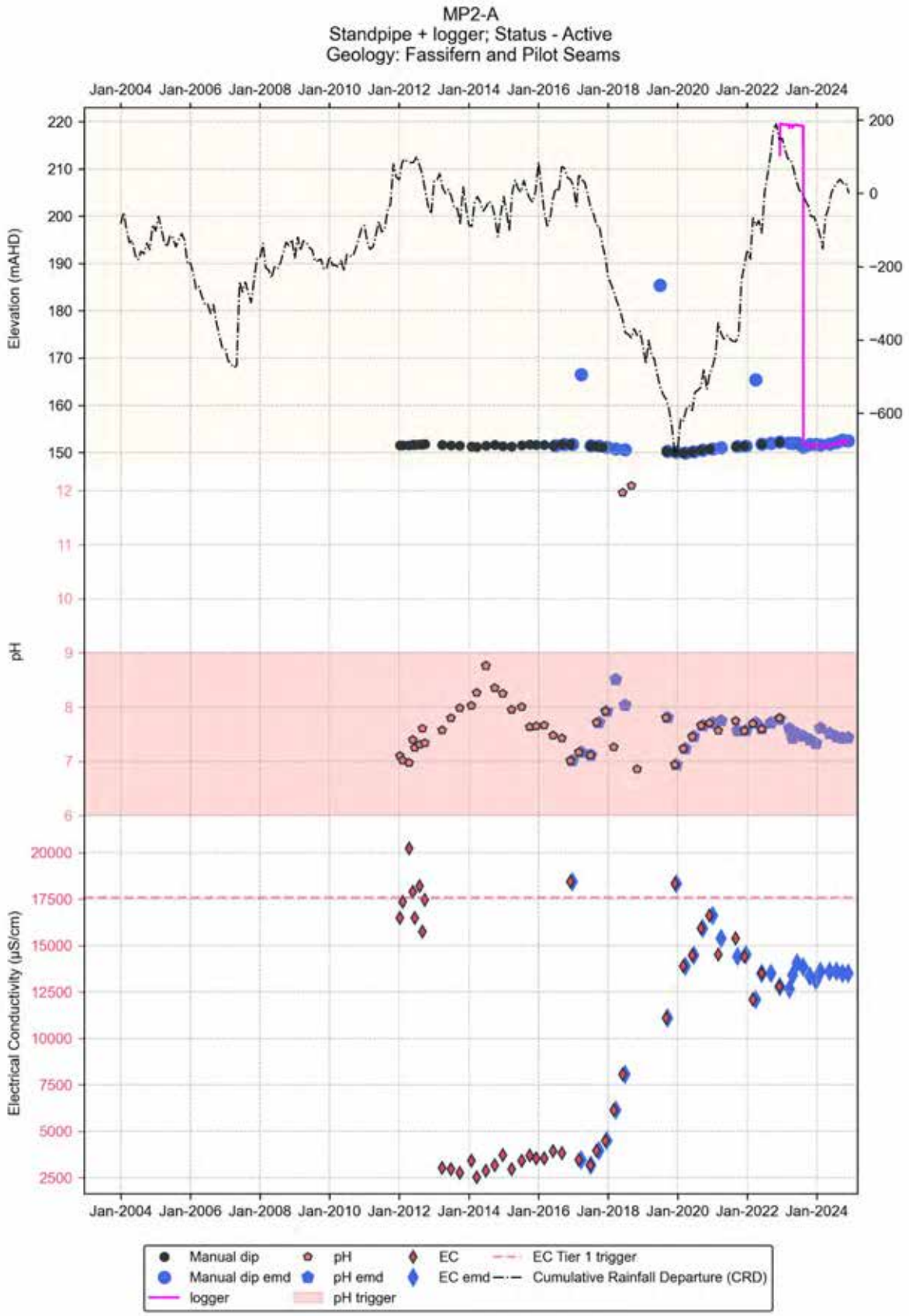


Figure F 14 MP2-A groundwater quality triggers chart

Appendix G - Annual Train Movements 2024

INDIVIDUAL TRAIN DETAILS

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
1	02-Jan-24 09:41:00	02-Jan-24 11:36:00	9,241.07
2	01-Jan-24 12:18:00	01-Jan-24 13:58:00	8,506.00
3	01-Jan-24 15:22:26	01-Jan-24 17:09:23	9,167.05
4	01-Jan-24 18:51:21	01-Jan-24 20:40:59	9,190.48
5	02-Jan-24 00:41:13	02-Jan-24 02:20:49	9,248.25
6	02-Jan-24 19:16:00	02-Jan-24 20:56:27	9,269.53
7	02-Jan-24 21:21:25	02-Jan-24 23:24:18	9,244.72
8	03-Jan-24 08:18:12	03-Jan-24 10:06:11	8,509.99
9	03-Jan-24 11:10:06	03-Jan-24 13:05:53	9,296.59
10	04-Jan-24 01:57:15	04-Jan-24 03:37:14	9,251.98
11	04-Jan-24 22:10:06	04-Jan-24 23:47:13	8,476.07
12	04-Jan-24 12:44:47	04-Jan-24 14:30:38	9,240.38
13	04-Jan-24 19:57:28	04-Jan-24 21:39:36	9,236.87
14	05-Jan-24 03:49:43	05-Jan-24 05:50:09	9,255.23
15	05-Jan-24 16:56:34	05-Jan-24 18:39:00	9,247.49
16	06-Jan-24 02:52:00	06-Jan-24 04:44:00	9,199.25
17	06-Jan-24 05:18:00	06-Jan-24 07:22:00	9,184.53
18	06-Jan-24 08:03:41	06-Jan-24 09:57:46	9,232.45
19	06-Jan-24 14:55:03	06-Jan-24 16:33:19	9,257.84
20	06-Jan-24 19:32:56	06-Jan-24 21:25:23	9,270.51
21	07-Jan-24 10:05:40	07-Jan-24 12:09:17	8,497.79

DAILY SUMMARY

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
01-Jan-24	6	26863.53
02-Jan-24	8	37003.57
03-Jan-24	4	17806.58
04-Jan-24	8	36205.30
05-Jan-24	4	18502.72
06-Jan-24	10	46144.58
07-Jan-24	5	17749.78
08-Jan-24	8	36089.42
09-Jan-24	2	9252.38
10-Jan-24	1	9291.89
11-Jan-24	1	0.00
12-Jan-24	10	45495.16
13-Jan-24	5	27812.82
14-Jan-24	6	26942.33
15-Jan-24	7	26988.95
16-Jan-24	5	27755.34
17-Jan-24	7	26945.56
18-Jan-24	3	18537.85
19-Jan-24	6	27008.08
20-Jan-24	6	27060.60
21-Jan-24	6	27833.49

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
22	07-Jan-24 19:24:29	07-Jan-24 21:06:33	9,251.99
23	07-Jan-24 23:05:00	08-Jan-24 00:43:00	9,158.02
24	08-Jan-24 08:08:46	08-Jan-24 10:09:33	9,233.42
25	08-Jan-24 14:02:00	08-Jan-24 15:37:00	8,468.97
26	08-Jan-24 16:30:46	08-Jan-24 18:28:38	9,229.01
27	08-Jan-24 23:19:46	09-Jan-24 01:14:09	9,252.38
28	10-Jan-24 00:39:00	10-Jan-24 02:20:00	9,291.89
29	11-Jan-24 22:49:00	12-Jan-24 00:55:00	9,187.82
30	12-Jan-24 01:25:00	12-Jan-24 03:49:00	8,489.93
31	12-Jan-24 04:22:31	12-Jan-24 06:14:49	9,297.62
32	12-Jan-24 08:00:47	12-Jan-24 09:40:02	9,261.23
33	12-Jan-24 11:53:00	12-Jan-24 13:43:00	9,258.56
34	12-Jan-24 23:21:56	13-Jan-24 01:09:43	9,279.68
35	13-Jan-24 09:36:00	13-Jan-24 11:29:00	9,244.71
36	13-Jan-24 21:41:42	13-Jan-24 23:28:35	9,288.43
37	14-Jan-24 01:41:31	14-Jan-24 03:22:10	8,496.42
38	14-Jan-24 11:50:21	14-Jan-24 13:28:04	9,234.88
39	14-Jan-24 17:26:18	14-Jan-24 19:47:51	9,211.03
40	15-Jan-24 13:44:00	15-Jan-24 15:21:00	9,219.19
41	15-Jan-24 17:14:13	15-Jan-24 20:38:20	9,269.68
42	15-Jan-24 21:33:37	15-Jan-24 23:25:00	8,500.08
43	16-Jan-24 00:54:07	16-Jan-24 05:46:18	9,200.17
44	16-Jan-24 09:10:15	16-Jan-24 10:51:10	9,290.76
45	16-Jan-24 15:17:20	16-Jan-24 17:18:27	9,264.41
46	17-Jan-24 03:59:20	17-Jan-24 05:50:07	9,215.58
47	17-Jan-24 19:19:40	17-Jan-24 21:17:50	9,236.87

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
22-Jan-24	2	9273.10
23-Jan-24	8	36286.51
24-Jan-24	6	18570.02
25-Jan-24	7	36386.53
26-Jan-24	7	37041.62
27-Jan-24	9	37044.18
28-Jan-24	9	45529.23
29-Jan-24	7	27807.29
30-Jan-24	5	27064.78
31-Jan-24	4	18499.08
01-Feb-24	6	26986.79
02-Feb-24	8	36241.66
03-Feb-24	8	36297.74
04-Feb-24	9	36201.84
05-Feb-24	9	44952.54
06-Feb-24	0	0.00
07-Feb-24	0	0.00
08-Feb-24	0	0.00
09-Feb-24	9	36999.88
10-Feb-24	13	58278.75
11-Feb-24	6	21999.51
12-Feb-24	4	13444.57
13-Feb-24	2	9240.90
14-Feb-24	6	27813.92
15-Feb-24	8	36294.99
16-Feb-24	4	18500.73

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
48	17-Jan-24 21:50:00	17-Jan-24 23:44:00	8,493.11
49	18-Jan-24 00:13:38	18-Jan-24 02:00:10	9,271.11
50	18-Jan-24 21:43:20	18-Jan-24 23:23:36	9,266.74
51	19-Jan-24 01:19:56	19-Jan-24 03:10:22	9,242.86
52	19-Jan-24 11:43:35	19-Jan-24 13:16:40	8,485.61
53	19-Jan-24 22:11:31	19-Jan-24 23:55:19	9,279.61
54	20-Jan-24 00:31:18	20-Jan-24 02:11:18	9,248.33
55	20-Jan-24 07:39:59	20-Jan-24 09:23:32	8,500.27
56	20-Jan-24 12:37:25	20-Jan-24 14:14:57	9,312.00
57	21-Jan-24 03:55:11	21-Jan-24 05:33:28	9,295.84
58	21-Jan-24 06:21:01	21-Jan-24 08:15:16	9,243.89
59	21-Jan-24 12:15:20	21-Jan-24 13:52:47	9,293.76
60	22-Jan-24 21:16:00	22-Jan-24 22:57:00	9,273.10
61	23-Jan-24 02:15:00	23-Jan-24 03:53:00	9,207.00
62	23-Jan-24 05:25:43	23-Jan-24 07:20:03	9,278.20
63	23-Jan-24 10:12:44	23-Jan-24 12:07:27	8,499.21
64	23-Jan-24 22:05:50	23-Jan-24 23:47:05	9,302.10
65	24-Jan-24 09:19:20	24-Jan-24 11:14:25	9,283.63
66	24-Jan-24 15:30:07	24-Jan-24 17:18:59	9,286.39
67	24-Jan-24 22:55:52	25-Jan-24 00:46:03	9,283.77
68	25-Jan-24 01:38:00	25-Jan-24 03:27:00	9,271.63
69	25-Jan-24 05:07:05	25-Jan-24 07:04:38	8,511.13
70	25-Jan-24 10:26:00	25-Jan-24 12:26:00	9,320.00
71	25-Jan-24 23:20:18	26-Jan-24 01:06:03	9,304.49
72	26-Jan-24 04:29:17	26-Jan-24 06:27:35	9,294.93
73	26-Jan-24 11:22:09	26-Jan-24 13:02:12	9,292.21

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
17-Feb-24	6	27751.67
18-Feb-24	0	0.00
19-Feb-24	4	17704.78
20-Feb-24	7	27754.59
21-Feb-24	5	26989.57
22-Feb-24	0	0.00
23-Feb-24	6	27055.18
24-Feb-24	7	27776.19
25-Feb-24	9	45325.38
26-Feb-24	2	9288.54
27-Feb-24	6	17799.65
28-Feb-24	6	27810.94
29-Feb-24	4	17815.25
01-Mar-24	8	36311.89
02-Mar-24	4	18564.12
03-Mar-24	9	36253.53
04-Mar-24	5	27874.04
05-Mar-24	8	36303.08
06-Mar-24	8	37004.16
07-Mar-24	8	27674.56
08-Mar-24	9	45493.87
09-Mar-24	6	27001.56
10-Mar-24	8	37073.85
11-Mar-24	9	44707.81
12-Mar-24	9	31934.32
13-Mar-24	7	36263.74

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
74	26-Jan-24 22:08:00	26-Jan-24 23:51:00	9,149.99
75	27-Jan-24 02:24:58	27-Jan-24 04:04:41	9,275.40
76	27-Jan-24 10:25:05	27-Jan-24 12:14:29	9,255.75
77	27-Jan-24 19:32:42	27-Jan-24 21:16:32	9,232.05
78	27-Jan-24 22:09:23	27-Jan-24 23:53:12	9,280.98
79	28-Jan-24 00:44:04	28-Jan-24 03:10:00	8,502.89
80	28-Jan-24 04:47:43	28-Jan-24 06:30:52	9,222.19
81	28-Jan-24 11:35:10	28-Jan-24 13:30:52	9,288.45
82	28-Jan-24 15:12:06	28-Jan-24 16:52:09	9,272.59
83	28-Jan-24 18:14:46	28-Jan-24 20:34:27	9,243.11
84	29-Jan-24 01:37:34	29-Jan-24 03:18:53	9,291.54
85	29-Jan-24 03:59:29	29-Jan-24 05:37:36	9,290.60
86	29-Jan-24 11:20:39	29-Jan-24 13:02:15	9,225.15
87	30-Jan-24 01:55:03	30-Jan-24 03:57:30	9,285.68
88	29-Jan-24 23:37:45	30-Jan-24 01:32:13	8,500.40
89	30-Jan-24 15:08:40	30-Jan-24 16:45:28	9,278.70
90	31-Jan-24 04:28:51	31-Jan-24 06:12:47	9,240.83
91	31-Jan-24 12:47:12	31-Jan-24 14:25:06	9,258.25
92	01-Feb-24 10:50:33	01-Feb-24 12:33:27	8,524.56
93	01-Feb-24 10:21:00	01-Feb-24 12:20:00	9,266.83
94	01-Feb-24 15:51:14	01-Feb-24 17:52:39	9,195.40
95	02-Feb-24 04:04:41	02-Feb-24 06:15:52	9,277.70
96	02-Feb-24 07:49:00	02-Feb-24 10:04:00	9,249.42
97	02-Feb-24 14:42:35	02-Feb-24 16:32:42	9,203.31
98	02-Feb-24 17:28:59	02-Feb-24 20:18:14	8,511.23
99	03-Feb-24 01:45:00	03-Feb-24 03:28:00	9,248.67

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
14-Mar-24	2	4261.46
15-Mar-24	2	8516.47
16-Mar-24	2	4252.29
17-Mar-24	1	0.00
18-Mar-24	3	12748.43
19-Mar-24	2	4254.69
20-Mar-24	2	8480.98
21-Mar-24	3	9259.98
22-Mar-24	3	13513.03
23-Mar-24	4	18587.53
24-Mar-24	6	27782.53
25-Mar-24	4	18582.00
26-Mar-24	10	46334.21
27-Mar-24	9	36289.09
28-Mar-24	4	18434.35
29-Mar-24	6	22698.72
30-Mar-24	9	45519.25
31-Mar-24	8	36260.66
01-Apr-24	9	31978.41
02-Apr-24	13	54054.60
03-Apr-24	0	0.00
04-Apr-24	0	0.00
05-Apr-24	0	0.00
06-Apr-24	5	12709.37
07-Apr-24	11	49798.75
08-Apr-24	3	9296.39

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
100	03-Feb-24 10:00:14	03-Feb-24 11:52:12	9,275.85
101	03-Feb-24 15:27:10	03-Feb-24 18:14:03	8,513.85
102	03-Feb-24 19:52:15	03-Feb-24 21:42:01	9,259.37
103	04-Feb-24 01:43:00	04-Feb-24 03:45:00	9,177.00
104	04-Feb-24 09:18:47	04-Feb-24 10:56:26	9,261.18
105	04-Feb-24 12:08:24	04-Feb-24 13:44:43	8,501.92
106	04-Feb-24 21:21:13	04-Feb-24 23:05:34	9,261.74
107	04-Feb-24 23:39:31	05-Feb-24 01:19:04	9,252.07
108	05-Feb-24 01:42:09	05-Feb-24 03:44:08	9,265.92
109	05-Feb-24 13:13:26	05-Feb-24 16:09:46	9,281.19
110	05-Feb-24 17:01:00	05-Feb-24 18:28:00	7,898.73
111	05-Feb-24 19:58:00	05-Feb-24 21:36:00	9,254.63
112	09-Feb-24 09:17:00	09-Feb-24 11:28:00	9,217.74
113	09-Feb-24 16:07:18	09-Feb-24 18:20:51	9,260.05
114	09-Feb-24 19:32:21	09-Feb-24 21:29:08	9,270.60
115	09-Feb-24 21:52:45	09-Feb-24 23:42:24	9,251.49
116	10-Feb-24 00:40:09	10-Feb-24 03:51:58	8,486.14
117	10-Feb-24 04:29:30	10-Feb-24 06:20:17	9,255.93
118	10-Feb-24 08:02:00	10-Feb-24 10:10:00	9,261.22
119	10-Feb-24 11:30:00	10-Feb-24 14:12:00	8,483.49
120	10-Feb-24 16:29:50	10-Feb-24 18:22:40	9,243.42
121	10-Feb-24 19:59:50	10-Feb-24 21:49:56	9,290.12
122	10-Feb-24 22:18:35	10-Feb-24 23:08:52	4,258.43
123	11-Feb-24 01:52:13	11-Feb-24 03:41:20	9,272.56
124	11-Feb-24 12:17:09	11-Feb-24 13:08:13	4,257.32
125	11-Feb-24 19:58:00	11-Feb-24 21:49:00	8,469.63

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
09-Apr-24	8	31272.50
10-Apr-24	4	18507.57
11-Apr-24	5	26950.86
12-Apr-24	0	0.00
13-Apr-24	6	21955.16
14-Apr-24	8	27042.05
15-Apr-24	4	13527.98
16-Apr-24	4	17763.22
17-Apr-24	5	18492.54
18-Apr-24	7	36140.10
19-Apr-24	8	31379.13
20-Apr-24	4	18591.47
21-Apr-24	10	40679.99
22-Apr-24	8	31246.95
23-Apr-24	11	40465.02
24-Apr-24	5	27806.89
25-Apr-24	4	17763.96
26-Apr-24	6	27772.87
27-Apr-24	3	8423.26
28-Apr-24	10	46116.19
29-Apr-24	5	26976.17
30-Apr-24	11	46409.29
01-May-24	7	36150.01
02-May-24	4	18420.80
03-May-24	4	17750.56
04-May-24	8	36282.03

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
126	12-Feb-24 07:49:00	12-Feb-24 08:33:00	4,257.23
127	12-Feb-24 12:00:22	12-Feb-24 13:41:35	9,187.34
128	13-Feb-24 15:46:41	13-Feb-24 17:24:28	9,240.90
129	14-Feb-24 01:54:51	14-Feb-24 05:12:46	9,239.47
130	14-Feb-24 07:32:00	14-Feb-24 09:14:00	9,311.10
131	14-Feb-24 19:32:30	14-Feb-24 21:34:10	9,263.35
132	15-Feb-24 02:29:20	15-Feb-24 04:25:35	9,255.50
133	15-Feb-24 09:21:29	15-Feb-24 11:00:50	9,294.78
134	15-Feb-24 15:29:16	15-Feb-24 17:13:25	8,523.21
135	15-Feb-24 19:29:43	15-Feb-24 21:21:11	9,221.50
136	16-Feb-24 02:32:39	16-Feb-24 04:23:53	9,237.61
137	16-Feb-24 04:55:03	16-Feb-24 06:41:03	9,263.12
138	17-Feb-24 00:13:02	17-Feb-24 01:56:16	9,220.08
139	17-Feb-24 04:25:00	17-Feb-24 06:05:00	9,243.09
140	17-Feb-24 14:24:00	17-Feb-24 16:35:00	9,288.50
141	28-Feb-24 15:09:27	28-Feb-24 17:06:15	9,279.03
142	19-Feb-24 07:32:00	19-Feb-24 18:39:00	8,501.96
143	19-Feb-24 19:32:17	19-Feb-24 21:38:09	9,202.82
144	20-Feb-24 07:50:45	20-Feb-24 09:53:05	9,255.29
145	20-Feb-24 11:29:12	20-Feb-24 13:18:35	9,257.38
146	20-Feb-24 15:23:05	20-Feb-24 17:11:20	9,241.92
147	20-Feb-24 22:37:58	21-Feb-24 00:18:21	9,230.03
148	21-Feb-24 17:43:00	21-Feb-24 19:41:00	8,500.84
149	21-Feb-24 20:31:32	21-Feb-24 22:21:10	9,258.70
150	23-Feb-24 04:53:31	23-Feb-24 06:43:14	9,265.71
151	23-Feb-24 08:32:59	23-Feb-24 10:38:53	8,520.82

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
05-May-24	10	40474.17
06-May-24	0	0.00
07-May-24	4	17772.81
08-May-24	5	18542.20
09-May-24	6	27700.24
10-May-24	7	30530.50
11-May-24	4	18462.73
12-May-24	10	45551.51
13-May-24	8	31265.70
14-May-24	11	35514.48
15-May-24	7	27038.70
16-May-24	4	18482.93
17-May-24	8	30569.37
18-May-24	5	18471.18
19-May-24	11	50545.84
20-May-24	9	36191.02
21-May-24	3	13536.16
22-May-24	0	0.00
23-May-24	0	0.00
24-May-24	3	9197.87
25-May-24	12	55570.21
26-May-24	11	55662.48
27-May-24	6	27935.94
28-May-24	4	17774.92
29-May-24	4	18582.00
30-May-24	3	9274.28

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
152	23-Feb-24 11:56:17	23-Feb-24 13:57:53	9,268.65
153	24-Feb-24 00:32:19	24-Feb-24 02:11:15	9,282.71
154	24-Feb-24 05:09:41	24-Feb-24 07:10:32	9,264.00
155	24-Feb-24 10:21:48	24-Feb-24 12:04:06	9,229.48
156	24-Feb-24 23:09:34	25-Feb-24 00:54:29	9,240.30
157	25-Feb-24 01:10:57	25-Feb-24 02:51:24	9,220.43
158	25-Feb-24 07:53:04	25-Feb-24 09:36:04	9,166.75
159	25-Feb-24 10:06:34	25-Feb-24 11:38:52	8,471.77
160	25-Feb-24 20:32:34	25-Feb-24 22:20:50	9,226.13
161	26-Feb-24 02:14:05	26-Feb-24 03:51:54	9,288.54
162	27-Feb-24 01:47:40	27-Feb-24 03:35:04	9,284.18
163	27-Feb-24 14:00:38	27-Feb-24 14:56:30	4,255.39
164	27-Feb-24 19:24:41	27-Feb-24 20:11:51	4,260.08
165	28-Feb-24 04:18:48	28-Feb-24 06:33:17	9,261.56
166	28-Feb-24 20:01:45	28-Feb-24 21:55:18	9,270.35
167	29-Feb-24 04:36:56	29-Feb-24 06:19:53	9,289.60
168	29-Feb-24 07:53:28	29-Feb-24 09:37:38	8,525.65
169	01-Mar-24 01:58:01	01-Mar-24 03:35:45	9,307.37
170	01-Mar-24 07:36:21	01-Mar-24 09:16:15	9,248.45
171	01-Mar-24 17:41:28	01-Mar-24 20:05:21	9,283.52
172	01-Mar-24 20:47:18	01-Mar-24 22:27:30	8,472.55
173	02-Mar-24 03:02:39	02-Mar-24 04:43:13	9,291.42
174	02-Mar-24 18:06:00	02-Mar-24 20:43:00	9,272.70
175	03-Mar-24 04:23:45	03-Mar-24 06:28:34	9,247.26
176	03-Mar-24 07:16:02	03-Mar-24 08:49:45	8,478.62
177	03-Mar-24 13:40:47	03-Mar-24 15:19:51	9,288.94

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
31-May-24	5	27642.16
01-Jun-24	6	27735.10
02-Jun-24	4	18509.14
03-Jun-24	4	13551.51
04-Jun-24	9	31209.27
05-Jun-24	9	40429.55
06-Jun-24	6	27790.18
07-Jun-24	7	27060.99
08-Jun-24	5	27789.62
09-Jun-24	11	46275.23
10-Jun-24	3	17756.85
11-Jun-24	6	27050.99
12-Jun-24	4	18551.12
13-Jun-24	5	17790.56
14-Jun-24	1	9268.82
15-Jun-24	4	17681.47
16-Jun-24	3	8498.28
17-Jun-24	7	36939.87
18-Jun-24	0	0.00
19-Jun-24	2	4259.78
20-Jun-24	1	0.00
21-Jun-24	8	26999.41
22-Jun-24	5	22618.62
23-Jun-24	8	31970.86
24-Jun-24	13	40451.80
25-Jun-24	9	36159.71

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
178	03-Mar-24 19:35:11	03-Mar-24 21:12:30	9,238.71
179	03-Mar-24 22:39:07	04-Mar-24 00:19:43	9,311.13
180	04-Mar-24 13:18:48	04-Mar-24 15:22:52	9,296.92
181	04-Mar-24 18:27:00	04-Mar-24 20:18:00	9,265.99
182	05-Mar-24 05:28:50	05-Mar-24 07:25:44	9,307.04
183	05-Mar-24 11:16:40	05-Mar-24 13:10:42	8,501.16
184	05-Mar-24 17:17:36	05-Mar-24 19:28:21	9,247.13
185	05-Mar-24 19:51:56	05-Mar-24 21:37:10	9,247.75
186	06-Mar-24 09:55:56	06-Mar-24 11:38:38	9,245.00
187	06-Mar-24 13:19:01	06-Mar-24 15:27:07	9,266.17
188	06-Mar-24 16:10:17	06-Mar-24 17:59:52	9,257.76
189	06-Mar-24 21:04:53	06-Mar-24 22:50:52	9,235.23
190	07-Mar-24 07:58:00	07-Mar-24 09:41:00	9,173.71
191	07-Mar-24 12:34:00	07-Mar-24 14:17:00	9,258.70
192	07-Mar-24 20:18:44	07-Mar-24 22:28:47	9,242.15
193	07-Mar-24 23:02:04	08-Mar-24 01:00:19	8,495.33
194	08-Mar-24 01:37:00	08-Mar-24 03:55:39	9,266.33
195	08-Mar-24 04:29:25	08-Mar-24 06:30:59	9,180.76
196	08-Mar-24 08:23:01	08-Mar-24 10:05:06	9,243.78
197	08-Mar-24 13:53:11	08-Mar-24 15:42:21	9,307.67
198	09-Mar-24 00:14:53	09-Mar-24 02:01:10	9,267.09
199	09-Mar-24 04:02:13	09-Mar-24 05:57:43	8,509.02
200	09-Mar-24 11:45:13	09-Mar-24 13:33:39	9,225.45
201	09-Mar-24 23:00:08	10-Mar-24 00:37:29	9,239.04
202	10-Mar-24 01:17:28	10-Mar-24 02:55:32	9,244.29
203	10-Mar-24 07:25:00	10-Mar-24 09:23:00	9,253.20

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
26-Jun-24	8	21341.09
27-Jun-24	5	13573.53
28-Jun-24	8	27065.79
29-Jun-24	9	40430.09
30-Jun-24	9	27117.14
01-Jul-24	4	17817.89
02-Jul-24	5	27748.32
03-Jul-24	6	27757.72
04-Jul-24	6	27042.45
05-Jul-24	4	17807.05
06-Jul-24	3	8521.34
07-Jul-24	1	9307.13
08-Jul-24	2	8507.90
09-Jul-24	4	18406.52
10-Jul-24	4	18402.14
11-Jul-24	8	36310.74
12-Jul-24	6	27778.46
13-Jul-24	4	18548.25
14-Jul-24	8	36305.30
15-Jul-24	1	0.00
16-Jul-24	8	36168.00
17-Jul-24	9	46400.72
18-Jul-24	2	9288.66
19-Jul-24	5	18526.82
20-Jul-24	10	46277.45
21-Jul-24	8	36956.47

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
204	10-Mar-24 15:19:01	10-Mar-24 17:24:39	9,337.32
205	10-Mar-24 23:53:41	11-Mar-24 01:54:41	9,265.72
206	11-Mar-24 02:57:02	11-Mar-24 04:49:40	8,512.90
207	11-Mar-24 08:33:27	11-Mar-24 10:36:06	8,510.83
208	11-Mar-24 10:58:22	11-Mar-24 12:55:31	9,171.45
209	11-Mar-24 22:05:00	11-Mar-24 23:51:00	9,246.91
210	12-Mar-24 02:31:07	12-Mar-24 04:12:18	9,259.58
211	12-Mar-24 04:50:00	12-Mar-24 06:39:00	9,173.87
212	12-Mar-24 07:44:38	12-Mar-24 08:29:54	4,253.24
213	12-Mar-24 12:26:39	12-Mar-24 14:08:23	9,247.63
214	12-Mar-24 21:23:33	13-Mar-24 00:48:18	9,237.49
215	13-Mar-24 01:13:00	13-Mar-24 03:52:00	9,282.78
216	13-Mar-24 08:46:29	13-Mar-24 10:49:12	8,496.22
217	13-Mar-24 20:55:35	13-Mar-24 22:52:33	9,247.25
218	14-Mar-24 13:44:00	14-Mar-24 14:38:00	4,261.46
219	15-Mar-24 08:15:07	15-Mar-24 10:24:39	8,516.47
220	16-Mar-24 17:19:02	16-Mar-24 18:48:43	4,252.29
221	17-Mar-24 21:53:43	18-Mar-24 01:37:21	8,508.68
222	18-Mar-24 04:49:00	18-Mar-24 05:56:00	4,239.75
223	19-Mar-24 19:26:46	19-Mar-24 20:12:07	4,254.69
224	20-Mar-24 14:29:33	20-Mar-24 16:05:52	8,480.98
225	21-Mar-24 05:01:00	21-Mar-24 07:41:00	9,259.98
226	22-Mar-24 00:43:25	22-Mar-24 01:42:54	4,258.33
227	22-Mar-24 08:18:04	22-Mar-24 10:09:06	9,254.70
228	23-Mar-24 01:16:25	23-Mar-24 03:05:37	9,308.59
229	23-Mar-24 20:38:00	23-Mar-24 22:25:00	9,278.94

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
22-Jul-24	10	45633.98
23-Jul-24	8	37109.82
24-Jul-24	4	17766.16
25-Jul-24	12	54937.12
26-Jul-24	6	27059.05
27-Jul-24	8	36172.86
28-Jul-24	9	45419.09
29-Jul-24	0	0.00
30-Jul-24	3	9261.65
31-Jul-24	6	27783.69
01-Aug-24	7	36365.82
02-Aug-24	8	36347.91
03-Aug-24	0	0.00
04-Aug-24	0	0.00
05-Aug-24	0	0.00
06-Aug-24	6	27706.13
07-Aug-24	4	18498.74
08-Aug-24	5	17808.90
09-Aug-24	7	36305.50
10-Aug-24	9	36782.38
11-Aug-24	9	45539.79
12-Aug-24	6	27081.68
13-Aug-24	7	27073.14
14-Aug-24	3	18467.46
15-Aug-24	0	0.00
16-Aug-24	8	36205.24

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
230	24-Mar-24 05:26:30	24-Mar-24 07:39:37	9,245.45
231	24-Mar-24 08:01:25	24-Mar-24 09:43:03	9,214.91
232	24-Mar-24 15:53:53	24-Mar-24 17:32:05	9,322.17
233	25-Mar-24 11:10:22	25-Mar-24 12:52:01	9,304.84
234	25-Mar-24 14:22:55	25-Mar-24 16:44:57	9,277.16
235	26-Mar-24 02:26:40	26-Mar-24 04:15:35	9,297.03
236	26-Mar-24 08:08:00	26-Mar-24 11:27:24	9,251.87
237	26-Mar-24 13:26:45	26-Mar-24 15:51:44	9,269.46
238	26-Mar-24 17:41:24	26-Mar-24 20:13:31	9,221.53
239	26-Mar-24 20:31:58	26-Mar-24 22:47:48	9,294.32
240	27-Mar-24 01:12:00	27-Mar-24 03:00:00	9,250.12
241	27-Mar-24 05:32:00	27-Mar-24 07:18:00	9,253.71
242	27-Mar-24 13:46:24	27-Mar-24 15:40:03	9,282.86
243	27-Mar-24 17:18:31	27-Mar-24 21:19:50	8,502.40
244	27-Mar-24 22:26:00	28-Mar-24 00:43:00	9,178.41
245	28-Mar-24 16:07:46	28-Mar-24 18:13:16	9,255.94
246	29-Mar-24 01:22:54	29-Mar-24 02:13:23	4,257.80
247	29-Mar-24 08:00:53	29-Mar-24 10:41:04	9,261.28
248	29-Mar-24 15:04:41	29-Mar-24 17:03:50	9,179.64
249	29-Mar-24 22:16:03	30-Mar-24 00:12:34	9,256.45
250	30-Mar-24 02:28:59	30-Mar-24 04:32:03	8,514.54
251	30-Mar-24 12:04:20	30-Mar-24 13:42:03	9,237.94
252	30-Mar-24 17:30:35	30-Mar-24 19:22:50	9,263.69
253	30-Mar-24 21:38:58	30-Mar-24 23:28:41	9,246.63
254	31-Mar-24 07:16:44	31-Mar-24 09:01:13	9,242.63
255	31-Mar-24 13:19:43	31-Mar-24 16:14:38	8,504.97

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
17-Aug-24	5	17773.66
18-Aug-24	9	45738.79
19-Aug-24	1	0.00
20-Aug-24	9	44858.08
21-Aug-24	4	17715.86
22-Aug-24	7	27665.43
23-Aug-24	6	27715.53
24-Aug-24	11	55461.25
25-Aug-24	2	9238.44
26-Aug-24	7	27158.67
27-Aug-24	3	18539.47
28-Aug-24	7	27616.37
29-Aug-24	3	18521.53
30-Aug-24	9	37080.40
31-Aug-24	5	27626.53
01-Sep-24	6	26882.61
02-Sep-24	8	36294.35
03-Sep-24	9	36185.07
04-Sep-24	3	18556.00
05-Sep-24	5	17718.75
06-Sep-24	10	45488.91
07-Sep-24	2	9224.86
08-Sep-24	7	35599.64
09-Sep-24	3	9169.66
10-Sep-24	5	27705.83
11-Sep-24	3	9266.99

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
256	31-Mar-24 16:38:17	31-Mar-24 18:16:32	9,260.67
257	31-Mar-24 20:23:00	31-Mar-24 22:13:00	9,252.39
258	01-Apr-24 01:27:14	01-Apr-24 03:26:46	9,183.47
259	01-Apr-24 10:51:45	01-Apr-24 11:43:08	4,273.74
260	01-Apr-24 12:00:19	01-Apr-24 13:42:22	9,247.23
261	01-Apr-24 15:34:13	01-Apr-24 17:15:24	9,273.97
262	01-Apr-24 23:35:27	02-Apr-24 01:13:38	9,288.13
263	02-Apr-24 01:30:00	02-Apr-24 02:19:00	4,261.73
264	02-Apr-24 05:27:47	02-Apr-24 08:02:33	9,283.20
265	02-Apr-24 05:04:00	02-Apr-24 07:57:00	8,498.46
266	02-Apr-24 08:22:00	02-Apr-24 10:20:00	9,256.39
267	02-Apr-24 15:46:23	02-Apr-24 16:32:16	4,264.96
268	02-Apr-24 19:49:01	02-Apr-24 21:45:49	9,201.73
269	06-Apr-24 11:25:00	06-Apr-24 12:28:00	4,229.89
270	06-Apr-24 13:50:00	06-Apr-24 15:49:00	8,479.48
271	06-Apr-24 23:07:08	07-Apr-24 00:47:02	9,254.00
272	07-Apr-24 02:00:42	07-Apr-24 03:43:14	9,263.54
273	07-Apr-24 11:53:38	07-Apr-24 12:43:49	4,261.86
274	07-Apr-24 08:04:23	07-Apr-24 09:54:16	9,248.11
275	07-Apr-24 14:07:56	07-Apr-24 16:00:57	9,263.00
276	07-Apr-24 19:46:00	07-Apr-24 21:50:00	8,508.24
277	08-Apr-24 01:37:15	08-Apr-24 03:19:46	9,296.39
278	09-Apr-24 00:16:00	09-Apr-24 02:18:00	9,220.35
279	09-Apr-24 07:57:14	09-Apr-24 09:48:12	9,297.82
280	09-Apr-24 10:11:38	09-Apr-24 10:59:31	4,256.76
281	09-Apr-24 15:03:15	09-Apr-24 16:44:39	8,497.57

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
12-Sep-24	6	27760.70
13-Sep-24	11	54777.25
14-Sep-24	6	26907.61
15-Sep-24	3	9235.81
16-Sep-24	12	54538.00
17-Sep-24	9	45277.93
18-Sep-24	0	0.00
19-Sep-24	3	9225.79
20-Sep-24	5	26094.16
21-Sep-24	6	26868.70
22-Sep-24	3	9262.40
23-Sep-24	7	36982.89
24-Sep-24	13	53940.34
25-Sep-24	12	54884.87
26-Sep-24	2	9235.69
27-Sep-24	3	18514.38
28-Sep-24	0	0.00
29-Sep-24	4	18448.05
30-Sep-24	4	18489.24
01-Oct-24	0	0.00
02-Oct-24	0	0.00
03-Oct-24	0	0.00
04-Oct-24	3	9280.79
05-Oct-24	3	17793.67
06-Oct-24	8	26959.92
07-Oct-24	5	18589.20

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
282	09-Apr-24 22:46:00	10-Apr-24 00:41:00	9,247.13
283	10-Apr-24 19:44:46	10-Apr-24 21:22:33	9,260.44
284	10-Apr-24 23:51:34	11-Apr-24 01:55:09	9,275.61
285	11-Apr-24 12:30:16	11-Apr-24 14:14:31	9,183.42
286	11-Apr-24 15:12:22	11-Apr-24 17:06:52	8,491.83
287	13-Apr-24 03:53:45	13-Apr-24 04:38:47	4,232.50
288	13-Apr-24 09:29:52	13-Apr-24 11:07:39	9,235.32
289	13-Apr-24 20:10:47	13-Apr-24 21:49:31	8,487.34
290	14-Apr-24 03:01:45	14-Apr-24 03:49:33	4,267.22
291	14-Apr-24 01:35:00	14-Apr-24 02:32:00	9,274.40
292	14-Apr-24 11:21:14	14-Apr-24 12:59:17	9,233.37
293	14-Apr-24 20:35:09	14-Apr-24 21:24:01	4,267.06
294	15-Apr-24 17:34:26	15-Apr-24 18:22:22	4,272.70
295	15-Apr-24 21:08:25	15-Apr-24 22:46:24	9,255.28
296	16-Apr-24 13:02:11	16-Apr-24 14:58:49	8,518.66
297	16-Apr-24 20:01:03	16-Apr-24 21:51:43	9,244.56
298	17-Apr-24 02:25:17	17-Apr-24 04:03:12	9,256.27
299	17-Apr-24 06:21:46	17-Apr-24 10:38:14	9,236.27
300	18-Apr-24 00:14:13	18-Apr-24 03:25:59	9,264.54
301	18-Apr-24 06:31:19	18-Apr-24 08:33:35	9,310.37
302	18-Apr-24 09:09:00	18-Apr-24 10:46:00	9,175.80
303	18-Apr-24 16:25:00	18-Apr-24 18:33:00	8,389.39
304	19-Apr-24 01:56:04	19-Apr-24 02:47:42	4,277.15
305	19-Apr-24 03:42:09	19-Apr-24 05:24:23	9,334.50
306	19-Apr-24 12:56:27	19-Apr-24 14:53:35	8,488.75
307	19-Apr-24 20:30:42	19-Apr-24 22:15:23	9,278.73

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
08-Oct-24	8	36665.31
09-Oct-24	7	37021.12
10-Oct-24	8	37067.66
11-Oct-24	9	36308.47
12-Oct-24	8	36805.38
13-Oct-24	16	72851.67
14-Oct-24	7	35281.61
15-Oct-24	8	36273.58
16-Oct-24	2	9251.56
17-Oct-24	4	18538.23
18-Oct-24	5	17751.53
19-Oct-24	15	73216.83
20-Oct-24	2	9252.72
21-Oct-24	4	17705.61
22-Oct-24	6	27076.05
23-Oct-24	6	27064.91
24-Oct-24	9	32463.26
25-Oct-24	5	26990.46
26-Oct-24	4	17755.64
27-Oct-24	5	18622.06
28-Oct-24	6	27099.16
29-Oct-24	9	45522.31
30-Oct-24	8	36293.97
31-Oct-24	4	18574.35
01-Nov-24	5	18489.84
02-Nov-24	4	18529.14

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
308	20-Apr-24 11:59:18	20-Apr-24 13:40:06	9,285.87
309	20-Apr-24 16:26:43	20-Apr-24 18:06:42	9,305.60
310	21-Apr-24 02:05:58	21-Apr-24 02:52:01	4,275.86
311	21-Apr-24 04:07:23	21-Apr-24 05:46:03	9,279.20
312	21-Apr-24 09:27:09	21-Apr-24 11:07:52	9,304.30
313	21-Apr-24 17:49:05	21-Apr-24 19:26:52	9,306.84
314	22-Apr-24 03:42:11	22-Apr-24 04:28:16	4,273.91
315	21-Apr-24 21:53:35	21-Apr-24 23:38:05	8,513.79
316	22-Apr-24 01:10:00	22-Apr-24 03:02:00	8,520.98
317	22-Apr-24 11:24:22	22-Apr-24 13:02:11	9,235.45
318	22-Apr-24 21:49:05	22-Apr-24 23:27:06	9,216.61
319	23-Apr-24 09:46:00	23-Apr-24 10:30:00	4,255.44
320	23-Apr-24 01:53:48	23-Apr-24 03:37:54	9,215.73
321	23-Apr-24 07:19:41	23-Apr-24 08:59:50	8,495.07
322	23-Apr-24 16:25:40	23-Apr-24 18:06:14	9,232.40
323	23-Apr-24 22:04:46	23-Apr-24 23:44:25	9,266.38
324	24-Apr-24 00:22:20	24-Apr-24 02:03:53	9,254.03
325	24-Apr-24 09:41:55	24-Apr-24 12:12:06	9,304.26
326	24-Apr-24 21:46:00	24-Apr-24 23:31:00	9,248.60
327	25-Apr-24 08:10:42	25-Apr-24 10:38:15	8,460.10
328	25-Apr-24 16:45:52	25-Apr-24 18:35:00	9,303.86
329	26-Apr-24 08:00:34	26-Apr-24 09:39:09	9,269.09
330	26-Apr-24 10:45:34	26-Apr-24 12:44:50	9,257.99
331	26-Apr-24 16:34:43	26-Apr-24 18:22:27	9,245.79
332	27-Apr-24 00:54:00	27-Apr-24 03:23:00	8,423.26
333	28-Apr-24 00:54:47	28-Apr-24 02:43:17	9,184.76

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
03-Nov-24	5	27046.32
04-Nov-24	7	26997.05
05-Nov-24	4	18460.93
06-Nov-24	7	35578.85
07-Nov-24	4	18510.91
08-Nov-24	7	27824.64
09-Nov-24	10	45568.84
10-Nov-24	5	27027.58
11-Nov-24	2	9279.55
12-Nov-24	6	27830.76
13-Nov-24	5	18544.60
14-Nov-24	8	37015.79
15-Nov-24	9	42341.47
16-Nov-24	4	18535.18
17-Nov-24	4	18523.56
18-Nov-24	4	18444.21
19-Nov-24	0	0.00
20-Nov-24	0	0.00
21-Nov-24	0	0.00
22-Nov-24	6	27793.27
23-Nov-24	3	9209.86
24-Nov-24	5	27821.89
25-Nov-24	2	9204.24
26-Nov-24	5	18570.38
27-Nov-24	6	27108.31
28-Nov-24	3	18494.72

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
334	28-Apr-24 07:16:00	28-Apr-24 09:04:00	9,227.55
335	28-Apr-24 09:39:22	28-Apr-24 11:23:34	9,234.36
336	28-Apr-24 13:44:53	28-Apr-24 15:23:17	9,254.16
337	28-Apr-24 19:33:33	28-Apr-24 21:11:20	9,215.36
338	28-Apr-24 22:45:40	29-Apr-24 00:25:19	9,239.48
339	29-Apr-24 10:17:39	29-Apr-24 12:01:48	8,473.19
340	29-Apr-24 18:23:01	29-Apr-24 20:17:35	9,263.50
341	30-Apr-24 00:56:59	30-Apr-24 02:53:35	9,265.07
342	30-Apr-24 04:33:00	30-Apr-24 06:22:00	9,305.11
343	30-Apr-24 10:09:00	30-Apr-24 11:59:09	9,306.24
344	30-Apr-24 16:31:55	30-Apr-24 18:30:05	9,254.22
345	30-Apr-24 19:25:34	30-Apr-24 21:30:48	9,278.65
346	30-Apr-24 23:09:45	01-May-24 01:43:06	9,242.51
347	01-May-24 04:17:19	01-May-24 06:09:24	8,480.72
348	01-May-24 11:27:00	01-May-24 13:53:00	9,250.53
349	01-May-24 15:42:38	01-May-24 17:27:05	9,176.25
350	02-May-24 09:53:05	02-May-24 11:31:04	9,166.03
351	02-May-24 12:09:37	02-May-24 13:48:09	9,254.77
352	03-May-24 08:05:00	03-May-24 09:59:00	8,510.30
353	03-May-24 11:34:04	03-May-24 13:19:55	9,240.26
354	04-May-24 03:11:08	04-May-24 04:54:14	9,253.38
355	04-May-24 09:04:56	04-May-24 10:48:05	8,479.88
356	04-May-24 11:34:13	04-May-24 13:11:34	9,287.91
357	04-May-24 16:05:36	04-May-24 17:45:42	9,260.86
358	05-May-24 00:29:08	05-May-24 01:16:43	4,272.62
359	05-May-24 01:52:00	05-May-24 03:37:00	9,284.27

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
29-Nov-24	4	16995.71
30-Nov-24	6	27689.23
01-Dec-24	6	27031.61
02-Dec-24	4	18565.95
03-Dec-24	8	36224.67
04-Dec-24	8	37022.79
05-Dec-24	5	18562.15
06-Dec-24	7	37084.83
07-Dec-24	7	27028.37
08-Dec-24	7	37040.54
09-Dec-24	8	36312.41
10-Dec-24	12	55166.06
11-Dec-24	5	17758.92
12-Dec-24	5	27848.21
13-Dec-24	8	37058.53
14-Dec-24	5	18534.13
15-Dec-24	6	27071.35
16-Dec-24	3	18530.22
17-Dec-24	2	8486.40
18-Dec-24	5	18498.43
19-Dec-24	1	9277.01
20-Dec-24	6	27827.09
21-Dec-24	6	27847.37
22-Dec-24	10	45579.59
23-Dec-24	2	9254.15
24-Dec-24	0	0.00

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
360	05-May-24 05:29:00	05-May-24 07:41:00	8,497.38
361	05-May-24 08:42:22	05-May-24 10:20:06	9,236.51
362	05-May-24 20:05:42	05-May-24 21:46:09	9,183.39
363	07-May-24 08:09:23	07-May-24 09:52:00	8,497.71
364	07-May-24 14:57:09	07-May-24 16:41:38	9,275.10
365	08-May-24 01:01:10	08-May-24 02:39:26	9,272.70
366	08-May-24 21:49:08	08-May-24 23:28:09	9,269.50
367	09-May-24 00:00:17	09-May-24 01:43:13	9,252.78
368	09-May-24 07:04:31	09-May-24 08:43:33	9,187.08
369	09-May-24 16:14:28	09-May-24 17:53:33	9,260.38
370	09-May-24 23:15:43	10-May-24 00:00:25	4,269.76
371	10-May-24 03:04:24	10-May-24 06:05:58	8,498.37
372	10-May-24 16:23:22	10-May-24 18:03:04	9,244.07
373	10-May-24 20:47:47	10-May-24 22:39:50	8,518.30
374	11-May-24 04:37:16	11-May-24 06:16:10	9,182.69
375	11-May-24 12:39:44	11-May-24 14:44:11	9,280.04
376	12-May-24 00:23:51	12-May-24 02:09:05	9,270.84
377	12-May-24 02:44:30	12-May-24 04:26:00	9,224.25
378	12-May-24 10:02:41	12-May-24 11:50:59	9,268.38
379	12-May-24 13:25:44	12-May-24 15:07:17	9,290.73
380	12-May-24 19:10:00	12-May-24 21:02:00	8,497.31
381	13-May-24 03:29:25	13-May-24 05:11:48	8,528.67
382	13-May-24 08:25:00	13-May-24 09:10:00	4,272.72
383	13-May-24 11:06:07	13-May-24 12:52:59	9,247.59
384	13-May-24 21:24:58	13-May-24 23:02:36	9,216.72
385	14-May-24 04:21:00	14-May-24 05:06:00	4,255.95

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes
25-Dec-24	0	0.00
26-Dec-24	1	0.00
27-Dec-24	11	54083.89
28-Dec-24	7	27080.86
29-Dec-24	12	50219.40
30-Dec-24	8	36181.51
31-Dec-24	11	54754.13

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
386	14-May-24 11:07:55	14-May-24 12:57:07	9,267.74
387	14-May-24 08:35:57	14-May-24 10:24:15	8,442.16
388	14-May-24 16:22:41	14-May-24 17:12:20	4,273.98
389	14-May-24 20:23:52	14-May-24 22:12:16	9,274.65
390	14-May-24 23:08:37	15-May-24 01:09:21	9,253.49
391	15-May-24 13:00:14	15-May-24 13:47:46	4,255.29
392	15-May-24 15:54:37	15-May-24 17:36:50	9,260.03
393	15-May-24 19:57:56	15-May-24 20:42:19	4,269.89
394	16-May-24 14:08:05	16-May-24 15:57:45	9,213.68
395	16-May-24 19:19:24	16-May-24 21:10:56	9,269.25
396	17-May-24 04:19:14	17-May-24 06:25:23	8,509.65
397	17-May-24 08:05:28	17-May-24 08:51:23	4,273.36
398	17-May-24 13:28:49	17-May-24 15:17:36	9,271.55
399	17-May-24 20:44:00	17-May-24 22:52:00	8,514.81
400	18-May-24 09:10:00	18-May-24 11:18:00	9,273.30
401	18-May-24 14:45:01	18-May-24 16:45:45	9,197.88
402	19-May-24 00:02:25	19-May-24 02:19:53	9,268.80
403	19-May-24 04:12:47	19-May-24 06:08:38	9,212.61
404	19-May-24 07:16:22	19-May-24 08:59:54	9,244.78
405	19-May-24 09:37:00	19-May-24 10:24:00	4,258.12
406	19-May-24 11:37:06	19-May-24 13:18:21	9,239.22
407	19-May-24 22:02:04	19-May-24 23:57:30	9,322.31
408	20-May-24 01:13:46	20-May-24 03:06:14	9,204.49
409	20-May-24 07:58:45	20-May-24 10:37:28	9,308.40
410	20-May-24 13:29:06	20-May-24 15:00:11	8,481.79
411	20-May-24 19:16:00	20-May-24 21:06:00	9,196.34

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
412	20-May-24 23:48:46	21-May-24 00:33:56	4,261.09
413	21-May-24 03:11:03	21-May-24 04:51:08	9,275.07
414	24-May-24 08:46:13	24-May-24 11:02:21	9,197.87
415	24-May-24 23:19:14	25-May-24 01:51:39	9,210.70
416	25-May-24 06:02:39	25-May-24 09:20:45	9,280.71
417	25-May-24 02:32:26	25-May-24 05:32:54	9,241.77
418	25-May-24 10:05:30	25-May-24 12:03:20	9,262.51
419	25-May-24 12:31:03	25-May-24 14:50:00	9,303.55
420	25-May-24 20:40:30	25-May-24 22:38:57	9,270.97
421	25-May-24 23:20:36	26-May-24 01:02:05	9,306.86
422	26-May-24 04:13:28	26-May-24 05:52:53	9,320.16
423	26-May-24 11:32:55	26-May-24 13:16:39	9,264.77
424	26-May-24 14:48:22	26-May-24 16:30:20	9,252.13
425	26-May-24 17:01:49	26-May-24 18:53:32	9,242.20
426	26-May-24 20:17:33	26-May-24 21:55:34	9,276.36
427	27-May-24 01:29:00	27-May-24 03:15:00	9,320.76
428	27-May-24 03:37:06	27-May-24 05:22:51	9,287.16
429	27-May-24 14:43:18	27-May-24 16:22:31	9,328.02
430	28-May-24 01:31:41	28-May-24 03:12:06	8,519.31
431	28-May-24 17:04:26	28-May-24 18:42:09	9,255.61
432	29-May-24 02:14:48	29-May-24 04:30:30	9,278.29
433	29-May-24 20:45:00	29-May-24 22:28:43	9,303.71
434	30-May-24 08:03:39	30-May-24 09:47:40	9,274.28
435	30-May-24 23:03:32	31-May-24 00:41:04	9,213.09
436	31-May-24 03:38:31	31-May-24 05:36:00	9,262.62
437	31-May-24 13:45:21	31-May-24 15:44:20	9,166.45

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
438	01-Jun-24 02:22:11	01-Jun-24 04:25:24	9,270.85
439	01-Jun-24 17:30:00	01-Jun-24 19:34:00	9,269.48
440	01-Jun-24 20:28:40	01-Jun-24 22:06:40	9,194.77
441	02-Jun-24 08:18:40	02-Jun-24 10:11:14	9,250.05
442	02-Jun-24 17:07:26	02-Jun-24 18:59:50	9,259.09
443	03-Jun-24 03:11:08	03-Jun-24 03:55:52	4,269.90
444	03-Jun-24 11:02:52	03-Jun-24 12:49:56	9,281.61
445	04-Jun-24 01:45:50	04-Jun-24 03:23:24	9,249.28
446	04-Jun-24 04:21:07	04-Jun-24 07:06:45	8,467.72
447	04-Jun-24 19:43:00	04-Jun-24 21:32:40	9,242.66
448	04-Jun-24 23:51:27	05-Jun-24 01:47:54	9,181.17
449	04-Jun-24 22:37:29	04-Jun-24 23:29:51	4,249.61
450	05-Jun-24 02:44:19	05-Jun-24 04:27:51	9,291.39
451	05-Jun-24 04:53:16	05-Jun-24 07:13:21	8,505.65
452	05-Jun-24 18:43:43	05-Jun-24 20:34:23	9,199.99
453	05-Jun-24 20:56:10	05-Jun-24 21:48:12	4,251.35
454	06-Jun-24 04:15:47	06-Jun-24 05:58:10	9,246.88
455	06-Jun-24 06:27:34	06-Jun-24 08:21:55	9,279.79
456	06-Jun-24 15:07:07	06-Jun-24 16:54:57	9,263.51
457	07-Jun-24 07:46:06	07-Jun-24 09:30:44	9,267.22
458	07-Jun-24 19:31:30	07-Jun-24 21:11:16	9,258.77
459	07-Jun-24 16:03:00	07-Jun-24 19:02:00	8,535.00
460	07-Jun-24 22:45:00	08-Jun-24 00:24:00	9,271.83
461	08-Jun-24 12:14:00	08-Jun-24 13:52:00	9,268.40
462	08-Jun-24 15:31:27	08-Jun-24 17:45:33	9,249.39
463	09-Jun-24 00:18:00	09-Jun-24 02:09:00	9,291.02

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
464	09-Jun-24 03:15:00	09-Jun-24 04:58:00	9,206.30
465	09-Jun-24 09:28:53	09-Jun-24 11:07:11	9,277.24
466	09-Jun-24 16:09:44	09-Jun-24 17:47:37	9,203.07
467	09-Jun-24 18:39:19	09-Jun-24 20:29:13	9,297.60
468	09-Jun-24 22:20:44	10-Jun-24 00:02:01	8,471.32
469	10-Jun-24 09:19:00	10-Jun-24 11:26:00	9,285.53
470	11-Jun-24 01:56:02	11-Jun-24 05:24:52	9,290.70
471	11-Jun-24 06:08:00	11-Jun-24 09:06:00	8,500.25
472	11-Jun-24 13:23:31	11-Jun-24 15:33:46	9,260.04
473	12-Jun-24 09:32:00	12-Jun-24 11:59:00	9,262.97
474	12-Jun-24 12:29:43	12-Jun-24 14:54:15	9,288.15
475	13-Jun-24 05:07:00	13-Jun-24 07:09:00	9,277.85
476	13-Jun-24 01:57:45	13-Jun-24 04:01:14	8,512.71
477	13-Jun-24 22:19:00	14-Jun-24 00:37:00	9,268.82
478	15-Jun-24 03:44:22	15-Jun-24 05:43:15	9,241.96
479	15-Jun-24 19:48:18	15-Jun-24 21:25:52	8,439.51
480	16-Jun-24 09:33:13	16-Jun-24 11:25:08	8,498.28
481	17-Jun-24 00:13:53	17-Jun-24 01:55:49	9,261.64
482	17-Jun-24 02:42:55	17-Jun-24 04:30:21	9,235.86
483	17-Jun-24 16:51:08	17-Jun-24 18:46:32	9,260.12
484	17-Jun-24 19:14:00	17-Jun-24 21:01:00	9,182.25
485	19-Jun-24 11:20:33	19-Jun-24 12:05:11	4,259.78
486	21-Jun-24 00:01:12	21-Jun-24 02:04:07	9,279.19
487	21-Jun-24 02:46:41	21-Jun-24 03:32:46	4,266.36
488	21-Jun-24 13:30:49	21-Jun-24 15:16:46	9,170.74
489	21-Jun-24 16:53:08	21-Jun-24 17:38:15	4,283.12

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
490	21-Jun-24 23:25:54	22-Jun-24 01:10:44	9,199.25
491	22-Jun-24 07:24:25	22-Jun-24 08:09:26	4,234.49
492	22-Jun-24 09:56:34	22-Jun-24 11:38:24	9,184.88
493	23-Jun-24 00:39:09	23-Jun-24 02:26:26	9,252.90
494	23-Jun-24 05:28:00	23-Jun-24 07:25:00	9,244.09
495	23-Jun-24 17:23:13	23-Jun-24 18:08:04	4,272.86
496	23-Jun-24 20:24:18	23-Jun-24 22:05:44	9,201.01
497	24-Jun-24 01:05:00	24-Jun-24 01:58:21	4,227.72
498	24-Jun-24 02:40:34	24-Jun-24 04:27:01	9,201.77
499	24-Jun-24 08:33:00	24-Jun-24 09:18:00	4,223.97
500	24-Jun-24 06:32:17	24-Jun-24 08:12:52	9,281.01
501	24-Jun-24 10:50:55	24-Jun-24 12:34:26	9,288.48
502	24-Jun-24 13:16:23	24-Jun-24 14:02:37	4,228.85
503	25-Jun-24 02:39:08	25-Jun-24 03:27:45	4,259.53
504	25-Jun-24 00:32:04	25-Jun-24 02:10:53	9,296.16
505	25-Jun-24 09:03:41	25-Jun-24 10:44:08	9,189.83
506	25-Jun-24 11:36:53	25-Jun-24 13:35:06	9,186.88
507	25-Jun-24 18:07:00	25-Jun-24 19:12:00	4,227.31
508	26-Jun-24 01:21:00	26-Jun-24 02:08:00	4,269.06
509	26-Jun-24 07:43:17	26-Jun-24 09:29:48	8,525.64
510	26-Jun-24 17:12:59	26-Jun-24 17:57:47	4,269.49
511	26-Jun-24 20:54:35	26-Jun-24 21:40:26	4,276.90
512	27-Jun-24 19:51:22	27-Jun-24 21:38:13	9,297.06
513	27-Jun-24 22:46:38	27-Jun-24 23:38:10	4,276.47
514	28-Jun-24 00:42:57	28-Jun-24 02:35:05	9,224.40
515	28-Jun-24 04:59:15	28-Jun-24 05:49:49	4,282.83

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
516	28-Jun-24 08:18:00	28-Jun-24 09:59:00	9,290.32
517	28-Jun-24 15:07:43	28-Jun-24 15:58:08	4,268.24
518	28-Jun-24 23:43:14	29-Jun-24 00:28:15	4,273.30
519	29-Jun-24 05:57:11	29-Jun-24 07:35:35	9,299.65
520	29-Jun-24 08:06:00	29-Jun-24 10:38:00	9,294.56
521	30-Jun-24 01:15:39	30-Jun-24 02:02:28	4,274.70
522	29-Jun-24 12:25:39	29-Jun-24 15:51:34	8,282.41
523	29-Jun-24 19:53:12	29-Jun-24 21:31:03	9,280.17
524	30-Jun-24 05:30:46	30-Jun-24 07:42:37	9,299.13
525	30-Jun-24 08:26:00	30-Jun-24 11:08:00	9,289.72
526	30-Jun-24 21:30:05	30-Jun-24 22:15:16	4,253.59
527	01-Jul-24 00:13:00	01-Jul-24 02:08:00	8,518.97
528	01-Jul-24 08:29:00	01-Jul-24 10:07:00	9,298.92
529	01-Jul-24 22:58:19	02-Jul-24 00:59:09	9,285.43
530	02-Jul-24 14:57:56	02-Jul-24 16:35:41	9,191.52
531	02-Jul-24 22:15:00	02-Jul-24 23:52:00	9,271.37
532	03-Jul-24 07:43:16	03-Jul-24 09:23:54	9,199.21
533	03-Jul-24 16:29:00	03-Jul-24 19:46:00	9,290.02
534	03-Jul-24 20:18:33	03-Jul-24 22:08:01	9,268.49
535	04-Jul-24 04:24:49	04-Jul-24 06:22:07	9,297.36
536	04-Jul-24 15:18:53	04-Jul-24 17:16:41	8,488.70
537	04-Jul-24 20:44:01	04-Jul-24 22:24:42	9,256.39
538	05-Jul-24 00:23:37	05-Jul-24 02:28:04	8,516.98
539	05-Jul-24 06:31:25	05-Jul-24 08:24:20	9,290.07
540	06-Jul-24 09:32:25	06-Jul-24 11:13:20	8,521.34
541	06-Jul-24 22:33:54	07-Jul-24 00:15:00	9,307.13

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
542	08-Jul-24 17:47:04	08-Jul-24 19:49:35	8,507.90
543	09-Jul-24 01:26:46	09-Jul-24 03:19:56	9,165.77
544	09-Jul-24 19:14:19	09-Jul-24 20:53:14	9,240.75
545	10-Jul-24 11:14:52	10-Jul-24 12:54:20	9,242.83
546	10-Jul-24 15:21:44	10-Jul-24 18:19:24	9,159.31
547	11-Jul-24 05:57:00	11-Jul-24 08:51:00	9,268.89
548	11-Jul-24 10:06:00	11-Jul-24 11:56:00	9,232.11
549	11-Jul-24 13:08:15	11-Jul-24 15:06:45	9,288.84
550	11-Jul-24 15:33:24	11-Jul-24 17:25:07	8,520.90
551	12-Jul-24 01:19:40	12-Jul-24 03:09:42	9,260.91
552	12-Jul-24 13:15:24	12-Jul-24 14:53:20	9,236.82
553	12-Jul-24 20:24:00	12-Jul-24 22:32:00	9,280.73
554	13-Jul-24 11:59:33	13-Jul-24 13:47:11	9,254.44
555	13-Jul-24 16:31:58	13-Jul-24 18:31:43	9,293.81
556	14-Jul-24 07:24:00	14-Jul-24 09:05:00	9,291.30
557	14-Jul-24 09:28:00	14-Jul-24 11:25:00	9,291.47
558	14-Jul-24 13:14:08	14-Jul-24 14:55:33	8,480.13
559	14-Jul-24 19:17:12	14-Jul-24 21:09:44	9,242.40
560	15-Jul-24 23:44:29	16-Jul-24 01:37:28	9,202.41
561	16-Jul-24 08:30:53	16-Jul-24 10:34:26	8,482.20
562	16-Jul-24 11:26:27	16-Jul-24 13:09:52	9,249.95
563	16-Jul-24 21:29:16	16-Jul-24 23:07:01	9,233.44
564	17-Jul-24 00:18:00	17-Jul-24 02:01:38	9,284.09
565	17-Jul-24 04:31:26	17-Jul-24 06:18:58	9,288.13
566	17-Jul-24 08:58:00	17-Jul-24 10:49:00	9,303.31
567	17-Jul-24 14:04:12	17-Jul-24 16:01:36	9,233.57

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
568	17-Jul-24 22:12:03	17-Jul-24 23:54:52	9,291.62
569	18-Jul-24 05:23:00	18-Jul-24 07:27:00	9,288.66
570	19-Jul-24 02:43:15	19-Jul-24 04:20:44	9,256.45
571	19-Jul-24 11:02:59	19-Jul-24 13:31:22	9,270.37
572	20-Jul-24 00:32:13	20-Jul-24 02:16:59	9,266.61
573	20-Jul-24 03:04:43	20-Jul-24 04:54:09	9,228.73
574	20-Jul-24 07:21:00	20-Jul-24 09:08:00	9,281.91
575	20-Jul-24 13:17:09	20-Jul-24 15:01:19	9,282.50
576	20-Jul-24 21:11:42	20-Jul-24 22:59:50	9,217.70
577	21-Jul-24 01:01:36	21-Jul-24 02:47:47	9,148.30
578	21-Jul-24 09:14:40	21-Jul-24 11:06:45	9,292.53
579	21-Jul-24 11:33:24	21-Jul-24 13:31:52	9,222.27
580	21-Jul-24 16:43:00	21-Jul-24 18:48:00	9,293.37
581	21-Jul-24 22:33:22	22-Jul-24 00:34:48	9,290.29
582	22-Jul-24 05:47:54	22-Jul-24 08:02:48	8,523.86
583	22-Jul-24 11:08:05	22-Jul-24 12:55:42	9,280.73
584	22-Jul-24 15:25:09	22-Jul-24 17:05:11	9,287.87
585	22-Jul-24 21:11:50	22-Jul-24 22:49:29	9,251.23
586	23-Jul-24 00:31:30	23-Jul-24 02:14:26	9,280.17
587	23-Jul-24 08:06:27	23-Jul-24 09:46:04	9,291.30
588	23-Jul-24 14:23:43	23-Jul-24 16:08:57	9,266.65
589	23-Jul-24 17:56:02	23-Jul-24 20:08:22	9,271.70
590	24-Jul-24 00:20:03	24-Jul-24 02:09:47	9,268.82
591	24-Jul-24 08:40:02	24-Jul-24 10:26:08	8,497.34
592	25-Jul-24 00:11:00	25-Jul-24 01:48:00	9,261.94
593	25-Jul-24 03:38:10	25-Jul-24 05:16:30	9,309.28

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
594	25-Jul-24 08:45:00	25-Jul-24 10:58:00	9,284.34
595	25-Jul-24 12:38:01	25-Jul-24 14:25:01	9,273.53
596	25-Jul-24 17:47:13	25-Jul-24 19:39:11	8,517.05
597	25-Jul-24 21:12:32	25-Jul-24 23:02:37	9,290.98
598	26-Jul-24 00:00:31	26-Jul-24 02:07:43	9,261.95
599	26-Jul-24 04:14:00	26-Jul-24 06:17:00	8,519.27
600	26-Jul-24 20:22:39	26-Jul-24 22:14:51	9,277.83
601	26-Jul-24 23:34:39	27-Jul-24 01:11:50	9,168.96
602	27-Jul-24 02:40:18	27-Jul-24 04:20:32	9,243.44
603	27-Jul-24 10:55:24	27-Jul-24 12:44:56	8,480.57
604	27-Jul-24 08:21:45	27-Jul-24 10:09:33	9,279.89
605	28-Jul-24 00:15:23	28-Jul-24 01:56:16	9,232.62
606	28-Jul-24 02:14:00	28-Jul-24 04:31:00	8,482.85
607	28-Jul-24 08:07:22	28-Jul-24 09:46:12	9,232.89
608	28-Jul-24 13:00:39	28-Jul-24 14:38:41	9,240.43
609	28-Jul-24 20:34:00	28-Jul-24 22:22:00	9,230.30
610	30-Jul-24 05:35:20	30-Jul-24 07:47:14	9,261.65
611	31-Jul-24 00:36:25	31-Jul-24 02:20:00	9,285.59
612	31-Jul-24 03:14:12	31-Jul-24 05:03:51	9,224.00
613	31-Jul-24 11:28:04	31-Jul-24 13:22:10	9,274.10
614	31-Jul-24 23:39:50	01-Aug-24 01:17:26	9,235.98
615	01-Aug-24 09:15:52	01-Aug-24 10:55:48	9,299.68
616	01-Aug-24 17:34:58	01-Aug-24 20:13:24	9,315.44
617	01-Aug-24 20:57:02	01-Aug-24 22:41:51	8,514.72
618	02-Aug-24 04:27:41	02-Aug-24 06:16:21	9,243.02
619	02-Aug-24 09:06:44	02-Aug-24 10:58:29	8,523.00

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
620	02-Aug-24 14:28:42	02-Aug-24 16:08:39	9,296.59
621	02-Aug-24 21:30:19	02-Aug-24 23:14:59	9,285.30
622	06-Aug-24 05:25:50	06-Aug-24 07:03:25	9,246.82
623	06-Aug-24 17:50:00	06-Aug-24 20:26:00	9,163.53
624	06-Aug-24 20:56:03	06-Aug-24 22:36:22	9,295.78
625	07-Aug-24 01:32:55	07-Aug-24 03:10:48	9,228.59
626	07-Aug-24 08:57:00	07-Aug-24 10:40:00	9,270.15
627	08-Aug-24 07:17:36	08-Aug-24 10:31:06	8,513.87
628	08-Aug-24 11:53:43	08-Aug-24 13:37:55	9,295.03
629	08-Aug-24 23:00:00	09-Aug-24 01:05:00	9,291.33
630	09-Aug-24 02:39:24	09-Aug-24 04:29:37	9,312.92
631	09-Aug-24 08:28:10	09-Aug-24 10:13:26	8,511.49
632	09-Aug-24 11:04:00	09-Aug-24 12:55:00	9,189.76
633	10-Aug-24 01:39:00	10-Aug-24 03:21:22	9,152.68
634	10-Aug-24 13:39:00	10-Aug-24 15:38:00	9,221.99
635	10-Aug-24 16:23:00	10-Aug-24 18:04:00	9,148.82
636	10-Aug-24 21:08:06	10-Aug-24 22:53:26	9,258.89
637	11-Aug-24 00:34:31	11-Aug-24 02:12:58	9,272.85
638	11-Aug-24 02:58:00	11-Aug-24 05:09:00	9,223.47
639	11-Aug-24 07:39:00	11-Aug-24 09:35:00	9,278.89
640	11-Aug-24 10:12:10	11-Aug-24 11:58:43	8,493.45
641	11-Aug-24 13:10:42	11-Aug-24 15:06:20	9,271.13
642	12-Aug-24 01:45:21	12-Aug-24 03:44:02	8,499.18
643	12-Aug-24 08:58:08	12-Aug-24 10:37:43	9,293.23
644	12-Aug-24 18:17:27	12-Aug-24 20:13:05	9,289.27
645	13-Aug-24 00:48:45	13-Aug-24 02:34:47	9,276.12

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
646	13-Aug-24 03:48:59	13-Aug-24 05:37:06	8,496.72
647	13-Aug-24 20:17:59	13-Aug-24 22:01:44	9,300.30
648	13-Aug-24 23:55:46	14-Aug-24 01:36:29	9,216.01
649	14-Aug-24 18:19:00	14-Aug-24 20:04:00	9,251.45
650	16-Aug-24 03:24:00	16-Aug-24 06:51:00	8,491.53
651	16-Aug-24 08:23:46	16-Aug-24 10:01:45	9,280.15
652	16-Aug-24 15:33:57	16-Aug-24 17:17:36	9,167.44
653	16-Aug-24 18:15:08	16-Aug-24 21:42:38	9,266.12
654	17-Aug-24 11:50:50	17-Aug-24 13:29:27	9,285.03
655	17-Aug-24 14:39:24	17-Aug-24 16:42:15	8,488.63
656	17-Aug-24 22:22:10	18-Aug-24 00:01:14	9,298.79
657	18-Aug-24 00:30:24	18-Aug-24 02:20:29	9,310.73
658	18-Aug-24 08:56:43	18-Aug-24 11:02:23	8,535.37
659	18-Aug-24 11:38:05	18-Aug-24 13:16:46	9,283.76
660	18-Aug-24 19:10:38	18-Aug-24 20:57:36	9,310.14
661	19-Aug-24 22:25:38	20-Aug-24 00:13:47	9,257.28
662	20-Aug-24 02:47:55	20-Aug-24 04:34:28	9,319.05
663	20-Aug-24 05:07:09	20-Aug-24 07:18:08	8,520.79
664	20-Aug-24 08:49:19	20-Aug-24 10:42:51	8,509.61
665	20-Aug-24 18:03:47	20-Aug-24 20:17:39	9,251.35
666	21-Aug-24 15:51:31	21-Aug-24 17:29:25	9,220.00
667	21-Aug-24 19:33:02	21-Aug-24 21:20:30	8,495.86
668	22-Aug-24 11:34:45	22-Aug-24 13:15:42	9,147.69
669	22-Aug-24 17:19:00	22-Aug-24 19:10:00	9,251.00
670	22-Aug-24 19:37:56	22-Aug-24 21:19:23	9,266.74
671	22-Aug-24 23:02:32	23-Aug-24 00:45:07	9,286.57

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
672	23-Aug-24 02:16:14	23-Aug-24 03:55:44	9,165.18
673	23-Aug-24 05:03:10	23-Aug-24 07:32:36	9,263.78
674	24-Aug-24 00:00:40	24-Aug-24 01:40:18	9,221.54
675	24-Aug-24 06:14:00	24-Aug-24 08:17:00	9,283.04
676	24-Aug-24 08:58:34	24-Aug-24 10:48:51	9,286.30
677	24-Aug-24 11:12:36	24-Aug-24 13:05:01	9,278.26
678	24-Aug-24 13:56:06	24-Aug-24 15:33:42	9,231.21
679	24-Aug-24 19:29:56	24-Aug-24 21:27:50	9,160.90
680	25-Aug-24 18:17:00	25-Aug-24 20:16:00	9,238.44
681	26-Aug-24 14:23:16	26-Aug-24 16:15:02	8,474.81
682	26-Aug-24 16:39:34	26-Aug-24 18:27:51	9,355.55
683	26-Aug-24 21:30:27	26-Aug-24 23:07:38	9,328.31
684	26-Aug-24 23:34:24	27-Aug-24 01:13:48	9,256.93
685	27-Aug-24 05:48:00	27-Aug-24 08:42:00	9,282.54
686	28-Aug-24 05:41:59	28-Aug-24 07:26:59	9,195.70
687	28-Aug-24 09:18:45	28-Aug-24 11:02:26	9,278.11
688	28-Aug-24 20:51:19	28-Aug-24 22:30:24	9,142.56
689	28-Aug-24 23:33:00	29-Aug-24 01:29:00	9,259.61
690	29-Aug-24 21:40:28	29-Aug-24 23:27:46	9,261.92
691	30-Aug-24 03:48:41	30-Aug-24 05:33:57	9,313.11
692	30-Aug-24 06:24:00	30-Aug-24 08:25:00	9,255.78
693	30-Aug-24 10:35:07	30-Aug-24 12:12:53	9,251.68
694	30-Aug-24 13:10:04	30-Aug-24 14:47:59	9,259.83
695	30-Aug-24 23:04:24	31-Aug-24 01:21:43	9,160.70
696	31-Aug-24 01:51:55	31-Aug-24 03:28:12	9,300.45
697	31-Aug-24 18:42:34	31-Aug-24 20:33:08	9,165.38

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
698	01-Sep-24 02:51:00	01-Sep-24 05:01:00	8,501.92
699	01-Sep-24 09:54:44	01-Sep-24 11:37:15	9,145.79
700	01-Sep-24 15:12:46	01-Sep-24 16:55:07	9,234.90
701	02-Sep-24 01:57:09	02-Sep-24 03:41:56	9,300.46
702	02-Sep-24 08:11:06	02-Sep-24 10:13:15	8,500.48
703	02-Sep-24 05:27:00	02-Sep-24 07:21:00	9,269.89
704	02-Sep-24 20:37:41	02-Sep-24 22:18:51	9,223.52
705	03-Sep-24 04:01:41	03-Sep-24 06:06:54	9,139.70
706	03-Sep-24 10:52:00	03-Sep-24 12:40:00	9,294.99
707	03-Sep-24 13:07:00	03-Sep-24 15:10:00	8,473.65
708	03-Sep-24 21:16:55	03-Sep-24 22:57:04	9,276.73
709	03-Sep-24 23:58:06	04-Sep-24 01:46:26	9,304.54
710	04-Sep-24 04:59:00	04-Sep-24 06:37:00	9,251.46
711	05-Sep-24 05:43:00	05-Sep-24 07:42:00	9,217.85
712	05-Sep-24 08:20:36	05-Sep-24 10:00:51	8,500.90
713	05-Sep-24 23:22:06	06-Sep-24 01:01:05	9,276.76
714	06-Sep-24 01:39:46	06-Sep-24 03:20:46	9,220.71
715	06-Sep-24 05:15:04	06-Sep-24 07:37:31	8,471.72
716	06-Sep-24 13:01:57	06-Sep-24 14:57:15	9,266.92
717	06-Sep-24 15:55:25	06-Sep-24 17:44:22	9,252.80
718	07-Sep-24 00:42:41	07-Sep-24 02:28:53	9,224.86
719	07-Sep-24 20:46:11	08-Sep-24 02:33:17	8,500.11
720	08-Sep-24 08:06:43	08-Sep-24 13:00:54	9,312.95
721	08-Sep-24 14:45:00	08-Sep-24 17:46:00	8,503.03
722	08-Sep-24 19:52:24	08-Sep-24 22:48:43	9,283.55
723	09-Sep-24 09:25:29	09-Sep-24 11:18:02	9,169.66

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
724	09-Sep-24 22:56:02	10-Sep-24 00:39:04	9,272.17
725	10-Sep-24 07:52:09	10-Sep-24 09:33:24	9,259.66
726	10-Sep-24 20:45:04	10-Sep-24 22:24:57	9,174.00
727	11-Sep-24 19:57:31	11-Sep-24 21:42:08	9,266.99
728	11-Sep-24 23:32:22	12-Sep-24 01:10:15	9,225.49
729	12-Sep-24 09:21:10	12-Sep-24 13:10:31	9,252.48
730	12-Sep-24 18:23:57	12-Sep-24 21:39:19	9,282.73
731	12-Sep-24 22:36:45	13-Sep-24 00:19:26	9,299.94
732	13-Sep-24 04:07:05	13-Sep-24 05:56:43	9,302.61
733	13-Sep-24 07:55:01	13-Sep-24 11:54:48	8,491.01
734	13-Sep-24 12:21:00	13-Sep-24 13:59:00	9,208.06
735	13-Sep-24 15:22:17	13-Sep-24 17:12:06	9,176.30
736	13-Sep-24 19:51:00	13-Sep-24 21:29:00	9,299.33
737	14-Sep-24 01:30:15	14-Sep-24 03:08:23	9,225.26
738	14-Sep-24 15:18:59	14-Sep-24 18:11:23	8,468.88
739	14-Sep-24 13:22:59	14-Sep-24 15:01:30	9,213.47
740	15-Sep-24 13:52:50	15-Sep-24 15:42:36	9,235.81
741	15-Sep-24 23:17:01	16-Sep-24 00:59:01	9,284.64
742	16-Sep-24 04:08:08	16-Sep-24 05:47:43	8,479.79
743	16-Sep-24 07:19:00	16-Sep-24 09:15:00	9,130.69
744	16-Sep-24 16:22:02	16-Sep-24 18:00:53	9,185.37
745	16-Sep-24 19:25:54	16-Sep-24 21:03:25	9,190.40
746	16-Sep-24 21:40:59	16-Sep-24 23:44:10	9,267.11
747	17-Sep-24 00:23:55	17-Sep-24 02:18:46	9,271.12
748	17-Sep-24 03:40:25	17-Sep-24 05:18:02	9,302.20
749	17-Sep-24 12:27:00	17-Sep-24 14:29:00	8,390.10

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
750	17-Sep-24 15:50:58	17-Sep-24 17:30:59	9,138.19
751	17-Sep-24 21:05:00	17-Sep-24 22:53:00	9,176.32
752	19-Sep-24 16:25:22	19-Sep-24 18:03:12	9,225.79
753	19-Sep-24 23:16:36	20-Sep-24 00:54:36	8,409.41
754	20-Sep-24 05:32:45	20-Sep-24 07:36:05	8,425.94
755	20-Sep-24 20:15:00	20-Sep-24 21:54:00	9,258.81
756	21-Sep-24 04:10:22	21-Sep-24 05:48:05	9,266.25
757	21-Sep-24 08:23:00	21-Sep-24 10:11:00	8,456.03
758	21-Sep-24 19:48:24	21-Sep-24 21:32:22	9,146.42
759	22-Sep-24 20:02:35	22-Sep-24 21:40:25	9,262.40
760	22-Sep-24 22:50:21	23-Sep-24 00:30:19	9,242.74
761	23-Sep-24 02:03:00	23-Sep-24 03:52:00	9,268.13
762	23-Sep-24 12:00:06	23-Sep-24 13:39:40	9,238.15
763	23-Sep-24 17:12:11	23-Sep-24 18:56:15	9,233.87
764	24-Sep-24 00:57:47	24-Sep-24 02:47:57	8,512.74
765	24-Sep-24 04:10:13	24-Sep-24 05:49:45	9,272.09
766	24-Sep-24 07:55:31	24-Sep-24 10:09:12	9,223.38
767	24-Sep-24 11:26:00	24-Sep-24 13:29:00	8,489.97
768	24-Sep-24 16:17:16	24-Sep-24 18:17:38	9,164.69
769	24-Sep-24 19:55:00	24-Sep-24 21:46:00	9,277.47
770	24-Sep-24 23:00:28	25-Sep-24 00:39:49	9,231.88
771	25-Sep-24 02:32:31	25-Sep-24 04:23:26	9,275.92
772	25-Sep-24 05:09:36	25-Sep-24 07:07:08	8,508.47
773	25-Sep-24 07:41:00	25-Sep-24 09:30:00	9,304.36
774	25-Sep-24 09:59:44	25-Sep-24 12:02:23	9,302.46
775	25-Sep-24 19:53:53	25-Sep-24 21:52:19	9,261.78

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
776	25-Sep-24 23:09:11	26-Sep-24 00:58:51	9,235.69
777	26-Sep-24 22:23:14	27-Sep-24 00:18:18	9,258.31
778	27-Sep-24 13:43:00	27-Sep-24 15:24:00	9,256.07
779	29-Sep-24 07:27:00	29-Sep-24 09:10:00	9,210.91
780	29-Sep-24 10:07:30	29-Sep-24 11:49:51	9,237.14
781	30-Sep-24 04:53:05	30-Sep-24 06:33:03	9,263.54
782	30-Sep-24 20:03:12	30-Sep-24 21:44:32	9,225.70
783	04-Oct-24 09:31:50	04-Oct-24 11:27:34	9,280.79
784	05-Oct-24 01:02:46	05-Oct-24 03:07:39	9,289.98
785	05-Oct-24 07:42:35	05-Oct-24 09:28:18	8,503.69
786	06-Oct-24 09:10:00	06-Oct-24 10:59:00	0.00
787	06-Oct-24 09:11:00	06-Oct-24 10:59:00	8,491.51
788	06-Oct-24 14:58:00	06-Oct-24 16:49:00	9,201.53
789	06-Oct-24 19:21:17	06-Oct-24 21:15:27	9,266.88
790	07-Oct-24 01:45:36	07-Oct-24 03:23:43	9,306.01
791	07-Oct-24 03:55:46	07-Oct-24 05:33:32	9,283.19
792	07-Oct-24 23:19:19	08-Oct-24 00:59:52	9,221.67
793	08-Oct-24 03:23:32	08-Oct-24 05:01:39	9,227.76
794	08-Oct-24 07:29:00	08-Oct-24 09:07:00	9,164.26
795	08-Oct-24 09:38:52	08-Oct-24 11:20:10	9,051.62
796	08-Oct-24 23:17:56	09-Oct-24 00:57:30	9,258.88
797	09-Oct-24 03:14:29	09-Oct-24 04:54:01	9,230.32
798	09-Oct-24 07:55:28	09-Oct-24 09:36:41	9,271.73
799	09-Oct-24 13:20:00	09-Oct-24 14:58:00	9,260.19
800	10-Oct-24 02:30:37	10-Oct-24 04:08:55	9,236.35
801	10-Oct-24 10:22:01	10-Oct-24 12:07:22	9,286.19

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
802	10-Oct-24 15:13:18	10-Oct-24 16:58:56	9,254.23
803	10-Oct-24 20:45:02	10-Oct-24 22:22:11	9,290.89
804	11-Oct-24 01:04:58	11-Oct-24 03:01:49	9,266.17
805	11-Oct-24 03:54:46	11-Oct-24 05:55:14	8,476.84
806	11-Oct-24 08:48:58	11-Oct-24 11:08:50	9,285.17
807	11-Oct-24 17:21:25	11-Oct-24 19:20:50	9,280.29
808	11-Oct-24 23:58:30	12-Oct-24 01:41:42	9,258.56
809	12-Oct-24 09:11:43	12-Oct-24 10:55:18	9,235.85
810	12-Oct-24 15:12:57	12-Oct-24 16:54:03	9,175.37
811	12-Oct-24 19:29:54	12-Oct-24 21:07:43	9,135.60
812	12-Oct-24 22:37:00	13-Oct-24 00:31:00	8,478.29
813	13-Oct-24 01:58:44	13-Oct-24 03:59:02	9,125.22
814	13-Oct-24 04:54:21	13-Oct-24 06:46:21	9,199.33
815	13-Oct-24 07:36:23	13-Oct-24 10:22:05	9,284.68
816	13-Oct-24 12:04:00	13-Oct-24 14:10:00	9,178.33
817	13-Oct-24 14:47:00	13-Oct-24 17:12:00	9,181.28
818	13-Oct-24 19:14:25	13-Oct-24 21:00:48	9,137.37
819	13-Oct-24 21:40:00	13-Oct-24 23:22:00	9,267.17
820	14-Oct-24 00:19:39	14-Oct-24 02:20:09	8,493.35
821	14-Oct-24 07:52:00	14-Oct-24 09:43:00	9,094.20
822	14-Oct-24 10:04:23	14-Oct-24 12:04:43	8,404.24
823	14-Oct-24 12:39:02	14-Oct-24 14:17:35	9,289.82
824	15-Oct-24 04:29:23	15-Oct-24 06:06:46	9,285.98
825	15-Oct-24 13:56:51	15-Oct-24 15:37:13	9,227.34
826	15-Oct-24 16:03:36	15-Oct-24 17:49:07	8,506.75
827	15-Oct-24 19:41:19	15-Oct-24 21:19:22	9,253.51

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
828	16-Oct-24 08:17:14	16-Oct-24 09:55:19	9,251.56
829	17-Oct-24 06:37:00	17-Oct-24 08:28:00	9,226.50
830	17-Oct-24 19:05:39	17-Oct-24 20:47:33	9,311.73
831	18-Oct-24 08:49:00	18-Oct-24 10:51:00	8,496.25
832	18-Oct-24 15:30:09	18-Oct-24 17:16:16	9,255.28
833	18-Oct-24 22:57:13	19-Oct-24 00:37:26	9,289.74
834	19-Oct-24 01:10:18	19-Oct-24 02:58:03	9,315.35
835	19-Oct-24 04:57:29	19-Oct-24 07:30:32	9,230.68
836	19-Oct-24 08:08:52	19-Oct-24 09:50:08	8,495.71
837	19-Oct-24 11:23:00	19-Oct-24 13:05:00	9,237.24
838	19-Oct-24 13:49:36	19-Oct-24 15:36:18	9,278.60
839	19-Oct-24 19:32:12	19-Oct-24 21:10:13	9,166.57
840	19-Oct-24 22:06:27	19-Oct-24 23:44:11	9,202.94
841	20-Oct-24 21:36:00	20-Oct-24 23:22:00	9,252.72
842	21-Oct-24 07:41:00	21-Oct-24 09:35:00	9,205.12
843	21-Oct-24 12:35:30	21-Oct-24 14:52:19	8,500.49
844	22-Oct-24 07:59:44	22-Oct-24 11:03:54	9,268.38
845	22-Oct-24 12:05:40	22-Oct-24 13:51:25	9,293.35
846	22-Oct-24 16:58:44	22-Oct-24 18:48:15	8,514.32
847	23-Oct-24 07:42:42	23-Oct-24 09:32:42	9,250.31
848	23-Oct-24 09:59:00	23-Oct-24 11:44:00	8,511.92
849	23-Oct-24 19:53:41	23-Oct-24 21:45:53	9,302.68
850	24-Oct-24 03:26:45	24-Oct-24 05:09:20	9,285.05
851	24-Oct-24 07:08:48	24-Oct-24 08:46:28	9,287.89
852	01-Nov-24 03:02:09	01-Nov-24 04:45:33	9,229.01
853	24-Oct-24 12:56:00	24-Oct-24 14:07:00	5,383.88

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
854	24-Oct-24 21:27:21	24-Oct-24 23:13:03	8,506.44
855	24-Oct-24 23:53:16	25-Oct-24 01:36:00	9,252.08
856	25-Oct-24 13:06:45	25-Oct-24 14:52:02	9,215.79
857	25-Oct-24 21:54:18	25-Oct-24 23:36:29	8,522.59
858	26-Oct-24 12:43:04	26-Oct-24 14:36:57	9,257.99
859	26-Oct-24 17:47:35	26-Oct-24 20:02:17	8,497.65
860	27-Oct-24 04:23:54	27-Oct-24 06:10:25	9,329.20
861	27-Oct-24 07:29:09	27-Oct-24 09:10:25	9,292.86
862	27-Oct-24 22:34:00	28-Oct-24 00:32:00	8,503.69
863	28-Oct-24 07:53:00	28-Oct-24 09:30:00	9,291.25
864	28-Oct-24 16:37:44	28-Oct-24 18:20:40	9,304.22
865	28-Oct-24 23:49:59	29-Oct-24 01:36:41	9,255.53
866	29-Oct-24 03:02:24	29-Oct-24 04:49:52	9,252.17
867	29-Oct-24 07:20:09	29-Oct-24 09:05:47	8,506.44
868	29-Oct-24 11:26:21	29-Oct-24 13:16:55	9,189.62
869	29-Oct-24 16:18:45	29-Oct-24 17:58:28	9,318.55
870	30-Oct-24 06:57:56	30-Oct-24 09:06:46	8,512.84
871	30-Oct-24 11:51:33	30-Oct-24 13:36:31	9,284.68
872	30-Oct-24 16:33:59	30-Oct-24 18:21:43	9,197.78
873	30-Oct-24 20:05:17	30-Oct-24 21:42:56	9,298.67
874	31-Oct-24 09:16:30	31-Oct-24 10:54:18	9,283.73
875	31-Oct-24 14:01:41	31-Oct-24 15:50:20	9,290.62
876	01-Nov-24 11:49:56	01-Nov-24 13:34:44	9,260.83
877	01-Nov-24 22:56:38	02-Nov-24 00:59:36	9,240.58
878	02-Nov-24 13:19:55	02-Nov-24 15:01:29	9,288.56
879	03-Nov-24 00:06:45	03-Nov-24 01:46:25	9,262.29

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
880	03-Nov-24 07:20:00	03-Nov-24 09:41:00	8,498.42
881	03-Nov-24 12:29:00	03-Nov-24 14:13:00	9,285.61
882	04-Nov-24 00:27:58	04-Nov-24 02:06:09	9,197.05
883	04-Nov-24 15:15:00	04-Nov-24 17:01:00	8,568.00
884	04-Nov-24 18:25:00	04-Nov-24 20:17:00	9,232.00
885	04-Nov-24 23:39:38	05-Nov-24 01:17:40	9,237.11
886	05-Nov-24 14:28:22	05-Nov-24 16:06:43	9,223.82
887	05-Nov-24 22:45:24	06-Nov-24 01:25:33	8,518.78
888	06-Nov-24 01:53:14	06-Nov-24 04:46:48	9,241.86
889	06-Nov-24 08:10:04	06-Nov-24 10:16:56	8,514.54
890	06-Nov-24 15:15:00	06-Nov-24 17:03:00	9,303.67
891	07-Nov-24 07:28:20	07-Nov-24 09:33:08	9,207.10
892	07-Nov-24 11:15:04	07-Nov-24 13:02:13	9,303.81
893	08-Nov-24 01:22:00	08-Nov-24 02:58:00	9,286.49
894	08-Nov-24 07:53:31	08-Nov-24 09:37:52	9,265.99
895	08-Nov-24 10:14:45	08-Nov-24 12:07:34	9,272.16
896	09-Nov-24 00:04:21	09-Nov-24 01:46:22	9,211.92
897	09-Nov-24 03:49:37	09-Nov-24 05:33:56	9,311.49
898	09-Nov-24 06:10:00	09-Nov-24 08:08:00	8,521.20
899	09-Nov-24 11:36:52	09-Nov-24 13:15:34	9,290.74
900	09-Nov-24 19:29:36	09-Nov-24 21:07:23	9,233.49
901	10-Nov-24 00:00:04	10-Nov-24 01:44:31	9,272.57
902	10-Nov-24 07:24:54	10-Nov-24 09:27:39	8,524.45
903	10-Nov-24 10:14:00	10-Nov-24 12:05:00	9,230.56
904	11-Nov-24 20:35:01	11-Nov-24 22:27:43	9,279.55
905	12-Nov-24 03:52:00	12-Nov-24 05:59:00	9,228.17

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
906	12-Nov-24 13:14:50	12-Nov-24 15:01:24	9,311.30
907	12-Nov-24 19:27:31	12-Nov-24 23:47:29	9,291.29
908	13-Nov-24 12:47:23	13-Nov-24 14:40:13	9,282.18
909	13-Nov-24 19:37:10	13-Nov-24 21:30:08	9,262.42
910	14-Nov-24 00:17:05	14-Nov-24 02:07:00	9,254.56
911	14-Nov-24 02:53:26	14-Nov-24 04:57:47	9,280.26
912	14-Nov-24 09:02:57	14-Nov-24 11:06:19	9,206.70
913	14-Nov-24 15:56:06	14-Nov-24 17:37:03	9,274.27
914	14-Nov-24 23:12:34	15-Nov-24 00:50:23	9,257.33
915	15-Nov-24 01:12:15	15-Nov-24 02:48:36	9,197.29
916	15-Nov-24 09:08:49	15-Nov-24 10:51:15	9,223.38
917	15-Nov-24 12:33:00	15-Nov-24 13:33:00	5,383.15
918	15-Nov-24 15:04:55	15-Nov-24 16:53:56	9,280.32
919	16-Nov-24 19:27:16	16-Nov-24 21:04:59	9,281.63
920	16-Nov-24 21:47:26	16-Nov-24 23:26:56	9,253.55
921	17-Nov-24 13:29:59	17-Nov-24 15:12:07	9,274.68
922	17-Nov-24 20:04:47	17-Nov-24 22:09:04	9,248.88
923	18-Nov-24 11:58:02	18-Nov-24 13:48:50	9,227.12
924	18-Nov-24 19:44:22	18-Nov-24 21:23:50	9,217.09
925	22-Nov-24 09:38:12	22-Nov-24 11:23:39	9,283.94
926	22-Nov-24 19:26:18	22-Nov-24 21:09:34	9,296.89
927	22-Nov-24 21:34:31	22-Nov-24 23:31:33	9,212.44
928	23-Nov-24 12:40:10	23-Nov-24 14:44:23	9,209.86
929	23-Nov-24 19:48:00	23-Nov-24 21:34:00	9,222.23
930	24-Nov-24 08:53:00	24-Nov-24 10:32:00	9,298.43
931	24-Nov-24 12:30:33	24-Nov-24 14:17:10	9,301.23

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
932	25-Nov-24 09:00:11	25-Nov-24 10:38:01	9,204.24
933	26-Nov-24 09:59:55	26-Nov-24 11:40:25	9,294.42
934	26-Nov-24 19:39:14	26-Nov-24 21:17:58	9,275.96
935	26-Nov-24 23:41:02	27-Nov-24 01:59:24	8,500.96
936	27-Nov-24 02:33:15	27-Nov-24 04:44:09	9,314.23
937	27-Nov-24 11:12:11	27-Nov-24 12:58:28	9,293.12
938	27-Nov-24 23:50:23	28-Nov-24 01:43:00	9,231.79
939	28-Nov-24 14:57:28	28-Nov-24 16:49:44	9,262.93
940	29-Nov-24 00:05:50	29-Nov-24 01:56:54	8,513.38
941	29-Nov-24 14:49:28	29-Nov-24 17:02:40	8,482.33
942	30-Nov-24 01:07:38	30-Nov-24 02:45:37	9,232.07
943	30-Nov-24 07:10:37	30-Nov-24 09:17:40	9,227.12
944	30-Nov-24 20:16:02	30-Nov-24 22:07:25	9,230.04
945	01-Dec-24 05:01:06	01-Dec-24 07:25:11	8,498.48
946	01-Dec-24 07:51:30	01-Dec-24 09:41:17	9,268.93
947	01-Dec-24 22:03:53	01-Dec-24 23:42:01	9,264.20
948	02-Dec-24 11:41:08	02-Dec-24 13:18:43	9,295.23
949	02-Dec-24 20:49:53	02-Dec-24 23:04:57	9,270.72
950	03-Dec-24 05:10:26	03-Dec-24 07:32:38	8,508.97
951	03-Dec-24 07:59:18	03-Dec-24 09:53:29	9,219.53
952	03-Dec-24 11:46:22	03-Dec-24 13:41:38	9,250.00
953	03-Dec-24 16:18:29	03-Dec-24 17:59:08	9,246.17
954	04-Dec-24 00:40:45	04-Dec-24 02:19:12	9,226.74
955	04-Dec-24 02:44:00	04-Dec-24 04:46:00	9,277.83
956	04-Dec-24 17:48:49	04-Dec-24 19:36:56	9,247.53
957	04-Dec-24 21:47:05	04-Dec-24 23:30:18	9,270.69

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
958	05-Dec-24 07:28:00	05-Dec-24 09:19:00	9,305.59
959	05-Dec-24 20:23:52	05-Dec-24 22:03:14	9,256.56
960	06-Dec-24 00:17:21	06-Dec-24 02:42:04	9,267.92
961	06-Dec-24 07:56:00	06-Dec-24 09:44:00	9,266.76
962	06-Dec-24 16:24:47	06-Dec-24 18:08:57	9,268.72
963	06-Dec-24 21:29:00	06-Dec-24 23:21:00	9,281.43
964	07-Dec-24 02:02:00	07-Dec-24 03:52:00	9,250.58
965	07-Dec-24 09:22:55	07-Dec-24 11:32:21	9,294.72
966	07-Dec-24 18:06:00	07-Dec-24 19:51:00	8,483.07
967	07-Dec-24 22:45:29	08-Dec-24 00:24:59	9,247.67
968	08-Dec-24 09:54:46	08-Dec-24 11:33:08	9,261.14
969	08-Dec-24 18:12:36	08-Dec-24 20:05:12	9,280.86
970	08-Dec-24 21:10:00	08-Dec-24 22:50:00	9,250.87
971	09-Dec-24 02:59:32	09-Dec-24 04:46:57	9,241.68
972	09-Dec-24 11:14:23	09-Dec-24 13:04:43	8,512.42
973	09-Dec-24 07:36:52	09-Dec-24 09:27:00	9,275.41
974	09-Dec-24 21:02:18	09-Dec-24 22:51:57	9,282.90
975	10-Dec-24 02:37:59	10-Dec-24 04:25:52	9,248.69
976	10-Dec-24 05:36:53	10-Dec-24 07:52:37	9,248.40
977	10-Dec-24 10:15:00	10-Dec-24 12:45:00	9,248.36
978	10-Dec-24 13:26:00	10-Dec-24 15:56:00	8,860.00
979	10-Dec-24 17:46:29	10-Dec-24 20:32:33	9,283.51
980	10-Dec-24 20:54:19	10-Dec-24 22:39:19	9,277.10
981	11-Dec-24 12:34:21	11-Dec-24 14:19:45	8,515.78
982	11-Dec-24 20:37:16	11-Dec-24 22:15:08	9,243.14
983	11-Dec-24 23:34:54	12-Dec-24 01:19:03	9,285.20

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
984	12-Dec-24 12:34:48	12-Dec-24 14:14:46	9,272.57
985	12-Dec-24 15:25:53	12-Dec-24 17:03:49	9,290.44
986	13-Dec-24 01:21:06	13-Dec-24 03:15:45	9,270.63
987	13-Dec-24 05:26:04	13-Dec-24 07:27:42	9,286.57
988	13-Dec-24 09:12:27	13-Dec-24 11:01:02	9,232.31
989	13-Dec-24 15:21:48	13-Dec-24 17:00:53	9,269.02
990	14-Dec-24 07:34:00	14-Dec-24 09:23:00	9,283.67
991	14-Dec-24 09:59:00	14-Dec-24 12:05:00	9,250.46
992	15-Dec-24 00:16:19	15-Dec-24 02:02:56	9,280.43
993	15-Dec-24 07:27:44	15-Dec-24 09:11:30	8,511.97
994	15-Dec-24 12:14:48	15-Dec-24 14:02:01	9,278.95
995	15-Dec-24 23:54:09	16-Dec-24 01:32:18	9,276.48
996	16-Dec-24 18:31:00	16-Dec-24 20:43:08	9,253.74
997	17-Dec-24 16:40:00	17-Dec-24 19:29:00	8,486.40
998	18-Dec-24 00:09:19	18-Dec-24 01:57:04	9,254.36
999	18-Dec-24 13:02:46	18-Dec-24 14:44:30	9,244.07
1000	18-Dec-24 22:23:03	19-Dec-24 00:17:59	9,277.01
1001	20-Dec-24 09:51:14	20-Dec-24 11:29:04	9,291.99
1002	20-Dec-24 15:49:14	20-Dec-24 17:37:21	9,266.30
1003	20-Dec-24 19:57:59	20-Dec-24 21:41:08	9,268.80
1004	21-Dec-24 03:06:59	21-Dec-24 04:46:11	9,277.14
1005	21-Dec-24 12:52:43	21-Dec-24 14:40:27	9,285.25
1006	21-Dec-24 20:01:00	21-Dec-24 21:48:00	9,284.98
1007	22-Dec-24 02:43:49	22-Dec-24 04:23:21	9,287.96
1008	22-Dec-24 04:49:54	22-Dec-24 06:36:50	8,511.75
1009	22-Dec-24 11:58:36	22-Dec-24 13:36:24	9,248.44

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
1010	22-Dec-24 16:27:18	22-Dec-24 18:08:11	9,252.61
1011	22-Dec-24 19:43:54	22-Dec-24 21:49:50	9,278.83
1012	23-Dec-24 19:49:05	23-Dec-24 21:30:22	9,254.15
1013	26-Dec-24 23:48:07	27-Dec-24 01:26:34	9,285.01
1014	27-Dec-24 02:26:25	27-Dec-24 04:14:32	9,280.21
1015	27-Dec-24 08:04:12	27-Dec-24 10:06:50	9,300.00
1016	27-Dec-24 12:15:00	27-Dec-24 15:11:00	8,477.80
1017	27-Dec-24 16:38:20	27-Dec-24 19:53:27	9,271.37
1018	27-Dec-24 20:19:20	27-Dec-24 22:25:00	8,469.50
1019	28-Dec-24 04:43:49	28-Dec-24 06:26:58	8,512.02
1020	28-Dec-24 13:28:00	28-Dec-24 15:12:00	9,292.55
1021	28-Dec-24 20:35:06	28-Dec-24 22:17:19	9,276.29
1022	29-Dec-24 00:16:00	29-Dec-24 01:14:00	5,401.78
1023	29-Dec-24 03:37:46	29-Dec-24 05:37:47	9,285.32
1024	29-Dec-24 08:08:12	29-Dec-24 09:53:15	8,506.67
1025	29-Dec-24 11:42:47	29-Dec-24 13:23:43	9,261.49
1026	29-Dec-24 15:44:29	29-Dec-24 17:23:35	9,245.15
1027	29-Dec-24 20:05:48	29-Dec-24 21:58:51	8,518.99
1028	29-Dec-24 22:34:59	30-Dec-24 00:25:54	9,252.52
1029	30-Dec-24 08:08:00	30-Dec-24 09:54:00	8,417.00
1030	30-Dec-24 13:21:00	30-Dec-24 15:45:00	9,239.11
1031	30-Dec-24 21:35:19	30-Dec-24 23:37:59	9,272.88
1032	31-Dec-24 00:01:58	31-Dec-24 01:46:47	9,251.03
1033	31-Dec-24 02:24:56	31-Dec-24 04:04:34	9,141.09
1034	31-Dec-24 06:12:00	31-Dec-24 07:49:00	9,303.70
1035	31-Dec-24 10:26:17	31-Dec-24 12:04:02	9,274.09

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Train Index	Load Start Time	Load Complete Time	Net Weight (t)
1036	31-Dec-24 13:16:13	31-Dec-24 15:05:00	8,514.86
1037	31-Dec-24 16:15:09	31-Dec-24 17:55:35	9,269.36

Start Date	Total Daily Train Movements (Limit = 20)	Tonnes

Bold indicates start of TLO arrival/loading

Italics - only half train loaded for power station

GLENCORE