YANCOAL
兖煤澳大利亚有限公司

AUSTAR COAL MINE
PART OF THE YANCOAL AUSTRALIA GROUP

Austar Coal Mine Annual Review

July 2022 – June 2023

ANNUAL REVIEW 2023

Name of operation	Austar Coal Mine
Name of operator	Yancoal Mining Services Pty Ltd
Development consent / project approval #	DA 29/95 and PA 08_0111
Name of holder of development consent / project	Austar Coal Mine Pty Limited
Mining lease #	Refer **Table 3-1**
Name of holder of mining lease	Austar Coal Mine Pty Limited
Water licence #	Refer **Table 7-1**
Name of holder of water licence	Austar Coal Mine Pty Limited
RMP start date	29 July 2022
Forward Plan start date	1 July 2022
Forward Plan end date	30 June 2025
Annual Review start date	1 July 2022
Annual Review end date	30 June 2023

I, William Farnworth, certify that this audit report is a true and accurate record of the compliance status of Austar Coal Mine for the period 1 July 2022 to 30 June 2023 and that I am authorised to make this statement on behalf of Austar Coal Mine Pty Ltd.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 9.39(2) of the Environmental Planning and Assessment Act 1979. Section 9.42 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	William Farnworth
Title of authorised reporting officer	Mining Engineering Manager
Signature of authorised reporting officer	
Date	20 September 2023

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1 STATEMENT OF COMPLIANCE

TABLE 1-1 STATEMENT OF COMPLIANCE

Were all the conditions of the relevant approval(s) complied with?	
Development Consent DA 29/95	No
Project Approval PA 08_0111	No
Environment Protection Licence EPL 416	No
CML 2	Yes
CCL 728	Yes
CCL 752	Yes
DSL 89	Yes
ML 1157	Yes
ML 1388	Yes
ML 1364	Yes
ML 1283	Yes
ML 1345	Yes
ML 1550	Yes
ML 1661	Yes
ML 1666	Yes
ML 1677	Yes
ML 1851	Yes
MPL 204	Yes
MPL 217	Yes
MPL 23	Yes
MPL 233	Yes
MPL 269	Yes
WAL 19181	Yes
WAL 41504	Yes
EL 6598	Yes

TABLE 1-2 NON-COMPLIANCES

Relevant Approval	Condition #	Condition Description (Summary)	Compliance Status	Comment	Where Addressed in this Annual Review
EPL 416 PA08_0111 DA29/95	L1.1 Schedule 4 Condition 8 Schedule 3 Condition 5	Shall comply with s120 of the POEO Act (pollution of waters) The proponent shall not discharge any water from the site except as may be expressly provided by an EPL, or in accordance with s120 of the POEO Act 1997.	Non-compliant	7 July 2022 - Aberdare Extended Emplacement Area Overflow, West Cessnock following heavy rainfall and flooding throughout Cessnock. 4-10 July 2022 – Kitchener SIS Sediment Dam overflow	**Section 7.3.5 and Section 11**
PA 08_0111	Schedule 4, Condition 3	The Proponent shall prepare and implement a Noise Management Plan… must include…. A noise monitoring program providing for a combination of continuous and supplementary attended monitoring measures	Non-compliant	The continuous noise monitor, located on Mt View Rd ceased operating on 22 February. This was identified in the morning report on the 23 February and the site was inspected and the monitor was found to have failed. The monitor was replaced and was back in operation by 27 February.	**Section 6.4 and Section 11**

TABLE 1-3 COMPLIANCE STATUS KEY FOR TABLE 1-2

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	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

2 INTRODUCTION

2.1 Scope

This Annual Review covers the annual reporting period from 1 July 2022 to 30 June 2023 (the reporting period). Austar Coal Mine Pty Limited (Austar) is required to prepare and submit an Annual Review that satisfies the annual reporting requirements under Development Consent DA 29/95, Project Approval PA 08_0111, Mining Leases, and management plans required under the various development consents. This Annual Review has been prepared in accordance with the NSW Government *Annual Review Guideline Post-approval requirements for State significant mining developments, October 2015*. Annual water take against water licences is also recorded in this document.

2.2 Background

Austar, a subsidiary of Yancoal Australia Limited (Yancoal), manages the Austar Coal Mine (Austar), a closed underground coal mine located approximately 10 kilometres (km) southwest of Cessnock in the Lower Hunter Valley in NSW. Austar incorporates the former Pelton, Ellalong, Cessnock No. 1 (Kalingo) and Bellbird South Collieries and includes facilities for coal extraction, handling, processing and rail and road transport. Pit top facilities are located on Middle Road, Paxton, and the Coal Handling and Preparation Plant (CHPP) is located at Wollombi Road, Pelton (**Figure 2-1**).

The mine was placed into closure on 26 February 2021with Austar currently completing a Pre-Feasibility Study (PFS) to address closure knowledge gaps and commence preparation of detailed decommissioning and rehabilitation execution plans that will be further developed throughout Feasibility Studies (FS) to deliver optimal rehabilitation outcomes at the site.

Surface infrastructure at Austar has been divided into Closure Management Areas (CMA's) and includes:

- CMA 1 - Austar Pit Top facilities, including administration buildings, bathhouses, the main access drift (including the dolly cart and drift which was sealed in October 2022), coal conveyor bin, store, workshop and laydown facilities;
- CMA 2 - the CHPP at Pelton, including coal handling and preparation plant, empty ROM and product coal stockpiles, train loading and railway infrastructure, coarse coal rejects and fine tailings emplacement areas, mine water management infrastructure, administration areas, Reverse Osmosis water treatment plant, overland conveyor and a number of heritage listed buildings in various states of repair;
- CMA 3 - No. 1 shaft, which was the second egress man winder, and was partially sealed in October 2022;
- CMA 4 - No. 2 shaft, including mine dewatering via a pipeline which pumps to Kalingo Dam, and on to Austar Dam and CHPP;
- CMA 5 - Kalingo Infrastructure Area (KIA), including ventilation fans and underground services, which were partially sealed during October 2022;

- CMA 6 - Kitchener Surface Infrastructure Site (SIS), including ventilation fans and shafts (temporarily sealed in March 2022), services borehole/drop hole (fully sealed in March 2022), along with water management dams, pipelines and powerlines; and
- Coarse reject emplacement areas (CMA 7 - Aberdare Extended Emplacement Area (EEA) and CMA 8 - Bellbird Areas 12 and 13).
- CMA 9 – all other land owned by Austar

The location of approved operations is shown in **Figure 2-1**.

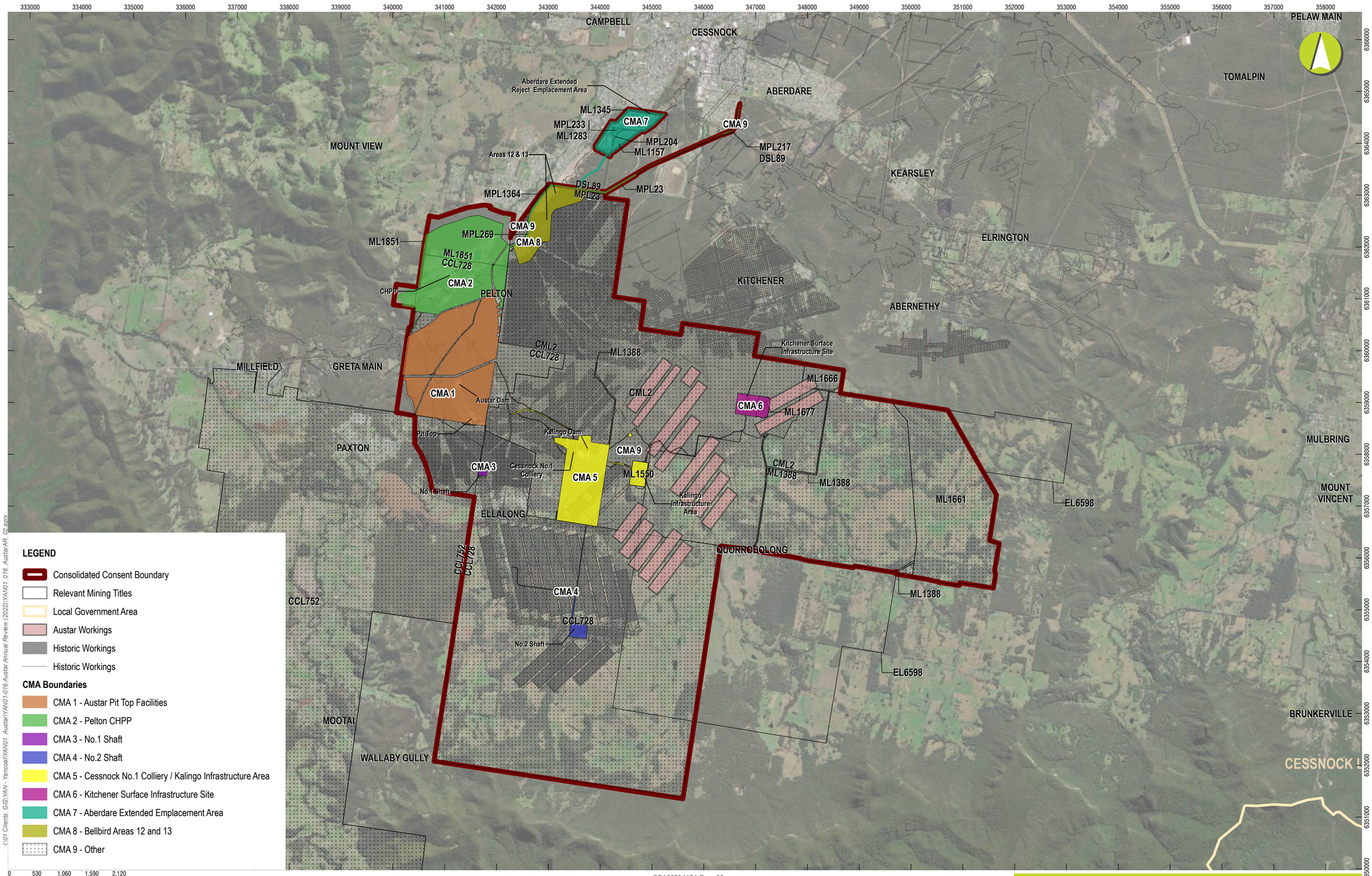
No mining was undertaken at Austar Coal Mine during the reporting period.

2.3 Mine Contacts

Table 2-1 outlines the contact details for site personnel responsible for closure, rehabilitation, environment, and community liaison at Austar.

TABLE 2-1 SITE PERSONNEL

Position	Name	Company	Contact Number
Closure Project Manager	Craig Reiss	Austar	0400 527 713
Mining Engineering Manager	William Farnworth	Austar	0409 023 031
Environment & Community Superintendent	Carly McCormack	Austar	0447 913 693



Austar Coal Mine Annual Review

Locality Plan and Complete Mining Operations

FIGURE 2-1

Sheet Size : A3

INTEGRATED ENVIRONMENTAL MANAGEMENT AUSTRALIA
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3 APPROVALS

Austar's operations are regulated through various leases, licences, permits and approvals as set out below.

3.1 Changes to Approvals during the Reporting Period

On 1 June 2023, Yancoal was advised that ML1851 was granted over the area of MLA 521. ML1851 covers the mine water management dams at the Coal Handling and Preparation Plant.

3.2 Primary Approvals

3.2.1 Project Approvals and Development Consents

Austar operates under two major project approvals: Bellbird South (DA 29/95) and Stage 3 (PA 08_0111), along with numerous development consents issued by Cessnock City Council between 1974 and 2012.
Development Consent DA 29/95 was granted under Section 91 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 14 February 1996 and was most recently modified under Section 75W (repealed) of the EP&A Act on 25 August 2017. DA 29/95 relates primarily to the Bellbird South mining area and operational areas.

Approval to undertake mining operations under DA 29/95 lapsed on 14 February 2022. Under Schedule 2 Condition 5, this consent continues to apply in all other respects until rehabilitation of the site is complete to the required standard. Austar continues to undertake rehabilitation activities and relevant monitoring in accordance with DA29/95 and all approved management plans.

Project Approval PA 08_0111 was granted under Section 75J of the EP&A Act on 6 September 2009 and was last modified under Section 75W of the EP&A Act in December 2013. PA 08_0111 relates primarily to the Stage 3 mining area. PA 08_0111 was declared State Significant Development (SSD) under Clause 6 of Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017* via Government Gazette on 15 November 2018.

A summary of Austar's project approvals and development consents is outlined in Austar's Environmental Management Strategy, found on the Austar website.

3.2.2 Mining Authorities

Details of the relevant mining authorities are summarised in **Table 3-1**.

TABLE 3-1 MINING AUTHORISATIONS HELD BY AUSTAR

Mining Title (Act)	Date Granted	Expiry Date	Area (ha)	Surface	Depth Restriction
EL 6598 (1992)	13 Jul 2006	13 Jul 2024	3582.7	Yes	Various
Dam Site Lease 89 (1901)	04 Apr 1908	04 Apr 2030	3.961	Yes	Surface to 15.24 metres
Mineral Lease No. 1157 (1906)	8 Jul 1949	08 Jul 2028	10.24	Yes	Surface to 15.24 metres
Mineral Lease No. 1283 (1906)	13 Jul 1961	13 Jul 2042	1.973	No (sub-surface)	7.62 to 15.24 metres
Mining Purposes Lease No. 23 (1906)	17 May 1909	17 May 2030	2.421	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 204 (1906)	03 Feb 1916	03 Feb 2039	1.2	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 217 (1906)	12 Apr 1916	03 Feb 2039	0.6298	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 233 (1906)	01 Aug 1916	01 Aug 2036	1.973	Yes	Surface to 7.62 metres
Mining Purposes Lease No. 269 (1906)	07 Dec 1917	07 Dec 2039	2.663	Yes	Surface to 6.1 metres below the level of the rails when laid
Mining Purposes Lease No. 1364 (1906)	28 Oct 1968	28 Oct 2029	0.4527	Yes	Surface to 15.24 metres
Consolidated Coal Lease No. 728 (1973)	10 Oct 1989	30 Dec 2044	3296	Various	Various
Consolidated Coal Lease No. 752 (1973)	23 May 1990	30 Dec 2044	3802	No (Sub-surface)	Various
Consolidated Mining Lease No. 2 (1992)	24 Mar 1993	06 Jul 2025	ML -3406 ha AMA - 2.528 ha	Various	Various
Mining Lease No. 1345 (1992)	23 Mar 1995	30 Dec 2044	ML - 41.9 ha AMA - 0.5659 ha	Yes	Surface to 900 metres depth
Mining Lease No. 1388 (1992)	02 Apr 1996	02 Apr 2038	15.12	No (sub-surface)	30.48 metres to unlimited depth
Mining Lease No. 1550 (1992)	24 Jun 2004	23 Jun 2025	14.11	Yes	Surface to 20 metres

Mining Title (Act)	Date Granted	Expiry Date	Area (ha)	Surface	Depth Restriction
Mining Lease No. 1661 (1992)	22 Nov 2011	22 Nov 2032	469.3	No (sub-surface)	20 to 900 metres
Mining Lease No. 1666 (1992)	25 Jan 2012	25 Jan 2033	34.13	No (sub-surface)	30.48 to 900 metres
Mining Lease No. 1677 (1992)	23 Aug 2012	22 Aug 2032	9.2	Yes	Surface to 30.48 metres
Mining Lease 1851 (1992)	16 May 2023	16 May 2044	115.1	Yes	Surface to 50 metres

3.2.3 Environment Protection Licence

Austar operates in accordance with Environment Protection Licence 416 (EPL 416), issued on 5 April 2000 and last updated on 15 December 2017 by the NSW Environment Protection Authority (EPA), under the authority of the *Protection of the Environment Operations Act 1997*.

3.3 Ancillary Approvals

3.3.1 Extraction Plans

A summary of Extraction Plan / Subsidence Management Plan (SMP) approvals for Bellbird South (LWB1-LWB7) and Stage 3 mining areas held by Austar is outlined in **Table 3-2**.

TABLE 3-2 SUBSIDENCE MANAGEMENT PLAN / EXTRACTION PLAN APPROVALS HELD BY AUSTAR

Description	Date	Expiry Date	Approval Authority	Approval Summary
Extraction Plan Approval	30 May 2013	31 Dec 2030	Department of Planning, and Environment (DPE)	Extraction Plan approval for Austar Longwalls A7 to A10. The Extraction plan has been modified in accordance with PA08_0111 modifications.
SMP Approval 13/1876	3 Jun 2013	31 May 2020	Division of Resources and Energy (DRE)	Subsidence Management Plan approval for Austar Longwalls A7 to A10. The SMP has been varied twice in accordance with PA08_0111 modifications and variations in start and end positions of longwalls.
Extraction Plan LWB1 to LWB3	16 May 2016	Not specified	DPE	Extraction Plan for Bellbird South Longwalls B1 to B3 was approved by DPE on 4 July 2016.
Extraction Plan LWB4 to LWB7	1 Feb 2019	Not specified	DPE	Extraction Plan for Bellbird South Longwalls B4 to B7 approved by DPE on 20 September 2017. Updated to include the shortening of LWB4 was approved by DP&E on 18 September 2018 and again on 12 February 2019. Other variations to Longwalls B5-B7 were approved by DPE on 7 August 2019.

3.3.2 Rehabilitation Management Plan

During the reporting period, Austar Coal Mine's Mining Operations Plan was superseded by the Rehabilitation Management Plan (RMP) and associated Rehabilitation Objectives and Forward Program. The RMP, Rehabilitation Objectives and Forward Program have been prepared in accordance with the Mining Act NSW 1992.

3.3.3 Environmental Management Plans

In accordance with DA 29/95 and PA 08_0111, Austar has developed and implemented environmental management plans. **Table 3-3** outlines the environmental management plans required by each relevant development consent, the determining authority and their approval status.

TABLE 3-3 ENVIRONMENTAL MANAGEMENT PLANS

Plan	DA Requirement	Approval Authority	Approval Date
Environmental Management Strategy, May 2021	DA 29/95 – Schedule 5 Condition 1 PA 08_0111 - Schedule 7 Condition 1	DPE	18 Aug 2021
Landscape Management Plan – Kitchener SIS, April 2021	PA 08_0111 – Schedule 6 Condition 4	DPE	19 Aug 2021
Site Water Management Plan, March 2022	DA 29/95 – Schedule 3 Condition 6-11 PA 08_0111 – Schedule 4 Condition 9	DPE	11 Mar 2022
Noise and Vibration Management Plan, June 2018	DA 29/95 – Schedule 3 Condition 13-16 PA 08_0111 – Schedule 4 Condition 2-3	DPE	1 Aug 2018
Air Quality and Greenhouse Gas Management Plan, October 2021	DA 29/95 – Schedule 3 Condition 17-20 PA 08_0111 – Schedule 4 Condition 6-7	DPE	26 Oct 2021
Aboriginal Cultural Heritage Management Plan, January 2023	PA 08_0111 – Schedule 3 Condition 4 and Schedule 4 Condition 10	DPE	26 April 2023
Historic Heritage Management Plan, April 2021	PA 08_0111 – Schedule 4 Condition 11	DPE	30 Jun 2021

4 OPERATIONS SUMMARY

Activities have generally been associated with rehabilitation and closure technical studies and site investigations as well as closure early works and general site operations including mine ventilation, waste and water management.

A summary of the progress of closure planning and execution works is included in **Section 4.1**. General operations are summarised in **Section 4.2**.

4.1 Closure Works

4.1.1 Mine Closure Planning Update

Austar has been undertaking technical studies and site investigations to address closure knowledge gaps and scope further works required to complete a detailed mine closure plan.

As detailed in **Table 4-1,** commitments made in MOP Amendment A and carried over into the RMP have generally progressed well during the reporting period.

The Austar Mine Closure Project team have been progressing through initial closure technical studies in a pre-feasibility project phase which will be completed during 2023. The findings of the technical studies have informed additional assessments and investigations, proved the preferred go-forward options, and refined the conceptual landform designs and final land use.

4.1.1.1 Detailed Site Investigations

Austar has completed detailed site investigation programs to inform mine rehabilitation and closure. Detailed site investigations and assessments were undertaken based on the recommendations of knowledge gap assessments.

The site investigations included the drilling of boreholes, the excavation of test pits and laboratory testing of selected samples from approximately 300 sample locations across CMAs 1-8. Austar commenced the drilling program in June 2022 and completed it in September 2022. The data obtained from the site investigations was used to inform the geotechnical, geochemical, contamination and water studies. The findings of these specialist studies have informed the development of the preferred go-forward rehabilitation and closure designs and strategies to be taken into the next stage of mine closure planning.

TABLE 4-1 MINE CLOSURE PLANNING STRATEGY STATUS UPDATE

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
Base Case: Final Land Use, Completion Criteria and Rehabilitation Objectives				
1	Final land use assessment	Undertake a final land use assessment. Final land uses are those approved in Austar's various consents, however, may be refined prior to mine closure.	Q3, 2021	Complete. Austar have investigated alternative final land use options including renewable energy (green gravity and solar) and residential land development. Based on financial analysis these options are not considered feasible and the go forward final land use option is structured native vegetation communities and grassland as per existing project approval obligations.
2	Mine closure risk assessment	Undertake an Environmental Risk Assessment focused on mine closure preparedness and specifically risks to achieving the final land use, as described in the RMP. NB the risk register will be reviewed following completion of the mine closure risk assessment.	Complete	Risk assessments have been undertaken and will continue throughout the next stage of mine closure planning and execution. A Rehabilitation Risk Assessment was undertaken in 2022 to inform the preparation of the Rehabilitation Management Plan.
3	Completion criteria and rehabilitation objectives	Refine the completion criteria and objectives in Table 16 (of the RMP) after final land uses confirmed.	Q3, 2021	Completion criteria have been presented in the Rehabilitation Management Plan and will continue to be refined during the closure planning process. The Rehabilitation Objectives were approved by the Resources Regulator in August 2023.

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
4	Final landform design	Review the final landform designs to ensure it can sustain the nominated final land uses and meet the rehabilitation objectives.	Q4, 2022	Conceptual final landform options have been developed for each Closure Management Area (CMA) with preferred go-forward options identified. Additional work to be completed in the next stage of mine closure planning to prove the preferred go forward options and refine the conceptual designs.
		Prepare detailed slope and drainage designs for the final landform to ensure long-term stability.	Q4, 2022	
Knowledge Base: Gap analysis and initial mine closure planning studies				
5	Rehabilitation resources balance	Establish an inventory of materials available for capping and rehabilitation (in an appropriate spatial format).	End of February 2021	Complete.
		Characterise available materials to confirm suitability for rehabilitation.	Q4, 2022	Geotechnical desktop assessment and site inspections completed. Initial Site investigation Sampling and Quality Plan (SAQP) completed. Geotechnical preliminary site investigations completed. Further geotechnical and contamination site investigations will be undertaken in the next phase of closure planning. Based on the conceptual landform designs and subject to further studies, capping material is proposed to be sourced from local materials captured onsite. Further approvals are required to execute this option (refer section **4.1.2.4**).
		In the case of a material deficit, develop a strategy to investigate and procure alternative sources of materials such as topsoils (and/or substitutes) and other rehabilitation materials such as clays, suitable weathered rock, hard rock, etc.	Q4, 2022	
		The material balance will be reviewed following confirmation of rejects and tailings capping designs prior to decommissioning.	Prior to decommissioning	

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
6	Historic heritage assessments	Undertake/review heritage assessments for known or potential historic heritage items at Austar Coal Mine to guide retention/demolition decisions.	Q4, 2021	Complete.
		Consult with Cessnock City Council heritage advisors and or the NSW Heritage Office (if required) to confirm approach and to seek appropriate heritage approvals prior to demolishing heritage items.	Q4, 2021	Consultation with the Cessnock City Council Heritage officer undertaken 7 June 2022. Ongoing consultation with Cessnock City Council will be undertaken throughout mine closure planning.
7	Derelict / redundant infrastructure decommissioning strategy	Prepare an infrastructure decommissioning strategy for progressive decommissioning of redundant, derelict, or hazardous buildings, structures, machinery, plant and equipment.	Q4, 2021	Hazardous Materials Survey completed. Demolition Plan complete. Progressive decommissioning of redundant infrastructure is ongoing as part of Early Works.
		Consult with Cessnock City Council heritage advisors and or the NSW Heritage Office (if required) to confirm approach and to seek appropriate heritage approvals prior to demolishing heritage items.	Q4, 2021	Consultation with the Cessnock City Council Heritage officer undertaken 7 June 2022. Ongoing consultation with Cessnock City Council will be undertaken throughout mine closure planning.
8	Infrastructure retention strategy	Identify infrastructure that could be retained post closure (i.e. internal roads, access tracks, dams, buildings, services), subject to approval, to support the final land use or to retain heritage value.	Q4, 2021	Complete, consultation ongoing throughout mine closure planning.
9	Mine water dam decommissioning strategy	Prepare a preliminary strategy for decommissioning of redundant mine water dams.	Q4, 2022	Redundant Dam decommissioning strategy is progressing, however is contingent on final landform planning and further site investigations.

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
		Prepare a strategy, in consultation with Dams Safety NSW, for decommissioning prescribed dams (i.e. Kalingo Dam).	Q4, 2022	Development of a Dam Decommissioning Strategy for Kalingo Dam is being prepared in consultation with Dam Safety NSW.
10	Tailings storage facilities and reject emplacement area decommissioning and capping strategy	Prepare strategy for progressive decommissioning of the tailings storage facilities and reject emplacement areas.	Q4, 2022	• Preliminary Capping Strategy completed. • Preliminary Geochemical assessment completed. • Rejects and tailings management strategy progressing. • Conceptual tailings and reject management and capping options have progressed for each CMA with preferred go-forward options identified. • Additional work to be completed in the next stage of mine closure planning to refine the conceptual capping designs.
		Review capping techniques.	Q4, 2022	
11	Water management	Review the existing groundwater information to consider aspects related to closure of the mine.	Q4, 2022	Preliminary studies completed, remaining groundwater knowledge gaps to be addressed in the next phase of mine closure planning.
		Review the site water balance and any post closure water management requirements, including management of acid mine drainage.	Q4, 2022	Surface water desktop assessment and site inspection completed. Geochemical (AMD) assessment complete. Flood management strategy commenced. Site water balance to be completed in the next stage of mine closure planning.
		Review post closure water licensing requirements.	Q4, 2022	Progressing.
12	Exploration borehole sealing	Undertake desktop and field surveys of borehole sealing status.	Q1, 2021	Progressing.
		Prepare and commence implementation of the exploration borehole sealing strategy.	Q1, 2022	Audit and sealing of Austar drilled boreholes is complete, with two boreholes requiring lodgement of an ESF2 form.

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
				A borehole sealing strategy for historic boreholes identified through old record tracings and the Resources Regulator database is underway. Sealing of boreholes to be progressively completed during closure planning and execution.
13	Underground mine sealing	Prepare mine sealing designs for all shafts, portals and operational boreholes.	Prior to decommissioning	Review of historic and current entries completed. Specialist engaged; mine sealing designs and geotechnical investigations completed for modern mine entries. No, 1, No. 3 and No. 4 shafts partially sealed. No. 5 and No.6 Shafts temporarily sealed. No.2 Shaft is flooded at base and will remain unsealed until water assessments are complete. Austar Drift permanently sealed. Historic mine entries sealing designs and geotechnical investigations to be completed in the next stage of mine closure planning.
14	Subsidence remediation works	Prepare a plan for post closure remediation of subsidence-related impacts to natural and built features.	As per approved Extraction Plan.	Preliminary subsidence and land stability assessment complete. Rehabilitation of areas affected by subsidence during mining operations under PA 08_0111 and DA 29/95 has been completed in accordance with the relevant Austar extraction plans.
15	Contaminated land assessments	Undertake a Phase 1 contaminated lands assessment focusing on surface infrastructure areas to identify any remediation requirements.	Q4, 2021	Preliminary site investigations complete.
		Undertake full Land Quality investigations and prepare a remediation action plan	Prior to mine closure – to be included in final mine closure plan	Preliminary site investigations complete. Contaminated Land Management Strategy complete.

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
				Further assessment to be undertaken in next phase of mine closure planning.
16	Hazardous materials assessment	Undertake assessments of hazardous materials and chemicals and develop registers and management strategies.	Q4, 2021	Hazardous materials survey complete. Waste management strategy complete.
17	Demolition waste disposal strategy	Identify volumes of waste streams and options to dispose on site or at licenced facilities.	Prior to decommissioning – to be included in final mine closure plan	Waste management strategy complete. Closure Waste Management Plan to be prepared in the next phase of mine closure planning.
		Develop strategy to segregate and manage waste streams on site during demolition.	Prior to decommissioning – to be included in final mine closure plan	
18	Environmental Management Plans	Review/ update the environmental management to reflect mine closure activities.	Prior to mine closure – to be included in final mine closure plan	All management plans have been reviewed, updated, and submitted to DPE for approval. Plans will continue to be updated as required during closure planning and execution.
19	Post-closure Monitoring and Maintenance	Identify post-closure environmental monitoring requirements, including monitoring of rehabilitation, subsidence, and water quality.	Prior to mine closure – to be included in final mine closure plan	To be completed on finalisation of executable closure plan.
		Identify post-closure maintenance requirements such as weed and feral animal control, bushfire management and maintenance of safety signage/fencing to control public access.	Prior to mine closure – to be included in final mine closure plan	
20	Approvals and mining lease relinquishment strategy	Prepare an approvals and mining lease relinquishment strategy that considers the timing and process for relinquishing approvals following mine closure (e.g. EPL, Project Approval and MLs).	Prior to mine closure – to be included in final mine closure plan	Approvals strategy completed. Preferred approval pathway and relinquishment strategy to be confirmed in the next stage of mine closure planning.

#	Aspect	Description	Nominated Timing in MOP Amendment A	Status as at June 2023
21	Human resources strategy	Prepare a human resources strategy to identify opportunities to stage the release of employees and contractors and to support redeployment where appropriate.	Prior to mine closure – to be included in final mine closure plan	Complete.
22	Community management strategy	Prepare a community management strategy to minimise any adverse socio-economic effects of mine closure.	Q2, 2021	Integrated with Mine Closure Stakeholder Engagement Strategy.
23	Stakeholder engagement strategy	Prepare a stakeholder engagement strategy to guide communication and engagement during mine closure.	Q2, 2021	Mine Closure Stakeholder Engagement Strategy complete and will be reviewed and revised as required throughout mine closure planning and execution.

4.1.2 Early Works

As mine closure planning is progressing, early works are being undertaken (including decommissioning, mine sealing and partial demolition) to prepare the site for rehabilitation and closure execution. Early works are discussed in more detail below and in **Section 4.3** where relevant.

4.1.2.1 Decommissioning Activities

Decommissioning activities have been progressed during the reporting period as follows.

Underground Decommissioning
Underground plant, equipment and services have been recovered and removed from the underground mine. Underground demobilisation has been completed. In October 2022, the underground mine was permanently sealed, and is no longer accessible.

Surface Decommissioning
Early works surface decommissioning is ongoing and has included:

- Decommissioning of the Drift Conveyor Drive head and Winder House buildings plant;
- Removal of the RO plant from service;
- Water pumping from underground has ceased allowing progressive flooding of underground workings;
- Decommissioning activities are complete on CVA1 conveyor and the Drift Winder;
- Decommissioning of the Pit Top Bin is underway; and
- Progressive disconnection of equipment at the CHPP in preparation for recovery of the equipment.

4.1.2.2 Mine Sealing

During the reporting period, Austar completed the partial sealing of mine entries across site and has permanently sealed the Austar drift. On 11 October 2022, sealing of the underground mine was completed, and ventilation ceased. Access is no longer possible, and the mine is gradually flooding.

Designs for the sealing of active mine entries and boreholes have been prepared in accordance with relevant shaft and borehole sealing guidelines. Geotechnical sampling to inform the detailed shaft sealing designs was completed as part of the site investigations program.

The Austar drift entry was permanently sealed from the surface to a depth with 15m competent rock cover using a Rocsil seal and grout in accordance with MDG6001. Sealing commenced on 11 October 2022.

Austar completed partial mine sealing of No. 1, No. 3, and No. 4 Shafts in October 2022. Partial mine sealing included construction of a seal at the base of shafts with ‘rubble’ imported from local hard

rock quarries and grout sourced from external concrete suppliers; and capping of shafts with temporary steel caps.

No. 5 and No.6 Shafts were temporarily sealed in March 2022 with the installation of 140kPa rated engineer designed steel plates. Permanent sealing of these ventilation shafts will be planned as part of ongoing closure planning and scheduling.

No.2 Shaft is flooded at the base and will remain unsealed until water assessments are completed in the next stage of mine closure planning.

Some services boreholes at the Kalingo Infrastructure Area have been permanently sealed in accordance with EDG01. Services infrastructure (cables and pipelines) were removed prior to sealing.

Exploration borehole rehabilitation is ongoing as detailed in **Section 8.2.**

4.1.2.3 Demolition

No demolition was undertaken in the reporting period; however, the following works occurred to prepare for demolition:

- Demolition, HAZMAT and preliminary contamination studies have been completed;
- Demolition scope of works completed by a specialist demolition company includes quantities, waste streams and proposed Environmental management plans and procedures;
- A waste management strategy has been developed; and
- Approvals Strategies have been prepared to identify the appropriate pathway for the demolition of non-heritage infrastructure at Austar.

Options to sell fixed infrastructure are also being considered as an alternative to demolition in some instances.

4.1.2.4 Importation of rehabilitation materials

Austar have carried out investigations to review potential sources of fill/capping material both on and off site. Based on the conceptual landform designs and subject to further studies, capping material is proposed to be sourced from local materials captured onsite. Further approvals are required to execute this option.

If required, importation of suitable rehabilitation earthworks materials (such as certified VENM, rock, topsoil, growth mediums, soil ameliorants and fertilisers) may be undertaken from suppliers around NSW and local quarries in the Hunter region NSW.

During the next reporting period, Austar propose to commence seed collection from target vegetation communities in the local area and establish a seed storage bank for future rehabilitation activities.

Further detail on closure planning works is provided in **Section 4.3** .

4.2 Mining Operations

4.2.1 Exploration

There were no exploration activities undertaken during the reporting period. Austar is progressing through an audit of historically drilled holes and developing a rehabilitation process for any drilled holes that require rehabilitation.

An exploration report for Exploration Licence EL6598 is prepared annually covering the period 13 July – 12 July. The report describes exploration and rehabilitation activities carried out on or within EL6598 and was lodged with DPE on 10 August 2023.

4.2.2 Ventilation

During the reporting period, all underground mine ventilation processes ceased, as the mine was sealed.

Prior to mine sealing the No.3 upcast shaft operated until October 2022. The No.3 shaft fan flowrate was reduced when 200 mains was sealed in March 2022 and reduced the workable area of the mine. From July to October 2022, No.3 shaft had an average flow rate of approximately 65m^3/s, with average CO_2 composition of 0.08% and methane composition of 0.03%.

The No.5 Upcast Shaft and No 6 Downcast shaft were temporarily sealed concurrently with 200 mains sealing underground in March 2022. The seal used on both shafts is an appropriately pressure-rated steel cap at the surface, with final sealing scheduled as part of closure execution works.

The No.3 Upcast Shaft and No. 4 Downcast shaft located at the Kalingo Infrastructure Area were sealed at the base in October 2022 using rock and grout. No 3 shaft was sealed to a depth of 426 metres and No.4 shaft to 438m from surface. Both shafts have a pressure-rated steel cover at the surface.

Concurrently, No. 1 shaft and the Pit Top Drift were also sealed. No. 1 shaft was sealed with rock at the base and grouted to 249 metres from the surface, with the winder providing cover at the surface within a locked building.

No. 2 Shaft is sealed from the atmosphere by the underground water storage at the base of the shaft, which forms an effective seal between the surface and underground atmospheres.

The ventilation system has been fully decommissioned with the sealing of the mine.

4.2.3 Production Summary

During the reporting period, no coal was mined or transported at Austar or processed at the Austar CHPP.

4.2.4 Waste Management

Waste collected during the reporting period is summarised and compared to the previous reporting periods in **Table 4-2**.

TABLE 4-2 WASTE MANAGEMENT DATA (TONNES)

Year	Paper & Cardboard	Chemical Anchors	Oily Filters	Oily Water	Waste Oil	Timber	Medical & Sanitary	Oily Rags	Mixed Solid Waste	Scrap Metal	Printer Cartridges
2022-23	0.21	0.79	0.16	34	3.8	-	0.08	-	45.52	47.2	-
2021-22	4.92	-	0.25	23.19	4.6	-	0.11	0.69	71.45	173.03	-
2020-21	3.7	0.09	0.14	4.53	13.44	0.46	0.14	0.17	116.33	289.63	-
2019-20	6.39	1.2	1.05	73.5	24.5	0.62	0.17	0.24	274.36	217.62	0.06
2018-19	7.88	1.35	0.97	32.25	28.8	-	0.2	0.18	249.75	166.89	0.17

Waste generation can be seen to be decreasing as the site is gradually cleaned up and items removed. This can be expected as Austar transitions to closure.

Waste contractors undertake regular inspections of waste bins, oil storage areas and spill kits and report any issues to Austar staff. If cross-contamination is an ongoing issue, or a waste improvement opportunity is identified, employees and contractors can be educated through toolbox talks and inductions.

4.3 Planned Activities Next Reporting Period

Activities in the next reporting period will be as detailed in this section and in the *Austar Coal Mine Forward Program - Friday 1 July 2022 to Monday 30 June 2025* (Forward Program) prepared in accordance with the requirements of the Mining Act. Activities will be associated with continued technical studies to inform rehabilitation and closure planning, and early works.

4.3.1 Mine Closure Planning Technical Studies

During the next reporting period, Austar will complete the prefeasibility stage of mine closure. Following PFS, Austar will undertake additional assessments and investigations to address recommendations of the PFS specialist studies, prove the preferred go-forward options, and refine the conceptual landform designs and final land use.

4.3.2 Early Works

Austar will conduct early works where possible in accordance with existing development consents and/or under the Exempt Development provisions of the State Environmental Planning Policy (Resources and Energy) 2021 (Resources SEPP).

4.3.2.1 Decommissioning

Progressive decommissioning will continue during the next reporting period and may include:

- Decommissioning and removal of redundant mining equipment from the site (non-heritage significant) for sale and beneficial re-use elsewhere;
- Commence the decommissioning, de-declaring, and rehabilitation of the Kalingo Dam (CMA 5);
- Commence decommissioning and/or removal of buried electricity and data services and potable water pipelines;
- Progress decommissioning and/or removal of above ground conveyors and electricity services;
- Dismantling and removal of redundant components of the mine water management system including pumping infrastructure, mine water pipelines and boreholes; and
- Dismantle the RO plant and store within the CHPP workshop.

4.3.2.2 Mine Sealing

All shafts are sealed from the atmosphere, with either a permanent plug at the base (Number 1,3 and 4 Shafts) a temporary pressure-rated cap (Number 5 and 6 Shafts), or through water sealing (No.2 shaft is sealed from atmosphere as it is partially filled with water). No.2 Shaft will remain open until water studies are completed during the next phase of mine closure planning.

Exploration borehole sealing and rehabilitation will continue in the next reporting period.

4.3.2.3 Demolition

Planning for demolition and removal of all non-heritage redundant mine infrastructure continues. During the next reporting period, demolition activities may include:

- Demolition of redundant, non-heritage significant mining infrastructure from within the Austar Coal Mine; and
- Hazardous materials clean up during the demolition project.

Major components of the proposed demolition activities will be detailed in the Forward Program. The outcomes of these investigations will be reported in future Annual Reviews.

4.3.3 Rehabilitation Maintenance and Monitoring

Based on the Forward Program, the following actions are proposed for the 2023-24 reporting period:

- Progress the mine closure planning strategy, and commence Feasibility Study technical studies as documented in the Rehabilitation Management Plan (RMP) as discussed in **Section 4.1**;
- Disconnection, decommissioning and demolition of some items of surface equipment; and
- Maintain existing rehabilitated areas at Aberdare Extended Emplacement Area, Bellbird Areas 12 and 13 and Cessnock No.1/Kalingo Collieries.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

DPE reviewed the 2021-2022 Annual Review and 'considers it to generally satisfy the reporting requirements of the consents and the Department's *Annual Review Guideline* (October 2015)'.

Actions committed to by Austar in the 2021-2022 Annual Review are provided in **Table 5-1**.

TABLE 5-1 ACTIONS REQUIRED FROM PREVIOUS REVIEW

Action Required from Previous Annual Review	Requested by	Status	Action taken by Austar
Progress the mine closure planning strategy as documented in the RMP and **Section 4.1**	2021-2022 Annual Review	Progressing, refer to **Section 4.1** for detail.	The Mine Closure Pre-Feasibility Study is progressing well and will be completed in the next reporting period.
Continue to partially seal boreholes, No. 1, 3 and 4 Shafts, and the Austar Drift	2021-2022 Annual Review	Completed	Numbers 1, 3 and 4 shafts, and the Austar Drift were partially sealed in October 2022. Some service boreholes in the area were also fully sealed. Refer to **section 4.2.2** for further information
Progress with decommissioning and demolition activities	2021-2022 Annual Review	Progressing	During the reporting period, the underground was fully decommissioned and sealed. Conveyor belting was removed from structures, and mining equipment was sold or transferred to other Yancoal sites.
Continue to implement the recommendations from the IEA (where they are relevant to closure)	2021-2022 Annual Review	Complete	All actions from the last IEA have been closed out.
Enact the recommendations in the Rehabilitation Monitoring report	2021-2022 Annual Review	Progressing	Weed management has continued during the reporting period as detailed in **Section 6.5**. Extensive works to limit trespassing in rehabilitated areas has been undertaken and is ongoing.
Continue to maintain and enhance existing rehabilitation	2021-2022 Annual Review	Progressing	Refer to section 8.1 for further information.
Continue to close outstanding actions from Extraction Plans	2021-2022 Annual Review	Progressing	During an Extraction Plan Obligations Audit in 2021, there were 668 obligations identified across three Extraction Plans. All obligations have been closed out except for 11, which are being tracked in Austar's compliance management software, Intelex.

6 ENVIRONMENTAL PERFORMANCE

6.1 Environmental Performance Summary

Table 6-1 outlines the key environmental performance or management aspects encountered at Austar and details how they have been addressed, as well as the implementation of any management measures from the reporting period and proposed improvements for the following years.

Where practical, environmental management of the key environmental aspects managed at Austar have been discussed in **Table 6-1**. Where tabulating the information is not practical, further detail is included in the following sections of this report.

TABLE 6-1 ENVIRONMENTAL PERFORMANCE SUMMARY

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Air Quality (**Section 6.3**)	Refer **Section 6.3** for detail on approval criteria and background levels.	Compliant with DA 29/95 and PA 08_0111.	Austar was compliant with the relevant criteria and monitoring results were generally consistent with previous years.	Air Quality will continue to be managed in accordance with the AQGHGMP.
Biodiversity	Biodiversity monitoring has been undertaken in accordance with the relevant Extraction Plans. Stage 3 Biodiversity Management Plan states that monitoring will continue for two years after subsidence monitoring reveals there is no longer significant ground movement. The Biodiversity Management Plan LWB4-B7 states that monitoring will continue for 12 months after the cessation of mining once subsidence monitoring reveals no further significant ground movement.	Compliant with DA 29/95 and PA 08_0111. Minor clearing undertaken (0.015ha) to maintain and repair Kalingo Dam to Austar Dam pipeline, and minor clearing of shrubby regrowth and several eucalypts to maintain the Aberdare Extended Emplacement Area clean water diversion embankment. Inspections by an appropriately qualified ecologist were undertaken, along with a five-part test to determine impacts.	Mining was completed in the Stage 3 Area in June 2015, with monitoring continuing post mining for approximately 5 years. As there is no further significant ground movement, and there have been no identified impacts over this time, monitoring ceased in 2020. Likewise, monitoring was finalised in the LWB4 – LWB7 area in September 2020. The final report states 'to date, there is no evidence of any impacts on ecological features as a result of longwall mining.'	No ongoing monitoring is currently required. Due diligence inspections will be undertaken as required for any closure actions that may require clearing or disturbance.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Vibration and Blasting	There are no operational vibration criteria provided in DA29/95 or PA08_0111.	As Austar is in closure, no vibration or blast monitoring is currently required. There are no proposed surface closure and rehabilitation activities planned at this stage that have the potential to cause vibration impacts.	No vibration causing activities occurred during the reporting period. Vibration monitors were removed from service on 18 June 2021.	Vibration and blast monitoring at Austar Coal Mine ceased 18 June 2021 in accordance with the approved NVMP.
Noise (**Section 6.4**)	Refer to **Section 6.4** for detail on approval criteria.	There were no exceedances of relevant noise criteria at the CHPP, Kitchener SIS or Kalingo Infrastructure Area during the reporting period.	There has been a period of minimal noise impact since March 2020, however Austar is aware that decommissioning activities (particularly in remote infrastructure areas) may have short term impacts on nearby neighbours.	Noise monitoring and management will continue in accordance with the NVMP. Austar will continue to consider noise impacts of specific closure execution activities on nearby neighbours and implement noise controls as applicable.
Aboriginal Cultural Heritage	The Aboriginal Cultural Heritage Management Plan (ACHMP) provides a consolidated framework and process for managing Aboriginal cultural heritage responsibilities at Austar.	During the reporting period, Austar completed Aboriginal cultural heritage due diligence surveys for two projects, being installation of a vibrating wire piezometer and decommissioning of services boreholes at KIA.	Aboriginal artefacts were not discovered during the surveys. There were no incidents or complaints regarding cultural heritage during this period.	Continue to assess and undertake operations in accordance with the ACHMP.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
		The ACHMP was reviewed to reflect closure and approved by DPE on 26/04/2023.		
Mine Subsidence	All recorded subsidence in Stage 3 and Bellbird South areas were within predicted subsidence documented in the relevant extraction plan subsidence management plans.	Compliant with DA 29/95 and PA 08_0111.	Subsidence has been deemed to be complete. No further mitigation is required.	No further subsidence monitoring is required under the SMP or Extraction Plans.
Water – Surface Water (**Section 7.3)**	Refer **Section 7.3** for detail on approval criteria and background levels.	There were no discharges from LDPs SW1 or SW6 during the reporting period. Water quality monitoring results for the reporting period were within historic ranges at upstream and downstream locations. Two unlicensed discharge events were recorded at the Kitchener SIS on 4 and 10 July 2022. One unlicensed discharge was recorded at the Aberdare Emplacement Area on 6 July 2022. Details of these incidents are presented in **Section 7.3.4**, **7.3.5** and **Section 11.**	Monitoring of the Investigation Drainage Line at the CHPP continued in accordance with the EPL PRP. Surface water quality trends indicate no adverse mining impacts on the water quality of Quorrobolong and Cony Creeks. There have been no community complaints made to Austar in relation to water quality during the reporting period. No TARPs under the SWMP were triggered.	Surface water monitoring and management will continue in accordance with the SWMP.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Water – Groundwater (**Section 7.4**)	Refer **Section 7.4** for detail on approval criteria and background levels.	Compliant with DA 29/95 and PA 08_0111.	The predictions in groundwater impact assessments from the DA 29/95 MOD6 EA, and the DA 29/95 MOD7 EA have, in general, been validated by measurements.	Groundwater monitoring and management will continue in accordance with the SWMP.
Erosion and Sediment Control	PA 08_0111 requires an Erosion and Sediment Control Plan as part of the SWMP.	Two unlicensed discharges from sedimentation dams during heavy rain events were reported during the reporting period. Details of these incidents are presented in **Section 7.3.4**. Results showed that the suspended solids were comparable in upstream and downstream and dam samples, indicating that the erosion and sediment control was adequate.	Erosion and sediment control is undertaken according to the SWMP. A range of erosion and sediment control measures have been implemented across the mining complex with the aim of preventing soil erosion and the entry of sediments into surrounding water bodies. Monthly environmental inspections are undertaken to monitor the sediment control structures for capacity, structural integrity and effectiveness.	Erosion and sediment controls will continue to be managed in accordance with the SWMP.
Hydrocarbon management	Not applicable.	There were no reportable incidents in relation to hydrocarbon management during the reporting period. The hydrocarbon remediation area was managed to ensure	Hydrocarbon management systems are designed and installed generally in accordance with Australian Standards and EPA guidelines.	Hydrocarbon management will continue to be undertaken in accordance with internal procedures and general good management practices.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
		no contamination to nearby areas. Spill kits in all hydrocarbon storage areas are monitored regularly by the waste contractor and replenished as necessary. Bunded hydrocarbon storage areas are also monitored by the waste contractor and pump out is scheduled as required.	Austar operates a hydrocarbon remediation area at the CHPP to manage hydrocarbon contaminated material recovered from the site. The area is signposted and has three bunded cells for segregation of materials of different ages and source locations. The bunded area was constructed on a disused laydown area and is within the sites mine water catchment. Contaminated materials are periodically turned to allow an adequate supply of oxygen to microbes that use the contaminants as a source of food and energy.	

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Weed and Feral Animal Management and Control (refer to **Section6.5**)	Not applicable.	A Weed Action Plan is being executed across Austar lands which implements weed control operations in a systematic manner. The primary targeted weeds which were controlled during the reporting period included Lantana, Mother of Millions, Tobacco Bush and Green Cestrum. Details of weed management are discussed in **Section 6.5**.	Weed infestations are managed according to the Weed Action Plan. During the next reporting period, weeds will continue to be monitored in monthly inspections and controlled as per the Weed Action Plan recommendations. Signs of feral animal presence are monitored for during monthly inspections. Ad hoc sightings of feral animals are also reported by operational personnel. Feral animal management is undertaken on an as needs basis.	Weeds and feral animals will continue to be managed in accordance with the Weed Action Plan, and good land management practices.
Visual Amenity and Lighting	Reject emplacement areas will be constructed to minimise visual impacts upon residents in the vicinity and from roads. Emplacement areas may include bunds and buffer zones to minimise visual impact.	There were no community complaints or non-compliances related to visual impacts or lighting during the reporting period. Unnecessary lighting is turned off since many parts of the site are non-operational at night. Only sufficient lighting for security purposes is operational.	Visual impacts and lighting will continue to be managed according to the EMS, guidelines and internal procedures as appropriate. Most closure work is conducted during daytime hours only.	Visual Amenity and Lighting will continue to be managed consistent with current good practice and commitments made in relevant EIS's.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
	Screening will be used as required. Lighting will be positioned to shine into the Kitchener SIS and light shields will be used where practical.			
European Heritage	Austar implements a Historic Heritage Management Plan (HHMP). The HHMP was updated in April 2021 to reflect the care and maintenance status of Austar and was approved by DPE on 30 June 2021.	Austar has several buildings, remnant structures and features located within heritage curtilages listed on the Cessnock Local Environment Plan (LEP). During the reporting period, Austar completed the Stage 1 Historic Heritage assessment, which will guide further consultation with relevant regulators and development of appropriate management or demolition plans.	Austar will consult with Cessnock Council regarding the findings of the Heritage assessment and seek appropriate heritage approvals prior to demolition (if applicable).	Management of historic heritage items will comply with the relevant approvals.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Spontaneous Combustion	Monitoring and response procedures will be used to minimise spontaneous combustion issues.	There were no spontaneous combustion events during the reporting period.	Spontaneous combustion is managed through the reject haulage and emplacement area procedure and routine inspections. Reject emplacement areas continue to be monitored and managed during closure. The ROM and clean coal stockpiles have been cleared and remain empty.	Monitoring for outbreaks of spontaneous combustion will continue and outbreaks will be responded to as required.
Bushfire	Maintain Asset Protection Zones (APZs) and Strategic Fire Advantage Zones (SFAZs) in accordance with Bushfire Management Plan.	Austar continued to monitor and maintain access tracks, APZs and SFAZs around its key operations. Slashing of APZs is undertaken on a routine basis.	Austar continues to maintain the area around its operations, including pit top facilities, CHPP, remote infrastructure areas and emplacement areas.	Austar will continue to implement the actions identified in the Bushfire Management Plan.

6.2 Meteorological Data

In accordance with DA 29/95, PA 08_0111 and EPL 416, Austar operates and maintains a meteorological station located at the CHPP.

Table 6-2 summarises the meteorological data for the 2022-2023 reporting period.

TABLE 6-2 WEATHER SUMMARY, 2022-2023

Month	Rainfall (mm)	Rain days (>0.2mm)	Maximum temperature (^{0}C)	Minimum Temperature (^{0}C)	Mean wind speed (km/hr)	Max wind speed (km/hr)	Dominant wind direction
Jul	281.4	16	19.2	0.5	6.16	32.18	SW
Aug	50.0	8	22.3	2.4	5.36	35.90	SW
Sep	102.0	18	22.4	6.0	5.04	28.90	SW
Oct	114.4	20	28	6.8	4.75	38.99	SW
Nov	51.6	7	31.3	8.7	6.05	40.90	SW
Dec	47.4	9	32.2	9.2	5.58	30.49	SW
Jan	75	15	36.6	12.6	5.76	33.80	SW
Feb	89	9	37.4	11.3	4.93	24.98	SW
Mar	54.2	12	38.1	12	4.43	20.70	SW
Apr	50.8	17	27.9	9.5	5.15	32.00	SW
May	22.2	5	22.7	0.2	5.04	38.20	SW
Jun	15.6	8	23.4	0	3.85	30.10	S
Total	**953.6**	**144**					

The total monthly rainfall, number of rain days and cumulative rainfall during the reporting period is shown in **Table 6-2** and **Figure 6-1**. An annual wind rose is provided in **Figure 6-2.**

A total rainfall of 953.6 mm was recorded during the 2022-2023 reporting period. This represents a decrease of 324.8 mm from the previous reporting period and is approximately 31% greater than the annual average rainfall for the Cessnock area (729.4mm) (Bureau of Meteorology Cessnock Airport AWS 1968 - 2020). Four months reported rainfall above their long-term average being July, August, September and October. July recorded the highest rainfall of any month in the reporting period being 281.4 mm, or 907% of the long-term monthly average. From November onwards however, rainfall exhibited a downward trend, with June 2023 recording 15.6mm, representing 27% of the long-term monthly average.

Predominant winds were from the southwest for every month of the reporting period except for June which was from the south.

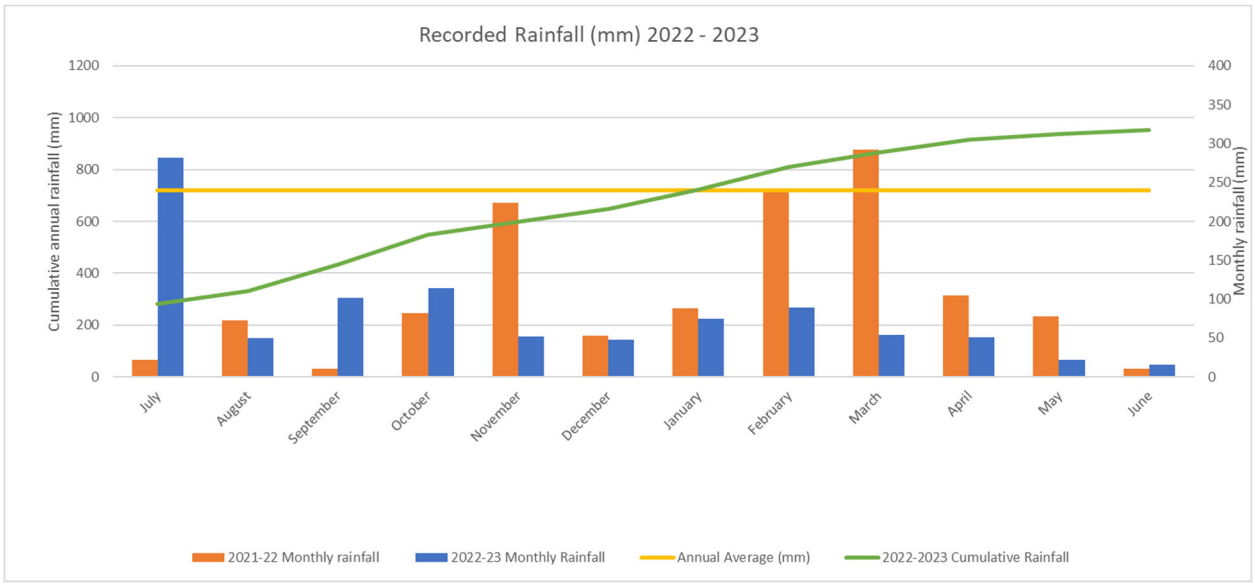

FIGURE 6-1 RECORDED RAINFALL (MM) AT AUSTAR METEOROLOGICAL STATION 2022-2023

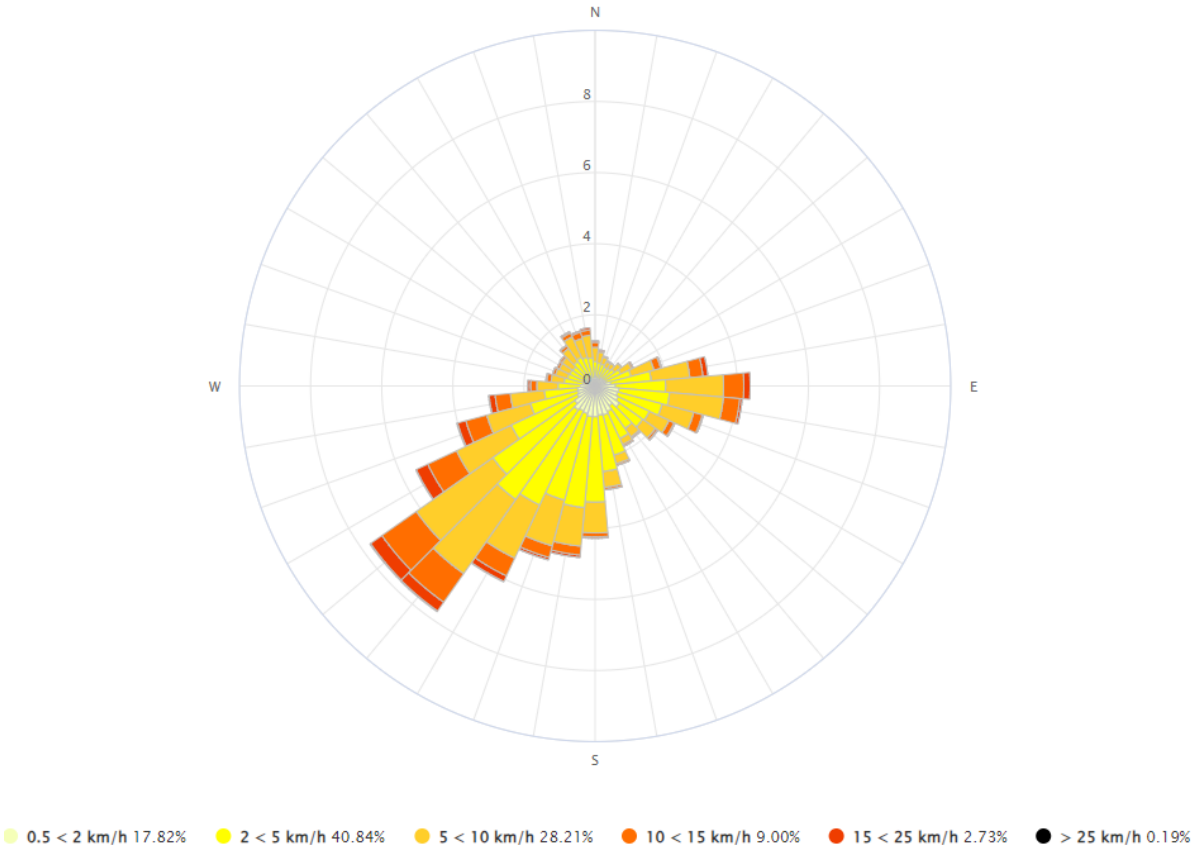

FIGURE 6-2 ANNUAL AVERAGE WIND ROSE 2022-2023

6.3 Air Quality

6.3.1 Environmental Management

Austar implements an Air Quality and Greenhouse Gas Management Plan (AQGHGMP) to meet the requirements of PA 08_0111, DA 29/95 and EPL 416. The AQGHGMP was approved by DPE on 26 October 2021. During the reporting period, the AQGHGMP was revised to reflect closure early works activities and submitted to the DPE for approval.

Dust generated from traffic around the CHPP, Pit Top, workshop areas, access roads and reject emplacement areas is generally controlled by water cart where required.

The ROM and clean coal stockpile areas have been cleared and the surface compacted to prevent wind and water erosion. Water carts and water sprays will continue to be utilised during closure activities to minimise dust on roads and stockpile areas where required. It has been observed that the stockpile areas seem to have a crust, and visible dust generation is rare.

The AQGHGMP monitoring program utilises eight depositional dust gauges (DDG), three high volume air samplers (HVAS) and one Tapered Element Oscillating Microbalance (TEOM) continuous dust monitor. The HVAS and TEOM measure for particulate matter less than 10 micrometres (10µm), more commonly referred to as PM_{10}. Total Suspended Particulates (TSP) are not directly measured and are calculated per the methodology outlined in the AQGHGMP.

The location of Austar's air quality monitoring equipment is listed in **Table 6-3** and shown in **Figure 6-3.**

TABLE 6-3 LOCATION OF AIR QUALITY MONITORING POINTS

ID	Location	Monitoring Equipment
D1	Pyne Way, Mount View	DDG, HVAS
D2	Ellalong Road, Pelton Village	DDG, HVAS
D3	Bimbadeen Road, Mount View	DDG
D4	Ellalong Village	DDG
D5	South of No. 3 upcast ventilation shaft	DDG
D6	Bimbadeen Road, Mount View	TEOM
D7	Pelton Fire Trail, Quorrobolong	DDG
D8	Coney Creek Lane, Quorrobolong	DDG, HVAS
D9	Kitchener Public School	DDG
Met Station	CHPP site, Pelton	Meteorological Station

338000 339000 340000 341000 342000 343000 344000 345000 346000 347000 348000 349000

6363000 6362000 6361000 6360000 6359000 6358000 6357000 6356000

KENDALL STREET
BIMBADEEN ROAD
MPL1364
MPL1223
MPL1269
D6
SW4
D3
NM C3
MLA521
BELLBIRD CREEK
SW1
D1
NM C1
SW2
MLA521
SW6
CHPP
SW5
NM C2
GGL728
WOLLOMBI ROAD
D2
MIDDLE ROAD
ELLALONG ROAD
Austar Dam
Pit Top
Kalingo Dam
Cessnock No.1 Colliery
No.1 Shaft
MAIN ROAD
SANCTUARY ROAD
RUBY STREET
HELENA STREET
QUORROBOLONG CREEK
CHURCH STREET
D4
SW Q3
SW Q2
MB04
LWB6
LWB5
LWB4
LWB3
LWB2
MB03A
SW Q1
SANDY CREEK ROAD
ML1550
D5
NER 1010
NM K4
NM K1
D7
AQD1073A
WBH1
WBH3
WBH2
Kalingo Infrastructure Area
EL6598
SW C1
MB01
MB02
ML1388
D8
NM K2
LW A7
LW A8
LW A9
LW A10
LW A11
LW A12
LW A13
LW A14
LW A15
LW A16
LW A17
LW A18
LW A19
GOWAN CREEK
SANDY CREEK
ML1666
CML2
Kitchener Surface Infrastructure Site
WERAKATA STATE CONSERVATION AREA
WERAKATA NATIONAL PARK
BLACK CREEK
CESSNOCK STREET
D9
ABERNETHY STREET
NM K3

LEGEND

- Colliery Holding Boundary
- Mining Lease Application Boundary
- Relevant Mining Titles
- Mine Plan
- Railway
- Creek Lines
- Water Pipeline - Potable
- Bellbird Pipeline 1 and 2
- Water Pipeline
- Austar Coal Mine - Austar Owned Land

Monitoring Locations

- Attended Noise Monitoring
- Dust Gauge
- Dust Gauge and HVAS
- Continuous Dust Monitor (TEOM)
- Creek Monitoring
- Ground Water Monitor
- Surface Water Monitoring
- Meteorological Station

CMA Boundaries

- CMA 1 - Austar Pit Top Facilities
- CMA 2 - Pelton CHPP
- CMA 3 - No.1 Shaft
- CMA 4 - No.2 Shaft
- CMA 5 - Cessnock No.1 Colliery / Kalingo Infrastructure Area
- CMA 6 - Kitchener Surface Infrastructure Site
- CMA 8 - Bellbird Areas 12 and 13
- CMA 9 - Other

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Austar Coal Mine

Environmental Monitoring Network

FIGURE 6-3

6.3.2 Environmental Performance

During the reporting period, all dust samples were collected by trained technicians and analysed by NATA-certified laboratories. Sampling is carried out in accordance with statutory requirements and relevant standards. Monitoring equipment is maintained in accordance with the manufacturer's specifications by qualified specialists. Dust deposition results and PM_{10} monitoring data for the reporting period is provided below, followed by a summary of exceedances and a commentary on results.

6.3.2.1 Dust Deposition

Table 6-4 provides a summary of Austar's deposited dust gauge annual average results for insoluble solids during the reporting period, previous reporting periods and against assessment criteria and environmental assessment predictions.

TABLE 6-4 DUST GAUGES ANNUAL AVERAGE COMPARED TO PREDICTIONS AND RESULTS OF PREVIOUS YEARS

ID	Location	EA Prediction Background Levels – Annual Average (g/m^2/month)	Assessment Criteria	Annual Average Total Insoluble Solids (g/m^2/month)						Change in Deposited Dust 2021-2022 to 2022-2023 Period (g/m^2/month)
				2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	
D1	Mount View	0.2 – 2.7*	4 g/m^2/month (maximum total deposited dust)	0.9	1.2	1.4	0.9	0.6	0.7	+0.1
D2	Pelton	0.2 – 2.7*		1.1	1.5	1.9	0.9	1.1	2.8	+1.7
D3	Mount View	0.2 – 2.7*		0.7	0.8	1.3	0.6	0.5	0.7	+0.2
D4	Ellalong	n/a		1.6	1.4	1.6	1.8	2.0	2.3	+0.3
D5	Kalingo Infrastructure Area	n/a	2 g/m^2/month (maximum annual increase in deposited dust)	0.7	1.8	1.3	1.2	1.0	0.9	-0.1
D7	Quorrobolong	1.5 – 1.65^		1.2	1.1	1.3	0.8	0.6	0.4	-0.2
D8	Quorrobolong	1.5 – 1.63^		0.9	0.7	1.4	0.6	0.9	0.6	-0.3
D9	Kitchener Public School	n/a		1.3	0.9	1.7	0.8	0.9	0.5	-0.4

Note: *Deposited Dust is assessed as insoluble solids as defined by Standards Australia, 2003 AS3580.10.1 -2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method.*

** Bellbird South EIS (1995)*

^ Proposed Stage 3 Extension Environmental Assessment (Appendix 17) (Umwelt, October 2008)

Depositional dust results during the reporting period were all below the annual average criteria of 4 g/m^2/month for insoluble solids. Site D2 recorded an annual average of 2.8 g/m^2/month for insoluble solids, with five instances of monthly contaminated samples. D2 is located within 10m of residential and business premises on Ellalong Road. In response to elevated results, several site inspections and

discussions with the closest resident have been undertaken. Numerous motorbike tracks were observed near the D2 gauge, and the resident advised that he also regularly mows the area near the monitor to maintain a fire break from the nearby bushland. It was noted that the area is dusty with limited ground cover due to the ongoing dry conditions and regular mowing.

There were seven instances (five at D2 and one each at D3 and D4) where the monthly dust deposition gauges were contaminated with bird droppings, insects or vegetative matter, and these results were excluded from the annual average calculation.

The dust results for the reporting period are consistent with 1995 Environmental Impact Statement (EIS) predictions. Section 4.7.2 of the 1995 EIS states that historical dust depositional data since 1991 ranges between 0.2 to 2.7 g/m^2/month.

6.3.2.2 Total Suspended Particulates

The annual average total suspended particulates (TSP) results for the reporting period are provided in **Table 6-5.**

The calculated TSP for the reporting period at all monitoring locations is below the annual average criterion of 90µg/m^3. The TSP is calculated by multiplying the PM_{10} result by 2.5 in accordance with the method outlined in the AQGHGMP.

6.3.2.3 Particulate Matter - PM_{10} Results

The HVAS units operated on a six-day cycle during the reporting period with the exception of:

- HVAS1 had water damage on paper on 9 July 2022 and a make-up run was completed on 12 July 2022.
- HVAS2 had a motor drive error/blockage on 25 September 2022 and a make-up run was completed on 28 September 2022.
- HVAS3 had an error message on the screen on 30 March 2023 and the power had tripped at the fuse box. Power was returned and a make-up run then completed on 31 March 2023.

The annual average PM_{10} and TSP results, as well as 24-hour maximum PM_{10}, for the reporting period are shown in **Table 6-5.**

A TEOM monitor which measures PM_{10} on a real-time continuous basis is located at monitoring site D6 to the northeast of the CHPP. 24 hour maximum results since 1 July 2017 and graphical representation of the 24 hour and annual rolling average PM_{10} results are provided in **Figure 6-4, Table 6-5,** and **Figure 6-4**.

The annual average PM_{10} result for the 2022-2023 reporting period as recorded by the TEOM was 11.1 µg/m^3, well below the PM_{10} Annual Average Criterion of 30 µg/m^3 and comparable to data over

the last five years (with the evident spike in 2019/2020 due to bushfire pollution, not Austar operations).

TSP and PM_{10} results for the HVAS units were also below the annual average criteria at all monitoring locations.

There were no exceedances of the 24-hour short term impact assessment criteria recorded during the reporting period.

Annual average PM_{10} results are lower than the previous reporting period for all monitoring locations, as shown in **Table 6-5.** This may be attributable to rainfall above the long-term average during the first half of the reporting period. All results remain below the PM_{10} annual average criterion of 30 µg/m^3.

TABLE 6-5 AIR QUALITY CRITERIA AND ANNUAL AVERAGES FOR PARTICULATE MATTER (PM_{10} AND TSP)

Description	Pollutant	Averaging Period	Monitor	Criterion (µg/m³)	Result 2018-2019 (µg/m3)	Result 2019-2020 (µg/m3)	Result 2020-2021 (µg/m3)	Result 2021-2022 (µg/m³)	Result 2022-2023 (µg/m³)
Long Term Impact Assessment Criteria for Particulate Matter	Total Suspended Particulate (TSP) matter	Annual Average	TEOM	90	33.4	56	30.8	28.2	27.6
			HVAS1		42.8	62.8	27.0	22.6	20.5
			HVAS2		47.7	62.0	25	22.9	21.0
			HVAS3		39.0	53.8	23	19.3	19.0
	Particulate Matter <10µm (PM_{10})	Annual Average	TEOM	30	13.4	22.4	12.3	11.3	11.1
			HVAS1		17.1	25.1	10.8	9.0	8.2
			HVAS2		19.1	24.8	10.0	9.2	8.4
			HVAS3		15.6	21.5	9.2	7.7	7.6
Short Term Impact Assessment Criterion for Particulate Matter	Particulate Matter <10µm (PM_{10})	24-hour Maximum	TEOM	50	131	193.5	39.5	29.9	25.7
			HVAS1		56	235	32.0	40.5	24.2
			HVAS2		57	237	28.0	24.7	20.1
			HVAS3		55	217	30.0	21.3	23.6

Note: *Methods for sampling and analysis of ambient air as defined by Standards Australia, AS 3580.9.6 -2003: Determination of suspended particulate matter—PM_{10} high volume sampler with size selective inlet—Gravimetric method.*

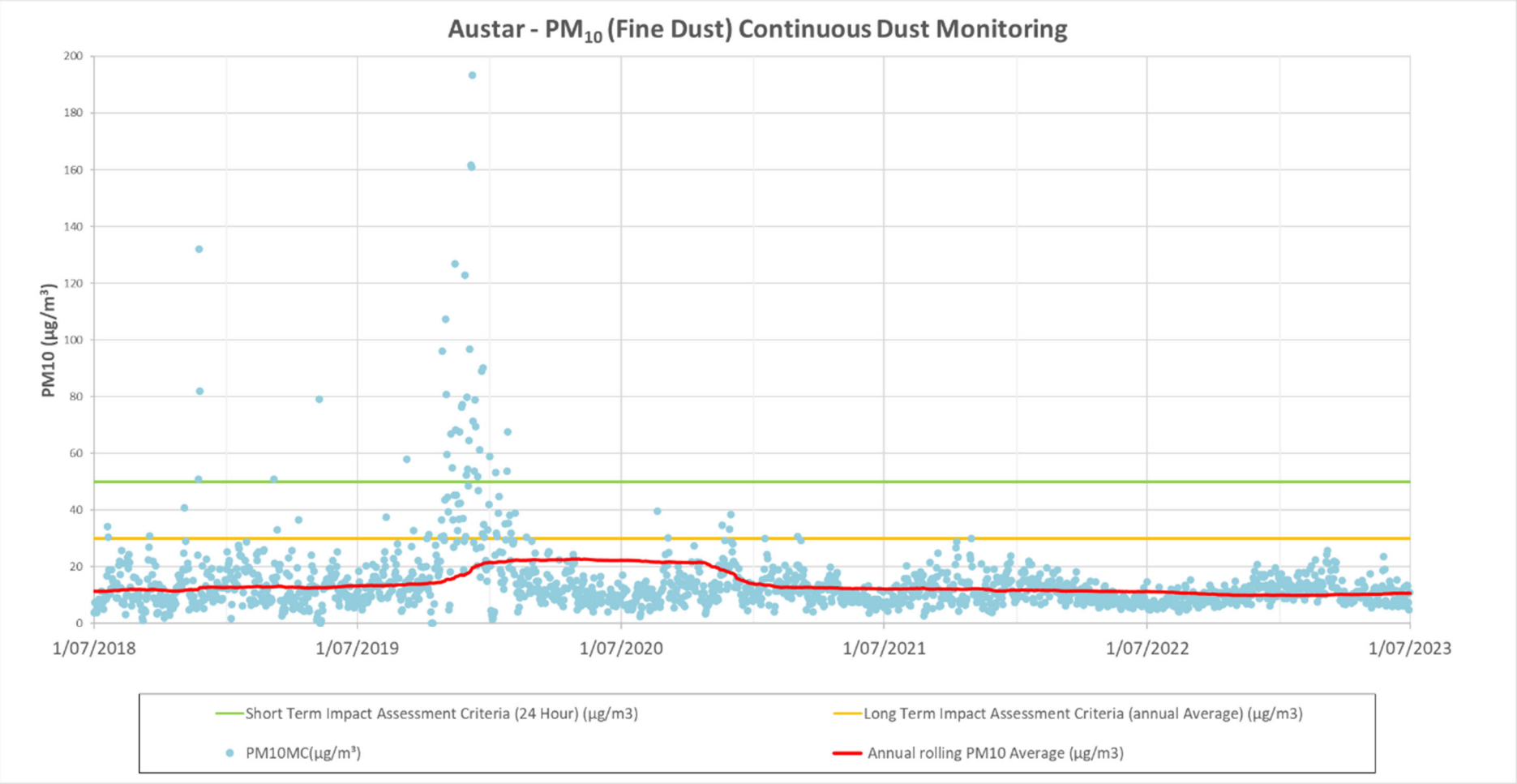


FIGURE 6-4 AUSTAR TEOM PM10 CONTINUOUS DUST MONITORING 2018 - 2023

6.4 Noise

6.4.1 Environmental Management

Austar implements a NVMP prepared in accordance with PA 08_0111, DA 29/95 and EPL 416. The NVMP was updated in June 2018 and approved by DPE on 1 August 2018. As the mine has moved into closure and does not operate at night, the NVMP has been revised and was lodged with the DPE for approval on the 22 February 2023.

Operational noise impacts are potentially greatest at night when background levels are typically low and the allowable levels are correspondingly low, and this is the period when noise propagation enhancement is most likely. Attended noise monitoring is conducted at night, in accordance with the NVMP. Austar has not conducted night-time activities (apart from inspections and security patrols) during this reporting period.

Periodic noise monitoring is conducted monthly and reported quarterly in accordance with the NVMP by an independent noise consultant. There are seven key monitoring locations representative of surrounding receivers. Monitoring points have been selected as reference locations and form the basis for assessing and evaluating noise emissions from the operation. The locations are listed in **Table 6-6** and presented in **Figure 6-3.** Noise impact assessment criteria for each location are also presented in **Table 6-6**.

TABLE 6-6 NOISE IMPACT ASSESSMENT CRITERIA AND GOALS

Receiver	Location	Receiver Description	Criteria/Goal
Nearest Potentially Affected Receivers to CHPP (EPL 416)			
C1	South of Bimbadeen Road, Mt View	West of CHPP	L_{A90} 40 dB
C2	Pelton Village	Southeast of CHPP	L_{A90} 43 dB
C3	Bimbadeen Road, Mt View	North-west of CHPP	L_{A90} 37 dB
Nearest Potentially Affected Receivers to Kitchener Surface Infrastructure Site (PA 08_0111)			
K1	Pelton Road, Quorrobolong	South of SIS	L_{Aeq} 35 dB / L_{A1} 45 dB
K2	Coney Creek Lane, Quorrobolong	East of SIS	L_{Aeq} 35 dB / L_{A1} 45 dB
K3	Richmond Street, Kitchener	North of SIS	L_{Aeq} 35 dB / L_{A1} 45 dB
Nearest Potentially Affected Receivers to Kalingo Infrastructure Area (DA 29/95)			
K4	Nash Lane, Quorrobolong	East of Kalingo Infrastructure Area	L_{Aeq} 35 dB

6.4.2 Environmental Performance

A summary of results from attended noise monitoring undertaken during the 2022-2023 reporting period is provided in **Table 6-7, Table 6-8** and **Table 6-9**. Results from the last five years are presented in **Appendix A**. All monitoring results were within compliance criteria during this reporting period.

Since the transition to care and maintenance and closure, the noise monitoring program has continued unchanged and in accordance with the NVMP and EPL Noise PRP requirements.

The Austar Noise and Vibration Management Plan requires a combination of continuous and supplementary attended monitoring measures.

The continuous noise monitor, located on Mt View Rd ceased operating on 22 February. This was identified in the morning report on the 23 February, the monitor inspected and found to have failed. The monitor was ordered and replaced and back in operation on 27 February.

Noise sources have reduced since mining ceased with the mine coal conveyor system including coal bins and conveyors decommissioned. The CHPP raw and clean coal systems, trains and loading infrastructure, stockpile dozers and reject trucks are also not operational. No works were undertaken on afternoon or night shift during the reporting period, and the site is not fully manned during evenings and night times. Results indicate very low levels of noise during the reporting period. Data presented in **Table App A-1** clearly identifies the transition from CHPP operation to care and maintenance in Q1 2020.

The mine ventilation fan at Kitchener SIS ceased operation in March 2022. The ventilation fan at Kalingo Infrastructure Area (KIA), and the Austar pit top Drift ceased operation on 10 October 2022 and sealing commenced on 11 October 2022. Data presented in Table 6-8 and Table 6-9 is consistent with longer term data presented in Appendix A at Kitchener SIS and KIA, with low noise monitoring results during operational and closure periods.

Austar continues to undertake due diligence noise impact assessments to predict potential noise impacts of closure execution activities and to implement appropriate noise mitigation and management measures. Austar also continues to engage with near neighbours about activities and potential impacts.

TABLE 6-7 NOISE GENERATED BY THE AUSTAR CHPP AGAINST PROJECT CRITERIA

Quarter	Period	Austar CHPP Only $L_{A90\ (15min)}$ (dB)		
		C1	C2	C3
	Noise Criteria	40	43	37
Q3 2022	Night	IA	IA	IA
		IA	IA	IA
		IA	<25	IA
Q4 2022	Night	IA	<25	IA
		IA	IA	IA
		IA	IA	IA
Q1 2023	Night	IA	IA	IA
		IA	IA	IA
		IA	IA	IA
Q2 2023	Night	IA	IA	IA
		IA	IA	IA
		IA	IA	IA

NM – Not measurable
IA – Inaudible
These are results for Austar CHPP in the absence of all other noise sources.

TABLE 6-8 NOISE GENERATED BY KITCHENER SIS AGAINST SPECIFIC PROJECT CRITERIA

Quarter	Period	Kitchener SIS Only $L_{Aeq,\ 15\ min}$ (dB)			Kitchener SIS Only, $L_{A1\ (1min)}$		
		K1	K2	K3	K1	K2	K3
	Noise Criteria	35	35	35	45	45	45
Q3 2022	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		<20	<20	IA	23	<20	IA
Q4 2022	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q1 2023	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q2 2023	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA

NM – Not measurable
IA – Inaudible *These are results for Austar Kitchener SIS in the absence of all other noise sources.*

TABLE 6-9 NOISE GENERATED BY KIA AREA AGAINST SPECIFIC PROJECT CRITERIA, SITE K4

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB)
		Noise Criteria 35
Q3 2022	Night	IA
		IA
		<20
Q4 2022	Night	<25
		IA
		IA
Q1 2023	Night	IA
		IA
		IA
Q2 2023	Night	IA
		IA
		IA

NM – Not measurable
IA – Inaudible
These are results for Austar Kalingo Infrastructure Area (KIA) in the absence of all other noise sources.

6.5 Weed Management

6.5.1 Environmental Management

A land management contractor conducted weed control works on Austar owned land between July 2022 to June 2023 in accordance with Austar's Weed Action Plan, which identifies environmental weeds found on site, and outlines locations, area covered, a summary of the weed characteristics, recommended actions and optimum season for treatment.

The Weed Action Plan identifies focus locations with exotic weed infestations as the primary target areas for control and management. These locations typically consist of areas previously disturbed by historic clearing, site works, rehabilitation areas, or are adjacent to roadsides or in riparian zones. It was noted during the inspections that large, relatively undisturbed areas outside of remnant bushland areas were generally clear of exotic weed infestations and in healthy condition.

6.5.2 Environmental Performance

During the reporting period, approximately 73 hectares of weeds were treated as shown in **Figures 6-5** to **Figure 6-9**. Species and approximate areas treated included:

- *Acacia saligna* (~1 ha)
- Blackberry (*Rubus Fruticosis*) (>3 ha)
- Camphor Laurel (*Cinnamomum camphora*) (>1 ha)

- Coolatai Grass (*Hyparrhenia hirta*) (<1 ha)
- Green Cestrum (*Cestrum parquai*) (>10 ha)
- Lantana (*Lantana sp.*) (>30 ha)
- Mother of Millions (*Bryophyllum sp.*) (~12 ha)
- Pampas Grass (*Cortaderia sp.*) (Isolated widespread infestations)
- Privet (*Ligustrum sp.)* (>1 ha)
- Tobacco Bush (*Solanum Mauritianum*) (>10 ha); and
- General seasonal weeds (>4 ha)

Weed treatment was prioritised to address areas where weeds may spread offsite including boundary fences and waterways, and rehabilitation areas where weed presence could compromise rehabilitation outcomes.

The Weed Action Plan is reported against annually to ensure that potential new weed outbreaks are identified, and to review progress of ongoing control works. Weed management works will continue to be implemented across the site, with progress to be reported in future Annual Reviews.

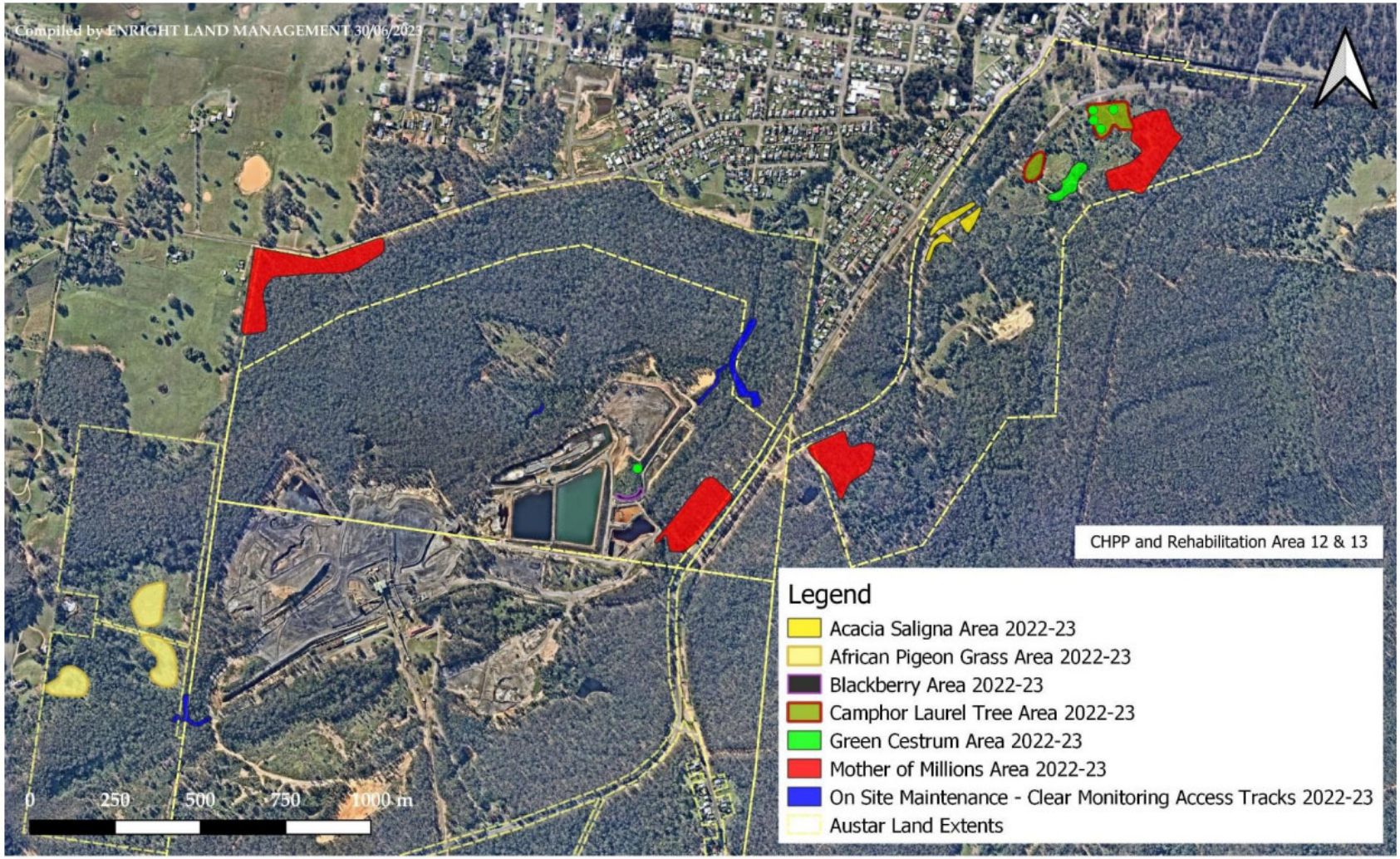


FIGURE 6-5 CHPP AND BELLBIRD AREAS 12 AND 13 WEED TREATMENT (SOURCE: AUSTAR WEED WORKS COMPLETED JULY 2022 TO JUNE 2023)

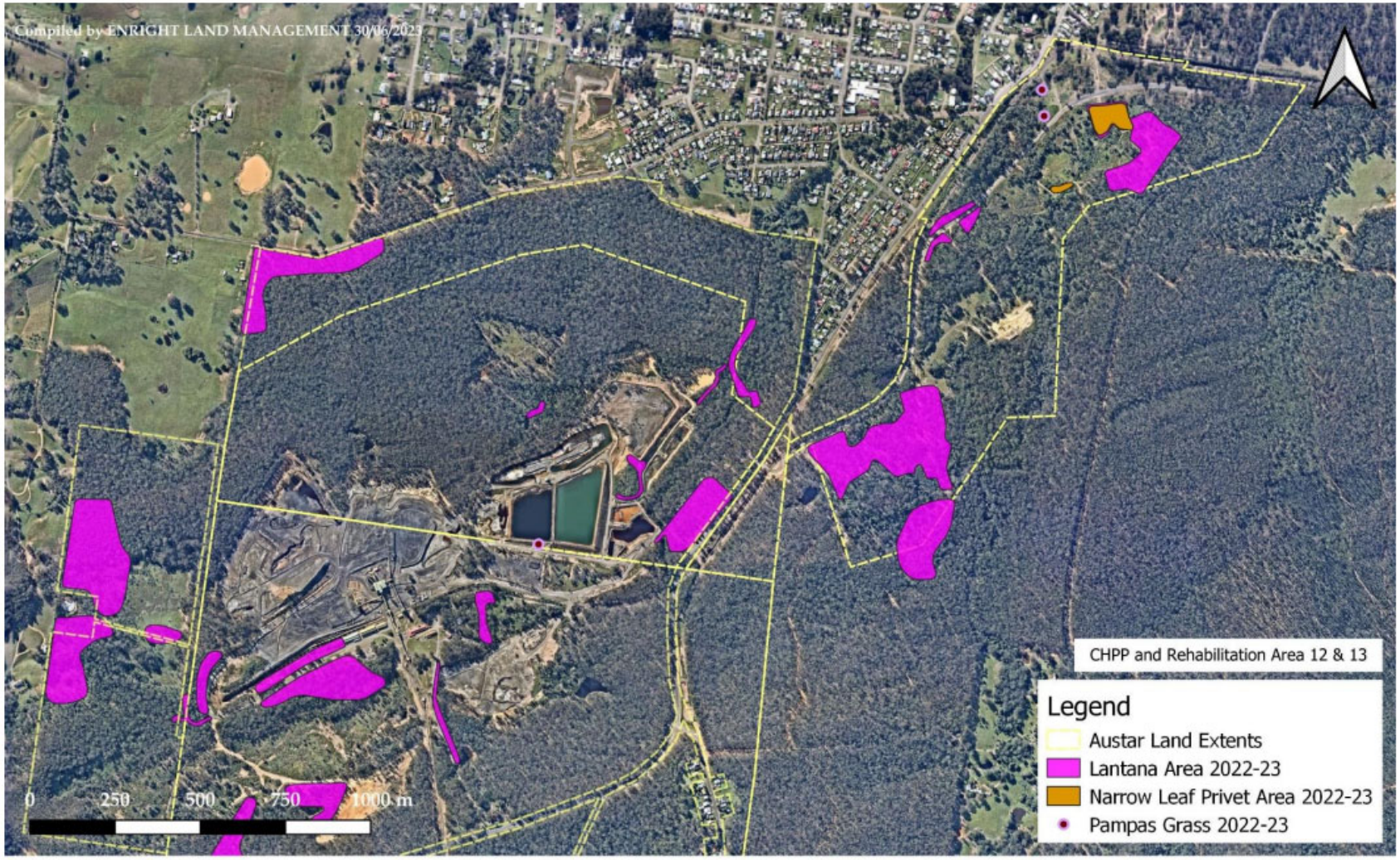


FIGURE 6-6 CHPP AND BELLBIRD AREAS 12 & 13 WEED TREATMENT (SOURCE: AUSTAR WEED WORKS COMPLETED JULY 2022 TO JUNE 2023)

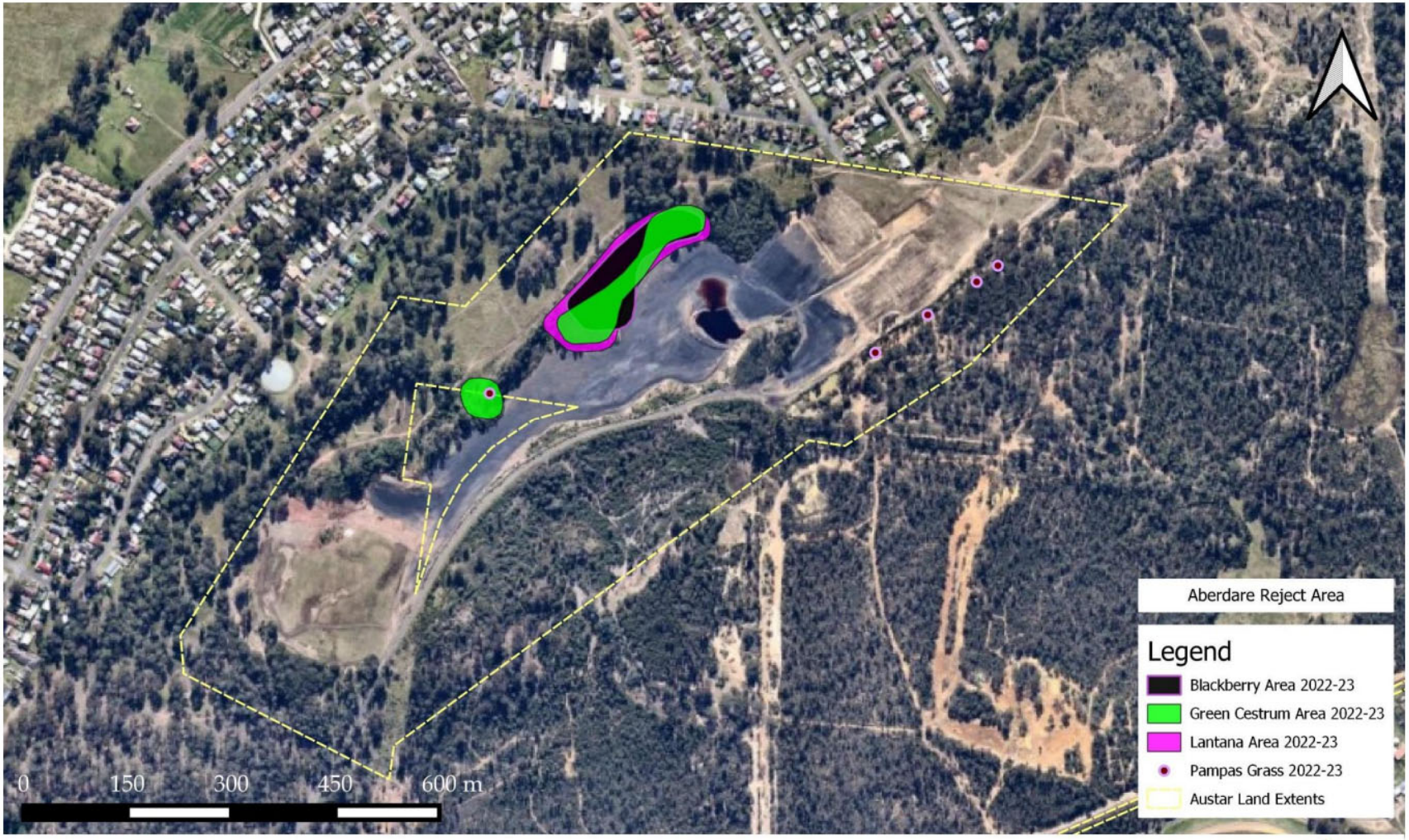


FIGURE 6-7 ABERDARE EXTENDED EMPLACEMENT AREA WEED TREATMENT (SOURCE: AUSTAR WEED WORKS COMPLETED JULY 2022 TO JUNE 2023)

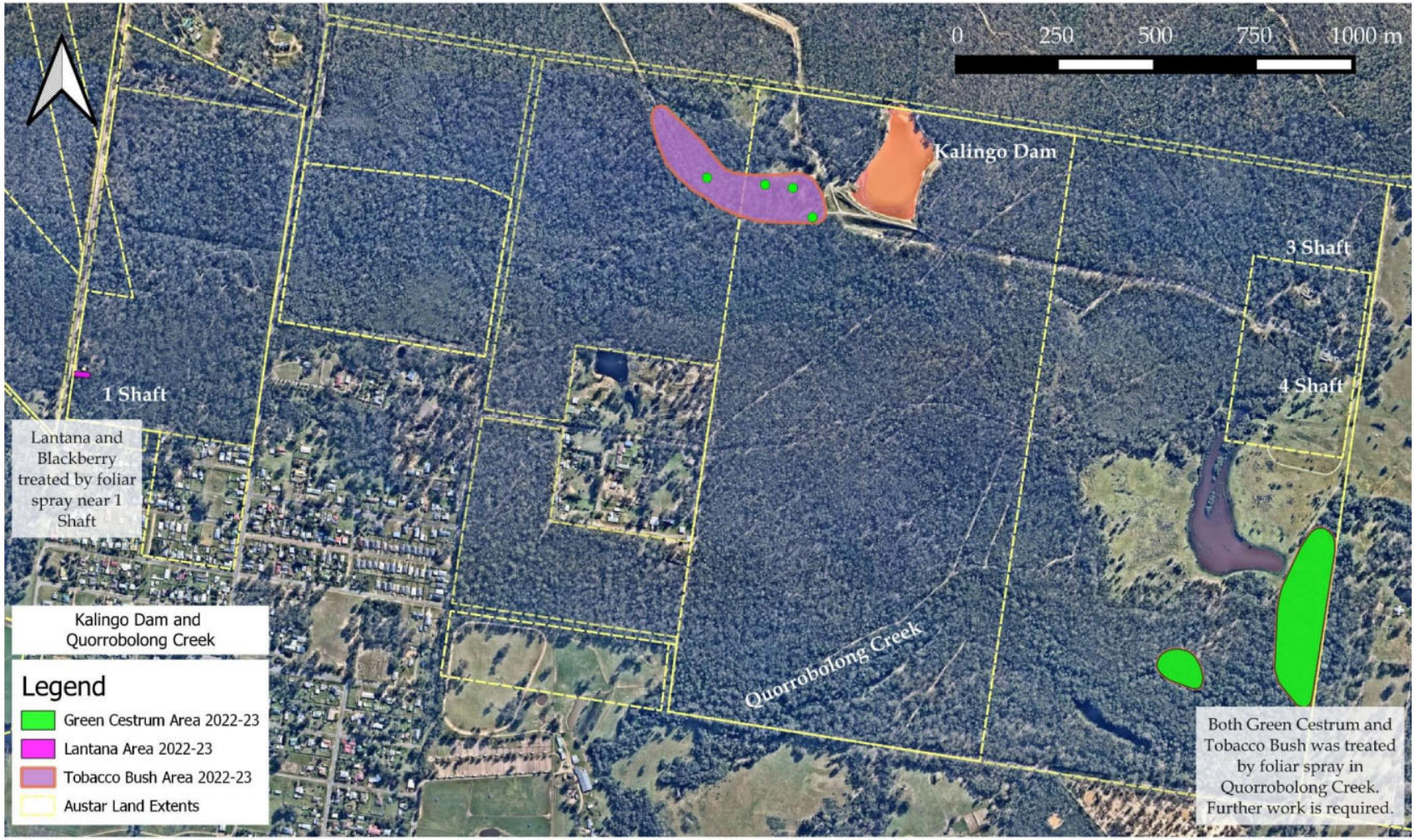


FIGURE 6-8 KALINGO DAM AND QUORROBOLONG CREEK WEED TREATMENT (SOURCE: AUSTAR WEED WORKS COMPLETED JULY 2022 TO JUNE 2023)

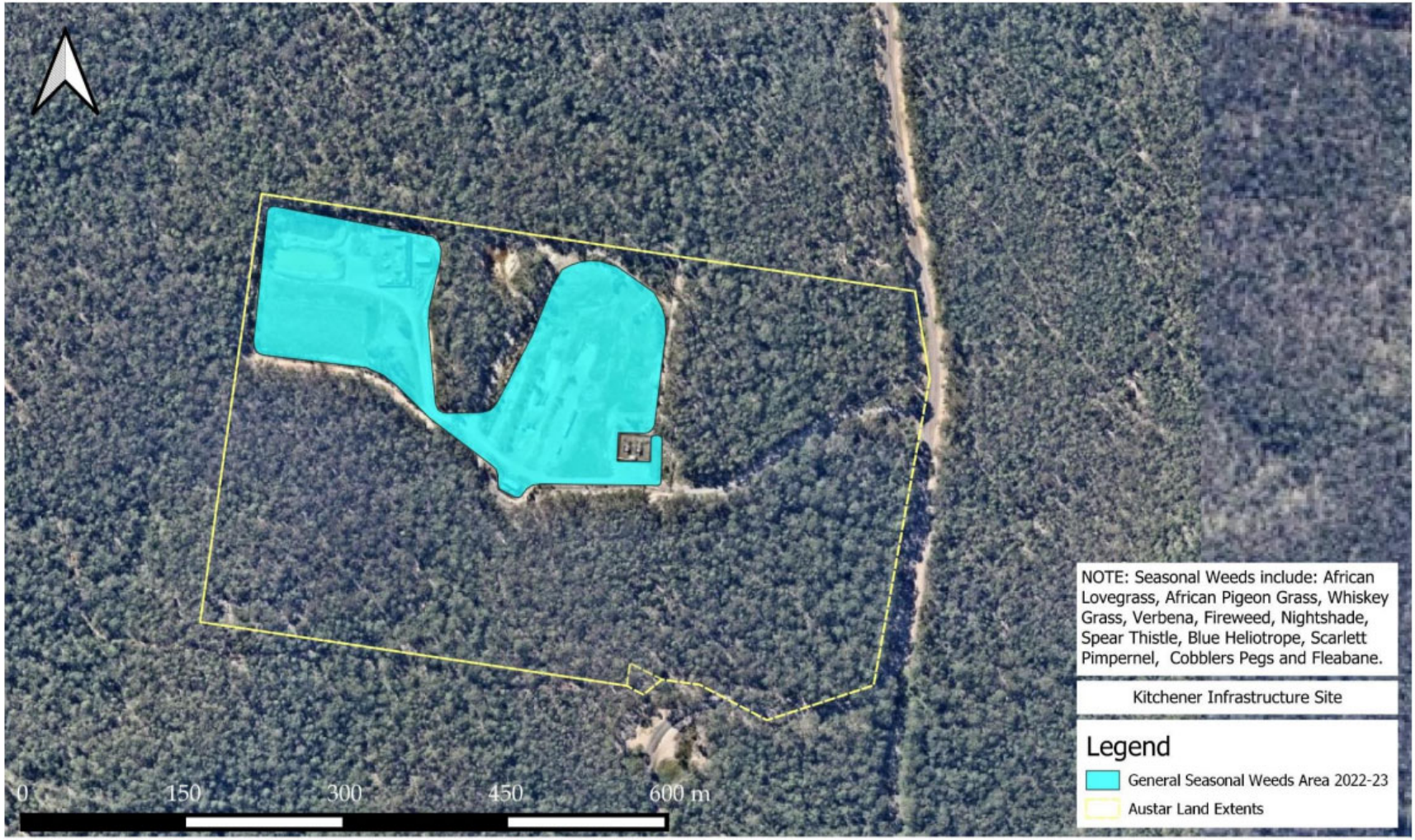


FIGURE 6-9 KITCHENER SURFACE INFRASTRUCTURE SITE WEED TREATMENT (SOURCE: AUSTAR WEED WORKS COMPLETED JULY 2022 TO JUNE 2023)

7 WATER MANAGEMENT

The three main components of the water management system are the:

- Underground mine water management system;
- Pelton CHPP site water management system; and
- Surface water storage and management system.

The Pelton CHPP site water management system historically managed water for use in the CHPP and underground. A Reverse Osmosis (RO) water treatment plant was used to treat water supply for the operations, as well as discharging offsite through a licenced discharge point. The main function of the CHPP site water management system is to manage stormwater runoff and contained mine water. The RO Plant has not operated during the reporting period.

As outlined in the SWMP, water is also pumped and stored underground. During the reporting period there was no dewatering of the underground. This allows progressive flooding of the underground during mine closure.

Given the cessation of underground dewatering since the previous reporting period, the primary role of the surface water storage and management system transitioned to management of surface water runoff during rain events. Further information on site water management can be found in the approved SWMP.

During the reporting period, the SWMP was revised and lodged with the DPE for approval. The SWMP revision reflects closure progress, including the sealing of the underground and the inaccessibility to monitor at underground water storages going forward, and early works plans, including the decommissioning of dams and pumping systems as available.

7.1 Water Licences

Austar holds water licences for monitoring and dewatering bores across the operation. Austar's current water licences issued under Part 5 of the *Water Act 1912* and the *Water Management Act 2000* are provided in **Table 7-1.**

TABLE 7-1 WATER LICENCES HELD BY AUSTAR

Licence Held	Licence Number	Validity of Licence	Purpose of Licence	Extraction Limit
Bore Licence Certificate	20BL171361	17 May 2007 - Perpetuity	Monitoring Bore (AQD1077)	N/A
Bore Licence Certificate	20BL172524	20 Jul 2010 - Perpetuity	Monitoring Bore (NER1010)	N/A
Bore Licence Certificate	20BL172852	7 Jun 2011 - Perpetuity	Monitoring Bore (WBH1, WBH2, WBH3)	N/A

Licence Held	Licence Number	Validity of Licence	Purpose of Licence	Extraction Limit
Bore Licence Certificate	20BL173843	1 Oct 2014 - Perpetuity	Monitoring Bore (BB1, BB2, BB3)	N/A
Bore Licence Certificate	20BL173878	8 Dec 2014 - Perpetuity	Monitoring Bore (MB01)	N/A
Bore Licence Certificate	20BL173891	19 Mar 2015 - Perpetuity	Monitoring Bore (MB02)	N/A
Water Access Licence	WAL19181 / 20AL210298	Continuing	Unregulated River Water Licence	Hunter Unregulated and Alluvial Water Sources - Upper Wollombi Water Source - Congewai Creek Management Zone. 10 shares
Water Access Licence	WAL41504 / 20AL217003	Continuing	Aquifer - Industrial dewatering 16CT pump station No. 2 Shaft No. 2 Shaft Borehole	Sydney Basin – North Coast Groundwater Source. North Coast Fractured and Porous Rock Groundwater Sources 2016. Extraction limit of 770ML in any 12-month period commencing 1 July

7.2 Water Take

Water take for the 2022-2023 reporting period is summarised in **Table 7-2**. Due to no pumping to dewater the underground, the water balance was recorded as zero.

TABLE 7-2 WATER TAKE 2022-2023

Water Licence #	Water sharing plan, source and management zone (as applicable)	Entitlement	Passive take / inflows (ML)	Active pumping (ML)	TOTAL (ML)
WAL19181 [1]	Hunter Unregulated and Alluvial Water Sources - Upper Wollombi Water Source - Congewai Creek Management Zone.	10 shares	0	0	0
WAL41504	Sydney Basin – North Coast Groundwater Source. North Coast Fractured and Porous Rock Groundwater Sources 2016.	Extraction limit of 770ML in any 12-month period commencing 1 July	0[2]	0	0

1 this WAL is not utilised at present by Austar.

2 Pumping ceased from water intakes in May 2021, therefore the site water balance is 0.

7.3 Surface Water

7.3.1 Environmental Management

The Austar SWMP has been prepared in accordance with the requirements of DA 29/95, PA 08_0111 and EPL 416, and includes a surface water monitoring program. The SWMP was approved by DPE on 11 March 2022. An updated SWMP has been lodged with the DPE for approval.

Austar has two licenced discharge points (LDPs). SW1 is an emergency wet weather discharge point, and SW6 is permitted to discharge 5,000 kilolitres (KL) per day (as an annual average) of permeate (treated water from the RO plant).

Austar has engaged an environmental monitoring specialist to undertake routine surface water sampling and analysis in accordance with the SWMP. Austar's surface water monitoring program includes:

- Five EPL monitoring sites (three creek sites and two discharge points); and
- Four creek monitoring sites (three sites in Quorrobolong Creek and one site in Cony Creek).

The surface water monitoring locations are presented in **Table 7-3** and shown in **Figure 6-3.** Discharge sampling is not detailed in **Table 7-3,** as there were no discharges during the reporting period.

TABLE 7-3 SURFACE WATER MONITORING LOCATIONS AND ANALYTES (SWMP, 2022)

Monitoring Location	Monitoring Frequency and analytes
SW1 (LDP 1 – Emergency Dam Spillway) SW2 (Bellbird Creek Pinch Bridge) SW4 (Bellbird Creek, Downstream Boundary) SW5 (Unnamed Creek, Upstream Boundary) SW6 (LDP6 – 1ML tank discharge to Bellbird Ck)	**Monthly** (unless there is no water at the sites): ▪ Quality – SW2, SW4, SW5, SW6 (pH, EC, TSS, Fe) ▪ Volume – SW6 (kL/day) ▪ Qualitative flow estimate – SW2, SW4, SW5 **Twice per year** (unless there is no water at the sites): ▪ Quality – SW2, SW4, SW5, SW6 (EC, pH, TSS, Total Dissolved Solids, redox potential, Major ions and charge balance error, Total Metals)
SW Q1 (Quorrobolong Ck, Sandy Ck Rd) SW Q2 (Quorrobolong Ck Upstream) SW Q3 (Quorrobolong Ck Downstream) SW C1 (Cony Ck)	**Quarterly** (unless there is no water at the sites): ▪ Quality (pH, EC, TSS, Fe) **Twice per year** (unless there is no water at the sites): ▪ Quality (EC, pH, TSS, Total Dissolved Solids, redox potential, Major ions and charge balance error, Total Metals) **Annual** ▪ Visual monitoring of stream health and channel stability (SW Q1, SW Q2 & SW C1 only)

7.3.2 Environmental Performance

Only LDPs SW1 and SW6 have water quality limits. Other locations are monitored for baseline data, or to observe any changes in water quality in the Bellbird South and Stage 3 mining areas.

There were no discharge events from SW1 or SW6 during the reporting period. A maintenance regime has been implemented on the RO plant so water treatment and discharge may recommence if required during closure.

As there was no discharge from SW1 and SW6 during the reporting period no water quality samples were collected from these locations.

Monitoring results at the up-, mid- and downstream CHPP creek monitoring points (SW5, SW2 and SW4, respectively) are summarised as follows:

- pH measured at individual sites remained relatively constant during the reporting period ranging between pH 6.91 (SW5) to pH 7.67 (SW2) which was similar to the 2021-2022 range of pH 5.21 to pH 7.61, and consistent with the five year data range of 5.21 – 7.67 (**Appendix B**);

- EC ranged between 391 µS/cm (SW2) and 11200 µS/cm (SW4). EC values during the reporting period were generally similar to those of the 2021-2022 reporting periods and indicates some change from the previous three years, which could be attributed to the wetter seasons and the decommissioning of the RO plant, which was the main source of water in Bellbird Creek during the dry years of 2018 - 2020;

- TSS ranged between <1 mg/L at all sites to 40 mg/L (SW2) for the reporting period. This is a lower variation and maximum than the previous reporting period, however at some sites the last two years show a higher TSS than previous years, predominantly due to higher intensity rainfall and greater runoff than experienced in 2018 - 2020; and

- Fe (Iron) ranged between 0.13 mg/L (SW2) and 7.62 mg/L (SW4) which is higher than the 2021-2022 range of <0.09 mg/L (SW2) and 6.02 mg/L (SW4) but comparable with historical data.

Bellbird Creek is ephemeral at sampling location SW5 upstream boundary to CHPP. Historically, water sampling at SW5 has been somewhat influenced by a potable water leak in the Hunter Water reservoir just upstream of the sample location.

Samples were collected from SW4 during seven sampling events out of twelve (July 2022 to January 2023). Sampling did not occur during months when the creek was dry. Twelve monthly sampling events were conducted from SW2 and SW5.

The five-year surface water graphs in **Appendix B** show a difference in water quality data that is predominantly driven by difference in rainfall patterns. 2018 – 2020 were drought years, and water flow in Bellbird Creek was predominantly RO treated water discharged from SW6. The RO plant was turned off in 2021, coinciding with heavier rainfall in 2021 -2022. The water quality of some sites in Bellbird Creek show change in late 2022 and 2023 as the drier weather influences creeks and stagnant water is more common.

Natural fluctuations in water quality in Quorrobolong and Cony Creeks were observed, with sample points generally reporting results within historical ranges. Subsidence in this area was deemed substantially complete in March 2021 and no mining impacts have been recorded or are expected in the future.

For the Quorrobolong and Cony Creek monitoring points (SWQ1, SWQ2, and SWQ3 & SWC1):

- Quorrobolong Creek was generally flowing throughout this reporting period. Ten samples were collected from SWQ1, due to the change in monitoring frequency from monthly to quarterly in April 2023 after the approval of the SWMP to reflect closure. Nine samples were collected from SWQ2, and four samples from SWQ3 (due to water across the track and subsequent erosion preventing access after heavy rains in the first half of the reporting period).

- The sampling location on Cony Creek is in a deep pool, ten samples were collected from SWC1 during the reporting period, due to the change in monitoring frequency from monthly to quarterly in April 2023 after the approval of the SWMP to reflect closure.

- pH ranged between pH 6.93 (SWQ2 and SWC1) and pH 7.60 (SWQ1) which is comparable to the 2021-2022 range of pH 6.65 (SWQ2) to pH 7.62 (SWQ1). This generally aligns with results reported in the previous periods;

- EC results ranged between 623 µS/cm (SWC1) and 2420 µS/cm (SWQ2). This is comparable with the 2021-2022 results of 260 µS/cm (SWQ1) and 2440 µS/cm (SWQ3) and generally comparable to data from previous reporting periods, such as 2020-21 with a range from 130 – 2000 µS/cm;

- TSS ranged from <5 mg/L at SWQ2 and SWC1, to 28 mg/L (SWC1) which is lower than the range reported in 2021-2022 being <5 mg/L to 88 mg/L;

- Iron results ranged from 0.97 mg/L (SWC1) to 5.43 mg/L (SWQ1) during the reporting period. This is a decrease from the 2021-2022 reporting period which reported results ranging from 0.37 mg/L to 43.40 mg/L, and generally consistent with historical results.

All water quality data from 2022-2023 in Quorrobolong and Cony Creeks is within the range of longer-term monitoring shown in the 5-year graphs in **Appendix B**.

7.3.3 CHPP Investigation Drainage Line

During routine inspections of clean water drainage lines in 2017, orange staining/residue was observed in a drainage line at the CHPP (referred to as the Investigation Drainage Line (IDL)). This was reported as an incident to the EPA and has been regularly inspected and monitored since in accordance with conditions added to the EPL in December 2017.

The IDL is ephemeral and while it had been mainly dry since 2017, during the reporting period there were commonly pools of water throughout.

Condition U3.3 requires the submission of an updated monthly report containing the monitoring results required by Condition U3.2. Condition U3.2 requirements include:

- sampling of surface water in the IDL;
- sampling of Groundwater Bore 1 adjacent to the IDL; and
- photos taken at specific locations along the Investigation Drainage Line.

Reports have been submitted each month to the EPA during the reporting period.

Condition E2 requires that the orange staining / residue within the IDL must be fully contained within the premises at all times. Any discharges to waters of this residue must comply with Condition L1.1 of the EPL which states that the licensee must comply with Section 120 of the *Protection of the Environment Operations Act 1997*. A bunded containment area has been installed upstream of a clean water tributary entering the Investigation Drainage Line to assist in the isolation of orange-stained water. Water captured is pumped from this containment area into the CHPP mine water system. Additionally, water below the IDL can be captured within Doyle Street Dam and pumped back to the mine water system as required.

During the reporting period orange staining was observed in the IDL during all monthly inspections.

Monitoring of the IDL will continue in the next reporting period. Austar is currently undertaking detailed mine closure planning. The ongoing findings of the IDL sampling and inspection program will inform the detailed mine closure technical studies for the CHPP as the source of the orange staining in the IDL is investigated further.

Table 7-4 summarises the recommended management actions and implemented controls for orange staining management in the IDL during the reporting period.

TABLE 7-4 MANAGEMENT ACTIONS AND IMPLEMENTED CONTROLS FOR ORANGE STAINING IN THE IDL DURING THE REPORTING PERIOD

Date / Trigger	Action	Key findings	Recommendations	Implemented controls
June 2022 – September 2022 Mine closure planning	Site Investigations Program. The program included shallow soil sampling, test pitting, surface water sampling, drilling of boreholes and installation of monitoring bores to inform contamination assessments, geotechnical investigations, material characterisation assessments and regional groundwater studies. Approximately 300 locations were sampled across the mine site, focusing mainly on previously disturbed areas (e.g. around surface infrastructure areas and rejects emplacements).	Results from the Site Investigations Program will assist to address any knowledge gaps in the closure planning process and will inform several planned closure studies including contamination and materials assessment, rehabilitation design and materials balance.	Use results / findings / recommendations from the Site Investigations Program to inform the closure plan for the Investigation Drainage Line	-
Mine Closure Planning	As part of mine closure planning, Austar has undertaken a Preliminary geochemical assessment to gain an understanding of the geochemical risk across the CHPP (and all other closure management areas) as it relates to the management of potentially acid forming material including coarse rejects and tailings during closure.	the geochemical assessment found that at the CHPP there is a high-medium Acid Mine Drainage risk, in areas where coarse reject and tailings are stored, including No. 9 Tailings Dam, the Noise Bund, the North-West Tailings Dam, the Precipitate Dam, the Product Stockpile, the RoM Stockpile, and the Stormwater Retention Dam.	Further geochemical sampling and analysis will be undertaken to address remaining knowledge gaps. A water balance may be undertaken for the CHPP to advance the site hydrological knowledge. Advance capping design using geochemical and landform evolution modelling to underpin the basis of design for potential capping and cell design for potentially acid forming materials.	The findings of the geochemical assessment have been incorporated into the development of conceptual landform designs and the coarse reject and tailings management strategy and have been used to scope further geochemical assessment to address remaining knowledge gaps.

Date / Trigger	Action	Key findings	Recommendations	Implemented controls
December 2022	A surface water assessment of the Investigation Drainage Line was finalised.	A small tributary between the IDL and the CHPP dams will be investigated further. Erosion issues require addressing. Minor additional monitoring.	There are recommendations from the assessment including to regrade channels, undertake clay sealing works and install embankments, which will all be assessed and, if feasible, designed in the new year.	Planning currently in place to repair erosion issues in two sections of the creek line.

7.3.4 Kitchener Sediment Dam Discharges Overflow event 4-10 July 2022

The Kitchener SIS contains infrastructure that is largely in the process of decommissioning, including upcast and downcast ventilation fans (temporarily sealed), services borehole/drop hole (fully sealed), pipelines, powerlines and electrical substation, as well as vegetated stockpiles that will be used for the rehabilitation of the site. There are three sediment dams on the site designed to catch sediment laden runoff from disturbed areas. Disturbed areas have been partially revegetated to stabilise the site until rehabilitation and reforestation.

As outlined in the SWMP, the sediment dams are designed to catch runoff for up to the 90th percentile 5-day rainfall events. Any rainfall event of greater intensity may cause the dams to overflow, with runoff reporting to the headwaters of Black Creek. There was one overflow event over approximately one week during the reporting period, as described below.

Over a four-day period from 3-6 July 2022 the Austar CHPP meteorological station recorded a total of 236mm of rainfall; Austar's Kitchener SIS meteorological station recorded a total of 285mm over the same period. This event was greater than the design size for the sediment dams at the Kitchener SIS. Real time monitoring indicates that the Eastern Sediment Dam was at (or over) 100% capacity at approximately 2:38am on 4 July 2022. Similarly, the Lower Sediment Dam was at (or over) 100% capacity at approximately 3:12am on 5 July 2022. Pumping from both dams had commenced prior to the dams overtopping and was continuous throughout and after the rain event. There was a further rain event of 20mm recorded at the CHPP meteorological station on the 10 July 2022 (24mm at the Kitchener SIS) into an already saturated catchment. Subsequently the Eastern Sediment Dam was over its maximum capacity, and the Lower Water Storage Dam was overtopping on the afternoon of the 10 July 2022.

Prior to the commencement of the rainfall event, all sediment dams at the Kitchener SIS were maintained at their lowest levels, with adequate storage for design rainfall events.

Austar enacted the Pollution Incident Response Management Plan (PIRMP) and reported the event to the relevant authorities on 4 July 2022. Water samples were collected for analysis on 4-7 and 11 July 2022 from the East Sediment Dam, Lower Water Storage Dam, Black Creek Upstream SIS and Black Creek Downstream SIS. Pumping of water from the Eastern Sediment Dam to the Upper Sediment Dam occurred during and after the rainfall event ceased. Pumping of water from the water storage dams to Kalingo Dam occurred during and after the rainfall event. Sampling indicated that given the minor difference in upstream and downstream water quality, there was no material harm to the environment as a result of the overtopping event.

Written incident reports were sent to the EPA and DPE on 11 July 2022 with no further actions required to date.

7.3.5 Aberdare Extended Emplacement Area overflow event 6 July 2022

The Aberdare Extended Emplacement Area is an old open cut void. When the site was operational, Austar Coal Mine was progressively filling the void with coarse coal washery rejects prior to capping and rehabilitating.

Water management for the Aberdare Extended Emplacement Area is undertaken in accordance with Austar Coal Mine's Environmental Management Strategy (May 2021) and Site Water Management Plan (March 2022), as approved by the DPE.

The Aberdare Extended Emplacement Area is located within the Black Creek catchment, therefore specific surface water management and erosion and sediment controls have been developed to protect the ephemeral tributaries of Black Creek from both surface runoff that has been in contact with coarse coal reject and potential sediment generated from active rehabilitation areas. At present, the Aberdare Extended Emplacement Area is not connected to the surrounding clean water systems with all water that falls within the open cut pit captured directly to the base of the pit to drain to old mine workings.

Over the period of 1 July to 6 July 2022, the Austar CHPP meteorological station recorded a total of 242mm of rainfall. During this period, a Disaster Declaration which included the Cessnock LGA had been made by the NSW Government in response to severe weather and flooding from 27 June 2022 onwards. On 5 July 2022, the Cessnock area began to flood, and it was observed that the clean water diversion drain to the southeast of the Aberdare Extended Emplacement Area had breached its banks and clean water was flowing into the emplacement area. Mitigation actions were implemented immediately to raise the height of the clean water diversion drain bund and repairs conducted. On 6 July 2022 however it was observed that water was leaving the coal reject emplacement area at low flow and mixing with water from the breached clean water diversion before leaving site during the flooding conditions.

Austar enacted the Pollution Incident Response Management Plan (PIRMP) and reported the event to the relevant authorities on 6 July 2022. Water samples were collected for analysis on 5-7 July 2022 from the emplacement area and surrounding upstream and downstream locations. Sampling indicated that the short-term low flow offsite discharge did not result in any material harm to the environment.

Written incident reports were sent to the EPA and DPE on 13 July 2022 with no further actions required to date.

7.4 Ground Water

7.4.1 Environmental Management

The SWMP has been prepared in accordance with the requirements of development consent DA29/95 and Project Approval PA08_0111 and includes a groundwater monitoring program. The revised SWMP was approved by the DPE on 11 March 2022. During the reporting period the SWMP was revised and lodged for approval with DPE. The revision removed much of the sampling and monitoring that is no longer accessible due to the sealing of the underground mine.

A groundwater monitoring specialist is engaged by Austar to undertake quarterly groundwater monitoring and analysis in accordance with the SWMP, utilising nine piezometers (MB01, MB02, MB03A, MB04, AQD1073a, NER1010, WBH1, WBH2 and WBH3) to assess any potential impacts on groundwater levels in the Bellbird South, Stage 2 and Stage 3 mining areas. The locations of these monitoring sites are presented in **Figure 6-3.**

Austar's groundwater monitoring program also includes monitoring of underground flows, water quality and pressure from surface boreholes where possible. Groundwater level data from Vibrating Wire Piezometer EX01H is downloaded quarterly. Groundwater resources in the vicinity of Austar are detailed in the SWMP.

7.4.2 Environmental Performance

Appendix C illustrates the groundwater monitoring results at Austar during the reporting period and the last five years for comparison. The graphs contained in **Appendix C** illustrate groundwater depth, rainfall, pH and conductivity. Trends from the monitoring program are summarised below:

7.4.2.1 Groundwater Level

- Groundwater elevation in Bellbird South sandstone bore NER1010 decreased between July 2022 and June 2023, coincident with decreased regional rainfall and decreasing cumulative rainfall departure (CRD). Groundwater elevation in NER1010 responds rapidly to significant (i.e., more than 20 mm) rain events. Rapid increases in groundwater elevation were recorded following heavy rainfall throughout the year. Although the total depth of the bore is 102 m, the screened interval spans 82 m in length (20 metres below ground level (mbgl) - 102 mbgl). It is likely that the shallow depth of the upper part of the screen is allowing rainfall recharge to infiltrate and mix with deeper groundwater. Prolonged, above average rainfall has resulted in historically high groundwater levels being recorded in NER1010 from Q3 2022 (**Figure App C-1**).
- Groundwater elevations in Stage 2 and Bellbird South alluvial bores (including two WaterNSW bores) (all shown in **Figure App C-2)** decreased during the year (Q3 2022 - Q2 2023). Below average rainfall since November 2022 has led to a reduction in alluvial groundwater levels. Pressure Transducer (PT) data indicate groundwater elevations increased rapidly following rainfall, decreasing shortly thereafter. No data was available for WaterNSW bores GW080975 and GW080974 between Q1 and Q2 2023 (**Figure App C-2**).

- Groundwater elevation in Stage 3 monitoring bore MB01 decreased overall during the reporting period (**Figure App C-3**). The PT in MB01 was replaced following further discordant readings and a new device has been installed.
- Groundwater elevation in Stage 3 monitoring bore MB02 decreased overall during the recent monitoring period (**Figure App C-4**). A new PT has been installed in MB02 following anomalous data discordant with manual readings.
- The VWP sensors remained relatively consistent during the reporting period:
  - Pressure head at VWP sensor no.1 (which is above predicted height of connected subsidence cracking) slightly decreased during the reporting period. Pressure head decreased from 64 metres Australian height datum (mAHD) to 61.5 mAHD during the reporting period. VWP sensor no.2 (which is within predicted height of connected subsidence cracking) also decreased throughout the year (**Figure App C-5)**.
  - Piezometric head at VWP sensors no.3 and no.4 (which are below predicted height of connected subsidence cracking) gradually decreased throughout the reporting year (**Figure App C-5**).
  - Piezometric head at VWP sensor no.5 (seam centre) gradually decreased throughout the reporting year.
  - Piezometric pressure at VWP sensor no.6 (seam floor) rapidly increased from the start of July 2022 (-291 mAHD on 1 July 2022) to mid-October 2022 (-277.5 mAHD on 20 Oct 2022), then decreased until early December 2022, where pressure head decreased for the remainder of the year at a slower rate **(Figure App C-6**).

Water Quality

- Except for AQD1073a and NER1010 in which pH values increased, groundwater pH in Stage 2 and Bellbird South alluvial bores (**Figure App C-7**) was stable during the 2022-2023 monitoring period. Observed fluctuations in groundwater pH throughout the year were attributed to natural variation.
- Stage 3 monitoring bores MB01 and MB02 recorded overall decreasing and increasing groundwater pH, respectively, during the reporting period. Groundwater pH at MB01 gradually decreased during the reporting year. Groundwater pH at MB02 remained stable from Q3 2022 to Q1 2023, increasing thereafter (**Figure App C-8**).
- A varied response in groundwater EC was recorded in Stage 2 and Bellbird South Alluvial bores during the 2022-2023 monitoring period (see **Figure App C-9**). Groundwater EC in MB04, NER1010, and WBH3 increased, while values in MB03a decreased. EC values in all remaining bores remained stable overall throughout the reporting year. Headworks for MB03a were reported damaged between Q1 2023 and Q2 2023, likely from nearby landscaping works. A new PT was installed, and temporary repairs were enacted during the Q2 monitoring round to ensure the integrity of the monitoring bore, with future repairs proposed during the 2023-2024 monitoring period.
- Groundwater EC in Stage 3 monitoring bore MB01 remained stable in the reporting period. Monitoring bore MB02 EC increased during the reporting period (see **Figure App C-10)**.

There are no new trends in groundwater quality or water levels that indicate impact conditions that require enactment of the SWMP Response Plan triggers. Monitoring indicates that mining impacts are within EA predictions, and there is no evidence of impacts outside of established predictions.
Trends for five-year monitoring period are summarised below:

- Groundwater elevation in sandstone bore NER1010 decreased between July 2018 and September 2019, increasing thereafter. NER1010 groundwater elevation correlates strongly with the CRD and rainfall recharge. Groundwater elevations have been decreasing following historically high levels in mid-2022 (**Figure App C-11)**.
- Groundwater elevation within alluvial Stage 2 and Bellbird South monitoring bores declined between July 2018 and March 2020. Groundwater elevations increased in response to significant rainfall recharge between 2020 and 2022, then began to decline following below-average rainfall (**Figure App C-12)**.
- Groundwater elevation in Stage 3 monitoring bore MB01 declined between July 2018 and September 2019. PT data recorded between 21 June 2019 and 4 November 2019 was erroneous and has been removed from the dataset. Groundwater elevation in MB01 steadily increased from September 2019 to June 2022, and has been decreasing thereafter (see **Figure App C-13)**.
- Groundwater elevation in MB02 was stable between July 2018 and October 2019. The decrease in 2019 is due to airlift development, with the bore recharging over the next year. Historically high groundwater elevations were recorded in this bore during Q2 2022 (**Figure App C-14**). MB02 decreased overall during the past 12 month reporting period to June 2023.
- Piezometric head at VWP sensor no.1 (above predicted height of connected subsidence cracking), no.2 (within predicted height of connected subsidence cracking) and no.3 (below predicted height of connected subsidence cracking) have been relatively stable since the start of 2018. Sensor no. 4 (coal seam roof) pressure head has fluctuated throughout the five-year monitoring period, decreasing overall (**Figure App C-15**). Sensors no.5 (seam centre) and no.6 (seam floor) piezometric heads have declined since July 2017, with latest data showing a sharp increase in pressure head at sensor no.6 between June 2022 and October 2022 (see **Figure App C-16**). The monitoring results between July 2018 and June 2023 are consistent with predicted impacts.
- Stage 2 and Bellbird South alluvial pH values have generally remained stable during the five-year period to June 2023 (see **Figure App C-17**).
- Groundwater pH in sandstone bore NER1010 fluctuated throughout the monitored period (July 2018 to June 2023), ranging from pH 7.08 in January 2022 to pH 11.53 in June 2018. Following airlift development in October 2019, pH values changed from hyper-alkaline to slightly alkaline (**Figure App C-17**). Elevated pH in NER1010 (and MB02 - see below) pre-airlift development in December 2019 has been attributed to stagnant water in the bore casing.
- Stage 3 monitoring bore MB01 pH was stable during the five-year monitoring period, with elevated values in conjunction with increased rainfall in July 2022. MB02 recorded stable, yet elevated, pH values until September 2019, which decreased rapidly following airlift development in December 2019. pH values remained stable until March 2022, with historically low values thereafter (**Figure App C-18**).

- Groundwater EC in Stage 2 and Bellbird south alluvium was variable. MB04, NER1010, and WBH3 have recorded a decreasing EC trend in recent times due to significant rainfall recharge, with a recent increasing trend following below-average rainfall from the beginning of 2023 onward. NER1010 groundwater quality is not likely representative of the screened formation (Branxton Formation), but instead is comprised of a mixture of surface and deeper groundwater resulting from the extended screen interval on this bore (**Figure App C-19**).
- AQD1073a recorded a sharp decrease in EC in September 2020, coincident with an increase in CRD. WBH1 and WBH2 EC values have been stable during the five-year monitoring period, with only slight fluctuations recorded during that time (**Figure App C-19)**.
- Groundwater EC in Stage 3 monitoring bore MB01 has remained stable during the five-year period. MB02 recorded stable EC values until September 2019, then increasing rapidly following airlift development in October 2019. EC values in MB02 steadily returned to ranges aligning with historical data until June 2022, where values sharply decreased to historical lows following significant rainfall (**Figure App C-20**).

Maintenance Works

The headworks at MB03a were reported to be damaged between Q1 2023 and Q2 2023 monitoring events. Temporary repairs were enacted to retain the integrity of the borehole and a new PT installed, with new headworks proposed later in 2023. A new PT was installed in MB02 during the Q1 2023 monitoring, and another in MB01 during the Q2 2023 monitoring round following discordant readings from both devices. Both devices have been installed lower in the bore screen.

Monitoring bores will continue to be inspected throughout the next reporting period. The bore network is currently considered effective with no further maintenance beyond that identified above recommended. Recommendations will continue to be addressed as required in future reporting periods.

8 REHABILITATION

Rehabilitation and land management activities were undertaken in accordance with the Austar Rehabilitation Management Plan (July 2022) (RMP) and the Austar Coal Mine Forward Program (1 July 2022 to 30 June 2025) (FP).

Since Austar is a closed mine, there were no mining operations undertaken during the reporting period. Consistent with the FP, rehabilitation activities during the reporting period focused on the maintenance of existing rehabilitation areas and the ongoing preparation of specialist studies to address rehabilitation and closure knowledge gaps and to inform closure execution.

Rehabilitation maintenance activities undertaken included ongoing weed management of the Aberdare Extended Emplacement Area (EEA), Bellbird Areas 12 and 13, and the Cessnock No. 1 Colliery/Kalingo Infrastructure Area.

Activities were also undertaken to restrict trespasser access into the Aberdare EEA and Bellbird Areas 12 and 13, through the installation of additional concrete barricades to prevent vehicle access. Annual rehabilitation monitoring was undertaken by consulting ecologists (refer **Section 8.3**) and routine inspections by Austar environmental personnel.

Consistent with the rehabilitation schedule in the FP, no new areas of rehabilitation were commenced and there were no areas of rehabilitation relinquished or signed off by the Resources Regulator during the reporting period.

8.1 Rehabilitation Maintenance and Management

During the reporting period rehabilitation maintenance and management activities were undertaken based on the recommendations of the 2022 Rehabilitation Monitoring Program as follows:

- Ongoing weed management of the rehabilitation areas at Kalingo East, Kalingo West, Aberdare Extended EEA, Bellbird Areas 12 and 13; and
- Installation of concrete blocks around multiple areas where unauthorised access has been made by vehicles into the Aberdare EEA and Bellbird rehabilitation areas.

Additionally, grassland areas have been slashed and dumped rubbish removed from the vicinity of Bellbird Areas 12 and 13, and the Aberdare Extended EEA.

Recommendations to remediate rehabilitation damage caused by motorbike tracks was not undertaken during the period, due to the constant difficulty in excluding motorbikes from the area. Options such as additional fencing and providing some designated vehicle tracks through the rehabilitation area are being considered as ways to minimise ongoing damage.

In addition to the annual monitoring program, routine site inspections are conducted monthly by Austar environmental personnel. Operational personnel also conduct inspections of the site which

include rehabilitation areas and areas susceptible to sinkhole formation. If issues are identified during inspections, corrective actions are implemented as required.

8.2 Exploration Borehole Rehabilitation

There were no surface exploration works undertaken during this reporting period. All previous exploration boreholes drilled by Austar in EL6598 have been rehabilitated. Two boreholes are outstanding, pending either final photos or landholder sign off.

Austar continued due diligence works on historic exploration boreholes drilled in Austar mining leases during the reporting period. This was predominantly a desktop exercise supplemented with site inspections to understand the status of exploration boreholes drilled prior to 2006. This due diligence exercise will continue as part of closure planning works.

8.3 Rehabilitation Monitoring

In accordance with the Austar RMP, rehabilitated areas are to be monitored on an annual basis until they are self-sustaining and no longer require management. Ecological monitoring was undertaken across all Austar rehabilitation areas and associated reference sites during May 2023.

The rehabilitation monitoring program is undertaken annually, with results compared to the completion criteria in the RMP and recommendations provided to progress towards the completion criteria.

The main factors identified during monitoring as key to progression of all monitoring locations towards completion criteria is a reduction in weed cover and a reduction in unauthorised access by trespassers into the area, with activities such as rubbish dumping and motorbike riding being commonplace. Recommendations have also been made with respect to the probability of needing to undertake supplementary planting, but this will depend on final land use determinations that will be made during detailed mine closure planning.

Results of the monitoring were compared to Performance Criteria for the Ecosystem and Land use Establishment and Sustainability phases (see **Table 8-1**) and the trigger action response plan (TARP) (**Table 8-2**) from the RMP.

Recommendations arising from the 2023 Annual Rehabilitation Monitoring Report are discussed below, along with proposed actions to address the recommendations:

- **Weed management** – weeds require management and control in all rehabilitation areas. Weeds identified include Blackberry, Fireweed, Lantana, Purple top, Fleabane, Whisky grass, Pigeon grass, African lovegrass and Rhodes grass. Austar has a site wide Annual Weed Action Plan in place incorporating the rehabilitation areas. Weed management works are undertaken by a specialist contractor on a regular basis throughout the year. Weed management in the rehabilitation areas is ongoing, with weed works focusing on recommended actions and areas, including creek lines across site during the reporting period.

- **Supplementary plantings** – should be taken in any areas where weed management is undertaken and areas are subsequently left unvegetated. Dependent upon decisions on final land use vegetation types, infill planting of target tree and shrub species may be required in some areas. Infill planting is not expected to be required in the short term, as the main weed management works are being undertaken in grassland/pasture areas.
- **Alteration of Seed Mixes** – Umwelt recommends that green panic (*Megathrysus maximus)* Rhodes grass *(Chloris gayana)* and kikuyu (*Cenchrus clandestinus*) be removed from any subsequent seeding mixes for pasture areas of vegetation. Prior to extensive rehabilitation occurring, the current seed mix will be reviewed and updated with the removal of the nominated grass species.
- **Remediation of dirt bike paths** - Dirt-bike paths are quite deep in the Aberdare REA, and remediation of these tracks is recommended so that the subsurface is not exposed. Supplementary planting of these areas may be required following remediation, however given the narrow width, it is likely that ground cover would naturally re-establish along these paths over time. Ongoing measures have been made to restrict access during the reporting period, and these measures will continue to be implemented across the Aberdare REA.
- **Prevention of unauthorised access** – Evidence of unauthorised access (such as 4WD tracks, motorbike riders and push bike riders) were identified in the Bellbird Areas 12 & Area 13 and Aberdare REA. Given proximity of these areas to urban areas, such aspects will be difficult to control. Measures are in place to strengthen site security and exclude trespassers through the installation of concrete barriers, maintenance of fencing and ongoing security patrols.
- **Rubbish removal** – In Kalingo East, various heritage buildings and structures, and loose surface debris are present throughout. Austar regularly removes dumped rubbish from rehabilitation areas when encountered. Further clean-up efforts will be undertaken after heritage assessments have been completed during the closure planning process.

Performance criteria and monitoring requirements and final land use vegetation types for the site are being reviewed and refined as part of the detailed mine closure planning work currently being undertaken.

TABLE 8-1 RMP PERFORMANCE CRITERIA ASSESSMENT

	Area 12	Area 13	Aberdare REA	Aberdare REA North	Kalingo Site 1	Kalingo Site 2
All Phases						
Minor rilling only (less than 30 cm by 30 cm), within areas that landform works have been undertaken	✓	✓	✓	✓	✓	✓
Ecosystem and Land-Use Establishment Phase						
Grassland						
Ground cover comparable to pre-mining environment is re-established following remediation activities.	**Unable to be determined**					
Remediation areas revegetated with species selected based on the existing land use (i.e., pasture) and surrounding vegetation	**X**	**X**	**X**	✓	**X**	**X**
Ecosystem function is rehabilitated to that existing pre-mining and consistent with the surrounding landform	✓	✓	✓	✓	✓	✓
Ecosystem and Land-Use Sustainability Phase						
Native Ecosystem						
Revegetation is progressing towards a sustainable ecosystem and only requires maintenance that is consistent with the intended final land use	**X**	**X**	✓	**X**	**X**	**X**
For pasture areas, groundcover targets: - 0-20% canopy	✓	✓	✓	✓	✓	✓
- 70-100% groundcover	**X**	✓	✓	**X**	✓	✓
Weeds identified on-site are actively controlled and/or removed using appropriate weed control techniques to meet the final land use criteria.	✓	✓	✓	✓	✓	✓
Weeds are absent from canopy and understorey	**X**	✓	**X**	**X**	✓	✓
Weeds comprise no more than 20% of ground cover vegetation	**X**	**X**	**X**	**X**	**X**	**X**

TABLE 8-2 COMPARISON OF MONITORING RESULTS TO TRIGGER, ACTION, RESPONSE PLAN

Trigger (RMP Extract)	Comment	Remediation Action
Hazardous Materials (asbestos) inappropriately removed during demolition of heritage structures, leading to soil contamination and/or health impact.	No hazardous materials identified during rehabilitation monitoring.	No remediation actions are required
Landform not in accordance with Resources Regulator requirements (i.e., not within criteria identified including capping material depth).	Landform is generally in accordance with final landform.	Not required
Erosion / poor water quality from rehabilitation areas (in excess of target criteria identified).	No erosion identified. However, remediation of degradation caused by dirt bike tracks in Aberdare REA required before depth reaches capping. Water quality not assessed as part of this program of work.	Remediation of dirt bike tracks in Aberdare REA
Lack of vegetation establishment or dieback of rehabilitated areas resulting in inability to meet vegetation criteria targets specified.	No substantial dieback identified.	Not required
Weed infestation threatening rehabilitation success (weeds in excess of identified criteria level).	Weed infestation threatens each of the REAs and Kalingo.	Implement weed management actions as required. Re-seed following weed management utilising appropriate species as per target final land use where necessary.
Significant damage to rehabilitation areas by feral animals, resulting in inability to meet vegetation criteria targets specified.	No evidence of feral animals identified.	Not required
Acid leachate identified from rehabilitated reject emplacement areas, potentially resulting in offsite water impact and/or dieback of revegetation, resulting in inability to meet vegetation criteria targets specified.	No evidence of acid leachate identified in rehabilitated areas during rehabilitation monitoring.	Not required
Spontaneous combustion of rehabilitation area	No evidence of spontaneous combustion observed in rehabilitated areas during rehabilitation monitoring.	Not required

8.4 Rehabilitation Trials and Research

There were no rehabilitation trials undertaken during the reporting period. Austar is currently at the Pre-Feasibility Study (PFS) stage of mine closure, undertaking numerous technical studies and site investigations to address closure knowledge gaps**.**

A rehabilitation trial is proposed to be commenced during the next reporting period, consisting of the establishment of trial plots to evaluate the performance of alternative growth mediums as a substitute for topsoil. Austar has identified a likely deficit in topsoil material at the site available for rehabilitation. The proposed trial will compare differing thicknesses of growth medium versus site won overburden without a growth medium, to evaluate factors such as soil chemistry, seed germination, growth rates and weed potential. The trial plots are planned to be seeded with representative canopy and pioneer species of the Lower Hunter Spotted Gum Iron Bark Forest, which is a primary vegetation community surrounding planned future rehabilitation works in many areas of the site.

8.5 Rehabilitation Summary

During the reporting period rehabilitation was managed generally in accordance with the RMP. Mining and rehabilitation status is presented in **Table 8-3.** In accordance with the Austar RMP and FP there were no areas of land where active disturbance or rehabilitation preparation occurred during the reporting period. Areas documented for the next reporting period are based on the areas detailed in the RMP and Forward Program.

The current rehabilitation and disturbance footprint at Austar is presented in **Plan 1A** as reproduced from the RMP.

8.6 Rehabilitation Actions for the Next Reporting Period

Rehabilitation activities in the next reporting period are as detailed in the *Austar Coal Mine Forward Program - Friday 1 July 2022 to Monday 30 June 2025* prepared in accordance with the requirements of the Mining Act Amendment.

Based on the Forward Program, the following actions are proposed for the 2023-24 reporting period:

- Progress the mine closure planning strategy, and commence Feasibility Study technical studies as documented in the Rehabilitation Management Plan (RMP) as discussed in **Table 4-1**;
- Disconnection, decommissioning and demolition of some items of surface equipment; and
- Maintain existing rehabilitated areas at Aberdare Extended Emplacement Area, Bellbird Areas 12 and 13 and Cessnock No.1/Kalingo Colliery.

TABLE 8-3 REHABILITATION SUMMARY

Mine Area Type	Previous Reporting Period (ha)	This Reporting Period (ha)	Next Reporting Period (ha)
	2021-22	**2022-23**	**2023-24**
Total mine footprint	210.3	210.3	210.3
Total active disturbance	172.5	172.5	172.5
Land being prepared for rehabilitation	0	18.5	18.5
Land under active rehabilitation	37.8	37.8	37.8
Completed rehabilitation	0	0	0

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 surface disturbance activities. The total disturbance footprint is the sum of the total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem and land use establishment, ecosystem and land use development and rehabilitation completion. Underground mining operations should not include the footprint of underground mining areas/subsidence management areas in the total disturbance footprint.*
Total active disturbance *includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).*
Land being prepared for rehabilitation *– Includes on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpile areas, access tracks and haul roads, active mining areas, waste rock emplacements (active/unshaped/in or out-of-pit), tailings dams (active/unshaped/uncapped) and temporary stabilised areas (e.g. areas sown with temporary cover crops for dust mitigation and temporary rehabilitation).*
Land under active rehabilitation *- Includes the sum of all disturbed land within a mining lease that have commenced any, or all, of the following phases of rehabilitation – decommissioning, landform establishment and growth medium development.*
Completed rehabilitation *– The final phase of rehabilitation when a rehabilitation area has achieved the approved rehabilitation objectives and rehabilitation completion criteria for the final land use. Rehabilitation areas may be classified as complete when the NSW Resources Regulator has determined in writing that the relevant rehabilitation obligations have been fulfilled following submission of Form ESF2 Rehabilitation completion and/or review of rehabilitation cost estimate application by the lease holder.*

9 COMMUNITY RELATIONS

Austar is committed to minimising the impacts of its operations and is an active participant and contributor to community projects that benefit local people.

9.1 Community Support Program

Yancoal's Community Support Program (CSP) is ongoing and supports organisations in the Hunter Valley. The aim of Yancoal's Community Support Program is to invest in community projects and local initiatives, particularly in the areas of Health, Community, Environment and Education and Training, with the potential to make a positive difference.

During the reporting period, Austar supported a number of organisations in the local Cessnock area, including:

- Cessnock Community Leos Club
- Cessnock Community of Great Public Schools
- Kitchener Public School
- Bellbird Preschool
- Aberdare Preschool
- Cessnock District Netball Association

During the next reporting period, Austar will be looking for further community applications to support in the fields of health, environment, arts and culture, education and training. While no longer operating, Austar is still a part of the Cessnock community and will continue to deliver its annual Community Support Program.

9.2 Community Sponsorship

In addition to the Community Support Program, Yancoal sponsors local community initiatives. In the 2022-2023 reporting year, the long-term sponsorship of the Cessnock Rugby League Football Club continued. Austar also provided funding to the Mayoral Scholarship Program.

9.3 Community Liaison

Yancoal continues to maintain close relationships with neighbouring properties and nearby communities as part of normal business. This is mainly done through individual contacts with neighbours, and the Community Consultative Committee (CCC), as described below.

9.3.1 Community Consultative Committee

The Austar CCC continued to operate during the reporting period. The CCC is conducted generally in accordance with the DPE's Community Consultative Committee Guideline (January 2019). CCC meetings are currently held every six months. Current members of the CCC are listed in **Table 9-1**.

During the reporting period Austar held two CCC meetings, which occurred on the 21 September 2022; and 22 March 2023.

Austar coordinates these meetings and provides information on mining progress, community programs and environmental performance. The annual review of the CCC and meeting minutes are located on the Austar coal website: http://www.austarcoalmine.com.au.

The major discussion points from the Austar meetings in 2022-2023 were:

- Closure planning, including green gravity concept studies, exploration borehole rehabilitation, mine sealing plans, management of sink holes and trespassers during closure.
- Environmental monitoring, results and incidents;
- Community support program.

TABLE 9-1 AUSTAR COMMUNITY CONSULTATIVE COMMITTEE (CCC) DURING THE REPORTING PERIOD

Organisation/Representative	Name
Independent Chairperson	Ms Margaret MacDonald-Hill
Cessnock Council Representative	Councillor John Moores
Community Representatives	Mr Alan Smith Ms Ashlee Baker Mr John Rayner Mr Peter Sturrock Chief Inspector Michael Gorman
Company Representatives	Mr William Farnworth Ms Carly McCormack Ms Julie McNaughton

9.3.2 Resident Consultation

During the reporting period, Austar consulted with individual residents who live in areas potentially affected by Austar's operations as required. This consultation was often conducted informally, in a manner that allowed the residents to openly discuss issues of importance to them.

In March, Austar advised Hunter Water of plans to decommission the Potable Water pipeline from South St Ellalong to Dry Creek Rd Ellalong. Residents that source potable water from this pipeline were notified in April that it would be decommissioned in October 2023. Austar will continue to update the residents and ensure that they have alternate water supplies in place prior to decommissioning the No. 2 shaft pipeline. Hunter Water had been approached to take over the privately owned pipeline to enable continued service to residents, however the pipeline requires frequent repair and does not meet Hunter Water's current engineering standards.

During the next reporting period, there will be further communication with the community regarding closure activities and the potential impacts to persons and/or property as required.

9.4 Community Complaints

Austar's Environmental Management Strategy (EMS) includes a procedure for receiving, investigating, responding and reporting complaints received from the community. Austar maintains a 24-hour-a-day, 7 days a week, free call number 1800 701 986 to receive environmental complaints and other enquiries.

No community complaints were received during the reporting period.

10 INDEPENDENT ENVIRONMENTAL AUDIT

The most recent Independent Environmental Audit was conducted by SLR Consulting in October 2020. There were twelve actions agreed upon by auditors and Austar personnel, all of which have been closed out. The Independent Audit report can be found on the Austar website. The next Independent Environmental Audit is scheduled to be undertaken during Q4 2023.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

During the reporting period, there were three events reported to the DPE. These are described in **Table 11-1**.

TABLE 11-1 INCIDENT REPORTS 2022-2023

Incident No.	Date	Incident Details	Follow Up Actions
1	6 Jul 2022	Aberdare Extended Emplacement Area Overflow, West Cessnock following very heavy rainfall and flooding throughout Cessnock.	Earthworks were undertaken to increase the bund height on the southern clean water diversion drain breach to reduce flow into the emplacement area. A bund was constructed across the outlet to the emplacement area to contain any further water from leaving the area. The clean water drain northern breach was repaired on 6 July. Water sampling was undertaken. The bund has since been repaired and increased in size to reduce the likelihood of clean water entering the emplacement area from future rainfall events.
2	4 July 2022 – 10 July 2022	Kitchener SIS Unlicenced Discharge	The Lower and Eastern Sediment Dams overflowed following very heavy rainfall between 4 and 10 July. The PIRMP process was triggered. Water monitoring was undertaken between the 4-7 and 11 July, with results showing very little difference in up- and down- stream quality. No corrective or preventative actions were identified from this incident.
3	22 Feb 2023	Continuous Noise Monitor outage, 22/2/2023 –	Noise monitor outage was identified in the daily report on the 23 February 2023. Environment and Community Coordinator attempted to restart the monitor without success. Contractor attended and removed faulty monitor,

Incident No.	Date	Incident Details	Follow Up Actions
		27/02/2023 due to equipment failure.	which was replaced on 27 February. DPE Compliance Officer was notified and advised that the non-compliance to be reported in the Annual Review.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

During the reporting period, the focus at Austar has been progressing the closure planning Pre-Feasibility Study as outlined in the Forward Program three-year forecast.

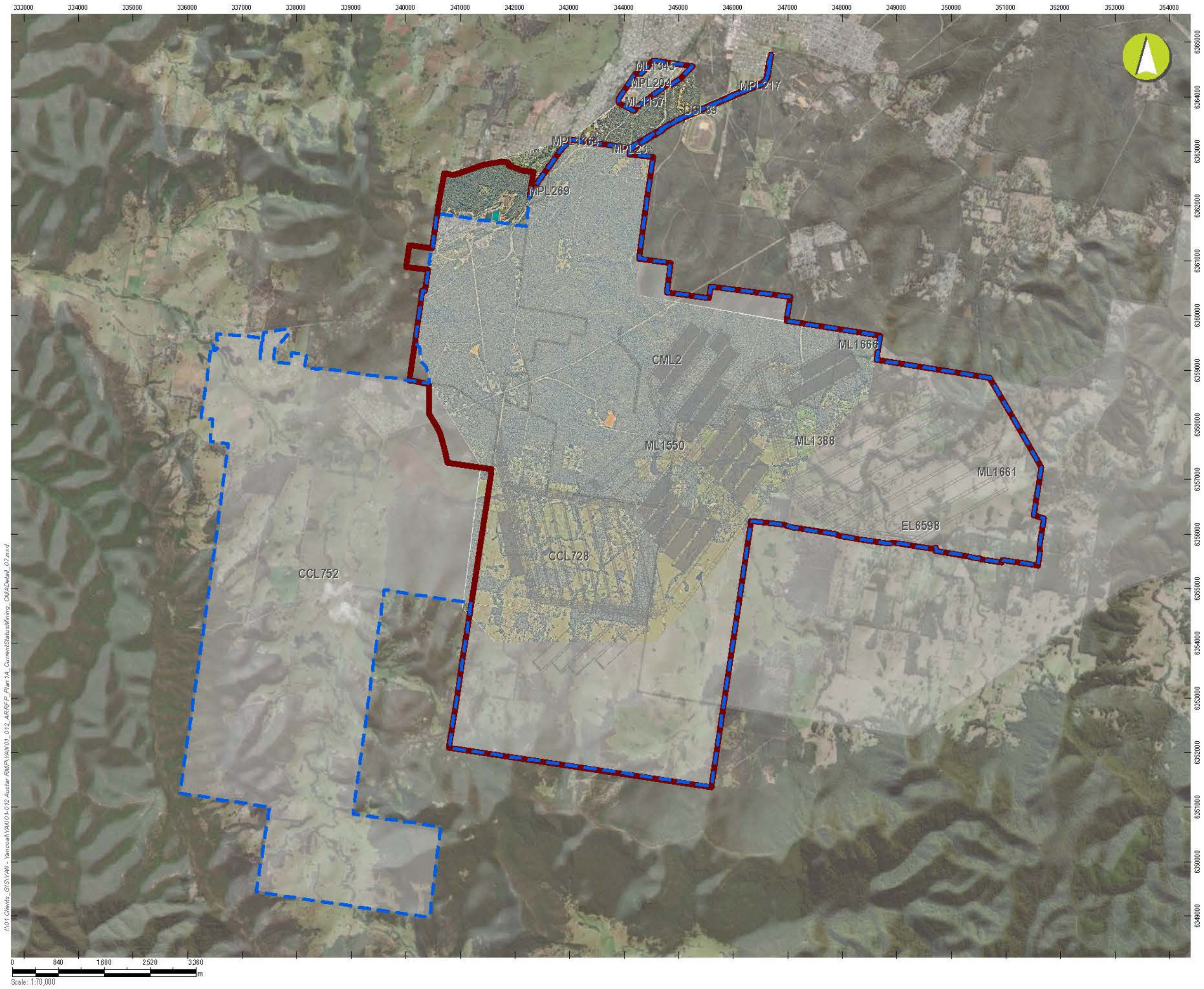
The focus in the next reporting period will be to finalise the PFS for closure, closing out the remaining actions required by Extraction Plans and work towards commencement of the closure feasibility planning stage.

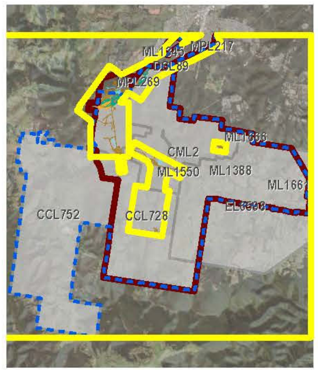
Yancoal endeavours to carry out the activities in **Table 12-1** during the 2023 - 2024 reporting period.

TABLE 12-1 PROPOSED ACTIVITIES FOR 2023-2024 REPORTING PERIOD

	Activities Proposed in the 2023-24 Reporting Period
1	Progress the mine closure planning strategy as documented **Section 4.1**
2	Conduct the 2023 Independent Environmental Audit and commence addressing actions as required
3	Continue to close outstanding actions from Extraction Plans
4	Continue to maintain existing rehabilitated areas at Aberdare Extended Emplacement Area, Bellbird Areas 12 and 13 and Cessnock No.1/Kalingo Colliery.
5	Commence an endemic seed collection program to establish a seed storage bank for future rehabilitation activities
6	Undertake a rehabilitation trial to evaluate the performance of alternative growth mediums
7	Disconnection, decommissioning and demolition of some items of surface equipment

Plans





Austar Coal ARR 2022

CMA 9 - Other

Current Status of Mining and Rehabilitation

PLAN 1A

Mine name	Austar Coal Mine
Plan name	Annual Rehabilitation Report 2022
Year of anticipated relinquishment	TBA on final submission
Data theme submission ID No.	2258 / 2133
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/09/2022

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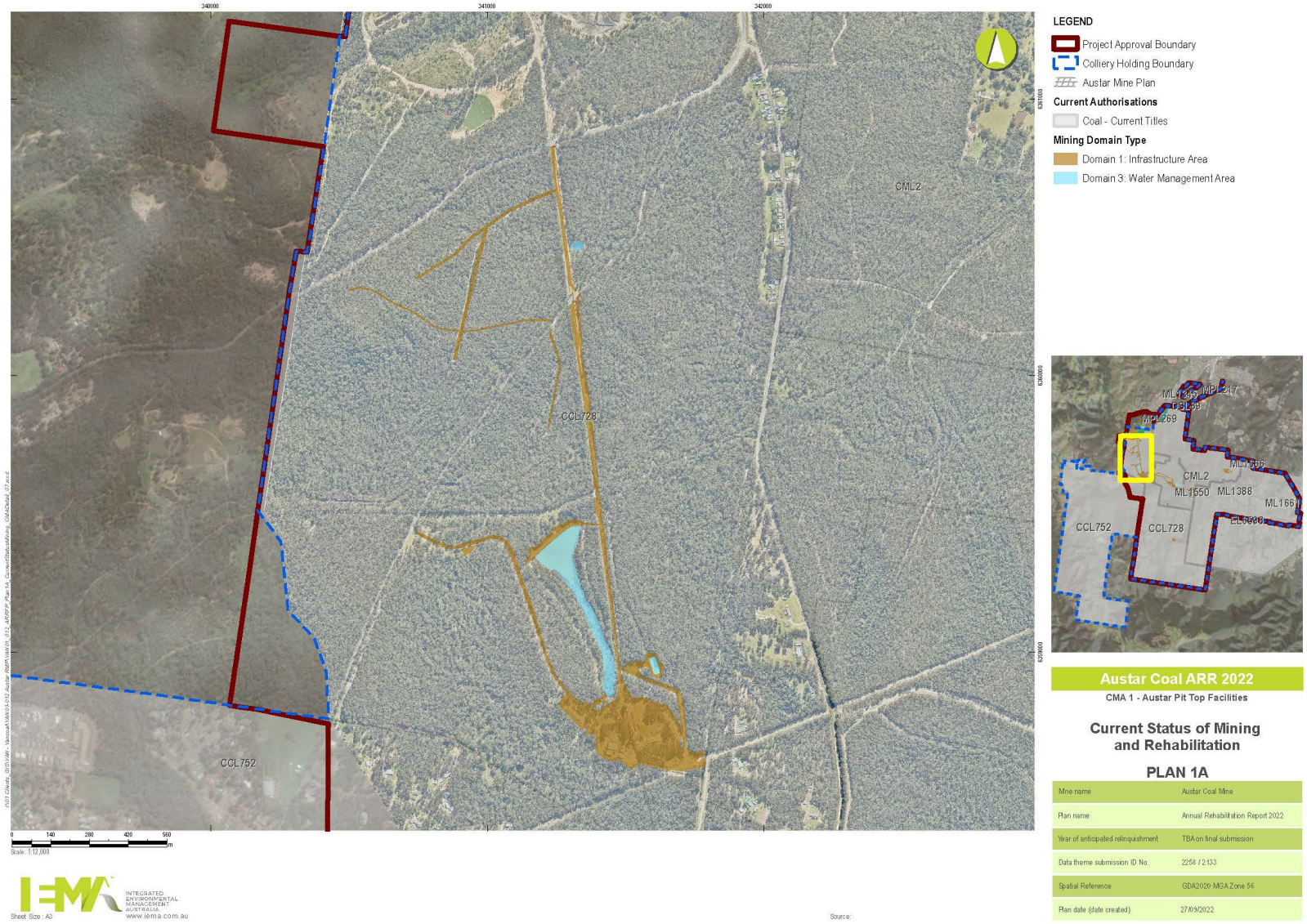
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CML2
CCL728
CCL752
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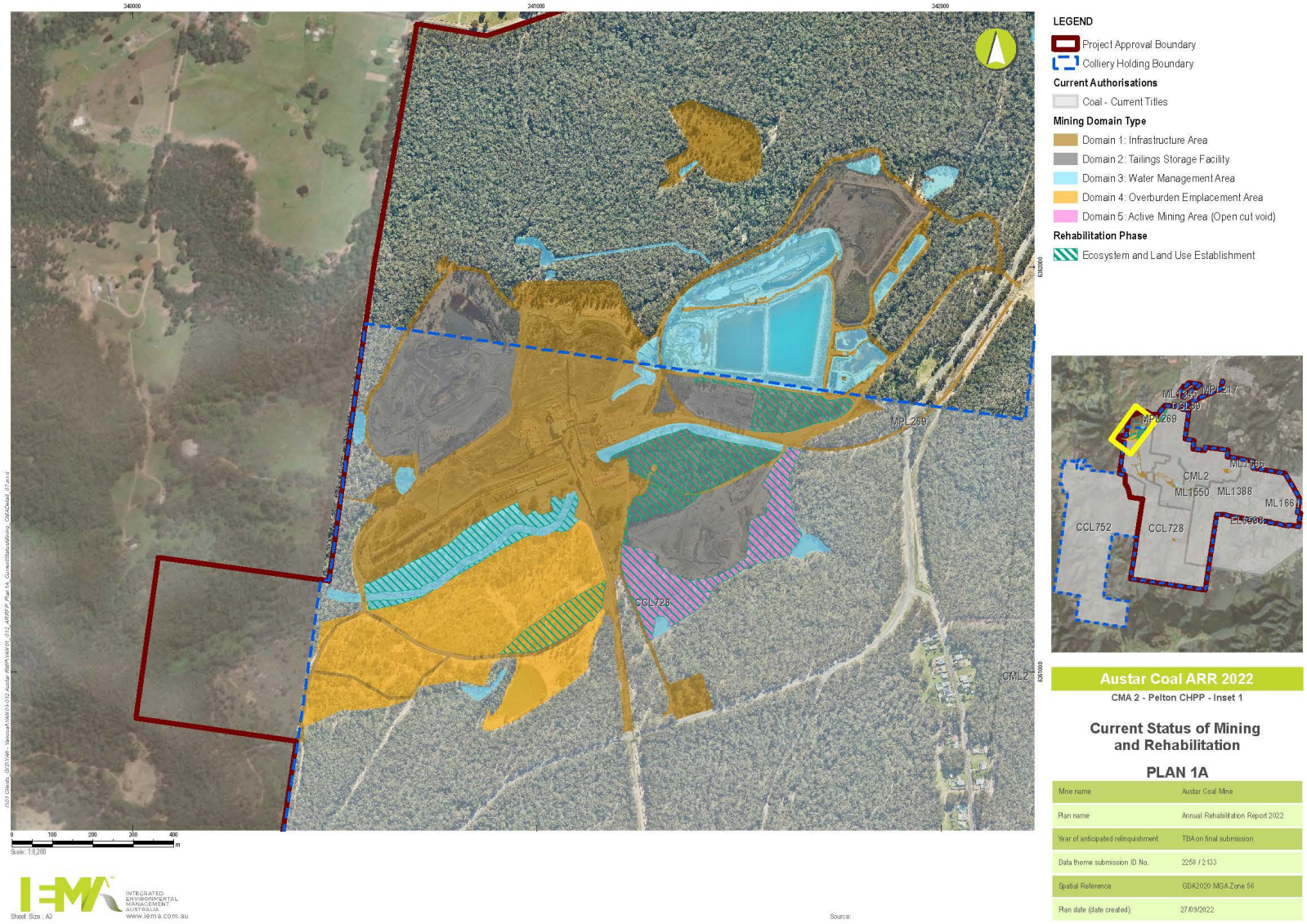
www.iema.com.au
Source:
LEGEND
Project Approval Boundary
Colliery Holding Boundary
Austar Mine Plan
Current Authorisations
Coal - Current Titles
Mining Domain Type
Domain 1: Infrastructure Area
Domain 3: Water Management Area
ML1550
ML1388
CCL752
CCL728
Austar Coal ARR 2022
CMA 1 - Austar Pit Top Facilities
Current Status of Mining and Rehabilitation
PLAN 1A
Mine name
Austar Coal Mine
Plan name
Annual Rehabilitation Report 2022
Year of anticipated relinquishment
TBA on final submission
Data theme submission ID No.
2258 / 2133
Spatial Reference
GDA2020 MGA Zone 56
Plan date (date created)
27/09/2022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MPL269
CCL728
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Project Approval Boundary
Colliery Holding Boundary
Current Authorisations
Coal - Current Titles
Mining Domain Type
Domain 1: Infrastructure Area
Domain 2: Tailings Storage Facility
Domain 3: Water Management Area
Domain 4: Overburden Emplacement Area
Domain 5: Active Mining Area (Open cut void)
Rehabilitation Phase
Ecosystem and Land Use Establishment
MPL217
MPL269
CML2
ML1550
ML1388
CCL752
CCL728
Austar Coal ARR 2022
CMA 2 - Pelton CHPP - Inset 1
Current Status of Mining and Rehabilitation
PLAN 1A
Mine name
Austar Coal Mine
Plan name
Annual Rehabilitation Report 2022
Year of anticipated relinquishment
TBA on final submission
Data theme submission ID No.
2258 / 2133
Spatial Reference
GDA2020 MGA Zone 56
Plan date (date created)
27/09/2022
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Source:

LEGEND

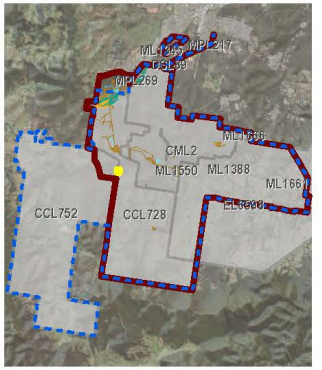
- Project Approval Boundary
- Colliery Holding Boundary
- Austar Mine Plan

Current Authorisations

- Coal - Current Titles

Mining Domain Type

- Domain 1: Infrastructure Area



Austar Coal ARR 2022

CMA 3 - No.1 Shaft - Inset

Current Status of Mining and Rehabilitation

PLAN 1A

Mine name	Austar Coal Mine
Plan name	Annual Rehabilitation Report 2022
Year of anticipated relinquishment	TBA on final submission
Data theme submission ID No.	2258 / 2133
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/09/2022

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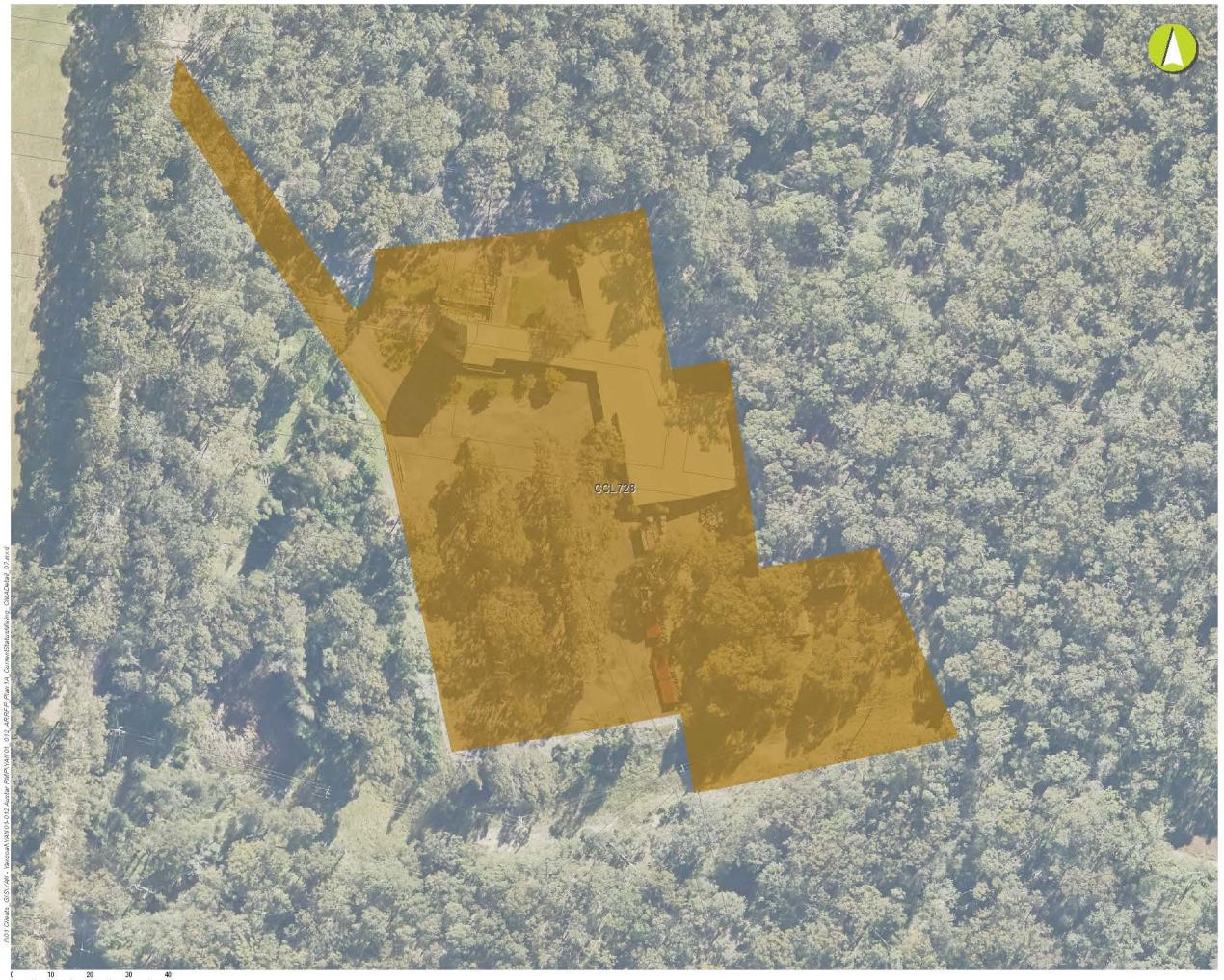


LEGEND

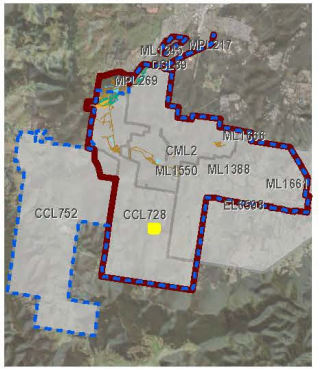
- Project Approval Boundary
- Colliery Holding Boundary
- Austar Mine Plan

Current Authorisations

- Coal - Current Titles

Mining Domain Type

- Domain 1: Infrastructure Area



Austar Coal ARR 2022

CMA 4 - No.2 Shaft - Inset

Current Status of Mining and Rehabilitation

PLAN 1A

Mine name	Austar Coal Mine
Plan name	Annual Rehabilitation Report 2022
Year of anticipated relinquishment	TBA on final submission
Data theme submission ID No.	2258 / 2133
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/09/2022

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CML2
ML1550
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EL8698
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Project Approval Boundary
Colliery Holding Boundary
Austar Mine Plan
Completed workings
Current Authorisations
Coal - Current Titles
Mining Domain Type
Domain 1: Infrastructure Area
Domain 3: Water Management Area
ML1388
MPL217
CML2
MPL269
ML1550
ML1388
ML1660
CCL752
CCL728
EL8698
Austar Coal ARR 2022
CMA 5 - Cessnock No.1 Colliery / Kalingo Infrastructure Area
Current Status of Mining and Rehabilitation
PLAN 1A
Mine name
Austar Coal Mine
Plan name
Annual Rehabilitation Report 2022
Year of anticipated relinquishment
TBA on final submission
Data theme submission ID No.
2258 / 2133
Spatial Reference
GDA2020 MGA Zone 56
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27/09/2022
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www.iema.com.au
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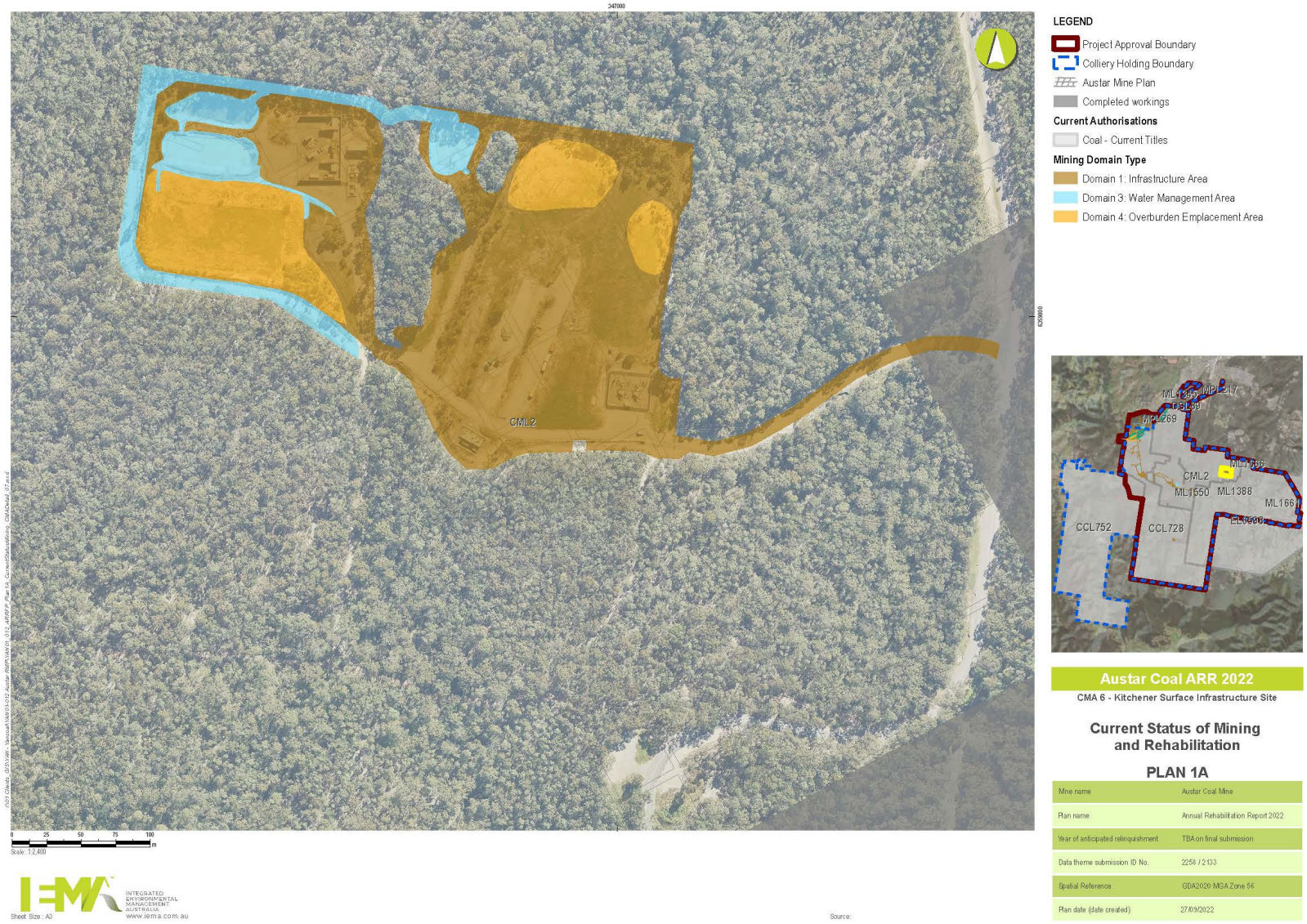
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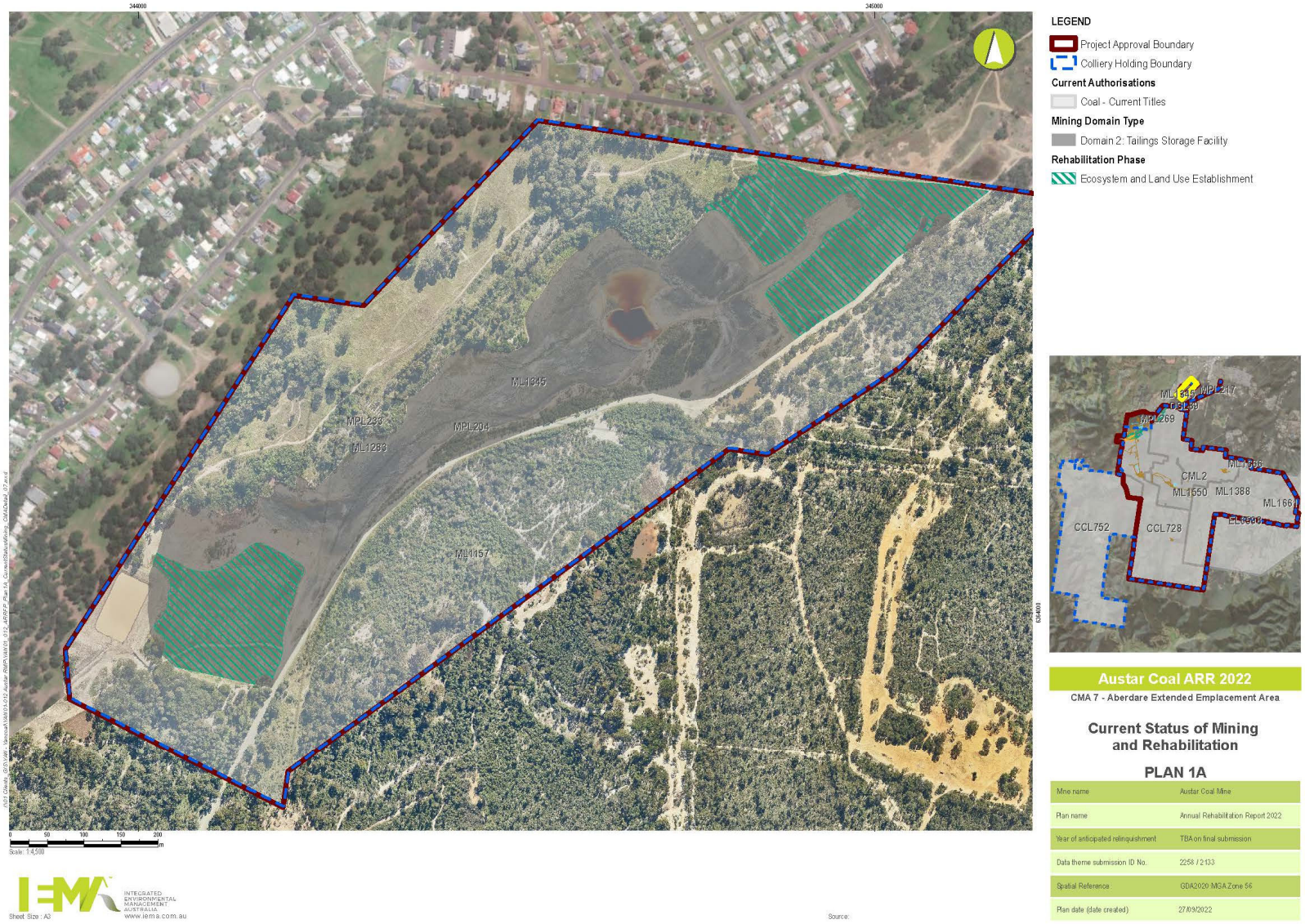
www.iema.com.au
Source:
LEGEND
Project Approval Boundary
Colliery Holding Boundary
Austar Mine Plan
Completed workings
Current Authorisations
Coal - Current Titles
Mining Domain Type
Domain 1: Infrastructure Area
Domain 3: Water Management Area
Domain 4: Overburden Emplacement Area
ML1399
MPL217
CL399
MPL269
ML1638
CML2
ML1550
ML1388
ML1661
CCL752
CCL728
EL6366
Austar Coal ARR 2022
CMA 6 - Kitchener Surface Infrastructure Site
Current Status of Mining and Rehabilitation
PLAN 1A
Mine name
Austar Coal Mine
Plan name
Annual Rehabilitation Report 2022
Year of anticipated relinquishment
TBA on final submission
Data theme submission ID No.
2258 / 2133
Spatial Reference
GDA2020 MGA Zone 56
Plan date (date created)
27/09/2022



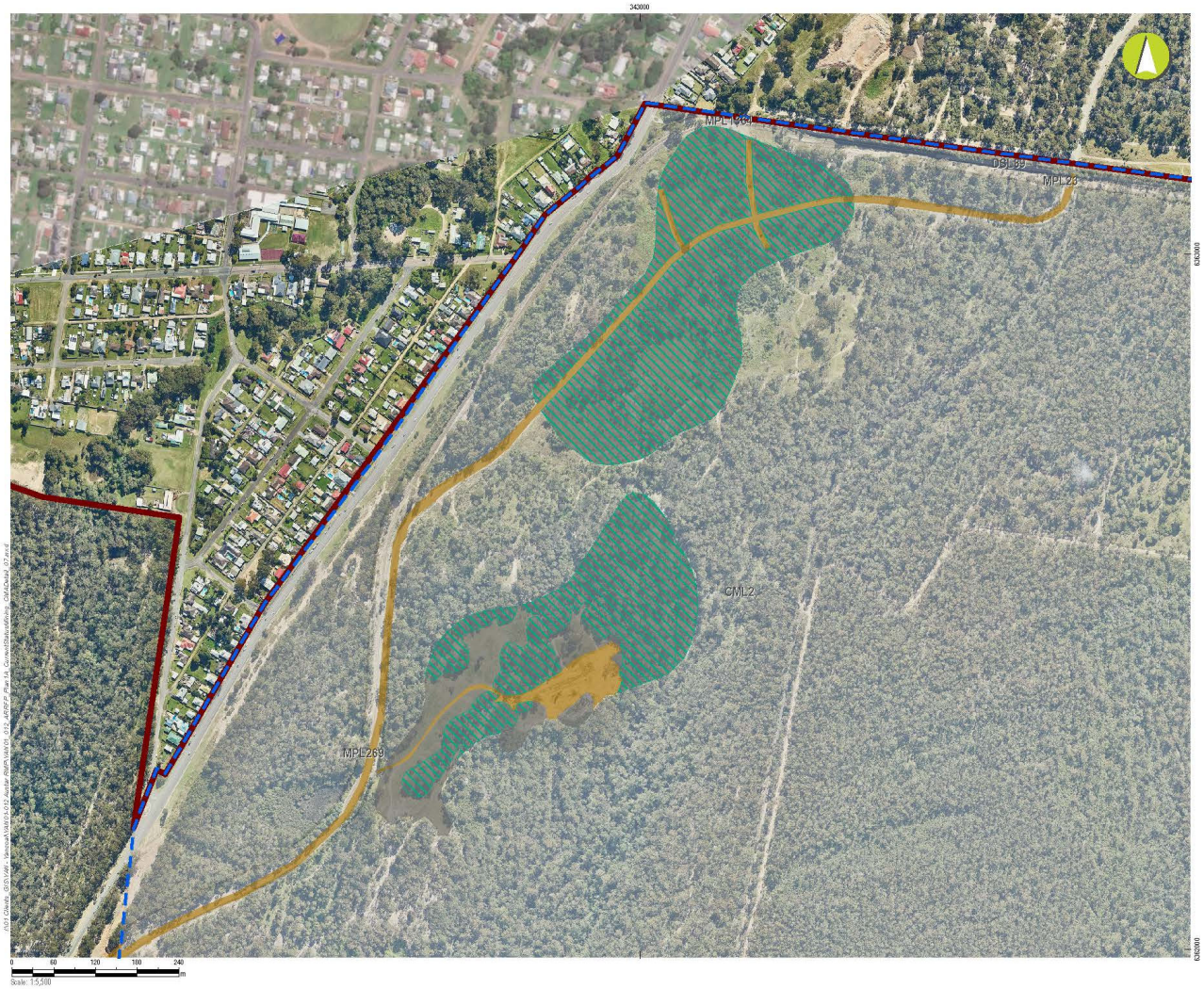
Austar Coal ARR 2022

CMA 7 - Aberdare Extended Emplacement Area

Current Status of Mining and Rehabilitation

PLAN 1A

Mine name	Austar Coal Mine
Plan name	Annual Rehabilitation Report 2022
Year of anticipated relinquishment	TBA on final submission
Data theme submission ID No.	2258 / 2133
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/09/2022



LEGEND

Project Approval Boundary

Colliery Holding Boundary

Current Authorisations

Coal - Current Titles

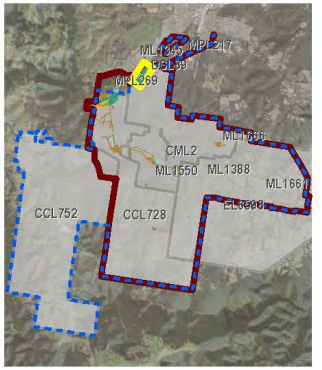
Mining Domain Type

Domain 1: Infrastructure Area

Domain 2: Tailings Storage Facility

Rehabilitation Phase

Ecosystem and Land Use Establishment



Austar Coal ARR 2022

CMA 8 - Bellbird Areas 12 and 13 - Inset

Current Status of Mining and Rehabilitation

PLAN 1A

Mine name	Austar Coal Mine
Plan name	Annual Rehabilitation Report 2022
Year of anticipated relinquishment	TBA on final submission
Data theme submission ID No.	2258 / 2133
Spatial Reference	GDA2020 MGA Zone 56
Plan date (date created)	27/09/2022

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Appendices

Appendix A. Long Term Noise Monitoring Data

TABLE APP A-1 CHPP NOISE DATA, 2018 - 2023

Quarter	Period	Austar CHPP Only L_{A90} (15min) (dB)		
		C1	C2	C3
	Noise Criteria	40	43	37
Q2 2023	Night	IA	IA	IA
		IA	IA	IA
		IA	IA	IA
Q1 2023	Night	IA	IA	IA
		IA	IA	IA
		IA	IA	IA
Q4 2022	Night	IA	<25	IA
		IA	IA	IA
		IA	IA	IA
Q3 2022	Night	IA	IA	IA
		IA	IA	IA
		IA	<25	IA
Q2 2022	Night	IA	<20	IA
		IA	<25	IA
		IA	<25	IA
Q1 2022	Night	IA	IA	IA
		IA	IA	IA
		IA	IA	IA
Q4 2021	Night	<20	<20	IA
		NM	NM	NM
		IA	IA	IA
Q3 2021	Night	IA	26	IA
		IA	IA	IA
		IA	<25	IA
Q2 2021	Night	<25	<25	NM
		NM	29	IA
		IA	IA	IA
Q1 2021	Night	<25	<25	IA
		<25	NM	IA
		IA	IA	IA
Q4 2020	Night	<25	21	IA
		IA	26	NM
		IA	IA	IA
Q3 2020	Night	IA	<25	IA
		NM	29	<25
		<25	NM	NM
Q2 2020	Night	IA	IA	IA
		IA	IA	IA
		IA	IA	NM
Q1 2020	Night	37	38	29
		25	<25	<20
		<20	<28	<20
Q4 2019	Night	38	36	30
		26	26	NM
		37	37	31
Q3 2019	Night	38	43	31
		NM	<35	IA
		33	IA	<30
Q2 2019	Night	30	32	27
		36	38	37
		39/44	<30	**40/45**
Q1 2019	Night	35	36	<30
		37	31	33
		<25	41	<25
Q4 2018	Night	<25	IA	<25
		IA	IA	<20
		<20	IA	<20
Q3 2018	Night	<20	<20	NM
		<30	32	IA
		<25	IA	IA

NM – Not measurable

IA – Inaudible

These are results for Austar CHPP in the absence of all other noise sources.

TABLE APP A-2 NOISE GENERATED AT KITCHENER SIS 2018 - 2023

Quarter	Period	Kitchener SIS Only $L_{Aeq,\ 15\ min}$ (dB)			Kitchener SIS Only, $L_{A1\ (1min)}$		
		K1	K2	K3	K1	K2	K3
	Noise Criteria	35	35	35	45	45	45
Q2 2023	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q1 2023	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q4 2022	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q3 2022	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		<20	<20	IA	23	<20	IA
Q2 2022	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q1 2022	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q4 2021	Night	IA	<20	IA	IA	<20	IA
		IA	IA	IA	IA	<20	IA
		IA	IA	IA	IA	IA	IA
Q3 2021	Night	<25	IA	IA	<25	IA	IA
		<25	IA	IA	<25	IA	IA
		IA	<20	IA	IA	<20	IA
Q2 2021	Night	IA	IA	IA	IA	IA	IA
		<25	<25	IA	<25	<25	IA
		27	<25	IA	33	<25	IA
Q1 2021	Night	IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
		IA	IA	IA	IA	IA	IA
Q4 2020	Night	<20	IA	IA	<20	IA	IA
		IA	<20	<25	IA	<20	<25
		IA	IA	IA	IA	IA	IA
Q3 2020	Night	IA	<20	<25	IA	<20	<25
		27	<25	<20	32	<25	<20
		27	<25	<25	31	<25	<25
Q2 2020	Night	<30	<25	NM	<30	<25	NM

Quarter	Period	Kitchener SIS Only $L_{Aeq, 15\ min}$ (dB)			Kitchener SIS Only, $L_{A1\ (1min)}$		
		K1	K2	K3	K1	K2	K3
	Noise Criteria	35	35	35	45	45	45
		IA	IA	<05	IA	IA	<20
		30	IA	<25	32	IA	<25
Q1 2020	Night	IA	IA	IA	IA	IA	IA
		<20	IA	IA	<20	IA	IA
		<20	IA	IA	<20	IA	IA
Q4 2019	Night	IA	IA	IA	IA	IA	IA
		<25	IA	IA	30	IA	IA
		IA	IA	IA	IA	IA	IA
Q3 2019	Night	33	<30	IA	42	<30	IA
		IA	NM	NM	IA	NM	NM
		<25	IA	IA	<25	IA	IA
Q2 2019	Night	<20	IA	IA	<20	IA	IA
		<30	<25	<25	<30	<25	<25
		<20	IA	IA	<20	IA	IA
Q1 2019	Night	<20	IA	IA	<20	IA	IA
		<25	IA	IA	<25	IA	IA
		<20	IA	IA	<20	IA	IA
Q4 2018	Night	<25	IA	<20	<25	IA	<20
		IA	IA	IA	IA	IA	IA
		<25	<20	<20	<25	<20	<20
Q3 2018	Night	<30	<25	IA	<30	<25	IA
		29	<25	<25	32	<30	<25
		IA	IA	NM	IA	IA	NM

NM – Not measurable

IA – Inaudible

These are results for Austar Kitchener SIS in the absence of all other noise sources.

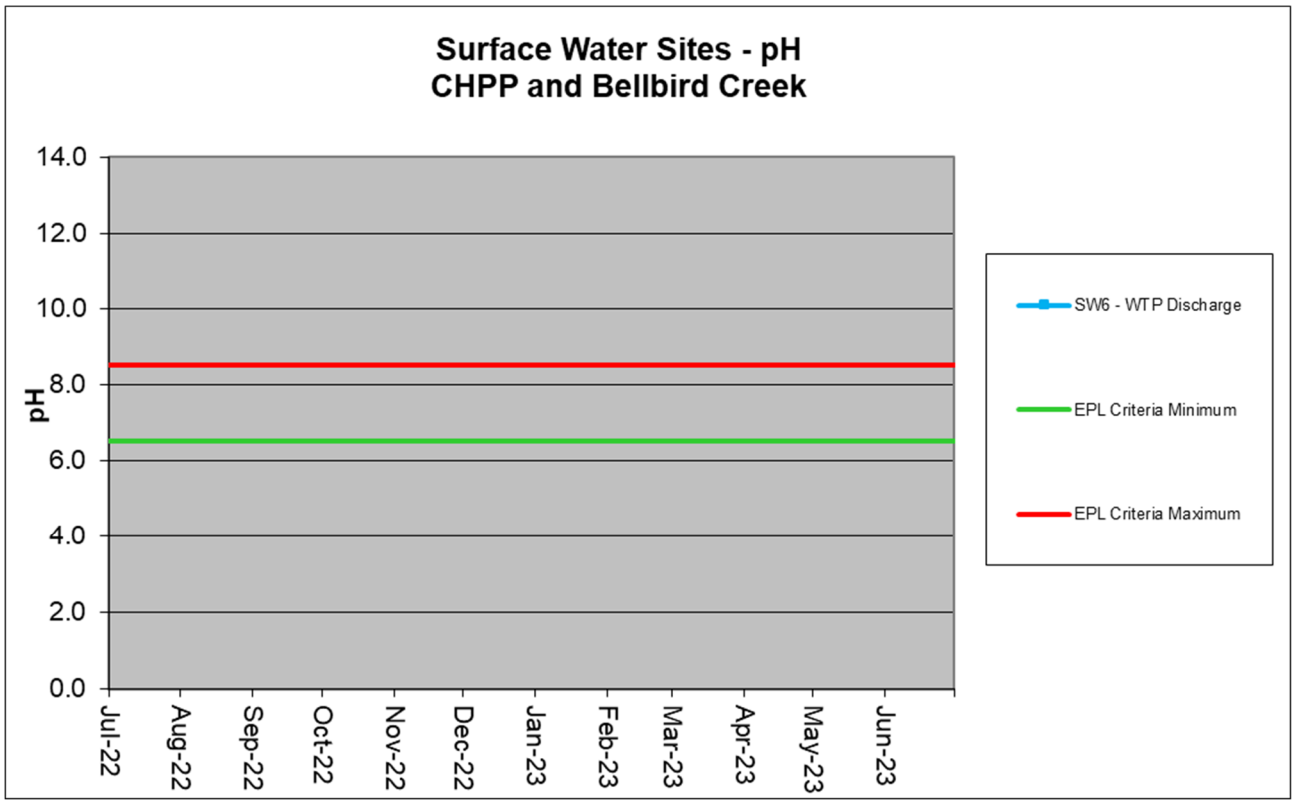
TABLE APP A-3 NOISE GENERATED BY KIA 2018 - 2023

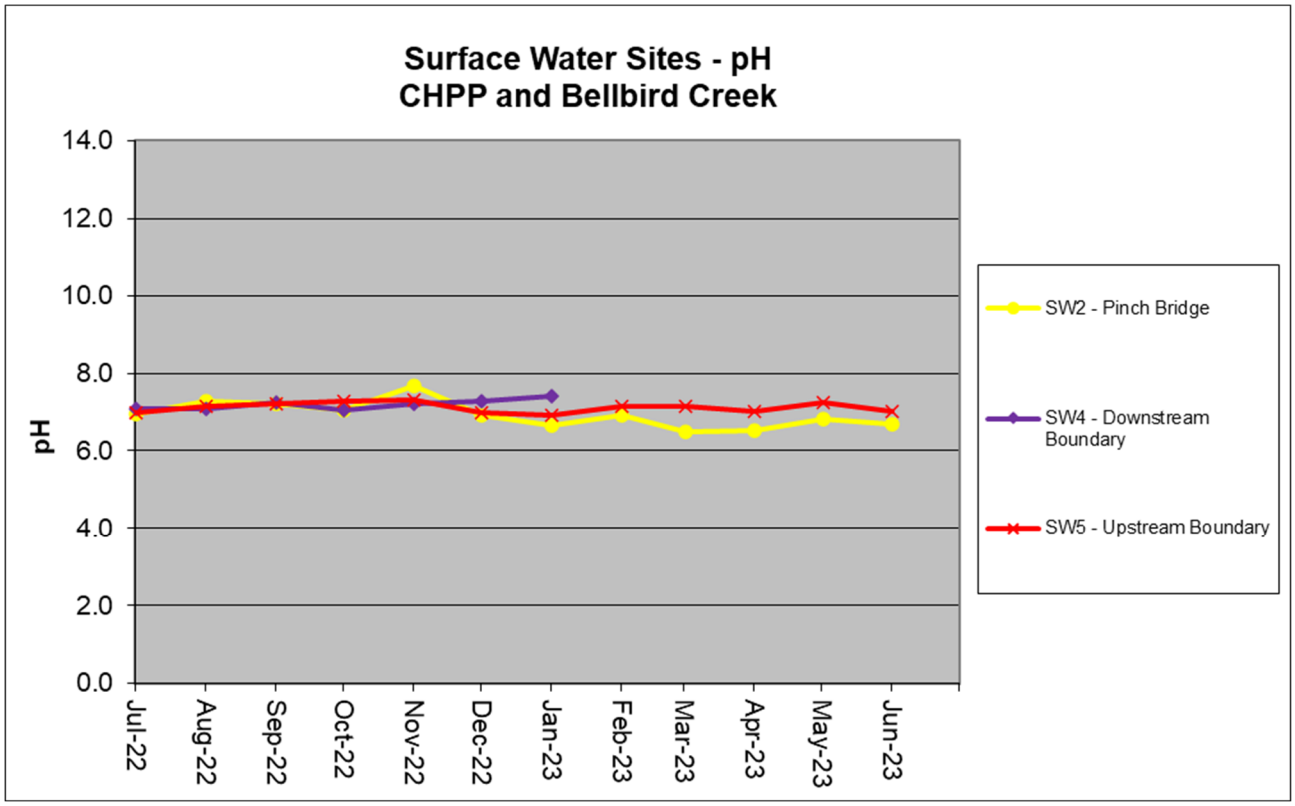
Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB)
		Noise Criteria 35
Q2 2023	Night	IA
		IA
		IA
Q1 2023	Night	IA
		IA
		IA
Q4 2022	Night	<25
		IA
		IA
Q3 2022	Night	IA
		IA
		<20
Q2 2022	Night	<20
		<25
		26
Q1 2022	Night	IA
		<25
		<25
Q4 2021	Night	<20
		<25
		<20
Q3 2021	Night	IA
		31
		IA
Q2 2021	Night	IA
		<25
		29
Q1 2021	Night	<25
		IA
		<20
Q4 2020	Night	22
		25
		<20
Q3 2020	Night	<25
		28
		28
Q2 2020	Night	<30
		<25
		<25
Q1 2020	Night	NM
		<20
		29
Q4 2019	Night	NM
		<20
		NM
Q3 2019	Night	34
		NM
		25
Q2 2019	Night	27
		<30
		33
Q1 2019	Night	<25
		25
		IA
Q4 2018	Night	<25
		IA
		<20
Q3 2018	Night	<30
		<25
		IA

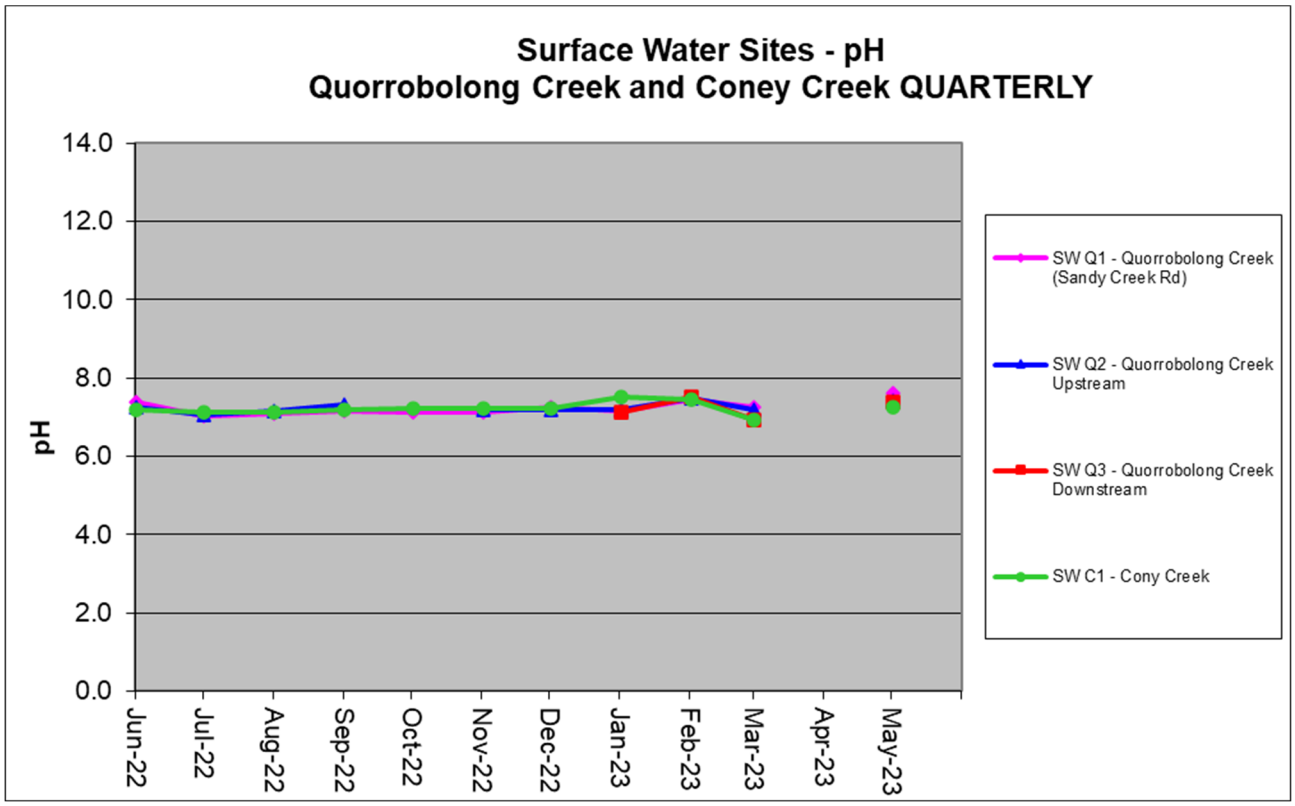
NM – Not measurable
IA – Inaudible
These are results for Austar Kalingo Infrastructure Area in the absence of all other noise sources.

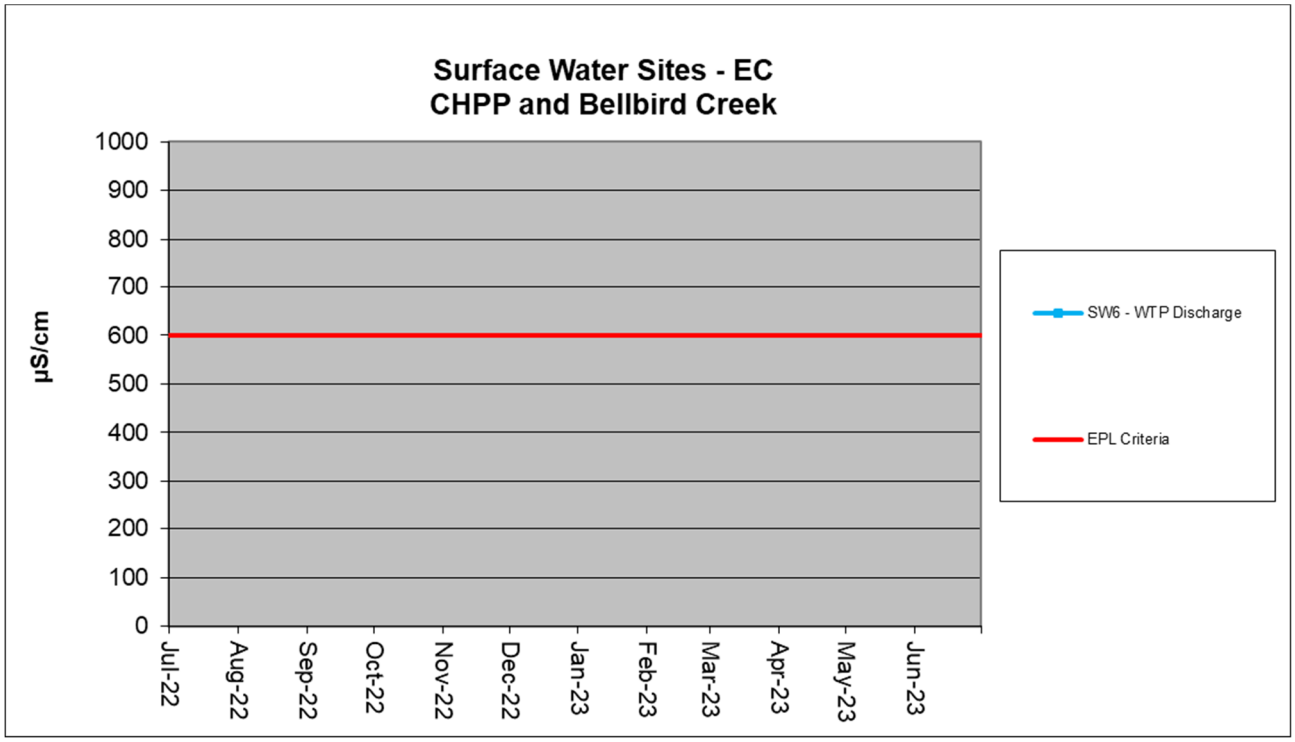
Appendix B. Surface Water Quality Graphs

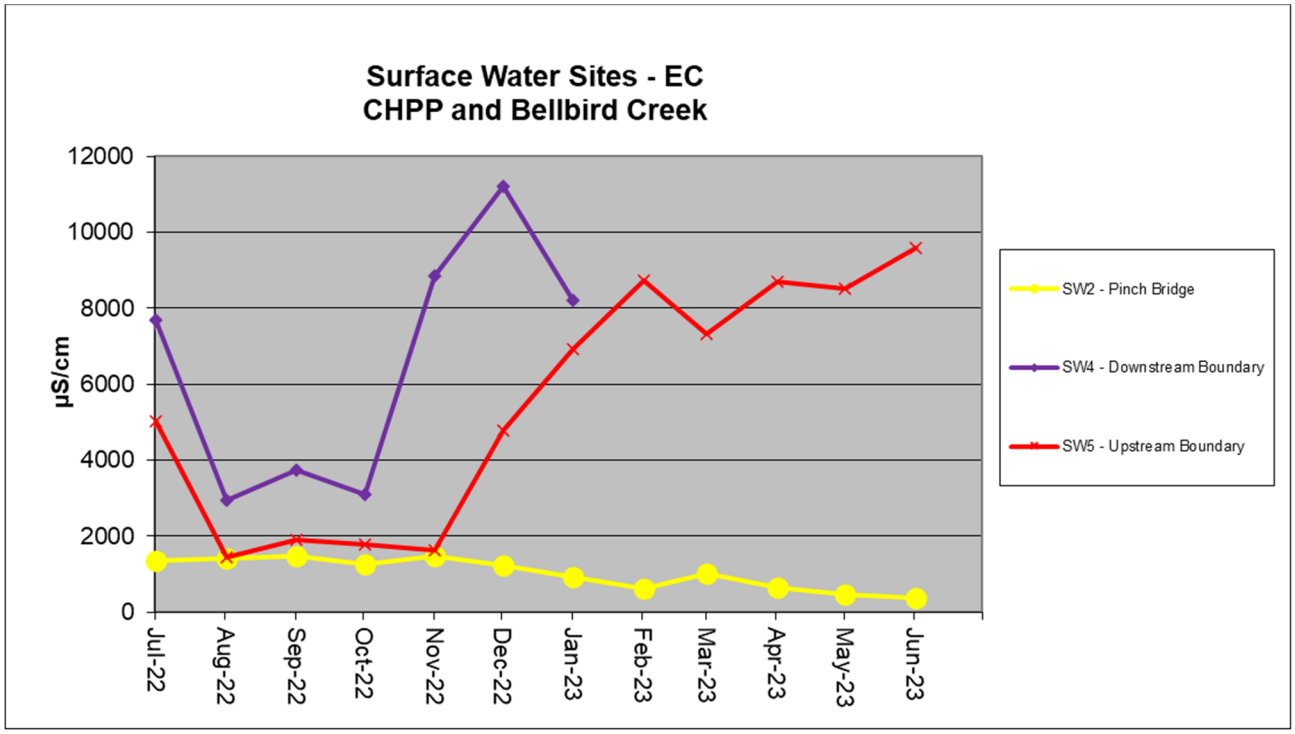
Surface Water Graphs, 2022 – 2023

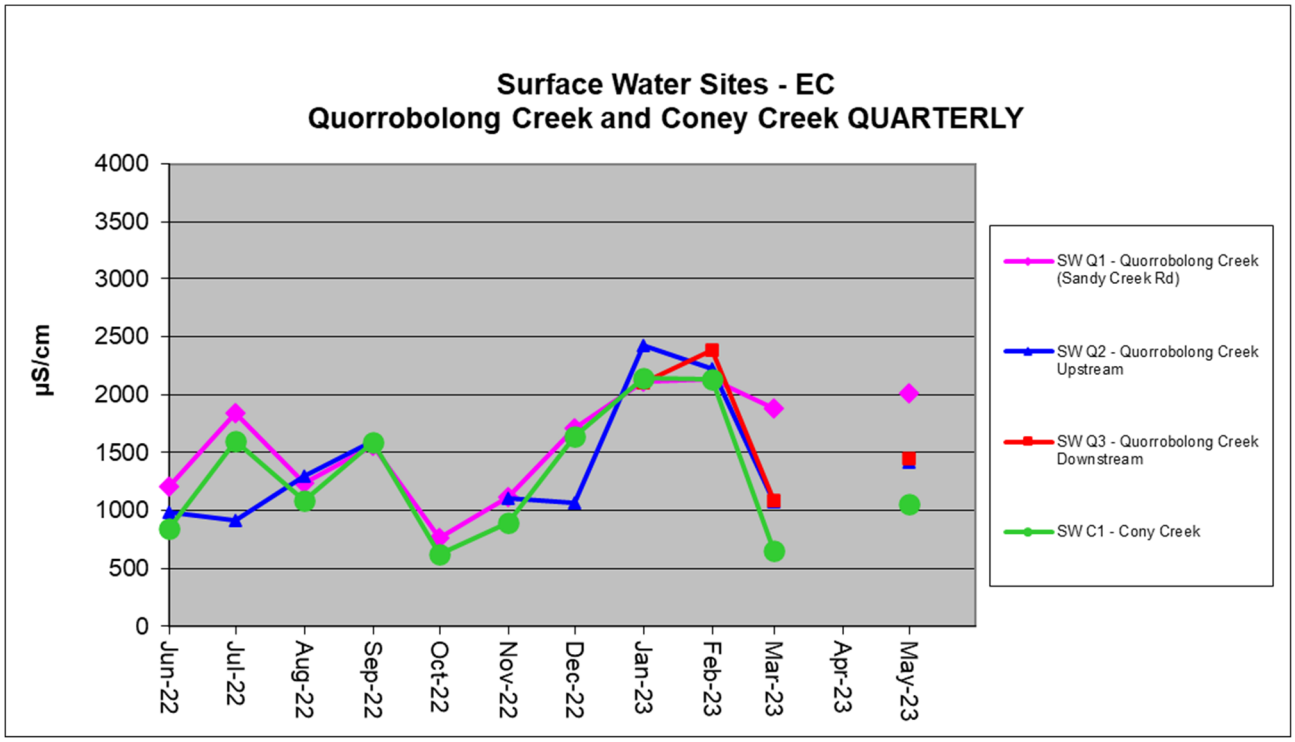


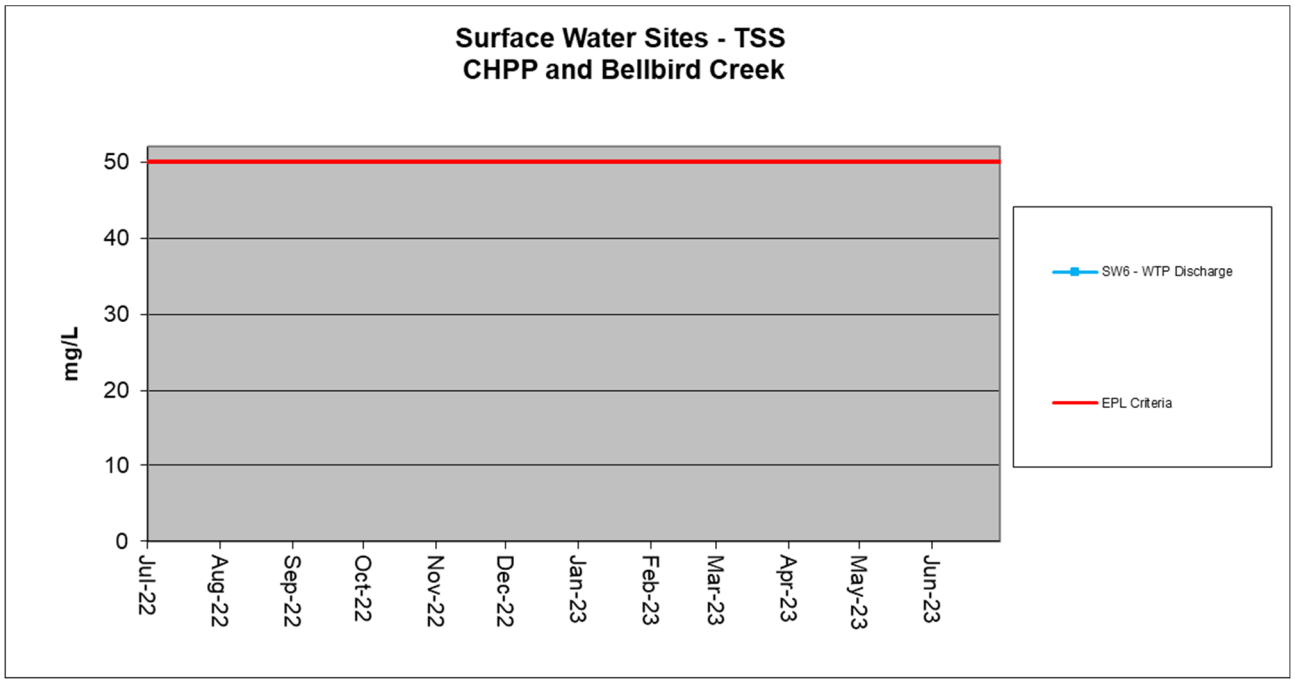


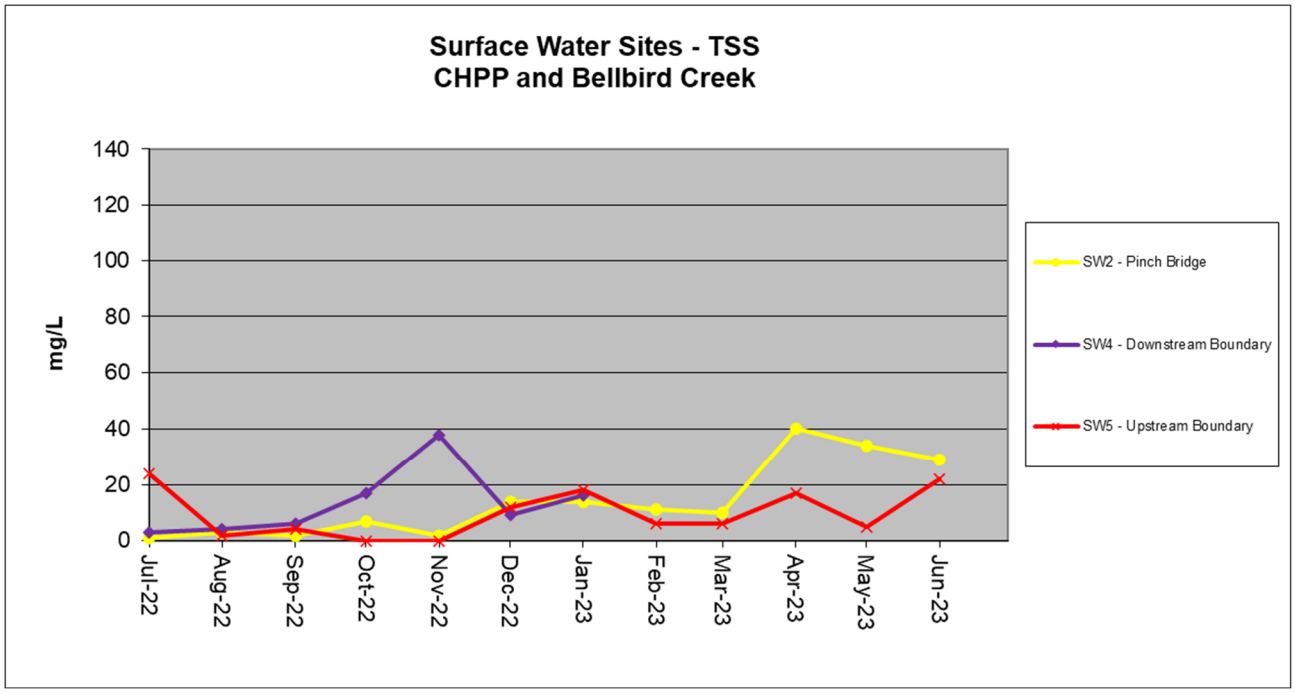

Surface Water Sites - pH
Quorrobolong Creek and Coney Creek QUARTERLY
pH
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

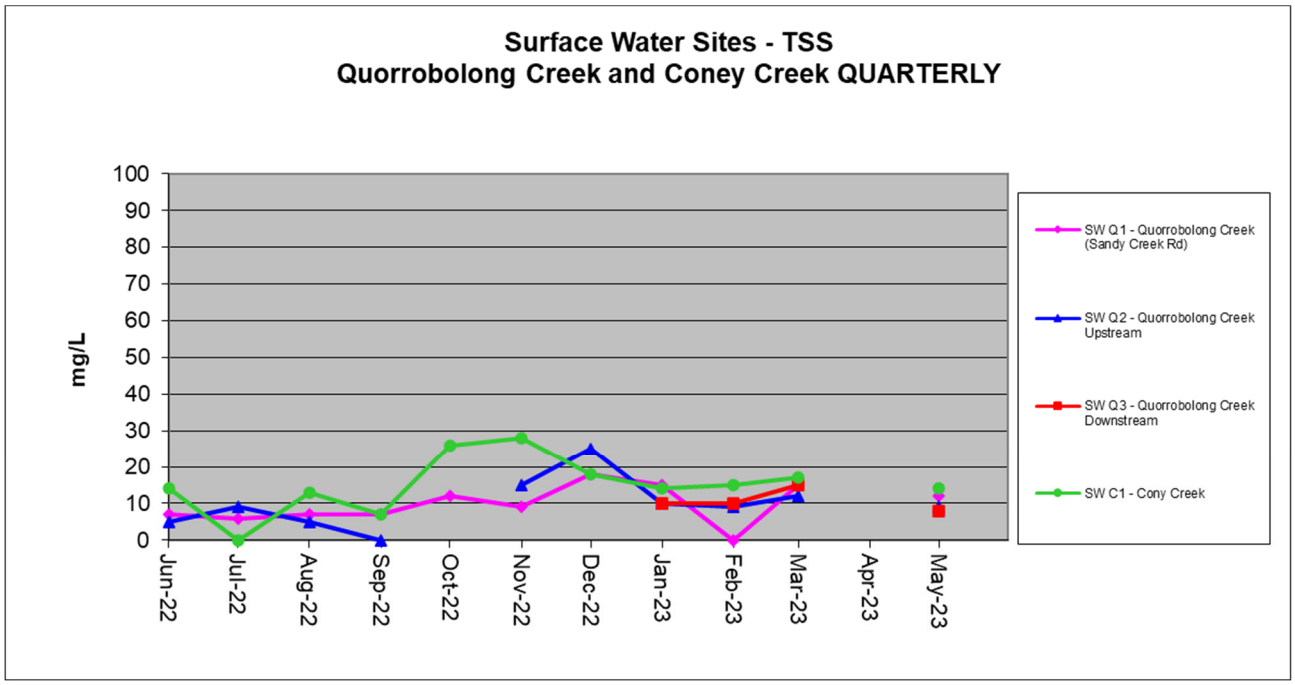

Surface Water Sites - EC
CHPP and Bellbird Creek
µS/cm
1000
900
800
700
600
500
400
300
200
100
0
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
SW6 - WTP Discharge
EPL Criteria

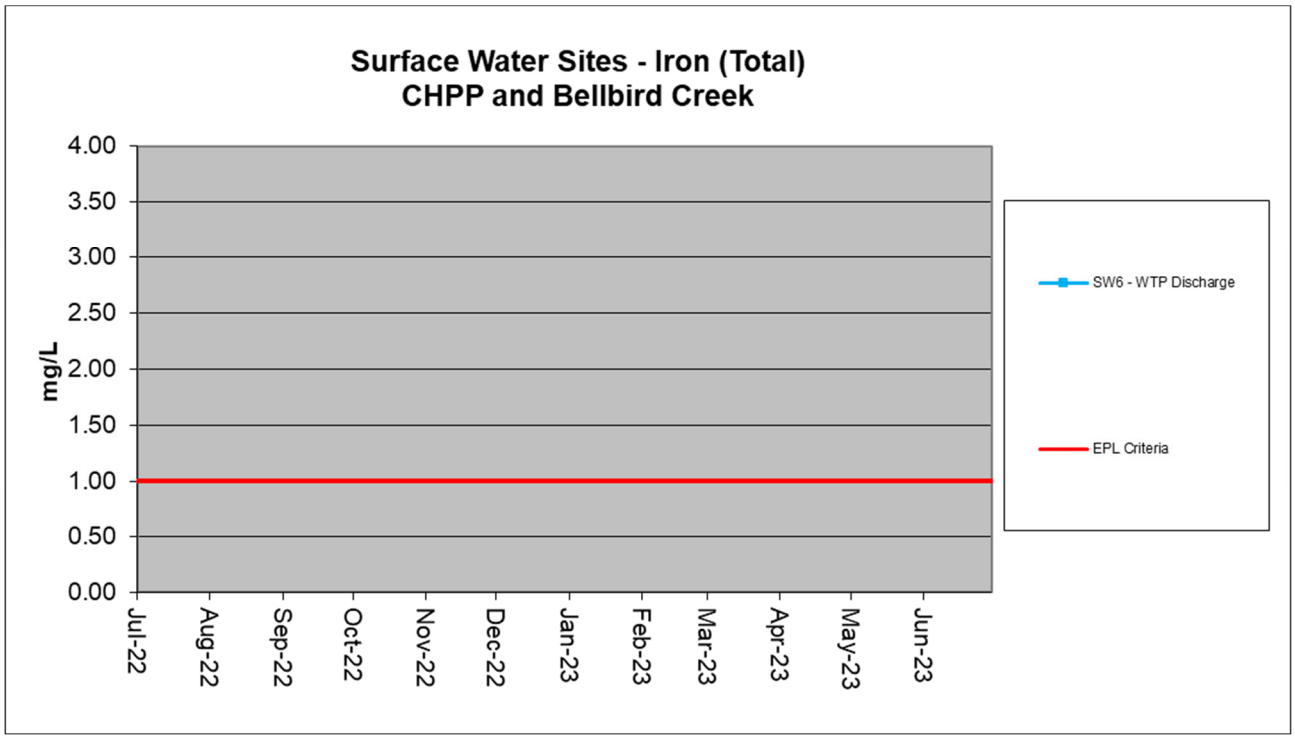

Surface Water Sites - EC
CHPP and Bellbird Creek
µS/cm
12000
10000
8000
6000
4000
2000
0
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
SW2 - Pinch Bridge
SW4 - Downstream Boundary
SW5 - Upstream Boundary

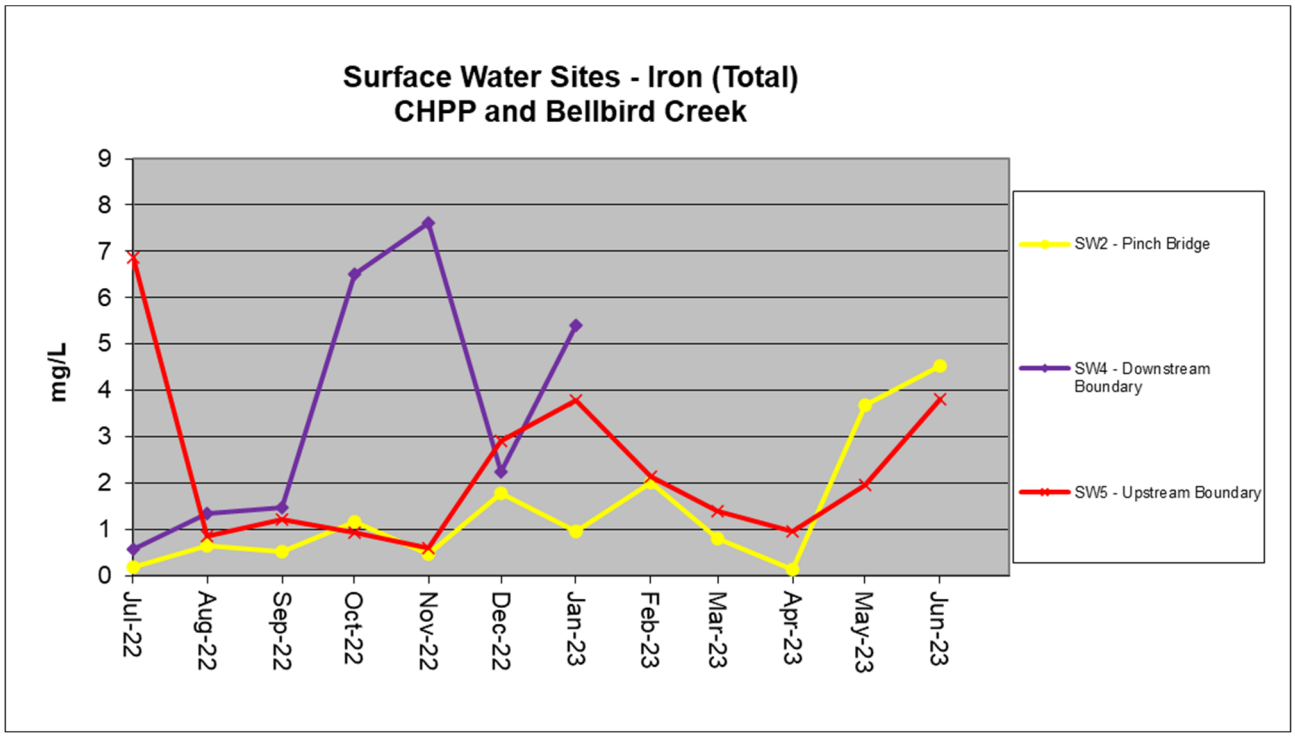

Surface Water Sites - EC
Quorrobolong Creek and Coney Creek QUARTERLY
µS/cm
4000
3500
3000
2500
2000
1500
1000
500
0
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

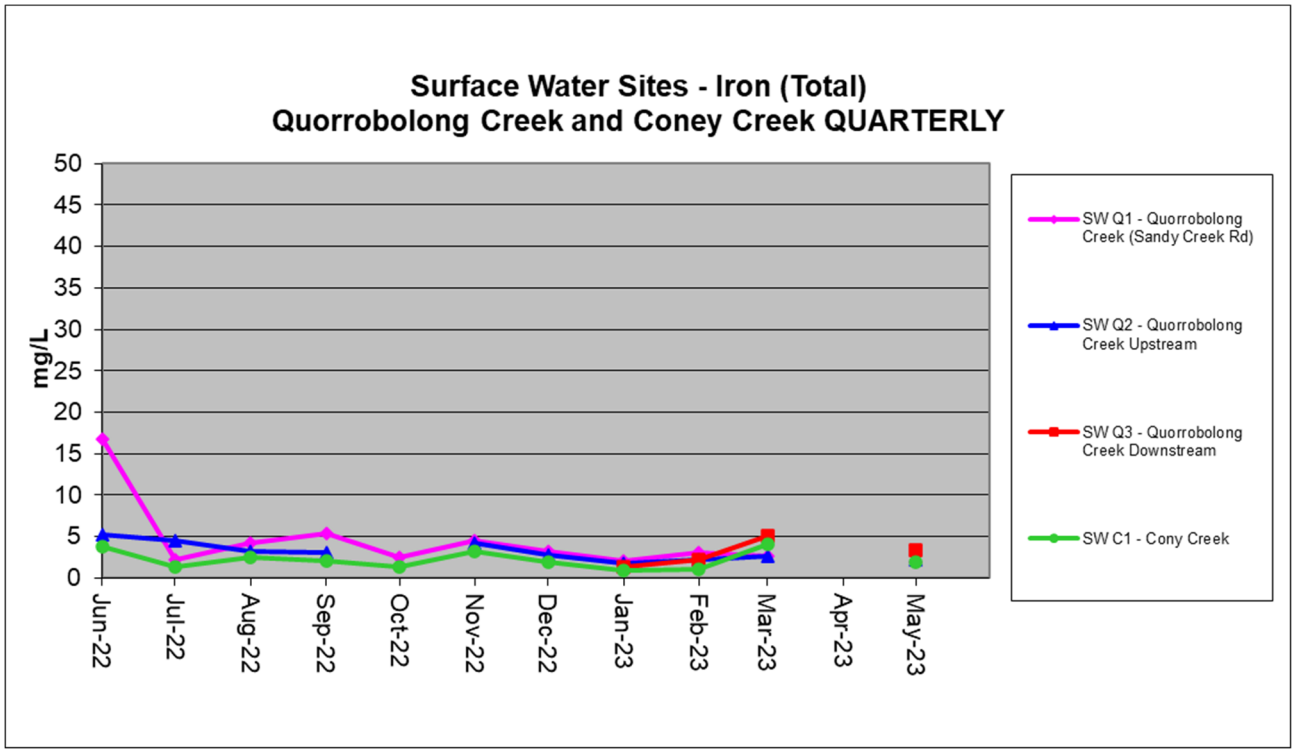

Surface Water Sites - TSS
CHPP and Bellbird Creek
mg/L
50
40
30
20
10
0
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
SW6 - WTP Discharge
EPL Criteria


Surface Water Sites - TSS
CHPP and Bellbird Creek
mg/L
140
120
100
80
60
40
20
0
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
SW2 - Pinch Bridge
SW4 - Downstream Boundary
SW5 - Upstream Boundary

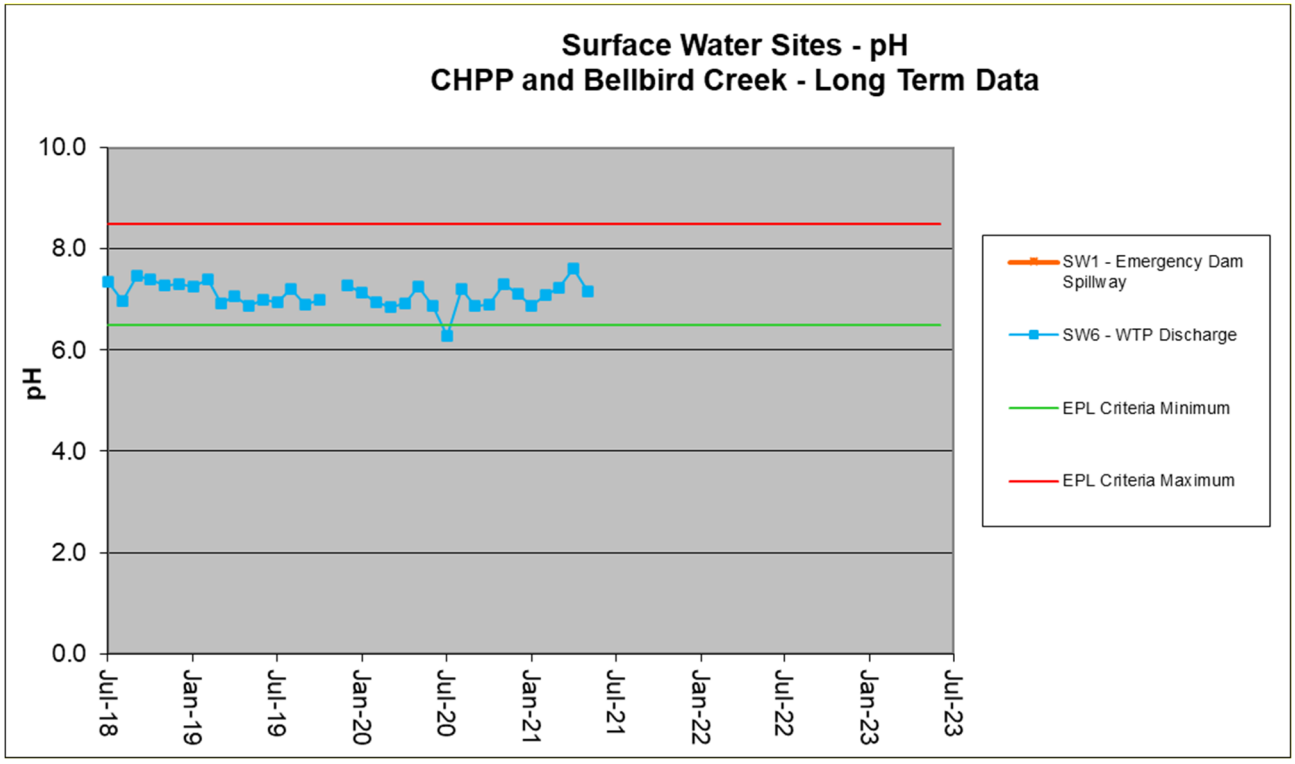

Surface Water Sites - TSS
Quorrobolong Creek and Coney Creek QUARTERLY
mg/L
100
90
80
70
60
50
40
30
20
10
0
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

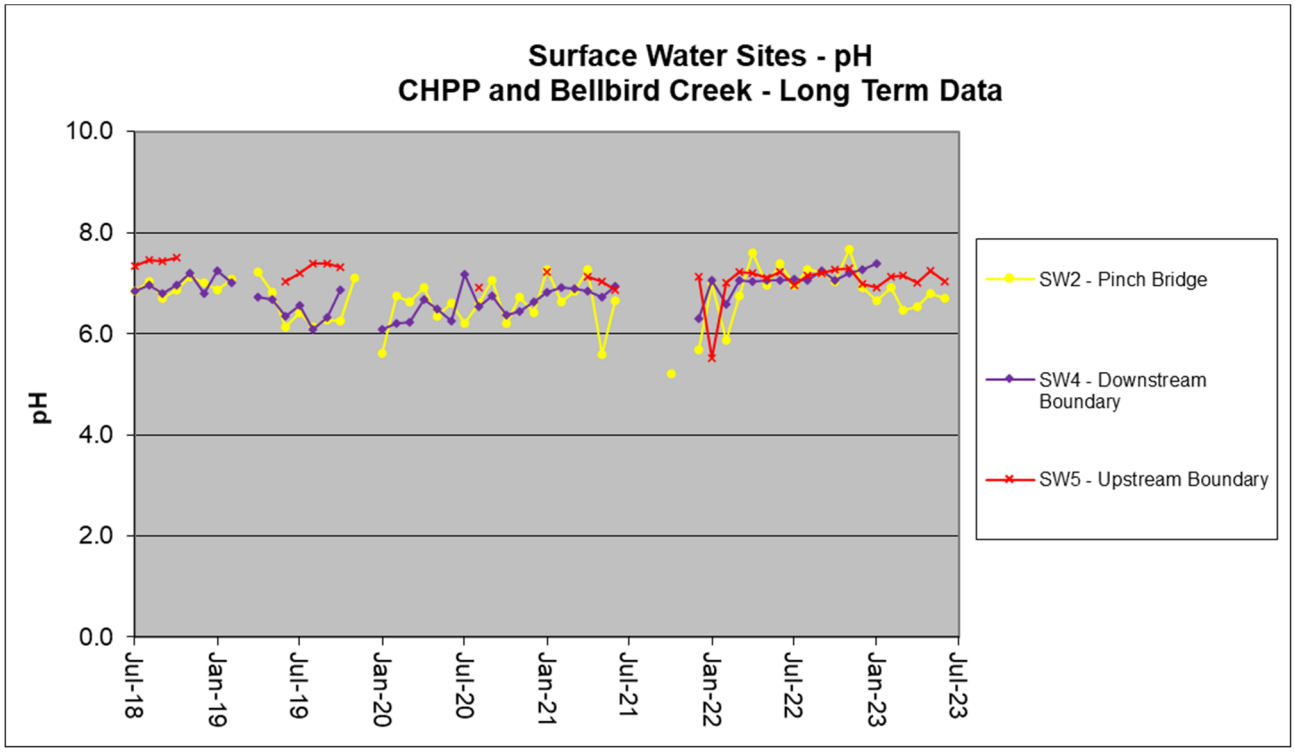

Surface Water Sites - Iron (Total)
CHPP and Bellbird Creek
mg/L
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
SW6 - WTP Discharge
EPL Criteria

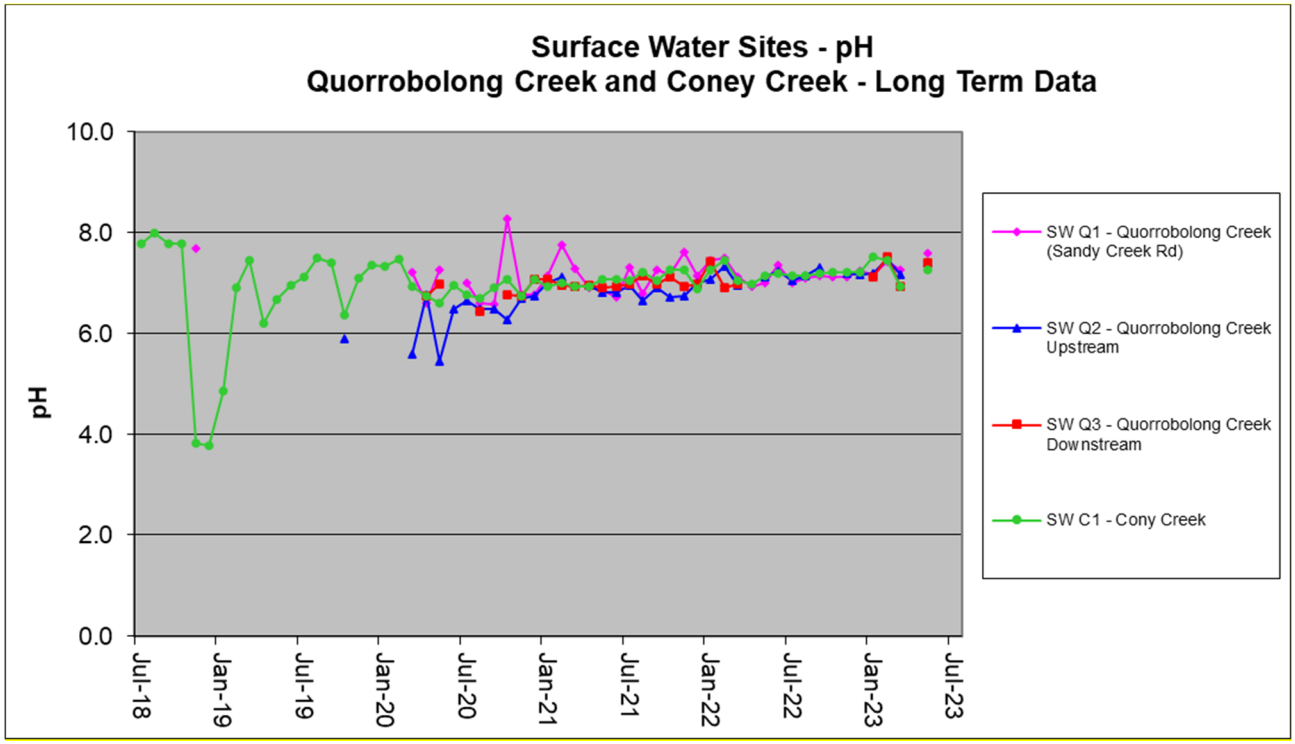

Surface Water Sites - Iron (Total)
CHPP and Bellbird Creek
mg/L
0
1
2
3
4
5
6
7
8
9
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
SW2 - Pinch Bridge
SW4 - Downstream Boundary
SW5 - Upstream Boundary

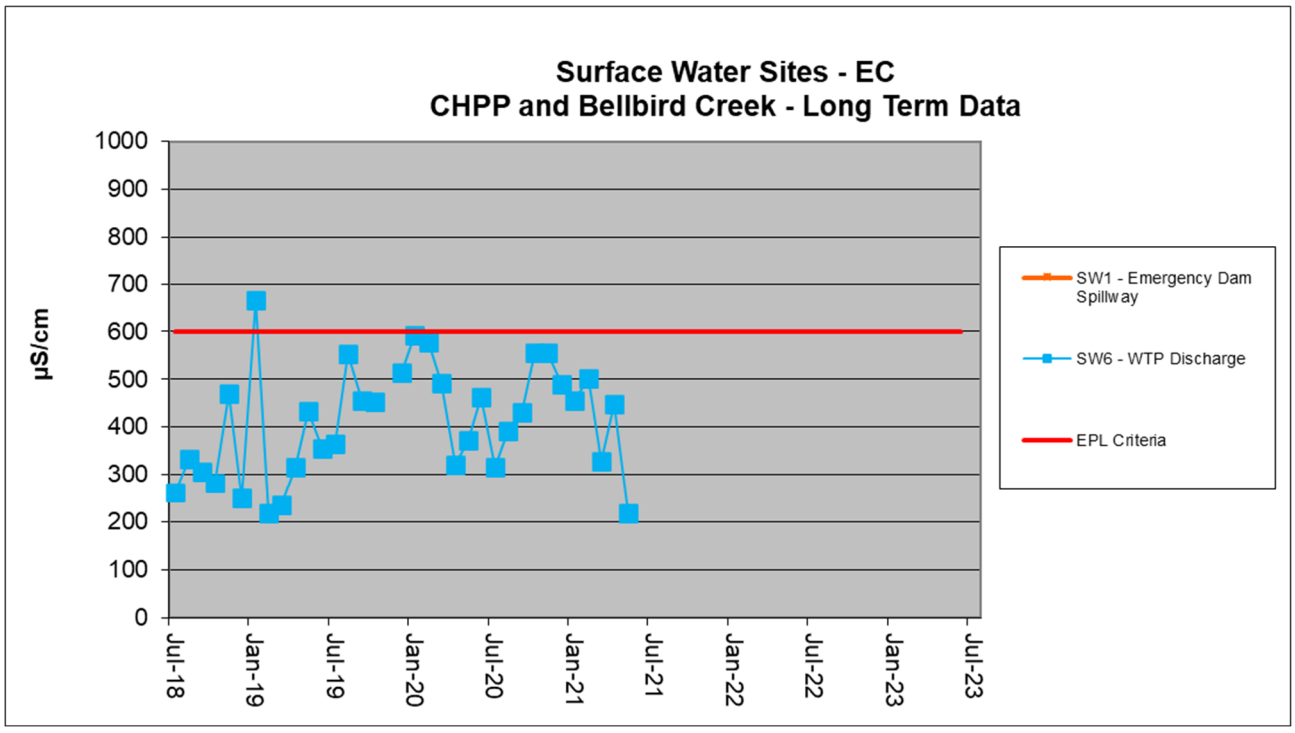

Surface Water Sites - Iron (Total)
Quorrobolong Creek and Coney Creek QUARTERLY
mg/L
0
5
10
15
20
25
30
35
40
45
50
Jun-22
Jul-22
Aug-22
Sep-22
Oct-22
Nov-22
Dec-22
Jan-23
Feb-23
Mar-23
Apr-23
May-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

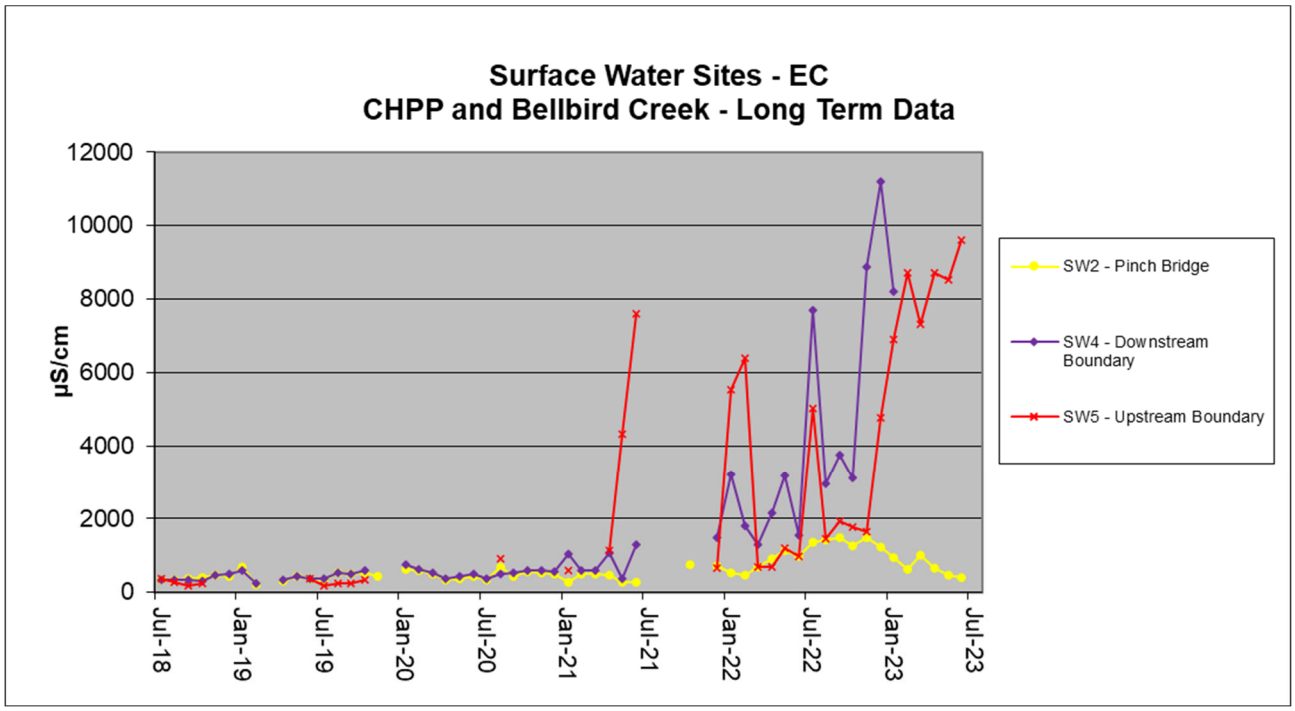
Long Term Surface Water Graphs 2018-2023

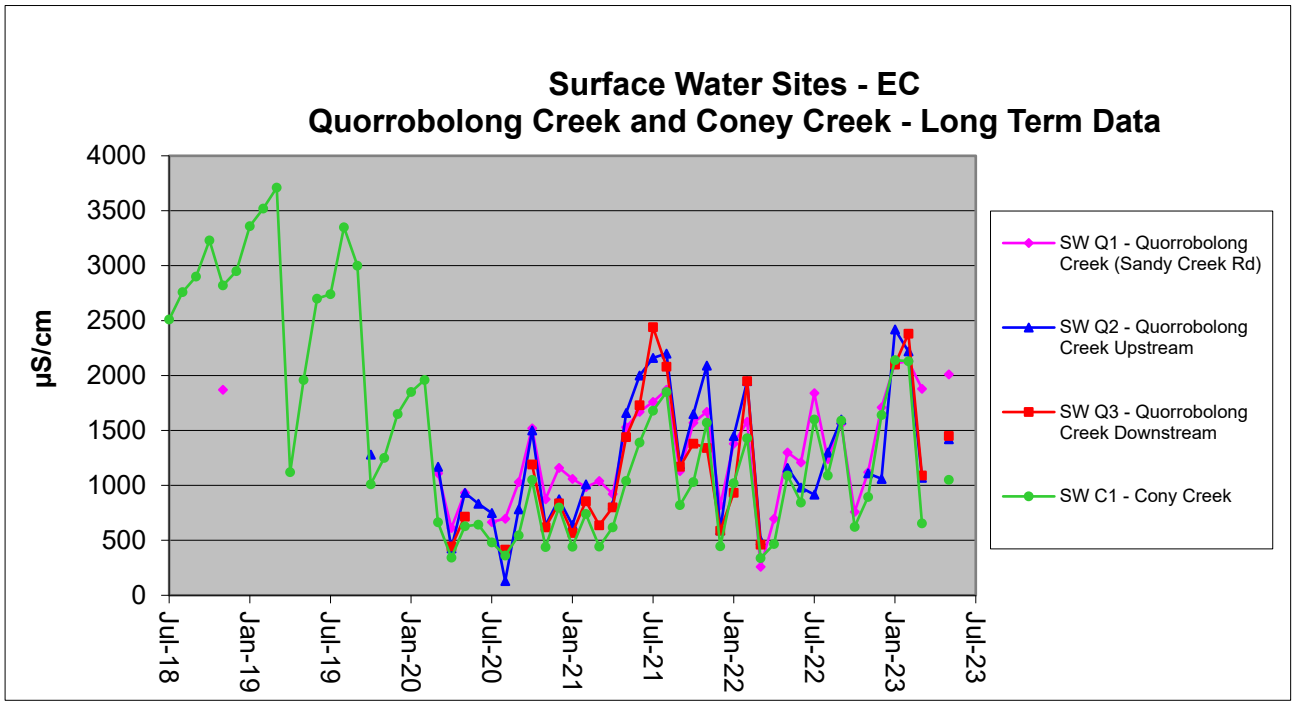


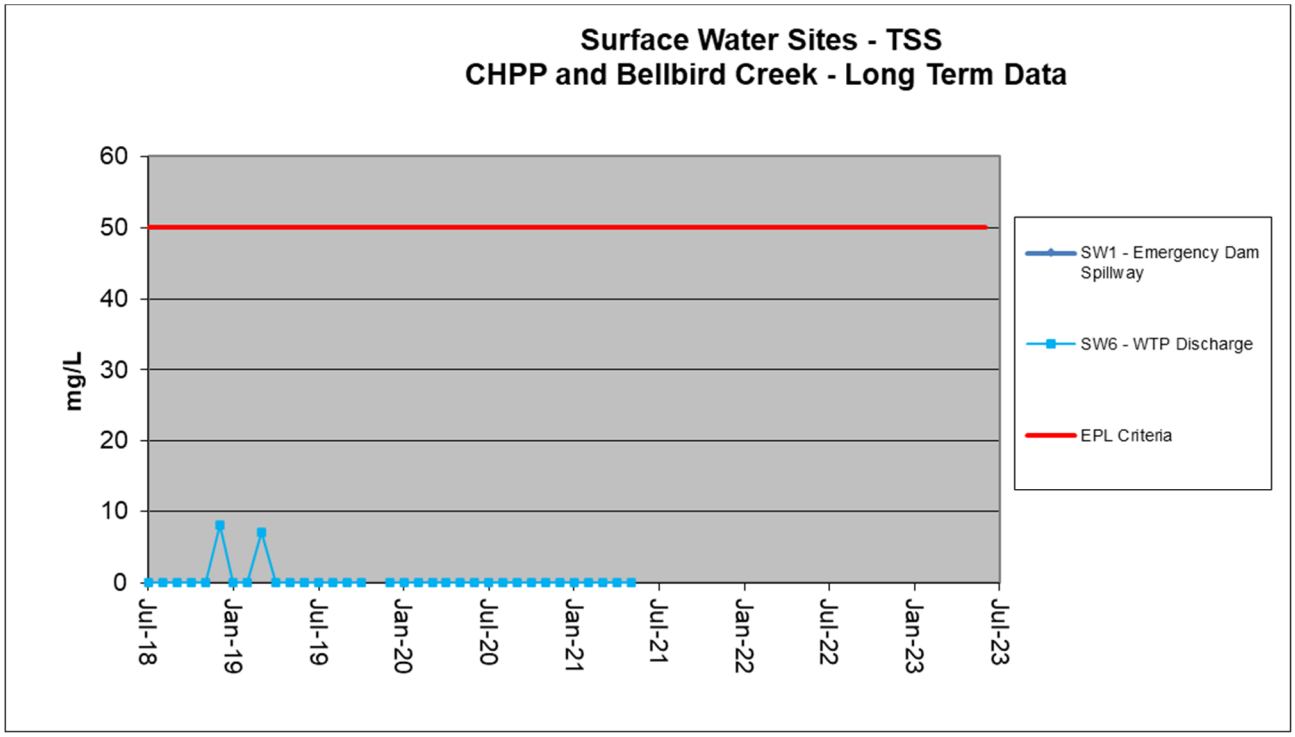


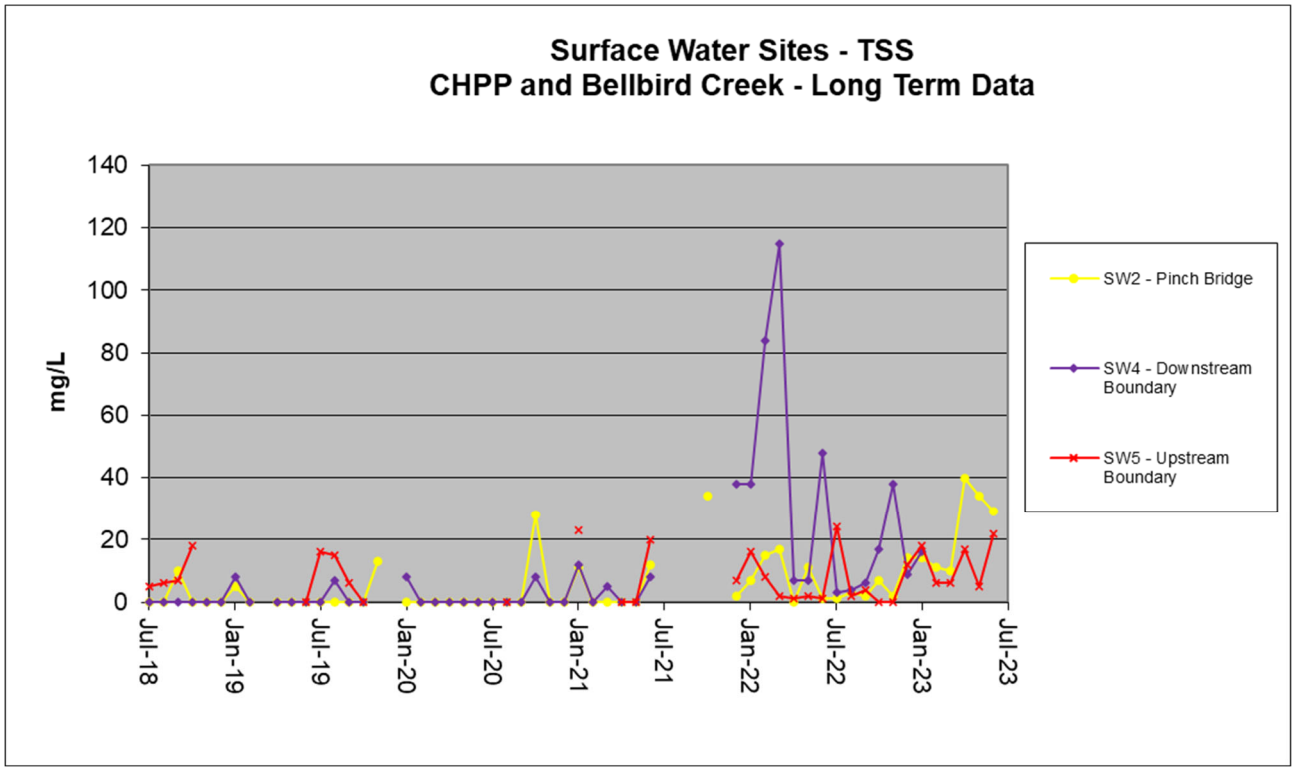

Surface Water Sites - pH
Quorrobolong Creek and Coney Creek - Long Term Data
pH
10.0
8.0
6.0
4.0
2.0
0.0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

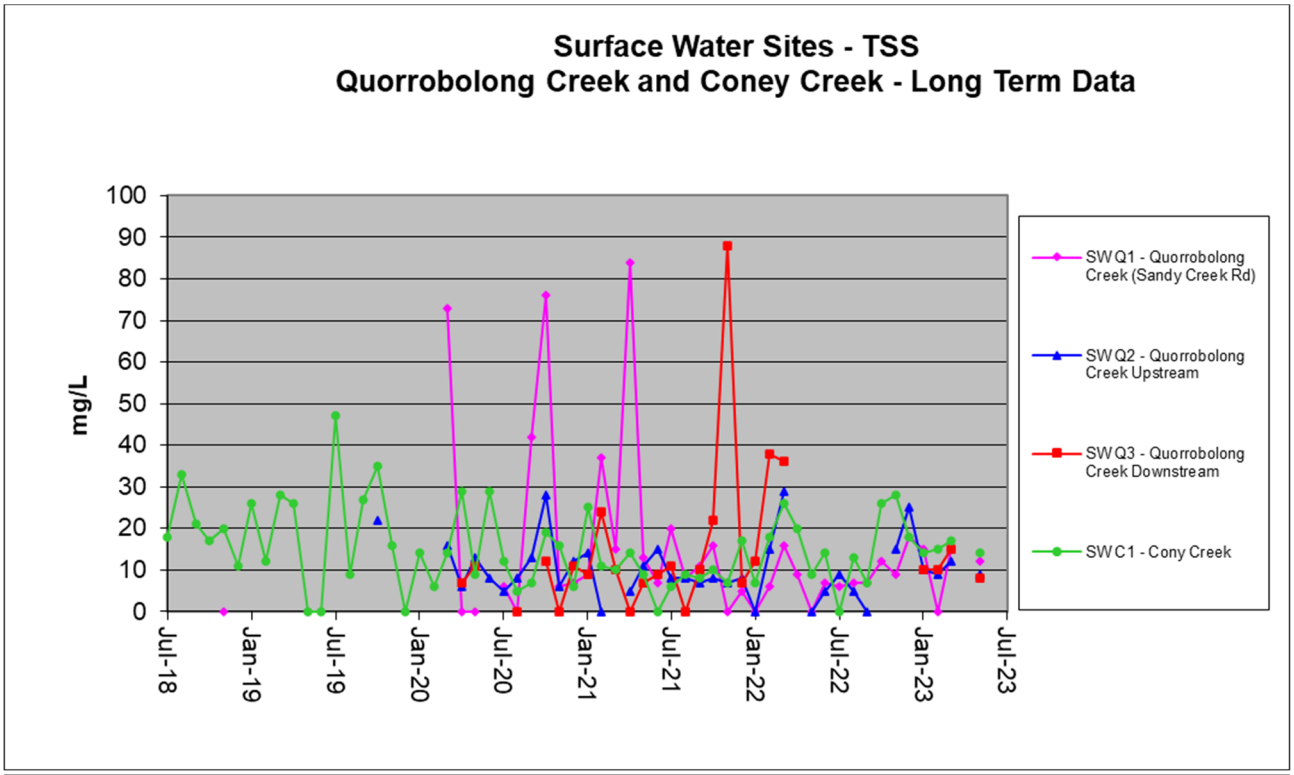

Surface Water Sites - EC
CHPP and Bellbird Creek - Long Term Data
µS/cm
1000
900
800
700
600
500
400
300
200
100
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW1 - Emergency Dam Spillway
SW6 - WTP Discharge
EPL Criteria

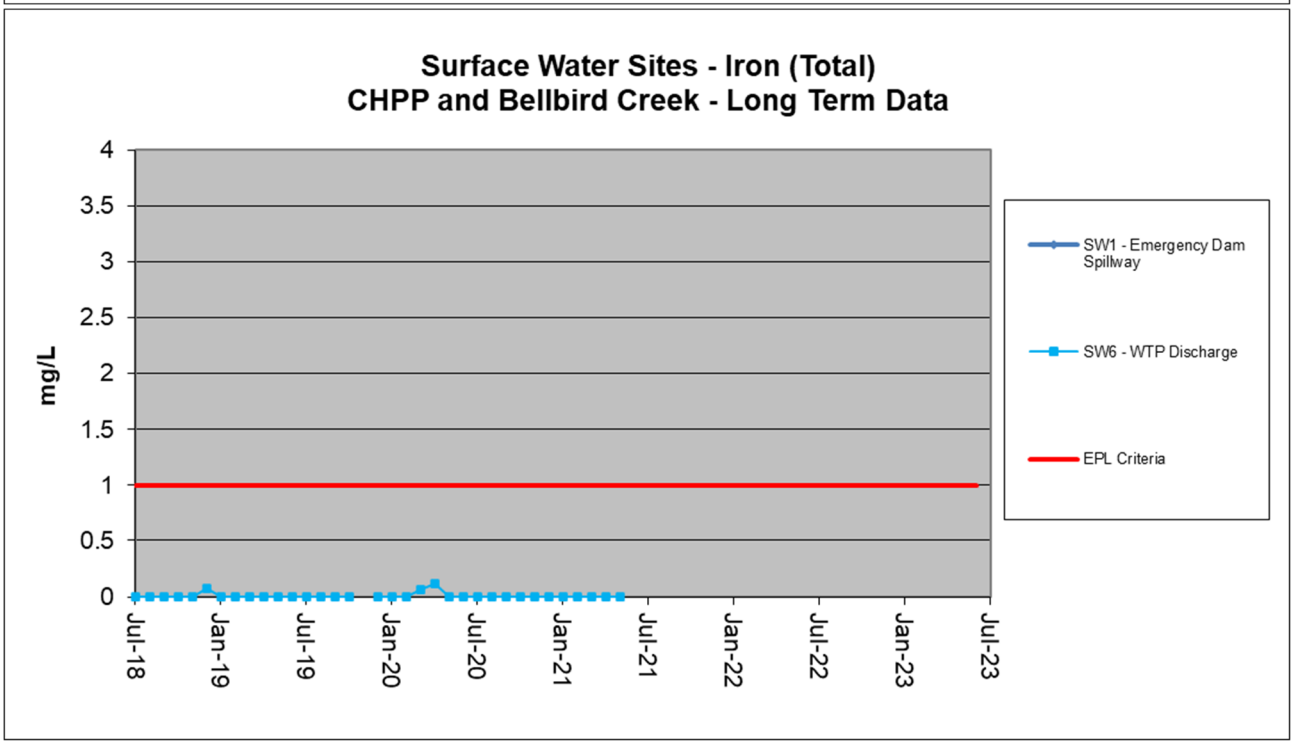

Surface Water Sites - EC
CHPP and Bellbird Creek - Long Term Data
µS/cm
12000
10000
8000
6000
4000
2000
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW2 - Pinch Bridge
SW4 - Downstream Boundary
SW5 - Upstream Boundary

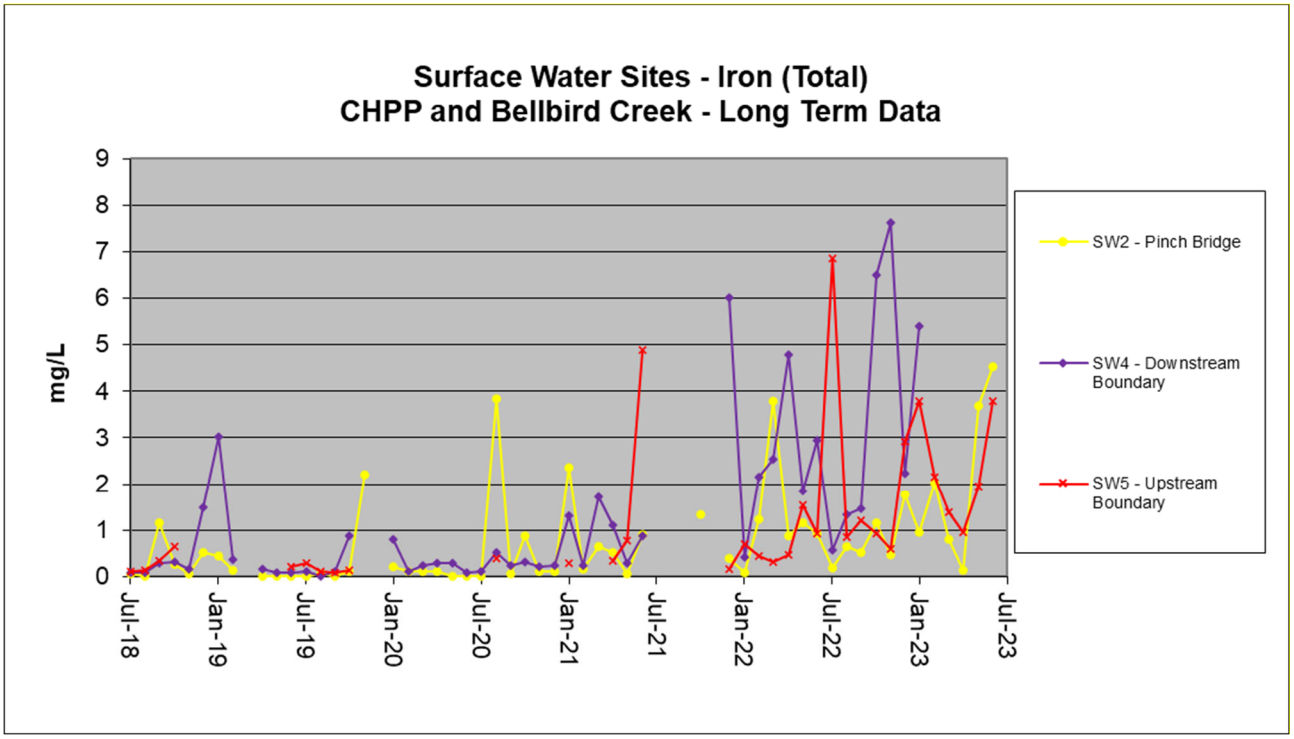

Surface Water Sites - EC
Quorrobolong Creek and Coney Creek - Long Term Data
µS/cm
4000
3500
3000
2500
2000
1500
1000
500
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

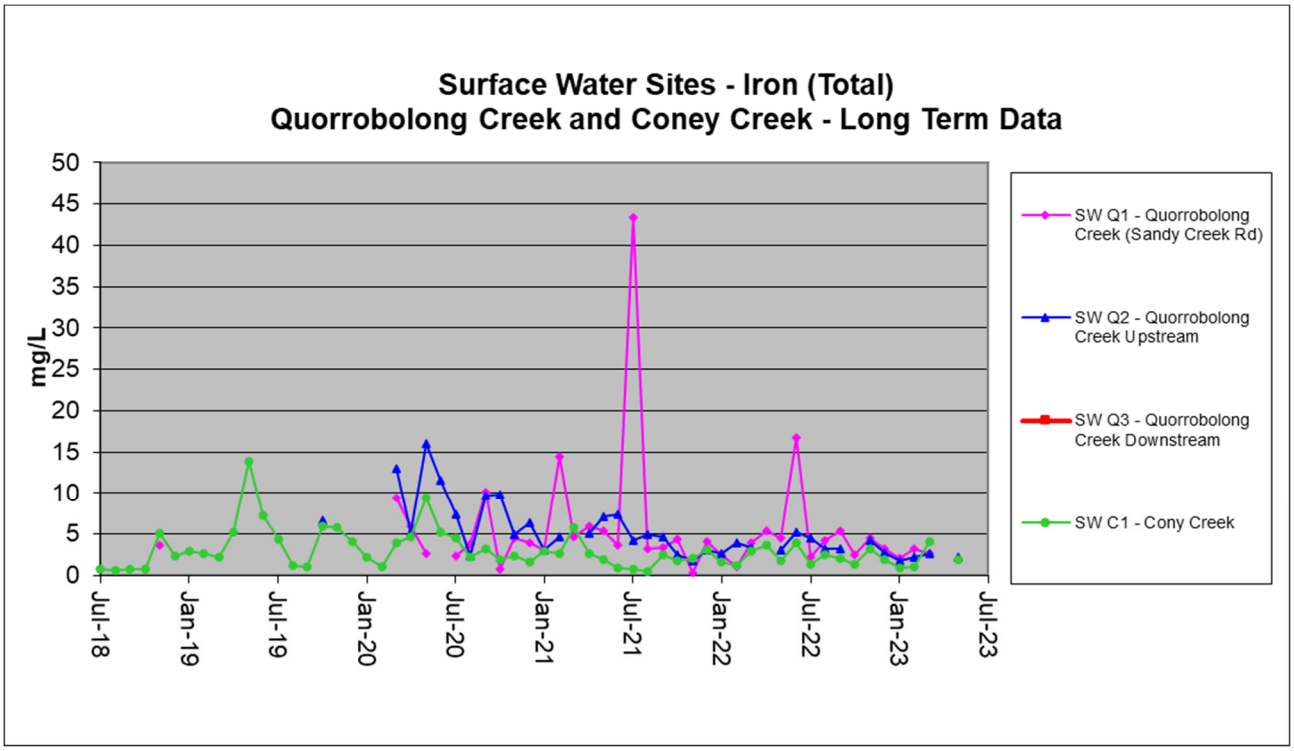

Surface Water Sites - TSS
CHPP and Bellbird Creek - Long Term Data
mg/L
60
50
40
30
20
10
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW1 - Emergency Dam Spillway
SW6 - WTP Discharge
EPL Criteria


Surface Water Sites - TSS
CHPP and Bellbird Creek - Long Term Data
mg/L
140
120
100
80
60
40
20
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW2 - Pinch Bridge
SW4 - Downstream Boundary
SW5 - Upstream Boundary


Surface Water Sites - TSS
Quorrobolong Creek and Coney Creek - Long Term Data
mg/L
100
90
80
70
60
50
40
30
20
10
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SWQ1 - Quorrobolong Creek (Sandy Creek Rd)
SWQ2 - Quorrobolong Creek Upstream
SWQ3 - Quorrobolong Creek Downstream
SWC1 - Cony Creek


Surface Water Sites - Iron (Total)
CHPP and Bellbird Creek - Long Term Data
mg/L
4
3.5
3
2.5
2
1.5
1
0.5
0
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW1 - Emergency Dam Spillway
SW6 - WTP Discharge
EPL Criteria


Surface Water Sites - Iron (Total)
CHPP and Bellbird Creek - Long Term Data
mg/L
0
1
2
3
4
5
6
7
8
9
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW2 - Pinch Bridge
SW4 - Downstream Boundary
SW5 - Upstream Boundary


Surface Water Sites - Iron (Total)
Quorrobolong Creek and Coney Creek - Long Term Data
mg/L
0
5
10
15
20
25
30
35
40
45
50
Jul-18
Jan-19
Jul-19
Jan-20
Jul-20
Jan-21
Jul-21
Jan-22
Jul-22
Jan-23
Jul-23
SW Q1 - Quorrobolong Creek (Sandy Creek Rd)
SW Q2 - Quorrobolong Creek Upstream
SW Q3 - Quorrobolong Creek Downstream
SW C1 - Cony Creek

Appendix C. Groundwater Level and Quality Graphs

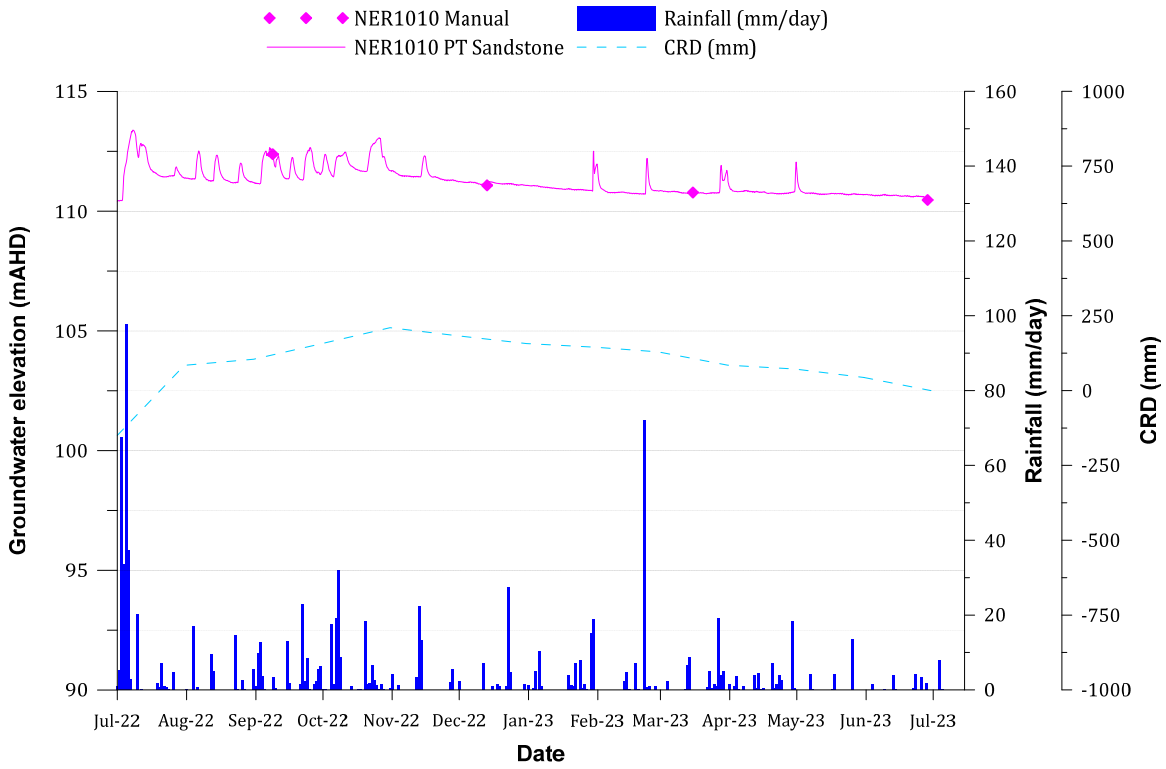


FIGURE APP C-1 NER1010 GROUNDWATER LEVEL HYDROGRAPHS

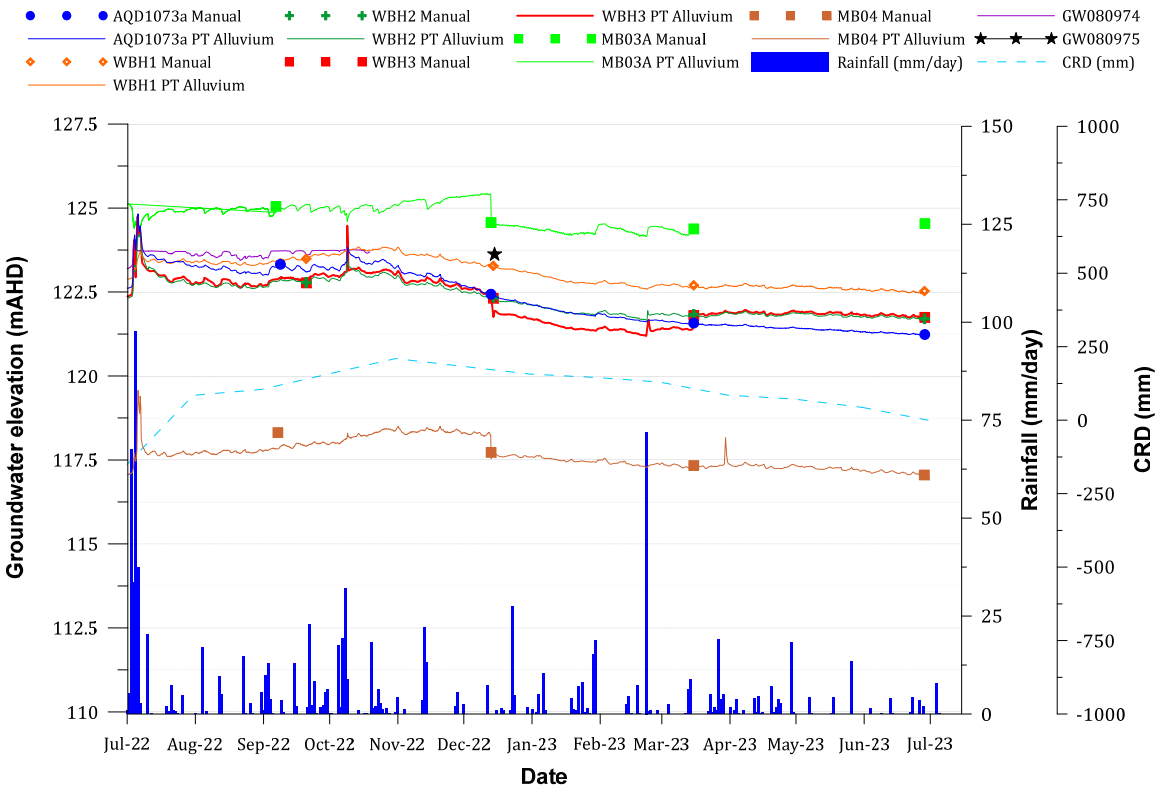


FIGURE APP C-2 STAGE 2 AND BELLBIRD SOUTH ALLUVIUM AND WATERNSW GROUNDWATER LEVEL HYDROGRAPHS

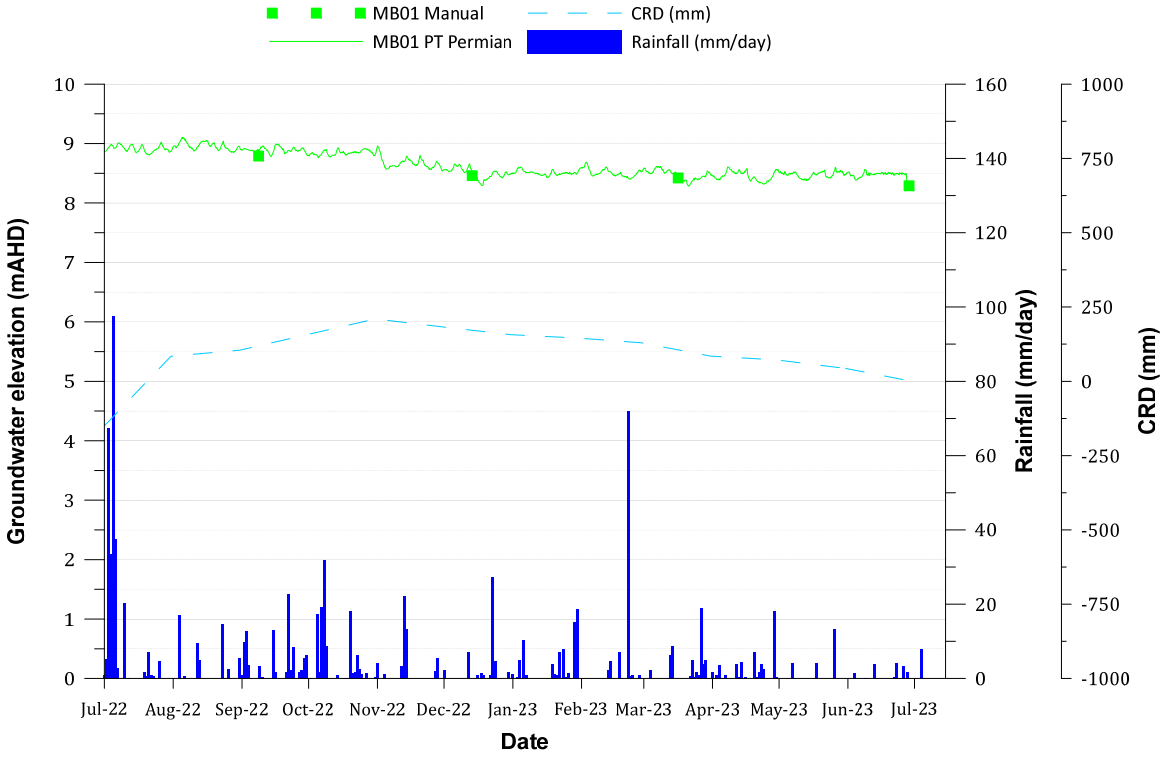


FIGURE APP C-3 STAGE 3 MB01 SANDSTONE AQUIFER GROUNDWATER LEVEL HYDROGRAPH

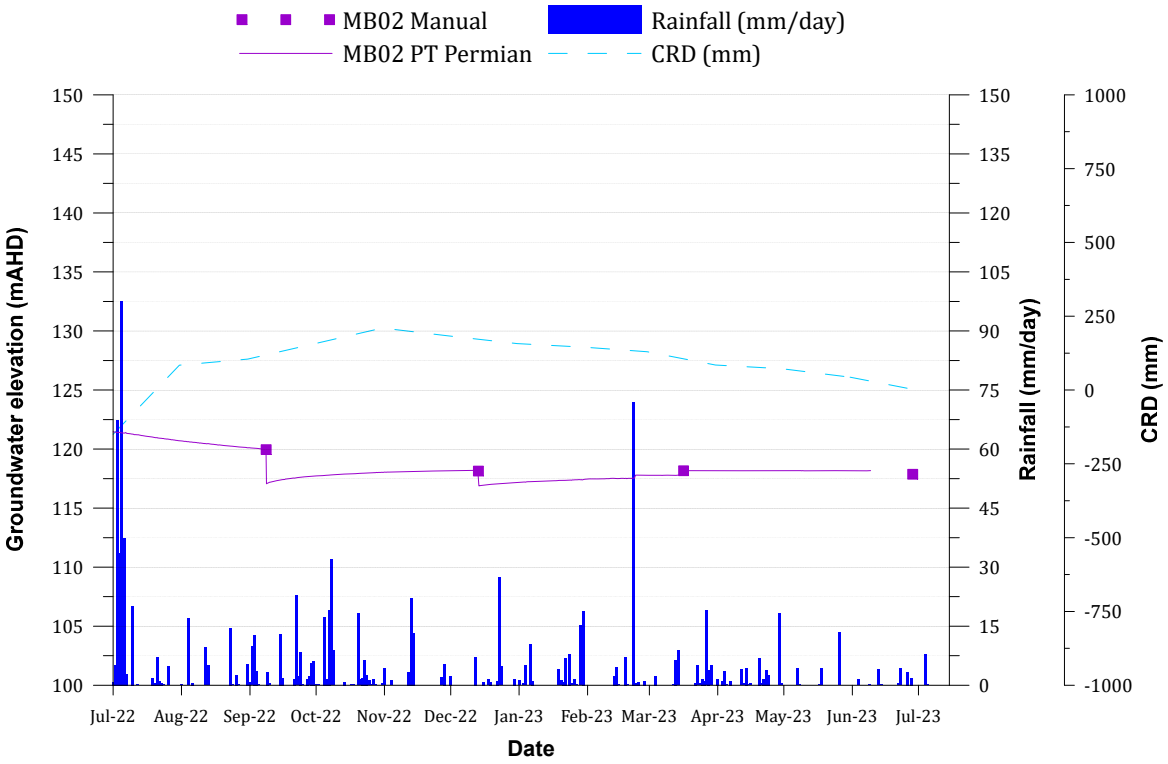


FIGURE APP C-4 STAGE 3 MB02 SANDSTONE AQUIFER GROUNDWATER LEVEL HYDROGRAPH

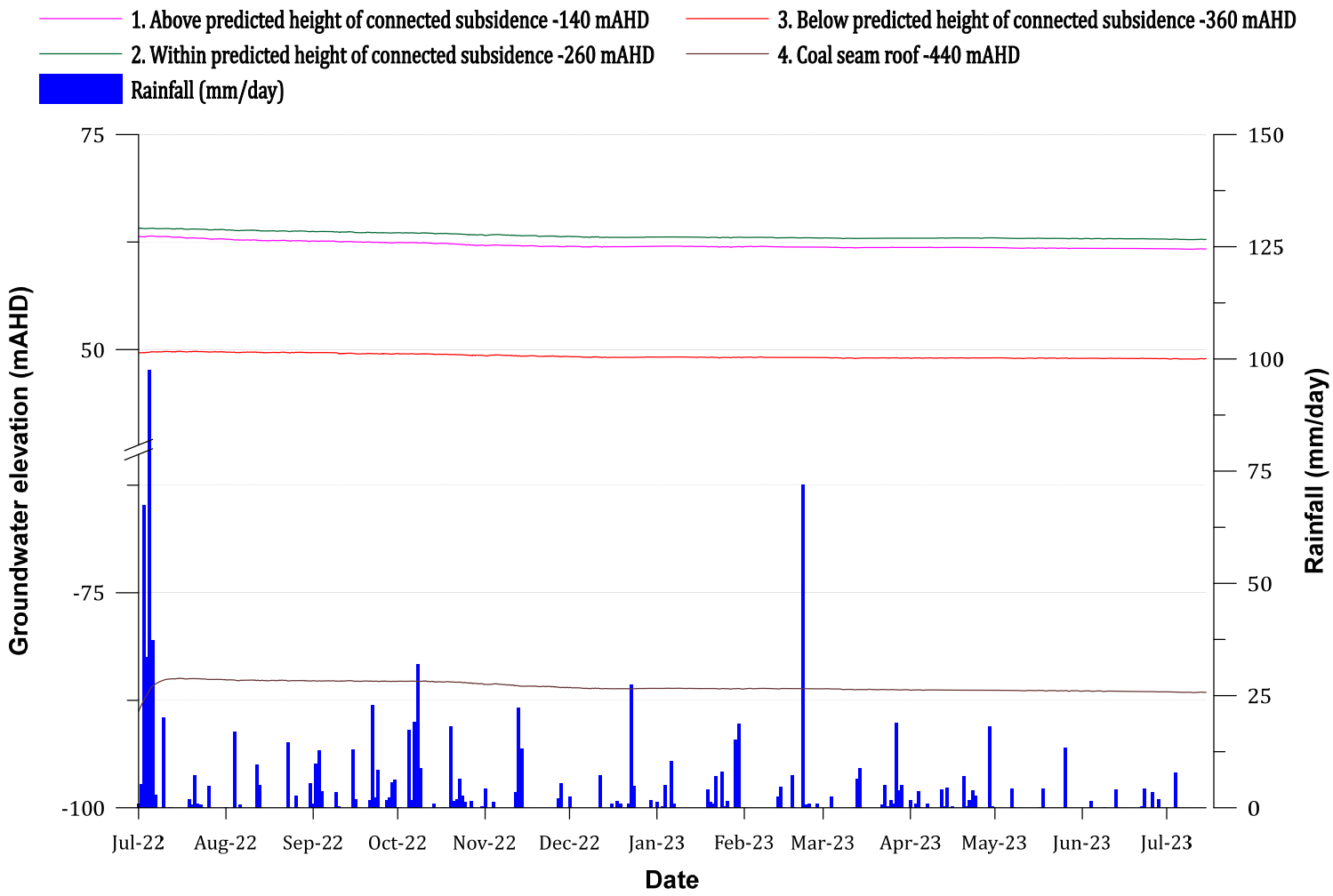


FIGURE APP C-5 EX01H PIEZOMETRIC HEAD MEASUREMENTS: SENSORS NO.1 TO NO.4

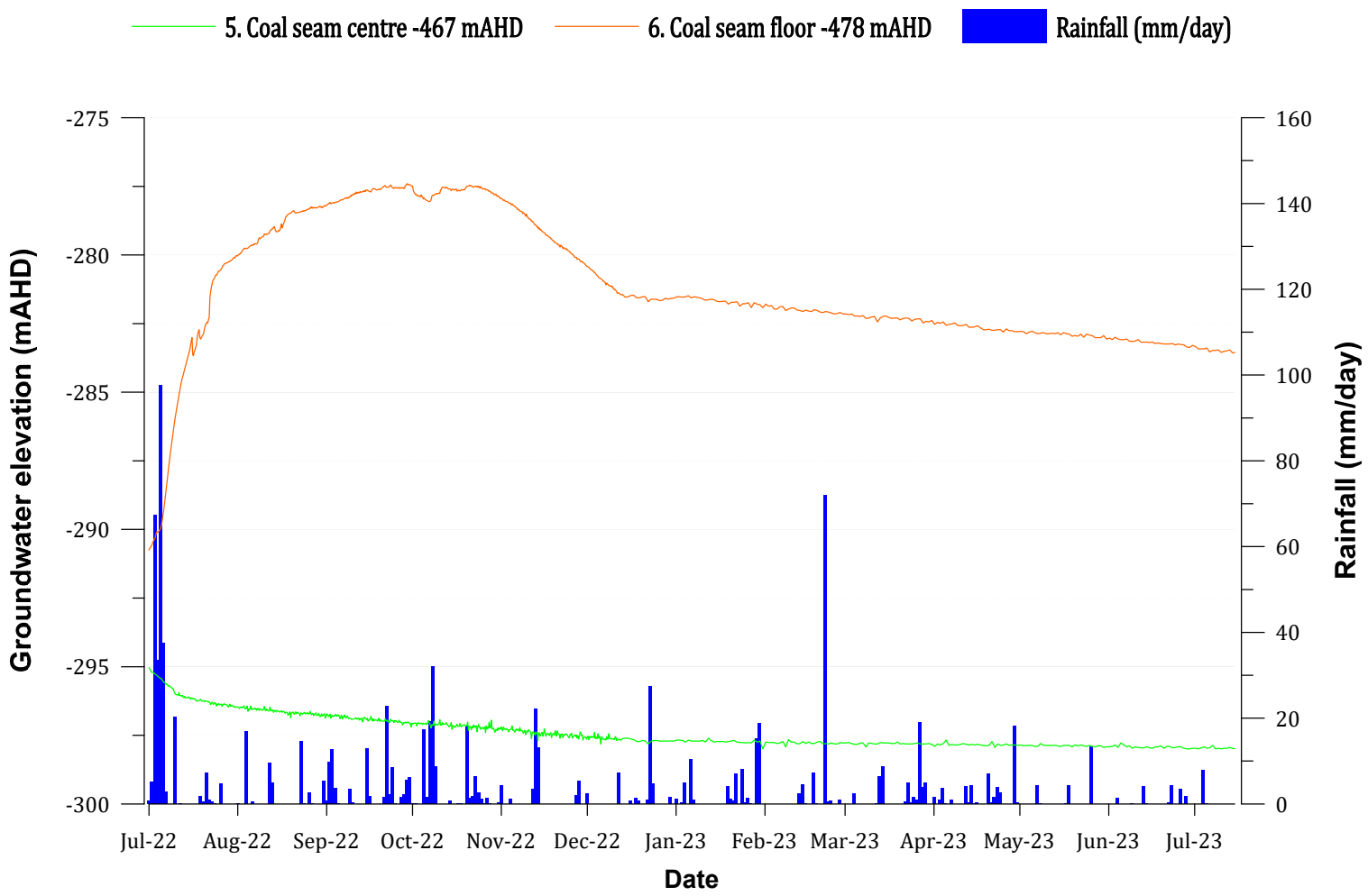


FIGURE APP C-6 EX01H PIEZOMETRIC HEAD MEASUREMENTS: SENSORS NO.5 AND NO.6

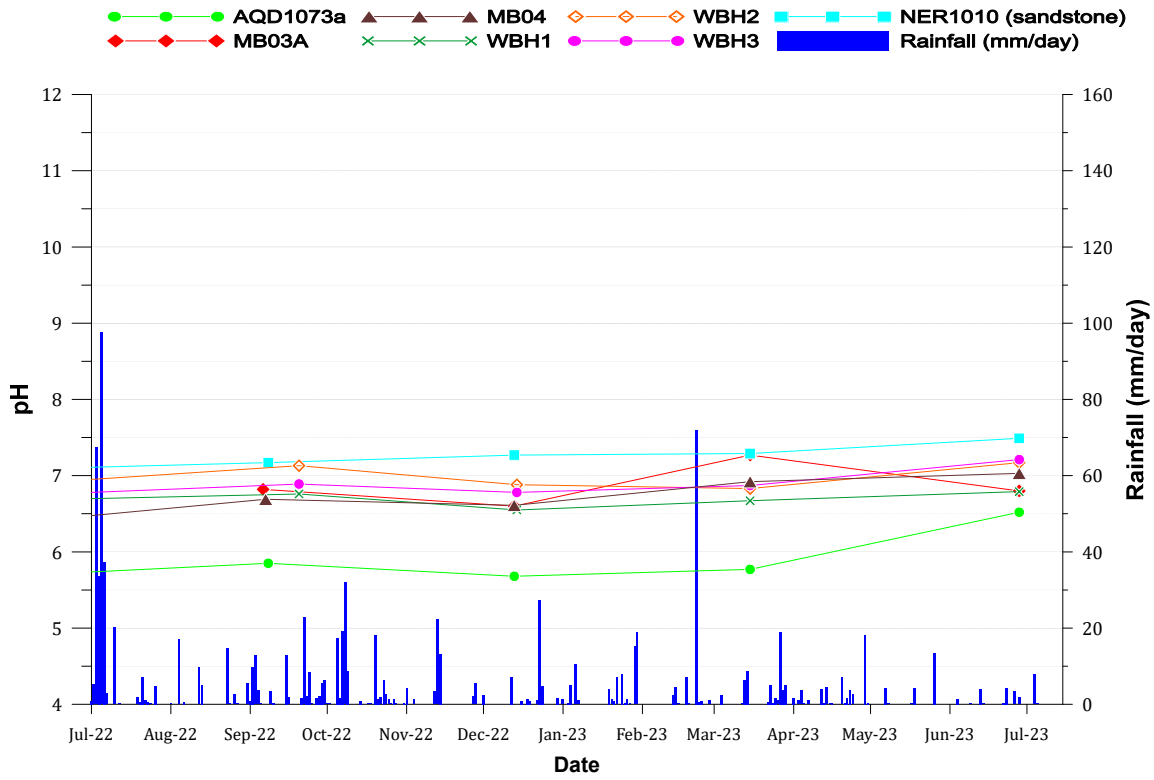


FIGURE APP C-7 STAGE 2 AND BELLBIRD SOUTH ALLUVIUM AND SANDSTONE AQUIFER PH TRENDS

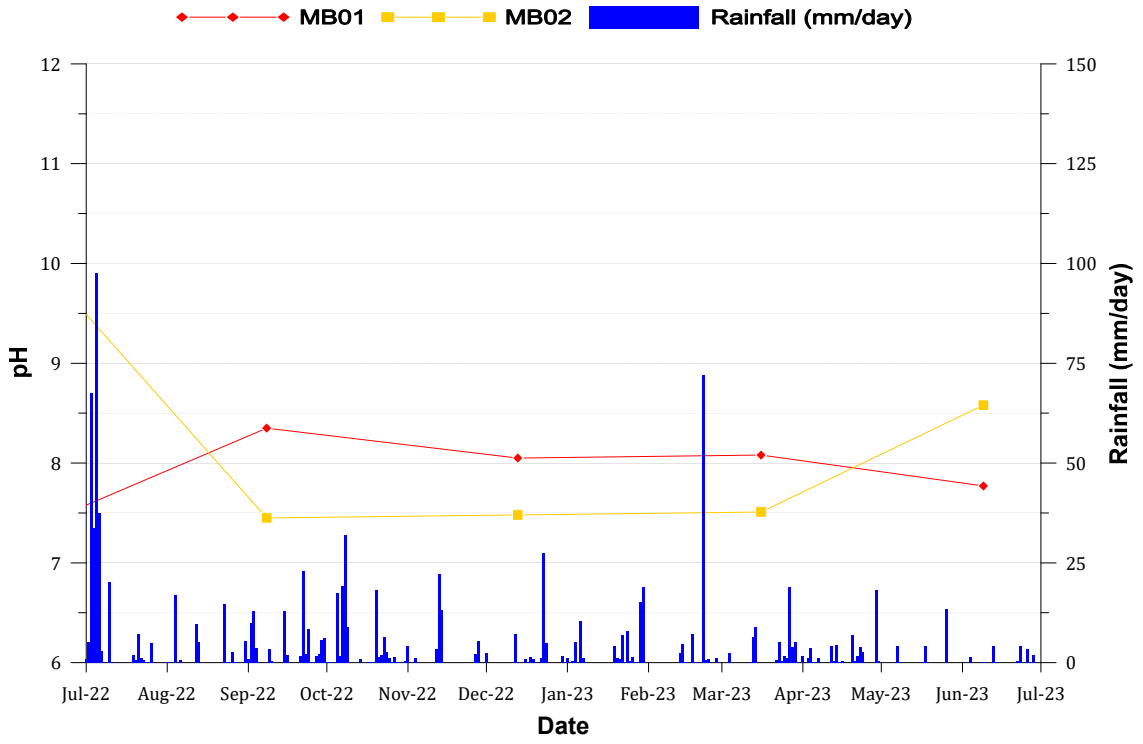


FIGURE APP C-8 STAGE 3 SANDSTONE AQUIFER PH TRENDS

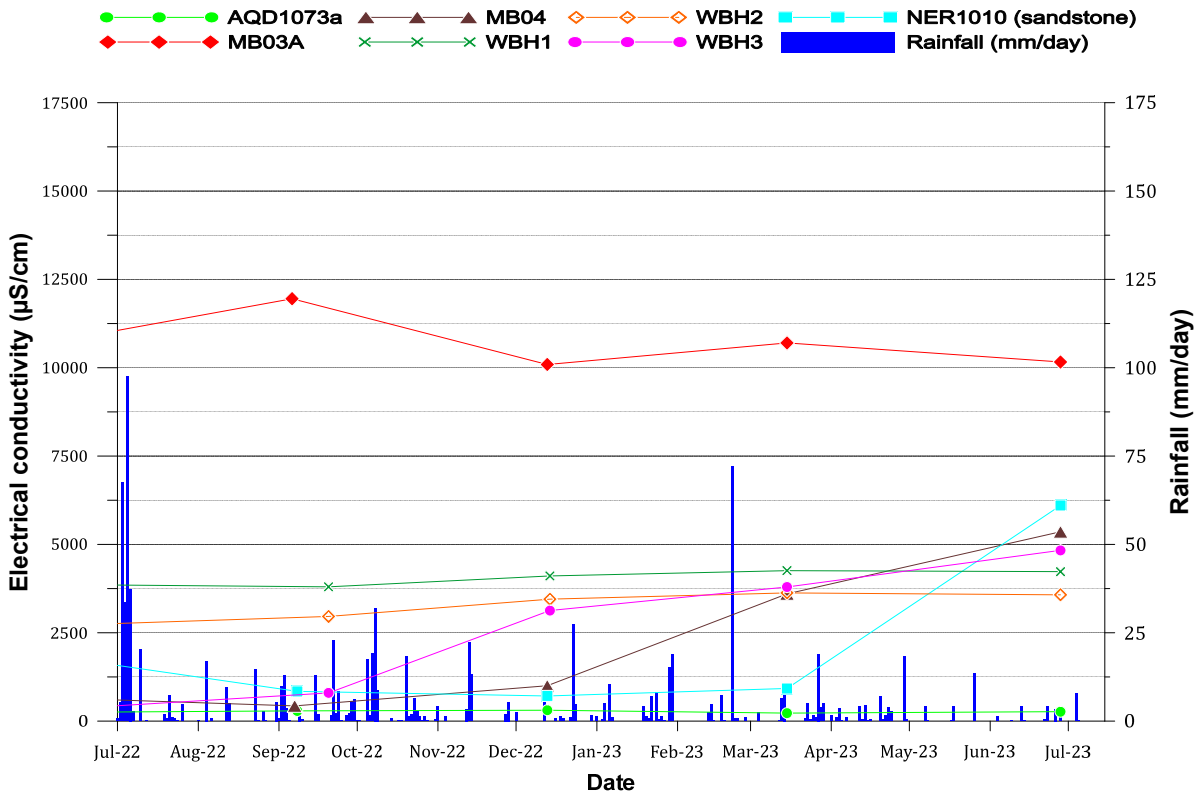


FIGURE APP C-9 STAGE 2 AND BELLBIRD SOUTH ALLUVIUM AND SANDSTONE AQUIFER EC TRENDS

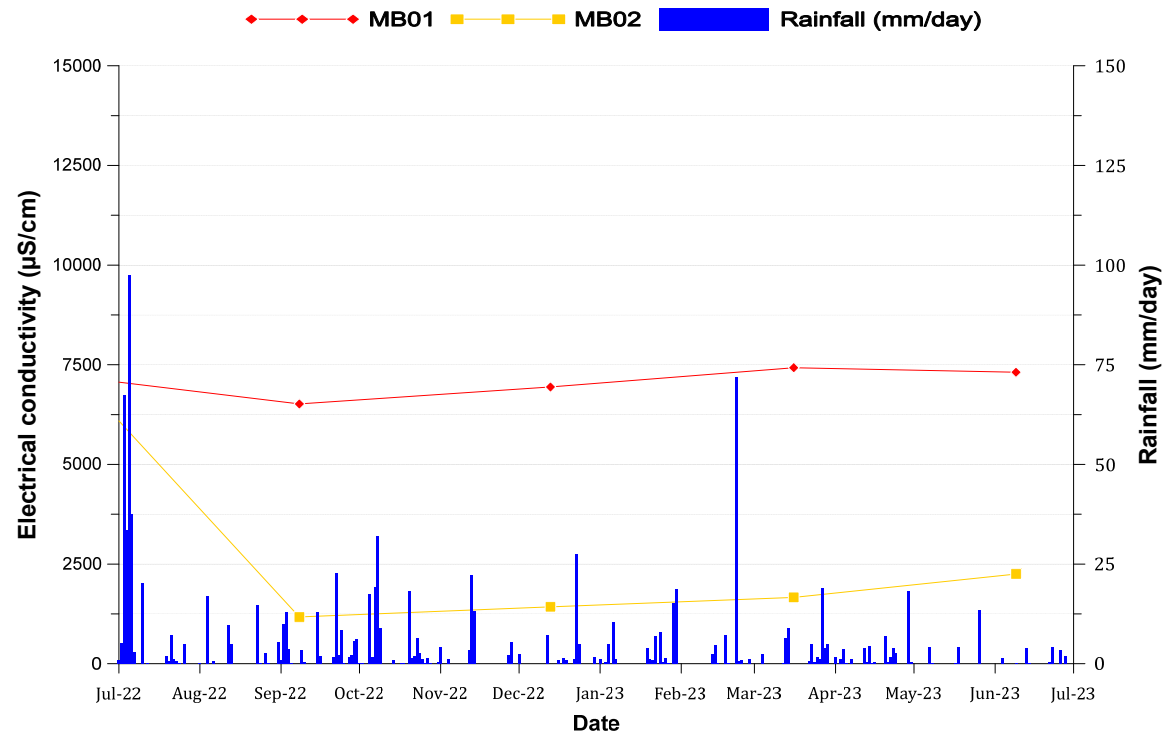


FIGURE APP C-10 STAGE 3 SANDSTONE AQUIFER EC TRENDS

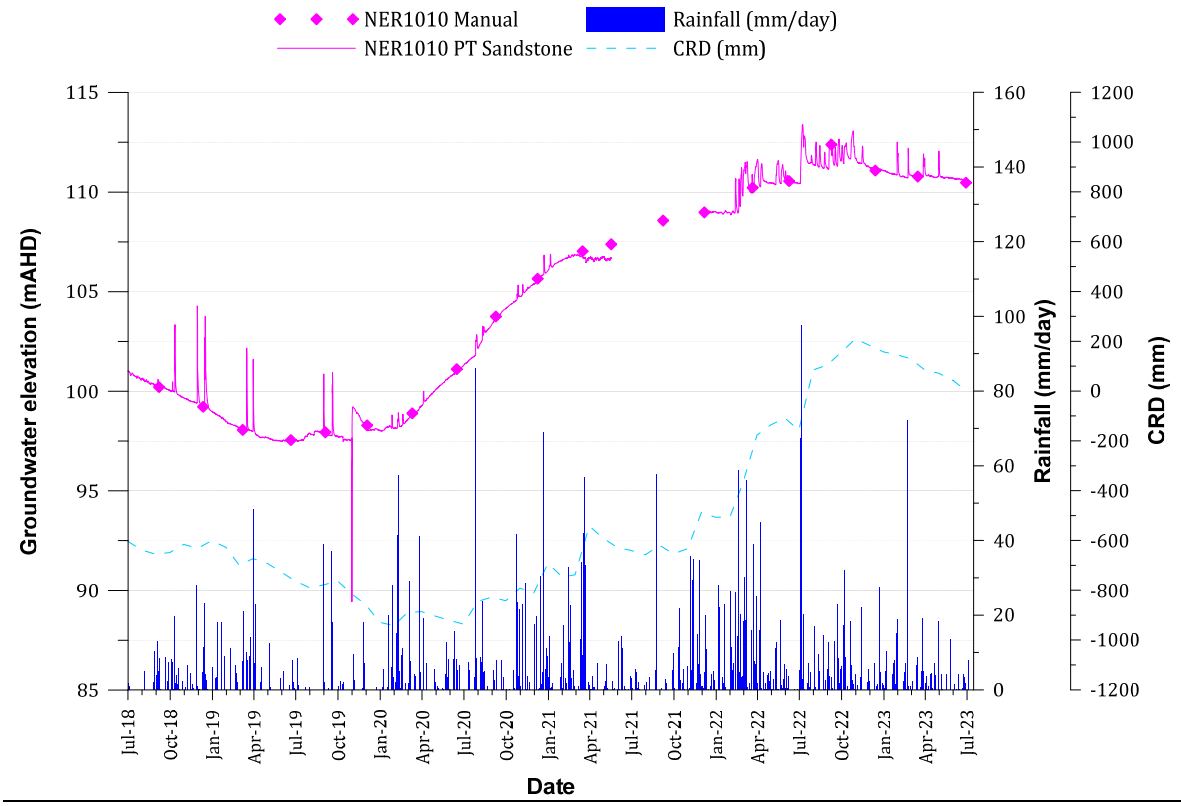


FIGURE APP C-11 5-YEAR NER1010 GROUNDWATER LEVEL HYDROGRAPH

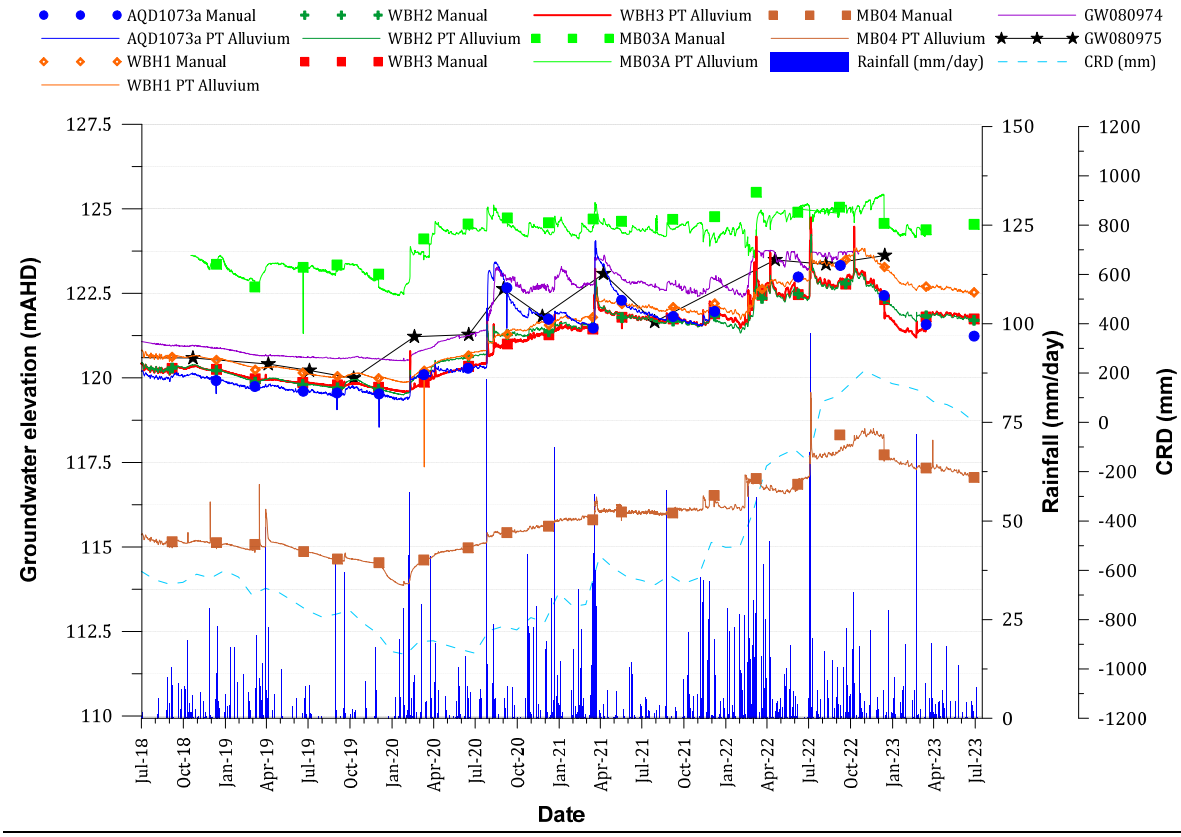


FIGURE APP C-12 5-YEAR STAGE 2 AND BELLBIRD SOUTH ALLUVIUM AND WATERNSW GROUNDWATER LEVEL HYDROGRAPHS

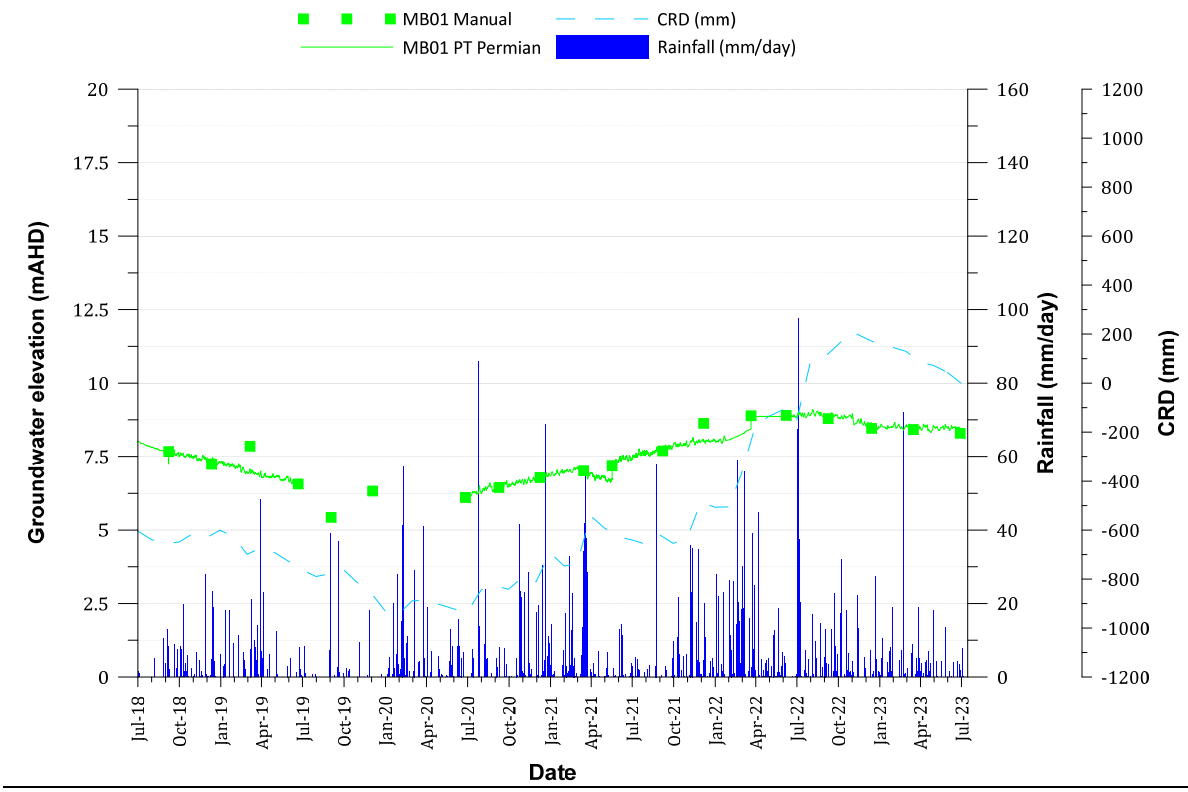


FIGURE APP C-13 5-YEAR STAGE 3 MB01 SANDSTONE AQUIFER GROUNDWATER LEVEL HYDROGRAPH

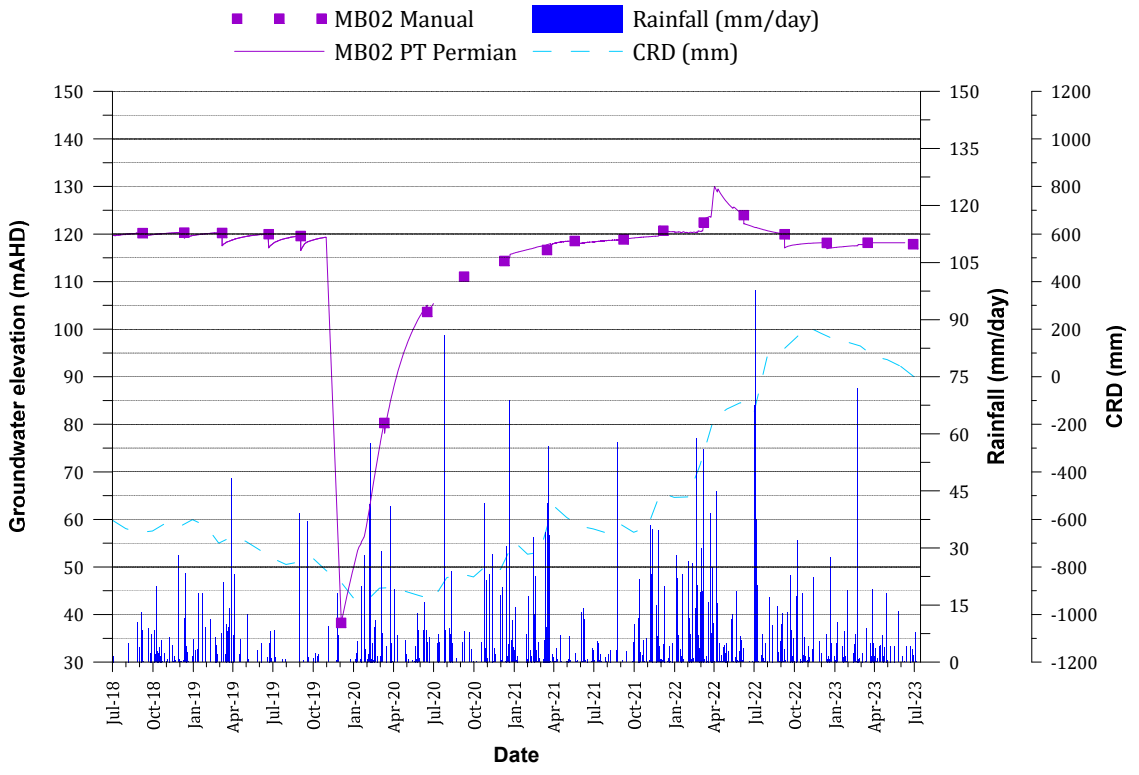


FIGURE APP C-14 5-YEAR STAGE 3 MB02 SANDSTONE AQUIFER GROUNDWATER LEVEL HYDROGRAPH

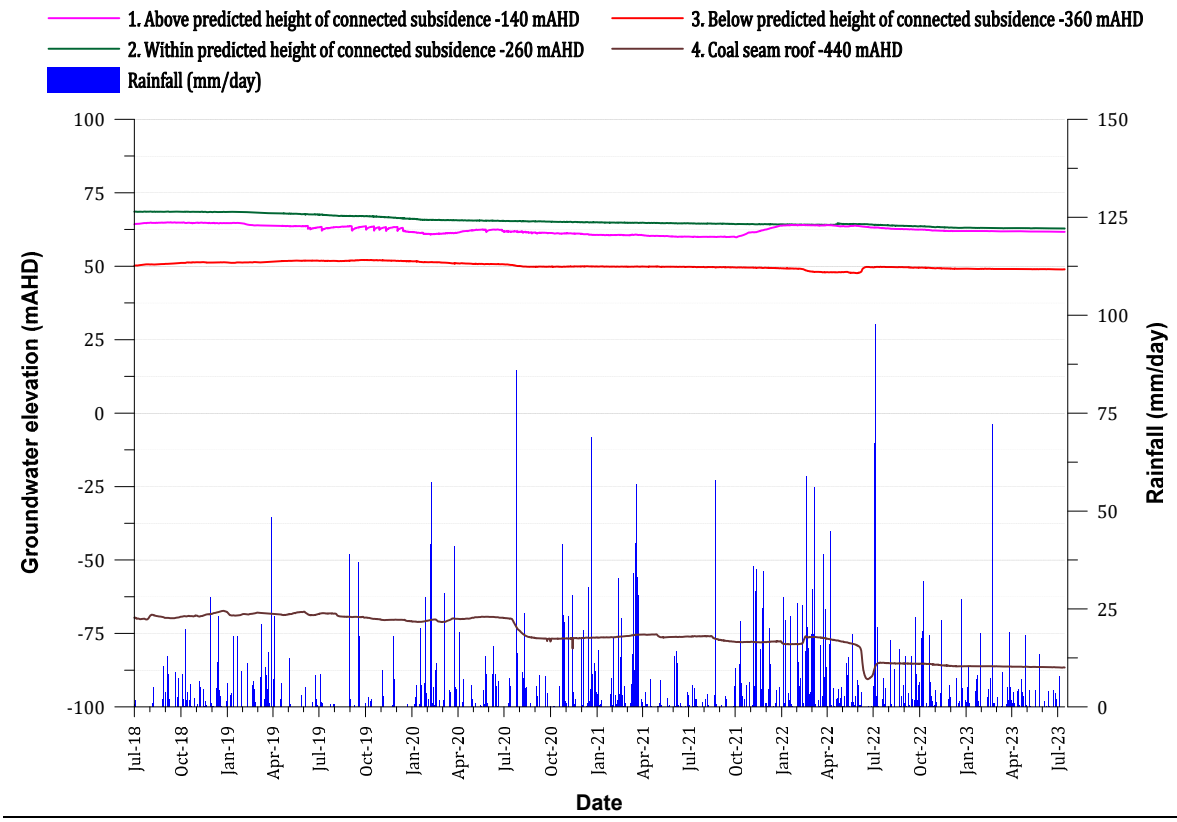


FIGURE APP C-15 5-YEAR EX01H PIEZOMETRIC HEAD MEASUREMENTS: SENSORS NO.1 TO NO.4

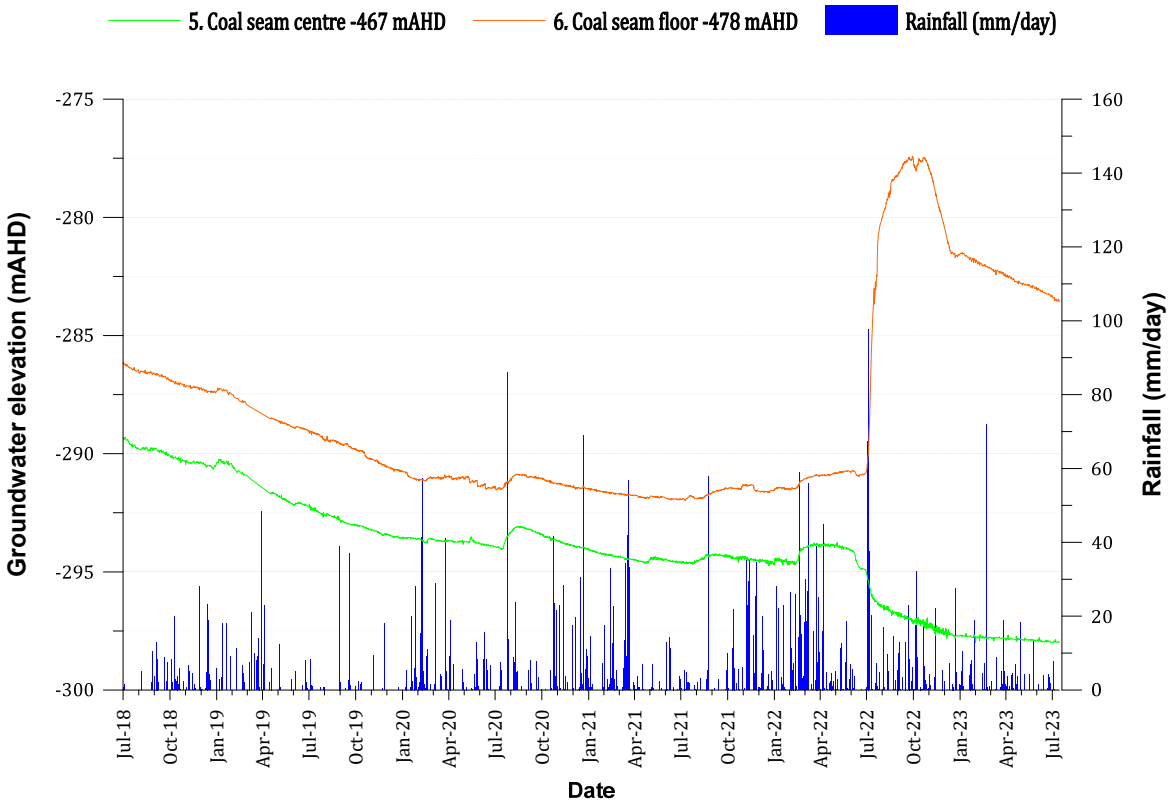


FIGURE APP C-16 5-YEAR EX01H PIEZOMETRIC HEAD MEASUREMENTS: SENSORS NO.5 AND NO.6

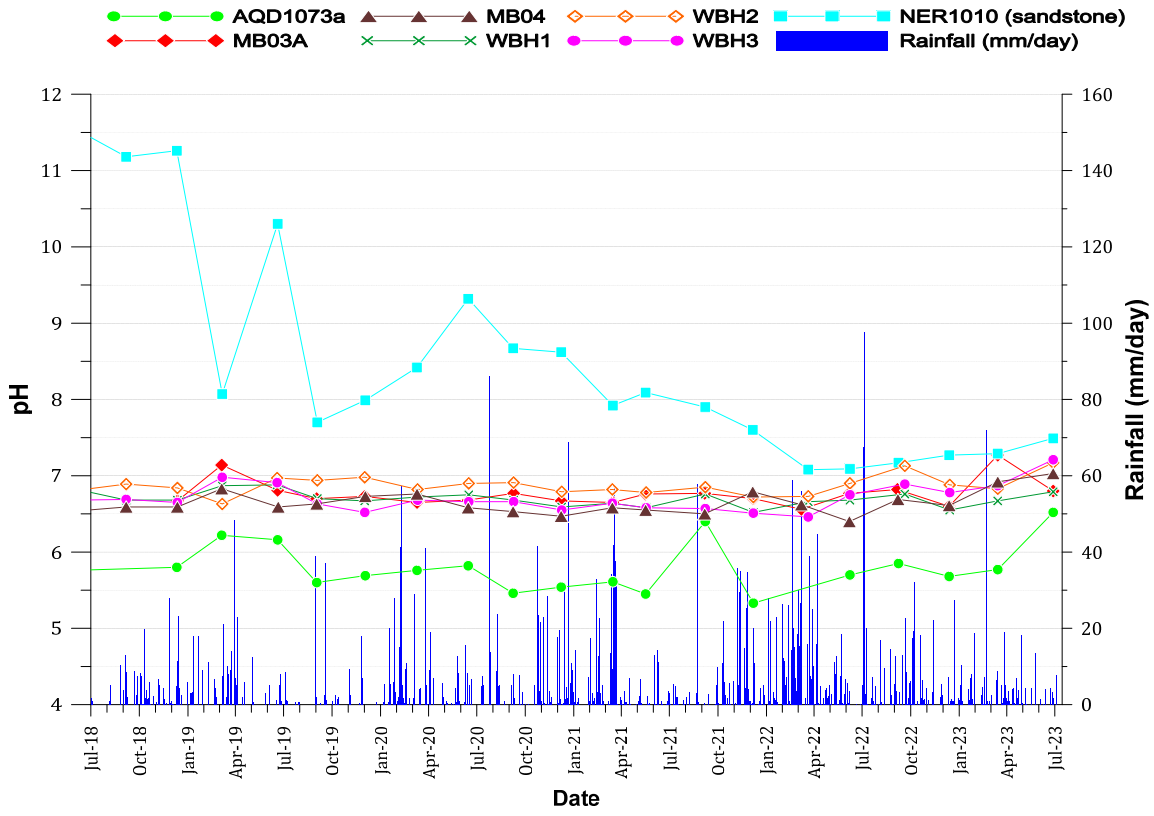


FIGURE APP C-17 5-YEAR STAGE 2 AND BELLBIRD SOUTH ALLUVIUM AND SANDSTONE AQUIFER PH TRENDS

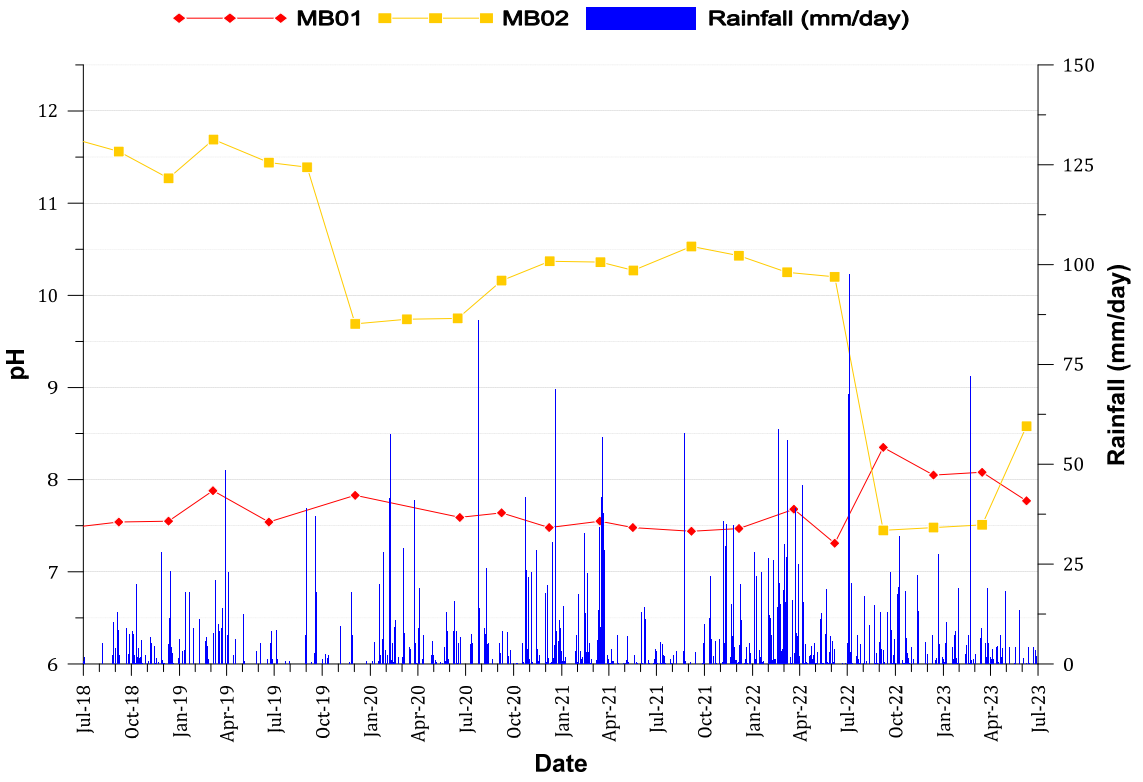


FIGURE APP C-18 5-YEAR STAGE 3 SANDSTONE AQUIFER PH TRENDS

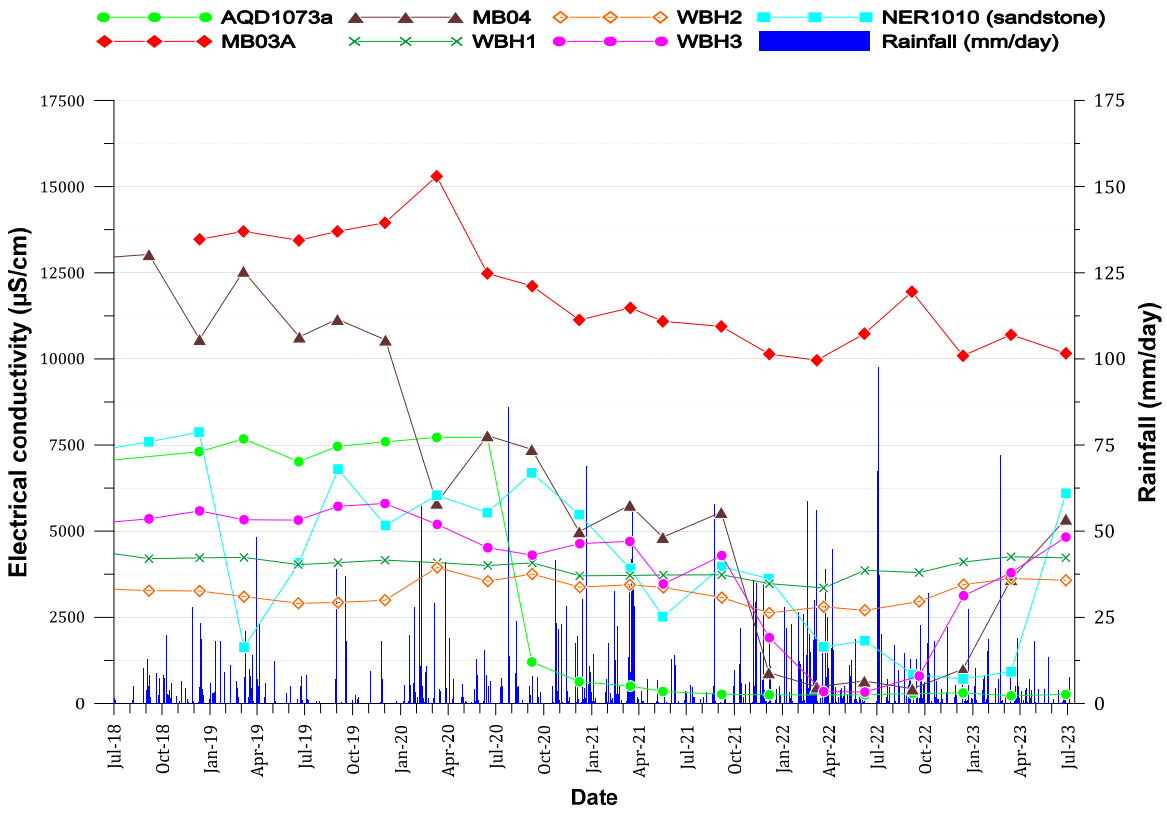


FIGURE APP C-19 5-YEAR STAGE 2 AND BELLBIRD SOUTH ALLUVIUM AND SANDSTONE AQUIFER EC TRENDS

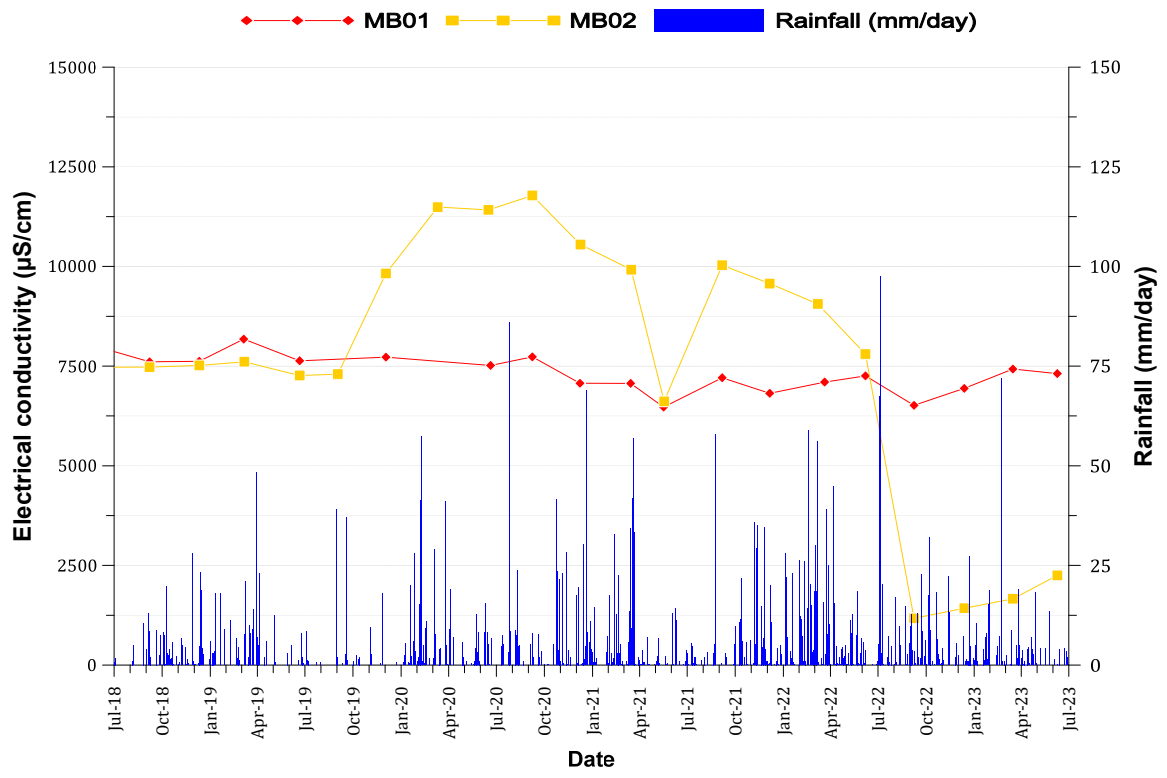


FIGURE APP C-20 5-YEAR STAGE 3 SANDSTONE AQUIFER EC TRENDS