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 2017 – June 2018

ANNUAL REVIEW 2018

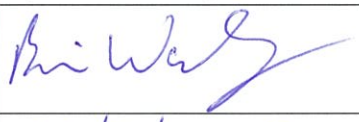
Name of operation	Austar Coal Mine
Name of operator	Yancoal Mining Services Pty Ltd
Development consent / project approval #	DA 29/95 and PA 08_0111
Name of holder of development consent / project	Austar Coal Mine Pty Ltd
Mining lease #	Refer **Table 3-2**
Name of holder of mining lease	Austar Coal Mine Pty Ltd
Water licence #	Refer **Table 7-1**
Name of holder of water licence	Austar Coal Mine Pty Ltd
MOP start date	9 Sep 2016
MOP end date	1 Jun 2023
Annual Review start date	1 July 2017
Annual Review end date	30 June 2018

I, Brian Wesley, certify that this audit report is a true and accurate record of the compliance status of Austar Coal Mine for the period 1 July 2017 to 30 June 2018 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 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.*

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

Name of authorised reporting officer	Brian Wesley
Title of authorised reporting officer	Operations Manager
Signature of authorised reporting officer	
Date	25/9/2018

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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	No
CCL 728	No
CCL 752	No
DSL 89	No
ML 1157	No
ML 1388	Yes
ML 1364	No
ML 1283	No
ML 1345	Yes
ML 1550	No
ML 1661	No
ML 1666	No
ML 1677	No
MPL 204	No
MPL 217	No
MPL 23	No
MPL 233	No
MPL 269	No
WAL 19181	Yes
WAL 41504	Yes

TABLE 1-2 NON-COMPLIANCES

Relevant Approval	Condition #	Condition Description (Summary)	Compliance Status	Comment	Where Addresssed in this Annual Review
EPL 416	U2.1	Noise generated by the premises must not exceed the limits set	Non-compliant	Activities from Austar complied with relevant noise limits on most occasions at the majority of monitoring locations during the 2017-18 reporting period, with the exception of an exceedance at C2 during July and an exceedance at C3 during October 2017 both due to application of the low frequency penalty.	**Section 6.6**
DA 29/95 PA 08_0111	Schedule 5, Condition 8 Schedule 7 Condition 4	Within 3 months of a modification, the Proponent must review management plans and lodge the revised document within 6 weeks (DA 29/95) or 4 weeks (PA08_0111)	Non-compliant	Management plans were revised and notification provided within the three month timeframe, however updated reports were not submitted for approval within the timeframes specified in the consents (6 weeks for DA 29/95 and 4 weeks for PA08_0111). The Historic Heritage Management Plan requires update to ensure it is reviewed after submission of Annual Review, relevant incident or audit.	**Section 3.3.3**

Relevant Approval	Condition #	Condition Description (Summary)	Compliance Status	Comment	Where Addresssed in this Annual Review
DA 29/95	Schedule 3, Condition 12A	By the end of February 2018 a groundwater impact review must be undertaken in consultation with DPI-Water	Non-compliant	The groundwater review was completed during the reporting period and consultation with DoI-Water was undertaken. The Groundwater Review was submitted in June 2018, so missed the timeframe given in the consent.	**Section 7.4**
DA 29/95 PA 08_0111 CML 2 CCL 752 CCL 728 DSL 89 ML1157 ML1364 ML1283 ML1550 ML1661 ML1666 ML1677 MPL204 MPL217 MPL23 MPL233 MPL269	Schedule 5 Condition 3, Schedule 5 Condition 5 Condition 5 Condition 3(2) Condition 3(2) Condition 5 Condition 3(2) Condition 5 Condition 3(2) Condition 3(2) Condition 4 Condition 4 Condition 4 Condition 3(2) Condition 3(f) Condition 4 Condition 3(f) Condition 3(2)	The Annual Review is required to: • Compare monitoring results against predictions in Environmental Assessments and Extraction Plans; • Report compliance with the MOP; • Report on progress in respect of rehabilitation completion criteria; • Have regard to relevant guidelines.	Non-compliant	The IEA identified a number of deficiencies in the AR. This AR will: • Include a comparison of monitoring results to predictions made in environmental assessments and extraction plans; • Include trends over a number of years; • Make reference to compliance with the MOP; • Be written using the Annual Review Guidelines, 2015.	**Section 6 and 7** **Section 6** **Section 7** **Section 8** This document.
EPL 416	M5.2	Complaints Register	Non-compliant	Time of the complaint was not logged. The complaints register has been updated to include time of the complaint as per the finding in the IEA.	**Section 9.4**

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 2017 to 30 June 2018 (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, Mining Operations Plan (MOP) 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*.

2.2 Background

Austar Coal Mine Pty Ltd (Austar), a subsidiary of Yancoal Australia Limited (Yancoal), operates the Austar Coal Mine, an underground coal mine located approximately 10 kilometres 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 coal extraction, handling, processing and rail and road transport facilities. 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** and **Plan 1A**).

Development Consent DA29/95 was granted under Section 91 of the *Environmental Planning and Assessment Act* (EP&A Act) on 14 February 1996, and was most recently modified under Section 75W of the EP&A Act on 25 August 2017. DA29/95 relates primarily to the Bellbird South mining area and operations.

Project Approval PA08_0111 was granted under Section 75J of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 6 September 2009, and was most recently modified under Section 75W of the EP&A Act in December 2013. PA08_0111 relates primarily to the Stage 3 mining area.

Surface operations include the Pit Top facilities (including administration buildings, the main access drift, coal clearance, store, workshop and laydown facilities), No 1 shaft (second egress man winder), No 2 shaft (mine dewatering), Kalingo Infrastructure Area (ventilation fans and underground services), the CHPP area (including CHPP, administration areas, Reverse Osmosis plant, overland conveyor and a number of heritage listed buildings in various states of repair), coarse reject emplacement areas (Aberdare, Area 12 and Area 13) and Kitchener Surface Infrastructure Site (ventilation shafts and fans, services borehole/drophole).

The Mining Operations Plan (MOP) was approved by DRE on 9 September 2016 and covers the period 9 September 2016 to 1 June 2023. The MOP identifies that mining will continue within existing approved coal reserves of the Bellbird South area (DA29/95) prior to returning to the Stage 3 area (PA08_0111).

During the reporting period, mining took place in Longwalls LWB3 and LWB4 in the Bellbird South mining area. Mining will continue in LWB4 before moving to LWB5 in the next reporting period. The location of approved operations is shown in **Figure 2-1** and **Plan 1C**.

2.3 Mine Contacts

Table 2-1 outlines the contact details for site personnel responsible for mining, coal preparation, rehabilitation, environmental and community liaison at Austar.

During the year, Gary Mulhearn transferred to Yancoal's Mt Thorley Warkworth Mine after approximately nine years at Austar. After the role was vacant for approximately one (1) month it was filled by Carly McCormack in June 2018.

TABLE 2-1 SITE PERSONNEL

Position	Name	Company	Contact Number
Mine Operations Manager	Brian Wesley	Austar Coal Mine	(02) 4993 7356
CHPP Manager	Jared King	Austar Coal Mine	(02) 4993 7509
Environment & Community Superintendent	Carly McCormack	Austar Coal Mine	(02) 4993 7334
Environment & Community Coordinator	Josh Chadwick	Austar Coal Mine	(02) 4993 7363

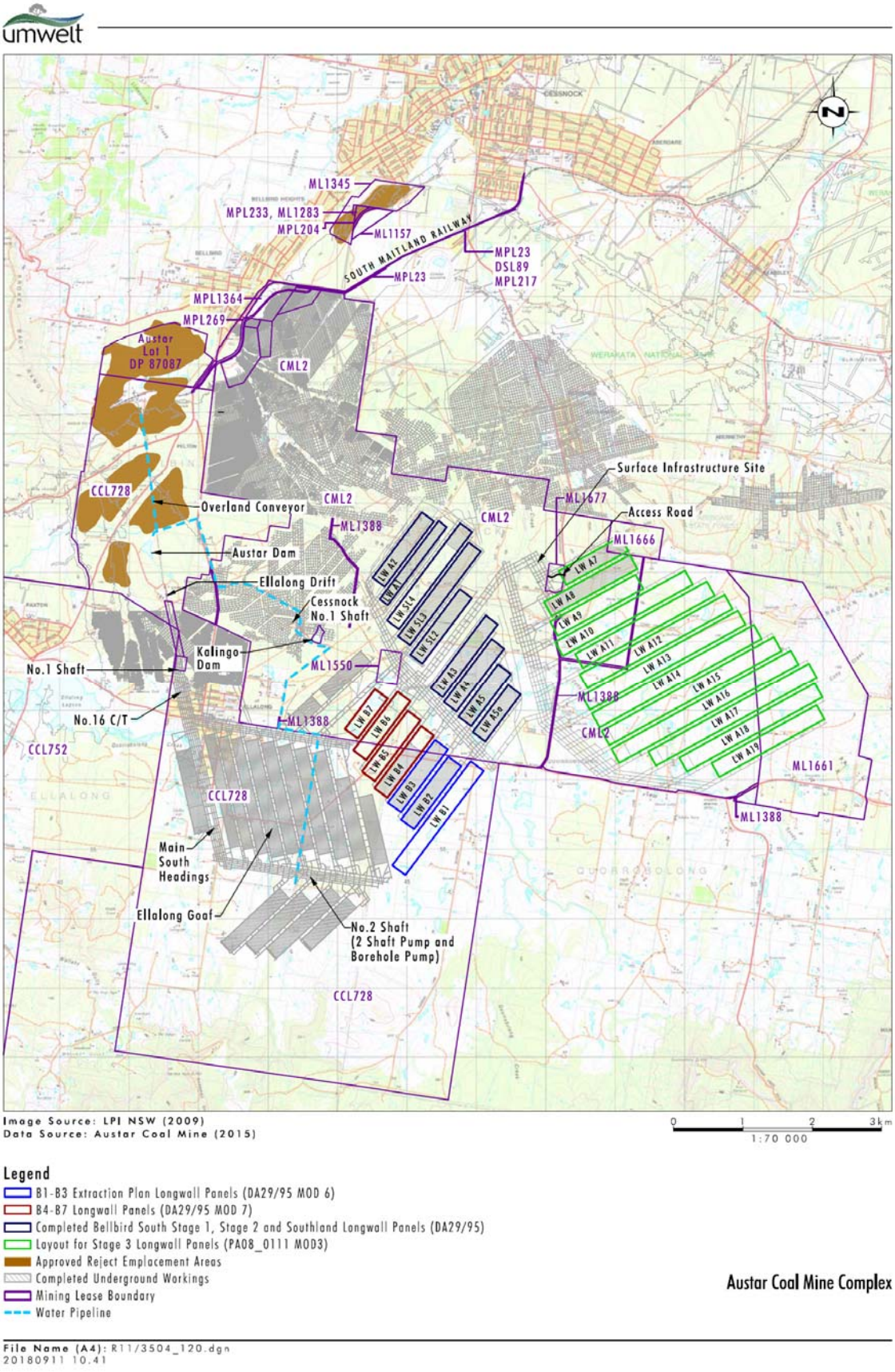


Figure 2-1 Locality Plan and Approved Mining Operations

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

Modification 7 to DA 29/95 was approved on 25 August 2017. The modification allows for mining to be extended into Longwalls LWB4 to LWB7 using conventional longwall mining methods. The modification includes updated rehabilitation objectives, the requirement for a groundwater impact review to be completed and the update of numerous conditions with more contemporary requirements.

A variation to Environment Protection Licence (EPL) 416 was approved on 15 December 2017 to increase the scale of activity to greater than two million tonnes per annum (Mtpa). This increased production rate is consistent with production approved under DA29/95 and PA08_0111, which allow for extraction of 3.6Mtpa of ROM coal.

Two additional conditions were also added to EPL 416 (U3 and E2) as a result of the ongoing drainage line investigation at the CHPP. This investigation is discussed further in **Section 7.3**.

Following approval of DA 29/95 Modification 7, the Environmental Management Strategy, and environmental management plans relevant to mining in the Bellbird South area, were revised and lodged with DPE for approval. A new Extraction Plan was lodged and approved for Longwalls LWB4 to LWB7. Details of approval dates are found in **Table 3-3** and **Table 3-4**.

3.2 Primary Approvals

3.2.1 Development Approval

A summary of Austar's development approvals are outlined in **Table 3-1**.

TABLE 3-1 DEVELOPMENT APPROVALS AND CONSENTS

Consent Description	Date	Approval Authority	Approved Development
DA 74/75/79	4 December 1975	Cessnock City Council (CCC)	Development Consent for a coal mine at Ellalong. • Approval for underground coal mining. • Construction of a new access drift, upcast shaft and ventilation shaft. • Expansion of the Pelton CHPP. • Conveyance of coal from the Ellalong pit top to the Pelton CHPP. Operation of the Pelton CHPP for the washing and handling of coal.

Consent Description	Date	Approval Authority	Approved Development
			• Water management systems. • Upgrade of the Pelton rail loading facility and railway spur. • Reject emplacement underground, company owned land, open cut areas adjoining Pelton and other abandoned mine sites.
DA 118/680/93	8 October 1980	CCC	Downcast Ventilation Shaft and Man Access Shaft, Bathhouse and Offices at Ellalong Colliery.
DA 118/691/181	26 November 1992	CCC	Pelton Open Cut Coal Mine. • Approval of an open cut coal mine adjoining Pelton Colliery up to 300,000 t of coal and underground mining of approximately 27,000 t of coal from a section of prior workings south of the proposed open cut.
DA 118/691/181 (modification)	11 January 1993	CCC	Pelton Open Cut Coal Mine – Modification. • Extension of open cut mining area. • Infrastructure and water management modifications.
DA 118/691/229	7 January 1993	CCC	Pelton Coal Handling Preparation Plant – Raw Coal Handling Facility, Washed Coal Facility and Upgrading Water Management System. • Upgrade and replacement of coal handling infrastructure such as surge bin, automatic stacking system, reclaim facilities and skyline conveyor. • Increase in stockpile capacity. • Upgrade to water management system. • Extension of the reclaim tunnel. • Construction of a mine water transfer pipeline from Ellalong Colliery to Pelton. • Provision of underground workings for emergency mine water disposal. • Upgrade of lime treatment plant.
DA 118/693/42	26 November 1993	CCC	Extension of Pelton Open Cut Mine. • Extension of open cut mining area including emplacement of overburden in previously mined blocks and extension of the mine's water management system.
DA 118/694/120	27 June 1994	CCC	Approves the extraction of longwall panels LW13 and LW14 as a minor extension to the Ellalong Colliery within CML2.
DA 118/694/152	7 July 1994	CCC	Relocatable Office and Temporary Bathhouse at Pelton Colliery.

Consent Description	Date	Approval Authority	Approved Development
DA 118/695/22	12 July 1995	CCC	Establishment of Overburden Stockpile at Pelton Colliery. • Establishment of an overburden stockpile for the Pelton Open Cut Operations.
DA 118/695/81	12 July 1995	CCC	Additions for Bathhouse, Office and Car park at Ellalong Colliery. • Extension to the bathhouse at the Ellalong drift site. • Extension of existing offices or construction of portable offices. • Construction of a 4000 square metre car park.
DA 8/1999/1658	18 February 2000	CCC	Relocation of Ventilation Facilities at Bellbird South Underground Mine. • Installation of a ventilation shaft and fan house. • Upgrading of the existing access track to the site from the Pelton-Ellalong Road.
DA 8/2002/655/1	16 October 2002	CCC	Compressor and Pump Enclosure Buildings at Ellalong Colliery.
DA 118/695/18	21 February 1995	CCC	Re-locatable Office at Pelton Colliery.
DA 29/95	14 February 1996	Minister for Urban Affairs and Planning	Ellalong Colliery Extension into Bellbird South. • Extension of underground mining activities into Bellbird South area (CML 2). • Mine life of 21 years with a production of 3 Mtpa. • Reject emplacement. • Construction and operation of a new infrastructure site including new ventilation shaft and fan(s) (No. 2 Shaft) adjacent to Sandy Creek Road. • Use of Pelton CHPP for washing and handling of coal. • Provision of a maximum raw coal stockpile of 100,000 t. • Reopening of disused Cessnock No. 1 Colliery shafts for ventilation and access, or the sinking of new shafts, as required. • Construction of various water management devices including sedimentation and clean water dams and drainage systems.
DA 29/95 (modifications)	27 Sep 2006 (MOD 1) 8 Jun 2008	Minister for Planning (or delegate)	Extension of Underground Mining Activities into Bellbird South (Ellalong Colliery) – Modifications. • Use of longwall top coal caving (LTCC) mining methods in longwall panels (A1 to A5).

Consent Description	Date	Approval Authority	Approved Development
	(MOD 2) 28 May 2009 (MOD 3) 7 Dec 2010 (MOD 4) 27 April 2012 (MOD 5) 29 Jan 2016 (MOD 6) 25 August 2017 (MOD 7)		• Installation of a larger capacity fan at the site approved for DA 8/1999/1658. • Installation of a new downcast ventilation shaft. • Installation of a new 10 MVA substation. • Installation of a nitrogen inertisation plant with a 2,000 m^3 capacity. • Provision of a diesel and emulsion fluid storage area and dispatch system. • Installation of a tube bundle shed to house electronic monitoring equipment. • Upgrade of the existing water treatment plant. • Upgrade of water reticulation and pumps. • Minor embankment stabilisation works at Kalingo Dam. • Longer and wider panels A4 and A5. • Extract one additional Longwall Panel A5a (LW A5a) using LTCC • Extension of LTCC Longwall Panel A5a • Extension to Bellbird South development consent area to include Longwall Panels LWB1 to LWB7 • Extension of consented activities to 14 Feb 2022.
Project Approval 08_0111	6 Sep 2009	Minister for Planning	Stage 3 Expansion Project - extension to longwall mining to an area east of existing operations. Key features: • Longwall production from the Greta coal seam from panels A6 to A17 using longwall Top Coal Caving (LTCC) technology • Construction of a new surface infrastructure site south west of Kitchener including ventilation shafts and fans, winders, bath house facilities, a workshop, electricity substation, store and offices. Construction of a new road and intersection at Quorrobolong Road. • Coal will continue to be brought to the surface at Austar's existing surface facilities at Paxton. These facilities will continue to be used to take large mining equipment into and out of the mine.

Consent Description	Date	Approval Authority	Approved Development
			• Continued use of Austar's existing water management, coal transport systems, coal preparation plant and rejects emplacement areas.
Project Approval 08_0111 (Modifications)	4 May 2010 (MOD 1) 13 March 2012 (MOD 2) 17 Dec 2013 (MOD 3)	Delegate for Minister for Planning Delegate for Minister for Planning	• Minor change to wording regarding subsidence impact performance measures to built features in Table 1 of approval. The key performance indicator requires the project does not cause built features to go beyond safe, serviceable and repairable criteria, unless the landowner agrees in writing. • Reorientation of the Stage 3 longwalls. Removal of longwall A6, and extraction of coal in longwalls A7 to A19, which are a reorientation of previously approved longwalls A7 to A17 to more closely align with the direction of principal stress. In addition, the chain pillar widths are increased from 45m to 55m to reduce roadway failure risks which in turn further minimises subsidence. The modification will enable more efficient and safer extraction of coal from the Stage 3 area. • Extension of longwalls A7 to A10 to the west by approximately 100m and 300m
DA 8/2012/503/1	19 Dec 2012	CCC	• Extension of car parking area associated with Austar Coal Mine

3.2.2 Mining Authorities

Details of the relevant mining authorities are summarised in **Table 3-2**.

TABLE 3-2 MINING LEASES

Mining Title (Act)	Date Granted	Expiry Date	Area (Ha)	Surface	Depth Restriction
EL 6598 (1992)	13/07/2006	13/06/2021	7,370	Yes	Various
Dam Site Lease 89 (1901)	04/04/1908	04/04/2030	3.961	Yes	Surface to 15.24 metres
Mineral Lease No. 1157 (1906)	8/07/1949	08/07/2028	10.24	Yes	Surface to 15.24 metres
Mineral Lease No. 1283 (1906)	13/07/1961	13/07/2022	1.973	No (subsurface)	7.62 to 15.24 metres

Mining Title (Act)	Date Granted	Expiry Date	Area (Ha)	Surface	Depth Restriction
Mining Purposes Lease No. 23 (1906)	17/05/1909	17/05/2030	2.421	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 204 (1906)	03/02/1916	03/02/2039	1.2	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 217 (1906)	12/04/1916	12/04/2039	0.6298	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 233 (1906)	01/08/1916	01/08/2036	1.973	Yes	Surface to 7.62 metres
Mining Purposes Lease No. 269 (1906)	07/12/1917	07/12/2018	2.79	Yes	Surface to 6.1 metres below the level of the rails when laid
Mining Purposes Lease No. 1364 (1906)	28/10/1968	28/10/2029	0.4527	Yes	Surface to 15.24 metres
Consolidated Coal Lease No. 728 (1973)	10/10/1989	30/12/2023	3296.8	Various	Various
Consolidated Coal Lease No. 752 (1973)	23/05/1990	30/12/2023	3802	No (subsurface)	Various
Consolidated Mining Lease No. 2 (1992)	24/03/1993	15/05/2025	3388	Various	Various
Mining Lease No. 1345 (1992)	23/03/1995	30/12/2023	41.895	Yes	Surface to 900 metres
Mining Lease No. 1388 (1992)	02/04/1996	02/04/2038	15.12	No (subsurface)	30.48 metres to unlimited depth
Mining Lease No. 1550 (1992)	24/06/2004	23/06/2025	14.11	Yes	Surface to 20 metres
Mining Lease No. 1661 (1992)	22/11/2011	22/11/2032	469.32	No (subsurface)	20 to 900 metres
Mining Lease No. 1666 (1992)	25/01/2012	25/01/2033	34.13	No (subsurface)	30.48 to 900 metres
Mining Lease No. 1677 (1992)	23/08/2012	23/08/2033	9.16	Yes	Surface to 30.48 metres

3.2.3 Environment Protection Licence

Austar operates in accordance with Environment Protection Licence 416 (EPL 416), issued on 5 April 2000 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

An Extraction Plan for LWB1 to LWB3 was prepared in consultation with the relevant government agencies and approved by the DPE on 4 July 2016. LWB2 and LWB3 were extracted from July 2016 to August 2017. An Extraction Plan for LWB4 to LWB7 was approved by the DPE on 20 September 2017 and extraction commenced in October 2017.

A summary of Extraction Plan / SMP approvals for Bellbird South (LWB1-LWB7) and Stage 3 mining areas held by Austar is outlined in **Table 3-3**. Previous SMP approvals for the Bellbird South Stage 2 area are also shown in **Table 3-3**.

TABLE 3-3 SUBSIDENCE MANAGEMENT PLAN / EXTRACTION PLAN APPROVALS

Consent Description	Date	Approval Authority	Approval Summary
SMP Approval 06/7775	30 Jan 2009	DRG	Subsidence Management Plan approval for Austar Colliery Longwall A3 only
SMP Approval 08/2956	24 Dec 2009	DRG	Subsidence Management Plan approval for Austar Colliery Longwalls A4-A5
SMP Approval 10/22	27 April 2011	DRG	Subsidence Management Plan approval for Austar Colliery Longwall A5a
SMP Approval 10/22	7 May 2012	DRG	Subsidence Management Plan approval for Austar Colliery Longwall A5a extension. Conditions of approval are the same as those issued for Longwall A5a
Extraction Plan Approval	30 May 2013	DPE	Extraction Plan approval for Austar Coal Mine Longwalls A7 to A10
SMP Approval 13/1876	3 June 2013	DRG	Subsidence Management Plan approval for Austar Coal Mine Longwalls A7 to A10
Extraction Plan Approval	6 January 2014	DPE	Extraction Plan approval for Austar Coal Mine Longwalls A7 to A10 to correspond to PA08_0111 MOD3 and retraction to LWA8 commencing end
SMP Variation Approval 13/1876	7 January 2014	DRG	Subsidence Management Plan approval for Austar Coal Mine Longwalls A7 to A10 to correspond to PA08_0111 MOD and retraction to LWA8 commencing end

Consent Description	Date	Approval Authority	Approval Summary
SMP Variation Approval 13/1876	19 February 2014	DRG	Subsidence Management Plan approval for retraction to LWA9 commencing end
Extraction Plan LWB1 to LWB3	4 July 2016	DPE	Extraction Plan for Bellbird South Longwalls B1 to B3 was approved by DPE on 4 July 2016
Extraction Plan LWB4 to LWB7	14 September 2017	DPE	Extraction Plan for B4 to B7 in accordance with the requirements of DA 29/95 and approved on 20 September 2017

3.3.2 Mining Operations Plan

In accordance with the *Mining Act 1992*, Austar conduct operations in accordance with a Mining Operations Plan (MOP). The MOP covers underground mining, coal handling and other associated activities. The MOP is approved for the period September 2016 to June 2023.

Under the MOP, mining will continue within existing approved coal reserves of the Bellbird South and Ellalong Colliery areas (LWB4 to LWB7) prior to returning to the Stage 3 area.

3.3.3 Environmental Management Plans

In accordance with DA29/95 and PA08_0111, Austar have developed and implemented a range of environmental management plans. **Table 3-4** outlines the environmental management plans required by each relevant development consent, the determining authority and their approval status during the reporting period.

The Environmental Management Strategy (EMS), and environmental management plans relevant to mining in the Bellbird South area, were updated and submitted to DPE in June 2018 for approval. Approval of the revised management plans was received in the 2018-19 reporting period.

DA29/95 Schedule 5, Condition 8 requires the revision of strategies, plans and programs to be undertaken within three months of a modification and submitted to the DPE for approval within 6 weeks of the review. The management plans were not submitted for approval within the time specified in the consent, leading to a non-compliance which has been reported in **Section 1** and the Independent Environmental Audit (IEA) conducted within the reporting period. The IEA also identified that the Historic Heritage Management Plan required an administrative update to include the requirements of Condition 8. This will be updated during the next reporting period.

Operations during the 2017-18 reporting period were undertaken in accordance with the EMS and environmental management plans prior to the June 2018 update, as listed in **Table 3-4**.
Environmental management plans are available from the Austar website: www.austarcoalmine.com.au

TABLE 3-4 ENVIRONMENTAL MANAGEMENT PLANS

Plan	DA Requirement	Approval Authority	Approval Date (Pre-update)
Environmental Management Strategy, May 2013	DA29/95 – Schedule 5 Condition 1 PA08_0111 - Schedule 7 Condition 1	DPE	2 October 2013
Environmental Monitoring Program, May 2013	DA29/95 – Schedule 5 Condition 2 PA08_0111 - Schedule 7 Condition 1	DPE	2 October 2013
Shaft Construction Environmental Management Plan, June 2012	PA08_0111 – Schedule 4 Condition 1, 2, 8	DPE	15 June 2012
Landscape Management Plan – Kitchener SIS, June 2013	PA08_0111 – Schedule 6 Condition 4	DPE	22 July 2013
Site Water Management Plan, April 2013	DA29/95 – Schedule 3 Condition 6-11 PA08_0111 – Schedule 4 Condition 9	DPE	17 May 2013
Noise and Vibration Management Plan, July 2013	DA29/95 – Schedule 3 Condition 13-16 PA08_0111 – Schedule 4 Condition 2-3	DPE	2 August 2013
Air Quality and Greenhouse Gas Management Plan, June 2013	DA29/95 – Schedule 3 Condition 17-20 PA08_0111 – Schedule 4 Condition 6-7	DPE	26 June 2013
Aboriginal Cultural Heritage Management Plan, May 2013 & Addendum October 2013.	PA08_0111 – Schedule 3 Condition 4 and Schedule 4 Condition 10	DPE	30 May 2013 & 6 January 2014
Historic Heritage Management Plan, January 2014	PA08_0111 – Schedule 4 Condition 11	DPE	19 February 2014
Surface Infrastructure Site Traffic Management Plan, December 2009	PA08_0111 – Schedule 4 Condition 1 Statement of Commitments 1.12.1	Cessnock City Council	22 December 2009

4 OPERATIONS SUMMARY

4.1 Exploration

Two surface exploration boreholes were drilled during the reporting period along with a seismic program, comprising an area of approximately 3.5 square kilometres over the south-western portion of the Stage 3 mining area. The purpose of these boreholes was to provide further data for resource definition, coal quality and seam structure modelling, while the purpose of the seismic program was to better define structure in the Stage 3 mining area, in particular the Quorrobolong Fault Zone.

During the 2018-19 reporting period it is planned to undertake further exploration boreholes to further optimise resource definition, coal quality modelling and seam structure modelling potential.

4.2 Mining

4.2.1 Underground Mining Operations

The Austar Coal resource covers a large area of the Greta Seam in the Newcastle Coalfield, situated approximately 10km west of Cessnock. Mining in the second Stage 3 panel (LWA8) was completed 24 June 2015. No mining was completed in the Stage 3 area during the 2016-17 AEMR or 2017-18 Annual Review reporting periods.

Extraction of longwall panel LWB3, within the Bellbird South mining domain, commenced 11 March 2017 and was completed 31 August 2017. The longwall equipment was then relocated to longwall panel LWB4 where extraction began 5 October 2017, with completion of LWB4 extraction planned to occur in the 2018-19 reporting period.

LWB4 had a planned total panel length of 1,125m. Due to geological factors and the occurrence of coal burst incidents in the LWB4 panel, an application has been made to DPE to shorten the finishing end of LWB4 by a nominal length of 279 metres from the location indicated in the approved Extraction Plan. LWB4 is now planned to be completed with a finishing end of 850m (subject to approval).

A number of prohibition notices were issued by the Resources Regulator during the reporting period, significantly restricting longwall mining capacity at Austar since February 2018. Two (2) notices were still in force at the end of the reporting period (cancelled on 30 July and 3 August 2018).

Mining undertaken in the 2017-18 reporting period, and planned for the next reporting period is presented in **Plan 3A**.

4.2.2 Ventilation

A mine gas monitoring station is located on the surface near the No.3 Shaft facility. Monitoring data indicates low levels of seam gas emissions comprising carbon dioxide (CO_2) (2017-18 Average 0.21%) and methane (CH_4) (2017-18 Average 0.07%) under normal operating conditions.

4.2.3 Production and Forecast Production

Austar Coal Mine is approved by Project Approval PA 08_0111 to extract up to 3.6 Mt of ROM coal from the Austar Coal Mine Complex.

Table 4-1 provides a summary of coal production and waste generation for the 2017-18 reporting period.

TABLE 4-1 PRODUCTION AND WASTE SUMMARY

Material	Approved Limit	2016 - 2017 Reporting Period	2017 - 2018 Reporting Period	2018-2019 Reporting Period (Forecast)
Waste Rock / Overburden	N/A	N/A	N/A	N/A
Fine Reject (Tailings) (ML)	-	334,900	255,966	175,936
Coarse Reject (t)	-	16,484	25,159	13,162
ROM Coal (t)	3,600,000	2,015,187	1,413,065	1,013,076
Saleable Product (t)	-	1,950,724	1,043,353	921,808

The forecast mine production in the 2016-17 AEMR estimated approximately 2.05 Mt ROM coal mined in 2017-18. Coal production at Austar during the reporting period was significantly lower than predicted. This was due to several coal burst incidents in Longwall LWB4 panel and the associated service of prohibition notices by the Resource Regulator. Total ROM mined in the 2017-18 reporting period was within approved production limits. Forecast production in the 2018-19 period will be mined from longwall panels in the Bellbird South mining area.

Coal is processed at the Austar Coal Handling and Preparation Plant (CHPP). During the reporting period fine tailings were transported by pipeline and emplaced in old underground workings within the mining lease area. The return water from the tailings gravitates through the old mine workings and is recovered by dewatering pumps back into Austar's contaminated water management system for treatment and reuse in the CHPP. Water treated by the Reverse Osmosis plant can be discharged off-site under Austar's EPL 416.

Coarse reject was transported by truck, predominantly to the Aberdare Reject Emplacement Area. The East Open Cut Void was also used as an alternative emplacement area when emplacement at the Aberdare Reject Emplacement Area was unavailable due to adverse weather conditions.

Analysis of the waste materials at Austar indicates that it contains sulphur in the organic or pyritic form, and therefore has the potential for acid mine drainage (AMD). Details regarding the control of acid water onsite are outlined in the approved Site Water Management Plan (SWMP). Rehabilitation strategies have been developed to reduce the potential for acid mine drainage by designing emplacement areas that drain to old mine workings.

4.3 Product Coal Transport

The existing approved coal transport system has continued to be utilised to transport product from the site. During the reporting period 1,546,932 tonnes of product coal from Austar was transported 65 km by rail to Port Waratah Coal Services (PWCS) and Newcastle Coal Infrastructure Group (NCIG) ship coal loading facilities for sale on the export market.

During the 2017-18 reporting period no product coal was transported by road.

4.4 Hours of Operation

Mining and coal processing activities were undertaken 24 hours per day, seven days per week during the reporting period.

4.5 Waste Management

Waste collected during the 2017-18 reporting period, as provided by Austar's waste management contractors, is summarised and compared to the previous reporting period in **Table 4-2**.

TABLE 4-2 WASTE MANAGEMENT DATA (TONNES)

	Paper & Cardboard	Chemical Anchors	Oily Filters	Oily Water	Waste Oil	Fluorescent Tubes	Timber	Medical & Sanitary	Oily Rags	Mixed Solid Waste	Scrap Metal	Printer Cartridges
2017-18	6.88	1.94	0.97	2.31	28.50	-	17.64	0.16	0.20	505.8	270.55	0.156
2016 -17	7.62	4.74	1.07	-	33.9	-	13.50	0.39	0.16	517.41	336.26	0.074

A reduction of waste generated can be seen across most waste streams in the current reporting period. This can be attributed to a maintained focus on effective waste management and a reduction in production during this period.

Waste contractors undertake weekly inspections of waste bins and report any issues to Austar staff. If cross contamination is an ongoing issue, or a waste improvement is identified, employees and contractors can be educated through tool box talks and inductions.

4.6 Planned Operations Next Reporting Period

During the next reporting period, longwall mining operations will continue in LWB4 before moving into LWB5 and then on to LWB6 in June 2019. Coarse reject will continue to be emplaced in the Aberdare Reject Emplacement Area, and fine tailings will continue to be emplaced in old underground workings.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

DRG reviewed the 2016-17 AEMR and provided a formal response on 27 February 2018. The AEMR was accepted subject a number of items. These items and their status at the end of the reporting period are shown in **Table 5-1**.

DPE noted receipt of the 2016-17 AEMR after its submission. A formal response was provided on 11 January 2018, with the comments provided in **Table 5-1**.

Actions identified in the 2016-17 AEMR are also provided in **Table 5-1**.

TABLE 5-1 ACTIONS REQUIRED FROM PREVIOUS REVIEW

Action Required from Previous Annual Review	Requested by	Action taken by Austar	Where discussed in Annual Review
The capping strategy for coarse rejects is further developed, with consideration to likely long-term vegetation communities, to ensure that reject material does not present a risk of spontaneous combustion or is potentially ignited by bushfire following relinquishment.	DRG	A geotechnical investigation was commissioned during the 2017-18 reporting period. The aim of the investigation was to assess the subsurface soil and groundwater conditions across at Aberdare Reject Emplacement Area. The findings of this study will assist in determining final rehabilitation and post mining land use.	**Section 8.4**
Borehole cutting material is stabilized with sufficient vegetation to prevent erosion.	DRG	Borehole cuttings have been seeded and where necessary sediment fencing has been constructed.	**Section 6.1**
Further consideration is given to the long-term vegetation cover in areas in close proximity to remnant woodland to reduce maintenance liabilities post-relinquishment.	DRG	A geotechnical investigation was commissioned during the 2017-18 reporting period. The aim of the investigation was to assess the subsurface soil and groundwater conditions across at Aberdare Reject Emplacement Area. The findings of this study will assist in determining final rehabilitation in these areas.	**Section 8.4**
For future reports please ensure the report is consistent with the format of the Department's Annual Review Guideline (2015).	DPE	This Annual Review has been updated to be consistent with the Department's Annual Review Guideline (2015).	**Section 2.1**
Continued emplacement of coarse reject at Aberdare Extended Reject Emplacement Area.	2016-17 AEMR	Coarse reject has continued to be emplaced at the Aberdare Reject Emplacement Area.	**Section 4.3**

Action Required from Previous Annual Review	Requested by	Action taken by Austar	Where discussed in Annual Review
A study of the coarse reject material to further understand its chemical and physical characteristics with the aim to determine spontaneous combustion and bushfire propensity and risks related to acid leachate, and based on the outcomes of the study, Austar will determine the suitability of a minimum capping thickness.	2016-17 AEMR	A geotechnical investigation was commissioned during the 2017-18 reporting period. The aim of the investigation was to assess the subsurface soil and groundwater conditions across at Aberdare Reject Emplacement Area. The findings of this study will assist in determining minimum capping thickness.	**Section 8.4**
Finalisation of Phase 1 Contamination Assessment for all Surface Mining Lease areas.	2016-17 AEMR	The Phase 1 Contamination Assessment will be reviewed and actions considered during the next reporting period.	**Section 12**
Submission of a new MOP including additional tailings boreholes to Pelton underground workings and installation of those boreholes in accordance with the new MOP.	2016-17 AEMR	The MOP will be revised during the next reporting period. No new tailings boreholes were installed in 2017-18 reporting period.	**Section 12**
Progress assessments to support demolition of existing structures and foundations at Bellbird, Pelton, and Cessnock No. 1 (Kalingo) Collieries.	2016-17 AEMR	No progress on the demolition of structures was made during the reporting period.	**Section 12**
Continued implementation of noise pollution reduction program at the Austar CHPP.	2016-17 AEMR	A noise source investigation was conducted during the reporting period.	**Section 6.6.2**
Progressive implementation of the erosion and sediment control plan at the Aberdare Extended Emplacement area for capped areas with potential to drain to natural watercourses. Progress installation of the clean water diversion drain.	2016-17 AEMR	Dirty water areas continue to drain to underground workings. Detailed design of the clean water diversion drain will be progressed.	**Section 8.2.1**
Investigation of mechanisms for controlling the drainage of acid leachate from the emplacement areas to underground workings.	2016-17 AEMR	A geotechnical investigation was commissioned during the 2017-18 reporting period. The aim of the investigation was to assess the subsurface soil and groundwater conditions at Aberdare Reject Emplacement Area.	**Section 8.4**
Revision of any strategies, plans and procedures relevant to the 2017-18 reporting period.	2016-17 AEMR	The EMS and environmental management plans were updated and submitted to DPE for approval.	**Section 3.3.3**

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 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 DA29/95 and PA08_0111.	Austar complied with all air quality criteria during the reporting period. There were no air quality complaints or reportable incidents related to air quality in the reporting period.	Air Quality will continue to be managed in accordance with the Air Quality and Greenhouse Gas Management Plan.
Biodiversity (**Section 6.4**)	Refer **Section 6.4** for detail on EIS predictions.	Compliant with DA29/95 and PA08_0111.	No significant observable impacts as a result of longwall mining were identified.	Ecological monitoring will continue in accordance with the relevant Extraction Plan Biodiversity Management Plan.
Vibration and Blasting (**Section 6.5**)	Refer **Section 6.5** for detail on monitoring criteria.	Compliant with DA29/95 and PA08_0111.	No blasting occurred during the reporting period. Non-mandatory vibration monitoring criteria adopted were not exceeded during the reporting period.	Vibration and blasting will continue to be undertaken in accordance with the Noise and Vibration Management Plan.
Noise (**Section 6.6**)	Refer **Section 6.6** for detail on approval criteria.	Two exceedances of EPL noise criteria at the CHPP in the reporting period. Two noise complaints relating to mechanical pump failure at Kalingo Infrastructure Area.	Both exceedances of EPL criteria were for the CHPP and were as a result of application of the low frequency noise penalty. Both noise complaints were related to the same mechanical pump failure.	Noise monitoring and management will continue in accordance with the Noise and Vibration Management Plan.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Aboriginal Cultural Heritage (**Section 6.7**)	The Aboriginal Cultural Heritage Management Plan provides a consolidated framework and process for managing Aboriginal cultural heritage responsibilities within the Austar Coal Mine in compliance with all Aboriginal cultural heritage management requirements under legislation, guidelines and existing consents.	Compliant with DA29/95 and PA08_0111.	Aboriginal Due Diligence Assessments were undertaken prior to land disturbance works. No Aboriginal objects were discovered during works.	Continue to assess and undertake operations in accordance with the Aboriginal Cultural Heritage Management Plan.
Mine Subsidence (**Section6.8**)	Refer **Section 6.8** for detail on predictions.	Compliant with DA29/95 and PA08_0111.	The observed subsidence resulting from the extraction of Longwalls B2, B3 and B4 were generally similar to or less than the maximum predicted subsidence. The profiles of observed subsidence also reasonably matched those predicted, but with reduced magnitudes.	Continue to monitor and manage subsidence impacts in accordance with the Extraction Plan and Subsidence Monitoring Program.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Water – Surface Water (**Section7.3**)	Refer **Section 7.3** for detail on approval criteria and background levels.	Compliant with DA29/95, PA08_0111 and EPL 416.	Discharge from LDP6 was in accordance with EPL criteria. Monitoring of the Investigation Drainage Line at the CHPP continued in accordance with the EPL Pollution Reduction Program. Surface water quality trends indicate no adverse mining impacts on the water quality of the local waterways. There have been no reportable incidents or community complaints in relation to water quality during the reporting period. No TARPs under the Water Management Plan were triggered.	Surface water monitoring and management will continue in accordance with the Site Water Management Plan.
Water – Groundwater (**Section 7.4**)	Refer **Section 7.4** for detail on approval criteria and background levels.	Compliant with DA29/95 and PA08_0111.	The predicted impacts by the groundwater impact assessments from the DA29/95 MOD6 EA, and the DA29/95 MOD7 EA have, in general, been validated by measurements. The predictions when compared to current groundwater monitoring data (groundwater levels, quality and mine inflow) are valid.	Groundwater monitoring and management will continue in accordance with the Site Water Management Plan and relevant Extraction Plan Water Management Plans.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Erosion and Sediment Control	PA 08_0111 requires an Erosion and Sediment Control Plan as part of the Site Water Management Plan (SWMP).	There were no reportable incidents or community complaints in relation to Erosion and Sediment control during the reporting period. Operations remained compliant with the SWMP. Monthly inspections are undertaken which incorporate inspections of erosion and sediment control and drainage lines. As a result of the DRG Annual review comments, borehole cuttings were stabilised using a mix of seeding and sediment control fencing as required.	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 inspect the sediment control structures for capacity, structural integrity and effectiveness.	Erosion and Sediment control will continue to be managed in accordance with the Site Water Management Plan.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
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 no contamination to nearby areas. Spill kits in all hydrocarbon storage areas are monitored weekly by the waste contractor and replenished as necessary. Bunded hydrocarbon storage areas are also monitored weekly by the waste contractor and pump out is scheduled as required.	Hydrocarbon management systems are designed and installed in accordance with Australian Standards and EPA guidelines. Austar operates a hydrocarbon remediation area at the CHPP to manage hydrocarbon contaminated material retrieved from the site. The area is signposted and has three bunded cells for segregation of materials of different ages. The bunded area was constructed on a disused laydown area and is within the sites dirty 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.	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
Weed and Feral Animal Management and Control	Not applicable.	*Dittrichia graveolens* (Stinkwort) was controlled at Kitchener SIS in March 2018 prior to temporarily stabilising the site through application of soil ameliorants and seeding.	Weeds and feral animals are managed on an as needs basis. During the next reporting period they will continue to be monitored in monthly inspections and treated as required.	Weeds and feral animals will be treated according to 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. Screening will be used as required. Lighting will be positioned to shine into the Kitchener SIS and light shields will be used where practical.	There were no community complaints or non-compliances related to visual impacts or lighting during the reporting period.	Visual impacts and lighting will continue to be managed according to the EMS, guidelines and internal procedures as appropriate.	Visual Amenity and Lighting will continue to be managed consistent with current good practice and commitments made in relevant EAs.

Aspect	Approval Criteria / EIS Prediction	Performance During the Reporting Period	Trend / Key Management Implications	Implemented / Proposed Management Actions
Historic Heritage	Fourteen potential historic heritage sites are located within the Stage 3 mining area and may potentially experience some minor subsidence impacts. The EA (Umwelt, Oct 2008) predicts there is unlikely to be any direct or indirect impacts on the identified potential historic heritage items within the assessment area. There are a number of heritage items in Austar infrastructure areas of the site that require ongoing management or demolition.	No mining occurred in the Stage 3 area during the reporting period and no impacts were observed on historic heritage items in this area. There was no restoration or demolition works on any Austar owned heritage structures during the reporting period.	Austar and DRG have identified some heritage structures as safety issues onsite. They are appropriately managed to ensure the safety of workers onsite.	Austar will progress plans to demolish those structures that will otherwise pose safety risks. Austar will work with Cessnock City Council prior to such rehabilitation works occurring.
Spontaneous Combustion	Monitoring and response procedures will be used to minimise spontaneous combustion issues.	There were no notable spontaneous combustion events during the reporting period.	Spontaneous combustion is managed through the reject haulage and emplacement area procedure.	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 maintain 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 DA29/95, PA 08_0111 and EPL 416, Austar operate and maintain a meteorological station located at the CHPP (**Plan 2**). The following section summarises the meteorological data for the 2017-18 reporting period.

6.2.1 Rainfall

The total monthly rainfall (mm) and number of rain days during the reporting period is shown in **Table 6-2** and **Figure 6-1**. A total rainfall of 363.4mm was recorded during the 2017-18 reporting period. This represents a decrease of 195.2mm from the 2016-17 total of 558.6mm. Additionally, it is 375.9mm below the annual mean rainfall for the Cessnock region of 739.3mm (Bureau of Meteorology Cessnock Airport AWS 1968 - 2018).

TABLE 6-2 RECORDED RAINFALL 2017-18

Total Monthly Rainfall (mm)												
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
1.6	7.8	9.4	62.8	32.8	37.2	26.4	71	49.4	14.6	11.2	39.2	**363.4**
Number of Rain Days (>0.2mm)												
5	2	1	9	10	16	4	9	14	14	6	23	**113**

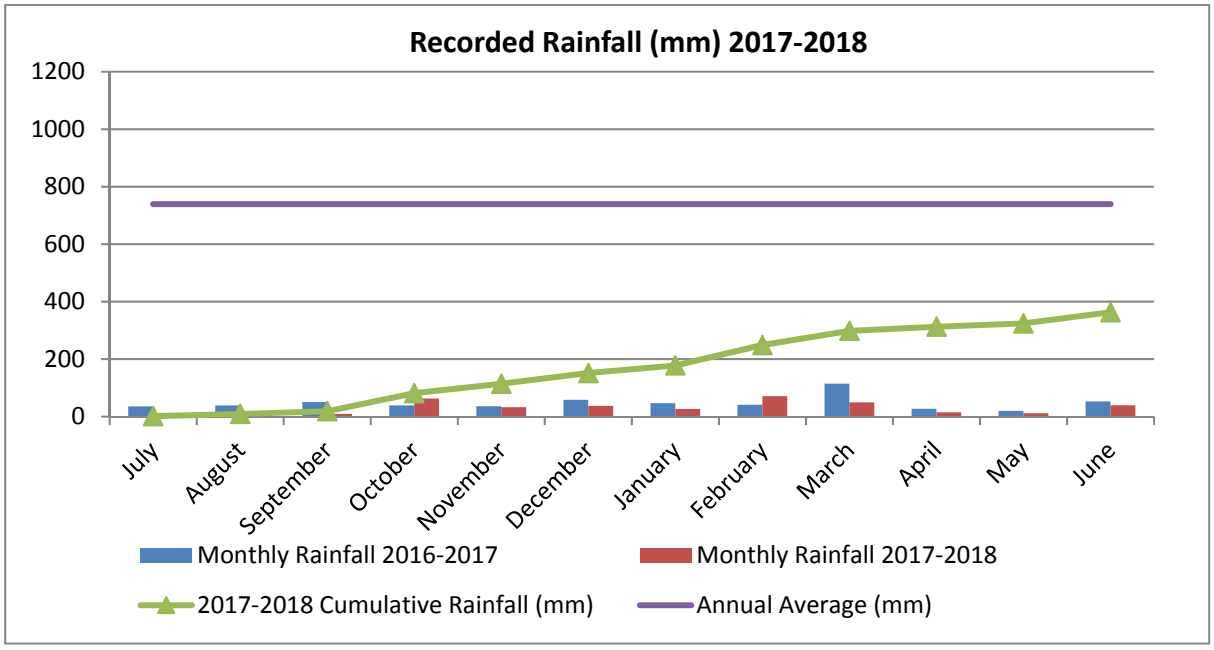


FIGURE 6-1 RECORDED RAINFALL (MM) AT AUSTAR METEOROLOGICAL STATION 2017-18

6.2.2 Temperature

Monthly maximum and minimum temperatures recorded during the reporting period are shown in **Table 6-3**.

TABLE 6-3 MONTHLY MINIMUM AND MAXIMUM TEMPERATURES 2017-18

Minimum and Maximum Monthly Temperatures (°C)												
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Min	-1.1	1.9	2.7	7.3	9.3	12.8	10.6	12.3	10	11.3	3.4	1.9
Max	24.4	27.4	34.7	35.7	31.3	42.0	43.3	38.8	37.5	33.8	27.3	19.4

6.2.3 Wind Speed

The recorded wind speed and direction data is summarised in **Table 6-4**. The annual wind rose for the reporting period is displayed in **Figure 6-2**.

TABLE 6-4 MEAN MONTHLY WIND SPEED 2017-18

Month	Mean Wind Speed (m/s)	Mean Maximum Wind Speed (m/s)	Dominant Wind Direction
July 2017	0.7	8.2	SW
August 2017	1.1	9.4	SW
September 2017	1.1	9.9	WSW
October 2017	0.8	7.9	E
November 2017	0.8	7.6	E
December 2017	0.7	8.0	E
January 2018	0.9	8.6	E
February 2018	0.8	7.9	E
March 2018	0.6	7.3	E
April 2018	0.7	7.5	SW
May 2018	0.6	7.2	SW
June 2018	0.8	7.6	SW

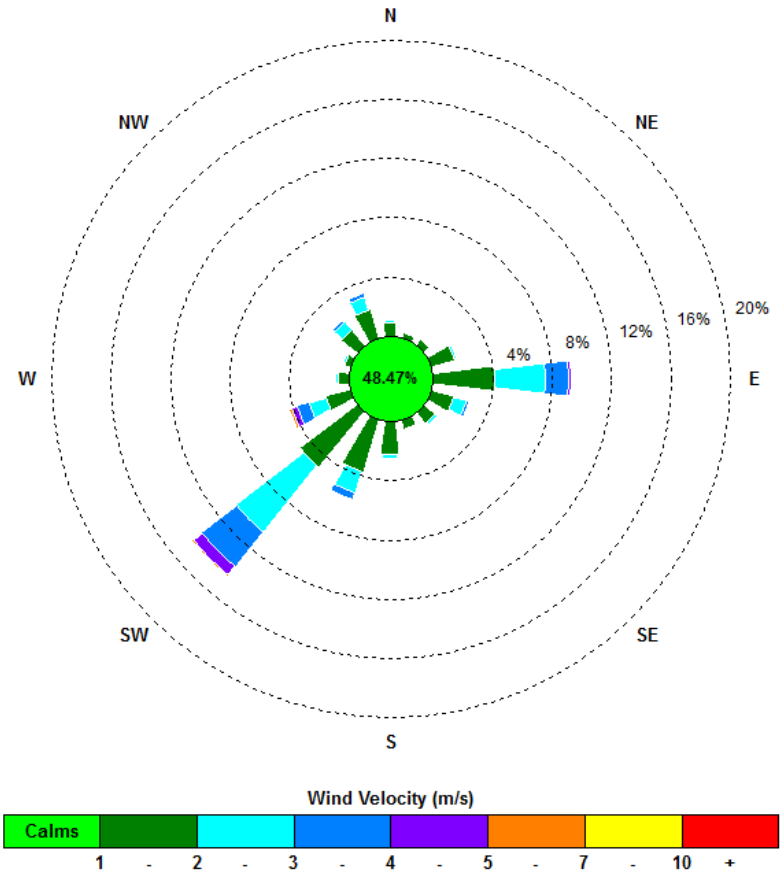


FIGURE 6-2 MONTHLY AVERAGE WIND ROSE 2017-2018

6.3 Air Quality

6.3.1 Environmental Management

Austar has prepared an Air Quality and Greenhouse Gas Management Plan (AQGGMP) for the Mine Complex to meet the requirements of PA08_0111 (specifically Schedule 4 Conditions 6 and 7), DA 29/95 and EPL 416. This Plan was approved by DPE on 26 June 2013.

Dust generated from traffic around the CHPP, Pit Top, workshop areas, access roads and reject emplacement areas is controlled by a water cart during active use of these areas. Generally, the majority of the site is stable, and does not generate excessive dust.

The AQGGMP was implemented by Austar and utilises eight dust depositional gauges, three high volume air samplers (HVAS) and one continuous dust monitor (TEOM). The HVAS and TEOM measure for particulate matter less than 10 micrometres (<=10µm), more commonly referred to as PM_{10}. Total Suspended Particulates (TSP) is not directly measured but calculated according to the methodology outlined in the AQGGMP. The location of Austar's air quality monitoring equipment is listed in **Table 6-5** and shown on **Plan 2**.

TABLE 6-5 LOCATION OF AIR QUALITY MONITORING POINTS

Site	Location Description
Dust Gauge D1	Pyne Way, Mount View
Dust Gauge D2	Ellalong Road, Pelton Village
Dust Gauge D3	Bimbadeen Road, Mount View
Dust Gauge D4	Ellalong Village
Dust Gauge D5	Kalingo Infrastructure Area (Upcast Shaft 3)
TEOM D6	Bimbadeen Road, Mount View
Dust Gauge D7	Pelton Fire Trail, Quorrobolong
Dust Gauge D8	Coney Creek Lane, Quorrobolong
Dust Gauge D9	Kitchener Village
HVAS 1 (PM_{10})	Pyne Way, Mount View
HVAS 2 (PM_{10})	Ellalong Road, Pelton Village
HVAS 3 (PM_{10})	Coney Creek Lane, Quorrobolong

6.3.2 Environmental Performance

During the reporting period, all dust samples were collected by trained specialists and analysed by NATA certified laboratories. This work 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.

Dust Deposition

Table 6-6 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 6-6 DEPOSITED DUST GAUGES ANNUAL AVERAGE COMPARED TO PREDICTIONS AND RESULTS OF PREVIOUS YEARS

No	Location	EA Prediction Background Levels – Annual Average (g/m^2/month)	Annual Average Insoluble Solids Assessment Criteria	Annual Average Insoluble Solids (g/m^2/month)				Annual Average Insoluble Solids Increase Assessment Criteria	Change in Deposited Dust 2016-17 to 2017-18 Period (g/m^2/month)
				2014-15	2015-16	2016-17	2017-18		
D1	Pyne Way, Mount View	0.2 – 2.7*	4 g/m^2 /month (maximum total deposited dust level)	1.0	0.9	0.8	0.9	2 g/m2 /month (maximum annual increase in deposited dust level)	0.1
D2	Ellalong Road, Pelton Village	0.2 – 2.7*		1.5	1.4	1.4	1.1		-0.3
D3	Bimbadeen Road, Mount View	0.2 – 2.7*		1.2	0.9	1.1	0.7		-0.4
D4	Ellalong Village	n/a		2.4	2.7	1.6	1.6		0
D5	Kalingo Infrastructure Area (Upcast Shaft 3)	n/a		2.3	3.3	1.5	0.7		-0.8
D7	Pelton Fire Trail, Quorrobolong	1.5 – 1.65^		0.7	0.9	0.9	1.2		0.3
D8	Coney Creek Lane, Quorrobolong	1.5 – 1.63^		0.8	0.6	0.9	0.9		0
D9	Kitchener Village	n/a		0.9	0.9	0.8	1.3		0.5

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 4g/m^2/month for insoluble solids. Overall dust results were generally similar to the 2016-17 reporting year as shown in **Table 6-6**. The maximum increase of recorded annual average insoluble solids at any one location from the 2016-17 reporting period to 2017-18 reporting period was 0.5g/m^2/month at dust monitor D9 in Kitchener Village.

Dust results for the reporting period are consistent with dust results stated in the 1995 Environmental Impact Statement (EIS) for extension of underground mining operations at Pelton/Ellalong Colliery. 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. The air quality criteria and measured results for deposited dust are provided in **Table 6-6**.

Overall, a total of seven (7) monthly dust deposition gauges were either contaminated with bird droppings, insects or vegetative matter, and these results were left out of the annual average calculation. This is down from a total of 13 in the 2016-17 reporting period. Of the seven (7) contaminated gauges, six (6) were depositional dust gauge five (DG5).

During the 2015-16 reporting period DG5 was contaminated eight (8) times in the period. Austar installed bird spikes in an attempt to minimise contamination of the gauge. A temporary decrease in contamination was noted with only four (4) samples in the 2016-17 reporting period being contaminated. This 2017-18 reporting period DG5 was contaminated on six (6) occasions. High levels of contamination of the gauge resumed in December 2017. In an effort to further limit this contamination bird spikes were adjusted and an alternative perch adjacent to the gauge was erected in July 2018.

Particulate Matter - PM_{10}

The HVAS units continued to operate on a six day cycle (in line with the OEH cycle) during the reporting period. The annual average PM_{10} and TSP results for the reporting period are all well below the annual average criteria at all sites, as shown in **Table 6-7**. 24 hour maximum PM_{10} results for the reporting period are typically well below the 24 hour maximum although there are occasional results near the limit at HVAS2 and the TEOM, as shown in **Table 6-7**.

TABLE 6-7 AIR QUALITY CRITERIA FOR PARTICULATE MATTER

Description	Pollutant	Averaging Period	Monitor	Criterion	Measured Result 2017-18
Long Term Impact Assessment Criteria for Particulate Matter	Total Suspended Particulate (TSP) matter	Annual Average	TEOM	90 µg/m^3	28.5 µg/m^3
			HVAS1		32.0 µg/m^3
			HVAS2		39.4 µg/m^3
			HVAS3		29.5 µg/m^3
	Particulate Matter < 10µm (PM_{10})	Annual Average	TEOM	30 µg/m^3	11.4 µg/m^3
			HVAS1		12.8 µg/m^3
			HVAS2		18.8 µg/m^3
			HVAS3		11.8 µg/m^3
Short Term Impact Assessment Criterion for Particulate Matter	Particulate Matter < 10µm (PM_{10})	24 hour Maximum	TEOM	50 µg/m^3	47.5 µg/m^3
			HVAS1		38 µg/m^3
			HVAS2		50 µg/m^3
			HVAS3		31 µg/m^3

Note: *Methods for sampling and analysis of ambient air as defined by Standards Australia, AS 3580.9.6 -2003: Determination of suspended particulate matter—PM10 high volume sampler with size selective inlet—Gravimetric method.*

Annual Average PM_{10} results are slightly higher than the previous reporting period (2016-17) for all units, as shown in **Table 6-8**. Operations have not changed in these periods and the slight increase has been attributed to the much lower rainfall received this reporting period. All results remain well below the PM_{10} Annual Average Criterion of 30 µg/m^3.

TABLE 6-8 PM_{10} HVAS AND TEOM RESULT ANNUAL AVERAGES FOR CURRENT AND PREVIOUS YEARS

No	Location	Annual Average PM_{10} (µg/m^3)				
		EA Prediction	2014-2015	2015-2016	2016-2017	2017-2018
TEOM	Bimbadeen Road, Mount View	n/a	6.3*	9.5	10.1	11.4
HVAS1	Pyne Way, Mount View	n/a	11.1	11.0	11.2	12.8
HVAS2	Ellalong Road, Pelton Village	n/a	11.9	12.5	12.0	15.8
HVAS3	Coney Creek Lane, Quorrobolong	42.07	10.8	9.6	9.8	11.8

** TEOM installed March 2015 so annual average is incomplete*

Total Suspended Particulates

The annual average TSP results for the reporting period are provided in **Table 6-9**.

TABLE 6-9 TSP HVAS AND TEOM RESULT ANNUAL AVERAGES FOR CURRENT AND PREVIOUS YEARS

No	Location	Annual Average TSP (µg/m^3)				
		EA Prediction	2014/2015	2015/2016	2016/2017	2017/2018
TEOM	Bimbadeen Road, Mount View	n/a	15.8*	23.8	25.3	28.5
HVAS1	Pyne Way, Mount View	n/a	27.8	27.5	28.0	32.0
HVAS2	Ellalong Road, Pelton Village	n/a	29.8	31.3	30.0	39.4
HVAS3	Coney Creek Lane, Quorrobolong	32.53	27.0	24.1	24.5	29.5

** TEOM installed March 2015 so annual average is incomplete*

The current project average for calculated Total Suspended Particulates (TSP) is well 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 Air Quality and Greenhouse Gas Management Plan.

PM_{10} (Fine Dust) Continuous Dust Monitoring

A Tapered Element Oscillating Microbalance (TEOM) monitor which measures PM_{10} on a real-time continuous basis is located at monitoring site D6 to the northeast of the CHPP. This was installed in May 2015. 24 hour maximum results for the reporting period and graphical representation of the running and cumulative average of PM_{10} results are provided in **Figure 6-3**, **Table 6-7** and **Table 6-8**. The annual average PM_{10} result for the 2017-18 reporting period was 11.4µg/m^3, well below the PM_{10} Annual Average Criterion of 30 µg/m^3 and similar to previous years.

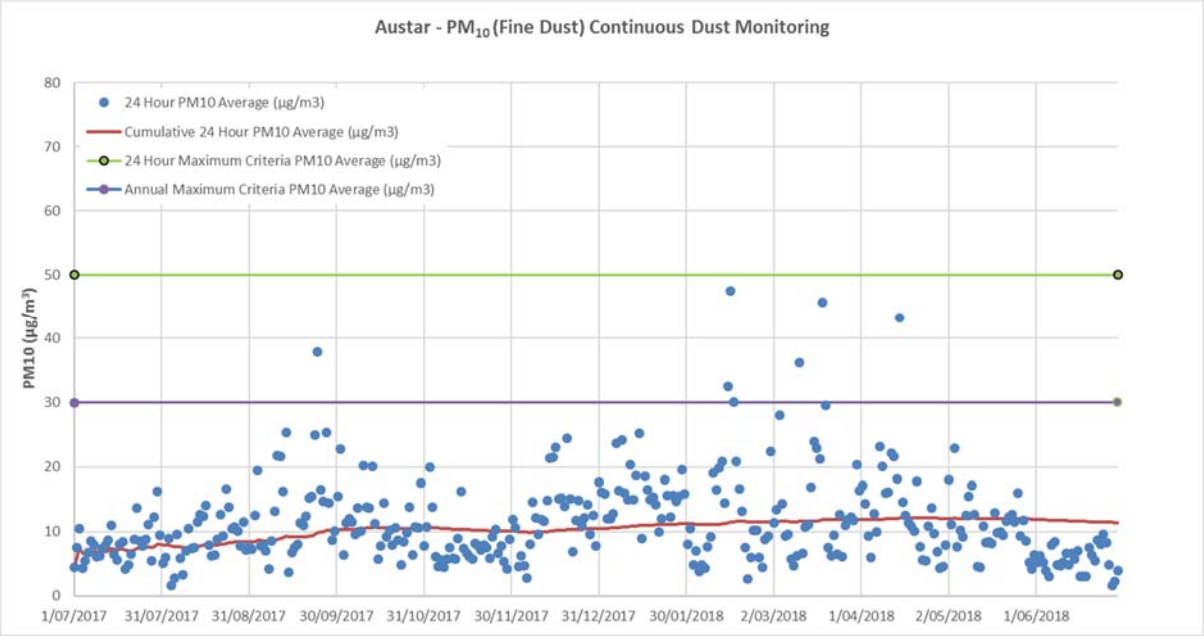


FIGURE 6-3 AUSTAR TEOM PM_{10} CONTINUOUS DUST MONITORING 2017-18

6.4 Biodiversity

6.4.1 Environmental Management

Stage 2

The EIS for 'Proposed extension of operations of Ellalong Colliery into Bellbird South' (1995) states: *The flora and fauna report concluded that the proposed development should not cause adverse impacts upon flora or fauna populations.*

The EIS did not identify any rare or endangered flora or fauna in the assessment, and did not propose any management, mitigation or monitoring measures.

Ecological assessments undertaken in the Stage 2 Mining Area (Umwelt 2007a, 2007b, 2010) identified the presence of a riparian endangered ecological community (EEC), the River-flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South-East Corner Bioregion (refer to **Figure 6-4**). This is an EEC listed under the *NSW Threatened Species Conservation Act 1995*. The ecological monitoring program targeted potential impacts to this ECC.

Ecological monitoring was undertaken in Spring 2017 for the Stage 2 mining area. The Stage 2 monitoring surveys are a continuation of the baseline monitoring established by Umwelt in 2008.

Stage 3

The Stage 3 EA (Umwelt, October 2008) states:

Subsidence impacts are not expected to have a significant impact on the ecology or ecological communities of the proposed Stage 3 mining area. In addition, due to the depth of cover and relative predicted uniformity of subsidence over the Project area, it is predicted that surface mitigation works along creeks and drainage channels will not be required and hence disturbance of these areas is not likely to be necessary.

Mining of the Project area is not expected to significantly impact on runoff regimes, bank stability, channel alignment, in-channel and out of channel ponding or groundwater availability. Drainage line analysis of the predicted subsided landform indicates that all creek systems will remain free draining without mitigation works.

The EA did not propose any management, mitigation or monitoring measures in relation to biodiversity.

The majority of the Stage 3 Extraction Plan area (LWA7-LWA10) comprises the Lower Hunter Spotted Gum – Ironbark Forest and Derived Grassland with Scattered Canopy Trees vegetation communities. The Riparian Red Gum Forest within the Stage 3 Mining Area (refer to **Figure 6-5**) was found to broadly align with the description of the *Threatened Species Conservation Act 1995* listed River-flat Eucalypt Forest Endangered Ecological Community (EEC).

Ecological monitoring was undertaken in Spring 2017 and Autumn 2018 for the Stage 3 mining area. The Stage 3 monitoring surveys are a continuation of baseline monitoring established in 2012 and are carried out in accordance with the Biodiversity Management Plan (Umwelt 2013).

Bellbird South

The Longwall B1-B3 Environmental Assessment (Umwelt, November 2015) states:

Biodiversity values have the potential to be impacted by subsidence related surface cracking in the soil, and by any associated remediation of surface cracking post mining. Secondary impacts associated with hydrological changes are also possible and typically impact greatest on riparian areas.

Based on the subsidence and groundwater assessments, the potential for biodiversity impacts is regarded as low, although a monitoring program is recommended.

The ecological monitoring program in the LWB1-LWB7 area targets significant vegetation communities in the Bellbird South Mining Area including Lower Hunter Spotted Gum – Ironbark Forest EEC, River-flat Eucalypt Forest EEC and potential Quorrobolong Scribbly Gum Woodland EEC (refer **Figure 6-6**).

Ecological monitoring was also undertaken in Spring 2017 and Autumn 2018 for the Bellbird South mining area. The LWB1-B7 monitoring surveys are a requirement of, and are carried out in accordance with, the Biodiversity Management Plan (BMP) (LWB1-B7) (Umwelt 2017).

The objectives of the ecological monitoring programs are to determine if there is any change in flora and habitat condition as a consequence of mining and associated subsidence.

6.4.2 Environmental Performance

Stage 2

No recommendations have been made for the Stage 2 monitoring site for the Spring 2017 surveys, as no observable impacts as a result of longwall mining were recorded.

The *Ecological Monitoring Program for Stage 2 Longwall Mining, Austar Coal Mine, Quorrobolong* (Umwelt, May 2011) states biannual monitoring will be conducted for a period of five years after the commencement of mining (February 2009), after which point the need for and frequency of subsequent monitoring surveys will be reviewed. The need for continued monitoring after five years will be largely dependent on the results obtained up to that stage.

Biannual monitoring of the Stage 2 mining area was conducted for a period of five years after completion of the last longwall mined in the Stage 2 area (LWA5A). Mining in LWA5A was completed in February 2013.

Ecological monitoring undertaken at Site 6 has not identified any negative trends as a result of longwall mining. As no negative impacts have been observed as a result of longwall mining, it is recommended that monitoring of Site 6 is no longer required as per the Stage 2 Ecological Monitoring Program (Umwelt, 2011). Consultation is to be undertaken with OEH to cease monitoring of the Stage 2 area.

Stage 3

No recommendations have been made for the Stage 3 monitoring sites for the Spring 2017 surveys, as no observable impacts as a result of longwall mining were recorded.

No substantial changes (other than increases in diversity of small terrestrial groundcover species) were identified at Stage 3 monitoring sites during the Autumn 2018 monitoring event from the Spring 2017 monitoring event.

Bellbird South

No management recommendations have been made for the LWB1-B7 monitoring sites for the Spring 2017 survey, as no significant observable impacts as a result of longwall mining were identified. Minor cracking was observed at BS1; however this was within the range of anticipated impacts (Umwelt 2015) and was not causing a substantial adverse impact to threatened species, populations, habitats or EECs. Following further investigation, the minor cracking was thought to be from natural shrinkage of soils rather than mining impacts.

No substantial changes (other than increases in diversity of small terrestrial groundcover species) were identified at LWB1-B7 monitoring sites during the Autumn 2018 monitoring event from the Spring 2017 monitoring event.

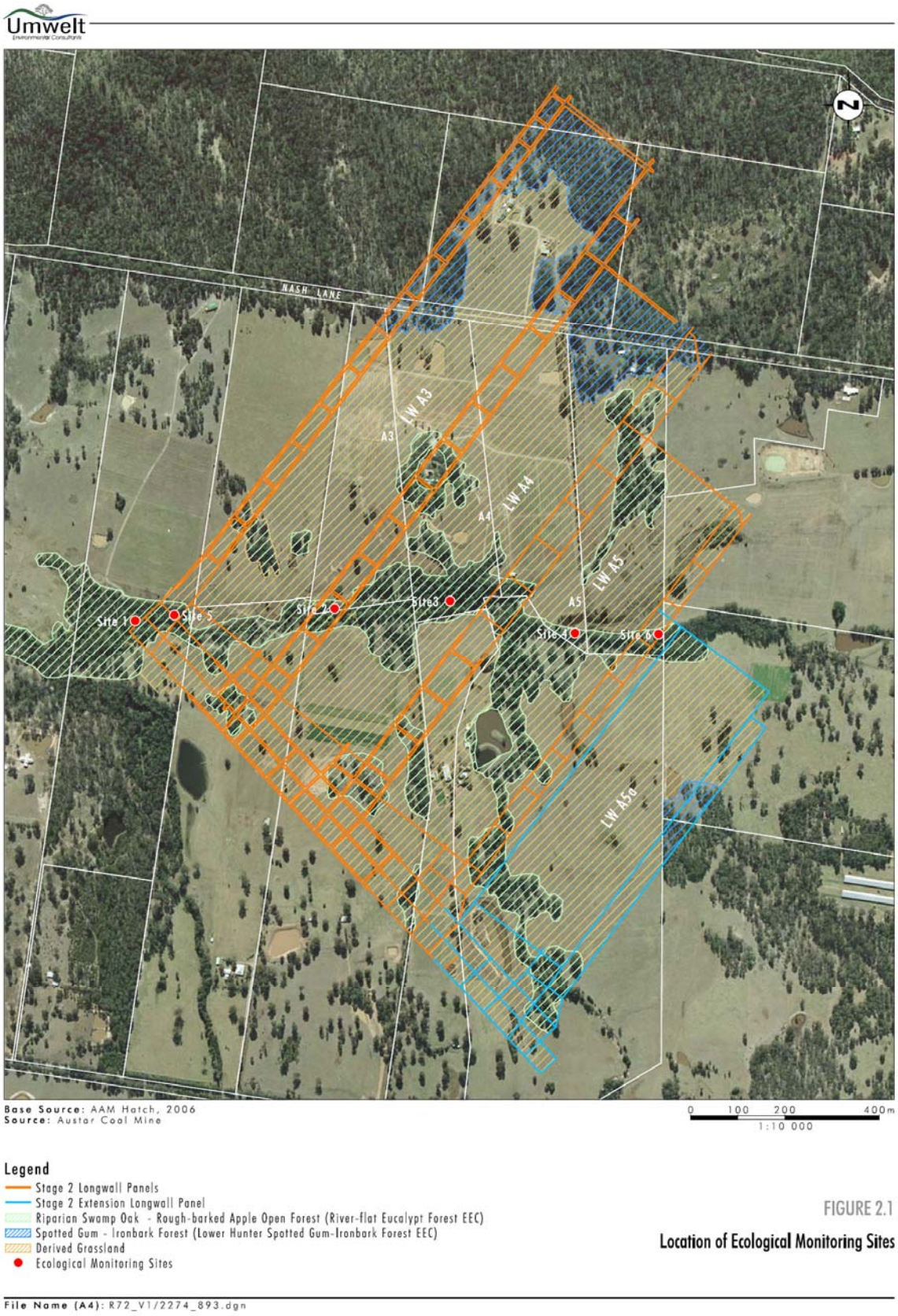


FIGURE 6-4 LOCATION OF STAGE 2 ECOLOGICAL MONITORING SITES

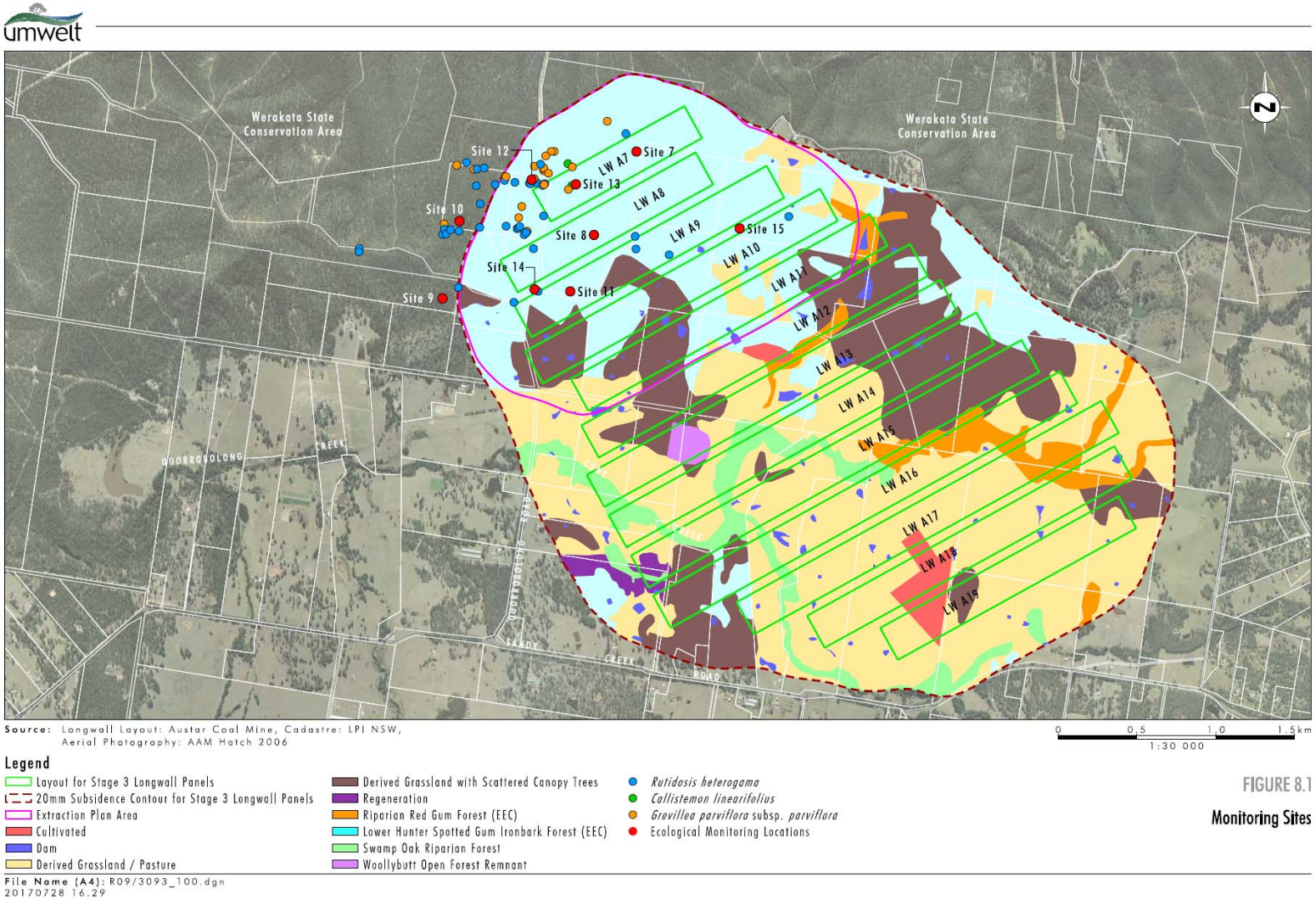


FIGURE 6-5 LOCATION OF STAGE 3 ECOLOGICAL MONITORING SITES

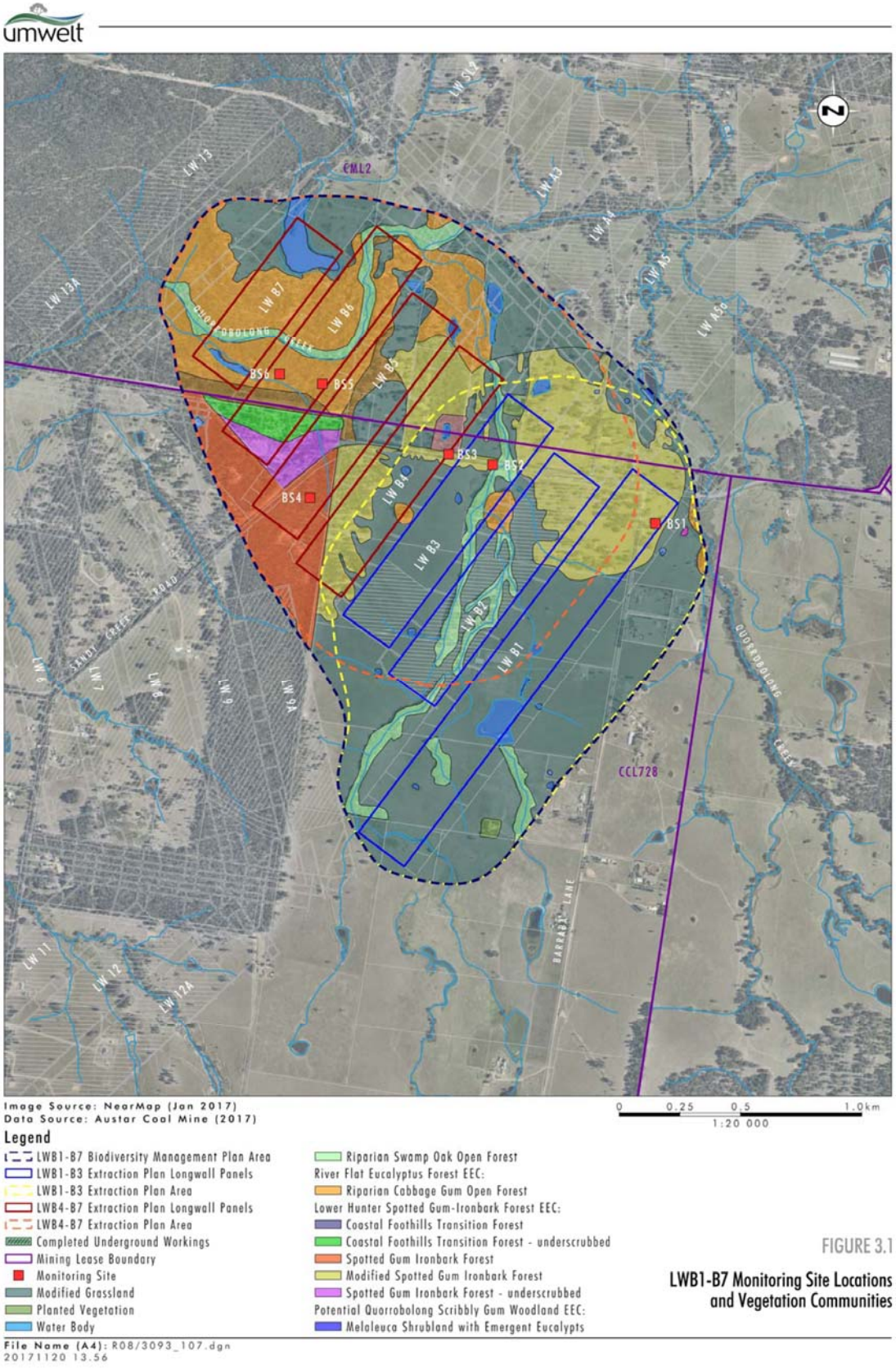


FIGURE 6-6 LOCATION OF LWB1-B7 ECOLOGICAL MONITORING SITES

6.5 Vibration and Blasting

6.5.1 Environmental Management

The mining complex Noise and Vibration Management Plan (NVMP) prepared in accordance with the requirements of PA08_0111, DA 29/95 and EPL 416 was approved by the Director General DPE on 2 August 2013. An updated NVMP was submitted to DPE on 25 June 2017 and was approved on 1 August 2018.

Austar have continued to undertake vibration monitoring in the Stage 3 area with a vibration monitor located at 345 Quorrobolong Road, Quorrobolong (V7). There was no mining in the Stage 3 area during the reporting period, and no vibration events recorded greater than 1mm/s peak vector sum (PVS) believed to be a result on mining.

Vibration monitors over the Bellbird South area were moved during the period due to landholder access constraints and to remain proximal to current mining. Vibration monitor V9, located in the Bellbird South LWB1-B3 area off Sandy Creek Road, Quorrobolong, was in operation until 19 July 2017 when it was moved to location V11. Vibration monitor V11 is located in the Bellbird South LWB4-B7 area was in operation from 24 July 2017 until the end of the reporting period. Vibration monitor V10, located over LWB5, began operation 28 August 2017. The new vibration monitoring locations were included in the update to the NVMP. The location of vibration monitors is shown on **Plan 2**.

The NVMP refers to a DECC guideline - *Assessing Vibration: A Technical Guideline* (DECC, February 2006) which provides preferred and maximum vibration values for different receiver types such as residences, offices, workshops, and critical work areas (hospital operating theatres, precision laboratories). The guideline indicates that the criteria are non-mandatory and are goals that should be sought to be achieved through the application of all feasible and reasonable mitigation measures. In the case of longwall mining, there is limited scope for mitigation measures. The NVMP also refers to a British Standard (BS 7385 Part 2-1993 'Evaluation and Measurement for Vibration in Buildings Part') in relation to potential risk of cosmetic damage to buildings.

No surface blasting activities were undertaken at Austar during the 2017-18 reporting period.

6.5.2 Environmental Performance

In general accordance with the NVMP, vibration monitors are set to trigger and record an event when vibration is greater than 1mm/second. Vibration monitoring results are presented in **Figure 6-7** and **Figure 6-8**.

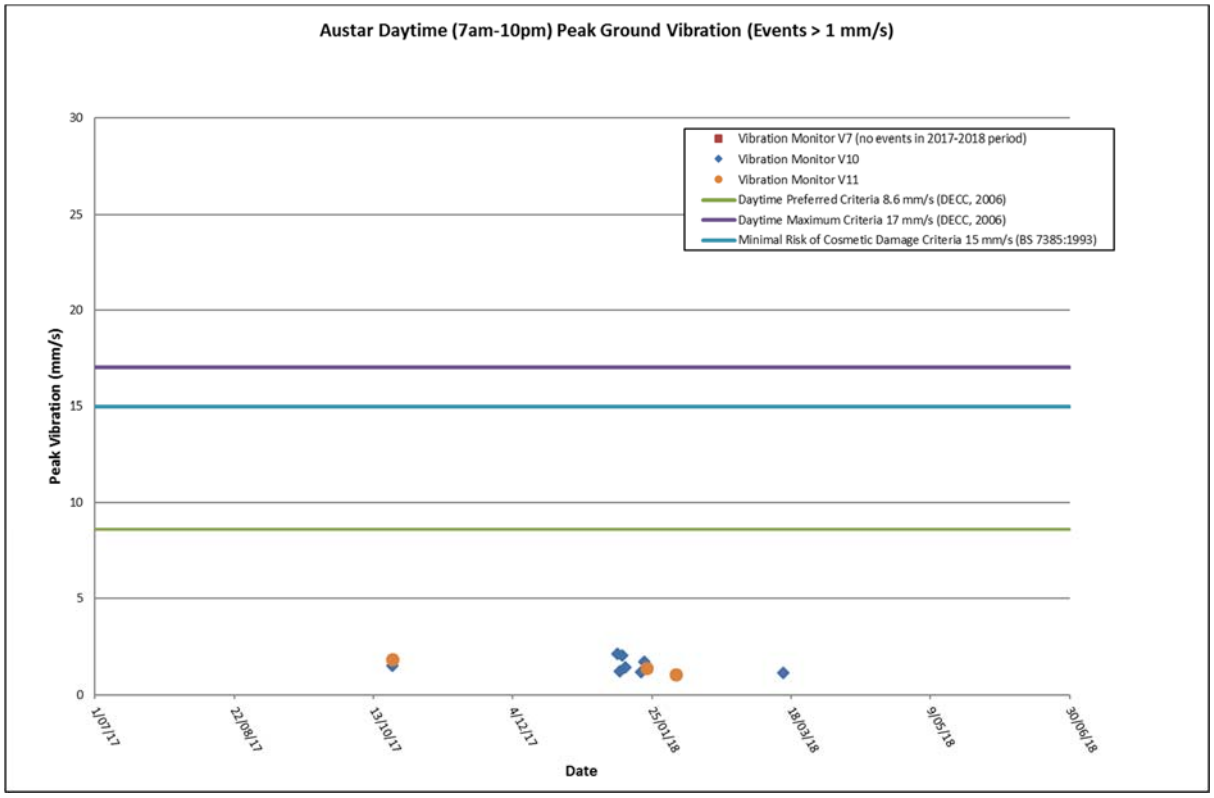


FIGURE 6-7 DAY TIME GROUND VIBRATION EVENTS

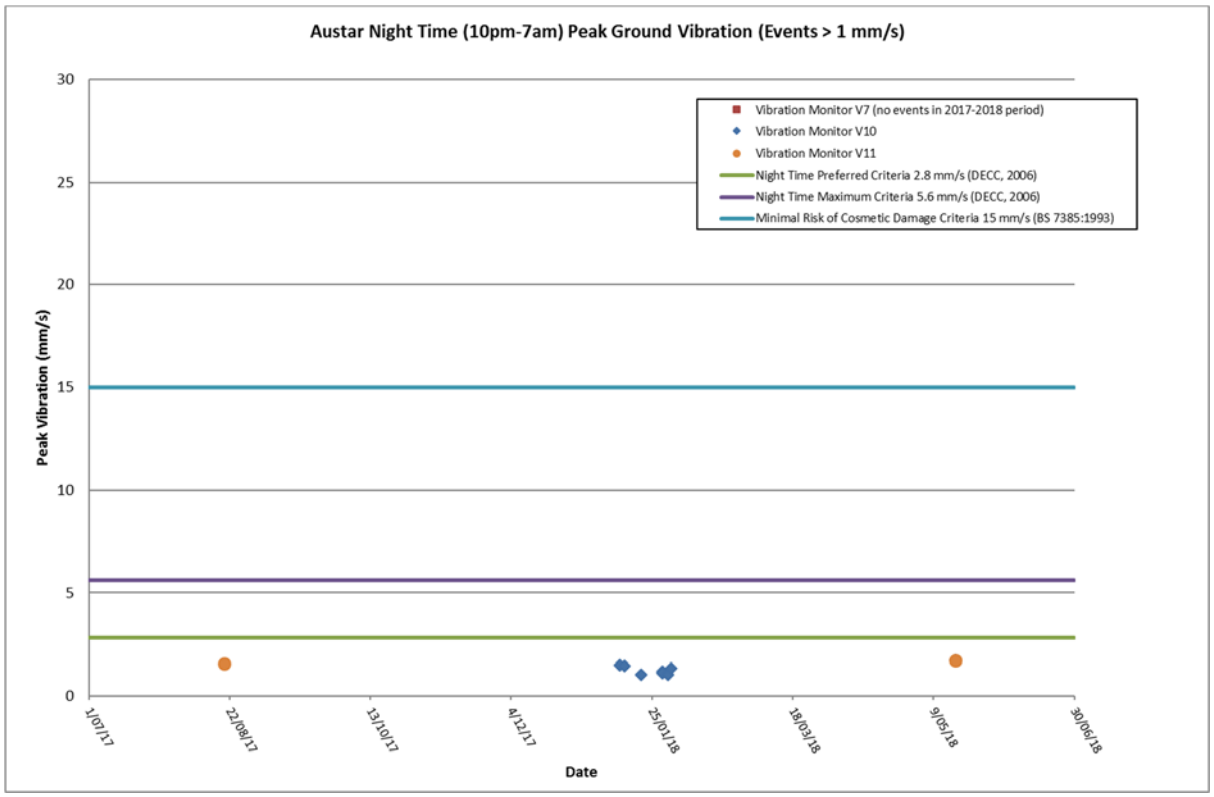


FIGURE 6-8 NIGHT TIME GROUND VIBRATION EVENTS

Monitoring undertaken in previous reporting periods has indicated vibration in the mining area is event based, and normally occurs when the longwall equipment is extracting coal. Vibration is typically generated from the caving zone behind the longwall, or from tensile fractures in the overlying strata immediately above the longwall mining area. There were 21 vibration events recorded (PVS >1mm/s) during the 2017-18 reporting period. This is a significant decrease from the 85 vibration events recorded in the 2016-17 reporting period.

The British Standard provides guideline values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated and where minimal risk of cosmetic damage may occur (15mm/s). The maximum recorded event for the current reporting period was 2.14mm/s.

6.6 Noise

6.6.1 Environmental Management

The mining complex Noise and Vibration Management Plan (NVMP) prepared in accordance with PA08_0111, DA 29/95 and EPL 416 was approved by DPE on 2 August 2013. Monitoring during the 2017-18 period was in accordance with the NVMP (2013), and all results were within compliance criteria, with the exception of recorded exceedances at monitoring locations C2 and C3. An updated NVMP was submitted to DPE on 25 June 2018 and was approved on 1 August 2018.

Periodic noise monitoring is conducted on a quarterly basis in accordance with the NVMP by an independent noise consultant. There are nine 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 6-10** and presented in **Plan 2**.

TABLE 6-10 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	South East of CHPP	L_{A90} 43 dB
C3	Bimbadeen Road, Mt View	North-west of CHPP	L_{A90} 37 dB
C4	84 Bimbadeen Road, Mt View	North of CHPP	L_{A90} 37 dB*
C5	43 Doyle Street, Mt View	North East of CHPP	L_{A90} 37 dB*
Nearest Potentially Affected Receivers to Kitchener Surface Infrastructure Site (PA08_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

Receiver	Location	Receiver Description	Criteria/Goal
Nearest Potentially Affected Receivers to Kalingo Infrastructure Area (DA29/95)			
K4	Nash Lane, Quorrobolong	East of Kalingo Infrastructure Area	L_{Aeq} 35 dB

** Note: No criteria exist in licence or development consents for C4 and C5. The NVMP has adopted the criteria from C3 in the absence of specific criteria.*

6.6.2 Environmental Performance

Austar complied with relevant noise limits during the 2017-18 reporting period, with the exception of noise criteria exceedances at:

- C2 during July 2017 (Q3 2017). Attended monitoring recorded a result equal to the relevant LA_{90} impact assessment criteria (43dB), however the exceedance was recorded when the low-frequency penalty was applied taking the result to 48dB, 5dB over the criteria. Follow-up monitoring, in accordance with the NVMP, was compliant.

- C3 during October 2017 (Q4 2017). Attended monitoring recorded a 1dB exceedance at C3 in October 2017 (38dB), before the low-frequency penalty was applied. Follow-up monitoring of the initial C3 exceedance, undertaken in accordance with the NVMP, also exceeded criteria. The initial exceedance, and follow-up monitoring exceedance, required the application of the low-frequency penalty taking them to 40dB, 3dB over the criteria. Further follow-up monitoring fell on the same date as the November 2017 attended monitoring event and was compliant.

The Noise Policy for Industry (NPfI) (October 2017) has been used for assessing low frequency noise for monitoring and reporting conducted at Austar since October 2017. This meant that the exceedance at C2 during July attracted a 5dB low frequency penalty under the Industrial Noise Policy (INP), and the exceedances at C3 during October 2017 attracted a 2dB penalty under the new NPfI.

All exceedances, with the low frequency penalty applied, were classed as a non-compliances as they were all greater than the limit detailed in Chapter 11 of the EPA 'Industrial Noise Policy' ("the monitored noise level is more than 2dB above the statutory noise limit specified in the consent or licence condition").

No atypical operations were occurring at the CHPP during the monitoring events. A review of the existing meteorological data indicated that noise limits were applicable at the time of monitoring for all exceedances.

In response to the exceedance in noise limits, Austar notified the EPA and DPE. Austar reviewed previous reports on the CHPP for potential noise control options and potential low frequency sources, and also carried out follow up monitoring when the CHPP was in operation and the weather conditions suitable. An incident report was submitted to the EPA and DPE. Details of environmental incidents are included in **Section 11**.

A summary of results from attended noise monitoring undertaken during the 2017-18 reporting period is provided in **Table 6-11, Table 6-12** and **Table 6-13**.

Exceedances from the CHPP reported in **Table 6-11** are results prior to the low frequency penalty application. There were no recorded exceedances from Kitchener SIS or Kalingo Infrastructure Area.

TABLE 6-11 CHPP ATTENDED NOISE MONITORING RESULTS 2017-18

Quarter	Period	Austar CHPP Only $L_{A90, 15\ min}$ (dB)				
		C1	C2	C3	C4	C5
	Noise Criteria	40	43	37	37	37
3 2017	Night	28	**43***	30	30	33
		26	34	25	25	28
		34	38	28	30	35
4 2017	Night	40	40	**38^**	31	36
		36	35	35	25	28
		27	33	24	25	34
1 2018	Night	32	37	29	NM	27
		<25	<30	<25	<25	<25
		IA	37	31	29	31
2 2018	Night	<25	<20	IA	IA	IA
		IA	NM	IA	NM	NM
		<20	<30	IA	<25	25

Note: These are results for CHPP in the absence of all other noise sources;
** indicates Industrial Noise Policy low frequency modifying factor caused exceedance of noise criteria.*
^ indicates Noise Policy for Industry low frequency modifying factor applies and causes further exceedance of noise criteria
Bolded results indicate exceedance of criteria and met data causes criteria to be applicable.
IA denotes inaudible.
NM denotes not measurable.
Note: No criteria exist in licence or development consents for C4 and C5. The NVMP has adopted the criteria from C3 in the absence of specific criteria.

TABLE 6-12 KITCHENER SIS ATTENDED NOISE MONITORING RESULTS 2017-18

Quarter	Period	Kitchener SIS Only $L_{Aeq, 15\ min}$ (dB)		
		K1	K2	K3
	Noise Criteria	35	35	35
3 2017	Night	30	IA	<25
		<25	IA	<25
		30	IA	IA
4 2017	Night	IA	IA	IA
		IA	IA	<25
		IA	IA	IA
1 2018	Night	20	20	IA
		<20	<20	IA
		IA	IA	IA
2 2018	Night	IA	IA	IA
		26	<25	<25
		29	26	<25

Note: These are results for Kitchener SIS in the absence of all other noise sources; IA denotes inaudible.

TABLE 6-13 KALINGO INFRASTRUCTURE AREA ATTENDED NOISE MONITORING RESULTS 2017-18

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB)
		K4
	Noise Criteria	35
3 2017	Night	30
		25
		30
4 2017	Night	IA
		NM
		IA
1 2018	Night	23
		<25
		IA
2 2018	Night	27
		30
		28

Note: These are results for Kalingo Infrastructure Area in the absence of all other noise sources; IA denotes inaudible.
NM denotes not measurable.

CHPP Noise Pollution Reduction Program

Austar has been undertaking a voluntary noise pollution reduction program (PRP) in consultation with the EPA over several years.

During the 2017-18 reporting period, a noise source investigation around the Austar Coal Handling Preparation Plant (CHPP) was undertaken. The purpose of the survey was to investigate the noise contribution of various parts of the CHPP infrastructure to the acoustic environment around the site.

The noise source investigation was undertaken during the evening and night of the 17 August 2017 and 24 October 2017. Measurements were undertaken for a number of operational conditions. Potential Noise Policy for Industry (NPfI) low frequency noise modifying factor penalties were applied where applicable. The dominant frequencies were noted for each noise source.

Following this investigation, the Austar noise model will be updated with the most recent sound power levels, and the ranking of noise sources will be further analysed to confirm fieldwork results and assist in targeted mitigation for these sources. Proposed mitigation will then be modelled to assess potential reductions and determine reasonable and feasible mitigation outcomes.

6.7 Aboriginal Heritage

6.7.1 Environmental Management

On 6 June 2017, during the previous 2016-17 reporting period, orange staining/residue was observed in a clean water drainage line at the CHPP site (for detail on this see **Section 7.3.3**). To support actions to investigate and manage this staining/residue, two archaeological due diligence assessments were conducted during the 2017-18 reporting period.

An *Archaeological Due Diligence Assessment* (Umwelt, 30 May 2018) was undertaken prior to investigative works in the investigation drainage line for five drill holes and excavation of five pits. An Aboriginal party representative participated in the inspection undertaken on 26 February 2018. The assessment found there to be no archaeological constraint to the proposed works being undertaken, and made a number of recommendations with reference to the requirements of the *National Parks and Wildlife Act 1974*, the *National Parks and Wildlife Regulation 2009* and the Office of Environment and Heritage (OEH) *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (Due Diligence Code).

An additional containment line is proposed for the clean water drainage line, which will require ground disturbance for installation. This will involve earthworks to establish a bund within the drainage line channel, and clearing of some vegetation to permit access for the works. An *Aboriginal Due Diligence Assessment Austar CHPP Containment Point 2 Northern Clean Water Diversion* (Advitech, 9 August 2017) was prepared by an archaeologist, in consultation with a registered Aboriginal party representative, to determine whether any Aboriginal objects will be impacted. No Aboriginal objects were identified within the study area and therefore an Aboriginal Heritage Impact Permit (AHIP) is not required. A number of recommendations were made with reference to the requirements of the

National Parks and Wildlife Act 1974, the *National Parks and Wildlife Regulation 2009* and the Due Diligence Code.

6.7.2 Environmental Performance

No Aboriginal objects were discovered during drilling or excavation of pits. The additional containment line was not installed during the 2017-18 reporting period.

6.8 Mine Subsidence

6.8.1 Environmental Management

In accordance with PA08_0111 Schedule 3 Condition 4, and DA29/95 Schedule 3 Condition 3A, Austar is required to prepare and implement an Extraction Plan prior to the commencement of any second workings in their respective mining areas. Austar received the approval for the Extraction Plan for Bellbird South LWB4-B7 from DPE on 25 August 2017. The Extraction Plan for Bellbird South LWB1-B3 was approved last reporting period on 4 July 2016.

The predicted conventional subsidence parameters for the proposed longwalls have been obtained using the Incremental Profile Method. The subsidence model has been calibrated and reviewed using the available ground monitoring data above the previously extracted longwalls at Austar. The maximum predicted mine subsidence movements due to the extraction of the proposed Longwalls B4 to B7 are: 1,350 mm vertical subsidence; 5.5 mm/m tilt (i.e. 0.55 %, or 1 in 180); 0.05 km-1 hogging curvature (20 km minimum radius) and 0.06 km-1 sagging curvature (17 km minimum radius).

Subsidence monitoring for Bellbird South LWB1-LWB3 and LWB4-LWB7 areas during the reporting period was completed in accordance with the Subsidence Monitoring Program which forms part of the Extraction Plan. Monitoring is conducted in affected areas pre- and post-mining on a monthly and then a quarterly basis until secondary extraction is complete in that panel. Access to the subsided area has been somewhat limited due to private landholder constraints during the reporting period so predicted vertical subsidence and tilt values for Sandy Creek Road (subsidence Line SCR1) from Table 6.1 of the Mine Subsidence Engineering Consultants (MSEC) report '*Austar Coal Mine: Longwalls B4 to B7 - Subsidence Predictions and Impact Assessments for the Natural and Built Features in Support of the Modification Application for Longwalls B4 to B7 at the Austar Coal Mine'* will be compared with the values measured along that line to assess changes to the area.

The overall framework for subsidence monitoring and management of impacts can be described as a subsidence monitoring program (actual measured subsidence, and inspections for environmental consequences of subsidence to compare against predicted impacts) which may trigger a response, or set of responses. The response is commensurate with the nature of the measurement or the impact which has been identified. The Extraction Plans for Bellbird South LWB1-B3 and LWB4-B7 rely on a set of individual management plans which are intended to address impacts to particular environmental or built features within the Extraction Plan areas.

6.8.2 Environmental Performance

Austar commenced extraction of Longwall LWB3 on 11 March 2017 and completed extraction on 31 August 2017. Extraction of Longwall LWB4 followed commencing on 5 October 2017 and was continuing at the end of the 2017-18 reporting period.

Subsidence monitoring has been undertaken in accordance with the Subsidence Monitoring Program and as landholder access has permitted. The mine subsidence movements resulting from the extraction of Longwall LWB3 and LWB4 were monitored during the 2017-18 reporting period using Line SCR1 (Sandy Creek Road). The location of this monitoring line for the Bellbird South area is shown on **Figure 6-9**.

Subsidence monitoring results from the Bellbird South area have been consistently within the maximum predicted range along Line SCR1 as shown in the **Table 6-14**. A maximum of 241mm of vertical subsidence was recorded at completion of LWB3 on Line SCR1, compared to the maximum predicted subsidence at this location on the completion of extraction of LWB3 of 850mm. This trend has continued after the commencement of LWB4, with a maximum measured subsidence of 473mm at the end of the current reporting period, compared to a maximum predicted subsidence at the completion of LWB4 of 1,100mm.

Measured tilt during the reporting period on Line SCR1 shows results well within values predicted by the MSEC report for Line SCR1, as shown in **Table 6-14**.

TABLE 6-14 MAXIMUM PREDICTED AND MEASURED TOTAL VERTICAL SUBSIDENCE AND TILT FOR SANDY CREEK ROAD (LINE SCR1) 2017-18

Location	Longwall	Maximum Predicted Incremental Vertical Subsidence (mm)	Maximum Measured Incremental Vertical Subsidence (mm)	Maximum Predicted Incremental Tilt (mm/m)	Maximum Measured Incremental Tilt (mm/m)
SCR1	LWB1-LWB3	850	241	2.5	1.2
	LWB4	1,100	473*	3.5	2.1*
	LWB5	1,250	Not yet mined	3.5	Not yet mined

NB: Predicted Numbers are from Table 6.1 from the MSEC MOD 7 application for Longwalls B4 to B7 report
**Measured maximum for the 2017-2018 Reporting Period. LWB4 is still being extracted.*

Strain on Line SCR1 measures a maximum of 1.7mm/m for compressive strain and 1.6mm/m for tensile strain during the reporting period. These results are less than the predicted maximum strain for LWB4-LWB7 of 2.2mm/m for compressive strain and 1.7mm/m for tensile strain (99% confidence level from Table 4.6 from MSEC report).

The ground movements, measured along Line SCR1 and previously along Lines B2, Bellbird South Crossline, and BL1, indicate that the observed subsidence resulting from the extraction of Longwalls LWB2, LWB3 and LWB4 were generally similar to or less than the maximum predicted subsidence. The profiles of observed subsidence also reasonably matched those predicted, but with reduced magnitudes.

During subsidence monitoring inspections, there have been no perceptible impacts to the environment or increases in public safety risk. There were no abnormal overburden behaviours observed that required particular review either at the completion of mining LWB3 or at the end of the reporting period.

No subsidence management actions were required to be undertaken as a result of LWB3 extraction during the 2017-18 reporting period.

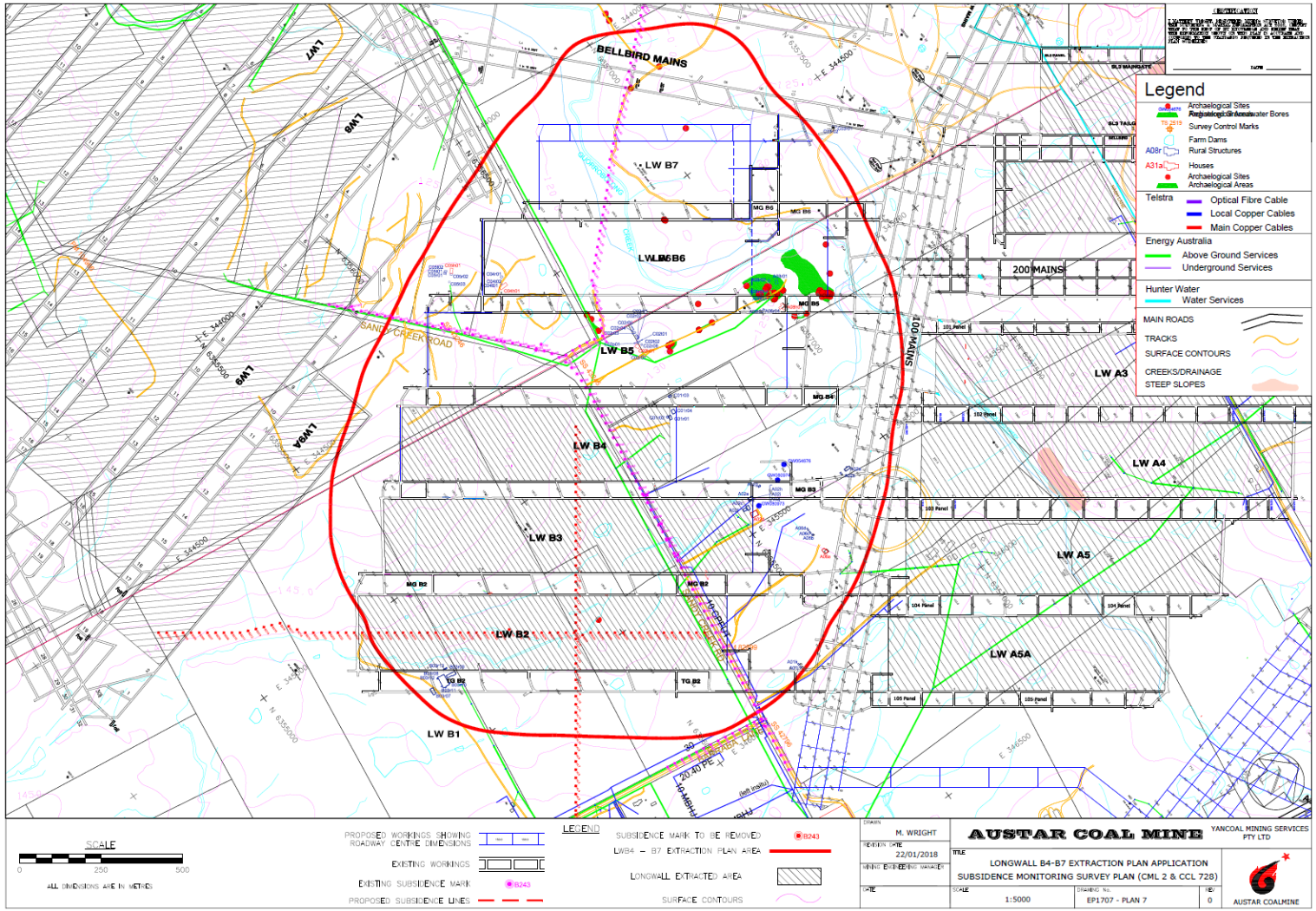


FIGURE 6-9 SUBSIDENCE MONITORING SURVEY PLAN BELLBIRD SOUTH AREA

7 WATER MANAGEMENT

Site water management at Austar is complex. 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.

Pelton CHPP site water management system includes a reverse osmosis water treatment plant, coal processing system, and stormwater runoff and management system. Treated water is used in the CHPP and underground, and may also be discharged into Bellbird Creek in accordance with EPL 416.

The groundwater management system is complex and is influenced by inflow from historic mine workings. There are a number of underground water storage areas, as outlined in the Site Water Management Plan (SWMP).

The surface water storage and management system is used to ensure the underground workings are able to be dewatered as required to allow for continual production, as well as manage surface water runoff during rain events and ensure adequate water supply for operations. Further information on site water management can be found in the approved SWMP on the Austar website.

7.1 Water Licences

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

TABLE 7-1 WATER LICENCES

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 July 2010 - Perpetuity	Monitoring Bore (NER1010)	N/A
Bore Licence Certificate	20BL172852	7 June 2011 - Perpetuity	Monitoring Bore (WBH1, WBH2, WBH3)	N/A
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

Licence Held	Licence Number	Validity of Licence	Purpose of Licence	Extraction Limit
Bore Licence Certificate	20BL173891	19 Mar 2015 - Perpetuity	Monitoring Bore (MB02)	N/A
Water Access Licence / Associated Works	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 / Associated Works	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

TABLE 7-2 WATER TAKE 2017-18

Water Licence #	Water sharing plan, source and management zone (as applicable)	Entitlement	Passive take / inflows (ML)	Active pumping (ML)	TOTAL (ML)
WAL19181 / 20AL210298*	Hunter Unregulated and Alluvial Water Sources - Upper Wollombi Water Source - Congewai Creek Management Zone.	10 shares	0	0	0
WAL41504 / 20AL217003	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	457	0	457

** this WAL is not utilised at present by Austar*

7.3 Surface Water

7.3.1 Environmental Management

The Austar SWMP has been prepared in accordance with the requirements of development consent DA29/95, Project Approval PA08_0111 and EPL 416, and includes a surface water monitoring program. The SWMP was approved by the DPE on 17 May 2013.

Austar have two licenced discharge points – SW1 is an emergency wet weather discharge point and SW6 which is permitted to discharge 5,000 kilolitres per day (as an annual average).

Austar have 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 (5) EPL monitoring sites (three creek sites and two discharge points); and
- Four (4) creek monitoring sites (three (3) sites in Quorrobolong Creek and one (1) site in Cony Creek).

In addition, grab samples are taken opportunistically from other points around the mine when required (e.g. sediment dams and mine water storage dams). The surface water monitoring locations are presented in **Table 7-3** and shown on **Plan 2**.

TABLE 7-3 SURFACE WATER MONITORING LOCATIONS AND EPL CRITERIA

Area	Monitoring Location	Parameters	EPL Limits /Criteria
CHPP – EPL Points	• **SW1** – Emergency Dam Spillway, **EPL Point 1**	pH EC Fe TDS TSS Volume	6.5-8.5 N/A 1 mg/L 6,000 mg/L 50 mg/L 2,000 KL/day
	• **SW2** – Bellbird Creek Pinch Bridge, **EPL Point 2** • **SW4** – Bellbird Creek Eastern Boundary Downstream of CHPP, **EPL Point 4** • **SW5** – Unnamed Creek Western Boundary Upstream of CHPP, **EPL Point 5**	EC pH Fe TSS	N/A N/A N/A N/A
	• **SW6** – 1ML tank discharge to Bellbird Creek, **EPL Point 6**	EC pH Fe TSS Volume	600 µS/cm 6.5-8.5 1 mg/L 50 mg/L 5,000 KL/day as annual average
Creeks – Underground Mining Areas	• **SWQ1** – Quorrobolong Creek Sandy Creek Road • **SWQ2** – Quorrobolong Creek Upstream of Stage 2 Area • **SWQ3** – Quorrobolong Creek Downstream of Stage 2 Area • **SWC1** – Cony Creek	EC pH Fe TSS	N/A N/A N/A N/A

7.3.2 Environmental Performance

Surface water quality data is presented in **Appendix A**. Only EPL licensed discharge points 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 was no discharge event from SW1 during the reporting period. At the 1ML tank EPL discharge point SW6, water quality results for all tested parameters (pH, EC, TSS and Fe) were within EPL limits. A total of 245ML was discharged from SW6 over the reporting period, which is an average of 0.67ML/day.

For the background CHPP creek monitoring points (SW2, SW4 & SW5):

- the pH measured at individual sites remained relatively constant ranging between pH 6.26 (SW2) to pH 7.78 (SW5), which was similar to the 2016-17 range of pH 6.57 to pH 7.73;
- Surface water EC ranged between 154µS/cm (SW2) and 9,870µS/cm (SW5), which was similar in the 2016-17 range of 114µS/cm (SW2) to 8,450µS/cm (SW5);
- Surface water TSS ranged between of <5mg/L (SW2, SW4, SW5) to 114mg/L (SW5) for the reporting period, which was similar to the 2016-17 range of 1mg/L (SW2, SW4) to 120mg/L (SW5); and
- Fe (Iron) recorded a minimum of <0.05mg/L (SW2) and a maximum of 8.82mg/L (SW5) for the reporting period, the maximum recorded Fe was lower than the maximum of the range of the 2016-17 reporting period <0.05mg/L (SW2) to 26.7mg/L (SW5).

The variability in the results from SW5, upstream of the mine, is thought to be due to the ephemeral nature of the stream in this location with results historically being variable. SW5 samples were collected from small pools in the creek bed on numerous occasions throughout the reporting period, with four samples unable to be collected due to the creek being dry.

Natural fluctuations in water quality in Quorrobolong and Cony Creeks were observed, with sample points displaying expected results when compared to previous years due to drought conditions, low flows and still water in creek sampling locations. No environmental impacts upon surface waters from mining can be interpreted.

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

- The pH measured at individual sites ranged between pH 6.99 (SWQ3) and pH 8.20 (SWC1), which is slightly higher than the 2016-17 range of pH 6.80 to 7.93;
- EC results ranged between 1,560µS/cm (SWC1) and 2,640µS/cm (SWC1), with the minimum EC being higher than the 2016-17 range of 599µS/cm to 3,170µS/cm;

- Maximum TSS recorded was 71mg/L (SWQ1) with a minimum of 5mg/L (all) for the reporting period. The maximum TSS was lower when compared to the 2016-17 range of <3mg/L to 388mg/L; and

- Fe (Iron) results range from 0.6mg/L (SWC1) and a maximum of 6.19mg/L (SWQ1) for the reporting period, which is a decrease in maximum when compared to the 2016-17 range of 0.452mg/L to 63mg/L.

7.3.3 Investigation Drainage Line

There were no surface water environmental incidents during the current reporting period, however one reportable incident from the 2016-17 period has ongoing actions. Orange staining/residue was observed in a clean water drainage line at the CHPP during the 2016-17 reporting period and reported as an incident to the Environmental Protection Authority (EPA).

The drainage line is ephemeral and mainly dry with areas of pooled water typically only after rainfall. Austar commenced a monitoring program to investigate the source of the orange staining / residue, and advised the regulators. Monitoring and investigation are continuing during the 2017-18 reporting period in line with conditions U3 and E2 of the Environmental Protection Licence 416, received 15 December 2017 from the EPA. These conditions were added to this update of the EPL specifically to address the orange staining issue in the drainage line at the CHPP.

Condition U3.1 required an investigation into the source cause and environmental impacts of the orange staining / residue within the CHPP clean water drain, identified as the '*Investigation Drainage Line*'. A geotechnical investigation was completed onsite from 7 to 9 March 2018 and the corresponding report was submitted to the EPA and Division of Resources and Geoscience (DRG) on 29 May 2018 to address this condition.

Condition U3.3 requires the submission of an updated monthly report containing the monitoring results required by Condition U3.2. Condition U3.2 monthly monitoring requirements are: sampling of surface water in the Investigation Drainage Line; sampling of groundwater from the groundwater bore adjacent to the Investigation Drainage Line; and photos taken at specific locations along the Investigation Drainage Line. Reports have been submitted each month to the EPA and DRG for the reporting period.

Condition E2 requires that the orange staining / residue within the clean water drain must be fully contained with 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 at the downstream extent of the Investigation Drainage Line has been installed to address this condition. Water is pumped from this containment area into the CHPP dirty water system.

7.4 Ground Water

7.4.1 Environmental Management

The Austar SWMP has been prepared in accordance with the requirements of development consent DA29/95 and Project Approval PA08_0111, and includes a groundwater water monitoring program. The SWMP was approved by the DPE on 17 May 2013.

An environmental monitoring specialist is engaged by Austar to undertake quarterly groundwater monitoring and analysis in accordance with the SWMP, utilising nine piezometers (MB01, MB02, MB03, MB04, AQD1073a, NER1010, WBH1, WBH2 and WBH3) to assess impacts on groundwater levels in the Bellbird South, Stage 2 and Stage 3 areas. An additional alluvial groundwater monitoring bore (MB04) was installed during the 2017-18 reporting period. The locations of these monitoring sites are presented in **Plan 2**.

DA 29/95 (Modification 7) contained a condition to lodge a groundwater impact review with DPE, written in consultation with DoI-Water, by end of February 2018. The review was written and submitted to DoI-Water for comment on 1 March 2018. DoI-Water replied with comments on 3 April 2018. These comments were responded to by a hydrogeological consultant. The groundwater review report, DoI-Water comments and the hydrogeological consultant's responses were submitted to DPE on 2 July 2018 for approval. The review found groundwater predictions when compared to current groundwater monitoring data to be valid, groundwater assessments to be appropriate and provide effective tools for current and future predictions, and the Site Water Management Plan and Extraction Plan Water Management Plan (LWB1-LWB7) to be appropriate and effective tools to monitor for potential mining inducted impacts.

In order to complete the groundwater review and provide adequate time for consultation with DoI-Water, Austar sought an extension to the lodgement date to the end of March. While the Department considered the request to be reasonable, DPE were unable to formally grant an extension because the wording of the condition did not allow it.

Austar's groundwater monitoring program also includes monthly, quarterly or annual monitoring of underground flows, water quality and pressure for operational purposes. Groundwater level data from EX01H is downloaded quarterly.

Groundwater resources in the vicinity of Austar are detailed in the SWMP.

7.4.2 Environmental Performance

A groundwater specialist was engaged to undertake quarterly groundwater depth monitoring in the Quorrobolong Creek alluvial aquifer (AQD1073a), in the non-alluvial hard rock aquifer (NER1010, MB01 and MB02), and in alluvial groundwater monitoring wells (MB03, MB04, WBH1, WBH2 and WBH3).

Appendix B illustrates the groundwater monitoring results at Austar during the reporting period. The graphs compare groundwater depth and rainfall, and pH and conductivity. Trends from the monitoring program are summarised below:

- A slow but constant decline in groundwater levels was recorded in all Bellbird South, Stage 2 and Stage 3 groundwater monitoring bores throughout the reporting period with the exception of bores MB01 and NER1010, which are discussed below. This decline correlates with declining cumulative rainfall, with bores having historically shown a response to rainfall. The 2017-18 reporting period was a dry year with only 363mm of rainfall recorded, which is less than half of the annual mean rainfall for Cessnock (Bureau of Meteorology Cessnock Airport AWS 1968 - 2018).

- The NER1010 monitoring bore, within a non-alluvial hard rock aquifer, shows an overall declining trend over the reporting period. NER1010 is visibly affected by major rainfall events, and may also be impacted by mining via drainage of groundwater along a geological structure; however, the exact mechanism causing the water level decline is not clear.

- Consistent with the previous reporting period, groundwater level in Stage 3 monitoring bore MB01 has continued to decline at a gradually lessening rate. Prior investigations have shown no additional flow into the underground mine. This bore is located in a faulted zone and may display some drainage through the fault system. The 2018 groundwater review identifies 'MB01 and possibly NER1010, show probably mining impact in the form of drawdown, not necessarily related to subsidence fracturing'.

- Alluvial water levels decreased in the range of 0.17 m to 0.225 m between the March 2018 and June 2018 monitoring campaigns. This can be attributed to the exceptionally dry conditions over the reporting period.

- Groundwater quality (pH and EC) remained relatively stable during the reporting period and when compared to the previous reporting period. No obvious mining impacts have been identified in relation to pH and EC results.

The *Historical Groundwater Review and Assessment* (AGE, March 2018) found the predictions made by the Environmental Assessments LWB1-B3 (Umwelt, November 2015) and LWB4-B7 (Umwelt, May 2017) for DA29/95 Modification 6 and Modification 7 respectively, to be valid against the vast majority of measured groundwater impacts. No impacts have been measured in any of the six alluvium monitoring bores in the Austar groundwater monitoring network.

In the Branxton Formation, hard rock aquifer MB01 shows probable mining impact; however, the impact may not necessarily be related to the propagation of deeper drawdown impact from the Greta Coal Seam. NER1010 may also have been impacted by mining, but it too is not necessarily due to propagation of deeper drawdown impact from the Greta Coal Seam. Predictions made to the Upper Branxton Formation are still considered valid as the impacts measured in MB01 and NER1010 are considered localised and not connected to each other. This impact, however, is sufficiently benign to

cause no immediate adverse impacts because it is localised, reversible (once groundwater heads recover post-mining) and groundwater resources in the Branxton Formation do not appear to be used locally.

8 REHABILITATION

Rehabilitation and land management activities were undertaken in accordance with the approved Mining Operations Plan (MOP). Consistent with the MOP, there were no areas of rehabilitation relinquished or signed off by DRE during the reporting period.

During the next reporting period, rehabilitation, maintenance and monitoring of reject emplacement areas will continue as required. Austar will also continue seeking heritage approval for demolition of selected heritage structures.

The MOP defines rehabilitation phases for each domain, and the completion criteria for each phase. For each domain, specific performance indicators have been established to allow the progress of rehabilitation to be measured.

8.1 Buildings

No buildings were demolished during the reporting period. Several buildings are proposed to be demolished as part of site rehabilitation works including the remaining buildings at the Bellbird site, Kalingo site and several buildings and the pony stables at the CHPP site.

A Historical Heritage Assessment and Structural Engineer's inspection report were completed in November 2008 and August 2008 respectively. The Heritage Assessment identified items which did not require further heritage management, and items of potential heritage value. Items which were identified as having no heritage significance in the Heritage Assessment will be progressively demolished.

The needs of Heritage Management will need to be balanced against structural and safety issues identified in the Structural Engineer's report and by DRG. Consultation will continue with Cessnock City Council in the 2017-18 reporting period.

8.2 Rehabilitation of Disturbed Land

The Tailings Storage Facility and Reject Emplacement Area domain has been identified for rehabilitation activities during the MOP term and are discussed in the sections below. Subsidence remediation may also be required in the Underground Mining Area (Extraction Plan) domain if impacts are observed. All other areas of the mine remain in the Active domain.

8.2.1 Reject Emplacement Areas

There are currently three areas within the Tailings Storage Facility and Reject Emplacement Area domain under active rehabilitation, maintenance and monitoring:

- Aberdare Reject Emplacement Area – active emplacement area in various phases of rehabilitation (refer **Plan 3B** Aberdare Extended Emplacement Area Mining and Rehabilitation 30 June 2018). Post rehabilitation land use is Grassland;
- Area 12 – Former reject emplacement area that has been substantially revegetated. A stockpile of capping material remains, which is planned to be used for capping in other reject emplacement areas. Post rehabilitation land use is Grassland;
- Area 13 – Former reject emplacement area that is within the Ecosystem and Landuse Sustainability Phase. A sinkhole exists in this area that is being investigated for remediation. Post rehabilitation land use is Grassland.

No capping was undertaken in the active Aberdare Reject Emplacement Area during the reporting period. Dirty water areas continue to drain to underground workings. Detailed design of the clean water diversion drain will be progressed.

8.2.2 Underground Mining Area (Extraction Plan)

No mining impacts have been observed that require remediation works in the Bellbird South LWB1-LWB7 Extraction Plan area.

8.2.3 Kitchener Surface Infrastructure Site

There was 4.4 hectares of disturbed land at the Kitchener Surface Infrastructure Site (SIS) temporarily stabilised during the reporting period. Soil testing was undertaken in the previous period to determine the rates for application of ameliorants. Lime, gypsum, compost, mulch, seed and fertiliser were applied to areas to be vegetated.

Following application of ameliorants and seed a watering system was established to spray clean treated water from the Reverse Osmosis plant on stabilised areas. The land stabilisation project was successful in reducing erosion and sedimentation as evidenced in the **Photo 1** below.

PHOTO 1 KITCHENER SIS - 30/07/18

8.2.4 Exploration

During the reporting period two (2) exploration boreholes were completed and rehabilitated. Rehabilitation of those areas includes: completely grouting the hole and removing casing below ground level; all drilling plant and materials transported offsite; landform returned to original level including sumps filled and compacted; vegetation established. Rock removal and addition of topsoil also occurred at one (1) of these sites where harrowing had brought rocks to the surface over the sump areas.

At the request of the landholder, further rehabilitation of one (1) exploration borehole site that was drilled in the previous reporting period was also undertaken in the 2017-18 reporting period. This included rock removal and the addition of compost and seed.

8.3 Rehabilitation Monitoring

In accordance with the MOP, reject emplacement areas where rehabilitation has been undertaken to grassland, are to be monitored on an annual basis until they are considered to be self sustaining and no longer require management.

Vegetated areas of the Aberdare Reject Emplacement Area are considered to be in the Ecosystem and Landuse Establishment phase. Rehabilitation monitoring was undertaken on the Aberdare Reject Emplacement Area on two occasions during the 2017-18 reporting period, being 26 October 2017 and

27 March 2018. Three quadrats of 2m x 2m each were established. Results of the monitoring are summarised in **Table 8-1**.

TABLE 8-1 RESULTS OF REHABILITATION MONITORING ABERDARE REJECT EMPLACEMENT AREA

Date	Groundcover (%)	Weed Cover (%)	Canopy Cover (%)	Comments
Quadrat 1 (E 344114, N 6363964)				
26/10/2017	50	0	0	After long dry period
27/03/2018	40	0	0	Shooting after recent rain following long dry period
Quadrat 2 (E 344167, N 6364088)				
26/10/2017	40	5	0	After long dry period
27/03/2018	50	0	2	Shooting after recent rain following long dry period
Quadrat 3 (E 344871, N 6364583)				
26/10/2017	60	5	0	After long dry period
27/03/2018	65	5	0	Shooting after recent rain following long dry period

Results of the monitoring were then compared to Performance Criteria for the Ecosystem and Landuse Establishment phase – Rehabilitation Area Grassland (**Table 8-2**).

TABLE 8-2 ABERDARE REJECT EMPLACEMENT AREA PERFORMANCE CRITERIA

Domain Objective	Performance Indicator	Completion Criteria	Justification/ Source	Current Status
Phase – Ecosystem and Landuse Establishment				
Secondary Domain – Rehabilitation Area – Grassland				
Establishment of vegetation that will achieve final land use	Suitable target species are used to establish a grassland ecosystem	Areas are seeded with target species immediately following growth medium establishment	Mining Lease conditions	Achieved - Seeded with species listed in Appendix 2 of current MOP
	Success of initial strike after seeding	For Grassland areas, groundcover targets are: -0-20% canopy -60-100% groundcover within 12 months of sowing during ecosystem	Based on Austar's ecological monitoring programs undertaken across its operations.	0-20% canopy – Compliant 60-100% groundcover – Partially compliant. Results indicate 40-65% cover across the 3 quadrats monitored

Domain Objective	Performance Indicator	Completion Criteria	Justification/ Source	Current Status
Phase – Ecosystem and Landuse Establishment				
		establishment phase.		
	Weed growth does not dominate during vegetation establishment phase	Weeds comprise no more than 20% of ground cover vegetation.	Developed for this MOP. Based on Austar's ecological monitoring programs undertaken across its operations.	Achieved – Results indicate 0-5% weed coverage in 3 quadrats monitored
Fauna diversity is progressing towards the ecosystems planned in the final land use.	Fauna pest species are managed and controlled (where possible)	Pest control activities will be undertaken in accordance with the *Local Land Services Act 2013*. Austar will control declared species on their land, where identified through rehabilitation monitoring.	Developed for this MOP	Achieved - No declared species observed to be impacting vegetation establishment
The area does not present a significant risk commensurate with NSW RFS requirements.	NSW Fire Service to provide comments on Bushfire Management Plan or the bushfire management plan has been developed using relevant NSW Fire Service guidelines.	Appropriate bushfire hazard controls have been implemented with advice from the NSW Rural Fire Service.	Developed for this MOP	Partially Compliant - Draft Bushfire Management Plan prepared in consultation with RFS. Plan to be finalised during 2018-19 reporting period.

During the reporting period, Areas 12 and 13 were not monitored. The rehabilitation monitoring program will be expanded in the 2018-19 reporting year to include monitoring of Areas 12 and 13.

8.4 Rehabilitation Trials and Research

A geotechnical investigation was commissioned during the 2017-18 reporting period. The aim of the investigation was to assess the subsurface soil and groundwater conditions at Aberdare Reject Emplacement Area in order to provide:

- Assessment of the existing drainage regime at Aberdare Reject Emplacement Area including review of mine Record Tracing provided by Yancoal;
- Discussions of options available to maintain existing drainage regime (into underground workings) as more material is placed and the site levels increased prior to capping;
- Assessment of the risk of generation of acid leachate;
- Comments on treatment and mitigation of leachate generation;
- Assessment of the propensity for spontaneous combustion and bushfire ignited combustion;
- Methods to reduce combustion risk; and
- Capping requirements to reduce combustion risk.

The investigation included a desktop review, site inspection by a geotechnical engineer, the excavation of test pits, and laboratory testing of selected samples.

A Report documenting the findings of the above investigations is in preparation.

8.5 Rehabilitation Summary

During the reporting period rehabilitation was managed generally in accordance with the MOP. The mining and rehabilitation status is presented in Table 8-3. Rehabilitation activities at Aberdare Emplacement Area are shown on **Plan 3B**. Rehabilitation in Areas 12 and 13 are shown on **Plan 3C**.

TABLE 8-3 REHABILITATION SUMMARY

Mine Area Type	Previous Reporting Period (Ha) (2016-17)	This Reporting Period (Ha) (2017-18)	Next Reporting Period (Ha) (2018-19)
Total Mine Footprint	182.01	182.01	182.01
Total Active Disturbance	137.94	137.94	134.90
Land being Prepared for Rehabilitation	0.00	0.00	0.00
Land under active Rehabilitation	44.07	44.07	47.50
Completed Rehabilitation	0.00	0.00	0.00

Notes from NSW Govt Annual Review Guideline (October 2015):
***Total mine footprint** includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in DRE MOP/RMP Guidelines). Please note that subsidence remediation areas are excluded.*
***Total active disturbance** includes all areas ultimately requiring rehabilitation such as: 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 emplacements (active/unshaped/in or out-of-pit), and tailings dams (active/unshaped/uncapped).*

Land being prepared for rehabilitation *– includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in DRE MOP/RMP Guidelines).*
Land under active rehabilitation *- includes areas under rehabilitation and being managed to achieve relinquishment – includes the following rehabilitation phases as described in the DRE MOP/RMP Guidelines – "ecosystem and land use establishment" (area seeded OR surface developed in accordance with final land use) and "ecosystem and land use sustainability" (revegetation assessed as showing signs of trending towards relinquishment OR infrastructure development).*
Completed rehabilitation *– requires formal sign-off by DRE that the area has successfully met the rehabilitation land use objectives and completion criteria.*

8.6 Rehabilitation Actions for the Next Reporting Period

The following actions are proposed for the 2018-19 reporting period:

- Expand the existing rehabilitation monitoring program to include Areas 12 and 13;
- Undertake soil testing and seek expert advice for application of ameliorants and further seeding of vegetated areas, if required, to increase groundcover at Aberdare Reject Emplacement Area for land in the Ecosystem Landuse and Establishment phase;
- Prepare a Report documenting the findings of the coarse rejects drainage and capping investigations; and
- Continue to cap areas of reject at Aberdare Reject Emplacement Area where the reject has reached design levels.

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

The aim of Austar's Community Support Program is to help benefit a wide range of community needs such as education, environment, health and safety, infrastructure projects, arts, leisure and research within the City of Cessnock and surrounding areas. The Community Support Program was advertised in the local newspaper and on the Austar website.

The closing date for applications in 2017 was 19 May 2017, with funds being distributed during the 2017-18 reporting period. Recipients of the 2017 Program funds included:

- Cessnock High School – Sensory Garden;
- Cessnock Minor Rugby League Club – Junior Presentation;
- Cessnock Netball – Water Bottle Refill Station; and
- Kitchener Public School – Edible Garden Upgrade.

The 2018 Community Support Program was also advertised in the 2017-18 reporting period, with a closing date of 11 May 2018. Funds for the 2018 Program will be distributed during the next reporting period.

9.2 Community Sponsorship

In addition to the Community Support Program, Austar sponsors local community initiatives. In the 2017-18 reporting year sponsorship included:

- Paxton Women's Bowling Club;
- Mount View High School;
- Kitchener Public School;
- Westpac Rescue Helicopter Service;
- Cessnock High School;
- Cessnock Rugby League Football Club;
- Hunter Valley Steamfest Maitland;
- 2017 Miners Challenge Memorial Woodchop (Ellalong Hotel);
- Cessnock City Council Mayoral Scholarship;
- Coalfields Amateur Swimming Club;
- Cessnock Regional Art Gallery; and
- Kurri Kurri Rugby League Club.

9.3 Community Liaison

The mine continues to maintain close relationships with all neighbouring properties, as well as nearby communities as part of normal business.

9.3.1 Community Consultative Committee (CCC)

The Austar Community Consultative Committee (CCC) continued to operate during the 2017-18 reporting period. Meetings are held on a quarterly basis and the membership is shown in **Table 9-1**. During the reporting period Austar held four CCC meetings, which occurred on the following dates:

- 23 August 2017;
- 15 November 2017;
- 28 February 2018; and
- 23 May 2018.

TABLE 9-1 AUSTAR COMMUNITY CONSULTATIVE COMMITTEE (CCC) DURING THE 2017-18 REPORTING PERIOD

Organisation/Representative	Name
Independent Chairperson	Ms Margaret MacDonald-Hill
Cessnock Council Representative	Clr Mark Lyons
Community Representatives	Mr Alan Smith Ms Ashlee Baker Mr John Rayner Mr Peter Sturrock
Company Representatives	Mr Brian Wesley Mr Gary Mulhearn* Mr Josh Chadwick

*Note: Carly McCormack commenced as Austar's Environment & Community Superintendent on 28 May 2018 replacing Gary Mulhearn as a Company Representative.

Austar coordinates these meetings, and provides information during and after the meetings on mining progress, community programs and environmental performance. Minutes from meetings are prepared by Austar in a format and manner acceptable to CCC members. The major discussion points from the Austar meetings in 2017-18 were:

- Current mining operations – underground, CHPP, Exploration, Bellbird South Area progress, Stage 3 progress, staff reductions, Resource Regulator notices;
- Environmental monitoring and results;
- Environmental incidents;
- Community complaints; and
- Community sponsorships.

Minutes of CCC meetings are published on the Austar Coal Mine website.

9.3.2 Resident Consultation

During the 2017-18 reporting period, Austar consulted with individual residents who live in areas potentially affected by the mine. This consultation was often conducted informally, in a manner that allowed the residents to openly discuss issues of importance to them. Monitoring results were often provided and progress of mining operations discussed as part of this resident consultation.

Stakeholders including landholders and infrastructure owners over the Bellbird South LWB1-B7 mining area, and relevant NSW Government Departments were provided with updates by letter to inform of the location and timing of extraction of the longwall panels, and predicted and measured environmental impacts.

Built Features Management Plans were completed for Ausgrid, Telstra, Cessnock City Council and landholders for the LWB4-LWB7 extraction area.

Landholders over the Stage 3 area were consulted regarding exploration boreholes and geophysical surveys (ground magnetic surveys and seismic surveys) over parts of the Stage 3 mining area. These discussions included a description of the proposed exploration activity, and negotiations for access to private property to undertake the planned works.

Ongoing consultation on mining operations in the LWB1-LWB7 area and for exploration activities will continue in the next reporting period.

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.

In the 2017-18 reporting period a total of two (2) complaints were received, a decrease on the five (5) complaints in 2016-17 reporting period. Both complaints received during the 2017-18 reporting period were related to noise generated by mechanical issues from a pump at Kalingo dam. The same resident reported the noise on two occasions two days apart. Details of the complaints are provided in **Table 9-2**.

The Independent Environmental Audit identified an administrative non-compliance regarding the way complaints are logged in the complaints register. Under condition M5.2 of EPL 416, the date and time of the complaint should be recorded. The complaints register had not included the time of complaint. Upon receiving the finding from the audit, the complaints log was updated to include date and time to rectify the finding.

TABLE 9-2 COMMUNITY COMPLAINTS SUMMARY

Time and Date	Property	Detail	Follow Up Actions
5:35pm 12/06/18	Glennie St, Ellalong	Complainant reported that Austar's 3 Shaft facility was generating unusual noise.	Control Room received a call on the afternoon of the 12/6/18 from a resident on Glennie Street, Ellalong reporting a loud noise from the 3 Shaft site approximately 5.35pm. An Austar mechanic went to the shaft area and was unable to identify any unusual sounds.
7:25pm 14/06/18	Glennie St, Ellalong	Complainant reported again that Austar's 3 Shaft facility was generating unusual noise.	The complainant above called the Control Room again at 7.25pm 14/6/2018 reporting the same sound (as noted in Complaint No. 1) and also mentioned hearing the noise at approximately 3am the same day. Austar staff went to listen from outside the complainant's house at Glennie Street, Ellalong while an Austar mechanic attended the infrastructure area. A squealing noise was heard and found to be Austar's Kalingo Dam pump. The pump was switched off immediately. Agreement was made with the resident to run the pump during daylight hours over the weekend until a replacement could be delivered. The pump was replaced on 20/06/18.

10 INDEPENDENT ENVIRONMENTAL AUDIT

An Independent Environmental Audit was conducted by SLR Consulting during the reporting period. The site visit was undertaken from 15 to 23 November 2017 and the report finalised in February 2018. The audit assessed the following key approvals:

- Stage 3 Project Approval (PA08_0111);
- Bellbird South Development Consent (DA 29/95);
- Environment Protection Licence 416;
- Environmental Assessment (EA) Modification 5 (MOD 5) Consolidated Statement of Commitments;
- Consolidated Mining Lease No 2 (Act 1992); and
- Water Access Licences.

The physical boundaries of the audit were defined by the Development Consent areas.

Consultation with relevant government departments, Cessnock City Council and the CCC was undertaken prior to the commencement of the Audit. At the request of the DPE, specialist auditors were included on the audit team to assess compliance with air quality, surface water, groundwater, noise and subsidence conditions.

There were ten recommendations made to address non-compliances against 19 conditions (some of which were duplicated between a number of approvals), relating predominantly to:

- Meteorological data capture;
- Water discharge (quality);
- Annual Review reporting;
- Management Plan review;
- Complaints register administration;
- Noise monitoring exceedances; and
- Water quality and exploration reporting.

Of the ten recommendations, eight have been completed and two remain ongoing. These actions will continue to be addressed in the next reporting period.

There were 15 additional recommendations made by the auditors, of which two require no ongoing actions, seven are complete and six are ongoing to be completed within this reporting period.

Table 10-1 outlines the audit recommendations and Austar's responses, along with the status of each action at the end of this reporting period. The next Independent Environmental Audit is scheduled to be undertaken in 2020. The Independent Audit report can be found on the Austar website.

TABLE 10-1 INDEPENDENT ENVIRONMENTAL AUDIT FINDINGS 2017

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses to DPE on 27 February 2018	Status
1	Continue to download meteorological data on a fortnightly basis.	Austar implemented fortnightly download of the meteorological station using a work order system since 1 March 2017. This was considered appropriate by the auditors. No further action is required.	Complete
2	Review and if possible reduce the 'leak detection' level for pipelines with the aim of minimising volume that could potentially leak without triggering alarms and the automatic shut down.	Austar note that there are existing leak detection systems on the pipelines which will shut down the pumping system in the event of a major leak. In addition, a three times per week physical pipeline inspection is used to monitor pipeline condition as a maintenance exercise, which is scheduled on a work order system. In response to this audit recommendation, Austar will undertake a review of the existing leak detection levels. This requires careful consideration of normal pipeline operation including start-up and shutdown flow data by the engineering team to determine if a reduction is possible. This review will be completed within 3 months of the Audit Report date.	Complete
3	- SLR recommends renaming the document an Annual Review and completing it in accordance with the Annual Review Guidelines; - Future Annual Reviews should compare results against EA predictions and assess trends in data (eg. over a five year period); - It is suggested that tilt and strain profiles be provided in the Annual Review reports and a sub-section provided in the text that compares the measured v. predicted values and discusses whether the overburden is behaving as expected or otherwise. Curvatures may be then able to be estimated from the strain profiles through a locally derived ratio between maximum strain and peak curvatures (excluding disturbed survey pegs). The main purpose of this exercise would be to provide technical information to	- Comment on changes to the report naming is noted, and will be adopted for the next Annual Review Report. The Annual Review Report is still intended to meet both the development consent reporting requirements and the mining lease reporting requirements, and so necessarily departs from being done in accordance with only the Annual Review Guidelines. - Comment on improved review against EA predictions is noted, and extended period for trends of data will be incorporated into the next Annual Review Report. - Additional information on subsidence parameters will be included in the next Annual Review Report. - Comments on improved reporting against MOP (rehabilitation and	Complete

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses to DPE on 27 February 2018	Status
	stakeholders that do not have access to the DRG portal - The amount of rehabilitation and disturbance undertaken during the reporting period vs that included in the MOP should be included in future Annual Reviews; - Future Annual Reviews should report compliance with the MOP; and - Future Annual Reviews should report progress in respect of rehabilitation completion criteria.	disturbance, compliance with MOP, progress with rehabilitation completion criteria) are noted and will be incorporated into future Annual Review Reports.	
4	Updates to Management Plans - All relevant Management Plans are to be updated to meet this timing, including updating the Plans with any recommendations from this audit.	Management Plans were reviewed and submitted to DPE in April 2017. Management plans have been reviewed again in response to the DA29/95 MOD7 approval and are in process of being updated, including consultation requirements of the management plan condition. It is anticipated this will be completed by end March 2018.	Complete
5	Groundwater monitoring - Provide a comparison of measured and predicted impacts in future Annual Reviews.	This has previously been provided in Annual Environmental Management Reports. Measured impacts are presented in every review report. An improved reporting to include comparison of measured and predicted impacts will be included in future Annual Review Reports.	Complete
6	Continue program to reduce noise. Complete sound power level testing of equipment in isolation in an attempt to reduce noise levels.	Noise Reduction Program has continued during 2017. Sound power / received noise level investigation of equipment in isolation was completed in August and September 2017. Next steps of this program include a noise reduction options assessment using the data captured (including reasonable / feasible test). This is scheduled to be completed by Q2 2018.	Ongoing
7	All Management Plans are to be updated to meet this timing, including updating the Plans with any recommendations from this audit.	Management Plans were reviewed and submitted to DPE in April 2017. Management plans have been reviewed again in response to the DA29/95 MOD7 approval and are in process of being updated, including consultation requirements of the management plan condition. It is	Complete

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses to DPE on 27 February 2018	Status
		anticipated this will be completed by end March 2018.	
8	Add an additional column to record the time of the complaint. Sometimes the time of the complaint is not known. Where this is the case, this should be recorded.	This has been completed.	Complete
9	Continue to investigate noise mitigation measures, including additional sound power level testing.	See response to Recommendation 6.	Ongoing
10	Ensure Exploration Reports are dated and sent to the DRG within 28 days of the anniversary date.	Exploration reports were submitted within one calendar month of the anniversary date of the indexing title (DSL89) anniversary date. Future reporting will be scheduled to meet the 28 day period.	Complete
11	Demolition/Hazardous Substances - Complete the 'Progress Assessments for demolition of existing structures and foundations at Bellbird, Pelton & Cessnock No 1 shaft. This should include a review of historical heritage significance as well as hazardous substances.	Currently these structures are fenced off until the assessment work can be progressed. This is a rehabilitation commitment to be completed prior to lease relinquishment, complicated by the heritage status of these collieries. This assessment works is budgeted to be progressed after Q2 2018.	Ongoing
12	Erosion and Sediment Control - Remove sediment collected in sediment fence to the north of the Surface Infrastructure Site (SIS); - Perimeter fence along the northern boundary of the SIS is being underscoured by a drainage channel. Maintenance required; - Water management required in laydown area 1 at the pit top. There was evidence of coal material leaving the disturbance footprint of the site (remains within site boundaries). Clean up this area; - Erosion and sediment control areas around rail spur of the CHPP. Steep sides, highly erodible. Based on site discussions Douglas Partners have been engaged to assist; and - Some sections of the dirty water drain at the CHPP (internal through site) have been eroded. Maintenance required.	- Kitchener SIS actions noted and are scheduled to be completed March 2018. - Pit top area coal material was cleaned up, and additional action added to the routine weekly Pit Top work order to remove any built up coal material from this area. CHPP actions – the comments relate to internal site components located wholly within the dirty water management are of the CHPP. For operational reasons, the rail spur will be maintained to minimise scour/erosion. Periodic maintenance of internal drains is undertaken to maintain general operational integrity.	Complete

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses to DPE on 27 February 2018	Status
13	Water quality testing – Recommend testing a greater suite of analytes when sampling discharge events from LDP001.	Austar's Environment Protection Licence 416 requires recording of flow and specific parameters whenever there is a discharge from Licenced Discharge Point 1. Austar will continue to comply with the requirements of Environment Protection Licence in relation to Licenced Discharge Point 1.	No action required
14	Water Spreadsheet - Austar to liaise with CITEC to ensure LDP001 is added as a line item in the 'Site Water Monthly Data' spreadsheet. Discharges rarely occur from this location, however it should be recorded in this spreadsheet.	This has been completed.	Complete
15	Noise Monitoring - Continue to implement actions to reduce noise. As discussed at the audit, complete additional sound power level testing program around the CHPP.	See response to Recommendation 6.	Ongoing
16	Spontaneous Combustion Management Plan - Update Spontaneous Combustion Management Plan with details regarding monthly pushing of material to reduce spontaneous combustion risks	An update to the reject emplacement procedure is nearing completion and this recommendation has been included in the updated procedure. This will be completed by end of March 2018.	Complete
17	General Management Plans – Update figures in management plan, to include more up-to-date aerial photos, including those that are in the 2017 version of the Site Water Management Plan; – Recommend continued liaison with the DPE regarding the approval of the revised management plans; – All management plans are to be updated to meet this timing (as per S5 C8 of DA29/95), including updating with any recommendations from this audit; and – Although it has been noted that consultation has been completed, some plans provide little detail regarding consultation dates and outcomes. Include additional detail including dates for consultation, outcomes and where it has been covered within the management plans.	Management Plans were reviewed and submitted to DPE in April 2017. Management plans have been reviewed again in response to the DA29/95 MOD7 approval and are in process of being updated, including consultation requirements of the management plan condition. It is anticipated this will be completed by end March 2018.	Complete

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses to DPE on 27 February 2018	Status
18	Groundwater Reporting – Recommend to remove data from when a logger was pulled out, which is evident on the graphs with large 'reverse or downward' spikes from the lines; – In AEMR - comments regarding trends are generally limited to the 12 month reporting period only. Suggest longer term discussion is included future reviews; and – In AEMR - no comparison to predicted results or discussion comparing model estimates to actual readings.	– Comments regarding data removal are noted and will be considered, or alternatively will be annotated in future reporting. – Trend review/discussion has typically included discussion of the previous year's data. Review of additional period data will be included in the next Annual Review Report. – Improved comparisons of the measured versus predicted results will be included in the next Annual Review Report.	Complete
19	Kitchener SIS/Lighting - If there are changes to the site such as finalising works at the Kitchener SIS then a lighting assessment should be completed to determine compliance with the Australian Standard AS4282 (INT) 1995.	Action noted – not triggered at this time.	Not triggered
20	Waste Minimisation – Waste bins at the Pit Top need to be labelled, to ensure waste is sorted into the right containers; – Compare waste volumes in the AEMR across the previous AEMR periods; and – Provide additional detail in the AEMRs regarding waste minimisation and management.	Waste bin labelling will be improved prior to end of Annual Review period. The AEMR includes comparison of mining waste streams against previous reporting period. Future Annual Review Reports will address the comment on reporting general waste streams, and waste minimisation and management.	Ongoing
21	Subsidence - It is suggested that tilt and strain profiles be provided in the Annual Review reports and a sub-section provided in the text that compares the measured v. predicted values and discusses whether the overburden is behaving as expected or otherwise. Curvatures may be then able to be estimated from the strain profiles through a locally derived ratio between maximum strain and peak curvatures (excluding disturbed survey pegs).	The additional subsidence parameter information will be included in future Annual Review Reports.	Complete
22	Photographic Monitoring – Creek Surveys - There is no discussion within the Photographic Survey Reports prepared by Carbon Based relating to creek stability. A conclusion should be added within these reports outlining if there were any creek stability issues.	The creek survey report format has been updated to include observations regarding creek stability.	Complete

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses to DPE on 27 February 2018	Status
23	Ecological Monitoring - Outline fauna work in 2017-18 AEMR; Send Ecological Monitoring report to OEH; and Based on site communications Austar are planning to cease ecological monitoring in Stage 2 as it's been 5 years since monitoring. Undertake consultation with OEH to obtain approval to cease this monitoring.	Ecological monitoring is reported in the Annual Review Reports. Austar will be engaging with OEH regarding the completion of ecological monitoring in the Stage 2 area (including the report for 2017) as the required period of monitoring has been completed, which has demonstrated nil impacts from the Stage 2 mining.	Ongoing
24	Reject Emplacement Area Capping - Recommend formal trials for capping the REA are undertaken. Justify capping depth and obtain approval from the DRG.	A study to confirm capping thickness was engaged in 2017 and is in progress. This is a commitment of the current Mining Operations Plan in relation to capping at the Aberdare Emplacement Area in consultation with the DRG.	Ongoing
25	Rehabilitation Phasing - Update with the correct rehabilitation phasing in MOP Plans in the next MOP.	The MOP is scheduled to be updated by Q2 2018, this item will be updated at that time.	Ongoing

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

There were no reportable incidents at Austar during the reporting period. There were two noise exceedance events reported to DPE and EPA during the reporting period, which are outlined in **Table 11-1**. No atypical operations were occurring at the CHPP during the monitoring events.

TABLE 11-1 EXCEEDANCE REPORTS 2017-18

Incident No.	Date	Incident Details	Follow Up Actions
1	10/07/17	A reportable noise exceedance from the CHPP was identified at one (1) location during routine noise monitoring on 10/7/2017 due to the low frequency modifying factor. A review of meteorological data at the time of testing indicated that noise limits were applicable at the time of monitoring though may have enhanced results by up to 1.5dB. There was no community complaint at the time of the measured exceedance.	**Immediate Actions:** EPA & DPE were notified once it was confirmed that the noise limits were exceeded on 14/7/17. **Follow up Actions:** Follow up monitoring at the same location was carried out on 17/7/17 when the CHPP was operating without exceedance; Austar are continuing to work on the noise pollution reduction program (PRP) in consultation with the EPA; an incident report was submitted to EPA & DPE on 19/7/17.
2	25/10/17	A reportable noise exceedance from the CHPP was identified at one (1) location during routine noise monitoring on 25/10/2017 due to the low frequency modifying factor. There was no community complaint at the time of the measured exceedance.	**Immediate Actions:** EPA & DPE were notified once it was confirmed that the noise limits were exceeded on 30/10/17. **Follow up Actions:** Follow up monitoring at the same location was carried out on 31/10/17 and an exceedance due to the low frequency modifying factor was again measured. Austar are continuing to work on the noise pollution reduction program (PRP) in consultation with the EPA; an incident report was submitted to EPA & DPE on 6/11/17. Noise monitoring undertaken on 6/11/2018 complied with limits at all locations.

A number of administrative non-compliances were identified during the reporting period, and these are discussed below as well as in relevant sections throughout this report.

Management Plans were reviewed following the approval of DA 29/95 (Modification 7), however they were not updated and lodged within the timeframes specified in the consent. Those management plans requiring updates were revised and lodged with the DPE for approval in June 2018, approximately seven months late. These were approved early in the 2018-19 reporting period. This is discussed in **Section 3.3.3**.

DA 29/95 (Modification 7) contained a condition to lodge a groundwater impact review with DPE, written in consultation with DoI Water, by February 2018. In order to complete the review and provide adequate time for consultation with DoI Water, Austar sought an extension to the lodgement date to the end of March. While the Department considered the request to be reasonable, the DPE were unable to formally grant an extension because the wording of the condition did not allow it. The review was lodged within the reporting period and has not yet been approved. This is also referenced in **Section 7.4** of this report.

A number of non-compliances have been identified in the previous reporting period's Annual Review. The last Annual Review was not compliant with a number of approval conditions (See **Section 1**), and did not adequately:

- Compare monitoring results against predictions in Environmental Assessments and Extraction Plans, or trends over the life of the project;
- Report compliance with the MOP;
- Report progress in respect of rehabilitation criteria; and
- Have regard to relevant guidelines.

This Annual Review attempts to address these non-compliances. It has been written in accordance with DPE's Annual Review Guidelines (2015) and where possible identifies trends and compares results to applicable predictions in the Environmental Assessments and Extraction Plans.

The Independent Environmental Audit identified an administrative non-compliance regarding the way complaints are logged in the complaints register. Under condition M5.2 of EPL 416, the date and time of the complaint should be recorded. The complaints register had not included the time of complaint. Upon receiving the finding from the audit, the complaints log was updated to include date and time to rectify the finding. This is discussed in **Section 9.4**.

During the next reporting period, Austar will continue to address non-compliances identified during the IEA, the Annual Review process and through identified incidents to work towards full compliance with approvals.

12 ACTIVITIES TO BE COMPLETED FOR THE NEXT REPORTING PERIOD

Austar will endeavour to carry out the following activities during the 2018-19 reporting period, as outlined in **Table 12-1**.

TABLE 12-1 PROPOSED ACTIVITIES FOR 2018-19 REPORTING PERIOD

	Activities Proposed in the 2018-19 Reporting Period
1	Continue to address the findings and actions of the Independent Environmental Audit.
2	Update the Historic Heritage Management Plan to include a mechanism of review after lodgement of an Annual Review, Audit report or relevant incident.
3	Progress heritage assessments to support demolition of existing structures and foundations at Bellbird, Pelton, and Cessnock No. 1 (Kalingo) Collieries.
4	Continued implementation of noise pollution reduction program at the Austar CHPP.
5	Phase 1 Contamination Assessment to be reviewed and actions considered.
6	Consultation is to be undertaken with OEH to cease ecological monitoring of the Stage 2 area.
7	Expand the existing rehabilitation monitoring program for Aberdare Reject Emplacement Area to include Rehabilitation Areas 12 and 13.
8	Undertake soil testing and seek expert advice for application of ameliorants and further seeding of vegetated areas, if required, to increase groundcover at Aberdare Reject Emplacement Area for land in the Ecosystem Landuse and Establishment phase.
9	Review the geotechnical investigation commissioned during the 2017-18 reporting period and report on the findings.
10	Progressive implementation of the erosion and sediment control plan at the Aberdare Extended Emplacement area for capped areas with potential to drain to natural watercourses. Progress design and installation of the clean water diversion drain.
11	Continue to cap areas of reject at Aberdare Reject Emplacement Area where the reject has reached design levels.
12	Submission of a new MOP including additional tailings boreholes to Pelton underground workings. Installation of those boreholes in accordance with the new MOP as required.

Plans

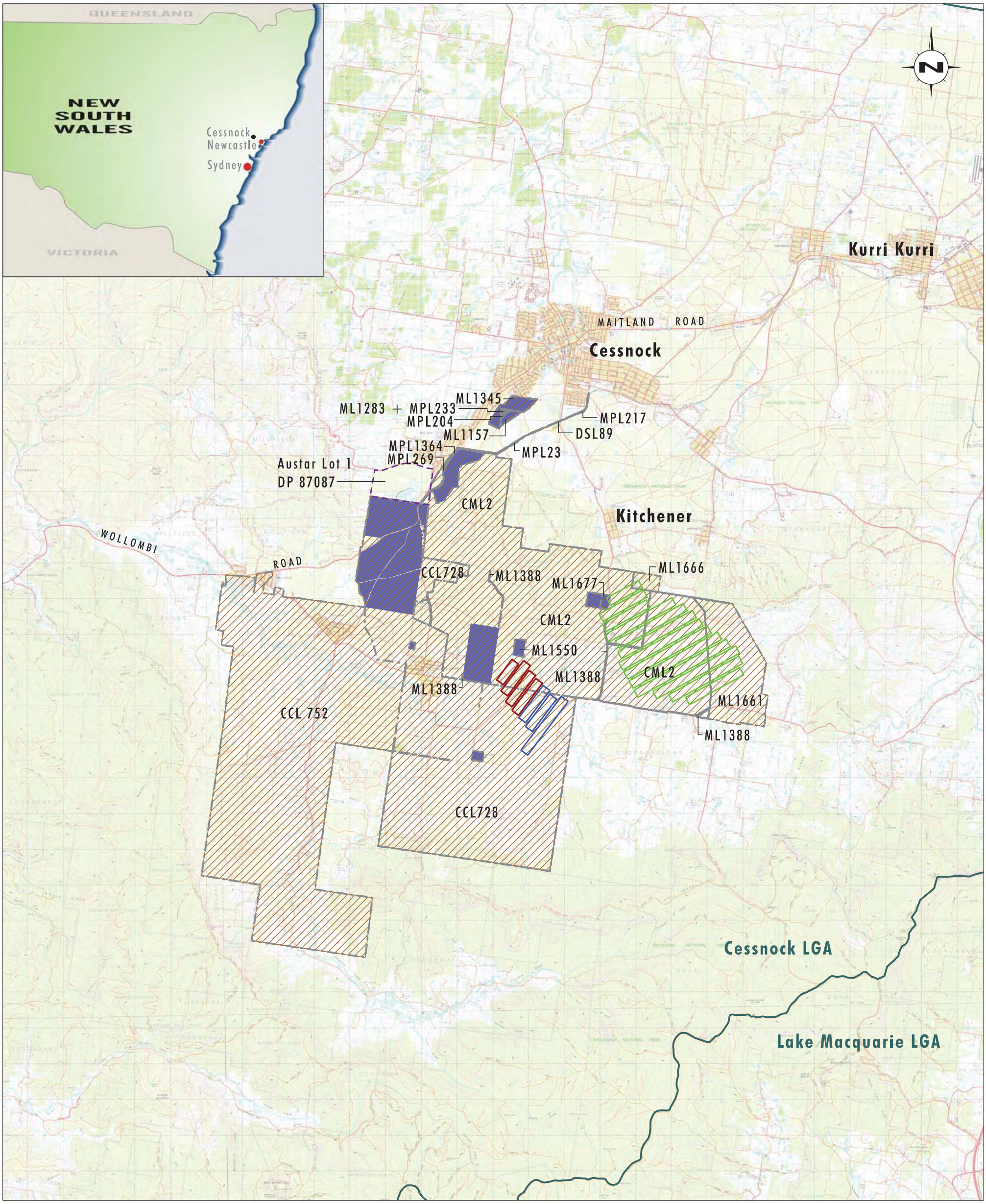


Image Source: Department of Land (2006)
Data Source: Austar Coal Mine (2015)

0 2.5 5.0 7.5km
1:150 000

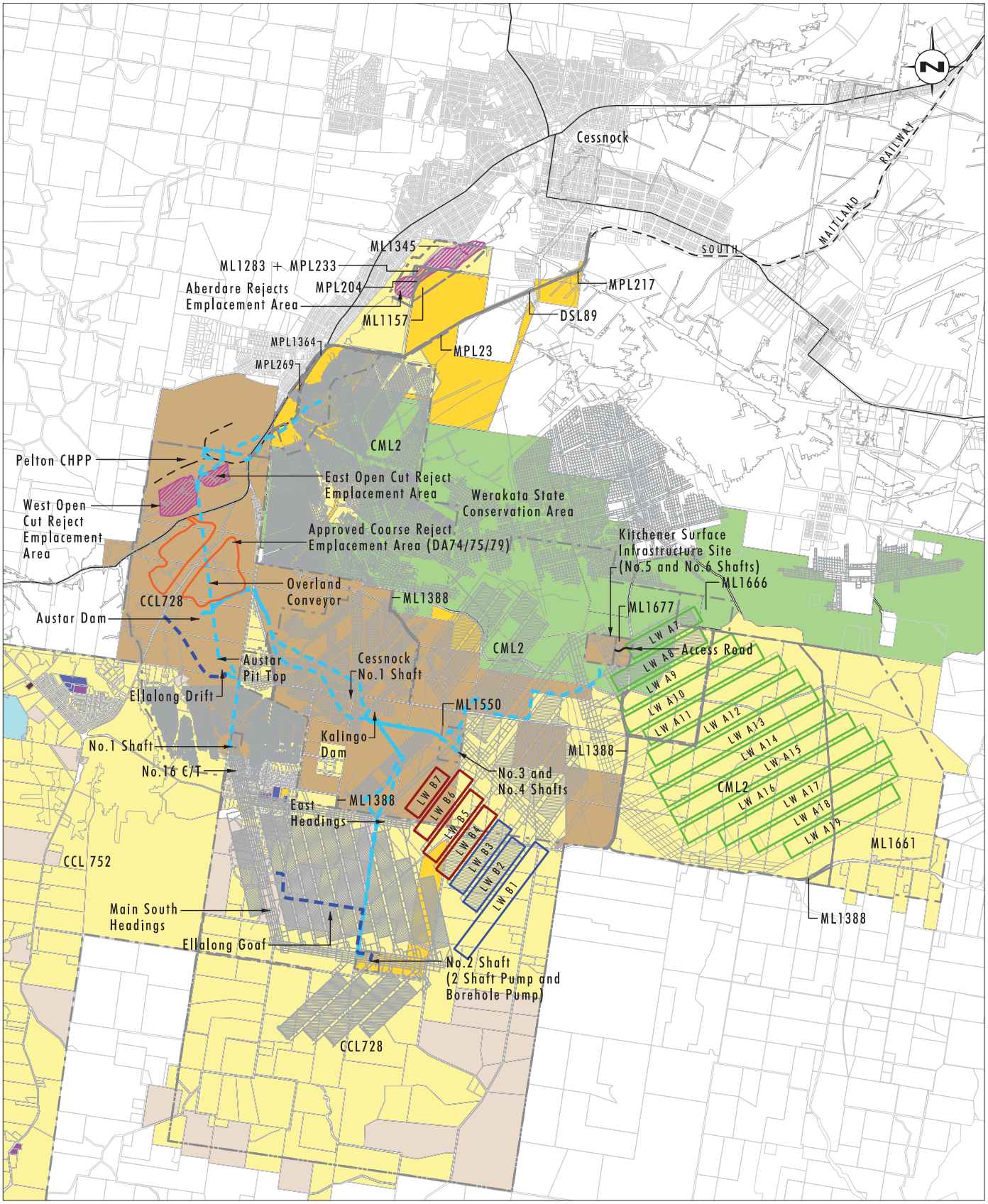
Legend

- B1-B3 Extraction Plan Longwall Panels (DA29/95 MOD 6)
- B4-B7 Longwall Panels (DA29/95 MOD 7)
- Layout for Stage 3 Longwall Panels (PA08_0111 MOD3)
- Local Government Area Boundary
- Mining Lease Boundary
- Surface Lease
- Sub Surface Lease
- Austar Lot 1, DP 87087

PLAN 1A

Pre-Mining Environment
Project Locality

File Name (A4): R11/3504_127.dgn
20180924 15.11



Data Source: Austar Coal Mine (2015)

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1:75 000

Legend

- B1-B3 Extraction Plan Longwall Panels (DA29/95 MOD 6)
- B4-B7 Longwall Panels (DA29/95 MOD 7)
- Layout for Stage 3 Longwall Panels (PA08_0111 MOD3)
- Approved Coarse Reject Emplacement Area (DA74/75/79)
- Reject Emplacement Areas
- Previously Mined Land/First Workings
- Mining Lease Boundary
- Water Pipeline
- Water Pipeline - Potable
- State Conservation Area
- Australian Communications Commission
- Austar Coal Mine Land
- Cessnock City Council
- Crown Land
- Energy Australia
- Hunter Water
- Minister for Education
- Private Land
- Assumed Freehold Land

PLAN 1C

Mining Activity Areas and Built Environment

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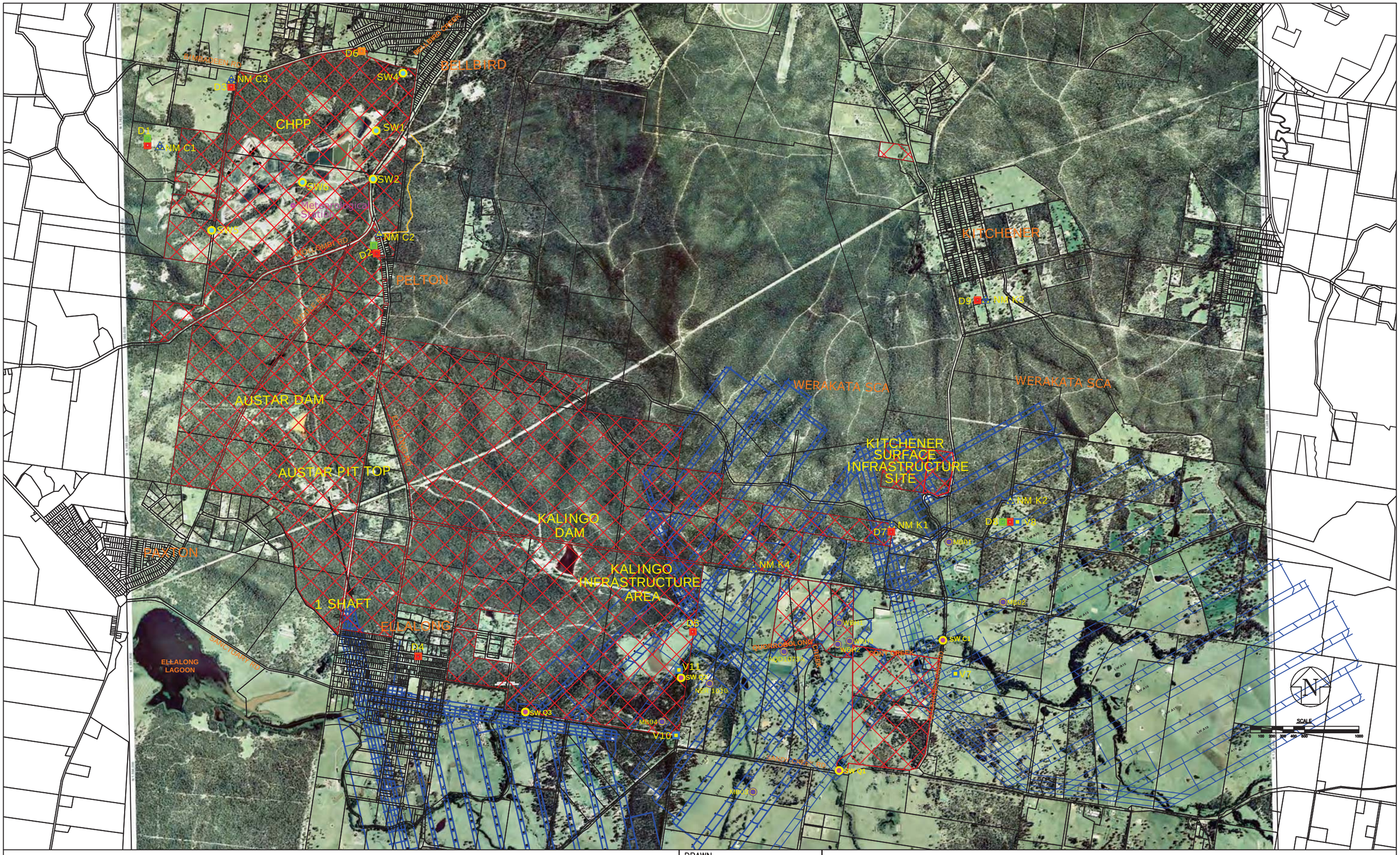
20180924 15.52



NER 1010 ..... Ground Water Monitor
NM K1 ..... Noise Monitors
V7 ..... Vibration Monitors

Austar Owned Land

D8 ..... High Volume Air Sampler / Dust Gauge
D6 ..... Continuous Dust Monitor
SW 2 ..... Surface Water EPL Sample Points
SW C1 ..... Coney Creek Sample Points
SW Q1 ..... Quorrobolong Creek Sample Points

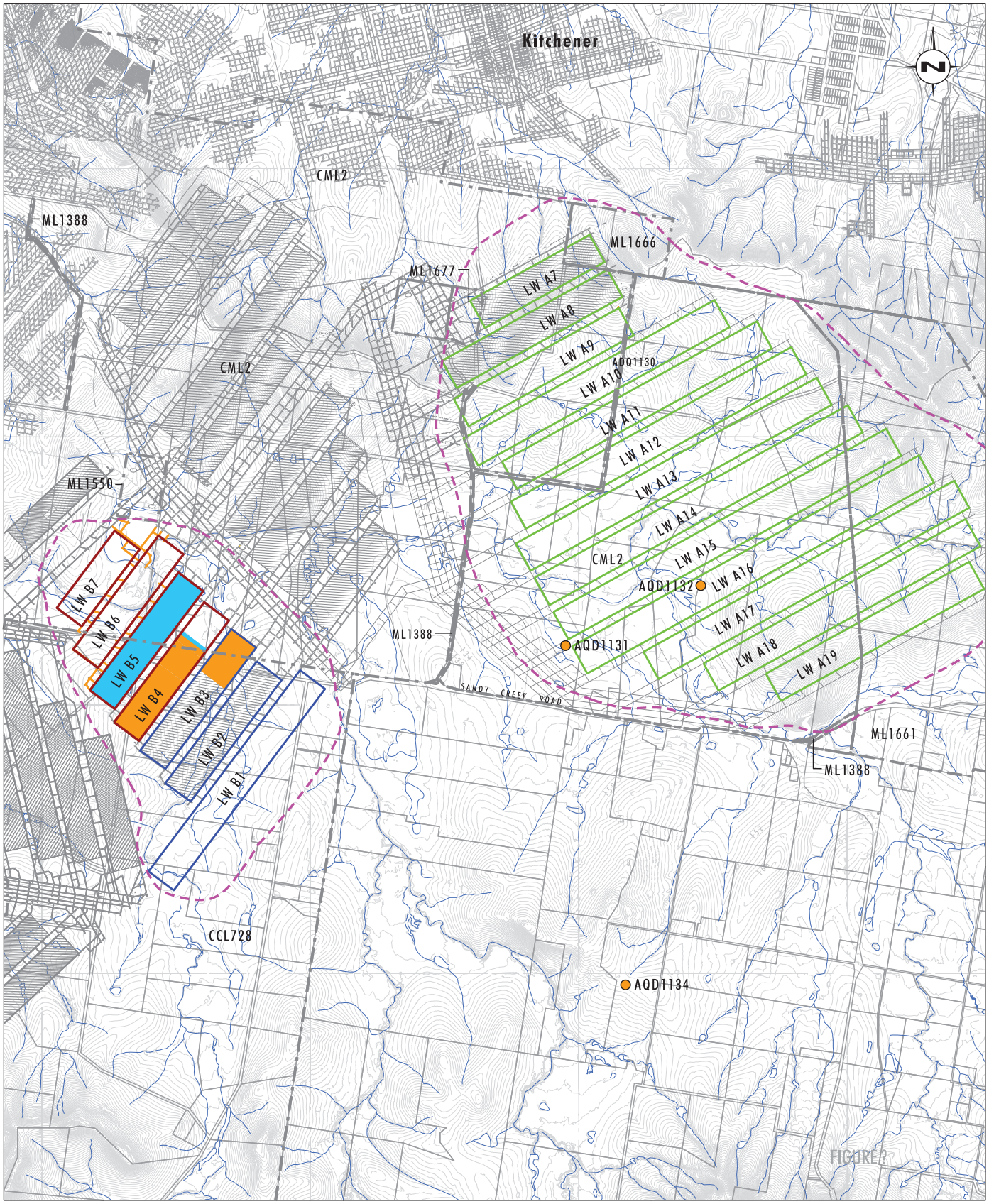
DRAWN	J. Chadwick
DATE	26/9/2018
CHECKED	C. McCormack
APPROVED	C. McCormack

AUSTAR COAL MINE

TITLE **Plan 2: Austar Environmental Monitoring Network**

SCALE Not to scale

DRAWING No. Environmental/ Monitoring Plan A3



Data Source: Austar Coal Mine (2015)
Note: 2m Contour Interval

0 0.5 1.0 2.0km
1:40 000

Legend

- B1-B3 Extraction Plan Longwall Panels (DA29/95 MOD 6)
- B4-B7 Longwall Panels (DA29/95 MOD 7)
- Layout for Stage 3 Longwall Panels (PA08_0111 MOD 3)
- Previously Mined Land/First Workings
- Mining Lease Boundary
- 20mm Subsidence Contour Estimate
- Drainage Line
- Contour Line
- Cadastre

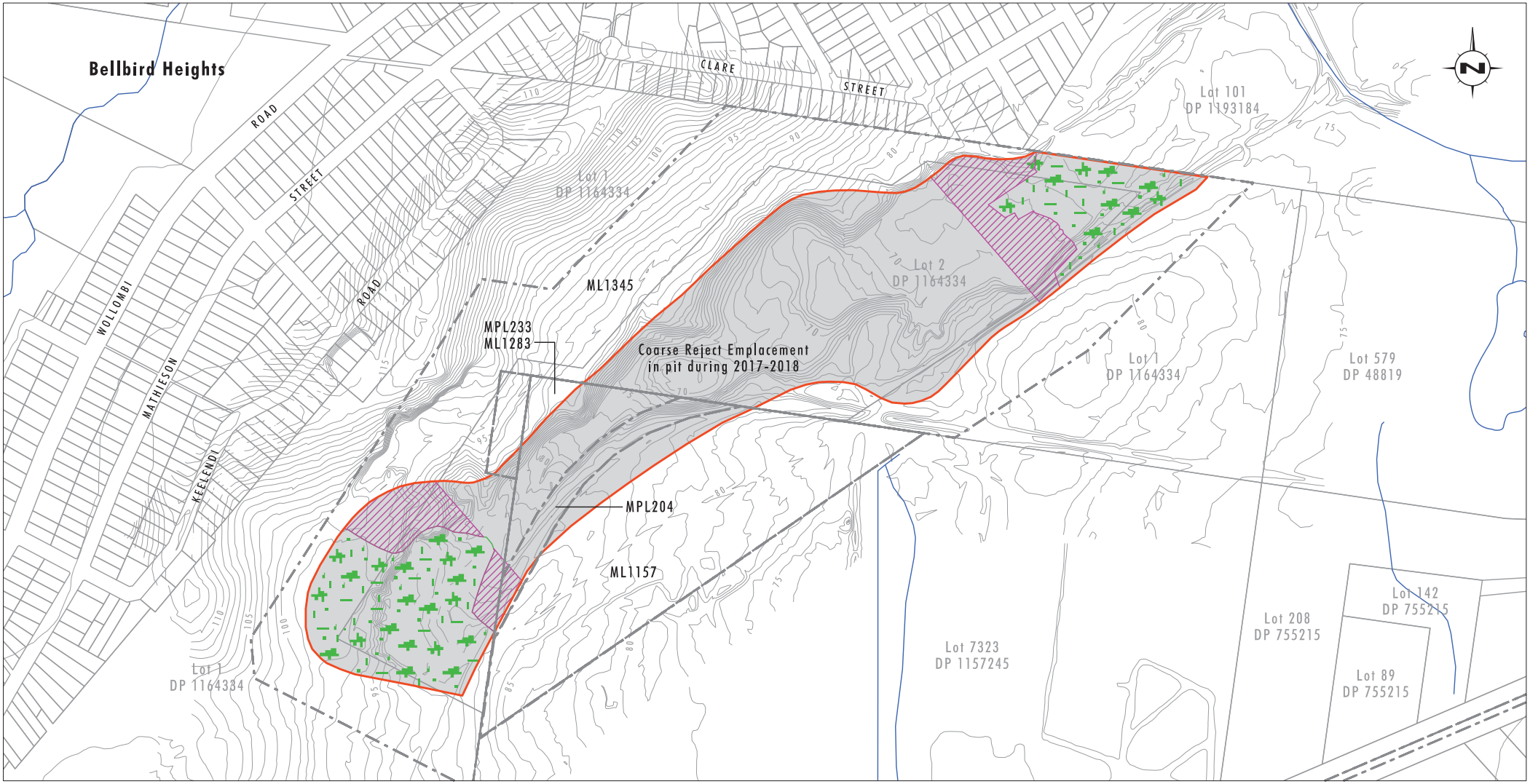
Mining Activities:

- July 2017 - June 2018
- July 2018 - June 2019
- Borehole

PLAN 3A

Mining Activities

File Name (A4): R11/3504_125.dgn
20180924 15.15



Data Source: Austar Coal Mine (2015)
Note: 1m and 10m Contour Interval

0 100 200 400m
1:7500

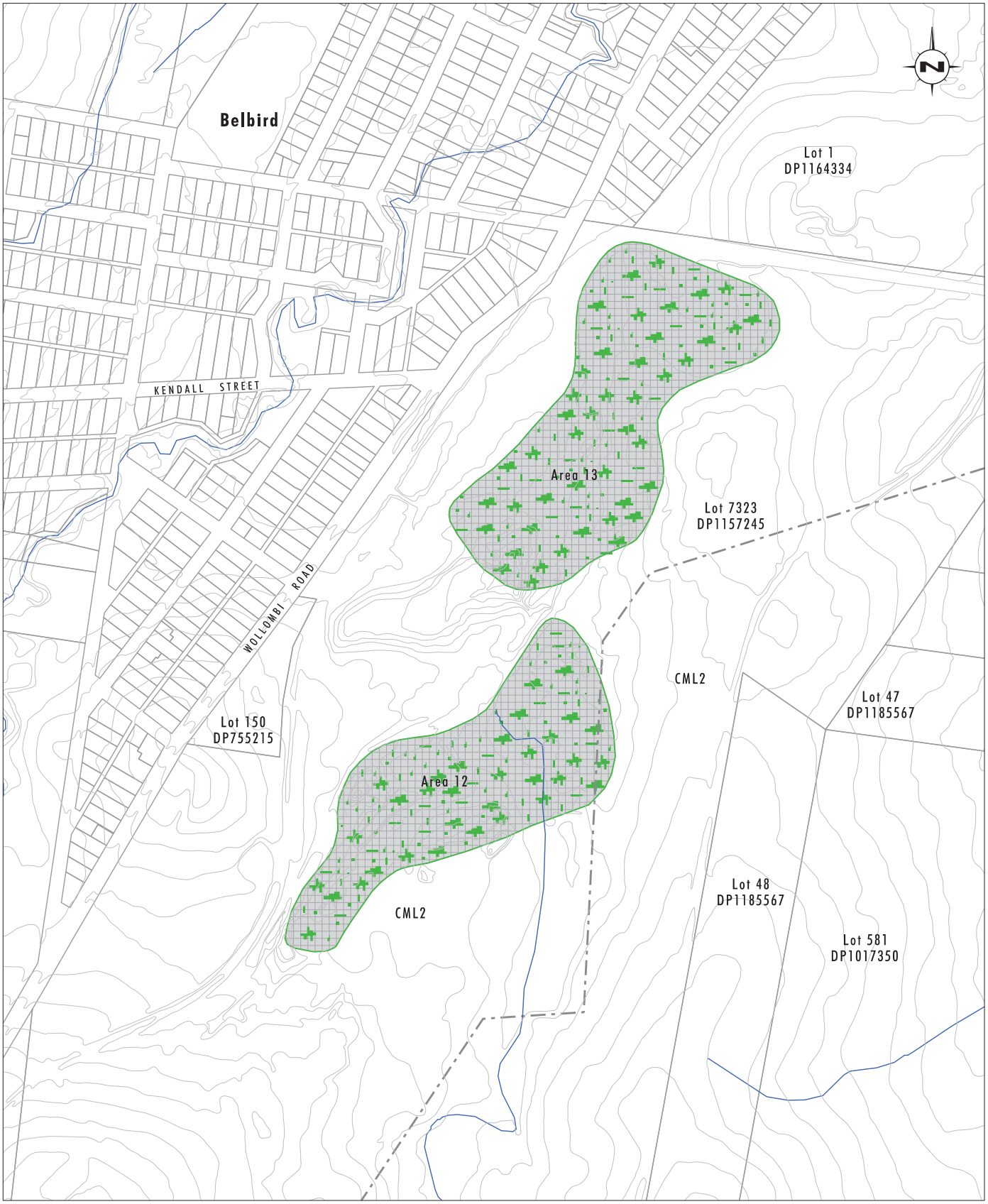
Legend

- Reject Emplacement Area
- Stage Plan 2018-2019
- Rehabilitation Area - Grassland
- Mining Lease Boundary
- Drainage Line
- Contour Line
- Cadastral Line

PLAN 3B

Aberdare Extended Emplacement Area Mining and Rehabilitation 30 June 2018

File Name (A4): R11/3504_126.dgn
20180924 15.16



Data Source: Austar Coal Mine (2015)
Note: 2m Contour Interval

Legend

- Mining Lease Boundary
- Drainage Line
- Contour Line
- Cadastral Line

Primary Domain
- 2 - Reject Emplacement Area

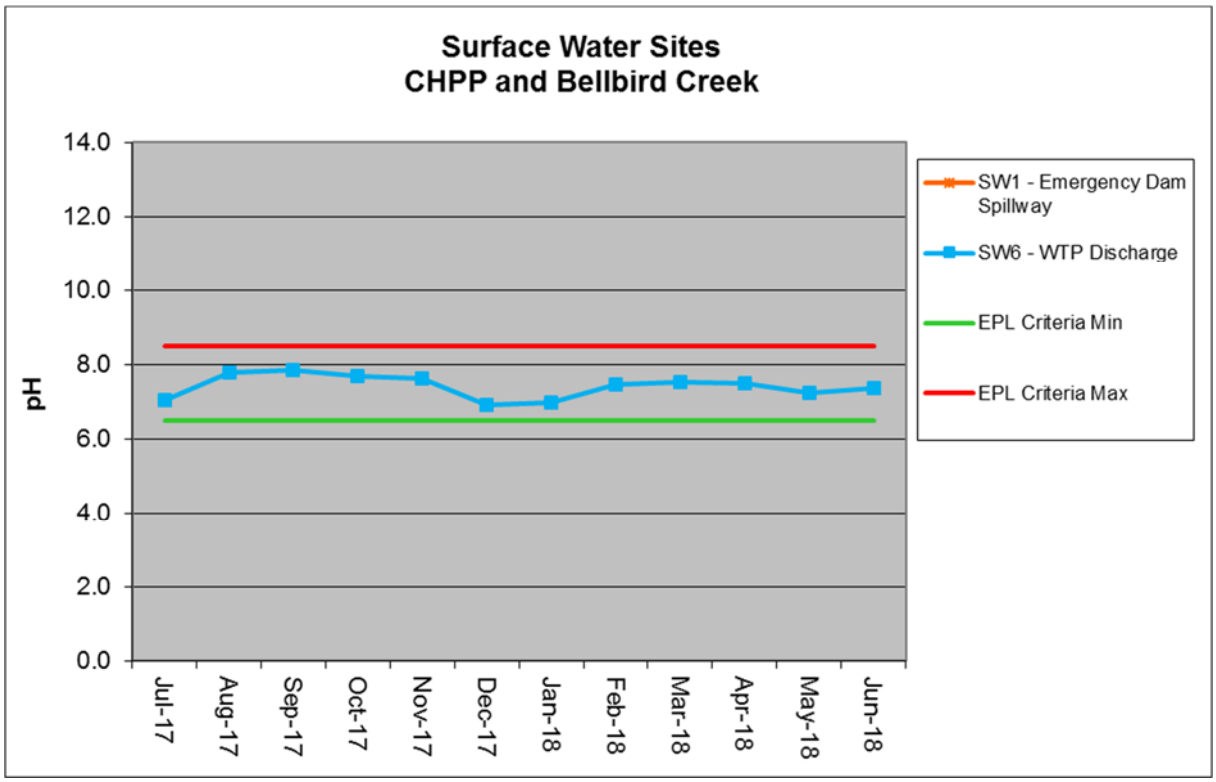
Secondary Domains
- Rehabilitation Area - Grassland

PLAN 3C

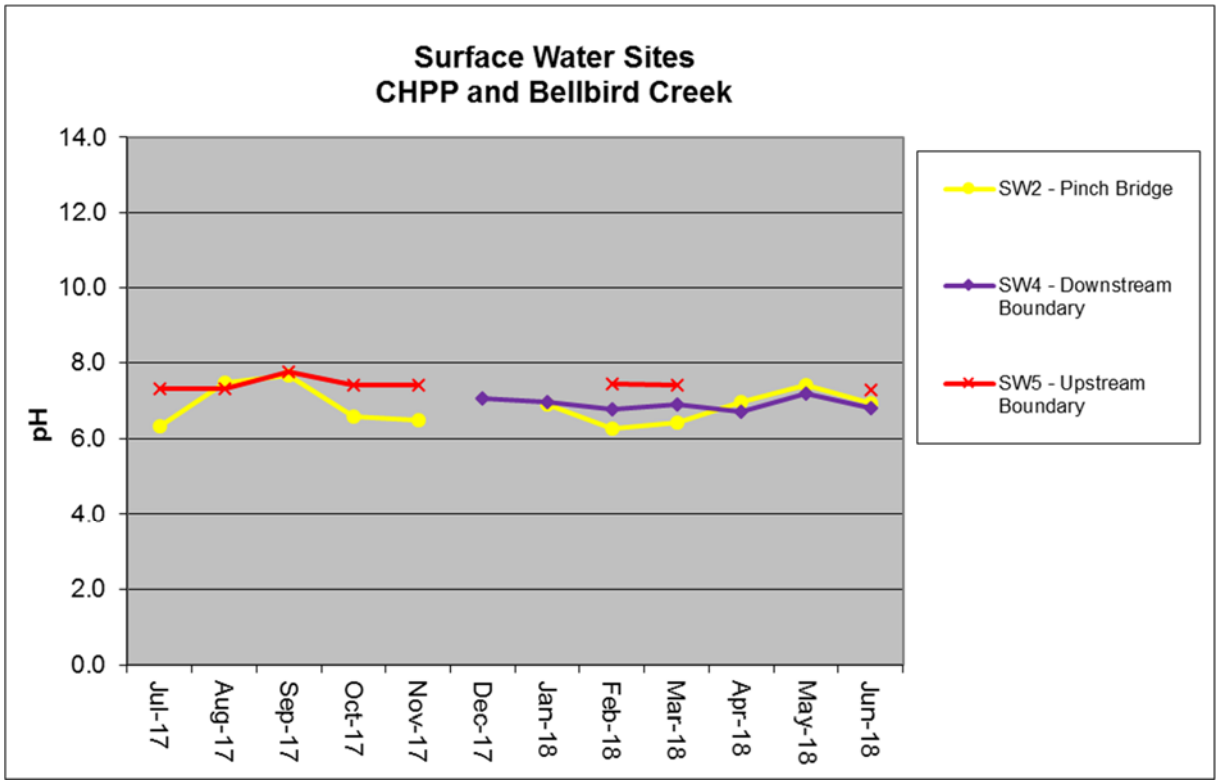
Aberdare Emplacement Areas 12 and 13

Appendix A – Water Quality Data

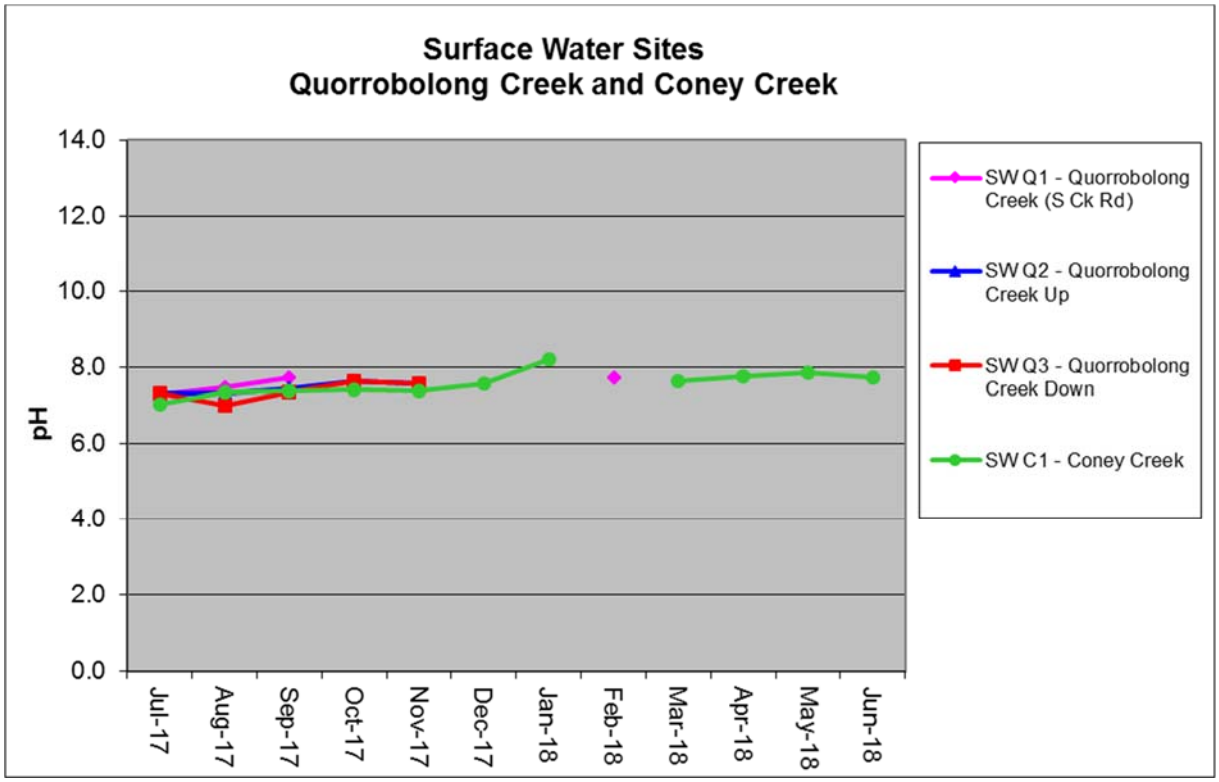
Austar Coal Mine 2017-18 Surface Water Monitoring Results Graphs – pH



Note: No discharge occurred from SW1 in 2017-18 reporting period.

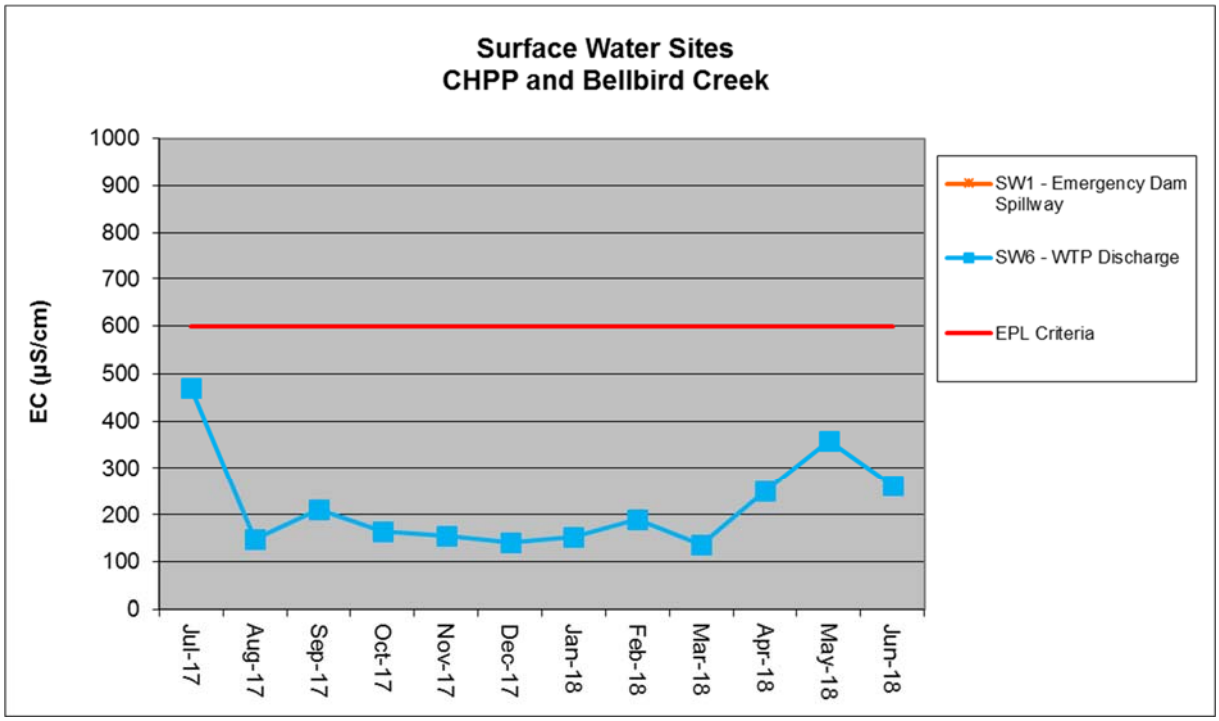


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

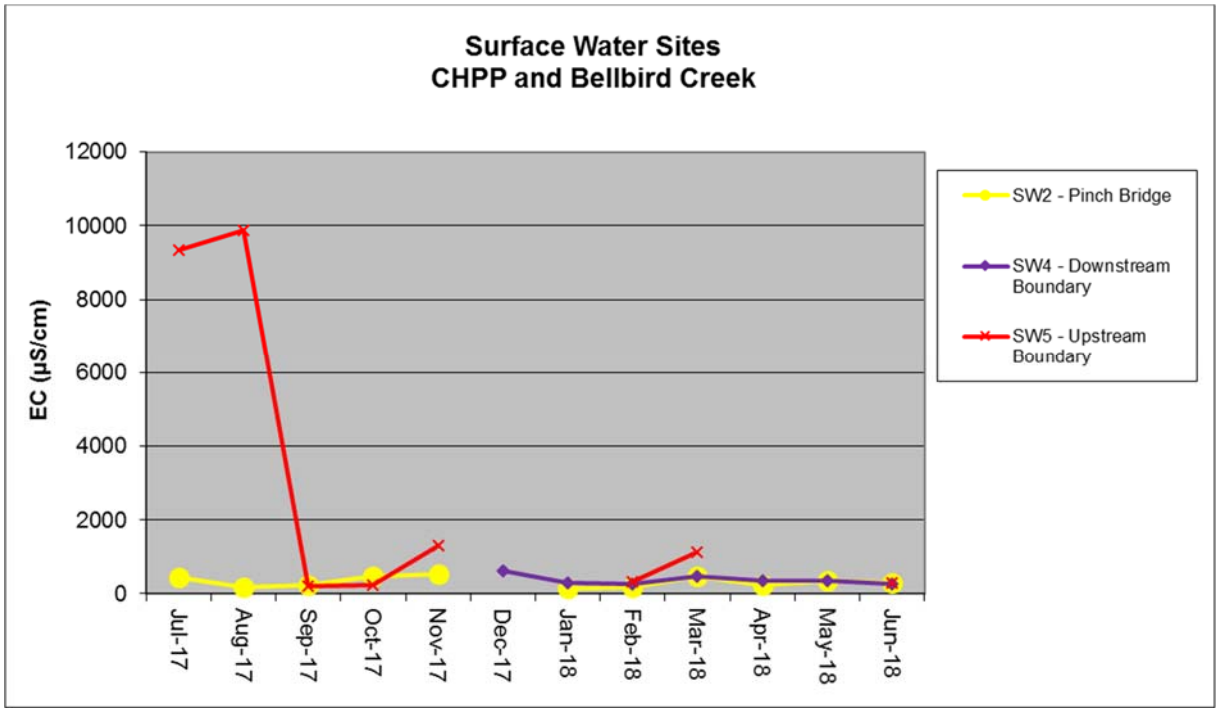


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

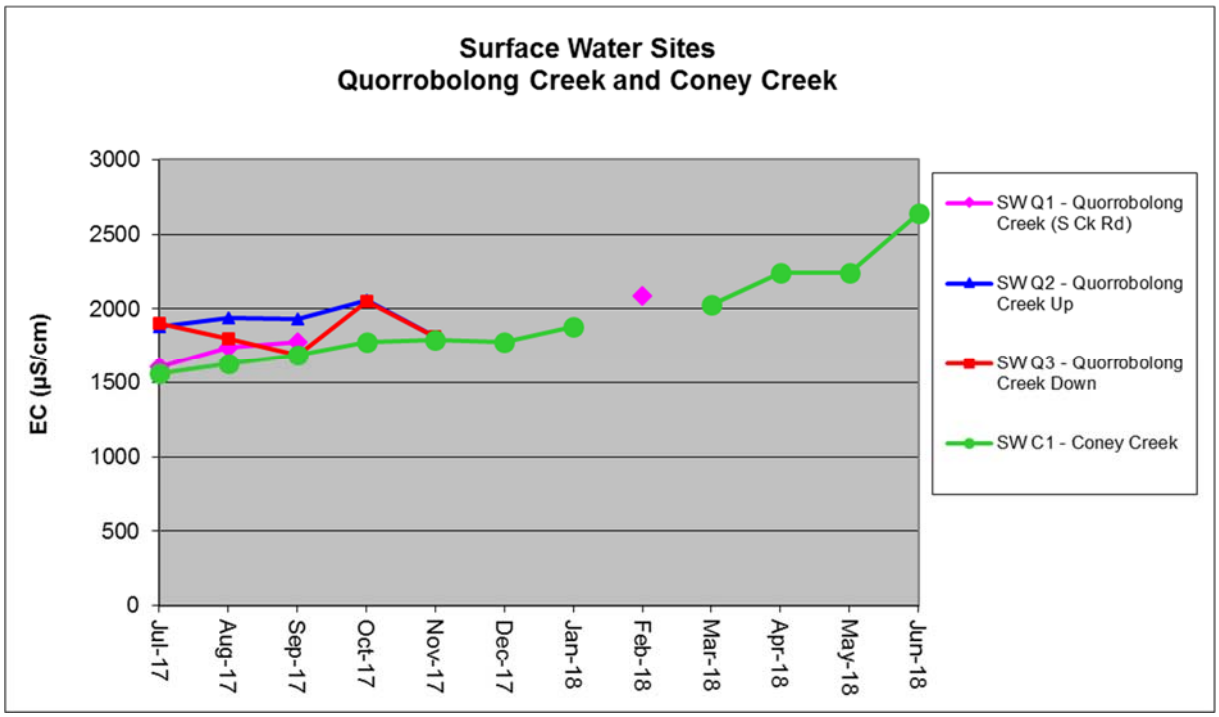
Austar Coal Mine 2017-18 Surface Water Monitoring Results Graphs – EC



Note: No discharge occurred from SW1 in 2017-2018 reporting period.

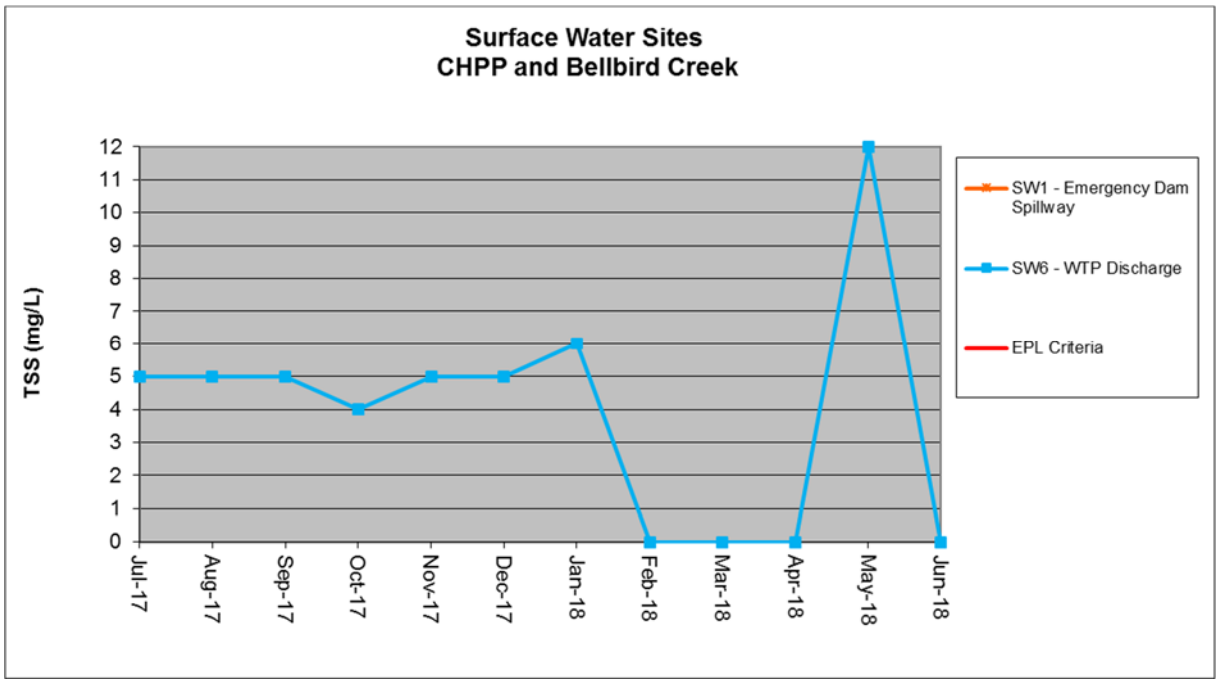


Note: For months where results are not shown the creek was dry and a sample was not able to be collected.

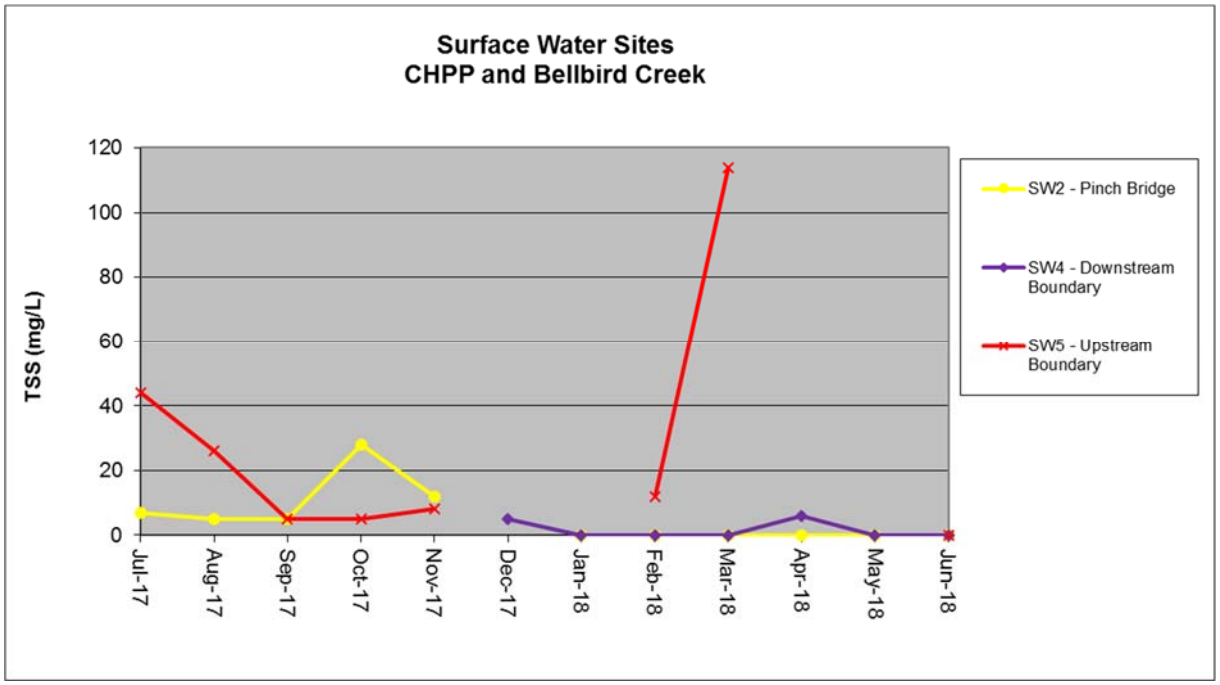


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

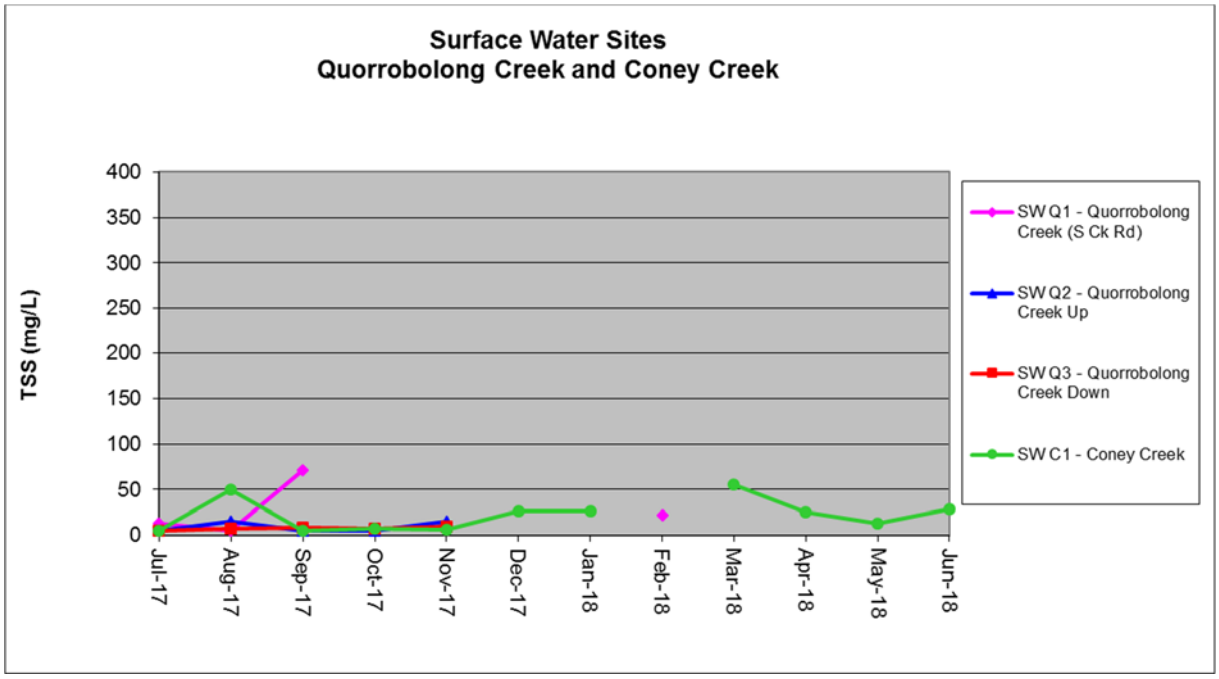
Austar Coal Mine 2017-18 Surface Water Monitoring Results Graphs – TSS



Note: No discharge occurred from SW1 in 2017-2018 reporting period.

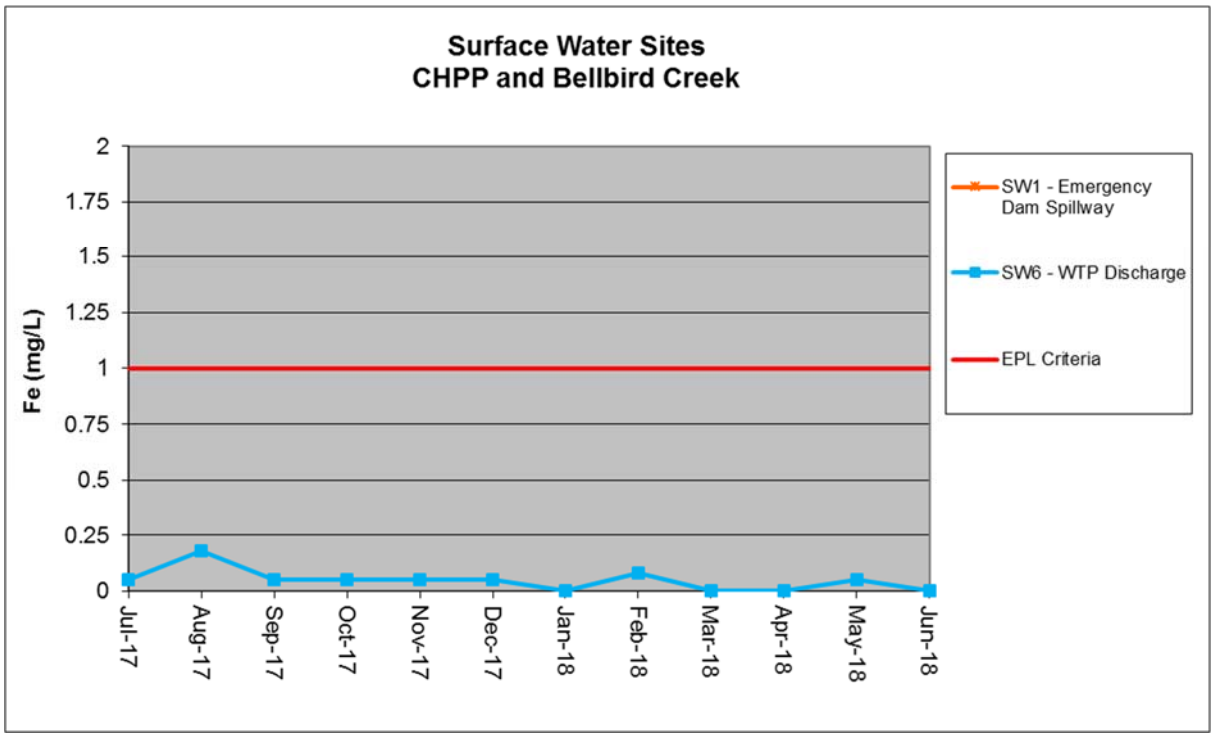


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

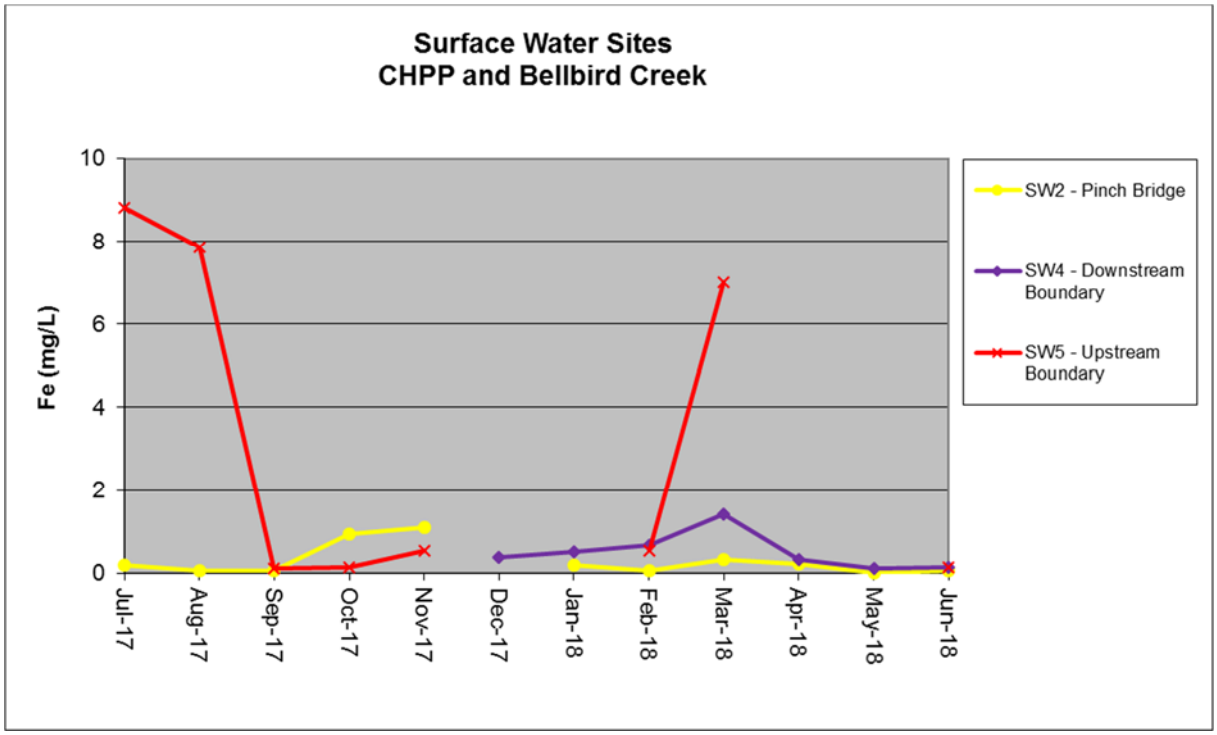


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

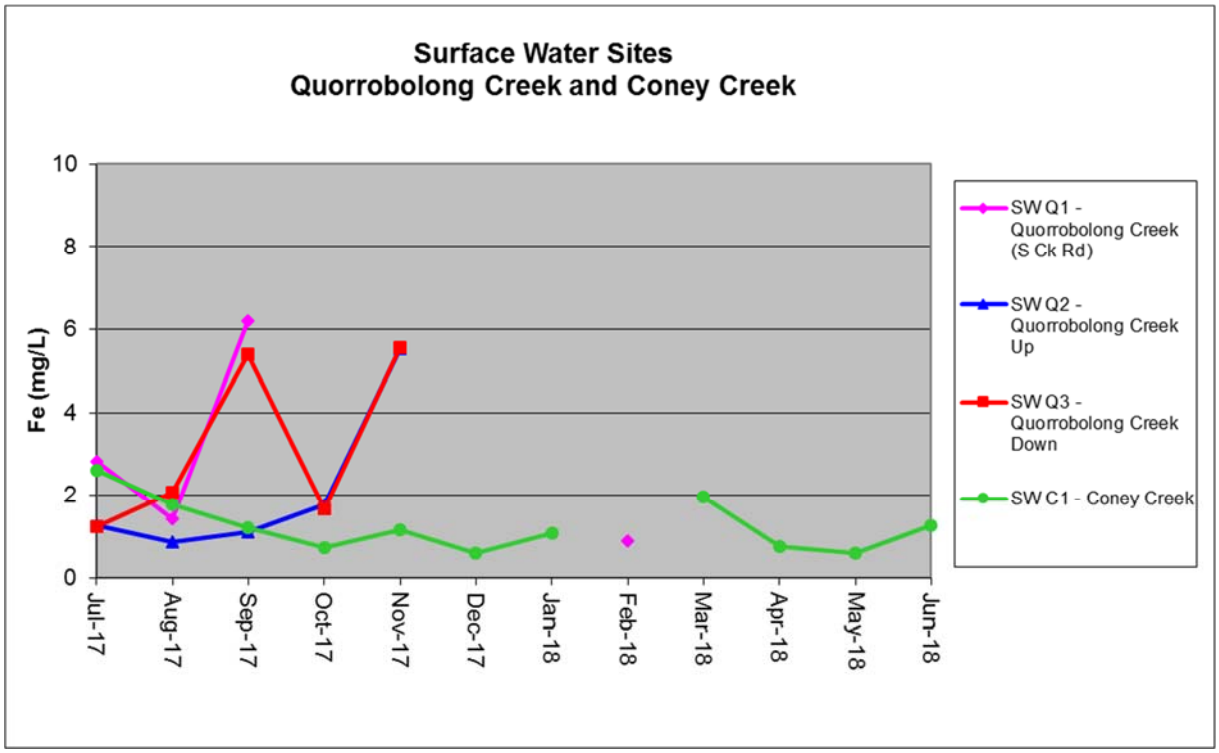
Austar Coal Mine 2017-18 Surface Water Monitoring Results Graphs – Fe



Note: No discharge occurred from SW1 in 2017-2018 reporting period.



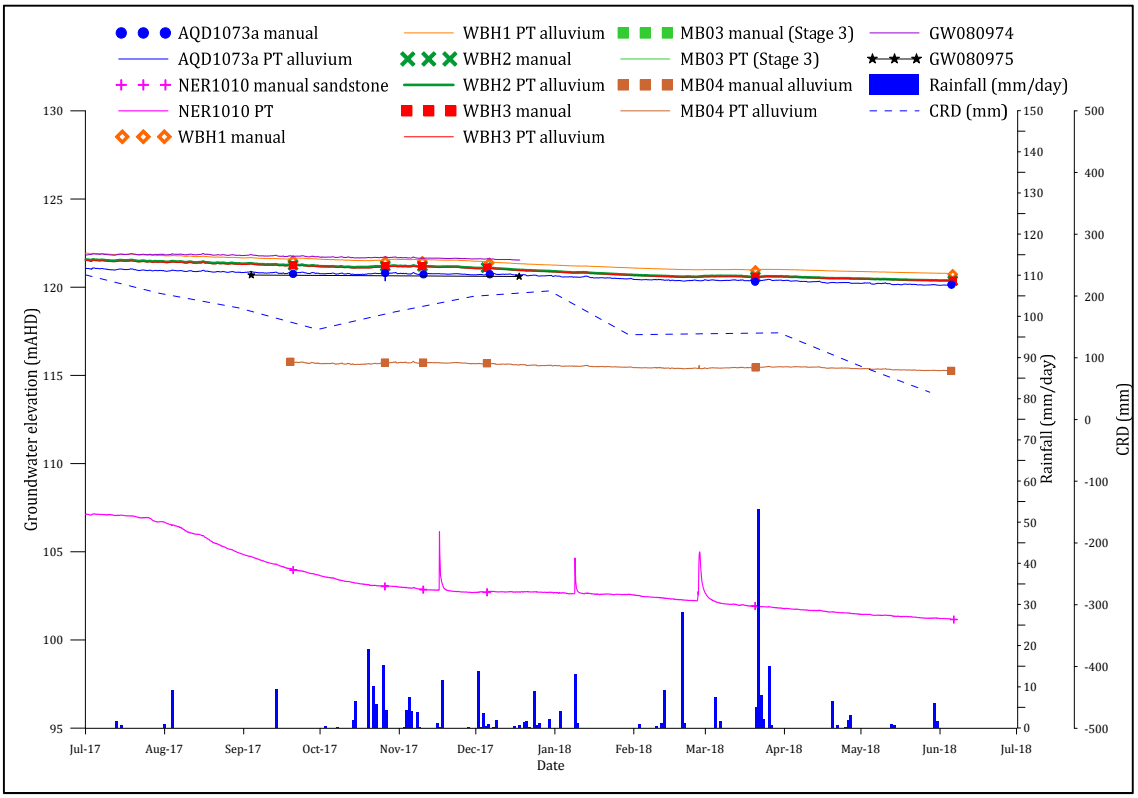
Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.



Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

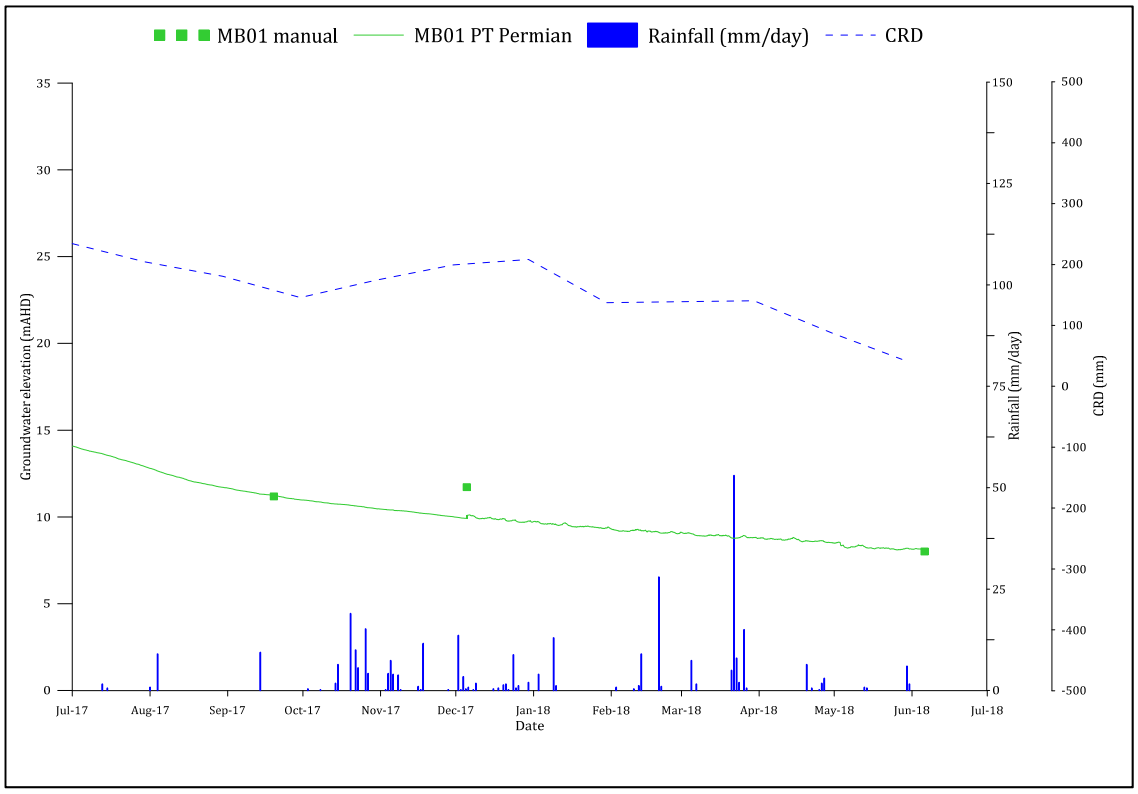
Appendix B – Groundwater Level and Quality Monitoring Data

Groundwater Level Monitoring Data – Groundwater Depth and Daily Rainfall

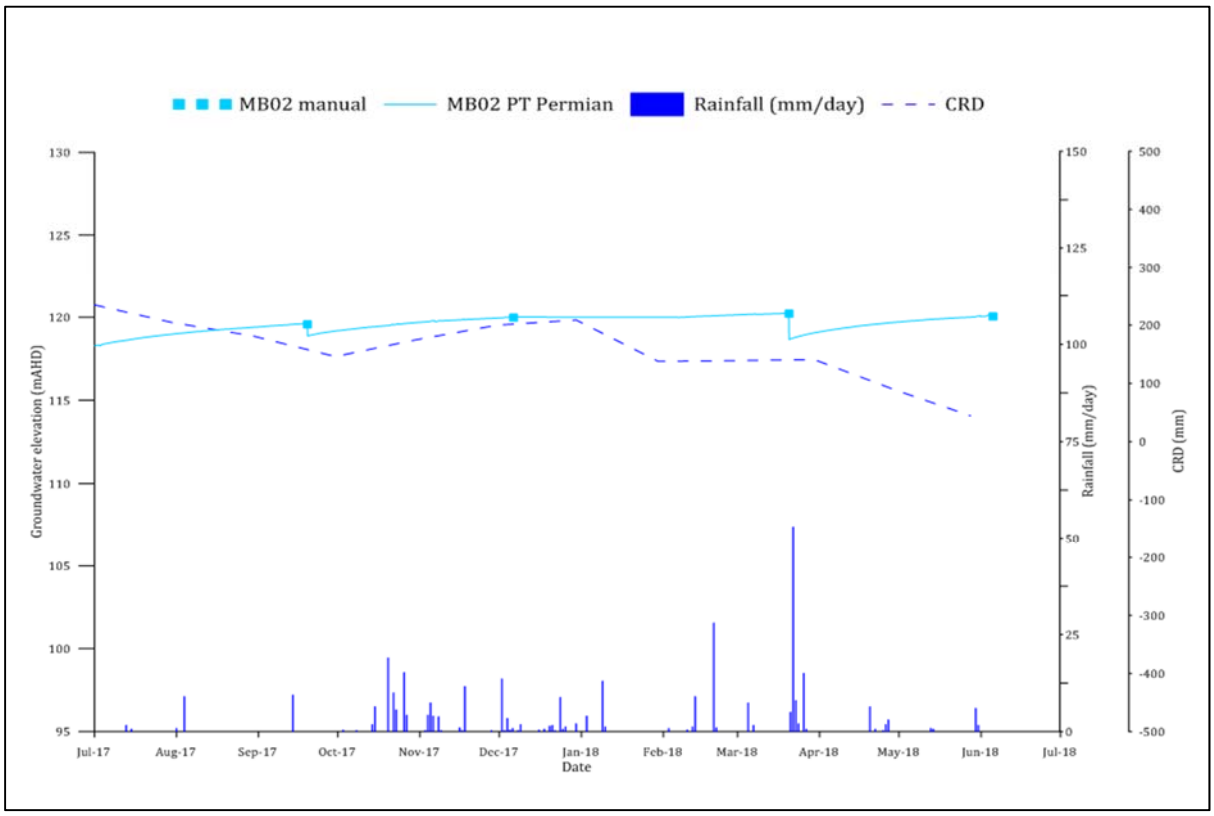


Note: No data available for alluvial groundwater monitoring well MB03 due to landholder access restrictions.

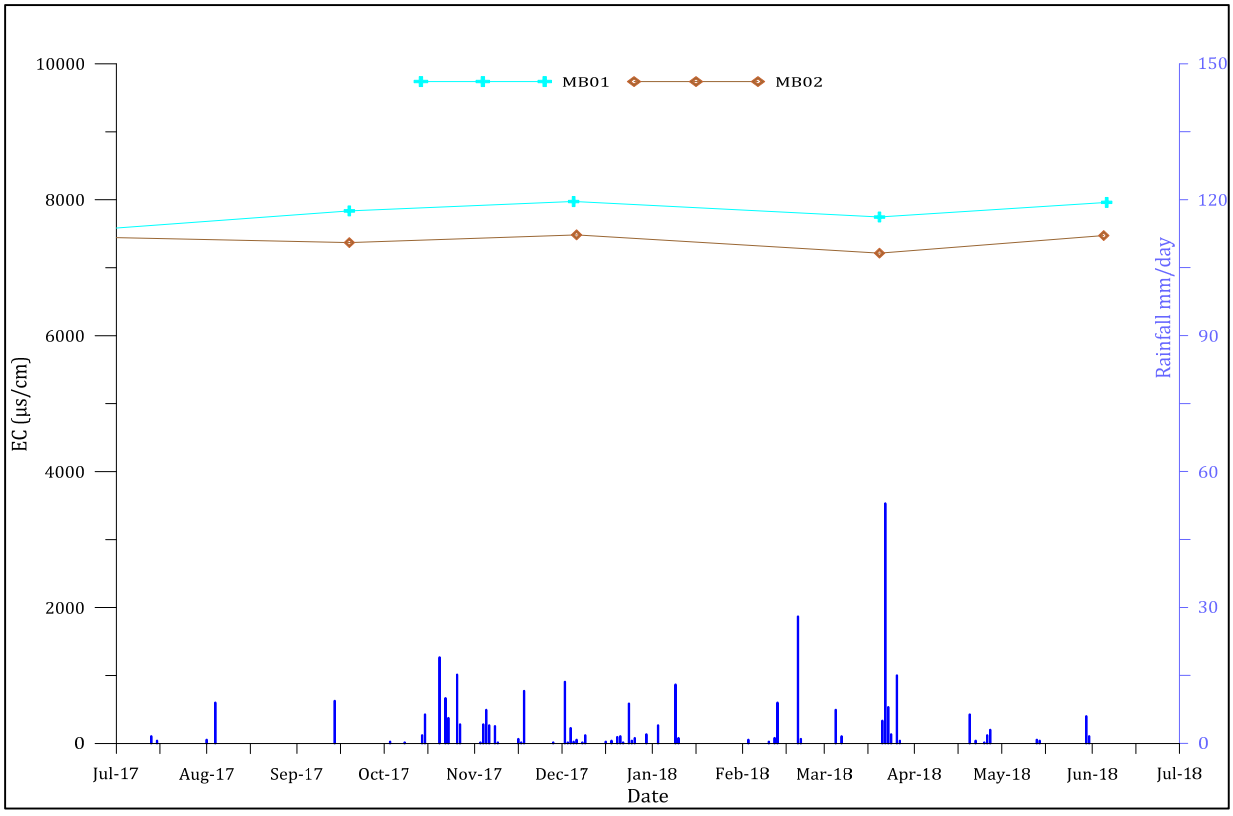
Stage 3 MB01 Sandstone Hydrograph



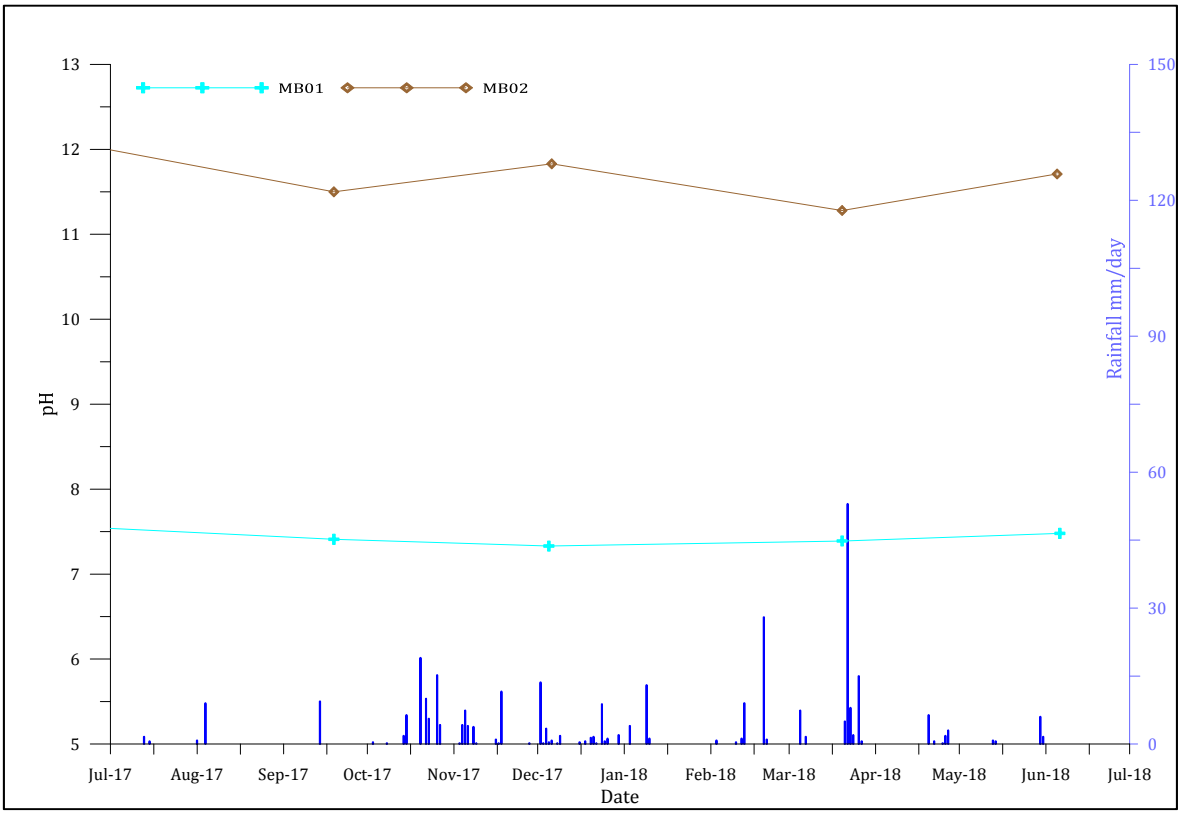
Stage 3 MB02 Sandstone Hydrograph



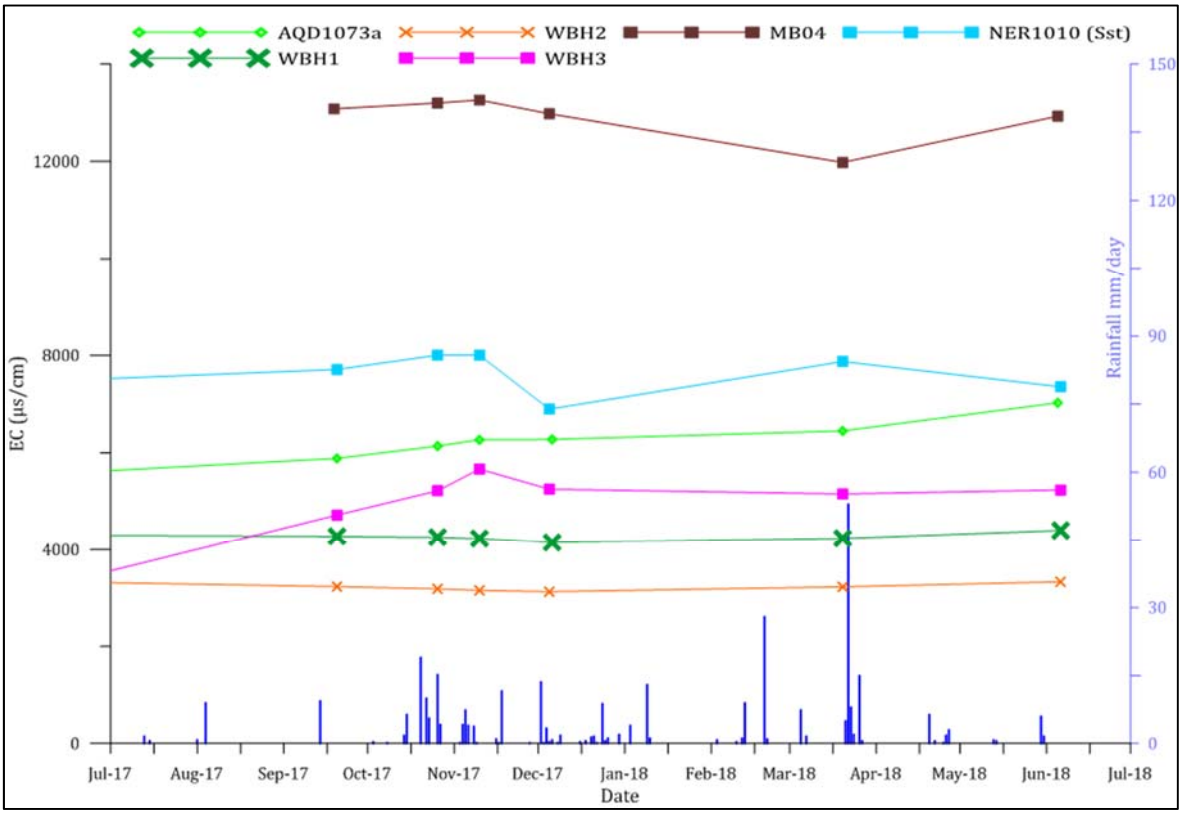
Stage 3 Sandstone EC



Stage 3 Sandstone pH



Stage 2 Alluvial and Sandstone EC



Stage 2 Alluvial and Sandstone pH