BHP

Mt Arthur Coal

Annual Environmental Management Review FY17

29 September 2017

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Table 1: Annual Review title block

Document Details	
Name of Operation	Mt Arthur Coal
Name of Operator	Hunter Valley Energy Coal Pty Ltd
Project Approvals	PA 09_0062 (MOD 1) PA 06_0091
Name of holder of project approval	Hunter Valley Energy Coal Pty Ltd
Mining Leases	CCL 744, CL 396, ML 1358, ML 1487, ML 1548, ML1593, ML1655, ML 1739, ML 1757, MPL 263
Name of holder of mining lease	Hunter Valley Energy Coal Pty Ltd; Mt Arthur Coal Pty Limited
Water Licences	WAL917, WAL918, WAL1296
Name of holder of water licence	Hunter Valley Energy Coal Pty Ltd
Mining Operations Plan Commencement Date	1 July 2016
Mining Operations Plan Completion Date	30 June 2020
Annual Review Commencement Date	1 July 2016
Annual Review Completion Date	30 June 2017
I, Kris Sheehan, certify that this audit report is a true and accurate record of the compliance status of Mt Arthur Coal for the period 1 July 2016 to 30 June 2017 and that I am authorised to make this statement on behalf of Hunter Valley Energy Coal 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	Kris Sheehan
Title of authorised reporting officer	HSE Superintendent – Mt Arthur Coal
Signature of authorised reporting officer	
Date	29/09/2017

Statement of Compliance

A statement of Mt Arthur Coal's compliance with its project approval and mining leases is presented in Table 2 with three identified non-compliances during the reporting period being discussed in Table 3.

Table 2: Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
PA 09_0062	NO
ML	YES

Table 3: Non-compliance summary

	Condition	**Description**	**Compliance Status**	**Comment**	**Report Reference**
PA 09_0062	27	Release of mine water from pipeline failure	Low	Three separate incidents	Erosion and sediment control section. Incidents and non-compliances section

Note: Compliance Status key for Table 3

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)

Acronyms

Acronyms	
AEMR	Annual Environmental Management Report
AHMP	Aboriginal Heritage Management Plan
BCM	Bank cubic metres
BMP	Biodiversity Management Plan
BRMP	Biodiversity and Rehabilitation Management Plan
CCC	Community Consultative Committee
CCL	Consolidated coal lease
CHBI	Central Hunter Box – Ironbark Woodland
CHISG	Central Hunter Ironbark – Spotted Gum Grey-Gum Box Forest
CHPP	Coal handling preparation plant
CL	Coal lease
DA	Development approval
DoEE	Federal Department of the Environment and Energy
DP&E	NSW Department of Planning and Environment
DRE	NSW Department of Trade and Investment - Division of Resources and Energy
DRG	NSW Department of Planning and Environment – Division of Resources and Geoscience
EA	Environmental assessment
EL	Exploration licence
EPA	NSW Environment Protection Authority
EP&A	Environmental Planning and Assessment Act 1979
EPBC	Environment Protection and Biodiversity Conservation
EPL	Environment Protection Licence
EMS	Environmental management system
FY	Financial year
HA	Hectares
HRSTS	Hunter River Salinity Trading Scheme

Acronyms	
HSE	Health, Safety and Environment
HVEC	Hunter valley Energy Coal (MT Arthur Coal)
MAC	Mount Arthur Coal
ML	Mining lease
MOP	Mining Operations Plan
MSC	Muswellbrook Shire Council
Mtpa	Million tonnes per annum
NOW	NSW Office of Water
NSW	New South Wales
OEH	NSW Office of Environment and Heritage
PIRMP	Pollution Incident Response Management Procedure
ROM	Run of mine

Introduction

The Mt Arthur Coal Complex, located approximately five kilometres south west of Muswellbrook in the Upper Hunter Valley in New South Wales (NSW) includes the Mt Arthur Coal Open Cut, the Mt Arthur Coal Underground Project (no underground operations are currently taking place), Coal Handling and Preparation Plant (CHPP), rail loop and rail load out. The Mt Arthur Coal Complex and surrounding region is shown in Figure 1.

This Annual Review details the environmental and community performance for the period from 1 July 2015 to 30 June 2016 for operations at the Mt Arthur Coal Complex.

This document has been prepared in accordance with the Annual Review guidelines issued in by Department of Planning and Environment (DP&E) in October 2015 and fulfils statutory reporting requirements required in mining leases and Schedule 5 Condition 3 of the Mt Arthur Coal Mine Open Cut Consolidation Project Approval Modification 1 (09_0062 MOD 1).

This report was prepared in consultation with the Division of Resources and Geoscience (DRG), DP&E, Muswellbrook Shire Council (MSC), NSW Environment Protection Authority (EPA) and NSW Department of Primary Industries – Office of Water (DPI – Water). The report is distributed to a range of external stakeholders and is available on the BHP website at www.bhp.com.

Contact details for personnel associated with environmental management at Mt Arthur Coal can be found in Table 4.

Table 4: Mt Arthur Coal management contact details

Name and role	Phone contact details
Dawid Boshoff, General Manager, BHP Mt Arthur Coal	(02) 6544 5800
Kris Sheehan, Superintendent Health, Safety and Environment Business Partner, Mt Arthur Coal	(02) 6544 5800
Luke Neil, Principal Environment Analysis and Improvement, BHP Minerals Australia	(02) 6544 5800

BHP

Mapping Services, Brisbane

0 1 2
Kilometres

Projection: GDA94 MGA Zone 56

MT ARTHUR COAL

Mining Leases and Project Approval Boundary

Drawn: P. Watts	Date: 28/09/2017	Revision: 02
Checked: L. Neil	Filename: 20160905-1.mxd	

Figure: 1

DENMAN ROAD

THOMAS MITCHELL DRIVE

EDDERTON ROAD

300000

6420000

280000

ML1487

ML1548

ML1655

AUTH171

MPL263

CCL744

CL396

ML1739

CL395

AUTH437

ML1358

CL229

EL5965

ML1593s

ML1593

AUTH 437

LEGEND

Lease areas

Project approval disturbance boundary

Approvals

Mt Arthur Coal has a number of statutory approvals, leases and licences that regulate activities on site. During the reporting period, the following approval modifications occurred.

- An application (MLA 533) was submitted to DRG in September 2016 for mining title over 2.45 ha parcel of land north of Denman Road used for use of the water discharge channel associated with Mt Arthur Coal's licensed discharge point to the Hunter River. A new Mining Operations Plan (MOP) was approved by DRG on 29 June 2017 for FY18-FY19 mining operations.
- EPL 11457 was varied to include:
    - air quality monitoring requirements for new monitoring points upwind and downwind of the mine.
    - monitoring, maintenance and reporting requirements to monitor the performance of the sewage treatment plant.
    - updated reference to the revised air quality monitoring locations and plan of the premises.
- On 5 December 2016, Mt Arthur Coal was granted approval (EPBC 2014/7377) for Mt Arthur Coal open cut activities aligned with the modification project approval areas.

Table 5: Mt Arthur Coal's existing statutory approvals as at 30 June 2017

Description	Issue date	Expiry date
Project approvals issued by the DP&E		
Mt Arthur Coal Mine Open Cut Consolidation Project Modification 1 (09_0062 MOD 1)	26/09/2014	30/06/2026
Mt Arthur Coal Mine Underground Project (06_0091)	02/12/2008	31/12/2030
Mining leases and exploration licences issued by the DRG		
CCL 744	03/07/1989	21/01/2028
CL 396	23/06/1992	03/02/2024
ML 1358	21/09/1994	21/09/2036
ML 1487	13/06/2001	12/06/2022
ML 1548	31/05/2004	30/05/2025
ML 1593	30/04/2007	29/04/2028
ML 1655	03/03/2011	03/03/2032
ML 1739	25/07/2016	25/07/2037
MLA 533 (now ML1757)	07/07/2017	07/07/2038
MPL 263	17/10/1990	17/10/2032
A 171	18/10/2004	18/10/2020
A 437	04/03/1991	04/03/2020

Description	Issue date	Expiry date
EL 5965	14/07/2007	*
Drayton sublease CL 395	13/04/2006 (registered 14/06/2013)	21/01/2029
Drayton sublease CL 229	13/04/2006 (registered 14/06/2013)	02/02/2024
EPL issued by the EPA		
EPL 11457	09/10/2001 (varied on 19/05/2017)	Not specified
EPBC approval issued by the DoE		
EPBC 2011/5866	30/04/2012 (varied on 29/06/2017)	30/06/2022
EPBC 2014/7377	05/12/2016	30/06/2026

* Application for renewal lodged with the DRG and renewal is currently pending.

Operations summary

Mining Operations

Mining and processing operations at Mt Arthur Coal continued 24 hours a day, seven days a week during the reporting period. Mining continued within the Ayredale, Calool, Huon, Macleans, Roxburgh and Windmill open cut pits. Overburden and interburden material was removed by excavator / shovel and transported via rear dump truck to overburden emplacements, including visual dump 1 (VD1) and contingency dumps 1 to 5 (CD1 to CD5). Raw coal was extracted by excavator and transported to the CHPP by rear dump truck.

Raw coal was processed at the CHPP, with 16.77 Mt product coal being railed to the port of Newcastle for export and 1.4 Mt of product coal being transported to the Bayswater power station via overland conveyor. Coarse coal waste (rejects) was co-disposed within overburden emplacements and fine coal waste (tailings) was pumped to the tailings storage emplacement in East Pit. Production figures for raw, product and waste materials produced during the reporting period are summarised in Table 6.

Table 6: Production summary

Material	Unit	Approved limit	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (estimate)
Overburden	bcm	N/A	106,348,000	101,770,000	125,340,000
Run-of-mine coal	tonnes	32Mtpa	21,904,000	23,407,000	24,998,000
Coarse reject	Tonnes (dry basis)	N/A	3,183,000	2,711,000	3,529,000
Fine reject / tailings	Tonnes (dry basis)	N/A	2,264,000	2,188,000	2,661,000
Product (saleable) coal	tonnes	27Mtpa (by rail)	17,101,000	18,177,000	18,982,000

Other Operations

Other operations at Mt Arthur Coal during the Reporting period included:

- *Exploration*: 97 boreholes (totalling 22,205 metres) were drilled in ML1358 and ML1487 to further define coal seam geology and geotechnical parameters of the resource. Rehabilitation and sealing of 33 boreholes was completed. During the reporting period there were no variations from the MOP related to exploration activities.
- *Land Preparation*: *Land Preparation*: During the reporting period 171,560 cubic metres of topsoil was recovered from 72.5 ha of clearing ahead of mining using excavators, dozers and trucks and stockpiled or placed directly onto reshaped areas to be rehabilitated. Between 200 to 400 millimetres of topsoil was recovered during stripping. A further 275,000 cubic metres was relocated from existing stockpiles on the Huon and Windmill Pit highwall areas and hauled to Denman Rd rehabilitation or prepared stockpile pads.
- *Infrastructure Construction and Management*: The following major projects were commenced, progressed or completed during the reporting period:
    - The expansion of the tailings storage facility went through a strategy development phase in the reporting period. The tailings storage facility expansion project involves the construction of two cross-valley embankments and a series of rim embankments which will be completed in four stages. The early phases of project development for the second stage of the project, is scheduled to commence in the next reporting period, with work planned to be carried out in FY18 and FY19.

- Decommissioning of the Main Dam continued in the reporting period. Modifications to the site water network in the reporting period, primarily in the form of upgrades to transfer pump stations, pipelines and associated control systems that link a number of on-site water storage facilities, have enabled the Main Dam to be removed as a focal point for on-site water storage and distribution. Water levels in the main dam have, as a consequence, been reduced significantly. The overall closure planning for the Main Dam is expected to be completed in FY17 with infilling to begin in FY18 aligned with MOP approval.
- Decommissioning of the disused Bayswater No. 2 infrastructure area is continuing. An asbestos audit was completed along with a scope of works for the dismantling and removal of structures. Timing is being finalised pending filling and expansion of the adjacent tailings dam with the Bayswater No. 2 area being in the footprint of the dam.

During the reporting period there were no variations from the current MOP related to construction works on site.

Employment Details

As at 30 June 2017, Mt Arthur Coal employed 1027 permanent and fixed-term contract employees and approximately 363 contractors on a full-time equivalent basis. Approximately 74 per cent of Mt Arthur Coal's employees resided in the local government areas (LGAs) of Muswellbrook, Upper Hunter and Singleton as at 30 June 2017. This is consistent with predictions in the consolidation environmental assessment and the previous reporting period (76 per cent as at 30 June 2016). During the reporting period, approximately 80 per cent of Mt Arthur Coal's new employees were recruited from these local LGAs. Included in the new employee figure is the hiring of six apprentices, 83% of whom were from the local area for 2017 apprenticeship program. Mt Arthur Coal plans to recruit a further six apprentices for the 2018 apprenticeship program.

Next reporting period

Forecast operations for the next reporting period, in particular significant changes in the mine, include:

- Tailings Dam Stage 2 Lift Project is currently in Definition Stage which may commence Execution but is unlikely to be completed in FY18;
- Re-commencement of open-cut mining operations in Saddler's Pit; and
- Additional water cart fill-point in Windmill Pit to provide enhanced water cart coverage across site.

Actions required from previous Annual Review

DRG conducted a site inspection 24 January 2017 and notified HVEC by letter dated 3 August 2017 that the FY16 Annual Environmental Management Review (AEMR) satisfied the Minister for Resources and Secretary for the NSW Department of Planning and Environment.

DP&E acknowledged receipt of the FY16 AEMR by email dated 9 August 2017.

Regulatory feedback and direction regarding the FY16 AEMR is summarised in Table 7.

Table 7: Actions Required at Previous AEMR Review

Action required from previous Annual Review (AEMR)	Requested by	Action taken by HVEC	Where discussed in Annual Review
Lodge FY17 Annual Review via: compliance@planning.nsw.gov.au. And cc compliance officer for your site in any correspondence.	DP&E	FY17 Annual Review to be lodged in accordance with DPE direction.	N/A
Update on actions from 7/11/16 pipe rupture	DP&E (by letter 8/11/16)	Installation of signage and workforce training	Water Management section

Environmental Performance

Noise

Environmental Management

Noise management at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-032 Noise Management Plan; and
- MAC-ENC-PRO-056 Noise Monitoring Program.

The Noise Management Plan was prepared to fulfil the requirements of project approval, meet conditions of Environmental Protection Licence (EPL) 1145, as well as manage and minimise mine noise impact on the community and environment.

Mt Arthur Coal has eight statutory monitoring locations as detailed in the Noise Monitoring Program. Noise monitoring locations are shown on Figure 2.

Environmental Performance

An analysis of monthly attended noise monitoring results indicates Mt Arthur Coal's operations did not exceed the $L_{Aeq\ (15min)}$ or $L_{A1\ (1min)}$ statutory limit during the reporting period. A summary of results from Mt Arthur Coal's attended noise monitoring in the reporting period is provided in Table 8. Where a remeasure was required on the same night to determine the sustained noise level, only the remeasure result has been used to calculate tabulated results. $L_{Aeq\ (15min)}$ noise level predictions modelled for 2016 in the 2013 noise impact assessment were used for comparison with monitoring results for this reporting period, as shown in Table 8. Maximum $L_{Aeq\ (15min)}$ noise results are generally below or consistent with modelled predictions, except for NP07 and NP10.

A comparison of FY16 noise monitoring results to previous years is presented in Table 9. FY17 ($L_{Aeq(15\ min)}$) noise levels are consistent or below historical results, except for NP10. Data capture was 100 per cent at all attended noise monitoring sites, however, on five occasions noise levels from Mt Arthur Coal were audible but too low to measure.

The additional impact of low frequency noise was assessed in accordance with the NSW Industrial Noise Policy (INP) and Broner method, with no exceedances of the project approval assessment criteria.

Complaints and Reportable Incidents

During the reporting period, 14 noise complaints were received, which is significantly lower than 69 complaints in FY16, but higher than the five complaints received in FY15. All complaints were investigated, with noise levels (generated by Mt Arthur Coal) being measured within internal management benchmarks at the nearest real-time monitor. Mt Arthur Coal did not receive any government fines or penalties related to noise data during the reporting period and there were no related reportable incidents.

Table 8: Monthly attended noise monitoring results in decibels

Noise Monitoring Location	$L_{Aeq\ (15min)}$ dB			$L_{A1\ (1min)}$ dB		Trend / key management implications	Implemented/ proposed management actions
	Approval criteria	EIS prediction	Reporting period performance (min/ave/max^)	Approval criteria	Reporting period performance (min/ave/max^)		
NP04	38	41	29/31.4/35	45	30/33.3/37	Compliant	Continuation of management and monitoring in
NP07	39	30	30/32/34	45	31/34.2/37		
NP10	39	29	33/37.3/44	45	30/36/38		

NP12	39	48	32/32.5/33	45	32/34.2/38		accordance with NMP
NP13	35	N/A	22/22/22	45	23/25/27		
NP14	35	42	28/28/28	45	30/31.3/32		
NP15	35	37	24/26/28	45	26/29.6/31		
NP16	37	39	23/30.6/36	45	29/36.2/42		

^ Measurable noise levels only – does not include *inaudible* or *not measurable* results
* Noise emission limits do not apply due to winds greater than 3 metres per second (at a height of 10 metres), or temperature inversion conditions greater than or equal to 4 degrees Celsius per 100 metres.

Table 9: Attended noise monitoring results in decibels in comparison to previous years

Monitoring Site	**FY17**		**FY16**		**FY15**		**FY14**		**FY13**	
	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
	($L_{Aeq(15\ min)}$)									
NP04	IA	35*	IA	34*	IA	35	IA	39*	IA	38
NP07	IA	34*	IA	38*	IA	34^	<30	38	IA	40
NP10	IA	44*	IA	37*	IA	39	IA	39	IA	41
NP12	IA	33*	IA	33*	IA	36	IA	37	IA	25
NP13	IA	22*	IA	<30*	IA	29*	IA	<30	IA	25
NP14	IA	28*	IA	30*	IA	34*	IA	27	<30^	<30^
NP15	IA	28*	IA	33*	IA	37*	IA	31	IA^	IA^
NP16	IA	36*	IA	37*	IA	37*	NM	39	IA^	IA^
NP04	IA	37*	IA	44*	IA	41*	IA	44	IA	43
NP07	IA	37*	IA	45*	IA	45*	34	44	IA	42
NP10	IA	38*	IA	40*	IA	44*	IA	45	IA	43
NP12	IA	38*	IA	41*	IA	43*	IA	43	IA	40
NP13	IA	27*	IA	<30*	IA	33*	IA	31	IA	26
NP14	IA	32*	IA	39*	IA	36*	IA	33	30^	30^
NP15	IA	31*	IA	41	IA	37*	IA	33	IA^	IA^
NP16	IA	42*	IA	40*	IA	39*	NM	42	IA^	IA^

* Noise emission limits do not apply due to winds greater than 3 metres per second (at a height of 10 metres), or temperature inversion conditions greater than or equal to 4 degrees Celsius per 100 metres.
IA – Mt Arthur Coal's operations were inaudible.
NM – Mt Arthur Coal's operations were audible but not measurable.
^ Only one monitoring event in year
- – Site not included in monitoring program, no data available.

BHP

Mapping Services, Brisbane

1:53,000

0 1 2

Kilometres

Projection: GDA94 MGA Zone 56

MT ARTHUR MINE

MONITORING LOCATIONS
AIR QUALITY, BLASTING, NOISE & METEOROLOGICAL

Drawn: K.Reedy	Date: 28/08/2017	Revision: 0	FIGURE 2
Checked: J.Desmond	Filename: 20170828-1a.mxd		

BENGALLA

MUSWELLBROOK

MT ARTHUR

DRAYTON

BP07 WS08 DD19 DF06 DC02 NP07 NC02

NP16

DD21 WS05 DF07 NC04 NP10 BP04

DC04

BP10 DD22

MLA555

DF05 DD14

DD16 DC08 BP08

NP14

DC09 NP15 NC05 WS10

DD15 BP09

DD01

WS12 DC07 BP11 NP04

NP12 DD04

AUTH171

DD03

ML1487

ML1665

WS09

DD12

DD10

ML1548

MPL263

CCL744

ML1739

CL396

CL395

ML1358

AUTH437

CL229

EL5965

ML1593

DD05

DD08 DC06

AUTH 437

Hunter River

Whites Creek

Quarry Creek

Ramrod Creek

Muster Creek

Saltwater Creek

Saddlers Creek

6425000

6420000

6415000

290000

295000

300000

305000

LEGEND

- Authorisation
- Mining Lease
- Coal Lease
- Consolidated Coal Lease
- Exploration Lease
- Surface Area
- Disturbance Boundary
- Blast Monitoring Site
- Depositional Dust Gauge
- High Volume Air Sampler
- TEOM Sensor Site
- Noise Monitoring Site
- Weather Station

Proposed Initiatives

Operational noise will continue to be managed and monitored in accordance with the Noise Management Plan and associated procedures.

Blasting

Environmental Management

Blast management at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-015 Blast Management Plan;
- MAC-ENC-PRO-055 Blast Monitoring Program; and
- MAC-ENC-MTP-024 Road Closure Management Plan.

The blast management plan details the relevant blast overpressure and vibration impact assessment criteria and compliance procedures and controls related to open cut blasting activities. It also includes the blast fume management strategy, which aims to minimise visible blast fume and reduce potential for offsite fume migration.

Mt Arthur Coal has five statutory blast monitors:

- BP04 (South Muswellbrook);
- BP07 (Sheppard Avenue);
- BP09 (Denman Road West);
- BP10 (North Yammanie); and
- BP11 (Balmoral Road).

Blast monitoring locations are shown on Figure 2.

The modification project approval states a ground vibration limit for public infrastructure of 50 millimetres per second (mm/s), unless Mt Arthur Coal has a written agreement with the relevant owner of the public infrastructure to exceed these criteria and advises the DP&E in writing of the terms of the agreement.

Written agreements with Roads and Maritime Services (RMS) and Ausgrid were in place prior to the reporting period to increase the ground vibration blast impact assessment criteria for RMS and Ausgrid public infrastructure to 150 mm/s and 100mm/s respectively.

On 19 October 2016, Telstra agreed in writing to increase the ground vibration blast impact assessment criteria for Telstra public infrastructure to 100 mm/s with allowable exceedances. Prior to 19 October an interim agreement with Telstra was in place, pending additional testing by Telstra, that set the ground vibration blast impact assessment criteria for Telstra public infrastructure to 70 mm/s with no allowable exceedances.

Environmental Performance

During the reporting period, 139 blasts were undertaken. Blast data capture rates for the reporting period were 100 per cent at all statutory sites.

Blasting was only undertaken between 8 am and 5 pm Monday to Saturday, with no blasts being undertaken on Sundays or public holidays. No blast ground vibration monitoring results above the maximum 10 mm/s limit, or airblast overpressure results above the maximum 120 dBL limit were recorded at any of the statutory blast monitors during the reporting period. Of the 139 blast events fired during the reporting period, three (2.3 %) exceeded the airblast overpressure criteria of 115 dBL, which remained below the five per cent limit. No results exceeded the ground vibration criteria of 5 mm/s. No reportable blast fume events occurred during the reporting period, and no blast fume events resulted in fume rating above level 3.

Results reflect predictions made in the 2013 consolidation environmental assessment and do not show a significant difference in average or maximum results compared to previous reporting periods. A comparison of FY17 blast monitoring results with previous years is provided in Table 10.

Calculated blast monitoring results for blasts in Roxburgh and Windmill Pits that met criteria specified in the Supplementary Blast Monitoring Program are presented in

There were 14 blasts in Windmill and Macleans pits that met criteria for public infrastructure monitoring calculations during the reporting period. Eight blasts in the Windmill and Macleans pits in July, August and October 2016 resulted in an initial calculated PPV of greater than 70mm/s, which was the agreed ground vibration blast impact assessment criteria for Telstra public infrastructure in place prior to 19 October 2016, therefore further investigations were undertaken on these blasts.

Initial PPV calculations used conservative Mt Arthur Coal site law inputs to provide a 95% confidence interval that the actual PPV would fall below this predicted value. Subsequent modelling used inputs that provided a 50% confidence interval (94% correlation to modelled data) that the actual PPV would fall below the predicted value. This subsequent modelling ultimately returned calculated PPV results below 70mm/s for all eight blasts. As such, Telstra were not notified of these blasts results.

Table 10: Summary of statutory blast monitoring results

Parameter	Statistic	FY17	FY16	FY15	FY14	FY13
Ground vibration (mm/s)	Average	0.26	0.23	0.30	0.46	0.34
	Maximum valid result	3.23 at BP09 (Denman Road West)	5.09 at BP09 (Denman Road West)	7.06 at BP08 (Edinglassie)	5.99 at BP08 (Edinglassie)	7.42 at BP09 (Denman Road West)
	Valid blasts above 5 mm/s threshold^	0	1	1	0	2
Airblast overpressure (dBL)	Average	95.6	95.4	93.9	96.1	94.8
	Maximum valid result*	118.4 at BP09 (Denman Road West)	117.7 at BP10 (North Yammanie)	124.3 at BP08 (Edinglassie)*	120.2 at BP08 (Edinglassie)*	120.0 at BP04 (South Muswellbrook)
	Valid blasts above 115 dBL threshold^	3	5	1	3	11

Complaints and Reportable Incidents

During the reporting period, 16 blast (overpressure, vibration and fume) complaints were recorded. This is an increase from 13 complaints in FY16, but still less than the 35 in FY15. All blast vibration and airblast overpressure results were within maximum regulatory criteria on dates when complaints were received in relation to these issues.

On 12/1/17, two blasts were initiated in the north of the mine (Roxburgh Pit). Five blast fume complaints (including two anonymous and one via MSC) were received following the blasts. The blasts, and potential fume impacts, were investigated and reported to EPA, DPE and MSC. The investigation indicated that blast preparation and initiation had followed the management measures approved in the Blast Management Plan and no further regulatory action was undertaken.

Proposed Initiatives

Initiatives to reduce the potential for blast fume impact will continue during the next reporting period.

A meteorological program (Weatherzone) is currently being developed to assist with the prediction and tracking of weather patterns with the potential to enhance blast impacts. Wetherzone will be progressed during the next reporting period.

Meteorological Data

Environmental Management

Meteorological monitoring at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-PRO-057 Air Quality Monitoring Program.

Mt Arthur Coal's primary statutory real-time meteorological station located at the mine's industrial area (WS09) is an essential component of the operation's environmental monitoring system. At the station, wind speed, wind direction, temperature, rainfall, solar radiation and humidity data is collected at 15 minute intervals and relayed using radio telemetry.

A secondary statutory real-time meteorological station, located off site to the north west of the mine at Wellbrook (WS10), also provides representative weather data for the mine site, including prevailing wind conditions, and is used in conjunction with WS09 to determine the presence and strength of temperature inversions in the local atmosphere as part of the pre-blast environmental assessment.

Both statutory meteorological stations comply with the Australian Standard 2923-1987 *Ambient Air – Guide for measurement of horizontal wind for air quality applications* and the NSW INP.

Environmental Performance

Meteorological data capture rate for the reporting period was 100 per cent at WS09. WS10 captured all data for the reporting period, except 15 August 2016, 4 September 2016 and 23-27 December 2016.

Rainfall for the reporting period was 662 mm, which compares with the long term average of 619 mm. Wind direction at Mt Arthur Coal (WS09) during the reporting period was predominantly from the north-west (Winter/Spring) and south-east (Summer/Autumn).

Proposed Initiatives

Mt Arthur Coal will continue to record and utilise meteorological data from its two statutory monitors during the next reporting period.

Air Quality

Environmental Management

Air quality at Mt Arthur Coal is managed in accordance with:

- MAC-ENC-MTP-040 Air Quality and Greenhouse Gas Management Plan;
- MAC-ENC-PRO-057 Air Quality Monitoring Program; and
- MAC-PRD-PRO-122 Dust Management Procedure.

Mt Arthur Coal operates an air quality monitoring network consisting of:

- Six statutory dust deposition gauges recording dust fallout, which can be derived from mining or non-mining activities, and provide a useful measure of changing air quality.
- Three high volume air samplers (HVAS) monitoring fine dust particles (PM10) for 24-hours every six days.
- Six statutory real-time dust monitors, referred to as tapered element oscillating microbalance samplers (TEOMs), which record PM10 levels on a continuous basis.
- One additional TEOM and one Electronic Beta Attenuation Monitor (E-BAM), which also record continuous PM10 levels, are non-statutory and used for proactive internal management purposes.
- A real-time short message service (SMS) alarm system that provides notifications to operational staff, in response to air quality monitoring measurements at real-time monitors, enabling dust-generating activities to be adjusted.

Air Quality monitoring locations are shown on Figure 2.

A predictive dust model predicts maximum PM_{10} concentrations up to 72 hours in advance for operational dust management planning and notification of mining supervisors when adverse weather conditions are predicted.

A dust Trigger Action Response Plan (TARP) is triggered when internal guideline monitoring conditions are exceeded (and notified by SMS message). Dedicated supervisors facilitate dust TARP response, dust complaint inspections, off site environmental inspections and coordination of operational response.

Environmental Performance

Air dispersion modelling completed for the 2016 representative mining scenario, as part of the 2013 environmental assessment, has been used to evaluate monitoring results for the reporting period.

Depositional Dust Gauges

The results from the statutory depositional dust monitoring results are summarised in Table 11. Depositional dust gauge data capture rates for the reporting period were 100 per cent at all statutory sites. Six monthly results were contaminated and have not been included in the annual average (mean) calculations.

For the reporting period, no statutory depositional dust gauges exceeded the annual average assessment criteria. With the exception of DD15, annual average depositional dust results were below FY16, and consistent with results previous to FY16. The annual average at DD15 was higher than previous years, due mainly to one anomalous result of 16.6 g/m^2/ month in January 2017.

Monitoring results for the reporting period were consistent with the 2016 modelled scenario, which indicated that only one exceedance of the annual average dust deposition above 4 g/m^2/month was likely to occur.

Table 11: Comparison of annual average deposited dust results

Monitor Location	Approval criteria (Annual average)	Annual average Depositional Dust (g/m^2/ month)				Trend / key management implications	Implemented/ proposed management actions
		FY17	FY16	FY15	FY14		
Antiene (DD04)	4 g/m^2/ month	2.1	2.3	2.7	2.2	Compliant	Continue dust management in accordance with AQMP
Edderton Homestead (DD08)		1.4	1.6	1.1	1.6		
Roxburgh Road (DD14)		1.6	1.8	2.1	2.1		
Denman Road West (DD15)		4.0	3.0	2.9	3.1		
Sheppard Avenue (DD19)		2.7	3.1	3.3	3.7		
South Muswellbrook (DD21)		1.7	1.8	2.2	2.0		

High Volume Air Samplers

A summary of results from the statutory HVAS PM_{10} monitoring sites for the reporting period is provided in Table 12 and further data can be found in Appendix 1 – Air Quality Monitoring Results.

During the period 12 January 2017 to 23 February 2017, HVAS DF06 malfunctioned and recorded unreliable results, with the HVAS being replaced on 13 March 2017. This resulted in a total of nine 24-hour results being missed and a data capture rate of 85.2% for the reporting period. Data capture rates for DF05 and DF07 were 100 per cent for the reporting period.

The short term 24-hour impact assessment criteria was exceeded twice at HVAS monitoring sites during the reporting period at DF05 (Roxburgh Rd). Investigations calculated Mt Arthur Coal's contribution to be less than 50 µg/m^3 for each exceedance, allocated on the proportion that wind direction was from operation to receptor. Regional air quality trends at the time and localised influences or events were also considered during the investigations. 24-hour PM_{10} results and calculated Mt Arthur Coal contributions for each elevated result were:

- 12 January 2017 – 24-hr result of 56 ug/m^3 at DF estimated Mt Arthur Coal contribution of 46.1 ug/m^3
- 11 February 2017 - 24-hr result of 53 ug/m^3; estimated Mt Arthur Coal contribution of 28.2 ug/m^3

During the reporting period, DF05, DF06 and DF07 remained below the long-term annual impact assessment criteria, and below the previous reporting year.

Air dispersion modelling predictions based on the cumulative annual average PM_{10} for the 2016 mining scenario have been used to evaluate HVAS results, as summarised in Table 12. The FY17 measured concentrations at DF05, DF06 and DF07 were below these predicted cumulative results.

Table 12: Summary of HVAS PM_{10} results

Monitor Location	Approval criteria (µg/m^3)	2016 – predicted cumulative µg/m^3	Monitoring results (µg/m^3)				Trend / key management implications	Implemented / proposed management actions
			FY17		FY16			
			Max 24-hr result	Annual average	Max 24-hr result	Annual average		
Roxburgh Road (DF05)	Short term 24-hr average: 50 Long term annual average: 30	25	56*	17.4	53*	20	Compliant	Continue dust management in accordance with AQMP
Sheppard Avenue (DF06)		26	47^	22.8	69*	29		
South Muswellbrook (DF07)		24	43	18.5	40	20		

* Table 12 results, which include air emissions from all sources, were all investigated as they exceeded the short term 24-hour impact assessment criteria of 50 µg/m^3. Investigations found that Mt Arthur Coal's contribution to these results was less than 50 µg/m^3 on all occasions.
^ This maximum result does not include results from the period 12 January to 23 February 2017, during which the DF06 HVAS was malfunctioning.

Tapered Element Oscillating Microbalance Samplers

A summary of the results from the statutory real-time TEOM PM_{10} monitoring sites for the reporting period is provided in Table 13 and further results are provided in Appendix 1 – Air Quality Monitoring Results.

Except for the Antienne monitoring site, data capture for reporting period ranged between 97 and 99 per cent, and averaged 98% across all sites. Antienne monitor had a data capture rate of 93% over the reporting period due to a technical fault from 21 July to 8 August 2017.

During the reporting period, the short term 24-hour impact assessment criteria was exceeded four times at statutory TEOM monitoring sites. Those exceedances were recorded over two consecutive days, characterised by extreme heat, heavy regional dust and bushfire smoke. Exceedance investigations for each elevated result, based on regional air quality influences and proportional mine-to-receptor wind direction, indicated the likely contribution from Mt Arthur Coal to be:

- *Saturday, 11/2/17*
    - DC09 (Wellbrook) 24-hour PM_{10} result of 64.81 µg/m^3; estimated Mt Arthur Coal contribution of 24.55 µg/m^3.
- *Sunday, 12/2/17*

- DC02 (Sheppard Ave) 24-hour PM_{10} result of 76.12 µg/m^3; estimated Mt Arthur Coal contribution of 4.35 µg/m^3.
- DC04 (South Muswellbrook) 24-hour PM_{10} result of 53.04 µg/m^3; estimated Mt Arthur Coal made a contribution of 9.25 µg/m^3.
- DC09 (Wellbrook) 24-hour PM_{10} result of 53.11 µg/m^3; – estimated Mt Arthur Coal contribution of 21.70 µg/m^3.

During the reporting period Mt Arthur Coal's statutory TEOM monitoring sites remained below the long-term annual impact assessment criteria. With the exception of DC06 (Edderton), the FY17 annual average PM_{10} was lower than or consistent with the FY16 annual average at the statutory real-time monitors. Site DC06 had a ten per cent rise in annual average PM_{10}.

Air dispersion modelling predictions for the 2016 mining scenario have been used to evaluate annual average TEOM PM_{10} results for the reporting period, as summarised in in Table 13. The monitored annual average PM10 is below the predicted cumulative annual average PM_{10} concentrations at all sites.

Table 13: Summary of TEOM PM_{10} monitoring results

Site name	Approval criteria (µg/m^3)	2016 – predicted cumulative (µg/m^3)	TEOM PM_{10} Monitoring results (µg/m^3)				Trend / key management implications	Implemented/ proposed management actions
			FY17		FY16			
			Max 24-hour result	Annual average µg/m^3	Max 24-hour result	Annual average µg/m^3		
Sheppard Avenue (DC02)	**Short term 24-hour average: 50** **Long term annual average: 30**	**26**	76.1	17.5	108*	19	Compliant	Continue dust management in accordance with AQMP
South Muswellbrook (DC04)		**24**	53.0	18.5	48*	18		
Roxburgh Road (DC05)		**25**	40.2	10.4	56*	14		
Edderton Homestead (DC06)		**22**	37.8	13.2	37	12		
Antiene (DC07)		**20**	41.9	13.9	136*	14		
Wellbrook (DC09)		**21**	64.8	14.2	44	14		

* These results, which include air emissions from all sources, were investigated as they exceeded the short term 24-hour impact assessment criteria of 50 µg/m^3. Investigations found that Mt Arthur Coal's contribution to these results was less than 50 µg/m^3 on all occasions.

Total Suspended Particulates

TEOM PM_{10} monitoring data is used to calculate annual average total suspended particulate (TSP) levels. TSP results were calculated by multiplying the annual average PM_{10} results by 2.5, in accordance with the approved Air Quality Monitoring Program. During the reporting period, TSP remained below the long-term annual impact assessment criteria at all statutory sites. TSP for the reporting period was also below or consistent with previous year's results, as shown in Table 14.

Table 14: Summary of Total Suspended Particulate results

Site name	Approval criteria	TSP Annual average monitoring results (µg/m^3)				Trend / key management implications	Implemented/ proposed management actions
		FY17	FY16	FY15	FY14		
Sheppard Avenue (DC02)	**Long term annual average: 90µg/m^3**	43.8	47.5	49	59		
South Muswellbrook (DC04)		46.2	45	50	51		
Roxburgh Road (DC05)		25.9	35	40	44		
Edderton Homestead (DC06)		33.1	30	31	41		
Antiene (DC07)		34.9	35	36	38		
Wellbrook (DC09)		35.4	35	36	43		

Complaints and Reportable Incidents

During the reporting period, 27 dust-related complaints were received, which is consistent with FY16 (26 complaints), but higher than FY15 (7 complaints). Complaint investigations indicated that real-time dust levels and 24-hour averages remained within regulatory limits at the monitoring location nearest to the complainant.

Mt Arthur Coal did not receive any dust-related fines or penalties during the reporting period, and there were no dust related reportable incidents.

Proposed Initiatives

To meet obligations under its EPL, Mt Arthur Coal will be installing four boundary real-time air quality monitors (TEOMS) during the next reporting period, to better assess airborne particulate matter levels leaving the mine site.

Biodiversity

Environmental Management

Flora and fauna at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-047 Rehabilitation Strategy;
- MAC-ENC-PRO-012 Land Management;
- MAC-ENC-MTP-050 Biodiversity Management Plan (BMP);
- MAC-ENC-PRG-007 Onsite and Near Offsite Offset Management Program;
- MAC-ENC-PRG-008 Offset Management Program – Middle Deep Creek Offset Area; and
- MAC-ENC-PRO-080 Rehabilitation and Ecological Monitoring Procedure.

The BMP together with the Offset Management Programs (OMPs) effectively manage habitat areas within and in the vicinity of the mine and associated conservation and biodiversity offset areas, reducing potential impacts and improving general habitat quality.

The biodiversity offset areas managed by Mt Arthur Coal, including expansions and additions in the reporting period, are:

- Mount Arthur Conservation Area (101 hectares);
- Saddlers Creek Conservation Area (431.3 hectares);
- Thomas Mitchell Drive Offsite Offset Area (492 hectares);
- Thomas Mitchell Drive Onsite Offset Area (219 hectares);
- Roxburgh Offset Area (109 hectares);
- Middle Deep Creek Offset Area and Oakvale Offset Area (1257 hectares).

In accordance with the modification project approval, long-term security for the Mt Arthur Coal biodiversity offset areas is provided through conservation agreements, which were approved by Office of Environment and Heritage (OEH) during the reporting period.

Mt Arthur Coal undertakes annual flora and fauna monitoring to track progress against the management plan and MOP objectives. The monitoring program tracks the condition of habitat areas over time and ensures that the management plan's established performance indicators and project approval requirements are being met. The program includes 24 monitoring sites throughout site woodland rehabilitation areas and remnant vegetation areas onsite and within offset areas. Remnant vegetation monitoring sites are used to assess mine impact and natural regeneration, as well providing reference data for comparative assessment of rehabilitation monitoring sites.

In accordance with the revised Biodiversity Management Plan, approximately:

- 12,300 tubestock were planted over 31 hectares at Thomas Mitchell Drive Onsite Offset Area; and
- 6,400 tubestock were planted over 16 hectares at the Middle Deep Creek Offset Area;

Note: Wherever possible tubestock used were developed using seed collected from the conservation and offset areas.

Weed and Feral Animal Control

As well as an annual weed survey conducted by independent consultants, weed impact and feral animal presence is continually monitored through scheduled inspections and workforce feedback. Information from these sources is used to plan the weed and feral animal control programs across the mine site and all biodiversity offset and conservation areas.

Weed control programs primarily target weeds that are locally declared under the *Noxious Weeds Act 1993*. Other weed species were also treated when in the vicinity of noxious weeds.

The vertebrate pest management program continued during the reporting period, with two campaigns utilising 1080 baiting to target wild dogs (*Canis lupus familiaris*) and foxes (*Vulpes vulpes*).

Environmental Performance

The annual ecological development monitoring program, consisting of vegetation community assessment and fauna surveys, was undertaken in late November / early December 2016 by independent consultants. The annual survey assessed diversity and habitat condition across nine sites in accordance with the rotational schedule of the monitoring program. Those sites consisted of:

- One rehabilitation site in the mine site woodland corridor (MCV2);
- One remnant vegetation reference site for the woodland corridor rehabilitation (MACT);
- Three remnant revegetation reference sites in onsite conservation and offset areas (SC 2, MTA1 and SAD1);
- One remnant vegetation reference site in the Thomas Mitchell Drive Offsite Offset (TMDOFF1);
- Two remnant revegetation reference sites in the Middle Deep Creek Offset (MDC1 and MDC2); and
- One natural regeneration site in the Middle Deep Creek Offset (MDC3).

Four nesting box monitoring locations (MACT, TMD Onsite, Saddlers Creek and Mt Arthur) were also monitored.

Biodiversity Monitoring Results

Results of flora and vertebrate fauna species for the monitoring sites are provided in Table 15, along with a condition assessment score, which indicates ecological health based on condition attributes such as canopy health, erosion, vegetation patch shape, epicormic growth, weed invasion, mid strata density, ground strata density and connectivity.

Woodland Rehabilitation

The dataset at MCV2, while not large enough to identify strong trends, indicates the rehabilitation is progressing well. Rehabilitation attributes were observed to be consistent with the previous two years, with only minor variations in diversity and abundance values. There is no major dieback of vegetation in any stratum that would indicate failure of establishment or serious problems with the rehabilitation. There are no major outbreaks of invasive weeds or indications of native species suppression due to competition with introduced species. Regeneration of native canopy species indicates natural recruitment is taking place, which is desirable and negates the need for supplementary planting. Rehabilitated vegetation at MCV2 appears to be developing into distinct canopy, middle and understorey layers, with pioneering species, such as *Acacia,* senescing progressively as the canopy trees grow. This is considered to be a natural process in the development of the vegetation.

The average native species diversity at MCV2 is lower than the average native species diversity at relevant reference sites, as would be expected at this stage of rehabilitation development. The floristic assemblage at MCV2 is generally consistent with the species composition and structure criteria for *Central Hunter Ironbark – Spotted Gum – Grey Box Forest* as outlined in Table 13 of the current MOP; however, planting of additional ground cover species would increase the number of target species in the understorey.

Fauna species diversity at MCV2 in FY17 is comparable to FY16, with a lower number of bird species but slightly higher numbers of microbat species. The Vulnerable Speckled Warbler (*Chthonicola sagittata*) and Eastern Bentwing-bat (*Miniopterus orianae oceanensis*) were recorded at MCV2 consistently over the three years of monitoring.

Rehabilitation at the MCV2 site is currently 14 years old and vegetation at this site is now at *Phase 4 Ecosystem and Landuse Establishment*. An assessment of the rehabilitation sites against specific performance and completion criteria for *Domain D Rehabilitation – Native Woodland* rehabilitated vegetation is shown in Table 16.

Table 15: Flora and fauna species recorded and condition assessment scores

Parameter	Woodland Rehabilitation			Woodland Regeneration			Conservation Areas		
	MCV2	MACT (Ref)	MDC3	MDC1 (Ref)	MDC2 (Ref)	SC2	MTA1	SAD1	TMDO FF1
Native flora species (per cent of total)	22 (65%)	42 (84%)	18 (46%)	45 (75%)	49 (73%)	48 (79%)	52 (93%)	43 (75%)	40 (85%)
Introduced flora species (per cent of total)	12 (35%)	8 (16%)	21 (54%)	15 (25%)	18 (27%)	13 (21%)	4 (7%)	14 (25%)	7 (15%)
Total flora species	34	50	39	60	67	61	56	57	47
Total condition assessment score (out of 32)	26 (81%)	31 (97%)	6 (19%)	30 (94%)	30 (94%)	30 (94%)	28 (88%)	28 88%)	28 88%)
Amphibians	0	0	0	0	0	4	0	0	0
Reptiles	2	3	2	4	4	3	4	3	7
Birds	10	9	14	25	24	26	17	18	17
Mammals	12	16	13	18	15	11	6	18	14
Total fauna species	25	16	29	47	29	46	27	40	39
Threatened fauna species^	1	4	1	6	4	2	2	4	2
Introduced fauna species	2	1	0	0	0	2	0	1	1

^ Does not include migratory- or marine-listed species declared under the EPBC Act

Conservation and Offset Areas Results

The remnant vegetation monitoring sites established in the conservation and offset areas are also used as references sites against which rehabilitation sites can be measured.

Performance indicators relevant to the first four years of management of the conservation and offset areas are provided in the MOP under *Domain F - Onsite Conservation and Offset Areas*. Compliance with these performance indicators and the relevant management actions in the BMP is evaluated in Table 17. Compliance with the broader scope and requirements of the BMP will be evaluated through the Independent Environmental Audit and/or Biodiversity Audit process.

Nest Box Monitoring Results

Nest box occupancy rates in 2017 were:

- Mt Arthur - 48% (12 of 25);
- MACT - 38% (5 of 13 located);
- TMD Onsite - 14% (1 of 7); and
- Saddlers Creek - 0% (0 of 9).

Compared with earlier years, Mt Arthur continues to have the highest occupancy rates, with a consistent increase in occupancy rates. Occupancy rates have also increased since FY15/FY16 at MACT. Occupancy rates at TMD Onsite and Saddlers Creek have been variable, but low, since FY15. Due to the low numbers of nest boxes at these sites, a difference in occupation at one or two nest boxes can produce large variations.

The continued low occupancy rates at Saddlers Creek may potentially be related to the heights of the nest boxes and the open and rather exposed nature of the woodland vegetation at this site. The continued low occupancy rates at TMD Onsite is generally likely due to the lack of connectivity with other woodland areas.

Table 16: Status of management actions from the BMP

Relinquishment Criteria	MCV2 (Domain D)
All areas shown as Native Woodland vegetation community in Plan 4, planted with a native species mix (seed or tubestock) targeted at establishing an open grassy woodland vegetation community.	Compliant for isolated stand of woodland at this monitoring site. On a whole of site basis, this criterion will not be fully compliant until all rehabilitation has been undertaken in the woodland corridor.
Rehabilitation species composition (seed mix or tubestock) drawn from the species list in Section 7.2 for Central Hunter Box – Ironbark Woodland or Central Hunter Ironbark - Spotted Gum – Grey Box Forest	On track, Partially compliant with *Central Hunter Ironbark - Spotted Gum – Grey Box Forest.* Canopy and ground strata species are compliant but shrub layer missing except for *Acacia salicina.* Ground cover includes five compliant species.
All structural dominant species represented compared with analogue site	On track, Partially compliant.
The diversity, percentage and density of shrubs and juvenile trees with a stem diameter <5cm is comparable to that of the local remnant vegetation.	Compliant
The total number of live native plant species is greater than or comparable to the local remnant vegetation	Not compliant
The number of tree, shrub and sub-shrub species is comparable to that of the local remnant vegetation	Compliant
Species composition for revegetation will be aimed at establishing a complex community structure consisting of groundcover, understory and canopy.	Compliant
Nesting boxes (various bird, squirrel glider, possum and bat) and natural habitat features (including large rocks, logs/coarse woody debris, hollow bearing timber) are placed in established native woodland rehabilitation.	Compliant. Large (habitat) logs have been placed in clumps within the stand of woodland.
Number of weed species and surface area comparable to reference sites	Compliant
Program implemented for fuel load assessment and reduction, with advice from NSW Rural Fire Service	Compliant
Pest animal infestation comparable to reference sites, with ongoing control program in place.	Compliant
Where adjacent to selected grazing or operational mining land, adequate fencing and signage is installed and maintained to prevent unintentional vehicle and livestock access.	Compliant
Rehabilitated native vegetation distribution will link areas of onsite and near-site native vegetation, and be consistent with the biodiversity corridors consistent with the latest version of the DRE Synoptic Plan.	Compliant

Table 17: Status of rehabilitation sites against MOP completion criteria

	SC2	MACT	MTA1	SAD1	TMDOFF1	MDC1	MDC2	MDC3
MOP Relinquishment Criteria for Phase – 5. Ecosystem and Landuse Sustainability (for Domain F – Onsite Conservation and Offset Areas)								
Compliance with management actions presented in the site Biodiversity Management Plan, as evidenced through the most recent Independent Environmental Audit and/or Biodiversity Audit.	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
BMP Section 5.1 – Offset Area Revegetation/Regeneration Works								
Natural regeneration encouraged and facilitated through livestock exclusion, fencing and access control, weed and pest management and bushfire management	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)	Compliant (natural regeneration phase)
All active revegetation works will be designed with structural and floristic diversity suitable to meet the benchmark vegetation community targets	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.
All active revegetation will involve use of local provenance seed.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.

	SC2	MACT	MTA1	SAD1	TMDOFF1	MDC1	MDC2	MDC3
Revegetation areas will be subject to a monitoring program developed.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.	N/A – no active revegetation required at this stage.
BMP Section 5.2 – General Offset Area Management Measures								
Fencing will only be used within the offset and conservation areas to replace existing fencing, or where potential vegetation disturbance by land use impacts warrants additional protection	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
Identification of areas with potential for impact on ecological values from human, vehicle or stock access	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
Fencing will be used to delineate those areas that are being actively regenerated, to exclude grazing impacts and allow vegetation to regenerate naturally	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
Appropriate signage will be used at key access points to the offset and conservation area to identify that the areas are of high ecological significance.	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant

	SC2	MACT	MTA1	SAD1	TMDOFF1	MDC1	MDC2	MDC3
A weed control program has been implemented to limit the spread and colonisation of noxious and environmental weeds at the Mt Arthur Coal Complex.	Compliant.	Compliant.	Compliant. Additional focus recommended for *Hyparrhenia hirta* (Coolatai Grass)	Compliant.	Compliant.	Compliant However presence of *Hypericum perforatum* (St John's Wort) and *Rosa rubiginosa* (Sweet Briar) noted but not currently present in problematic numbers	Compliant However presence of *Hypericum perforatum* (St John's Wort) and *Rosa rubiginosa* (Sweet Briar) noted but not currently present in problematic numbers	Compliant However particular focus on perennial pasture weeds may be required (incl. *Hypericum perforatum*, *Cirsium vulgare*, *Sida rhombifolia*)
The ongoing fauna and flora monitoring program will include surveys for the presence of significant populations of feral fauna species.	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant	Compliant
Feral animal control programs will be completed at least annually and more frequently if required.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.
Strategic grazing – grazing is currently excluded from offset and conservation areas.	Compliant	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant.	Compliant

Weed and Feral Animal Control

Annual weed assessments were conducted by land management consultants on the Mt Arthur Coal site in October 2016, and the biodiversity offset and conservation areas in December 2016.

The FY17 annual weed assessment identified 37 weeds in total across the Mt Arthur Coal site, biodiversity offsets and conservation areas. This was an increase from 22 species identified in FY16. This increase is believed to be due to the increased scope and intensity of assessment, rather than newly invaded species. Six Class I to Class III declared noxious weed species were identified in the FY17 reporting period:

- African boxthorn (*Lycium ferocissimum*)
- Blue Heliotrope (*Heliotropium amplexicaule*)
- Coolatai Grass (*Hyparrhenia Hirta*)
- Mother-of-millions (*Chrysanthemoides Monilifera*)
- Pampas Grass (*Cortaderia* species)
- Prickly Acacia *(Acacia Nilotica)*

Mt Arthur Coal targeted over 285 hectares of land for weed treatment during the reporting period. Priority areas for treatment included the mine site boundary, rehabilitation areas and the biodiversity offset and conservation areas. Weed control methods included chemical spraying, cut and paste and manual removal. Target species included African boxthorn (*Lycium ferocissimum*), Mother-of-millions (*Chrysanthemoides Monilifera*), Prickly Pear (*Cylindropuntia* species), St Johns Wort (*Hypericum perforatum*) and Noogoora Burr (*Xanthium occidentale*).

During May/June 2017, a wild dog and fox baiting campaign was completed across Mount Arthur Coal mine site and adjacent conservation areas. During the campaign, 157 baits were laid across 48 locations, with 34 wild dog takes and 50 fox takes. A vertebrate pest control campaign was also undertaken in Winter 2017 across the Middle Deep Creek and Roxburgh Rd Offset Areas. During the campaign, 177 baits were laid across 59 locations, with 29 wild dog takes and 9 fox takes.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to flora and fauna during the reporting period and there were no related reportable incidents.

Proposed Initiatives

Mt Arthur Coal will continue to implement the Ecological Development Monitoring Program during the next reporting period, with monitoring of woodland rehabilitation, remnant woodland community sites and regeneration areas within conservation areas.

Mt Arthur Coal will continue removing waste items and repairing sections of fence that require maintenance in conservation and biodiversity offset areas during the next reporting period.

During the next reporting period Mt Arthur Coal will conduct an annual weed assessment. Weed management priorities will be revised based on the outcomes of the assessment.

During the next reporting period, Mt Arthur Coal will also run another vertebrate pest management program on site and across all conservation and offset areas.

Visual Amenity and Lighting

Environmental Management

Visual amenity and lighting management at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-PRO-071 Visual Assessment Procedure;
- MAC-PRD-PRO-073 Procedure for Lighting Plant Movement and Setup; and

- MAC-ENC-PRO-077 Light Management Procedure.

Mt Arthur Coal's visual assessment procedure ensures overburden emplacement development is monitored and assessed against modelled predictions in the consolidation environmental assessment.

Management measures presented in the Light Management Procedure aim to control and reduce the impact of lighting on the surrounding area. The procedure is used in conjunction with the procedure for lighting plant movement and setup, which advises operational staff on correct alignment of lights to avoid offsite impact.

Environmental Performance

Quarterly visual impact inspections were completed in July 2016, October 2016, February 2017 and April 2017. Inspections indicated that locations to the east of Mt Arthur Coal have extensive views of rehabilitated overburden dumps, with reduced visual contrast to surrounding non-mined landforms and peripheral visual impact from active mining activities. From locations to the north and west, a distinct visual contrast between mining activity and the surrounding non-mined landscape is evident due to exposure to low wall overburden dumps. For all locations the shape and size of the overburden dumps are within the predicted model shown in the consolidation environmental assessment for the modelled year 2016.

Complaints and Reportable Incidents

During the reporting period, 18 lighting complaints were received, which was lower than FY16 (19 complaints) and FY15 (24 complaints). Where complaints were received at night, immediate action was taken to locate and redirect the offending light, to address the complainant concerns.

Mt Arthur Coal did not receive any government fines or penalties related to lighting or visual amenity during the reporting period and there were no related reportable incidents.

Proposed Initiatives

During the reporting period Mount Arthur Coal made the first steps to incorporate fluvial geomorphic principles into the design of overburden emplacements. Rehabilitated landforms were reshaped to facilitate natural surface flow processes, resulting in a final shape that more closely mimics the adjacent non-mined landscape and reduces visual impact. This process will be developed further in subsequent reporting periods.

Lighting from Mt Arthur Coal will continue to be implemented in accordance with the Light Management Procedure and managed to minimise impacts on the local community whilst maintaining the minimum level necessary for operational and safety needs.

Aboriginal Cultural Heritage

Environmental Management

Aboriginal cultural heritage at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-042 Aboriginal Heritage Management Plan.

Mt Arthur Coal has implemented a management plan that provides the framework to identify, assess, monitor, conserve and manage Aboriginal cultural heritage. The management plan assists Mt Arthur Coal to mitigate the impacts of its operations on Aboriginal cultural heritage, comply with the requirements of the *National Parks and Wildlife Act 1974*, EP&A Act and the modification project approval and continue its active partnership with the Aboriginal community.

Environmental Performance

During November 2016, salvage works were undertaken in pre-strip areas in advance of the active pit by registered archaeologists in consultation with attending representatives from the Aboriginal community. Artefacts were collected and recorded in accordance with the methodology detailed in the Aboriginal Heritage Management Plan. A total of 354 Aboriginal objects were salvaged. Mudstone and silcrete artefacts were the most common raw material types salvaged with lesser quantities of artefacts manufactured from basalt, quartz, tuff, porcellanite and quartzite. The most common artefact types were flakes, flake fragments and cores. A number of mature trees were inspected for evidence of cultural scarring but no such markings were identified.

In accordance with the Aboriginal Heritage Management Plan a visual inspection was undertaken on the three AHIMS registered grinding groove sites within the Mt Arthur Coal modification project environmental assessment boundary. Results showed that two of the three grinding groove sites were considered to be in good condition and showed minimal exfoliation and minor evidence of weathering. One of the grinding grooves was considered to be in fair condition due to evidence of weathering by water flow.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to Aboriginal cultural heritage during the reporting period and there were no related reportable incidents.

Proposed Initiatives

A temporary Keeping Place was established on site at Mt Arthur Coal during FY14 in consultation representatives of the local Aboriginal community. The Keeping Place stores artefacts that are collected during archaeological salvage programs and access to the collections is available to the Aboriginal community for cultural, educational and research purposes. Mt Arthur Coal also maintains a database of Aboriginal Heritage Information Management System (AHIMS) registered archaeological sites.

European Cultural Heritage

Environmental Management

European cultural heritage at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-046 European Heritage Management Plan;
- MAC-ENC-MTP-048 Edinglassie and Rous Lench Conservation Management Plan - Volume 1;
- MAC-ENC-MTP-049 Edinglassie and Rous Lench Conservation Management Plan - Volume 2; and
- MAC-ENC-PRG-004 Edinglassie and Rous Lench Heritage Management Program.

Mt Arthur Coal has implemented several management plans that provide the framework to identify, assess, monitor, conserve and manage European cultural heritage. Mt Arthur Coal owns and manages five heritage-listed homesteads as follows:

- Edinglassie Homestead (state significance);
- Rous Lench Homestead (state significance);
- Edderton Homestead Complex (local significance);
- Belmont Homestead Complex (local significance); and
- Balmoral Homestead (local significance).

The two State-significant historic heritage items with possible impacts from the Mt Arthur Coal operation are the Edinglassie and Rous Lench homesteads.

The European heritage management plan assists Mt Arthur Coal to coordinate and manage the European heritage items affected or potentially affected by its operations, comply with the requirements of the Heritage Act 1977 and the consolidation project approval and mitigate impacts of its operations on European cultural heritage.

Environmental Performance

During the reporting period, Mt Arthur Coal inspected all of its historic homesteads and related buildings located on freehold land to ensure properties were maintained to an acceptable standard.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to European cultural heritage during the reporting period and there were no related reportable incidents.

Proposed Initiatives

All heritage structures are planned to remain in situ during the next reporting period with no impacts predicted from the current mine plan. Inspections and maintenance measures will continue to be implemented during the next reporting period to conserve all historic homesteads and related buildings owned by Mt Arthur Coal.

Contaminated Land and Hydrocarbon Contamination

Environmental Management

Contaminated land at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-PRO-028 Storage of Fuels and Chemicals;
- MAC-ENC-PRO-029 Spill Response;
- MAC-ENC-PRO-074 Contaminated Land Management; and
- MAC-STE-PRO-013 Hazardous Materials Management Procedure.

Hydrocarbons and other hazardous substances are kept in designated storage compounds designed and managed in accordance with relevant standards and procedures. Monitoring and inspection programs are maintained for these facilities to ensure hazardous materials and wastes are being adequately stored and disposed and that any spills or leaks are promptly reported and managed.

Environmental Performance

During the reporting period, all spills were controlled and contained immediately using emergency spill kits or earthmoving equipment to form a temporary bund. Small spills were disposed of offsite by Mt Arthur Coal's waste contractor. Mt Arthur Coal is considering options regarding management of larger scale contaminated soils on site.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to contaminated land or hydrocarbon contamination during the reporting period and there were no related reportable incidents.

Proposed Initiatives

Mt Arthur Coal will continue to manage contaminated land and hydrocarbon contamination in accordance with project approval and legislative requirements.

Spontaneous Combustion

Environmental Management

Spontaneous combustion at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-PRG-002 Spontaneous Combustion Control Program.

Mt Arthur Coal has implemented a spontaneous combustion control program to prevent, monitor, control and report outbreaks of spontaneous combustion.

Environmental Performance

Spontaneous combustion at Mt Arthur Coal is predominantly confined to old mining areas at Bayswater No. 2 and the Drayton sublease area. This is a result of the higher levels of carbon and sulphuric material in the coal seams mined in these Greta measures in comparison to those mined in current active mining areas.

During the reporting period there was an increase in the area recorded as being affected by spontaneous combustion at Mt Arthur Coal. A total of 1823 m² of land was treated for spontaneous combustion in the reporting period. A summary of spontaneous combustion in the reporting period is shown in Table 18.

Figure 3 shows locations of spontaneous combustion at Mt Arthur Coal at start and end of reporting period.

Table 18: Summary of spontaneous combustion at Mt Arthur Coal in FY17

Month Year	Area affected at start of month m^2	Area naturally extinguished m^2	Area treated m^2	New or recurring areas m^2	Area affected at end of month m^2
July 2016	707	0	0	148	855
August 2016	855	0	12	4	847
September 2016	847	6	0	1621	2462
October 2016	2462	0	1657	203	1008
November 2016	1008	0	5	7	1010
December 2016	1010	0	118	10	902
January 2017	902	0	0	0	902
February 2017	902	0	14	17	905
March 2017	905	0	2	2	905
April 2017	905	0	15	116	1006
May 2017	1006	0	0	42	1048
June 2017	1048	0	0	181	1229
Total	**707**	**6**	**1823**	**2351**	**1229**

Complaints and Reportable Incidents

During the reporting period, no complaints were received regarding odour from spontaneous combustion, which is consistent with FY16, and an improvement on five complaints received in FY15.

Mt Arthur Coal did not receive any government fines or penalties related to spontaneous combustion during the reporting period.

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Mapping Services, Brisbane

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Kilometres

Projection: GDA94 MGA Zone 56

MT ARTHUR MINE

MONITORING LOCATIONS
SPONTANEOUS COMBUSTION AT START & END OF REPORTING PERIOD

Drawn: K.Reedy	Date: 28/08/2017	Revision: 0	FIGURE 3
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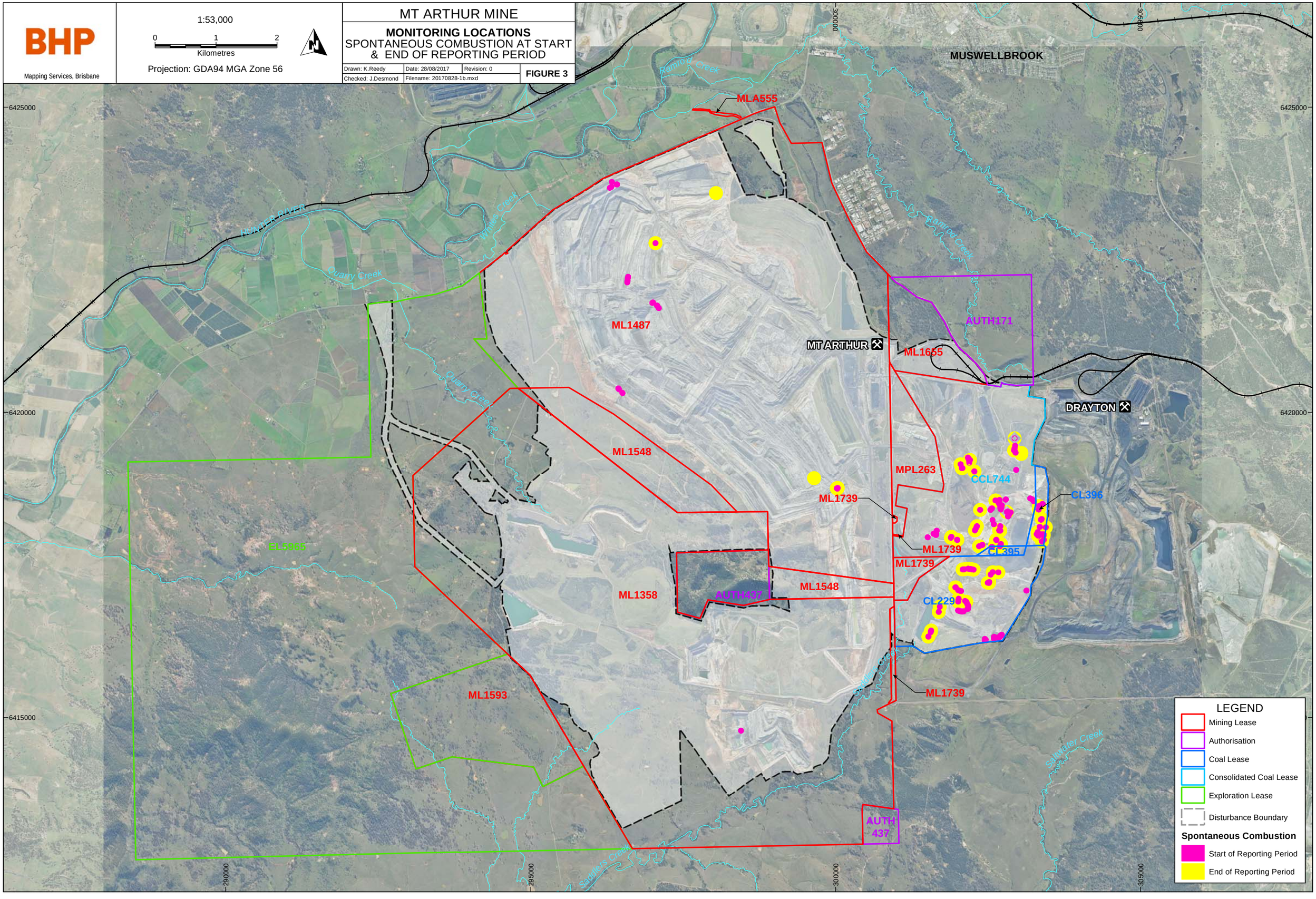

Initiatives

Mt Arthur Coal will continue to monitor spontaneous combustion during the next reporting period, and cap readily accessible areas.

In accordance with the approved mine operations plan, overburden material will continue to be emplaced over current emplacement areas at Bayswater No. 2. This will be carried out in alignment with the design of the extension of the existing tailings storage facility, which is planned to encompass most of this area, and will ultimately treat a significant portion of identified spontaneous combustion areas.

Bushfire

Environmental Management

Bushfire at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-PRO-076 Bushfire Prevention Procedure; and
- MAC-STE-PRO-010 Emergency Procedure – Bushfires.

Specific prevention and fire suppression control measures are implemented in order to protect remnant vegetation communities as well as Mt Arthur Coal infrastructure. Preventative measures include fuel load assessment and reduction programs, the establishment and maintenance of fire breaks and the prevention of ignition sources. Fire suppression and control is achieved through on-site fire-fighting equipment, including a rescue truck and water carts, facilitated by a network of roads and vehicle access trails, which provide access to all areas of Mt Arthur Coal owned land. Mt Arthur Coal also maintained a trained emergency response team on each shift, and fire extinguishers are fitted in vehicles and buildings.

Environmental Performance

No bushfires were reported during the reporting period.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to bushfire during the reporting period and there were no related reportable incidents.

Initiatives

During the next reporting period Mt Arthur Coal will continue to manage bushfire risk in accordance with relevant procedures and will put a tank and pump in at Middle Deep Creek Offset for firefighting purposes in FY17.

Greenhouse Gas and Energy

Environmental Management

Greenhouse gas and energy at Mt Arthur Coal are managed in accordance with the:

- MAC-ENC-MTP-040 Air Quality and Greenhouse Gas Management Plan.

Mt Arthur Coal undertakes regular reviews and monitoring of greenhouse gas emissions and energy efficiency initiatives to ensure that greenhouse gas emissions per tonne of product coal are kept to the minimum practicable level. During the reporting period Mt Arthur Coal continued greenhouse gas and energy consumption monitoring with the use of a centralised database to assist with monthly tracking and reporting of key emission sources. A key focus during the reporting period was to ensure the operation complied with the regulations under the *National Greenhouse and Energy Reporting* (NGER) *Act 2007*.

Environmental Performance

Total emissions were 542 kt CO2-e in the FY17 reporting period, of which direct (scope 1) emissions accounted for 85 per cent, and scope 2 emissions from the use of grid-based electricity accounted for the remaining 15 per cent.

As in the previous reporting period, Mt Arthur Coal used NGER Method 2 measurement of its open fugitive emissions, which increased in absolute terms (to 48 kt CO2-e) and as a proportion of total scope 1 emissions (11%). Fugitive emissions are expected to continue increasing in future, as mining at Mount Arthur progresses into areas with higher in-situ methane contents. Fuel combustion will continue to constitute the bulk of emissions from Mt Arthur Coal. Fuel use accounted for almost 90% of scope 1 emissions and 75% of total emissions in the reporting period. Energy use was similarly dominated by diesel fuel (93%), with other fuels accounting for 1% and electricity making up the balance.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to greenhouse gas or energy during the reporting period and there were no related reportable incidents.

Proposed Initiatives

Mt Arthur Coal will continue to investigate and, where feasible, implement projects to mitigate, substitute, reduce or eliminate energy consumption and greenhouse gas emissions in accordance with BHP Billiton's sustainability commitments.

Waste Management

Environmental Management

Waste at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-PRO-033 Waste Handling and Disposal.

Environmental Performance

During the reporting period Mt Arthur Coal's activities generated approximately 3,758 tonnes of waste sent off site for management, which was approximately a 13 per cent increase on the previous financial year's result of 3,328 tonnes. Approximately 88.3 per cent of the total waste produced and sent off site for management was recycled, as shown in Figure 4. This is a slightly higher result when compared with results from FY16 (86 per cent).

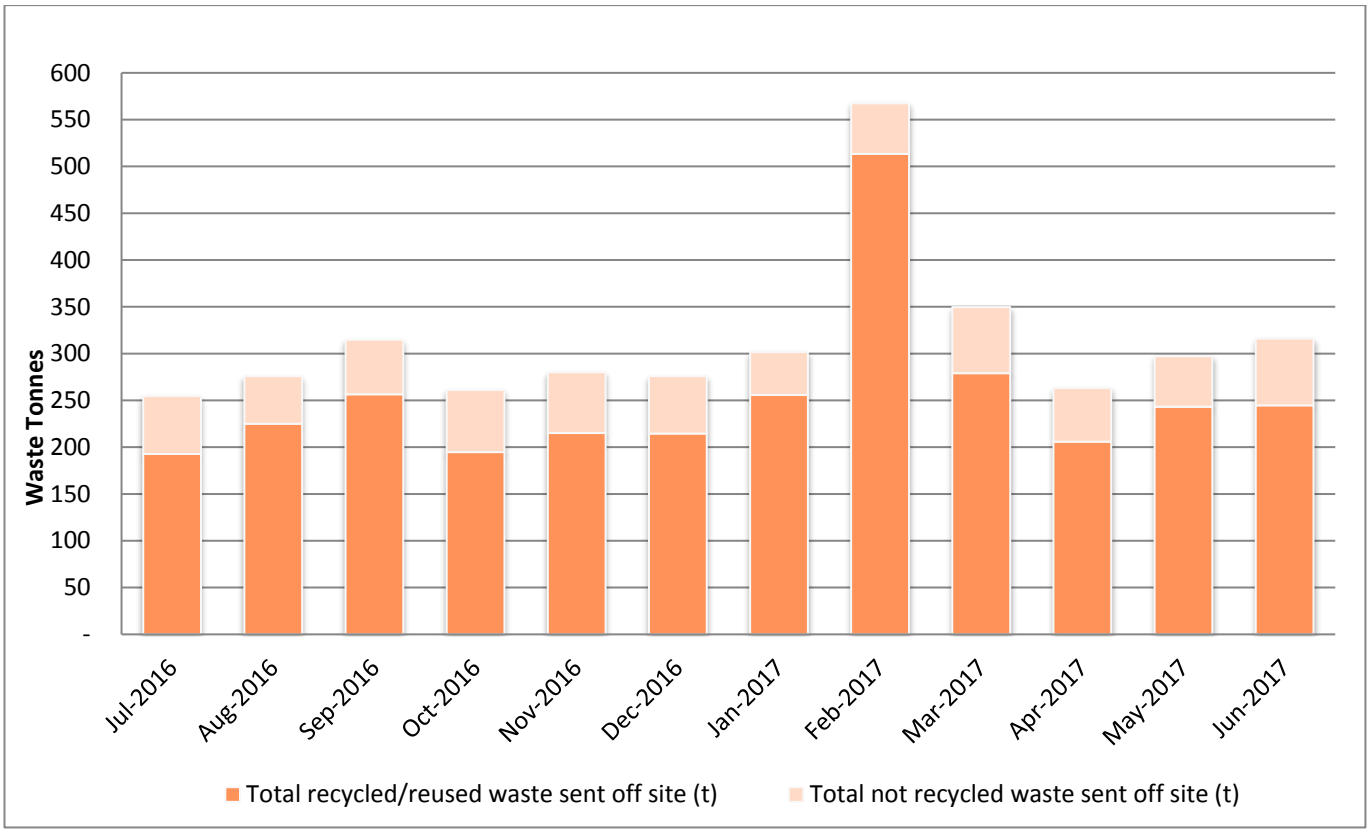

Figure 4: Waste disposal from Mt Arthur Coal

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to waste during the reporting period and there were no related reportable incidents.

Proposed Initiatives

General awareness through toolbox talks and other site communications will continue during the next reporting period to ensure Mt Arthur Coal achieves high levels of compliance in the areas of waste segregation and tracking.

Public Safety

Environmental Management and Performance

During the reporting period Mt Arthur Coal maintained a boundary security fence around much of the perimeter of its site to ensure no unauthorised access to mining areas. A number of boom gates also exist to restrict unauthorised or unintentional access to the active mining and infrastructure areas. Routine patrols of these boundaries and access points are conducted through the engagement of third party security specialists and by internal statutory compliance personnel with no identified security or access breach occurring.

Reportable Incidents

Mt Arthur Coal did not receive any government fines or penalties related to public safety during the reporting period and there were no related reportable public safety incidents.

Further Improvements

Mt Arthur Coal substantially progressed the implementation of the Training and Access Management System (TAMS) during the reporting period. TAMS comprises a significant upgrade of boundary fences, physical access controls and monitoring systems to ensure only persons who are approved, competent and fit for work are able to access active mining areas. TAMS implementation will be completed during the next reporting period.

Water Management

Water Balance

Mt Arthur Coal's water management system includes surface and ground water management, and maintenance of a site water balance to assist with modelling and prediction of water supply and usage under different climatic scenarios. This model is generally in accordance with the Minerals Council of Australia Water Accounting Framework.

During the reporting period there were no variations from the current MOP related to water management activities.

Mt Arthur Coal did not discharge any water to the Hunter River from its licensed discharge point under the Hunter River Salinity Trading Scheme (HRSTS) during the reporting period.

During the reporting period, Mt Arthur Coal used approximately 6,678 ML of water for coal handling and processing, dust suppression, potable consumption and use in the industrial area, most of which is recycled back into the water management system. This is a decrease in water usage compared to the 7,075 ML used in FY16.

In line with predictions in the consolidation environmental assessment and the modification project environmental assessment, the majority of the operation's water supply was sourced from catchment runoff. The second largest water input to site was licenced extraction from the Hunter River of 1667 megalitres (ML), as shown in Table 19.

Mt Arthur Coal also continued to source water from the MSC treated effluent scheme to reduce the demand from other external sources. The site water balance indicated that outputs for the reporting period exceeded inputs by 2,755 ML.

Table 19: Water take for FY17

Water Licence Number	Water sharing plan, source and management zone (as applicable)	Committed Orders	Use
20AL201127	REGULATED RIVER (GENERAL SECURITY)	2223.0 ML	1583.2 ML
20AL201126	REGULATED RIVER (HIGH SECURITY)	0.0 ML	84.2 ML

Erosion and Sediment

Environmental Management

Erosion and sediment at Mt Arthur Coal is managed in accordance with:

- MAC-ENC-PRO-060 Erosion and Sediment Control Plan (ESCP);
- MAC-ENC-PRO-061 Surface Water Monitoring Program; and
- MAC-ENC-PRO-063 Surface and Ground Water Response Plan.

Environmental Performance

Total suspended solids results remained low during the reporting period at all statutory sites, with no reportable exceedances. The TSS results were low compared with results from previous financial years. TSS results are summarised in Table 21, with further results presented in Appendix 2 - Surface Water Quality Monitoring Results. Water management structures were also routinely inspected after rain events > 25mm and maintained to ensure they are performing to design and prevent impacts on downstream waters.

During the reporting period monitoring of riparian vegetation was undertaken as part of the annual riparian vegetation and channel stability assessment (RVCSA), in accordance with the Surface Water Monitoring Program. Table 20 summarises the results of the riparian vegetation assessment undertaken at the monitoring sites. The results of the FY17 channel stability assessment are generally consistent with FY16, with most sites showing increased native and

introduced species and improved or consistent condition scores. This indicates that Saddlers Creek, Quarry Creek, Ramrod Creek and White's Creek Diversion are generally stable and/or stabilising with regenerating riparian vegetation and ground cover.

Table 20: Riparian Vegetation Assessment- species diversity and total condition scores for FY17

	SW03 (Saddlers Creek)		SW04 (Quarry Creek)		SW12 (Ramrod Creek)		SW15 (White's Creek Diversion)	
	FY17	FY16	FY17	FY16	FY17	FY16	FY17	FY16
Number of native species (% of total)	40 (65)	32 (65)	14 (38)	9 (36)	22 (56)	18 (50)	10 (31)	13 (43)
Number of introduced species (% of total)	22 (35)	17 (35)	23 (62)	16 (64)	17 (44)	18 (50)	22 (69)	17 (57)
Total number of species	62	49	37	25	39	36	32	30
Total condition score (% of 32)	26 (81)	21 (91)	24 (75)	25 (78)	24 (75)	26 (81)	24 (75)	24 (75)

Complaints and Reportable Incidents

Mt Arthur Coal reported three mine water release incidents during the reporting period (7 October 2016 and 6 April 2017). These incidents were identified and responded to with minimal environmental impact. Further details on these failures are discussed further in the *Incidents and Non-compliances* section. Mt Arthur Coal did not receive any government fines or penalties related to erosion and sediment controls during the reporting period.

Proposed Initiatives

New sediment dams constructed for expanded overburden emplacements in the conveyor corridor will be designed in accordance with the provisions for sediment retention basins in the Managing Urban Stormwater Guidelines (Landcom, 2004).

Surface Water

Environmental Management

Surface water at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-034 Site Water Management Plan;
- MAC-ENC-PRO-061 Surface Water Monitoring Program;
- MAC-ENC-PRO-059 Site Water Balance;
- MAC-ENC-PRO-063 Surface and Ground Water Response Plan (SWMP); and
- MAC-ENC-PRO-032 Water Management.

Water quality downstream of Mt Arthur Coal's operation is currently monitored by an independent consultant at five statutory monitoring sites, plus Mt Arthur Coal's licensed discharge point and Saddlers Creek flow monitoring gauge.

Mt Arthur Coal's Site Water Management Plan outlines measures for managing water on site, while the Surface Water Monitoring Program establishes impact assessment criteria against which monitoring results are compared. Impact assessment criteria are presented as trigger values which, if exceeded, lead to a response such as more intensive monitoring, investigation and if required, remedial action.

Environmental Performance

A summary of the surface water quality data for statutory sites during the reporting period is provided in Table 21, with further results provided in Appendix 2 - Surface Water Quality Monitoring Results.

Water quality parameters in natural watercourses surrounding the mine including Saddlers Creek (SW02 and SW03), Quarry Creek (SW04), Ramrod Creek (SW12) and Whites Creek (SW15) were subject to normal variations in response to the ephemeral nature of the creeks, local geology and weather conditions. Water quality parameters are only recorded at the HRSTS discharge point (SW28) during discharge, and no HRSTS discharge occurred during the reporting period.

Surface water pH measured at individual statutory sites remained relatively constant during the reporting period and within the impact assessment trigger levels of 6.5-9.0 at all times. Surface water EC and TSS measured at individual statutory sites remained below impact assessment trigger levels during the reporting period.

Data capture during the reporting period was 100 per cent for SW3, SW4 and SW12. SW02 was either dry or too low to sample on nine months during the reporting period, giving a capture rate of 25 percent. SW15 was too low to sample in three months, giving a capture rate of 75 percent.

Surface water monitoring results were also recorded for flow, EC and turbidity at the SWGS1 monitoring station in Saddlers Creek. As it is an ephemeral creek, Saddlers Creek was mostly dry over the reporting period. Peak flows and corresponding turbidity and EC results were recorded in late late July and mid-September 2016, December 2016 (Christmas and Boxing Day) and late March/early April 2017. Note that no EC results were recorded during the flow event in late March/early April 2017. Flows generally coincided with significant rainfall events that occurred during the reporting period. Flow, EC and turbidity results for SWGS1 for the reporting period are summarised in Table 22, with reporting period results presented as plots in Appendix 2 - Surface Water Quality Monitoring Results.

Surface water monitoring locations are shown in Figure 5.

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Projection: GDA94 MGA Zone 56

MT ARTHUR MINE

MONITORING LOCATIONS
SURFACE WATER & GROUNDWATER

Drawn: K.Reedy	Date: 28/08/2017	Revision: 0	FIGURE 5
Checked: J.Desmond	Filename: 20170828-1c.mxd		

MUSWELLBROOK
BENGALLA
DRAYTON
MT ARTHUR

Ramrod Creek
Whites Creek
Quarry Creek
Saddlers Creek
Saltwater Creek
HUNTER RIVER

SW34 GW25 MLA555 SW28 SW15 SW16 GW23 GW21 GW22 SW38
GW16 SW35 GW39A, P GW38A, P GW40A, P GW41A, P
ML1487
SW33 SW17 SW12 AUTH171 SW09 SW10 SW23 ML1665
BCGW18 GW7 GW8 ML1548 SW04 OD1078 BCGW19 OD1073 GW6
SW36 SW37 MPL263 CCL744 GW26 GW27 CL396 ML1739
EL5005
SW31 OD1074 GW37 ML1739 CL395
OR2051 ML1358 AUTH437 ML1548 CL229
EWPC33 OD1082 SW30 OD1079 SW01 SW32 SW02 ML1739
SW24
ML1593
BCGW10, 11 BCGW12 OD1046
BCGW22 OD1049
SW03 GW2 GW3 AUTH 437 SWGS1

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LEGEND

- Mining Lease
- Coal Lease
- Consolidated Coal Lease
- Exploration Lease
- Authorisation
- Surface Area
- Disturbance Boundary
- Groundwater Monitor Site
- Surface Water Monitor Site

Table 21: Summary of statutory surface water quality monitoring results

Site	Impact Assessment Criteria Trigger Values			Monitoring Results			Trend / key management implications	Implemented/ proposed management actions
				min	ave	max		
SW2	pH	6.5 – 9.0		7.02	7.24	7.41	No assessment criteria triggered	Continue managing surface water in accordance with site WMP
	EC (µS/cm)	Stage 1	12,365	3430	4733	4050		
		Stage 2	13,900					
	TSS (mg/L)	Stage 1	219	10	29	56		
		Stage 2	277					
SW3	pH	6.5 – 9.0		7.36	7.74	8.19		
	EC (µS/cm)	Stage 1	10,133	2130	3970	5850		
		Stage 2	11,402					
	TSS (mg/L)	Stage 1	37	8	10	11		
		Stage 2	46					
		Stage 2	46					
SW4	pH	6.5 – 9.0		8.07	8.32	8.64		
	EC (µS/cm)	Stage 1	10,133	6740	8993	11650		
		Stage 2	11,402					
	TSS (mg/L)	Stage 1	37	6	11	22		
		Stage 2	46					
SW12	pH	6.5 – 9.0		7.35	7.57	7.85		
	EC (µS/cm)	Stage 1	10,133	2750	4620	6240		
		Stage 2	11,402					
	TSS (mg/L)	Stage 1	37	5	16.4	64		
		Stage 2	46					
SW15	pH	6.5 – 9.0		7.58	7.82	8.39		
	EC (µS/cm)	Stage 1	10,133	549	1080	1729		
		Stage 2	11,402					
	TSS (mg/L)	Stage 1	37	5	11	18		
		Stage 2	46					

*Absolute limits based on EPL 11457 Condition L2 for pH and TSS.

Table 22: Summary of SWGS1 surface water gauging station monitoring results on Saddlers Creek

FY16	Flow (ML/day)	Average Daily EC (µS/cm)	Average Daily Turbidity (NTU)
Minimum	0	0	0
Maximum	56	1465	108
Average	0.4	7.4	0.7

Complaints and Reportable Incidents

Mt Arthur Coal did not have any reportable incidents relating to surface water and did not receive any government fines or penalties related to surface water during the reporting period.

Proposed Initiatives

Mt Arthur Coal will continue to use site water collected in both in-pit and out-of-pit storages prior to the use of water from the Hunter River. Where plans indicate that there would be sufficient water stored on site, water allocations for the Hunter River will continue to be offered to leaseholders and near neighbours as a temporary transfer.

Ground Water

Environmental Management

Ground water at Mt Arthur Coal is managed in accordance with the:

- MAC-ENC-MTP-034 Site Water Management Plan;
- MAC-ENC-PRO-062 Ground Water Monitoring Program; and
- MAC-ENC-PRO-063 Surface and Ground Water Response Plan.

Mt Arthur Coal's Site Water Management Plan aims to minimise any adverse impacts on aquifers in proximity to the operation, including the two major aquifer areas, the hard rock coal measures and the shallow alluvial deposits associated with the Hunter River.

The Ground Water Monitoring Program outlines program requirements for monitoring of potential groundwater impacts from mining operations. A program to upgrade ground water monitoring bores, and improve monitoring accuracy, was completed during the FY16 reporting period. A review of groundwater quality monitoring quality assurance (QA) measures was also completed by an independent consultant during the reporting period. Observations and recommendations from that review will be incorporated into ground water monitoring programs, where required.

The Surface and Ground Water Response Plan outlines the response actions to be implemented, should ground water monitoring trigger values be exceeded. Management measures associated with the alluvial ground water cut-off wall and flood levee constructed parallel to Denman Road along the northern boundary of the site to prevent both surface and subsurface migration from the Hunter River to the active pit, have also been incorporated into the Surface and Ground Water Response Plan.

Environmental Performance

Drawdown and cut off wall performance

Piezometric pressure head, or drawdown, for each statutory bore was calculated for both the total monitoring period and for the reporting period. Drawdown is evident around the main open cut pit, and extends southwest in the vicinity of the Bayswater mine area. Drawdown within the alluvium is limited and less than the trigger value of 1 m. Drawdown contours and tabulated data for the reporting period are presented in Appendix 3 – Groundwater Monitoring Results.

During 2013 and 2014, a bentonite wall was installed along Denman Road to minimise groundwater level drawdown in the alluvium. To the northwest of the bentonite wall, variable drawdown has been recorded since monitoring commenced in August 2011 ranging from 46.24 m within a localised fault (F4 Fault), through 55.04 m in the Edinglassie Seam, to 60.83 m in the deeper Ramrod Creek Seam. Future drawdown to the west of this wall within the alluvium is likely to be minimal.

In contrast, nearby Hunter River Alluvial aquifer monitoring bores have remained relatively static with only a nominal decline in groundwater levels up to 0.1 m and 0.4 m observed over the same period. GW42 is located northwest of the bentonite wall and has also remained relatively static, displaying an increase in groundwater level of 0.57 m since it was installed. The relatively static groundwater levels within the alluvium indicates the depressurisation observed in the underlying Permian coal seam does not appear to have propagated upwards into the Hunter River Alluvium. A nominal decline observed in nearby alluvium monitoring bores is most likely a response to seasonal conditions, with fluctuating groundwater levels seen in GW42 loosely correlating with Hunter River levels.

The FY17 modelled head was extracted for all model slices from the Consolidation Project groundwater model and compared to measured May 2017 data. A figure showing the comparative results is presented in Appendix 3 – Groundwater Monitoring Results.

Groundwater Quality

A summary of the ground water quality data for each key aquifer during the reporting period is provided in Table 23. Plots of ground water quality data during the reporting period for all statutory sites are provided in Appendix 3 - Ground Water Quality Monitoring Results.

Assessment criteria for groundwater monitoring results consists of a two stage trigger process for EC, and pH results outside the trigger range of 6.5 to 9.0 over three consecutive months.

Table 23: Summary of ground water monitoring results by aquifer

Aquifer	Sites	pH			EC (µS/cm)			Depth to water from top of casing (m)		
FY17	**Site references**	**Min.**	**Max**	**Avg**	**Min.**	**Max.**	**Avg**	**Min.**	**Max.**	**Avg**
Saddlers Creek Alluvial	GW45, GW46, GW47	6.5	8	7.2	638	6,360	3,995	6.5	10.5	8
Hunter River Alluvial	GW16, GW21,GW25, GW38A,GW39A, GW40A,GW41A	6.7	8.6	7.3	737	7,770	4,001	7.2	10.2	9.0
Permian	GW2,GW3,GW6, GW7,GW23, GW38P,GW39P, OD1078, OD1078-Piezo, OD1079-Piezo, BCGW05, BCGW10, BCGW11,BCGW12, BCGW15,BCGW18, BCGW19,EWPC33	6.9	12.5	8	2,130	12,480	5,263	3.2	55.8	21.6
West Cut Groundwater	GW26,GW27	6.4	6.7	6.5	4,980	6,730	5,601	50.1	51.3	51.8
FY16	**Site references**	**Min.**	**Max**	**Avg**	**Min.**	**Max.**	**Avg**	**Min.**	**Max.**	**Avg**
Saddlers Creek Alluvial	GW2, GW3	7.4	7.7	7.6	3,310	4,500	4,011	5.81	8.94	7.44
Hard Rock Ground Water (north west)	GW6, GW7, GW8	7.0	7.5	7.21	4,040	5,140	4,756	23.38	80.80	45.76
Hunter River Alluvial	GW16, GW21, GW22, GW23, GW25	5.9	7.6	7.2	669	5,640	3,091	9.34	80.57	24.39
West Cut Ground Water	GW26, GW27	6.4	6.7	6.5	4,150	5,960	5,241	47.66	49.24	48.6
FY15	**Site references**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**
Saddlers Creek Alluvial	GW2, GW3	7.68	8.69	8.13	3,120	4,240	3,571	6.19	9.35	7.62
Hard Rock Ground Water (north west)	GW6, GW7, GW8	6.82	7.96	7.17	3,820	5,120	4,511	23.25	88.23	46.34
Hunter River Alluvial	GW16, GW21, GW22, GW23, GW25	6.53	8.03	7.33	742	5,430	3,326	9.30	65.20	27.43
West Cut Ground Water	GW26, GW27	6.10	7.05	6.55	4,400	6,370	5,488	42.63	47.19	45.35

Ground water pH results were within the impact assessment criteria of 6.5-9.0 for the reporting period. There were a number of exceedances of the EC trigger value and groundwater level trigger during the reporting period as listed in Table 24. A single Stage-2 EC trigger value was exceeded during the reporting period (GW38A in November 2016); however, this result was not representative of the overall ground water quality trends for the reporting year, and is believed to be an anomaly.

Table 24: Groundwater level and quality exceedances

Site references	Elevated months	Investigation results
Level		
GW2	Jul 2016 to May 2017	Investigations revealed that the bore did not appear to be impacted by mining activities. The groundwater trigger value will be revised following the two year period of intense groundwater monitoring that commenced in February 2016.
GW3	Mar & May 2017	Investigations revealed that the bore did not appear to be impacted by mining activities. The groundwater level trend is influenced by rainfall recharge and the exceedances are well within the historic data range.
GW21	Jan, Mar & May 2017	GW21 exceeded the groundwater level trigger in January (9.73m), March (9.78m) and May (9.78m). Investigations revealed that the change in groundwater level was likely to be caused by depressurisation of the Vaux seam and was consistent with modelled predictions in the EA.
GW23	Jul 2016 to May 2017	GW23 exceeded the groundwater level trigger in every monitoring month, with a maximum depth to water of 50.97m. Investigations revealed that the change in ground water level was likely be related to the mining related depressurisation of the coal seam and was consistent with modelled predictions in the EA.
GW39P	Jul 2016 to May 2017	GW39P exceeded the groundwater level in every month, with a maximum depth to water of 10.34m. Investigations revealed that the depressurisation of the coal seams within the open cut mine was the likely cause of the decreasing water level in GW39P and the drawdown was within the predicted order of magnitude which was comparable to model predictions.
EC		
GW2	Sep 2016	Stage 2 trigger in September 2016 (4520 uS/cm). The bore did not appear to be impacted by mining activities. Historically, EC values show a correlation with both rainfall trends and groundwater elevations and during 2016, the site received less than average rainfall.
BCGW18	-	Triggers no longer applicable due to major upgrade works undertaken at this bore, which has changed the screened interval.

Data capture for manual sampling was 100% at all monitoring sites, with the exception of those seven discussed below. Monitoring was changed to two monthly from January 2017. Several monitoring bores also have data gaps in water level logger data during the reporting period, primarily due to issues with logger battery life. This issue will be reviewed in FY18.

No water quality data was able to be obtained from GW44 for the entire reporting period as this new bore is very deep and low flow sampling methodologies have proven not been effective at this site thus far. Rainfall in March prevented access to GW8 and GW27 in March 2017, so water level readings could not be obtained. Issues with the landholder prevented access to bores BCGW05, BCGW10, BCGW11 and BCGW15 for the entire reporting period, so no water level or quality data was obtained for these bores.

Complaints and Reportable Incidents

Mt Arthur Coal did not receive any complaints, government fines or penalties related to ground water during the reporting period.

Proposed Initiatives

During the next reporting period, Mt Arthur Coal will continue to monitor hydro-geomorphological conditions and evidence of any ground water ingress as operations progress towards the Hunter River alluvials, including monitoring of the alluvial cut-off wall.

Rehabilitation

Buildings and Infrastructure

No buildings or infrastructure were decommissioned or demolished during the reporting period.

Topsoil

Topsoil management at Mt Arthur Coal focuses on maintaining the quality of the topsoil resource as a rehabilitation growth medium. Activities undertaken during the reporting period included:

- Prioritising direct placement of topsoil;
- Testing topsoil to determine appropriate depths for stripping and recovery as well as ameliorant requirements;
- Felling and mulching trees in situ on disturbance areas to increase organic content within the topsoil that was used directly on rehabilitation areas; and
- Reusing felled trees from disturbance areas on new rehabilitation areas to provide habitat.

Additional measures generally undertaken when topsoil stockpiling include;

- restricting stockpile height generally to three metres or less, consistent with the MOP, to minimise compaction and anaerobic conditions within topsoil stockpiles,
- locating stockpiles so as to reduce the requirement for re-handling and establishing cover crops and;
- spraying topsoil stockpiles to manage weeds.

Topsoil was placed and spread to an approximate depth of 200 to 300 millimetres on rehabilitation areas. The newly spread topsoil surface was contour cultivated prior to sowing to provide a suitable environment that encourages water infiltration in the soil. Large rocks were removed from the ripped soil surface prior to sowing.

Landform Design

Mt Arthur Coal aims to create rehabilitation that is safe, stable and non-polluting that is self-sustaining and comparable to the surrounding natural landscape. Landform and rehabilitation incorporates micro-relief and natural drainage lines for landforms designed and constructed post the current approval. Design and implementation of Appllied Geofluv™ (Geofluv) was used for the first time during the reporting period. This natural landform design has been integrated into the Rehabilitation Strategy and MOP in which completion criteria are outlined. A copy of the Rehabilitation Strategy and MOP is available on MAC's website.

Geofluv rehabilitation technique is the use of a three-dimensional model to create a landform design that is based on natural analogues from the local environment. The use of this technique sees a landform profile and drainage lines that mimic the natural environment to establish landforms consistent with the erosion rate natural features in the area. This process requires the development of a fully integrated mine rehabilitation plan and differs significantly compared to more generic linear designs widely used in the Hunter Valley of NSW, and on site at Mt Arthur Coal previously.

The MacLeans emplacement (Figure 6, Figure 7) and areas of the visual emplacements have been designed and rehabilitated with the Geofluv design during FY17. Although Geofluv design has been implemented on other sites within NSW and also worldwide there are many defining characteristics that restrict its use such as space, waste characterisation, availability of suitable rock availability of mulch, landform height and steepness of the landform. Mt

Arthur is one of the higher landforms to use Geofluv and is also space constrained for emplacement area. However the resultant design aligns with industry best practice, but will be monitored over the coming years to ensure further natural landform design incorporates learnings from the current work.

The current Geofluv work has been completed as a trial to understand time, cost, stability and volume constraints. The assessment of the Geofluv results will be written into a report that will identify other potential suitable locations at Mt Arthur Coal and or how natural drainage lines and natural landform design can be implemented across new landforms. The report will be submitted to DPE and DRG in 2018.

Disturbed Land

Rehabilitation of land is carried out in accordance with the:

- Mt Arthur Coal's FY16-FY20 MOP;
- Rehabilitation Strategy MAC-ENC-MTP-047;
- Biodiversity Management Plan MAC-ENC-MTP-050; and the
- Land Management Procedure.

Rehabilitation is designed to achieve a stable final landform compatible with the surrounding environment and to meet the landform commitments presented in the MOP.

During the reporting period Mt Arthur Coal completed 56.8 hectares of rehabilitation across four areas as listed in as specified in the MOP. The rehabilitation result is in accordance with the total rehabilitation proposed in the current MOP for FY17, which was 51.3 hectares. There were some minor variations in the locational distribution of rehabilitation, compared to what was proposed in the current MOP, due to availability of emplacement areas to be reshaped.

Table 25 includes 8 hectares of grazing pasture rehabilitation (land capability class six), 26.4 hectares of native woodland rehabilitation, and 22.4 hectares of box-gum woodland rehabilitation. The methodology for revegetation of rehabilitated areas was selected to support the designated post-mining land use, as presented in the MOP. Figure 8 shows an example of rehabilitated woodland.

Both woodland and pasture seed mixes and rates have been revised in consultation with an independent specialist, as specified in the MOP.

Table 25: Mt Arthur Coal rehabilitation claimed for FY17

Location	FY17 MOP commitment (hectares)	FY17 rehabilitated area (hectares)
Dump 11	11	13.4
CD1	3.1	5
Belmont West	19	16
VD5	10	22.4
Total	43.1	56.8

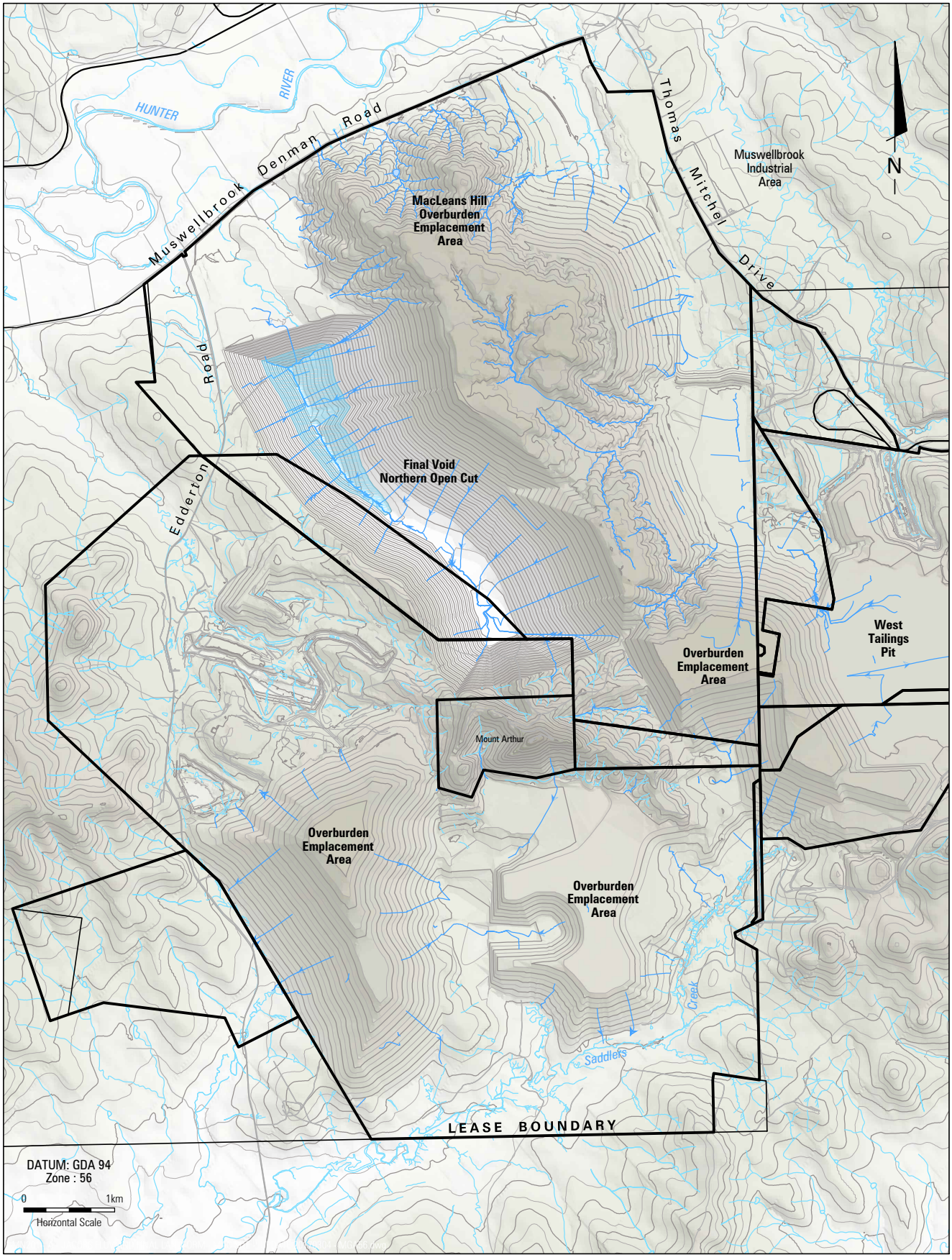


Figure 6: Natural drainage design for Macleans emplacement

Figure 7: Newly seeded rehabilitation at Macleans emplacement using natural landform design

Figure 8: Open native woodland rehabilitation at McDonalds Pit which was rehabilitated in 2003

Table 26: Mt Arthur Coal rehabilitation summary

Mine Area Type	Previous Reporting Period (FY16 Actual)	This Reporting Period (FY17 Actual)	Next Reporting Period (FY18 Forecast)
A. Total mine footprint[6]	4367.5	4454.8	5014.0
B. Total active disturbance[7]	3266.5	3297.0	3812.0
C. Land being prepared for rehabilitation[8]	0.0	0.0	0.0
D. Land under active rehabilitation[9]	1114.5*	1171.3	1202.0
E. Completed rehabilitation[10]	0.0	0.0	0.0

6 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.

7 Total active disturbance includes all areas ultimately requiring rehabilitation.

8 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).

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

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

*Reconciled via survey from FY16 (has seen increase from 1101 ha)

Other Activities

During the reporting period other rehabilitation related activities undertaken included:

- Collection of approximately 8.5 kilograms of seed from remnant native vegetation located on Mt Arthur Coal owned land in the vicinity of the operation within conservation and offset areas for use in rehabilitation of disturbed areas.
- Planting of approximately 5,100 tubestock of Box Gum Woodland shrubs and trees in a 12 hectare portion of the VD1 rehabilitation area and approximately 6,500 of Native Woodland shrubs and trees in a 17 hectare portion of Dump 11 rehabilitation area.
- A cattle grazing trial on rehabilitated land was continued with good results. The trials see beef cattle grazed on rehabilitated land on Coal & Allied's Hunter Valley Operations (HVO) mine site and BHP Billiton's Mt Arthur Coal site. At the same time, cattle are grazed on analogue sites located nearby but on unmined land and results between rehabilitated and unmined paddocks are independently monitored and compared.

  The study was designed and is monitored by the Department of Primary Industries in collaboration with the Upper Hunter Mining Dialogue Joint Working Group - Land Management, including representatives from agricultural groups, local farmers, environmental groups, state and local government and the mining industry.

  The trial also monitors the health of the cattle through blood tests and monitors the pasture, providing valuable information on the growth rates and feed quality of the rehabilitated land.

  Results: With the study half-way completed, the first mobs of cattle have been sent to market with very encouraging results. In both trial sites, the livestock's weight gain outperformed the cattle grazing on the analogue sites.

- Rehabilitation maintenance activities, including slashing, fencing, weed spraying, soil management, minor earthworks repairs and feral animal control.
- Topsoil testing of pre-strip areas and stockpiling to a maximum of three metres ahead of re-use on rehabilitated areas.
- Topsoil stockpiles were seeded with a suitable cover crop to minimise weed infestation and also stabilise the surface for air quality and visual amenity purposes.

Rehabilitation activities for next reporting period (FY18)

The FY18 – FY19 MOP was approved in June 2017 by DRG (formerly DRE) for the period of 1 July 2017 to 30 June 2019. Performance indicators and completion criteria were developed for the MOP and are representative of current site techniques and information derived from monitoring data. This will be dynamic over the life of the mine in consultation with DRG progressing towards rehabilitation being self-sustaining on site.

Rehabilitation activities for the FY18 reporting period include the continuation of natural landform design rehabilitation techniques and the inclusion of habitat in new areas as they become available. Rehabilitation targets will align with those in the FY18 and FY19 MOP with an annual rehabilitation area target of 32 ha.

New rehabilitation of land will be carried out in accordance with the:

- Mt Arthur Coal's FY18 & FY19 MOP;
- Rehabilitation Strategy MAC-ENC-MTP-047;
- Biodiversity Management Plan MAC-ENC-MTP-050; and the
- Land Management Procedure.

An additional 2 ha of tree planting and 20 ha of tree seeding is planned during the next reporting period to continue to enhance existing VD1 rehabilitation. This will be focussed on areas of pasture to align with the final proposed landform. Additional 8 ha of tree planting is also planned on Dump 11. Denman Rd visual bund was weeded, and received subsequent planting and watering during FY17. Further planting along Denman Road visual bund to enhance screening and visual amenity of the operation is planned in FY18.

Community

Community Interaction

Mt Arthur Coal invites feedback about its activities through a free-call 24-hour Community Response Line (1800 882 044), which is advertised in the local newspapers and at www.bhpbilliton.com.

During the reporting period, Mt Arthur Coal received 77 complaints from community members and near neighbours. Two of these complaints were made through third parties such as the EPA and the DP&E. A comparison of complaints received during the reporting period against previous financial years is shown in Figure 9 and a complete register of complaints is presented in Appendix 4 - Community Complaints.

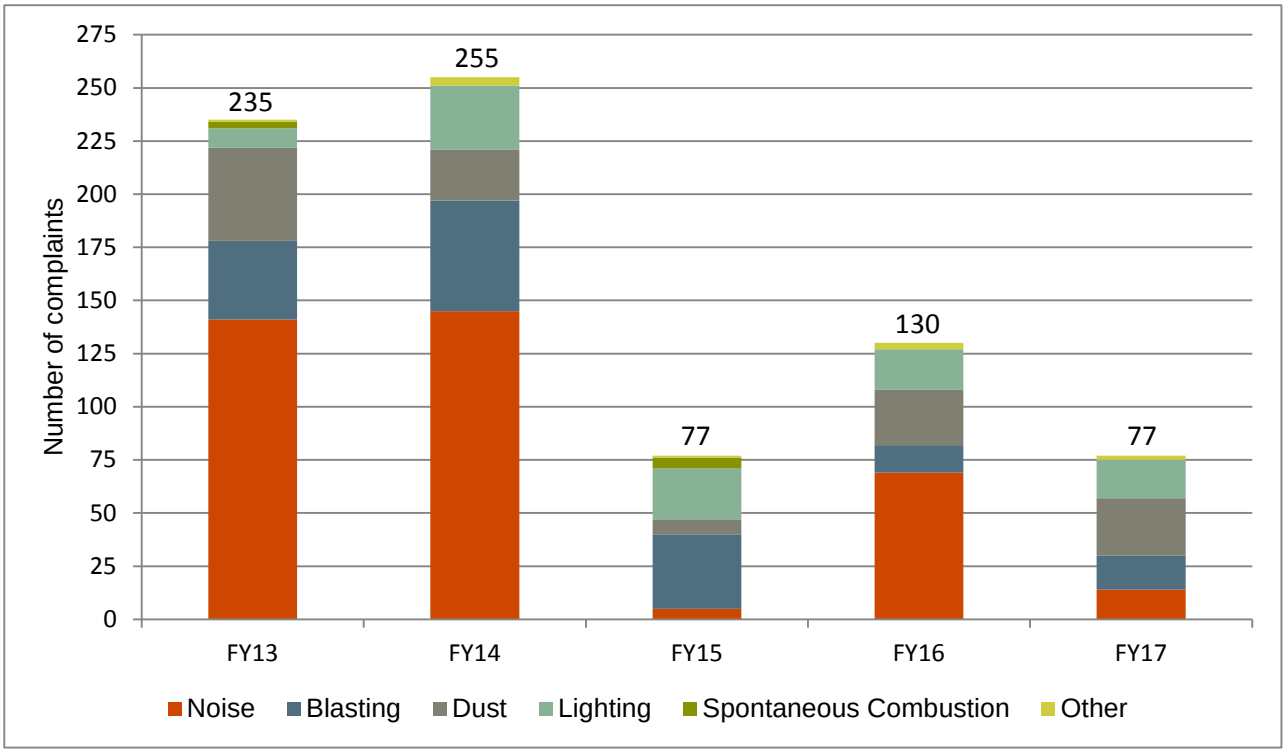


Figure 9: Comparison of complaints received during current and previous financial years

Website and Media

Mt Arthur Coal provides information about the operation through the BHP Billiton website at www.bhpbilliton.com, including project approval documents, blast schedules, coal transport information, Community Consultative Committee (CCC) meeting minutes, community complaint records, environmental monitoring information, environmental audits, environmental management plans and AEMRs.

Community Consultative Committee

During the reporting period, Mt Arthur Coal coordinated four CCC meetings in accordance with the Department of Planning and Environment Guidelines for Community Consultative Committees. CCC meetings were held on:

- 9 September 2016
- 13 December 2016
- 3 May 2017
- 13 June 2017

And participated in two Joint CCC meetings with Anglo American's Drayton Coal, held on:

- 13 December 2016
- 13 June 2017

Community Investment

During the reporting period Mt Arthur Coal contributed $922,500 to the local community, both financially and in-kind. Central to Mt Arthur Coal's commitment to the local community is its Voluntary Planning Agreement (VPA) with MSC, of which $500,000 is provided annually toward the Mt Arthur Coal Community Fund. Established under the EP&A Act, the VPA contributes to public amenities and services that may be impacted by the growth in mining operations.

Independent Audit

An Independent Environmental Audit (IEA) was not undertaken during the reporting period.

All actions committed to in response to the 2014 IEA have been implemented.

The next IEA will be undertaken in the FY18 reporting period, and initial preparations commenced during the FY17 reporting period.

Incidents and Non-compliances

Dam overflow – 18 August 2016

On Thursday 18 August 2016, Mt Arthur Coal mine notified the NSW Environment Protection Authority (EPA) of an incident where a dam (Dam 1) being utilised as a water fill point for water carts overflowed (via a spillway) and resulted in water passing underneath Edderton Road and discharging into a farm dam located on Mt Arthur Coal owned land (Dam 2).

The valve located on the pipeline to Dam 1 was shut down immediately and the Mt Arthur Coal and the site PIRMP was initiated. Vacuum trucks and water carts were deployed to the area to pump water from Dam 1 and Dam, with approximately 490,000 litres of water being removed over two days. There were no complaints received in relation to the incident.

Surface water samples were collected from Dam 1 and Dam 2, with water quality results being compared against concentration limits specified in Condition L2 of EPL 11457 for pH and TSS. With no concentration limits specified in EPL 11457 for TDS or heavy metals, and the surrounding land being used predominantly for grazing, trigger values specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) (2000) for livestock drinking water were used as a comparative measure.

The pH and TSS levels at both dams were below concentration limits specified in EPL 11457. All other results were below the ANZECC guideline trigger values with the exception of aluminium in Dam 2. The level of aluminium in Dam 1 was not above the guideline trigger values. Further investigation revealed that the water in Dam 1 was sourced from surface water monitoring site SW31. A review of routine monitoring undertaken in June 2016 at SW31 showed an aluminium level of 1.23 mg/L. Based on this information, it is believed that the elevated level of aluminium in Dam 2 was existing prior to the incident.

Based on the analysis of these water quality results, it is unlikely that adverse environmental impact occurred as a result of the water discharge. A summary of the water quality results are provided in the table below.

^ No adverse effects on beef cattle expected up to 4,000 mg/L. TDS based on Table 4.3.1 Tolerances of livestock to TDS (salinity) in drinking water.

Analyte	Units	Dam 1	Dam 2	ANZECC Guidelines for Livestock Drinking Water * (unless otherwise indicated)
pH	pH Unit	8.96	7.72	6.5 – 9.0~
TSS	mg/L	12	13	120~
TDS	mg/L	2,270	376	4,000^
Aluminium	mg/L	0.25	9.24	5
Arsenic	mg/L	0.004	0.002	0.5
Cadmium	mg/L	<0.0001	<0.0001	0.01
Calcium	mg/L	23	18	1000
Chromium	mg/L	<0.001	0.010	1
Copper	mg/L	0.001	0.009	1#
Iron	mg/L	0.21	9.32	Not sufficiently toxic
Lead	mg/L	<0.001	0.002	0.1
Molybdenum	mg/L	0.013	<0.001	0.15
Nickel	mg/L	0.005	0.015	1
Nitrate	mg/L	0.05	0.44	400
Nitrite	mg/L	<0.01	<0.01	30
Sulfate	mg/L	567	56	1000
Zinc	mg/L	<0.005	0.017	20

Mt Arthur Coal undertook an internal investigation utilising the Incident Cause Analysis Methodology to define the root cause and identify corrective and preventative actions. Investigations undertaken by Mt Arthur Coal have revealed that a valve was opened to transfer water into Dam 1 approximately 16 hours prior to the incident. The valve remained open, causing Dam 1 to fill to capacity and overflow. As a result, Mt Arthur Coal committed to undertake a full risk assessment of Dam 1, install a ball valve, and investigate the installation of leak detection prior to its recommissioning (noting Dam 1 has not been utilised since the incident).

Pipeline failure – 7 October 2016

On 7 October 2016, Mt Arthur Coal notified DPE of an incident where an excavator installing signs adjacent to a site light vehicle road made contact with a buried pipeline causing the line to rupture and water to be released.

The majority of the water was contained on site however a small amount of water has travelled in a northerly direction and passed through a culvert underneath Denman Road and onto Mt Arthur Coal owned land. The pipeline was not being used to transfer water at the time of the incident. Subsequently the only water that was released was the water stored in the pipeline at the time of the incident.

In response, the Mt Arthur Coal PIRMP was initiated and notification calls were made to all relevant authorities and the lessee of the impacted adjacent property. Checks were made to ensure the pipeline was not being used to transfer water at the time of the incident and equipment was mobilised to the area to create a small bund to contain the water. No complaints received in relation to the incident.

Mt Arthur Coal undertook an internal investigation utilising the Incident Cause Analysis Methodology (ICAM) to define the root cause and identify corrective and preventative actions. The pipeline already contained leak detection; however, this did not alert as the pipeline was not being used to transfer water at the time of the incident. The ruptured pipeline was repaired and recommissioned, and Mt Arthur Coal has completed the following preventative actions:

- Installation of signs above the pipe work indicating pipe is buried at a shallow depth.
- Communication session with relevant personnel regarding site excavation procedures.

Surface water samples were collected from the ruptured pipeline (referred to as 'Pipe' in the results table and laboratory analysis) and the small pond of water located off site and on the other side of Denman Road (referred to as 'Dam' in the results table and laboratory analysis). Water quality results were assessed against concentration limits specified in Condition L2 of EPL 11457 for pH and total suspended solids (TSS). There are no concentration limits specified in EPL 11457 for total dissolved solids (TDS) or heavy metals. Given the surrounding and downstream land use is predominantly grazing, trigger values specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC) (2000) for livestock drinking water have been used as a comparative measure.

The pH levels at both sites were within the concentration limits specified in EPL 11457. The TSS level at the pipe was below the concentration limit specified in EPL 11457. The TSS level at the dam was slightly elevated primarily due to the depth of water at the time of sampling. All other results were below the ANZECC guideline trigger values. Based on the analysis of these water quality results, it is unlikely that there has been any adverse environmental impact as a result of the water discharge. A summary of the water quality results are provided in the Table below.

Analyte	Units	Pipe	Dam	ANZECC Guidelines for Livestock Drinking Water * (unless otherwise indicated)
pH	pH Unit	8.15	7.98	6.5 – 9.0~
TSS	mg/L	28	146	120~
TDS	mg/L	565	640	4,000*
Aluminium	mg/L	1.40	3.85	5
Arsenic	mg/L	0.001	0.003	0.5
Cadmium	mg/L	<0.0001	<0.0001	0.01
Calcium	mg/L	36	92	1000
Chromium	mg/L	0.002	0.004	1
Copper	mg/L	0.002	0.007	1#
Iron	mg/L	1.41	4.09	Not sufficiently toxic
Lead	mg/L	<0.001	0.003	0.1
Molybdenum	mg/L	0.005	0.004	0.15
Nickel	mg/L	0.003	0.007	1
Nitrate	mg/L	0.18	2.72	400
Nitrite	mg/L	<0.01	0.04	30
Sulfate	mg/L	143	148	1000
Zinc	mg/L	0.006	0.019	20

Pipeline failure – 6 April 2017

On 6 April 2017, Mt Arthur Coal mine notified DPE of a potential pollution incident where a buried polyethylene pipeline ruptured, causing water to be released. The rupture was detected during a routine inspection and water was

observed to be flowing down a V-drain and pooling against a sediment fence just inside the mine site boundary. Subsequent inspection identified that some of this water had flowed offsite.

The pipeline was not being used to transfer water at the time of the event; however, due to the head of water contained within the pipe, the pipe continued to leak at approximately 1 litre per second. Approximately 20,000 litres of water was discharged from the ruptured pipe, of which it is estimated that less than five per cent of this water flowed offsite in a northerly direction, passing through a culvert underneath Denman Road and offsite onto land owned by Mt Arthur Coal. Following remedial containment action, offsite flow ceased at approximately 5:30pm that same day.

In response, the pipeline was immediately isolated and inspections were made of the downstream extent of offsite discharge flow. A small sump, pump and additional sediment fencing was established downstream of the rupture point to intercept and retain discharge water within site dams.

Mt Arthur Coal initiated the PIRMP and were verbally notified all relevant authorities and the lessee of the adjacent land immediately after the event. Surface water samples were collected at the point where water from the ruptured pipeline was rising to the ground surface (referred to as 'Poly Pipe' in the results table) and from an offsite location on the southern side (Mt Arthur Coal side) of Denman Road (referred to as 'Denman Road' in the results table). A third sample was collected from the onsite water storage dam, which was the source of the discharged water (referred to as 'Enviro Dam' in the results table).

Water quality results have been compared against concentration limits specified in Condition L2 of Environment Protection Licence 11457 (EPL) for pH and total suspended solids (TSS). There are no concentration limits specified in the EPL for TDS or heavy metals, so the ANZECC guidelines for livestock drinking water were used as a comparative measure.

Testing of water contained within the boundary of Mt Arthur Coal mine indicated the TSS level at the poly pipe was 219 mg/L, against the concentration limit of 120 mg/L specified in the EPL. However, the TSS levels of water in the Enviro Dam and on Denman Road were below the concentration limit specified in the EPL.

Aluminium level at the poly pipe was 5.69 mg/L against the concentration limit of 5.0 mg/L specified in the ANZECC guidelines. The aluminium levels were however below concentration limits at the Enviro Dam and on Denman Road. All other results were below the ANZECC guideline trigger values. Based on analysis of these water quality results, it appears unlikely that material environmental harm was caused as a result of the water discharge. A summary of the water quality results are provided in the Table below.

Analyte	Units	Poly Pipe	Denman Road	Enviro Dam	ANZECC Guidelines for Livestock Drinking Water * (unless otherwise indicated)
pH	pH Unit	8.84	8.29	8.92	6.5 – 9.0[~]
TSS	mg/L	219	78	31	120[~]
TDS	mg/L	859	911	821	4,000[^]
Aluminium	mg/L	5.69	2.46	0.82	5
Arsenic	mg/L	0.003	0.003	0.001	0.5
Cadmium	mg/L	<0.0001	<0.0001	<0.0001	0.01
Calcium	mg/L	45	75	31	1000
Chromium	mg/L	0.004	0.002	<0.001	1
Copper	mg/L	0.006	0.006	0.004	1[#]
Iron	mg/L	5.99	2.55	0.80	Not sufficiently toxic
Lead	mg/L	0.003	0.002	<0.001	0.1
Molybdenum	mg/L	0.007	0.006	0.007	0.15
Nickel	mg/L	0.008	0.005	0.002	1
Nitrate	mg/L	0.02	0.04	0.03	400
Nitrite	mg/L	<0.01	<0.01	<0.01	30
Sulfate	mg/L	252	254	243	1000
Zinc	mg/L	0.016	0.014	0.007	20

Mt Arthur Coal has not received any complaints in relation to the event. An ICAM was undertaken to determine the cause of the pipeline rupture and identify corrective and preventative actions. Mt Arthur Coal has completed the following actions to prevent recurrence of the event:

- Assessment of the failed polyethylene weld at an independent laboratory to confirm the exact cause of failure.
- Update site pipe welding procedures and quality control processes to minimise risk of failed pipe welds, including data collection and recording methods.

- Pressure testing of pipelines in environmentally sensitive areas, where welding records are not currently available.
- Investigate the lowest measurable leak detection tolerance, so that minor leaks are detected as far as reasonably practicable.

Activities during next reporting period

Mt Arthur Coal has established targets for the next reporting period. These targets will be closely monitored and an update on the status of each will be reported in the next Annual Review.

Table 27 outlines a progress summary of Mt Arthur Coal's performance against targets set for the FY17 period.

- continue the rehabilitation grazing study project in conjunction with NSWMC;
- employ at least eight first-year apprentices from the local community; and
- Continue study on Natural design locations for Mt Arthur Coal. To be submitted in 2018.
- Continue study and development of void management plan, to be submitted in 2018.

Table 27: Mt Arthur Coal's performance against targets for FY17

Target	Status	Performance
Investigate and, where feasible, implement projects to mitigate, substitute, reduce or eliminate energy consumption and greenhouse gas emissions.	Ongoing	Mt Arthur Coal continues to investigate greenhouse gas emissions and energy consumption reductions.
Investigate and, where feasible, implement projects to reduce water consumption.	Ongoing	Projects to reduce water consumption in the reporting period include: • completed the removal of the main dam as the focal point of Mt Arthur Coal's site water network which has provided a flexible water network system that can transfer between most site storages for maximum practical. • Below average rainfall has resulted in reduced rainfall being captured within the site catchment.
Continue the rehabilitation grazing study project	Ongoing	The grazing project is providing good results and will continue into the next reporting period. Further ACARP funding is being sought by NSWMC with support of Mt Arthur Coal.
Employ at least eight first-year apprentices from the local community	Complete	Completed during the reporting period.

Appendix 1 - Air Quality Monitoring Results

High Volume Air Sampler (HVAS) PM_{10} Results

Date	DF05		DF06		DF07		Regulatory Criteria	
	24-hour PM_{10}	Annual Average	24-hour PM_{10}	Annual Average	24-hour PM_{10}	Annual Average	Short term (24-hour)	Longterm (Annual Average)
4/07/2016	10.0	20.7	9.0	28.6	30.0	19.6		
10/07/2016	8.0	20.7	11.0	28.6	11.0	19.5		
16/07/2016	23.0	21.0	17.0	28.7	23.0	19.7		
22/07/2016	1.0	20.9	1.0	28.6	8.0	19.8		
28/07/2016	1.0	20.8	6.0	28.2	4.0	19.3		
3/08/2016	3.0	20.8	8.0	28.1	8.0	19.2		
9/08/2016	4.0	20.7	15.0	28.1	12.0	19.2		
15/08/2016	18.0	20.7	18.0	28.1	20.0	19.2		
21/08/2016	5.0	20.5	9.0	27.9	10.0	19.1		
27/08/2016	4.0	20.3	11.0	27.2	15.0	19.0		
2/09/2016	6.0	20.0	8.0	27.3	9.0	19.1		
8/09/2016	30.0	20.3	18.0	27.3	19.0	19.2		
14/09/2016	2.0	20.2	7.0	27.2	4.0	19.1		
20/09/2016	6.0	19.9	6.0	26.8	8.0	18.9		
26/09/2016	3.0	19.8	12.0	26.5	8.0	18.8		
2/10/2016	5.0	19.5	15.0	26.4	9.0	18.7		
8/10/2016	11.0	18.9	23.0	26.1	17.0	18.6		
14/10/2016	11.0	18.7	22.0	25.7	17.0	18.3		
20/10/2016	3.0	18.2	18.0	25.2	20.0	18.2		
26/10/2016	10.0	17.7	23.0	24.5	10.0	17.9		
1/11/2016	12.0	17.6	38.0	24.6	25.0	18.0		
7/11/2016	19.0	17.7	34.0	24.9	42.0	18.0		
13/11/2016	23.0	17.8	24.0	25.0	32.0	18.2		
19/11/2016	30.0	18.2	32.0	25.4	31.0	18.6		
25/11/2016	47.0	18.6	47.0	25.6	15.0	18.6		
1/12/2016	15.0	18.5	44.0	25.8	17.0	18.5		
7/12/2016	17.0	18.3	15.0	25.3	5.0	18.2		
13/12/2016	18.0	17.9	43.0	25.0	17.0	18.1		
19/12/2016	29.0	17.8	29.0	24.7	18.0	17.9		
25/12/2016	9.0	17.4	11.0	24.3	7.0	17.5		
31/12/2016	23.0	17.5	37.0	24.6	30.0	17.9	50	30
6/01/2017	23.0	17.5	19.0	24.5	15.0	17.9		
12/01/2017	56.0	18.4	77.0	25.7	40.0	18.5		
18/01/2017	44.0	18.5	60.0	25.6	32.0	18.5		
24/01/2017	25.0	18.6	90.0	26.7	22.0	18.7		
30/01/2017	25.0	18.6	90.0	27.7	22.0	18.7		
5/02/2017	11.0	18.5	NR	27.8	23.0	18.8		
11/02/2017	53.0	18.9	NR	27.7	43.0	18.9		
17/02/2017	29.0	18.9	NR	27.5	25.0	18.8		
23/02/2017	49.0	19.0	NR	27.1	37.0	18.8		
1/03/2017	15.0	18.3	9.0	26.5	10.0	18.5		
7/03/2017	10.0	17.8	18.0	25.9	21.0	18.5		
13/03/2017	36.0	17.9	NR	25.7	30.0	18.6		
19/03/2017	12.0	17.4	16.0	25.1	14.0	18.2		
25/03/2017	21.0	17.6	16.0	25.0	15.0	18.2		
31/03/2017	11.0	17.0	13.0	24.5	13.0	18.0		
6/04/2017	15.0	17.0	12.0	24.0	10.0	17.8		
12/04/2017	17.0	16.7	18.0	23.3	17.0	17.6		
18/04/2017	34.0	16.8	19.0	22.7	17.0	17.5		
24/04/2017	26.0	16.4	20.0	22.2	19.0	17.3		
30/04/2017	18.0	16.5	11.0	22.2	14.0	17.2		
6/05/2017	14.0	16.2	20.0	21.6	17.0	17.2		
12/05/2017	21.0	16.4	30.0	21.6	29.0	17.5		
18/05/2017	26.0	16.7	30.0	21.8	26.0	17.8		
24/05/2017	11.0	16.8	19.0	22.0	21.0	17.9		
30/05/2017	3.0	16.5	6.0	21.5	7.0	17.5		
5/06/2017	8.0	16.6	13.0	21.7	19.0	17.7		
11/06/2017	14.0	16.8	12.0	21.8	13.0	17.7		
17/06/2017	18.0	17.1	20.0	22.2	26.0	18.1		
23/06/2017	6.0	17.1	19.0	22.4	19.0	18.2		
29/06/2017	2.0	17.4	8.0	22.8	10.0	18.5		
	Malfunctioning HVAS monitor - results unreliable or unreadable							
	24-hour result excedding regulatory criteria							

Tapered Element Oscillating Microbalance (TEOM) PM_{10} Results

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
1/07/2016	5.0	10.5	9.4	3.9	3.0	6.6		
2/07/2016	7.0	4.7	9.1	3.3	4.4	4.5		
3/07/2016	4.3	9.7	12.8	4.6	5.6	7.7		
4/07/2016	6.8	11.7	21.3	8.3	8.9	23.7		
5/07/2016		4.8	10.0	5.1	5.9	8.9		
6/07/2016		0.1	4.7	2.3	1.2	2.0		
7/07/2016		6.7	13.6	5.0	2.0	7.8		
8/07/2016		5.5	11.2	3.1	3.9	4.1		
9/07/2016		8.6	12.7	5.5	4.3	7.8		
10/07/2016	6.3	7.9	13.8	9.7	7.7	8.6		
11/07/2016	5.3	7.4	12.2	9.4	10.3	7.3		
12/07/2016	4.7	12.1	11.7	3.8	5.2	6.6		
13/07/2016	6.8	18.0	16.5	4.9	4.4	13.9		
14/07/2016	4.5	6.8	12.6	4.1	4.4	6.8		
15/07/2016	6.9	13.0	17.9	6.2	7.5	13.5		
16/07/2016	16.6	14.2	20.9	17.6	14.4	15.9		
17/07/2016	9.6	12.3	15.6	10.1	7.8	11.8		
18/07/2016	6.2	7.9	13.0	3.5	8.9	7.2		
19/07/2016	11.7	14.9	21.1	5.5	8.9	14.6		
20/07/2016	4.4	9.4	11.1	2.6	5.4	7.1		
21/07/2016	4.2	12.1	14.5	5.5	7.1		50	30
22/07/2016	4.6	3.6	6.9	3.4	6.1			
23/07/2016	8.1	18.4	15.0	5.4	6.5			
24/07/2016	4.8	8.7	10.9	4.0	5.0			
25/07/2016	6.7	8.8	9.4	5.4	3.4			
26/07/2016	7.7	9.1	9.4	4.2	4.3	6.4		
27/07/2016	6.3	11.9	11.5	3.9	4.0	7.9		
28/07/2016	3.9	6.8	8.7	2.5	3.3			
29/07/2016	3.8	8.7	10.8	2.6	3.0			
30/07/2016	9.2	11.9	14.5	8.6	8.2			
31/07/2016	7.4	10.0	11.7	7.1	7.9			
1/08/2016	9.7	16.5	18.0	5.5	9.2			
2/08/2016	17.3	19.8	15.8	12.9	11.4			
3/08/2016	2.9	4.2	8.0	4.4	5.4			
4/08/2016	3.9	6.4	10.6	2.2	4.6			
5/08/2016	5.0	10.1	12.8	2.5	6.4			
6/08/2016	10.1	8.1	12.2	3.7	10.8			
7/08/2016	7.6	15.6	14.2	3.3	8.0			
8/08/2016	10.1	15.9	18.6	4.0	10.2			
9/08/2016	10.4	13.8	14.0	3.6	12.7	7.2		
10/08/2016	11.7	16.1	14.5	4.4	10.2	10.9		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
11/08/2016	6.3	11.0	11.9	2.1	6.1	7.0		
12/08/2016	5.1	14.2	14.8	1.3	3.8	9.9		
13/08/2016	6.4	14.2	13.5	2.4	5.5	11.6		
14/08/2016	16.9	12.5	13.6	5.5	11.8	10.3		
15/08/2016	16.9	21.7	23.0	6.0	16.7	17.9		
16/08/2016	13.0	21.1	22.0	5.9	15.8	12.9		
17/08/2016	13.0	19.2	17.6	4.3	15.5	9.1		
18/08/2016	16.9	14.8	16.3	5.7	14.6	10.2		
19/08/2016	13.9	20.0	19.1	4.4	13.3	12.1		
20/08/2016	4.9	12.8	10.4	1.7	4.3	6.5		
21/08/2016	7.0	13.7	12.1	1.6	7.8	5.6		
22/08/2016	15.3	14.2	16.3	3.5	8.1	10.2		
23/08/2016	6.2	7.4	11.3	3.1	5.5	6.8		
24/08/2016	5.7	7.0	9.4	2.6	6.5	6.8		
25/08/2016	1.6	4.0	6.9	1.0	1.9	2.6		
26/08/2016	6.9	10.4	12.5	2.8	4.7	6.3		
27/08/2016	10.9	10.7	14.9	2.5	5.0	9.2		
28/08/2016	5.1	7.8	8.6	1.1	4.5	5.5		
29/08/2016	22.5	19.3	17.6	6.9	23.8	12.5		
30/08/2016	35.7	27.3	27.9	12.6	23.0	19.0		
31/08/2016	14.2		21.5	6.8	15.3	16.5		
1/09/2016	4.5	5.7	10.4	1.2	5.5	6.7	50	30
2/09/2016	5.3	7.6	9.8	3.5	7.6	7.2		
3/09/2016	4.1	6.9	8.8	1.8	4.0	6.6		
4/09/2016	3.2	4.6	7.1	1.5	4.4	3.6		
5/09/2016	5.4	12.3	13.2	4.8	5.9	9.4		
6/09/2016	6.6	14.2	15.9	5.9	7.7	10.6		
7/09/2016	17.4	19.4	23.3	18.4	15.2	17.8		
8/09/2016	18.8	19.0	22.6	21.0	17.6	18.7		
9/09/2016	11.5	20.1	21.1	15.3	15.3	19.8		
10/09/2016	2.9	4.6	6.7	2.1	5.6	4.5		
11/09/2016	4.4	14.6	7.4	3.1	4.7	6.0		
12/09/2016	7.7	14.2	15.1	7.3	10.6	9.8		
13/09/2016	17.6	20.5	21.4	17.0	20.3	0.0		
14/09/2016	3.3	5.4	8.6	2.4	6.4	5.0		
15/09/2016	3.2	4.6	5.5	1.2	5.3	3.0		
16/09/2016	4.1	5.6	7.6	2.3	3.2	3.6		
17/09/2016	7.0	11.3	11.5	7.2	7.0	8.0		
18/09/2016	10.2	13.6	17.7	13.0	14.4	14.8		
19/09/2016	2.7	4.9	6.5	1.9	2.6	3.2		
20/09/2016	5.3	8.5	10.1	5.5	4.7	6.8		
21/09/2016	5.9	8.5	13.1	7.5	13.0	10.0		
22/09/2016	6.8	10.7	11.6	4.0	5.6	8.2		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
23/09/2016	7.1	13.7	10.9	4.4	6.1	6.9		
24/09/2016	8.6	11.8	14.6	7.3	11.3	11.4		
25/09/2016	4.0	9.1	9.2	2.2	4.2	5.4		
26/09/2016	4.2	13.9	0.0	2.9	5.3	8.4		
27/09/2016	9.0	43.1	14.4	9.7	6.9	16.2		
28/09/2016	15.2	16.0	14.5	11.8	13.2	14.1		
29/09/2016	14.5	14.9	20.7	18.8	19.0	19.0		
30/09/2016	8.3	11.9	12.4	6.7	6.8	8.8		
1/10/2016	5.4	10.8	8.2	4.0	5.1	7.1		
2/10/2016	6.6	10.8	8.9	3.9	8.5			
3/10/2016	11.3	12.0	9.2	3.7	8.2			
4/10/2016	8.2	19.4	9.4	4.2	7.1			
5/10/2016	9.4	18.8	12.2	6.5	5.3	10.4		
6/10/2016	11.2	23.9	13.0	7.7	8.6	10.5		
7/10/2016	13.1	16.0	13.5	7.0	14.3	11.1		
8/10/2016	18.5	28.0	21.4	12.1	17.3	17.9		
9/10/2016	22.4	18.0	19.7	17.1	19.1	17.7		
10/10/2016	18.8	33.0	31.2	19.1	18.0	24.0		
11/10/2016	4.4	12.1	11.7		5.4	7.0		
12/10/2016	8.2	15.4	11.7	5.0	5.8	7.9		
13/10/2016	15.0	17.0	17.1	13.0	8.5	14.7		
14/10/2016	14.9	14.6	16.0	18.2	11.5	14.4	50	30
15/10/2016	8.6	15.7	14.4	10.7	12.1	8.9		
16/10/2016	17.3	19.0	15.6	9.4	21.2	11.1		
17/10/2016	9.7	13.1	13.9	7.8	10.4	9.6		
18/10/2016	4.7	11.9	8.4	2.2	5.0	5.2		
19/10/2016	9.7	14.3	17.3	7.9	8.3	10.4		
20/10/2016	20.0	18.8	22.8	17.8	16.3	20.5		
21/10/2016	16.0	19.2	20.3	16.5	16.6	15.6		
22/10/2016	3.3	4.5	7.1	1.6	5.0	2.2		
23/10/2016	10.6	11.5	14.6	7.9	7.9	11.3		
24/10/2016	7.5	9.6	12.6	7.5	8.4	9.1		
25/10/2016	9.2	11.5	13.7	7.9	10.3	9.4		
26/10/2016	13.2	14.6	11.8	5.9	12.3	8.1		
27/10/2016	26.3	32.9	25.5	15.6	16.8	19.3		
28/10/2016	15.3	13.8	17.1	14.8	12.2	12.2		
29/10/2016	22.2	19.3	21.0	20.1	18.0	17.5		
30/10/2016	15.7	15.3	16.0	13.0	13.6	10.9		
31/10/2016	10.0	15.1	15.9	6.3	10.9	11.4		
1/11/2016	15.3	33.5	26.4	10.0	15.9	21.0		
2/11/2016	14.3	18.2	16.6	8.8	13.8	13.6		
3/11/2016	12.7	20.7	12.9	7.5	12.9	11.2		
4/11/2016	13.4	29.8	18.8	6.9	10.2	13.0		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
5/11/2016	23.2	40.6	26.6	11.6	15.8	21.0		
6/11/2016	19.4	32.5	28.7	9.8	14.2	19.0		
7/11/2016	19.9	23.5	26.0	10.5	21.7	13.4		
8/11/2016	26.2	31.0	28.4	15.0	28.2	21.1		
9/11/2016	15.5	13.9	16.6	11.7	14.6	14.3		
10/11/2016	13.1	20.8	18.8	7.7	11.2	16.3		
11/11/2016	22.1	22.7	26.6	15.9	17.8	23.1		
12/11/2016	10.6	10.4	12.6	7.4	10.7	9.4		
13/11/2016	16.4	23.7	20.7	7.1	14.4	14.8		
14/11/2016	8.0	14.9	12.7	4.6	4.5	10.4		
15/11/2016	10.1	11.0	14.1	6.6	8.3	10.6		
16/11/2016	17.6	16.9	19.5	15.0	13.3	15.9		
17/11/2016	21.1	16.5	18.0	14.8	13.9	15.4		
18/11/2016	22.3	16.7	17.5	11.6	18.7	13.9		
19/11/2016	31.6	28.2	28.4	17.1	24.8	22.9		
20/11/2016	34.5	30.3	33.3	29.0	28.7	29.1		
21/11/2016	18.7	30.4	30.7	17.4	26.2	26.7		
22/11/2016	27.3	36.8	34.8	19.7	28.9	29.2		
23/11/2016	43.8	40.3	32.9	28.9	24.3	27.9		
24/11/2016	13.4	25.6	23.7	6.3	8.1	23.2		
25/11/2016	17.6	39.8	21.2	10.0	15.2			
26/11/2016	22.6	32.3	29.2	14.5	17.7		50	30
27/11/2016	34.2	35.1	34.3	27.2	27.5			
28/11/2016	16.6	33.2	29.6	16.4	23.4			
29/11/2016	32.9	39.8	29.0	20.7	26.3	26.2		
30/11/2016	22.3	23.2	21.9	16.6	19.8	19.3		
1/12/2016	15.2	16.3	17.9	9.4	16.0	14.2		
2/12/2016	24.7	26.0	26.4	12.7	19.5	18.3		
3/12/2016	37.5	31.1	33.4	27.0	28.8	29.0		
4/12/2016	29.2	27.5	28.8	27.7	27.0	26.5		
5/12/2016	26.2	26.9	31.0	23.6	25.2	27.9		
6/12/2016	19.4	24.9	27.7	18.6	22.1	25.1		
7/12/2016	10.3	5.1	8.0	5.0	10.4	5.6		
8/12/2016	16.6	16.6	20.0	10.6	22.1	14.8		
9/12/2016	11.0	43.8	20.5	7.1	8.9	15.9		
10/12/2016	22.1	21.5	26.8	18.9	20.5	22.5		
11/12/2016	22.4	29.8	32.8	19.4	21.5	29.3		
12/12/2016	16.5	17.9	20.2	14.6	22.3	16.2		
13/12/2016	15.1	26.6	18.7	9.0	19.0	15.6		
14/12/2016	28.1	39.1	23.5	15.3	25.8	20.0		
15/12/2016	10.3	12.5	16.7	12.4	9.5	12.5		
16/12/2016	6.1	7.5	9.7	6.2	7.3	6.0		
17/12/2016	6.3	12.9	13.9	4.6	9.7	10.4		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
18/12/2016	20.1	23.3	31.3	23.2	21.5	26.3		
19/12/2016	18.4	18.2	23.4	17.4	17.0	19.1		
20/12/2016	16.5	20.6	22.8	13.9	18.2	16.4		
21/12/2016	17.6	27.0	22.4	14.7	18.4	19.3		
22/12/2016	17.1	22.0	24.3	17.1	18.8	19.8		
23/12/2016	19.9	23.1	26.1	18.3	18.0	22.1		
24/12/2016	13.8	14.7	16.7	9.8	15.1	13.4		
25/12/2016	5.1	7.3	9.9	4.2	8.3	6.4		
26/12/2016	7.7	10.5	18.7	6.5	12.6	7.6		
27/12/2016	25.8	17.2	28.5	19.0	22.3	15.7		
28/12/2016	17.5	17.5	35.0	14.6	20.2	14.6		
29/12/2016	19.5	21.5	15.0	9.3	26.9	11.1		
30/12/2016	32.0	32.7	27.1	21.2	30.4	21.8		
31/12/2016	34.4	31.9	34.2	15.5	24.6	28.9		
1/01/2017	17.9	19.1	27.3	17.2	21.3	21.5		
2/01/2017	8.1	7.9	15.9	8.4	12.6	11.3		
3/01/2017	12.5	9.6	17.6	11.7	12.0	13.7		
4/01/2017	10.6	6.2	13.1	10.4	9.4	10.0		
5/01/2017	9.6	8.2	13.4	9.8	8.3	9.9		
6/01/2017	12.9	12.7	13.9	12.3	10.6	13.1		
7/01/2017	11.1	9.1	15.0	11.5	10.8	11.7		
8/01/2017	22.8	15.4	14.9	19.6	18.1	11.1	50	30
9/01/2017	35.0	31.4	28.6	31.5	30.6	29.3		
10/01/2017	27.8	46.8	37.4	25.8	23.6	30.6		
11/01/2017	25.3	43.2	29.0	13.5	24.9	19.0		
12/01/2017	34.3	32.2	38.1	35.2	23.8	32.7		
13/01/2017	20.9	23.5	25.0	17.7	23.0	18.4		
14/01/2017	19.0	37.7	26.1	13.9	19.9	23.1		
15/01/2017	19.4	11.8	20.5	22.1	19.9	16.8		
16/01/2017	27.8	23.7	30.0	27.4	22.6	27.1		
17/01/2017	21.1	19.5	23.9	20.0	22.2	16.0		
18/01/2017	27.5	29.2	26.0	12.4	22.0	23.0		
19/01/2017	17.8	9.9	21.4	16.1	18.5	16.4		
20/01/2017	18.5	17.1	21.1		15.5	15.8		
21/01/2017	16.1	13.0	21.8	19.5	17.3	16.3		
22/01/2017	21.6	14.0	25.1	19.1	19.8	18.9		
23/01/2017	19.9	13.8	18.7	17.4	20.2	13.9		
24/01/2017	26.4	23.2	24.9	22.1	28.5	20.3		
25/01/2017	7.7	7.0	14.1	8.8	11.2	9.7		
26/01/2017	12.0	11.1	16.5	14.0	13.2	12.5		
27/01/2017	14.5	12.0	19.7	17.8	15.5	15.8		
28/01/2017	18.8	17.0	18.8	19.4	17.7	15.3		
29/01/2017	26.2	19.5	21.0	18.3	23.1	17.8		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
30/01/2017	18.5	16.9	20.2	18.7	25.2	14.6		
31/01/2017	26.9	44.7	21.7	25.4	29.5	17.0		
1/02/2017	22.5				19.4			
2/02/2017								
3/02/2017		33.2	33.3	22.1		25.3		
4/02/2017	22.5	25.8	24.9	18.0	20.5	19.2		
5/02/2017	14.3	27.6	26.3	6.7	16.5	17.5		
6/02/2017	22.3	29.9	21.4	13.7	27.2	18.0		
7/02/2017	19.7	33.6	32.9	19.1	16.8	25.8		
8/02/2017	12.8	17.9	14.2	16.6	11.1	9.7		
9/02/2017	13.9	23.0	18.1	18.4	18.7	15.2		
10/02/2017	49.1	47.9	27.7		32.1	24.4		
11/02/2017	64.8	41.9	33.0		37.8	33.5		
12/02/2017	53.1	76.1	53.0	40.2	36.8	41.9		
13/02/2017	19.0	27.6	27.5	18.5	17.2	19.7		
14/02/2017	21.7	30.7	24.8	21.9	15.7	16.6		
15/02/2017	21.3	21.6	24.1	7.8	16.5	15.4		
16/02/2017	31.0	46.4	29.8	12.4	25.0	16.8		
17/02/2017	28.8	38.8	37.8	14.0	33.0	27.6		
18/02/2017	15.0	24.5	22.8	7.6	17.3	14.9		
19/02/2017	17.1	24.1	25.5	8.8	17.7	18.3		
20/02/2017	13.1	34.1	30.8	3.8	10.6	20.8	50	30
21/02/2017	35.3	46.9	31.1	12.5	25.7	25.3		
22/02/2017	30.3	41.2	32.1	11.5	21.0	23.8		
23/02/2017	34.2	46.6	32.5	14.3	24.1	25.2		
24/02/2017	42.1	49.9	41.6	16.7	27.7	32.8		
25/02/2017	14.7	26.2	22.4	4.7	9.8	16.4		
26/02/2017	12.0	14.2	17.2	4.9	12.4	12.8		
27/02/2017	12.5	14.7	15.6	4.7	10.2	11.6		
28/02/2017	7.5	10.3	12.8	3.3	7.0	8.9		
1/03/2017	7.1	6.0	9.1	3.2	6.4	6.1		
2/03/2017	11.4	13.6	16.3	7.9	12.0	12.3		
3/03/2017	8.6	13.6	15.5	6.1	6.7	11.4		
4/03/2017	3.4	7.3	9.2	1.6	5.3	4.0		
5/03/2017	4.7	2.5	5.7	1.6	4.4	2.1		
6/03/2017	7.5	9.5	12.1	6.0	9.0	8.4		
7/03/2017	12.5	15.4	19.7	7.9	10.3	14.0		
8/03/2017	11.0	11.9	16.7	7.5	11.8	12.2		
9/03/2017	9.4	14.7	17.4	6.7	10.1	12.8		
10/03/2017	17.6	19.4	22.4	8.6	15.0	15.6		
11/03/2017	18.2	15.0	19.2	12.0	17.7	13.4		
12/03/2017	19.1	15.3	18.7	17.0	19.7	15.5		
13/03/2017	34.3	29.4	30.4	19.6	24.9	26.2		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
14/03/2017	21.7	18.2	19.4	10.9	12.6	14.5		
15/03/2017	8.9	8.6	11.2	7.7	9.8	7.8		
16/03/2017	5.3	6.1	7.6	2.5	7.0	4.8		
17/03/2017	9.4	9.9	14.7	6.3	8.7	11.8		
18/03/2017	10.8	10.9	13.7	5.8	10.2	10.4		
19/03/2017	7.8	7.6	10.9		7.5	7.6		
20/03/2017	17.1	16.3	19.7	11.6	15.6	15.7		
21/03/2017	11.3	11.6	15.4	8.2	12.7	11.3		
22/03/2017	7.5	9.7	12.2	3.2	7.2	7.8		
23/03/2017	9.0	10.5	13.8	5.8	9.8	10.1		
24/03/2017	5.5	5.6	9.6	4.2	6.3	6.2		
25/03/2017	15.8	12.5	16.7	9.0	16.0	13.5		
26/03/2017	19.5	18.0	20.7	13.6	17.2	16.1		
27/03/2017	16.5	17.6	19.4	11.0	18.5	14.5		
28/03/2017	21.7	24.7	26.4	13.1	27.5	21.7		
29/03/2017	17.7	19.8	20.4	8.0	21.4	14.2		
30/03/2017	5.9	4.5	9.3	2.9	10.2	12.3		
31/03/2017	9.5	10.0	15.0	6.1	11.3	11.2		
1/04/2017	12.0	12.3	17.4	8.7	12.8	13.3		
2/04/2017	9.9	11.8	16.2	6.9	11.0	12.2		
3/04/2017	5.9	8.4	12.2	3.9	8.4	8.7		
4/04/2017	6.2	8.1	11.9	3.9	9.4	8.2	50	30
5/04/2017	5.5	7.6	11.1	4.5	7.7	7.6		
6/04/2017	6.0	8.0	11.3	5.3	8.2	7.9		
7/04/2017	7.2	8.7	12.6	8.6	9.2	9.1		
8/04/2017	12.0	9.2	13.1	13.3	12.1	9.8		
9/04/2017	6.3	11.4	12.9	5.2	12.3	8.4		
10/04/2017	40.8	45.0	45.9	20.5	35.9	38.8		
11/04/2017	24.1	19.8	23.2	11.3	16.4	18.8		
12/04/2017	11.5	14.1	17.0	9.0	10.7	14.3		
13/04/2017		17.8	14.8	6.7	10.0	12.6		
14/04/2017	10.1	18.9	21.5	8.6	15.3	15.5		
15/04/2017	16.9	22.9	22.9	14.0	18.7	17.2		
16/04/2017	26.0	34.4	29.2	15.5	25.8	22.4		
17/04/2017	25.7	23.7	29.5	21.4	26.6	26.3		
18/04/2017	22.3	19.4	21.7	17.0	23.0	18.1		
19/04/2017	29.8	17.7	21.3	15.5	20.1	17.3		
20/04/2017	16.0	15.5	18.5	10.1	14.1	14.7		
21/04/2017	17.6	34.4	25.6	9.9	18.0	20.1		
22/04/2017	17.7	17.1	21.2	12.8	15.8	13.1		
23/04/2017	9.0	12.3	15.4	6.1	9.3	11.0		
24/04/2017	26.4	20.1	23.0	16.8	24.8	19.5		
25/04/2017	14.6	18.9	20.5	15.4	18.1	14.7		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
26/04/2017	5.0	13.3	6.2		6.3	2.5		
27/04/2017	4.3	8.2	12.9	3.7	4.1	9.6		
28/04/2017	5.6	12.2	18.0	4.1	6.4	12.2		
29/04/2017	6.8	12.3	16.2	5.7	9.0	11.2		
30/04/2017	14.9	14.0	18.7	12.1	15.4	15.8		
1/05/2017	6.9	12.1	14.9	3.6	9.7	9.7		
2/05/2017	17.5	20.7	25.4	11.7	12.4	21.1		
3/05/2017	22.5	16.8	27.3	16.1	14.4	23.9		
4/05/2017	10.9	16.2	23.0	13.2	10.1	18.7		
5/05/2017	16.3	13.8	21.4	19.9	14.7	15.4		
6/05/2017	11.2	13.3	19.2	13.1	12.3	10.7		
7/05/2017	14.7	22.4	18.4	12.6	12.4	13.6		
8/05/2017	23.1	21.8	24.5	26.0	19.1	23.9		
9/05/2017	16.4	25.4	24.5	24.3	15.8	21.5		
10/05/2017	13.0	22.3	20.9	14.5	11.7	12.3		
11/05/2017	18.4	28.9	24.8	17.6	17.1	17.9		
12/05/2017	22.0	25.7	33.2	20.9	25.0	27.6		
13/05/2017	24.4	19.5	24.5	24.5	22.2	20.6		
14/05/2017	10.2	15.7	21.8	12.3	10.3	15.6		
15/05/2017	7.5	16.0	15.5	4.5	7.9	5.6		
16/05/2017	11.0	18.5	19.4		13.3	10.7		
17/05/2017	22.8	30.1	24.4		19.0	19.1	50	30
18/05/2017	24.1	23.4	26.6		18.1	20.2		
19/05/2017	12.7	12.7	17.4	12.0	6.8	10.3		
20/05/2017	4.1	5.5	9.3	2.8	5.8	3.4		
21/05/2017	4.9	8.7	11.3	4.3	7.2	7.0		
22/05/2017	13.2	14.8	20.0	14.9	14.1	16.4		
23/05/2017	9.5	13.0	15.6	8.7	14.7	8.6		
24/05/2017	6.9	16.9	18.9	5.3	6.4	13.0		
25/05/2017	7.2	14.2	16.2	8.1	7.2	8.8		
26/05/2017	8.8	14.2	19.0	9.0	9.5	13.7		
27/05/2017	8.6	17.2	23.0	11.1	13.7	11.6		
28/05/2017	7.0	14.8	21.5	7.5	9.0	12.5		
29/05/2017	6.5	10.4	11.0	3.5	5.4	6.9		
30/05/2017	8.2	12.6	10.4	3.8	6.2	7.5		
31/05/2017	7.8	10.3	12.7	3.7	5.0	6.5		
1/06/2017	9.1	15.6	19.6	6.1	6.3	11.6		
2/06/2017	7.0	15.1	17.8	11.1	6.8	10.6		
3/06/2017	7.5	20.7	27.6	8.6	7.0	21.6		
4/06/2017	10.5	11.7	20.7	11.6	7.4	9.8		
5/06/2017	8.3	10.3	17.3	7.7	8.8	10.0		
6/06/2017	8.1	17.6	18.4	7.3	9.7	12.9		
7/06/2017	5.9	8.7	14.0	4.2	3.8	7.5		

Date	24-hour PM_{10}						Regulatory Criteria	
	DC09	DC02	DC04	DC05	DC06	Antiene	Short term (24-hour)	Long term (Annual Average)
8/06/2017	5.7	8.5	12.7	3.2	4.1	6.0		
9/06/2017	6.9	7.1	10.4	8.0	6.7	6.7		
10/06/2017	5.1	5.9	9.6	8.1	5.6	5.9		
11/06/2017	7.7	8.6	12.6	12.0	8.4	9.8		
12/06/2017	8.6	11.0	16.5	15.6	9.4	10.8		
13/06/2017	7.3	12.6	16.2	7.1	9.2	12.8		
14/06/2017	6.7	15.0	15.8	7.3	6.8	10.9		
15/06/2017	8.7	12.2	13.6	5.8	14.9	5.8		
16/06/2017	11.0	16.0	18.7	14.2	12.2	12.4		
17/06/2017	16.4	17.2	24.5	17.0	17.8	17.6		
18/06/2017	9.6	13.3	18.7	9.1	11.9	15.8		
19/06/2017	12.5	18.7	23.3	14.1	12.5	18.4	50	30
20/06/2017	5.9	12.4	17.6	9.3	6.7	13.7		
21/06/2017	6.9	15.1	19.0	6.8	5.3	12.3		
22/06/2017	13.8	15.1	18.3	16.1	15.4	11.3		
23/06/2017	7.5	17.5	21.4	6.8	8.4	13.6		
24/06/2017	12.1	18.2	19.6	8.1	9.6	12.7		
25/06/2017	16.2	15.5	15.4	10.1	8.6	13.3		
26/06/2017	7.1	13.2	17.7	8.8	8.1	9.8		
27/06/2017	18.2	22.8	26.6	21.7	15.2	18.7		
28/06/2017	19.6	16.8	19.8	12.5	15.9	14.2		
29/06/2017	3.0	6.0	10.7	2.7	7.2	5.5		
30/06/2017	6.7	8.5	14.8	3.7	7.6	5.1		
Mean	**14.2**	**17.5**	**18.5**	**10.4**	**13.2**	**13.9**		
Max	**64.8**	**76.1**	**53.0**	**40.2**	**37.8**	**41.9**		
Data Recovery %	**98%**	**99%**	**99%**	**97%**	**99%**	**93%**		
TSP	**35.4**	**43.8**	**46.2**	**25.9**	**33.1**	**34.9**		

Orange font shows 24hr average above 24hr average max level of 50ug/m^3.

Blank cells indicate no validated data was available.

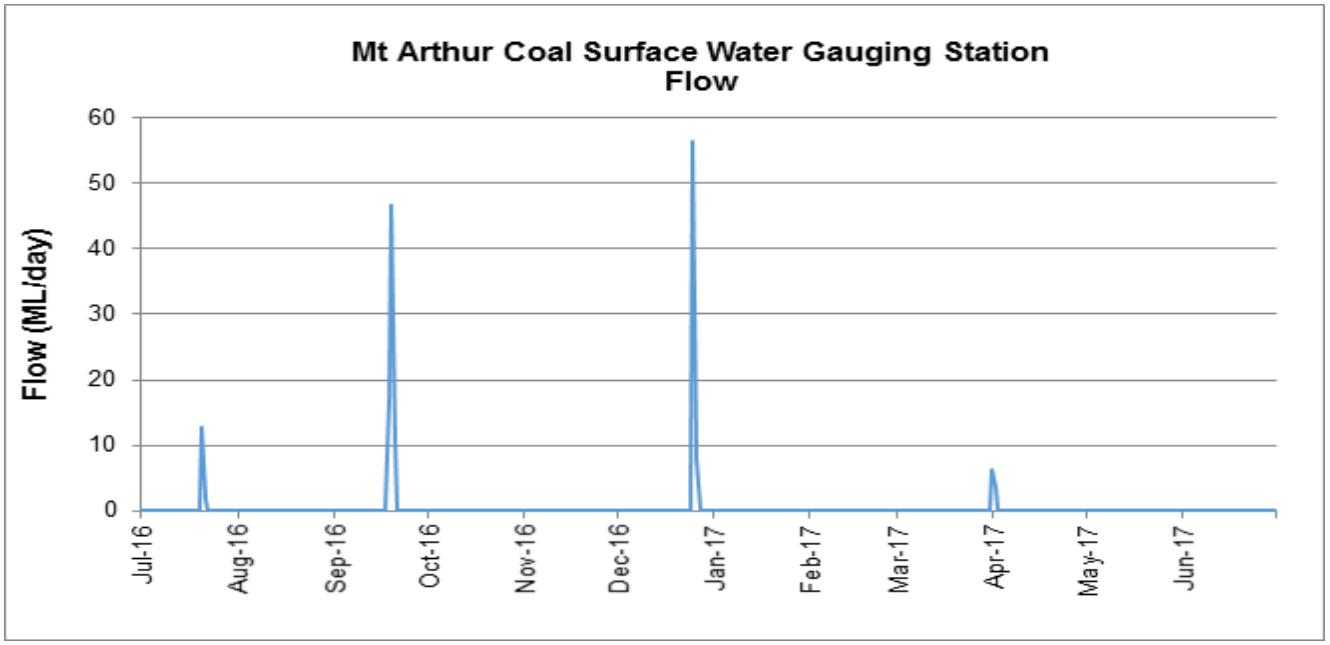
Appendix 2 - Surface Water Quality Monitoring Results

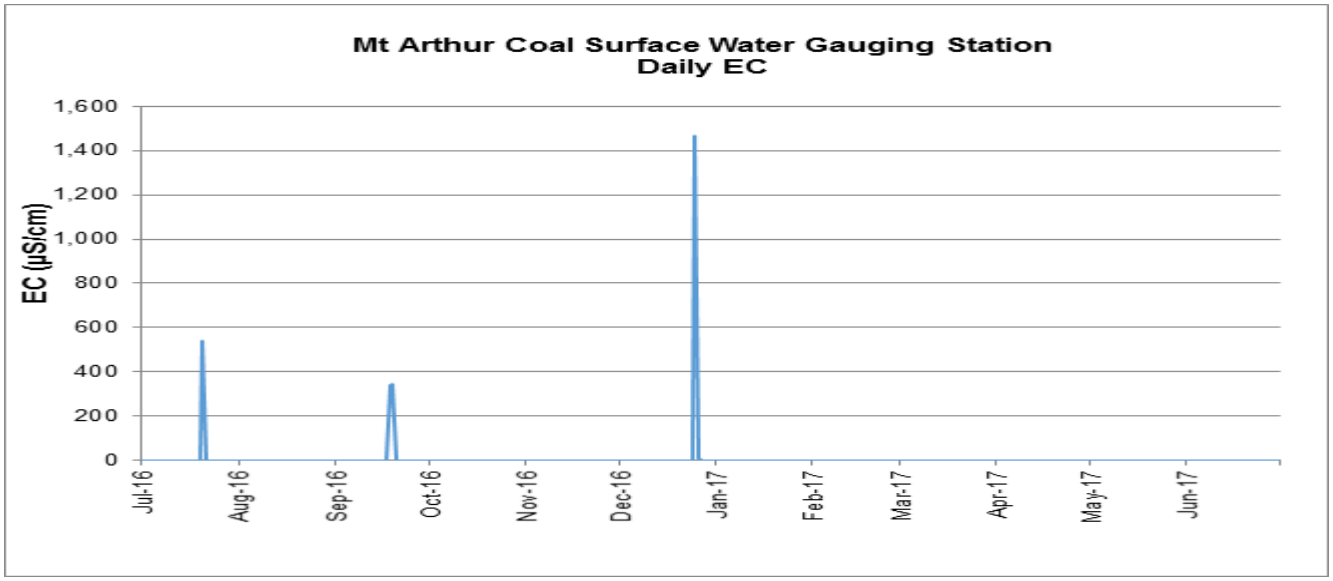
Surface Water Quality Results

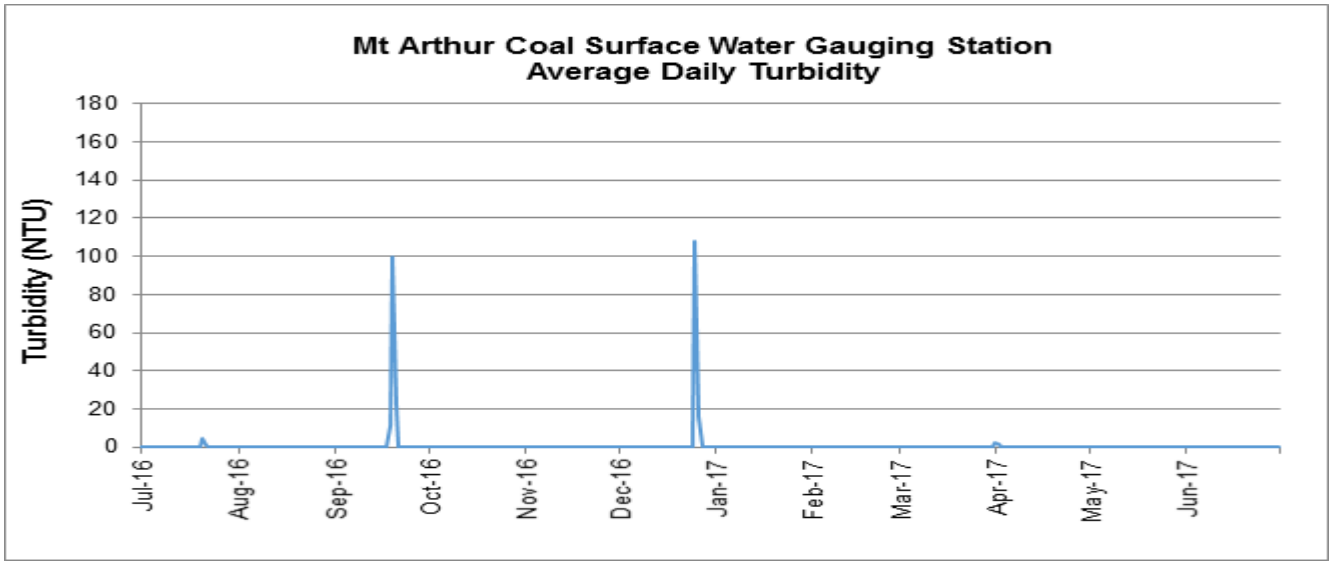
Site	Month	Date Sampled	Flow Notes	Field pH	Field EC (uS/cm)	TDS (mg/L)	TSS (mg/L)	Turbidity (NTU)	Sulfate (mg/L)	Dissolved Fe (mg/L)	Total Fe (mg/L)	Nitrate (mg/L)	O&G (mg/L)
SW2	Jul-16	12 & 13/7/2016	Dry										
	Aug-16	9 & 10/8/2016	Dry										
	Sep-16	13 & 14/9/ 2016	Still	7.41	5570	4390	21	5.7	2070	0.21	0.51	<0.01	<5
	Oct-16	18 & 19/10/2016	Still	7.29	5200	5300	10	7.7	2180	0.08	0.37	0.04	<5
	Nov-16	14/11/2016											
	Dec-16	12 & 13/12/2016											
	Jan-17	17 & 18/1/2017											
	Feb-17	13 & 14/2/2017											
	Mar-17	13 & 14/3/2017											
	Apr-17	10 & 11/4/2017	Still	7.02	3430	2460	56	27.4	949	0.07	1.26	0.04	<5
	May-17	16 & 17/5/2017											
	Jun-17	13/06/2017											
	Impact Assessment Criteria Trigger Values		**Stage 1 trigger**	**6.5-9.0**	**12,365**	**219**							
			Stage 2 trigger		**13,900**	**277**							
SW3	Jul-16	12 & 13/7/2016	Still	8.18	5850	3590	<5	0.5	394	<0.05	<0.05	<0.01	<5
	Aug-16	9 & 10/8/2016	Still	8.11	3590	2120	<5	1.3	203	<0.05	0.1	<0.01	<5
	Sep-16	13 & 14/9/ 2016	Still	8.05	5240	3160	<5	0.8	330	<0.05	0.08	<0.01	<5
	Oct-16	18 & 19/10/2016	Still	7.62	2200	1490	<5	1.4	188	0.06	0.12	0.02	<5
	Nov-16	14/11/2016	Still	7.57	4020	2440	10	2.4	251	<0.05	0.22	<0.01	165
	Dec-16	12 & 13/12/2016	Still	7.57	4780	2670	<5	2.8	303	<0.05	0.21	<0.01	<5
	Jan-17	17 & 18/1/2017	Still	7.53	2130	1440	11	1.4	346	0.09	0.3	<0.01	<5
	Feb-17	13 & 14/2/2017	Still	7.47	2650	1620	11	1.7	343	0.06	0.14	<0.01	<5
	Mar-17	13 & 14/3/2017	Still	7.36	3560	2300	<5	2.7	375	0.06	0.2	0.04	<5
	Apr-17	10 & 11/4/2017	Still	7.5	4140	2840	10	1.4	382	0.16	0.33	<0.01	<5
	May-17	16 & 17/5/2017	Still	7.72	4630	2750	8	1.9	468	0.09	0.64	<0.01	<5
	Jun-17	13/06/2017	Still	8.19	4850	3180	<5	1	549	<0.05	0.2	0.02	<5
	Impact Assessment Criteria Trigger Values		**Stage 1 trigger**	**6.5-9.0**	**10,133**	**37**							
			Stage 2 trigger		**11,402**	**46**							
SW4	Jul-16	12 & 13/7/2016	Trickle	8.4	9850	5220	<5	1	362	<0.05	0.07	<0.01	<5
	Aug-16	9 & 10/8/2016	Trickle	8.23	8240	4890	<5	0.8	316	<0.05	0.06	<0.01	<5
	Sep-16	13 & 14/9/ 2016	Trickle	8.22	7530	4180	<5	1.5	304	<0.05	0.08	0.03	<5
	Oct-16	18 & 19/10/2016	Trickle	8.37	6740	4530	<5	1.6	257	0.06	0.11	0.02	<5
	Nov-16	14/11/2016	Trickle	8.43	7200	4040	8	2.2	258	<0.05	0.06	0.03	<5
	Dec-16	12 & 13/12/2016	Still	8.24	7630	3660	6	4.5	298	<0.05	0.1	0.87	<5
	Jan-17	17 & 18/1/2017	Still	8.46	8040	5070	<5	1.3	260	<0.05	<0.05	<0.01	<5
	Feb-17	13 & 14/2/2017	Still	8.64	9470	5290	<5	3.4	300	<0.05	0.06	<0.01	<5
	Mar-17	13 & 14/3/2017	Still	8.26	9530	6140	8	3.9	419	<0.05	0.06	<0.01	<5
	Apr-17	10 & 11/4/2017	Still	8.21	10730	6760	22	6.1	774	0.14	0.31	<0.01	<5
	May-17	16 & 17/5/2017	Still	8.07	11650	7630	<5	1.7	908	0.09	0.28	<0.01	<5
	Jun-17	13/06/2017	Still	8.29	11310	7430	<5	1.3	912	<0.05	0.12	<0.01	<5
	Impact Assessment Criteria Trigger Values		**Stage 1 trigger**	**6.5-9.0**	**13,959**	**82**							
			Stage 2 trigger		**15,509**	**104**							
SW12	Jul-16	12 & 13/7/2016	Trickle	7.5	6010	4690	5	1.5	1870	<0.05	0.17	<0.01	15
	Aug-16	9 & 10/8/2016	Still	7.37	5560	3920	<5	1	1250	<0.05	0.13	<0.01	<5
	Sep-16	13 & 14/9/ 2016	Slow	7.35	6240	4420	<5	1.8	1340	<0.05	0.17	0.04	<5
	Oct-16	18 & 19/10/2016	Still	7.43	4940	4030	<5	1.6	933	<0.05	0.19	<0.01	<5
	Nov-16	14/11/2016	Trickle	7.69	2750	1720	10	6.2	422	<0.05	0.2	<0.01	<5
	Dec-16	12 & 13/12/2016	Still	7.42	5840	3220	11	5.5	901	<0.05	0.32	0.05	<5
	Jan-17	17 & 18/1/2017	Still	7.77	2820	1940	21	3.3	408	0.06	0.38	<0.01	<5
	Feb-17	13 & 14/2/2017	Still	7.85	3600	2330	12	2.8	439	0.07	0.12	<0.01	<5
	Mar-17	13 & 14/3/2017	Still	7.7	4630	3360	64	24.6	900	0.08	0.25	<0.01	10
	Apr-17	10 & 11/4/2017	Still	7.83	3330	2320	13	1.5	658	0.06	0.26	0.01	<5
	May-17	16 & 17/5/2017	Still	7.41	4750	3220	6	1.6	963	<0.05	0.16	0.05	<5
	Jun-17	13/06/2017	Still	7.54	4970	3570	6	1	915	<0.05	0.1	<0.01	<5
	Impact Assessment Criteria Trigger Values		**Stage 1 trigger**	**6.5-9.0**	**6,659**	**555**							
			Stage 2 trigger		**7,153**	**708**							
SW15	Jul-16	12 & 13/7/2016	Dam	7.58	1444	849	<5	1.9	258	0.1	0.28	<0.01	<5
	Aug-16	9 & 10/8/2016	Dam	7.62	954	562	10	6.5	178	0.13	0.57	<0.01	<5
	Sep-16	13 & 14/9/ 2016	Dam	7.62	1100	641	<5	5.9	209	<0.05	0.67	<0.01	<5
	Oct-16	18 & 19/10/2016	Dam	7.7	1122	780	<5	2.2	195	0.08	0.31	<0.01	<5
	Nov-16	14/11/2016	Dam	8.39	953	472	8	15.6	194	0.09	0.48	0.35	9
	Dec-16	12 & 13/12/2016	Dam	7.64	1729	1060	18	12.1	283	0.09	0.2	0.01	<5
	Jan-17	17 & 18/1/2017											
	Feb-17	13 & 14/2/2017											
	Mar-17	13 & 14/3/2017											
	Apr-17	10 & 11/4/2017	Dam	8.19	549	372	14	1.8	36	0.28	0.69	<0.01	<5
	May-17	16 & 17/5/2017	Dam	7.63	838	483	<5	1.2	29	0.2	0.39	<0.01	<5
	Jun-17	13/06/2017	Dam	7.99	1032	612	5	1.6	33	0.3	0.47	<0.01	<5
	Impact Assessment Criteria Trigger Values		**Stage 1 trigger**	**6.5-9.0**	**7,128**	**103**							
			Stage 2 trigger		**8,262**	**130**							

Unable to sample due to low water level

Saddlers Creek Surface Water Flow Plots







Appendix 3 - Ground Water Monitoring Results

Statutory bore, groundwater level and drawdown data

Bore ID	Easting	Northing	Elv.[1] collar mAHD 2014 survey	Total depth bore (m)	Target formation	WMP triggers	2005StartHead	MAC consolidation project 2017 modelled head (mbgl)	MAC consolidation project 2017 modelled head (mAHD)	Date first GWL record	First record depth to GWL (mBC)	First record GWL (mAHD)	June 2016 depth to GWL (mBC)	June 2016 GWL (mAHD)	May 2017 depth to GWL (mBC)	May 2017 GWL (mAHD)	Diff. 2017 modelled head versus May 2017 measured (m)[2]	Measured drawdown (m) - first record versus June 2017 [3]	Measured drawdown (m) - first record versus modelled June 2017	2016-2017 measured draw-down[4]
GW2	299044.92	6413510.7	153.92	113	Woodlands Hill	145.4	144.36	-0.44	144.80	Jun-01	7.5	146.4	8.9	145.02	9.1	144.82	0.03	1.58	1.61	0.2
GW3	298855.8	6413389.4	151.56	120.4	Woodlands Hill	145.3	143.65	0.4	143.25	Aug-01	5.3	146.3	6.1	145.46	6.4	145.16	1.91	1.14	3.05	0.3
GW6	294227.05	6418579.2	198.49	27.1	Glen Munro	165.5	189.47	61	128.47	Feb-96	19.8	178.7	25.4	173.09	26.1	172.39	43.92	6.31	50.23	0.7
GW7	295635.41	6419594.5	214.65	48.8	Woodlands Hill	134.1	177.18	7.95	169.23	Jul-99	41	173.7	41.7	172.95	41.35	173.3	4.07	0.4	4.47	-0.35
GW8	296991.44	6419491.1	207.63	-	NA	118.4	178.51	31.97	146.54	Feb-99	18	189.6	80.8	126.83	98.8	108.83	-37.71	80.77	43.06	18
GW16	294197.18	6422759.3	132.22	13.3	Alluvium	121.8	123.45	0.51	122.94	Feb-99	9.2	123	9.4	122.82	9.47	122.75	-0.19	0.25	0.06	0.07
GW21	296141.35	6424483	136.03	15.8	Alluvium	126.4	127.86	0.6	127.26	Feb-99	8.6	127.4	9.7	126.33	9.78	126.25	-1.01	1.15	0.14	0.08
GW22*	296929.99	6423998.4	154.36	91.2	Ramrod Creek	88.2	135.51	18.81	116.70	May-99	15.2	139.2	80.6	73.76		154.36	37.66	-15.16	22.50	-80.6
GW23	297919.37	6424514.9	181.7	54.6	Ramrod Creek	132.5	136.23	6.69	129.54	Feb-99	42.3	139.4	50.8	130.9	49.75	131.95	2.41	7.45	9.86	-1.05
GW25	298375.73	6425230.8	140.43	13.7	Alluvium	120	134.49	0.67	133.82	Feb-99	9.6	130.8	10.1	130.33	9.81	130.62	-3.20	0.18	-3.02	-0.29
GW26	301841.28	6418791.9	234.8	93.1	West Cut Tails	-	-	N/A	N/A	Feb-04	69	165.8	49.2	185.6	51.46	183.34	Outside model	-17.54	Outside model	2.26
GW27	301862.79	6418412.2	236.42	115.5	West Cut Tails	-	-	N/A	N/A	May-04	71	165.4	49.2	187.22	52	184.42	Outside model	-19.02	Outside model	2.8
GW38A	293831.43	6422377	131.57	20.6	Alluvium	121.9	123.64	0.39	123.25	Jan-08	8.7	122.9	9.5	122.07	9.51	122.06	-1.19	0.84	-0.35	0.01
GW38P	293831.7	6422384.1	131.58	32.6	Warkworth	121	123.62	0.4	123.22	Jan-08	9.5	122	10.1	121.48	10.23	121.35	-1.87	0.65	-1.22	0.13
GW39A	293094.34	6422248.3	130.68	10.4	Alluvium	120.8	123.91	0.29	123.62	Jan-08	8.9	121.8	9.2	121.48	9.2	121.48	-2.14	0.32	-1.82	0
GW39P	293094.7	6422250.9	130.4	42.7	Warkworth	120.9	123.91	0.29	123.62	Jan-08	8.5	121.9	10	120.4	10.33	120.07	-3.55	1.83	-1.72	0.33
GW40A	291815.48	6422119.3	129.35	13.8	Alluvium	118.7	122.41	0.1	122.31	Jan-08	9.6	119.7	10.3	119.05	10.21	119.14	-3.17	0.56	-2.61	-0.09
GW41A	290354.29	6421788.5	126.48	11.6	Alluvium	118.7	119.70	-0.07	119.77	Jan-08	6.8	119.7	7.2	119.28	7.2	119.28	-0.49	0.42	-0.07	0
GW45	298889.71	6413629.5	-	15	Alluvium	-	-	0.18		Feb-16	8.43	-	10.08	-	10.52	-	-	2.09	-	0.44
GW46	298336.76	6413469.3	-	21	Alluvium	-	-	0.82		Feb-16	6.91	-	7.27	-	7.46	-	-	0.55	-	0.19
GW47	297408.76	6412974.1	-	18	Alluvium	-	-	-0.26		Feb-16	6.41	-	6.74	-	6.84	-	-	0.43	-	0.1
OD1078*	294495.47	6419259.3	171.32	63	Arrowfield	-	166.24	-3.81	170.05	Jan-08	7.3	164.1	6.8	164.52	22.5	148.82	-21.23	15.28	-5.95	15.7
OD1078-piezo	294495.47	6419259.3	171.38	82.8	Bowfield	142.3	166.24	-3.81	170.05	Jan-08	18.5	152.9	26.1	145.28	29	142.38	-27.67	10.52	-17.15	2.9
OD1079*	295956.29	6416426.9	227.2	NA	NA	-	214.46	102.6	111.86	Oct-14	31.89	195.3	41.8	185.4	39.2	188	76.14	7.3	83.44	-2.6
OD1079-piezo	295956.29	6416426.9	227.34	87.2	Glen Munro	158.7	214.46	102.6	111.86	Jan-08	51.7	175.7	55.9	171.44	55.8	171.54	59.68	4.16	63.84	-0.1
BCGW05	291052.66	6410763.6	139.91	16.7	Glen Munro	-	137.87	1.85	136.02	Jan-08	13.5	126.4	NM	NM	NM	NM	NM	NM	NM	NM
BCGW10	293115.4	6414781	185.43	65.4	Woodlands Hill	-	182.01	51.76	130.25	Jan-08	7.1	178.3	NM	NM	NM	NM	NM	NM	NM	NM
BCGW11	293117.47	6414779.4	185.8	39.1	Glen Munro	-	182.01	51.76	130.25	Jan-08	7.3	178.5	NM	NM	NM	NM	NM	NM	NM	NM
BCGW12	293142.78	6414688.5	182.86	43.9	Glen Munro	-	180.03	54.61	125.42	Jan-08	8.3	174.5	NM	NM	NM	NM	NM	NM	NM	NM
BCGW15	290716.63	6412432.5	161.38	36.7	Glen Munro	-	176.61	1.85	174.76	Jan-08	14.1	147.2	NM	NM	NM	NM	NM	NM	NM	NM
BCGW18	294345.19	6419985.4	158.79	11.3	Arrowfield	142.7	156.68	-1.17	157.85	Jan-08	3.9	154.9	6.9	151.89	7.96	150.83	-7.02	4.07	-2.95	1.06

Bore ID	Easting	Northing	Elv.[1] collar mAHD 2014 survey	Total depth bore (m)	Target formation	WMP triggers	2005StartHead	MAC con-solidation project 2017 modelled head (mbgl)	MAC con-solidation project 2017 modelled head (mAHD)	Date first GWL record	First record depth to GWL (mBC)	First record GWL (mAHD)	June 2016 depth to GWL (mBC)	June 2016 GWL (mAHD)	May 2017 depth to GWL (mBC)	May 2017 GWL (mAHD)	Diff. 2017 modelled head versus May 2017 measured (m)[2]	Measured drawdown (m) - first record versus June 2017 [3]	Measured drawdown (m) - first record versus modelled June 2017	2016-2017 measured draw-down[4]
BCGW19	292461.91	6419151.8	187.43	8.4	Glen Munro	174.4	191.41	75.4	116.01	Jan-08	5.6	181.8	6.1	181.33	6.5	180.93	64.92	0.87	65.79	0.4
BCGW22*	295304.16	6414210.9	143.91	37.9	Glen Munro	128.8	150.02	85.12	64.90	Jan-08	4	139.9	3.9	140.01	3.82	140.09	75.19	-0.19	75.00	-0.08
EWPC33	294252.7	6416847.1	230.34	57.4	Blakefield	176.2	222.90	126.36	96.54	Jan-08	34.3	196	32.6	197.74	32.81	197.53	100.99	-1.53	99.46	0.21
VWP1 P1	295166.64	6423380.8	135.46	204.5	Edinglassie	96.1	-	12.04	-	Sep-11	23.6	111.9	61.18	74.28	69.12	66.34	-	45.56	-	7.94
VWP2 P1	295194.77	6423364.1	135.41	216.5	F4 Fault	70.4	-	12.79	-	Aug-11	47.7	87.7	90.64	44.77	93.91	41.5	-	46.2	-	3.27
VWP3 P1	295165.89	6423349.4	135.38	227	Edinglassie	88.5	-	12.57	-	Sep-11	29.8	105.6	77.56	57.82	88.58	46.8	-	58.8	-	11.02
VWP3 P2	295165.89	6423349.4	135.38	241	Ramrod Creek	85	-	12.57	-	Sep-11	33.3	102.1	86.78	48.6	92.03	43.35	-	58.75	-	5.25

Table 3.1 Statutory bore, groundwater level and drawdown data

Notes: *[1] Elv. – elevation; mAHD metres Australian Height Datum; GWL – groundwater level; mBC – metres below collar elevation.*

[2] Negative values indicate the measured piezometric level is higher than modelled – this means the model is over-predicting effects at this site for FY17.

[3] Negative values indicate drawdown.

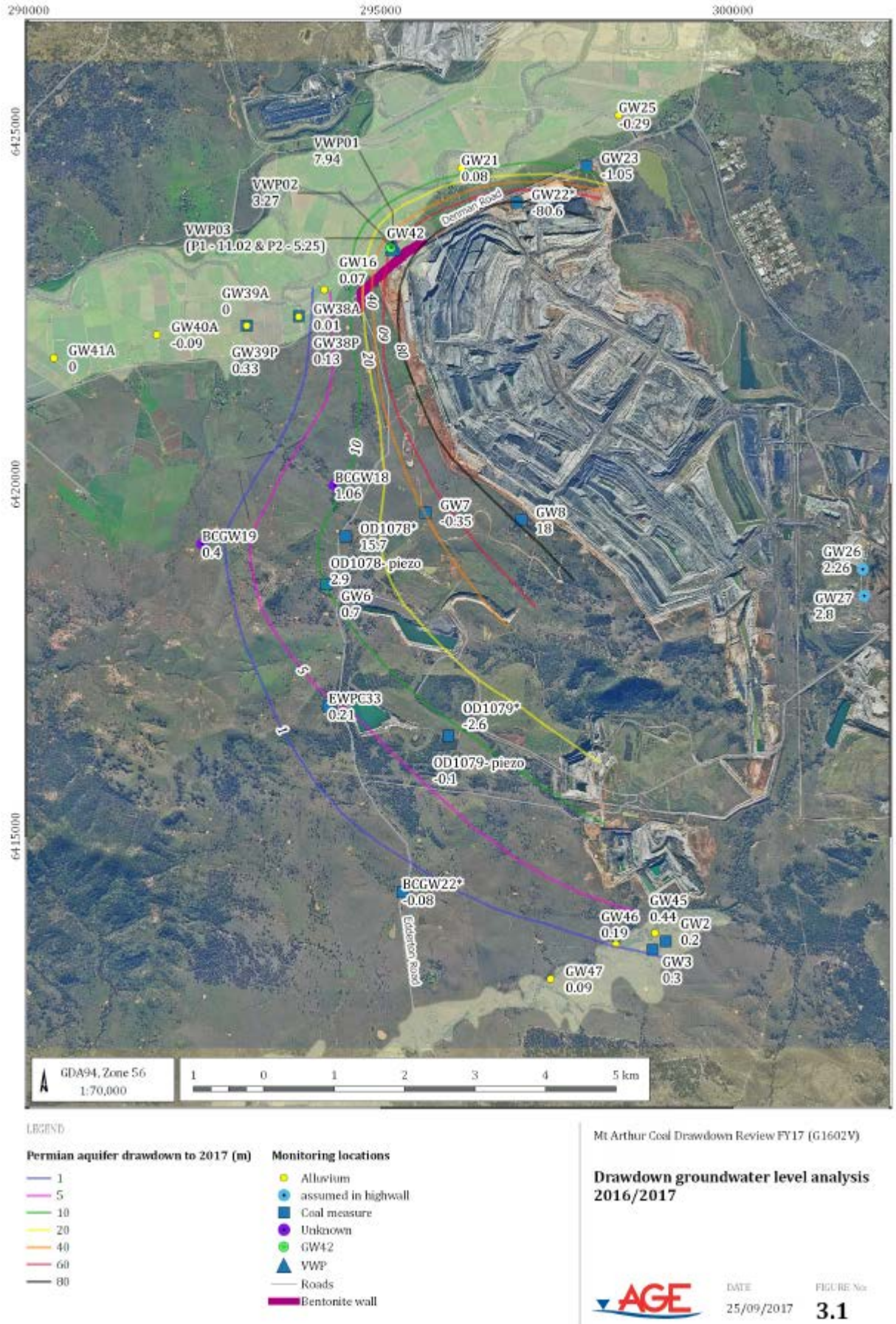
[4] Negative values indicate drawdown over the last year.

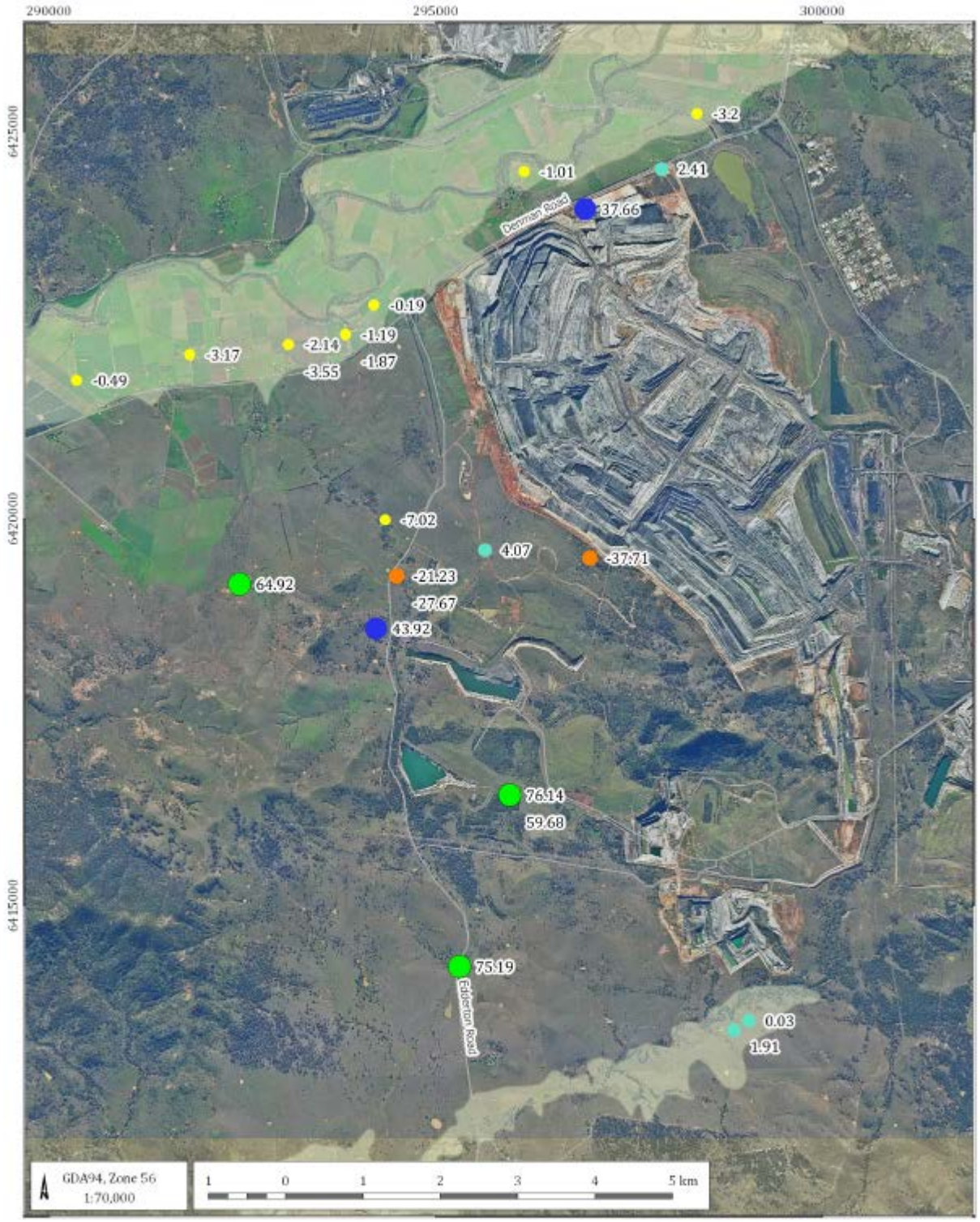
** Monitoring bores removed from monitoring program or decommissioned in FY16 – last recorded reading presented.*

NA – Data not available.

NM – Monitoring bore not measured in FY15 – access denied by landowner.

Groundwater drawdown contours and heads (modelled vs measured)





LEGEND

2017 modelled versus measured heads (m)

- -150 - -50
- -50 - -15
- -15 - 0
- 0 - 15
- 15 - 50
- 50 - 100

Mt Arthur Coal Drawdown Review FY16 (G1602V)

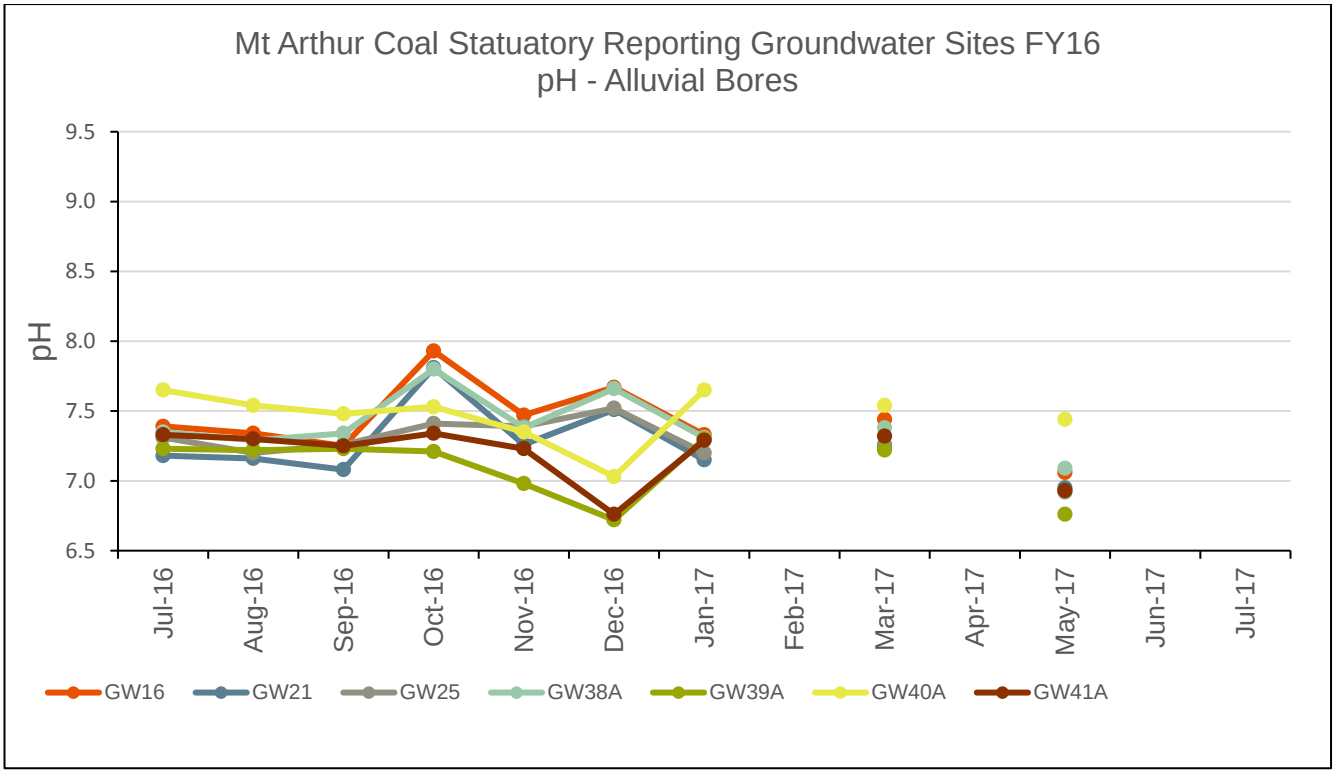
Consolidation report modelled FY17 heads versus measured heads

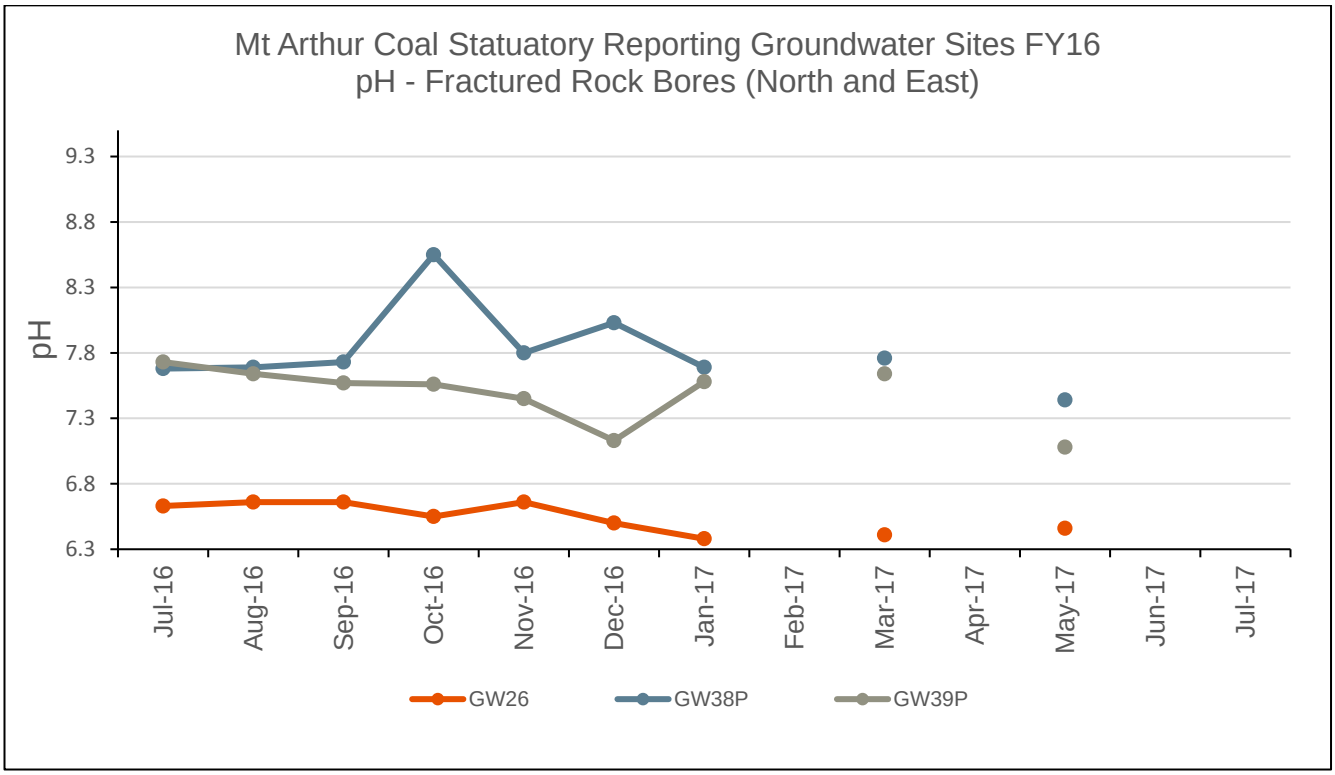
AGE

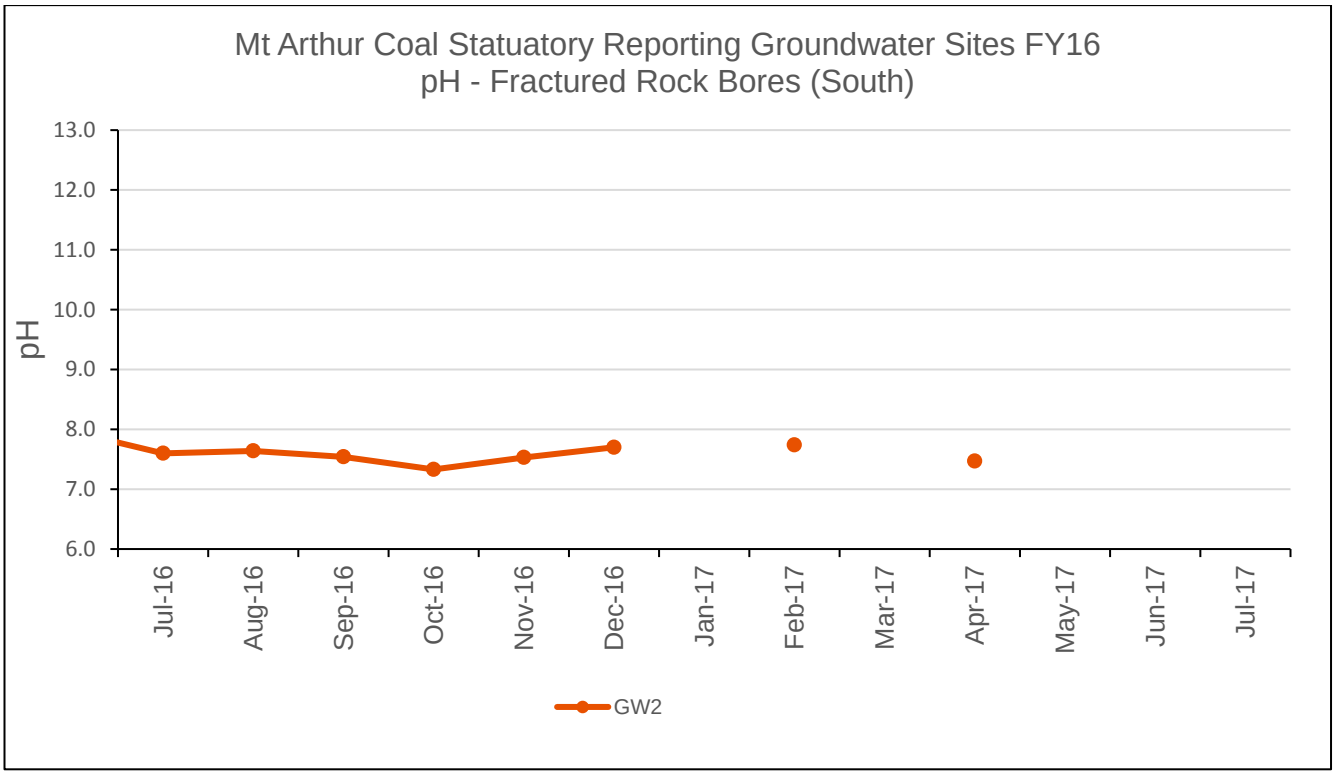
DATE 26/09/2017

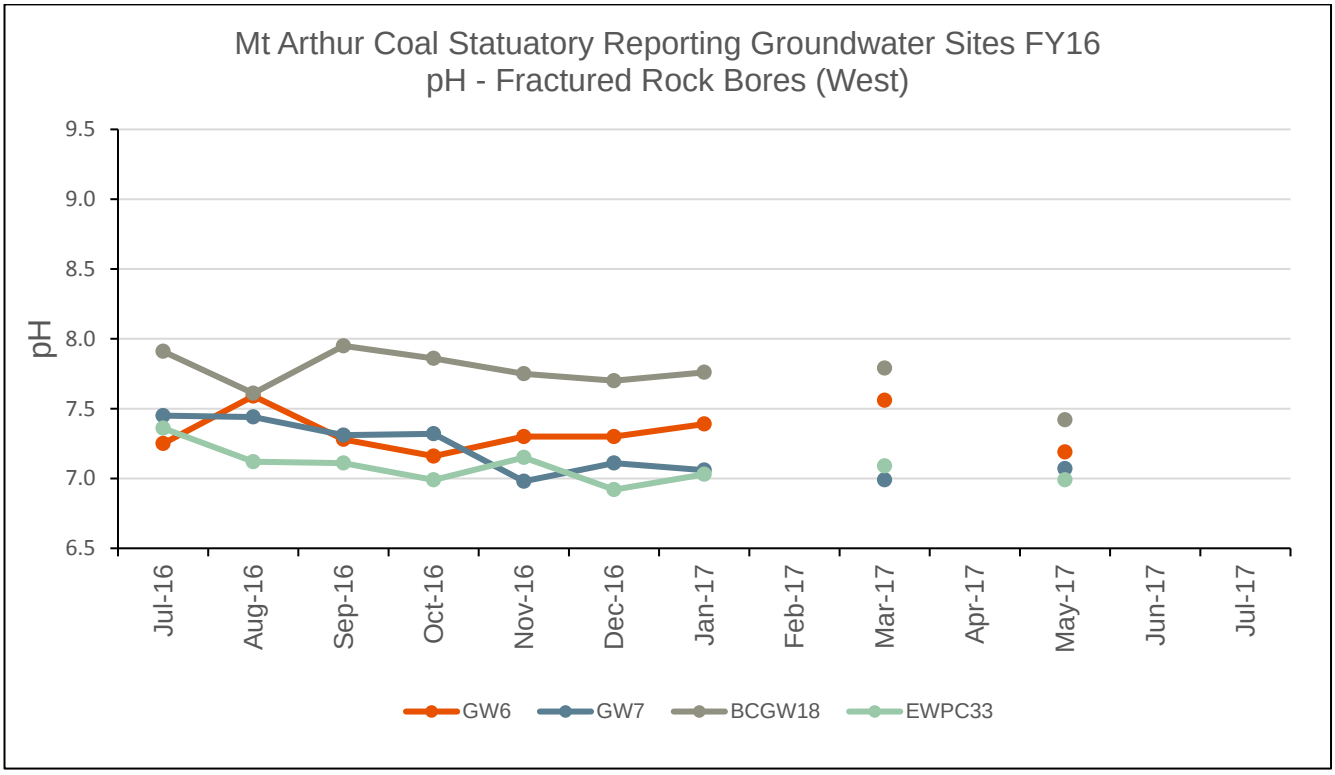
FIGURE No: **3.2**

Groundwater quality plots (pH)

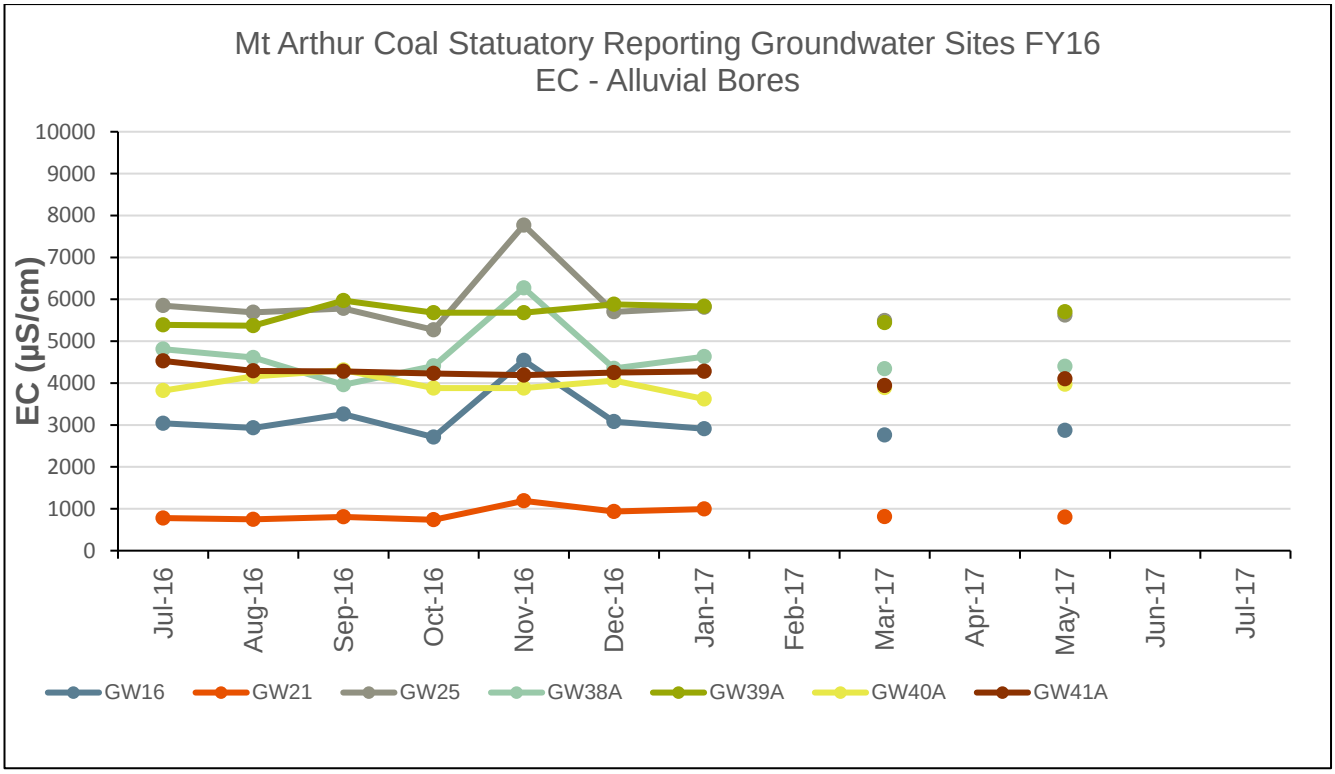


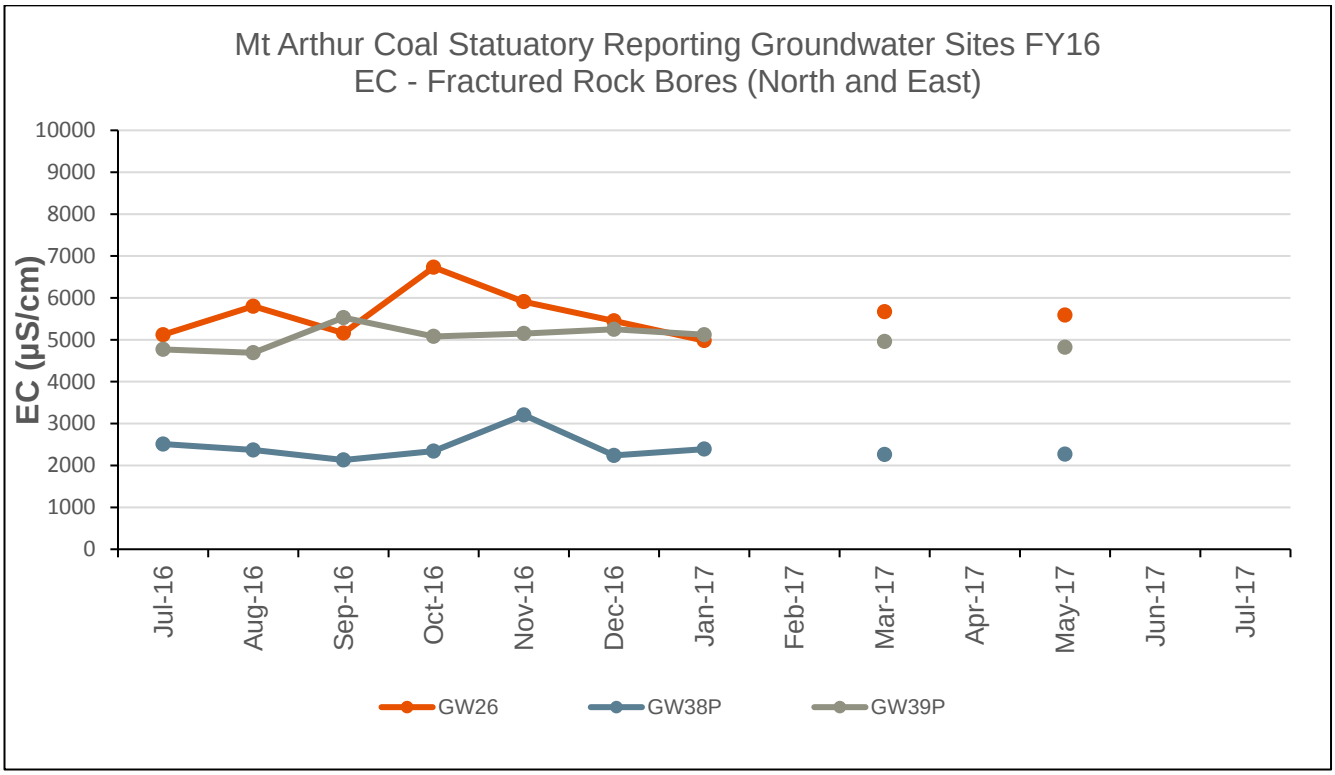


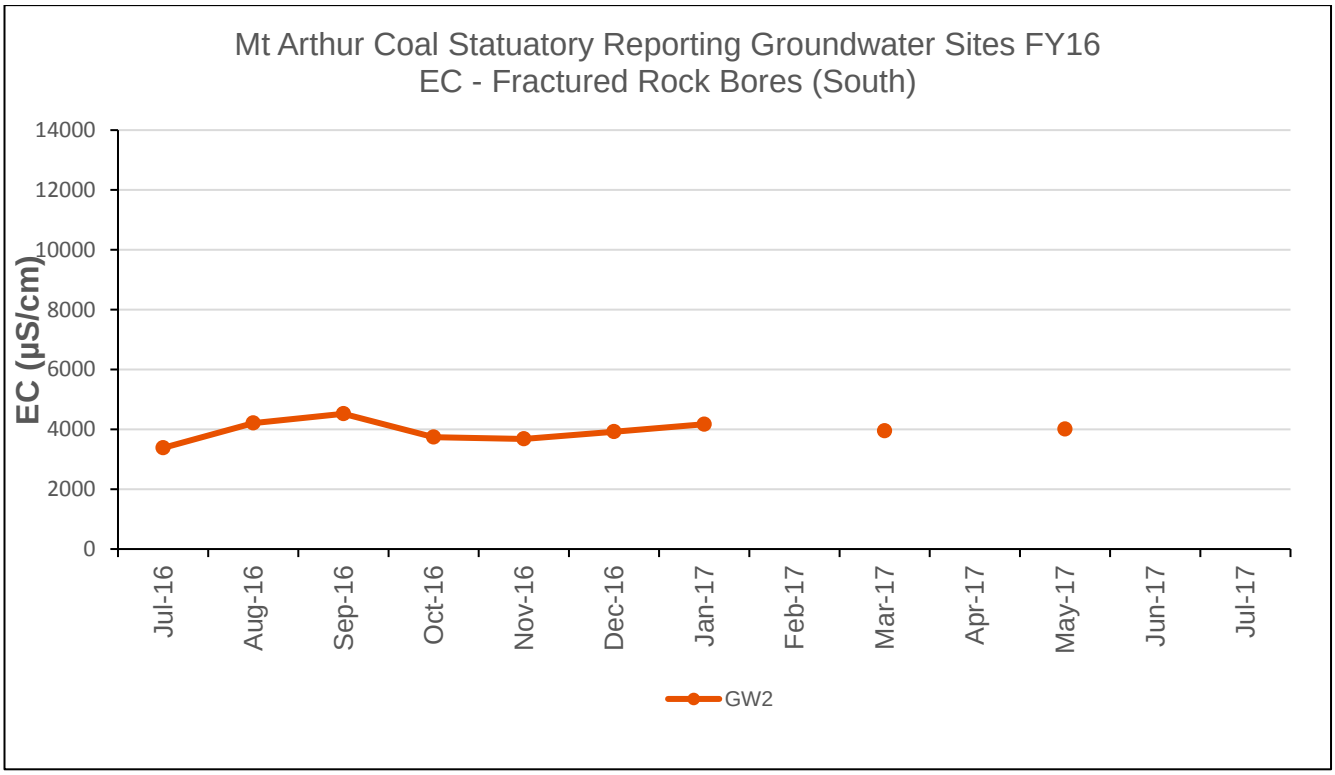

Mt Arthur Coal Statuatory Reporting Groundwater Sites FY16
pH - Fractured Rock Bores (South)
pH
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
GW2

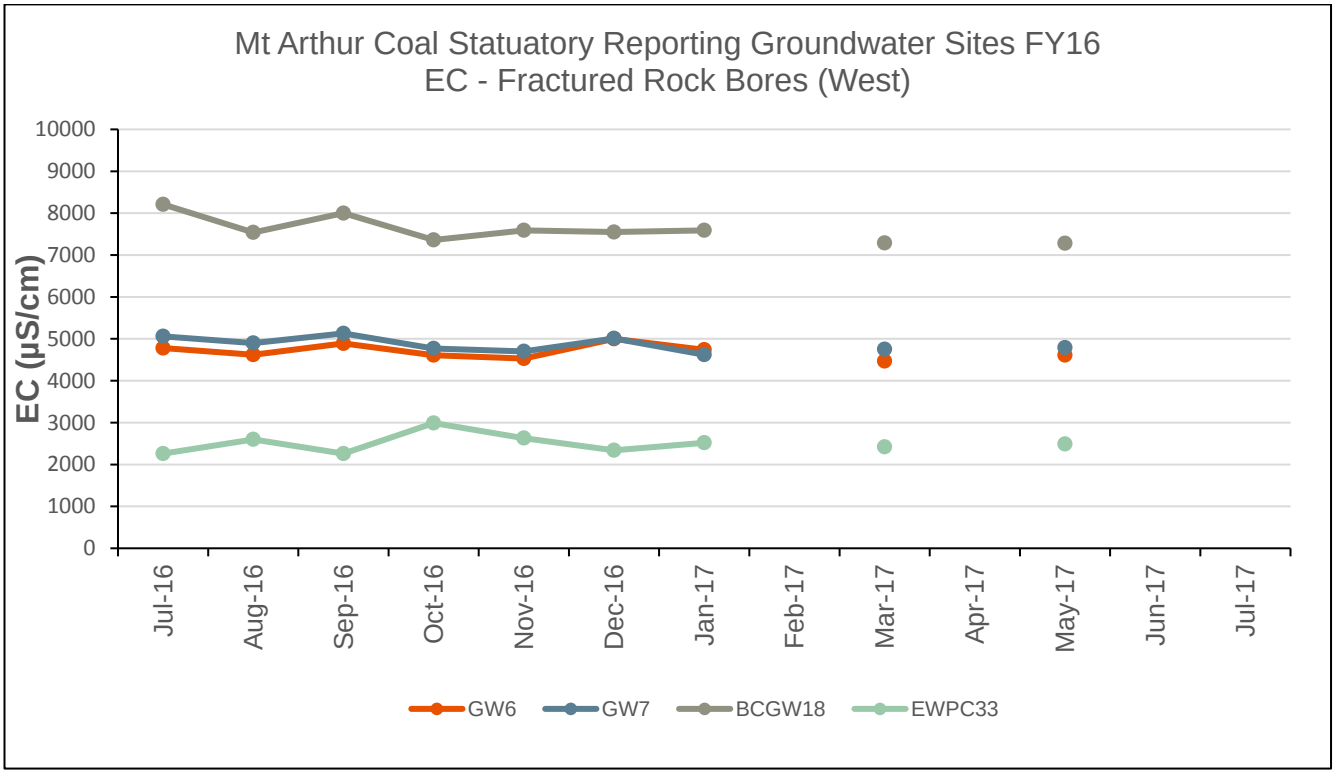

Mt Arthur Coal Statuatory Reporting Groundwater Sites FY16
pH - Fractured Rock Bores (West)
pH
9.5
9.0
8.5
8.0
7.5
7.0
6.5
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
GW6
GW7
BCGW18
EWPC33

Groundwater quality plots (EC)






Mt Arthur Coal Statuatory Reporting Groundwater Sites FY16
EC - Fractured Rock Bores (South)
EC (µS/cm)
14000
12000
10000
8000
6000
4000
2000
0
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
GW2


Mt Arthur Coal Statuatory Reporting Groundwater Sites FY16
EC - Fractured Rock Bores (West)
EC (µS/cm)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
Jul-16
Aug-16
Sep-16
Oct-16
Nov-16
Dec-16
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
GW6
GW7
BCGW18
EWPC33

Appendix 4 - Community Complaints

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
July	14/07/2016	14:13	Roxburgh Road	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
	15/07/2016	22:03	Skellatar Stock Route	Lighting	Community Response Line	Investigation revealed location of lights, which were turned off or redirected. Caller did not request to be called back regarding investigation results.
	15/07/2016	23:41	Muswellbrook	Lighting	Community Response Line	Investigation revealed location of lights, which were turned off or redirected. Caller did not request to be called back regarding investigation results.
	16/07/2016	17:20	Denman Road	General Dust	Community Response Line	Investigation revealed mining operations had already ceased at the time. Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller did not request to be called back regarding investigation and monitoring results.
	16/07/2016	20:09	Muswellbrook	Lighting	Community Response Line	Investigation revealed location of lights, which were turned off or redirected. Caller did not request to be called back regarding investigation results.
	25/07/2016	15:40	Denman Road	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
	25/07/2016	16:10	Muswellbrook	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
	30/07/2016	19:11	Muswellbrook	Lighting	Community Response Line	Investigation revealed location of lights, which were turned off or redirected. Caller did not request to be called back regarding investigation results.
	31/07/2016	19:39	Muswellbrook	Lighting	Community Response Line	Investigation revealed no offending lights upon inspection. Caller did not request to be called back regarding investigation results.
August	2/08/2016	12:17	Roxburgh Road	Blast Fume	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller was advised of investigation and monitoring results.

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
	10/08/2016	14:03	Muswellbrook	General Dust	Community Response Line	Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller did not request to be called back regarding investigation and monitoring results.
	10/08/2016	14:15	Racecourse Road	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller was advised of investigation and monitoring results.
	12/08/2016	18:10	Roxburgh Road	Lighting	Community Response Line	Investigation revealed location of lights, which were turned off or redirected. Caller did not request to be called back regarding investigation results.
	18/08/2016	16:15	Muswellbrook	General Dust	Community Response Line	Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller was advised of investigation and monitoring results.
	28/08/2016	21:00	Muswellbrook	Lighting	Community Response Line	Investigation revealed no issue with lighting.
	28/08/2016	21:00	Muswellbrook	Lighting	Community Response Line	Investigation revealed no issue with lighting.
September	5/09/2016	22:12	Muswellbrook	Lighting	Community Response Line	Investigation revealed no issue with lighting. Additionally the phone number provided did not match the callers name - therefore we believe this was not a genuine complaint
	9/09/2016	12:11	Skellatar Stock Route	Blast Fume	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller was advised of investigation and monitoring results.
	15/09/2016	11:08	Denman Road	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller did not request to be called back regarding investigation and monitoring results.

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
	28/09/2016	17:35	Denman Road	Blast Fume	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated fume, overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
October	7/10/2016	14:20	Muswellbrook	General Dust	Community Response Line	Investigation revealed no issue with dust. Additionally the phone number provided was disconnected or false - therefore we believe this was not a genuine complaint.
	8/10/2016	8:52	Roxburgh Road	General Dust	Community Response Line	Investigation revealed mining operations had already ceased at the time. Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria. Caller was advised of investigation and monitoring results.
	10/10/2016	14:19	Muswellbrook	General Dust	Community Response Line	Investigation revealed no issue with dust. Additionally the phone number provided was disconnected or false - therefore we believe this was not a genuine complaint.
	12/10/2016	10:36	Muswellbrook	General Dust	Community Response Line	Investigation revealed no issue with dust. Additionally the phone number provided was disconnected or false - therefore we believe this was not a genuine complaint.
November	17/11/2016	19:25	Denman Road	General Dust	Community Response Line	Investigation revealed no issue with dust. Additionally the phone number provided was disconnected or false - therefore we believe this was not a genuine complaint.
	28/11/2016	11:34	Muswellbrook	General Dust	Regulator	Received from the NSW Environment Protection Authority on behalf of a resident. Investigation revealed mining operations had already ceased at the time. Results at the nearest monitor indicated the 24 hour average remained within regulatory criteria. The Authority was advised of investigation and monitoring results.
December	1/12/2016	12:40	Muswellbrook	Blast Vibration	Other	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
	1/12/2016	13:04	Roxburgh Road	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
	10/12/2016	15:52	Other	General Dust	Community Response Line	Investigation revealed no issue with dust. Additionally the phone number provided was disconnected or false - therefore we believe this was not a genuine complaint
	20/12/2016	9:45	Other	General Dust	Community Response Line	Investigation revealed no issue with dust. Additionally the phone number provided was disconnected or false - therefore we believe this was not a genuine complaint

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
	21/12/2016	13:02	Thomas Mitchell Drive	General Dust	Community Response Line	Investigation revealed mining operations had already ceased at the time. Results at the nearest monitor indicated dust levels were not elevated at the time, and the 24 hour average remained within regulatory criteria.
January	1/01/2017	11.10pm	Muswellbrook	Noise	Community Response Line	Investigation revealed noise levels are within limits. Caller was advised of investigation and monitoring results.
	9/01/2017	3.30pm	Denman Rd	Blast Vibration	Community Response Line	Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of investigation and monitoring results.
	9/01/2017	3.23am	Roxburgh	Noise	Community Response Line	Investigation revealed MAC was not the source of the noise which was within limits. Caller was advised of investigation and monitoring results.
	11/01/2017	11.59am	Denman Rd	Blast	Community Response Line	Caller noted they did not hear or see the blast. Just rattled the house. Investigation indicated overpressure noise and ground vibration levels were within regulatory criteria. Caller was advised of results of investigation.
	11/01/2017	3.32pm	Muswellbrook	General Dust	Community Response Line	Amended dumping operations and continued to monitor. Caller was advised of operational change and monitoring results.
	12/01/2017	3.42pm	Muswellbrook	General Dust	Community Response Line	Caller noted dust near the Denman Road area. Advised caller that Mt Arthur Coal had recently blasted and an investigation was underway. Asked caller whether a follow up call was sought. Caller declined.
	12/01/2017	3:30pm	Other	General Dust	Third Party	Letter received from Third Party on Friday 13 January asking for investigation into dust emitting from site. Investigation reported in a reply letter to Third Party determined MAC fired two blasts, the first at 3:24pm, the second around 3:30pm. Normal mining operations also were continuing. Blasts were carried out in accordance with regulatory criteria. Other dust controls were implemented: grader activity reduced, additional water cart deployed to the region. Letter, with supporting documentation, sent to Third Party.
	12/01/2017	3:30pm	Other	General Dust	Mt Arthur Coal Reception	Caller did not want to call the Community Response Line and left no call back details
	12/01/2017	3:40pm	Other	General Dust	Mt Arthur Coal Reception	Caller did not want to call the Community Response Line and left no call back details

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
	12/01/2017	3.46pm	Roxburgh	Blast	Community Response Line	Caller noted that a gas smell was evident at their residence. Advised caller that Mt Arthur Coal has recently blasted and an investigation was underway. Following the investigation, called back and advised that wind direction and speed did not support dust or fume leaving site.
	17/01/2017	11.39am	Muswellbrook	Dust	Third Party	Third party caller noted dust left site on 12/01/2017 around 3.45pm. Advised an internal investigation was underway. Following investigation a report was provided on 19/01/2017.
	22/01/2017	10.07pm	Roxburgh	Noise	Community Response Line	Caller noted continuous low frequency noise. Investigation determined MAC is not source of noise. Testing completed and caller was advised of outcome.
	23/01/2017	11.26pm	Bureen Road	Light	Community Response Line	Caller did not provide contact number. Advised number of lights to the north/north east, stationary. Investigation revealed location of lights, which were turned off or redirected. Caller did not request to be called back regarding investigation results.
	24/01/2017	12.14am	Muswellbrook	Light	Community Response Line	Investigation showed no identifiable external impact. Caller advised of investigation.
	27/01/2017	3.14pm	Muswellbrook	Dust	Community Response Line	Caller noted dust from trucks on top of dumps. Modified operations to minimise dust. Caller notified of change.
	28/01/2017	8.39pm	Denman Rd	Light	Community Response Line	Stationary white light facing left on upper dump. Investigation conducted and adjustment made.
	30/01/2017	12.10am	Roxburgh	Noise	Community Response Line	Caller noted continuous low frequency noise. Investigation determined that MAC was not the source of the noise. What sounds like conveyor belt noise at source of complaint and wind direction north east.
	31/01/2017	2.31pm	Roxburgh	Blast	Community Response Line	Caller noted grey/black cloud at 2.15pm and that it shook the house. Investigation revealed no dust nor fume left the site and vibration levels were within regulatory criteria. Caller was notified of outcome of investigation.
February	2/02/2017	9.15pm	Denman Rd	Lighting	Community Response Line	Caller noted one bright stationary light on upper dump facing west. Caller was contacted several times and adjustments made. Issue resolved.
	5/02/2017	9.02pm	Roxburgh	Lighting	Community Response Line	Adjusted two lights and conducted inspection from Callers location.
	6/02/2017	7.20am	Muswellbrook	Cattle on road	Community Response Line	Advised caller that cattle did not belong to MAC.

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
	6/02/2017	7.45am	Muswellbrook	Cattle on road	Other	Advised caller that cattle did not belong to MAC.
	6/02/2017	3.31pm	Muswellbrook	General Dust	Other	Concern over dust on 02/02/2017. Investigation found all MAC real time monitors were below the criteria specified in the project approval and no dust complaints were received by MAC on this day. Investigation outcomes provided.
	10/02/2017	8.40am	Muswellbrook	General Dust	Community Response Line	Conducted investigation and advised caller that investigation did not find any dust leaving site.
	15/02/2017	7.30pm	Roxburgh	Noise	Community Response Line	Investigation revealed no mining noise heard near residence. Local noise was also within regulatory limits. Caller advised of investigation outcomes.
	22/02/2017	12.27am	Roxburgh	Noise	Community Response Line	Caller reported continuous general excavator mining noise. Caller advised that investigation determined MAC was not source of noise.
	25/02/2017	3.04am	Roxburgh	Noise	Community Response Line	Investigation noted significant noise associated with wind in trees. Caller advised that MAC was not source of the noise near residence.
	28/02/2017	3.59pm	Edderton Rd	General Dust	Other	Operational changes undertaken in response to wind increases associated with storm fronts. Caller advised of the changes.
	28/02/2017	4.08pm	Not disclosed	General Dust	Community Response Line	Operational changes undertaken in response to wind increases associated with storm fronts. Caller advised of the changes.
March	1/03/2017	9:30	Roxburgh Rd	Noise	Community Response Line	Caller reported continuous noise from Operations. Investigation found no operations causing impact of noise at that time. Noise reading take from Roxburgh Rd at 11pm was 33.7dBA
	3/03/2017	11:40	Roxburgh Rd	Dust	Community Response Line	Complaint of dust following blast. Investigation advised did not detect any dust leaving the site.
	3/03/2017	11:29	Denman Rd	Dust	Other	Concern over dust pollution over a period of some time. Investigation based on monitoring information available and consultation with the residents found no need for further investigation.
	5/03/2017	20:30	Roxburgh Rd	Noise	Community Response Line	Caller reported continuous beating noise. Investigation found no impact of noise at that time. Noise readings taken at Roxburgh Rd was 30.5dBA. Pit was in recovery mode at time of complaint, so little noise was being generated. Noise not coming from site

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
	9/03/2017	11:36	Roxburgh Rd	Noise	Community Response Line	Caller reported continuous low frequency beeping noise from Operations. Investigation found low levels of noise, no beeping but there was a humming noise. Unable to determine where it was emanating from. Not determined it was even from the Mt Arthur site
	9/03/2017	23:23	Roxburgh Rd	Noise	Community Response Line	Caller reported continuous beating noise. Investigation found no impact of noise at that time. Noise reading taken at Roxburgh Rd was 34.8dBA
	14/03/2017	10:40	Roxburgh Rd	Dust	Community Response Line	Complaint of dust following blast. Investigation advised did not find any dust leaving the site.
	14/03/2017	11:15	Denman Rd	Blast	Community Response Line	Caller advised could smell after blast. Wasn't a complaint as such, just wanted to advise.
	17/03/2017	16:28	Denman Rd	Dust	Community Response Line	Caller advised poor visibility on Denman Rd due to dust. Investigation did not directly observe any excessive dust. Weather conditions on the day created a general dust haze originating from points unknown. This wasn't a formal complaint. The caller wanted the site to be aware of the haze.
	20/03/2017	20:00	Roxburgh Rd.	Light	Community Response Line	Caller advised bright lights emitting from site. Investigation was precautionary as couldn't confirm with the caller where the light was coming from exactly, so site repositioned potentially suspect lighting as precautionary action.
April	7/04/2017	9.22am	Roxburgh Rd	Noise	Community Response Line	Caller advised constant bangs, wasn't sure from what though., but was continuous. Investigation was not able to identify that the source of the noise was coming from the MAC site.
	22/04/2017	8:34pm	Muswellbrook	Lighting	Community Response Line	Caller advised stationary, white light. Investigation revealed exact light, which was redirected. Caller was advised of investigation results and action taken. Caller advised they were satisfied that the issue had been resolved and impressed by such a rapid response.
May	4/05/2017	11.35pm	Roxburgh Rd	Lighting	Community Response Line	Clear light shining directly onto house. Investigation found that a light had been set up and at some stage and was shining towards Roxburgh road but was identified internally just before receiving the call from community member and the light was already repositioned so it wasn't facing Roxburgh Rd.
	16/05/2017	12:07pm	Denman Rd	Blast	Community Response Line	Caller felt 3 blasts, saw some dust. Investigation revealed weather conditions were suitable for blasting at the time. Results indicated overpressure noise and ground vibration levels were within regulatory criteria and that dust created by blast remained on site. Caller was advised of investigation.

Month	Date and time	Time	From	Issue	Lodgement type	Investigation and response to caller
June	6/06/2017	10:03pm	Denman Rd	Noise	Community Response Line	Caller advised could hear sounds like empty bins and was continuous Investigation revealed MAC was not the source of the noise which was within limits. Caller didn't request a call back
	8/06/2017	10.16am	Other	Noise	Community Response Line	Caller advised what sounded like banging from trucks all night, Investigation showed no unusual mining operations were occurring at that time resulting in any noise.
	15/06/2017	17:37	Roxburgh Rd	Lighting	Community Response Line	Caller advised 4 lights from work areas. Investigation revealed location of lights, which were turned off or redirected

Appendix 5 - Rehabilitation Plan

294000 296000 298000 300000 302000 304000

6424000 6422000 6420000 6418000 6416000 6414000 6412000 6410000

TO MUSWELLBROOK (5Kms)

DENMAN ROAD

THOMAS MITCHELL DRIVE

WHITES CREEK DIVERSION

ENVIRONMENTAL DAM

VD1 DUMP

ML 1487

FY 2003-2007

FY15

2011

FY16

FY15

FY16

FY15

FY14

DIRTY WATER DAM

FY 2004

2008

ML 1655

COAL HANDLING PREP PLANT

RAIL LOOP

A171

FY 1996

MAIN DAM

NORTH CUT S126 EMPLACEMENT AREA

PRIOR 1996

EXPORT STOCKPILE AREA

FY 1998

OLD CHPP BCC No2 AREA

CONTRACTORS WORKSHOP and DEPLOYMENT AREA

CCL744

CL39

WHITES CREEK DAM

PRIOR 1996

WEST CUT S126 EMPLACEMENT AREA

ML 1739

EAST PIT

CL 395

FY 2005

SW TAILINGS S100 EMPLACEMENT AREA

ML1739

DRAYTON SUB LEASE

FY16

FY16

DRAYTON DAM

CL 229

ML 1548

ML1358

FY 2000

FY 2013

BELMONT VOID

EDDERTON ROAD

EL5965

FY 2002

FY 2004

MacDONALDS VOID

FY 2002

A437

ADIT PORTAL AREA

FY 2004

FY16

FY14

FY 2004

FY 1998

SADDLERS NORTH

2010

2009

FY14

FY15

FY14

FY15

FY15

FY16

FY16

500 KV POWERLINE

FY 2000

ML1593

SADDLERS SOUTH

FY16

SADDLERS CREEK CONSERVATION AREA

A437

LEGEND

- COLLIERY HOLDING
- EXCLUDED FROM COLLIERY HOLDING
- LEASEHOLD BOUNDARY
- AUTHORISATION & EL BOUNDARIES
- EXEMPTION of SURFACE and 20m BELOW from MINING LEASE
- INFRASTRUCTURE
- ACTIVE WASTE EMPLACEMENT AREAS
- ACTIVE TAILINGS EMPLACEMENT AREA
- REHABILITATION COMPLETED PRIOR to FY17
- REHABILITATION GREATER THAN 14 DEGREES
- REHABILITATION FY17
- REHABILITATION GREATER THAN 10 DEGREES
- PROPOSED REHABILITATION FY18 (FY 2017)
- SHAPED NO VEG
- PROPOSED TOPSOIL FY 18
- OTHER DISTURBED LAND
- CONSERVATION AREAS
- ACTIVE MINING AREA
- PROPOSED ACTIVE MINING AREA FY'18
- DAMS
- 500 KV POWERLINE
- OFFSET AREAS
- WATER MANAGEMENT

ENDORSEMENTS

1. Contours generated by MAC Surveyors
2. Rehabilitation, Proposed Rehab and topsoiling areas are supplied by Environmental department.
3. Topo data generated from aerial photography and MAC Surveyors
4. Active mining and waste areas generated from aerial photography and MAC Surveyors
5. Endorse Mining Surveys done by other Mining Surveyors

I, Brent Jason Maxwell, OF ST. ARTHUR Qld PTY LTD A REGISTERED MINING SURVEYOR, DO HEREBY CERTIFY THE ACCURACY OF THE MINING SURVEYS USED TO COMPILE THIS PLAN.

SIGNED_____

DATE_____

1000 0 500 1000 1500 2000 2500

Metres

bhpbilliton

Mt. Arthur Coal Pty. Ltd.

A.C.N 000 181 902 A.B.N 83 000 181 902

Thomas Mitchell Drive, Muswellbrook, 2333

QUARTERLY LAND SURVEY REPORT – June 2017 REHABILITATION PLAN

DRAWN:	T.HOSWELL	DRAWING:	322526
DEPARTMENT:	SURVEY	SCALE:	1:40000
DATE:	05–Jul–20		MAPTEK - VULCAN