Annual Review

Tarrawonga Coal Mine

Name of operation	Tarrawonga Coal Mine
Name of operator	Whitehaven Coal Mining Pty Ltd
Development consent/project approval number	PA 11_0047
Name of holder of development consent/project approval	Tarrawonga Coal Pty Ltd
Mining lease number	ML 1579, ML 1685, ML 1693
Name of holder of mining lease	Tarrawonga Coal Pty Ltd
Water licence number	WAL 31084
Name of holder of water licence	Whitehaven Coal
MOP start date	4/12/2015
MOP end date	30/11/2020
Annual review start date [1]	1/5/2016
Annual review end date	31/12/2016

I, Nigel Wood, certify that this audit report is a true and accurate record of the compliance status of the Tarrawonga Coal Mine for the period 1st May 2016 until 31st December 2016, and that I am authorised to make this statement on behalf of Tarrawonga 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	NIGEL WOOD
Title of authorised reporting officer	DIRECTOR
Signature of authorised reporting officer	N WOOD
Date	28.2.2017

[1] NSW Annual Review Guideline was released in October 2015

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 STATEMENT OF COMPLIANCE

The compliance status of the Tarrawonga Coal Mine (TCM) as at 31st December 2016 is summarised in Table 1. Table 2 notes non-compliances that occurred during the reporting period, and non-compliances from previous reporting periods that still require management action. References to the Environment Protection Licence (EPL) are limited to those that relate to the Project Approval conditions, specifically Schedule 3 Condition 22, 28(c), 33, 39(c)(ii) and Schedule 5 Condition 10 (c) and (e).

Table 1 - Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
PA 11_0047	No
EPL 12365 (applicable conditions as above)	Yes
ML 1579	No
ML 1693	Yes
ML 1685	Yes
WAL 31084	Yes

Compliance status key for Table 2

Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 2 - Non-compliances

Relevant Approval	Condition Number	Condition Description (summary)	Compliance status	Comment	Where Addressed in Annual Review
PA11_0047	Schedule 2(2)	Carry out project generally in accordance	Non-compliant	Refer following	Throughout AR
	Schedule 2(18)	Operation of plant and equipment	Non-compliant	Sound power level testing identified that some pieces of plant had results greater than the indicative levels identified in the EA. The incident was reported to DP&E upon receipt of results. The results were received outside of the reporting period and subsequent notification and investigation were carried out outside of the reporting period.	Section 4.2 and Section 11
	Schedule 3(9)	Attenuation of plant	Non-compliant	Sound power level testing identified that some pieces of plant had results greater than the indicative levels identified in the EA. The incident was reported to DP&E upon receipt of results. The results were received outside of the reporting period and subsequent notification and investigation were carried out outside of the reporting period.	Section 4.2 and Section 11
	Schedule 3(47)	Biodiversity Management Plan	Non-compliant	The "fauna translocation strategy" was not submitted to OEH as required by the Biodiversity Mananagement Plan in relation to fauna during clearing activities. This strategy has now been submitted to OEH. Note: TCM has not undertaken any fauna translocation.	Section 6.4.2 and Section 11

Relevant Approval	Condition Number	Condition Description (summary)	Compliance status	Comment	Where Addressed in Annual Review
ML1579	Condition #11 (b)	Blasting	Non-compliant	Blast on 19 August 2016 exceeded 120dB limit for blast overpressure and exceeded limit of 5% of blasting above 115dB over a period of 12 months.	Section 6.2.3 and Section 11

2 INTRODUCTION

This is the eleventh Annual Review (AR) formerly known as the Annual Environmental Management Report (AEMR) produced for the TCM, and it has been prepared in accordance with Condition 3 of Mining Lease (ML) 1579 and ML 1685 and Condition 4 of ML 1693 (Mining Act 1992), and Condition 4 (Schedule 5) of PA 11_0047, as modified.

The TCM is located approximately 16km east of Boggabri (Refer Figure 1). The TCM is owned by Tarrawonga Coal Pty Ltd (TCPL) and operated by Whitehaven Coal Mining Pty Ltd (WCMPL). Biodiversity offsets are shown in Figure 2 and Figure 3.

The current Mining Operations Plan for TCM was prepared under the new guidelines "ESG3: Mining Operations Plan (MOP) Guidelines". The AR follows the format required by the NSW Government Annual Review Guideline (October, 2015). Though primarily covering the period from 1st May 2016 to 31st December 2016 (the reporting period), where relevant the Annual Review provides information on historical aspects of the operations, longer term trends in environmental monitoring results and provides relevant information on activities to be undertaken during the ensuing period, i.e. from 1st January 2017 to 31st December 2017, or beyond.

TCPL gained approval from DRE and DP&E to vary the reporting period (as per NSW Government Annual Review Guidelines); as such, this report covers a period of less than twelve months and is an interim Annual Review. The next Annual Review will cover the full 2017 calendar year.

2.1 Mine Contacts

The management personnel responsible for operational and environmental performance at the TCM and their relevant contact details are as follows:

- Mr Anthony Margetts, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6743 4000.
- Mr Nigel Wood, General Manager, Open Cut Operations - oversees Open Cut Operations for the Whitehaven Group. Contact: (02) 6741 9309.
- Mr Lachlan Johnson, Environmental Officer– oversees day-to-day environmental and rehabilitation performance across the site. Contact: (02) 6743 4000.

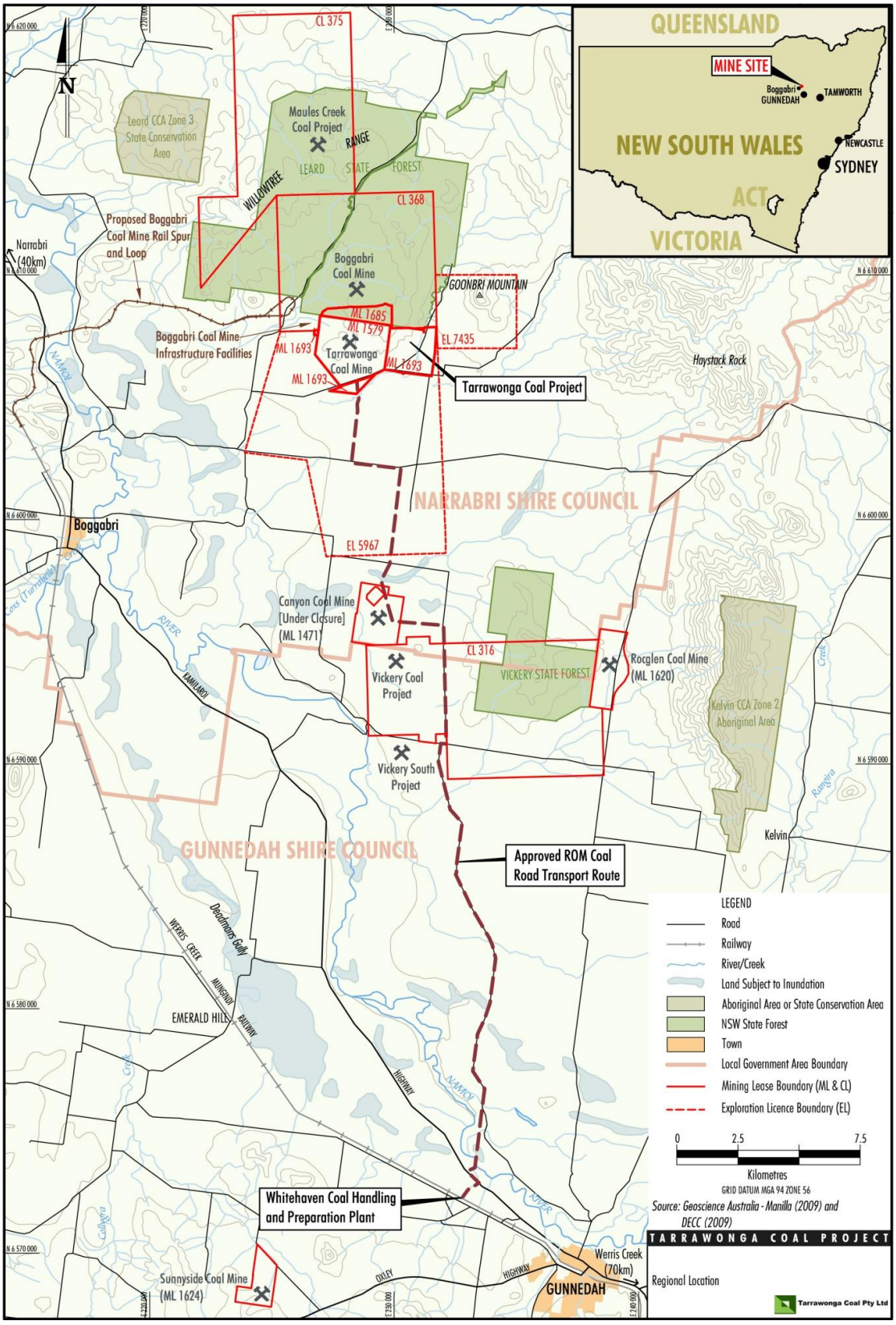

Figure 1 - Locality Plan

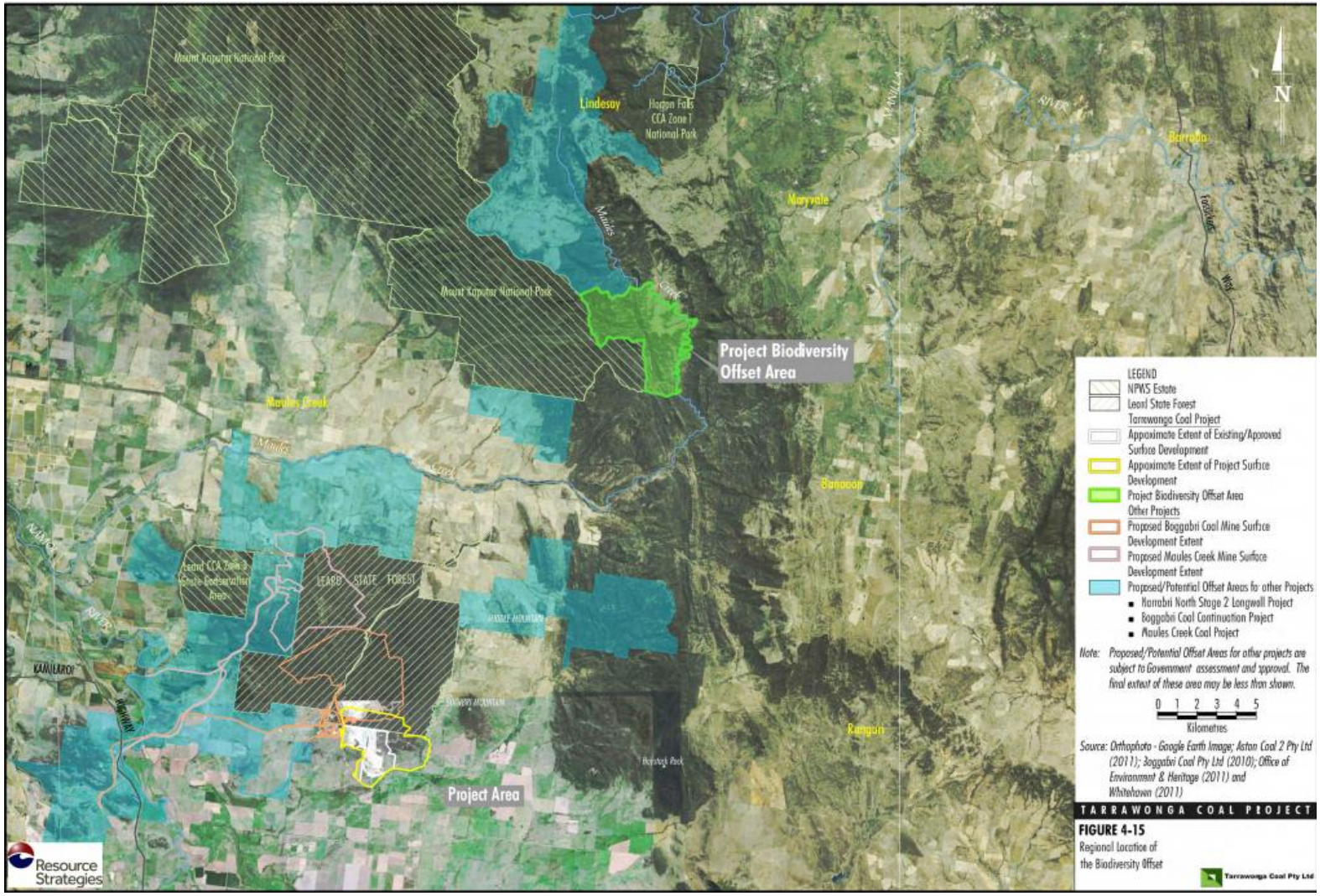

Figure 2 - Regional Location of Biodiversity Offset

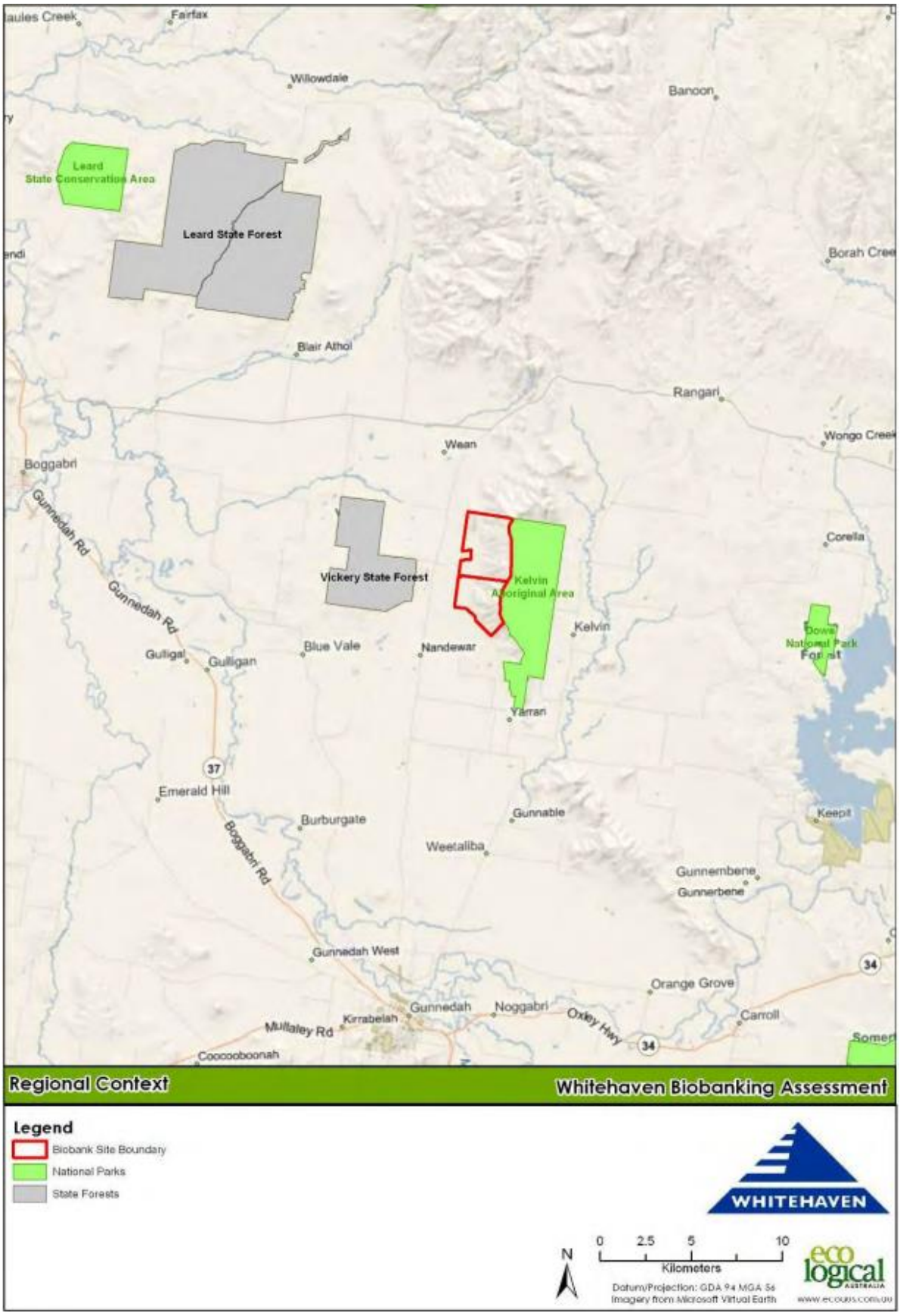

Figure 3 – Regional Location of Biobank Site

3 APPROVALS

3.1 Tenements, Licences, and Approvals

Table identifies the approvals in place for the TCM at the end of the reporting period, the issuing/responsible Authority, dates of issue, expiry date and relevant comments.

Table 3 - Tenements, Licences and Approvals

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Division of Resources and Energy (DRE)	Exploration Licence (EL 5967)	24/07/2002	23/07/2015	Renewal submitted July 2015 with acknowledgment received 23/7/2015; currently pending renewal approval.
Division of Resources and Energy (DRE)	Mining Lease (ML) 1579	03/04/2006	02/04/2027	Expires 21 years from commencement
Environment Protection Authority (EPA)	Environment Protection Licence (EPL) No. 12365	09/01/2006	N/A	
NSW Department Primary Industry - Water	90BL253276 90BL253278 90BL253279 90BL253280 90BL254253 90BL254254 90BL254255 90BL254221 90BL254214 90BL255766 WAL31084 WAL29548	18/05/2006 18/05/2006 18/05/2006 18/05/2006 18/05/2006 18/05/2006 24/04/2007 05/04/2007 04/04/2007 19/08/2012 02/08/2013 26/07/2012	Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity 25/06/2017 Perpetuity	Monitoring bores 250ML Mining 50ML
Department of Planning & Environment (DP&E)	Project Approval PA 11_0047	22/01/2013	31/12/2030	Modified 2014 for continued coal haulage to Gunnedah CHPP. Modified 2016 to allow receipt of all types of coal reject.
Department of the Environment	EPBC 2011/5923	11/03/2013	31/12/2053	Conditional Federal Project Approval for

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
				LOM Project
Division of Resources and Energy (DRE)	Mining Lease (ML) 1685	18/07/2013	14/11/2032	
Division of Resources and Energy (DRE)	Mining Lease (ML) 1693	14/10/2013	14/10/2034	Expires 21 years from commencement
Division of Resources and Energy (DRE)	Mining Operations Plan (MOP) Amendment A	4/12/2015	30/11/2020	MOP Amendment A approved 22/12/2016.

4 OPERATIONS SUMMARY

4.1 Mining Operations

Table 4, presents the Production Summary at the end of the reporting period.

Table 4 – Production Summary

Material	Approved Limit	Previous Reporting Period (actual)	This Reporting Period (actual)	Next Reporting Period (forecast)
Waste Rock/Overburden (bcm)	n/a	19,996,819	12,708,988	20,900,000
ROM Coal/Ore (t)	3,000,000 (Project Approval PA11_0047)	2,236,642	1,661,266	2,780,000
Coarse and Fine Reject (t)	700,000	0	68,524[1]	700,000
Saleable Product (t)	n/a	2,023,981	1,520,053	2,500,000
Gravel Production (t)	90,000 (Project Approval PA11_0047)	0	0	90,000[1]

[1] Course reject only.

4.2 Other Operations

4.2.1 Hours of Operations

PA 11_0047 permits 24-hour operation of mining activities, and allows for changes to coal transportation following the commissioning of the Boggabri Rail Spur Line, and Boggabri CHPP. TCPL has made some minor changes to operating times to accommodate changes in the working roster for improved production and economic stability.

Open cut mining activities, including processing of coal, generally occurred between the hours of 6:30am and midnight Monday to Friday and between midnight and 3.00am Tuesday to Saturday. On occasion, Saturday and Sunday day shifts have been run to meet production deadlines.

4.2.2 Coal Haulage

For the reporting period, there were 35,307 truck movements to transport 1,520,053t along the approved haulage route from TCM to the Whitehaven Gunnedah CHPP. Combined haulage of ROM coal from TCM and Rocglen Coal Mine was 2,343,437t. Transport of coal from the site or receipt of coal reject from the Whitehaven CHPP by truck has only occurred during the approved hours of:

(a) 6 am to 9.15 pm Monday to Friday;

(b) 7 am to 5.15 pm Saturday; and

(c) at no time on Sundays or public holidays.

4.2.3 Exploration

During the reporting period 15 exploration holes were drilled in ML1685 and ML1693. Exploration drilling will continue to be undertaken at the TCM to further assess the coal reserves within the tenements.

4.3 Next Reporting Period

4.3.1 Mine Operations

The mine production rates are planned for approximately 2.78Mtpa of ROM coal and approximately 20.9 million bank cubic metres (Mbcm) of overburden during 2017.

Vegetation clearing activities in mining areas over the next reporting period will be conducted in accordance with the approved Biodiversity Management Plan and MOP. The clearing program will be undertaken during the annual ten week clearing campaign from the 15th February to the 30th April, except under exceptional circumstances and with the approval of the Secretary of the DP&E.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Actions from the previous Annual Review are noted in Table 5.

Table 5 - Actions Required from the Previous Annual Review

Action Required from Previous Annual Review	Requested By	Action Taken by the Operator	Where Discussed in Annual Review
Comparison of PM2.5 against target levels	DP&E	Included in this AR	Section 6.3.3
Include waste record data in future AR's.	DP&E	Included in this AR	Section 6.10
Ensure that KPI's identified in Table 5.1 of the *Tarrawonga Coal Mine Particulate Matter Control Best Practice Pollution Reduction Program* (PAE Holmes, June 2012) are reported in the Annual Review.	DP&E	Included in this AR	Section 6.3.3

6 ENVIRONMENTAL PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the TCM, together with monitoring data for the reporting period. Life of mine monitoring data is included as Appendices in this AR, where relevant, to allow for discussion on longer-term trends.

6.1 Noise

6.1.1 Criteria

The Project Approval and EPL detail the noise criteria for site operations and coal haulage.

Noise compliance criteria of PA 11_0047 are specified as follows:

Noise Criteria dB(A)

Location	Day, Evening & Night LAeq (15 min)	Night LAeq (1 min)
All other privately-owned residences	*35*	*45*

Road Traffic Noise Criteria dB(A) LAeq (1 hour)

Location	Day	Evening	Night
Any residence on privately-owned land	*60*	*60*	*55*

A number of other specific conditions (i.e. acquisition, monitoring protocols and cumulative impacts) are listed in PA 11_0047 and EPL 12365.

6.1.2 Environmental Management Measures

A number of operational measures continue to be implemented on site to maintain compliance with limits. These include but are not limited to:

- Noise risk/response matrix;
- Automated SMS alarms notifying site personnel of elevated noise levels approaching noise criteria;
- Modification of operations where required;
- Reduction in fleet numbers during night time operation;

- Real-time noise monitor and web based repository.

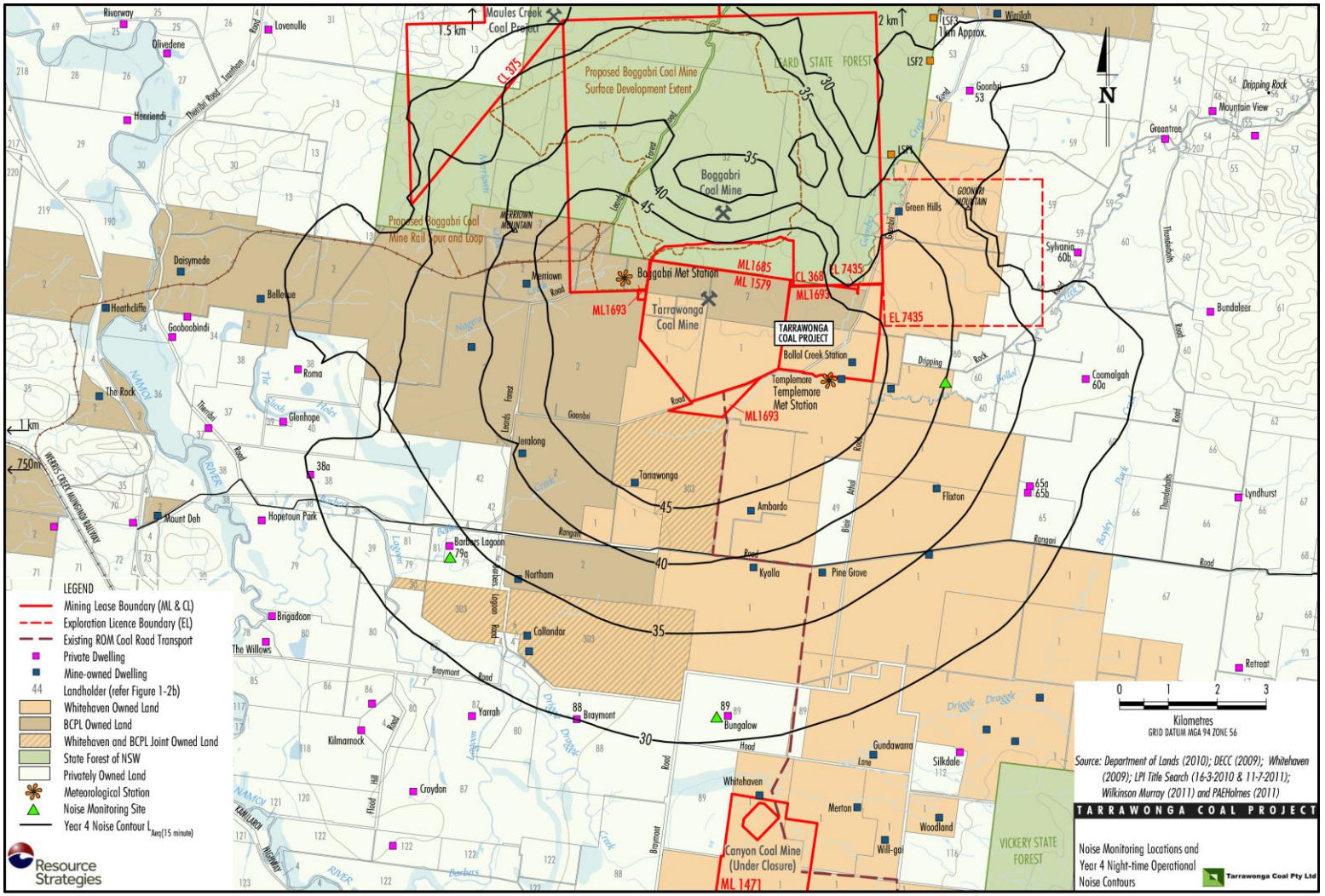

Figure 4 – Noise Monitoring Locations

6.1.3 Key Environmental Performance/Management Issues

Attended Noise Monitoring

Routine attended noise monitoring programs were undertaken quarterly during the reporting period by Spectrum Acoustics and Global Acoustics. The noise monitoring sites are identified on Figure 4 and include the "Bungalow", "Barbers Lagoon" and "Matong" properties. Attended noise monitoring undertaken throughout the reporting period showed compliance with the limits specified in the project approval on all occasions except during September at Barbers Lagoon where an individual excursion of the night time limit was experienced. As defined by the Industrial Noise Policy it is not considered to be a non-compliance due to minor nature (≤2dB) and it being an isolated event. No complaints were received in relation to noise during the monitoring period.

Table 6 – Summary of Attended Noise Monitoring Excursion

Location	Date	Time	Result	Criteria
Barbers Lagoon	7/9/2016	1.14am	37	35

Notification with regard to this result was made to DP&E. An investigation was undertaken following the receipt of results and a combination of unique atmospheric conditions and atypical ground conditions (highly saturated, surface water ponding) appear to be the primary causal factors for the exceedance.

With the exception of this single excursion, attended noise monitoring to date indicates that results are generally consistent or below the predicted LAeq, 15 minute 10th Percentile Operational Noise from Project predicted in the 2011 Environmental Assessment.

Road Noise Monitoring

In addition to the operational noise requirements, TCM monitors road transport noise along public sections of the coal haulage route, in accordance with the Tarrawonga and Rocglen Road Noise Management Plan. This monitoring occurs at the privately owned residences on the "Weroona" property and "Brooklyn" property located off Blue Vale Road. Monitoring at these locations showed compliance on all occasions, which is consistent with the predictions of the Whitehaven ROM Coal Haulage Modification Environmental Assessment for the southern section of the approval transport route. No monitoring occurs on the northern section of the approved road transport route as the closet private receiver is over 4km away.

Real Time Noise Monitoring

In accordance with the requirements of PA 11_0047 and EPL 12365, TCPL continued to undertake real time noise monitoring and implement noise management procedures during the reporting period.

Annual Sound Power Testing

Sound power level testing of fixed and mobile plant undertaken during the reporting period identified 16 pieces of plant that had SPL results which were greater than indicative levels identified in the EA. Table 7 provides a summary of the plant which had elevated results. All other plant on site was tested and was within the indicative levels adopted for modelling purposes in the EA. Whilst some plant may not have met the Indicative SPL specified in the Environmental Assessment, monthly attended monitoring results and the Annual Noise Validation Assessment shows that TCM is operating generally (one minor excursion at one monitoring location) in accordance with the project approval noise affectation criteria. Notification with regard to sound power levels was made to DP&E following the receipt of the results from the consultant. The investigation was undertaken following the receipt of results which occurred outside of the reporting period and the incident report has been provided to DP&E as part of the reporting process.

Table 7 – Summary of Sound Power Level Exceedance

Plant Item	Indicative Sound Power Level	Exceedance (dB)
Terex RH170 Excavator	115 dB	+4
CAT MD6420 Drill	117 dB	+2
CAT D10T/R x3	116 dB	+1-2
CAT D11T/R x5	116 dB	+4-5
CAT 773D/E x2	111 dB	+5
CAT 785C x5	121 dB	+1-2

TCM has liaised with DP&E throughout the reporting period to develop a program to address SPL level exceedances recorded in the previous reporting period. During the reporting period the Cubex Drill was removed from operation and will not recommence until appropriate noise attenuation has been undertaken. During the next reporting period 2xTerex RH170 excavators will have noise attenuation works completed and a Hitachi 1900 excavator will have a new power module installed. The equipment will be retested to determine outcomes of works.

Annual Validation

Attended monitoring results were filtered to extract those that were taken during applicable meteorological conditions according to the EPL and PA. These results were compared with model predictions to provide an indication of relative difference between measured and predicted levels.

297 of the 396 attended measurements during 2016 (measurements for which results are available) occurred during relevant meteorological conditions. During periods when these conditions did occur, a wide variation in measured levels resulted. There were no measurements with meteorological conditions that fell into the night (calm) category.

There were times during Quarter 2 (June) and Quarter 3 (September) when actual measured LAeq,15minute were greater than model predictions, with the most occurring during September at Barbers Lagoon. The largest difference between modelled and actual LAeq, 15minute noise levels was +9 dB which occurred at Barbers during the day period on 6 September.

The largest difference between modelled and actual LA1, 1minute noise levels was +6 dB at Barbers Lagoon on 7th September 2016. Attended monitoring has shown that TCM is generally in compliance with noise criteria and that no systemic noise issues have occurred as a result of operations. The model predicts that no exceedances of the criterion will occur for the indicative mining operations (as per EA); as there has been no sustained exceedance at any monitoring location the variances between the model and actual recorded results are deemed acceptable with no further revision of the model required.

In the 2016 reporting period, measured levels were above the LAeq,15minute 35 dB noise impact criterion on one occasion at Barbers Lagoon by 2 dB during the night period of 6/7 September 2016.

6.1.4 Proposed Improvements to Environmental Management

During the next reporting period a number of improvement will be made to the operating fleet in regard to the observed sound power levels; including installation of sound attenuation of 2xRH170 excavators, new power module in the Hitachi 1900 excavator. Investigation will continue into sound attenuation options for plant identified to have been above the indicative levels during the November testing.

A revised Noise Management Plan will be submitted.

6.2 Blasting

6.2.1 Criteria

Blasting criteria for the TCM are noted in PA 11_0047, and Condition L5 of EPL 12365.

- Blasting must only be carried out between 9.00 am and 5.00 pm, Monday to Saturday inclusive. Blasting is not allowed on Sundays, public holidays or at any other time without the written approval of the Director-General.
- A maximum of one (1) blast per day, unless an additional blast is required following a blast misfire and a maximum of 4 blasts per week averaged over a calendar year for the project:
- For non-project related residences, the overpressure level from blasting operations must not:
    - exceed 115dB (Lin Peak) for more than 5% of the total number of blasts over a period of 12 months; or
    - exceed 120dB (Lin Peak) at any time.
- For non-project related residences, ground vibration peak particle velocity from the blasting operations must not:
    - exceed 5mm/s for more than 5% of the total number of blasts over a period of 12 months; and
    - exceed 10mm/s at any time, at any residence on privately owned land.

6.2.2 Key Environmental Performance/Management Issues

During the reporting period, a total of 54 blasts were initiated (all of which were monitored). Four (4) instances occurred where two or more blasts were required to be fired on one day due to safety reasons. When this occurred the appropriate notifications where undertaken. There were three instances of monitoring results exceeding 115 dB during the reporting period, occurring at the project-related “Tarrawonga” and “Matong”. There were two results >120dB which were recorded at the project related “Tarrawonga” property.

DRE were notified of blast exceedances associated with ML1579 and ML1693. As the monitors were located on project related land, results were not considered to be non-compliant with the project approval and thus DP&E were not notified.

TCM engaged a specialist consultant to undertake an investigation into primary cause of overpressures; these findings are being incorporated into blast design to mitigate future likelihood of overpressure reoccurrence.

The maximum recorded ground vibration during the reporting period was 0.73mm/s recorded at “Matong” on 29th August 2016. This is well inside the consent criteria of 5mm/s. Results during the

reporting period showed that performance declined with greater number of events in excess of 115dB and 120dB. All blast monitoring results for the reporting period, including the time of initiation, have been included in Appendix 1.

The EA predicted that no exceedance of the blast criterion would occur at privately owned residences. For part there of the reporting period all monitoring was been undertaken on project related land (as a result of property acquisitions) and therefore no exceedances of the blasting criteria have been recorded on privately owned land. The blast monitor located at Matong was relocated to the privately owned Coomalgah property to the east of the operation in October 2016. Section 6.2.3 below outlines the status of Tarrawonga blast monitors and plans to have the second monitor relocated to a privately owned property.

The maximum fume rating for the reporting period was classified as a 3a per the *Australian Explosives Industry And Safety Group Inc. – Code of Practice: Prevention and Management of Blast Generated NOx Gases in Surface Blasting*. No instances were recorded of blast fume leaving the premises boundary.

6.2.3 Proposed Improvements to Environmental Management

The relocation of one blast monitor as specified in the Blast Management Plan did not occur during the reporting period as agreement between WHC and the proposed private receivers was not reached. A revised Blast Management Plan is to be submitted to DP&E with an alternative private property identified for relocation of the second blast monitor.

TCM will implement the findings of the blast overpressure investigation to improve blasting performance. .

6.3 Air Quality

6.3.1 Criteria

The air quality criteria applicable to the TCM are specified in PA 11_0047 Schedule 3. Air quality criteria is summarised below:

- Acceptable mean annual increase in deposited dust – 2g/m^2/month.
- Mean annual dust deposition (all sources) – 4g/m^2/month.
- Mean annual TSP (all sources) concentration – 90 μg/m^3.
- Mean annual PM_{10} particulate level – 30 μg/m^3.
- 24-hour average PM_{10} particulate level – 50 μg/m^3.

6.3.2 Environmental Management Measures

TCM employs a range of air pollution control measures including:

- modification of work practices where required including changing dumping strategies;
- temporary cessation of operational equipment;
- maintaining a real time SMS alarming system to key operational personnel;
- Re-use of selected trunks, branches and litter from clearing for mine site rehabilitation. No materials are burnt;
- Limiting groundcover removal in advance of mining consistent with operational requirements;
- Groundcover removal as part of the topsoil removal activities, rather than prior to topsoil removal;
- Where practicable, limiting soil stripping activities to periods when there is sufficient soil moisture to prevent significant dust lift-off and avoiding periods of high winds;
- Soil stripping using bulldozers, thereby eliminating the dust generated from elevated scrapers;
- Application of water to exposed surfaces, with emphasis on those areas subject to frequent vehicle/equipment movements which may cause dust generation and dispersal;
- Use of water injection on drilling rigs;
- Use of imported aggregates for blast hole stemming;
- Water application at the crusher and on the conveyor discharge point to the coal bin;
- Cessation of coal processing activities during periods of concurrent high winds and temperatures which cause coal dust dispersal, independent of water applications.
- ROM coal pad watering;
- Progressive shaping and rehabilitation of areas once they are no longer required for mining purposes;
- Speed limit restrictions on all vehicles and equipment on the mine site;
- Equipment exhaust positioning to avoid exhausts impinging on the ground and causing dust lift-off; and
- Use of covers on all product coal trucks. All coal haulage vehicles (road trucks only), including those operated by sub-contractors, are fitted with rollover tarpaulins.
- Stabilisation trial of the southern face of the southern emplacement.
- TCM continues to liaise with Boggabri Coal Mine and Maules Creek Coal Mine during periods of elevated air quality events to manage cumulative impacts.

6.3.3 Air Quality Monitoring

Figure 5 identifies the locations of the various deposited dust gauges, TEOM and HVAS maintained during the reporting period.

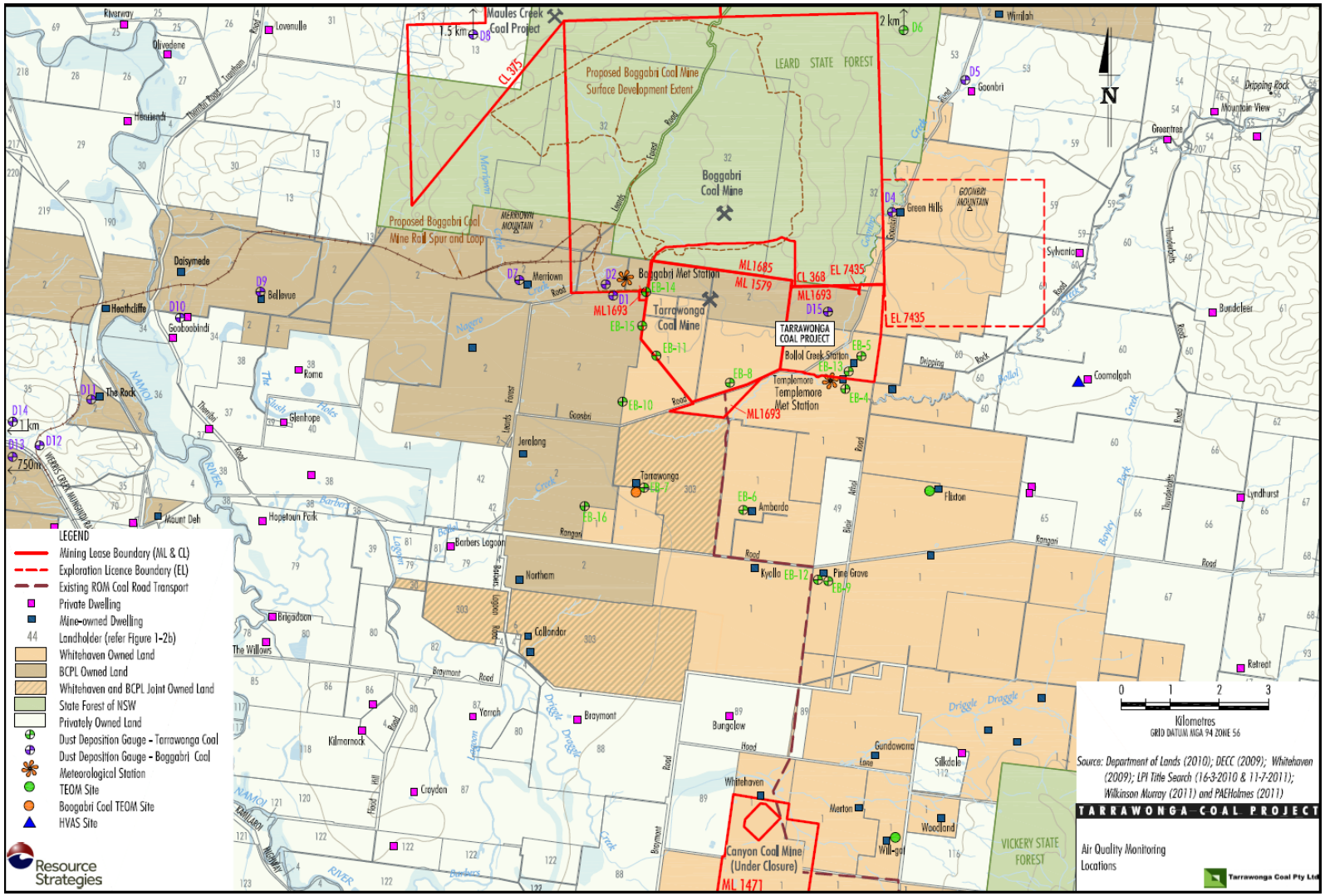

Figure 5 – Air Quality Monitoring Locations

A review of Table 8 shows that the annual average limit for deposited dust was exceeded at five monitoring locations; EB-4, EB-8, EB-10, EB-11, EB-15. These monitoring locations are all located on project related land and therefore the elevated levels are not non-compliant.

Results from previous monitoring periods in comparison to results recorded during this reporting period indicate that deposited dust results trended downwards with an decrease in the number of monitoring locations exceeding the annual average limit. Dust is managed per the environmental measures described in Section 6.3.2.

The EA predicted no exceedance of the deposited dust level criterion. Tarrawonga does not have dust monitors located on privately owned land.

Table 8 - Deposited Dust Monitoring Data Summary (May 2016 to December2016)

MONTH	TEMPLEMORE (EB-4)[1]	BOLLOL CREEK STN (EB-5)[1]	AMBARDO (EB-6)[1]	TARRAWONGA (EB-7)[1]	THUJIN (EB-8)[1]	PINE GROVE (EB-9)[1]	TARRAWONGA MINE (EB-10)[1]	TARRAWONGA MINE (EB-11)[1]	TARRAWONGA MINE (EB-14)[1]	TARRAWONGA MINE (EB-15)[1]	JERALONG NORTH (EB-16)[2]
May 2016	10.6	2.2	0.9	0.7	5.3	1.0	4.0	5.7	1.9	4.9	1.0
June 2016	2.8	1.3	0.9	0.4	4.4	0.4	3.7	10.9	1.7	11.8	0.5
July 2016	5.4	1.1	1.0	0.3	10.6	0.1	4.2	3.3	1.0	4.9	0.2
August 2016	13.9	6.9	0.1	0.3	15.3	0.3	2.6	10.1	1.2	3.7	0.3
September 2016	4.6	8.1	0.3	0.4	22.8	0.4	23.4	7.3	1.5	5.5	0.4
October 2016	2.7	4	0.3	0.6	10.4	1.6	9.1	3.7	0.5	2.8	0.2
November 2016	7.1	4.3	1.2	1.3	1.9	3.7	5.9	3.0	1.7	2.3	2.1
December 2016	18.6	2	0.7	0.5	5.7	2.3	1.8	2.6	2.4	4.2	2.1
Reporting Period Average	8.2	3.7	0.7	0.6	9.6	1.2	6.8	5.8	1.5	5.0	0.9
Long Term Average	3.8	3.1	1.5	1.2	3.1	1.1	4.6	2.5	2.8	5.3	2.1

[1] Project related land

[2] Owned by Boggabri Coal Mine.

TCM has one High Volume Air Sampler (HVAS - PM_{10}) which is located at the "Coomalgah" property, due east of the operation. The PM_{10} results for the reporting period show no exceedances of the 24hr criteria and results remain within the annual average criteria.

The EA predicted no exceedances of the 24hr average and annual criterion for PM_{10} at any privately owned residence. Monitoring at the privately owned residence Coomalgah confirms that results are in compliance with the criterion and consistent with the EA.

Emission contours shown in Appendix D of the EA show that results recorded at the Coomalgah residence (project related land) are consistent with those predicted.

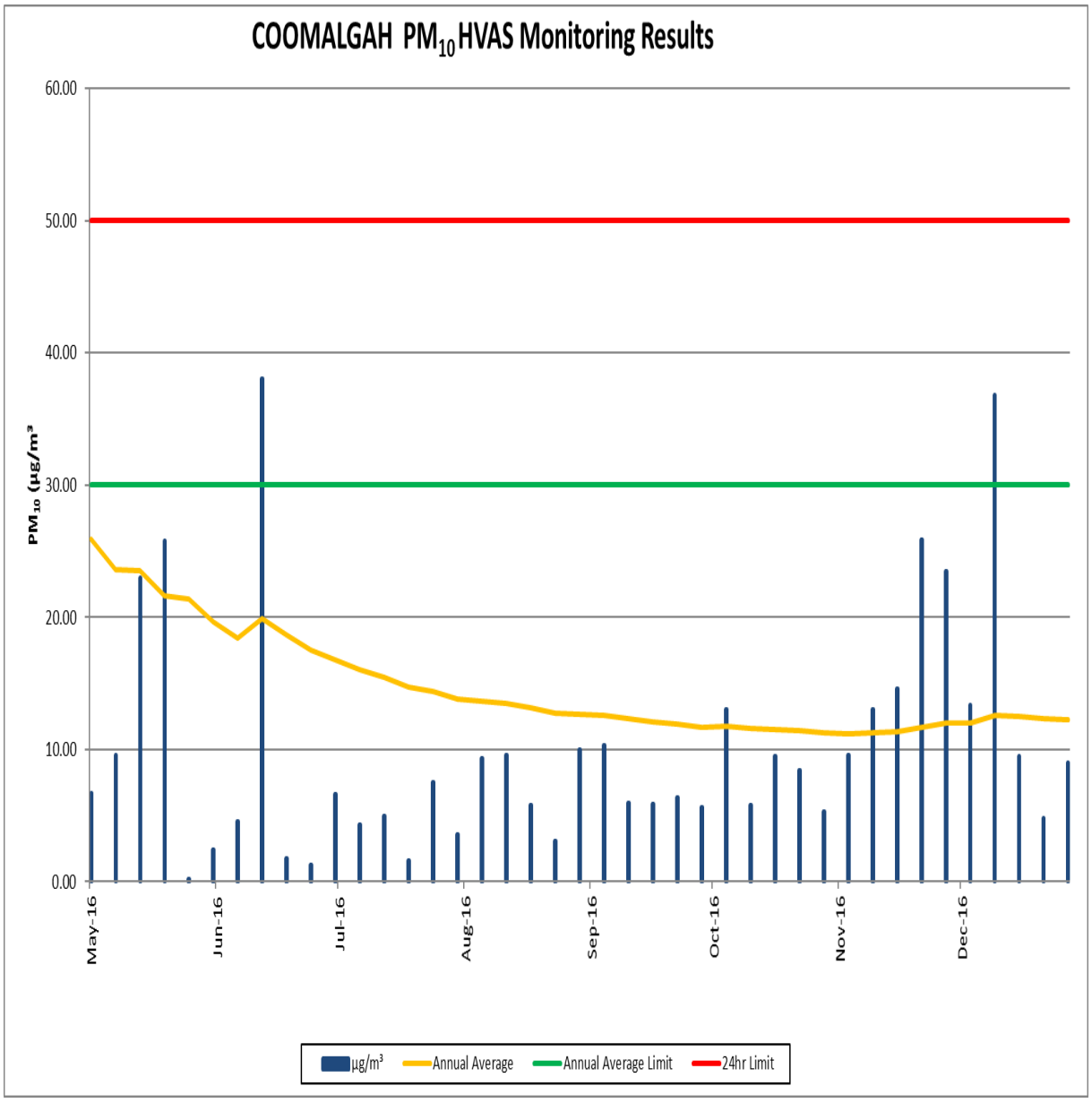

Figure 6 – Coomalgah HVAS Monitoring Data Summary (May 2016 to December 2016)

Total Suspended TSP is inferred from the measured PM_{10} data. Monitoring conducted at the Coomalgah HVAS indicated the TSP rolling annual average remained well below the applicable criteria of 90 µg/m^3. The TSP monitoring results are illustrated in Figure 7 below.

The EA predicted no exceedance of the annual average TSP criterion. TSP results inferred from PM_{10} data indicate that no exceedance of the criterion occurred during the reporting period.

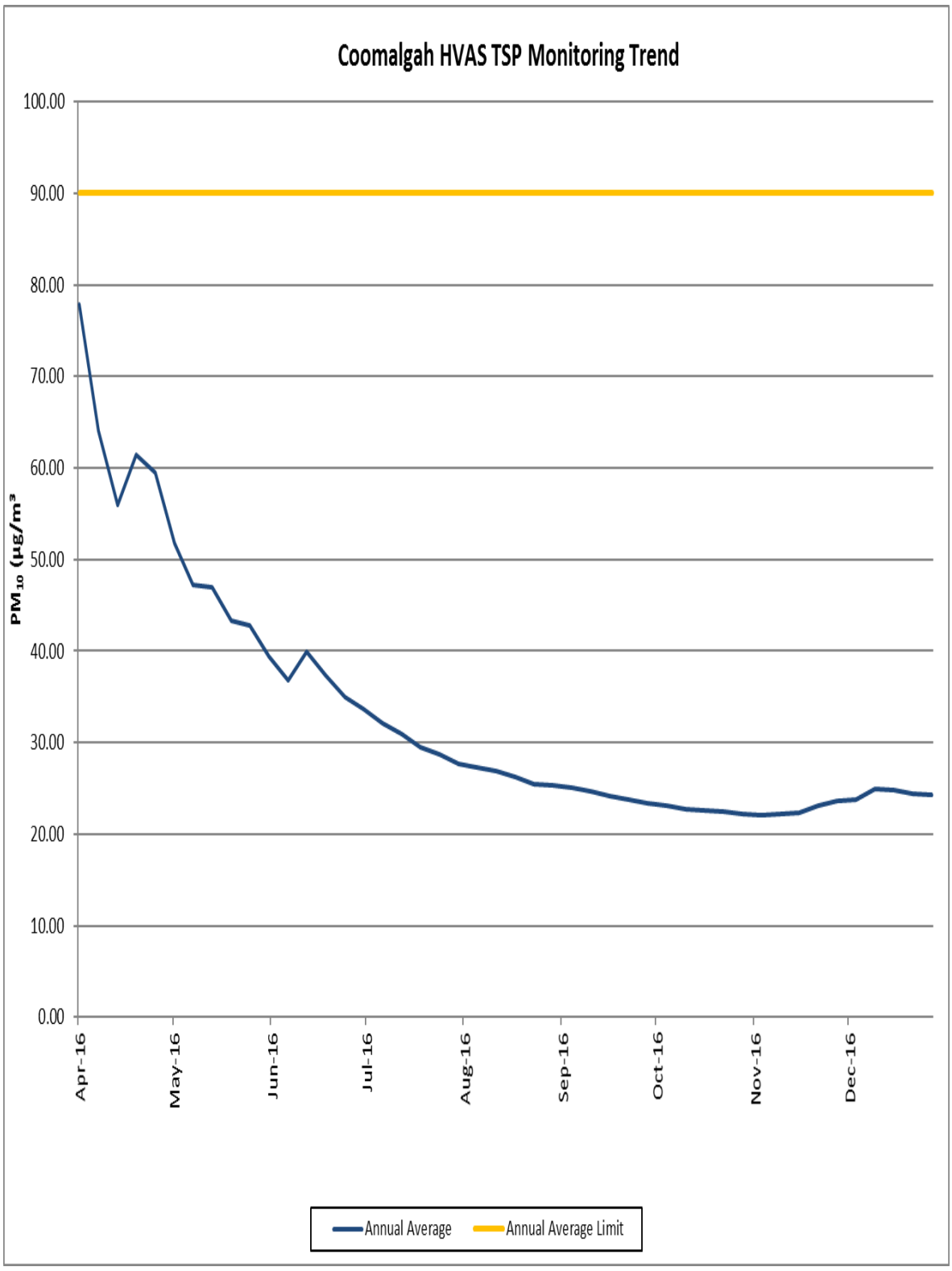

Figure 7 – Coomalgah HVAS TSP Monitoring Data Summary (May 2016 to December 2016)

Throughout the reporting period, real time PM_{10} TEOM (air quality) monitoring was conducted with a permanent monitoring station located at the nearby "Flixton" property and $PM_{2.5}$ TEOM located at "Wilgai" (Figure 5). Data is generated every 15 minutes and correlated against current weather conditions, with alarms notifying site personnel of elevated PM_{10} results when wind conditions and direction is indicative of potential mining influence on the monitor. Real-time monitoring is used as a management tool to facilitate in the day to day mine plan and operations and is not used as a compliance monitor.

Results recorded at the $PM_{2.5}$ monitor on the "Wilgai" property remain consistent with those recorded during previous reporting periods. The AQGGMP states that whilst no criteria applies TCPL will compare results against target levels of 8 µg/m^3 for annual average and 25 µg/m^3 for 24hr maximum. During the reporting period an annual average of 1.87 µg/m^3 was recorded whilst the maximum 24hr result was 15.2 µg/m^3. These results are within the target levels noted in the AQGGMP.

As there are no criteria for PM2.5 no assessment was undertaken in the EA.

TCM performance against the KPI's listed in Table 5.1 of Tarrawonga Coal Mine – Particulate Matter Control Best Practice Pollution Reduction Program was assessed. The assessment has shown that:

1. KPI – 1 Annual emissions of PM10 per tonne of ROM Coal (kg PM10/t ROM): There has been a reduction in the PM_{10}/ROM ratio since the initial assessment undertaken in 2012 from 0.20 to 0.18.
2. KPI – 2 PM10 Emission Control (%): The level of control applied to operations has not changed since the PRP. There has been a reduction in the percentage control which has been attributed to the increase in the operational expansion of the mine site including increased total area of exposed areas of which control factors are limited. In this case the KPI does not present a like for like comparison.
3. KPI – 4 Water Intensity for Hauling (L/VKT): Whilst total kilometres are not precisely measured there has been a significant increase in total water applied to haul roads since 2012 whilst maintaining a focus on minimising haul distances through mine planning.

6.3.4 Key Environmental Performance/Management Issues

Following the initial stabilisation trial of the southern emplacement which was unsuccessful, the second trial had reasonable success. Outcomes from the first trial were taken into consideration and

adjustments made to timing of subsequent seeding and seed mixture. This combined with favourable rainfall throughout winter resulted in reasonable success. It had been intended to aerial seed during spring with a summer species however poor rainfall and hot weather meant this did not occur. Conditions will be monitored to determine future activities.

The BTM Air Quality Strategy was submitted to DP&E for approval during the reporting period. The predictive air dispersal modelling system and daily predictive forecasts have been progressively implemented; some ongoing hardware and software issues continue to be encountered and are being resolved on a progressive basis.

6.3.5 Proposed Improvements to Environmental Management

The predictive air dispersal modelling system to be fully implemented in accordance with the draft BTM Air Quality Management Strategy. A revised Air Quality Greenhouse Gas Management Plan will be submitted to DP&E for approval and will include a revision of the air quality monitoring network with particular focus on deposited dust gauges and monitoring of project related land.

6.4 Biodiversity

6.4.1 Threatened Flora

Investigations undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd as part of the original Mine EIS identified no significant impact on threatened flora species, endangered ecological communities, endangered flora populations or critical habitat as a consequence of the development. Establishment of monitoring plots commenced in April 2007 and has continued as required. Over the life of the mine, a total of 28 quadrats are to be established across rehabilitation sites and control sites.

Vegetation monitoring was conducted during mid to late 2016 by Eco Logical Australia Pty Ltd. This monitoring comprised of:

- Multi-spectral imagery capture across the entire target area (including control areas) using 4-Band WorldView-2;
- Native vegetation monitoring.

Potential impacts noted in the EA included the clearing of Box-Gum Woodland EEC/CEEC and the groundwater dependent ecosystem - Bracteates Honey myrtle low riparian forest. These areas have not yet been cleared for mining purposes.

Remote Sensing Analysis

Remote sensing analysis identified areas of significant change in photo synthetically active biomass (PAB) across the site between 2015 and 2016. All areas of significant decreases in PAB were associated with mine development and infrastructure, particularly roadways and mine expansion. Small significant decreases were also apparent in many ponding areas being associated with reflective anomalies and light image shift. Significant increases in PAB were directly related to areas of mine rehabilitation and are all within similar areas denoted in the previous monitoring report.

Woodland Vegetation

Woodland vegetation monitoring showed an increase in native and exotic groundcover species diversity and cover in most plots, a result of wet conditions in the months preceding the survey. Canopy and midstorey cover remained stable however; shrub species diversity in the rehabilitation plots remains low.

Average percentage True Projected Crown Cover increased slightly from 2014 to 2016 for midstorey species in Rehab Zone 2 and Rehab Zone 3 & 4, while remaining steady in the Control Zone. In all rehabilitation zones tree species are yet to reach a height where they provide canopy cover. Vegetation in Rehab Zone 5 is yet to provide midstorey and canopy cover.

Average number of canopy and midstorey species has remained relatively stable at Rehab Zone 2 and Rehab Zone 3 & 4 across all years, while it has appeared to decrease in the Control Zone between 2015 and 2016. The reduction in the Control Zone may be a result of juvenile tree species, considered as a midstorey component in previous years, reaching canopy height for 2016 monitoring. The average number of canopy and midstorey species in Rehab Zone 5 is relatively low compared with the other rehab zones

Temporal comparison of groundcover composition indicates that percentage native groundcover is not significantly different within each zone between years. Exotic groundcover percentage is also not significantly different within each zone between years, except for Rehab Zone 2 where in November 2014 it was significantly lower than in some other years, including 2016. Leaf litter cover has significant variation between years in all zones. Bare earth cover has not changed significantly in the past four monitoring periods in any of the zones.

Seed Collection

Four routine seed assessments were completed across the TCM and Willeroi BOA as well as including the mine site vegetation in February (prior to annual clearing program), May, August and November 2016 designed to identify on a seasonal basis the life cycle stage and development of

native plants to identify what, where, when and how to target appropriate resources to collect seed for future revegetation programs. The seed assessments resulted in timely and prioritised seed collection with the spatial information directly given to seed collection contractors to undertake the following overstorey seed collection works in accordance with standard industry practice outlined in the Florabank guidelines.

As part of the WHC group wide revegetation planning; a local revegetation provider was engaged in November 2016 with the relevant overstorey species collected above being sent to a reputable nursery for propagation ahead of the planned Autumn 2017 revegetation program for the TCM Rehabilitation of Box Gum and non-EEC/CEEC Woodland (no revegetation is currently planned for Willeroi BOA).

Clearing

No clearing was undertaken during the reporting period.

6.4.2 Threatened Fauna

The annual terrestrial fauna monitoring of native vegetation areas between 28 and 29 June 2016; and between 18 and 19 October 2016. Species richness and guild diversity for bird species was greater at the control sites compared to the rehabilitation sites in 2016, following trends from previous monitoring surveys.

Monitoring shows a clear difference between the rehabilitation and the control sites for both winter and spring. The control sites in the spring plot are clustered more closely together compared with the rehab sites (indicating more similar communities in the control sites), though the winter plot clearly isolates Fauna Control 5 from all other sites (including other control sites). Cluster analysis supported this showing that there was a separation between Rehab 1 & 2 and all other sites at the 30% similarity level.

Between the winter 2015 and winter 2016 monitoring periods the most notable change was the substantial decrease in the number of species at Fauna Control 5. The number of species recorded dropped from 29 in 2015 to 12 in 2016 (Figure 9). The number of species recorded at Fauna Control 4 also dropped, however, an increase in the occurrence of the vulnerably listed *Chthonicola sagittata* (Speckled Warbler) was recorded in 2016. Fauna Rehab 1 displayed somewhat of a recovery from the decrease in species between 2014 and 2015, with an increase in both species richness (Figure 9) and abundance of individuals. The species counts for Fauna Rehab 1, 2 and 4 did not vary substantially between spring 2015 and spring 2016, though Fauna Control 5 showed an

increase in species richness. Overall, species richness in the rehabilitation zones has been reasonably steady, with only slight fluctuations since 2013.

Trends for terrestrial fauna were similar to previous years, with *Macropus giganteus* (Eastern Grey Kangaroo) and *Macropus robustus* (Common Wallaroo) recorded in both winter and spring periods of 2016 at both rehabilitation sites, though *Macropus giganteus* (Eastern Grey Kangaroo) was not recorded in spring at either control site, nor in winter for Fauna Control 5. *Macropus rufogriseus* (Red-necked Wallaby) was recorded for the first time in the rehab area, having only previously been recorded in the control areas. *Wallabia bicolor* (Swamp Wallaby) was only recorded in the spring 2016 period at Fauna Rehab 2 and in the winter 2016 period at Fauna Control 4. No reptiles or amphibians were recorded for any of the rehabilitation or control sites for either monitoring period in 2016, which is not dissimilar to the 2015 surveys. Dense and high groundcover during spring monitoring limited frog and reptile observations.

During the reporting period, no ecological monitoring of the Willeroi BOA was undertaken pending final approval of the BMP.

Areas cleared for mining purposes which was predicted in the EA to displace threatened fauna is offset by the Willeroi West Offset property. The clearing undertaken in the LSF and predicted impacts is as per predictions in the EA. In accordance with the BMP hollow bearing trees which represent suitable habitat to a variety of native fauna are salvaged for reuse on rehabilitation areas.

No change to natural flow regime has occurred and Goonbri Creek realignment has not occurred. The EA also predicts impacts to groundwater dependent fauna at the time of Goonbri Creek realignment.

Clearing

No clearing was undertaken during the reporting period.

6.4.3 Weeds

WHC coordinated routine formal weed monitoring/inspections undertaken across Willeroi BOA in April, July, October and December 2016. The priority weeds for control were noted as general broadleaf weeds (noxious and environmental species), Coolatai Grass as well as legacy noxious weeds inherited from previous owners management regimes such as St Johns Wort, Sweet Briar and Common Prickly Pear. The weed monitoring/inspections ensure that timely and prioritised weed control is undertaken on a seasonal basis with the spatial information directly given to spraying contractors to identify what, where, when and how to target appropriate resources across the Willeroi BOA for weed control.

During the reporting period, WHC implemented a comprehensive weed control program across the Willeroi BOA including 555ha treated between May and December 2016. The record wet weather during winter and early spring resulted in significant areas of St Johns Wort requiring spraying. Only appropriately qualified and experienced weed contractors (AQF3 accreditation or higher for use of herbicide) were engaged to undertake weed control works for WHC.

Targeted weed management within the mine leases is undertaken at opportune times following suitable weather and with consideration to the NIWAC Weed Management Guide for North West NSW (NSW DPI) with a focus on the following weeds:

- Spot spraying of African Boxthorn within the ML;
- Spot spraying of general weeds and grasses around the administration office and workshops;
- Spot spraying of Prickly Pear, Bathurst Burr and Noogoora Burr within the ML;
- Continue to manage and control Prickly Pear plants with Cactoblastis and Cochineal; and
- Spraying of grasses along rip lines and mounded areas to reduce competition with planted tubestock in rehabilitation areas.
- Spraying of weeds ahead of top soil stripping including common pear and Patterson's curse.

6.4.4 Feral Animal Control

WHC coordinated routine formal feral animal monitoring across the Willeroi BOA in March, June, October and December 2016. The adoption of a "monitor, measure and manage" approach to feral animal management will allow WHC to implement adaptive management in response to changes being measured through monitoring in feral animal abundance specific to the different geographical regions of the TCM BOA. Feral animal monitoring utilises the relevant methodologies for specific feral animals generally in accordance with the NSW DPI *Monitoring Techniques for Vertebrate Pests* so that a range of methods can be used such as transects/spotlighting, sand pads, cameras traps where practicable and relevant to specific offset areas/properties. Monitoring demonstrated that the feral animals in moderate to high abundance were the European Red Fox, Feral Pig and Feral Goat. The feral animal monitoring ensures that timely and prioritised feral animal control is undertaken on a seasonal basis identifying what, where, when and how to target appropriate resources across the Willeroi BOA for feral animal management.

During the reporting period, WHC implemented a comprehensive feral animal control program across the Willeroi BOA with fox baiting and pig trapping undertaken in May (7 out of 24 fox baits taken and 25 pigs trapped), July (no fox baits laid for goat mustering and 19 pigs trapped) and November 2016 (no fox baits laid for goat mustering and 1 pigs trapped). The record wet weather during winter and early spring limited the success of control programs during this period with a goat harvester appointed but not being able to successfully get over the ground to muster goats until December 2016 with 18 captured on sold to a goat depot. Only appropriately qualified and experienced feral animal contractors (appropriate feral animal management qualifications, NSW gun licence and pesticide accreditation where relevant) were engaged to undertake feral animal control works for WHC.

As part of the implementation of the Vertebrate Pest Management Plan eight infra-red motion cameras were strategically located around the mine site and specialist consultant has been engaged to implement the monitoring component of the VPMP and provide recommendations on pest control, the first report is scheduled for the first quarter of 2017.

The feral animal control program on TCM included 1080 fox baiting with sites strategically selected. Limited success was observed with low take up rates and no observations of fox activity during the program.

During the 2016 Rehabilitation Monitoring program the only exotic species detected in 2016 was *Oryctolagus cuniculus* (Rabbit), recorded in the spring and winter periods of Fauna Control 4. All other previously recorded exotic species (fox, feral pig and hare) were absent from all sites and monitoring periods in 2016

Feral animals as per the predictions of the EA and are managed accordingly.

6.4.5 Key Environmental Performance/Management Issues

WHC has substantially commenced the process towards long term security of Willeroi BOA in accordance with Project Approval obligations. OEH (in correspondence dated 1st July 2016) outlined to WHC which BOA would be considered for transfer to Parks Estate which was followed up with site inspections by NPWS and OEH staff on 8th - 9th September and 29th November 2016. The process is currently with OEH to complete inter-agency notifications before further negotiations can continue. OEH (in correspondence dated 9th December 2016) indicated that for the portions of WHC BOA not being considered for transfer to Parks Estate; can commence the Conservation Agreement application process. DPE approved an extension of timing for commencing the mechanism for securing of offsets on 23th December 2016 to 30th June 2017.

During the reporting period, installation of new signage and locks on the front gate of the Willeroi BOA was completed as part of taking management control, implementing access management and restricting unauthorised access to the property.

6.4.6 Proposed Improvements to Environmental Management

TCM Revised Biodiversity Management Plan (BMP) draft was submitted to DPE for NSW approval on 30th June 2015. TCM has an approved Willeroi BOA for maintaining and improving 1,660ha of native woodland and forest adjacent to the south eastern boundary of Mount Kaputar National Park. It is anticipated that this plan will be approved during the next reporting period.

6.5 Aboriginal Heritage Management

6.5.1 Environmental Management Measures

A Cultural Heritage Assessment was completed in September 2011 as part of the Tarrawonga Coal Project EA by Kayandel Archaeological Services. A total of 57 sites (21 open artefacts, 11 scarred trees and 21 isolated artefacts) were located during the surveys of the Project Area. An additional requirement of PA 11_0047 includes the development of an Aboriginal Cultural Heritage Strategy (ACHS) in conjunction with the Boggabri Coal Mine and Maules Creek Project. This Strategy has been submitted to DP&E for approval following the completion of the Stage One Scoping Study.

To date, the measures in place to protect Aboriginal cultural heritage are considered satisfactory, with all measures identified in the EA, Project Approval and HMP in place. New procedures have been implemented to manage a significantly larger number of registered Aboriginal parties identified through the Tarrawonga Coal Project EA (refer to HMP).

6.5.2 Key Environmental Performance/Management Issues

The 12 monthly inspections of fenced sites were undertaken in July 2016. All sites were inspected with fencing and the sites considered to be in satisfactory condition.

In September 2016, Registered Aboriginal Parties were invited to attend site to record additional artefacts which had been identified during a stage of pre soil strip inspection undertaken in July. At the time of the discovery in July 2016 the area was demarcated, work suspended and an archaeologist notified of the find. . During this inspection 4 artefacts were identified and recorded. The attending archaeologist provided a subsequent report to the Office of Environment and Heritage, detailing the additional artefacts associated with an existing identified archaeological site.

During the reporting period soil stripping monitoring activities were undertaken for both the Northern and Central pits in advance of mining activities.

During the reporting period, a heritage due diligence assessment of Willeroi BOA identified one aboriginal heritage site that required 146m of identification/demarcating fencing to be installed.

6.5.3 Proposed Improvements to Environmental Management

No improvements to cultural heritage are proposed within the next reporting period.

6.6 Natural Heritage

There are no features of natural heritage within the Project Approval area and hence, no specific management procedures are required.

6.7 Spontaneous Combustion

6.7.1 Environmental Management Measures

TCM has a low percentage of inorganic sulphur and hence a low potential for exothermic oxidation reactions. In the event of spontaneous combustion TCM personnel are trained to watch for indications of spontaneous combustion. Any incident would be followed by excavation to identify the source and extinguishment through water saturation.

6.7.2 Performance/Management Issues

A number of minor instances occurred where small amounts of coal smouldered on the ROM pad. These instances were managed accordingly with no offsite impacts.

6.7.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.8 Bushfire Management

6.8.1 Environmental Management Measures

Bushfire management is undertaken in accordance with Condition 59 of Schedule 3 of PA 11_0047 with relevant aspects described within the Biodiversity Management Plan.

TCM maintains firebreaks around both its landholding, the mine area and the biodiversity offset area and maintains firefighting equipment as well as earthmoving equipment, a water truck etc. Any use of equipment for offsite bushfire control would be under the direction of the Rural Fire Service.

Fuel load monitoring was undertaken in October 2016 with the average fuel load rating for the Willeroi BOA being Very High as per the "Overall Fuel Assessment Guide" (July 2010). In accordance

with the BMP, WHC then prioritised resources targeting maintenance and upgrade of 13.2km of the southern boundary fire break and main access track to Willeroi BOA during December 2016.

6.8.2 Key Environmental Performance/Management Issues

No instances occurred where TCM was required to provide assistance to the RFS or any other landholder or body.

6.8.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.9 Meteorological Data

Meteorological monitoring is conducted onsite in accordance with Schedule 3 Condition 30 of the PA 11_0047. Table 9 summarise the monthly meteorological conditions at TCM for 2016 reporting period.

The total annual rainfall for the reporting period was 484.4mm; this is well above the annual average rainfall (397.7) for the corresponding period. The maximum rainfall was recorded during August 2016 (127.8.4 mm), which is significantly higher than the historical average. The months of November and December were well below historical monthly averages.

A minimum temperature of -4.2°C was recorded in July and a maximum temperature of 41.5°C in December. The temperature records and wind patterns are consistent with the long term climatic data recorded at nearby BOM sites. Prevailing winds were predominately from the north and north west. Comparison of 2016 wind rosettes with data from the 2015/2016 reporting period indicate generally similar patterns which are broadly comparable to patterns observed from previous years.

Table 9 – Tarrawonga Weather Station Meteorological Data

Month	*2m Temperature (°C)*			*10m Temperature (°C)*			*Average Wind Speed (m/s)*	*Prevailing Wind Direction*	*Monthly Rainfall (mm)*	*Long Term Average (mm)*	*Cumulative Rainfall (mm)*	*Number of Rain Days (≥1mm)*
	Min	Mean	Max	Min	Mean	Max						
May 2016	-1.2	14.0	27.5	1.1	15.3	27.0	0.8	N	44.0	42.5	44.0	4
June 2016	-2.9	11.1	21	-1.5	11.8	20.5	2.3	NW	72.8	43.6	116.8	11
July 2016	-4.2	10.4	23.2	-2.0	11.5	22.9	1.9	NW	48.2	42.7	165.0	3
August 2016	-1.9	10.1	22.5	0.7	11.3	21.8	1.7	NE/SW	127.8	41.3	292.8	9
September 2016	2.1	13.9	23.8	3.1	14.5	22.3	2.1	N	94.8	40.3	387.6	12
October 2016	0.7	15.8	31.2	3.7	16.8	30.2	2.1	N	60.8	55.1	448.4	7
November 2016	3.0	21.2	38.1	5.8	22.3	36.3	2.4	NE	12.6	62.2	461.0	2
December 2016	7.2	26.7	41.5	10.0	27.0	39.9	2.1	W/SW	23.4	70	484.4	5

6.10 Waste

6.10.1 Environmental Management

During the reporting period the following waste streams were removed from site:

- Waste Oil – Approximately 148,000 litres
- Recycled Scrap Metal - Approximately 4,200kg
- General Waste – Approximately 360 loads[1]

[1] Note: A load is defined as one trip to site rather than one full rubbish load.

6.10.2 Key Environmental Performance/Management Issues

During the reporting period no incidents relating to waste management occurred.

6.10.3 Proposed Improvements to Environmental Management

Tarrawonga continues to aim to reduce waste via a number of initiatives including recycling (oils, greases, scrap steel, and domestic recyclables) and increasing tyre life through employee education and training.

6.11 Environmental Performance Summary

An environmental performance summary for TCM is presented in Table 10.

Table 10 - Environmental Performance

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / Key Management Implications	Implemented / proposed management actions
Noise	Refer s6.1.3	1. Sound power levels greater than the indicative levels identified in the EA. 2. Single excursion of noise criteria at attended noise monitoring location during September.	1. Operation of equipment found to be in excess of SPL identified in the EA. 2. Excursion of noise criteria was fully investigated. Subsequent monitoring showed a return to compliance.	1. Install sound attenuation to equipment as advised to DP&E. Undertake investigation into attenuation options for remainder of equipment with levels above those specified in the EA. 2. Not considered to be a systemic issue and therefore not considered a non-compliance in accordance with the Industrial Noise Policy. Result ≤2dB. Additional monitoring undertaken as part of investigation.
Blast	Refer s6.2.2	Non-compliance with ML1579 and 1693 associated with overpressure events.	Exceedance of blast criteria occurred during the reporting period. Results restricted to project related land.	Implement investigation findings into blast designs to reduce likelihood of reoccurrence of results.
Air Quality	Refer s6.3.4	Approval criteria met.	Nil	Fully implement predictive forecast air dispersal modelling system In conjunction with the BTM.
Biodiversity	Refer s6.4	Approval criteria met.	Nil	
Heritage	Refer s6.5.2	Approval criteria met.	Nil	Nil
Spontaneous Combustion	Refer s6.7.2	Approval criteria met.	Nil	Nil
Bushfire Management	Refer s6.8.2	Approval criteria met.	Nil	Nil
Waste Management	Refer 6.10	Approval Criteria Met	Nil	Nil

7 WATER MANAGEMENT

The mine lies within the catchment of the Namoi River. Locally, and within proximity of the project site, Goonbri Creek, Bollol Creek and Nagero Creek all provide flows to the Namoi River during runoff events. The design of sediment detention basins within the disturbed area of the mine aims to limit the opportunity of discharge of runoff from mine-disturbed area, i.e. after appropriate detention time to satisfy licensed discharge criteria.

Detailed Surface Water and Groundwater monitoring results are providing in Appendix 2 and Appendix 3 respectively.

7.1 Surface Water Management

All sediment basins, storage dams and associated banks and drains have been designed and constructed in accordance with the *Managing Urban Stormwater: Soils and Construction Vol 2E Mines and Quarries* (DECC, 2008) in conjunction with the references to Volume 1 (Landcom, 2004). Water within the Project Approval area is nominally classified either as "clean", "dirty", "contaminated" or "pit water" depending on the source of the flow and it's potential for physical or chemical contamination. The definition of these classifications follows:-

> "***Clean Water***" comprises water that has not come in contact with mine disturbance and does not have potential to contain hydrocarbons.
>
> "***Dirty Water***" comprises water that has come into contact with mine disturbance and does not have potential to contain hydrocarbons.
>
> "***Pit Water***" comprises water contained within the open cut sump or pumped to the void water dam for containment and use for dust suppression across the site.
>
> "***Contaminated Water***" comprises runoff water which could potentially contain hydrocarbons.

There are seven wet weather discharge points nominated in the current EPL 12365 (relevant to PA11_0047 Schedule 3 Condition 33, 39). These are SD9, SD16, SD17, SB14, SB22, SB23 and SB24.

At the end of the reporting period onsite water levels were at 201.2ML. A total of 283L was used during the reporting period for dust suppression.

7.1.1 Surface Water Monitoring Results

TCM has a requirement to undertake surface water monitoring on a quarterly basis in addition to the monitoring of any wet weather discharge event. Surface water monitoring locations are shown on Figure 8.

Whilst there are no criteria or concentration limits specified for the quarterly surface water samples, the results do provide an indication as to the quality of waters on-site. The assessment of sediment load, salinity, pH, oil and grease and other monitoring parameters during these quarterly water monitoring events also provides an indication of the capacity for those storages to meet water quality criteria should a wet weather discharge occur, and if additional treatment methods would be warranted to minimise potential for a non-compliant discharge. All samples taken throughout the reporting period indicate consistency across all monitoring parameters (with the exception of TSS) with only slight fluctuations observed. Overall TSS has been variable due to timing of sampling which is impacted by inflows immediately before sampling.

Two dirty water dams returned high pH results (between 8.6-8.8) during November quarterly monitoring .Water from these dams was preferentially pumped into the mine water system for use as dust suppression. Water levels at the time of sampling were low.

Antimony, arsenic, molybdenum, selenium were monitored throughout the monitoring period. Results have remained consistently low and below thresholds outlined in the ANZECC Guidelines with no suggested trend of enrichment of these minerals in surface waters adjacent to the overburden emplacements.

Surface water monitoring results have shown generally consistent trends with previous reporting periods. No discharge of waters from site has occurred and therefore no trends can be concluded during this reporting period.

In comparison with the EA, the following assessments have been made:

- During the reporting period there were no discharges from site and no impact upon the downstream water quality.
- No instances of acid rock drainage have occurred.
- No irrigation activities have been undertaken on site.
- Flooding occurred in the Goonbri/Bollol Creek, Nagero Creek and Namoi River during the reporting period throughout August and September following consistent rainfall.

Commitments made in the EA with regard to the surface water monitoring program are addressed in the updated draft Water Management Plan which had previously been submitted to DP&E for review. The draft Water Management Plan has been revised and is being finalised for final review and submission to DP&E during the next reporting period.

7.1.2 Discharges

There were no wet weather or controlled discharges during the reporting period.

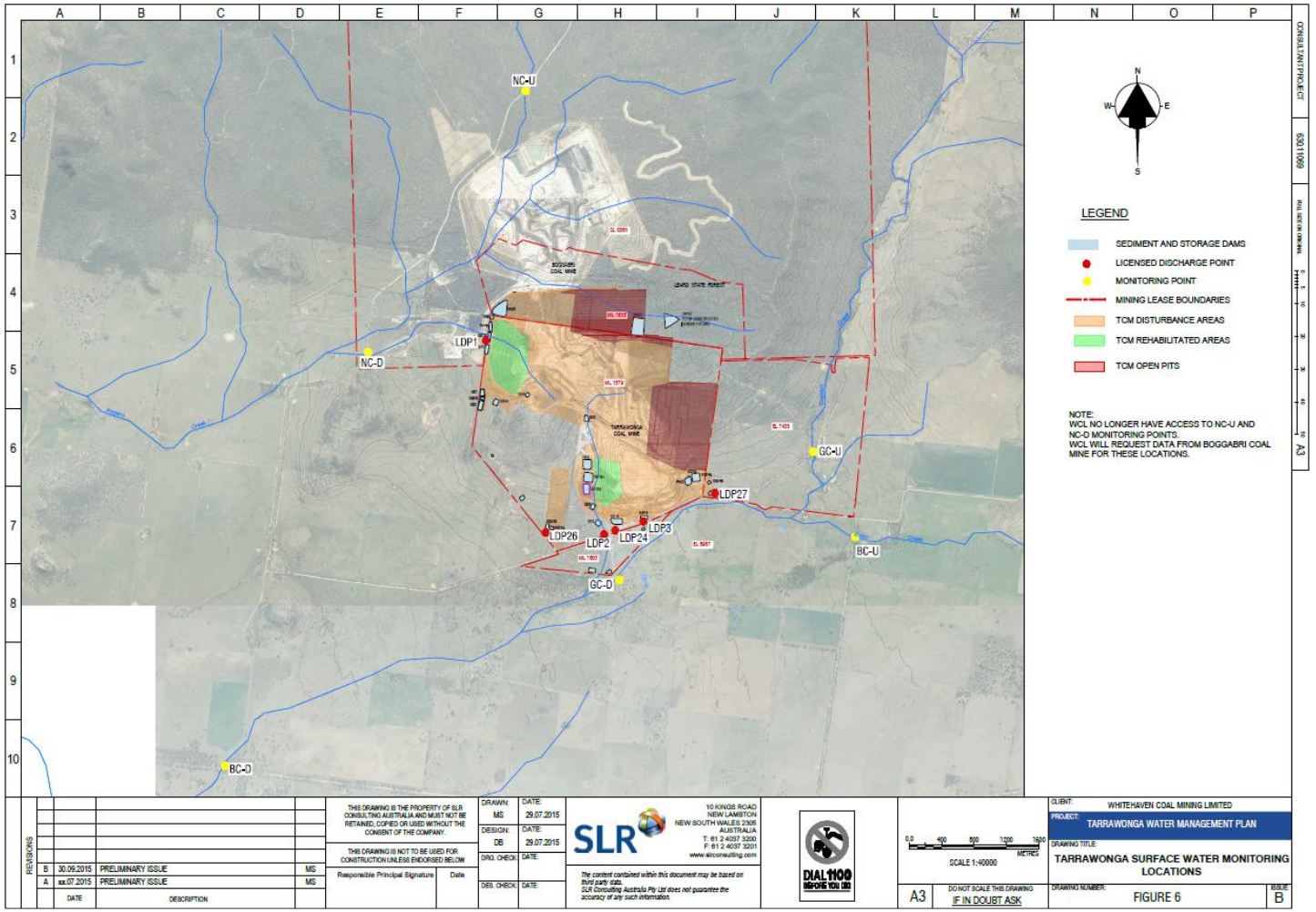

Figure 8 – Surface Water Monitoring Locations

7.2 Groundwater Management

7.2.1 Environmental Performance/Management

The mine's performance with respect to groundwater performance/management, the prevention of pollution, and the assessment of impacts on groundwater availability to other surrounding users, has been assessed through groundwater level and chemistry monitoring undertaken at a series of piezometers and bores within the Project Area and adjacent properties.

7.2.2 Groundwater Monitoring

The details of the groundwater monitoring program throughout the reporting period are listed in Table 11. Monitoring sites are shown on Figure 9.

Groundwater sampling and analysis was undertaken by ALS Acirl Pty Ltd during the reporting period. Water level data loggers, which store SWL data at 12 hourly intervals in MW1 and MW2 operated during the reporting period.

Table 11 - Groundwater Monitoring Points

Site ID (see Figure 5)	Registered Bore No. & Licence No	Property/ Location	Frequency		Purpose
			SWL*2, EC*3 and pH	Representative Metals and Ions	
MW1	GW967848 90BL253276	"Thuin"	Quarterly	Six monthly	To determine existing status and any impacts
MW2	GW967849 90BL253278	"Thuin"	Quarterly	Six monthly	
MW3*1	GW967860 90BL253841	"Nagero"	Quarterly	Six monthly	
MW4	GW967850 90BL253279	"Tarrawonga"	Quarterly	Six monthly	To determine existing status and any impacts
MW5	GW967851 90BL253280	"Thuin"	Quarterly	Six monthly	
MW6	GW967881 90BL254255	West of Boggabri Coal Infrastructure Area	Quarterly	Six monthly	
MW7	GW967883 90BL254254	"TCM"	Quarterly	Six monthly	
MW8	GW967882 90BL254253	"TCM"	Quarterly*5	Six monthly	
GW044997	GW044997 90BL102564	"Templemore"	Quarterly	Six monthly	
Templemore A	N/A	"Templemore"	Quarterly	Six monthly	
Templemore B	N/A	"Templemore"	Quarterly	Six monthly	To determine existing status and any impacts

GW031856	GW031856 90WA809087	"Ambardo"	Quarterly	Six monthly	
GW052266	GW052266 90BL116929	"Tarrawonga"	Quarterly	Six monthly	
TA60	90BL255930	"TCM"	Continuous	Nil	Vibrating Wire Piezometers
TA65	90BL255930	"TCM"	Continuous	Nil	

*[1] Non-Company owned bore *[2] SWL – Standing Water Level *[3] EC = Electrical Conductivity

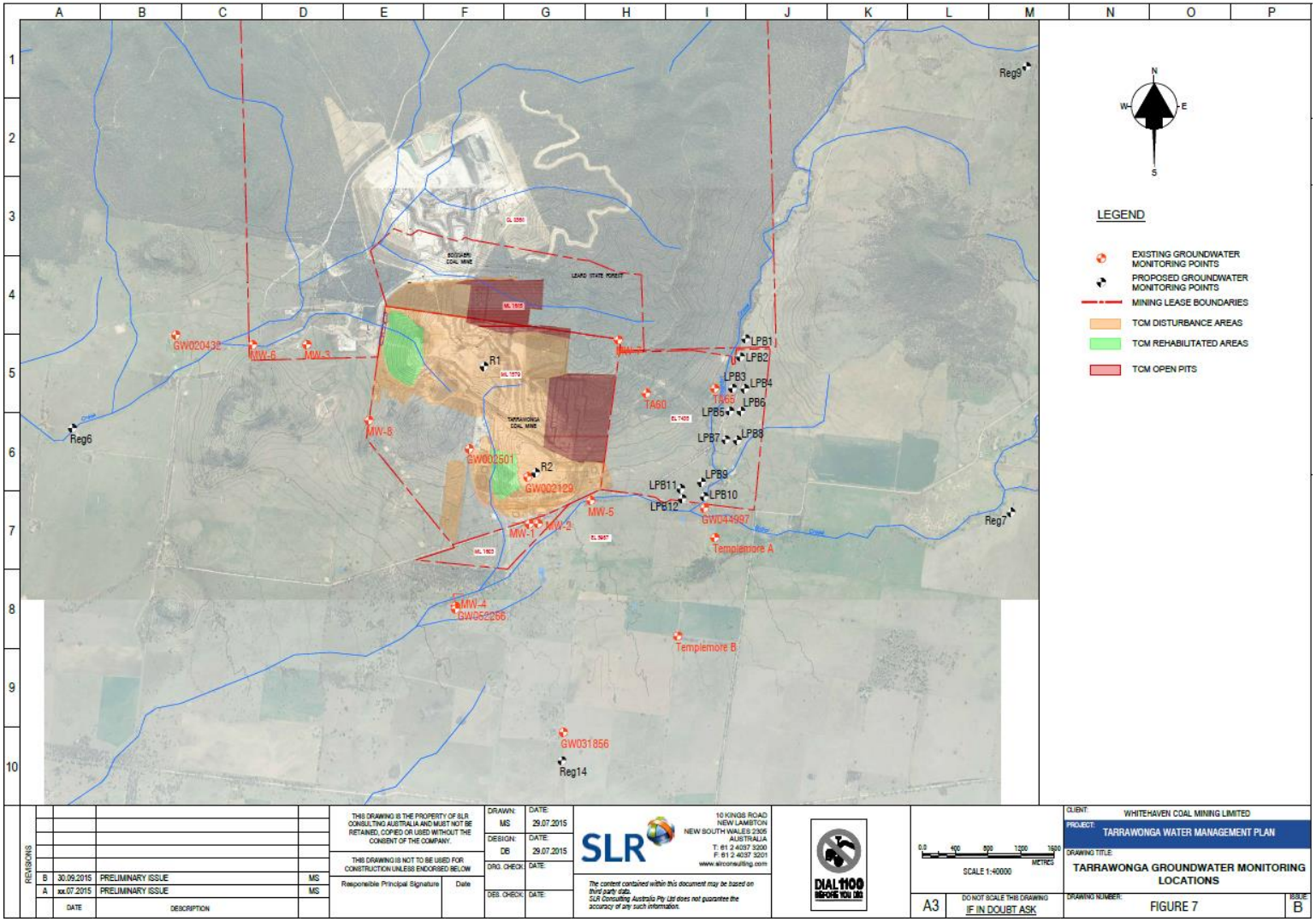

Figure 9 – Groundwater Monitoring Locations

Groundwater levels

Groundwater levels at the nominated monitoring bores generally remained steady throughout the reporting period with some slight water level rising in the latter part of the reporting period following rainfall and flooding during August and September. The Vibrating Wire Piezometers (VWP) in TA60 and TA65 have indicated continued reduced head pressure however the rate of depressurisation has declined during the reporting period.

Groundwater quality

Analysis of samples taken during the reporting period has shown that groundwater quality has remained generally in line with historical data at all locations monitored. Water quality has been compared to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (ANZECC) guidelines for stock watering (cattle). The following instances occurred during September monitoring where groundwater quality exceeded limits within the ANZECC Guidelines:

- MW2 exceeded limits for aluminium with a result of 11.7 mg/L
- MW5 exceeded limits for aluminium with a result of 5.55mg/L.

Water quality has also been compared against the National Environment Protection Council (NEPC) Agricultural and Livestock Guidelines. The following instances occurred where water quality did not meet the parameters identified in the guidelines:

- All monitors locations were above the agricultural irrigation guidelines for iron (0.2mg/L) during September
- MW2 and MW5 above guidelines for livestock for aluminium (5mg/L)

Monitoring trends over the life of the mine has shown that both MW2 and MW5 have had fluctuating aluminium levels. No consecutive monitoring periods have had elevated results at either monitoring location. During the life of monitoring MW2 has ranged from 0.01mg/L through to 14.8mg/L and MW5 has ranged from 0.04mg/L through to 12.7mg/L. No further analysis is considered to be necessary.

7.2.3 Groundwater Management

At the end of the reporting period an estimated 50 ML of water was held in the pit from rainfall and groundwater seepage. Inflows into the open cut result from a combination of:

- Direct rainfall runoff and infiltration through the emplaced overburden which flows down-dip to the open cut sump(s); and

- Inflows from the exposed coal seam.

Contamination of groundwater is controlled by the management of chemical, oil and grease spills and storage, with:

- Vehicle maintenance carried out in designated areas;
- Any spills being cleaned up; and
- Fuels oil and grease being stored within a bunded area, constructed in accordance with AS 1940-2004 and/or EPA requirements.

Groundwater from surrounding bores is monitored on a regular basis to detect and assess any changes in groundwater quality or level that may be attributable to the mine.

The Tarrawonga Coal Project EA identified that there would be a reduction in the potentiometric head in the aquifers of the porous rock systems to the east and the north. The Vibrating Wire Piezometer installed in TA60 and TA65 continue to demonstrate depressurisation as predicted as the mine moves toward the east.

Water extracted from the voids indicates that the inflows from the porous rock groundwater system to be less than the predicted 0.5ML per day average identified in the EA. Table 12 outlines the water take under WAL31084, noting that this volume includes surface water runoff collected from rain events.

The alluvial aquifer system has not yet been impacted.

No complaints have been received in relation to impacts upon any other groundwater users. This is consistent with the predictions of the EA; that no significant impact would therefore affect beneficial use of groundwater of other groundwater users.

7.2.4 Water Take

The water taken by the operation is summarised in Table 12.

Table 12 - Water Take

Water Licence Number	Water Sharing Plan, Source and Management Zone (as applicable)	Entitlement	Passive take/ inflows	Active Pumping	TOTAL
WAL 31084	NSW Murray Darling Basin Porous Rock Groundwater Sources Gunnedah - Oxley Basin Mdb Groundwater Source Gunnedah - Oxley Basin Mdb (Other) Management Zone	250 units[1]	0	137.55[2]	137.55ML

[1] Reduced reporting period.

[2] Includes in pit surface water runoff

7.2.5 Site Water Balance

Findings of the Site Water Balance undertaken in 2016 by SLR Consulting Australia indicate that TCM would be in a water deficit during both wet and dry years in regard to water inflows and outflows. It also predicts that small quantities of externally sourced water would be required under periods of extended dry weather when water from sediment dams is used for operational purposes. These predictions are consistent with the actual outcomes observed during this monitoring period.

Table 13 provides an overview of water held on site and provides a comparison to the previous reporting period.

Table 13: Stored Water

	Volumes Held (m^3)		Total Storage Capacity at the end of the Reporting Period (m^3)
	Start of Reporting Period	At end of Reporting Period	
Storage Dams	0	4,050	110,053
Sediment Basins	58,335	66,300	178,527
Pit Water Storages	125,047	134,601	176,768

8 REHABILITATION

8.1 Rehabilitation Performance During the Reporting Period

8.1.1 Status of Mining and Rehabilitation

The status of mining and rehabilitation at the completion of the reporting period is presented in Table 14 and Figure 10.

Table 14 - Rehabilitation Status

Mine Area Type [1]	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2015/16 (ha)	2016	2017 (ha)
Total Mine Footprint	578.6	579.5	604
Total Active Disturbance	527.4	510.6	530
Land Being Prepared for Rehabilitation	6.6	9.9	5.8
Land Under Active Rehabilitation	51.2	59.0	68.9
Completed Rehabilitation	0.0	0.0	0.0

[1] Refer Annual Review Guideline (p.11) for description of mine area types.

The MOP notes at the start of the MOP period a disturbance area of 615.17 ha. This area is larger than the actual area disturbed as determined by surveyed area (in accordance with the AR Guidelines). Following a review of the MOP and the December end of month survey; it has been determined that the discrepancy lies in proposed/planned versus the actual disturbance undertaken.

8.1.2 Post Rehabilitation Land Uses

Woodland areas will be established on slopes and upper terraces of the Northern and Southern Emplacement Areas. Tree species selection and planting densities adjacent to Boggabri and Leard State Forest are being determined with consideration of required integration with the Boggabri waste emplacement area and Leard State Forest. Rehabilitation on the southern emplacement is immature and requires ongoing maintenance. Rehabilitation on the northern emplacement is further advanced, requires significantly less maintenance and is nearing the point where it could be considered that open woodland land use has been achieved. Rehabilitation has commenced adjacent to Boggabri and in the Leard State Forest (ML1685) which has been undertaken in accordance with the MOP and is currently immature.

Rehabilitation on the northern emplacement area has not reached final completion however, is generally proceeding in accordance with predictions of the EA. Integration with Boggabri Coal's waste emplacement is described in the MOP and will begin to occur during 2017 with rehabilitation activities to follow as per the MOP.

Rehabilitation on the southern emplacement has not advanced as predicted in the EA as a result of a number of factors including the postponement of the relocation of the infrastructure area, commencement of haulage of ROM coal to Boggabri Coal rail facility and subsequent construction of the services corridor. The further advancement of rehabilitation of the southern emplacement is described in the current MOP and future revision of the MOP.

No rehabilitation of agricultural lands has occurred.

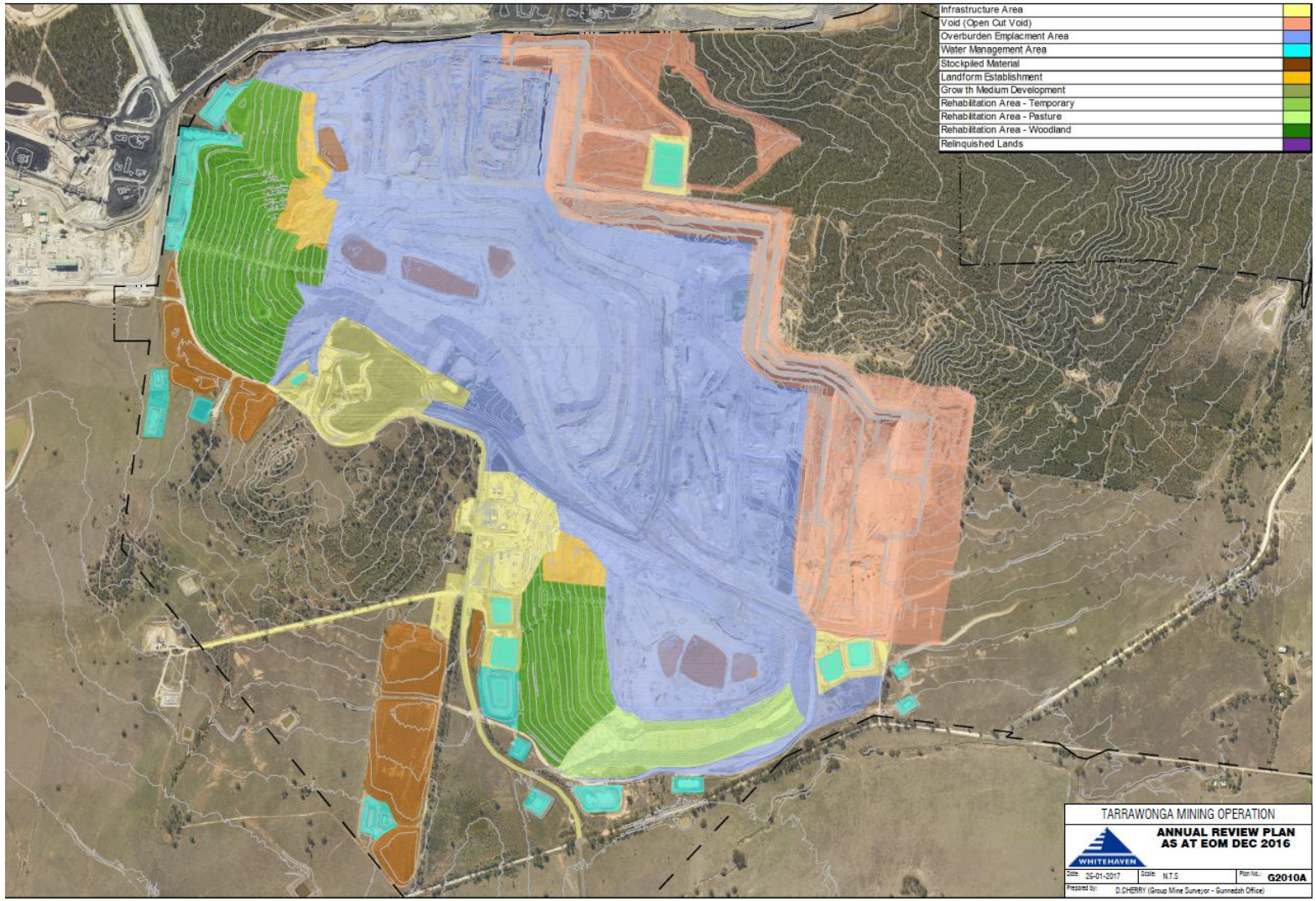

Figure 10 - Status of Mining and Rehabilitation

8.1.3 Rehabilitation Undertaken

During the reporting period rehabilitation activities were restricted to landform establishment and growth medium development activities focussing on the northern extension emplacement. A total of 9.9ha transitioned from active mining to landform establishment.

8.1.4 Rehabilitation Monitoring

Winter and spring monitoring programmes are undertaken on site in accordance the MOP (formerly the Rehabilitation Management Plan). Part of this monitoring provided an annual snapshot of the habitats available in these areas and habitat utilisation by fauna. This was then compared to baseline data collected from adjacent unaffected land surrounding the mine to determine its success and progression in regards to habitat value for native and threatened species. Monitoring undertaken during the reporting period indicates rehabilitation trending towards completion criteria some minor revegetation will be required on an ongoing basis.

8.1.5 Weeds Management

Monthly inspections of rehabilitation areas, as well as periodic general observations of the site, are undertaken in order to identify the presence of weeds. Where practicable weed infestations are managed with a combination of chemical, physical or biological controls. African Boxthorn is actively managed within the rehabilitation areas and is currently being controlled effectively with very few plants observed. The rehabilitation monitoring report identified that African boxthorn had been successfully controlled in the monitoring plots. Rhodes Grass which had been identified in the previous monitoring report and was subject to ongoing control was not identified in the report.

8.1.6 Renovation or Removal of Buildings

No renovation or removal of buildings occurred during the reporting period.

8.1.7 Other Rehabilitation Undertaken

No additional rehabilitation of explorations areas, infrastructure, shafts, adits, dams, fence lines or bunds occurred during the reporting period.

8.1.8 Departmental Sign-off of Rehabilitated Areas

Departmental sign-off has not been requested for any rehabilitated areas.

8.1.9 Variations in Activities against MOP/RMP

MOP Amendment A was approved by DRE during the reporting period to enable TCM to receive and dispose of both coarse and fine coal reject material (or a combination of both).

8.1.10 Trials, Research Projects and Initiatives

The direct seeding trial undertaken during 2015 has shown limited success; the site has been incorporated into the annual rehabilitation monitoring program to effectively evaluate success over time.

At this stage it is too early to determine success rates of the trial.

8.1.11 Key Issues to Achieving Successful Rehabilitation

The four key issues to achieving successful rehabilitation include:

- excessive erosion and sedimentation (e.g. gullying and sedimentation resulting in land stability and vegetation growth issues);
- weed and feral animal infestation;
- poor vegetation establishment and growth; and
- landform stability.

In cases where the performance is sub-optimal, additional management measures will be implemented (e.g. replanting, repairing landform and water management features, application of much/fertilisers, feral animal and weed control etc. A Trigger Action Response Plan (TARP) for rehabilitation at the TCM has been included in the MOP, which outlines appropriate actions and varied responses that will be implemented as required.

8.2 Actions for Next Reporting Period

Rehabilitation in the upcoming reporting period will include landform establishment (5.86ha) and ecosystem establishment 9.9ha within the northern extension emplacement and southern emplacement areas. In accordance with the MOP an area of 5.8ha is to be shaped ahead of rehabilitation activities in CY2018. The monitoring of rehabilitation condition involves the regular inspections of ground cover, trees and the presence of erosion and weeds. The 2017 rehabilitation monitoring program will be undertaken in winter and spring and will be reported in the next AR.

9 COMMUNITY

In accordance with PA 11_0047 a Community Consultative Committee (CCC) continues to be operated for TCM. The committee comprises representatives of Gunnedah Shire Council, Narrabri Shire Council, TCM and the community.

TCM maintains a designated complaints line. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded. Each complaint is investigated and documented with individual complaint records maintained. Complaints were reported to the Community Consultative Committee. Not withstanding the short reporting period the number of complaints has decreased since the previous reporting period, in particular in relation to air quality. Table 15 provides a comparison of complaints received over the last five AR reporting periods.

Table 15 – Complaints Summary and Trend

Category	2012/13	2013/14	2014/15	2015/16	2016
Air Quality	23	2	11	13	1
Traffic	8	3	0	0	1
Surface Water	1	0	0	0	1
Visual Amenity	1	0	0	0	0
Noise / Vibration	6	1	0	0	1
Blast	12	3	5	3	2
Other	4	2	2	0	0
TOTAL	55	11	18	16	5

* Tally of complaints does not necessarily equate to total complaints; some complaints received are for multiple categories.

Community contributions are managed in accordance the Whitehaven Coal Donations and Sponsorship Policy.

10 INDEPENDENT AUDIT

No independent audit was undertaken of TCM during the reporting period. The next independent audit is scheduled for July 2017. The most recent independent audit was undertaken in 2014. Outstanding items from the 2014 Audit Action Plan, and how they are being addressed, are summarised in Table 16 below.

Table 16 - 2014 Independent Audit - Outstanding Actions

Condition/Plan	Proposed Action	Status
PA 11_0047 Schedule 3 Condition 29	Review merit of "Wil-gai" as a control monitoring site.	AQMS submitted to DP&E for Approval.
PA 11_0047 Schedule 3 Condition 46	Provide security for the offset area as per consent condition.	Extension granted by DP&E based on upon significant progression towards completion (S6.4).
PA 11_0047 Schedule 3 Condition 49	Lodge Conservation and Biodiversity Bond with the Department.	3 months post approval of the BMP incorporating the LSF BMS and implementation plans.
Air Quality Greenhouse Gas Management Plan	Inclusion of predictive air dispersal modelling.	Air dispersal modelling software currently in commissioning phase on site and will continue to be utilised and improved onsite. AQMS submitted to DP&E for approval.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 Reportable Incidents

TCM reported one incident during the reporting period in relation to an exceedance of blasting limits refer to s6.2.2.

11.2 Non-compliances

Non-compliances with relevant approvals noted within Section 1 are outlined in Table 17.

Table 17 – Non-compliance Action Plan

Non - Compliance	Date / Location	Cause	Action Plan	Estimated Completion Date
Schedule 2(2)	Reporting Period.	Per below	Per below	Per below
Schedule 2(18) Operations of plant and equipment – Sound Power Levels	14th – 17th November 2016	Equipment sound power levels above EA indicative levels	1. Submission of Application to Project Approval. 2. Continue to liaise with DP&E and address any further comments or requirements	1. Complete 2. Subject to further liaison with DP&E. Preliminary investigation into attenuation options has commenced.
Schedule 3(9) Attenuation of Plant	14th – 17th November 2016	Equipment sound power levels above those EA indicative levels.	1. Submission of Application to Project Approval. 2. Continue to liaise with DP&E and address any further comments or requirements	1. Complete 2. Subject to further liaison with DP&E. Preliminary investigation into attenuation options has commenced.
Schedule 3 # 3 Noise Criteria	7th September 2016 1:14am	Exceedance of night time noise criteria limits.	Undertake investigation into primary cause and incorporate findings into daily operations.	Complete
ML1579 Condition 11 (b) ML 1693 Condition 10	19th August 2016 12:07pm	Exceedance of blast over pressure limits.	Undertake investigation and incorporate any findings into future blast designs.	Complete

11.3 Regulatory Actions

DP&E issued a Warning Letter to TCM in relation to the Sound Power Level results (Schedule 2(18) and Schedule 3(9). Actions are ongoing to address the requirements of the Department.

DP&E issued a Warning Letter in relation to the Biodiversity Management Plan (Schedule 3(47) for failure to consult with OEH when developing the translocation strategy associated with clearing activities at TCM. As required by DP&E the strategy has been developed in consultation with OEH and will be submitted prior to the 2017 clearing campaign.

12.0 Activities to be completed in the next reporting period

The following measures will be continued, or implemented, in the next reporting period:

- Review and revision of various Environmental Management Plans, including relocation of any monitoring currently on mine owned land to privately owned land;
- Undertake rehabilitation and mining activities in accordance the TCM MOP;
- The continuation of environmental monitoring and management;
- Implementation of approved Leard Forest Precinct Strategies;
- Continued community liaison and engagement with local stakeholders.

Appendix 1

BLAST MONITORING DATA

Tarrawonga Coal Pty Ltd ACN 155 742 195

Environmental Blast Monitoring

*no monitor results obtained on basis of blast size (coal/parting shots)

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME	Fume Rating
646	6/05/2016	Tarrawonga Station	0.4500	110.00	11:54:36	0
646	6/05/2016	Matong	0.5800	102.00	11:54:36	0
647	11/05/2016	Tarrawonga Station	0.4200	100.80	10:33:33	0
647	11/05/2016	Matong	0.3700	99.70	10:33:33	0
648	17/05/2016	Tarrawonga Station	0.3000	101.20	12:08:54	2a
648	17/05/2016	Matong	0.5500	108.80	12:08:54	2a
649	20/05/2016	Tarrawonga Station	0.6700	105.70	10:36:14	0
649	20/05/2016	Matong	0.3000	100.70	10:36:14	0
650	1/06/2016	Tarrawonga Station	0.3100	104.40	12:03:46	0
650	1/06/2016	Matong	0.4300	103.80	12:03:46	0
651	8/06/2016	Tarrawonga Station	0.3900	102.00	11:55:37	0
651	8/06/2016	Matong	0.5200	106.20	11:55:37	0
652	10/06/2016	Tarrawonga Station	0.1500	99.20	11:53:46	0
652	10/06/2016	Matong	0.1200	100.00	11:53:46	0
653	16/06/2016	Tarrawonga Station	0.3600	101.90	12:04:35	0
653	16/06/2016	Matong	0.6000	108.00	12:04:35	0
654	17/06/2016	Tarrawonga Station	0.0500	111.30	14:52:24	0
654	17/06/2016	Matong	0.0300	104.80	14:52:24	0
655	23/06/2016	Tarrawonga Station	0.1700	103.10	13:36:57	3a
655	23/06/2016	Matong	0.4300	115.30	13:36:57	3a
656	30/06/2016	Tarrawonga Station	0.0000	97.90	14:31:04	0
656	30/06/2016	Matong	0.0200	104.20	14:31:04	0
657	1/07/2016	Tarrawonga Station	0.3300	94.50	11:58:16	0
657	1/07/2016	Matong	0.4500	95.70	11:58:16	0
658	8/07/2016	Tarrawonga Station	0.0300	100.60	10:31:14	0
658	8/07/2016	Matong	0.0200	95.30	10:31:14	0
659	14/07/2016	Tarrawonga Station	0.4300	115.30	11:55:01	0
659	14/07/2016	Matong	0.4800	103.60	11:55:01	0
660	15/07/2016	Tarrawonga Station	0.4400	107.60	12:00:39	0
660	15/07/2016	Matong	0.6200	104.60	12:00:39	0
661	20/07/2016	Tarrawonga Station	0.2300	105.30	11:56:02	0
661	20/07/2016	Matong	0.5000	110.00	11:56:02	0
662	22/07/2016	Tarrawonga Station	0.4700	91.90	16:27:17	0
662	22/07/2016	Matong	0.6600	103.50	16:27:17	0
663	27/07/2016	Tarrawonga Station	0.3600	111.80	11:05:03	0
663	27/07/2016	Matong	0.6400	110.50	11:05:03	0
664	29/07/2016	Tarrawonga Station	0.4500	105.70	12:01:56	0
664	29/07/2016	Matong	0.7300	103.30	12:01:56	0
665	5/08/2016	Tarrawonga Station	0.2700	101.00	11:45:46	2b
655	5/08/2016	Matong	0.1500	101.00	11:45:46	2b
666	11/08/2016	Tarrawonga Station	0.3300	83.50	14:31:38	0
666	11/08/2016	Matong	0.6900	97.50	14:31:38	0
667	12/08/2016	Tarrawonga Station	0.3100	95.20	11:02:35	1a
667	12/08/2016	Matong	0.2300	93.60	11:02:35	1a
668	18/08/2016	Tarrawonga Station	0.3800	107.00	11:56:27	0
668	18/08/2016	Matong	0.4500	105.90	11:56:27	0
669	19/08/2016	Tarrawonga Station	0.2400	121.20	12:07:36	0
669	19/08/2016	Matong	0.3900	113.90	12:07:36	0
670	22/08/2016	Tarrawonga Station	0.0600	104.30	12:01:06	0
670	22/08/2016	Matong	0.0400	97.40	12:01:06	0
671	31/08/2016	Tarrawonga Station	0.1900	98.60	12:21:03	0
671	31/08/2016	Matong	0.2300	109.10	12:21:03	0
672	1/09/2016	Tarrawonga Station	0.5000	115.30	15:41:40	1b
672	1/09/2016	Matong	0.3900	101.00	15:41:40	1b
673	8/09/2016	Tarrawonga Station	0.3200	88.50	16:38:45	0
673	8/09/2016	Matong	0.4900	86.30	16:38:45	0
674	9/09/2016	Tarrawonga Station	0.3600	124.20	15:18:50	0
674	9/09/2016	Matong	0.2900	104.70	15:18:50	0
675	10/09/2016	Tarrawonga Station	0.1200	96.40	9:06:25	0
675	10/09/2016	Matong	0.1000	102.90	9:06:25	0
676	13/09/2016	Tarrawonga Station	0.1900	104.90	10:50:31	2a
676	13/09/2016	Matong	0.2600	112.60	10:50:31	2a
677	14/09/2016	Tarrawonga Station	0.1200	94.20	10:37:53	0
677	14/09/2016	Matong	0.0600	95.00	10:37:53	0
678	20/09/2016	Tarrawonga Station	0.2100	92.40	12:15:51	0
678	20/09/2016	Matong	0.1000	91.20	12:15:51	0
679	23/09/2016	Tarrawonga Station	0.6600	104.40	13:04:47	0
679	23/09/2016	Matong	0.4900	99.70	13:04:47	0
680	28/09/2016	Tarrawonga Station	0.2100	107.40	14:29:54	0
680	28/09/2016	Matong	0.3800	106.50	14:29:54	0
681	5/10/2016	Tarrawonga Station	0.1900	96.70	13:01:39	2a
681	5/10/2016	Matong	0.3400	100.80	13:01:39	2a
682	12/10/2016	Tarrawonga Station	0.1500	97.70	12:10:16	0
682	12/10/2016	Matong	0.1900	105.90	12:10:16	0
683	14/10/2016	Tarrawonga Station	0.2800	100.70	13:58:59	0
683	14/10/2016	Matong	0.2800	99.50	13:58:59	0
684	18/10/2016	Tarrawonga Station	0.2900	96.80	12:05:49	0
684	18/10/2016	Matong	0.2800	103.10	12:05:49	0
685	20/10/2016	Tarrawonga Station	0.1400	98.40	12:07:47	2a
685	20/10/2016	Matong	0.3100	101.40	12:07:47	2a
686	24/10/2016	Tarrawonga Station	0.1500	100.50	15:08:26	0
686	24/10/2016	Matong	0.1300	94.50	15:08:26	0
687	25/10/2016	Tarrawonga Station	0.0100	94.90	14:37:59	0
687	25/10/2016	Coomalgah	0.0000	88.70	14:37:59	0
688	3/11/2016	Tarrawonga Station	0.1000	93.40	12:06:09	0
688	3/11/2016	Coomalgah	0.1300	88.60	12:06:09	0
689	4/11/2016	Tarrawonga Station	0.1600	94.20	14:02:02	2b
689	4/11/2016	Coomalgah	0.1900	100.70	14:02:02	2b
690	10/11/2016	Tarrawonga Station	0.0900	100.20	11:32:01	1a
690	10/11/2016	Coomalgah	0.0400	88.20	11:32:01	1a
691	17/11/2016	Tarrawonga Station	0.6600	106.30	12:06:43	0
691	17/11/2016	Coomalgah	0.4100	98.60	12:06:43	0
692	25/11/2016	Tarrawonga Station	0.3100	108.20	11:56:59	0
692	25/11/2016	Coomalgah	0.3400	101.50	11:56:59	0
693	12/01/2016	Tarrawonga Station	0.0200	99.80	10:03:30	0
693	12/01/2016	Coomalgah	0.0100	89.10	10:03:30	0
694	12/06/2016	Tarrawonga Station	0.1300	90.20	14:44:17	0
694	12/06/2016	Coomalgah	0.0300	101.80	14:44:17	0
695	12/09/2016	Tarrawonga Station	0.3100	97.70	12:06:29	0
695	12/09/2016	Coomalgah	0.3600	96.00	12:06:29	0
696	14/12/2016	Tarrawonga Station	0.1800	103.00	12:09:28	0
696	14/12/2016	Coomalgah	0.1900	105.10	12:09:28	0
697	15/12/2016	Tarrawonga Station	0.1000	91.80	14:33:19	0
697	15/12/2016	Coomalgah	0.0600	96.40	14:33:19	0
698	23/12/2016	Tarrawonga Station	0.0100	97.00	11:34:21	0
698	23/12/2016	Coomalgah	0.0100	93.10	11:34:21	0
699	30/12/2016	Tarrawonga Station	0.4100	101.10	12:00:44	0
699	30/12/2016	Coomalgah	0.2600	96.60	12:00:44	0

Appendix 2

SURFACE WATER MONITORING DATA

Quarterly Surface Water Monitoring Results

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
	8 September 2006		SD5	6.5	930	144		<2				
	8 September 2006		SD6	7.5	310	104		<2				
	8 September 2006		SD8	8.9	190	25		<6				
	8 September 2006		SD9	9	285	1940		<2				
	11 January 2007		SD5	8.4	3750	20		<2				
	11 January 2007		SD8	8.2	420	84						
	11 January 2007		SD9	8.6	440	15		<2				
	11 January 2007		MV1	7.7	3970	293		<2				
	18 April 2007		SD1	8.6	605	86		<2				
	18 April 2007		SD2	8.5	395	102		<2				
	18 April 2007		SD8	8.6	270	36		<2				
	18 April 2007		SD9	8.4	310	133		<2				
	18 April 2007		SD20	9.1	520	80		<2				
	18 April 2007		MV	7.8	4260	<2		<2				
27514.01	25 July 2007	1510	SD1	7.5	990	23		<2				
27514.02	25 July 2007	1525	SB5	8	1150	17		<2				
27514.03	25 July 2007	1540	MV1	7.6	3130	15		30				
27514.04	25 July 2007	1550	SD8	8.1	260	25		<2				
27514.05	25 July 2007	1600	SD9	7.7	290	22		<2				
27514.06	25 July 2007	1605	SD5	8.4	3370	8		<2				
28415.01	31 October 2007	1545	SD9	7.8	310	16		<2				
28415.02	31 October 2007	1555	SD8	8.8	780	32		<2				
28415.03	31 October 2007	1610	SB5	8.9	1200	60		<2				
28415.04	31 October 2007	1620	SB8*	9	2000	110		<2				
28415.05	31 October 2007	1630	SB7	8.4	560	27		<2				
28415.06	31 October 2007	1640	MV	8.1	2780	45		<2				
28415.07	31 October 2007	1650	SD5	8.3	2620	44		<2				
29740.01	18 March 2008	1035	SD9	6.9	245	27		<2				
29740.02	18 March 2008	1050	SD8	8.4	1340	19		<2				
29740.03	18 March 2008	1110	SD5									
29740.04	18 March 2008	1120	SD20	7.4	385	44		<2				
29740.05	18 March 2008	1130	Pit Water Dam	8.4	1620	14		<2				
29740.06	18 March 2008	1145	MV	7.8	3110	10		<2				
29740.07	18 March 2008	1155	SB5	7.8	870	54		<2				
29740.08	18 March 2008	1200	SB7	7.5	365	387		<2				
29740.09	18 March 2008	1205	SD17	7.4	460	58		<2				
31188.01	22 August 2008	1350	SD9	7.9	275	35		<2				
31188.02	22 August 2008	1355	SD8	8.9	1450	20		<2				
31188.03	22 August 2008	1405	SB16	8.8	1440	16		<2				
31188.04	22 August 2008	1425	SD5	8.7	1310	35		<2				
31188.05	22 August 2008	1430	SB4	8.7	1980	31		<2				
31188.06	22 August 2008	1440	SB5	8.5	955	13		<2				
31188.07	22 August 2008	1455	Pit Water Dam	8.7	2420	17		<2				
31333.01	5 September 2008	1600	BCD	7.2	75	150		<2				
31333.02	5 September 2008	1025	DAM1	7.4	185	4930		<2				
31490.01	23 September 2008	1400	BCU	6.8	95	92		<2				
31490.02	23 September 2008	1545	BCD	6.7	115	107		<2				
31490.03	23 September 2008	1516	SD8	8.9	995	24		<2				
31490.04	23 September 2008	1450	SD17	8.3	720	456		<2				
31597.01	7 October 2008	930	SD17	8.2	735	75		<2				
31597.02	7 October 2008	950	SD8	8.9	775	22		<2				
31597.03	7 October 2008	1015	SB14	8.5	255	43		<2				
32277.01	15 December 2008	1114	SD17	7.4	435	152		<2				
32277.02	15 December 2008	1140	SD9	7.3	245	24		3				
32277.03	15 December 2008	1130	SD8	8.2	635	22		<2				
32277.04	15 December 2008	1207	BCD	6.9	135	30		<2				
32738.01	10 February 2009	0620	MV	8.2	3370	13		<2				
32738.02	10 February 2009	0638	SD8	8.9	790	11		<2				
32738.03	10 February 2009	0655	SD9	8.5	330	16		<2				
32738.04	10 February 2009	0646	SB14	8	380	32		<2				
32738.05	10 February 2009	0604	SB5	8.8	1070	7		<2				
32738.06	10 February 2009	0631	SB16	9	1200	6		<2				
ES0909243-001	24 June 2009	0910	SB7	8.21	401	90	6	<5				
ES0909243-002	24 June 2009	0925	SB5	8.62	1180	12	8	<5				
ES0909243-003	24 June 2009	0935	Pit water	8.87	2330	148	5	<5				
ES0909243-004	24 June 2009	0950	SD9	8.33	335	5	8	<5				
ES0909243-005	24 June 2009	1010	SD16	8.16	550	20	5	<5				
ES0909243-006	24 June 2009	1040	SB14	7.71	351	29	9	<5				
ES0912983-001	27 August 2009	1035	SB7	8.1	418	62	5	<10				
ES0912983-002	27 August 2009	1050	SB5	8.64	1210	29	8	<10				
ES0912983-003	27 August 2009	1145	Pit water	8.2	2580	264	6	<10				
ES0912983-004	27 August 2009	1105	SD9	8.36	389	12	8	<10				
ES0913144-001	31 August 2009	0905	SB14	8.73	342	56	10	<10				
ES0913144-002	31 August 2009	0915	SD16	8.3	547	158	5	<10				
ES0919560-001	22 December 2009	1030	NCD	7.8	137	164	16	19				
ES0919560-002	22 December 2009	1100	BCU	7.32	150	220	25	-				
ES0919560-003	22 December 2009	1125	BCD	7.04	146	32	43	-				
ES0919731-001	29 December 2009	1300	BCD	6.88	75	47	15					

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES0919731-002	29 December 2009	1310	NCD	6.73	143	32	10					
ES0919731-003	29 December 2009	1320	NCU	6.79	95	34	18					
ES0919731-004	29 December 2009	1350	SD14	8.12	1080	65	4					
ES0919731-005	29 December 2009	1405	SB14	7.41	374	128	19					
ES0919731-006	29 December 2009	1410	Goonbri Creek	7.02	60	38	12					

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1003581-001	25 February 2010	1400	SB7	8.14	197	194	3	5				
ES1003581-002	25 February 2010	1415	SB5	8.06	681	77	4	<5				
ES1003581-003	25 February 2010	1505	SD9	7.95	123	18	8	5				
ES1003581-004	25 February 2010	1445	SD16	8.49	734	257	3	<5				
ES1003581-005	25 February 2010	1455	SB14	8.03	232	40	6	<5				
ES1003581-006	25 February 2010	1530	SD2	8.37	276	15	<5	<5				
ES1009879-001	24 May 2010	1030	SB7	8.41	291	17	4	13				
ES1009879-001	24 May 2010	1045	SB5	8.59	531	48	5	13				
ES1009879-001	24 May 2010	1110	SD9	8.62	148	10	8	6				
ES1009879-001	24 May 2010	1125	SD16	8.93	810	9	4	8				
ES1009879-001	24 May 2010	1205	SB14	7.76	251	538	8	6				
ES1013265-001	6 July 2010	1130	SB14	8.09	245	95	5	<5				
ES1015929-001	9 August 2010	1245	SB16	8.39	1170	10	3	<5				
ES1015929-002	9 August 2010	1320	Pit water	7.07	1940	37	2	<5				
ES1015929-003	9 August 2010	1150	SD9	7.72	147	24	9	<5				
ES1015929-004	9 August 2010	1210	SD16	8.29	793	40	5	<5				
ES1015929-005	9 August 2010	1220	SB14	7.69	260	1300	6	<5				
ES1022163-001	2 November 2010	1610	SB7 (pre floc)	8.33	332	38	4	<5				
ES1022525-001	4 November 2010	1530	SB7 (post floc)	8.72	339	10	3	<5				
ES1022922-01	10 November 2010	940	SB16	9.19	1140	14	3	<5				
ES1022922-02	10 November 2010	1020	SD9	7.94	168	16	11	<5				
ES1022922-03	10 November 2010	1000	SD16	9.49	831	11	5	<5				
ES1022922-04	10 November 2010	1010	SB14	7.72	323	56	5	<5				
ES1105082-001	9 March 2011	1120	SD17	8.38	393	42	6	<5				
ES1105082-002	9 March 2011	0915	SB16	7.17	968	20	6	<5				
ES1105082-003	9 March 2011	1200	VOID	7.95	2540	78	6	<5				
ES1105082-004	9 March 2011	1050	SD9	7.98	186	30	11	<5				
ES1105082-005	9 March 2011	1110	SD16	8.71	762	27	5	<5				
ES1105082-006	9 March 2011	1015	SB14	8.17	361	43	6	<5				
ES1109209-001	3 May 2011	11:00	SD16	8.58	1020	22	6	<5	<0.001	0.002	0.014	<0.01
ES1109209-002	3 May 2011	11:20	SB14	7.9	434	24	6	<5	<0.001	0.002	0.004	<0.01
ES1109209-003	3 May 2011	10:40	SD17	8.92	2040	20	6	<5	<0.001	0.004	0.014	<0.01
ES1109209-004	3 May 2011	10:50	SB16	8.58	1030	13	4	<5	0.003	0.2	0.029	<0.01
-	3 May 2011	-	VOID	Dry								
ES1116908-001	4 August 2011	14:10	SD16	8.64	975	32	8	<5	<0.001	0.002	0.011	<0.01
ES1116908-002	4 August 2011	14:25	SB14	8.33	414	24	6	<5	<0.001	0.001	0.003	<0.01
ES1116908-003	4 August 2011	13:40	SD17	8.53	925	10	8	<5	<0.001	0.002	0.006	<0.01
ES1116908-004	4 August 2011	13:10	SB16	8.52	891	24	4	<5	0.004	0.002	0.028	<0.01
ES1116908-005	4 August 2011	13:10	VOID	8.52	2890	49	5	<5		0.015		
ES1124591-001	9 November 2011	13:00	SD16	9.03	791	20	7	<5	<0.001	0.003	0.010	<0.01
ES1124591-002	9 November 2011	12:30	SB14	7.84	431	20	5	<5	<0.001	0.002	0.004	<0.01
ES1124591-003	9 November 2011	13:20	SD17	8.39	448	56	6	<5	<0.001	0.002	0.003	<0.01
ES1124591-004	9 November 2011	11:10	SB16	8.39	646	6	3	<5	0.003	0.002	0.026	<0.01
ES1124591-005	9 November 2011	14:00	VOID	8.08	1790	158	3	<5				
ES1204830-001	29 February 2012	1240	SD16	7.96	365	34	2	<5	<0.001	0.001	0.009	<0.01
ES1204830-002	29 February 2012	1220	SB14	8.15	443	174	5	<5	<0.001	0.002	0.003	<0.01
ES1204830-003	29 February 2012	1145	SD17	8.23	434	18	7	<5	<0.001	0.003	0.004	<0.01
ES1204830-004	29 February 2012	1200	SB16	8.17	433	23	1	<5	0.001	0.001	0.012	<0.01
ES1204830-007	29 February 2012	1115	VOID	8.3	727	1620	2	<5		0.008		
ES1205971-001	9 March 2012	10:05	SB23 Pre-floc	7.84	148	70	4	<5				
ES1205971-002	10 March 2012	10:00	SB23 24hrs post floc	7.82	159	60	16	<5				
ES1205971-003	11 March 2012	9:30	SB23 48hrs post floc	7.75	158	61	16	<5				
ES1205277-001	2 March 2012	10:05	SD16 Pre-floc	8.17	351	16	2	<5				
ES1205277-002	2 March 2012	10:25	SB14 Pre-floc	8.13	452	50	5	<5				
ES1210729-001	2 May 2012	11:40	SD16	8.37	388	14	2	<5	<0.001	<0.001	0.008	<0.01
ES1210729-002	2 May 2012	12:00	SB14	9.08	1060	57	5	<5	<0.001	0.002	0.004	<0.01
ES1210729-003	2 May 2012	10:30	SD17	8.74	602	8	6	<5	<0.001	0.001	0.006	<0.01
ES1210729-004	2 May 2012	10:45	SB16	7.87	456	6	1	<5	0.001	0.001	0.013	<0.01
ES1210729-005	2 May 2012	10:00	VOID	8.26	2080	10	1	<5	0.002	0.009	0.048	<0.01
ES1210729-006	2 May 2012	11:15	GCR1	7.99	689	104	35	<5	<0.001	0.003	0.002	<0.01
ES1211990-001	11 May 2012	16:00	SB23		246	18	8	<5				
ES1212919-001	22 May 2012	1:50	SB24		373	42	11	<5				
ES1212919-002	22 May 2012	2:30	SB14		980	42	5	<5				
ES1212919-003	22 May 2012	2:55	SD16		400	35	2	<5				
ES1212919-004	22 May 2012	3:05	SD9		133	36	8	<5				
ES1212919-005	22 May 2012	3:25	SD17		618	20	6	<5				
ES1213239-001	28 May 2012	7:45	SD17	8.58	558	16	7	<5				
ES1213239-002	28 May 2012	8:05	SD9	7.97	136	37	8	<5				
ES1213239-003	28 May 2012	8:25	SB14	8.21	661	53	5	<5				

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1213239-004	28 May 2012	8:40	SB24	8.21	351	42	11	<5				
ES1215160-001	18 June 2012	9:30	SB14	8.05	513	92	5	<5				
ES1215160-002	18 June 2012	9:30	SD16	8.13	445	25	4	<5				
ES1215160-003	18 June 2012	9:30	SD9	7.95	137	23	8	<5				
ES1215160-004	18 June 2012	9:30	SD17	8.54	533	14	6	<5				
ES1215160-005	18 June 2012	9:30	Canyon SD	8.13	304	87	9	<5				

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1217223-001	11 July 2012	4:33	NCD	7.19	174	150	19	<5				
ES1218109-001	20 July 2012	11:30	SB23-After Floc	7.92	254	16	3	<5				
ES1218108-001	23 July 2012	11:00	SD16-Background info water	8.02	450	25	3	<5				
ES1218108-002	23 July 2012	11:15	SD14-After floc	7.94	590	35	3	<5				
ES1219866-001	14 August 2012	10:40	SD16	8.1	454	<5	3	<5	<0.001	0.001	0.008	<0.01
ES1219866-002	14 August 2012	11:00	SB14	8.11	646	<5	7	<5	<0.001	0.002	0.007	<0.01
ES1219866-003	14 August 2012	10:00	SD17	8.08	465	<5	5	<5	<0.001	0.001	0.004	<0.01
ES1219866-004	14 August 2012	10:15	SB16	7.96	561	<5	2	<5	0.003	0.002	0.02	<0.01
ES1219866-005	14 August 2012	9:40	VOID	8.39	2220	<5	2	<5				
ES1219866-006	14 August 2012	11:40	GCR1	7.82	190	16	19	<5	<0.001	0.002	<0.001	<0.01
ES1219866-007	14 August 2012	11:20	GCR2	7.72	182	12	17	<5	<0.001	0.002	<0.001	<0.01
ES1227081-001	14 November 2012	11:10	SD16	9.84	679	100	6	<5	<0.001	0.004	0.01	<0.01
ES1227081-002	14 November 2012	10:40	SB14	8.85	890	24	3	<5	<0.001	<0.001	0.006	<0.01
ES1227081-003	14 November 2012	10:15	SD17	8.7	700	14	4	<5	<0.001	<0.001	0.006	<0.01
ES1227081-004	14 November 2012	10:00	SB16	8.69	707	76	1	<5	0.004	0.002	0.026	<0.01
ES1227081-005	14 November 2012	9:30	VOID	8.62	2870	10	<1	<5				
ES1302567-001	1 February 2013	15:10	SD9 pre floc	7.44	262	43	7	<5				
ES1302567-002	1 February 2013	13:10	SD9 post floc	7.39	267	82	8	<5				
ES1303969-001	20 February 2013	15:00	SD9-Pre Discharge	7.89	275	18	8	<5				
ES1305311-001	6 March 2013	10:40	SD16	7.69	252	288	5	<5	<0.001	0.005	0.001	<0.01
ES1305311-002	6 March 2013	11:00	SB14	7.81	378	99	4	<5	<0.001	0.001	0.002	<0.01
ES1305311-003	6 March 2013	10:20	SD17	8	229	91	4	<5	<0.001	<0.001	0.002	<0.01
ES1305311-004	6 March 2013	9:30	SB16A	8.01	365	240	4	<5	0.002	0.004	0.013	<0.01
ES1305311-005	6 March 2013	9:50	VOID	8.23	1620	16	2	<5				
ES1305311-006	6 March 2013	11:20	GCR1	7.43	126	106	5	<5	<0.001	<0.001	<0.001	<0.01
ES1305311-007	6 March 2013	11:40	GCR2	7.42	173	48	16	<5	<0.001	0.002	<0.001	<0.01
ES1312392-001	30 May 2013	11:20	SD16	8.16	341	100	7	<5	<0.001	0.003	0.003	<0.01
ES1312392-002	30 May 2013	11:00	SB14	8.42	538	38	6	<5	<0.001	0.002	0.003	<0.01
ES1312392-003	30 May 2013	10:00	SD17	8.47	334	49	6	<5	<0.001	0.002	0.003	<0.01
ES1312392-004	30 May 2013	10:30	SB16A	8.25	530	108	10	<5	0.004	0.004	0.018	<0.01
ES1312392-005	30 May 2013	9:30	VOID	8.51	3120	45	4	<5				
ES1317665-001	7 August 2013	10:20	SD16	8.49	390	7	6	<5	<0.001	0.001	0.003	<0.01
ES1317665-002	7 August 2013	10:40	SB14	8.96	570	8	7	<5	<0.001	<0.001	0.002	<0.01
ES1317665-003	7 August 2013	10:00	SD17	8.59	371	9	4	<5	<0.001	<0.001	0.003	<0.01
ES1317665-004	7 August 2013	9:30	SB16A	8.05	585	20	7	<5	0.005	0.003	0.022	<0.01
ES1317665-005	7 August 2013	11:30	VOID	8.35	2660	29	6	<5				
ES1317665-006	7 August 2013	11:00	TAR-GCD	7.4	155	52	16	<5	<0.001	0.002	<0.001	<0.01
ES1317665-007	7 August 2013	11:15	TAR-GCU	7.42	208	14	20	<5	<0.001	0.003	<0.001	<0.01
ES1324032-001	5 November 2013	9:35	SD16	9.42	538	29	15	<5	<0.001	0.004	0.004	<0.01
ES1324032-002	5 November 2013	9:35	SB14	8.55	1070	172	17	<5	<0.001	0.002	0.005	<0.01
ES1324032-003	5 November 2013	8:45	SD17	8.87	573	21	9	<5	<0.001	0.002	0.005	<0.01
ES1324032-004	5 November 2013	9:10	SB16A	8.8	918	38	8	<5	0.008	0.005	0.04	<0.01
ES1324032-005	5 November 2013	11:00	VOID	8.25	2530	11	29	<5		0.01		
ES1403679-001	20 February 2014	11:05	TAR-SD16	8.35	432	65	6	<5	<0.001	0.006	0.003	<0.01
ES1403679-002	20 February 2014	11:25	TAR-SB14	8.09	393	1280	8	<5	<0.001	0.005	<0.001	0.01
ES1403679-003	20 February 2014	10:45	TAR-SD17	8.79	712	46	8	<5	<0.001	0.002	0.007	<0.01
ES1403679-004	20 February 2014	9:10	TAR-SB16A	8.61	713	330	8	<5	0.004	0.01	0.023	<0.01
ES1403679-005	20 February 2014	10:15	TAR-VOID	8.63	1350	22	1	<5	0.007	0.026	0.101	<0.01
ES1403679-006	20 February 2014	11:45	TAR-GCU	6.69	115	433	23	<5	<0.001	0.005	0.001	<0.01
ES1410071-001	6 May 2015	10:15	TAR-SD16	8.12	404	19	3	21	<0.001	0.004	0.003	<0.01
ES1410071-002	6 May 2015	10:30	TAR-SB14	8.92	1980	10	4	5	<0.001	0.002	0.008	<0.01
ES1410071-003	6 May 2015	9:55	TAR-SD17	8.26	351	25	3	<5	<0.001	0.002	0.0002	<0.01
ES1410071-004	6 May 2015	10:50	TAR-SB16A	8.2	483	134	1	<5	0.003	0.008	0.02	<0.01
ES1410071-005	6 May 2015	11:10	TAR-VOID	8.31	3280	213	<1	<5		0.006		
ES1410071-006	6 May 2015	12:05	TAR-GCU	7.89	318	<5	14	<5	<0.001	0.002	0.001	<0.01
ES1410071-007	6 May 2015	11:45	TAR-GCD	7.88	301	<5	17	<5	<0.001	0.001	<0.001	<0.01
ES1417356-001	6 August 2014	10:45	TAR-SD16	8.7	439	5	6	<5	<0.001	0.002	0.002	<0.01
ES1417356-002	6 August 2014	11:10	TAR-SB14	8.67	1450	22	7	<5	<0.001	0.001	0.004	<0.01
ES1417356-003	6 August 2014	9:40	TAR-SD17	8.44	397	48	7	<5	<0.001	0.002	0.003	<0.01
ES1417356-004	6 August 2014	10:30	TAR-SB16A	8.25	609	63	8	<5	0.005	0.004	0.024	<0.01
ES1417356-005	6 August 2014	10:10	TAR-VOID	8.5	3260	515	16	<5				
ES1417356-006	6 August 2014	11:40	TAR-GCU	8.31	392	42	14	<5	<0.001	0.002	<0.001	<0.01
ES1424845-001	11 November 2014	11:15	TAR-SD16	8.7	507	14	6	<5	<0.001	0.002	0.004	<0.01
ES1424845-002	11 November 2014	11:35	TAR-SB14	8.85	1480	50	14	<5	<0.001	0.003	0.012	<0.01
ES1424845-003	11 November 2014	10:30	TAR-SD17	8.7	539	34	7	<5	<0.001	<0.001	0.005	<0.01
ES1424845-004	11 November 2014	10:50	TAR-SB16A	8.51	740	18	5	<5	0.006	0.003	0.032	<0.01
ES1424845-005	11 November 2014	9:40	TAR-GCU	7.7	549	1230	57	<5	<0.001	0.022	0.006	<0.01
ES1424845-006	11 November 2014	9:10	TAR-GCD	7.64	751	62	50	<5	<0.001	0.011	0.004	<0.01
ES1427251-001	8 December 2014	0:45	TAR-VOID	8.04	3060	170	<1	<5				
ES1504050-001	18 February 2015	10:10	TAR-SD16	8.19	451	16	4	<5	<0.001	0.004	0.006	<0.01
ES1504050-002	18 February 2015	10:30	TAR-SB14	8	626	12	4	<5	<0.001	0.004	0.005	<0.01

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1504050-003	18 February 2015	9:30	TAR-SD17	8.13	313	123	5	<5	<0.001	0.007	0.006	<0.01
ES1504050-004	18 February 2015	9:50	TAR-SB16A	8.29	574	71	2	<5	0.003	0.007	0.025	<0.01
ES1504050-005	18 February 2015	11:40	TAR-GCU	7.43	242	86	6	<5	<0.001	0.01	0.02	<0.01
ES1504050-006	18 February 2015	12:00	TAR-GCD	7.22	444	748	26	<5	<0.001	0.016	0.002	<0.01
ES1504050-007	18 February 2015	10:45	TAR-VOID	8.72	3170	10	<1	<5				
ES1521532-001	7 May 2015	10:40	TAR-SD16	8.27	409	16	6	<5	<0.001	0.003	<0.001	<0.01
ES1521532-002	7 May 2015	10:55	TAR-SB14	8.85	1300	17	8	<5	<0.001	0.002	0.002	<0.01
ES1521532-003	7 May 2015	10:05	TAR-SD17	8.3	539	44	5	<5	0.001	0.003	0.007	<0.01
ES1521532-004	7 May 2015	10:20	TAR-SB16A	8.19	571	44	2	<5	0.005	0.003	0.008	<0.01
ES1521532-005	7 May 2015	9:45	TAR-VOID	8.62	2910	5	5	<5				
ES1521532-006	7 May 2015	11:15	TAR-GCD	7.35	147	29	8	<5	<0.001	0.003	<0.001	<0.01
ES1528624-001	17 August 2015	11:10	TAR-SD16	8.43	426	19	4	8	<0.001	0.003	0.011	<0.01
ES1528624-002	17 August 2015	11:30	TAR-SB14	8.91	1070	7	5	<5	0.001	0.001	0.02	<0.01
ES1528624-003	17 August 2015	10:35	TAR-SD17	8.81	902	192	8	7	<0.001	0.002	0.043	<0.01
ES1528624-004	17 August 2015	10:55	TAR-SB16A	7.95	658	65	2	7	0.007	0.004	0.05	<0.01
ES1528624-005	17 August 2015	9:45	TAR-GCU	7.67	161	96	6	6	<0.001	0.004	0.001	<0.01
ES1528624-006	17 August 2015	10:10	TAR-GCD	7.59	202	35	7	<5	<0.001	0.007	<0.001	<0.01
ES1529602-001	27 August 2015	10:35	TAR-VOID	8.41	1020	49200	<20	6				
ES1236562-001	17/11/2015	13:20	TAR-SD16	8.9	440	10	6	<5	<0.001	0.004	0.004	<0.01
ES1236562-002	17/11/2015	13:05	TAR-SB14	8.21	455	100	9	<5	<0.001	0.003	0.005	<0.01
ES1236562-003	17/11/2015	12:25	TAR-SD17	7.98	361	191	10	<5	<0.001	0.004	0.004	<0.01
ES1236562-004	17/11/2015	12:45	TAR-SB16A	8.08	550	64	6	<5	0.001	0.002	0.048	<0.01
ES1236562-005	17/11/2015	10:30	TAR-VOID	8.36	1350	43	4	<5				
ES1236562-006	17/11/2015	9:30	TAR-GCU	7.47	157	33	15	<5	<0.001	0.006	<0.001	<0.01
ES1603268-001	11/02/2016	11:45	TAR-SD16	8.2	289	95	5	<5	<0.001	0.006	0.004	<0.01
ES1603268-002	11/02/2016	11:30	TAR-SB14	8.29	722	21	4	<5	<0.001	0.004	0.007	<0.01
ES1603268-003	11/02/2016	12:15	TAR-SD17	8.26	698	174	2	<5	0.002	0.007	0.014	<0.01
ES1603268-004	11/02/2016	11:10	TAR-SB16A	7.99	622	84	1	<5	0.002	0.003	0.035	<0.01
ES1603268-005	11/02/2016	10:50	TAR-VOID	8.28	882	53	<1	<5				
ES1603268-006	11/02/2016	10:00	TAR-GCD	7.45	159	129	10	<5	<0.001	0.01	0.002	<0.01

Wet Weather Discharge Results

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
26194.01	BCU	1 March 2007	1600	6.8	165	193	<2		
26194.02	NCU	1 March 2007	1530	7.0	105	78	4		
26194.03	NCD	1 March 2007	1545	6.5	65	304	<2		
26194.04	BCD	2 March 2007	900	6.4	105	45	4		
26194.05	SD1	2 March 2007	1345	7.5	540	524	3		
26194.06	SD2	2 March 2007	1350	7.8	610	290	2		
27779.01	BCD	23 August 2007	1015	6.2	110	23	<2		
27779.02	SD8	23 August 2007	1035	6.8	475	5	<2		
27779.03	BCU	23 August 2007	1100	6.8	180	46	2		
29122.01	SB14	17 January 2008	1420	7.3	570	100	<2		
29122.02	SD17	17 January 2008	1500	7.6	425	837	<2		
29122.03	SD8	17 January 2008	1715	7.4	725	173	<2		
29297.01	BCU	6 February 2008	1505	7.1	120	20	<2		
29297.02	SD9	6 February 2008	1525	7.4	220	42	<2		
29297.03	SD8	6 February 2008	1535	8.2	1170	26	<2		
29297.04	SD17	6 February 2008	1615	7.9	420	476	<2		
29297.05	BCD	6 February 2008	1700	7.3	135	9	<2		
32813.01	BCU	17 February 2009	1418	6.8	275	35	<2		
32813.02	SD9	17 February 2009	1510	7.1	90	22	<2		
32813.03	BCD	17 February 2009	1530	6.5	130	32	<2		
ES1000141-001	SD16	4 January 2010	1600	7.3	729	51	<5	20	
ES1000141-002	NC-D	4 January 2010	1630	7.56	189	29	<5	28	
ES1000141-003	NC-U	4 January 2010	1725	7.42	181	68	<5	20	
ES1000141-004	BC-D	4 January 2010	1750	7.43	125	5	<5	35	
ES1002193	SD16	8 February 2010	1055	7.63	633	242	7	3	
ES1002886-001	SD17	15 February 2010	1315	7.56	252	1020	<5	4	
ES1002886-002	SD9	15 February 2010	1350	7.18	55	75	<5	11	
ES1002886-003	SD16	15 February 2010	1400	7.54	741	263	<5	7	
ES1002886-004	BCU	15 February 2010	1445	7.22	63	94	<5	13	
ES1002886-005	NCD	15 February 2010	1505	7.09	101	40	<5	19	
ES1002886-006	NCD	15 February 2010	1525	6.89	71	40	<5	26	
ES1002886-007	NCU	15 February 2010	1545	6.6	78	24	<5	30	
ES1006095-001	SD16	31 March 2010	0850	7.95	816	23	<5	3	
ES1013940-001	SB14	14 July 2010	1255	8.04	246	30	<5	7	
ES1015037-003	SB14	28 July 2010	1354	7.71	74	41	<5	15	
ES1015037-001	NCU	28 July 2010	1312	8.05	26	1940	<5	10	
ES1015037-002	NCD	28 July 2010	1325	7.53	379	44	<5	16	
ES1015611-001	BCD	3 August 2010	1115	8.03	101	32	<5	28	
ES1016049-005	SB14	10 August 2010	1300	6.76	233	2630	<5	<10	
ES1016049-001	NCU	10 August 2010	1200	7.51	34	766	<5	7	
ES1016049-002	NCD	10 August 2010	1215	7.14	72	616	<5	8	
ES1016049-004	BCU	10 August 2010	1250	6.66	65	94	<5	13	
ES1016049-003	BCD	10 August 2010	1230	6.7	78	39	<5	19	
ES1016144-001	SD16	11 August 2010	1150	8.42	727	64	<5	4	
ES1016144-002	SD9	11 August 2010	1200	7.27	116	28	<5	12	
ES1016962-001	SD16	20 August 2010	1230	8.76	748	22	9	4	
ES1016962-002	SB14	20 August 2010	1250	8.36	264	666	33	5	
ES1016962-003	BCD	20 August 2010	1310	8.29	115	26	22	32	
ES1017959-001	SD16	2 September 2010	1620				<5		
ES1017959-002	SB14	2 September 2010	1630				5		Resample for oil and grease only
ES1017959-003	BCD	2 September 2010	1600				<5		
ES1018430-002	SB14	10 September 2010	1220	7.71	298	548	<5	5	
ES1018430-001	BCD	10 September 2010	1120	6.64	99	66	<5	22	
ES1018625-001	SB14	15 September 2010	0820	7.63	272	231	5	5	
ES1018625-002	SD16	15 September 2010	0840	8.52	795	21	<5	5	
ES1018625-003	SD9	15 September 2010	0850	7.28	110	78	<5	19	
ES1023143-001	SB14	12 October 2010	0930	6.75	98	58	6	17	
ES1023279-001	BCD	16 October 2010	1055	6.58	143	85	8	17	
ES1023279-002	NCD	16 October 2010	1115	6.86	140	118	<5	22	
ES1024688-001	SD16	1 December 2010	1130	8.03	857	6	<5	6	
ES1025100-001	SB14	3 December 2010	0800	7.64	321	122	<5	5	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
ES1025103-001	BCD	6 December 2010	1420	6.72	152	46	<5	23	

ES1025678-001	SD17	10 December 2010	1000	7.31	232	152	<5	14	
ES1025678-002	NCD	10 December 2010	1030	6.97	132	79	<5	15	
ES1025678-003	NCU	10 December 2010	1055	6.57	29	181	<5	10	
ES1025678-004	SD16	10 December 2010	1140	8.14	800	45	<5	5	
ES1025678-005	SD9	10 December 2010	1200	7.25	118	66	<5	10	
ES1025678-006	SB14	10 December 2010	1210	6.9	77	156	<5	18	
ES1025678-007	BCD	10 December 2010	1230	6.83	77	65	<5	15	

Appendix 3

GROUNDWATER MONITORING DATA

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations					Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**											**1500**	**400**		**4000**			
THUIN																																															
MW1	2-Jun-06		7.77	8.50	7.48				0.006																	6330	92	138	1710	43		2680	424				772										
MW1	11-Jan-07		8.49	9.22	7.12				0.001				<0.0001	<0.005		<0.006		<0.001		0.026			0.11	<0.0001		2410	26	33	554	18		346	145				684										
MW1	18-Apr-07		6.77	7.50																																											
MW1	9-Jul-07		7.23	7.96	7.30	2440	17.4		<0.001				<0.0001	<0.005		0.0005		<0.001		0.008			0.09	<0.0001		2500	21	29	504	25		385	143				614								3.1	<20	380
MW1	10-Jul-07		7.18	7.91																																										
MW1	18-Jul-07		7.18	7.91																																										
MW1	7-Aug-07	1250	7.01	7.74																																										
MW1	22-Aug-07	1355	6.93	7.66																																										
MW1	5-Sep-07	1005	6.97	7.70																																										
MW1	24-Sep-07	1320	6.93	7.66																																										
MW1	11-Oct-07	1110	6.91	7.64																																										
MW1	26-Nov-07	1400	6.89	7.62																																										
MW1	29-Jan-08	1430	6.82	7.55																																										
MW1	4-Mar-08	1210	6.87	7.60																																										
MW1	23-Apr-08	1240	6.94	7.67	7.30	3100	21.3		<0.001				<0.00005	<0.01		0.002		0.0036		0.01			0.007	0.0002		3120	46	50	614	29		567	247				665									<0.025	0.027
MW1	21-Aug-08	1251	7.00	7.73																																										
MW1	29-Oct-08	1615	7.07	7.82	7.80	3430	21.6		0.001				0.00023	0.015		0.13		0.37		0.03			0.22	<0.0001		3500	44	51	670	32		680	210				690									<0.025	<0.100
MW1	29-Jan-09	1030	7.08	7.73																																										
MW1	17-Jun-09			7.87	7.20	5470	19.8		0.001	0.091	<0.001		<0.0001	0.013	0.001	0.047	0.71	0.008	0.103	0.009		<0.01	0.019	<0.0001		3870	46	61	762	28	41.2	777	167	<1	<1	725	725	39.9	1.58	<0.01				2320			
MW1	11-Sep-09	1344	7.23	7.90																																										
MW1	14-Dec-09	1000	7.23	7.90	7.5	4670	17.5	<0.01	0.001					<0.005		0.014	<0.05	0.001	0.131	0.038			0.048	<0.0001	7.83	4510	70	95	875	28	50.1	882	234	<1	<1	780	780	45.3	4.99		<0.01	0.2	0.2				
MW1	25-Feb-10	1025	7.17	7.84																																										
MW1	11-May-10	1045	7.46	8.13	7.56	4330	22.6		0.001	0.075	<0.001		0.0001	0.002	0.002	0.011	0.88	0.005	0.204	0.009		<0.01	0.012	<0.0001		4090	43	60	779	26	41.7	795	229	<1	<1	694	694	41	0.75	0.16				1850			
MW1	30-Aug-10	1010	7.47	8.14	7.47	3890	21.5																																								
MW1	9-Nov-10	1050	7.45	8.12	7.06	3170	24.6																																								
MW1	10-Mar-11	1310	7.38	8.05	7.1	3280	23.7	0.04	0.002					0.003		0.063	0.3	0.006	0.035	0.006			0.016	<0.0001	7.26	3650	44	62	771	29	41.6	839	210	<1	<1	658	658	41.2	0.49		<0.01	0.09	0.09				
MW1	6-Jun-11	1110	7.20	7.87	7.2	3110	19.9																																								
MW1	6-Sep-11	1050	7.19	7.86	7.09	3200	22.5	0.1	0.003	0.057	<0.001		0.0001	0.002	0.002	0.019	0.99	0.01	0.193	0.005		<0.01	0.014	<0.0001	7.72	3990	41	56	739	26	39.5	774	246	<1	<1	620	620	39.3	0.12	<0.01	<0.01	0.04	0.04	2080			
MW1	7-Dec-11	1020	7.09	7.76	7.16	3150	20.1																																								
MW1	13-Mar-12	1100	6.90	7.57	7.44	3140	21.9	0.12	<0.001	0.067	<0.001		<0.0001	0.003	<0.001	0.081	0.23	0.001	0.028	0.009		<0.01	0.027	<0.0001	7.78	3590	44	58	758	30	40.7	748	232	<1	<1	629	629	38.5	2.76	<0.01	<0.01	0.12	0.12	2040			
MW1	13-Jun-12	1100	6.53	7.20	7.37	3730	20.3																																								
MW1	4-Sep-12	1220	6.41	7.08	7.44	3340	20.8	0.03	<0.001	0.069	<0.001		<0.0001	0.005	<0.001	0.09	0.2	0.003	0.067	0.007		<0.01	0.067	<0.0001	7.8	3570	39	55	662	26	35.9	676	212	<1	<1	681	681	37.1	1.62	<0.01	<0.01	0.06	0.06	2090			
MW1	27-Nov-12	1020	6.25	6.92	7.54	3140	20.8																																								
MW1	20-Mar-13	1055	6.15	6.82	7.52	3180	21.9	0.05	0.002	0.055	<0.001		<0.0001	0.007	<0.001	0.1	0.25	0.008	0.031	0.016		<0.01	0.125	<0.0001	7.65	3400	35	48	700	25	36.8	575	182	<1	<1	690	690	33.8	4.2	0.08	<0.01	0.1	0.1	1830			
MW1	11-Jul-13	1040	6.18	6.85	7.49	3110	20.1																																								
MW1	5-Sep-13	1120	6.14	6.81	7.48	3040	21.4	0.15	<0.001	0.058	<0.001	0.06	<0.0001	0.003	<0.001	0.113	0.24	0.005	0.088	0.012	<0.01	<0.01	0.079	<0.0001	7.99	3330	31	44	677	27	35.3	586	205	<1	<1	672	672	34.2	1.52	0.02				1900			
MW1	22-Nov-13	1100	5.95	6.62	7.6	3140	20.8																																								
MW1	20-Feb-14	1100	6.08	6.75	7.5	3150	20.2	1.23	0.001	0.062	<0.001	<0.05	0.0004	0.023	0.001	0.487	2.49	0.031	0.073	0.016	<0.01	<0.01	0.624	<0.0001	7.65	3440	29	45	710	30	36.8	516	195	<1	<1	624	624	31.1	8.39	0.07				1800			
MW1	27-May-14	0950	6.25	6.92	7.6	3140	20.7																																							
MW1	9-Sep-14	1040	6.26	6.83	7.7	3220	20.2	0.13	0.002					0.01		0.058	0.53	0.006	0.077	0.009			0.098		7.97	3320	29	40	594	24	31.2	520	206	<1	<1	714	714	33.2	3.19		<0.01	0.17	0.17				
MW1	20-Nov-14	0945	6.36	7.03	7.7	3190	21.6																																							
MW1	26-Feb-15	1110	6.39	7.06	7.6	3170	27.7	0.08	0.001	0.056	<0.001		<0.0001	0.004	<0.001	0.045	0.3	0.003	0.078	0.009	<0.01	<0.01	0.118	<.00001	7.13	800	34	45	634	22	33.5	551	210	<1	<1	739	739	34.7	1.71	0.05	<0.01	0.15	0.15	1700			
MW1	26-May-15	1005	6.47	7.14	7.5	3210	19.2																																							
MW1	27-Aug-15	1200	6.51	7.18	7.6	3280	18.5	0.1	0.001	0.066	<0.001	<0.05	<0.0001	<0.001	<0.001	0.026	0.18	<0.001	0.019	0.004	<0.01	<0.01	0.073	<0.0001	8.03	3440	28	42	651	22	33.7	<1	225	<1	<	636	636	30.1	5.68	0.06	<0.01	0.11	0.11	1900			
MW1	4-Dec-16	1100	6.59	7.26	7.7	3270	21																																							
MW1	24-Feb-16	1130	6.59	7.26	7.6	3290	23.2	0.02	0.001	0.061	<0.001	<0.05	<0.0001	<0.001	<0.001	0.032	0.12	0.001	0.016	0.006	<0.01	<0.01	0.049	<0.0001	8.09	3400	40	48	715	24	37.7	582	233	<1	<1	686	686	35	3.66	0.1	<.01	0.15	0.15	1950			
MW1	23-May-16	1130	6.65	7.32	7.7	3340	21.4																																							
MW1	1-Sep-16	1100	6.67	7.34	7.6	3270	20.8	0.22	0.002					0.008		0.062	2.07	0.008	0.708	0.026				<0.0001	8	3350	36	45	545	20	34.1	572	210	<1	<1	674	674	34	0.1		<0.01	0.03	0.13				
MW1	29-Nov-16	1200	6.68	7.35	7.6	3170	21.7																																							
THUIN																																															
MW2	2-Jun-06		3.63	4.40	7				<0.001																	5440	132	106	1400	14		2230	475				432										
MW2	11-Jan-07		3.85	4.62	6.8				0.002				0.0001										0.09	<0.0001		511	1	<1	101	1		25.1	9				176										
MW2	18-Apr-07		2.83	3.60																																											
MW2	9-Jul-07		3.39	4.16	7.15	446	18.8		0.002				0.0002	<0.005		0.003		<0.001		0.002			0.233	<0.0001		496	<1	<1	99	1		27.2	11				175								7.89	<20	250
MW2	10-Jul-07		3.45	4.22																																										
MW2	18-Jul-07		3.52	4.29																																										
MW2	7-Aug-07	1245	3.58	4.35																																										
MW2	22-Aug-07	1350	3.55	4.32																																										
MW2	5-Sep-07	1040	3.57	4.34																																										
MW2	24-Sep-07	1315	3.57	4.34																																										
MW2	11-Oct-07	1105	3.60	4.37																																										
MW2	26-Nov-07	1355	3.91	4.68																																										
MW2	29-Jan-08	1435	3.48	4.25																																										
MW2	4-Mar-08	1200	3.46	4.23																																										
MW2	23-Apr-08	1115	3.73	4.50	7.3	400	19.9		0.005				0.00018	0.11		0.13		0.14		0.15			0.37	0.0004		440	8.9	5.8	99	17		39	10				165									<0.025	<0.1
MW2	21-Aug-08	1244	3.74	4.51																																										
MW2	29-Oct-08	1655	3.59	4.37	6.9	600	19.2		0.008				0.00007	0.026		0.027		0.061		0.031			0.17	0.0002		620	6.8	7.1	120	6.8		93	27				180									<0.025	<0.100
MW2	29-Jan-09	1040	3.73	4.51																																										
MW2	17-Jun-09		3.69	4.53	7.7	660	19.1		0.006	0.311	0.004		0.0002	0.025	0.052	0.047	32.6	0.052	1.54	0.041		0.08	0.172	0.0005		602	1	1	128	2	5.76	59	<10	<1	<1	195	195	5.57	1.62	0.1				1540			
MW2	11-Sep-09	1348	4.01	4.8																																										
MW2	14-Dec-09	1100	3.72	4.51	7.7	691	18.3	<0.01	<0.001					<0.001		<0.001	<0.05	<0.001	0.018	<0.001			<0.005	<0.0001	7.5	640	2	1	134	2	6.07	55.3	12.8	<1	<1	202	202	5.86	1.73		<0.01	0.45	0.45				
MW2	25-Feb-10	1029	1.72	2.51																																									
MW2	11-May-10	1115	2.15	2.94	7.61	717	22.3		0.014	0.441	0.006		0.0002	0.071	0.058	0.073	88.3	0.071	1.06	0.094		0.13	0.3	0.0002		618	2	1	129	2	5.84	76.7	24.3	<1	<1	149	149	5.66	1.6	0.01				780			
MW2	30-Aug-10	1020	2.10	2.89	7.4	590	20.5																																							
MW2	9-Nov-10	1040	2.22	3.01	7.32	513	24.1																																							
MW2	10-Mar-11	1330	2.96	3.75	7.31	566	24.2	0.28	0.001					0.001		0.018	0.3	0.002	0.018	0.006			0.045	0.0001	7.23	457	2	2	124	2	5.69	69	24	<1	<1	156	156	5.57	1.02		<0.01	0.07	0.07				
MW2	6-Jun-11	1130	2.86	3.65	7.3	553	20.3																																							
MW2	6-Sep-11	1120	2.95	3.74	6.9	585	19.8	1.93	<0.001	0.016	<0.001		<0.0001	0.002	<0.001	0.005	1.76	0.001	0.028	0.003		<0.01	0.021	<0.0001	7.33	692	3	3	144	2	6.71	92	32	<1	<1	169	169	6.64	0.5	<0.01	<0.01	0.02	0.02	340			

ANNUAL REVIEW
2016

TARRAWONGA COAL PTY LTD
Groundwater Monitoring Data

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																		Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**									**1500**	**400**		**4000**			
MW2	7-Dec-11	1040	2.71	3.5	7.08	600	19.2																																									
MW2	13-Mar-12	1130	2.38	3.17	7.06	912	22	0.3	<0.001	0.012	<0.001		<0.0001	0.002	<0.001	0.002	0.28	<0.001	0.058	0.004		<0.01	0.01	<0.0001	7.41	1060	12	10	224	4	11.3	164	50	<1	<1	232	232	10.3	4.44	0.03	<0.01	0.05	0.05	640			
MW2	13-Jun-12	1120	3.13	3.92	7.02	1320	20																																									
MW2	4-Sep-12	1250	3.11	3.9	7.07	1260	19.7	3.48	0.001	0.034	<0.001		<0.0001	0.002	0.002	0.009	2.86	0.003	0.145	0.004		<0.01	0.075	0.0002	7.47	1310	20	17	252	5	13.5	221	68	<1	<1	319	319	14	1.99	<0.01	<0.01	0.06	0.06	802			
MW2	27-Nov-12	1035	3.42	4.21	7.29	905	19.1																																									
MW2	20-Mar-13	1115	2.82	3.61	7.39	670	22.7	1.3	0.002	0.022	<0.001		<0.0001	<0.001	0.004	0.036	0.88	0.006	0.293	0.005		<0.01	0.078	0.0002	6.9	686	3	3	150	3	7	95	26	<1	<1	179	179	6.8	1.41	0.04	<0.01	0.05	0.05	376			
MW2	11-Jul-13	1050	3.64	4.43	7.03	739	19.8																																									
MW2	5-Sep-13	1130	3.45	4.24	6.78	680	19.8	6.39	0.001	0.1	0.039	<0.001	<0.0001	0.005	0.002	0.037	5.54	0.006	0.134	0.006	<0.01	0.02	0.095	0.0002	7.46	674	2	2	142	3	6.52	83	28	<1	<1	173	173	6.38	1.01	0.04				389			
MW2	22-Nov-13	1120	3.68	4.47	6.9	694	19.4																																								
MW2	20-Feb-14	1120	3.72	4.51	7.4	675	21.2	1.32	0.001	0.06	0.012	<0.001	<0.0001	0.004	<0.001	0.055	1.32	0.006	0.058	0.004	<0.01	<0.01	0.08	<0.0001	7.01	694	2	2	155	3	7.08	85	27	<1	<1	171	171	6.38	5.2	<0.01				395			
MW2	27-May-14	10.20	3.35	4.14	7.4	618	20.9																																									
MW2	9-Sep-14	1040	3.48	4.29	7.6	845	21.4	14.8	0.004					0.01			11.8	0.01	0.22	0.012			0.086	<0.0001	7.27	615	<1	<1	131	2	5.75	57	19	<1	<1	219	219	6.38	5.25		<0.01	0.08	0.08				
MW2	20-Nov-14	1005	3.63	4.42	7.4	615	20.4																																									
MW2	26-Feb-15	1110	3.32	4.11	7.3	495	21.6	0.01	0.002	0.007	<0.001	0.05	<0.0001	<0.001	0.001	0.006	0.75	0.001	0.066	0.002	<0.01	<0.01	0.027	<0.0001	7.59	567	<1	<1	113	2	4.97	27	16	<1	<1	214	214	5.37	3.97	0.02	<0.01	0.02	0.02	306			
MW2	26-May-15	1025	3.44	4.23	7.2	522	19.7																																									
MW2	27-Aug-15	1225	3.46	4.25	7.1	540	18	0.87	0.002	0.015	<0.001	<0.05	<0.0001	<0.001	<0.001	0.006	0.69	0.001	0.035	0.002	<0.01	0.01	0.028	<0.0001	7.32	538	1	1	119	1	5.33	28	13	<1	<	188	188	4.82	5.04	0.04	<0.01	<0.01	0.02	298			
MW2	4-Dec-15	1120	3.49	4.28	7.1	528	20.2																																									
MW2	24-Feb-16	1150	3.62	4.41	7	562	21.4	0.48	0.002	0.008	<0.001	<0.05	<0.0001	<0.001	<0.001	0.032	0.45	<0.001	0.038	0.002	<0.01	<0.01	0.016	<0.0001	7.38	575	2	2	131	2	6.01	37	3.1	<1	<1	209	209	5.66	3	<0.01	<0.01	0.03	0.03	305			
MW2	23-May-16	1145	3.74	4.53	6.9	597	21																																									
MW2	1-Sep-16	1125	3.5	4.29	6.9	554	19.6	11.7	0.004					0.01		0.02	11.4	0.007	0.287	0.011			0.091	0.0001	7.04	557	<1	<1	130	2	5.7	36	19	<1	<1	207	207	5.55	1.35		<0.01	0.27	0.27				
MW2	29-Nov-16	1220	3.54	4.33	7	524	21.2																																									

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations					Major Anions							Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**								**1500**	**400**		**4000**			
NAGERO																																														
MW3	2-Jun-06		15.08		7.65		20		<0.001																	1525	25	10	356	4		139	16				642										
MW3	15-Oct-06		15.71		7.85		23.1																			1534																				
MW3	11-Jan-07		15.89		7.66		24.9		<0.001					<0.001		0.006		<0.001		0.004						1600	19	7	381	4		127	4				696										
MW3	9-Jun-07		15.9		7.69		19.7		<0.001				<0.0001	<0.005		<0.001		<0.001		0.01			0.1			1028	15	5	389	3			3				673										
MW3	5-Oct-07		15.6		6.8		19.8																			1710																				
MW3	8-Jan-08		15.01		7.9		23.8																			1620																				
MW3	23-Apr-08		14.05		7.8		23.5																			1740																				
MW3	10-Jul-08		14.08		7.8		19																			1630																				
MW3	29-Oct-08		13.85		7.8		22.8																			1770																				
MW3	20-Jan-09		13.3		7.8		21.7																			1770																				
MW3	22-Apr-09		13.78		7.9		21.8																			1780																				
MW3	22-Jul-09		14.13		7.9		21.2																			1780																		890			
MW3	12-Nov-10		14.65		8		23.1																			1800																		890			
MW3	15-Feb-10		14.24		7.9	1440	21.5																			1440																		720			
MW3	16-Apr-10		13.21		8	1440	23.3																			1440																		720			
MW3	19-Jul-10		12.7		7.8	1700	20.3		0.002				<0.0001	<0.001		0.003	0.27	<0.001		0.003			0.013		7.93	1730	12	4	479	3	21.8	104	<1	<1	<1	871	871	20.3	3.56	0.17	<0.01	<0.01	<0.01	1020			
MW3	26-Oct-10		12.2		7.83	1730	21.7																																								
MW3	28-Jan-11		11.7		7.35	1750	26.1		0.001				<0.0001	<0.005		<0.001	0.16	<0.001		0.003			0.005		7.6	1740	10	4	436	3	19.8	108	<1	<1	<1	815	815	19.3	1.27	0.33	<0.01	<0.01	<0.01				
MW3	2-May-11		11.92		8.05	1760	22.2																																								
MW3	18-Jul-11		11.95		7.9	1760	20.8		<0.001				0.0001	0.003		<0.001	<0.005	<0.001		0.004			0.017		7.96	1840	11	4	3	454	20.7	104	<1	<1	<1	798	798	18.9	4.55	0.33	<0.01	0.02	0.02	1060			
MW3	24-Oct-11		12.1		8.08	1810	23.5																																								
MW3	18-Jan-12		11.25		6.86	1670	23.6		0.002				<0.0001	0.004		0.001	0.49	<0.001		0.007			0.02		7.63	1690	29	9	5	410	20.2	112	40	<1	<1	715	715	18.3	4.82	0.14	<0.01	<0.01	<0.01				
MW3	1-May-12		10.4		7.18	1840	22.5																																								
MW3	23-Jul-12		9.9		7.56	1700	20.6		<0.001				<0.0001	0.001		<0.001	<0.05	<0.001		0.004			0.01		8.05	1730	19	5	398	4	18.8	104	35	<1	<1	765	765	19	0.52	0.31	<0.01	0.02	0.02	1010			
MW3	23-Oct-12		9.84		7.66	1900	21.7																																								
MW3	7-Mar-13		10.02		7.25	1650	21.9		0.001				<0.0001	0.008		0.001	0.17	<0.001		0.013			0.022		7.68	1830	18	5	470	4	21.9	103	31	<1	<1	815	815	19.8	4.79	0.17	<0.01	<0.01	<0.01	1190			
MW3	16-May-13		10.12		7.78	1730	20.7																																							0.86		
MW3	21-Aug-13		10.23		7.57		20.1		0.003				<0.0001	<0.001		<0.001	<0.05	<0.001		0.002			0.008		7.93	2020	12	4	504	4	23	284	52	<1	<1	592	592	20.9	4.58	0.23	<0.01	<0.01	<0.01				
MW3	14-Nov-13		10.39		8.13	1820	23.6																																						0.91		
MW3	3-Feb-14		10.3		8.41	1.87	23.3		0.001				<0.0001	<0.001		0.002	<0.05	<0.001		0.002			0.013		7.76	2140	17	5	464	4	21.5	319	60	<1	<1	477	477	19.8	4.23	0.12	<0.01	0.12	0.12		0.93		
MW3	17-Jul-14		10.00		7.98	2150																																								
MW3	29-Jan-15		10.47						0.001				<0.0001		<0.001	0.001	<0.05	<0.001		0.002			0.026		7.92	2050	17	5	436	3	20.3	369	74	<1	<	398	398	20.5	0.66	0.2	<0.01	0.02	0.02				
MW3	19-May-15		10.05		7.96	1790	21.9																																							
MW3	13-Aug-15		9.55				20.2		<0.001				<0.0001	<0.001		0.028	<0.05	<0.001		0.003			0.584		7.96	2060	15	5	403	3	18.8	285	78	<1	<1	451	451	18.7	0.2	0.32	<0.01	0.02	0.02				
MW3	30-Nov-15		9.28		7.22		23.2																																							
MW3	24-Feb-16		9.37		6.93		22.9		<0.001				<0.0001	<0.001		<0.001	<0.05	<0.001		0.002			0.014		7.94	2050	17	5	450	3	20.9	397	83	<1	<1	348	348	19.9	2.49	0.22	<0.01	<0.01	<0.01				
MW3	13-Sep-16		8.9						<0.001				<0.0001	<0.001		<0.001	0.05	<0.001		0.001			<0.005		8	2060	16	5	433	3		362	80		<1	396	396			0.29	<0.05		0.3				
TARRAWONGA																																														
MW4	2-Jun-06		8.8	9.5	7				0.006																	3290	157	118	614	19		905	155				1010										
MW4	9-Sep-06		8.6	9.3																																										
MW4	11-Jan-07		8.67	9.37	7.06				0.004				0.0003	<0.005		0.011		0.029		0.014			0.1	<0.0001		3430	152	103	594	17		787	143				1050										
MW4	9-Jul-07		9.13	9.83	6.82	5410	18.9		0.001				0.0004	<0.005		0.008		0.011		0.011			0.13	<0.0001		5400	211	166	829	16		1480	235				989								0.6	<20	330
MW4	18-Jul-07		9.18	9.88																																									
MW4	7-Aug-07	1305	9.17	9.87																																									
MW4	22-Aug-07	1340	9.17	9.87																																									
MW4	5-Sep-07	1000	9.21	9.91																																									
MW4	24-Sep-07	1310	9.03	9.73																																									
MW4	11-Oct-07	1055	8.97	9.67																																									
MW4	26-Nov-07	1350	9.06	9.76																																									
MW4	29-Jan-08	1425	9.1	9.8																																									
MW4	4-Mar-08	1150	9.17	9.87																																									
MW4	4-Apr-08	1220	9.15	9.85																																									
MW4	23-Apr-08	1015	9.18	9.88	7.1	5160	18		0.004				0.0015	0.042		0.29		0.44		0.16			0.62	0.001		4960	210	158	802	21		1240	317				995									<0.025	<0.1
MW4	21-Aug-08	1230	9.31	10.01																																										
MW4	29-Oct-08	1740	9.28	9.98	7	5740	22.2		0.001				0.00009	0.008		0.008		0.18		0.016			0.2	<0.0001		5800	220	170	840	23		1400	280				980									<0.025	<0.100
MW4	29-Jan-09	0900	9.29	9.96																																										
MW4	17-Jun-09			10.05	6.8	5400	21.5		0.007	1.16	0.003		0.0004	0.023	0.015	0.207	24.9	0.106	1.82	0.055		0.04	0.278	0.0004		4920	189	147	755	16	54.8	1160	156	<1	<1	977	977	55.6	0.8	<0.01				2980			
MW4	28-Aug-09	1215	9.48	10.1																																									
MW4	14-Dec-09	0900	9.52	10.14	6.94	5060	25.6	<0.01	0.001					<0.005		0.001	<0.05	<0.001	0.671	0.016			0.114	<0.0001	7.35	5040	187	149	746	16	54.5	64.1	31.6	<1	<1	783	783	45.3	3.41		0.02	0.45	0.48				
MW4	25-Feb-10	1330	9.68	10.3																																									
MW4	11-May-10	1000	9.66	10.28	7.58	5660	21.8		0.012	1.84	0.006		0.0006	0.033	0.03	0.17	25.3	0.138	1.26	0.096		0.08	0.238	0.0002		5210	149	115	821	14	53	1180	200	<1	<1	942	942	56.2	3.01	0.02				3120			
MW4	30-Aug-10	0940	9.69	10.31	7.33	4740	20																																							
MW4	9-Nov-10	0940	9.61	10.23	6.9	3810	24.4																																							
MW4	10-Mar-11	1130	9.31	9.93	7.18	3060	24.9	0.77	<0.001					0.005		0.084	1.08	0.15	0.188	0.014			0.801	<0.0001	7.37	3460	78	63	741	11	41.6	730	87	<1	<1	893	893	40.2	1.61		0.04	0.38	0.41				
MW4	6-Jun-11	1000	9.42	10.04	7.25	3080	18.7																																							
MW4	6-Sep-11	0950	9.46	10.08	7.12	3196	21	0.65	<0.001	0.146	<0.001		<0.0001	0.001	0.002	0.008	0.7	0.006	0.175	0.006		<0.01	0.418	<0.0001	7.77	3910	74	58	702	10	39.3	700	104	<1	<1	861	861	39.1	0.15	0.2	<0.01	0.43	0.43				
MW4	7-Dec-11	0940	9.35	9.97	7.1	3180	20.5																																							
MW4	13-Mar-12	0940	9.36	9.98	7.6	2580	22.1	0.16	<0.001	0.159	<0.001		<0.0001	<0.001	<0.001	0.01	0.3	<0.001	0.017	0.004		<0.01	0.27	<0.001	8.01	3690	90	64	759	13	43.1	700	103	<1	<1	898	898	39.8	3.92	<0.01	<0.01	0.85	0.85	2130			
MW4	13-Jun-12	0935	9.22	9.84	7.52	3850	20.6																																							
MW4	4-Sep-12	1120	9.11	9.73	7.72	3410	21.8	0.07	<0.001	0.167	<0.001		<0.0001	<0.001	<0.001	0.058	0.44	0.005	0.116	0.007		<0.01	0.513	<0.0001	7.98	3770	82	65	664	12	38.6	674	108	<1	<1	962	962	40.5	2.37	0.02	0.02	1.04	1.06	2170			
MW4	27-Nov-12	0920	8.94	9.56	7.74	3440	21.7																																							
MW4	20-Mar-13	0945	8.92	9.54	7.53	3420	21.6	0.27	0.001	0.156	<0.001		<0.0001	0.011	<0.001	0.05	0.4	0.006	0.158	0.01		<0.01	0.338	<0.0001	7.65	3730	104	73	672	12	40.7	652	49	<1	<1	880	880	37	4.78	0.02	<0.01	1.68	1.68	2020			
MW4	11-Jul-13	940	8.87	9.49	7.76	3410	20.9																																							
MW4	5-Sep-13	950	8.83	9.45	7.63	3560	21.8	0.21	<0.001	<0.05	0.182	<0.001	0.0002	0.001	0.005	0.144	0.68	0.018	0.282	0.008	<0.01	<0.01	0.453	<0.0001	7.99	3950	110	81	704	15	43.2	745	110	<1	<1	908	908	41.4	2	0.09				2260			
MW4	22-Nov-13	940	8.61	9.23	7.6	3720	21.7																																							
MW4	24-Feb-14	940	8.74	9.36	7.6	3920	21.4	0.14	<0.001	<0.05	0.166	<0.001	0.0003	0.005	<0.001	0.128	1.22	0.006	0.116	0.007	<0.01	<0.01	0.444	<0.0001	7.98	3890	93	78	644	15	39.5	676	113	<1	<1	875	875	38.9	0.68	0.06				2010			
MW4	27-May-14	930	8.78	9.4	7.6	3840	21.3																																							
MW4	9-Sep-14	0940	8.76	9.38	7.2	4090	20.5	0.13	<0.001					0.003		0.057	0.86	0.007	0.235	0.008			0.334	<0.0001	7.83	4170	108	79	597	11	38.1	679	118	<1	<1	1020	1020	42	4.83		0.2	0.54	0.74				

ANNUAL REVIEW
2016

TARRAWONGA COAL PTY LTD
Groundwater Monitoring Data

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																		Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**									**1500**	**400**		**4000**			
MW4	20-Nov-14	0930	8.72	9.34	7.3	3970	21.8																																								
MW4	26-Feb-15	930	8.71	9.33	7.3	4030	21.6	0.13	<0.001	0.159	<0.001	<0.05	<0.0001	0.002	0.002	0.033	3.4	0.02	0.373	0.007	<0.01	<0.01	0.244	<0.0001	7.7	4430	131	107	687	14	45.6	786	132	<1	<1	1090	1090	46.7	1.23	0.18	0.01	0.97	0.98	2200			
MW4	26-May-15	940	8.93	9.55	7.3	4120	20.7																																								
MW4	27-Aug-15	1000	8.85	9.47	7.2	4340	19.5	0.02	<0.001	0.159	<0.001	<0.05	<0.0001	<0.001	<0.001	0.004	1.21	0.002	0.359	0.004	<0.01	<0.01	0.149	<0.0001	7.72	4680	123	107	719	14	46.6	711	151	<1	<1	870	870	40.6	6.85	0.56	<0.01	0.6	0.6	2550			
MW4	4-Dec-15	1000	8.85	9.47	7.3	4410	21.1																																							
MW4	24-Feb-16	930	8.86	9.48	7.4	4450	21.7	0.2	0.003	0.18	0.002	<0.05	0.0004	0.003	0.003	0.02	1.84	0.014	0.46	0.006	<0.01	<0.01	0.209	<0.0001	7.85	4650	156	119	767	17	51.4	899	152	<1	<1	988	988	48.3	3.1	2.22	<0.01	0.07	0.07	2610			
MW4	23-May-16	930	8.92	9.54	7.4	4480	21.4																																							
MW4	1-Sep-16	No access																																												
MW4	29-Nov-16	950	8.91	9.53	7.3	4330	22.8																																							

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**								**1500**	**400**		**4000**			
TEMPLEMORE																																													
MW5	2-Jun-06		2.78	3.4	6.9				0.006																1530	17	13	373	6		169	138				472										
MW5	9-Sep-06		2.98	3.6																																									
MW5	11-Jan-07		3.56	4.18	7.25				0.003				<0.0001	<0.001		<0.001		<0.001		0.013			0.09		4870	44	49	1070	13		1060	435				836										
MW5	18-Apr-07		2.98	3.6																																									
MW5	10-Jul-07		3.85	4.47	7.59	1360	19.7		0.002				<0.0001	<0.005		0.001		<0.001		0.009			0.111	<0.0001	1930	14	15	13	5		291	161				380								1.32	<20	3490
MW5	18-Jul-07		3.87	4.49																																									
MW5	7-Aug-07	1230	3.92	4.54																																									
MW5	22-Aug-07	1500	3.88	4.5																																									
MW5	5-Sep-07	1200	3.84	4.46																																									
MW5	24-Sep-07	1410	3.86	4.48																																									
MW5	11-Oct-07	1200	3.91	4.53																																									
MW5	26-Nov-07	1515	3.94	4.56																																									
MW5	29-Jan-08	1520	3.06	3.68																																									
MW5	4-Mar-08	1405	3.01	3.63																																									
MW5	4-Apr-08	1200	3.07	3.69																																									
MW5	23-Apr-08	1500	3.15	3.77	7.9	3550	19.9		0.012				0.00017	0.006		0.027		0.054		0.042			0.11	<0.0001	3260	29	33	696	13		553	332				630										
MW5	21-Aug-08	1305	3.10	3.72																																									
MW5	29-Oct-08	1840	2.97	3.59	7.3	3300	19.1		0.008				<0.00005	0.005		0.004		0.018		0.007			0.028	<0.0001	3400	21	24	640	11		560	290				680									<0.025	0.57
MW5	29-Jan-09	1050	3.12	3.73																																									
MW5	17-Jun-09		3.33	4.18	7.7	2390	19.6		0.012	0.054	<0.001		<0.0001	0.002	0.003	0.02	1.66	0.019	0.586	0.006		<0.01	0.105	<0.0001	2120	13	15	485	8	23.2	315	120	<1	<1	486	486	21.1	4.6	0.07				1370			
MW5	14-Sep-09	1314	3.52	4.32																																								
MW5	14-Dec-09	1200	3.76	4.56	7.21	6900	28.4	0.04	0.016					<0.001		0.002	0.19	<0.001	1.4	0.022			0.078	<0.0001	7.44	7460	9	106	1870	28	91	1720	678	<1	<1	1110	1110	84.9	3.44		<0.01	<0.01	<0.01				
MW5	25-Feb-10	1035	2.91	3.71																																								
MW5	11-May-10	1145	3	3.8	7.73	6590	22		0.032	0.426	0.001		0.009	0.024	0.032	0.07	23	0.068	1.59	0.071		0.05	0.277	<0.0001		5920	38	70	1210	17	60.5	1260	491	<1	<1	838	838	62.4	1.53	0.1				3630			
MW5	30-Aug-10	1210	2.6	3.4	7.85	1740	22.8																																						
MW5	9-Nov-10	1115	2.48	3.28	7.35	2620	24.1																																						
MW5	10-Mar-11	1400	2.51	3.31	7.39	1917	25.2	0.81	0.01					0.001		0.03	0.79	0.007	0.64	0.003			0.139	<0.0001	7.69	1980	11	13	474	8	22.4	396	150	<1	<1	416	416	22.6	0.49		<0.01	0.11	0.11				
MW5	6-Jun-11	1200	2.47	3.27	7.45	1032	20.8																																						
MW5	6-Sep-11	1240	2.7	3.5	7.39	1910	22.6	6.24	0.012	0.051	<0.001		<0.0001	0.004	0.001	0.006	4.1	0.004	0.081	0.005		<0.01	0.032	<0.0001	7.89	2310	10	11	501	7	23.4	385	177	<1	<1	427	427	23.1	0.6	0.11	<0.01	0.04	0.04	1360			
MW5	7-Dec-11	1100	1.96	2.76	7.36	2275	20.5																																						
MW5	13-Mar-12	1320	1.28	2.08	7.52	1110	25.1	1.91	0.006	0.027	<0.001		<0.0001	0.002	<0.001	0.005	1.2	<0.001	0.122	0.003		0.01	0.02	<0.0001	7.78	1250	8	7	292	5	13.8	262	45	<1	<1	269	269	13.7	0.33	<0.01	<0.01	0.43	0.43	736			
MW5	13-Jun-12	1150	1.58	2.38	7.81	977	20.3																																						
MW5	4-Sep-12	1320	1.46	2.26	7.63	1980	20.1	7.89	0.016	0.056	<0.001		<0.0001	0.004	<0.001	0.014	5.13	0.007	0.073	0.004		<0.01	0.086	<0.0001	7.92	2120	9	11	473	8	22.1	380	146	<1	<1	439	439	22.5	0.93	<0.01	<0.01	<0.01	<0.01	1400			
MW5	27-Nov-12	1105	1.84	2.64	7.65	2650	22.5																																						
MW5	20-Mar-13	1300	1.94	2.74	7.54	1430	24.7	0.53	0.011	0.029	<0.001		<0.0001	0.002	<0.001	0.054	0.56	0.008	0.33	0.004		<0.01	0.158	<0.0001	7.61	1520	7	8	321	6	15.1	236	46	<1	<1	323	323	14.1	3.57	0.08	<0.01	0.06	0.06	956			
MW5	11-Jul-13	1120	2.26	3.06	7.62	846	21.5																																						
MW5	5-Sep-13	1200	2.45	3.25	7.55	1640	21.8	4.62	0.011	0.12	0.038	<0.001	<0.0001	0.003	<0.001	0.062	3.25	0.009	0.07	0.004	<0.01	<0.01	0.118	<0.0001	8.07	1810	5	7	406	8	18.7	287	115	<1	<1	396	396	18.4	0.73	0.02				1040			
MW5	22-Nov-13	1155	2.76	3.56	7.7	2430	21.1																																						
MW5	20-Feb-14	1145	3.01	3.81	7.9	1790	22.7	2.6	0.014	<0.05	0.039	<0.001	0.0004	0.01	0.002	0.166	2.68	0.024	0.232	0.007	<0.01	<0.01	0.46	<0.0001	7.77	1850	7	8	394	6	18.3	282	111	<1	<1	377	377	17.8	1.34	<0.01				964			
MW5	27-May-14	11.50	2.77	3.57	7.7	925	22.5																																						
MW5	9-Sep-14	1500	2.80	3.6	7.7	2130	20.5	12.7	0.014					0.009		0.059	8.81	0.016	0.379	0.019			0.141	<0.0001	7.99	2200	7	8	462	8	21.3	319	159	<1	<1	476	476	21.8	1.23		0.02	0.65	0.67				
MW5	20-Nov-14	1240	3.00	3.8	7.8	3020	22.3																																						
MW5	26-Feb-15	1155	3.18	3.97	7.8	1890	23.7	1.18	0.01	0.026	<0.001	<0.05	<0.0001	<0.001	<0.001	0.005	0.74	<0.001	0.044	0.002	<0.01	<0.01	0.04	<0.0001	8.15	2060	5	6	399	6	18.2	299	130	<1	<1	433	433	19.8	4.09	0.01	<0.01	0.14	0.14	1060			
MW5	26-May-15	1240	3.29	4.08	7.8	2120	21.3																																						
MW5	27-Aug-15	1250	3.19	3.98	7.7	2110	19.7	1.29	0.023	0.051	<0.001	<0.05	<0.0001	<0.001	<0.001	0.002	1.67	<0.001	0.373	0.002	<0.01	<0.01	0.036	<0.0001	8.08	2210	8	9	465	6	21.5	262	174	<1	<1	424	424	19.5	4.92	0.04	<0.01	0.02	0.02	1300			
MW5	4-Dec-15	1200	3.29	4.08	7.7	3070	21.2																																						
MW5	24-Feb-16	1215	3.36	4.15	7.7	2060	23.5	0.95	0.01	0.036	<0.001	<0.05	<0.0001	<0.001	<0.001	0.013	0.79	0.002	0.209	0.003	<0.01	<0.01	0.071	<0.0001	7.76	2230	12	13	519	7	24.4	361	184	<1	<1	471	471	23.4	2.04	0.09	<.01	0.24	0.24	1180			
MW5	23-May-16	1210	3.41	4.2	7.7	1632	23.4																																						
MW5	1-Sep-16	1200	2.29	3.08	7.7	1700	21	5.55	0.009					0.003		0.007	3.86	0.002	0.071	0.004			0.05	<0.0001	7.96	1750	6	7	378	5	17.4	256		<1	<1	382	382	17.5	0.25		<0.01	1.1	1.1				
MW5	29-Nov-16	1310	2	2.79	7.6	3010	20.7																																						
NAGERO																																													
MW6	2-Jun-06		8.34	9	7.3				<0.001																2030	59	29	440	8		308	55				720										
MW6	9-Sep-06		8.84	9.5																																									
MW6	11-Jan-07		9.15	9.81	6.89				<0.001				<0.0001	<0.005		<0.001		<0.001		0.011			0.08	<0.0001		2030	62	30	426	7		252	51				724										
MW6	10-Jul-07		9.37	10.03	7.5	2060	18.1		0.0005				0.00005	0.0025		0.001		0.0005		0.004			0.01	0.00005		2000	58	27	411	8		283	47				666								5.99		
MW6	18-Jul-07		9.35	10.01																																									
MW6	7-Aug-07	1105	9.32	9.98																																									
MW6	22-Aug-07	1320	9.29	9.95																																									
MW6	5-Sep-07	1110	9.31	9.97																																									
MW6	24-Sep-07	1250	9.07	9.73																																									
MW6	11-Oct-07	1035	9.16	9.82																																									
MW6	26-Nov-07	1325	9.17	9.83																																									
MW6	29-Jan-08	1400	9.06	9.72																																									
MW6	4-Mar-08	1125	8.815	9.475																																									
MW6	22-Apr-08	1700	8.62	9.28	7.1	2000	21.1		0.001				<0.00005	0.001		0.002		0.0031		0.006			0.005	<0.0001		2120	64	29	391	9.8		273	51				670									<0.025	<0.1
MW6	21-Aug-08	1051	8.545	9.205																																									
MW6	29-Oct-08	1530	8.48	9.15	7.1	2050	23.9		0.001				0.00005	0.003		0.003		0.077		0.004			0.034	<0.0001		2100	60	27	380	8.5		280	50				680									<0.025	0.18
MW6	29-Jan-09	1010	8.33	9.1																																									
MW6	14-Sep-09	1246	8.65	9.43																																									
MW6	14-Dec-09	1130	8.86	9.64	7.13	2112	23.4	<0.01	<0.001					<0.005		<0.001	<0.05	0.002	0.336	0.008			0.01	<0.0001	7.3	2100	56	26	385	8	21.9	252	39.4	<1	<1	652	652	21	2.24		0.02	0.53	0.55				
MW6	25-Feb-10	1010	8.84	9.62																																									
MW6	11-May-10	1515	8.3	9.08	7.56	2360	21.5		<0.001	0.193	<0.001		<0.0001	0.002	0.002	0.002	2.13	0.006	0.278	0.003		<0.01	0.008	<0.0001		2030	56	26	380	7	21.6	261	42.2	<1	<1	645	645	21.1	1.14	<0.01				1160			
MW6	30-Aug-10	1230	8	8.78	7.2	1927	23.8																																						
MW6	9-Nov-10	1015	7.72	8.5	7.03	1835	24.3																																						
MW6	10-Mar-11	1220	7.41	8.19	7.08	1783	24	0.15	<0.001					0.002		0.034	0.32	0.015	0.047	0.003			0.216	<0.0001	7.53	1790	55	27	406	9	22.9	293	42	<1	<1	627	627	21.7	2.61		0.03	0.97	1				
MW6	6-Jun-11	1040	7.44	8.22	7.15	1670	19.6																																						
MW6	6-Sep-11	1020	Piezo damaged																																										

ANNUAL REVIEW
2016

TARRAWONGA COAL PTY LTD
Groundwater Monitoring Data

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																		Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**									**1500**	**400**		**4000**			
MW6	7-Dec-11	1000	Piezo damaged																																												
MW6	13-Mar-12	1030	5.74	6.52	7.49	1840	23.4	0.15	<0.001	0.125	<0.001		<0.0001	0.002	<0.001	0.009	0.12	0.001	0.013	0.004		<0.01	0.071	<0.0001	7.68	1980	55	24	390	9	21.9	262	46	<1	<1	624	624	20.8	2.54	<0.01	<0.01	1.44	1.44	1150			
MW6	13-Jun-12	1025	5.87	6.65	7.45	2040	21.3																																								
MW6	4-Sep-12	1150	5.58	6.36	7.82	1840	22	0.09	<0.001	0.143	<0.001		<0.0001	<0.001	<0.001	0.012	0.18	0.003	0.013	0.003		<0.01	0.072	<0.0001	8.08	1990	53	25	381	8	21.5	276	39	<1	<1	681	681	22.2	1.69	<0.01	<0.01	1.13	1.13	1210			
MW6	27-Nov-12	0950	5.55	6.33	7.6	1817	21.1																																								
MW6	20-Mar-13	1025	5.75	6.53	7.46	343	22.8	0.49	0.001	0.037	<0.001		<0.0001	0.003	<0.001	0.081	0.56	0.009	0.095	0.006		0.02	0.402	<0.0001	7.43	351	12	3	49	8	3.18	16	28	<1	<1	106	106	3.15	0.44	0.23	0.1	0.6	0.7	252			
MW6	11-Jul-13	1020	5.88	6.66	7.62	452	20.8																																								
MW6	5-Sep-13	1105	5.96	6.74	7.21	465	21.3	0.86	<0.001	0.08	0.038	<0.001	<0.0001	0.002	<0.001	0.075	0.93	0.006	0.058	0.005	<0.01	0.02	0.151	<0.0001	7.8	496	18	3	75	10	4.66	25	60	<1	<1	132	132	4.59	0.74	0.09				327			
MW6	22-Nov-13	1255	5.85	6.63	7.2	486	20.8																																							
MW6	24-Feb-14	1050	5.84	6.62	7.8	215	22.1	0.48	<0.001	<0.05	0.02	<0.001	<0.0001	0.008	0.001	0.045	0.5	0.004	0.094	0.005	<0.01	0.02	0.185	<0.0001	7.51	212	8	1	29	8	1.95	5	26	<1	<1	66	66	2		0.35				182			
MW6	27-May-14	12.40	5.64	6.42	7.5	360	22.1																																							
MW6	9-Sep-14	1010	5.54	6.32	7.6	845	21.4	1.63	0.002					0.005		0.006	1.55	0.016	0.154	0.012			0.13	<0.0001	7.61	854	24	7	140	8	8.07	83	46	<1	<1	274	274	8.77	4.22		<0.01	<0.01	<0.01				
MW6	20-Nov-14	1140	5.55	6.33	7.5	712	21.6																																							
MW6	26-Feb-15	1040	5.64	6.43	7.6	543	22.2	0.13	<0.01	0.036	<0.01	<0.05	<0.0001	0.001	<0.001	0.012	0.32	0.002	0.059	0.007	<0.01	<0.01	0.238	<0.0001	7.67	617	25	5	89	10	5.79	43	42	<1	<1	173	173	5.54	2.11	0.06	<0.01	0.62	0.62	353			
MW6	26-May-15	1135	5.65	6.44	7.5	692	19.7																																							
MW6	27-Aug-15	NO ACCESS																																												
MW6	4-Dec-15	1035	5.4	6.18	7.8	946	21.2																																							
MW6	24-Feb-16	1025	5.38	6.16	7.6	1012	21.2	0.31	0.002	0.083	<0.001	0.06	<0.0001	0.004	<0.001	0.018	1.94	0.006	0.063	0.01	<0.01	<0.01	0.211	<0.0001	7.85	1080	41	12	203	10	12.1	125	46	<1	<1	327	327	11	4.73	0.09	<0.01	0.98	0.98	620			
MW6	23-May-16	1010	5.36	6.14	7.6	1090	21.8																																							
MW6	6-Sep-16	1145	5.15	5.93	7.6	1080	23.3	0.04	<0.001					<0.001		0.004	0.49	<0.001	0.016	0.007			0.079	<0.0001	7.77	1100	34	10	181	9	10.6	129		<1	<1	331	331	11	1.97		<0.01	0.42	0.42				
MW6	29-Nov-16	1020	4.74	5.52	7.5	1416	21.2																																							

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations					Major Anions							Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**									**1500**	**400**		**4000**			
TARRAWONGA MINE																																															
MW7	2-Jun-06		73.47	74.3	7.2				0.002																	2250	45	43	536	12		202	34				1100										
MW7	9-Sep-06		79.67	80.5																																											
MW7	11-Jan-07		76.17	77	7.32				<0.001				<0.0001	<0.005		<0.001		<0.001		0.005			0.05	<0.0001		1960	23	36	459	8		189	22				935										
MW7	18-Apr-07		76.07	76.9																																											
MW7	10-Jul-07		77.06	77.89	7.24	2250	18.7		<0.001				<0.0001	<0.005		0.001		<0.001		0.018			0.106	<0.0001		2270	35	36	458	10		170	23				998								4.38	<20	410
MW7	18-Jul-07		77.1	77.93																																										
MW7	7-Aug-07	1340	78.29	79.12																																										
MW7	22-Aug-07	1430	78.45	79.28																																										
MW7	5-Sep-07	1140	78.6	79.43																																										
MW7	24-Sep-07	1350	78.56	79.39																																										
MW7	11-Oct-07	1140	78.72	79.55																																										
MW7	26-Nov-07	1440	79.34	80.17																																										
MW7	29-Jan-08	1500	79.8	80.63																																										
MW7	4-Mar-08	1335	80.27	81.10																																										
MW7	22-Apr-08	1200	80.85	81.68	7.6	2440	21.9		<0.001				0.00014	0.004		0.033		0.25		0.017			0.12	<0.0001		2370	52	45	483	11		188	5				1050										
MW7	21-Aug-08	1526	83.74	84.57																																										
MW7	29-Oct-08	0915	85.99	86.81	7.4	2310	24.8		0.001				0.00006	0.005		0.014		0.088		0.009			0.099	<0.0001		2300	48	44	470	13		180	24				990									<0.025	0.3
MW7	28-Jan-09	1615	86.99	87.8																																										
MW7	17-Jun-09	0915	86.45	87.5	7.4	2440	20.7		<0.001	0.2	<0.001		<0.0001	0.001	<0.001	0.057	0.43	0.054	0.047	0.007		<0.01	0.13	<0.0001		2280	46	44	481	11	27.1	169	16	<1	<1	1050	1050	26.1	1.96	0.17				1430			
MW7	27-Aug-09	1225	89.99	91.04																																										
MW7	23-Dec-09	1355	89.53	90.58	7.55	2230	27.4	0.03	<0.001					<0.001		0.002	0.26	0.004	0.075	0.007			0.015	<0.0001	7.49	2240	5	46	556	9	28.5	182	17.1	<1	<1	1050	1050	26.5	3.58		<0.01	<0.01	<0.01				
MW7	25-Feb-10	1355	89.64	90.69																																										
MW7	11-May-10	1400	89.85	90.9	8.32	2950	23.9		<0.001	0.227	<0.001		<0.0001	<0.001	<0.001	0.009	1.5	0.046	0.11	0.017		<0.01	0.054	<0.0001		2330	42	41	478	9	26.5	182	15.9	<1	<1	1010	1010	25.6	1.72	0.45				1380			
MW7	30-Aug-10	1400	90.48	91.53	7.52	2385	24.7																																								
MW7	10-Nov-10	0900	90.38	91.43	7.47	2010	26																																								
MW7	14-Mar-11	1210	90.95	92	7.24	2075	26.2	0.2	<0.001					<0.001	0.094		0.74	0.036	0.155	0.01			0.274	<0.0001	7.57	2220	41	41	493	11	27.1	225	23	<1	<1	951	951	25.8	2.43		<0.01	0.07	0.07				
MW7	21-Jun-11	1400	91.31	92.36	7.55	2180	22.3																																								
MW7	8-Sep-11	0950	92.49	93.54	7.35	2160	22.5	0.09	0.001	0.18	<0.001		<0.0001	<0.001	<0.001	0.006	0.41	0.028	0.059	0.007		<0.01	0.047	<0.0001	7.84	2550	10	36	545	10	27.4	255	29	<1	<1	936	936	26.5	1.66	0.55	<0.01	0.02	0.02	1510			
MW7	9-Dec-11	1000	93.89	94.94	7.7	2200	26.8																																								
MW7	19-Mar-12	1345	95.05	96.10	7.25	2460	24.9	0.31	<0.001	0.186	<0.001		<0.0001	0.002	<0.001	0.032	0.61	0.065	0.059	0.009		<0.01	0.085	<0.0001	7.82	2650	35	34	622	11	31.9	321	45	<1	<1	991	991	29.8	3.34	0.52	<0.01	0.03	0.03	1590			
MW7	14-Jun-12	1040	97.70	98.75	7.6	2900	23.6																																								
MW7	6-Sep-12	1150	98.95	100.00	7.33	2730	25.2	0.52	0.002	0.205	<0.001		<0.0001	0.002	<0.001	0.088	2.84	0.114	0.057	0.005		<0.01	0.19	<0.0001	7.93	2840	18	21	678	8	32.3	342	50	<1	<1	1140	1140	33.5	1.79	0.61	<0.01	0.05	0.05	1760			
MW7	28-Nov-12	0945	101.99	103.04																																										
MW7	20-Mar-13	1200	102.49	103.54																																										
MW7	11-Jul-13	1315	103.65	104.7																																										
MW7	5-Sep-13	1325	103.65	104.7																																										
MW7	22-Nov-13	1025	103.43	104.48																																										
MW7	20-Feb-14	1000	103.55	104.6																																										
MW7	27-May-14	1310	103.96	105.01																																										
MW7	9-Sep-14	1300	103.84	104.89																																										
MW7	20-Nov-14	1040	104.01	105.06																																										
MW7	26-Feb-15	1300	104.09	105.14																																										
MW7	26-May-15	1050	104.67	105.46																																										
MW7	27-Aug-15	1050	104.26	105.05																																										
MW7	4-Dec-15	1310	104.35	105.14																																										
MW7	24-Feb-16	1050	104.77	105.56																																										
MW7	23-May-16	1050	105.13	105.92																																										
MW7	1-Sep-16	1230	104.19	104.98																																										
MW7	29-Nov-16	1100	104.41	105.2																																										
TARRAWONGA MINE																																															
MW8	2-Jun-06		13.06	13.8	6.7				<0.001																	2240	161	48	298	9		426	46				588										
MW8	9-Sep-06		13.16	13.9																																											
MW8	11-Jan-07		13.41	14.15	6.7				<0.001				<0.0001	<0.005		0.002		0.001		0.007			0.16	<0.0001		2260	180	53	319	7		411	80				587										
MW8	18-Apr-07		12.86	13.6																																											
MW8	9-Jul-07		13.62	14.36	6.8	2530	18.9		<0.001				<0.0001	<0.005		0.005		0.004		0.006			0.102	<0.0001		2610	196	55	308	8		483	80				616								7.77	<20	250
MW8	18-Jul-07		13.67	14.41																																											
MW8	7-Aug-07	1325	13.66	14.4																																										
MW8	22-Aug-07	1415	13.66	14.4																																										
MW8	5-Sep-07	1130	13.72	14.46																																										
MW8	24-Sep-07	1340	13.64	14.38																																										
MW8	11-Oct-07	1120	13.63	14.37																																										
MW8	26-Nov-07	1410	13.69	14.43																																										
MW8	29-Jan-08	1445	13.54	14.28																																										
MW8	4-Mar-08	1220	13.56	14.3																																										
MW8	22-Apr-08				Bore blocked no sample																																											
MW8	21-Aug-08	1510	13.78	14.52																																										
MW8	29-Oct-08	1030	13.85	14.59	Bore blocked no sample																																										
MW8	28-Jan-09	1600	13.85	14.6																																										
MW8	17-Jun-09		14.02	14.77	Unable to sample - casing blocked																																										
MW8	27-Aug-09	1145	14.02	14.77																																										
MW8	23-Dec-09	1415	14.1	14.85	Unable to sample - casing blocked																																										
MW8	25-Feb-10	1520	13.8	14.55																																										
MW8	11-May-10	1440	13.72	14.47	Unable to sample - casing blocked																																										
MW8	30-Aug-10	1420	13.71	14.46	Unable to sample - casing blocked																																										
MW8	9-Nov-10	1255	13.74	14.49	Unable to sample - casing blocked																																										
MW8	14-Mar-11	1120	14.12	14.87	Unable to sample - casing blocked																																										
MW8	21-Jun-11	1420	13.62	14.37	Unable to sample - casing blocked																																										
MW8	8-Sep-11	1030	13.80	14.55	Unable to sample - casing blocked																																										
MW8	9-Dec-11	1040	13.24	13.99	Unable to sample - casing blocked																																										

ANNUAL REVIEW
2016

TARRAWONGA COAL PTY LTD
Groundwater Monitoring Data

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**						**1500**	**400**		**4000**			
MW8	14-Mar-12	1235	12.57	13.32	Unable to sample - casing blocked																																							
MW8	14-Jun-12	1115	12.76	13.51	Blocked 3.2 down pipe																																								
MW8	6-Sep-12	1220	12.63	13.38	Blocked 3.2 down pipe																																								
MW8	28-Nov-12	1005	12.79	13.54	Blocked about 3m down pipe																																								
MW8	20-Mar-13	1230	12.68	13.43	Blocked 3.2 down pipe																																								
MW8	11-Jul-13	1230	12.95	13.7																																								
MW8	5-Sep-13	1300	13.00	13.75																																								
MW8	22-Nov-13	1045	13.01	13.76																																								
MW8	20-Feb-14	1040	13.07	13.82																																								
MW8	27-May-14	1330	13.00	13.75																																								
MW8	9-Sep-14	1240	13.13	13.88																																								
MW8	20-Nov-15	1110	13.22	13.97																																								
MW8	26-Feb-15	1315	13.27	14.02																																								
MW8	26-May-15	1110	13.43	14.22																																								
MW8	27-Aug-15	1115	13.43	14.22																																								
MW8	4-Dec-15	1330	13.46	14.25																																								
MW8	24-Feb-16	1100	13.49	14.28																																								
MW8	23-May-16	1110	13.54	14.33																																								
MW8	1-Sep-16	1300	13.08	13.87																																								
MW8	29-Nov-16	1120	12.62	13.41																																								

					Field Parameters			Total Metals																			Major Cations					Major Anions															
Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**								**1500**	**400**		**4000**			
TEMPLEMORE																																															
GW044997	2-Jun-06		6.19	6.4	6.9				0.001																	3000	112	102	544	4		758	170				768										
GW044997	11-Jan-07		6.62	6.83	6.95				0.009				<0.0001	<0.005		0.001		<0.001		0.002			0.04	<0.0001		1570	45	36	298	1		200	55				495										
GW044997	10-Jul-07		6.7	6.91	7.06	785	17.1		0.009				0.0002	<0.005		0.001		<0.001		0.001			0.088	<0.0001		1590	46	41	270	1		211	84				441								9	<20	740
GW044997	18-Jul-07		6.73	6.94																																											
GW044997	7-Aug-07	1130	6.79	7																																											
GW044997	22-Aug-07	1505	6.76	6.97																																											
GW044997	5-Sep-07	1205	6.83	7.04																																											
GW044997	24-Sep-07	1415	6.62	6.83																																											
GW044997	11-Oct-07	1210	6.73	6.94																																											
GW044997	26-Nov-07	1525	7.05	7.26																																											
GW044997	29-Jan-08	1525	6.44	6.65																																											
GW044997	4-Mar-08	1410	6.23	6.44																																											
GW044997	4-Apr-08	1140	6.295	6.505																																											
GW044997	22-Apr-08	1615	6.31	6.52	7	3370	21.8		0.007				<0.00005	<0.001		0.005		0.0003		0.012			0.008	<0.0001		3150	135	125	461	1.7		656	276				585									<0.025	<0.1
GW044997	21-Aug-08	1410	6.81	7.02																																											
GW044997	29-Oct-08	1815	6.86	7.06	Bore blocked, no sample																																										
GW044997	29-Jan-09	1130	7	7.2																																											
GW044997	17-Jun-09		7.52	7.77	7.1	3580	18.9		0.066	0.523	<0.001		0.0003	0.001	0.002	0.134	46.9	0.016	0.204	0.006		0.09	0.327	0.0001		3350	112	111	486	8	36	626	132	<1	<1	693	693	34.2	2.53	2.93				2020			
GW044997	28-Aug-09	1240	7.85	8.05																																											
GW044997	23-Dec-09	1130	7.97	8.17	6.95	3050	24.2	0.02	0.008					<0.001		0.005	0.07	<0.0010	0.021	0.004			0.065	<0.0001	6.87	3050	40	118	546	3	35.5	636	203	<1	<1	517	517	32.5	4.4		0.22	21	21.2				
GW044997	25-Feb-10	1040	7.81	8.01																																											
GW044997	11-May-10	1200	7.98	8.18	7.49	3720	22.7		0.018	0.258	<0.001		<0.0001	<0.001	<0.001	0.014	7.2	0.002	0.04	0.006		0.04	0.048	<0.0001		3480	114	119	434	2	34.4	640	192	<1	<1	593	593	33.9	0.66	2.03				1770			
GW044997	30-Aug-10	1120	7.91	8.11	6.82	3720	22.2																																								
GW044997	9-Nov-10	1140	7.8	8	6.8	3010	24.2																																								
GW044997	14-Mar-11	1040	7.25	7.45	6.83	1670	25.9	0.04	0.002					<0.001		0.013	<0.05	<0.001	0.004	<0.001			0.032	<0.0001	7.15	1620	131	67	160	2	19.1	333	87	<1	<1	410	410	19.4	0.84		<0.01	1.8	1.8				
GW044997	6-Jun-11	1320	8.02	8.22	7.3	1514	16.8																																								
GW044997	6-Sep-11	1220	8.73	8.93	6.98	1525	16.7	0.05	0.002	0.174	<0.001		<0.0001	<0.001	<0.001	0.01	<0.05	<0.001	0.007	<0.001		0.02	0.047	<0.0001	7.64	1830	122	58	174	2	18.5	308	110	<1	<1	400	400	19	1.31	0.51	<0.01	1.43	1.43	1000			
GW044997	7-Dec-11	1130	8.32	8.52	7.27	1545	20.6																																								
GW044997	13-Mar-12	1230	5.1	5.3	No sample - pump not operational																																										
GW044997	14-Jun-12	940	5.18	5.38																																											
GW044997	6-Sep-12	1100	4.8	5	7.95	1750	17.5	0.02	0.002	0.128	<0.001		<0.0001	<0.001	<0.001	0.011	0.07	<0.001	0.005	<0.001		0.01	0.027	<0.0001	7.69	1840	120	56	211	2	19.8	323	147	<1	<1	409	409	20.3	1.29	0.05	<0.01	5	5	1130			
GW044997	27-Nov-12	1145	5.04	5.24	7.61	1665	24.6																																								
GW044997	21-Mar-13	1230	5.78	5.98																																											
GW044997	11-Jul-13	1205	6.37	6.57																																											
GW044997	5-Sep-13	1145	6.65	6.85																																											
GW044997	22-Nov-13	1140	6.87	7.07																																											
GW044997	20-Feb-14	1205	6.93	7.13																																											
GW044997	27-May-14	1210	8.05	8.25																																											
GW044997	9-Sep-14	1120	7.99	8.19																																											
GW044997	20-Nov-14	1215	8.56	8.76																																											
GW044997	26-Feb-15	1355	8.61	8.81																																											
GW044997	26-May-15	1200	8.74	8.94																																											
GW044997	27-Aug-15	1315	10.67	10.87																																											
GW044997	4-Dec-15	1140	10.43	10.63																																											
GW044997	24-Feb-16	1300	10.72	10.92																																											
GW044997	23-May-16	1245	10.99	11.19																																											
GW044997	1-Sep-16	1220	11.18	11.38																																											
GW044997	29-Nov-16	1240	9.17	9.37																																											
AMBARDO																																															
GW031856	2-Jun-06		15.76	16.4	7.3				<0.001				<0.0001	<0.001		0.036		0.001		0.001			0.126	<0.0001		1150	50	33	156	3		105	22				459									<20	<50
GW031856	11-Jan-07		19.1	19.74	7.27	910	23.1		<0.001				<0.0001	<0.005		0.005		<0.001		<0.001			<0.005	<0.0001		1080	47	30	164	3		75	18				457								3.37	<20	<50
GW031856	10-Jul-07		15.51	16.15	7.9	1080	13.5		<0.001				<0.0001	<0.005		0.008		0.0005		0.0005			2.29	0.00005		1180	48	34	162	3		94.8	20				440								3.11	10	25
GW031856	22-Apr-08	1650			7.4	1090	19.8		0.001				<0.00005	<0.001		0.008		0.0004		0.003			0.048	<0.0001		1060	50	33	145	3.6		106	18				480									<0.025	<0.1
GW031856	29-Oct-08	1225																																													
GW031856	10-Feb-09	0915	17.85	18.49	7.3	1090	26.9		0.002				<0.00005	0.003		0.009		0.0006		0.002			0.26	<0.0001		1100	51	30	150	2.8		81	19				440									<0.025	<0.025
GW031856	17-Jun-09	1005			7.4	1170	20.1		0.001	0.156	<0.001		<0.0001	<0.001	<0.001	0.004	0.06	<0.001	0.001	<0.001		<0.01	0.037	<0.0001		1110	51	33	149	3	11.8	92	15	<1	<1	453	453	12	0.52	<0.01				704			
GW031856	11-Sep-09	1330	15.51	16.28																																											
GW031856	23-Dec-09	1450	18.4		7.73	1029	29.3	0.01	0.001					<0.001		0.001	<0.05	0.001	0.012	0.001			0.205	<0.0001	7.45	1060	40	34	169	3	12.2	92.2	17.4	<1	<1	422	422	11.4	3.24		<0.01	0.14	0.14				
GW031856	25-Feb-10	1245	16.31	16.91	7.61	1240	25.3	<0.01	0.001					<0.005		0.002	<0.05	<0.001	0.001	<0.001			0.014	<0.0001	7.54	1110	47	34	160	3	12.2	90.8	17.6	<1	<1	436	436	11.6	2.42		<0.01	0.19	0.19				
GW031856	11-May-10	1310	16.58	17.18	8.2	1292	14.9		<0.001	0.15	<0.001		0.0002	<0.001	<0.001	0.116	<0.05	0.006	<0.001	<0.001		<0.01	0.51	<0.0001		1140	49	32	154	3	11.9	91.8	16.8	<1	<1	431	431	11.5	1.45	0.02				576			
GW031856	30-Aug-10	1310	15.35	15.95	7.35	1106	18.2	<0.01	<0.001					<0.001		0.008	<0.05	<0.001	0.009	<0.001			1.88	<0.0001	7.33	1140	49	33	159	3	12.2	98	20	<1	<1	426	426	11.7	1.99		<0.01	0.24	0.24				
GW031856	10-Nov-10	1310	15.52	16.12	7.08	990	27.8	<0.01	0.001					<0.005		0.014	<0.05	<0.001	0.004	<0.001			1.26	<0.0001	7.42	1160	22	33	163	3	11	103	18	<1	<1	440	440	12.1	4.84		<0.01	0.2	0.2				
GW031856	14-Mar-11	1250	19.71	20.31	7.19	945	26.5	<0.01	<0.001					0.001		0.004	<0.05	<0.001	<0.001	<0.001			0.015	<0.0001	7.46	887	45	30	151	3	11.4	92	20	<1	<1	414	414	11.3	0.4		<0.01	0.2	0.2				
GW031856	7-Jun-11	1430	16.08	16.68	7.35	929	19.2																																								
GW031856	9-Sep-11	1150	15.49	16.09	7.33	970	17	<0.01	<0.001	0.146	<0.001		<0.0001	<0.001	<0.001	0.005	<0.05	<0.001	<0.001	0.001		<0.01	1.25	<0.0001	7.71	1120	52	35	161	3	12.6	109	22	<1	<1	412	412	11.8	3.22	<0.01	<0.01	0.16	0.16	620			
GW031856	7-Dec-11	1230	15.65	16.25	7.64	940	20.9																																								
GW031856	19-Mar-12	1150	15.1	15.7	7.27	1070	24.3	0.02	0.002	0.161	<0.001		<0.0001	0.002	<0.001	0.012	0.06	<0.001	0.002	<0.001		0.02	0.034	<0.0001	7.82	1110	53	34	155	3	12.3	106	23	<1	<1	421	421	11.9	1.55	<0.01	<0.01	0.27	0.27	666			
GW031856	14-Jun-12	1210	16.04	16.64	7.57	1170	25.1																																								
GW031856	19-Sep-12	1040	16.6	17.2	7.39	1060	21.2	0.01	0.001	0.176	<0.001		<0.0001	<0.001	<0.001	0.012	0.29	0.002	0.004	<0.001		0.01	0.027	<0.0001	7.84	1160	48	33	158	4	12.1	115	21	<1	<1	410	410	11.9	0.86	<0.01	<0.01	0.17	0.17	670			
GW031856	27-Nov-12	1230	16	16.6	7.43	1048	25.4																																								
GW031856	21-Mar-13	1300	15.7	16.3	7.42	1020	24.2	<0.01	0.001	0.166	<0.001		<0.0001	0.003	<0.001	0.027	<0.05	0.006	0.005	<0.001		0.01	0.193	<0.0001	7.78	1100	49	32	157	3	12	90	21	<1	<1	435	435	11.7	1.31	<0.01	<0.01	0.22	0.22	640			
GW031856	11-Jul-13	850	17.47	18.07	7.54	1064	19.6																																								
GW031856	5-Sep-13	915	17.2	17.8	7.56	1070	19.2	<0.01	<0.001	<0.05	0.141	<0.001	<0.0001	<0.001	<0.001	0.005	0.06	<0.001	0.002	<0.001	<0.01	<0.01	0.017	<0.0001	7.92	1130	49	33	158	4	12.1	100	20	<1	<1	432	432	11.9	1.08	<0.01				660			
GW031856	22-Nov-13	900	15.88	16.48	7.6	1120	24.9																																								
GW031856	24-Feb-14	1020	15.1	15.7	7.7	1120	24.5	<0.01	0.001	<0.05	0.156	<0.001	<0.0001	<0.001	<0.001	0.007	<0.05	<0.001	<0.001	<0.001	<0.01	0.01	0.138	<0.0001	7.84	1150	48	32	155	3	11.8	99	22	<1	<1	430	430	11.8	<0.01	0.02				684			
GW031856	27-May-14	1050	15.20	15.8	7.5	1097	20.1																																								
GW031856	9-Sep-14	900	14.70	15.3	7.3	1120	18	<0.01	0.002					0.002		0.006	0.12		<0.001	<0.001			0.056	<0.0001	7.82	1140	46	30	142	3	11	101	23	<1	<1	388	388	11.1	0.31		<0.01	0.2	0.2				

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**									**1500**	**400**		**4000**			
GW031856	20-Nov-14	0845	15.87	16.47	7.2	1120	24.5																																							
GW031856	26-Feb-15	1000	15.6	16.2	7.5	1090	25.6	<0.01	0.001	0.143	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<0.05		<0.001	0.001	<0.01	0.01	0.197	<0.0001	7.94	1220	48	33	150	3	11.7	99	22	<1	<1	478	478	12.8	4.47	0.02	<0.01	0.21	0.21	570			
GW031856	26-May-15	1345	15.07	15.67	No access																																								
GW031856	27-Aug-15	900	15.1	15.7	6.9	1120	14.7	0.01	0.001	0.126	<0.001	<0.05	<0.0001	<0.001	<0.001	0.022	0.19	0.003	0.002	0.001	<0.01	<0.01	0.348	<0.0001	7.8	1120	49	35	157	2	12.2	66	23	<1	<1	406	406	10.4	7.71	0.04	<0.01	0.21	0.21	592			
GW031856	4-Dec-15	905	18.77	19.37	7	1118	22.1																																							
GW031856	24-Feb-16	955	17.83	18.43	7.1	1117	23.8	0.01	0.002	0.154	<0.001	<0.05	<0.0001	<0.001	<0.001	0.007	0.09	<0.001	0.005	<0.001	<0.01	0.01	0.035	<0.0001	7.89	1140	57	38	173	3	13.6	75	23	<1	<1	454	454	11.7	7.53	0.05	<0.01	0.21	0.21	656			
GW031856	23-May-16	910	16.53	17.13	7.2	1121	21																																							
GW031856	6-Sep-16	1110	14	14.6	7.3	1140	16.7	<0.01	0.001					0.001		0.057	0.25	0.009	0.001	0.002			0.594	<0.0001	7.61	1120	53	33	142	2	11.6	96		<1	<1	424	424	11.6	0.06		<0.01	0.2	0.2				
GW031856	29-Nov-16	900	15.83	16.43																																									

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**							**1500**	**400**		**4000**			
TARRAWONGA																																													
GW052266	2-Jun-06		7.67	8.1	7.9				<0.001																	1360	17	13	301	5		134	65				488									
GW052266	11-Jan-07		8.94	9.37	7.58				<0.001				<0.0001	<0.005		<0.001		<0.001		<0.001			0.02	<0.0001		1950	45	29	389	8		362	126				457									
GW052266	10-Jul-07		7.92	8.35	8.01	1330	13.3		<0.001				<0.0001	<0.005		<0.001		<0.001		<0.001			0.01	<0.0001		1480	23	14	315	6		170	79				435						10.61	<20	250
GW052266	18-Jul-07		7.97	8.4																																								
GW052266	7-Aug-07	1300	7.94	8.37																																								
GW052266	22-Aug-07	1335	7.95	8.38																																								
GW052266	5-Sep-07	0955	8.02	8.45																																								
GW052266	24-Sep-07	1305	7.92	8.35																																								
GW052266	11-Oct-07	1050	7.9	8.33																																								
GW052266	26-Nov-07	1345	8	8.43																																								
GW052266	29-Jan-08	1420	8.01	8.44																																								
GW052266	4-Mar-08	1145	8.04	8.47																																								
GW052266	4-Apr-08	1210	8	8.43																																								
GW052266	22-Apr-08	0915	8.04	8.47	7.2	1230	20.6		<0.001				<0.00005	<0.001		<0.001		0.0002		0.006			<0.005	<0.0001		1250	94	48	110	4.5		131	19				465							<0.025	<0.1
GW052266	21-Aug-08	1225	5.86	6.29																																								
GW052266	29-Oct-08	1725			8.7	1600	28.4		<0.001				<0.00005	0.002		0.001		0.0003		<0.001			0.013	0.0006		1600	19	17	270	6.5		220	93				450							<0.025	<0.100
GW052266	28-Aug-09	1205	9.7	10.13																																								
GW052266	14-Dec-09	0840	11.3	11.35	7.4	922	23.3	<0.01	0.003					<0.001		0.003	<0.05	<0.001	0.006	0.003			0.018	<0.0001	7.51	838	55	16	84	<1	7.72	64.1	31.6	<1	<1	252	252	7.51	1.36		<0.01	6.09	6.09				
GW052266	25-Feb-10	1320	10.44	10.49																																								
GW052266	11-May-10	0940	10.43	10.48	8.23	954	18.6		0.002	0.078	<0.001		<0.0001	<0.001	<0.001	0.002	0.54	0.002	0.017	0.004		0.01	0.024	<0.0001		813	54	16	80	<1	7.52	68.3	34	<1	<1	241	241	7.46	0.42	0.05				446			
GW052266	16-Aug-10	1450	9.71	10.21	7.4	860	18.7																																							
GW052266	9-Nov-10	0900	10.53	10.58	6.98	817	24.1																																							
GW052266	10-Mar-11	1045	10.51	11.01	7.04	786	23.5	0.15	0.004					<0.001		0.024	1.28	0.002	0.034	0.001			0.103	<0.0001	7	640	53	17	94	1	8.2	72	34	<1	<1	262	262	7.98	1.34		0.34	4.32	4.66				
GW052266	6-Jun-11	0930	10.19	10.24	7.05	663	20.2																																							
GW052266	6-Sep-11	0920	10.51	10.56	6.94	714	20.2	0.96	0.003	0.106	<0.001		<0.0001	0.002	<0.001	0.009	2.63	0.002	0.085	0.008		0.02	0.061	<0.0001	7.48	823	57	16	90	<1	8.08	71	38	<1	<1	260	260	7.99	0.53	0.14	<0.01	6.35	6.35	464			
GW052266	7-Dec-11	0910	10.55	10.60	6.95	705	20.6																																							
GW052266	13-Mar-12	0900	9.18	9.23	7.04	784	21.6	0.03	0.002	0.086	<0.001		<0.0001	<0.001	<0.001	0.113	0.1	0.003	0.005	0.012		0.02	0.15	<0.0001	7.54	821	57	17	99	<1	8.55	68	37	<1	<1	267	267	8.44	0.65	<0.01	<0.01	5.92	5.92	498			
GW052266	13-Jun-12	900	8.38	8.43	7.05	837	20.4																																							
GW052266	4-Sep-12	1040	7.91	7.96	7.41	780	22.4	0.04	0.003	0.078	<0.001		<0.0001	<0.001	<0.001	0.018	0.92	0.002	0.03	<0.001		0.01	0.068	<0.0001	7.56	802	50	17	93	<1	7.94	76	32	<1	<1	260	260	8	0.42	0.07	0.01	5.53	5.54	562			
GW052266	27-Nov-12	0850	8.00	8.05	7.28	750	22																																							
GW052266	20-Mar-13	0915	9.24	9.29	7.18	740	21.4	0.02	0.004	0.072	<0.001		<0.0001	<0.001	<0.001	0.034	0.16	0.002	0.007	0.001		0.01	0.176	<0.0001	7.13	798	54	17	89	<1	7.97	80	28	<1	<1	244	244	7.71	1.58	0.02	<0.01	5.9	5.9	326			
GW052266	11-Jul-13	0920	7.79	7.84	7.25	822	18.1																																							
GW052266	5-Sep-13	935	8.29	8.34	7.09	590	22.4	1.02	0.002	<0.05	0.091	<0.001	<0.0001	0.004	0.002	0.324	1.72	0.006	0.036	0.009	<0.01	0.02	0.19	<0.0001	7.62	782	48	16	95	<1	7.84	73	35	<1	<1	238	238	7.54	1.94	<0.01				493			
GW052266	22-Nov-13	0920	7.84	7.89	7.2	670	21.8																																							
GW052266	24-Feb-14	910	7.74	7.79	7	727	21.2	0.2	0.002	<0.05	0.072	<0.001	<0.0001	0.001	<0.001	0.112	0.86	0.007	0.03	0.003	<0.01	0.01	0.152	<0.0001	7.48	737	42	14	83	<1	6.86	66	33	<1	<1	203	203	6.6	1.87	0.05				514			
GW052266	27-May-14	900	7.68	7.73	7.2	692	20.6																																							
GW052266	9-Sep-14	920	7.73	7.78	7.4	684	20.6	0.22	0.0001					<0.001		0.007	3.63	<0.001	0.318	0.003			0.048	<0.0001	7.83	693	34	12	82	<1	6.25	66	34	<1	<1	222	222	7.01	4.83		<0.01	1.75	1.75				
GW052266	20-Nov-14	0910	7.77	7.82	7.2	748	21.5																																							
GW052266	26-Feb-15	900	7.51	7.56	7.2	752	21.6	0.44	0.006	0.086	<0.001	<0.05	<0.0001	0.001	0.001	0.012	22.9	0.002	0.141	0.008	<0.01	0.03	0.214	<0.0001	7.13	800	47	15	89	1	7.48	62	81	<1	<1	168	168	9.56	14.2	0.54	0.74	5.12	5.86	430			
GW052266	26-May-15	915	7.75	7.8	7.3	713	20.2																																							
GW052266	27-Aug-15	925	7.76	7.81	7.2	707	19.7	0.06	<0.001	0.049	<0.001	<0.05	<0.0001	<0.001	<0.001	0.006	16	<0.001	0.273	0.002	<0.01	<0.01	0.093	<0.0001	7.61	712	40	15	85	2	6.98	48	36	<1	<1	218	218	6.46	3.85	0.19	0.03	0.46	0.49	380			
GW052266	4-Dec-15	930	7.83	7.88	7.1	734	20.5																																							
GW052266	24-Feb-16	900	7.86	7.91	7	752	21.7	0.14	0.007	0.084	<0.001	<0.05	<0.0001	<0.001	<0.001	0.008	30.6	<0.001	0.096	<0.001	<0.01	0.03	0.067	<0.0001	7.5	508	52	15	90	<1	7.74	56	37	<1	<1	219	219	7.74	3.82	0.1	<0.01	6.21	6.21	508			
GW052266	23-May-16	900	7.91	7.96	7	746	20.6																																							
GW052266	6-Sep-16	920	7.94	7.99	7.1	712	21.5	0.12	0.001					<0.001		0.002	0.34	<0.001	0.03	<0.001			0.026	<0.0001	7.51	719	43	14	80	<1	6.78	66		<1	<1	224	224	7	1.65		<0.01	3.05	3.05				
GW052266	29-Nov-16	930	7.79	7.84	7.3	752	21.3																																							
TEMPLEMORE A																																													
Templemore A	18-Jul-07		8.61	9.07																																										
Templemore A	7-Aug-07	1135	11.33	11.79																																									
Templemore A	22-Aug-07	1515	12.08	12.54																																								
Templemore A	5-Sep-07	1208	12.09	12.55																																								
Templemore A	24-Sep-07	1420	12.22	12.68																																								
Templemore A	11-Oct-07	1215	12.08	12.54																																								
Templemore A	26-Nov-07	1530	12.09	12.55																																								
Templemore A	29-Jan-08	1540	12.05	12.51																																								
Templemore A	4-Mar-08	1420	12.07	12.53																																								
Templemore A	4-Apr-08	1145	9.16	9.62																																								
Templemore A	21-Aug-08	1325	8.68	9.14																																								
Templemore A	29-Jan-09	1118	7.84	8.3																																								
Templemore A	17-Jun-09		8.65	9.39	7.7	1640	19.7		0.003	0.132	<0.001		<0.0001	<0.001	<0.001	0.021		0.002	0.247	0.002		<0.01	0.02	<0.0001	0.16	1500	165	42	106	1	16.3	228	56	<1	<1	426	426	16.1	0.7	0.01				1000			
Templemore A	28-Aug-09	1242	8.92	9.4																																									
Templemore A	23-Dec-09	1110	10.1	10.58	7.2	1473	24	<0.01	0.002					<0.001		0.007	<0.05	<0.001	0.013	0.001			0.025	<0.0001	7.54	1400	72	41	125	1	12.4	246	79	<1	<1	241	241	13.6	4.61		0.07	3.25	3.32				
Templemore A	25-Feb-10	1055	9.16	9.64																																									
Templemore A	11-May-10	1230	9.12	9.6	7.92	1083	21.2		0.004	0.21	<0.001		0.0001	<0.001	<0.001	0.011	0.11	<0.001	1.9	0.006		0.01	0.019	<0.0001		1600	152	38	105	3	15.4	241	68.3	<1	<1	376	376	15.7	1.13	3.1				906			
Templemore A	30-Aug-10	1100	9.19	9.67	7.77	1590	22.1																																							
Templemore A	9-Nov-10	1130	9.24	9.72	7.67	1485	23.7																																							
Templemore A	14-Mar-11	1020	9.44	9.92	7.35	1486	24.8	0.02	0.003					<0.001		0.011	0.76	<0.001	3.31	0.005			0.079	<0.0001	7.56	1420	175	41	120	4	17.4	297	49	<1	<1	402	402	17.4	0.03		<0.01	0.09	0.09				
Templemore A	6-Jun-11	1255	9.36	9.84	7.45	1392	20.2																																							
Templemore A	6-Sep-11	1150	9.5	9.98	7.61	1395	21.8	0.08	0.004	0.266	<0.001		<0.0001	<0.001	<0.001	0.004	0.1	<0.001	1.81	0.004		<0.01	0.033	<0.0001	8.04	1670	169	41	120	3	17.1	285	62	<1	<1	405	405	17.4	0.9	1.37	0.12	0.46	0.58	790			
Templemore A	9-Dec-11	1120		No access to well - paddock flooded																																											
Templemore A	13-Mar-12	1200	2.7	3.18	7.62	960	22.9	0.1	0.003	0.093	<0.001		<0.0001	<0.001	<0.001	<0.001	0.11	<0.001	0.006	<0.001		<0.01	0.023	<0.0001	7.79	988	92	25	74	8	10.1	103	59	<1	<1	222	222	9.98	0.6	0.04	0.01	19.7	19.7	578			
Templemore A	13-Jun-12	1250	3.28	3.76	7.31	826	20.2																																							
Templemore A	6-Sep-12	1000	3.59	4.07	7.32	816	20.1	0.05	0.002	0.071	<0.001		<0.0001	<0.001	<0.001	0.017	0.09	<0.001	0.008	<0.001		<0.01	0.026	<0.0001	7.67	820	80	22	54	4	8.25	103	66	<1	<1	203	203	8.34	0.48	<0.01	<0.01	2.79	2.79	500			
Templemore A	27-Nov-12	1130	3.85	4.33	7.42	812	21.1																																							
Templemore A	21-Mar-13	1210	4.31	4.79	7.67	943	21.8	1.68	0.003	0.114	<0.001		0.0001	0.001	0.001	0.142	2.56	0.01	0.501	0.005		<0.01	0.279	<0.0001	7.75	1020	97	24	60	9	9.66	116	74	<1	<1	242	242	9.65	0.06	2.75	3.32	0.18	3.5	614			

ANNUAL REVIEW
2016

TARRAWONGA COAL PTY LTD
Groundwater Monitoring Data

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																		Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**									**1500**	**400**		**4000**			
Templemore A	11-Jul-13	1120	5.34	5.82	7.68	1162	19.2																																								
Templemore A	5-Sep-13	1220	4.29	4.77	7.57	1150	20.4	0.07	0.003	<0.05	0.119	<0.001	<0.0001	<0.001	<0.001	0.068	0.12	0.003	0.688	0.003	<0.01	<0.01	0.103	<0.0001	7.96	1240	119	30	93	5	12.6	175	96	<1	<1	284	284	12.6	0.1	0.07				765			
Templemore A	22-Nov-13	1215	7.5	7.98	7.7	1189	19.8																																								
Templemore A	20-Feb-14	1220	4.41	4.89	7.7	1110	20.7	0.23	0.004	<0.05	0.1	<0.001	<0.0001	0.001	<0.001	0.105	0.75	0.012	0.432	0.005	<0.01	<0.01	0.204	<0.0001	7.71	1150	104	27	80	6	11	150	84	<1	<1	272	272	11.4	1.63	4.83				669			
Templemore A	27-May-14	1130	4.57	5.05	7.6	1281	20																																								
Templemore A	9-Sep-14	1210	4.31	4.79	7.8	1150	19.3	0.02	0.004					<0.001		0.012	0.86	<0.001	0.011	<0.001			0.031	<0.0001	7.98	1190	105	26	78	2	10.8	164	98	<1	<1	272	272	12	5.3		<0.01	2.6	2.6				
	20-Nov-14	1300	4.78	5.26	7.9	1117	21.2																																								
Templemore A	26-Feb-15	1340	5.27	5.75	7.9	1100	23.7	0.2	0.003	0.079	<0.001	<0.05	<0.0001	<0.001	<0.001	0.015	0.22	<0.001	0.1	0.002	<0.01	<0.01	0.064	<0.0001	7.69	1210	109	27	84	4	11.4	157	105	<1	<1	242	242	12.9	13.7	0.73	0.14	0.3	0.44	674			
Templemore A	26-May-15	1300	5.59	6.07	7.9	1125	19.4																																								
Templemore A	27-Aug-15	1335	5.64	6.12	7.9	1180	18.4	0.04	0.002	0.077	<0.001	<0.05	<0.0001	<0.001	<0.001	0.019	0.05	<0.001	0.014	<0.001	<0.01	<0.01	0.034	<0.0001	8.03	1190	113	27	87	3	11.7	134	82	<1	<1	264	264	10.8	4.28	0.04	<0.01	0.93	0.93	755			
Templemore A	4-Dec-15	1215	5.77	6.25	7.8	1192	22.7																																								
Templemore A	24-Feb-16	1245	6.08	6.56	7.8	1234	22.5	0.03	0.004	0.105	<0.001	<0.05	<0.0001	<0.001	<0.001	0.012	0.11	0.001	0.415	0.001	<0.01	<0.01	0.037	<0.0001	8.09	1300	147	30	102	4	14.3	176	88	<1	<1	340	340	13.6	2.71	0.5	0.44	<0.01	0.27	668			
Templemore A	23-May-16	1230	6.31	6.79	7.9	1302	20.7																																								
Templemore A	6-Sep-16	1340	6.43	6.91	7.9	1280	23.8	0.04	0.003					<0.001		0.023	0.26	0.002	0.404	0.001			0.26	<0.0001	7.89	1300	134	26	89	4	12.8	183		<1	<1	338	338	13.5	2.64		<.01	2.14	2.14				
Templemore A	29-Nov-16	1250	3.27	3.75	7.5	810	20.5																																								

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals																	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Boron (B) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Selenium (Se) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**				**0.1**	**1**	**1**	**1**		**0.1**		**1**			**20**	**0.002**			**1000**						**4.7410 4.4113**						**1500**	**400**		**4000**				
TEMPLEMORE B																																													
Templemore B	18-Jul-07		9.89	9.89																																										
Templemore B	7-Aug-07	1145	8.14	8.14																																										
Templemore B	22-Aug-07	1525	8.31	8.31																																										
Templemore B	5-Sep-07	1211	8.17	8.17																																										
Templemore B	24-Sep-07	1425	8.05	8.05																																										
Templemore B	11-Oct-07	1220	8.09	8.09																																										
Templemore B	26-Nov-07	1535	7.9	7.9																																										
Templemore B	29-Jan-08	1545	8.13	8.13																																										
Templemore B	4-Mar-08	1425	8.44	8.44																																										
Templemore B	4-Apr-08	1150	8.42	8.42																																										
Templemore B	21-Aug-08	1329	10.55	10.55																																										
Templemore B	29-Jan-09	1145	15.5	15.5																																										
Templemore B	17-Jun-09		9.49	9.63	7.3	1810	19.5		0.002	0.145	<0.001		<0.0001	<0.001	<0.001	0.055	<0.05	<0.001	0.008	<0.001		0.01	0.052	<0.0001		1700	118	52	175	2	17.9	240	106	<1	<1	419	419	17.4	1.46	<0.01				1080			
Templemore B	28-Aug-09	1250	12.69	12.83																																										
Templemore B	23-Dec-09	1040	15.84	15.98	6.75	1491	24.4	<0.01	0.003					<0.001		0.022	<0.05	<0.001	0.003	0.002			0.068	<0.0001	7.44	1420	31	31	221	2	13.8	196	134	<1	<1	291	291	14.1	1.29		<0.01	0.74	0.74				
Templemore B	25-Feb-10	1112	9.36	9.5																																										
Templemore B	11-May-10	1250	10.52	10.66	8.01	1722	22.2		0.002	0.059	<0.001		<0.0001	<0.001	<0.001	0.007	0.11	<0.001	0.024	<0.001		0.01	0.02	<0.0001		1540	85	30	194	2	15.1	204	129	<1	<1	328	328	15	0.48	0.02				854			
Templemore B	30-Aug-10	1145	17.65	17.79	7.23	1532	23.8																																								
Templemore B	9-Nov-10	1215	9.94	10.08	7.19	1405	24.8																																								
Templemore B	14-Mar-11	0940	17.11	17.25	7.21	1460	24.7	0.28	0.002					<0.001		0.055	0.43	0.003	0.034	0.002			0.185	<0.0001	7.28	1400	97	37	200	2	16.6	264	136	<1	<1	339	339	17	1.3		<0.01	2.85	2.85				
Templemore B	6-Jun-11	1230	10.42	10.56	7.3	1370	21.5																																								
Templemore B	8-Sep-11	1100	13.56	13.7	7.12	1387	20.8	0.03	0.003	0.076	<0.001		<0.0001	<0.001	<0.001	0.015	<0.05	<0.001	0.005	<0.001		0.01	0.019	<0.0001	7.54	1630	62	38	202	2	15.1	254	137	<1	<1	325	325	16.5	4.62	0.03	<0.01	0.73	0.73	982			
Templemore B	7-Dec-11	1150	10.53	10.67	7.21	1360	21																																								
Templemore B	13-Mar-12	1250	9.58	9.72	7.28	1680	23	0.07	0.002	0.09	<0.001		<0.0001	<0.001	<0.001	0.013	0.1	<0.001	0.004	<0.001		0.02	0.036	<0.0001	7.7	1790	116	42	228	2	19.2	307	142	<1	<1	338	338	18.4	2.24	0.11	<0.01	3.37	3.37	1040			
Templemore B	13-Jun-12	1220	10.51	10.65	7.34	1704	20.8																																								
Templemore B	4-Sep-12	1350	8.28	8.42	7.3	1770	21.4	0.05	0.002	0.099	<0.001		<0.0001	<0.001	<0.001	0.01	0.1	<0.001	0.005	<0.001		0.01	0.072	<0.0001	7.63	1920	110	46	248	2	20.1	326	181	<1	<1	364	364	20.2	0.31	<0.01	<0.01	7.25	7.25	1200			
Templemore B	27-Nov-12	1200	7.65	7.79	7.37	1611	21.8																																								
Templemore B	20-Mar-13	1330	12.36	12.5	7.29	1570	22.4	0.04	0.004	0.069	<0.001		<0.0001	<0.001	<0.001	0.019	0.09	0.001	0.012	<0.001		0.01	0.064	<0.0001	7.51	1700	94	36	235	2	17.9	255	137	<1	<1	335	335	16.7	3.41	0.03	<0.01	4.44	4.44	886			
Templemore B	11-Jul-13	1145	6.08	6.22	7.22	1523	21.7																																								
Templemore B	5-Sep-13	1240	6.1	6.24	7.24	1470	22.3	0.28	0.003	0.06	0.076	<0.001	<0.0001	<0.001	<0.001	0.046	0.3	0.002	0.035	<0.001	<0.01	0.02	0.148	<0.0001	7.79	1620	78	32	230	2	16.6	242	158	<1	<1	304	304	16.2	1.18	0.03				988			
Templemore B	22-Nov-13	1235	7.89	8.03	7.4	1483	20.7																																							
Templemore B	20-Feb-14	1240	8.31	8.45	7.5	1400	21.6	0.1	0.004	0.06	0.061	<0.001	<0.0001	<0.001	<0.001	0.045	0.38	0.005	0.022	0.002	<0.01	0.02	0.129	<0.0001	7.47	1470	69	29	204	1	14.7	199	142	<1	<1	293	293	14.4	1.03	0.02				829			
Templemore B	27-May-14	1110	10.51	10.65	7.4	1566	19.7																																							
Templemore B	9-Sep-14	1220	6.38	6.52	7.4	1390	21.5	0.05	0.004					<0.001		0.007	0.07	<0.001	0.004	<0.001			0.028	0.0001	7.7	1480	63	25	192	1	13.6	195	141	<1	<1	325	325	14.9	4.76		<0.01	2.3	2.3				
Templemore B	20-Nov-14	1330	6.96	7.1	7.4	1523	22.3																																							
Templemore B	26-Feb-15	1220	7.58	7.72	7.4	1450	23.6	0.15	0.003	0.064	<0.001	<0.05	<0.0001	<0.001	<0.001	0.01	0.2	<0.001	0.013	0.002	<0.01	0.01	0.078	<0.0001	7.89	1580	70	30	205	2	14.9	211	144	<1	<1	328	328	15.5	1.9	0.09	<0.01	2.38	2.38	955			
Templemore B	26-May-15	1320	8.37	8.51	7.4	1453	20.6																																							
Templemore B	27-Aug-15	1400	8.03	8.17	7.3	1480	19.2	0.03	0.003	0.061	<0.001	<0.05	<0.0001	<0.001	<0.001	0.006	0.07	0.003	0.005	<0.001	<0.01	0.02	0.046	<0.0001	7.73	1520	74	31	202	1	15	179	158	<1	<1	286	286	14	3.43	0.04	<0.01	2.07	2.07	826			
Templemore B	4-Dec-15	1230	10.98	11.12	7.3	1572	22.8																																							
Templemore B	24-Feb-16	1330	10.77	10.91	7.2	1465	23.4	0.31	0.004	0.069	<0.001	<0.05	<0.0001	<0.001	<0.001	0.007	1.7	<0.001	0.005	<0.001	<0.01	0.01	0.046	<0.0001	7.77	1510	82	32	219	1	16.3	214	158	<1	<1	307	307	15.5	2.56	0.05	<0.01	0.21	0.21	874			
Templemore B	23-May-16	1315	7.18	7.32	7.2	1481	21.8																																							
Templemore B	6-Sep-16	1425	13.46	13.6	7.2	1510	23.5	0.25	0.004					<0.001		0.024	1.12	0.003	0.021	<0.001			0.153	<0.0001	7.58	1560	90	30	196	2	15.5	240		<1	<1	325	325	16.1	1.84		<0.01	2.14	2.14				
Templemore B	29-Nov-16	1330	9.27	9.41	7.2	1345	21.3																																							

Denotes dissolved metals