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	31/12/2020
Annual review start date [1]	1/1/2017
Annual review end date	31/12/2017

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 January 2017 until 31st December 2017, 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	NWOOD
Date	29-03-2018

[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 2017 is summarised in Table 1. Table 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	Yes
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 condition 2	Carry out project generally in accordance	Non-compliant	Refer following	Throughout AR
PA11_0047	Schedule 3 condition 12	Annual Road Noise monitoring Campaign	Non-compliant	Annual Road Traffic Noise survey was not conducted in 2017.	Section 6.1.3

2 INTRODUCTION

The Annual Review (AR) formerly known as the Annual Environmental Management Report (AEMR) produced for Tarrawonga Coal Mine (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.

TCM is located approximately 16km east of Boggabri (Refer Figure 1). 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 January 2017 to 31st December 2017 (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 2018 to 31st December 2018, or beyond).

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 Nigel Wood, General Manager, Open Cut Operations - oversees Open Cut Operations for the Whitehaven Group. Contact: (02) 6741 9300.

Mr Blair Meyers, Operations Manager and Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6741 5002.

Mr Sebastien Moreno, Environmental Superintendent – oversees day-to-day environmental and rehabilitation performance across the site. Contact: (02) 6741 5009.

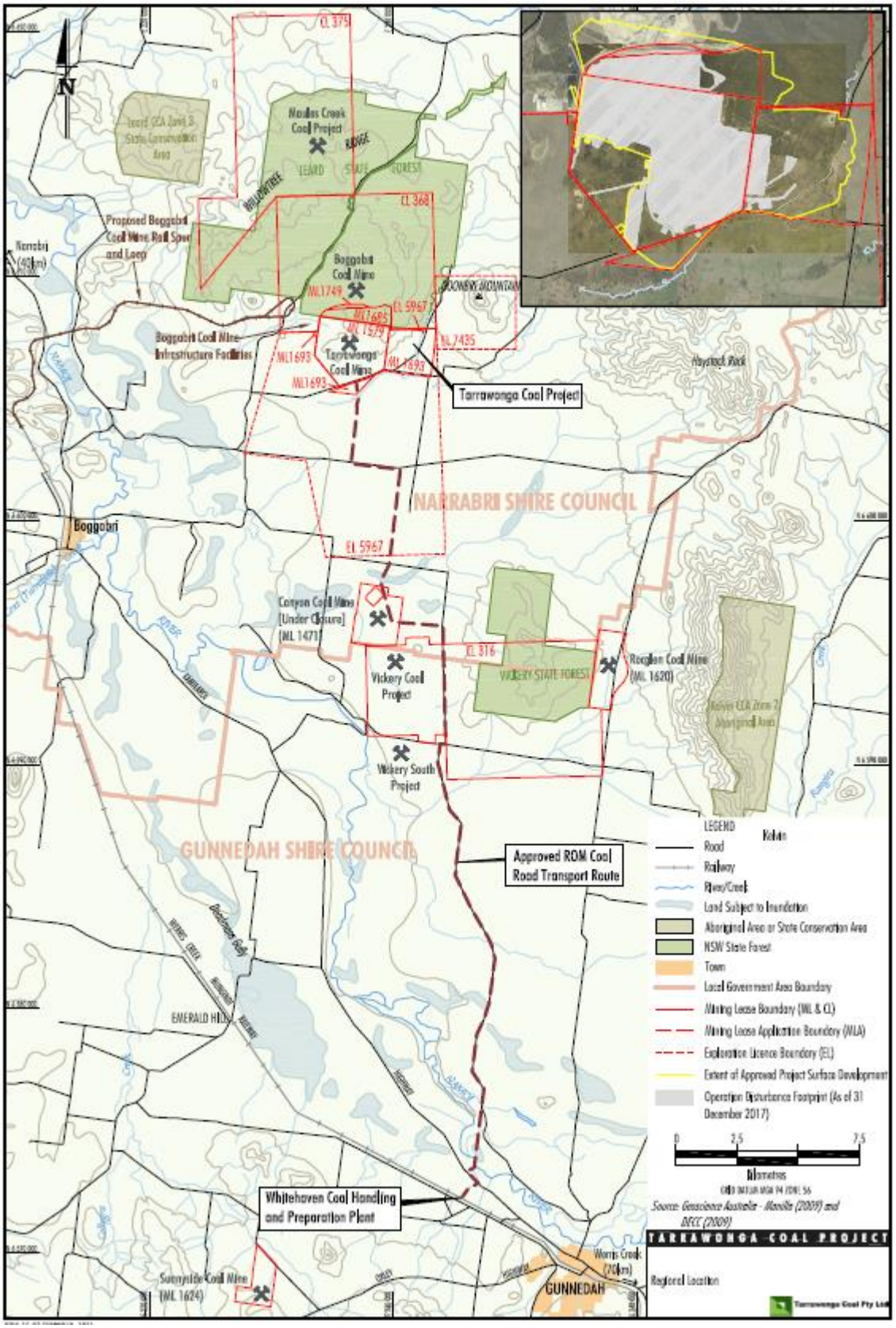


Figure 1 - Locality Plan

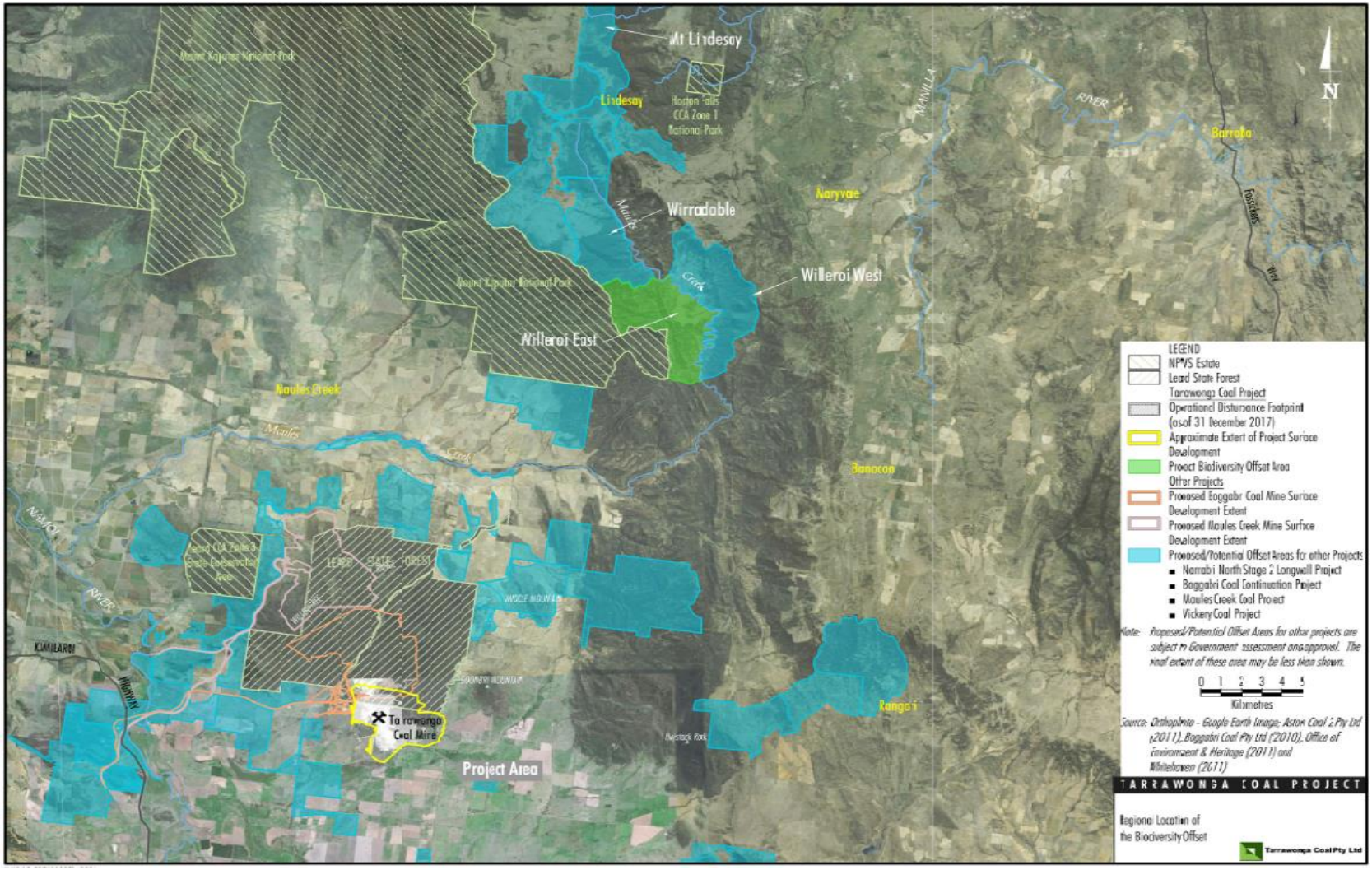


Figure 2 - Regional Location of Biodiversity Offset

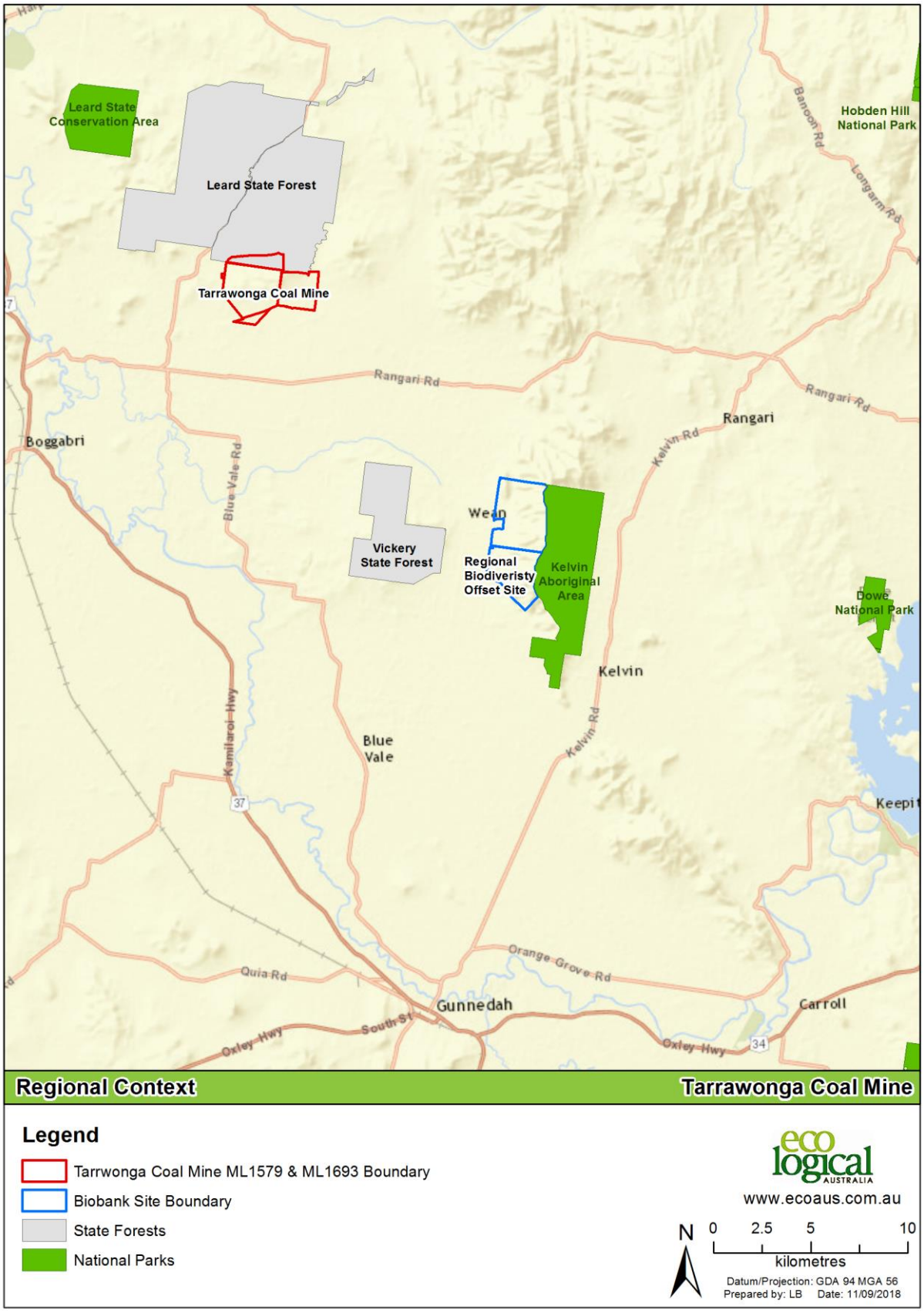


Figure 3 – Regional Location of Biobank Site

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)	10/01/2017	24/07/2021	Exploration Licence
Environment Protection Authority (EPA)	Environment Protection Licence (EPL) No. 12365	09/01/2006	N/A	EPL12365
Environment Protection Authority (EPA)	Variation- Environment Protection Licence (EPL) No. 12365	27/06/2017	N/A	Variation
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	
Department of Planning & Environment (DP&E)	Project Approval PA 11_0047	2014	31/12/2030	MOD1 (continued coal haulage to Gunnedah CHPP)

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Department of Planning & Environment (DP&E)	Project Approval PA 11_0047	2016	31/12/2030	MOD2 (allow receipt of all types of coal reject)
Department of Planning & Environment (DP&E)	Project Approval PA 11_0047	February 2017	31/12/2030	MOD3 (traffic Management Plan)
Department of Planning & Environment (DP&E)	Project Approval PA 11_0047	May 2017	31/12/2030	MOD4 (Sound Power Level
Department of Planning & Environment (DP&E)	Project Approval PA 11_0047	Aug. 2017	31/12/2030	MOD5 (Open Cut Augmentation)
Department of the Environment	EPBC 2011/5923	11/03/2013	31/12/2053	Conditional Federal Project Approval for LOM Project
Division of Resources and Energy (DRE)	Mining Lease (ML) 1579	03/04/2006	02/04/2027	Expires 21 years from commencement
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	14/11/2016	31/12/2020	MOP Amendment A
Division of Resources and Energy (DRE)	Mining Operations Plan (MOP) Amendment B	30/06/2017	30/12/2020	MOP Amendment B approved 30/06/2017.

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 (Project Approval PA11_0047)	Previous Reporting Period 2016 (actual)	This Reporting Period 2017 (actual)	Next Reporting Period 2018 (forecast)
Waste Rock/Overburden (bcm)	***n/a***	14,463,530	15,051,089	17,786,724
ROM Coal/Ore (t)	***3,000,000***	1,763,718	1,872,836	2,111,558
Coarse and Fine Reject (t)	***700,000***	0	527,718	700,000
Saleable Product (t)	***n/a***	2,023,981	3,376,226	2,000,004
Gravel Production (m^3)	***90,000***	0	0	90,000

[1] Course reject only.

4.1.1 Other 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 6:30 am and 5:00 pm (day shift) and 4:30 pm and 3:00 am (night shift) from Monday to Friday. Whilst processing of coal day shifts have been run almost every Saturday, mining activity day shifts have only occurred on occasion to meet production deadlines.

4.1.2 Coal Haulage

For the reporting period 2,536,891t of coal was hauled along the approved haulage route from TCM to the Whitehaven Gunnedah CHPP. During the same period 69,252t of coal was distributed from TCM for direct distribution to the domestic market. Combined haulage of ROM coal from TCM,

Rocglen Coal Mine and Vickery Coal Mine during 2017 was 3,993,662t. There was no coal haulage from Vickery Coal Mine during the reporting period. The total tonnage of coal rejects received by TCM during 2017 was 527,718t. 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.

4.1.3 Exploration

No exploration holes were drilled during the reporting period. Exploration drilling will continue to be undertaken at the TCM to further assess the coal reserves within the tenements. The renewal of the licence (EL5967) took effect on 10 January 2017 and term will end on 24 July 2021.

4.2 Next Reporting Period

4.2.1 Mine Operations

The mine production rates are planned for approximately 2,111,558 Mtpa of ROM coal and approximately 17,786,724 million bank cubic metres (Mbcm) of overburden during calendar year 2018.

Vegetation clearing activities in mining areas over the next reporting period will be conducted in accordance with the approved Biodiversity Management Plan (BMP) and the updated Mining Operations Plan (MOP, 2018). 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 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 (PA 11_0047) and EPL 12365 detail the noise criteria for site operations and coal haulage.

Table 6: 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 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;
- Real-time noise monitor and web based interface.

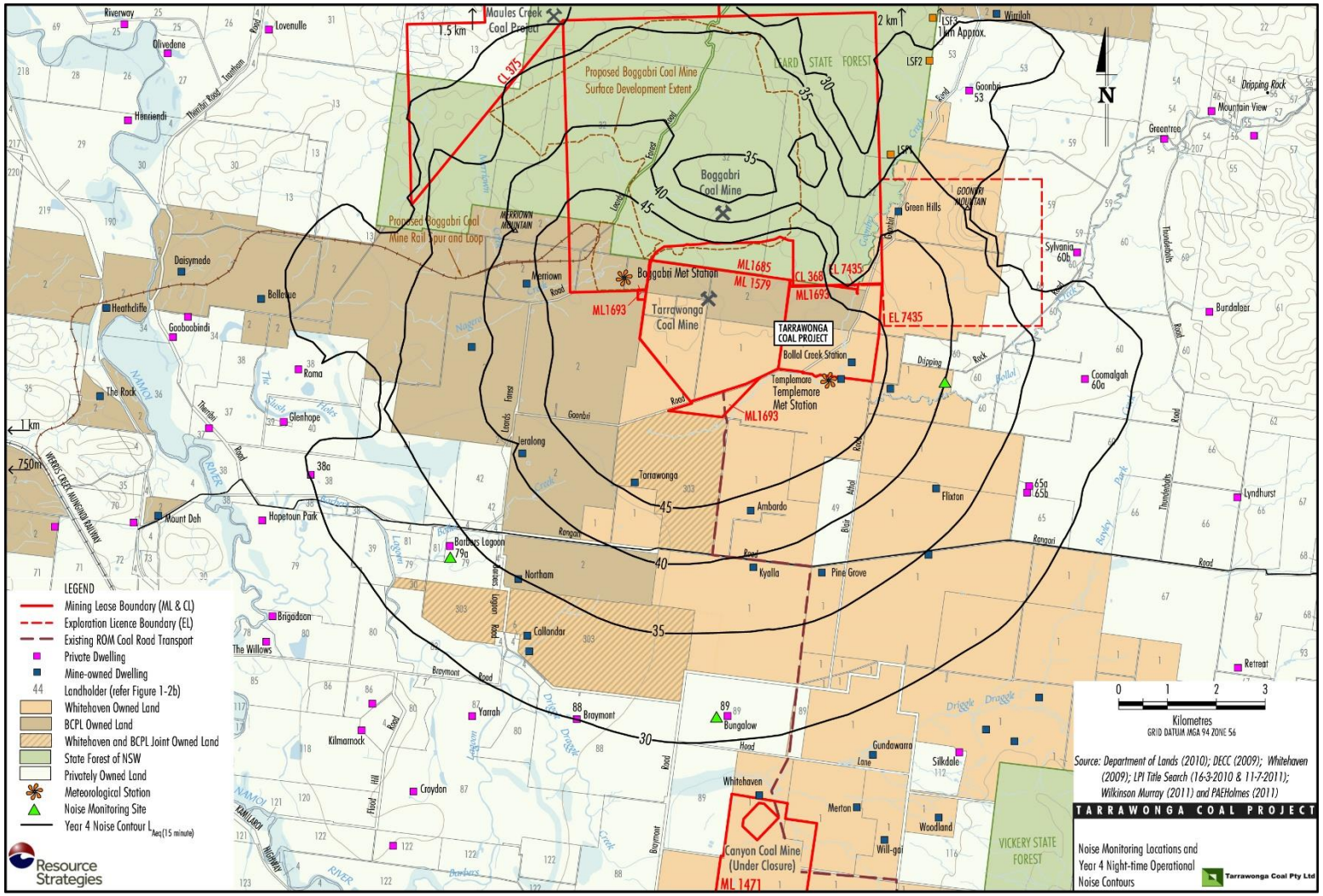


Figure 4 – Noise Monitoring Locations

6.1.3 Key Environmental Performance/Management Issues

Attended Noise Monitoring

Attended noise monitoring programs were undertaken quarterly during the reporting period by Global Acoustics. The noise monitoring sites are identified on Figure 4 and include 3 sites: the "Bungalow" (TN4), "Barbers Lagoon" (TN3) and "Matong" (TN2) properties. Attended noise monitoring undertaken throughout the reporting period showed compliance with the limits specified in the project approval on all occasions. No complaints were received in relation to noise during the monitoring period.

Attended noise monitoring to date indicates that results are generally consistent with previous reporting year's results.

Road Noise Monitoring

TCM had to ensure that the noise generated by road transport along public sections of the coal haulage route was in accordance with the Tarrawonga and Rocglen Road Noise Management Plan and with Schedule 3 condition 12 of PA 11_0047. However the Road noise survey was not completed in 2017 and TCM notified the department of the breach in January 2018. TCM implemented an action plan including usage of a compliance management system to minimize risk of re occurrence and the monitoring was completed in January 2018.

This monitoring occurred at the privately owned residences on the "Weroona" property and "Brooklyn" property located off Blue Vale Road. Results 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.

Real Time Noise Monitoring

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

Annual Sound Power level Testing

In December 2017, Sound power level (SPL) testing of fixed and mobile plant was undertaken of 14 nominated pieces of plant. According to May 2017 modification of the PA 11_0047, there is no criteria applicable for SPL and levels identified in the EA are only used for comparison. Each plant item was assessed for different types of activities (i.e.: Dynamic, stationary) and SPL results of the six machines which were greater than indicative levels identified in the EA are shown in Table 7. All other plants tested were within the indicative levels adopted for modelling purposes in the EA.

Table 7 – Summary of Sound Power Level Exceedance

Plant Items	Name	Activity	Indicative Sound Power Level A-weighted (dB)	Limit dB(A)	Exceedance (dB)
1	***CAT 785C***	Stationary	121	118	+3
		Dynamic-Uphill	122	121	+1
2	***CAT D11R-DOZER***	Stationary	119	116	+3
		Dynamic-Uphill	118	116	+2
3	***CAT D11T-DOZER***	Dynamic-Uphill	122	116	+6
4	***CAT D10T-DOZER***	Dynamic-Uphill	117	116	+1
5	***TEREX SKF***	Operational	119	117	+2
6	***CAT 773D WC-WATERCART***	Stationary	117	108	+9
		Dynamic-Uphill	115	111	+4
		Dynamic-Downhill	111	108	+3

During the period, TCM installed sound suppressed mufflers on three RH170 and excavator EXC540 (1900) had a Cummins engine module installed.

Annual Validation

Global Acoustics was engage to assess and validate the noise model prediction developed in 2011. The results generally indicated a comparison of predicted and measured levels from TCM Year 4 operation varied greatly (this comparison did not take into account operational activities at the time of monitoring compared to modelled scenarios).

Exceedances of modelled predictions occurred during Quarter 1, Quarter 3, and Quarter 4, with the most occurring during Quarter 3 at TN2 (Matong property). The largest positive difference which is where the measured level is greater than the predicted level, between modelled and actual LAeq,15minute noise levels was 8 dB. This occurred at TN2 during the evening period in Quarter 3 2017, and at TN4 during the day period in Quarter 4 2017. The largest positive difference between modelled and actual LA1,1minute noise levels was 11 dB at TN2 during Quarter 3 2017.

There were times when actual measured LAeq,15minute were greater than model predictions, but Attended monitoring showed that TCM was in compliance with noise criteria and that no systemic noise issues had occurred as a result of operations.

6.1.4 Proposed Improvements to Environmental Management

During the next reporting period a number of improvement will be made and investigations will continue into sound attenuation options for plant identified to have been above the indicative levels during the testing period. TCM will assess if the noise model requires to be calibrated and /or updated.

A revised Noise Management Plan was submitted in July 2017 and is being reviewed by the department. The revised Plan addresses the recent approval of the Sound Power Level Modification and the approval of the BTM Noise Management Strategy.

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 81 blasts were initiated (all of which were monitored). There were no instances where two or more blasts were required to be fired on one day due to safety reasons. There was one instance where monitoring results exceeded 115 dB during the reporting period, occurring at the project-related "Tarrawonga" property. There were no instances where blast overpressure exceeded 120dB .

The maximum recorded ground vibration during the reporting period was 1.44mm/s recorded at "Tarrawonga" on 13th April 2017 which is well below the consent criteria of 5mm/s. Results during the reporting period showed that performance improved with only one event slightly in excess of 115dB with 115.7dB. 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. No exceedances of the blasting criteria have been recorded on privately owned land during the reporting period.

The maximum fume rating for the reporting period was classified as a 2c 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

A revised Blast Management Plan was submitted to DP&E in June 2017 and is waiting for approval. No additional improvement are proposed for the next period.

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/m2/month.
- Mean annual dust deposition (all sources) – 4g/m2/month.
- Mean annual Total Suspended Particles (TSP) (all sources) – 90 □g/m3.
- Mean annual Particle Matter under 10 microns (PM10) – 30 □g/m3.
- 24-hour average PM10 particulate level – 50 □g/m3.

6.3.2 Environmental Management Measures

According to Air Quality and Greenhouse Gas Management Plan, 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 ground cover removal in advance of mining consistent with operational requirements;
- Ground cover 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;
- Use of covers on all product coal trucks. All coal haulage vehicles (road trucks only), including those operated by sub-contractors, are fitted with roll-over 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.

Figure 5 identifies the locations of the various deposited dust gauges (DGDG), two Tapered Element Oscillating Micro balance units (TEOM) on Flixton and Will-gai properties and one High Volume Air Sampler (HVAS) on Coomalgah operating and serviced during the reporting period.

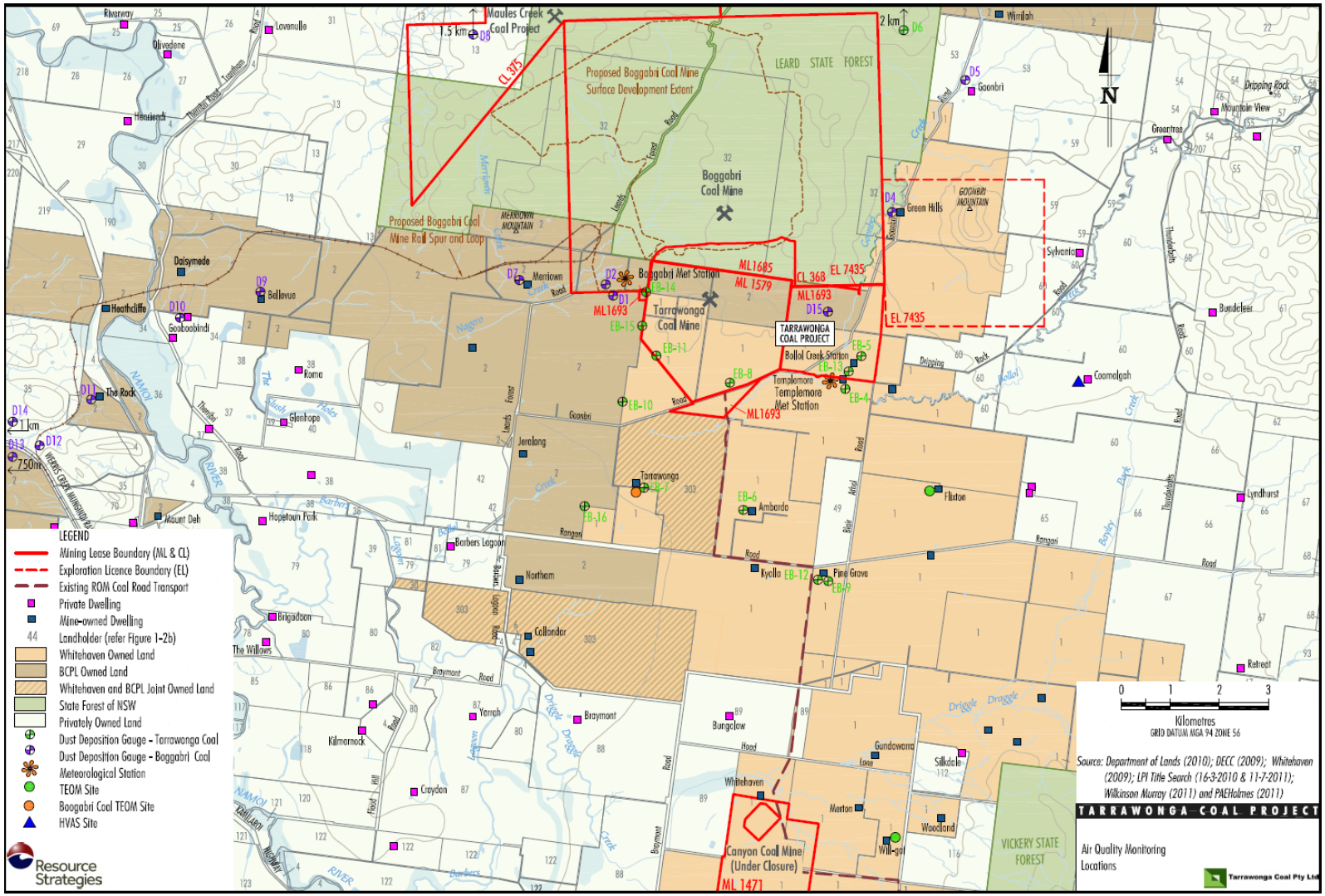


Figure 5 – Air Quality Monitoring Locations

A review of Table 8 shows that the annual average limit for deposited dust was exceeded at five monitoring locations; EB-4, EB-5, EB-10, EB-15 and EB-16. These monitoring locations are all located on project related land and therefore the elevated levels recorded are not subject to a non-compliance. Results from Templemore (EB-4) sites were regularly elevated during the period with peak above the 50 g/m2/month in February and June. Jeralong north (EB-16) recorded the highest level of deposited dust with 71.3g/m2/month in December.

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

Table 8 - Deposited Dust Monitoring Data Summary in g/m2/month for 2017

MONTH	TEMPLEMORE (EB-4)[1]	BOLLOL CREEK STN (EB-5)[1]	AMBARDO (EB-6)[1]	TARRAWONGA (EB-7)[1]	THUIN (EB-8)	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]
Jan 2017	23.8	3.4	0.9	0.8	4.7	2.3	4.4	2.3	2.2	2.3	2
Feb 2017	59.5	17.9	0.4	1.1	2.3	1	0	2.8	2.2	4.3	4.3
Mar 2017	3.5	4	4.7	1.1	1.5	1.4	22	3.7	6	7.8	1.8
Apr 2017	6	3.9	5.9	0.8	4.6	0.5	8.7	2.4	2.8	2.5	2.8
May 2017	3	3	0	0.7	2	0.4	4.1	2.7	2	4.3	1
Jun 2017	53.6[1]	4.2	1.5	0.9	3	2.4	6.9	4.5	2	2.4	1
Jul 2017	2	2.4	0.9	0.7	2	1	1.6	3.7	1.2	4.1	0.5
Aug 2017	2.9	3.1	0.9	0.9	2.4	1.5	4.2	2.2	1.8	4.9	0.4
Sep 2017	12.7	3.5	1.8	0.6	2	1.4	3.2	2	1.9	-	0.7
Oct 2017	6.6	4.2	2	1.1	1.1	3	2.5	3.3	4.7	8.6	1.8
Nov 2017	2.7	4.8	3.8	7.1	-	4	2.9	3.1	2.6	4.8	3.6
Dec 2017	24.6	2.3	1.8	1.9	3.5	3	13.5	7.5	3.1	4.1	71.3
Reporting Period Average	13.4	4.7	2.1	1.5	2.6	1.8	6.2	3.4	2.7	4.6	7.6
Long Term Average	4.6	3.3	1.5	1.2	3	1.2	4.7	2.6	2.8	5.2	5.7
Mean Annual Limit (g/m^2/month)	4	4	4	4	4	4	4	4	4	4	4

[1] Project related land

[2] Owned by Boggabri Coal Mine.

TCM has one High Volume Air Sampler which is located at the "Coomalgah" property (privately owned). The PM10 results recorded for the reporting period show five exceedances of the 24hr criteria occurring on April 12th, May 18th, November 14th, November 26th and December 8th. Despite these exceedances the annual average was 21.3 µg/m3 which is below the 30 µg/m3 criterion.

Investigation of those exceedances showed they were not mine related but more likely caused by farming activity (i.e.: harvest of wheat) and high wind speed (above 7.5m/s) recorded during the monitoring period. However, according to Schedule 3 condition 25, TCM is compliant with PM10 annual average value showed in Figure 6.

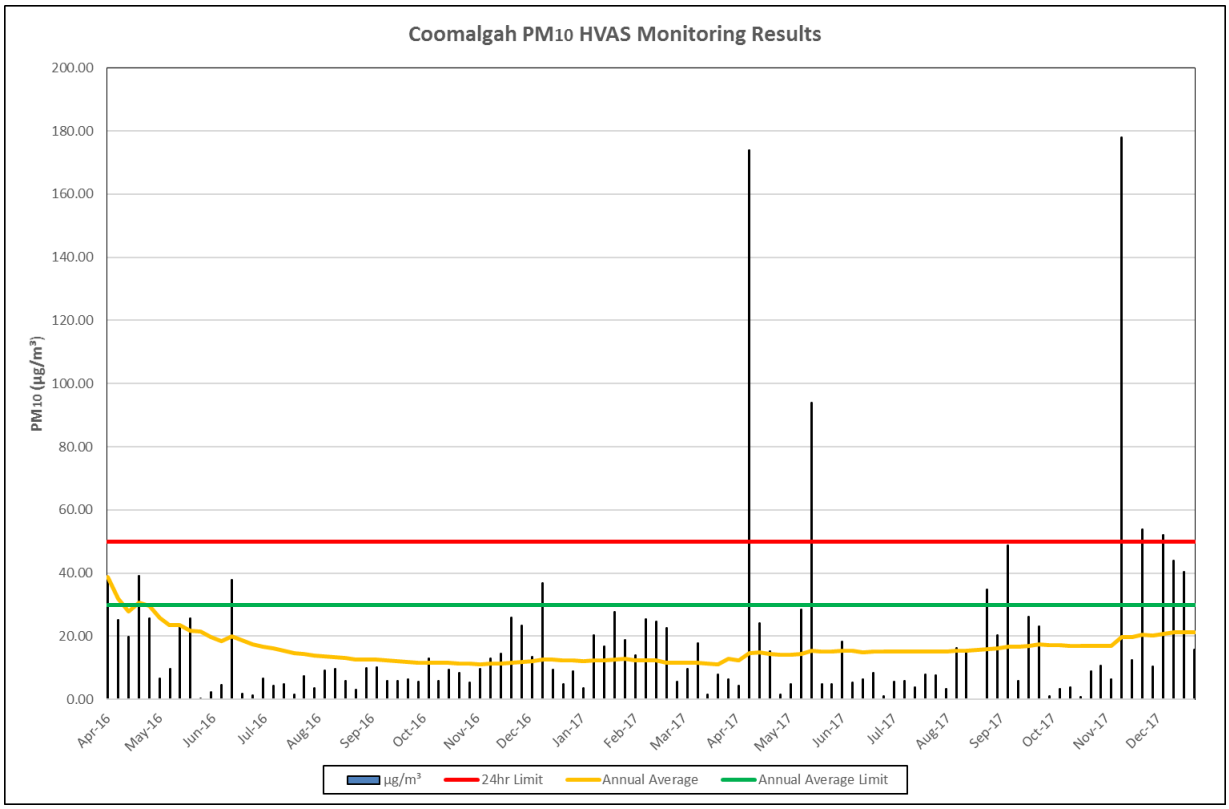


Figure 6 – Coomalgah HVAS Monitoring Data Summary (April 2016 to December 2017)

Total Suspended Particulate (TSP) is inferred from the measured PM10 data using monitoring conducted at the Coomalgah HVAS. Results indicated the TSP rolling annual average remained well below the applicable criteria of 90 µg/m and are illustrated in Figure 7 .

The EA predicted no exceedance of the annual average TSP criterion. TSP results inferred from PM10 data were consistent with the EA for the reporting period.

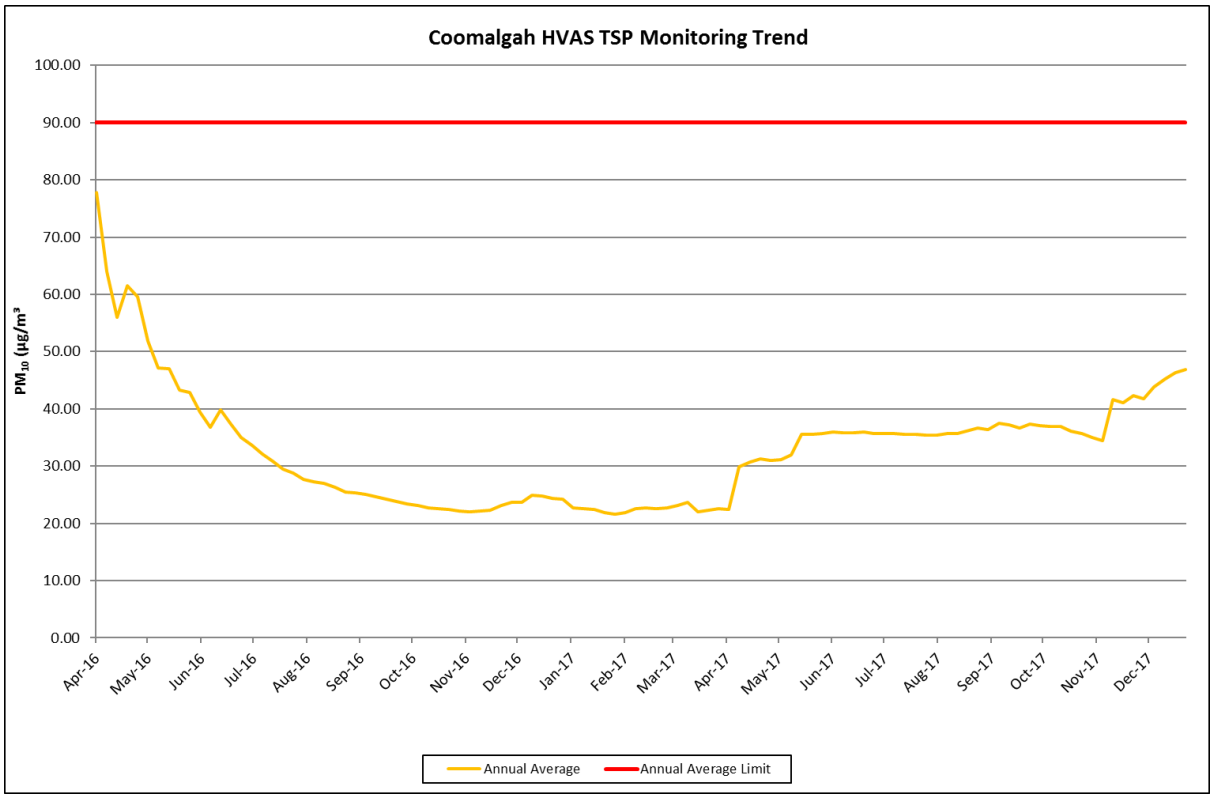


Figure 7 – Coomalgah HVAS- calculated TSP Monitoring Data Summary

Throughout the reporting period, the TEOM located on a mine owned land at the "Flixton" property monitored continuously and real-time PM10 levels. The monitor is used as a management tool to facilitate the day to day mine operations therefore there is no criterion applicable at that location.

Results recorded at the PM2.5 monitor on the "Will-gai" property remained consistent with those recorded during previous reporting periods. The Air Quality Greenhouse Gas Mamagement Plan (AQGGMP) states that whilst no criteria applies TCPL will compare results against target levels of 8 µg/m3 for annual average and 25 µg/m3 for 24hr maximum. During the reporting period an annual average of 3.8 µg/m3 was recorded whilst the maximum 24hr result was 11.2 µg/m3. 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 Key Performance Indicators (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:

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.

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 2011 from 263ML to 656ML used in dust suppression in 2017.

6.3.3 Key Environmental Performance/Management Issues

The predictive air dispersion modelling system and daily predictive forecasts were implemented and regularly used; but few ongoing hardware and software issues continue to be encountered and are being resolved on a progressive basis. TCM has been investigating options to improve the current predictive forecast system and will investigate further.

6.3.4 Proposed Improvements to Environmental Management

The predictive air dispersion model system was fully implemented in accordance with the BTM Air Quality Management Strategy. A revised Air Quality Greenhouse Gas Management Plan was submitted in June 2017 and is waiting for DP&E approval. TCM are investigating options to improve the current predictive forecast tool. TCM will assess if a calibration or update of the current air dispersion model will be necessary. Monitors installed at the Coomalgah property triggered during five opportunities but investigation showed they were not mine related and due to farming activity and high wind speed. TCM will evaluate if the assistance of an air specialist will be required to review the current air monitoring network including (DDG, HVAS and TEOM) and assess all the air monitoring sites.

6.4 Biodiversity

TCM revised Biodiversity Management Plan (BMP) draft was submitted to DPE for NSW approval on 5th July 2017. TCMs approved Biodiversity Offset Strategy includes the Willeroi West BOA for maintaining and improving 1,660ha of native woodland and forest adjacent to the south eastern boundary of Mount Kaputar National Park. VCPs approved Biodiversity Offset Strategy includes the Willeroi East (Offset Area 1) BOA for maintaining and improving 1,671ha of native woodland and forest adjacent to Willeroi West BOA and the south eastern boundary of Mount Kaputar National Park; as well as Offset Areas 2 to 5 covering 391.5ha located to the south and east of Boggabri.

The approved WHC Biobank Biodiversity Offset Management Plan outlines the Biodiversity Offset Strategy requiring 1,524ha of native woodland to be maintained and improved on the Yarrari and Belah properties with subsequent biobanking credits retired relating to the Rocglen Coal Mine, Canyon Coal Mine and Tarrawonga Coal Mines. An application to vary the WHC Biobank BOA Biobanking Agreement was made during the reporting period to generate additional species credits combined with residual vegetation community credits to be retired for the part of the Vickery Coal Project expansion subject to current development approval assessment.

Offset Security Management

During the reporting period, WHC continued to negotiate with OEH and NPWS regarding the potential to transfer of parts of the Willeroi BOA to National Parks Estates as per the letter from NPWS dated 16th August 2017 outlining the WHC BOAs that NPWS were interested in. WHC have requested extensions from DPE and DoEE for the timing of securing these offset areas until 31st December 2018 to allow negotiations on which BOAs to be transfer to Parks Estate to finalise with the residual BOAs to be secured via conservation agreements.

The WHC Biobank BOA is secured under a NSW Biobanking Agreement with the BOMP indicating that OEHs intention is to transfer the property to the National Parks Estate as an addition to the Boonalla (Kelvin) Aboriginal Area after Year 10 (~2023). Should such a land dedication be made and accepted by the NSW Minister for the Environment, the balance of funds held in the Biobanking Trust Fund would be transferred to the Minister in accordance with Section 36 of the Threatened Species Conservation (Biodiversity Banking) Regulation 2008 to provide for the ongoing management of the reserve.

Infrastructure Management

During the reporting period, maintenance of signage and gates at the Willeroi BOA were undertaken as required to continue to restrict unauthorised access and prevent inadvertent livestock grazing.

During the reporting period, the final 2.5km of redundant internal fences were reconstructed across the Biobank BOA bringing the site back into compliance with the BOMP. All fencing material waste was removed from the Biobank BOA and recycled at the Narrabri Waste Management Facility. Also 770m of new fencing (fauna friendly) was constructed along the northern boundary of the Yarrari Homestead with the condition of the Biobank BOA fences, gates and signage maintained to continue restricting unauthorised access and prevent inadvertent livestock grazing.

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 2017 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 survey;
- Fauna Survey

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.

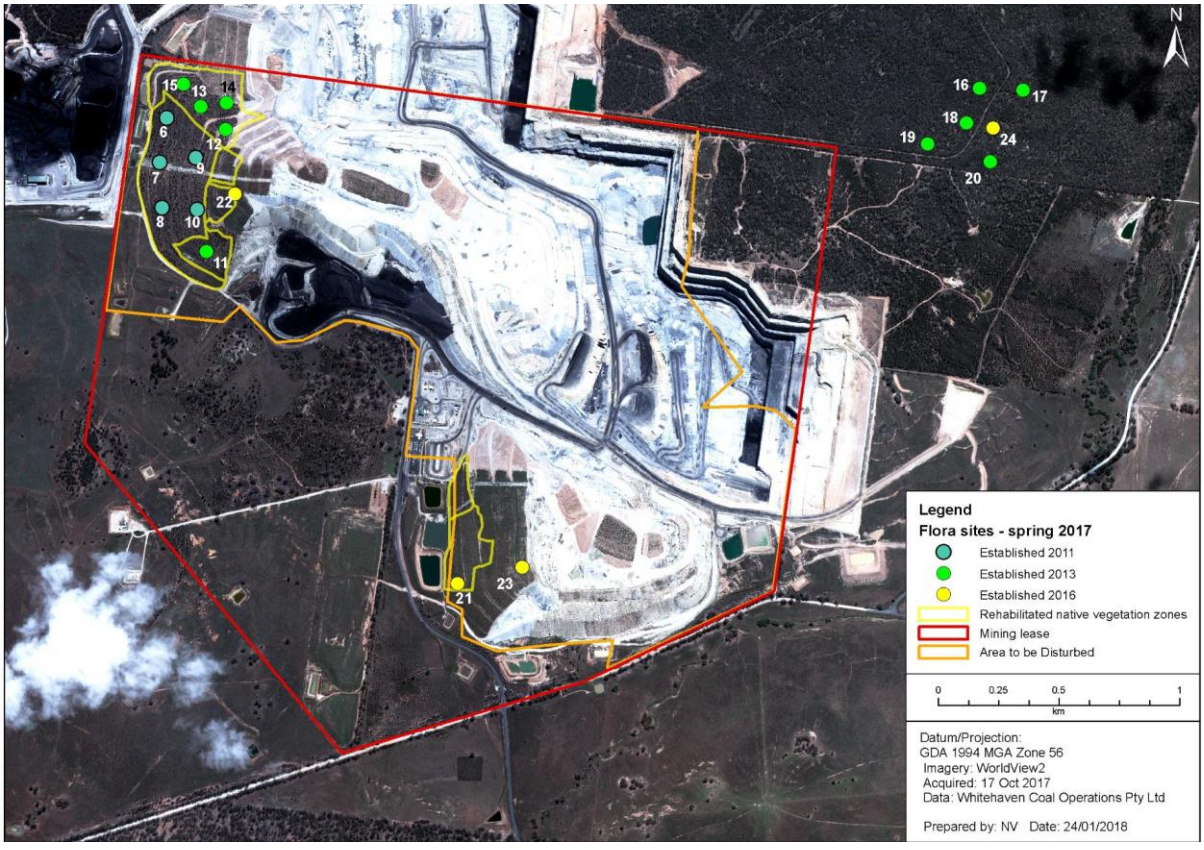


Figure 8 - Flora Survey 2017

Remote Sensing Analysis

Remote sensing analysis identified areas of significant decrease in photosynthetically active biomass (PAB). Most significant decreases in PAB were associated with a change in ponding areas or as a direct result of 2017 imagery being cloud affected. Small significant decreases were also apparent in the south east corner of mining lease ML1579 due to mine development and in the north-west due to a reduction in vegetation cover.

A minor significant increase in PAB was identified across the site and appeared to be directly related to reduction of water in ponds and creeklines.

Woodland Vegetation

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

Seed Collection

Four routine seed assessments were completed across the Willeroi BOA and TCM mine site vegetation in February (prior to the annual clearing program), March, August and November 2017 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 targeted seed collection. Seed collection programs undertaken by WHC during the reporting period targeted over storey and shrub species at TCM mine site in February and November 2017 in accordance with the Florabank guidelines.

As part of the WHC group wide revegetation planning; the onsite collected seed was supplemented with commercially sourced local and regional provident seed and a local revegetation provider was engaged to propagate the seed to produce Box Gum and non-EEC/CEEC Woodland over storey species seedlings required for the FY17 and FY18 revegetation programs for the TCM rehabilitation and Willeroi BOA.

Four routine seed assessments were completed across the Biobank BOA in in February, March, August and November 2017 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. No seed collection programs were undertaken on the Biobank BOA during the reporting period because no new revegetation areas are planned for 2018. However the seed previously collected onsite at the Biobank BOA during 2016 was supplemented with commercially sourced local and regional provident seed and a local revegetation provider was engaged to propagate the seed to produce Box Gum Woodland over storey species seedlings required for the FY17 (2017) revegetation program for the Biobank BOA.

Clearing

During the pre-clearance survey undertaken at TCM mine in March, Tylophora linearis, which is listed as endangered under state and federal legislation, was identified within the proposed 'east of main pit' disturbance area. T. linearis has been observed to be locally abundant during previous surveys (i.e.:2016), however only one plant was observed at the time of the most recent field survey.

Revegetation Management

In accordance with the draft BMP revegetation schedule focusing on cleared non-native grassland (former cultivation) and derived native grasslands; WHC organised 293ha of due diligence assessments of potential Box Gum and non-EEC/CEEC Woodland revegetation across the Willeroi West BOA investigating potential ecological constraints and heritage sites within areas required to be disturbed as part of the revegetation ground preparation process. During the reporting period, revegetation ground preparation (tractor and excavator augered holes to a depth >0.3m every 10m to relieve compaction, improve permeability and infiltration to increase sub-surface soil moisture ahead of tree planting) was completed over 79ha of the Willeroi West BOA between September and October 2017. The ecology due diligence identified 87ha of natural regeneration revegetation not requiring additional active revegetation of the cleared non-native grassland and derived native grasslands.

In accordance with the BOMP revegetation schedule for Year 4 (2017 commence revegetation); WHC coordinated two revegetation programs during the reporting period across the Biobank BOA with the understorey revegetation (direct seeding) undertaken between May and July 2017 across 259ha sown with 1,191kg of native grass seed (16 species), 55kg of native forb seed (13 species) and 2,216kg of bulking agent (lime). Overstorey revegetation program was undertaken between July and August 2017 with 11,637 hiko seedlings of Eucalyptus albens, Eucalyptus blakelyi, Eucalyptus melliodora and Angophora floribunda planted across 248ha. Despite a very dry July to September period; tree watering and maintenance tree planting activities between September and December

2017 have been successful to ensure that a better than minimum survival (20 trees per hectare) is achieved commensurate with the target open Box Gum Woodland vegetation structure of the Biobank BOA. Previous ecological due diligence identified that there was 45ha of natural regeneration revegetation not requiring additional active revegetation at Biobank BOA.

6.4.2 Threatened Fauna

At TCM Fauna and habitat monitoring surveys focused on thirteen sites within the woodland rehabilitation zones and two control sites within the Leard State Forest. The terrestrial fauna surveys targeted:

• Woodland birds

• Searches of available reptile habitat.

Woodland bird monitoring was undertaken during winter and spring 2017. Woodland birds were recorded while walking in a meandering path within each site, targeting areas of available habitat. All birds seen or heard were recorded in 5 minute intervals and recording continued until no new species were recorded for three consecutive 5 minute periods.

Opportunistic fauna sightings were also recorded.

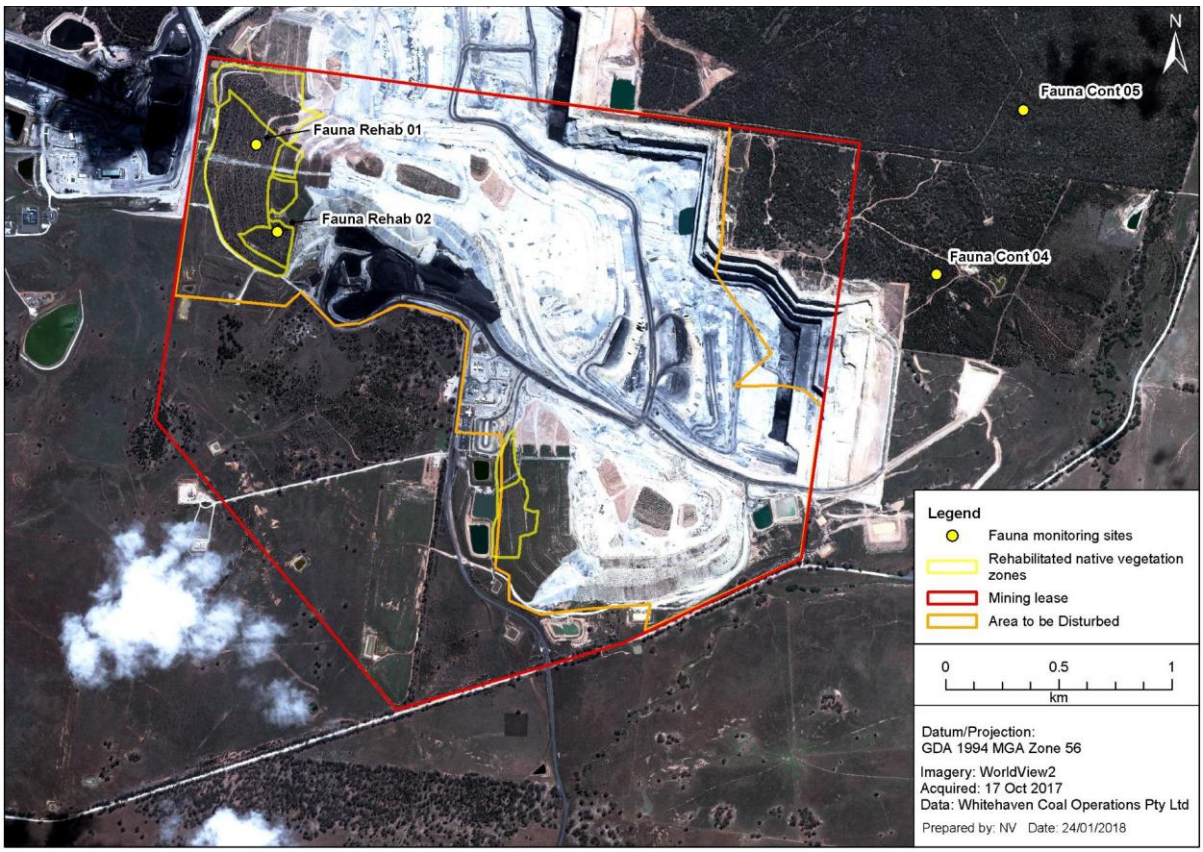


Figure 9 - Fauna Survey 2017

Table 9 - Total individuals: Bird survey Spring and winter 2017 and 2016

	Total Individuals	Fauna Rehab 1	Fauna Rehab2	Fauna Cont 4	Fauna Cont 5
Spring	2016	57	46	108	83
	2017	74	30	69	71
Winter	2016	35	40	72	96
	2017	19	26	28	35

Birds survey show a clear difference between the rehabilitation and the control sites for both winter and spring 2017. The control sites had double the number of individuals of the rehabilitation sites. However, overall trend show number of individuals and species significantly decreased between 2016 and 2017 for both rehabilitation and Control sites except for Rehabilitation site 1 that recorded an increase of species by about 50% in Spring.

The annual terrestrial fauna monitoring of native vegetation areas was conducted in 2017. Species richness and guild diversity for bird species was greater at the control sites compared to the rehabilitation sites in 2017, following trends from previous monitoring surveys with Macropus giganteus (Eastern Grey Kangaroo) and Macropus robustus (Common Wallaroo) recorded in spring 2017 at one rehabilitation site.

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 threatened fauna were observed at the time of the Pre-clearing survey; however, the survey area joins onto Leard State Forest to the east and could be expected to support a suite of threatened fauna species that are likely to use the habitat, or that have been observed within the Tarrawonga Mine lease in the past, including Neophema pulchella (Turquoise Parrot), Calyptorhynchus lathami (Glossy Black-Cockatoo), Climacteris picumnus (Brown Treecreeper), Glossopsitta pusilla (Little

Lorikeet), Pyrrholaemus sagittatus (Speckled Warbler) and Daphoenositta chrysoptera (Varied Sittella) (all listed under the Threatened Species Conservation Act 1995).

During the clearing campaign a small number of fauna were observed within the disturbance area. All captured fauna were relocated during clearing except for one Striated Skink, which died as a result of injuries obtained during felling. All captured fauna were released into a designated fauna relocation area to the east of current mining operations, in the Leard State Forest. No unidentified species of fauna were observed.

Habitat Management

During the reporting period, no habitat augmentation was undertaken in accordance with the draft BMP.

During the reporting period, a total of 4 rock debris habitat structures were constructed from salvaged bush rock in October 2017.

6.4.3 Weeds

WHC coordinated routine formal weed monitoring/inspections undertaken across Willeroi BOA in February, April, August and November 2017. The priority weeds for control were noted as general broadleaf weeds (Biosecurity Act 2015 priority and general biosecurity duty species) as well as legacy noxious weeds inherited from previous owners management regimes such as Coolati Grass, 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 409.3ha treated between January and December 2017 targeting primarily Coolati Grass and St Johns Wort infestations as well as Broadleaf and Pear species as required. Only appropriately qualified and experienced weed contractors (AQF3 accreditation or higher for use of herbicide) were engaged to undertake weed control works for WHC.

A noxious weed survey was conducted at TCM on February 16th and September 1st 2017. The survey identified nine species of noxious weeds within the exploration tenement area being:

- African boxthorn (Lycium ferocissimum)
- Blue heliotrope (Heliotropium amplexicaule)

- Common pear (Opuntia stricta)
- Galvanised burr (Sclerolaena birchii)
- Green cestrum (Cestrum parqui)
- Noogoora burr (Xanthium occidentale)
- Paterson's curse (Echium plantagineum)
- Silverleaf nightshade (Solanum elaeagnifolium)
- Tree-of-heaven (Ailanthus altissima)

The infestation rates of the noxious weeds at Tarrawonga Coal Mine were low with the exception of the Common Pear (Opuntia stricta) which had a low to medium level of infestation. 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 2017. 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 Willeroi BOA. Feral animal monitoring utilises the relevant methodologies for specific feral animals generally in accordance with the NSW DPI Monitoring Techniques for Vertebrate Pests (2005) so that a range of methods can be used such as transects/spotlighting, sandpads, cameras traps where practicable and relevant to specific offset areas/properties. Monitoring demonstrated that there were some feral animals species were in moderate abundance such as 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 March (6 Foxes and 1 Wild Dog baited from 24 baits presented and 32 Feral Pigs trapped), June (no baiting undertaken to allow Feral Goat harvesting and 4 Feral Pigs trapped), August (6 Foxes baited from 32 baits presented and 9 Feral Pigs trapped) and November 2017 (5 Foxes and 2 Wild Dogs baited from 32 baits presented and 1 Feral Pig trapped). The Feral Goat harvesting during the reporting period resulted in 185 captured with the Feral Goats on sold to an abattoir. 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.

WHC coordinated routine formal feral animal monitoring across Biobank BOA in February, April, August and November 2017. 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 Biobank 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, sandpads, 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 Biobank BOA for feral animal management.

TCM coordinated the implementation of the Vertebrate Pest Management Plan using eight infra-red motion cameras installed at strategic locations around the site.

The survey for 2017 showed there were no sightings of feral cats and feral goats as such. Sightings for rabbits and hares have been higher in the last Quarter 2017. A baiting program was recommended to be used to control numbers, using 1080 or Pindone. Fox sightings generally was low with the exception of one location (south west of mine site adjacent the Goonbri road).

Finally, feral pig sightings were medium/high at the end of the year specially at the eastern side of the mining operations around Cameras 5 and 8. Due to the age range of the feral pigs sighted from

piglets to lone boars, a trapping, shooting or baiting program was recommended to control the feral pig population. At TCM, feral animals are monitored and managed according to the BMP.

Table 10 - Summary of Vertebrate Pest Sighting

	Feral Pig (descendant of various breeds of Sus scrofa)	Fox (Vulpes vulpes)	Feral Cat Felis catus)	Rabit/Hare (Oryctolagus cuniculus) / (Lepus capensis))	Feral Goat (capra hircus)	Wild Dog (canis familiaris)
Quarter 1	117	9	0	7	0	0
Quarter 2	91	13	0	24	0	0
Quarter 3	30	38	0	81	0	0
Quarter 4	122	15	0	63	0	1

Soil & Erosion Management

During the reporting period, no specific treatment or soil erosion mitigation works were undertaken.

Grazing Management

Willeroi BOA was destocked at the end of 2015 and during the reporting period, grazing was continued to be excluded from the Willeroi BOA.

During the reporting period, the Biobank BOA was not stocked and subsequently grazing was excluded.

Monitoring Program

During the reporting period, the first ecological monitoring program of the Willeroi BOA was designed and implemented in accordance with the draft BMP. Vegetation and habitat monitoring was completed in October 2017; while bird survey for winter migratory species was undertaken in August 2017 with the full fauna monitoring undertaken in November 2017.

During the reporting period, ecological monitoring of the Biobank BOA consisted of annual flora monitoring which was undertaken in November 2017 and winter bird surveys targeting migratory species in August 2017.

Independent Biodiversity Audit

An Independent Biodiversity Audit for TCM was undertaken during July 2017 with some administrative non-compliances identified regarding Willeroi BOA to be addressed with submission of a Conservation Bond in February 2018 and the draft BMP to be updated to address heritage management.

6.4.5 Key Environmental Performance/Management Issues

Negotiations with OEH and NPWS in ongoing regarding the potential to transfer of parts of the Willeroi BOA to National Parks Estates as per the letter from NPWS dated 16th August 2017 outlining the WHC BOAs that NPWS were interested in. WHC have requested extensions from DPE and DoEE for the timing of securing these offset areas until 31st December 2018 to allow negotiations on which BOAs to be transfer to Parks Estate to finalise with the residual BOAs to be secured via conservation agreements.

6.4.6 Proposed Improvements to Environmental Management

TCM Revised Biodiversity Management Plan (BMP) draft was submitted in February 2018 to DPE for review and approval.

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

An aboriginal heritage survey was undertaken in January 2017 in accordance with the draft Aboriginal Heritage Conservation Strategy for the Willeroi BOA which identified 18 new aboriginal heritage sites (19 sites in total at Willeroi BOA) that required 1.8km of identification/demarcating fencing to be installed.

During the reporting period, one additional heritage site on the Biobank BOA was identified (32 heritage sites in total) which required only 40m of identification/demarcating fencing to be installed. Inspections of fenced sites were undertaken in 2017. All sites were inspected with fencing and the sites considered to be in satisfactory condition.

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. No additional 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 2017 with the overall Willeroi BOA grassland fuel coverage assessed as 50% (considered 'Normal' on the CFA Grassland Curing Guideline, July 2010) and the average fuel load of 2.5 t/ha considered to be low (July 2010). In accordance with the draft BMP, WHC undertook maintenance and upgrade of fire break tracks in February 2017 and then again in August/September 2017 with 44.7km and 79.6km of tracks respectively maintained to a zero fuel barrier standard across the Willeroi BOA.

During the reporting period, WHC organised for fuel load monitoring to be undertaken in October 2017 with the average fuel load rating for the Biobank BOA being low in accordance with "Overall

Fuel Assessment Guide" (July 2010). In accordance with the BOMP, WHC undertook annual maintenance and upgrade of fire breaks and tracks across the Biobank BOA with 28.1km of fire breaks completed during September/October 2017.

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 11 summarise the monthly meteorological conditions at TCM for the 2017 reporting period.

The total annual rainfall for the reporting period was 510.8mm; this is below the annual average rainfall (621.7mm) and the rains recorded in 2016. The maximum monthly rainfall was recorded during October 2017 with 98.4 mm. The months of May, June, October and November were well above historical monthly averages.

A minimum temperature of -4.5°C was recorded in August and a maximum temperature of 45.8°C in February.

In 2017, prevailing winds were predominately from the north-north west from July to October, January and December but from south- south-est for the rest of the year. This is different compare to 2016 where prevailing winds were coming from north-north-west for most of the year.

Table 11 – Tarrawonga Weather Station Meteorological Data 2017

Month	2m Temperature (°C)			10m Temperature (°C)			Average Wind Speed (m/s)	Prevailing Wind Direction	Monthly Rainfall (mm)
	Min	Mean	Max	Min	Mean	Max			
January	15.2	29.0	42.4	17.3	29.1	41.1	1.8	NW	66.8
February	7.3	28.1	45.8	11.4	28.5	44.5	1.5	ESE	10.6
March	8.7	22.9	34.9	11.4	23.2	34.1	1.8	SSE	20.2
April	1.8	17.2	27.9	3.8	17.9	26.8	2.0	SE	12
May	-0.9	13.7	26.6	1.5	15.0	25.2	0.8	WSW	70.8
June	-2.4	10.1	20.8	0.0	11.5	20.7	1.1	SE	76.4
July	-4.3	8.4	22.7	-1.5	10.2	22.1	1.0	NW	7.8
August	-4.5	9.8	26.0	-1.3	11.6	25.4	1.4	NW	18.4
September	-3.8	15.2	36.0	0.4	16.7	34.8	1.5	NW	9.4
October	6.4	20.0	35.4	8.5	20.5	34.4	1.9	WNW	98.4
November	3.9	20.9	33.9	9.1	21.3	32.7	1.6	ESE	88.0
December	11.1	26.9	41.1	13.9	27.0	39.4	1.6	WNW	32.0

6.10 Waste

6.10.1 Environmental Management

During the reporting period the following waste streams were removed from site for disposal or recycling:

Table 12: Waste Management summary 2017

Waste Stream	Volume / Quantity	Unit of Measure
General Waste	600	2 m^3 bin*
Tyres **	73	each
Batteries ***	72	each
Waste Oil	242,000	litre
Filters	6,160	Kg
Coolant	13,700	litre
Scrap Metal	29,260	kg
Cardboard	57	IBC
Paper/Plastic/ Aluminium Can	37	240 Litre bin*

* Bins were not always 100% full at the time of collection
**(several tyre sizes)
*** (Size N200 (9), N150 (19) and N70 (44))

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 education and training of machine operators.

6.11 Environmental Performance Summary

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

Table 13 - Environmental Performance Summary

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / Key Management Implications	Implemented / proposed management actions
Noise	Refer s6.1.3	Road Traffic Noise monitoring delayed	Nil	Use a compliance management system to meet commitment and deadlines. Traffic Noise monitoring was completed early 2018 and was compliant.
Blast	Refer s6.2.2	Approval criteria met.	Nil	Nil
Air Quality	Refer s6.3.4	Approval criteria met.	Nil	Review Air monitoring Network
Biodiversity	Refer s6.4	Approval criteria met.	Nil	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 6.10.2	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 by an engineering consultant 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 six 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, SB23B and SB24A.

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 10.

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 was consistent with previous reporting year.

Levels of grease and oil were low and in most cases below the level of reporting of 5mg/l. Level of Total Suspended Solids (TSS) fluctuated between 8 and 875 mg/l. It's worth noting that TSS were likely increasing when the samples were taken with low level in the dams or when sampling occurred after a rainfall event. Overall pH values showed that water sampled was more alkaline with a few values recorded above 9 units during quarter 2, 3 and 4.

Concentration level of antimony, arsenic, molybdenum and selenium were monitored throughout the period. Results remained consistently low and below thresholds outlined in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000). Guidelines with no suggested trend of enrichment of these minerals in surface waters adjacent to the overburden emplacements.

Surface water monitoring results showed generally consistent trends with previous reporting periods. No discharge of waters from site occurred in 2017 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 irrigation activities have been undertaken on site.

Commitments made in the EA with regard to the surface water monitoring program are addressed in the updated Water Management Plan which was submitted to DP&E for review in June 2017.

7.1.2 Discharges

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

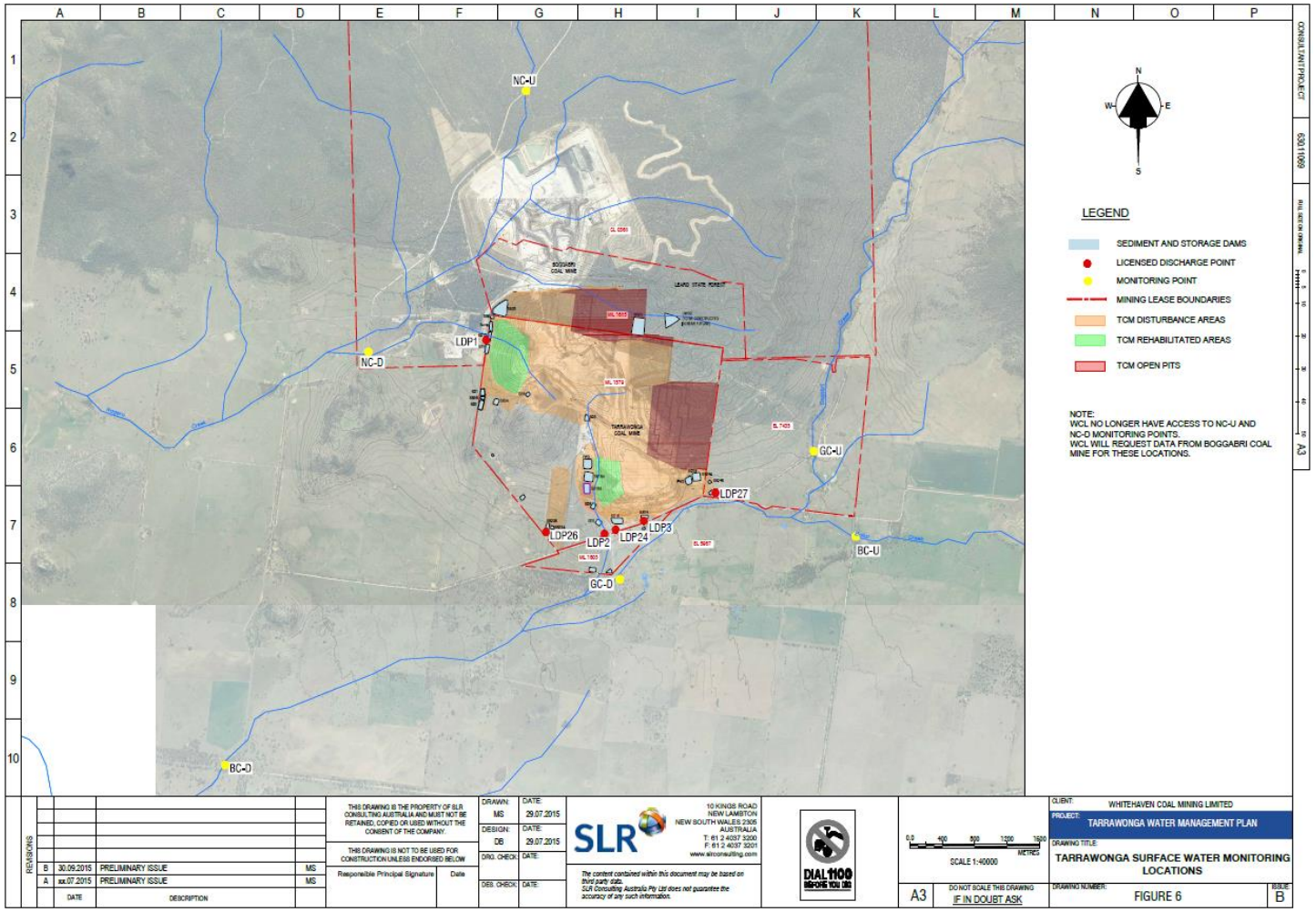


Figure 10 – Surface Water Monitoring Locations

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 14 and monitoring sites are shown on Figure 11.

Groundwater sampling and analysis was undertaken by ALS Acirl Pty Ltd during the reporting period. At MW1 and MW2, groundwater level loggers monitored water levels during the reporting period. Vibrating Wire Piezometers (VWPs) were operating at 2 sites (TA60 and TA65).

Table 14 - Groundwater Monitoring Points

Site ID (see Figure 11)	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	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

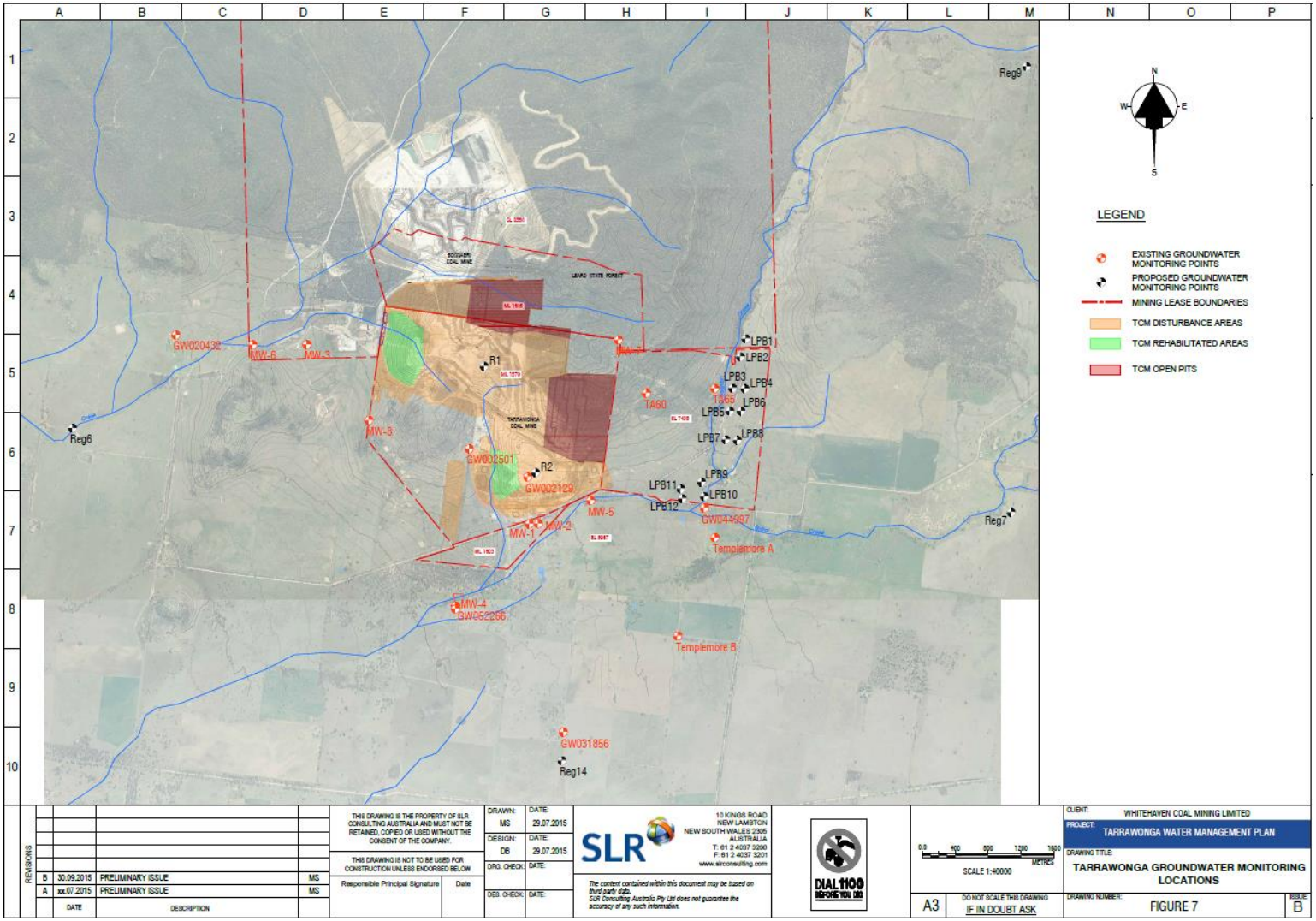


Figure 11 – Groundwater Monitoring Locations

Groundwater levels

Whist groundwater levels at the majority of nominated monitoring bores maintained a steady trend, MW6, GW044997 , Templemore A and B had a slightly rising trend.

The Vibrating Wire Piezometers (VWP) installed at TA60 and TA65 indicated generally depressurisation increases with depth (at 110 and 153m intake) at TA65 and greatest depressurisation was observed for the shallowest and deepest intake 69 and 118m respectively at TA60.

Groundwater quality

Analysis of samples taken during the reporting period showed that groundwater quality remained generally in line with historical data at all locations monitored. Water quality was compared to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000) guidelines for stock watering (cattle). There were no recorded instances of groundwater quality exceeding the limits prescribed by those guidelines during the reporting period.

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:

- Since there is no Iron limits for livestock in the ANSECC, the agricultural irrigation guidelines for iron (0.2mg/L) was used for comparison. All the monitoring site were above the 0.2mg/l limit on at least one occasion during the reporting period with the exception of GW031856, Templemore A and Templemore B with 0.06, 0.1 and 0.08 mg/l respectively.
- Similarly to last year MW1, MW5, MW6, GW031856 and Templemore B were above the agricultural irrigation guideline for TDS (600mg/L) when sampled in March and September 2017. MW4 was above the livestock guideline for TDS (2400mg/L) when sampled during March and September 2017.

7.2.3 Groundwater Management

At the end of the reporting period an estimated 62 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.

To prevent any potential risk of contamination with chemical and hydrocarbon, TCM implemented control measures such as:

- Vehicle maintenance carried out in designated areas;
- Any spills being cleaned up; and
- Hydrocarbons products 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 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. In the past, the Vibrating Wire Piezometer installed in TA60 and TA65 have demonstrated depressurisation as predicted as the mine moves toward the east. This trend will have to be confirmed when the 2017 results are available.

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

In 2017, no water was withdrawn from the licenced groundwater bores. Rainfall and runoff captured in the sediment dams and pit provided for the operations water demand.

Table 15 - 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	0	0	0

7.3 Site Water Balance

According to the site most recent Water Balance undertaken by SLR Consulting Australia, the water management system for 2017 had the capacity to be operated and meet operational objectives;

- All pit water could be contained on-site and there were no wet weather discharge recorded;
- Rainfall and runoff captured in the sediment and pit water dams would provide for the majority of water demand in the dry, median and wet years;
- Small quantities of externally sourced water could be required under periods of extended dry weather.

These predictions were consistent with the actual outcomes observed during this monitoring period.

Table 16 provides an overview of water stored and used on site during the reporting period.

Table 16 - Water stored and used during the reporting period

	Site water Balance (ML)	Table 2-3 EA values (2012) (ML)		
	Mar 2017- Mar 2018 (1 year)*	Dry Year- 25%-ile (17 years)	Average Year (17 years)	Wet Year -75%ile (17 years)
Total Runoff	605	325	402	480
Groundwater inflow	183	255	255	255
TOTAL INPUT	788	580	657	735
Evaporation	164	118	130	141
Moisture loss in coal	94	n/a	n/a	n/a
Crusher Dust suppression	35	8	8	8
Haul Road and ROM pad dust suppression	637	389	394	399
TOTAL OUTPUT	**932**	**515**	**532**	**548**
Irrigation	0	64	125	193
Offsite release/ discharge	0	0	0	0

***Note: For 2017-2018 period, values must be compared with caution as the EA value is based on 17 year annual average with changing catchment and land uses over time.**

8 REHABILITATION

8.1 Rehabilitation Performance during the Reporting Period

8.1.1 Status of Mining and Rehabilitation

The EA predicted rehabilitation areas are greater than the MOP rehabilitation areas for three main reasons:

- The TCM EA mining and rehabilitation progression were based on an indicative mine schedule. The significantly reduced waste rock production over the period 2013-2017 has materially affected ability to advance TCMs emplacement area to final landform.
- The TCM EA rehabilitation progressions were based on the assumption that the ROM coal haulage, and the associated removal of existing TCM ROM infrastructure allowing the rehabilitation of the southern face of the northern area. Agreement with Boggabri Coal mine to receive TCM ROM coal haulage has not been reached to date: and as such

the TCM ROM infrastructure has not been remove d preventing part of the northern waste emplacement

- The TCM EA rehabilitation progression were based on the assumption that the existing MIA area will be relocated to the southern extend of the project area, and Goonbri road realigned to allow rehabilitation of the southern face of the southern emplacement area and some ancillary areas. The existing MIA has not been relocated nor Goonbri Road realigned as assumed by the EA affecting the ability to rehabilitate the southern emplacement.

The EA Total disturbance Area generally align with the MOP total disturbance Areas.

Rehabilitation on the northern emplacement area has not reached final completion however is generally progressing. Integration with Boggabri Coal's waste emplacement has started 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.

The status of mining and rehabilitation at the completion of the reporting period is summarised in **Table** 17 and Figure 12.

Table 17 - Rehabilitation Status

Mine Area Type [1] [Ha]		2016	2017	Forecast 2018
0	***Total Mine Footprint***	579.5	600.1	633.0
1	***Total Active Disturbance***	510.6	498.4	527.0
2	***Land Being Prepared for Rehabilitation***	9.9	8.9	26.0
3	***Land Under Active Rehabilitation***	59.0	83.3	83.3
4	***Completed Rehabilitation***	0.0	0.0	0.0

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

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.

No rehabilitation of agricultural lands has occurred.

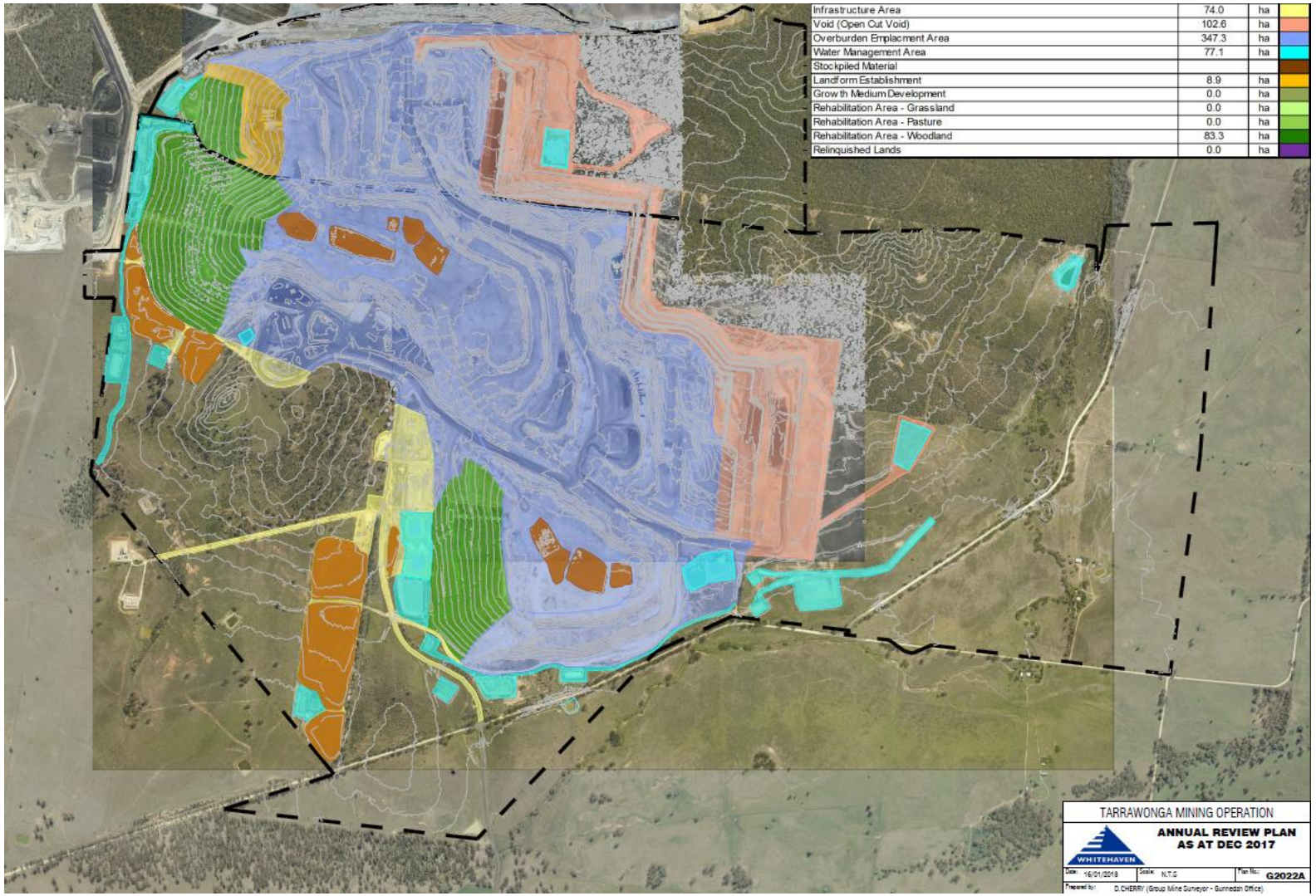


Figure 12 - Status of Mining and Rehabilitation

8.1.3 Rehabilitation Undertaken

During the reporting period rehabilitation activities included landforms establishment, growth medium development and ecosystem establishment focussing on the northern extension emplacement. TCM coordinated two revegetation programs in 2017 with the understorey revegetation (direct seeding) undertaken in November 2017 across 2ha sown with 8.6kg of native grass seed (16 species), 0.4kg of native forb seed (13 species) and 16kg of bulking agent (lime). Overstorey revegetation program was undertaken in November 2017 with 1,100 hiko seedlings of Eucalyptus albens, Eucalyptus blakelyi, Eucalyptus crebra, Eucalyptus melliodora, Eucalyptus pilligaensis, Eucalyptus populanea and Eucalyptus microcarpa planted across 6.6ha.

8.1.4 Rehabilitation Fauna and Flora Monitoring

Winter and spring monitoring programmes were 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 control sites to determine its success and progression in regards to habitat value for native and threatened species. Details on the results of the monitoring campaign are available in section 6.4.1 Threatened Flora and 6.4.2 Threatened Fauna.

8.1.5 Weeds Management

A noxious weed survey was conducted at TCM mine on February 16th and September 1st 2017. The survey identified nine species of noxious weeds being:

- African boxthorn (Lycium ferocissimum)
- Blue heliotrope (Heliotropium amplexicaule)
- Common pear (Opuntia stricta)
- Galvanised burr (Sclerolaena birchii)
- Green cestrum (Cestrum parqui)
- Noogoora burr (Xanthium occidentale)
- Paterson's curse (Echium plantagineum)
- Silverleaf nightshade (Solanum elaeagnifolium)
- Tree-of-heaven (Ailanthus altissima)

African Boxthorn were actively managed within the rehabilitation areas and the infestation rates of the noxious weeds at Tarrawonga Coal Mine were low with the exception of the Common Pear (Opuntia stricta) which had a low to medium level of infestation. Targeted weed management within the mine leases was undertaken at opportune times following suitable weather and with consideration to the NIWAC Weed Management Guide for North West NSW (NSW DPI). 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, 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

The MOP Amendment B was approved by the Department in July 2017. This approval is limited to the rehabilitation objectives and completion criteria and the schedule of rehabilitation activities proposed for the MOP period.

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.

There were no specific rehabilitation trials or research proposed for TCM. Rehabilitation monitoring and rehabilitation methodology records are, however, shared among Whitehaven operations to inform decision making regarding future rehabilitation campaigns. Specifically the nearby Maules Creek mine has a requirement to undertake a $1M research program into rehabilitation of Box Gum Grassy Woodland upon mine rehabilitation, the findings from which will be considered by TCM and integrated into future MOP amendments as appropriate.

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

- landforms stability.

In cases where the performance is sub-optimal, additional management measures will be implemented (e.g. replanting, repairing landforms 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

As an outcome of recent MOP consultation with DRG and DPE; TCM is now reviewing current rehabilitation progression to identify opportunities where rehabilitation can be accelerated into a revised rehabilitation schedule.

The 2018 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) was held regularly at TCM. The committee comprised representatives of Gunnedah Shire Council, Narrabri Shire Council, TCM and the community.

Community contributions continued to be managed in accordance with the Whitehaven Coal Donations and Sponsorship Policy. Approximately $65,780 were donated to several organisations for health, education and indigenous sport support including Doctors recruitment support, Aboriginal girls academy education support, Westpac Rescue Helicopters, the purchase of Medical Equipment for Boggabri Health Service and participation to several Charity day fundraiser.

TCM maintained 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. Any Complaints is reported and findings discussed with during the CCC meeting. Those meetings give an opportunity to provide an update of the Environmental and Operations performance.

Three Complaints were recorded in 2017 and findings of the investigation showed that dust generated at the time of the complaint were not mine related. The number of complaints has decreased since the previous reporting period and Table 18 provides a comparison of complaints received over the last few annual reporting periods.

Table 18– Complaints Summary

Category	2012/13	2013/14	2014/15	2015/16	2016	2017
Air Quality	23	2	11	13	1	3
Traffic	8	3	0	0	1	0
Surface Water	1	0	0	0	1	0
Visual Amenity	1	0	0	0	0	0
Noise / Vibration	6	1	0	0	1	0
Blast	12	3	5	3	2	0
Other	4	2	2	0	0	0
TOTAL	55	11	18	16	5	3

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

10 INDEPENDENT AUDIT

An Independent Environmental Audit (IEA) was conducted in July 2017. The previous independent audit was undertaken in 2014. Outstanding items from the 2014 and 2017 Audits are detailed in Table 19 and 20 below.

Table 19- 2014 Independent Audit – Outstanding Actions Status in 2017

Management Area	Recommendations/ Proposed Action	Timing	Status
Biodiversity	The baseline surveys for threatened species in offset areas should be conducted in accordance with the department's Survey Guidelines for Australia's Threatened Birds and the Survey Guidelines for Australia's Threatened Bats. The annual monitoring reports should confirm compliance with the two stated methodologies	Ongoing	Baseline threatened species surveys will be undertaken in accordance with, and reported with reference to, the relevant methodologies. Awaiting approval of Stage 2 Biodiversity Management Plan.
Rehabilitation	Work be conducted to soften the visual impact of the unrehabilitated southern emplacement, reduce risk of impacts to Goonbri Creek and to lessen the levels of fugitive particulate emissions.	1/04/2015	Follow up seeding undertaken 18/5/2016. Review currently being undertaken to reshape the area to achieve desired outcomes.
	No rehabilitation works were observed that did not comply with the rehabilitation management plan. However, revegetation is not of good quality, some trials have been conducted, further trials should be implemented to establish the most appropriate vegetation establishment methodologies.	Ongoing	
	Some topsoil at the site has been stored since the site inception. As soon as there is an opportunity to use this material it should be used. The longer topsoil is stored the less effective it is for vegetation establishment.	Ongoing (Ref1)	
	Topsoil should be characterised prior to striping to ensure stripping depths are suitable and that similar soil qualities are stored together allowing the application of suitable soil ameliorants when the topsoil is spread.	As above (Ref1)	
	Topsoils should be characterised prior to spreading to allow the application of suitable ameliorants (predominantly gypsum and lime).	As above (Ref1)	

	Dirty water management needs review in consideration of the water from around the coal loader not going into the dirty water system.	Ongoing	Ongoing discussions with NSW EPA.
	To obtain groundwater samples that are representative of the water within the aquifer being sampled, groundwater wells should be purged (see Groundwater sampling guidelines, EPA Victoria 2000).	Ongoing	Groundwater monitoring undertaken in accordance with the relevant Guidelines. Not complete.

Table 20- 2017 Independent Audit Outstanding Action Status

Item No	Findings/ Comment	Action/Timing
Minister's Conditions of Approval PA 11_0047		
3. 8	No agreements are held with landowners adjacent to haul route. No coal haulage at night. Noise monitoring reports reviewed demonstrated no exceedence of criteria. Three monitoring locations (2 properties) – 2 residences on Brooklyn and Werona. Report states that for practical reasons it is not possible to undertake monitoring for 15 hours (entire day period). The approach here is to monitor noise over a representative one hour period and utilise the results of this to theoretically predict noise over the compliance period. TMCL should consider updating this condition to reflect the approach used to ensure 100% compliance	TCM to raise practicality of meeting condition with DP&E Timing: Ongoing discussions
3.41	Group Superintendent - Environment (Compliance), Site Environment Officer and Specialist-Offsets interview stated that the responsibility for the LFMPRBS was taken over by the DP&E, although no evidence of the removal of Whitehaven's responsibility to contribute to the preparation of the plan is available. A spreadsheet reviewed by the auditor identified the breakdown of relative financial responsibility for some plans between the three projects, however it contains no dollar values for the LFMPRBS. ERM considers a non-compliance on the basis of: • No evidence of reports meeting each of the timings for Stages 1, 2 & 3. • No evidence of Whitehaven financial contribution to the strategy. No evidence of Whitehaven contribution to the preparation of the LFMPRBS (or in the case that the DP&E took this over, evidence of that agreement).	RBS approved. TCM to confirm with DP&E that intent of condition has been met. Timing 31/12/2017
3.49	Predates this audit period. The previous IEA (SMEC 2014) stated against this condition: "Biodiversity Management Plan not approved, not able to calculate bond amount, not compliant with deadline stated" and adjudged as "Not Compliant Administrative". No evidence of a conservation bond exists which appears to have been required by May 2013 (or if not, then following	Agreement between DP&E and TCM in place. Bond to be calculated following approval of BMP. Timing: expected in 2018

Item No	Findings/ Comment	Action/Timing
	the BMP preparation (ELA April 2015).	
3.64(h)	The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of DRE. The auditor recommended more thorough implementation and recording of MOP requirements.	2018 MOP amendment C more clearly describe implementation, monitoring and auditing of rehabilitation. Timing: Complete in March 2018
EPL 12365		
L4.4	Monitoring locations are stated in the NMP and in quarterly monitoring report. Site inspection demonstrated where noise monitoring is undertaken. The location of monitoring at Barbers Lagoon is on the property boundary however the residence is approximately 200m from the monitoring location. Hence this is considered a non-compliance (NC).	Modification to the EPL in draft to be submitted to EPA to amend condition. Timing: expected in 2018 (TCM contest the weighting of NC; monitoring occurs at a location closer to the operation and due to distance from noise source the variability is immaterial. ANC considered appropriate).
M7.4	The auditor observed the noise monitoring locations in the field. Monitoring locations are stated in the NMP and in quarterly monitoring report. Site inspection demonstrated where noise monitoring is undertaken. The location of monitoring at Barbers Lagoon is on the property boundary however the residence is approximately 200m from the monitoring location. Hence this is considered a non-compliance. New EPL includes TB1	Modification to the EPL in draft to be submitted to EPA to amend condition. Current monitoring occurs at a location closer to noise source. Timing: 30 November 2017
Mining Lease 1579		
4a	MOP (2015-2020) (SLR 2016) details rehabilitation planning (section 5), implementation (section 7) and MOP Plans 3(a-f) (annual timeslices) and 4 (post-mining landuse). Section 2.3.10 contains a table showing the material production schedule for six years. Plans are only for 5 years and material production schedule is only for 6 years, as such this is considered to be an ANC.	New MOP amendment C submitted and approved. Timing: Complete March 2018
4e,4g	BMP (ELA April 2015) describes and demonstrates the flora and fauna on the site (especially shown in Figures 3.1, 3.2 and 3.3). Not contained in MOP.	New MOP amendment C submitted and approved. Timing: Complete March 2018
Mining Lease 1693		
5a	Auditor document review and interview with the Environmental Officer identified that no environmental incidents occurred on this mining lease. Other incidents have occurred and evidence of reporting has been observed. The incident report referenced was not submitted within 24 hours. Report all environmental incidents within 24 hours of the incident occurring.	Ensure any incidents are duly reported. Timing: Ongoing (TCM contest NC weighting; noting evidence of reporting to respective agencies. ANC considered appropriate).
Mining Lease 1685		
5a	No environmental incidents occurred on this mining lease. Incidents against other conditions have occurred as detailed in this report and evidence of reporting has been observed. However, the incident report referenced was not submitted	Ensure any incidents are duly reported. Timing: Ongoing

Item No	Findings/ Comment	Action/Timing
	within 24 hours. Report all environmental incidents within 24 hours of the incident occurring as this is the most stringent criteria at the site.	(TCM contest NC weighting; noting evidence of reporting to respective agencies. ANC considered more appropriate).
5b	No environmental incidents occurred on this mining lease. Incidents against other conditions have occurred as detailed in this report and evidence of reporting has been observed. However, the incident report referenced was not submitted within 24 hours. Report all environmental incidents within 24 hours of the incident occurring as this is the most stringent criteria at the site.	Ensure any incidents are duly reported. Timing: Ongoing TCM contest NC weighting; noting evidence of reporting to respective agencies. ANC considered appropriate.
EPBC Approval (2011/5923)		
7	Offset review completed by Eco Logical Australia 2013 Review submitted 5 December 2013. TCPL will publish the findings of the independent review once approved.	To be published following approval. Timing: expected in 2018
26	WHC_PLN_TAR_MINE SITE REHABILITATION PLAN) (dated 31 May 2016) Appendix A contains independent review. It is not published on the TMCL website.	To be published following approval. Timing: expected in 2018
37	Although a request has not been made by the Department accurate records substantiating said activities are not maintained.	TCM to seek clarification from the Department as to what constitutes accurate records. Timing: expected in 2018

11 INCIDENTS AND NON-COMPLIANCES FOR THE REPORTING PERIOD

11.1 Reportable Incidents

No reportable incidents and exceedances recorded during the reporting period.

11.2 Non-compliances

Non-compliances with relevant approvals noted within Section 1 are outlined in Table 21

Table 21 – Non-compliance Action Plan

Non - Compliance	Date / Location	Cause	Action Plan	Status/Estimated Completion Date
PA 11_0047, Schedule 2 condition 2	Reporting Period.	Per below	Per below	Per below
PA 11_0047, Schedule 3 condition 12	December 2017	Oversight following a change in monitoring consultant	DP&E notified and Complete the Monitoring campaign	Monitoring completed in January 2018

11.3 Regulatory Actions

DP&E issued a Warning Letter on 27 February 2017 related to the Sound Power Levels and plant equipment exceeding noise level (that occurred in 2016) after determination there was a breach of Schedule 3 Condition 9 of the PA 11_0049 in an incident.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

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

Table 22 - Summary of activities for 2018

	Activity Description	Timing
1	Review and update various Environmental Management Plans as required	As required
2	Undertake rehabilitation and mining activities in accordance with most recent MOP.	Ongoing throughout the year
3	Continue environmental monitoring and management.	Ongoing throughout the year
4	Continue implementation of approved Leard Forest Precinct Strategies.	Ongoing throughout the year
5	Continue community liaison and engagement with local stakeholders	Ongoing throughout the year
6	Engage a consultant to conduct an archaeological and aboriginal audit and to update the cultural heritage register.	Commenced Quarter 1 2018

Appendix 1

BLAST MONITORING DATA

Tarrawonga Coal Pty Ltd ACN 150 742 186

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
700	1/6/2017	Tarrawonga Station	0.3900	93.30	12:25:40	0
700	1/6/2017	Coomalgah	0.3800	95.50	12:25:40	0
701	1/11/2017	Tarrawonga Station	0.1800	96.30	15:26:00	0
701	1/11/2017	Coomalgah	0.1000	87.00	15:26:00	0
702	1/19/2017	Tarrawonga Station	0.3500	107.50	12:53:54	0
702	1/19/2017	Coomalgah	0.4700	98.40	12:53:54	0
703	1/24/2017	Tarrawonga Station	0.1200	101.10	15:03:04	0
703	1/24/2017	Coomalgah	0.0400	107.80	15:03:04	0
704	2/1/2017	Tarrawonga Station	0.1500	94.90	14:09:02	1a
704	2/1/2017	Coomalgah	0.1400	90.70	14:09:02	1a
705	2/3/2017	Tarrawonga Station	0.3100	93.80	12:06:18	2b
705	2/3/2017	Coomalgah	0.2500	92.10	12:06:18	2b
706	2/14/2017	Tarrawonga Station	0.3100	93.80	13:18:41	0
706	2/14/2017	Coomalgah	0.2500	92.10	13:18:41	0
707	2/17/2017	Tarrawonga Station	0.3900	108.40	16:31:39	0
707	2/17/2017	Coomalgah	0.4100	97.20	16:31:39	0
708	2/21/2017	Tarrawonga Station	0.1700	100.60	13:02:11	0
708	2/21/2017	Coomalgah	0.0400	95.50	13:02:11	0
709	2/24/2017	Tarrawonga Station	0.2700	105.50	12:15:42	0
709	2/24/2017	Coomalgah	0.2800	98.80	12:15:42	0
710	2/28/2017	Tarrawonga Station	0.1400	101.10	12:00:57	0
710	2/28/2017	Coomalgah	0.1000	94.50	12:00:57	0
711	3/2/2017	Tarrawonga Station	0.1500	103.60	14:40:58	0
711	3/2/2017	Coomalgah	0.0600	99.90	14:40:58	0
712	3/6/2017	Tarrawonga Station	0.1500	96.80	12:12:04	1a
712	3/6/2017	Coomalgah	0.2700	91.30	12:12:04	1a
713	3/8/2017	Tarrawonga Station	0.4100	89.80	11:56:33	0
713	3/8/2017	Coomalgah	0.2100	105.80	11:56:33	0
714	3/10/2017	Tarrawonga Station	0.6700	102.00	12:04:04	0
714	3/10/2017	Coomalgah	0.1100	98.30	12:04:04	0
715	3/16/2017	Tarrawonga Station	0.1200	100.00	12:00:04	0
715	3/16/2017	Coomalgah	0.1100	90.90	12:00:04	0
716	3/24/2017	Tarrawonga Station	0.7700	115.70	12:02:52	2a
716	3/24/2017	Coomalgah	0.2500	103.50	12:02:52	2a
717	3/28/2017	Tarrawonga Station	0.6500	87.00	12:17:06	0
717	3/28/2017	Coomalgah	0.1900	91.20	12:17:06	0
718	3/30/2017	Tarrawonga Station	0.8900	108.20	9:10:10	2b
718	3/30/2017	Coomalgah	0.6600	99.90	9:10:10	2b
719	4/1/2017	Tarrawonga Station	0.3300	101.30	9:12:15	2b
719	4/1/2017	Coomalgah	0.1200	91.60	9:12:15	2b
720	4/11/2017	Tarrawonga Station	0.9300	111.80	12:01:37	0
720	4/11/2017	Coomalgah	0.6400	96.30	12:01:37	0
721	4/12/2017	Tarrawonga Station	0.3700	99.80	12:00:47	0
721	4/12/2017	Coomalgah	0.1700	89.30	12:00:47	0
722	4/13/2017	Tarrawonga Station	1.4400	99.70	13:38:52	1a
722	4/13/2017	Coomalgah	1.0500	102.50	13:38:52	1a
723	4/24/2017	Tarrawonga Station	0.0000	95.70	11:58:29	0
723	4/24/2017	Coomalgah	0.0000	90.70	11:58:29	0
724	4/28/2017	Tarrawonga Station	0.3500	106.80	15:21:48	0
724	4/28/2017	Coomalgah	0.3400	92.60	15:21:48	0
725	5/1/2017	Tarrawonga Station	0.2900	98.40	12:01:11	1a
725	5/1/2017	Coomalgah	0.2600	86.30	12:01:11	1a
726	5/3/2017	Tarrawonga Station	0.2400	99.00	12:02:56	0
726	5/3/2017	Coomalgah	0.3200	93.40	12:02:56	0
727	5/5/2017	Tarrawonga Station	0.1400	97.90	12:05:15	0
727	5/5/2017	Coomalgah	0.1700	97.10	12:05:15	0
728	5/8/2017	Tarrawonga Station	0.0700	95.00	13:16:32	0
728	5/8/2017	Coomalgah	0.0200	92.70	13:16:32	0
729	5/11/2017	Tarrawonga Station	0.3600	107.60	12:05:17	0
729	5/11/2017	Coomalgah	0.5200	98.40	12:05:17	2c
730	5/12/2017	Tarrawonga Station	0.1400	105.80	11:54:20	2c

Tarrawonga Coal Pty Ltd ACN 150 742 186

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
730	5/12/2017	Coomalgah	0.0600	94.80	11:54:20	0
731	5/16/2017	Tarrawonga Station	0.1500	88.20	11:58:52	0
731	5/16/2017	Coomalgah	0.0700	90.70	11:58:52	0
732	5/18/2017	Tarrawonga Station	0.4200	98.80	11:57:58	0
732	5/18/2017	Coomalgah	0.3600	93.80	11:57:58	0
733	5/19/2017	Tarrawonga Station	0.0500	106.00	11:58:28	1a
733	5/19/2017	Coomalgah	0.0200	94.00	11:58:28	1a
734	5/24/2017	Tarrawonga Station	0.1300	92.70	12:10:35	1a
734	5/24/2017	Coomalgah	0.1400	99.10	12:10:35	1a
735	5/26/2017	Tarrawonga Station	0.3900	107.40	13:06:26	0
735	5/26/2017	Coomalgah	0.6000	96.40	13:06:26	0
736	5/31/2017	Tarrawonga Station	0.1700	99.30	12:12:22	0
736	5/31/2017	Coomalgah	0.2400	100.90	12:12:22	0
737	6/2/2017	Tarrawonga Station	0.1100	96.50	13:02:13	0
737	6/2/2017	Coomalgah	0.1200	91.70	13:02:13	0
738	6/6/2017	Tarrawonga Station	0.1100	91.60	12:06:15	0
738	6/6/2017	Coomalgah	0.0500	90.80	12:06:15	0
739	6/7/2017	Tarrawonga Station	0.2300	89.10	16:35:07	0
739	6/7/2017	Coomalgah	0.1500	93.90	16:35:07	0
740	6/9/2017	Tarrawonga Station	0.5100	104.20	14:08:48	2b
740	6/9/2017	Coomalgah	0.6500	95.10	14:08:48	2b
741	6/16/2017	Tarrawonga Station	0.2400	110.60	13:05:19	1a
741	6/16/2017	Coomalgah	0.4600	98.90	13:05:19	1a
742	6/21/2017	Tarrawonga Station	0.4100	91.70	14:40:39	0
742	6/21/2017	Coomalgah	0.1400	86.50	14:40:39	0
743	6/23/2017	Tarrawonga Station	0.0900	93.40	12:10:45	0
743	6/23/2017	Coomalgah	0.0300	106.20	12:10:45	0
744	6/28/2017	Tarrawonga Station	0.1100	103.80	12:59:50	0
744	6/28/2017	Coomalgah	0.1500	104.50	12:59:50	0
745	7/5/2017	Tarrawonga Station	0.1200	92.80	12:04:24	1a
745	7/5/2017	Coomalgah	0.1200	98.70	12:04:24	1a
746	7/7/2017	Tarrawonga Station	0.1300	102.10	12:12:02	0
746	7/7/2017	Coomalgah	0.1400	108.40	12:12:02	0
747	7/11/2017	Tarrawonga Station	0.1200	95.20	12:31:43	0
747	7/11/2017	Coomalgah	0.0800	90.40	12:31:43	0
748	7/14/2017	Tarrawonga Station	0.1000	102.30	11:30:51	0
748	7/14/2017	Coomalgah	0.1000	95.90	11:30:51	0
749	7/20/2017	Tarrawonga Station	0.1400	96.50	12:05:31	1b
749	7/20/2017	Coomalgah	0.1500	96.90	12:05:31	1b
750	7/29/2017	Tarrawonga Station	0.3300	109.70	10:51:14	0
750	7/29/2017	Coomalgah	0.0200	73.80	10:51:14	0
751	8/3/2017	Tarrawonga Station	0.4100	107.50	12:06:14	0
751	8/3/2017	Coomalgah	0.1600	107.10	12:06:14	0
752	8/4/2017	Tarrawonga Station	0.3700	96.20	12:04:26	1a
752	8/4/2017	Coomalgah	0.3600	101.70	12:04:26	1a
753	8/11/2017	Tarrawonga Station	0.4100	107.60	12:16:14	0
753	8/11/2017	Coomalgah	0.8400	103.10	12:16:14	0
754	8/15/2017	Tarrawonga Station	0.3400	94.00	11:57:42	1b
754	8/15/2017	Coomalgah	0.1300	102.80	11:57:42	1b
755	8/21/2017	Tarrawonga Station	0.5100	111.30	11:59:49	0
755	8/21/2017	Coomalgah	0.3000	99.10	11:59:49	0
756	8/25/2017	Tarrawonga Station	0.3100	100.40	13:11:01	0
756	8/25/2017	Coomalgah	0.4600	94.70	13:11:01	0
757	9/1/2017	Tarrawonga Station	0.0400	99.10	11:32:40	1b
757	9/1/2017	Coomalgah	0.0400	90.60	11:32:40	1b
758	9/7/2017	Tarrawonga Station	0.8500	111.20	12:00:01	0
758	9/7/2017	Coomalgah	1.0300	104.80	12:00:01	0
759	9/15/2017	Tarrawonga Station	0.1800	90.10	11:08:50	
759	9/15/2017	Coomalgah	0.0900	100.70	11:08:50	
760	9/22/2017	Tarrawonga Station	0.5300	105.60	12:09:06	
760	9/22/2017	Coomalgah	0.4200	106.50	12:09:06	
761	9/27/2017	Tarrawonga Station	0.3000	95.90	13:04:33	
761	9/27/2017	Coomalgah	0.1800	95.90	13:04:33	
762	10/3/2017	Tarrawonga Station	0.1900	97.20	11:16:37	

Tarrawonga Coal Pty Ltd ACN 150 742 186

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
762	10/3/2017	Coomalgah	0.2100	102.20	11:16:37	
763	10/4/2017	Tarrawonga Station	0.0000	71.10	12:10:38	
763	10/4/2017	Coomalgah	0.0000	73.00	12:10:38	
764	10/5/2017	Tarrawonga Station	0.7400	101.70	16:23:19	
764	10/5/2017	Coomalgah	0.7400	104.70	16:23:19	
765	10/9/2017	Tarrawonga Station	0.1800	94.90	10:29:19	2b
765	10/9/2017	Coomalgah	0.1500	93.60	10:29:19	2b
766	10/13/2017	Tarrawonga Station	0.1200	93.40	15:11:03	
766	10/13/2017	Coomalgah	0.1200	95.60	15:11:03	
767	10/17/2017	Tarrawonga Station	0.1600	104.00	13:20:09	
767	10/17/2017	Coomalgah	0.2100	113.70	13:20:09	
768	10/24/2017	Tarrawonga Station	0.2200	92.90	13:01:05	
768	10/24/2017	Coomalgah	0.2500	91.40	13:01:05	
769	10/27/2017	Tarrawonga Station	0.3000	103.70	12:07:18	
769	10/27/2017	Coomalgah	0.6300	101.10	12:07:18	
770	10/31/2017	Tarrawonga Station	0.1000	92.70	11:36:28	
770	10/31/2017	Coomalgah	0.0300	94.20	11:36:28	
771	11/3/2017	Tarrawonga Station	0.2500	108.40	11:57:06	
771	11/3/2017	Coomalgah	0.1600	99.10	11:57:06	
772	11/7/2017	Tarrawonga Station	0.1700	92.60	12:05:53	2c
772	11/7/2017	Coomalgah	0.1800	93.90	12:05:53	2c
773	11/10/2017	Tarrawonga Station	0.3000	96.00	13:06:46	
773	11/10/2017	Coomalgah	0.0000	87.00	13:06:46	
774	11/15/2017	Tarrawonga Station	0.1800	103.40	12:03:24	
774	11/15/2017	Coomalgah	0.1300	94.70	12:03:24	
775	11/22/2017	Tarrawonga Station	0.1500	92.60	12:03:14	2b
775	11/22/2017	Coomalgah	0.1800	88.70	12:03:14	2b
776	11/23/2017	Tarrawonga Station	0.1500	98.10	12:01:24	
776	11/23/2017	Coomalgah	0.2800	93.30	12:01:24	
777	12/8/2017	Tarrawonga Station	0.6100	106.50	9:39:32	1c
777	12/8/2017	Coomalgah	0.9200	103.00	9:39:32	1c
778	12/12/2017	Tarrawonga Station	0.9600	88.70	15:40:16	
778	12/12/2017	Coomalgah	0.2700	92.00	15:40:16	
779	12/19/2017	Tarrawonga Station	0.3900	99.00	9:05:03	
779	12/19/2017	Coomalgah	0.2200	96.30	9:05:03	
780	12/21/2017	Tarrawonga Station	1.1400	103.10	14:41:39	
780	12/21/2017	Coomalgah	0.3900	100.80	14:41:39	
781	12/28/2017	Tarrawonga Station	0.1600	99.70	12:03:25	
781	12/28/2017	Coomalgah	0.1200	99.10	12:03:25	

Appendix 2

SURFACE WATER MONITORING DATA

Quarterly Surface Water Monitoring Results

Sample No.	Date	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	SD1	7.5	990	23		<2				
27514.02	25 July 2007	SB5	8	1150	17		<2				
27514.03	25 July 2007	MV1	7.6	3130	15		30				
27514.04	25 July 2007	SD8	8.1	260	25		<2				
27514.05	25 July 2007	SD9	7.7	290	22		<2				
27514.06	25 July 2007	SD5	8.4	3370	8		<2				
28415.01	31 October 2007	SD9	7.8	310	16		<2				
28415.02	31 October 2007	SD8	8.8	780	32		<2				
28415.03	31 October 2007	SB5	8.9	1200	60		<2				
28415.04	31 October 2007	SB8*	9	2000	110		<2				
28415.05	31 October 2007	SB7	8.4	560	27		<2				
28415.06	31 October 2007	MV	8.1	2780	45		<2				
28415.07	31 October 2007	SD5	8.3	2620	44		<2				
29740.01	18 March 2008	SD9	6.9	245	27		<2				
29740.02	18 March 2008	SD8	8.4	1340	19		<2				
29740.03	18 March 2008	SD5									
29740.04	18 March 2008	SD20	7.4	385	44		<2				
29740.05	18 March 2008	Pit Water Dam	8.4	1620	14		<2				
29740.06	18 March 2008	MV	7.8	3110	10		<2				
29740.07	18 March 2008	SB5	7.8	870	54		<2				
29740.08	18 March 2008	SB7	7.5	365	387		<2				
29740.09	18 March 2008	SD17	7.4	460	58		<2				
31188.01	22 August 2008	SD9	7.9	275	35		<2				
31188.02	22 August 2008	SD8	8.9	1450	20		<2				
31188.03	22 August 2008	SB16	8.8	1440	16		<2				
31188.04	22 August 2008	SD5	8.7	1310	35		<2				
31188.05	22 August 2008	SB4	8.7	1980	31		<2				
31188.06	22 August 2008	SB5	8.5	955	13		<2				
31188.07	22 August 2008	Pit Water Dam	8.7	2420	17		<2				
31333.01	5 September 2008	BCD	7.2	75	150		<2				
31333.02	5 September 2008	DAM1	7.4	185	4930		<2				
31490.01	23 September 2008	BCU	6.8	95	92		<2				
31490.02	23 September 2008	BCD	6.7	115	107		<2				
31490.03	23 September 2008	SD8	8.9	995	24		<2				
31490.04	23 September 2008	SD17	8.3	720	456		<2				
31597.01	7 October 2008	SD17	8.2	735	75		<2				
31597.02	7 October 2008	SD8	8.9	775	22		<2				
31597.03	7 October 2008	SB14	8.5	255	43		<2				
32277.01	15 December 2008	SD17	7.4	435	152		<2				
32277.02	15 December 2008	SD9	7.3	245	24		3				
32277.03	15 December 2008	SD8	8.2	635	22		<2				
32277.04	15 December 2008	BCD	6.9	135	30		<2				
32738.01	10 February 2009	MV	8.2	3370	13		<2				
32738.02	10 February 2009	SD8	8.9	790	11		<2				
32738.03	10 February 2009	SD9	8.5	330	16		<2				
32738.04	10 February 2009	SB14	8	380	32		<2				
32738.05	10 February 2009	SB5	8.8	1070	7		<2				
32738.06	10 February 2009	SB16	9	1200	6		<2				
ES0909243-001	24 June 2009	SB7	8.21	401	90	6	<5				
ES0909243-002	24 June 2009	SB5	8.62	1180	12	8	<5				
ES0909243-003	24 June 2009	Pit water	8.87	2330	148	5	<5				
ES0909243-004	24 June 2009	SD9	8.33	335	5	8	<5				
ES0909243-005	24 June 2009	SD16	8.16	550	20	5	<5				
ES0909243-006	24 June 2009	SB14	7.71	351	29	9	<5				
ES0912983-001	27 August 2009	SB7	8.1	418	62	5	<10				
ES0912983-002	27 August 2009	SB5	8.64	1210	29	8	<10				
ES0912983-003	27 August 2009	Pit water	8.2	2580	264	6	<10				
ES0912983-004	27 August 2009	SD9	8.36	389	12	8	<10				
ES0913144-001	31 August 2009	SB14	8.73	342	56	10	<10				
ES0913144-002	31 August 2009	SD16	8.3	547	158	5	<10				

Sample No.	Date	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES0919560-001	22 December 2009	NCD	7.8	137	164	16	19				
ES0919560-002	22 December 2009	BCU	7.32	150	220	25	-				
ES0919560-003	22 December 2009	BCD	7.04	146	32	43	-				
ES0919731-001	29 December 2009	BCD	6.88	75	47	15					
ES0919731-002	29 December 2009	NCD	6.73	143	32	10					
ES0919731-003	29 December 2009	NCU	6.79	95	34	18					
ES0919731-004	29 December 2009	SD14	8.12	1080	65	4					
ES0919731-005	29 December 2009	SB14	7.41	374	128	19					
ES0919731-006	29 December 2009	Goonbri Creek	7.02	60	38	12					

Sample No.	Date	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	SB7	8.14	197	194	3	5				
ES1003581-002	25 February 2010	SB5	8.06	681	77	4	<5				
ES1003581-003	25 February 2010	SD9	7.95	123	18	8	5				
ES1003581-004	25 February 2010	SD16	8.49	734	257	3	<5				
ES1003581-005	25 February 2010	SB14	8.03	232	40	6	<5				
ES1003581-006	25 February 2010	SD2	8.37	276	15	<5	<5				
ES1009879-001	24 May 2010	SB7	8.41	291	17	4	13				
ES1009879-001	24 May 2010	SB5	8.59	531	48	5	13				
ES1009879-001	24 May 2010	SD9	8.62	148	10	8	6				
ES1009879-001	24 May 2010	SD16	8.93	810	9	4	8				
ES1009879-001	24 May 2010	SB14	7.76	251	538	8	6				
ES1013265-001	6 July 2010	SB14	8.09	245	95	5	<5				
ES1015929-001	9 August 2010	SB16	8.39	1170	10	3	<5				
ES1015929-002	9 August 2010	Pit water	7.07	1940	37	2	<5				
ES1015929-003	9 August 2010	SD9	7.72	147	24	9	<5				
ES1015929-004	9 August 2010	SD16	8.29	793	40	5	<5				
ES1015929-005	9 August 2010	SB14	7.69	260	1300	6	<5				
ES1022163-001	2 November 2010	SB7 (pre floc)	8.33	332	38	4	<5				
ES1022525-001	4 November 2010	SB7 (post floc)	8.72	339	10	3	<5				
ES1022922-01	10 November 2010	SB16	9.19	1140	14	3	<5				
ES1022922-02	10 November 2010	SD9	7.94	168	16	11	<5				
ES1022922-03	10 November 2010	SD16	9.49	831	11	5	<5				
ES1022922-04	10 November 2010	SB14	7.72	323	56	5	<5				
ES1105082-001	9 March 2011	SD17	8.38	393	42	6	<5				
ES1105082-002	9 March 2011	SB16	7.17	968	20	6	<5				
ES1105082-003	9 March 2011	VOID	7.95	2540	78	6	<5				
ES1105082-004	9 March 2011	SD9	7.98	186	30	11	<5				
ES1105082-005	9 March 2011	SD16	8.71	762	27	5	<5				
ES1105082-006	9 March 2011	SB14	8.17	361	43	6	<5				
ES1109209-001	3 May 2011	SD16	8.58	1020	22	6	<5	<0.001	0.002	0.014	<0.01
ES1109209-002	3 May 2011	SB14	7.9	434	24	6	<5	<0.001	0.002	0.004	<0.01
ES1109209-003	3 May 2011	SD17	8.92	2040	20	6	<5	<0.001	0.004	0.014	<0.01
ES1109209-004	3 May 2011	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	SD16	8.64	975	32	8	<5	<0.001	0.002	0.011	<0.01
ES1116908-002	4 August 2011	SB14	8.33	414	24	6	<5	<0.001	0.001	0.003	<0.01
ES1116908-003	4 August 2011	SD17	8.53	925	10	8	<5	<0.001	0.002	0.006	<0.01
ES1116908-004	4 August 2011	SB16	8.52	891	24	4	<5	0.004	0.002	0.028	<0.01
ES1116908-005	4 August 2011	VOID	8.52	2890	49	5	<5		0.015		
ES1124591-001	9 November 2011	SD16	9.03	791	20	7	<5	<0.001	0.003	0.010	<0.01
ES1124591-002	9 November 2011	SB14	7.84	431	20	5	<5	<0.001	0.002	0.004	<0.01
ES1124591-003	9 November 2011	SD17	8.39	448	56	6	<5	<0.001	0.002	0.003	<0.01
ES1124591-004	9 November 2011	SB16	8.39	646	6	3	<5	0.003	0.002	0.026	<0.01
ES1124591-005	9 November 2011	VOID	8.08	1790	158	3	<5				
ES1204830-001	29 February 2012	SD16	7.96	365	34	2	<5	<0.001	0.001	0.009	<0.01
ES1204830-002	29 February 2012	SB14	8.15	443	174	5	<5	<0.001	0.002	0.003	<0.01
ES1204830-003	29 February 2012	SD17	8.23	434	18	7	<5	<0.001	0.003	0.004	<0.01
ES1204830-004	29 February 2012	SB16	8.17	433	23	1	<5	0.001	0.001	0.012	<0.01
ES1204830-007	29 February 2012	VOID	8.3	727	1620	2	<5		0.008		
ES1205971-001	9 March 2012	SB23 Pre-floc	7.84	148	70	4	<5				
ES1205971-002	10 March 2012	SB23 24hrs post floc	7.82	159	60	16	<5				
ES1205971-003	11 March 2012	SB23 48hrs post floc	7.75	158	61	16	<5				
ES1205277-001	2 March 2012	SD16 Pre-floc	8.17	351	16	2	<5				
ES1205277-002	2 March 2012	SB14 Pre-floc	8.13	452	50	5	<5				
ES1210729-001	2 May 2012	SD16	8.37	388	14	2	<5	<0.001	<0.001	0.008	<0.01
ES1210729-002	2 May 2012	SB14	9.08	1060	57	5	<5	<0.001	0.002	0.004	<0.01
ES1210729-003	2 May 2012	SD17	8.74	602	8	6	<5	<0.001	0.001	0.006	<0.01
ES1210729-004	2 May 2012	SB16	7.87	456	6	1	<5	0.001	0.001	0.013	<0.01
ES1210729-005	2 May 2012	VOID	8.26	2080	10	1	<5	0.002	0.009	0.048	<0.01
ES1210729-006	2 May 2012	GCR1	7.99	689	104	35	<5	<0.001	0.003	0.002	<0.01
ES1211990-001	11 May 2012	SB23		246	18	8	<5				
ES1212919-001	22 May 2012	SB24		373	42	11	<5				
ES1212919-002	22 May 2012	SB14		980	42	5	<5				
ES1212919-003	22 May 2012	SD16		400	35	2	<5				
ES1212919-004	22 May 2012	SD9		133	36	8	<5				
ES1212919-005	22 May 2012	SD17		618	20	6	<5				

Sample No.	Date	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1213239-001	28 May 2012	SD17	8.58	558	16	7	<5				
ES1213239-002	28 May 2012	SD9	7.97	136	37	8	<5				
ES1213239-003	28 May 2012	SB14	8.21	661	53	5	<5				
ES1213239-004	28 May 2012	SB24	8.21	351	42	11	<5				
ES1215160-001	18 June 2012	SB14	8.05	513	92	5	<5				
ES1215160-002	18 June 2012	SD16	8.13	445	25	4	<5				
ES1215160-003	18 June 2012	SD9	7.95	137	23	8	<5				
ES1215160-004	18 June 2012	SD17	8.54	533	14	6	<5				
ES1215160-005	18 June 2012	Canyon SD	8.13	304	87	9	<5				
ES1217223-001	11 July 2012	NCD	7.19	174	150	19	<5				
ES1218109-001	20 July 2012	SB23-After Floc	7.92	254	16	3	<5				
ES1218108-001	23 July 2012	SD16-Background info water	8.02	450	25	3	<5				
ES1218108-002	23 July 2012	SD14-After floc	7.94	590	35	3	<5				
ES1219866-001	14 August 2012	SD16	8.1	454	<5	3	<5	<0.001	0.001	0.008	<0.01
ES1219866-002	14 August 2012	SB14	8.11	646	<5	7	<5	<0.001	0.002	0.007	<0.01
ES1219866-003	14 August 2012	SD17	8.08	465	<5	5	<5	<0.001	0.001	0.004	<0.01
ES1219866-004	14 August 2012	SB16	7.96	561	<5	2	<5	0.003	0.002	0.02	<0.01
ES1219866-005	14 August 2012	VOID	8.39	2220	<5	2	<5				
ES1219866-006	14 August 2012	GCR1	7.82	190	16	19	<5	<0.001	0.002	<0.001	<0.01
ES1219866-007	14 August 2012	GCR2	7.72	182	12	17	<5	<0.001	0.002	<0.001	<0.01
ES1227081-001	14 November 2012	SD16	9.84	679	100	6	<5	<0.001	0.004	0.01	<0.01
ES1227081-002	14 November 2012	SB14	8.85	890	24	3	<5	<0.001	<0.001	0.006	<0.01
ES1227081-003	14 November 2012	SD17	8.7	700	14	4	<5	<0.001	<0.001	0.006	<0.01
ES1227081-004	14 November 2012	SB16	8.69	707	76	1	<5	0.004	0.002	0.026	<0.01

Sample No.	Date	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1227081-005	14 November 2012	VOID	8.62	2870	10	<1	<5				
ES1302567-001	1 February 2013	SD9 pre floc	7.44	262	43	7	<5				
ES1302567-002	1 February 2013	SD9 post floc	7.39	267	82	8	<5				
ES1303969-001	20 February 2013	SD9-Pre Discharge	7.89	275	18	8	<5				
ES1305311-001	6 March 2013	SD16	7.69	252	288	5	<5	<0.001	0.005	0.001	<0.01
ES1305311-002	6 March 2013	SB14	7.81	378	99	4	<5	<0.001	0.001	0.002	<0.01
ES1305311-003	6 March 2013	SD17	8	229	91	4	<5	<0.001	<0.001	0.002	<0.01
ES1305311-004	6 March 2013	SB16A	8.01	365	240	4	<5	0.002	0.004	0.013	<0.01
ES1305311-005	6 March 2013	VOID	8.23	1620	16	2	<5				
ES1305311-006	6 March 2013	GCR1	7.43	126	106	5	<5	<0.001	<0.001	<0.001	<0.01
ES1305311-007	6 March 2013	GCR2	7.42	173	48	16	<5	<0.001	0.002	<0.001	<0.01
ES1312392-001	30 May 2013	SD16	8.16	341	100	7	<5	<0.001	0.003	0.003	<0.01
ES1312392-002	30 May 2013	SB14	8.42	538	38	6	<5	<0.001	0.002	0.003	<0.01
ES1312392-003	30 May 2013	SD17	8.47	334	49	6	<5	<0.001	0.002	0.003	<0.01
ES1312392-004	30 May 2013	SB16A	8.25	530	108	10	<5	0.004	0.004	0.018	<0.01
ES1312392-005	30 May 2013	VOID	8.51	3120	45	4	<5				
ES1317665-001	7 August 2013	SD16	8.49	390	7	6	<5	<0.001	0.001	0.003	<0.01
ES1317665-002	7 August 2013	SB14	8.96	570	8	7	<5	<0.001	<0.001	0.002	<0.01
ES1317665-003	7 August 2013	SD17	8.59	371	9	4	<5	<0.001	<0.001	0.003	<0.01
ES1317665-004	7 August 2013	SB16A	8.05	585	20	7	<5	0.005	0.003	0.022	<0.01
ES1317665-005	7 August 2013	VOID	8.35	2660	29	6	<5				
ES1317665-006	7 August 2013	TAR-GCD	7.4	155	52	16	<5	<0.001	0.002	<0.001	<0.01
ES1317665-007	7 August 2013	TAR-GCU	7.42	208	14	20	<5	<0.001	0.003	<0.001	<0.01
ES1324032-001	5 November 2013	SD16	9.42	538	29	15	<5	<0.001	0.004	0.004	<0.01
ES1324032-002	5 November 2013	SB14	8.55	1070	172	17	<5	<0.001	0.002	0.005	<0.01
ES1324032-003	5 November 2013	SD17	8.87	573	21	9	<5	<0.001	0.002	0.005	<0.01
ES1324032-004	5 November 2013	SB16A	8.8	918	38	8	<5	0.008	0.005	0.04	<0.01
ES1324032-005	5 November 2013	VOID	8.25	2530	11	29	<5		0.01		
ES1403679-001	20 February 2014	TAR-SD16	8.35	432	65	6	<5	<0.001	0.006	0.003	<0.01
ES1403679-002	20 February 2014	TAR-SB14	8.09	393	1280	8	<5	<0.001	0.005	<0.001	0.01
ES1403679-003	20 February 2014	TAR-SD17	8.79	712	46	8	<5	<0.001	0.002	0.007	<0.01
ES1403679-004	20 February 2014	TAR-SB16A	8.61	713	330	8	<5	0.004	0.01	0.023	<0.01
ES1403679-005	20 February 2014	TAR-VOID	8.63	1350	22	1	<5	0.007	0.026	0.101	<0.01
ES1403679-006	20 February 2014	TAR-GCU	6.69	115	433	23	<5	<0.001	0.005	0.001	<0.01
ES1410071-001	6 May 2014	TAR-SD16	8.12	404	19	3	21	<0.001	0.004	0.003	<0.01
ES1410071-002	6 May 2014	TAR-SB14	8.92	1980	10	4	5	<0.001	0.002	0.008	<0.01
ES1410071-003	6 May 2014	TAR-SD17	8.26	351	25	3	<5	<0.001	0.002	0.0002	<0.01
ES1410071-004	6 May 2014	TAR-SB16A	8.2	483	134	1	<5	0.003	0.008	0.02	<0.01
ES1410071-005	6 May 2014	TAR-VOID	8.31	3280	213	<1	<5		0.006		
ES1410071-006	6 May 2014	TAR-GCU	7.89	318	<5	14	<5	<0.001	0.002	0.001	<0.01
ES1410071-007	6 May 2014	TAR-GCD	7.88	301	<5	17	<5	<0.001	0.001	<0.001	<0.01
ES1417356-001	6 August 2014	TAR-SD16	8.7	439	5	6	<5	<0.001	0.002	0.002	<0.01
ES1417356-002	6 August 2014	TAR-SB14	8.67	1450	22	7	<5	<0.001	0.001	0.004	<0.01
ES1417356-003	6 August 2014	TAR-SD17	8.44	397	48	7	<5	<0.001	0.002	0.003	<0.01
ES1417356-004	6 August 2014	TAR-SB16A	8.25	609	63	8	<5	0.005	0.004	0.024	<0.01
ES1417356-005	6 August 2014	TAR-VOID	8.5	3260	515	16	<5				
ES1417356-006	6 August 2014	TAR-GCU	8.31	392	42	14	<5	<0.001	0.002	<0.001	<0.01
ES1424845-001	11 November 2014	TAR-SD16	8.7	507	14	6	<5	<0.001	0.002	0.004	<0.01
ES1424845-002	11 November 2014	TAR-SB14	8.85	1480	50	14	<5	<0.001	0.003	0.012	<0.01
ES1424845-003	11 November 2014	TAR-SD17	8.7	539	34	7	<5	<0.001	<0.001	0.005	<0.01
ES1424845-004	11 November 2014	TAR-SB16A	8.51	740	18	5	<5	0.006	0.003	0.032	<0.01
ES1424845-005	11 November 2014	TAR-GCU	7.7	549	1230	57	<5	<0.001	0.022	0.006	<0.01
ES1424845-006	11 November 2014	TAR-GCD	7.64	751	62	50	<5	<0.001	0.011	0.004	<0.01
ES1427251-001	8 December 2014	TAR-VOID	8.04	3060	170	<1	<5				
ES1504050-001	18 February 2015	TAR-SD16	8.19	451	16	4	<5	<0.001	0.004	0.006	<0.01
ES1504050-002	18 February 2015	TAR-SB14	8	626	12	4	<5	<0.001	0.004	0.005	<0.01
ES1504050-003	18 February 2015	TAR-SD17	8.13	313	123	5	<5	<0.001	0.007	0.006	<0.01
ES1504050-004	18 February 2015	TAR-SB16A	8.29	574	71	2	<5	0.003	0.007	0.025	<0.01
ES1504050-005	18 February 2015	TAR-GCU	7.43	242	86	6	<5	<0.001	0.01	0.02	<0.01
ES1504050-006	18 February 2015	TAR-GCD	7.22	444	748	26	<5	<0.001	0.016	0.002	<0.01
ES1504050-007	18 February 2015	TAR-VOID	8.72	3170	10	<1	<5				
ES1521532-001	7 May 2015	TAR-SD16	8.27	409	16	6	<5	<0.001	0.003	<0.001	<0.01
ES1521532-002	7 May 2015	TAR-SB14	8.85	1300	17	8	<5	<0.001	0.002	0.002	<0.01
ES1521532-003	7 May 2015	TAR-SD17	8.3	539	44	5	<5	0.001	0.003	0.007	<0.01
ES1521532-004	7 May 2015	TAR-SB16A	8.19	571	44	2	<5	0.005	0.003	0.008	<0.01
ES1521532-005	7 May 2015	TAR-VOID	8.62	2910	5	5	<5				
ES1521532-006	7 May 2015	TAR-GCD	7.35	147	29	8	<5	<0.001	0.003	<0.001	<0.01
ES1528624-001	17 August 2015	TAR-SD16	8.43	426	19	4	8	<0.001	0.003	0.011	<0.01
ES1528624-002	17 August 2015	TAR-SB14	8.91	1070	7	5	<5	0.001	0.001	0.02	<0.01
ES1528624-003	17 August 2015	TAR-SD17	8.81	902	192	8	7	<0.001	0.002	0.043	<0.01

Sample No.	Date	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1528624-004	17 August 2015	TAR-SB16A	7.95	658	65	2	7	0.007	0.004	0.05	<0.01
ES1528624-005	17 August 2015	TAR-GCU	7.67	161	96	6	6	<0.001	0.004	0.001	<0.01
ES1528624-006	17 August 2015	TAR-GCD	7.59	202	35	7	<5	<0.001	0.007	<0.001	<0.01
ES1529602-001	27 August 2015	TAR-VOID	8.41	1020	49200	<20	6				
ES1236562-001	11/17/2015	TAR-SD16	8.9	440	10	6	<5	<0.001	0.004	0.004	<0.01
ES1236562-002	11/17/2015	TAR-SB14	8.21	455	100	9	<5	<0.001	0.003	0.005	<0.01
ES1236562-003	11/17/2015	TAR-SD17	7.98	361	191	10	<5	<0.001	0.004	0.004	<0.01
ES1236562-004	11/17/2015	TAR-SB16A	8.08	550	64	6	<5	0.001	0.002	0.048	<0.01
ES1236562-005	11/17/2015	TAR-VOID	8.36	1350	43	4	<5				

Sample No.	Date	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1236562-006	11/17/2015	TAR-GCU	7.47	157	33	15	<5	<0.001	0.006	<0.001	<0.01
ES1603268-001	2/11/2016	TAR-SD16	8.2	289	95	5	<5	<0.001	0.006	0.004	<0.01
ES1603268-002	2/11/2016	TAR-SB14	8.29	722	21	4	<5	<0.001	0.004	0.007	<0.01
ES1603268-003	2/11/2016	TAR-SD17	8.26	698	174	2	<5	0.002	0.007	0.014	<0.01
ES1603268-004	2/11/2016	TAR-SB16A	7.99	622	84	1	<5	0.002	0.003	0.035	<0.01
ES1603268-005	2/11/2016	TAR-VOID	8.28	882	53	<1	<5				
ES1603268-006	2/11/2016	TAR-GCD	7.45	159	129	10	<5	<0.001	0.01	0.002	<0.01
ES1610100-001	5/10/2016	TAR-VOID	8.33	3270	<5	2	<5		0.011		<0.01
ES1610100-002	5/10/2016	TAR-SD16	8.04	340	66	5	<5	<0.001	0.004	0.003	<0.01
ES1610100-003	5/10/2016	TAR-SB14	8.45	535	108	8	<5	<0.001	0.005	0.004	<0.01
ES1610100-004	5/10/2016	TAR-SD17	8.45	774	25	9	<5	<0.001	0.003	0.016	<0.01
ES1610100-005	5/10/2016	TAR-SB16A	8.42	847	21	4	<5	<0.001	0.002	0.03	<0.01
ES1610100-006	5/10/2016	TAR-GCD	7.25	170	119	14	<5	<0.001	0.005	<0.001	<0.01
ES1617724-001	8/10/2016	TAR-SD16	8.13	427	19	6	<5	<0.001	0.004	0.003	<0.01
ES1617724-002	8/10/2016	TAR-SD14	8.13	644	154	6	<5	<0.001	0.004	0.003	<0.01
ES1617724-003	8/10/2016	TAR-SD17	7.85	267	87	5	<5	<0.001	0.005	0.003	<0.01
ES1617724-004	8/10/2016	TAR-SB16A	8.13	474	45	3	<5	<0.001	0.002	0.017	<0.01
ES1617724-005	8/10/2016	TAR-GCU	7.29	136	18	16	<5	<0.001	0.003	<0.001	<0.01
ES1617724-006	8/10/2016	TAR-GCD	7.08	95	33	12	<5	<0.001	0.002	<0.001	<0.01
ES1617724-007	8/10/2016	TAR-VOID	8.55	3010	6	1	<5				
ES1626063-001	11/15/2016	TAR-SD16	8.72	712	7	5	<5	<0.001	0.005	0.004	<0.01
ES1626063-002	11/15/2016	TAR-SD17	8.77	557	37	10	<5	<0.001	0.003	0.01	<0.01
ES1626063-003	11/15/2016	TAR-SB16A	8.36	603	14	6	<5	<0.001	0.003	0.025	<0.01
ES1626063-004	11/15/2016	TAR-VOID	8.6	3000	26	2	<5				
ES1626063-005	11/15/2016	TAR-GCU	7.89	242	26	16	<5	<0.001	0.004	0.002	<0.01
ES1626063-006	11/15/2016	TAR-GCD	8.15	526	12	12	<5	<0.001	0.004	<0.001	<0.01
ES1703029001	8/2/2017	SD14	7.9	459	28	12	<5	<0.001	0.008	0.002	<0.01
ES1703029002	8/2/2017	SD17	8.1	528	202	22	<5	<0.001	0.009	0.006	<0.01
ES1703029003	8/2/2017	SB16a	8.4	551	93	8	<5	<0.001	0.003	0.017	<0.01
ES1703029004	8/2/2017	GCU	7.3	208	70	29	<5	<0.001	0.009	0.001	<0.01
ES1703029005	8/2/2017	GCD	8.1	489	169	33	<5	<0.001	0.026	0.002	<0.01
ES1703029006	8/2/2017	VOID	8.1	3360	8	2	<5	----	----	----	----
ES1711217001	9/5/2017	SB14	8.9	757	67	5	5	<0.001	0.008	0.004	<0.01
ES1711217002	9/5/2017	SD17	9.1	1300	170	12	12	<0.001	0.005	0.023	<0.01
ES1711217003	9/5/2017	SB16a	8.4	957	41	1	1	<0.001	0.003	0.03	<0.01
ES1711217004	9/5/2017	QCU	8.3	15	878	7	7	<0.001	0.006	<0.001	<0.01
ES1711217005	9/5/2017	QCD	7.4	678	225	37	37	<0.001	0.006	0.003	<0.01
ES1711217006	9/5/2017	VOID	8.6	3100	12	1	<5	----	0.006	----	----
ES1719876001	9/8/2017	SD16	9.4	463	19	9	<5	<0.01	<0.01	<0.01	<0.01
ES1719876002	9/8/2017	SD14	9.7	580	47	11	<5	<0.01	<0.01	<0.01	<0.01
ES1719876003	9/8/2017	SD17	8.2	416	120	10	<5	<0.01	<0.01	<0.01	<0.01
ES1719876004	9/8/2017	SB16a	8.1	703	62	6	<5	<0.01	<0.01	0.02	<0.01
ES1719876005	9/8/2017	GCU	7.5	114	121	8	<5	<0.01	<0.01	<0.01	<0.01
ES1719876006	9/8/2017	GCD	7.9	280	161	12	<5	<0.01	<0.01	<0.01	<0.01
ES1722233001	5/9/2017	VOID	8.5	3050	21	1	<5	---	---	---	---
ES1728506001	13/11/2017	SB14	8.1	440	130	11	<5	<0.001	0.007	0.002	<0.01
ES1728506002	13/11/2017	SD17	9.1	958	122	29	<5	<0.001	0.006	0.017	<0.01
ES1728506003	13/11/2017	SB16A	8.6	901	85	7	<5	<0.001	0.004	0.026	<0.01
ES1728506004	13/11/2017	VOID	8.6	2970	19	2	<5	----	----	----	----
ES1728506005	13/11/2017	GCU	6.5	175	22	14	<5	<0.001	0.007	0.001	<0.01
ES1728506006	13/11/2017	GCD	6.7	234	125	14	<5	<0.001	0.005	0.001	<0.01

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**400**		**4000**			
NEPC Guideline - Agricultural Irrigation (mg/L)								**5**	**0.1**			**0.01**	**1**	**0.05**	**0.2**		**2**	**0.02**	**0.02**		**2**	**0.5**	**0.2**	**0.002**																				**600**			
NEPC Guideline - Livestock (mg/L)								**5**	**0.5**			**0.01**		**1**	**0.5**			**1**			**20**	**5**		**0.002**			**1000**						**1000**									**30**	**400**		**2400**			
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	<0.001	0.091	<0.0001	0.013	0.001	0.047	0.008	0.103	0.009		<0.01	0.019		0.71		<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	0.001	0.131	0.038			0.048		<0.05		<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	<0.001	0.075	0.0001	0.002	0.002	0.011	0.005	0.204	0.009		<0.01	0.012		0.88		<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	0.006	0.035	0.006			0.016		0.3		<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	<0.001	0.057	0.0001	0.002	0.002	0.019	0.01	0.193	0.005		<0.01	0.014		0.99		<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	<0.001	0.067	<0.0001	0.003	<0.001	0.081	0.001	0.028	0.009		<0.01	0.027		0.23		<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	<0.001	0.069	<0.0001	0.005	<0.001	0.09	0.003	0.067	0.007		<0.01	0.067		0.2		<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	<0.001	0.055	<0.0001	0.007	<0.001	0.1	0.008	0.031	0.016		<0.01	0.125		0.25		<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	<0.001	0.058	<0.0001	0.003	<0.001	0.113	0.005	0.088	0.012	<0.01	<0.01	0.079	0.06	0.24		<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	<0.001	0.062	0.0004	0.023	0.001	0.487	0.031	0.073	0.016	<0.01	<0.01	0.624	<0.05	2.49		<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	0.006	0.077	0.009			0.098		0.53			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	<0.001	0.056	<0.0001	0.004	<0.001	0.045	0.003	0.078	0.009	<0.01	<0.01	0.118		0.3		<.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	<0.001	0.066	<0.0001	<0.001	<0.001	0.026	<0.001	0.019	0.004	<0.01	<0.01	0.073	<0.05	0.18		<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	<0.001	0.061	<0.0001	<0.001	<0.001	0.032	0.001	0.016	0.006	<0.01	<0.01	0.049	<0.05	0.12		<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	0.008	0.708	0.026					2.07		<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																																									
MW1	23-Mar-17		6.66	7.33	7.7	3210		0.11	0.002	<0.001	0.069	<0.0001	0.003	0.001	0.086	0.011	0.323	0.016	<0.01	<0.01	0.135	<0.05	0.93		<0.0001	8.36	3380	34	45	634	23	33.6	578	188	<1	17	708	725	34.7	1.67	0.03	<0.01	0.15	0.15	2060			
MW1	21-Jun-17	1000	6.74	7.41	7.8	3290	19.4																																									
MW1	13-Sep-17		6.80	7.47	7.8	3270		0.05	<0.001	<0.001	0.047	<0.0001	0.001	<0.001	0.025	0.002	0.065	0.009	<0.01	<0.01	0.028	<0.05	0.17		<0.0001	8.31	3370	31	46	656	22	34.4	550	214	<1	8	784	792	35.8	1.94	0.01	<0.01	0.07	0.07	1850			
MW1	13-Dec-17	12:50	6.73	7.4	7.7	3280																																									
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	0.004	0.311	0.0002	0.025	0.052	0.047	0.052	1.54	0.041		0.08	0.172		32.6		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	<0.001	0.018	<0.001			<0.005		<0.05		<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	0.006	0.441	0.0002	0.071	0.058	0.073	0.071	1.06	0.094		0.13	0.3		88.3		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																																									

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**400**		**4000**			
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	0.002	0.018	0.006			0.045		0.3	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	<0.001	0.016	<0.0001	0.002	<0.001	0.005	0.001	0.028	0.003		<0.01	0.021		1.76	<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			
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	<0.001	0.012	<0.0001	0.002	<0.001	0.002	<0.001	0.058	0.004		<0.01	0.01		0.28	<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	<0.001	0.034	<0.0001	0.002	0.002	0.009	0.003	0.145	0.004		<0.01	0.075		2.86	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	<0.001	0.022	<0.0001	<0.001	0.004	0.036	0.006	0.293	0.005		<0.01	0.078		0.88	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	0.039	0.1	<0.0001	0.005	0.002	0.037	0.006	0.134	0.006	<0.01	0.02	0.095	<0.001	5.54	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	0.012	0.06	<0.0001	0.004	<0.001	0.055	0.006	0.058	0.004	<0.01	<0.01	0.08	<0.001	1.32	<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			0.01	0.22	0.012			0.086		11.8	<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	<0.001	0.007	<0.0001	<0.001	0.001	0.006	0.001	0.066	0.002	<0.01	<0.01	0.027	0.05	0.75	<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	<0.001	0.015	<0.0001	<0.001	<0.001	0.006	0.001	0.035	0.002	<0.01	0.01	0.028	<0.05	0.69	<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	<0.001	0.008	<0.0001	<0.001	<0.001	0.032	<0.001	0.038	0.002	<0.01	<0.01	0.016	<0.05	0.45	<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	0.007	0.287	0.011			0.091		11.4	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																																							
MW2	23-Mar-17		3.85	4.64	7	650		4.76	0.002	<0.001	0.032	<0.0001	0.004	0.004	0.019	0.004	0.235	0.005	<0.001	0.02	0.045	0.06	4.7	<0.0001	7.7	639	<1	1	138	2	6.14	48	18	<1	<1	232	232	6.36	1.82	0.02	<0.01	0.74	0.74	432			
MW2	21-Jun-17	10:20	3.85	4.64	7	591	18.9																																							
MW2	13-Sep-17		3.64	4.43	6.9	548		0.32	0.001	<0.001	0.006	<0.0001	<0.001	0.001	0.002	<0.001	0.077	0.001	<0.01	<0.01	0.01	0.07	0.21	<0.0001	7.54	533	2	1	130	2	5.89	31	16	<1	<1	226	226	5.72	1.42	0.02	<0.01	1.11	1.11	295			
MW2	13-Dec-17	13:10	3.68	4.47	7	545	20.2																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**										**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	<0.001		0.003			0.013		0.27			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	<0.001		0.003			0.005		0.16			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	<0.001		0.004			0.017		<0.005			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	<0.001		0.007			0.02		0.49			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																																						910			
MW3	23-Jul-12		9.9		7.56	1700	20.6		<0.001			<0.0001	0.001		<0.001	<0.001		0.004			0.01		<0.05			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																																						1020			
MW3	7-Mar-13		10.02		7.25	1650	21.9		0.001			<0.0001	0.008		0.001	<0.001		0.013			0.022		0.17			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	<0.001		0.002			0.008		<0.05			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	<0.001		0.002			0.013		<0.05			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	<0.001		0.002			0.026		<0.05			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	<0.001		0.003			0.584		<0.05			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	<0.001		0.002			0.014		<0.05			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				
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	0.003	1.16	0.0004	0.023	0.015	0.207	0.106	1.82	0.055		0.04	0.278		24.9	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	<0.001	0.671	0.016			0.114		<0.05	<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	0.006	1.84	0.0006	0.033	0.03	0.17	0.138	1.26	0.096		0.08	0.238		25.3	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	0.15	0.188	0.014			0.801		1.08	<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	<0.001	0.146	<0.0001	0.001	0.002	0.008	0.006	0.175	0.006		<0.01	0.418		0.7	<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	<0.001	0.159	<0.0001	<0.001	<0.001	0.01	<0.001	0.017	0.004		<0.01	0.27		0.3	<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	<0.001	0.167	<0.0001	<0.001	<0.001	0.058	0.005	0.116	0.007		<0.01	0.513		0.44	<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	<0.001	0.156	<0.0001	0.011	<0.001	0.05	0.006	0.158	0.01		<0.01	0.338		0.4	<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	0.182	<0.05	0.0002	0.001	0.005	0.144	0.018	0.282	0.008	<0.01	<0.01	0.453	<0.001	0.68	<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	0.166	<0.05	0.0003	0.005	<0.001	0.128	0.006	0.116	0.007	<0.01	<0.01	0.444	<0.001	1.22	<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	0.007	0.235	0.008			0.334		0.86	<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				
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	<0.001	0.159	<0.0001	0.002	0.002	0.033	0.02	0.373	0.007	<0.01	<0.01	0.244	<0.05	3.4	<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			

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**400**		**4000**			
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	<0.001	0.159	<0.0001	<0.001	<0.001	0.004	0.002	0.359	0.004	<0.01	<0.01	0.149	<0.05	1.21	<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	0.002	0.18	0.0004	0.003	0.003	0.02	0.014	0.46	0.006	<0.01	<0.01	0.209	<0.05	1.84	<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																																							
MW4	3/23/2017		8.92	9.54	7.4	4370		0.54	<0.001	<0.001	0.184	0.0002	<0.001	0.002	0.036	0.011	0.356	0.008	<0.01	<0.01	1.57	<0.05	1.05	<0.0001	8.13	4610	145	113	710	16	47.8	882	101	<1	<1	982	982	46.6	1.3	0.1	0.05	1.36	1.41	2800			
MW4	6/21/2017	9:30	9	9.62	7.4	4370	19.7																																							
MW4	9/13/2017		8.9	9.52	7.3	4420		0.75	<0.001	<0.001	0.166	<0.0001	<0.001	0.001	0.015	0.009	0.316	0.005	<0.01	<0.01	0.686	<0.05	1.46	<0.0001	7.82	4570	141	116	730	15	48.7	848	147	<1	<1	1040	1040	47.8	0.99	0.03	0.08	1.15	1.23	2450			
MW4	13-Dec-17	12:30	8.95	9.57	7.2	4440	22.6																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**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	<0.001	0.054	<0.0001	0.002	0.003	0.02	0.019	0.586	0.006		<0.01	0.105		1.66	<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	<0.001	1.4	0.022			0.078		0.19	<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	0.001	0.426	0.009	0.024	0.032	0.07	0.068	1.59	0.071		0.05	0.277		23	<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	0.007	0.64	0.003			0.139		0.79	<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	<0.001	0.051	<0.0001	0.004	0.001	0.006	0.004	0.081	0.005		<0.01	0.032		4.1	<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	<0.001	0.027	<0.0001	0.002	<0.001	0.005	<0.001	0.122	0.003		0.01	0.02		1.2	<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	<0.001	0.056	<0.0001	0.004	<0.001	0.014	0.007	0.073	0.004		<0.01	0.086		5.13	<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	<0.001	0.029	<0.0001	0.002	<0.001	0.054	0.008	0.33	0.004		<0.01	0.158		0.56	<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	0.038	0.12	<0.0001	0.003	<0.001	0.062	0.009	0.07	0.004	<0.01	<0.01	0.118	<0.001	3.25	<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	0.039	<0.05	0.0004	0.01	0.002	0.166	0.024	0.232	0.007	<0.01	<0.01	0.46	<0.001	2.68	<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	0.016	0.379	0.019			0.141		8.81	<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	<0.001	0.026	<0.0001	<0.001	<0.001	0.005	<0.001	0.044	0.002	<0.01	<0.01	0.04	<0.05	0.74	<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	<0.001	0.051	<0.0001	<0.001	<0.001	0.002	<0.001	0.373	0.002	<0.01	<0.01	0.036	<0.05	1.67	<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	<0.001	0.036	<0.0001	<0.001	<0.001	0.013	0.002	0.209	0.003	<0.01	<0.01	0.071	<0.05	0.79	<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	0.002	0.071	0.004			0.05		3.86	<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																																							
MW5	23-Mar-17		2.36	3.15	7.7	1750		0.59	0.007	<0.001	0.042	<0.0001	<0.001	0.002	0.03	0.005	0.638	0.004	<0.01	<0.01	0.144	<0.05	0.5	<0.0001	8.24	1750	8	9	352	7	16.6	293	92	<1	<1	340	340	17	1.02	0.94	0.14	2.4	2.54	1100			
MW5	21-Jun-17	10:45	2.55	3.34	7.9	1288	20.7																																							
MW5	13-Sep-17		2.76	3.55	7.8	2610		1.13	0.014	<0.001	0.035	<0.0001	<0.001	<0.001	0.007	0.005	0.082	0.001	<0.01	<0.01	0.085	<0.05	0.74	<0.0001	8.19	2640	12	14	567	8	26.6	421	200	<1	<1	561	561	27.2	1.17	0.06	<0.01	0.06	0.06	1520			
MW5	13-Dec-17	14:10	2.79	3.58	7.7	2630	21.4																																							
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	0.002	0.336	0.008			0.01		<0.05	<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	<0.001	0.193	<0.0001	0.002	0.002	0.002	0.006	0.278	0.003		<0.01	0.008		2.13	<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																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**400**		**4000**			
MW6	10-Mar-11	1220	7.41	8.19	7.08	1783	24	0.15	<0.001				0.002		0.034	0.015	0.047	0.003			0.216		0.32	<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																																											
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	<0.001	0.125	<0.0001	0.002	<0.001	0.009	0.001	0.013	0.004		<0.01	0.071		0.12	<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	<0.001	0.143	<0.0001	<0.001	<0.001	0.012	0.003	0.013	0.003		<0.01	0.072		0.18	<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	<0.001	0.037	<0.0001	0.003	<0.001	0.081	0.009	0.095	0.006		0.02	0.402		0.56	<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	0.038	0.08	<0.0001	0.002	<0.001	0.075	0.006	0.058	0.005	<0.01	0.02	0.151	<0.001	0.93	<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	0.02	<0.05	<0.0001	0.008	0.001	0.045	0.004	0.094	0.005	<0.01	0.02	0.185	<0.001	0.5	<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	0.016	0.154	0.012			0.13		1.55	<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	<0.01	0.036	<0.0001	0.001	<0.001	0.012	0.002	0.059	0.007	<0.01	<0.01	0.238	<0.05	0.32	<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	<0.001	0.083	<0.0001	0.004	<0.001	0.018	0.006	0.063	0.01	<0.01	<0.01	0.211	0.06	1.94	<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	<0.001	0.016	0.007			0.079		0.49	<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																																							
MW6	13-Mar-17		4.68	5.46	7.5	1600	22.8	0.04	<0.001	<0.001	0.103	0.0001	0.003	<0.001	0.026	0.002	0.008	0.007	<0.01	<0.01	0.156	0.07	0.21	<0.0001	8.25	1630	44	20	296	9	16.9	269	45	<1	<1	481	481	18.1	3.39	0.01	<0.01	1.1	1.1	980			
MW6	21-Jun-17	14:00	4.77	5.55	7.5	1660	21.8																																							
MW6	13-Sep-17		4.57	5.35	7.6	1660		0.05	<0.001	<0.001	0.09	<0.0001	0.007	<0.001	0.006	<0.001	0.006	0.008	<0.01	<0.01	0.121	0.08	0.14	<0.0001	8.15	1710	51	22	318	9	18.4	221	46	<1	<1	573	573	18.6	0.6	0.03	<0.01	1.7	1.7	1710			
MW6	13-Dec-17	11:35	4.55	5.33	7.6	1738	21.7																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**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	<0.001	0.2	<0.0001	0.001	<0.001	0.057	0.054	0.047	0.007		<0.01	0.13		0.43	<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	0.004	0.075	0.007			0.015		0.26	<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	<0.001	0.227	<0.0001	<0.001	<0.001	0.009	0.046	0.11	0.017		<0.01	0.054		1.5	<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		0.036	0.155	0.01			0.274		0.74	<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	<0.001	0.18	<0.0001	<0.001	<0.001	0.006	0.028	0.059	0.007		<0.01	0.047		0.41	<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	<0.001	0.186	<0.0001	0.002	<0.001	0.032	0.065	0.059	0.009		<0.01	0.085		0.61	<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	<0.001	0.205	<0.0001	0.002	<0.001	0.088	0.114	0.057	0.005		<0.01	0.19		2.84	<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																																									
MW7	21-Jun-17	11:15	105.18	105.97																																									
MW7	13-Dec-17	10:40	104.79	105.58																																									
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																																								

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**400**		**4000**			
MW8	9-Dec-11	1040	13.24	13.99	Unable to sample - casing blocked																																								
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	Blocked 3.2 down pipe																																								
MW8	5-Sep-13	1300	13.00	13.75	Blocked 3.2 down pipe																																								
MW8	22-Nov-13	1045	13.01	13.76	Blocked 3.2 down pipe																																								
MW8	20-Feb-14	1040	13.07	13.82	Blocked 3.2 down pipe																																								
MW8	27-May-14	1330	13.00	13.75	Blocked 3.2 down pipe																																								
MW8	9-Sep-14	1240	13.13	13.88	Blocked 3.2 down pipe																																								
MW8	20-Nov-15	1110	13.22	13.97	Blocked 3.2 down pipe																																								
MW8	26-Feb-15	1315	13.27	14.02	Blocked 3.2 down pipe																																								
MW8	26-May-15	1110	13.43	14.22	Blocked 3.2 down pipe																																								
MW8	27-Aug-15	1115	13.43	14.22	Blocked 3.2 down pipe																																								
MW8	4-Dec-15	1330	13.46	14.25	Blocked 3.2 down pipe																																								
MW8	24-Feb-16	1100	13.49	14.28	Blocked 3.2 down pipe																																								
MW8	23-May-16	1110	13.54	14.33	Blocked 3.2 down pipe																																								
MW8	1-Sep-16	1300	13.08	13.87	Blocked 3.2 down pipe																																								
MW8	29-Nov-16	1120	12.62	13.41	Blocked 3.2 down pipe																																								
MW8	21-Jun-18	11:40	13.07	13.86	Blocked 3.2 down pipe																																								
MW8	13-Dec-17	11:00	13.12	13.91	Blocked 3.2 down pipe																																								

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**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	<0.001	0.523	0.0003	0.001	0.002	0.134	0.016	0.204	0.006		0.09	0.327		46.9	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	<0.0010	0.021	0.004			0.065		0.07	<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	<0.001	0.258	<0.0001	<0.001	<0.001	0.014	0.002	0.04	0.006		0.04	0.048		7.2	<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	<0.001	0.004	<0.001			0.032		<0.05	<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	<0.001	0.174	<0.0001	<0.001	<0.001	0.01	<0.001	0.007	<0.001		0.02	0.047		<0.05	<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	<0.001	0.128	<0.0001	<0.001	<0.001	0.011	<0.001	0.005	<0.001		0.01	0.027		0.07	<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																																									
GW044997	21-Jun-17	12:20	9.68	9.88																																									
GW044997	13-Dec-17	13:25	9.67	9.87																																									
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	<0.001	0.156	<0.0001	<0.001	<0.001	0.004	<0.001	0.001	<0.001		<0.01	0.037		0.06	<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	0.001	0.012	0.001			0.205		<0.05	<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	<0.001	0.001	<0.001			0.014		<0.05	<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	<0.001	0.15	0.0002	<0.001	<0.001	0.116	0.006	<0.001	<0.001		<0.01	0.51		<0.05	<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	<0.001	0.009	<0.001			1.88		<0.05	<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	<0.001	0.004	<0.001			1.26		<0.05	<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	<0.001	<0.001	<0.001			0.015		<0.05	<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	<0.001	0.146	<0.0001	<0.001	<0.001	0.005	<0.001	<0.001	0.001		<0.01	1.25		<0.05	<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	<0.001	0.161	<0.0001	0.002	<0.001	0.012	<0.001	0.002	<0.001		0.02	0.034		0.06	<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	<0.001	0.176	<0.0001	<0.001	<0.001	0.012	0.002	0.004	<0.001		0.01	0.027		0.29	<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	<0.001	0.166	<0.0001	0.003	<0.001	0.027	0.006	0.005	<0.001		0.01	0.193		<0.05	<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	0.141	<0.05	<0.0001	<0.001	<0.001	0.005	<0.001	0.002	<0.001	<0.01	<0.01	0.017	<0.001	0.06	<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	0.156	<0.05	<0.0001	<0.001	<0.001	0.007	<0.001	<0.001	<0.001	<0.01	0.01	0.138	<0.001	<0.05	<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																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**										**400**		**4000**			
GW031856	9-Sep-14	900	14.70	15.3	7.3	1120	18	<0.01	0.002				0.002		0.006		<0.001	<0.001			0.056		0.12	<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				
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	<0.001	0.143	<0.0001	<0.001	<0.001	<0.001		<0.001	0.001	<0.01	0.01	0.197	<0.05	<0.05	<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	<0.001	0.126	<0.0001	<0.001	<0.001	0.022	0.003	0.002	0.001	<0.01	<0.01	0.348	<0.05	0.19	<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	<0.001	0.154	<0.0001	<0.001	<0.001	0.007	<0.001	0.005	<0.001	<0.01	0.01	0.035	<0.05	0.09	<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	0.009	0.001	0.002			0.594		0.25	<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																																										
GW031856	23-Mar-17		15.6	16.2	7.2	1130		<0.01	0.001	<0.001	0.158	<0.0001	<0.001	<0.001	0.03	0.002	0.002	<0.001	<0.01	0.01	0.068	<0.05	0.06	<0.0001	8.08	1110	50	34	149	3	11.8	102	18	<1	<1	460	460	12.4	2.44	0.02	<0.01	0.22	0.22	682			
GW031856	21-Jun-17	13:05	14.79	15.39	7.5	1152	14.7																																							
GW031856	13-Sep-17		17	17.6	7.4	1150		<0.01	0.001	<0.001	0.146	<0.0001	<0.001	<0.001	0.004	<0.001	<0.001	<0.001	<0.01	<0.01	0.008	<0.05	<0.05	<0.0001	7.99	1130	56	35	159	3	12.7	82	22	<1	<1	497	497	12.7	0.13	0.03	<0.01	0.23	0.23	601			
GW031856	13-Dec-17	15:00	14.7	15.3	7.4	1133	25.6																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**							**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	<0.001	0.006	0.003			0.018		<0.05	<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	<0.001	0.078	<0.0001	<0.001	<0.001	0.002	0.002	0.017	0.004		0.01	0.024		0.54	<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	0.002	0.034	0.001			0.103		1.28	<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	<0.001	0.106	<0.0001	0.002	<0.001	0.009	0.002	0.085	0.008		0.02	0.061		2.63	<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	<0.001	0.086	<0.0001	<0.001	<0.001	0.113	0.003	0.005	0.012		0.02	0.15		0.1	<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	<0.001	0.078	<0.0001	<0.001	<0.001	0.018	0.002	0.03	<0.001		0.01	0.068		0.92	<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	<0.001	0.072	<0.0001	<0.001	<0.001	0.034	0.002	0.007	0.001		0.01	0.176		0.16	<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	0.091	<0.05	<0.0001	0.004	0.002	0.324	0.006	0.036	0.009	<0.01	0.02	0.19	<0.001	1.72	<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	0.072	<0.05	<0.0001	0.001	<0.001	0.112	0.007	0.03	0.003	<0.01	0.01	0.152	<0.001	0.86	<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	<0.001	0.318	0.003			0.048		3.63	<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	<0.001	0.086	<0.0001	0.001	0.001	0.012	0.002	0.141	0.008	<0.01	0.03	0.214	<0.05	22.9	<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	<0.001	0.049	<0.0001	<0.001	<0.001	0.006	<0.001	0.273	0.002	<0.01	<0.01	0.093	<0.05	16	<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	<0.001	0.084	<0.0001	<0.001	<0.001	0.008	<0.001	0.096	<0.001	<0.01	0.03	0.067	<0.05	30.6	<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	<0.001	0.03	<0.001			0.026		0.34	<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																																							
GW052266	23-Mar-17		7.67	7.72	7.3	780	21.5	0.07	0.002	<0.001	0.071	<0.0001	<0.001	<0.001	0.013	<0.001	0.03	<0.001	<0.01	0.01	0.05	<0.05	0.39	<0.0001	7.81	780	47	17	90	<1	7.66	67	29	<1	<1	246	246	7.41	1.66	0.02	<0.01	5.97	5.97	490			
GW052266	21-Jun-17	9:00		7.86	7.3	776	19.9																																							
GW052266	13-Sep-17			7.86	6.9	793	21	0.61	0.001	<0.001	0.067	<0.0001	<0.001	<0.001	0.002	<0.001	0.176	0.001	<0.01	0.01	0.029	<0.05	2.56	<0.0001	7.72	779	58	18	93	<1	8.42	60	35	<1	<1	264	264	7.7	4.5	0.04	<0.01	6.17	6.17	404			
GW052266	13-Dec-17	12:05		7.93	7.1	815	22.3																																							
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	<0.001	0.132	<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	<0.001	0.013	0.001			0.025		<0.05	<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	<0.001	0.21	0.0001	<0.001	<0.001	0.011	<0.001	1.9	0.006		0.01	0.019		0.11	<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	<0.001	3.31	0.005			0.079		0.76	<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	<0.001	0.266	<0.0001	<0.001	<0.001	0.004	<0.001	1.81	0.004		<0.01	0.033		0.1	<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	<0.001	0.093	<0.0001	<0.001	<0.001	<0.001	<0.001	0.006	<0.001		<0.01	0.023		0.11	<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																																							

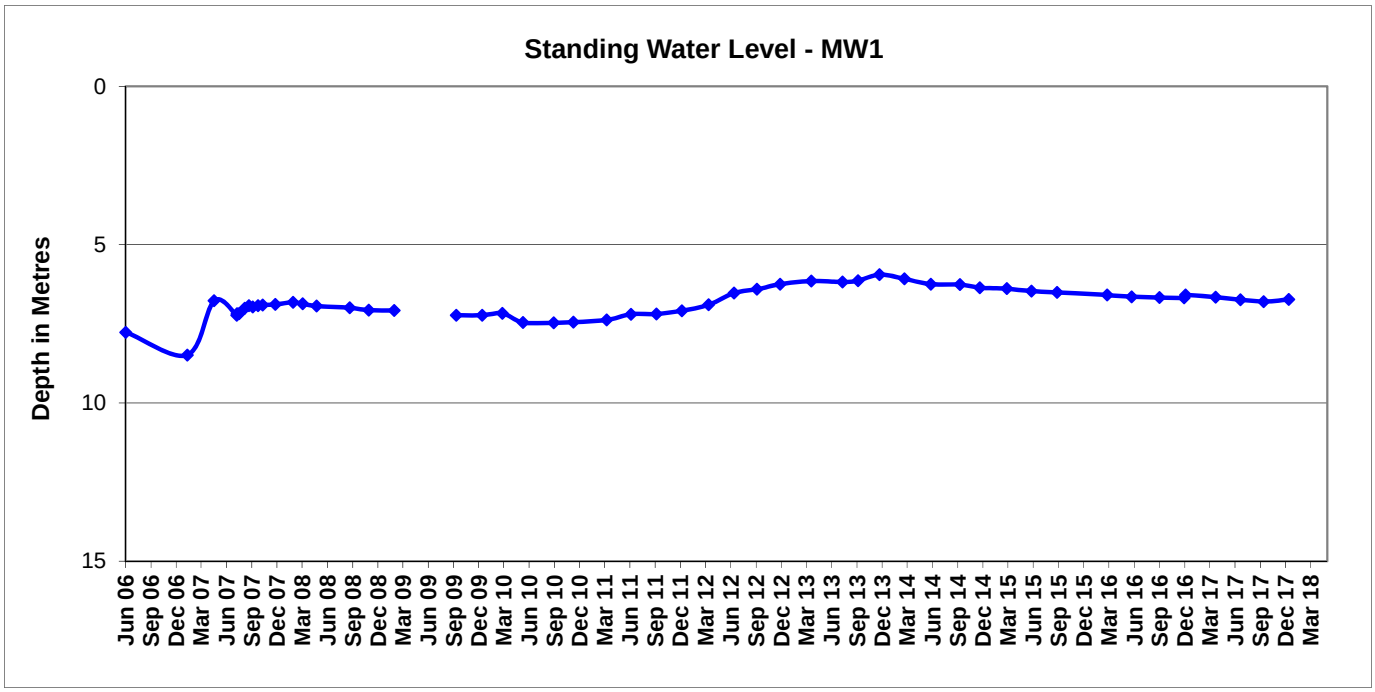
ANNUAL REVIEW
2017

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**400**		**4000**			
Templemore A	6-Sep-12	1000	3.59	4.07	7.32	816	20.1	0.05	0.002	<0.001	0.071	<0.0001	<0.001	<0.001	0.017	<0.001	0.008	<0.001		<0.01	0.026		0.09	<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	<0.001	0.114	0.0001	0.001	0.001	0.142	0.01	0.501	0.005		<0.01	0.279		2.56	<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			
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	0.119	<0.05	<0.0001	<0.001	<0.001	0.068	0.003	0.688	0.003	<0.01	<0.01	0.103	<0.001	0.12	<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	0.1	<0.05	<0.0001	0.001	<0.001	0.105	0.012	0.432	0.005	<0.01	<0.01	0.204	<0.001	0.75	<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	<0.001	0.011	<0.001			0.031		0.86	<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	<0.001	0.079	<0.0001	<0.001	<0.001	0.015	<0.001	0.1	0.002	<0.01	<0.01	0.064	<0.05	0.22	<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	<0.001	0.077	<0.0001	<0.001	<0.001	0.019	<0.001	0.014	<0.001	<0.01	<0.01	0.034	<0.05	0.05	<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	<0.001	0.105	<0.0001	<0.001	<0.001	0.012	0.001	0.415	0.001	<0.01	<0.01	0.037	<0.05	0.11	<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	0.002	0.404	0.001			0.26		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																																							
Templemore A	23-Mar-17		4.31	4.79	7.4	824	22.1	0.31	0.002	<0.001	0.07	<0.0001	<0.001	<0.001	0.026	0.001	0.086	0.001	<0.01	<0.01	0.097	<0.05	0.35	<0.0001	7.99	816	65	20	65	4	7.82	112	53	<1	<1	189	189	8.04	1.39	0.56	0.1	3.14	3.24	530			
Templemore A	21-Jun-17	12:35	4.89	5.37	7.6	943	18.7																																							
Templemore A	13-Sep-17		5.11	5.59	7.5	1050	20.3	0.1	0.003	<0.001	0.076	0.0002	<0.001	<0.001	0.02	<0.001	0.018	<0.001	<0.01	<0.01	0.07	<0.05	0.1	<0.0001	8.08	1030	110	24	75	4	10.8	143	76	<1	<1	259	259	10.8	0.18	0.05	<0.01	1.79	1.79	575			
Templemore A	13-Dec-17	13:45	5.22	5.7	7.7	1091	210																																							

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	Beryllium (Be) - mg/L	Barium (Ba) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - 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	Boron (B) - mg/L	Iron (Fe) - 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**			**0.01**	**1**	**1**	**1**	**0.1**		**1**	**0.02**		**20**			**0.002**			**1000**						**1000**									**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	<0.001	0.145	<0.0001	<0.001	<0.001	0.055	<0.001	0.008	<0.001		0.01	0.052		<0.05	<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	<0.001	0.003	0.002			0.068		<0.05	<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	<0.001	0.059	<0.0001	<0.001	<0.001	0.007	<0.001	0.024	<0.001		0.01	0.02		0.11	<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	0.003	0.034	0.002			0.185		0.43	<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	<0.001	0.076	<0.0001	<0.001	<0.001	0.015	<0.001	0.005	<0.001		0.01	0.019		<0.05	<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	<0.001	0.09	<0.0001	<0.001	<0.001	0.013	<0.001	0.004	<0.001		0.02	0.036		0.1	<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	<0.001	0.099	<0.0001	<0.001	<0.001	0.01	<0.001	0.005	<0.001		0.01	0.072		0.1	<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	<0.001	0.069	<0.0001	<0.001	<0.001	0.019	0.001	0.012	<0.001		0.01	0.064		0.09	<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	0.076	0.06	<0.0001	<0.001	<0.001	0.046	0.002	0.035	<0.001	<0.01	0.02	0.148	<0.001	0.3	<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	0.061	0.06	<0.0001	<0.001	<0.001	0.045	0.005	0.022	0.002	<0.01	0.02	0.129	<0.001	0.38	<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	<0.001	0.004	<0.001			0.028		0.07	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	<0.001	0.064	<0.0001	<0.001	<0.001	0.01	<0.001	0.013	0.002	<0.01	0.01	0.078	<0.05	0.2	<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	<0.001	0.061	<0.0001	<0.001	<0.001	0.006	0.003	0.005	<0.001	<0.01	0.02	0.046	<0.05	0.07	<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	<0.001	0.069	<0.0001	<0.001	<0.001	0.007	<0.001	0.005	<0.001	<0.01	0.01	0.046	<0.05	1.7	<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	0.003	0.021	<0.001			0.153		1.12	<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																																							
Templemore B	23-Mar-17		6.91	7.05	7.3	1500	23	0.04	0.003	<0.001	0.069	<0.0001	<0.001	<0.001	0.014	<0.001	0.012	<0.001	<0.01	0.02	0.035	<0.05	0.08	<0.0001	8.02	15200	71	31	197	1	14.7	235	129	<1	<1	322	322	15.7	3.48	0.02	<0.01	2.42	2.42	1040			
Templemore B	21-Jun-17	13:30	6.46	6.6	7.4	1613	19.7																																							
Templemore B	13-Sep-17		6.68	6.82	7.6	1600	21.13	<0.01	0.003	<0.001	0.07	<0.0001	0.001	<0.001	0.011	<0.001	0.009	0.004	<0.01	0.01	0.044	<0.05	0.23	<0.0001	8.3	1620	89	37	213	2	16.8	245	149	<1	<1	360	360	17.2	1.19	0.04	<0.01	2.31	2.31	916			
Templemore B	13-Dec-17	14:40	6.61	6.75	7.4	1425	22.4																																							

Denotes dissolved metals


Standing Water Level - MW1
Depth in Metres
0
5
10
15
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
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Sep 08
Dec 08
Mar 09
Jun 09
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Dec 09
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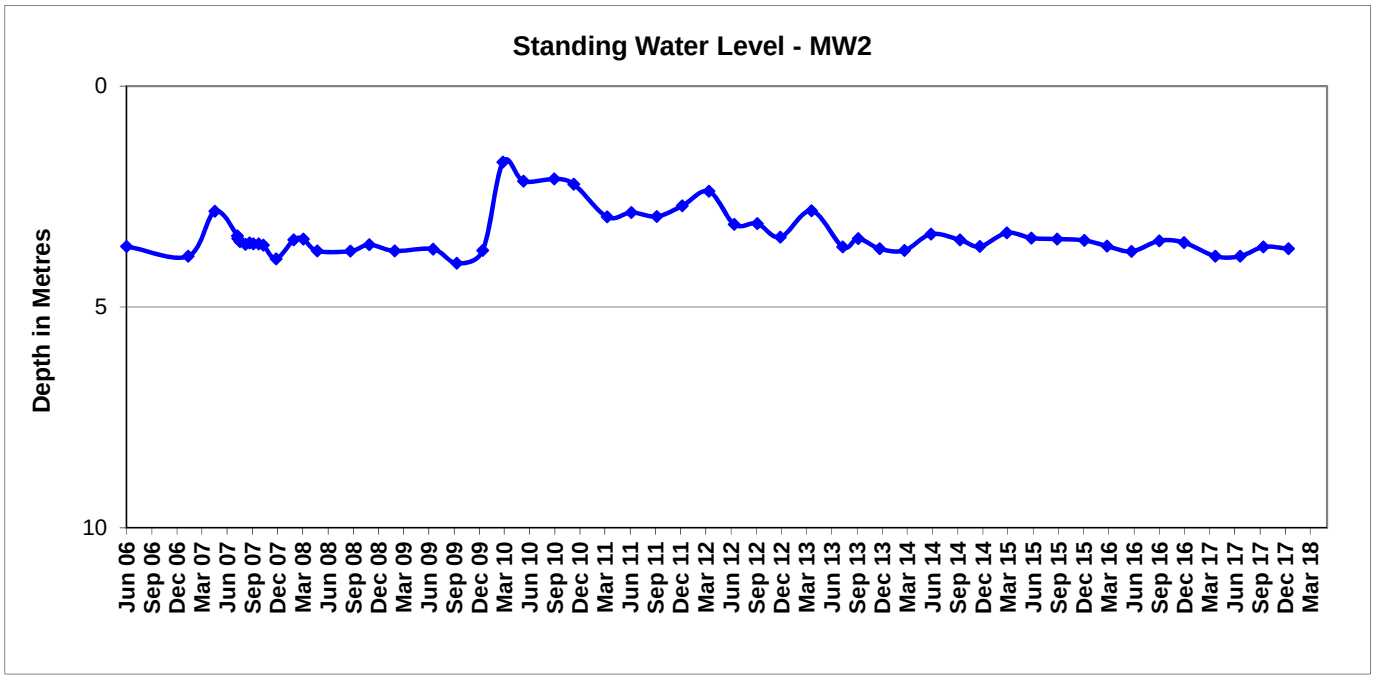
Standing Water Level - MW2
Depth in Metres
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5
10
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
Mar 08
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Dec 08
Mar 09
Jun 09
Sep 09
Dec 09
Mar 10
Jun 10
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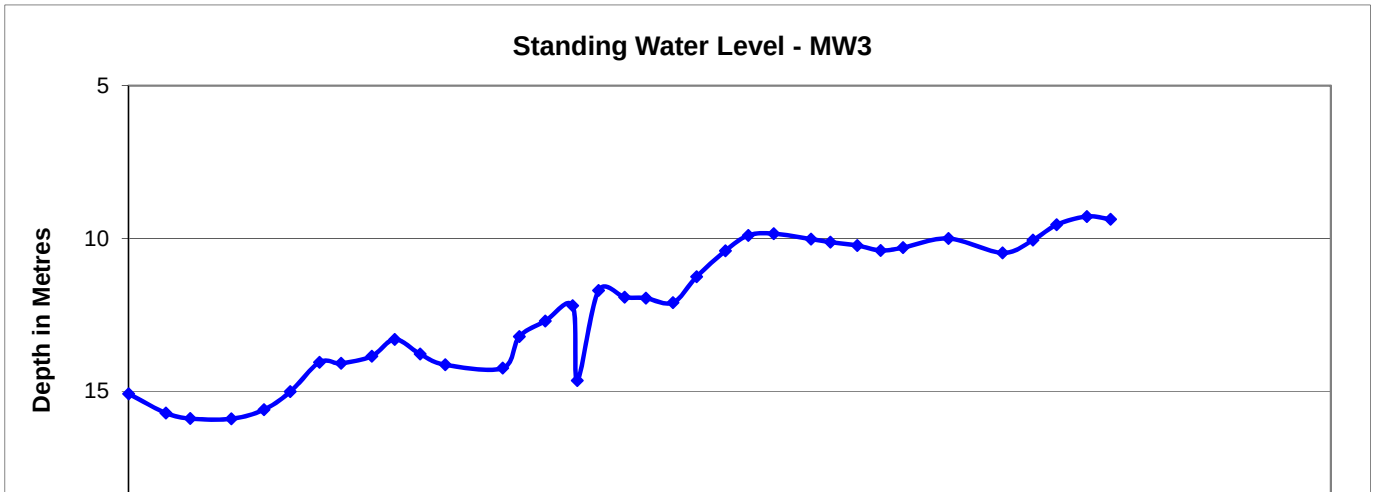
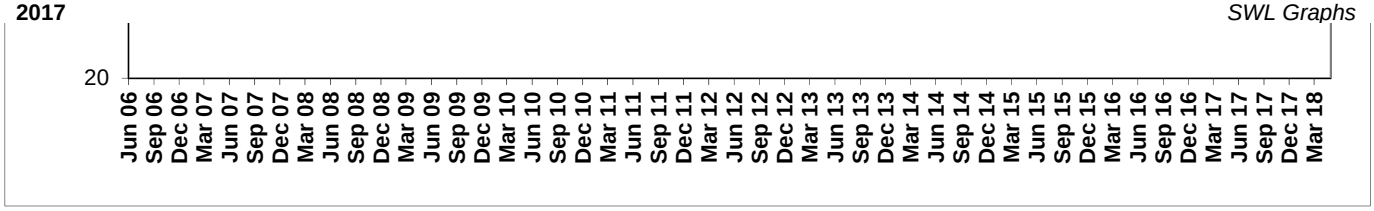
Mar 18


Standing Water Level - MW3
Depth in Metres
5
10
15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Jun 06
Sep 06
Dec 06
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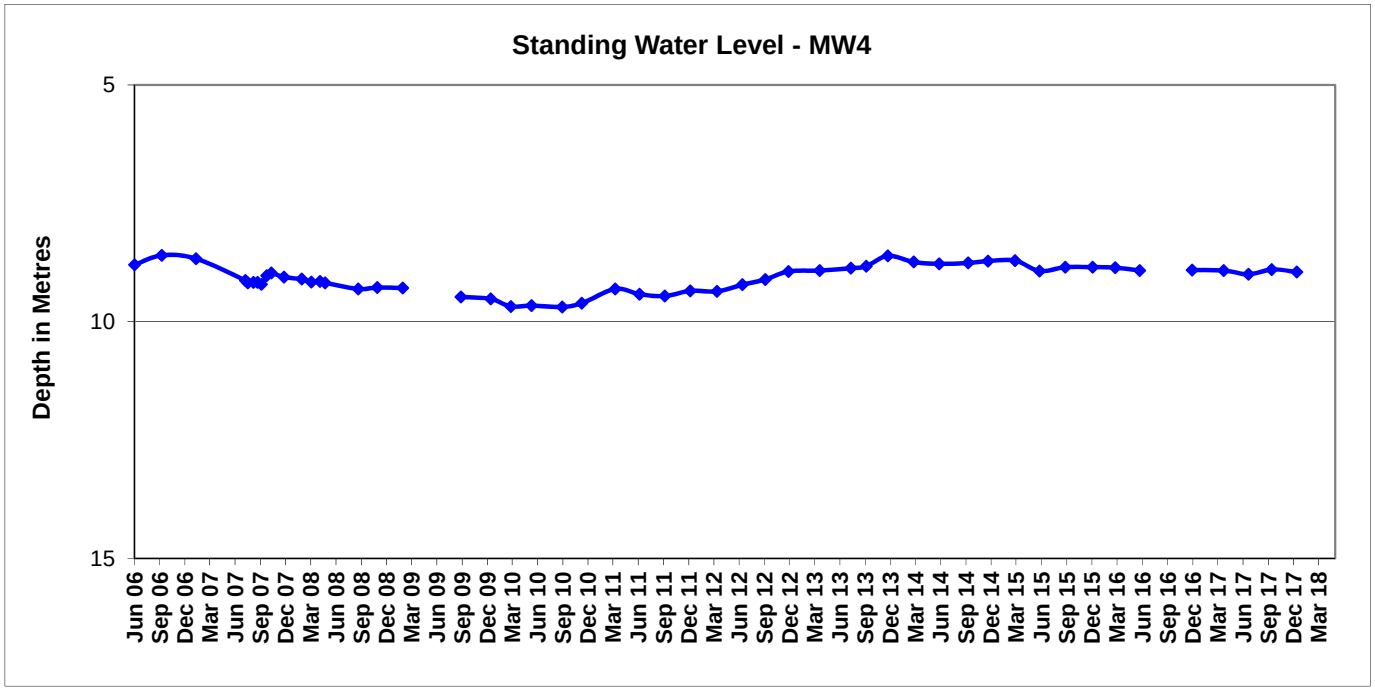
Mar 18


Standing Water Level - MW4
Depth in Metres
5
10
15
Jun 06
Sep 06
Dec 06
Mar 07
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Dec 07
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Dec 08
Mar 09
Jun 09
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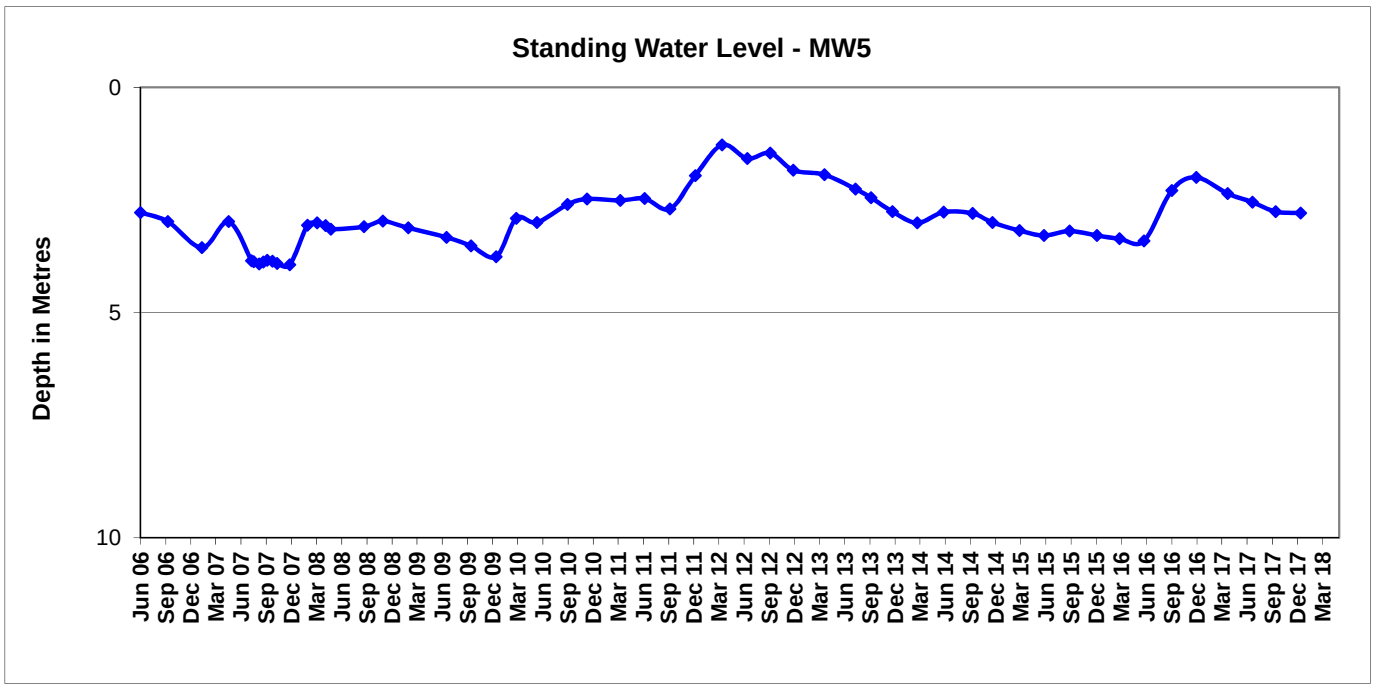
Dec 17
Mar 18


Standing Water Level - MW5
Depth in Metres
0
5
10
Jun 06
Sep 06
Dec 06
Mar 07
Jun 07
Sep 07
Dec 07
Mar 08
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Dec 08
Mar 09
Jun 09
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Dec 09
Mar 10
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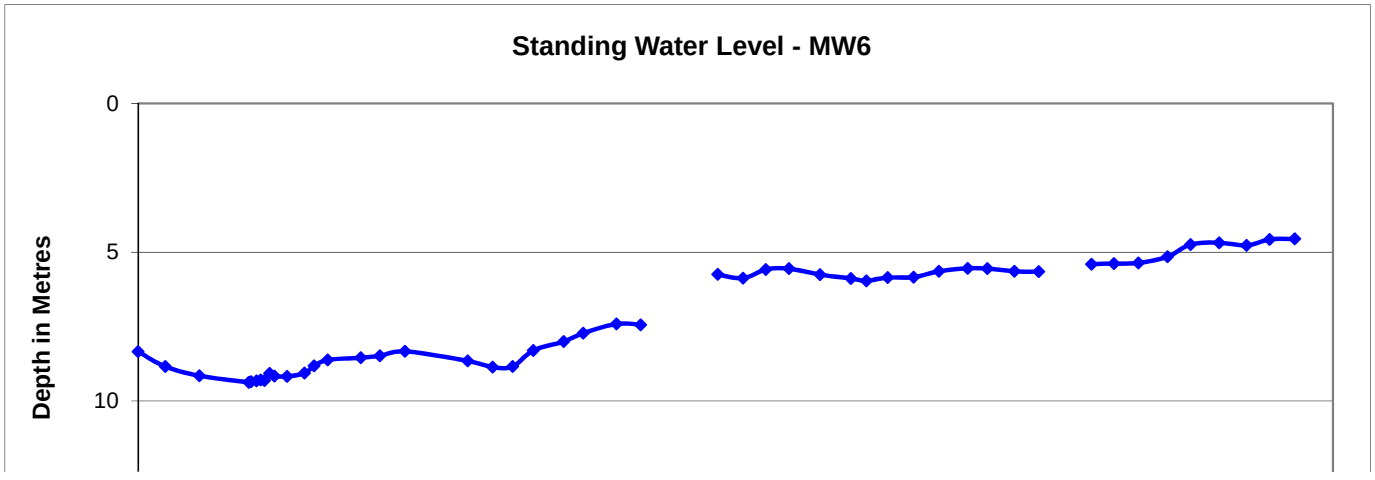
Dec 17
Mar 18


Standing Water Level - MW6
Depth in Metres
0
5
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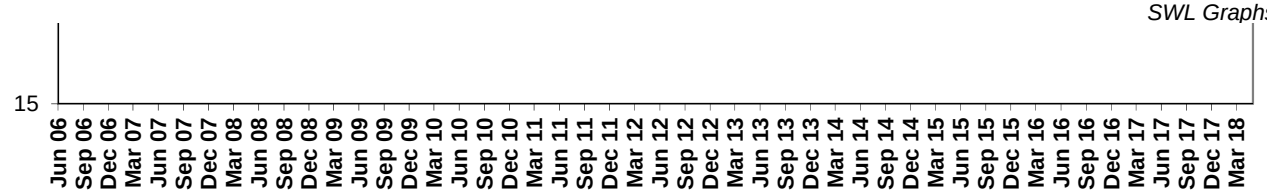
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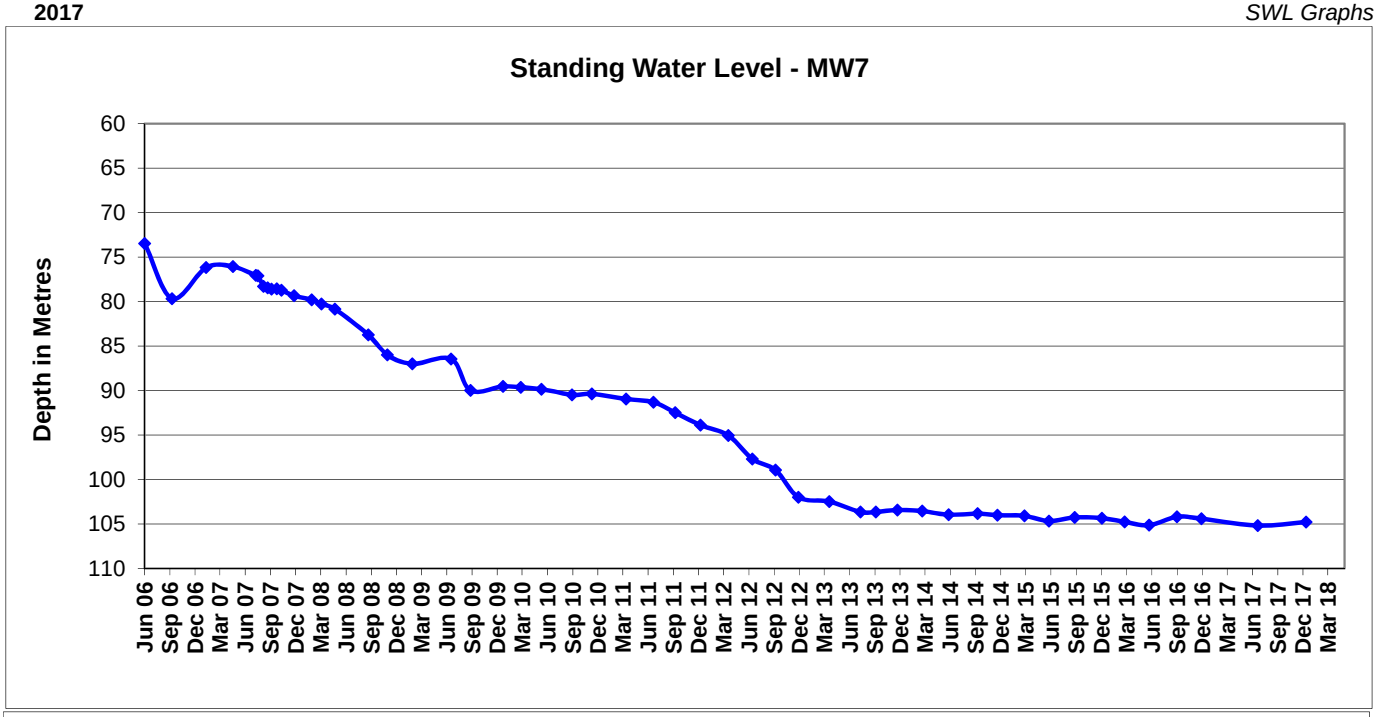
Standing Water Level - MW7
Depth in Metres
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65
70
75
80
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100
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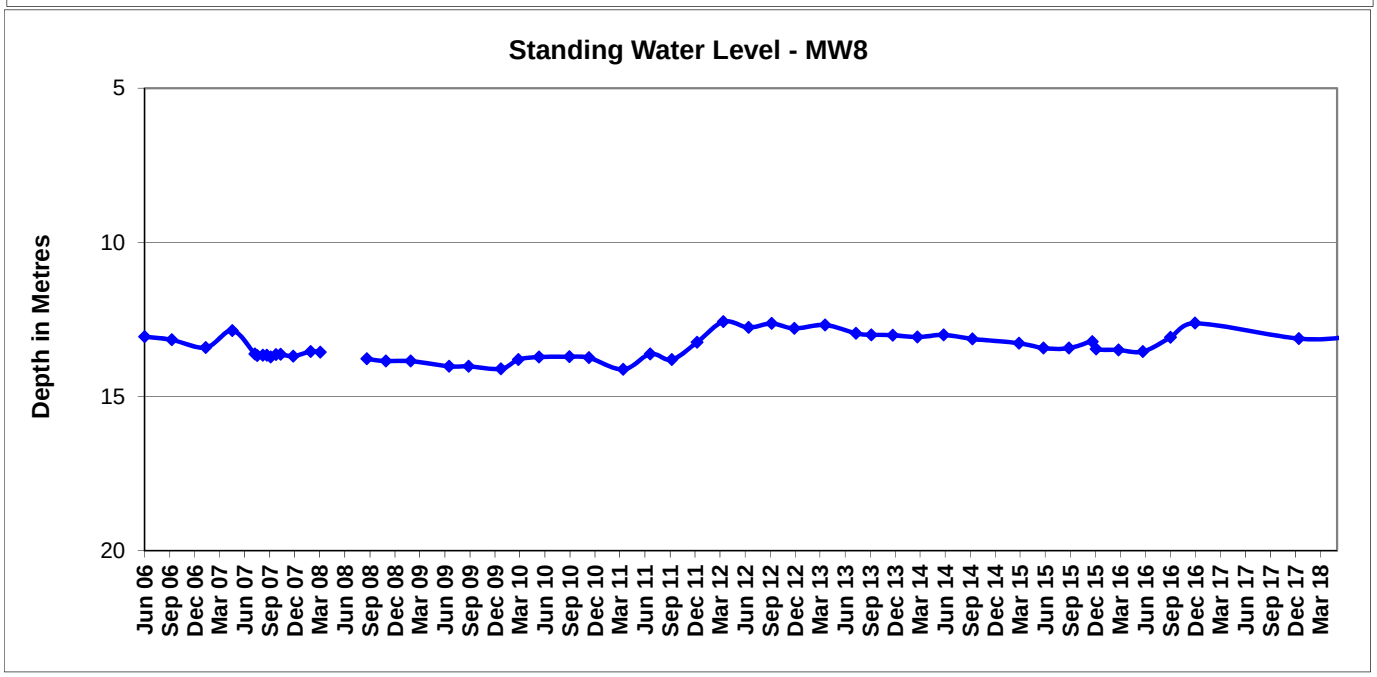
Standing Water Level - MW8
Depth in Metres
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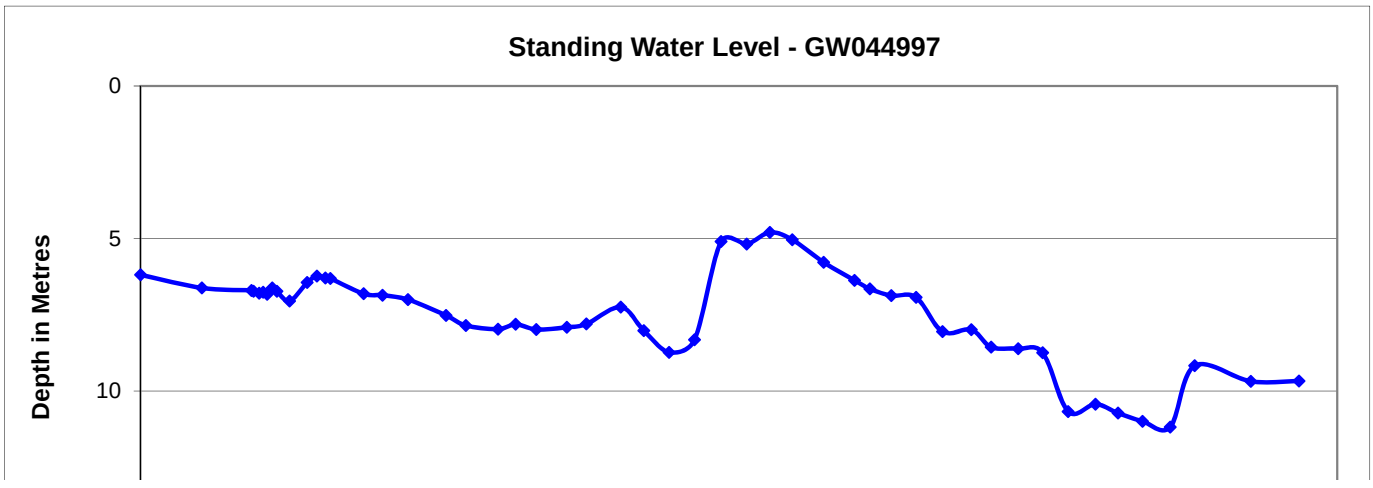
Standing Water Level - GW044997
Depth in Metres
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5
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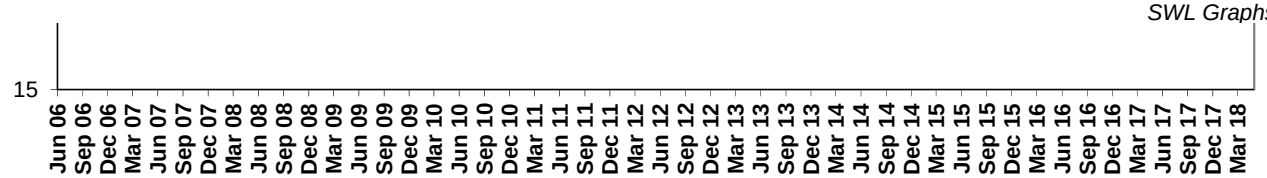
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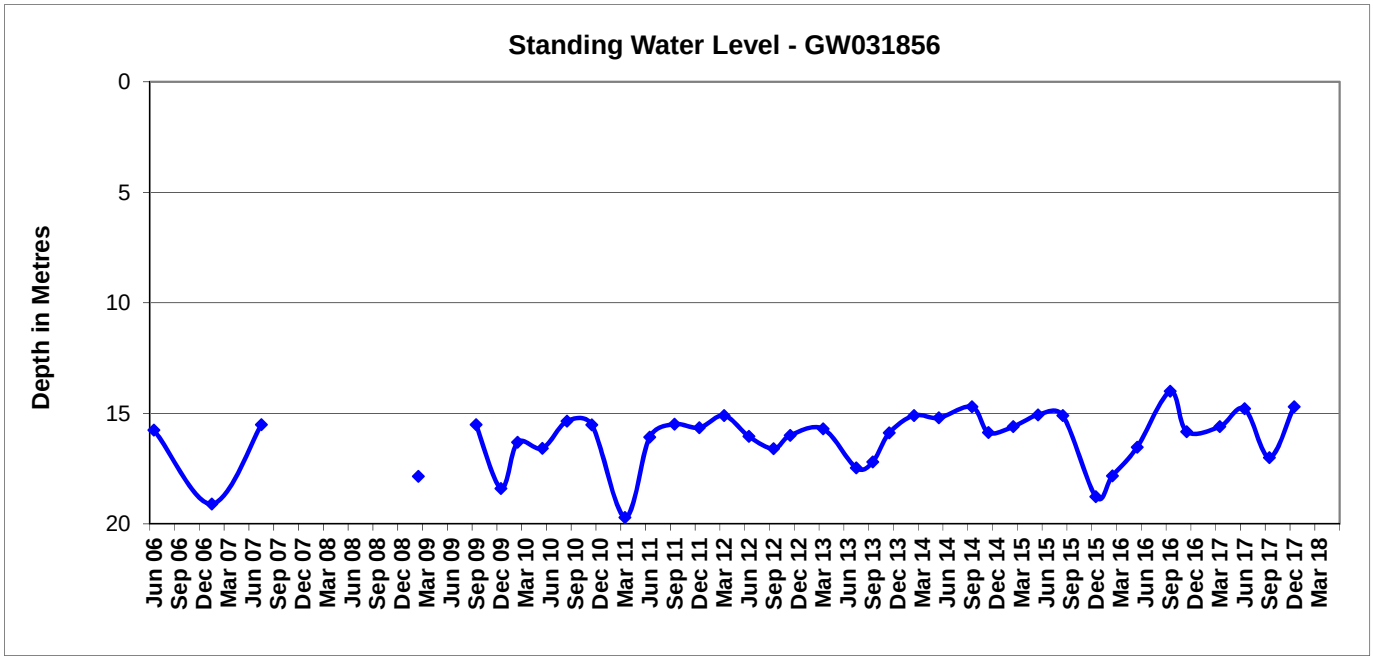
Standing Water Level - GW031856
Depth in Metres
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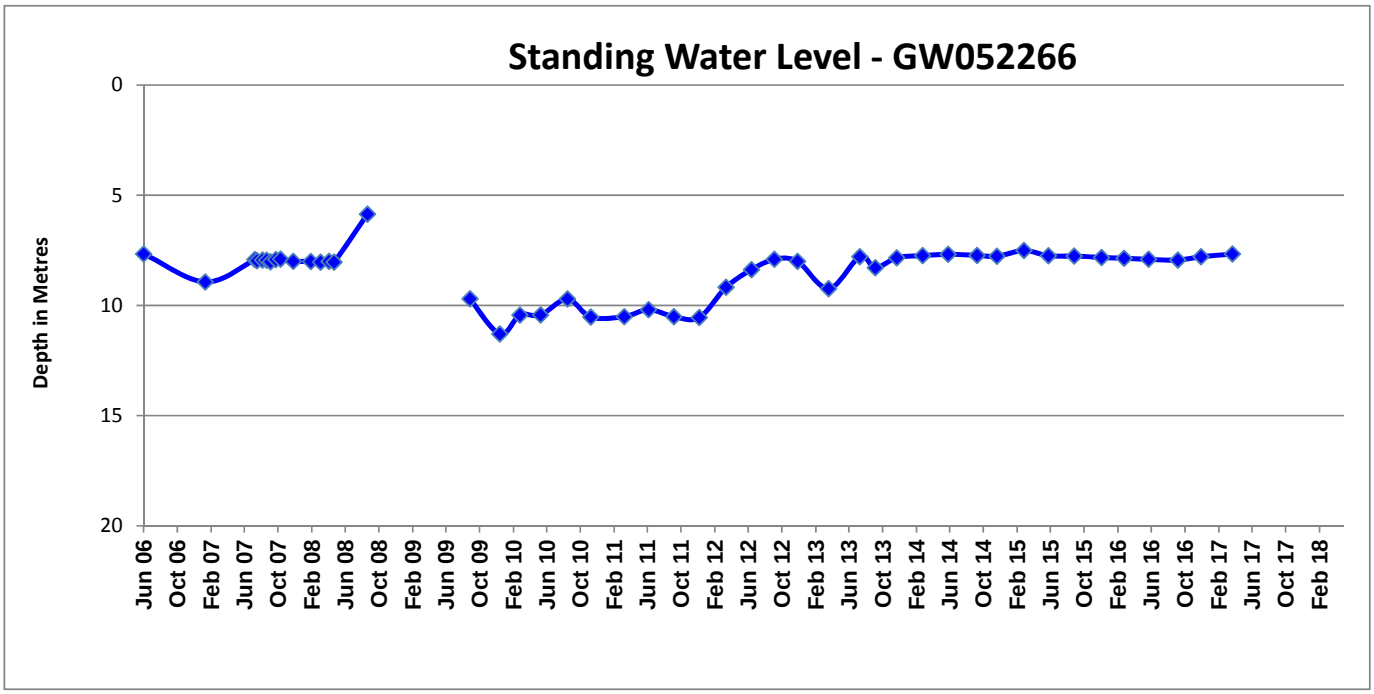
Standing Water Level - GW052266
Depth in Metres
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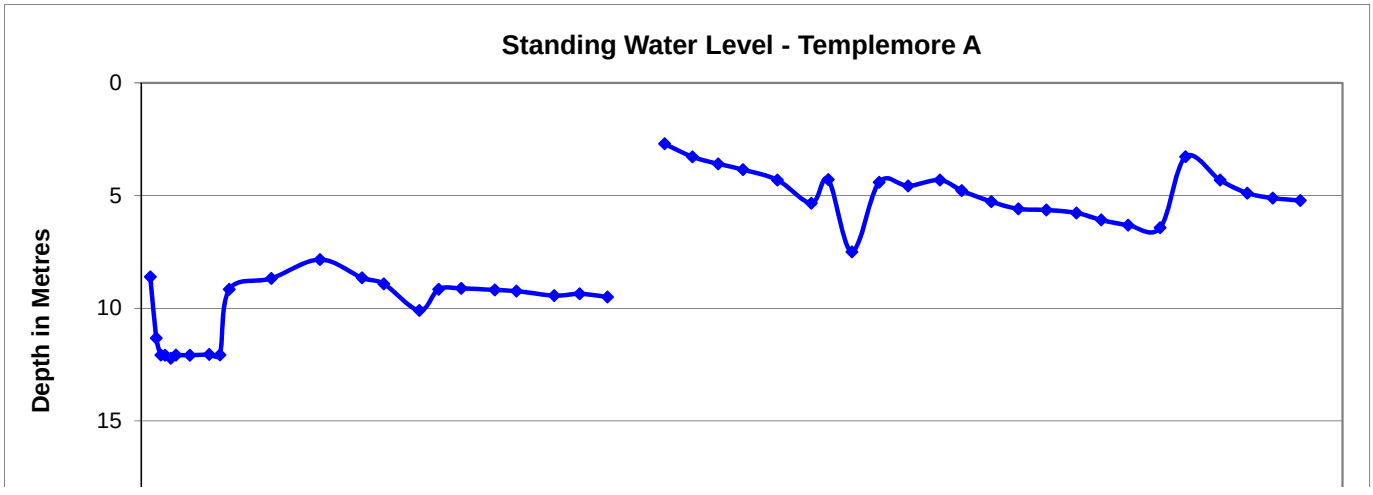
Standing Water Level - Templemore A
Depth in Metres
0
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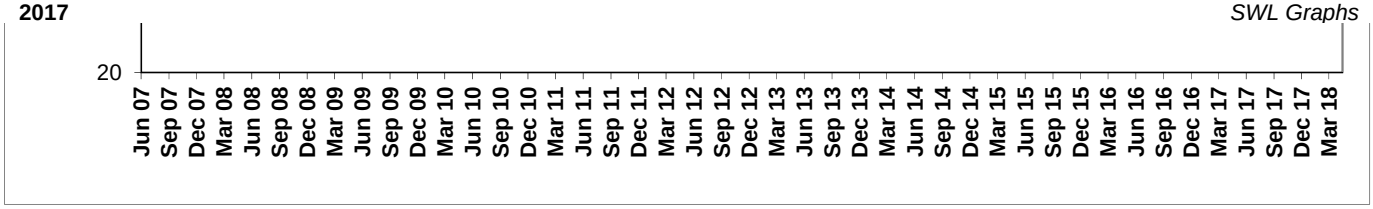
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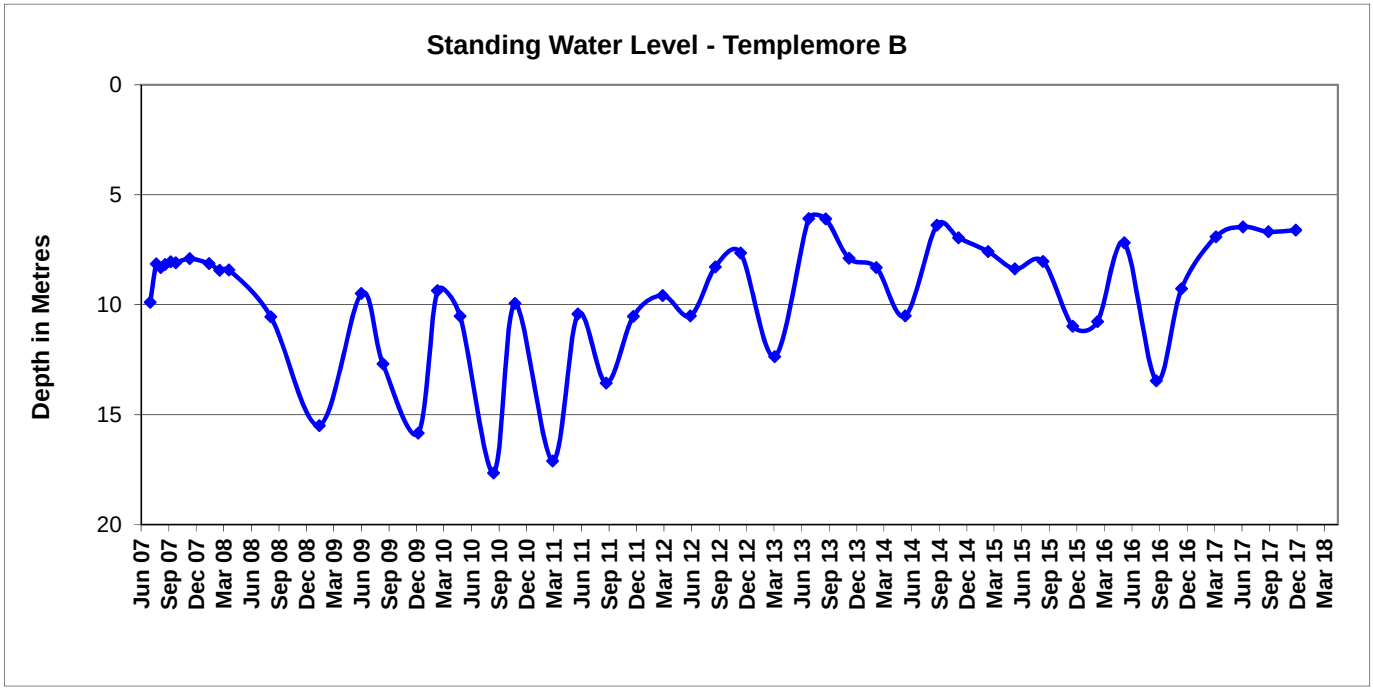
Standing Water Level - Templemore B
Depth in Metres
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