Annual Review
Sunnyside Coal Mine

Name of operation	Sunnyside Coal Mine
Name of operator	Whitehaven Coal Mining Pty Ltd
Development consent/project approval number	PA 06_0308 MOD 1
Name of holder of development consent/project approval	Namoi Mining Pty Ltd
Mining lease number	ML 1624
Name of holder of mining lease	Namoi Mining Pty Ltd
Water licence number	WAL 29537
Name of holder of water licence	Namoi Mining Pty Ltd
MOP start date	06-11-2015
MOP end date	05-05-2016
Annual review start date [1]	01-12-2014
Annual review end date	30-11-2015
I, Jamie Frankcombe, certify that this audit report is a true and accurate record of the compliance status of Sunnyside Coal Mine for the period December 1st 2014 until November 30th 2015, and that I am authorised to make this statement on behalf of Namoi Mining 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	Jamie Frankcombe
Title of authorised reporting officer	Director – Namoi Mining Pty Ltd
Signature of authorised reporting officer	
Date	24/2/2016
[1] NSW Annual Review Guideline was released in October 2015	

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TABLES

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1 STATEMENT OF COMPLIANCE

The compliance status of the Sunnyside Coal Mine as at 30th November 2015 is summarised in Table 1. Table 2 notes non-compliances that occurred during the reporting period, and non-compliances from previous reporting periods that still require management action.

Table 1 - Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
PA 06_0308 MOD 1	No
EPL 12957	No
ML 1624	Yes
WAL 29537	No

Table 2 - Non-compliances

Relevant Approval	Condition Number	Condition Description (summary)	Compliance status	Comment	Where Addressed in Annual Review
PA 06_0308 MOD 1	2(2)	Carry out project generally in accordance	Non-compliant	Refer following	n/a
PA 06_0308 MOD 1	3(20)	Meteorological station on site	Non-compliant	EPL varied to remove requirement for meteorological monitoring on site	Section 11
EPL 12957	A2.1	Premises details	Non-compliant	Premises details are incorrect – EPL variation to be sought	Section 11
EPL 12957	O4.3	PIRMP to be kept on site	Non-compliant	No office facilities onsite – EPL variation to be sought	Section 11
EPL 12957	G1.1	Copy of licence to be kept on site	Non-compliant	No office facilities onsite – EPL variation to be sought	Section 11
EPL 12957	F (Annual Return)	Publish Monitoring Data	Non-compliance	Not all monthly monitoring reports uploaded within 14 days - Internal	Section 11

				directive provided regarding requirement	
WAL 29537	MW0632-00001	Maintain a logbook	Non-compliant	No water was extracted during the reporting period	Section 11

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)

2 INTRODUCTION

This is the seventh Annual Review (AR), formerly Annual Environmental Management Report, produced for the Sunnyside Coal Mine, and it has been prepared in accordance with Conditions 4 and 5 of Mining Lease (ML 1624) (Mining Act 1992) and Condition 5 (Schedule 5) of PA 06_0308 MOD 1. The AR follows the format required by the NSW Government Annual Review Guideline (October, 2015).

Though primarily covering the period from 1st December 2014 to 30th November 2015 (the reporting period), where relevant the AR provides information on historical aspects of the operation and longer term trends in environmental monitoring results.

The Sunnyside Coal Mine is located within the Gunnedah Shire, approximately 15 km west of Gunnedah (Figure 1). The mine is owned by Namoi Mining Pty Ltd (NMPL) and operated by Whitehaven Coal Mining Pty Ltd. Both companies are wholly owned subsidiaries of Whitehaven Coal Limited (WCL).

On the 25th October 2012, Whitehaven announced that mining operations would be suspended at Sunnyside and the mine would be placed into a care and maintenance phase. Mining operations ceased in November 2012, with the remaining ROM coal stockpiled at site crushed and transported to the CHPP until stockpiles were exhausted in May 2013.

2.1 Mine Contacts

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

- Mr Blair Meyers, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6740 7000.
- Mr Nigel Wood, General Manager, Open Cut Operations - oversees Open Cut Operations for the Whitehaven Group. Contact: (02) 6741 9309.
- Mrs Jill Johnson, Group Manager - Environment – oversees day to day environmental and rehabilitation performance across the site. Contact: (02) 6741 9321.

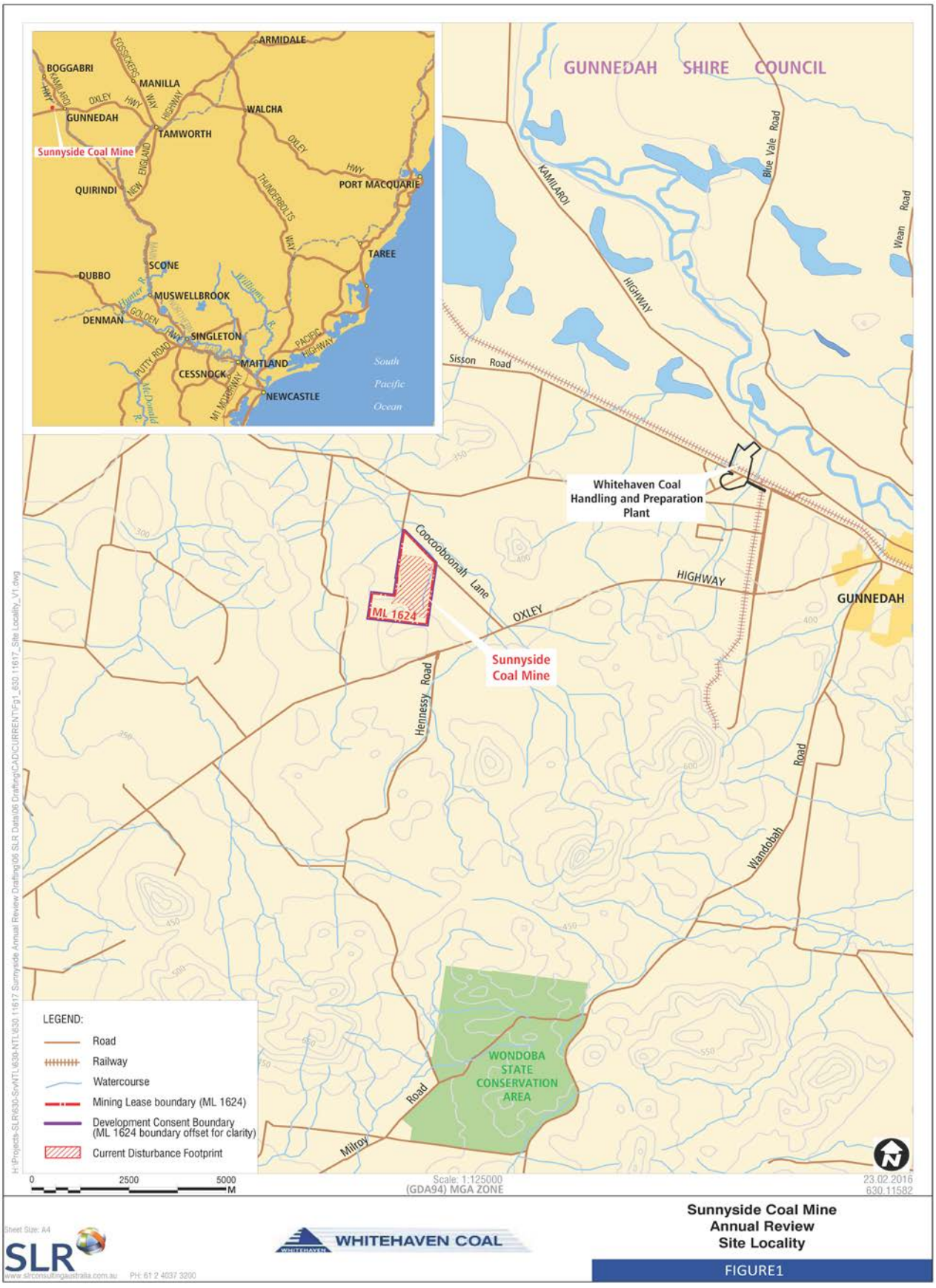

Figure 1 - Locality Plan

3 APPROVALS

3.1 Tenements, Licences, and Approvals

Table 3 identifies the approvals in place for the Sunnyside Coal Mine 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
Department of Planning and Environment	Project Approval (PA) 06_0308 MOD 1	3rd November 2015	5th November 2020	PA modified to extend expiry date
Environment Protection Authority	Environment Protection Licence No. 12957	14th July 2015	N/A	EPL varied 14th July 2015 to include standard conditions relating to noise limits, blast fume and Pollution Incident Response Management Plans.
Department of Primary Industry – Division of Resources and Energy	ML 1624	5th November 2008	5th November 2029	
Department of Primary Industry - Water	WAL 29537 (90WA822534) 90BL253767 90BL253768 90BL253769 90BL254686 90BL254687 90BL254688 90BL254689 90BL254690	27th April 2009 9th Feb 2007 9th Feb 2007 9th Feb 2007 26th Mar 2008 26th Mar 2008 26th Mar 2008 26th Mar 2008 26th Mar 2008	17th January 2025 Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity	Mining Test Test Test Monitoring Monitoring Monitoring Monitoring Monitoring

4 OPERATIONS SUMMARY

4.1 Mining Operations

No mining operations occurred during the reporting period. Table 4, presents the Production Summary at the end of the reporting period.

Table 4 – Production Summary

Material	Approved Limit	Previous Reporting Period (actual)	This Reporting Period (actual)	Next Reporting Period (forecast)
Waste Rock/Overburden	4.9 Mm^3 [1]	0	0	0
ROM Coal/Ore	1 Mtpa [2] 0.5 Mtpa [3]	0	0	0
Coarse Reject	n/a	0	0	0
Fine Reject (Tailings)	n/a	0	0	0
Saleable Product	n/a	0	0	0

[1] Environmental Assessment

[2] PA 06_0308 MOD 1

[3] EPL 12957

4.2 Other Operations

4.2.1 Hours of Operations

Some minor equipment and road access/ROM maintenance was undertaken during the reporting period within permitted operating times ie 7:00am to 10:00pm Monday to Friday and 7:00am to 6:00pm on Saturdays, and not on public holidays.

No coal production (including blasting), processing or transport was undertaken during the reporting period.

No changes or additions to the process or facilities occurred during the reporting period.

4.2.2 Oil Containment and Disposal

Any waste oil generated from minor maintenance activities undertaken during the reporting period were collected and removed from site.

4.2.3 Infrastructure Management

Management of infrastructure (e.g. buildings, roads, generators and pumps) and other facilities not specified elsewhere within this AR is undertaken on an as-needs basis or in accordance with statutory requirements in order to maintain them in an operationally efficient, safe, neat and tidy condition, and one which does not result in the direct or indirect generation of unacceptable environmental impacts.

4.3 Next Reporting Period

Operations forecast for the next reporting period are expected to be limited to the following:-

- Environmental monitoring,
- Maintenance earthworks (as required), and
- Equipment maintenance (as required).

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
Include in AR further analysis of any relevant monitoring results against predictions in the EA.	DP&E	Included in 2014/15 AR	Section 6
Include in AR, as and where required, a dedicated section outlining any reportable incidents.	DP&E	Included in 2014/15 AR	Section 11
Include in AR, a section outlining any consultation undertaken in relation to coal contact water and any associated changes to the Site Water Management Plan.	DP&E	Included in 2014/15 AR	Section 7
Include in AR, a section outlining progress made on the 2013 Independent Audit Action Plan	DP&E	Included in 2014/15 AR	Section 10
Update Environmental Monitoring Program to reflect the approved changes made to the air and noise monitoring program during care and maintenance by 14/5/2015.	DP&E	Environmental Monitoring Program updated by 14/5/2015.	Section 6.1 Section 6.4
Risk of spontaneous combustion within waste emplacements or pit area- Continue regular surveillance for spontaneous combustion and take action to control as necessary.	DRE	Weekly spontaneous combustion inspections undertaken on site by Environmental Graduate.	Section 6.7

6 ENVIRONMENTAL PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the Sunnyside Coal Mine, together with monitoring data for the reporting period. Existing monitoring sites are shown in Figure 2. Life of mine monitoring data is included as Appendices in this AR, where relevant, to allow for discussion on longer-term trends.

6.1 Air Quality

6.1.1 Criteria

The air quality criteria applicable to the Sunnyside Coal Mine are specified in PA 06_0308 MOD 1 Schedule 3, Tables 7, 8 & 9, which are summarised below.

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

Monitoring of deposited dust is undertaken on a monthly basis whilst PM_{10} levels are monitored every 6 days.

6.1.2 Environmental Management Measures

In order to satisfy the criteria identified above, Sunnyside Coal Mine has ensured that revegetation of disturbed areas has progressed as far as practicable and been maintained.

6.1.3 Dust Monitoring

Table 6 presents a summary of the deposited dust monitoring data. Figure 2 identifies the locations of the various deposited dust gauges maintained during the reporting period.

Table 6 - Deposited Dust Monitoring Data Summary (December 2014 to November 2015)

Site (see Figure 2)	EPL ID no.	Property Name	Annual Mean Total Insoluble Solids (g/m^2/month)	Annual Mean Ash (g/m^2/month)
SD1	1	Ferndale	1.2	0.9
SD3	2	Plainview	1.4	0.8
SD4		Lilydale	2.0	0.9
SD5	4	Ivanhoe	3.5	1.5
SD6	5	Illili	1.6	0.8
SD7	6	Innisvale	1.2	0.8
SD8		Woodlawn	1.1	0.9

A review of Table 6 shows that the annual average limit for deposited dust was not exceeded at any location during the reporting period.

Sunnyside Coal Mine has one High Volume Air Sampler (HVAS - PM_{10}) located at the property Illili (EPL ID 7), to the north-west of the mine site (refer Figure 2).

The PM_{10} results for the reporting period show compliance with the 24hr criteria, and the annual average criteria. Results have remained relatively stable, with the annual average dropping only slightly to 11.73µg/m^3 at the end of the reporting period, with a peak of 16.50µg/m^3 occurring in December 2014. This is below the EA annual prediction of 22.1 µg/m^3.

6.1.4 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.1.5 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

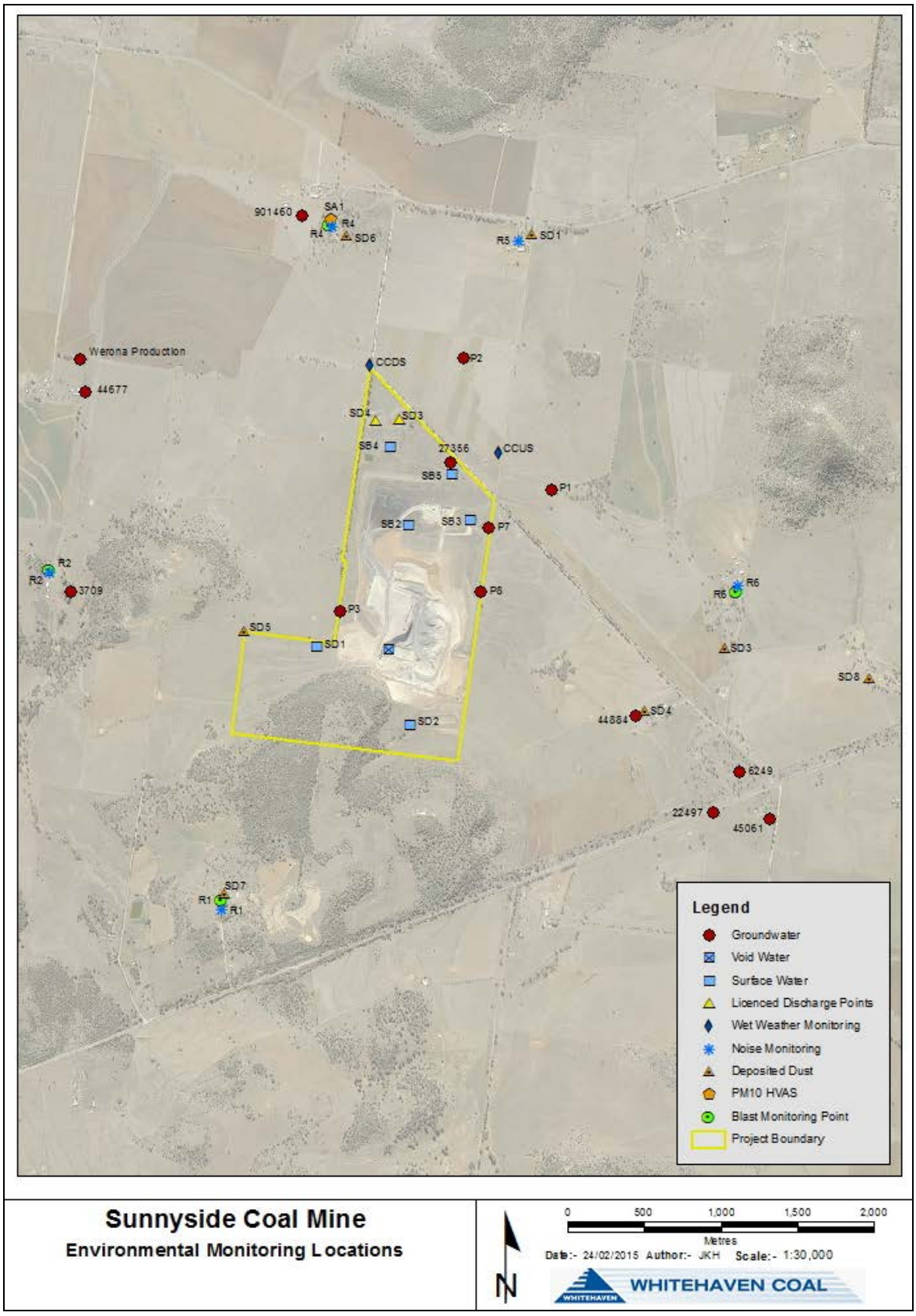

Figure 2 - Monitoring Locations

6.2 Biodiversity

6.2.1 Threatened Flora

Investigations into the occurrence of threatened flora within the Project Approval Area were undertaken as part of the Environmental Assessment by Geoff Cunningham Natural Resource Consultants Pty Ltd in 2007, following field surveys in October and December 2006. The investigation identified no significant impact on threatened flora species, endangered ecological communities, endangered flora populations or critical habitat as a consequence of the development, either because they do not exist in the area or avoidance is possible due to project design.

Investigations identified a remnant of the White Box Yellow Box Blakely's Red Gum Woodland endangered ecological community within the study area but concluded that it would not be affected in any significant manner by the mine.

A remnant of the Native Vegetation on Cracking Clay Soils of the Liverpool Plains endangered ecological community was also identified within the study area. It was noted that a small section of this community would be temporarily affected by the Coocooboonah Lane re-alignment but the community would be rehabilitated and enhanced following rehabilitation after mining ceases. It was assessed that this action, due to its temporary impact and final environmental enhancement, would not require approval under the Commonwealth EPBC Act.

Much of the area has been cleared in the past and most of this cleared area has been cultivated. The vegetation on the cleared areas has been invaded by introduced species. The establishment of the mine site did not involve clearing of native vegetation and as such no biodiversity offsets were required.

6.2.2 Threatened Fauna

Investigations into the occurrence of threatened fauna within the Project Approval Area were undertaken by Kevin Mills and Associates as part of the Environmental Assessment, following surveys conducted in September 2006. These investigations identified that the proposed development was unlikely to significantly affect any of the threatened species, fauna populations or communities listed under the *Threatened Species Conservation Act 1995*, or their habitats.

It was also concluded that development of the mine was not likely to have a significant impact on any matter of national environmental significance listed under the *Environment Protection and Biodiversity Conservation Act 1999*. Referral to the Commonwealth Minister for the Environment for assessment and approval was therefore not warranted.

The area surrounding the mine site supports a viable Koala population. NMPL has undertaken a number of measures to minimise the impacts on this population, including:

- Relocating the southern section of Coocooboonah Lane to avoid disturbing remnant Koala habitat;
- Erecting a Koala-proof fence around the active mine area;
- Minimising clearing and utilising local tree species for revegetation with an emphasis on Koala feed trees. This has continued since the last reporting period with Koala feed trees planted in koala corridor.

Fauna quadrat establishment was undertaken in November 2010 by Dr Leong Lim (Countrywide Ecological Services), where two grassland monitoring plots were established. Since establishment, roof tiles have been scattered throughout the quadrats to enhance the ground habitat structure and provide refuges for the ground fauna. The establishment of two woodland plots to the south of the active mining area occurred in February 2011, during a monitoring campaign. These plots are placed in open woodland, and open woodland with grassy understory communities.

Monitoring undertaken in September 2012 identified seven new bird species and the reoccurrence of a family group of Grey-crowned Babblers. The previously identified Koala population was noted as not having been impacted by mining operations, and up to 10 species of microbats were noted as being active in the vicinity of the mine, including the listed Yellow-bellied Sheathtail Bat.

No monitoring was conducted during the reporting period.

6.2.3 Weeds

Weed management within the project area involves targeted monthly inspections to determine levels of weed infestation. Weed control is undertaken by Whitehaven's own qualified personnel. All persons involved with weed control hold required chemical handling certificates.

Minor ongoing weed management comprised general weed spraying on three occasions during the reporting period, in January, August, and October 2015. No major weed infestations were identified on rehabilitation areas.

6.2.4 Feral Animal Control

Feral animals are not a significant land management issue on Sunnyside Coal Mine's landholding and are limited to isolated occurrences of pigs, foxes, hares and rabbits. In view of the low frequency of occurrence, and in the absence of an extensive programme by all surrounding landowners, no broad scale feral animal control programme was considered warranted during the reporting period. In accordance with prior commitments, mine personnel will continue to monitor feral animal occurrences and implement necessary control programmes if and when necessary.

6.2.5 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.2.6 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.3 Blasting

6.3.1 Criteria

Blasting criteria for the Sunnyside Coal Mine are noted in PA 06_0308 MOD 1, and Condition L5 of EPL 12957, however is not relevant for this reporting period, as no blasting has been undertaken onsite.

6.3.2 Key Environmental Performance/Management Issues

No blasts were undertaken during the reporting period.

6.3.3 Proposed Improvements to Environmental Management

No blasting is proposed within the next reporting period.

6.4 Operational Noise

6.4.1 Criteria

The Project Approval and EPL detail the noise criteria for site operations and coal haulage, however there is no requirement for noise monitoring whilst the site is in care and maintenance.

6.4.2 Environmental Management Measures

Given the care and maintenance status of the site the environmental management measures for noise are limited to ensuring that any minor mechanical and earthwork maintenance is restricted to the approved hours of operation.

6.4.3 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.4.4 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.5 Aboriginal Heritage Management

6.5.1 Environmental Management Measures

An assessment of the cultural heritage of the mine site was conducted by Archaeological Surveys and Reports Pty Ltd (ASR). Prior to the investigation, ASR contacted the Red Chief Local Aboriginal Land Council (LALC) and Bigundi Biame Gunnedarr Traditional People to arrange for site officers to assist in the survey. A representative from each group was present for the site survey conducted on the 12th September 2006 and the coal transport route survey on the 7th December 2006. The ASR assessment was used in the preparation of the Environmental Assessment for the mine, undertaken by R.W. Corkery & Co. Pty Ltd on behalf of Namoi Mining Pty.

Four sites were recorded during the investigation, as detailed in Table 7. Only one site (AGG1) was recorded within the mine site while the three isolated artefact sites were identified to the south of the mine site.

All Aboriginal Heritage sites are managed in accordance with the Sunnyside Coal Mine Aboriginal Cultural Heritage Management Plan, prepared in accordance with Schedule 3 Condition 32 of PA 06_0308 MOD 1.

6.5.2 Consultation

On the basis of the mine being in care and maintenance, no soil stripping took place during the reporting period. No additional Aboriginal cultural heritage items have been discovered during the reporting period and no consultation with Aboriginal stakeholders was conducted.

Table 7 - Aboriginal Artefacts

Site Name	Site Type	Site Description/Comments
Sunnyside AGG1	Axe Grinding Groove	Axe grinding groove at the rim of a cliff-like scarp (beside a small water-filled natural depression in the rock). Dimensions: 28cm (L) x 6cm (W) x 2cm (D). Located approximately 150m from the southern side of the open cut area.
Sunnyside ISO1	Isolated Artefact	Flake with possible retouch to one margin located on the bank beside the upper reaches of a dry creek (on a vehicle track). Dimensions: 21 x 12 x 3mm
Sunnyside ISO2	Isolated Artefact	Proximal fragment of a flake located on the bank beside the upper reaches of a dry creek. Dimensions: 22 x 22 x 5mm.
Sunnyside OS1	Artefact Scatter	Artefact scatter of at least ten artefacts in a lozenge-shaped area of 30 x 8m, on the upper slopes down slope of a contour bank down slope of a saddle. Artefact types: flakes and flaked pieces, including a backed blade.
Source: Modified after ASR (2007) – EA SCSC Part 7		

6.5.1 Environmental Management Measures

Given the care and maintenance status of the site the environmental management measures for Aboriginal Heritage are limited to ensuring that any identified heritage sites remain protected.

6.5.2 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.5.3 Proposed Improvements to Environmental Management

No improvements 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

Sunnyside Coal Mine is located within the Hoskissons Coal Seam which has been mined for over 120 years with a number of reported outbreaks of spontaneous combustion. Tests confirmed that coal from the Sunnyside Coal Mine has the potential to spontaneously combust and this has been particularly evident during the care and maintenance phase. A Spontaneous Combustion Management Plan was developed when the mine was operational to prevent and manage spontaneous combustion issues.

Following spontaneous combustion management earthworks in previous reporting periods, weekly onsite inspections have occurred. No visible sign of spontaneous combustion has been observed during the regular onsite inspections, however, a slight sulphur odour was detected in early 2015, in close proximity to the affected area. No such odour have been detected since the 2nd February 2015. Areas affected by spontaneous combustion, and other areas that may develop spontaneous combustion, will continue to be monitored on a weekly basis throughout the next AR period.

6.7.2 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.7.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.8 Bushfire Management

6.8.1 Environmental Management Measures

Sunnyside Coal Mine is located within an area of cleared agricultural land. Whitehaven Coal personnel liaise with the local (Coocooboonah) Rural Fire Service, as required.

There have been no bushfire incidents on, or adjacent, to the mine site since development commenced.

6.8.2 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.8.3 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.9 Public Safety

6.9.1 Environmental Management Measures

The Sunnyside Coal Mine is located wholly on NMPL owned land in a relatively remote area. The northern boundary of the mine site is adjacent to Coocooboonah Lane, an unsealed road generally used by local traffic only. The site is fenced and appropriate warning signs have been installed. The access gates are locked whenever the site is unattended.

Access to the site is permitted only by authorised personnel.

A geotechnical stability assessment of the final void high wall was undertaken by Lambert Geotech during the reporting period. The assessment confirmed that the appropriate factor of safety for long term stability would be maintained, following partial backfill of the void.

6.9.1 Key Environmental Performance/Management Issues

No key environmental performance/management issues were identified during the reporting period.

6.9.2 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.10 Environmental Performance Summary

An environmental performance summary for Sunnyside Coal Mine is presented in Table 8 below.

Table 8 - Environmental Performance

Aspect	Approval Criteria / EIS Prediction	Performance during the reporting period	Trend / Key Management Implications	Implemented / proposed management actions
Air Quality	Refer Section 6.1.1	Approval criteria met.	Nil	Nil
Biodiversity	EIS prediction of no impact on known koala population	No recorded impact on koala population	Nil	Installation and ongoing maintenance of koala fence
Heritage	EIS prediction of potential blast impact on a recorded site	No recorded impact on site	Nil	Nil
Spontaneous Combustion	EIS prediction of no material spontaneous combustion	No recorded outbreaks of previously mitigated spontaneous combustion	Nil	Ongoing implementation of Spontaneous Combustion Management Plan including weekly visual inspections of previously mitigated area.

7 WATER MANAGEMENT

The Sunnyside Coal Mine lies within the catchment of the Namoi River. The majority of the surface water runoff flows northwards across the mine site. It then flows into Coocooboonah Creek which flows north-west within a constructed waterway paralleling Coocooboonah Lane. From there, it flows into Rock Well Creek then into Native Cat Creek which continues to flow north-west for 6km. Runoff then flows northwards within Collygra Creek where it flows across a floodplain area before flowing into the Namoi River some 25km north of the Mine Site. The remainder of the mine's surface water flows south into Coocooboonah Creek ultimately flowing into the Namoi River to the north.

The design of sediment detention basins within the disturbed area of the mine limits the opportunity for discharge of runoff from mine-disturbed area, i.e. after appropriate detention time to satisfy licensed discharge criteria.

Two wet weather discharge points are nominated in the current EPL 12957. These are Storage Dam 3 (EPL ID No. 9) and Storage Dam 4 (EPL ID No. 10) (refer Figure 2). Two additional monitoring points are nominated on the EPL for water quality monitoring during discharge events. These are Coocooboonah Creek Upstream (CCUS – EPL ID No. 11) and Coocooboonah Creek Downstream (CCDS – EPL ID No. 12) (refer Figure 2).

7.1.1 Surface Water Management

All sediment basins, storage dams and associated banks and drains have been designed and constructed in accordance with the *Managing Urban Stormwater: Soils and Construction Vol 2E Mines and Quarries* (DECC, 2008) in conjunction with the references to Volume 1 (Landcom, 2004).

Water within the Project Approval area is nominally classified either as "clean", "dirty", "contaminated" or "pit water" depending on the source of the flow and it's potential for physical or chemical contamination. The definition of these classifications follows:-

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

"***Contaminated Water***" comprises runoff water which could potentially contain hydrocarbons.

As directed by the EPA (EPA letter dated 21st August 2015), where runoff from coal contact areas is captured in storage dams designed for sediment control, Sunnyside Coal Mine will need to establish whether the discharge from these structures contains pollutants that pose a risk of non-trivial harm to human health and/or the environment.

As directed by the EPA, trivial versus non-trivial pollutant concentrations can be defined with reference to the default trigger values for toxicants and physical/chemical stressors in the ANZECC (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality. If a pollutant exceeds the relevant trigger value, it can be considered that it poses a risk of non-trivial harm to human health and/or the environment.

It is not possible to provide a definitive timeline to gather sufficient data for a robust analysis of the potential impact of coal contact water. Notwithstanding this, once sufficient data becomes available and on completion of detailed analysis, Sunnyside Coal Mine will consult with the EPA in regard to the outcomes of the monitoring.

7.1.2 Surface Water Monitoring Results

Sunnyside Coal Mine has a requirement to undertake surface water monitoring on a quarterly basis in addition to the monitoring of any wet weather discharge event. Due to below average rainfall for much of the year, several dams were dry and unable to be sampled at each quarterly monitoring event.

Water quality monitoring locations are shown on Figure 2 and complete surface water quality monitoring results are provided in Appendix 1.

The quarterly monitoring results show that water quality within onsite storages was generally consistent with results from previous years, with several sites returning to normal after elevated results last reporting period. Total Suspended Solids has dropped for SD4, SB4, and SB5. In May 2014 of the previous reporting period, SD4 recorded a maximum of 3190mg/L, but has since dropped back down to 255mg/L at the end of this period. Similarly, SB4 (previous maximum of 647mg/L), and SB5 (maximum of 6750mg/L) are dropping, with levels of 32mg/L and 568mg/L respectively. Results of Total Organic Carbon remain generally consistent with previous years.

The water in all sediment basins and storage dams can be described as fresh, neutral to slightly alkaline, and well within the discharge limits for oil and grease. Void water results

were generally consistent with previous reporting periods with the exception of a slight increase in EC to 5850 µS/cm, while remaining well below the previous maximum of 7270µS/cm. The void EC records are within the range predicted within the Projects Environmental Assessment, being 5831 µS/cm – 10999 µS/cm.

7.1.3 Discharges

There were no wet weather discharges during the reporting period.

7.1.4 Water Take

During the reporting period no water was used on site. The water taken by the operation is summarised in Table 9 below.

Table 9 - Water Take

Water Licence Number	Water Sharing Plan, Source and Management Zone (as applicable)	Entitlement	Passive take/ inflows	Active Pumping	TOTAL
WAL 29537	Gunnedah - Oxley Basin Mdb Groundwater Source	120 units	0	0	0

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 groundwater monitoring throughout the reporting period are listed in Table 10. Monitoring sites are shown on Figure 2 and complete monitoring datasets are provided in Appendix 2.

Groundwater sampling and analysis was undertaken by ALS Acirl Pty Ltd during the reporting period. Below are some points to note regarding monitoring locations and frequencies:

- Bore 27356 has not been monitored since June 2012, as there is a windmill over the bore and it no longer functions resulting in samples for analysis being unobtainable.
- Standing Water Level (SWL) data was unavailable for bores 27356, 44884, 3709, and Werona.

Table 10 - Groundwater Monitoring Points

Site ID (see Figure 2)	Registered Bore No. & Licence No	Property/ Location	Frequency		Purpose
			SWL*2, EC*3 and pH	Representative Metals and Ions	
P1*1	GW968386 90BL253767	"Plainview"	Quarterly	Six monthly	To determine existing status and any impacts
P2*1	GW968387 90BL253768	"Ferndale"	Quarterly	Six monthly	
P3	GW968388 90BL253769	"Sunnyside"	Quarterly	Six monthly	
P7	GW968392 90BL254689	"Sunnyside"	Quarterly	Six monthly	To determine existing status and any impacts
P8	GW968393 90BL254690	"Sunnyside"	Quarterly	Six monthly	
3709*1	N/A	"Ivanhoe"	Quarterly	Six monthly*5	
22497*1	N/A	"Coocooboonah"	Quarterly	Six monthly	
44677*1	N/A	"Werona"	Quarterly*5	Six monthly	
44884*1	N/A	"Lilydale"	Quarterly	Six monthly	
6249*1	N/A	"Lilydale"	Quarterly	Six monthly	
901460	GW901460 90BL249138	"Illili"	Quarterly	Six monthly*5	To determine existing status and any impacts
27356	GW027356 90BL020042	"Sunnyside"	Quarterly	Six monthly*5	
45061	N/A	"Coocooboonah"	Quarterly	Six monthly*5	
Werona Production	90BL255246	"Werona"	Quarterly	Six monthly*5	

*1 Non-Company owned bore
*2 SWL – Standing Water Level
*3 EC = Electrical Conductivity
*4 Company production bore
*5 – Not available this reporting period due to lack of access

- The Werona Production Bore and bore 3709 have not been monitored since March 2013 as a pump has been over each bore.

- Water level data loggers, which store SWL data at 12 hourly intervals in P2 and P3 operated during the reporting period, until their batteries went flat. P2 provided data from 3/3/14 to 23/1/15, and P3 provided data from 4/3/14 to 29/6/15.

Groundwater levels

Groundwater levels have remained relatively consistent at all locations monitored during the reporting period.

Groundwater quality

Analysis of samples taken during the reporting period has shown that groundwater quality has remained generally in line with historical data at all locations monitored. Water quality has been compared to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (ANZECC) guidelines for stock watering (cattle), and with the exception of high total dissolved solids concentration (greater than 4000mg/L) at bores P3 (with a TDS result of 8930), and 44677 (with a result of 5070), water quality results show all bores remained within the ANZECC guidelines.

Three bores showed a slight increase in ionic balance- 27356, 22497, and 44677, with 44677 also showing a slight increase in alkalinity to 618mg/L, just above the previous maximum of 590mg/L. All other parameters remained stable during the reporting period.

7.2.3 Groundwater Management

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.

At the end of the reporting period an estimated 30 ML of water was held in the pit from rainfall and groundwater seepage.

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

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

Groundwater from surrounding bores, as well as the mine production bore, is monitored on a regular basis to detect and assess any changes in groundwater quality or level that may be attributable to the mine. The mine production bore is not currently operating as the generator supplying power to the pump was removed. As such the water meter has not been read to assess usage in comparison to the allocation.

8 REHABILITATION

8.1 Rehabilitation Performance During the Reporting Period

8.1.1 Status of Mining and Rehabilitation

The status of mining and rehabilitation at the completion of the reporting period is presented in Table 11 and Figure 3**.**

Table 11 - Rehabilitation Status

Mine Area Type [1]	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2014/15 (ha)	2015/16 (ha)	2016/17 (ha)
A. Total Mine Footprint	136.7	136.7	136.7
B. Total Active Disturbance	118.9	118.9	118.9
C. Land Being Prepared for Rehabilitation	0	0	0
D. Land Under Active Rehabilitation	17.8	17.8	17.8
E. Completed Rehabilitation	0	0	0

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

8.1.2 Post Rehabilitation Land Uses

Two final rehabilitation land uses are to be established at Sunnyside, being Pasture and Woodland. The eastern, northern and western slopes of the out of pit emplacement area will be planted with locally occurring tree and shrub species with the objective of re-establishing woodland areas and providing habitat and food trees for the local koala population. The plateau on top of the waste emplacement and the flatter areas around the base of the emplacement area will be returned to pasture.

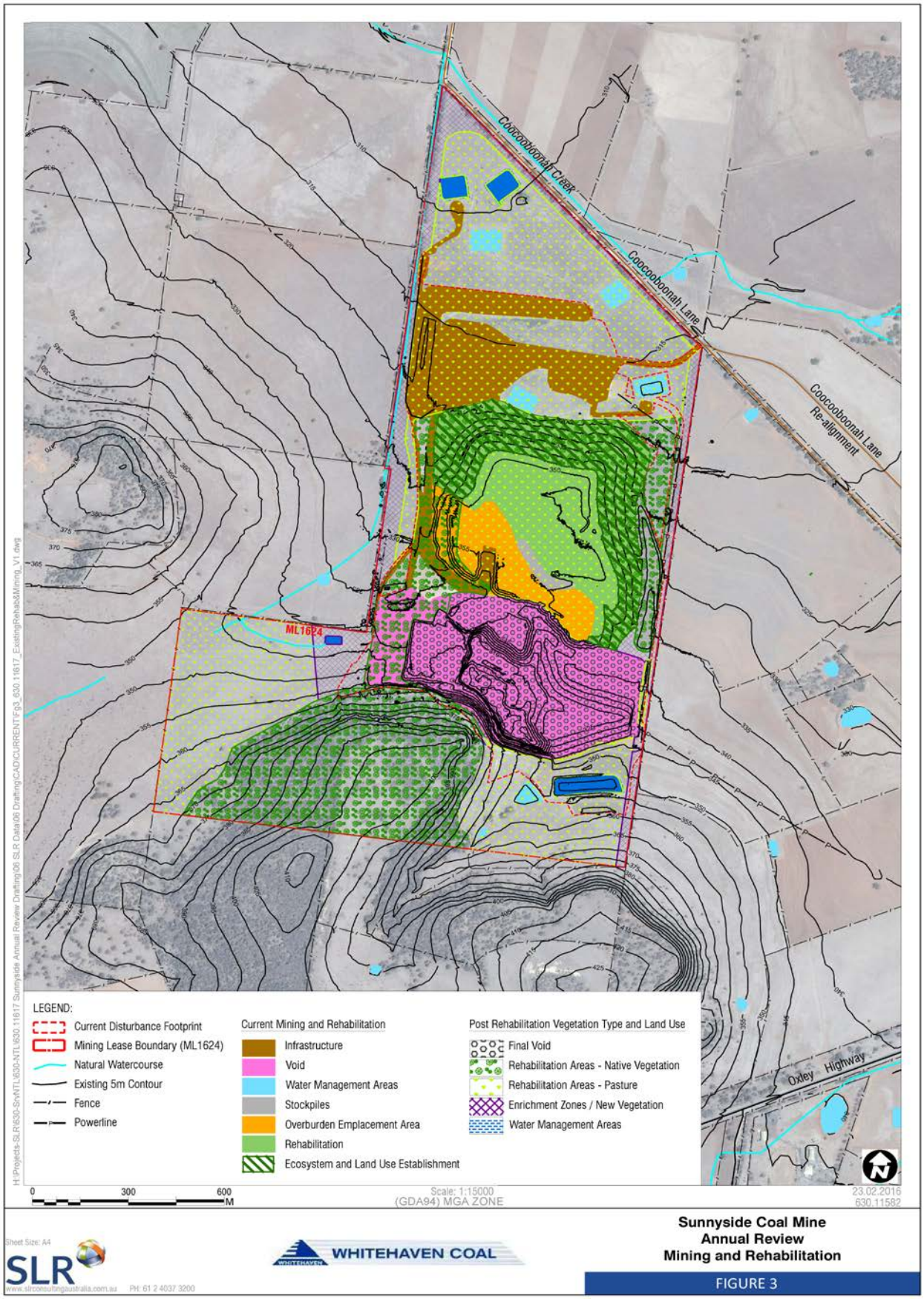

Figure 3 - Status of Mining and Rehabilitation

8.1.3 Rehabilitation Undertaken

Vegetation species planted during the reporting period were restricted to the planned koala corridor, which was established in accordance with the Rehabilitation and Landscape Management Plan.

8.1.4 Rehabilitation Monitoring

Winter and spring monitoring programmes were historically undertaken on site in accordance with the then Rehabilitation Management Plan. Part of this monitoring provided an annual snapshot of the habitats available in these areas and habitat utilisation by fauna. This was then compared to baseline data collected from adjacent unaffected land surrounding the mine to determine its success and progression in regards to habitat value for native and threatened species. No rehabilitation monitoring was undertaken during the reporting period.

8.1.5 Weeds Management

Monthly inspections of rehabilitation areas, as well as periodic general observations of the site, are undertaken in order to identify the presence of weeds. Where practicable weed infestations are managed with a combination of chemical, physical or biological controls.

There were no significant noxious weed populations identified at Sunnyside at the end of the reporting period, however Mexican Poppy continues to be present adjacent to the site access/haul road.

8.1.6 Renovation or Removal of Buildings

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

8.1.7 Other Rehabilitation Undertaken

No additional rehabilitation of explorations areas, infrastructure, shafts, adits, dams fencelines 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

A modified Project Approval addressing final landforms was approved on the 3rd November 2015. A Care and Maintenance MOP, including site closure and final rehabilitation, will be developed in consultation with DRE and submitted for approval in the next reporting period.

8.1.10 Trials, Research Projects and Initiatives

No rehabilitation trials, research projects or other initiatives were undertaken during the reporting period.

8.1.11 Key Issues to Achieving Successful Rehabilitation

Two key issues to achieving successful rehabilitation are:-

- Landform stability (Final Void), and
- Spontaneous combustion.

Management measures to address the key issues of landform instability and spontaneous combustion will be described in the Care and Maintenance MOP to be submitted for approval in the next reporting period, and the site Closure Plan to be developed in consultation with DRE.

8.2 Actions for Next Reporting Period

The submission and approval of the Care and Maintenance MOP will be a step towards developing the strategies to achieve agreed final rehabilitation outcomes.

No specific rehabilitation actions in addition to ongoing monitoring are proposed for the next reporting period.

Rehabilitation condition is monitored through monthly environmental inspections. The monitoring of rehabilitation condition involves the regular inspections of ground cover, trees and the presence of erosion and weeds.

9 COMMUNITY

Sunnyside Coal Mine maintains a designated complaints line and, in the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded.

No complaints were received during the reporting period compared to 1 (2013/14), 7 (2012/13), 2 (2011/12) and 4 (2010/11). The five year period of records indicate a low steady trend of complaints.

Any complaints that are made are reported to the Community Consultative Committee and documented in the AR. A complaints register is also maintained on Whitehaven's website.

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

10 INDEPENDENT AUDIT

No independent audit was undertaken of Sunnyside Coal Mine during the reporting period. The next independent audit is scheduled for September 2016. The most recent independent audit was undertaken in 2013. Outstanding items from the 2013 Audit Action Plan, and how they are being addressed, are summarised in Table 12 below.

Table 12 - 2013 Independent Audit - Outstanding Actions

Condition/Plan	Proposed Action	Status
PA 06_0308 Condition 2.1 ML 1624 Condition 2	Submit Care and Maintenance MOP, comprising a Mine Closure Plan, to DRE	Care and Maintenance MOP to be submitted to DRE in next reporting period. Mine Closure Plan to be developed separately in consultation with DRE.
Site Water Management Plan	Site Water Management Plan to be updated for care and maintenance phase	Site Water Management Plan will be updated in accordance with Condition 5A Schedule 5 of PA 06_0308 MOD 1 in the next reporting period.
Mine Closure Plan	Submit Care and Maintenance MOP, comprising a Mine Closure Plan, to DRE	Care and Maintenance MOP to be submitted to DRE in next reporting period. Mine Closure Plan to be developed separately in consultation with DRE.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 Reportable Incidents

No environmental incidents occurred at Sunnyside Coal Mine during the reporting period.

11.2 Non-compliances

Non-compliances with relevant approvals noted within Section 1 are all considered to be administrative in nature.

Non-compliance with PA 06_0308 MOD 1 Schedule 3 Condition 20 (requirement for weather station) will be addressed by seeking DP&E agreement on the use of another nearby Whitehaven owned and operated weather station located at the Gunnedah CHPP.

Non-compliance with EPL 12957 Condition A2.1 (Premises details) will be addressed by applying for an EPL variation to correct the premises referred to in the EPL.

Non-compliance with EPL 12957 Conditions O4.3 (PIRMP at Premises) and G1.1 (EPL at Premises) will be addressed by seeking EPA approval to hold such documents at the nearby Gunnedah CHPP corporate offices.

Non-compliance with Section 66(6) of the POEO Act 1997, noted under Section F of EPL Annual Returns, was addressed during the reporting period with required reporting timeframes reiterated to internal WHC personnel and relevant environmental monitoring consultants.

Non-compliance with WAL 29537 will be addressed by commencing the use of a logbook to record water use information.

11.3 Regulatory Actions

No regulatory actions (official cautions or warning letters, penalty notices or prosecution proceedings) were undertaken with respect to the Sunnyside Coal Mine during the reporting period.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following measures will be continued, or implemented, in the next reporting period to improve the environmental or community performance of the operation:-

- Revision of Environmental Management Plans and Strategies to reflect the Care and Maintenance status of the mine – March 2016;
- Submission of Care and Maintenance MOP to reflect the Care and Maintenance status of the mine – prior to May 2016;
- The continuation of successful spontaneous combustion management on site;
- The continuation of development and maintenance of the koala habitat enhancement area;
- The maintenance of woodland on the rehabilitated waste emplacements slopes;
- Continued community liaison, support and involvement / education in the mines activities;
- Compliance with all relevant conditions of the lease, licences and consents;
- The continuation of environmental monitoring and management.

Appendix 1

SURFACE WATER MONITORING DATA

Surface Water Monitoring Data

Sample No.	Sample Location	Date	Time	pH Field	pH Lab	Electrical Conductivity @25C (µS/cm)	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Total Alkalinity	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Aluminium	Antimony	Chloride	Molybdenum	Selenium	Sodium	Arsenic	Manganese	Iron	Comments
ES1117295-002	SB1	10-Aug-11	10:45	9.3	9.07	648	536	46	47	<5						<0.001		0.007	<0.01		0.002			
ES1125734-002	SB1	22-Nov-11	10:15	10.1	9.22	592	486	208	73	<5						<0.001		0.008	<0.01		0.009			
ES1203324-002	SB1	14-Feb-12	10:00	9.1	9.02	329	279	100	14	<5						0.001		0.004	<0.01		0.005			
ES1210728-003	SB1	01-May-12	10:00	8.7	9.82	422	364	136	21	<5						<0.001		0.005	<0.01		0.006			
ES1303279002	SB1	12-Feb-13	11:10	8.79	8.23	310	296	86	4	<5						<0.001		0.002	<0.01		0.006			
ES1318099-002	SB1	13-Aug-13	8:30	8.87	8.47	405	513	343	22	<5						<0.001		0.003	0.01		0.005			
ES1325115-001	SB1	18-Nov-13	10:20	9.7	8.88	399	390	46	13	<5						<0.001		0.007	<0.01		0.005			
ES1410234-002	SB1	07-May-14	10:15	8.8	8.35	452	453	196	4	<5						<0.001		0.003	<0.01		0.005			
ES1417254-001	SB1	05-Aug-14	11:10	8.6	8.53	609	644	40	20	<5						<0.001		0.006	<0.01		0.003			
ES1521694-002	SB1	11-May-15	14:05	9	8.32	323	314	107	6	<5						<0.001		0.002	<0.01		0.002			
ES1528398-002	SB1	13-Aug-15	9:25	9.2	8.58	508	497	24	7	5						<0.001		0.004	<0.01		0.003			
ES1536059-004	SB1	11-Nov-15	9:10	9.5	8.64	366	391	194	8	<5						<0.001		0.003	<0.01		0.007			
ES1004139	SB2	04-Mar-10	13:00		8.3		554	17	<1	8														
ES1009878	SB2	24-May-10	9:35		8.14		586	30	2	7														
ES1109425-002	SB2	05-May-11	10:30		8.85		663	233	9	<1														Turbid/Odour
ES1117295-003	SB2	10-Aug-11	10:30	8.9	8.2	608	513	82	11	<5						<0.001		0.005	<0.01		0.001			
ES1125734-003	SB2	22-Nov-11	10:00	10.2	9.24	486	389	64	5	<5						<0.001		0.018	<0.01		0.002			
ES1203324-003	SB2	14-Feb-12	11:50	9.5	9.12	481	398	51	3	<5						<0.001		0.018	<0.01		0.002			
ES1210728-004	SB2	01-May-12	9:40	8.2	8.92	682	562	356	9	<5						<0.001		0.017	<0.01		0.007			
ES1219038-002	SB2	02-Aug-12	10:40	8.85	8.84	376	441	24	11	<5						<0.001		0.008	<0.01		<0.001			
ES1303279003	SB2	12-Feb-13	10:40	8.33	8.2	322	309	436	2	<5						<0.001		0.004	<0.01		0.004			
ES1310164-001	SB2	02-May-13	9:30	8.62	7.92	402	396	61	3	<5						<0.001		0.004	<0.01		0.002			
ES1318099-003	SB2	13-Aug-13	9:50	8.19	8.15	312	318	82	4	<5						<0.001		0.002	<0.01		0.003			
ES1325115-002	SB2	18-Nov-13	11:15	9.2	8.31	410	420	27	8	<5						<0.001		0.002	<0.01		0.005			
ES1402292-001	SB2	04-Feb-14	11:30	9.9	8.97	713	663	66	31	<5											0.002			
ES1410234-003	SB2	07-May-14	11:30	8	8.45	492	474	59	3	<5											0.001			
ES1417254-002	SB2	05-Aug-14	12:00	9.3	8.53	522	494	11	5	<5											0.001			
ES142449-001	SB2	06-Nov-14	9:00	9.1	8.41	738	702	21	6	<5														
ES1503593-001	SB2	12-Feb-15	925	9.2	8.49	497	446	20	4	<5						<0.001		0.003	<0.01		0.002			
ES1521694-004	SB2	11-May-15	12:45	8.7	8.27	283	278	40	3	<5						<0.001		0.002	<0.01		0.002			
ES1528398-003	SB2	13-Aug-15	10:35	8.9	8.38	332	315	5	<1	<5						<0.001		0.001	<0.01		0.001			
ES1536059-003	SB2	11-Nov-15	10:20	9.2	8.85	384	371	13	5	<5						<0.001		0.003	<0.01		<0.001			
ES1104965-001	SB3	08-Mar-11	9:30		8.49		1300	20	<1	<5														
ES1109425-001	SB3	05-May-11	9:55		8.3		3020	147	6	<5														Turbid/Odour
ES1117295-004	SB3	10-Aug-11	10:10	8.8	8.35	2250	1800	82	12	<5						<0.001		0.012	<0.01		<0.001			
ES1123157-001	SB3	18-Oct-11	16:00	7.84	7.84		267	91	4	<5														
ES1125734-004	SB3	22-Nov-11	9:15	8.8	8.26	353	283	79	3	<5						<0.001		0.003	<0.01		0.002			
ES1203324-004	SB3	14-Feb-12	12:10	9.3	8.83	437	360	26	1	<5						<0.001		0.014	<0.01		0.002			
ES1210728-005	SB3	01-May-12	9:00	8	8.44	498	417	42	2	<5						<0.001		0.015	<0.01		0.002			
ES1219038-003	SB3	02-Aug-12	10:20	8.78	8.47	349	393	14	5	<5						<0.001		0.008	<0.01		0.002			
ES1227200-002	SB3	15-Nov-12	9:45	9.18	8.89	1120	926	96	29	<5						<0.001		0.025	<0.01		0.004			Dam level low
ES1303279004	SB3	12-Feb-13	10:00	8.29	7.96	324	315	18	3	<5						<0.001		0.004	<0.01		0.003			
ES1310164-002	SB3	02-May-13	9:50	8.25	8.09	394	403	144	4	<5						<0.001		0.004	<0.01		0.002			
ES1318099-004	SB3	13-Aug-13	10:10	8.45	8.35	331	320	72	5	<5						<0.001		0.002	<0.01		0.003			
ES1521694-005	SB3	11-May-15	12:25	7.5	7.6	353	343	26	7	<5						<0.001		0.002	<0.01		0.002			
ES1109617-002	SB4	09-May-11	12:05		8.65		512	32	14	<5														
ES1117295-005	SB4	10-Aug-11	11:40	8.8	8.36	546	474	62	8	<5						<0.001		0.008	<0.01		<0.001			
ES1125734-005	SB4	22-Nov-11	10:30	9.7	8.95	352	286	40	4	<5						<0.001		0.006	<0.01		<0.001			
ES1203324-005	SB4	14-Feb-12	11:30	9	8.74	335	276	13	2	<5						<0.001		0.011	<0.01		<0.001			
ES1210728-006	SB4	01-May-12	10:30	8.1	8.21	400	334	39	1	<5						<0.001		0.011	<0.01		0.001			
ES1219038-004	SB4	02-Aug-12	11:10	8.89	8.79	298	339	8	3	<5						<0.001		0.008	<0.01		<0.001			
ES1227200-003	SB4	15-Nov-12	9:20	8.37	8.36	939	754	149	5	<5						<0.001		0.02	<0.01		0.001			Dam level low
ES1303279005	SB4	12-Feb-13	11:40	8.37	7.79	243	234	113	2	<5						<0.001		0.005	<0.01		0.001			
ES1318099-005	SB4	13-Aug-13	9:00	7.99	8.07	347	340	110	9	<5						<0.001		0.001	<0.01		0.005			
ES1410234-004	SB4	07-May-14	11:05	8.2	7.76	484	457	647	6	<5											0.005			
ES1521694-006	SB4	11-May-15	13:30	8.6	7.95	209	204	32	4	<5						<0.001		0.001	<0.01		0.001			
ES1004139	SB5	04-Mar-10	12:50		7.85		412	30	6	<5														
ES1109425-003	SB5	05-May-11	11:40		8.93		759	36	4	<5														Turbid/Odour
ES1117295-006	SB5	10-Aug-11	8:45	9.3	8.9	940	768	88	24	<5						<0.001		0.01	<0.01		0.002			
ES1125734-006	SB5	22-Nov-11	9:30	9.5	8.65	636	504	352	43	<5						<0.001		0.002	<0.01		0.012			
ES1203324-006	SB5	14-Feb-12	12:00	8.8	8.46	464	382	14	3	<5						<0.001		0.016	<0.01		<0.001			
ES1210728-007	SB5	01-May-12	9:20	8.3	8.74	543	452	34	3	<5						<0.001		0.016	<0.01		0.001			
ES1219038-005	SB5	02-Aug-12	11:00	8.48	7.98	351	401	10	2	<5						<0.001		0.009	<0.01		<0.001			
ES1303279006	SB5	12-Feb-13	10:20	8.02	7.53	152	144	266	2	<5						<0.001		<0.001	<0.01		0.008			
ES1318099-006	SB5	13-Aug-13	10:30	7.55	7.63	160	158	471	10	<5						<0.001		0.012	0.02		<0.001			Dam level low
ES1410234-005	SB5	07-May-14	12:05	8.5	7.48	225	221	6750	56	<5											0.019			
ES1417254-003	SB5	05-Aug-14	12:10	8.1	7.81	177	162	5500	54	8											<0.001			
ES1521694-007	SB5	11-May-15	12:00	8.2	7.66	104	102	202	2	25						<0.001		<0.001	0.02		0.012			

Namoi Mining Pty Ltd

Surface Water Monitoring Data

Sample No.	Sample Location	Date	Time	pH Field	pH Lab	Electrical Conductivity @25C (µS/cm)	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Total Alkalinity	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Aluminium	Antimony	Chloride	Molybdenum	Selenium	Sodium	Arsenic	Manganese	Iron	Comments
ES1528398-004	SB5	13-Aug-15	10:15	8.4	7.61	130	138	2330	4	6						<0.001		<0.001	0.04		0.021			
ES1536059-002	SB5	11-Nov-15	9:55	8.8	7.54	184	169	568	9	<5						<0.001		<0.001	0.01		0.01			
ES1318099-002	SD1	13-Aug-13	8:30	8.87	8.47	405	513	343	22	<5						<0.001		0.005	0.01		0.003			Dam level low
ES1325115-001	SD1	18-Nov-13	10:20	9.7	8.88	399	390	46	13	<5						<0.001		0.005	<0.01		0.007			Low water level
ES1410234-002	SD1	07-May-14	10:15	8.8	8.35	453	452	196	4	<5											0.005			
ES1417254-001	SD1	05-Aug-14	11:10	8.6	8.53	609	644	40	20	<5											0.003			
ES1521694-002	SD1	11-May-15	14:05	9	8.32	323	314	107	6	<5						<0.001		0.002	<0.01		0.002			
ES1528398-002	SD1	13-Aug-15	9:25	9.2	8.58	508	497	24	7	5						<0.001		0.004	<0.01		0.003			
ES1536059-004	SD1	11-Nov-15	9:10	9.5	8.64	366	391	194	8	<5						<0.001		0.003	<0.01		0.007			
ES1023171-002	SD3	15-Nov-10	9:40		7.54		166	140	3	<5														
ES1004139	SD4	04-Mar-10	13:15		8.08		321	12	<1	<5														
ES1009878	SD4	24-May-10	9:25		8.11		351	9	2	6														
ES1016142-001	SD4	11-Aug-10	13:00		7.82		312	26	<1	<5														
ES1023171-001	SD4	15-Nov-10	9:20		7.81		186	56	3	<5														
ES1104965-002	SD4	08-Mar-11	9:50		8.72		271	15	2	<5														
ES1109617-001	SD4	09-May-11	11:51		8.43		394	62	5	<5														
ES1117295-001	SD4	10-Aug-11	11:15	8.9	8.17	360	313	13	10	<5						<0.001		0.003	<0.01		<0.001			
ES1016142-001	SD4	11-Aug-11	13:00		7.82	312		26	<1	<5														
ES1125734-001	SD4	22-Nov-11	10:45	9.5	8.74	372	299	19	8	<5						<0.001		0.005	<0.01		0.002			
ES1203324-001	SD4	14-Feb-12	10:40	8.9	8.2	274	227	16	5	<5						<0.001		0.006	<0.01		<0.001			
ES1210728-002	SD4	01-May-12	11:00	8.1	7.9	330	276	26	2	<5						<0.001		0.005	<0.01		0.001			
ES1219038-001	SD4	02-Aug-12	11:30	8.94	8.63	269	311	8	5	<5						<0.001		0.005	<0.01		<0.001			
ES1227200-001	SD4	15-Nov-12	9:10	8.22	8.24	582	546	66	6	<5						<0.001		0.007	<0.01		0.003			
ES1303279001	SD4	12-Feb-13	12:00	9.14	8.49	458	429	248	9	<5						<0.001		0.005	<0.01		0.004			
ES1318099-001	SD4	13-Aug-13	9:30	8.33	8.07	799	762	318	26	<5						<0.001		0.004	<0.01		0.005			
ES1410234-001	SD4	07-May-14	10:35	8.1	7.69	717	677	3190	13	<5											0.013			
ES1521694-001	SD4	11-May-15	13:05	8.2	7.86	299	286	176	7	<5						<0.001		<0.001	0.01		0.01			
ES1528398-001	SD4	13-Aug-15	10:55	8.4	8.01	403	389	255	8	5						<0.001		<0.001	0.01		0.01			
ES1104965-003	VOID	08-Mar-11	9:15		7.68		4220	23	<1	<5														
ES1109617-003	VOID	09-May-11	12:40		8.3		4550	6	58	<5														
ES1117295-007	VOID	10-Aug-11	12:15	8.4	8.3	5240	4050	10	5	<5	444	<1	<1	444	0.1		1140			720	0.005	0.054	0.11	
ES1203324-007	VOID	14-Feb-12	12:45	8.6	8.59	2280	1810	10	<1	<5	398	<1	46	352	0.03		278			420	0.005	0.004	0.06	
ES1219038-006	VOID	02-Aug-12	10:00	8.64	8.4	3490	4400	9	<1	<5														
ES1227200-004	VOID	15-Nov-12	10:30	8.46	8.44	5360	4720	30	<1	<5														
ES1303279007	VOID	12-Feb-13	12:40	8.68	8.58	5090	4480	5	2	<5														
ES1310164-003	VOID	02-May-13	9:00	8.78	8.54	4870	5350	6	1	<5														
ES1318099-007	VOID	13-Aug-13	8:00	8.48	8.51	5080	4810	22	2	<5						0.001		0.002	0.04		0.088			
ES1325115-003	VOID	18-Nov-13	10:45	8.8	8.5	5850	5370	6	3	<5	403	<1	43	360	0.02		1120	0.004				0.011	<0.05	
ES1402292-002	VOID	05-Feb-14	11:10	8.9	8.5	7270	6210	<5	52	<5														
ES1410234-006	VOID	07-May-14	9:30	8.7	8.51	6620	6140	26	<1	<5	629	<1	28	401	0.02		1210			933	0.002	0.007	<0.05	
ES1417254-004	VOID	05-Aug-14	10:55	8.7	8.57	6410	5930	<5	4	<5														
ES142449-002	VOID	06-Nov-14	9:20	8.8	8.66	6610	6330	6	3	<5											0.001			
ES1503593-002	VOID	12-Feb-15	825	9.1	8.66	5940	6100	7	3	<5														
ES1521694-008	VOID	11-May-15	13:50	8.8	8.44	5590	5270	10	2	<5	304	<1	24	280	0.31		1150			764	0.002			
ES1528398-005	VOID	13-Aug-15	9:05	8.8	8.46	5580	5190	9	<1	<5														
ES1536059-001	VOID	11-Nov-15	8:50	8.7	8.53	5850	5270	9	2	<5														

Appendix 2

GROUNDWATER MONITORING DATA

Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Dissolved Metals															Major Cations					Major Anions														Comments
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N	Nitrate as N	Nitrite and Nitrate as N (NOX)	Total Dissolved Solids	
ANZECC guideline*								**5**	**0.5**			**0.01**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**											**4000**	
P1	**15-Jun-07**		11.25	11.51																																					
Registered Number:	**7-Aug-07**	0835	11.20	11.46																																					
GW968386	**19-Dec-07**	1535	11.25	11.51																																					
Licence Number:	**24-Jan-08**	1140	11.21	11.47																																					
90BL253767	**5-Mar-08**	0835	11.17	11.43																																					
	7-Apr-08	1515	11.17	11.43																																					
	8-May-08	1550	11.16	11.42																																					
	3-Jun-08																																								Too Wet to Access
	9-Jul-08	0905	11.16	11.42																																					
	11-Aug-08	0845	11.15	11.41																																					
	17-Nov-08	1655	11.19	11.45																																					
	19-Jan-09	1355	11.22	11.48																																					
	26-Feb-09	1645	11	11.3																																					
	17-Jun-09	1015	11.3	11.6																																					
	23-Jun-09	1000	12.57	12.83	7.1	3790	20.6		0.007	0.04	<0.001	<0.0001	0.006	0.005	0.005	1.11	0.013	0.592	0.047	<0.01	0.274	<0.0001		3610	45	160	585	8	41.1	725	39	<1	<1	1010	1010	41.4	0.4	0.53				2240	
	9-Sep-09	1230	11.8	12.76																																					
	2-Dec-09	1205	11.87	12.83	7.32	4140	32.4	<0.01	0.008				<0.005		<0.001	0.31	<0.001	0.872	0.015		<0.005	<0.0001	7.35	3700	58	195	537	6	42.5	781	39.1	<1	<1	962	962	42	0.48		<0.01	<0.01	<0.01		
	16-Feb-10	1320	11.77	12.73																																					
	17-May-10	1230	11.77	12.73	6.89	6320	21.2	<0.01	0.019				<0.005		<0.001	<0.05	<0.001	0.918	0.027		0.006	<0.0001	7.16	4150	104	226	541	4	47.5	982	81.9	<1	<1	758	758	44.6	3.16		<0.01	0.19			
	31-Aug-10	1030	11.81	12.77	7.27	2136	22.1																																		
	15-Nov-10	1150	11.63	12.59	6.81	2770	23.5																																		
	9-Mar-11	1220	11.52	12.48	7.33	3340	24.6	1	0.004				0.003		0.096	1.98	0.022	1.27	0.013		0.277	<0.0001	8.51	3860	94		443	20	41.8	866	68	<1	116	886	860	43	1.45		0.03	0.36	0.39		
	14-Jun-11	1220	11.40	12.36	7.2	3270	19.5																																		
	20-Sep-11	1120	11.38	12.34	7.2	2960	22.6	0.52	0.006	0.164	<0.001	0.0006	0.002	0.003	0.028	1.15	0.023	1.16	0.011	0.01	0.435	<0.0001	7.49	4200	114	236	416	7	43.4	802	76	<1	<1	835	835	40.9	2.95	1.19	0.29	0.29	0.58	2120	
	15-Dec-11	1050	11.49	12.45	7.04	3350	22.7																																		
	2-Apr-12	1110	11.14	12.1	7.15	2960	24.6	4.25	0.011	0.254	<0.001	0.0008	0.01	0.011	0.121	7.07	0.084	0.858	0.02	0.1	0.943	<0.0001	7.61	3860	131	260	434	9	47	872	47	<1	<1	904	904	43.6	3.74	4.35	0.2	<0.01	0.2	2370	
	20-Jun-12	1110	11.14	12.1	7.19	3480	21.5																																		
	12-Sep-12	1145	11.04	12	7.2	3560	22.1	0.4	0.001	0.178	<0.001	0.0003	0.001	<0.001	0.02	0.84	0.008	0.503	0.004	<0.01	0.252	<0.0001	7.62	4000	98	247	410	8	43.3	854	26	<1	<1	1050	1050	45.6	2.67	6.26	<0.01	0.07	0.07	2300	
	7-Dec-12	1015	11.14	12.1	7.2	3540	22																																		
	18-Mar-13	1025	11.2	12.16	7.17	3590	21.6	0.56	0.003	0.199	<0.001	0.0001	0.001	<0.001	0.052	1.77	0.012	0.504	0.005	0.02	0.307	<0.0001	7.5	4020	157	144	412	8	43.2	725	78	<1	<1	853	853	39.1	4.93	5.29	<0.1	0.3	0.3	2130	
	9-Jul-13	1020	11.39	12.35	7.12	3630	19.5																																		
	6-Sep-13	1230	11.34	12.3	7.18	3600	22.3	2.01	0.012	0.258	<0.001	0.0004	0.004	0.004	0.21	3.64	0.026	0.544	0.012	0.1	0.729	<0.0001	7.6	4030	117	250	411	8	44.5	761	62	<1	<1	888	888	40.5	4.68	2.2				2140	
	10-Dec-13	1020	11.31	12.27	7.2	3680	22.6																																		
	4-Mar-14	1030	11.54	12.5	7.2	3670	21.5	4.58	0.006	0.328	<0.001	0.0003	0.011	0.004	0.285	8.09	0.074	0.566	0.015	0.05	0.811	<0.0001	7.57	4010	124	243	504	7	48.3	786	88	<1	<1	842	842	40.8	8.35	3.02				2150	
	30-May-14	1245	11.59	12.55	7.3	3670	21.3																																		
	3-Sep-14	1145	11.54	12.5	7.3	3720	20.4	0.44	0.01	0.283	<0.001	0.0001	0.004	0.007	0.062	2.17	0.014	0.54	0.013	0.04	0.347	<0.0001	7.43	3970	112	218	316	6	37.4	746	93	<1	<1	896	896	40.9	4.42	0.06	<0.01	0.61	0.61	2200	
	19-Nov-14	1035	11.71	12.67	7.3	3740	21.7																																		
	25-Feb-15	1035	11.74	12.7	7.3	3720	21.7	0.1	0.006	0.195	<0.001	<0.0001	<0.001	0.005	0.018	0.71	0.003	0.395	0.006	0.03	0.192	<0.0001	7.72	3950	145	257	383	6	45.2	827	100	<1	<1	845	845	42.3	3.31	0.22	0.02	0.2	0.22	2280	
	20-May-15	1030	11.84	12.8	6.9	3770	21.5																																		
	1-Sep-15	1035	11.68	12.64	7.1	3810	20.3	0.09	0.005	0.185	<0.001	<0.0001	<0.001	0.002	0.007	0.33	<0.001	0.186	0.004	0.03	0.15	<0.0001	7.68	4110	150	242	382	6	44.2	675	84	<1	<1	941	941	39.6	5.45	0.07	<0.01	0.6	0.6	2380	
P2	**15-Jun-07**		16.77	17.61																																					
Registered Number:	**7-Aug-07**	0850	16.77	17.61																																					
GW968387	**19-Dec-07**	1545	16.70	17.54																																					
Licence Number:	**24-Jan-08**	1155	16.69	17.53																																					
90BL253768	**5-Mar-08**	0845	11.69	12.53																																					
	4-Apr-08	1450	16.61	17.45																																					
	8-May-08	1600	16.58	17.42																																					Too wet to access
	3-Jun-08																																								
	9-Jul-08	0916	16.58	17.42																																					
	11-Aug-08	0856	16.56	17.40																																					
	17-Nov-08	1703	16.50	17.34																																					
	19-Jan-09	1404	16.50	17.34																																					
	26-Feb-09	1630	16.25	17.10																																					
	17-Jun-09	0950	16.61	17.45																																					
	23-Jun-09	0900	16.53	17.38	7.4	4650	21.6		0.003	0.087	<0.001	<0.0001	0.032	0.012	0.024	1.96	0.006	0.414	0.154	0.07	0.064	<0.0001		4560	114	320	476	10	53	1030	410	<1	<1	973	973	57	3.62	0.02				3280	
	9-Sep-09	1215	16.49	17.31																																					
	2-Dec-09	1240	16.56	17.38	6.84	4520	31.8	<0.01	0.01				<0.005		0.001	<0.05	<0.001	0.613	0.24		0.01	<0.0001	7.03	4090	145	298	395	9	49.2	855	401	<1	<1	852	852	49.5	0.3		<0.01	3.81	3.81		
	16-Feb-10	1300	16.45	17.27																																					
	17-May-10	1150	16.38	17.20	7	6420	20.1	<0.01	0.002				<0.005		0.008	<0.05	<0.001	0.178	0.015		0.086	<0.0001	7.09	4250	173	281	457	7	51.8	832	444	<1	<1	807	807	48.8	2.93		0.02	5.09			
	19-Jul-10	1226	16.89	17.71																																					
	31-Aug-10	1015	16.33	17.15	7.06	4150	21.4																																		
	15-Nov-10	1220	16.26	17.08	7.01	3580	22.6																																		
	9-Mar-11	1150	16.35	17.17	7	3410	24.7	3.28	0.002				0.023		0.255	8.13	0.038	0.352	0.042		2.64	<0.0001	8.59	3860	161	282	405	10	49.1	839	362	<1	199	842	832	47.8	1.3		0.02	4.41	4.44		
	14-Jun-11	1150	15.77	16.59	7.05	3400	19.6																																		
	20-Sep-11	1150	15.63	16.45	7.05	3240	21.9	0.24	0.003	0.075	<0.001	0.0003	0.003	0.004	0.114	0.77	0.006	0.324	0.013	0.02	0.422	<0.0001	7.45	4550	154	269	409	8	47.8	828	346	<1	<1	767	767	45.9	2.05	0.18	<0.01	6.94	6.94	2560	
	15-Dec-11	1240	15.65	16.47	6.85	3610	22.3																																		
	2-Apr-12	1150	15.38	16.20	7.1	3210	24.3	0.14	0.001	0.054	<0.001	<0.0001	<0.001	0.002	0.069	0.29	0.004	0.064	0.013	0.01	0.331	<0.0001	7.56	3970	169	276	402	9	48.9	871	330	<1	<1	734	734	46.1	2.9	<0.01	0.02	5.66	5.68	2670	
	20-Jun-12	1140	15.27	16.09	7.08	3710	21.3																																		Piezo-Ferndale
	12-Sep-12	1145	14.58	15.40	7.15	3860	22	0.02	0.001	0.048	<0.001	<0.0001	<0.001	0.006	0.094	0.1	0.002	0.171	0.008	0.01	0.365	<0.0001	7.5	4230	145	270	409	10	47.5	866	316	<1	<1	844	844	47.9	0.4	<0.01	<0.01	5.98	5.98	2630	
	7-Dec-12	1330	15.33	16.15	7.02	3890	23.9																																		
	18-Mar-13	1200	14.9	15.72	6.98	3870	22.7	0.13	0.002	0.06	<0.001	0.0001	<0.001	0.005	0.281	0.64	0.005	0.194	0.012	0.01	0.646	<0.0001	7.38	4300	157	244	418	9	46.3	767	310	<1	<1	769	769	43.5	3.19	<0.01	<0.01	6.02	6.02	2510	
	9-Jul-13	0950	14.89	15.71	6.92	3910	19.7																																		
	6-Sep-13	1050	14.78	15.60	7.03	3920	22	0.1	0.002	0.054	<0.001	<0.0001	<0.001	0.003	0.114	0.29	0.003	0.128	0.006	0.01	0.18	<0.0001	7.49	4300	158	281	427	10	49.8	810	321	<1	<1	778	778	45.1	5	0.02				2370	
	13-Dec-13	1330	14.61	15.43	7.1	3960	24.1																																		
	4-Mar-14	1200	14.68	15.50	7	3920	21.8	0.84	0.002	0.076	<0.001	0.0001	0.012	0.003	0.114	1.13	0.005	0.172	0.013	0.01	0.25	<0.0001	7.37	4270	158	265	511	10	52.2	796	314	<1	<1	785	785	44.7	7.73	0.01				2480	
	30-May-14	1220	14.64	15.46	7.3	3950	21																																		
	3-Sep-14	1345	14.48	15.30	6.8	4080	20.3	0.66	0.003	0.075	<0.001	<0.0001	0.002	0.005	0.146	0.88	0.006	0.175	0.01	0.01	0.324	<0.0001	7.08	4240	158	296	483	8	53.5	716	293	<1	<1	839	839	43.1	10.8	0.03	<0.01	6.59	6.59	2530	
	19-Nov-14	1050	14.56	15.38	6.9	3090	21.4																																		
	25-Feb-15	1100	14.58	15.40	6.9	3930	21.8	0.04	0.002	0.063	<0.001	0.0001	<0.001	0.001	0.047	0.12	0.002	0.097	0.005	<0.01	0.316	<0.0001	7.62	4210	175	280	394	8	49.1	822	334	<1	<1	796	796	46	3.22	0.04	0.04	6.58	6.62	2000	
	20-May-15	1055	14.53	15.35	6.9	3990	21.4																																		
	1-Sep-15	1100	14.41	15.23	7	4120	20.5	0.8	0.002	0.06	<0.001	0.0002	0.002	0.003	0.134	1.08	0.006	0.134	0.012	<0.01	0.462	<0.0001	7.52	4380	183	260	395	9	47.9	687	315	<1	<1	856	856	43	5.37	0.08	<0.01	6.29	6.29	2620	
P3	**15-Jun-07**		12.50	12.92																																					
Registered Number:	**7-Aug-07**	0945	12.72	13.14																																					
GW968388	**19-Dec-07**	1620	12.99	13.41																																					
Licence Number:	**24-Jan-08**	1235	13.08	13.50																																					
90BL253769	**5-Mar-08**	0925	13.15	13.57																																					
	4-Apr-08	1430	13.20	13.62																																					
	8-May-08	1626	13.25	13.67																																					
	3-Jun-08	0942	13.29	13.71																																					
	9-Jul-08	0958	13.36	13.78																																					
	11-Aug-08	0940	13.41	13.83																																					
	17-Nov-08	1726	13.57	13.99																																					
	19-Jan-09	1308	13.65	14.07																																					
	26-Feb-09	1430	14.10	14.40																																					
	17-Jun-09	0845	14.29	14.71																																					
	23-Jun-09	1045	14.28	14.70	7.1	14200	23.3		<0.001	0.167	<0.001	<0.0001	0.008	0.002	0.008	4.11	0.018	0.376	0.038	<0.01	0.207	<0.0001		6670	160	310	852	40	71.6	2120	90	<1	<1	859	859	78.8	4.82	2.05				4210	

Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Dissolved Metals															Major Cations				Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N	Nitrate as N	Nitrite and Nitrate as N (NOX)	Total Dissolved Solids	Comments
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L								
ANZECC guideline*								**5**	**0.5**			**0.01**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**					**1000**									**4000**	
	9-Sep-09	1340	14.46	14.90					<0.001	0.147	<0.001	<0.0001	0.003	0.002	0.007	1.5	0.005	0.408	0.027	<0.01	0.151	<0.0001		7980	189	330	1130	50	86.8	2220	225	<1	<1	882	882	84.9	1.14	1.25				5780	
	2-Dec-09	1415	14.72	15.16	6.57	14040	25.4	<0.01	0.002				<0.005		0.002	0.26	<0.001	0.475	0.011		0.026	<0.0001	6.73	11900	219	521	1840	83	136	4360	549	<1	<1	637	637	147	3.95		0.01	0.16	0.17		
	16-Feb-10	1045	14.33	14.77																																					
	17-May-10	1315	14.15	14.59	6.88	14400	19.9	<0.01	0.002				<0.005		0.007	<0.05	<0.001	0.433	0.018		0.198	<0.0001	6.77	12300	319	532	2000	59	148	4560	717	<1	<1	718	718	158	3.18		<0.01	1.09			
	19-Jul-10	1204	14.37	14.81																																					
	31-Aug-10	1210	14.45	14.89	6.75	12580	23.3																																		
	15-Nov-10	1110	14.52	14.96	6.52	10230	22.6																																		
	8-Mar-11	1100	14.31	14.75	6.56	10350	26.4	0.26	0.001				0.001		0.016	0.42	<0.001	0.32	0.008		0.067	<0.0001	6.6	12400	290	534	2040	87	72.7	4340	502	<1	<1	791	791	149	0.14		<0.01	0.17	0.17		
	21-Jun-11	1030	14.15	14.59	6.60	10540	19.3																																		
	21-Sep-11	950	14.47	14.91	6.80	9650	22.4	0.41	0.002	0.081	<0.001	<0.0001	<0.001	0.008	0.018	0.82	0.00	0.46	0.009	<0.01	0.143	<0.0001	7.14	14100	267	0.459	1960	76	138	4350	494	<1	<1	747	747	148	3.55	<0.10	<0.01	0.57	0.57		
	30-Dec-11	1420	14.26	14.70																																					SWL taken during logger changeover
	6-Jan-12																																								No Access
	3-Apr-12	0920	14.02	14.46	7.2	8650	22.4	0.06	0.002	0.081	<0.001	<0.0001	<0.001	0.016	0.015	0.16	0.001	0.385	0.008	<0.01	0.285	<0.0001	7.39	11200	307	502	2010	79	146	3950	493	<1	<1	656	656	135	4.01	<0.10	0.04	1.53	1.57	7230	
	22-Jun-12	1200	13.90	14.34	6.85	8750	20.5																																			Piezo
	20-Sep-12	1500	14.46	14.90	6.68	11700	21.2	1.13	0.002	0.092	<0.001	0.0003	0.002	0.012	0.052	2.29	0.007	0.464	0.012	<0.01	0.285	<0.0001	7.37	13600	287	503	1980	76	144	4610	608	<1	<1	726	726	157	4.47	<0.10	<0.01	0.57	0.57	8710	
	7-Dec-12	1135	14.66	15.10	6.64	12150	22.1																																		
	18-Mar-13	1250	14.84	15.28	6.75	12160	21.7	0.03	<0.001	0.05	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.05	<0.001	0.023	<0.001	<0.1	<0.005	<0.0001	7.23	13900	293	483	2000	74	143	4020	460	<1	<1	732	732	138	2.01	0.01	<0.01	0.19	0.19	8150	
	9-Jul-13	0845	14.99	15.43	6.47	12460	18.9																																		
	6-Sep-13	0950	15.06	15.50	6.49	12800	21.5	0.31	0.002	0.092	<0.001	0.0002	0.002	0.011	0.429	0.77	0.033	0.404	0.024	<0.01	0.406	<0.0001	7.18	14200	297	534	2110	86	153	3920	584	<1	<1	785	785	138	4.91	0.09				7920	
	10-Dec-13	1045	15.10	15.54	6.5	12960	23.4																																		
	4-Mar-14	1230	15.46	15.90	6.5	12700	22.3	0.74	<0.010	0.081	<0.010	<0.0010	0.015	0.012	0.194	1.31	0.028	0.434	0.019	<0.10	0.448	<0.0001	7.08	14100	309	496	2720	79	176	4670	600	<1	<1	762	762	142	10.6	0.05				8660	
	30-May-14	1100	15.28	15.72	6.5	12990	20.6																																		
	3-Sep-14	1310	15.36	15.80	6.5	13100	20.4	0.2	<0.010	0.103	<0.010	<0.0010	<0.010	0.013	0.118	0.66	0.017	0.378	0.016	<0.10	0.565	<0.0001	6.88	14400	284	538	2020	82	148	4010	603	<1	<1	826	826	142	2.14	0.08	<0.01	0.06	0.06	9820	
	19-Nov-14	1125	15.57	16.01	6.5	13470	21.3																																		
	25-Feb-15	1130	15.56	16.00	6.4	13400	22.6	0.03	0.001	0.083	<0.001	0.0004	<0.001	0.007	0.022	0.16	0.004	0.283	0.005	<0.01	0.139	<0.0001	7.33	14300	430	560	2170	82	164	4430	637	<1	<1	785	785	154	3.18	0.06	<0.01	0.04	0.04	9750	
	20-May-15	1125	15.44	15.88	6.4	13340	21.4																																		
	1-Sep-15	1310	15.35	15.79	6.6	13280	21.8	0.03	0.001	0.075	<0.001	<0.0001	<0.001	0.006	0.014	0.1	0.002	0.312	0.004	<0.01	0.077	<0.0001	7.19	14440	348	431	2010	79	142	3530	627	<1	<1	897	897	130	4.29	0.1	<0.01	0.03	0.03	8930	
P7	**15-Jun-07**		12.77	13.04																																					
Registered Number:	**7-Aug-07**	0905	12.75	13.02																																					
GW968392	**20-Dec-07**	1050	12.73	13.00																																					
Licence Number:	**24-Jan-08**	1345	12.72	12.99																																					
90BL254689	**5-Mar-08**	0855	12.74	13.01																																					
	7-Apr-08	1520	12.70	12.97																																					
	8-May-08	1712	12.71	12.98																																					
	3-Jun-08	1006	12.72	12.99																																					
	9-Jul-08	1045	12.73	13.00																																					
	11-Aug-08	1013	12.72	12.99																																					
	17-Nov-08	1750	12.70	12.97																																					
	19-Jan-09	1343	13.70	13.97																																					
	26-Feb-09	1410	12.65	12.90																																					
	17-Jun-09	0925	11.13	11.40																																					
	23-Jun-09	1315	11.36	11.61	6.8	7590	22.7		<0.001	0.103	<0.001	0.0027	<0.001	<0.001	0.002	<0.05	<0.001	0.029	0.002	<0.01	<0.005	<0.0001		7140	171	413	826	23	79.1	2370	231	<1	<1	782	782	87.4	4.98	0.04				4170	
	9-Sep-09	1333	10.68	10.94																																					
	2-Dec-09	1610	11.24	11.50	6.85	7900	23.3	<0.01	<0.001	<0.005			0.002			<0.05	<0.001	0.024	0.002		0.006	<0.0001	7	6940	148	420	779	24	76.5	2190	290	<1	<1	654	654	80.9	2.83		<0.01	5.9	5.9		
	16-Feb-10	1145	9.89	10.15																																					
	17-May-10	1530	10.64	10.90	7.09	8500	20.2	<0.01	<0.001				<0.005		0.002	<0.05	<0.001	0.009	0.003		0.015	<0.0001	7	7180	218	456	876	18	87	2220	349	<1	<1	681	681	83.6	2		<0.01	6.29			
	31-Aug-10	1330	9.73	9.99	6.95	7700	22.5																																		
	15-Nov-10	1040	9.60	9.86	6.82	6190	23.1																																		
	8-Mar-11	1330	8.72	8.98	6.83	4760	26.5	2.34	<0.001				0.003		0.021	2.52	0.002	0.046	0.004		0.081	<0.0001	6.91	6330	172	365	769	24	72.7	1630	352	<1	<1	708	708	67.4	3.76		<0.01	4.31	4.31		
	21-Jun-11	1210	9.17	9.43	6.85	4810	21.2																																		
	21-Sep-11	1120	10.51	10.77	6.85	2380	24.2	3.25	0.002	0.107	<0.001	<0.0001	<0.001	0.005	0.046	5.24	0.009	0.423	0.024	0.02	0.256	<0.0001	7.34	3200	35	49	127	49		306	<1	<1	<1	974	974	28.1		224	<0.01	0.16	0.16		
	6-Jan-12	930	8.31	8.57	6.83	2810	22.5																																		
	3-Apr-12		8.16	8.42	7.25	3820	24.7	0.52	<0.001	0.03	<0.001	<0.0001	0.001	<0.001	0.04	1.4	0.003	0.096	0.004	<0.01	0.236	<0.0001	7.36	4860	34	75	214	76	49.9	494	65	<1	<1	1640	1640	48.1	1.84	432	<0.01	0.22	0.22	3250	Standpipe repaired 20/4 - new "stick up" = 0.5m
	11-May-12	1245						2.97	0.002	0.138	<0.001	<0.0001	0.009	0.006	0.111	4.8	0.009	0.365	0.02	0.02	0.319	<0.0001	7.27	4750	51	92	247	64	49.2	548	7	<1	<1	1580	1580	47.2	2.07	374	<0.01	0.02	0.02	1390	
	11-May-12	1330						1.34	<0.001	0.078	<0.001	<0.0001	0.006	0.001	0.016	1.89	0.004	0.083	0.006	<0.01	0.062	<0.0001	7.32	4760	119	232	588	24	51.2	1020	235	<1	<1	696	696	47.6	3.68	28	0.08	3.03	3.11	2810	
	22-Jun-12	1300	8.12	8.62	7.26	3690	20																																		
	20-Sep-12	1500	9.70	10.20	7.18	4310	21.9	1.06	0.001	0.065	<0.001	<0.0001	0.003	0.002	0.032	1.65	0.004	0.096	0.005	<0.01	0.128	<0.0001	7.67	5030	121	230	597	21	51.5	1100	327	<1	<1	648	648	50.8	0.66	10.9	0.07	0.12	0.19	2930	
	7-Dec-12	1255	10.47	10.97	7.27	4420	22.5																																		
	18-Mar-13	1345	10.39	10.89	7.4	4460	23.6	0.06	<0.001	0.046	<0.001	<0.0001	<0.001	<0.001	<0.001	<0.05	<0.001	0.005	<0.001	<0.01	0.03	<0.0001	7.73	5040	127	235	659	21	54.9	1120	298	<1	<1	604	604	59.9	4.77	0.07	<0.01	3.93	3.93	2950	
	9-Jul-13	0925	10.44	10.94	7.34	4630	19.5																																		
	6-Sep-13	1030	10.60	11.10	7.46	4630	22.4	0.04	<0.001	0.062	<0.001	<0.0001	<0.001	<0.001	0.033	0.11	0.002	0.034	0.004	<0.01	0.14	<0.0001	7.83	5150	132	244	669	23	56.4	1110	315	<1	<1	659	659	51	4.94	0.06				2560	
	10-Dec-13	1100	10.99	11.44	7.6	4870	22.5																																		
	4-Mar-14	1250	11.35	11.80	7.8	4740	21.6	0.38	<0.001	0.069	<0.001	0.0002	0.024	0.002	0.113	0.84	0.01	0.059	0.018	<0.01	0.335	<0.0001	7.93	5160	131	237	754	23	59.4	1120	328	<1	<1	643	643	51.3	7.35	0.05				3290	
	30-May-14	1120	11.38	11.88																																					
	3-Sep-14	1220	11.55	12.00	7.2	4940	20.2	0.03	<0.001	0.072	<0.001	<0.0001	<0.001	<0.001	0.019	0.15	0.002	0.02	0.004	<0.01	0.143	<0.0001	7.34	5180	123	260	830	18	64.1	992	239	<1	<1	797	797	48.9	13.4	<0.01	<0.01	491	491	2780	
	19-Nov-14	1140	11.83	12.33	7.2	4910	21.7																																		
	25-Feb-15	1155	11.90	12.40	7.2	4870	24	0.06	<0.001	0.052	<0.001	0.0003	<0.001	<0.001	0.014	0.21	0.002	0.02	0.004	<0.01	0.12	<0.0001	7.7	5060	134	244	673	18	56.5	1100	264	<1	<1	794	794	52.4	3.76	0.07	<0.01	4.83	4.83	2520	
	20-May-15	1210	11.56	12.06	7.1	4750	21.9																																		
	1-Sep-15	1220	11.83	12.33	7.1	4470	21.4	0.11	<0.001	0.06	<0.001	<0.0001	<0.001	<0.001	0.005	0.21	<0.001	0.022	0.003	<0.01	0.062	<0.0001	7.64	5120	136	217	664	18	54	868	249	<1	<1	860	860	46.8	7.06	0.04	<0.01	4.33	4.33	2880	
P8	**15-Jun-07**		15.63	15.63																																					
Registered Number:	**7-Aug-07**	0910	15.70	15.70																																					
GW968393	**19-Dec-07**	1630	21.25	21.25																																					
Licence Number:	**24-Jan-08**	1240	21.30	21.30																																					
90BL254690	**5-Mar-08**	0900	19.25	19.25																																					
	7-Apr-08	1525	20.13	20.13																																					
	8-May-08	1710	20.49	20.49																																					
	3-Jun-08	1003	18.79	18.79																																					
	9-Jul-08	1043	19.12	19.12																																					
	11-Aug-08	1010	19.72	19.72																																					Windmill pumping
	17-Nov-08	1747	16.74	16.74																																					
	2-Mar-09	1300	15.85	15.95																																					Windmill pumping
	17-Jun-09	0920	16.90	16.90																																					
	23-Jun-09	1245	16.59	16.69	6.9	6460	21.8		<0.001	0.068	<0.001	0.0022	<0.001	<0.001	0.004	0.35	0.002	0.023	0.01	<0.01	0.046	<0.0001		6220	158	306	771	24	79.1	1930	245	<1	<1	710	710	73.6	4.54	<0.01				3600	
	9-Sep-09	1330	16.58	16.71																																					Windmill pumping
	2-Dec-09	1555	17.67	17.80	6.96	6440	23.8	<0.01	<0.001				<0.005		0.014	<0.05	<0.001	0.004	0.022		0.063	<0.0001	7.05	6000	119	308	723	24	63.3	1830	238	<1	<1	601	601	68.7	4.08		<0.01	8.64	8.64		Bore equipped
	16-Feb-10	1140	16.94	17.07																																					
	17-May-10	1550	16.94	17.07	7.41	4380	20.6	<0.01	<0.001				<0.005		0.002	<0.05	<0.001	0.003	0.003		0.02	<0.0001	7.02	6000	185	320	793	18	70.5	1730	259	<1	<1	690	690	68.1	1.77		<0.01	8.99			Bore equipped
	31-Aug-10	1330	16.96	17.09	6.87	6220	22.9																																		Bore equipped
	15-Nov-10	1030	16.88	17.01	6.67	5400	23.5																																		
	8-Mar-11	1250	17.02	17.15	6.82	4790	26.1	0.18	<0.001				0.002		0.0034	1	0.004	0.053	0.004		0.171	<0.0001	6.98	6280	194	337	760	18	71.2	1660	50	<1	23	144	765	66.4	3.48		0.03	0.57	0.6		
	21-Jun-11	1150	16.79	16.92	6.8	4920	21.1																																		
	21-Sep-11	1100	16.91	17.04	6.75	5040	24.2	1.53	<0.001	0.084	<0.001	<0.0001	<0.001	0.005	0.012	3.64	0.002	0.062	0.008	<0.01	0.036	<0.0001	7.31	7180	198	330	786	23	71.8	1710	261	<1	<1	660	660	66.9	3.57	0.86	0.02	3.71	3.73		
	6-Jan-12	950	16.89	17.02	6.64	5590	23.8																																		
	3-Apr-12	1010	16.15	16.28	6.95	5140	24.6	6	0.002	0.156	<0.001	<0.0001	0.016	0.011	0.023	7.42	0.005	0.162	0.011	0.02	0.048	<0.0001	7.46	6520	196	334	710	21	68.7	1800	276	<1	<1	677	677	70	0.98	1.86	0.03	0.79	0.82	4180	
	22-Jun-12	1315	2.86	3.66	7.29	6150	19.8																																		
	11-Jul-12	1200	3.46	4.26																																					Dipped to confirm previous reading

Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Dissolved Metals																Major Cations					Major Anions												Comments
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N	Nitrate as N	Nitrite and Nitrate as N (NOX)	Total Dissolved Solids	
ANZECC guideline*								**5**	**0.5**			**0.01**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**					**1000**											**4000**	
	20-Sep-12	1500	4.79	5.59	7.04	725	21.7	7.12	0.01	0.198	<0.001	0.0003	0.013	0.018	0.069	12	0.021	2.54	0.028	0.02	0.191	<0.0001	7.55	803	42	29	49	9	7.48	123	50	<1	<1	151	151	7.53	0.33	4.12	0.01	0.12	0.13	426	
	7-Dec-12	1235	23.63	24.13	7.43	1311	23.2																																			
	18-Mar-13	1320	22.44	22.94	7.25	1005	23.4	0.82	0.006	0.12	<0.001	0.0012	0.003	0.023	0.112	<0.05	0.017	1.01	0.022	<0.01	0.399	<0.0001	7.3	958	51	36	71	11	8.88	158	86	<1	<1	138	138	9	0.71	0.07	<0.01	3.93	3.93	506	
	9-Jul-13	905	23.43	23.93	7.05	1098	19.6																																			
	6-Sep-13	1010	23.10	23.90	6.92	1140	22.4	0.18	0.002	0.101	<0.001	0.0006	<0.001	0.010	0.093	0.49	0.006	0.815	0.017	<0.01	0.21	<0.0001	7.35	1020	49	36	78	12	9.11	165	75	<1	<1	154	154	9.29	1	3.57				511	
	10-Dec-13	1120	23.30	24.05	7.1	978	22.9																																			
	4-Mar-14	1310	23.05	23.80	7.2	915	22	0.32	0.001	0.087	<0.001	0.0002	0.017	0.008	0.135	1.25	0.01	0.841	0.022	<0.01	0.319	<0.0001	7.16	1100	50	39	110	13	10.8	194	86	<1	<1	157	157	10.4	1.99	2.93				617	
	30-May-14	1135	23.63	24.13	6.9	1017	21.8																																			
	3-Sep-14	1245	23.25	24.00	6.9	1030	20.4	0.37	0.003	0.099	<0.001	0.0004	0.004	0.010	0.128	1.83	0.014	1.01	0.028	<0.01	0.743	<0.0001	7.09	972	55	44	80	12	10.2	154	84	<1	<1	163	163	9.35	4.12	1.55	<0.01	0.96	0.96	514	
	19-Nov-14	1200	23.54	24.34	7.1	1010	21.9																																			
	25-Feb-15	1210	23.40	24.20	7.2	994	24.3	0.06	0.001	0.087	<0.001	0.0003	<0.001	0.003	0.014	0.15	<0.001	0.763	0.015	<0.01	0.34	<0.0001	7.5	1050	53	41	88	11	10.1	176	90	<1	<1	170	170	10.2	0.52	0.76	0.04	0.19	0.23	2520	
	20-May-15	1150	23.64	24.44	7.1	1132	21.9																																			
	1-Sep-15	1245	23.52	24.32	7.1	1147	22	0.04	<0.001	0.104	<0.001	<0.0001	<0.001	<0.001	0.004	1.51	<0.001	1.16	0.005	<0.01	0.034	<0.0001	7.25	1190	69	47	94	11	11.7	162	76	<1	<1	235	235	10.8	3.7	5.12	<0.01	0.04	0.04	552	
27356	**7-Aug-07**	1005																																								
Registered Number:	**19-Dec-07**	1555																																								
GW027356	**24-Jan-08**	1220	14.30	14.61																																						
Licence Number:	**5-Mar-08**	1000	14.25	14.56																																						
90BL020042	**4-Apr-08**	1447	14.11	14.42																																						
	8-May-08	1605	15.30	15.61																																						
	3-Jun-08	0852	17.61	17.92																																						
	9-Jul-08	0925	14.12	14.43																																						No access
	11-Aug-08	0908	16.05	16.36																																						No access
	17-Nov-08	1710	13.92	14.23																																						
	19-Jan-09	1250	14.45	14.76																																						
	26-Feb-09	1400	14.50	14.80																																						
	9-Sep-09	1255			7.47	4350	20.2		<0.001	0.182	<0.001	<0.0001	<0.001	0.003	0.035	0.47	<0.001	0.08	0.003	<0.01	0.031	<0.0001		4260	143	247	446	17	47.3	946	164	<1	<1	745	745	45	2.5	0.15				2910	
	2-Dec-09	1340			7.07	4620	26.2	<0.01	<0.001				<0.005		0.021	<0.05	<0.001	0.074	0.002		0.018	<0.0001	7.24	4160	77	245	433	18	73.3	1070	196	<1	<1	654	654	47.2	4.33		<0.01	1.57	1.57		
	16-Feb-10	1205	13.41	13.71																																						
	17-May-10	1600			8.26	5400	23.5	<0.01	0.002				<0.005		0.015	0.06	<0.001	0.056	0.002		0.013	<0.0001	7.78	4810	172	306	538	14	57.6	1280	268	<1	<1	680	680	55.2	2.1		<0.01	0.28			Bore Covered
	31-Aug-10	1100			7.8	4610	17.3																																			Bore Covered
	15-Nov-10	1320			7.65	4100	23.2																																			Bore Covered
	9-Mar-11	1350			7.35	4700	25.4	0.02	0.003				<0.001		0.021	1.34	0.002	0.142	0.006		0.1	<0.0001	7.54	5520	173	366	573	24	64.3	1840	198	<1	<1	636	636	68.7	3.34		<0.01	0.7	0.7		Bore Covered
	14-Jun-11	1020			7.4	4141	15.3																																			Bore Covered
	21-Sep-11	1150			7.55	3900	18.4	0.05	<0.001	0.368	<0.001	<0.0001	<0.001	0.002	0.049	1.09	0.001	0.036	0.003	<0.01	0.104	<0.0001	7.84	5650	170	330	474	19	56.8	1350	139	<1	<1	694	694	54.8	1.7	0.03	0.03	1.93	1.96		Bore Covered
	15-Dec-11	1310			7.49	4360	23.2																																			
	3-Apr-12	1240			8.3	4150	25.9	0.28	0.003	0.528	<0.001	<0.0001	<0.001	0.004	0.079	2.2	0.003	0.114	0.004	<0.01	0.184	<0.0001	7.89	5550	89	406	567	25	63.2	1540	152	<1	<1	556	556	57.7	4.49	0.29	<0.01	0.07	0.07	3820	
	20-Jun-12	1210			8.12	4310	19.5																																			Tank fed by windmill
	7-Dec-12	1150																																							Windmill over bore no sample (now disconnected)
	18-Mar-13	1130																																							Windmill over bore no Sample (now disconnected)
	9-Jul-13	1140																																							Windmill over bore, windmill on mine site
	6-Sep-13																																								Windmill over bore, windmill on mine site
	10-Dec-13																																								Windmill over bore
	4-Mar-14																																								Windmill over bore
	30-May-14	1155																																							Windmill over bore, on mine site.
	3-Sep-14																																								Windmill over bore
	19-Nov-14	1210																																							Windmill over bore
	1-Sep-15																																								Windmill over bore
901460	**10-Dec-08**	0900	15.38	15.80																																					Bore covered
Registered Number:	**19-Jan-09**	1414	15.53	15.95																																					Bore covered
GW901460	**2-Mar-09**	1320	19.73	20.15																																					Bore covered
	8-Apr-11	1410	15.18	15.60																																					Bore covered
	14-Jun-11	1120	15.03	15.45																																					Windmill over bore
	20-Sep-11	1230	14.97	15.39																																					Windmill over bore
	15-Dec-11	1130	15.03	15.45																																					Illlili windmill over bore
	2-Apr-12	1230	14.87	15.29																																					Illlili windmill over bore
	20-Jun-12	1240	14.74	15.16																																					Pump cap over bore
	12-Sep-12	1205	14.63	15.05																																					Pump cap over bore
	7-Dec-12	1045	17.66	18.08																																					Pump cap over bore
	9-Jul-13	1050	14.57	14.99																																					Pump over bore
	6-Sep-13	1115	14.5	14.92																																					Pump over bore
	10-Dec-13	1150	14.43	14.83																																					Pump over bore
	4-Mar-14																																								Pump over bore
	30-May-14	1030	14.2	14.62																																					Pump over Bore
	3-Sep-14																																								Pump over bore
	19-Nov-14	1225	14.41	14.83																																					Pump over bore
	20-May-15	1230	14.22	14.64																																					Pump over bore
	1-Sep-15	1120	14.16	14.58																																						
6249	**9-Sep-09**	1500	10.10		7.75	2340	19.6		0.002	0.346	<0.001	0.0001	0.002	0.005	0.062	9.15	0.012	0.798	0.018	<0.01	1.01	<0.0001		2300	70	94	281	13	23.7	596	16.9	<1	<1	272	272	22.6	2.41	2.47					
	2-Dec-09	1100	10.22	9.89	7.5	3480	23.7	<0.01	<0.001				<0.005		0.001	<0.05	<0.001	1.14	0.004		0.101	<0.0001	7.48	3370	67	135	361	12	30.5	980	11	<1	<1	289	289	33.6	4.98		<0.01	0.93	0.93		
	16-Feb-10	1000	9.87	10.20																																						1770	
	17-May-10	1025	9.96	10.29	7.1	5930	20.8	<0.01	<0.001				<0.005		<0.001	<0.05	<0.001	1.80	0.003		0.122	<0.0001	7.53	3890	106	198	480	4	42.5	1070	71.6	<1	<1	372	372	39.1	4.14		<0.01	1.31			
	31-Aug-10	0820	9.91	10.24	7.9	3260	17.3																																			
	23-Nov-10	1330	9.86	10.19	7.4	2430	24.5																																			
	9-Mar-11	1040	10.02	10.35	7.6	2230	23.5	0.22	0.001				0.001		0.079	2.29	0.01	0.51	0.007		0.768	<0.0001	7.84	2420	69	125	283	8	26.3	700	44	<1	<1	284	284	26.3	0.12		0.26	2.36	2.63		
	14-Jun-11	950	9.62	9.95	7.6	2420	18.7																																			
	20-Sep-11	1010	9.65	9.98	7.7	2520	22.3	0.06	0.003	0.324	<0.001	0.0001	0.002	<0.001	0.035	0.96	0.00	0.67	0.007	<0.01	0.264	<0.0001	7.86	3470	80	155	369	7	33	868	44	<1	<1	278	278	31	3.16	0.32	<0.01	10.9	10.9	1640	
	15-Dec-11	1010	9.69	10.02	7.31	3020	21.8																																			
	2-Apr-12	1010	9.35	9.68	7.75	2350	22.9	0.02	<0.001	0.317	<0.001	<0.0001	<0.001	0.002	0.021	1.47	0.003	1.96	0.006	<0.01	0.387	<0.0001	7.78	2760	80	131	295	10	27.9	785	28	<1	<1	321	321	29.1	2.25	3.4	0.14	1.05	1.19	1700	
	20-Jun-12	1020	9.21	9.54	7.7	3100	20.2																																			TSR near tanks
	12-Sep-12	1000	9.11	9.44	7.6	3090	21.2	0.02	0.002	0.362	<0.001	<0.0001	<0.001	<0.001	0.01	5.14	0.005	2.48	0.003	<0.01	0.191	<0.0001	7.72	3490	89	179	388	9	36.3	956	19	<1	<1	413	413	35.6	0.92	3.92	0.14	0.02	0.16	2180	
	7-Dec-12	0930	9.19	9.52	7.7	3210	20.9																																			
	18-Mar-13	0930	9.24	9.57	7.5	3200	20.4	0.05	0.001	0.357	<0.001	0.0001	<0.001	<0.001	0.025	5.57	0.005	2.63	0.002	<0.01	0.198	<0.0001	7.78	3540	84	174	378	11	35.2	865	4	<1	<1	375	375	32	4.84	8.9	0.09	<0.01	0.09	1890	
	9-Jul-13	1225	9.33	9.66	7.6	3220	18.6																																			
	6-Sep-13	1300	9.31	9.64	7.73	3090	21.8	0.09	<0.001	0.32	<0.001	<0.0001	<0.001	0.002	0.04	1.56	0.003	1.5	0.005	<0.01	0.158	<0.0001	7.95	3400	85	161	364	10	33.6	815	8	<1	<1	366	366	30.5	4.85	5.71				1680	
	10-Dec-13	945	9.33	9.63	7.8	3260	21																																			
	4-Mar-14	945	9.54	9.87	7.8	3140	20.1	0.1	<0.001	0.339	<0.001	<0.0001	0.004	0.002	0.036	3.65	0.009	1.37	0.006	<0.01	0.43	<0.0001	7.79	3420	86	158	453	11	37.3	847	6	<1	<1	361	361	31.2	8.82	3.86				2030	
	30-May-14	1320	9.56	9.88	7.8	3120	19.5																																			
	3-Sep-14	1100	9.50	9.83	7.5	3180	19.6	0.02	<0.001	0.357	<0.001	<0.0001	<0.001	0.003	0.01	1.13	0.001	1.29	0.006	<0.01	0.233	<0.0001	7.74	3300	84	138	290	10	28.4	810	5	<1	<1	385	385	30.6	3.77	0.73	<0.01	0.29	0.29	1820	
	19-Nov-14	950	9.62	9.95	7.5	3150	21.1																																			
	25-Feb-15	945	9.67	10.00	7.6	3090	21.4	0.05	<0.001	0.277	<0.001	0.0001	<0.001	<0.001	0.036	2.26	0.003	1.2	0.004	<0.01	0.127	<0.0001	7.96	3220	106	152	323	10	32.1	853	3	<1	<1	342	342	31	1.82	0.56	0.03	0.1	0.13	1910	
	20-May-15	950	9.75	10.08	7.5	3040	20.1																																			
	1-Sep-15	950	9.73	10.06	7.4	3070	19.4	0.04	<0.001	0.28	<0.001	<0.0001	<0.001	<0.001	0.003	4.07	<0.001	1.48	0.002	<0.01	0.036	<0.0001	7.87	3170	116	147	329	12	32.5	688	<1	<1	<1	372	372	26.8	9.54	1.09	<0.01	0.03	0.03	2000	
44884	**9-Sep-09**	1155			7.50	3050	20.2		0.007	0.624	<0.001	0.0005	<0.001	0.004	0.004	5.32	0.002	0.787	0.001	<0.01	0.223	<0.0001		2950	45	102	527	5	33.7	442	16.2	<1	<1	1040	1040	33.7	0.02	0.14					
	2-Dec-09	1145			7.4	3700	25	<0.01	0.002				<0.005		<0.001	<0.05	<0.001	0.89	0.002		0.076	<0.0001	7.47	3340	30	149	504	5	35.8	655	25	<1	<1	933	933	37.6	2.51		<0.01	<0.01	<0.01		
	16-Feb-10	1010																																							

Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Dissolved Metals															Major Cations					Major Anions														Comments
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L	Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N	Nitrate as N	Nitrite and Nitrate as N (NOX)	Total Dissolved Solids	
ANZECC guideline*								**5**	**0.5**			**0.01**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**					**1000**											**4000**	
	17-May-10	1135																																						
	31-Aug-10	0945			8.5	2720	17																																	
	15-Nov-10	1130																																						
	9-Mar-11	1100	13.10	13.57	7.9	1385	24	1.04	0.005				0.003		0.226	14.5	0.165	1.05	0.008		3.63	<0.0001	8.76	1280	23	36	279	15	16.6	203	9	<1	109	552	547	16.8	0.72		<0.01	0.06	0.06		
	14-Jun-11	1000	27.79	28.26	7.7	2080	18																																	
	20-Sep-11	1050	30.78	31.25	7.9	2460	17.3	<0.01	0.005	0.592	<0.001	0.0001	0.002	0.004	0.008	44677	0.004	0.738	0.001	<0.01	0.795	<0.0001	8.01	3330	47	104	558	4	35.3	530	21	<1	<1	931	931	34	1.82	0.04	<0.01	0.04	0.04	1740	
	15-Nov-11	1030	14.51	14.98	8.05	2800	23.1																																	
	2-Apr-12	1040	14.83	15.30	8.25	1620	24	0.03	<0.001	0.277	<0.001	<0.0001	<0.001	<0.001	0.008	0.07	<0.001	0.011	<0.001	<0.01	0.534	<0.0001	8.23	1970	29	81	327	3	22.4	390	19	<1	<1	528	528	22	1.02	<0.01	<0.01	0.19	0.19	1050	
	20-Jun-12	1040	15.42	15.89	8.2	1160	18.4																																			Lillydale windmill
	12-Sep-12	1020	15.13	15.60	8.14	2590	18.1	<0.01	0.002	0.325	<0.001	0.0031	<0.001	<0.001	0.033	0.33	<0.001	0.066	0.006	<0.01	0.599	<0.0001	8.3	2770	29	74	549	5	31.6	420	16	<1	<1	1030	1030	32.8	1.93	<0.01	<0.01	0.1	0.1	1640	
	7-Dec-12	0945	17.09	17.56	7.89	1975	21.7																																			
	18-Mar-13	0950	15.42	15.89	7.91	2910	23.3	<0.01	0.004	0.396	<0.001	<0.0001	<0.001	<0.001	0.003	2.7	<0.001	0.122	<0.001	<0.01	0.834	<0.0001	8.1	3280	39	128	520	5	35.2	545	27	<1	<1	847	847	32	3.44	0.15	<0.01	<0.01	<0.01	1830	
	9-Jul-13	1200	15.06	15.53	7.89	1843	12.5																																			
	6-Sep-13	1240	15.43	15.90	7.49	910	17.4	<0.01	0.002	0.287	<0.001	0.0017	<0.001	<0.001	0.017	0.95	0.029	0.033	0.001	<0.01	1.52	<0.0001	7.9	956	56	37	89	2	9.76	102	41	<1	<1	283	283	9.39	1.96	<0.01				514	
	10-Dec-13	1000	15.40	15.87	7.9	2760	24.2																																			
	4-Mar-14	1005	15.53	16.00	8	2240	23.4	0.02	0.004	0.465	<0.001	0.0048	<0.001	0.001	0.082	2.15	0.037	0.352	0.001	<0.01	2.91	<0.0001	8.04	2420	42	76	527	3	31.4	330	19	<1	<1	781	781	25.3	10.6	0.07				1260	
	30-May-14	1040	15.65	16.12	8	2610	20.5																																			
	3-Sep-14	1120			8	2650	20.1	<0.01	<0.001	0.422	<0.001	0.0008	<0.001	<0.001	0.009	0.15	0.005	0.018	0.001	<0.01	1.27	<0.0001	8.1	3110	18	106	414	4	29.2	471	30	<1	<1	995	995	33.8	7.27	0.02	<0.01	0.02	0.02	1650	
	19-Nov-14	1015			7.9	2730	21.8																																			
	25-Feb-15	1010			7.9	2820	24.7	<0.01	0.006	0.561	<0.001	0.0001	<0.001	0.004	0.005	3.5	<0.001	0.493	<0.001	<0.01	0.342	<0.0001	8.19	2970	52	98	528	4	33.7	437	21	<1	<1	992	992	32.6	1.69	0.1	<0.01	0.01	0.01	1420	
	20-May-15	1005			7.8	3090	17.2																																			
	1-Sep-15	1010			7.9	1349	12.9	0.01	0.007	0.169	<0.001	0.0007	<0.001	0.005	0.041	7.45	0.005	0.267	0.001	<0.01	6.91	<0.0001	8.17	1360	26	52	202	3	14.4	173	16	<1	<1	397	397	13.1	4.66	0.03	<0.01	1.09	1.09	654	
Werona Bore	**9-Sep-09**	1245			7.68	5150	19.3		<0.001	0.325	<0.001	<0.0001	0.001	<0.001	0.001	<0.05	<0.001	0.014	<0.001	<0.01	0.01	<0.0001		5210	152	257	572	10	53.9	1390	108	<1	<1	501	501	51.4	2.3	0.1					
(bore equipped)	**2-Dec-09**	1405			8.0	5770	25.9	<0.01	<0.001				<0.005		0.01	<0.05	<0.001	0.00	<0.001		<0.005	<0.0001	8.16	5220	48	280	624	11	52.9	16580	120	<1	<1	354	354	56.1	2.98		0.07	1.83	1.9		
	16-Feb-10	1235	16.73	17.36																																						
	17-May-10	1255			7.8	5510	16.8	<0.01	<0.001				<0.005		0.001	<0.05	<0.001	0.01	<0.001		<0.005	<0.0001	7.74	5100	157	288	656	7	60.2	1520	141	<1	<1	497	497	55.7	3.94		0.02	1.31			
	31-Aug-10	1200			8.4	4410	19.9																																		
	15-Nov-10	1245																																							No access
	8-Mar-11	1020			7.76	4200	25	0.18	<0.001				<0.001		0.002	0.29	<0.001	0.01	0.001		0.006	<0.0001	7.96	5060	136	262	601	11	54.8	1380	117	<1	<1	514	514	51.5	3.08		0.02	1.06	1.08		Bore covered by pump
	14-Jun-11	1100			7.85	3870	17.5																																		Bore covered by pump
	21-Sep-11	910			8.05	3200	19.7	0.08	<0.001	0.172	<0.001	<0.0001	<0.001	<0.001	0.002	0.07	<0.001	0.02	0.002	<0.01	0.018	<0.0001	8.03	4410	122	208	486	8	44.6	1070	92	<1	<1	512	512	42.3	2.55	0.03	0.02	1.09	1.11		Bore covered by pump
	6-Jan-12	1030			7.92	2745	23.8																																		bore covered by pump
	3-Apr-12	0840			7.55	3150	22.2	0.05	<0.001	0.251	<0.001	<0.0001	<0.001	<0.001	0.003	0.06	<0.001	0.01	0.001	<0.01	0.008	<0.0001	8.14	3840	94	201	483	8	42.4	1030	93	<1	<1	462	462	40.2	2.68	0.16	<0.01	0.04	0.04	2230	bore covered by pump
	20-Jun-12	1230			8.13	3070	14.5																																		bore covered by pump - from dam fed by bore
	20-Sep-12	0950			7.68	3730	22	0.81	0.001	0.184	<0.001	0.0001	0.002	0.001	0.006	0.92	<0.001	0.076	0.002	<0.01	0.021	<0.0001	8.04	4290	71	199	461	10	40.2	1040	96	<1	<1	513	513	41.6	1.67	<0.01	<0.01	0.42	0.42	2260	bore covered by pump
	7-Dec-12	1210			8.08	3410	26.8																																		bore covered by pump
	18-Mar-13	1215			8.16	3470	24.3	0.72	<0.001	0.147	<0.001	<0.0001	<0.001	<0.001	0.006	0.84	<0.001	0.022	0.002	<0.01	0.023	<0.0001	8.04	3900	78	194	476	10	40.8	935	88	<1	<1	439	439	37	4.92	0.04	<0.01	0.04	0.04	2250	bore covered by pump
	9-Jul-13	1110																																							pump cap over bore - pump off genset removed
	6-Sep-13	1125																																							pump cap over bore - pump off genset removed
	10-Dec-13	1200																																							Pump over bore
	4-Mar-14																																								Pump over bore
	5-Jun-14	1115																																							Pump over bore, genset removed
	3-Sep-14																																								Pump over bore
	19-Nov-14																																								Pump over bore
	25-Feb-15																																								Pump over bore
	20-May-15																																								Pump over bore
	1-Sep-15																																								Pump over bore
22497	**21-Dec-09**	1520	15.31	15.31	5.59	3600	25.4	<0.01	<0.001				<0.001		0.004	<0.05	<0.001	0.180	0.006		0.261	<0.0001	7.41	3600	12	155	770	54	48.2	1140	12	<1	<1	246	246	37.4	12.5		<0.01	0.05	0.05		
	16-Feb-10	0950	15.19	15.19																																						
	17-May-10	1010	15.36	15.36	7.3	5400	19.3	<0.01	<0.001				<0.005		0.001	<0.05	<0.001	0.236	0.004		0.214	<0.0001	7.69	3460	69	201	350	14	35.6	1010	8.29	<1	<1	233	233	33.2	3.43		<0.01	0.09			
	31-Aug-10	0920	15.47	15.47	7.8	3770	19.2																																			
	23-Nov-10	1410	15.46	15.46	7.3	2730	24.4																																			
	9-Mar-11	950	15.05	15.35	7.73	2210	23.1	0.2	<0.001				<0.001		0.147	9.89	0.016	0.24	0.001		0.946	<0.0001	8.21	2190	49	127	211	24	22.7	665	5	<1	<1	232	232	23.5	1.66		0.31	1.16	1.47		
	14-Jun-11	930	15.02	15.32	7.75	2880	19.4																																			
	20-Sep-11	940	15.18	15.48	7.8	2450	23.1	0.02	0.001	0.217	<0.001	<0.0001	<0.001	<0.001	0.017			0.22	0.002	0.178	6.89	<0.0001	7.79	3500	58	171	303	23	30.7	898	<1	<1	<1	251	251	30.4	0.63	16.4	0.07	0.07	0.14	1530	
	15-Dec-11	0940	15.26	15.56	7.3	3150	21.7																																			
	2-Apr-12	0945	14.52	14.82	7.3	2610	23.8	0.01	<0.001	0.206	<0.001	<0.0001	<0.001	<0.001	0.063	7.95	0.009	0.32	<0.001	<0.01	0.435	<0.0001	7.9	3190	65	176	321	30	32.5	973	3	<1	<1	276	276	33	0.87	19	0.3	0.19	0.49	1890	
	20-Jun-12	0950	14.55	14.85	7.7	3420	20.2																																			Coocooboonah back-tyres on bore
	12-Sep-12	0930	14.60	14.90	8.0	3150	21.7	0.15	<0.001	0.292	<0.001	0.0012	<0.001	<0.001	0.17	21.2	0.08	0.088	0.005	<0.01	2.8	<0.0001	7.85	3560	50	183	337	30	33	1030	<1	<1	<1	261	261	34.3	1.92	19.1	0.11	<0.01	0.11	1860	
	7-Dec-12	0905	14.79	15.09	7.8	3200	21.9																																			
	18-Mar-13	0900	14.88	15.18	7.7	3240	20.8	0.14	0.002	0.336	<0.001	0.0006	0.002	0.001	0.159	19.2	0.041	0.417	0.003	<0.01	<0.005	<0.0001	7.79	3580	48	179	335	34	32.6	900	3	<1	<1	276	276	31	2.52	38.7	0.12	0.06	0.18	1770	
	9-Jul-13	1255	15.14	15.44	7.7	3430	19.6																																			
	6-Sep-13	1340	15.20	15.50	7.83	3560	22.5	0.16	0.001	0.547	<0.001	0.0004	0.002	<0.001	1.11	31	0.097	0.506	0.007	<0.01	1.96	<0.0001	7.84	3900	48	195	371	34	35.4	1010	<1	<1	<1	209	209	32.7	4.08	32.2				1910	
	10-Dec-13	930	15.39	15.59	7.8	3480	22.7																																			
	4-Mar-14	930	15.50	15.80	7.5	3730	21.6	0.04	<0.001	0.613	<0.001	0.0002	0.001	<0.001	0.068	7.38	0.007	0.239	0.002	<0.01	0.238	<0.0001	7.81	4000	49	194	468	31	39.6	1100	4	<1	<1	169	169	34.5	6.84	29				2410	
	5-Jun-14	945	15.64	15.84	7.8	3740	19.3																																			
	3-Sep-14	910	15.60	15.80	7.6	3810	20.8	0.52	0.002	0.91	<0.001	0.0014	0.004	0.002	0.461	66.9	0.148	1.04	0.03	0.02	7.73	<0.0001	7.67	3970	49	173	302	30	30.6	1040	2	<1	<1	158	158	32.5	3.09	22.9	0.03	0.1	0.13	2100	
	19-Nov-14	925	15.76	16.06	7.3	3840	21.6																																			
	25-Feb-15	915	15.90	16.20	7.4	3830	21.9	0.19	<0.001	0.648	<0.001	0.0008	0.001	<0.001	0.229	17.4	0.032	0.22	0.007	<0.01	1.15	<0.0001	7.84	3980	67	188	348	30	34.7	1150	<1	<1	<1	147	147	35.4	0.94	24.8	0.04	<0.01	0.02	2070	
	20-May-15	925	15.85	16.15	7.4	3880	20.3																																			
	1-Sep-15	930	15.93	16.23	7.3	3620	17.8	0.08	<0.001	0.889	<0.001	<0.0001	<0.001	<0.001	0.007	7.74	0.002	0.221	0.002	<0.01	0.154	<0.0001	7.74	3900	76	174	345	34	34	905	<1	<1	<1	130	130	28.1	9.44	19.9	<0.01	0.02	0.02	2440	
45061	**17-May-10**	1000	9.10	9.20	5.59	3600	25.4	<0.01	<0.001				<0.001		0.004	<0.05	<0.001	0.180	0.006		0.261	<0.0001	7.41	3600	12	155	770	54	48.2	1140	12	<1	<1	246	246	37.4	12.5		<0.01	0.05	0.05		
	31-Aug-10	850	9.10	9.20																																						
	23-Nov-10	1345	9.05	9.15	7.3	5400	19.3	<0.01	<0.001				<0.005		0.001	<0.05	<0.001	0.236	0.004		0.214	<0.0001	7.69	3460	69	201	350	14	35.6	1010	8.29	<1	<1	233	233	33.2	3.43		<0.01	0.09			
	9-Mar-11	920	9.06	9.16	7.8	3770	19.2																																			
	14-Jun-11	910	8.95	9.05	7.3	2730	24.4																																			
	20-Sep-11	910	8.86	8.96	7.73	2210	23.1	0.2	<0.001				<0.001		0.147	9.89	0.016	0.24	0.001		0.946	<0.0001	8.21	2190	49	127	211	24	22.7	665	5	<1	<1	232	232	23.5	1.66		0.31	1.16	1.47		
	15-Dec-11	920	8.86	8.96	7.75	2880	19.4																																			
	2-Apr-12	915	8.67	8.77	7.8	2450	23.1	0.02	0.001	0.217	<0.001	<0.0001	<0.001	<0.001	0.017			0.22	0.002	0.178	6.89	<0.0001	7.79	3500	58	171	303	23	30.7	898	<1	<1	<1	251	251	30.4	0.63	16.4	0.07	0.07	0.14	1530	
	20-Jun-12	920	8.52	8.62																																					Windmill over bore
	12-Sep-12	900	8.39	3.49																																					Windmill over bore
	7-Dec-12	0845	8.33	8.43																																					Windmill over bore
	18-Mar-13	0840	8.34	8.44																																					Windmill over bore
	9-Jul-13	1315																																							no access casing collapsed - windmill over bore
	6-Sep-13	0920	8.33	8.43																																					Windmill over bore - rusty casing broken
	10-Dec-13	910	8.38	8.48																																					Windmill over bore, casing broken
	4-Mar-14																																								Windmill over bore
	5-Jun-14	840	8.47	8.57																																					Windmill over bore
	3-Sep-14																																								Windmill over bore
	19-Nov-14	900	8.58	8.68																																					Windmill over bore
	25-Feb-15	845	8.65	8.75																																					Windmill over bore
	20-May-15	900	8.71	8.81																																					Windmill over bore
	1-Sep-15	900	8.75	8.85																																					Windmill over bore
3709	**21-Jun-11**	910			7.05	4420	18.5																																			Covered by Pump
	22-Sep-11	1100			6.76	4937	20.1																																			Ivanhoe tank tap

Site ID	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Dissolved 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	Nitrate as N	Nitrite and Nitrate as N (NOX)	Total Dissolved Solids	Comments
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L								
ANZECC guideline*								**5**	**0.5**			**0.01**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**											**4000**	
	3-Apr-12	1200			7.05	4340	25.5	0.57	0.011	0.314	<0.001	0.0003	0.002	<0.001	1.41	26	0.117	0.048	0.003	0.03	4.15	<0.0001	7.9	5520	128	232	848	18	62.8	1400	100	<1	<1	767	767	56.9	4.94	<0.01	0.02	6.12	6.14	3220	Ivanhoe tank tap
	11-Jul-12	1115			7.29	4480	17.8																																			Pump over bore
	11-Oct-12	850			7.08	5570	19.2	0.01	0.001	0.294	<0.001	<0.0001	<0.001	<0.001	0.034	3.36	0.004	0.033	0.002	<0.01	1.93	<0.0001	7.76	6550	157	235	925	15	67.8	1710	142	<1	<1	849	849	68.2	0.28	0.02	0.05	0.47	0.52	3560	Ivanhoe tank tap
	7-Dec-12	1125			6.95	5470	24.7																																			Pump over bore
	18-Mar-13	1045	14.58	14.98																																						Pump cap over bore
	11-Apr-13	0900			6.99	5560	21.4	<0.01	0.001	0.261	<0.001	0.0004	<0.001	<0.001	0.021	0.77	0.006	0.016	<0.001	<0.01	4.7	<0.0001	7.54	5960	142	225	700	19	56.5	1300	97	<1	<1	783	783	54.3	1.97	<0.01	<0.01	2.69	2.69	3340	
	11-Sep-13	0830			7.03	5460	20.2	0.07	0.003	0.331	<0.001	0.0006	0.001	<0.001	0.104	4.52	0.03	0.03	0.002	<0.01	1.67	<0.0001	7.6	6200	147	217	888	14	64.2	1420	96	<1	<1	831	831	58.7	4.48	<0.01				3660	
	4-Mar-14	0830			7	5860	21.6	<0.01	0.003	0.294	<0.001	0.0001	<0.001	<0.001	0.03	0.73	0.002	0.02	0.002	<0.01	0.584	<0.0001	7.18	6470	154	229	830	14	63	1510	105	<1	<1	842	842	61.6	1.1	<0.01				3490	
	5-Jun-14	920																																							Pump over bore
	3-Sep-14	0930			6.9	5990	20.1	0.02	0.002	0.256	<0.001	0.0002	<0.001	<0.001	0.022	1.1	0.003	0.02	0.001	<0.01	1.1	<0.0001	7.33	6360	154	240	825	16	63.7	1660	101	<1	<1	931	931	67.5	2.91	0.02	<0.01	0.62	0.62	3630	
	12-Dec-14	1215			7.2	6260	22.4																																			
	5-Mar-15	1100			6.9	6220	22.9	<0.01	<0.001	0.312	<0.001	0.0001	<0.001	<0.001	0.014	1.92	<0.001	0.042	0.003	<0.01	0.828	<0.0001	7.21	6100	158	240	926	11	68.2	1560	102	<1	<1	898	898	64.1	3.1	0.03	0.07	0.38	0.45	3580	
	27-May-15	1040			6.7	5330	20.4																																			
	16-Sep-15	930			7	5410	20.8	0.01	0.003	0.24	<0.001	<0.0001	0.003	<0.001	0.046	2.5	0.004	0.018	0.002	<0.01	0.637	<0.0001	7.38	5890	146	238	807	11	62.2	1410	80	<1	<1	866	866	58.7	2.89	0.03	0.02	0.8	0.82	2330	
44677	**15-Dec-11**	1200			7.1	4080	24																																			Bore covered
	2-Apr-12	1300			7.2	3810	25.2	<0.01	<0.001	0.462	<0.001	<0.0001	<0.001	<0.001	0.004	<0.05	<0.001	<0.001	<0.001	<0.01	0.019	<0.0001	7.71	4790	202	253	531	6	54.2	1380	81	<1	<1	524	524	51.1	2.91	<0.01	<0.01	3.18	3.18	2980	Bore covered
	20-Jun-12	1320			7.1	4370	18.1																																			Bore covered with scale and grass
	12-Sep-12	1230			7.1	4360	22.8	<0.01	<0.001	0.406	<0.001	<0.0001	<0.001	<0.001	0.002	<0.05	<0.001	<0.001	<0.001	<0.01	0.013	<0.0001	7.53	4880	99	244	504	6	47.1	1280	72	<1	<1	586	586	49.3	2.31	0.06	<0.01	3.01	3.01	2750	
	7-Dec-12	1115			7.1	4320	23.9																																			Bore covered with scale and grass
	18-Mar-13	1120			7.0	4340	22.7	<0.01	0.001	0.44	<0.001	<0.0001	<0.001	<0.001	0.003	<0.05	0.017	<0.001	<0.001	<0.01	0.037	<0.0001	7.42	4910	188	236	523	5	51.7	1260	77	<1	<1	525	525	47.6	4.07	<0.01	<0.01	3.43	3.43	2770	Bore covered with scale
	9-Jul-13	1130			8.3	4470	17.1																																			Bore covered with scale
	6-Sep-13	1140			7.06	4420	23	<0.01	<0.001	0.466	<0.001	<0.0001	<0.001	<0.001	0.009	<0.05	<0.001	0.002	<0.001	<0.01	0.052	<0.0001	7.52	4920	180	237	518	5	51.2	1200	73	<1	<1	556	556	46.5	4.78	0.02				3040	
	10-Dec-13	1215			7.1	4520	27.2																																			Bore covered with scale
	4-Mar-14	1120			7	4530	23.6	<0.01	<0.001	0.494	<0.001	<0.0001	<0.001	<0.001	0.003	<0.05	<0.001	<0.001	<0.001	<0.01	0.022	<0.0001	7.45	4940	183	231	561	5	52.7	1210	77	<1	<1	546	546	46.6	6.06	<0.01				2990	
	5-Jun-14	1055			7	4650	16.8																																			
	3-Sep-14	1430			7.3	4550	21.2	0.01	<0.001	0.461	<0.001	<0.0001	<0.001	<0.001	0.004	<0.05	<0.001	0.001	<0.001	<0.01	0.063	<0.0001	7.52	4900	194	365	652	5	60	1040	70	<1	<1	590	590	42.6	17	0.01	<0.01	3.6	3.6	2900	
	19-Nov-14	1250	ore covered with sca		7.3	4630	24.9																																			
	25-Feb-15	1320			7.2	4620	26.2	0.02	<0.001	0.455	<0.001	<0.0001	<0.001	<0.001	0.004	<0.05	<0.001	0.002	0.001	<0.01	0.027	<0.0001	7.74	4870	192	243	501	5	51.5	1250	83	<1	<1	559	559	48.2	3.35	0.04	0.01	3.6	3.61	3110	
	20-May-15	1255			7.2	4640	25.3																																			
	1-Sep-15	1150			7.4	4780	18.4	0.01	<0.001	0.439	<0.001	<0.0001	<0.001	<0.001	0.014	<0.05	0.002	0.004	0.012	<0.01	0.567	<0.0001	7.81	5070	209	220	494	5	50.2	1010	73	<1	<1	618	618	42.4	8.42	0.07	<0.01	2.9	2.9	5070	

* ANZECC guideline - stock drinking water (cattle)