

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
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	06-11-2018
MOP end date	05-11-2025
Annual review start date	01-01-2020
Annual review end date	31-12-2020
<p>I, Daryl Robinson, certify that this audit report is a true and accurate record of the compliance status of Sunnyside Coal Mine for the period January 1st 2020 until December 31th 2020, and that I am authorised to make this statement on behalf of Namoi Mining Pty Ltd.</p> <p>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.</p> <p>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).</p>	
Name of authorised reporting officer	Daryl Robinson
Title of authorised reporting officer	Closed Mines and Rehabilitation Manager
Signature of authorised reporting officer	
Date: 30/07/2021	

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1 STATEMENT OF COMPLIANCE

The compliance status of the Sunnyside Coal Mine as at 31st December 2020 is summarised in Table 1a. Non-compliances that occurred during the reporting period are listed in Table 1b, and non-compliances from previous reporting periods that still require management action.

Table 1a - Statement of Compliance

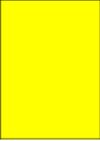
Were all conditions of the relevant approval(s) complied with?	
PA 06_0308 Consolidated	Yes
EPL 12957	Yes
ML 1624	Yes
WAL 29537	Yes

Table 1b - Non-compliances

Relevant Approval	Schedule (Condition) Number	Condition Description (summary)	Compliance status	Comment	Where Addressed in Annual Review
PA 06_0308	Condition 3(18)	Particulate matter emissions generated by the development do not cause exceedances of the daily 24hr dust of 50 µg/m ³	Dust readings exceeded the level on 3 occasions	Exceedances were due to regional dust event	Section 7.1.3 and 12.2
PA 06_0308	Condition 3(18)	Deposited dust annual average to be below 4 g/m ² /moth	Two very high readings were recorded in Jan 2020 and February 2020 causing annual average to exceed criteria	Exceedances were due to regional dust event	Section 7.1.3 and 12.2

Note: Non-compliances identified within the Independent Environmental Audit undertaken during a previous reporting period (2019) are listed in Table 11.

Compliance status key for Table 1b

Risk level	Colour code	Description
High		Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium		Non-compliance with: <ul style="list-style-type: none">• potential for serious environmental consequences, but is unlikely to occur; or• potential for moderate environmental consequences, but is likely to occur
Low		Non-compliance with: <ul style="list-style-type: none">• potential for moderate environmental consequences, but is unlikely to occur; or• potential for low environmental consequences, but is likely to occur

2 INTRODUCTION

This is the twelfth Annual Review (AR), formerly Annual Environmental Management Report, produced for the Sunnyside Coal Mine (SCM), 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 (consolidated). The AR follows the format required by the NSW Government Annual Review Guideline (October 2015).

Covering the period from 1st January 2020 to 31st December 2020 (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).

Mining and coal transporting operations at SCM ceased in May 2013, with recommencement of mining activities on 12th September 2017. Mining operations for coal ceased in August 2019, with coal crushing and transporting activities ceasing on the 27th of October 2019. Site activities are currently limited to aftercare, maintenance water management and rehabilitation.

2.1 Mine Contacts

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

- Mr Daryl Robinson, Closed Mines and Rehabilitation Manager, (02) 6740 7000
- Bernie O'Neill, General Manager Open Cut Operations - oversees Open Cut Operations for the Whitehaven Group. Contact: (02) 6741 9325.
- Mr Andrew Raal, Superintendent Closed Mines – oversees day to day environmental and rehabilitation performance across the site. Contact: (02) 6740 7009

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Note site is in full closure, all fixed infrastructure, sealed roads, stockpiles, bunds, some water structures ect. have been removed.

Figure 1
June 2021

Datum: MGA Zone 56 **Author:** A.Raal **Image:** LiDAR, March 2021
Date: August-2020 **Size/Scale:** 1:8,000 (A3)

ML1624	Koala Fence	Secondary Domain
Water Storage	Limit of out of pit overburden	Conservation area (Koala Corridor)
Heritage Site	Limit of extraction (opencut)	Final Depression High Wall

3 APPROVALS

3.1 Tenements, Licences, and Approvals

Table 3.1 identifies the approvals in place for SCM at the end of the reporting period, the issuing / responsible Authority, dates of issue, expiry date and relevant comments.

Table 3.1 – Tenements, Licences and Approvals

Issuing Responsible Authority /	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Department of Planning, Industry and Environment (DPIE)	Project Approval (PA) 06_0308	24 th September 2008	5 th November 2020	PA modified December 2016 to update Annual Review period.
Environment Protection Authority (EPA)	Environment Protection Licence No. 12957	19 th September 2017	N/A	Update to reflect recommencement of operations
Resource Regulator (NSW Resources and Geoscience (RR)	ML 1624	5 th November 2008	5 th November 2029	
Division of Resources and Geoscience	Mining Operations Plan (MOP)	6 th November 2018	5 th November 2025	Amendment A submitted (August 2020)
Department of Primary Industry - Water	WAL 29537 (90WA822534)	27 th April 2009	17 th January 2025	Mining
	90BL253767	9 th Feb 2007	Perpetuity	Test
	90BL253768	9 th Feb 2007	Perpetuity	Test
	90BL253769	9 th Feb 2007	Perpetuity	Test
	90BL254686	26 th Mar 2008	Perpetuity	Monitoring
	90BL254687	26 th Mar 2008	Perpetuity	Monitoring
	90BL254688	26 th Mar 2008	Perpetuity	Monitoring
	90BL254689	26 th Mar 2008	Perpetuity	Monitoring
	90BL254690	26 th Mar 2008	Perpetuity	Monitoring

4 OPERATIONS SUMMARY

4.1 Mining Operations

Mining operations during the reporting period included bulk rehabilitation earthworks, handling of waste rock/overburden material, rehabilitation activities. Table 4.1 presents the Production Summary at the end of the reporting period.

Table 4.1 – Production Summary

Material	Approved Limit	Previous Reporting Period (actual)	This Reporting Period (actual)	Next Reporting Period (forecast)
Waste Rock/Overburden	4.9 M m ³ ¹	1,584,472 m ³	0	0
ROM Coal/Ore	1 Mtpa ²	244,865 t	0	0
Reject material	n/a	0	0	0
Saleable Product	n/a	396,235 t	0	0

¹ Environmental Assessment

² PA 06_0308 Consolidated

4.2 Other Operations

4.2.1 Hours of Operations

Mining operations were undertaken during the reporting period within permitted operating times, i.e. 7:00am to 10:00pm Monday to Friday and 7:00am to 6:00pm on Saturdays, and not on public holidays.

4.2.2 Infrastructure Management

All fixed infrastructure has been dismantled and removed including all bitumen from internal roads. Fuel tanks were removed.

Remaining infrastructure includes one demountable building, and three water tanks and koala fence.

4.2.3 Exploration Drilling

There was no exploration drilling undertaken during the period.

4.3 Next Reporting Period

Site is in aftercare and maintenance. The site gate has been locked and the site is only accessed for inspection and ongoing maintenance. Remaining activities is to establish a highwall drain to prevent any run-on water from the Sunnyside hill from cascading down the highwall slopes. Authorisation for the highwall drain will be sought. Rehabilitation trial for effectiveness of seed coatings is planned for 2021.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Site noise Management Plan is to be updated and approved prior to the cessation of site noise monitoring. Noise Management Plan was update and approve by DPIE on the 21 September 2020. As required the 2019 approved annual review was updated onto Whitehaven Coal public web site.

6 ENVIRONMENTAL PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the SCM, together with monitoring data for the reporting period. Existing monitoring sites are given in Figure 6. 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 SCM are specified in PA 06_0308 (consolidated) Schedule 3, Tables 7, 8 & 9, which are summarised below.

- Acceptable mean annual increase in deposited dust – 2 g/m²/month.
- Mean annual dust deposition (all sources) – 4 g/m²/month.
- Mean annual Total Suspended Particulate (TSP) matter (all sources) concentration – 90 µg/m³.
- Mean annual PM₁₀ particulate level – 30 µg/m³.
- 24 hour average PM₁₀ particulate level – 50 µg/m³.

Monitoring of deposited dust is undertaken on a continuous monthly basis whilst PM₁₀ levels are monitored every 6 days.

6.1.2 Environmental Management Measures

In order to satisfy the criteria identified above, SCM implemented the following controls during the reporting period

- Training and discussion of dust during adverse weather conditions with equipment operators, including requirement to report any dust
- Reduced unsealed road haulage or cessation of operations during high rainfall events to maintain road surfaces in good condition
- Use of extra water cart as required during strong winds, and if any excessive dust is noticed
- Conducting inspections that align with our T.A.R.P process for adverse weather conditions and monitoring the whole operation, which includes, cessation of operations during extreme weather where dust can't be controlled.

6.1.3 Dust Monitoring

Deposited Dust

Depositional dust monitoring data for the reporting period is given in Table 6.1.3a.

Table 6.1.3a Deposited Dust Monitoring Data Summary

Site (Figure 2)	EPL ID no.	Property Name	Approval Criteria Annual mean (g/m ² /month)	Annual Mean Total Insoluble Solids (g/m ² /month)
SD1	1	Ferndale	4	1.72
SD3	2	Plainview	4	7.01
SD4		Lilydale	4	1.01
SD5	4	Ivanhoe	4	2.14
SD6	5	Illili	4	1.87
SD7	6	Innisvale	4	1.21
SD8		Woodlawn	4	1.86

Annual average for all depositional gauges were below guideline levels of annual average of 4 g/m²/month except for SD3 which had very high readings of 58.5 in January and 9.0 g/m²/month in February 2020, which put the annual average over the approved criteria.

The high levels recorded were due to dust storms and bushfire smoke. The NSW DPIE air quality website noted 11 exceptional days in January and February 2020.

HVAS/PM10 Dust

SCM has one High Volume Air Sampler (HVAS - PM₁₀) located at the property Illili (EPL ID 7), to the north-west of the mine site which takes a sample every 6 days for a 24h period. The annual mean value for 2020 was 13.65 µg/m³ within the EA annual prediction of 22.1 µg/m³. Sixty one samples were taken with 3 events that were over the 24h 50 µg/m³ guideline limit (Table 6.1.3b). These were on the 3 and 9th of January and 2nd February 2020 with readings of **76.8**, **80.5** and **50.4** µg/m³ respectively. The NSW DPIE air quality index (AQI) for far north slopes recorded exceptional days on 1, 4, 5, 9, 11, 20, 21, 23, 25 of January and 3, 19 February 2020. The 3 exceedances occurred either on the on an exceptional day or within 24h of a recorded exceptional event. The exceedances were reported to DPIE on the 28th of April 2020.

Table 6.1.3b – PM10 Monitoring Summary

Month	PM10 (µg/m ³)					
Jan	76.8	80.5	38.1	48.3	11.7	
Feb	50.4	1.6	6.4	24.1	12.2	
Mar	23.2	4.6	7	24	8.1	
Apr	7.2	5.5	8.7	7.7	14.6	
May	0.1	7.4	3.1	6.7	1.8	
Jun	6.5	6.2	6	4.4	0.7	
Jul	4.9	4.5	<0.1	1.9	<0.1	5.4
Aug	4.3	4.1	1.9	1.5	8.5	
Sep	6.3	2.6	15.6	10.7	11.4	
Oct	12.6	10	33.4	9.9	6.8	
Nov	25.5	10.3	25.1	19.9	16.6	
Dec	12.3	21.5	7.4	1.9	4.8	

The 12 month rolling average for 2020 is given in the Figures 6.1.3c & d. The first chart is with full data set and the second chart has the exceptional events removed.

Figure 6.1.3c Illili PM10 Annual Rolling Average (full data set)

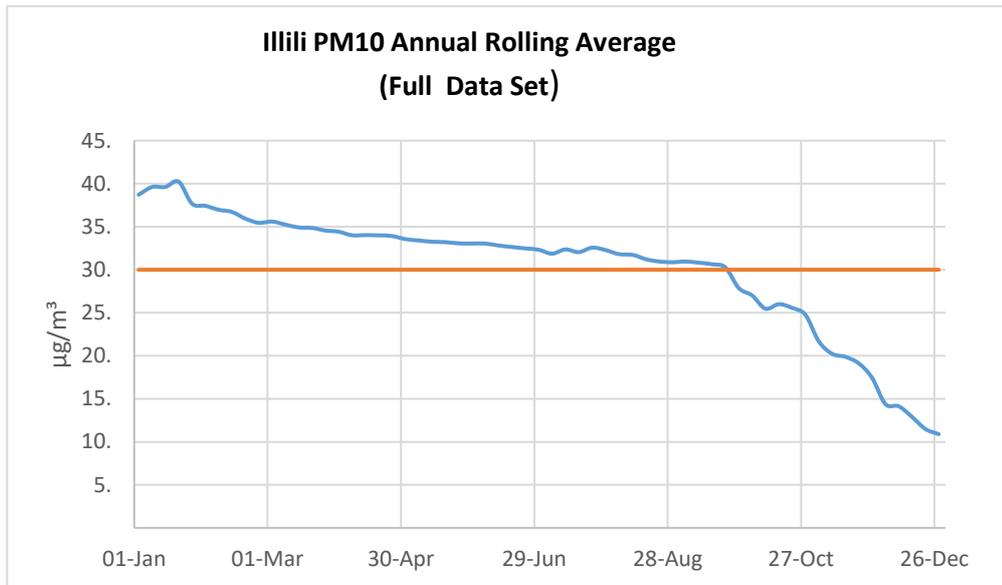
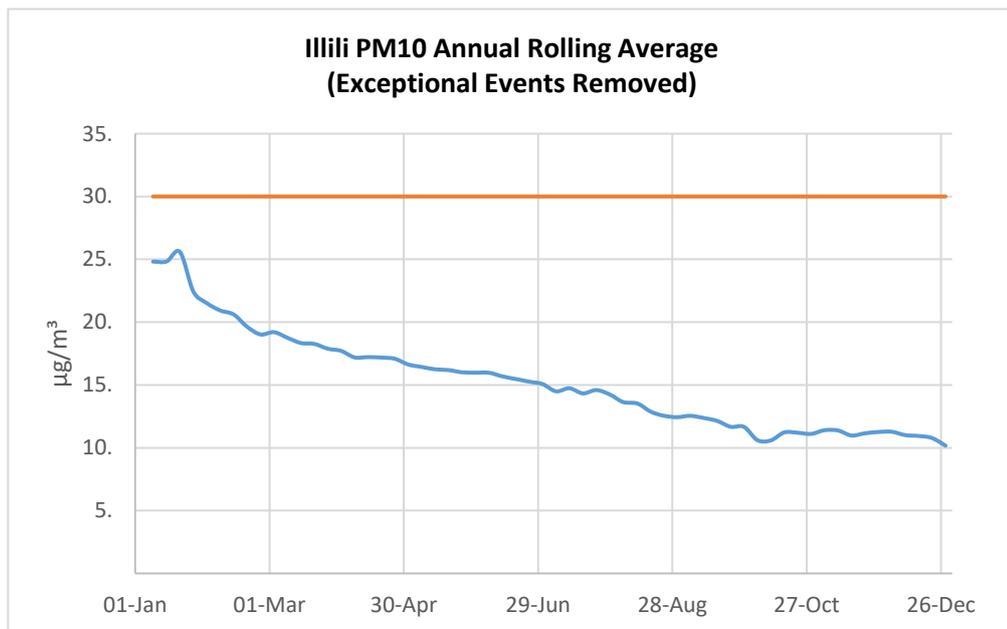


Figure 6.1.3d Illili PM10 Annual Rolling Average (edited data set)



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, as activities will be limited to aftercare and maintenance.

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 Coochoonah 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 Coccooboonah 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.

6.2.3 Ecological Monitoring

A detailed annual ecological assessment of rehabilitated areas and analogue sites was undertaken by Aspect Ecology Pty Ltd in October 2020. Monitoring was undertaken using the Whitehaven Annual Rehabilitation Monitoring Methodology (WARMM—Aspect Ecology 2020a).

Monitoring in the Woodland Domain comprised:

- One repeat analogue grassy white box woodland site;
- One newly established analogue grassy white box woodland site; and
- Six woodland rehabilitation structural sites:
 - Three repeat monitoring plots previously established within 2010 rehabilitation;
 - Three repeat monitoring plots established by Aspect Ecology in 2019—one within each of the rehabilitation years 2011, 2012 and 2013

Monitoring in the Pasture Domain comprised:

- Three newly established analogue sites in adjacent pastures;
- Two newly established monitoring transects in 2019 and 2020 rehabilitation; and
- Categorical point assessments at notable locations within the Pasture rehabilitation, aimed at highlighting priority areas and further improving rehabilitation data spatial coverage.

Monitoring in the Conservation Domain comprised:

- Categorical point assessments at notable locations within the recently planted areas, aimed at providing ecological data on the Conservation Domain.
- Plotless quantitative estimates of planted tree seedling abundance and survival rate.

6.2.3.1 WOODLAND DOMAIN

Groundcover

Native vegetation, leaf litter and mulch and are collectively termed “vegetative surface cover” (CMOP tbl 17 & 25). As exotic vegetation is at odds with the Woodland Domain objective, only the combined contribution of litter and native vegetation was assessed as contributing to the cover target. The completion criteria state that vegetative surface cover is to be greater than 85% (CMOP tbl 17).

All values observed in the rehabilitation in 2020 were below the minimum completion criteria value of 85% (Figure 6.2.3a). The target value observed in the local PCT 589 in 2020 was lower than the completion criteria value, with 74% observed (Figure 1). Among rehabilitation sites in 2020, desirable cover was lowest at the 2010 site SSR1114 with 26% (± 10.3), and this was also the site that had the greatest decrease since 2019, reducing by 15.2% (from 41.2% in 2019). The highest value was observed at the 2013 site SSR19184 (51% ± 5.6), and this site saw the greatest year-to-year increase (31%), with almost all of this increase (29%) driven by the native vegetation cover component. Sites SSR19104 (2010), SSR19194 (2011) and SSR19124 (2012) all had very similar vegetative surface cover results, all close to 40% (Figure 6.2.3a).

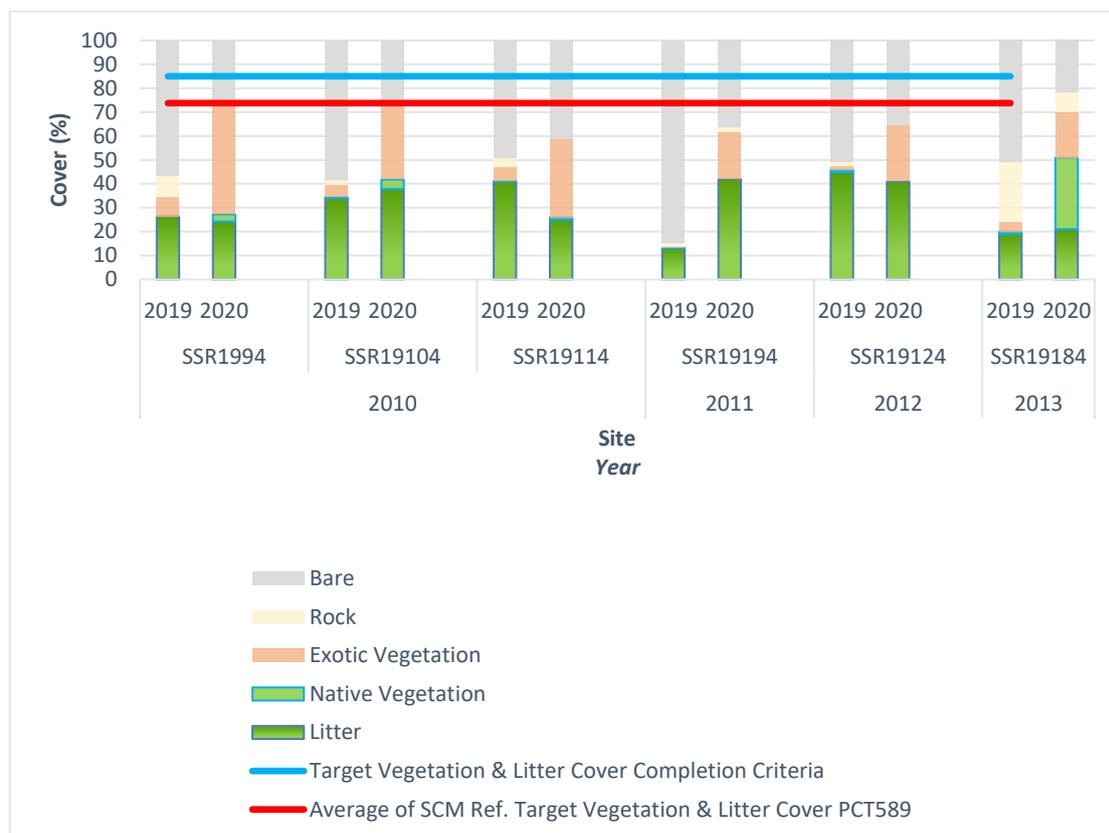


Figure 6.2.3a Average Percentage Cover of Groundcover Components within each Rehabilitation Year at Sunnyside Coal Mine, comparing the 2019 and 2020 Monitoring Seasons.

< 2m Tall Tree Density

< 2m tall tree density comprised mostly of seedling planted in 2020, with a few individuals from previous planting campaigns. The highest seedling densities were found in the SSR19104 (50 stems/ha) and SSR1994 (70 stems/ha). This reflects the relatively high density of seedling plantings carried out in sections of the 2010 rehabilitation in 2020, which was warranted due to the low density of established trees in that rehabilitation year (see Aspect Ecology 2020b, Figure 4-5). However, the 2010 site SSR19114 also evidently received a dense planting of seedlings, but had the second lowest density (10 stems/ha) due to very high seedling mortality (130 stems/ha). The 2011 and 2012 sites had 30 and 20 stems/ha, respectively. The 2013 site SSR19184 had 0 stems/ha, reflecting the fact that that it had not been planted with seedlings in 2020, due to having adequate densities of trees. Many seedlings throughout the Sunnyside rehabilitation appeared water stressed and in decline.

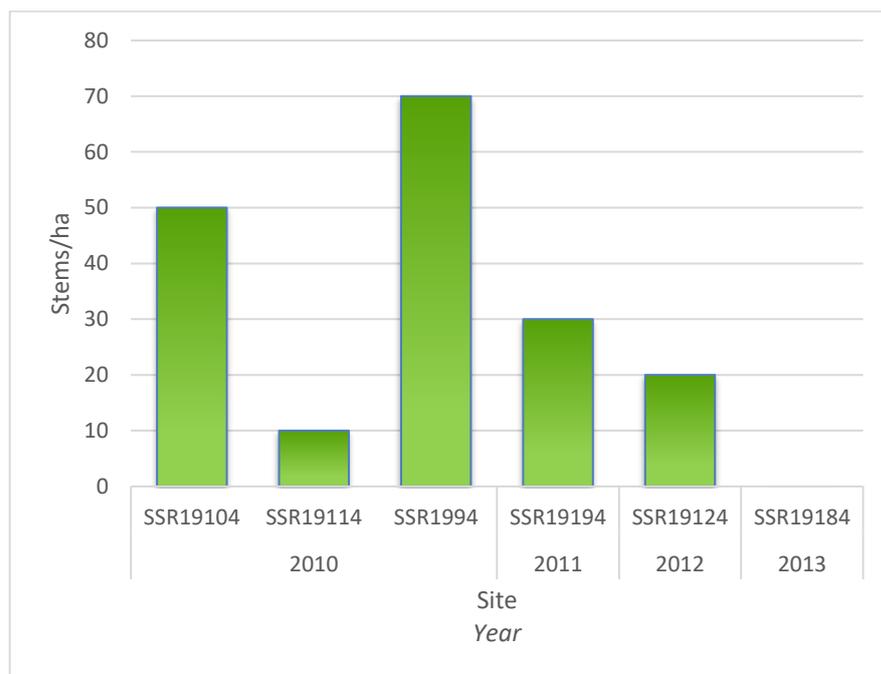


Figure 6.2.3b Density of tree seedlings within rehabilitation sites at Sunnyside Coal Mine, grouped by year seeded

Fauna

Noted habitat features included occasional small rocks and the developing tree canopy, and a bird's nest. Animals sighted included Eastern Grey Kangaroos and a pair of finches. Macropods scats were almost always present within sites. Pig scats were observed at one sites and pig tracks at another. Fox scats were also frequently observed.

6.2.3.2 CONSERVATION DOMAIN

With the Conservation Domain at Sunnyside, 14% of Rehabilitation Point Assessment (RPAs—Aspect Ecology 2020a) had a seedling abundance rating of “occasional”, with the remaining proportions equally split between “frequent”, “common”, and “abundant” (Table 6.2.3.3).

Table 6.2.3.3 Categorical Abundance of seedlings as a percentage of 2020 RPA sites in the Sunnyside Conservation Domain

Abundance	Percentage of RPAs
3 - occasional	14%
4 - frequent	29%
5 - common	29%
6 - abundant	29%

The RPA methodology (Aspect Ecology 2020a) was modified to incorporate an assessment of tree seedling survival. This methodology was applied to areas of the conservation domain planted with seedlings in 2020 (Figure 1). Seedling survival was estimated to be above 50% at all 2020 plantings, with overall average survival estimated at 77%. Two plantings were estimated to have excellent survival rates of 97%.



Figure 6.2.3b Seedling Survival Estimates based on RPAs within the Conservation Domain at Sunnyside Mine

6.2.3.3 PASTURE DOMAIN

Groundcover

The average combined total of bare ground and litter exceeded the completion criteria minimum of 85% within both the 2019 and 2020 rehabilitation (Figure 6.2.3.4). However, a large proportion of the species were annuals and therefore this level of cover may decline over time if perennials do not establish.



Figure 6.2.3.4 Combined Pasture completion criteria ground cover components (vegetation, leaf litter, and mulch) at Sunnyside Mine. Line shows minimum MOP completion criteria target of 85%. Bars show standard error of the mean.

Species Composition

At both sites the dominant grass was Oats (*Avena sativa*). Saltbush (*Einadia* spp.) were common, as were Medics (*Medicago* spp.).

6.2.3.4 RECOMMENDATIONS

It is recommended that:

- 2020 tree seedling plantings be monitored for health and regularly watered as necessary;
- additional seedling plantings be carried out where there has been high seedling mortality, especially in the 2010 rehabilitation in the vicinity of site SSR19114;
- monitor pasture rehabilitation for the establishment of perennial grasses, and introduce supplementary seed of appropriate species if necessary; and
- take steps improve native groundcover diversity, using species recorded in the analogue sites, once the necessary techniques are determined.

6.2.4 Weeds

Site Weed inspections are undertaken quarterly by consultants (Hunter Land Management), and annually during the detailed ecological monitoring. Additional weed inspection with management recommendations was undertaken by an agronomist from Pinnacle Agriculture. Main weeds found on site include: Catheads, Saffron Thistle, Patterson Curse, Yellowvine, Pigweed, Marshmallow, Blue Heliotrope, Boggabri weed, St Barnaby's Thistle.

A site wide program of weed spraying was undertaken in March and June 2020.

6.2.5 Feral Animal Control

Two camera traps were established during the last reporting period to monitor wildlife numbers and movement at Sunnyside. Results indicated a scarcity of Wild dogs, cats, pig, rabbit, hare and deer, with a low population of foxes, and high abundance of kangaroos.

Fox baiting using 1080 was undertaken in May and December 2020 over a period of 4 weeks, baits were checked weekly and replaced. Bait take up in May was higher than in December, likely due to more feed been available due to high rodent numbers in the area.

6.2.6 Koala Management

During the reporting period no koalas were spotted onsite by mine personal. AMBS Ecology & Heritage undertook two nights of koala spotting with thermal cameras in October 2020. No Koalas were found during the survey.

Some koala activity was recorded by the camera trap on the northern section of the mining lease.

Tree planting was undertaken in August 2020. 1,402 Hiko seedlings were planted on the, east and west koala corridors.

6.2.7 Performance/Management Issues

No major issues.

6.2.8 Proposed Improvements to Environmental Management

Improved rainfall has led to improved grass cover and vegetation cover. A strategy to manage tropical grasses and increase the number of native grass species is being developed.

A vegetation trial on the use of seed coating will start in 2021.

6.3 Blasting

There is no further blasting to occur on site.

6.3.1 Proposed Improvements to Environmental Management

No improvements are proposed for the next reporting period. All blasting at the mine site has ceased. Blast monitors have been decommissioned and removed.

6.4 Operational Noise

6.4.1 Criteria

Operational noise criteria for SCM are specified in PA 06_0308 and EPL 12957, as follows:

Location	Day	Evening
	L _{Aeq} (15 min)	L _{Aeq} (15 min)
All privately-owned land	35	35

6.4.2 Environmental Management Measures

Control of noise generation and propagation at the mine is by a combination of general source and propagation path methods including:

- Where operationally feasible, scheduling activities to minimise operation of equipment in exposed locations when winds are blowing towards residences and elevated locations when temperature inversions are present;
- Equipment removal or replacement;
- Changing operational procedures;
- Reduced hours of operations;
- Enclosure of fixed items of plant, e.g. generators;
- Bunding close to noise sources to create obstructions to the propagation path;
- On-going site road maintenance using the mine-based grader; and
- Regular equipment maintenance.

6.4.3 Noise Monitoring Results

Attended monitoring was conducted for the first 2 quarters of 2020. Approval to no longer carry out attended noise monitoring was received from the EPA and the Noise management plan was amended accordingly and was approved by DPIE in September 2020. Attended noise monitoring is repeated for each site over a 3-day period. A summary of the results for the three quarters are presented in Table 6.4.3. With the maximum recorded value being listed. During the reporting period there were no recorded exceedances of the monitoring criteria.

Table 6.4.3 - Summary of quarterly noise monitoring results

2020 Noise Monitoring Summary				
Monitoring repeated over 3 days, only highest reading shown				
Quarter	Station	Period	L _{Aeq} 15min I/A = Mine noise Inaudible	Exceedance
Q1 March 2020	Ferndale	Day	<30	No
	Ferndale	Evening	I/A	No
	Glendower	Day	<30	No

2020 Noise Monitoring Summary				
Monitoring repeated over 3 days, only highest reading shown				
Quarter	Station	Period	LAeq 15min I/A = Mine noise Inaudible	Exceedance
	Glendowe I/A	Evening	I/A	No
	Illili	Day	<30	No
	Illili	Evening	I/A	No
	Innisvale	Day	I/A	No
	Innisvale	Evening	I/A	No
	Plainview	Day	I/A	No
	Plainview	Evening	I/A	No
	Woodlawn	Day	I/A	No
	Woodlawn	Evening	I/A	No
Q2 July 2020	Ferndale	Day	I/A	No
	Ferndale	Evening	I/A	No
	Glendower	Day	20	No
	Glendower	Evening	I/A	No
	Illili	Day	25	No
	Illili	Evening	I/A	No
	Innisvale	Day	I/A	No
	Innisvale	Evening	I/A	No
	Plainview	Day	I/A	No
	Plainview	Evening	I/A	No
	Woodlawn	Day	I/A	No
	Woodlawn	Evening	I/A	No

6.4.4 Key Environmental Performance/Management Issues

Key issue to maintain noise levels was ensuring maintenance of equipment, that it operated according to manufacturing specifications.

6.4.5 Proposed Improvements to Environmental Management

None there is no permanent stationed equipment on site. Any maintenance activities will be during day hours.

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 6.5.2. 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 Consolidated.

6.5.2 Consultation

No soil stripping of previously undisturbed areas took place during the reporting period. No additional Aboriginal cultural heritage items were discovered during the reporting period and no consultation with Aboriginal stakeholders was conducted. Known heritage sites are listed in Table 6.5.2. A review of heritage sites found that site OS1 was not previously registered. It was reinvestigated by consultant Archaeologist (Whincop archaeology) and the site was registered with AHIMS in July 2020 as Sunnyside – OS1.

Table 6.5.2 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		

6.5.3 Key Environmental Performance/Management Issues

The preservation conveyor belt strip was removed from the axe grinding grove that is located south of the mine pit, as blasting is no longer taking place. Inspections found no impact on the heritage site.

6.5.4 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

A carbonaceous test procedure was developed to identify and manage any carbonaceous material within 5m of the final landform. A total of 99 test pits to identify carbonaceous material with potential for spontaneous combustion were dug to at least 5m below final landform. Of those five test pits had carbonaceous material with potential for spontaneous combustion. The areas surrounding those test pits were dug out and carbonaceous material removed to the base of the void.

6.7.2 Key Environmental Performance/Management Issues

No incidence of spontaneous combustion occurred.

6.7.3 Proposed Improvements to Environmental Management

As final rehabilitation has been completed and conformation that there is no material with a potential for spontaneous combustion within 5m of the final landform, no further management activities are required.

6.8 Bushfire Management

6.8.1 Environmental Management Measures

SCM is located within an area of cleared agricultural land.

Measures to deal with bushfires include the following;

- Hot work permit system to manage activities that could potentially cause fire.
- A fully equipped firefighting trailer is kept onsite.
- Whitehaven Coal have engaged a firefighting contract company LRM Fire and Rescue on a retainer bases to assist in case of any fire breakout.

6.8.2 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

6.9 Waste Management

Removal of standard wastes (general domestic, hydrocarbons {oils, grease, oil filters, oily rags etc.}, vehicle batteries, sewage and recyclable) was removed from site by a dedicated waste contractor. Site collection of waste is arrange by site clerk as required. Waste levels in bins are inspected monthly by site environmental officer, no issues with standard waste occurred during the reporting period.

Additional waste generated as part of site closure included scrap steel, concrete, and bitumen from demolition of ROM Pad, coal loader gantry, weigh bridge, site workshop and onsite sealed roads. Waste streams were sampled using the EPA guidelines for general solid waste (EPA, Part 1 Classifying waste 2014). All waste were within specification for general solid waste disposal.

Additional waste streams associated with site demolition that was disposed off site include the following;

- Disposal of 409.6t of recovered bitumen road surface to Gunnedah Shire Council
- Disposal of 195.24t of concrete to Gunnedah Shire Council
- 10t of Hydrocarbon contaminated soil collected by Namoi Waste for disposal at SUEZ Kemp's Creek facility.

Remaining waste on site includes;

- 37 large tyres
- 9 small truck types
- 260m³ of Bitumen and gravel mix stockpiled on surface

6.9.1 Proposed Improvements to Environmental Management

Mine site has closed and there is no additional waste being generate. No improvements are proposed within the next reporting period.

6.9.1 Key Environmental Performance/Management Issues

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

6.10 Environmental Performance Summary

An environmental performance summary for SCM is presented in 7.9.

Table 6.10 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	Numerous PM10 exceedances of the 24h limit of 50 $\mu\text{g}/\text{m}^3$	Major impact from dust storms and regional smoke, ash and dusty conditions.	Ongoing implementation of the Air Quality Management Plan throughout Closure phase.
Biodiversity	EIS prediction of no impact on known koala population.	No recorded impact on koala population. No koala deaths recorded onsite.	Nil	Additional tree planting in the koala corridors
Heritage	EIS prediction of potential blast impact on a recorded site.	No recorded impact on site.	Nil	Blasting has ceased on site
Spontaneous Combustion	EIS prediction of no material spontaneous combustion	No in-pit spontaneous combustion found during the year.	Nil	Test pitting for carbonaceous material to ensure no material with potential for SponCom within 5m of final landform has been completed.
Noise	35dB	No exceedances	Nil	Site activities limited to aftercare and maintenance.
Blasting	<115dB overpressure	No exceedances	Nil- all blasting has ceased.	Nil.

7 WATER MANAGEMENT

The SCM 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 Coochooboonah Creek which flows north-west within a constructed waterway paralleling Coochooboonah 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 Coochooboonah Creek ultimately flowing into the Namoi River to the north.

The design of sediment dams within the disturbed area of the mine limits the opportunity for discharge of runoff from mine-disturbed area, i.e. after appropriate settling 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). Two additional monitoring points are nominated on the EPL for water quality monitoring during discharge events. These are Coochooboonah Creek Upstream (CCUS – EPL ID No. 11) and Coochooboonah Creek Downstream (CCDS – EPL ID No. 12).

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).

7.1.2 Surface Water Monitoring Results

SCM has a requirement to undertake surface water monitoring on a quarterly basis in addition to the monitoring of any wet weather discharge event.

Summary of water quality results are given in Table 7.1.2, and complete surface water quality monitoring results are provided in Appendix 1.

Table 7.1.2 Summary Surface Water Monitoring Results

Storage	No. Samples	Oil and Grease	Conductivity $\mu\text{S}/\text{cm}$	pH
SD4	3	<5	233	7.4
Production Bore Dam	0	Dam removed		
Void	1	8.1	4,700	8.1
SB4	2	<5	4,950	7.5
SD3	2	5	91	7.21
SB2	4	6	7,210	8.25
SD2	0	Dam removed		

Quarterly monitoring results show that water quality within onsite storages was generally consistent with historical analysis. SD3 and SB4 were dry in November 2020. As part of rehabilitation non-essential dams were removed this included SD2, Production Bore dam and the Void was backfilled (Nov 2020) above groundwater level.

There were no wet weather discharges during the reporting period.

7.1.3 Key Environmental Performance/Management Issues

No non-conformances or changes were made to surface water management program during the reporting period.

7.1.4 Proposed Improvements to Environmental Management

No improvements are proposed within the next reporting period.

7.1.5 Water Take

SCM groundwater licence (WAL 29537) is for 120 units from the Gunnedah - Oxley Basin. Groundwater Sources used during the reporting period was approximately 26.76ML with additional 26.8ML rainfall capture (Table 7.1.5).

Table 7.1.5 - Water Take

Extraction Point	Type	Monitoring	Extraction ML
Werona Bore (Decommissioned)	Bore hole	Flow meter	0
Bore in historic underground working	Bore hole	Flow Meter	0
Pit Void (Access to Void closed due to rehabilitation activities).	Subsurface seepage into pit	None	0
Surface storage dams	Rainfall capture	Survey and estimation	110.4ML
Total			110.4ML

Water storage on site at end of reporting year was limited to SB2, as only source of water onsite was rainfall capture and water from other on site storages was transferred to SB2.

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 7.2.2. 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 which no longer functions.
- Standing Water Level (SWL) data is unavailable for bores 27356, 44884, 3709
- Werona bore pump was last used in 2019. Since then the bore pump and generator have been removed. Water levels have risen from 21.49mbgl (March 2020) to 19.22mbgl (Dec 2020).

Table 7.2.2 - 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	To determine existing status and any impacts
901460	GW901460 90BL249138	“Illili”	Quarterly	Six monthly*5	
27356	GW027356 90BL020042	“Sunnyside”	Quarterly	Six monthly*5	
45061	N/A	“Coochooboonah”	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			

7.2.2.1 Groundwater levels

Groundwater levels have remained stable with slight rise in sync with increased rainfall at year end Figure 7.2.2.1a & b. Piezometer P3 sits on the western edge of the pit and was impacted by drought conditions in 2019 and since has stabilised in 2020. Mine void was closed and made free draining in December 2020. P3 water levels are expected to rise.

Figure 7.2.2.1a - Monitoring piezometer water depth

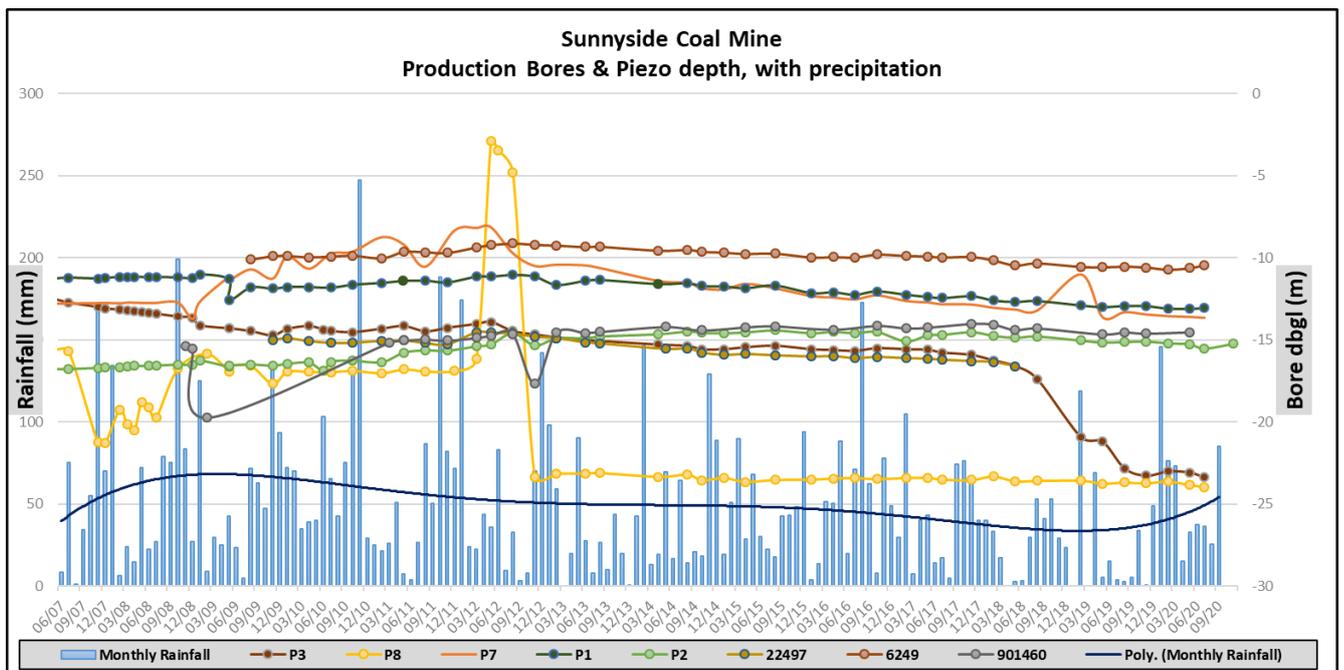
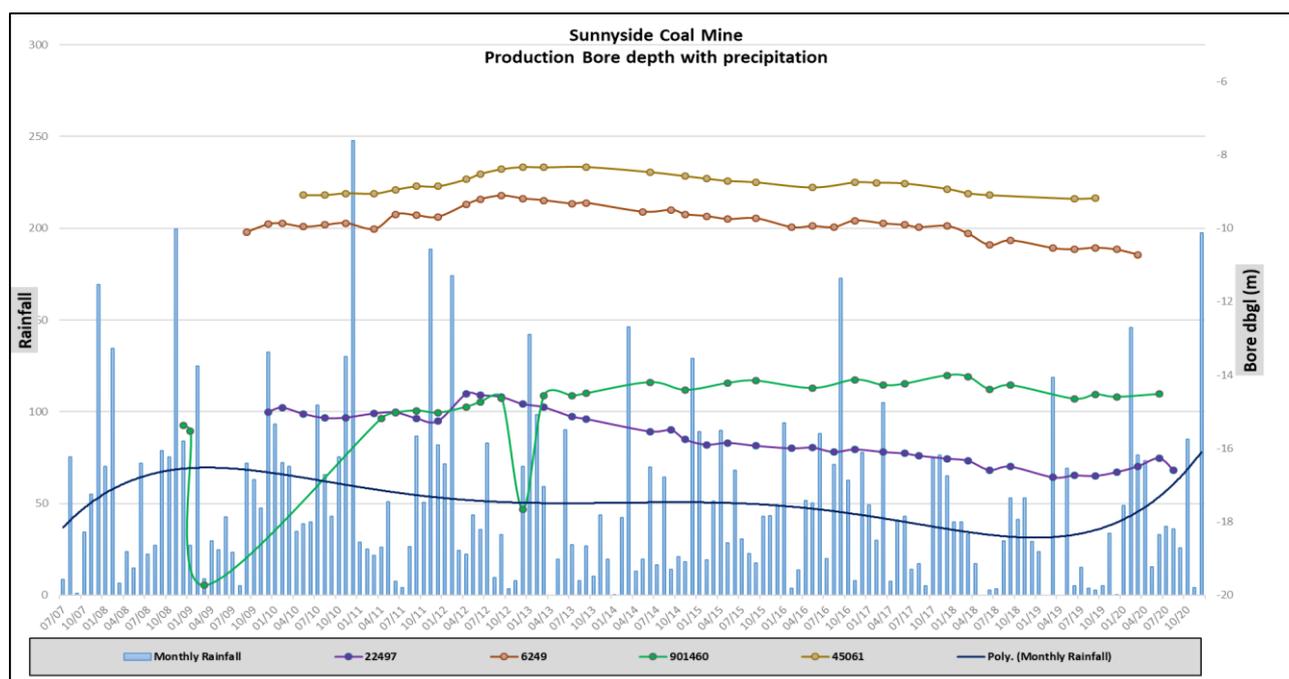


Figure 7.2.2.1b Production bore water depth



7.2.3 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). Groundwater has constant quality (very low metals, and pH between 7-8) across the monitoring region except for sodium and associated conductivity which varies depending on local geology and groundwater source. Sodium levels fluctuate from 114mg/l (Piezometer P8) to 877mg/l (Piezometer P3). Piezometer P3 electrical conductivity dropped from 12,600 μ S/cm to 8,130 μ S/cm.

7.2.4 Groundwater Management

There is no groundwater extraction and the void has been backfilled and is free draining. Groundwater from surrounding bores, as well as the mine piezometers will continue to be monitored to assess any changes in groundwater quality or level.

7.2.5 Key Environmental Performance/Management Issues

Pumping from the Werona Production bore continued and due to dry conditions and shortage of water on site, water from the historic underground working was utilised from an access bore.

7.2.6 Proposed Improvements to Environmental Management

No proposed improvements. Ongoing monitoring to monitor for any changes.

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 Figure 9. For next reporting period only temporary water infrastructure (1.08ha) will remain for rehabilitation, they will be kept operational for up to five years.

Outstanding rehabilitation works include:

- Two remaining exploration drill holes require sealing
- Two water dams (1.08ha) to be removed and filled after vegetation has successfully established and rehabilitation is safe and stable.
- Highwall drain to divert rainfall run-on water away from the highwall batters
- Aftercare and maintenance of rehabilitated areas and infill planting where required

Table 8.1.1 Rehabilitation Status

Mine Area Type ¹	Previous Reporting Period	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2019	2020	2021
A. Total Mine Footprint	107.82	107.82	107.82
B. Total Active Disturbance	54.12	1.08	**1.08
C. Land Being Prepared for Rehabilitation	36.01	0	0
D. Land Under Active Rehabilitation	17.69	97.02	97.02
E. Completed Rehabilitation	0	0	0

Footprint exclude 17.6ha conservation area (Koala Corridors)

**Two dams to be filled/rehabilitated after ecosystem sustainability has been achieved

8.1.2 Post Rehabilitation Land Uses

The overall closure goal for the Sunnyside Coal Mine is to establish a stable and safe landform that is commensurate with the surrounding topography and which maximises the return to an appropriate agricultural land use comparable to the pre-mining land use, but is considerate of the fact that the landform is a backfilled mining area.

The post-mining landform will include approximately 17.6 hectares (ha) of land rehabilitated with woodland species on dump and highwall slopes to enhance biodiversity values of the area, with additional, ±17.2 ha of trees planted on areas undisturbed by mining activities along the eastern, northern and western boundaries of the property to enhance the wildlife corridors (Conservation).

8.1.3 Rehabilitation Undertaken

Total of 79.33ha was taken to ecosystem establishment including 51.2ha shaped to final landform. Additional infill planting included;

- August 2020 850 dump infill planting of Hiko seedlings
- August 2020 1,402 Hiko seedlings planted in Koala Corridors (conservation)

8.1.4 Rehabilitation Monitoring

Monitoring consists of;

- Quarterly monitoring for weeds and feral animals by Hunter Land Management (HLM) and a consultant agronomic is use for weed identification and treatment recommendations. Weed monitoring was also undertaken by local Agronomist.
- Monthly site inspection by site environmental officer for weeds, feral animals, visual condition of planted tube stock and for signs of erosion.
- Annual detailed ecological assessment of rehabilitated areas and analogue sites by consultant ecologists.
- Two camera traps were installed in 2018 to monitor for feral animal abundance and wildlife movement.
- A camera was placed on Sunnyside highwall that takes daily photograph of site changes over the southern rehabilitated void and discard dump.

8.1.5 Weeds Management

Weed management is discussed in section 6.2.4.

8.1.6 Renovation or Removal of Buildings

All fixed building and tanks, concrete pads, bitumen road base were removed. Concrete and bitumen was taken to Gunnedah Shire Council tip.

8.1.7 Other Rehabilitation Undertaken

No further rehabilitation was undertaken.

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

Sunnyside closure MOP was approved in January 2019, Amendment was submitted in August 2020. There were no variations against the Closure MOP.

8.1.10 Trials, Research Projects and Initiatives

No rehabilitation trials, research projects or other initiatives were undertaken during the reporting period. Seed coating trial will be established in the first quarter 2021 at the site of the rehabilitated ROM pad.

8.1.11 Key Issues to Achieving Successful Rehabilitation

Three key issues to achieving successful rehabilitation are:-

- Design of final landform stability and drainage,
- Establishment of vegetation species to meet Plant Community Types (PCT).
- Burial of all carbonaceous material at depth.

8.2 Actions for Next Reporting Period

- Infill planting of tree tube stock where required
- Ongoing Weed management,
- Rehabilitation/sealing of two remaining exploration drill holes.
- Establishing high wall drain.

9 COMMUNITY

SCM 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.

Last five years of complaints are listed in Table 9. Due to the low number of complaints graphing the data is not practical.

Table 9 - Community Complaints

Community complaints			
Year	Number of complaints	Aspect	Comment
2020	None		
2019	None		
2018	1	Water	Metallic taste in rainwater tank
2017	None		
2016	1	Air quality	Odor and fumes from mine
2015	None		

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

Community contributions are managed regionally by Whitehaven Coal corporate office.

10 INDEPENDENT AUDIT

An Independent Environmental Audit (IEA) was undertaken by ERM on 11th to 13th September in 2019.

Non-compliances with project approvals identified by the IEA were risk ranked by the auditor in accordance with the compliance status key for

Table 1b, and SCM subsequently developed an Audit Action Plan for these non-compliances. Items from the 2019 Audit Action Plan, and their due date, are summarised in Table 10. All actions have been completed with the required timeframe.

Next IEA is scheduled for September 2022.

Table 11 2019 IEA Outstanding Action Table

Condition/Plan	IEA Proposed Action	IEA Action Status
<i>Minister's Conditions of Approval PA 06_0308</i>		
3.2.7	Water Management Plan to be updated in accordance with Schedule 5 Condition 5.	Closed
5.5A	Develop document and record tracking system.	Closed
<i>Minister's Conditions of Approval PA 06_0308</i>		
5.5A	Ensure that a review of management plans is undertaken to ensure alignment with the latest MOD and that this review and future reviews consider the Rehabilitation and Landscape Management Plan.	Closed
5.10	Ensure monthly EPL monitoring data is included within the Published Monthly EPL monitoring data published on the website. Ensure complaints are updated on the website on a monthly basis. Where no complaints are received, upload a complaint register stipulating this.	Closed
Statement of Commitments		
5.3	In the next modification of the CoA, request an update of the SoC to remove timing requirements for removal of industrial waste.	Ongoing
9.16	Where mature vegetation clearing activities are conducted, ensure records of vegetation clearance permits are maintained.	Closed

9.17	Where vegetation disturbance is to occur, ensure associated permit, inspection and control measures are in place to manage the potential identification and relocation of nesting and roosting hollows, as well as nests.	Closed
12.5	Ensure that training provided to all staff and contractors, is appropriately detailed that it supports the commitment to “help raise awareness and ameliorate any impact on heritage sites”.	Closed
16.2	Develop formal induction kit for new non-local employees, where applicable.	Closed
Mining Lease 1624		
3b	Ensure that when the MOP is next updated this inconsistency is removed.	Closed
Water Management Plan		
3.2.7	Review and update WMP to establish groundwater trigger levels, benchmarks and contingency criteria. It should be noted that coal mining at SCM is now complete and therefore interaction with the groundwater due to this activity is now ceased.	Closed

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 Reportable Incidents

None for the reporting period

11.2 Non-compliances

All of the non-compliances with PA 06_0308 were related to high dust levels as a result of regional dust storm events.

- Condition 3(18) of PA 06_0308 requires that particulate matter emissions generated by the development do not cause exceedances of the criteria provided in the Project Approval. As described in Section 7.1.3, the daily 24hr 50 µg/m³ criteria was exceeded on 3 occasions throughout the reporting period. The exceedance was deemed to be a result of elevated PM10 levels across the entire state, caused by a combination of bushfire smoke and dust storms. Exceedances were reported to DPIE.
- Condition 3(18) of PA 06_0308 requires that deposited dust annual average to be below 4 g/m²/moth. High readings in Jan and February 2020 of 58.5 and 9 g/m²/moth were recorded which put the annual average over criteria. The high readings are attributed to regional dust storms and bushfire smoke.

11.3 Regulatory Actions

No regulatory actions were issued to Sunnyside in 2020.

12 ACTIONS 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:-

- Undertake closure and rehabilitation activities in accordance with the MOP;
- The continuation of environmental monitoring and management;
- Review and revision of various Environmental Management Plans; and
- Continued community liaison and engagement with local stakeholders.

Appendix 1

SURFACE WATER MONITORING DATA

Data Point: Production Dam; Northing: 224418; Easting: 6570412

	20-Feb-18	09-May-18	04-Sep-18	21-Nov-18	18-Feb-19	13-May-19	05-Nov-20
Rec ID	72638	72639	72640	72641	72642	72643	77921
Lab Ref							89104
Antimony (total)		<0.001		0.001	0.001	0.001	
Arsenic-Total (mg/L)		<0.001		0.001	0.001	0.002	
Comments							NO
EC - Field	6,340	4,470	3,550	3,410	3,610	2,670	
Electrical Conductivity @ 25°C	6,630	4,700	3,800	4,070	3,740	2,790	
Molybdenum (total)		<0.001		0.001	0.001	0.001	
Oil & Grease	<5	<5	5	5	5	5	
pH (pH Unit)	8.7	7.9	8.1	7.7	7.8	8.8	
pH Value (pH Unit)	8.43	8.07	8.07	8.1	8.21	8.5	
Selenium-Total (mg/L)		<0.01		0.01	0.01	0.01	
Total Organic Carbon	12	1	4	3	7	8	
Total Suspended Solids (TSS)	43	6	25	14	32	67	

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: SB2; Northing: 224854; Easting: 6568067

	04-Feb-16	05-May-16	08-Aug-16	01-Nov-16	30-Jan-17	08-May-17	08-Aug-17	25-Aug-17	09-Nov-17	20-Feb-18	18-Feb-19	13-May-19	12-Aug-19
Rec ID	72529	72530	72531	72532	72533	72534	72535	72525	72536	72537	72538	72539	72540
Lab Ref													
Antimony (total)		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001		0.001	0.001	0.001
Appearance													
Arsenic-Total (mg/L)		0.002	<0.001			<0.001	0.001	0.002	0.002		0.002	0.002	0.002
Colour													
Comments													
EC - Field	294	292	390	279	285	433	380	446	1,760	6,770	7,290	2,070	4,770
Electrical Conductivity @ 25°C	308	292	386	243	273	350	383	497	1,690	7,070	8,040	2,140	4,430
Molybdenum (total)		<0.001	<0.001			0.002	0.001	0.003	0.008		0.05	0.046	0.059
Odour													
Oil & Grease	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
pH (pH Unit)	9.1	8.7	7.9	8.4	8.5	9.2	9	9.2	8.3	8.5	8.6	8.8	8.8
pH Value (pH Unit)	8.6	8.11	8.27	8.05	8.29	8.91	8.46	8.49	7.9	8.33	8.49	8.67	8.59
Selenium-Total (mg/L)		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01		0.01	0.01	0.01
Temperature													
Total Organic Carbon	4	8	4	4	6	6	6	4	11	4	6	2	3
Total Suspended Solids (TSS)	29	33	40	14	47	6	61	20	121	26	14	9	10

Outliers: 0

Field Name	Result	Outlier Comment

	12-Nov-19	06-Feb-20	12-May-20	06-Aug-20	05-Nov-20
Rec ID	72541	72542	72543	74805	77922
Lab Ref				88038	89105
Antimony (total)	0.001		<0.001	<0.001	<0.001
Appearance				Turbid	Turbid
Arsenic-Total (mg/L)	0.001		0.002	<0.001	0.002
Colour				Brown	Brown
Comments			Slight Turbid,		
EC - Field	5,170	7,910	423	420	350
Electrical Conductivity @ 25°C	5,390	7,210	440	429	331
Molybdenum (total)	0.034		0.005	0.003	0.004
Odour				Nil	Nil
Oil & Grease	<5	5	<5	6	<5
pH (pH Unit)	8.6	8.3	8.6	7.5	8.5
pH Value (pH Unit)	8.44	8.25	8.09	7.87	6.92
Selenium-Total (mg/L)	0.01		<0.01	<0.01	<0.01
Temperature				9	18.9
Total Organic Carbon	3	6	8	3	4
Total Suspended Solids (TSS)	13	250	79	53	44

Data Point: SB3; Northing: 224537.0332; Easting: 6569855.774

	21-Nov-18	05-Nov-20
Rec ID	72557	77923
Lab Ref		89106
Antimony (total)	0.001	
Arsenic-Total (mg/L)	0.001	
Comments		NO
EC - Field	6,410	
Electrical Conductivity @ 25°C	7,750	
Molybdenum (total)	0.002	
Oil & Grease	<5	
pH (pH Unit)	8.6	
pH Value (pH Unit)	8.51	
Selenium-Total (mg/L)	0.01	
Total Organic Carbon	3	
Total Suspended Solids (TSS)	11	

Outliers: 0

Field Name	Result	Outlier Comment
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Data Point: SB4; Northing: 224383.713; Easting: 6569783.0221

	01-Nov-16	20-Feb-18	13-May-19	12-Aug-19	12-Nov-19	06-Feb-20	12-May-20	05-Nov-20
Rec ID	72569	72570	72571	72572	72573	72574	72575	77924
Lab Ref								89107
Antimony (total)			0.001	0.001	<.001		<0.001	
Arsenic-Total (mg/L)			0.002	0.001	0.001		0.003	
Comments							Slight Turbid,	NO
EC - Field	255	6,340	210	3,480	3,460	4,950	633	
Electrical Conductivity @ 25°C	235	6,630	177	3,240	3,550	4,580	635	
Molybdenum (total)			0.002	0.001	0.001		0.003	
Oil & Grease	<5	<5	<5	<5	<5	<5	<5	
pH (pH Unit)	8.5	8.7	6.7	8	7.8	8.3	8.6	
pH Value (pH Unit)	7.62	8.43	7.69	8.24	8.01	8.28	8.07	
Selenium-Total (mg/L)			0.01	0.01	0.01		<0.01	
Total Organic Carbon	15	12	6	1	2	4	7	
Total Suspended Solids (TSS)	98	43	33	5	18	50	644	

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: SB5; Northing: 224944.083; Easting: 6569671.7898

	04-Feb-16	05-May-16	08-Aug-16	01-Nov-16	30-Jan-17	08-May-17	08-Aug-17	12-May-20	06-Aug-20	05-Nov-20
Rec ID	72590	72591	72592	72593	72594	72595	72596	72597	74806	77925
Lab Ref									88039	89108
Antimony (total)		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001
Appearance									Turbid	Turbid
Arsenic-Total (mg/L)						0.02	0.006	0.009	<0.001	0.006
Chloride (mg/L)		0.004	<0.001							
Colour									Brown	Brown
Comments								Turbid,		
EC - Field	105	135	142	143	156	262	159	108	130	135
Electrical Conductivity @ 25°C	106	101	150	117	81	254	163	125	126	124
Molybdenum (total)		<0.001	<0.001			<0.001	<0.001	<0.001	<0.001	<0.001
Odour									Nil	Nil
Oil & Grease	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
pH (pH Unit)	8	8.3	7.8	8	8.2	7.6	8.9	8	7.9	8.4
pH Value (pH Unit)	7.44	7.69	7.66	7.67	7.46	7.75	7.79	7.42	7.49	7.3
Selenium-Total (mg/L)		<0.01	<0.01			0.01	<0.01	<0.01	<0.01	<0.01
Temperature									6.7	15.8
Total Organic Carbon	4	6	4	4	2	8	4	3	4	5
Total Suspended Solids (TSS)	696	344	91	26	492	5,950	138	107	83	223

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: SD1; Northing: 225055.9165; Easting: 6569362.7446

	04-Feb-16	05-May-16	08-Aug-16	12-May-20	05-Nov-20
Rec ID	72605	72606	72607	72608	77926
Lab Ref					89109
Antimony (total)		<0.001	<0.001	<0.001	
Arsenic-Total (mg/L)		0.006	0.004	0.002	
Comments				Slight Turbid,	NO
EC - Field	240	332	258	331	
Electrical Conductivity @ 25°C	228	217	265	350	
Molybdenum (total)		0.002	0.001	0.001	
Oil & Grease	6	<5	<5	<5	
pH (pH Unit)	9.2	9.4	8.3	8.5	
pH Value (pH Unit)	8.03	8.45	7.97	8.1	
Selenium-Total (mg/L)		<0.01	<0.01	<0.01	
Total Organic Carbon	55	6	6	6	
Total Suspended Solids (TSS)	193	24	65	113	

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: SD2; Northing: 224648.2654; Easting: 6569332.6818

	13-May-19	05-Nov-20
Rec ID	72609	77927
Lab Ref		89110
Antimony (total)	<0.001	
Arsenic-Total (mg/L)	0.002	
Comments		NO
EC - Field	1,360	
Electrical Conductivity @ 25°C	1,370	
Molybdenum (total)	0.027	
Oil & Grease	<5	
pH (pH Unit)	8.8	
pH Value (pH Unit)	8.52	
Selenium-Total (mg/L)	0.01	
Total Organic Carbon	4	
Total Suspended Solids (TSS)	31	

Outliers: 0

Field Name	Result	Outlier Comment
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Data Point: SD3; Northing: 224662.6955; Easting: 6568025.5527

	13-May-19	12-May-20	06-Aug-20	05-Nov-20
Rec ID	72611	72612	74803	77928
Lab Ref			88036	89111
Antimony (total)	0.001	<0.001	<0.001	
Appearance			Turbid	
Arsenic-Total (mg/L)	0.001	<0.001	0.002	
Colour			Brown	
Comments		Turbid,		NO
EC - Field	70	53	69	
Electrical Conductivity @ 25°C	50	70	91	
Molybdenum (total)	0.001	<0.001	<0.001	
Odour			Nil	
Oil & Grease	<5	<5	5	
pH (pH Unit)	6.5	8	7.7	
pH Value (pH Unit)	7.54	7.21	6.49	
Selenium-Total (mg/L)	0.01	<0.01	<0.01	
Temperature			9.3	
Total Organic Carbon	6	6	30	
Total Suspended Solids (TSS)	47	136	430	

Outliers: 0

Field Name	Result	Outlier Comment
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Data Point: SD4; Northing: 224060.2377; Easting: 6568539.0248

	08-Aug-16	01-Nov-16	30-Jan-17	13-May-19	12-Aug-19	12-Nov-19	12-May-20	06-Aug-20	05-Nov-20
Rec ID	72631	72632	72633	72634	72635	72636	72637	74804	77929
Lab Ref								88037	89112
Antimony (total)	<0.001			<0.001	0.001	0.001	<0.001	<0.001	<0.001
Appearance								Turbid	Turbid
Arsenic-Total (mg/L)	0.012			0.002	0.002	0.002	<0.001	<0.001	0.003
Colour								Brown	Brown
Comments							Slight Turbid		
EC - Field	235	314	180	150	210	340	248	320	410
Electrical Conductivity @ 25°C	230	300	186	120	203	328	265	299	424
Molybdenum (total)	<0.001			<0.001	0.001	0.005	0.002	<0.001	0.005
Odour								Nil	Nil
Oil & Grease	<5	<5	<5	<5	<5	<5	6	12	<5
pH (pH Unit)	7.8	7.8	8.1	6.8	7.4	8.1	7.9	7.7	8.6
pH Value (pH Unit)	7.33	7.63	7.81	7.64	7.68	8.07	7.65	7.96	7.81
Selenium-Total (mg/L)	0.02			<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Temperature								8.6	17.2
Total Organic Carbon	12	13	11	8	10	13	13	12	21
Total Suspended Solids (TSS)	232	85	179	11	12	10	66	100	142

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: VOID (Sunnyside VOID); Northing: 224405.3582; Easting: 6568425.9888

	04-Feb-16	05-May-16	08-Aug-16	01-Nov-16	30-Jan-17	08-May-17	17-May-17	08-Aug-17	09-Nov-17	20-Feb-18	09-May-18	04-Sep-18	21-Nov-18
Rec ID	72662	72663	72664	72665	72666	72667	72658	72668	72669	72670	72671	72672	72673
Lab Ref													
Aluminium (total) (mg/L)		0.07				0.02					<0.01		
Antimony (total)												0.003	0.001
Arsenic-Total (mg/L)		<0.001				<0.001					0.004	0.006	0.001
Bicarbonate Alkalinity as CaCO3											747		
Carbonate Alkalinity as CaCO3											25		
Chloride (mg/L)													
Comments													
EC - Field	5,040	5,890	5,580	4,910	5,070	5,580	6,100	5,350	5,620	6,580	4,470	6,830	7,200
Electrical Conductivity @ 25°C	5,580	6,790	5,920	5,390	5,380	5,460	5,940	5,620	5,790	6,730	4,700	7,450	8,800
Hydroxide Alkalinity as CaCO3											<1		
Iron-Total (mg/L)											<0.05		
Manganese (total)						0.02					0.164		
Molybdenum (total)		<0.001										0.082	0.001
Oil & Grease	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	5	5
pH (pH Unit)	9.1	8.6	8.4	8.6	8.7	8.9	9.1	9.1	8.4	8.3	7.9	8.7	8.6
pH Value (pH Unit)	8.68	8.51	8.39	8.52	8.63	8.5	8.66	8.38	8.53	8.17	8.07	8.47	8.51
Selenium-Total (mg/L)												0.01	0.01
Sodium-Dissolved (mg/L)													
Total Alkalinity as CaCO3 (mg/L)											772		
Total Organic Carbon	1	2	2	3	3	2	3	3	2	3	1	2	2
Total Suspended Solids (TSS)	6	<5	<5	<5	16	6	7	29	8	40	<5	18	15

Outliers: 0

Field Name	Result	Outlier Comment
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	18-Feb-19	13-May-19	12-Aug-19	06-Feb-20	05-Nov-20
Rec ID	72674	72675	72676	72677	77930
Lab Ref					89113
Aluminium (total) (mg/L)		2.14			
Antimony (total)					
Arsenic-Total (mg/L)		0.002			
Bicarbonate Alkalinity as CaCO3		138			
Carbonate Alkalinity as CaCO3					
Chloride (mg/L)		238			
Comments					NO
EC - Field	7,310	1,390	2,910	5,070	
Electrical Conductivity @ 25°C	8,010	1,370	2,740	4,700	
Hydroxide Alkalinity as CaCO3					
Iron-Total (mg/L)		1.52			
Manganese (total)		0.061			
Molybdenum (total)					
Oil & Grease	<5	<5	<5	<5	
pH (pH Unit)	8.7	8.7	8.4	8.1	
pH Value (pH Unit)	8.46	8.58	8.54	8.34	
Selenium-Total (mg/L)					
Sodium-Dissolved (mg/L)		208			
Total Alkalinity as CaCO3 (mg/L)					
Total Organic Carbon	5	4	5	3	
Total Suspended Solids (TSS)	14	56	29	29	

Appendix 2

GROUNDWATER MONITORING DATA

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76556	76557	76558	76559	75103	78314
Lab Ref					88336	
Aluminium (total) (mg/L)	0.06		0.02		0.07	
Appearance					Slight Turbid	Turbid
Arsenic-Total (mg/L)	0.001		<0.001		<0.001	
Barium (total)	0.322		0.303		0.242	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	193		221		231	
Boron (total)	0.05		0.37		<0.05	
Cadmium-Total (mg/L)	0.0001		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)	39		34		27	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	778		893		694	
Chromium-Total (mg/L)	0.001		<0.001		<0.001	
Cobalt	0.001		<0.001		<0.001	
Colour					Brown	
Comments			Clear			
Copper-Total (mg/L)	0.013		0.012		0.046	
EC - Field	2,960	2,990	2,890	2,750	2,670	2,710
Electrical Conductivity @ 25°C	3,040		2,980		2,550	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	5.37		8.08		5.31	
Iron-Total (mg/L)	5.78		6.98		9.53	
Lead-Total (mg/L)	0.002		0.005		0.005	
Magnesium-Dissolved (mg/L)	28.8		122		99	
Manganese (total)	0.185		0.188		0.269	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.001		<0.001		<0.001	
Nitrate as N (mg/L)	0.01		0.02		0.08	
Nitrite + Nitrate as N (mg/L)	0.04		0.12		0.18	
Nitrite as N (mg/L)	0.03		0.1		0.1	

Data Point: 22497; Northing: 226528.408; Easting: 6566793.9615

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76543	76544	76545	76546	76547	76548	76549	76550	76551	76552	76553	76554	76555
Lab Ref													
Aluminium (total) (mg/L)	0.18		0.1		0.03		0.01		0.03		0.07	<0.01	
Appearance													
Arsenic-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Barium (total)	0.81		0.922		0.57		0.515		0.426		0.391	0.368	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	132		132		213		236		327		240	222	
Boron (total)	<0.05		<0.05		<0.05		<0.05		<0.05		0.05	<0.05	
Cadmium-Total (mg/L)	0.0004		0.0002		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Calcium-Dissolved (mg/L)	67		72		35		46		44		43	52	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	906		897		674		706		772		915	838	
Chromium-Total (mg/L)	0.002		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Cobalt	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Colour													
Comments													Brown
Copper-Total (mg/L)	0.146		0.069		0.013		0.018		0.003		0.002	0.007	
EC - Field	3,220	3,180	2,910	2,940	2,680	2,710	2,750	2,720	2,920	3,070	3,090	3,160	3,120
Electrical Conductivity @ 25°C	3,180		3,070		2,760		2,810		3,040		3,150	3,210	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	0.4		3.66		0.45		2.44		4.13		8.75	0.86	
Iron-Total (mg/L)	30.8		23.5		6.42		5.88		8.07		6.74	7.18	
Lead-Total (mg/L)	0.1		0.032		0.001		0.008		<0.001		0.001	0.005	
Magnesium-Dissolved (mg/L)	150		158		113		130		132		131	138	
Manganese (total)	0.647		0.409		0.406		0.388		0.461		0.214	0.18	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Nickel-Total (mg/L)	0.002		0.002		<0.001		<0.001		<0.001		0.001	<0.001	
Nitrate as N (mg/L)	<0.01		0.02		0.02		<0.01		0.02		0.01	0.1	
Nitrite + Nitrate as N (mg/L)	0.06		0.02		0.02		0.02		0.02		0.05	0.2	
Nitrite as N (mg/L)	0.06		<0.01		<0.01		0.03		<0.01		0.07	0.1	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76543	76544	76545	76546	76547	76548	76549	76550	76551	76552	76553	76554	76555
Lab Ref													
Odour													
pH (pH Unit)	7.4	7.4	7.5	7.5	7.7	7.7	7.8	7.8	7.9	7.8	7.9	7.9	7.8
pH Value (pH Unit)	7.87		7.67		7.85		7.985		8.12		7.85	8.04	
Potassium-Dissolved (mg/L)	30		35		59		60		61		53	59	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Sodium-Dissolved (mg/L)	275		290		242		261		264		262	279	
Standing Water Level	16	15.98	16.1	16.03	16.1	16.14	16.2	16.28	16.34	16.59	16.5	16.79	16.74
Stick up													
Sulfate as SO4 - Turbidimetric-	<1		2		1		1		2		1	<1	
Temperature	22.3	21.7	21.1	21.2	21.6	21	18.9	19.7	21.9	21.2	21.1	20.3	19.3
Total Alkalinity as CaCO3 (mg/L)	132		132		213		236		327		240	222	
Total Anions	28.2		28		23.3		24.6		28.4		30.6	28.1	
Total Cations	28.4		30.1		23.1		25.9		26.1		25.7	27.6	
Total Dissolved Solids @180°C-	2,080		1,940		1,430		1,560		1,790		1,650	1,980	
Vanadium	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Water Depth to Stand	16.3	16.28	16.4	16.33	16.4	16.44	16.5	16.58	16.64	16.89	16.8	17.09	17.04
Zinc (total)	3.37		1.58		0.109		0.205		0.075		0.065	0.139	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76556	76557	76558	76559	75103	78314
Lab Ref					88336	
Odour					Nil	
pH (pH Unit)	8	7.9	7.8	7.8	7.8	7.8
pH Value (pH Unit)	7.89		7.94		7.92	
Potassium-Dissolved (mg/L)	63		63		71	
Purge Type					Bail	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	320		272		240	
Standing Water Level	16.75	16.65	16.49	16.27	16.59	23.38
Stick up					0.2	
Sulfate as SO4 - Turbidimetric-	1		<1		<1	
Temperature	18.6	20.3	20.8	20.3	18.9	20.1
Total Alkalinity as CaCO3 (mg/L)	193		221		231	
Total Anions	25.8		29.6		24.2	
Total Cations	28.8		25.2		21.8	
Total Dissolved Solids @180°C-	1,760		1,710		1,450	
Vanadium	0.01		<0.01		<0.01	
Water Depth to Stand	17.05	16.95	16.79	16.57	16.79	17.07
Zinc (total)	0.099		0.199		0.421	



Area/Site: *Sunnyside*
 From Date: *01-Jan-2016*
 Standard: *<Blank>*

To Date: *31-Dec-2020*

Data Point: 27356; Northing: 224912.785; Easting: 6569803.28

	10-May-16	11-Nov-16	01-Mar-17	14-Jun-17	19-Sep-17	06-Dec-17	21-Mar-18	06-Jun-18	13-Jun-19	10-Sep-19	04-Dec-19	04-Jun-20	02-Dec-20
Rec ID	76589	76590	76591	76592	76596	76593	76594	76595	76597	76598	76599	76600	78310
Lab Ref													
Comments	Windmill over	Windmill	Windmill	Windmill	Windmill								
FLS Duplicate													Windmill

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: 44677 Werona Tanks; Northing: 222328.0678; Easting: 6570216.8968

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76803	76804	76805	76806	76807	76808	76809	76810	76811	76812	76813	76814	76815
Lab Ref													
Aluminium (total) (mg/L)	<0.01		<0.01		0.03		<0.01		0.02		0.03	0.12	
Appearance													
Arsenic-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Barium (total)	0.434		0.458		0.448		0.451		0.429		0.415	0.266	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	483		516		548		605		601		512	375	
Boron (total)	0.12		0.13		0.14		0.12		0.11		0.12	0.13	
Cadmium-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Calcium-Dissolved (mg/L)	193		214		175		195		184		171	134	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	1,260		1,290		1,100		1,130		1,210		1,370	1,150	
Chromium-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Cobalt	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Colour													
Comments		Bore covered	Bore covered	Pump over									
Copper-Total (mg/L)	0.003		0.012		0.01		0.004		0.003		0.009	0.003	
EC - Field	4,750	4,820	4,660	4,590	4,690	4,720	4,750	4,610	4,940	4,760	4,740	4,850	4,680
Electrical Conductivity @ 25°C	4,970		4,900		5,010		4,960		4,980		4,920	4,950	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	3.07		5.36		6.02		4.73		2.15		3.33	7.62	
Iron-Total (mg/L)	<0.05		<0.05		0.1		<0.05		0.06		0.1	0.08	
Lead-Total (mg/L)	<0.001		0.002		0.003		0.001		<0.001		0.004	<0.001	
Magnesium-Dissolved (mg/L)	233		258		232		230		237		223	245	
Manganese (total)	<0.001		0.007		0.013		0.005		0.008		0.004	0.003	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Nickel-Total (mg/L)	<0.001		0.004		0.007		<0.001		0.001		0.001	0.001	
Nitrate as N (mg/L)	3.9		3.15		3.66		3.28		3.14		2.72	2.47	
Nitrite + Nitrate as N (mg/L)	3.9		3.15		3.66		3.28		3.14		2.72	2.47	
Nitrite as N (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76816	76817	76818	76819	75099	78308
Lab Ref					88332	
Aluminium (total) (mg/L)	0.01		0.02		<0.01	
Appearance					Clear	
Arsenic-Total (mg/L)	0.001		<0.001		<0.001	
Barium (total)	0.39		0.459		0.456	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	497		482		583	
Boron (total)	0.12		0.11		0.12	
Cadmium-Total (mg/L)	0.0001		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)	178		183		173	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	1,130		1,360		1,260	
Chromium-Total (mg/L)	0.001		<0.001		<0.001	
Cobalt	0.001		<0.001		<0.001	
Colour					Clear	No Sample
Comments			Clear			
Copper-Total (mg/L)	0.003		0.008		0.003	
EC - Field	4,770	4,870	4,790	4,870	4,780	0
Electrical Conductivity @ 25°C	4,950		5,010		4,620	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	8.16		1.91		2.93	
Iron-Total (mg/L)	0.05		0.16		<0.05	
Lead-Total (mg/L)	0.004		0.003		<0.001	
Magnesium-Dissolved (mg/L)	51.1		222		225	
Manganese (total)	0.002		0.003		0.002	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.001		0.002		0.005	
Nitrate as N (mg/L)	3.15		<0.01		2.85	
Nitrite + Nitrate as N (mg/L)	3.15		2.86		2.85	
Nitrite as N (mg/L)	0.01		2.86		<0.01	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76803	76804	76805	76806	76807	76808	76809	76810	76811	76812	76813	76814	76815
Lab Ref													
Odour													
pH (pH Unit)	7.2	7.1	7.1	7	7	7.1	7.2	7.4	7.3	7.6	7.1	7.9	7.8
pH Value (pH Unit)	7.72		7.46		7.37		7.65		7.95		7.33	8.17	
Potassium-Dissolved (mg/L)	4		4		6		<10		5		4	5	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Sodium-Dissolved (mg/L)	483		498		488		489		494		463	496	
Sulfate as SO4 - Turbidimetric-	84		73		79		70		98		72	84	
Temperature	25.5	25.8	19	23.5	25.2	22.6	19.6	27.1	25.9	19.3	22	22.2	14.9
Total Alkalinity as CaCO3 (mg/L)	483		516		548		605		601		512	375	
Total Anions	46.9		48.2		43.6		45.4		48.2		50.4	41.7	
Total Cations	49.9		53.7		49.2		49.9		50.3		47.1	48.6	
Total Dissolved Solids @180°C-	3,260		3,220		3,620		2,980		3,320		3,020	3,760	
Vanadium	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Zinc (total)	0.009		0.296		0.42		0.072		0.071		0.168	0.095	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76816	76817	76818	76819	75099	78308
Lab Ref					88332	
Odour					Nil	
pH (pH Unit)	7.8	7.8	7.4	7.2	7	
pH Value (pH Unit)	7.91		7.66		7.85	
Potassium-Dissolved (mg/L)	5		5		7	
Purge Type					Tap	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	506		477		431	
Sulfate as SO4 - Turbidimetric-	76		104		80	
Temperature	17	27.3	22.8	7.2	18.6	
Total Alkalinity as CaCO3 (mg/L)	497		482		583	
Total Anions	43.4		50.2		48.8	
Total Cations	51.1		48.3		46.1	
Total Dissolved Solids @180°C-	3,030		3,860		3,020	
Vanadium	0.01		<0.01		<0.01	
Zinc (total)	0.089		0.147		0.436	

Data Point: 44884; Northing: 226251.5937; Easting: 6568123.6077

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	28-Feb-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76624	76625	76626	76627	76628	76629	76630	76631	76632	76633	76634	76635	76636
Lab Ref													
Aluminium (total) (mg/L)	0.08		0.01		0.05		0.01				0.01	<0.01	
Appearance													
Arsenic-Total (mg/L)	0.002		0.009		0.003		0.004				0.004	0.003	
Barium (total)	0.443		0.556		0.423		0.447				0.472	0.568	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001				0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	885		951		935		1,090				913	843	
Boron (total)	0.09		0.11		0.09		0.09				0.1	0.09	
Cadmium-Total (mg/L)	<0.0001		0.0002		0.0002		0.0006				0.0003	0.0013	
Calcium-Dissolved (mg/L)	26		79		37		45				49	85	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1				1	<1	
Chloride (mg/L)	263		551		391		334				477	620	
Chromium-Total (mg/L)	<0.001		<0.001		<0.001		<0.001				0.001	<0.001	
Cobalt	<0.001		0.008		0.007		0.02				0.003	0.002	
Colour													
Comments	Pump over	Bore and											
Copper-Total (mg/L)	0.034		0.016		0.025		0.005				0.01	0.01	
EC - Field	2,570	3,120	3,090	3,160	2,450	3,040	2,570	2,410		2,630	2,820	3,480	2,900
Electrical Conductivity @ 25°C	2,510		3,250		2,840		2,670				2,890	3,500	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1				1	<1	
Ionic Balance (%)	5.83		5.46		0.48		1.28				2.75	4.42	
Iron-Total (mg/L)	1.34		4.34		2.05		4.58				3.74	7.41	
Lead-Total (mg/L)	0.004		0.002		<0.001		0.003				0.002	0.003	
Magnesium-Dissolved (mg/L)	40		150		82		68				96	160	
Manganese (total)	0.127		0.577		0.17		0.279				0.345	0.477	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001				0.0001	<0.0001	
Nickel-Total (mg/L)	<0.001		0.003		0.002		0.006				0.001	0.001	
Nitrate as N (mg/L)	0.02		<0.01		0.02		<0.01				0.02	<0.01	
Nitrite + Nitrate as N (mg/L)	0.02		<0.01		0.02		<0.01				0.02	<0.01	
Nitrite as N (mg/L)	<0.01		<0.01		<0.01		<0.01				0.01	<0.01	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76637	76638	76639	76640	75095	78304
Lab Ref					88328	
Aluminium (total) (mg/L)	0.01		<0.01		<0.01	
Appearance					Clear	
Arsenic-Total (mg/L)	0.011		0.007		0.005	
Barium (total)	0.583		0.473		0.45	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	824		854		1,080	
Boron (total)	0.09		<0.05		0.09	
Cadmium-Total (mg/L)	0.0003		0.0002		0.0002	
Calcium-Dissolved (mg/L)	32		15		18	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	415		326		252	
Chromium-Total (mg/L)	0.001		<0.001		<0.001	
Cobalt	0.001		<0.001		<0.001	
Colour					Clear	Clear
Comments	Bore and		Clear	New electric		
Copper-Total (mg/L)	0.008		0.004		0.003	
EC - Field	2,790	2,770	2,620	2,230	2,560	2,620
Electrical Conductivity @ 25°C	2,860		2,680		2,470	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	9.82		4.66		0.95	
Iron-Total (mg/L)	4.93		2.69		2.15	
Lead-Total (mg/L)	0.003		<0.001		<0.001	
Magnesium-Dissolved (mg/L)	77		35		36	
Manganese (total)	0.087		0.027		0.024	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.001		<0.001		<0.001	
Nitrate as N (mg/L)	0.02		<0.01		0.02	
Nitrite + Nitrate as N (mg/L)	0.02		0.02		0.02	
Nitrite as N (mg/L)	0.01		0.02		<0.01	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	28-Feb-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76624	76625	76626	76627	76628	76629	76630	76631	76632	76633	76634	76635	76636
Lab Ref													
Odour													
pH (pH Unit)	7.8	7.6	7.5	7.4	7.6	7.5	7.6	7.7		7.7	7.6	7.5	7.7
pH Value (pH Unit)	8.26		7.61		7.79		8.03				7.72	7.96	
Potassium-Dissolved (mg/L)	4		4		5		<10				4	6	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01				0.01	<0.01	
Sodium-Dissolved (mg/L)	544		524		484		560				459	470	
Stick up													
Sulfate as SO ₄ - Turbidimetric-	5		27		17		9				21	22	
Temperature	22.5	21.1	21.3	19.9	22.6	19.9	21.4	22.8		20.9	21.4	20.9	15.7
Total Alkalinity as CaCO ₃ (mg/L)	885		951		935		1,090				913	843	
Total Anions	25.2		35.1		30.1		31.4				32.1	34.8	
Total Cations	28.4		39.2		29.8		32.2				30.4	38	
Total Dissolved Solids @180°C-	1,380		1,660		1,800		1,380				1,680	1,890	
Vanadium	<0.01		<0.01		<0.01		<0.01				0.01	<0.01	
Zinc (total)	0.104		0.217		0.098		0.27				0.142	0.378	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76637	76638	76639	76640	75095	78304
Lab Ref					88328	
Odour					Nil	
pH (pH Unit)	7.4	7.5	7.9	7.8	7.8	7.8
pH Value (pH Unit)	8.06		8.14		8.14	
Potassium-Dissolved (mg/L)	5		4		4	
Purge Type					Tap	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	608		577		556	
Stick up					0.47	0.47
Sulfate as SO4 - Turbidimetric-	8		<1		<1	
Temperature	18.4		21.1	12.7	13.9	22.8
Total Alkalinity as CaCO3 (mg/L)	824		854		1,080	
Total Anions	28.3		26.2		28.7	
Total Cations	34.5		28.8		28.1	
Total Dissolved Solids @180°C-	1,500		1,450		1,480	
Vanadium	0.01		<0.01		<0.01	
Zinc (total)	0.086		0.072		0.076	

Data Point: 45061 Coocooboonah; Northing: 226935.4925; Easting: 6567303.1717

	10-May-16	11-Nov-16	28-Feb-17	14-Jun-17	06-Dec-17	21-Mar-18	06-Jun-18	10-Sep-19	23-Mar-20	04-Jun-20	31-Aug-20
Rec ID	76730	76731	76732	76733	76734	76735	76736	76738	76739	76740	75211
Lab Ref											
Comments	Windmill over				Windmill over						
Standing Water Level	8.89	8.75	8.76	8.78	8.93	9.05	9.1	9.18	9.14	8.82	8.88
Water Depth to Stand	8.99	8.85	8.86	8.88	9.03	9.15	9.2	9.28	9.24	8.92	8.98

Outliers: 0

Field Name	Result	Outlier Comment

Data Point: 6249; Northing: 226815.754; Easting: 6567710.997

	23-Feb-16	15-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76664	76665	76666	76667	76668	76669	76670	76671	76672	76673	76674	76675	76676
Lab Ref													
Aluminium (total) (mg/L)	0.02		0.03		0.03		0.01		0.07		0.05	0.1	
Appearance													
Arsenic-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Barium (total)	0.279		0.334		0.348		0.326		0.312		0.239	0.232	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	284		317		310		335		307		236	198	
Boron (total)	<0.05		0.06		<0.05		<0.05		<0.05		0.005	<0.05	
Cadmium-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Calcium-Dissolved (mg/L)	104		122		84		91		83		90	97	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	816		811		698		696		735		795	719	
Chromium-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	0.002	
Cobalt	<0.001		<0.001		<0.001		0.001		<0.001		0.001	0.003	
Colour													
Comments													Bail; brown
Copper-Total (mg/L)	0.017		0.008		<0.001		0.004		0.005		0.002	0.015	
EC - Field	3,050	3,070	2,920	2,810	2,710	2,730	2,840	2,720	2,750	2,790	2,640	2,760	2,510
Electrical Conductivity @ 25°C	3,080		2,990		2,940		2,840		2,800		2,720	2,690	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	2.82		4.66		2.65		4.31		2.52		3.36	2.4	
Iron-Total (mg/L)	9.11		6.54		9.68		13		9.68		1.82	5.28	
Lead-Total (mg/L)	<0.001		0.001		<0.001		<0.001		<0.001		0.001	0.002	
Magnesium-Dissolved (mg/L)	142		150		126		112		115		113	112	
Manganese (total)	1.75		1.94		2.39		2.05		1.65		0.85	0.42	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Nickel-Total (mg/L)	<0.001		0.002		<0.001		0.002		0.002		0.002	0.009	
Nitrate as N (mg/L)	<0.01		0.2		0.07		0.02		<0.01		0.1	0.12	
Nitrite + Nitrate as N (mg/L)	<0.01		0.27		0.07		0.04		0.02		0.1	0.12	
Nitrite as N (mg/L)	0.19		0.07		<0.01		0.02		0.02		0.01	<0.01	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76677	76678	76679	76680	75094	78303
Lab Ref					88327	
Aluminium (total) (mg/L)	0.09		0.04		0.02	
Appearance					Slight Turbid	
Arsenic-Total (mg/L)	0.001		<0.001		<0.001	
Barium (total)	0.205		0.268		0.306	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	177		176		217	
Boron (total)	0.05				<0.05	
Cadmium-Total (mg/L)	0.0002		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)	76		85		122	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	681		768		702	
Chromium-Total (mg/L)	0.001		<0.001		0.001	
Cobalt	0.001		<0.001		<0.001	
Colour					Brown	Brown
Comments			Brown			
Copper-Total (mg/L)	0.002		0.004		0.002	
EC - Field	2,570	2,610	2,510	2,610	2,650	2,920
Electrical Conductivity @ 25°C	2,600		2,520		2,530	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	7.58		4.96		7.98	
Iron-Total (mg/L)	7.77		6.5		9.06	
Lead-Total (mg/L)	0.001		<0.001		<0.001	
Magnesium-Dissolved (mg/L)			100		116	
Manganese (total)	0.78		1.06		1.14	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.001		0.002		<0.001	
Nitrate as N (mg/L)	0.01		0.04		0.01	
Nitrite + Nitrate as N (mg/L)	0.01		0.04		0.01	
Nitrite as N (mg/L)	0.01		<0.01		<0.01	

	23-Feb-16	15-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76664	76665	76666	76667	76668	76669	76670	76671	76672	76673	76674	76675	76676
Lab Ref													
Odour													
pH (pH Unit)	7.5	7.4	7.4	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.7	7.6	7.7
pH Value (pH Unit)	7.9		7.59		7.53		7.73		7.97		7.9	8.05	
Potassium-Dissolved (mg/L)	10		10		13		10		11		9	11	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Sodium-Dissolved (mg/L)	304		308		285		233		268		261	256	
Standing Water Level	9.97	9.94	9.97	9.79	9.87	9.91	9.97	9.94	10.15	10.46	10.33	10.54	10.57
Stick up													
Sulfate as SO ₄ - Turbidimetric-	<1		1		<1		<1		<1		1	2	
Temperature	21.4	20.2	21.1	21.2	20.7	19.9	19.8	20.1	21	20.8	20.2	20.1	19
Total Alkalinity as CaCO ₃ (mg/L)	284		317		310		335		307		236	198	
Total Anions	28.7		29.2		28.9		26.3		26.9		27.1	24.3	
Total Cations	30.4		32.1		27.3		24.1		25.5		25.4	25.5	
Total Dissolved Solids @180°C-	1,880		1,980		2,210		1,590		1,950		1,620	1,710	
Vanadium	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Water Depth to Stand	10.3	10.27	10.3	10.12	10.2	10.24	10.3	10.27	10.48	10.79	10.66	10.87	10.9
Zinc (total)	0.042		0.194		0.039		0.146		0.054		0.032	0.402	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76677	76678	76679	76680	75094	78303
Lab Ref					88327	
Odour					Nil	
pH (pH Unit)	7.4	7.5	7.5	7.4	7.5	7.5
pH Value (pH Unit)	7.77		7.63		7.83	
Potassium-Dissolved (mg/L)	12		11		15	
Purge Type					Bail	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	295		231		284	
Standing Water Level	10.53	10.58	10.72	10.62	10.44	10.38
Stick up					0.33	
Sulfate as SO4 - Turbidimetric-	1		<1		2	
Temperature	18.4	20.2	20.1	19.4	17.7	18.9
Total Alkalinity as CaCO3 (mg/L)	177		176		217	
Total Anions	22.7		25.2		24.2	
Total Cations	26.5		22.8		28.4	
Total Dissolved Solids @180°C-	1,560		1,680		1,550	
Vanadium	0.01		<0.01		<0.01	
Water Depth to Stand	10.86	10.91	11.05	10.95	10.77	10.71
Zinc (total)	0.067		0.092		0.025	

Data Point: 901460; Northing: 223859; Easting: 6571173

	10-May-16	11-Nov-16	01-Mar-17	14-Jun-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	13-Jun-19	10-Sep-19	04-Dec-19	04-Jun-20	31-Aug-20
Rec ID	76699	76700	76701	76702	76703	76704	76705	76706	76707	76708	76709	76710	75212
Lab Ref													
Comments	Pump over												
Standing Water Level	14.36	14.13	14.28	14.24	14.01	14.05	14.39	14.28	14.65	14.53	14.6	14.52	14.41
Water Depth to Stand	14.78	14.55	14.7	14.66	14.43	14.47	14.81	14.7	15.07	14.95	15.02	14.94	14.83

Outliers: 0

Field Name	Result	Outlier Comment

	02-Dec-20
Rec ID	78316
Lab Ref	
Comments	
Standing Water Level	14.56
Water Depth to Stand	14.96

Data Point: Ivanhoe 3709; Northing: 222301.0604; Easting: 6568883.2261

	23-Mar-16	12-May-16	30-Nov-16	01-Mar-17	21-Jun-17	07-Sep-17	13-Dec-17	31-Mar-18	07-Jun-18	19-Sep-18	04-Apr-19	13-Jun-19	04-Dec-19
Rec ID	76755	76756	76757	76758	76759	76760	76761	76762	76763	76764	76765	76766	76767
Lab Ref													
Aluminium (total) (mg/L)	<0.01					0.08		0.02		0.02	0.01		
Appearance													
Arsenic-Total (mg/L)	0.003					0.014		0.002		0.002	0.003		
Barium (total)	0.282					0.259		0.266		0.236	0.266		
Beryllium (total)	<0.001					<0.001		<0.001		0.001	0.001		
Bicarbonate Alkalinity as CaCO3	938					878		991		846	838		
Boron (total)	0.17					0.17		0.17		0.17	0.18		
Cadmium-Total (mg/L)	<0.0001					<0.0001		<0.0001		0.0001	0.0001		
Calcium-Dissolved (mg/L)	163					160		139		124	122		
Carbonate Alkalinity as CaCO3	<1					<1		<1		1	<1		
Chloride (mg/L)	1,540					1,330		1,460		1,480	1,400		
Chromium-Total (mg/L)	0.001					0.011		<0.001		0.001	0.001		
Cobalt	<0.001					<0.001		<0.001		0.001	0.001		
Colour													
Comments		Pump over	Tap	Clear, pump									
Copper-Total (mg/L)	0.065					0.25		0.051		0.04	0.202		
EC - Field	6,020	5,590	5,560	4,510	5,420	5,420	5,390	6,130	5,920	5,560	5,690	5,070	4,130
Electrical Conductivity @ 25°C	6,140					5,520		6,170		5,760	6,170		
Hydroxide Alkalinity as CaCO3	<1					<1		<1		1	<1		
Ionic Balance (%)	2					7.92		0.48		2.94	0.26		
Iron-Total (mg/L)	1.69					27.2		0.98		0.16	4.54		
Lead-Total (mg/L)	0.003					0.039		0.004		0.006	0.011		
Magnesium-Dissolved (mg/L)	220					275		215		206	201		
Manganese (total)	0.025					0.073		0.022		0.017	0.045		
Mercury-Total (mg/L)	<0.0001					0.0001		<0.0001		0.0001	0.0001		
Nickel-Total (mg/L)	0.002					0.006		0.002		0.001	0.002		
Nitrate as N (mg/L)	0.5					1.21		0.29		0.98	0.5		
Nitrite + Nitrate as N (mg/L)	0.5					1.23		0.29		0.98	0.74		
Nitrite as N (mg/L)	<0.01					0.02		<0.01		0.01	0.24		

	04-Jun-20	16-Sep-20	02-Dec-20
Rec ID	76768	75104	78317
Lab Ref		88337	
Aluminium (total) (mg/L)		0.21	
Appearance		Slight Turbid	Clear
Arsenic-Total (mg/L)		0.006	
Barium (total)		0.275	
Beryllium (total)		<0.001	
Bicarbonate Alkalinity as CaCO3		900	
Boron (total)		0.14	
Cadmium-Total (mg/L)		<0.0001	
Calcium-Dissolved (mg/L)		114	
Carbonate Alkalinity as CaCO3		<1	
Chloride (mg/L)		1,230	
Chromium-Total (mg/L)		0.001	
Cobalt		<0.001	
Colour		Slight Brown	
Comments			
Copper-Total (mg/L)		0.17	
EC - Field	5,740	5,360	5,650
Electrical Conductivity @ 25°C		5,620	
Hydroxide Alkalinity as CaCO3		<1	
Ionic Balance (%)		2.87	
Iron-Total (mg/L)		17.4	
Lead-Total (mg/L)		0.032	
Magnesium-Dissolved (mg/L)		218	
Manganese (total)		0.098	
Mercury-Total (mg/L)		<0.0001	
Nickel-Total (mg/L)		0.002	
Nitrate as N (mg/L)		0.99	
Nitrite + Nitrate as N (mg/L)		0.99	
Nitrite as N (mg/L)		<0.01	

	23-Mar-16	12-May-16	30-Nov-16	01-Mar-17	21-Jun-17	07-Sep-17	13-Dec-17	31-Mar-18	07-Jun-18	19-Sep-18	04-Apr-19	13-Jun-19	04-Dec-19
Rec ID	76755	76756	76757	76758	76759	76760	76761	76762	76763	76764	76765	76766	76767
Lab Ref													
Odour													
pH (pH Unit)	7	7.3	6.9	7.5	6.7	7	7	7	7.2	7.1	7	7.2	7.2
pH Value (pH Unit)	7.4					7.52		7.96		7.26	8.04		
Potassium-Dissolved (mg/L)	10					16		13		10	11		
Selenium-Total (mg/L)	<0.01					<0.01		<0.01		0.01	0.01		
Sodium-Dissolved (mg/L)	809					809		864		779	821		
Sulfate as SO4 - Turbidimetric-	96					69		104		101	100		
Temperature	21.1	19	22.6	23.5	18.5	20	21.3	21.8	20	21.9	20.7	20.4	21.6
Total Alkalinity as CaCO3 (mg/L)	938					878		991		846	838		
Total Anions	64.2					56.5		63.2		60.8	58.3		
Total Cations	61.7					66.2		62.5		57.3	58.6		
Total Dissolved Solids @180°C-	3,680					3,080		3,610		3,410	3,210		
Vanadium	<0.01					0.03		<0.01		0.01	0.01		
Zinc (total)	0.314					5.34		7.4		4.72	8.31		

Outliers: 0

Field Name	Result	Outlier Comment
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	04-Jun-20	16-Sep-20	02-Dec-20
Rec ID	76768	75104	78317
Lab Ref		88337	
Odour		NIL	
pH (pH Unit)	7.1	7	7
pH Value (pH Unit)		7.76	
Potassium-Dissolved (mg/L)		17	
Selenium-Total (mg/L)		<0.01	
Sodium-Dissolved (mg/L)		634	
Sulfate as SO ₄ - Turbidimetric-		97	
Temperature	20.3	15.9	21.8
Total Alkalinity as CaCO ₃ (mg/L)		900	
Total Anions		54.7	
Total Cations		51.6	
Total Dissolved Solids @180°C-			
Vanadium		0.02	
Zinc (total)		3.45	

Data Point: P1; Northing: 225592; Easting: 6569560

	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19	10-Sep-19
Rec ID	76284	76285	76286	76287	76288	76289	76290	76291	76292	76293	76294	76295	76296
Lab Ref													
Aluminium (total) (mg/L)		0.02		0.25		0.2		0.7		0.36	0.07		0.13
Appearance													
Arsenic-Total (mg/L)		<0.001		0.003		0.004		0.001		0.004	0.004		0.002
Barium (total)		0.448		0.253		0.252		0.233		0.22	0.207		0.2
Beryllium (total)		<0.001		<0.001		<0.001		<0.001		0.001	<0.001		0.001
Bicarbonate Alkalinity as CaCO3		966		853		920		959		794	730		716
Boron (total)		0.17		0.12		0.11		0.1		0.11	0.11		0.11
Cadmium-Total (mg/L)		<0.0001		<0.0001		0.0003		<0.0001		0.0001	<0.0001		0.0001
Calcium-Dissolved (mg/L)		161		118		148		121		128	142		122
Carbonate Alkalinity as CaCO3		<1		<1		<1		<1		1	<1		1
Chloride (mg/L)		851		754		778		843		902	811		786
Chromium-Total (mg/L)		<0.001		<0.001		<0.001		0.001		0.001	<0.001		0.001
Cobalt		<0.001		<0.001		0.004		0.001		0.003	0.001		0.001
Colour													
Comments												Clear	
Copper-Total (mg/L)		0.002		0.016		0.075		0.01		0.018	0.005		0.003
EC - Field	3,890	3,990	3,560	3,720	3,580	3,920	3,910	4,070	3,830	3,940	3,940	3,830	3,760
Electrical Conductivity @ 25°C		4,180		4,050		4,040		4,060		4,000	4,060		3,950
Hydroxide Alkalinity as CaCO3		<1		<1		<1		<1		1	<1		1
Ionic Balance (%)		5.23		2.27		0.83		4.17		3.11	4.06		8.35
Iron-Total (mg/L)		0.06		1.39		0.84		1.58		0.69	0.34		0.34
Lead-Total (mg/L)		<0.001		0.002		0.009		0.004		0.004	0.002		0.001
Magnesium-Dissolved (mg/L)		278		244		240		240		232	243		255
Manganese (total)		0.614		0.013		0.216		0.267		0.214	0.153		0.175
Mercury-Total (mg/L)		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001		0.0001
Nickel-Total (mg/L)		0.004		0.003		0.005		0.003		0.004	0.003		0.002
Nitrate as N (mg/L)		0.28		0.37		1.81		0.24		0.45	0.82		0.36
Nitrite + Nitrate as N (mg/L)		0.28		0.42		1.84		0.24		0.45	0.84		0.36
Nitrite as N (mg/L)		<0.01		0.05		0.03		<0.01		0.01	0.02		0.01

	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76297	76298	76299	75097	78306
Lab Ref				88330	
Aluminium (total) (mg/L)		0.08		0.01	
Appearance				Clear	Clear
Arsenic-Total (mg/L)		<0.001		<0.001	
Barium (total)		0.221		0.215	
Beryllium (total)		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3		848		851	
Boron (total)		0.1		0.11	
Cadmium-Total (mg/L)		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)		126		116	
Carbonate Alkalinity as CaCO3		<1		<1	
Chloride (mg/L)		921		810	
Chromium-Total (mg/L)		<0.001		<0.001	
Cobalt		<0.001		<0.001	
Colour				Clear	Clear
Comments		Clear			
Copper-Total (mg/L)		0.002		0.001	
EC - Field	3,820	3,930	3,980	3,920	4,030
Electrical Conductivity @ 25°C		4,090		3,760	
Hydroxide Alkalinity as CaCO3		<1		<1	
Ionic Balance (%)		5.6		4.32	
Iron-Total (mg/L)		0.16		0.13	
Lead-Total (mg/L)		<0.001		<0.001	
Magnesium-Dissolved (mg/L)		233		227	
Manganese (total)		0.117		0.184	
Mercury-Total (mg/L)		<0.0001		<0.0001	
Nickel-Total (mg/L)		0.001		<0.001	
Nitrate as N (mg/L)		0.03		0.12	
Nitrite + Nitrate as N (mg/L)		1.32		0.12	
Nitrite as N (mg/L)		1.29		<0.01	

	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19	10-Sep-19
Rec ID	76284	76285	76286	76287	76288	76289	76290	76291	76292	76293	76294	76295	76296
Lab Ref													
Odour													
pH (pH Unit)	7.1	7.1	7.1	7.1	7.1	7.2	7.2	7.2	7.2	7.1	7.3	7.2	7.4
pH Value (pH Unit)		7.59		7.48		7.63		7.94		7.4	7.86		7.78
Potassium-Dissolved (mg/L)		10		8		<10		7		5	6		7
Purge Type													
Selenium-Total (mg/L)		<0.01		<0.01		<0.01		<0.01		0.01	<0.01		0.01
Sodium-Dissolved (mg/L)		394		367		362		360		349	366		426
Standing Water Level	12.09	12.24	12.03	12.24	12.37	12.44	12.33	12.59	12.68	12.62	12.89	12.99	12.92
Stick up													
Sulfate as SO4 - Turbidimetric-		9		94		89		111		101	112		108
Temperature	21.2	22.5	21.8	21.8	21.4	21.4	21.3	22.7	20.6	21.2	20.9	20.6	20.5
Total Alkalinity as CaCO3 (mg/L)		966		853		920		959		794	730		716
Total Anions		43.5		40.3		42.2		45.2		43.4	39.8		38.7
Total Cations		48.3		42.1		42.9		41.6		40.8	43.2		45.8
Total Dissolved Solids @180°C-		2,170		2,630		2,440		2,490		2,450	2,550		2,390
Vanadium		<0.01		0.03		0.04		0.02		0.03	0.03		0.01
Water Depth to Stand	13.05	13.2	12.99	13.2	13.33	13.4	13.29	13.55	13.64	13.58	13.85	13.95	13.88
Zinc (total)		0.044		0.177		0.269		0.236		0.203	0.136		0.057

Outliers: 0

Field Name	Result	Outlier Comment
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	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76297	76298	76299	75097	78306
Lab Ref				88330	
Odour				Nil	
pH (pH Unit)	7.4	7.4	7.3	7.1	4.2
pH Value (pH Unit)		7.76		7.75	
Potassium-Dissolved (mg/L)		6		8	
Purge Type				Bail	
Selenium-Total (mg/L)		<0.01		<0.01	
Sodium-Dissolved (mg/L)		356		317	
Standing Water Level	12.93	13.08	13.09	13.06	13.09
Stick up				0.96	
Sulfate as SO4 - Turbidimetric-		147		100	
Temperature	7.4	21.4	20.3	18.7	20.7
Total Alkalinity as CaCO3 (mg/L)		848		851	
Total Anions		46		41.9	
Total Cations		41.1		38.5	
Total Dissolved Solids @180°C-		2,410		2,340	
Vanadium		<0.01		<0.01	
Water Depth to Stand	13.89	14.04	14.05	14.02	14.04
Zinc (total)		0.047		0.019	

Data Point: P2; Northing: 225012; Easting: 6570423

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76337	76338	76339	76340	76341	76342	76343	76344	76345	76346	76347	76348	76349
Lab Ref													
Aluminium (total) (mg/L)	5.54		0.76		0.15		0.26		2.43		1.11	0.43	
Appearance													
Arsenic-Total (mg/L)	0.003		0.002		0.002		0.002		0.002			0.001	
Barium (total)	0.127		0.08		0.087		0.083		0.156			0.086	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001			<0.001	
Bicarbonate Alkalinity as CaCO3	664		759		701		799		964		739	674	
Boron (total)	0.13		0.13		0.13		0.12		0.1			0.12	
Cadmium-Total (mg/L)	0.0005		<0.0001		<0.0001		0.0002		<0.0001			<0.0001	
Calcium-Dissolved (mg/L)	176		189		139		177		142		153	164	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	818		824		711		718		789		873	783	
Chromium-Total (mg/L)	0.011		0.0001		<0.001		<0.001		0.005			0.001	
Cobalt	0.008		0.005		0.002		0.005		0.004			0.002	
Colour													
Comments													Clear
Copper-Total (mg/L)	0.169		0.027		0.01		0.03		0.009			0.009	
EC - Field	4,060	4,080	3,920	3,720	3,740	3,330	3,760	2,830	3,960	3,920	4,010	3,950	3,620
Electrical Conductivity @ 25°C	4,170		4,130		4,000		3,890		4,040		4,110	4,080	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	4.46		7.46		3.05		4.46		4.71		2.89	2.41	
Iron-Total (mg/L)	8.04		1.12		0.27		0.53		4.03		1.83	0.77	
Lead-Total (mg/L)	0.043		0.01		<0.001		0.018		0.007			0.011	
Magnesium-Dissolved (mg/L)	262		296		244		270		233		239	248	
Manganese (total)	0.558		0.357		0.237		0.327		1.19			0.234	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001			<0.0001	
Nickel-Total (mg/L)	0.019		0.008		0.003		0.007		0.01			0.004	
Nitrate as N (mg/L)	9.59		5.25		6.28		4.36		0.18		3.33	2.19	
Nitrite + Nitrate as N (mg/L)	9.8		5.71		6.65		5		0.18		3.56	2.39	
Nitrite as N (mg/L)	0.21		0.46		0.37		0.64		<0.01		0.23	0.2	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76350	76351	76352	76353	75096	78305
Lab Ref					88329	
Aluminium (total) (mg/L)	0.51		0.25		0.16	
Appearance					Clear	Clear
Arsenic-Total (mg/L)	0.001		<0.001		0.001	
Barium (total)	0.085		0.088		0.079	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	652		659		742	
Boron (total)	0.11		0.08		0.11	
Cadmium-Total (mg/L)	0.0001		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)	137		139		126	
Carbonate Alkalinity as CaCO3	12		<1		<1	
Chloride (mg/L)	721		838		748	
Chromium-Total (mg/L)	0.002		<0.001		<0.001	
Cobalt	0.002		0.002		<0.001	
Colour					Clear	Clear
Comments			Clear			
Copper-Total (mg/L)	0.008		0.006		0.004	
EC - Field	3,740	3,950	3,590	3,560	3,750	3,890
Electrical Conductivity @ 25°C	3,820		3,920		3,550	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	7.01		4.06		5.55	
Iron-Total (mg/L)	0.9		0.33		0.27	
Lead-Total (mg/L)	0.008		0.004		0.002	
Magnesium-Dissolved (mg/L)	249		226		216	
Manganese (total)	0.15		0.385		0.076	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.004		0.004		0.002	
Nitrate as N (mg/L)	4.01		0.23		4.5	
Nitrite + Nitrate as N (mg/L)	4.17		6.03		4.5	
Nitrite as N (mg/L)	0.16		5.8		<0.01	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76337	76338	76339	76340	76341	76342	76343	76344	76345	76346	76347	76348	76349
Lab Ref													
Odour													
pH (pH Unit)	7	7	7	7	7	7.1	7.1	7.1	7.1	7.1	7.1	7.3	7.2
pH Value (pH Unit)	7.64		7.22		7.38		7.51		7.92		7.38	7.78	
Potassium-Dissolved (mg/L)	13		10		13		<10		22		12	12	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01			<0.01	
Sodium-Dissolved (mg/L)	378		394		347		330		339		351	360	
Standing Water Level	14.58	14.5	14.58	14.5	15.08	14.7	14.68	14.52	14.74	14.86	14.78	15.03	15.15
Stick up													
Sulfate as SO ₄ - Turbidimetric-	324		272		282		255		200		290	332	
Temperature	22	20.8	21.4	21.5	21.8	20.9	21.2	21.3	23.4	20.5	21.3	21	20.2
Total Alkalinity as CaCO ₃ (mg/L)	664		759		701		799		964		739	674	
Total Anions	43.1		44.1		39.9		41.5		45.7		45.4	42.5	
Total Cations	47.1		51.2		42.4		45.4		41.6		42.9	44.6	
Total Dissolved Solids @180°C-	2,650		2,150		2,840		1,990		2,450		2,530	3,000	
Vanadium	0.02		<0.01		<0.01		<0.01		0.01			<0.01	
Water Depth to Stand	15.4	15.32	15.4	15.32	15.9	15.52	15.5	15.34	15.56	15.68	15.6	15.85	15.97
Zinc (total)	0.997		0.363		0.272		0.299		0.076			0.094	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76350	76351	76352	76353	75096	78305
Lab Ref					88329	
Odour					Nil	
pH (pH Unit)	7.3	7.4	7.2	7.2	7.3	7.4
pH Value (pH Unit)	7.8		7.69		7.81	
Potassium-Dissolved (mg/L)	13		11		14	
Purge Type					Bail	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	401		337		291	
Standing Water Level	15.12	15.09	15.2	15.26	15.52	15.23
Stick up					0.82	
Sulfate as SO4 - Turbidimetric-	280		341		265	
Temperature	20.6	21.2	21.6	20.4	18.7	20.4
Total Alkalinity as CaCO3 (mg/L)	652		659		742	
Total Anions	39.2		43.9		41.4	
Total Cations	45.1		40.5		37.1	
Total Dissolved Solids @180°C-			2,230		2,320	
Vanadium	0.01		<0.01		<0.01	
Water Depth to Stand	15.94	15.91	16.02	16.08	16.04	16.05
Zinc (total)	0.084		0.122		0.067	

Data Point: P3; Northing: 224211; Easting: 6568768

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Jun-18	26-Mar-19	13-Jun-19
Rec ID	76393	76394	76395	76396	76397	76398	76399	76400	76401	76402	76403	76404	76405
Lab Ref													
Aluminium (total) (mg/L)	0.14		0.42		0.08		0.02		0.27		0.24	0.14	
Appearance													
Arsenic-Total (mg/L)	0.002		0.002		0.001		0.001		0.002		0.003	0.003	
Barium (total)	0.079		0.083		0.082		0.077		0.07		0.078	0.087	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	691		730		766		874		880		736	675	
Boron (total)	0.61		0.6		0.7		0.67		0.54		0.69	0.57	
Cadmium-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Calcium-Dissolved (mg/L)	372		406		264		405		289		328	360	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	4,540		4,450		3,940		3,980		4,070		4,580	4,460	
Chromium-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Cobalt	0.005		0.006		0.006		0.008		0.006		0.001	0.031	
Colour													
Comments													
Copper-Total (mg/L)	0.023		0.005		0.001		0.003		0.002		0.002	0.003	
EC - Field	13,800	13,720	13,100	12,730	12,400	12,400	13,000	13,320	14,190	13,800	13,490	13,700	12,870
Electrical Conductivity @ 25°C	14,500		14,100		14,200		13,900		14,700		12,700	14,000	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	0.49		5.75		0.37		2.54		0.84		4.91	1.98	
Iron-Total (mg/L)	0.3		1.01		0.16		0.18		1.06		0.134	1.33	
Lead-Total (mg/L)	0.002		0.004		<0.001		<0.001		0.002		0.003	0.002	
Magnesium-Dissolved (mg/L)	540		602		464		486		503		478	522	
Manganese (total)	0.299		0.298		0.292		0.329		0.268		0.702	0.927	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0002	<0.0001	
Nickel-Total (mg/L)	0.003		0.003		0.003		0.003		0.002		0.003	0.004	
Nitrate as N (mg/L)	0.04		0.05		0.03		0.02		0.03		0.05	0.07	
Nitrite + Nitrate as N (mg/L)	0.04		0.05		0.03		0.02		0.03		0.05	0.07	
Nitrite as N (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76406	76407	76408	76409	75102	78313
Lab Ref					88335	
Aluminium (total) (mg/L)	0.35		0.26		1.64	
Appearance					Slight Turbid	Slightly turbid
Arsenic-Total (mg/L)	0.004		0.002		0.006	
Barium (total)	0.121		0.109		0.211	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	686		696		716	
Boron (total)	0.49		0.16		0.3	
Cadmium-Total (mg/L)	0.0001		0.0001		0.0001	
Calcium-Dissolved (mg/L)	309		293		232	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	360		3,660		2,760	
Chromium-Total (mg/L)	0.002		<0.001		0.004	
Cobalt	0.066		0.028		0.219	
Colour					Brown	
Comments			Clear			
Copper-Total (mg/L)	0.003		0.002		0.011	
EC - Field	12,210	12,400	10,400	9,620	8,750	8,290
Electrical Conductivity @ 25°C	12,600		10,900		8,130	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	2.49		7.22		4.5	
Iron-Total (mg/L)	2.34		1.09		5.59	
Lead-Total (mg/L)	0.004		0.002		0.008	
Magnesium-Dissolved (mg/L)	138		521		472	
Manganese (total)	1.73		1.26		7.09	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.006		0.004		0.012	
Nitrate as N (mg/L)	0.25		<0.01		0.54	
Nitrite + Nitrate as N (mg/L)	0.25		0.58		0.54	
Nitrite as N (mg/L)	0.01		0.58		<0.01	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Jun-18	26-Mar-19	13-Jun-19
Rec ID	76393	76394	76395	76396	76397	76398	76399	76400	76401	76402	76403	76404	76405
Lab Ref													
Odour													
pH (pH Unit)	6.6	6.7	6.6	6.6	6.6	6.6	6.6	6.5	6.5	6.5	6.4	6.7	6.7
pH Value (pH Unit)	7.3		6.96		6.6		7.14		7.51		7.08	7.26	
Potassium-Dissolved (mg/L)	73		72		94		74		89		72	74	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Sodium-Dissolved (mg/L)	2,040		2,280		1,940		1,980		1,900		1,940	1,910	
Standing Water Level	15.56	15.61	15.66	15.5	15.56	15.6	15.76	15.91	16.24	16.59	17.37	20.9	21.18
Stick up													
Sulfate as SO ₄ - Turbidimetric-	636		581		611		535		516		610	600	
Temperature	22.7	20.8	21.5	22	22.6	21	21.3	21.8	22.5	21	22	21.6	20.7
Total Alkalinity as CaCO ₃ (mg/L)	691		730		766		874		880		736	675	
Total Anions	155		152		139		141		143		157	152	
Total Cations	154		171		138		148		141		142	146	
Total Dissolved Solids @180°C-	9,890		9,270		9,480		7,100		9,470		9,720	10,500	
Vanadium	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Water Depth to Stand	16	16.05	16.1	15.94	16	16.04	16.2	16.35	16.68	17.03	17.81	21.34	21.62
Zinc (total)	0.099		0.053		0.039		0.014		0.045		0.031	0.026	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76406	76407	76408	76409	75102	78313
Lab Ref					88335	
Odour					Nil	
pH (pH Unit)	6.9	6.8	6.7	6.7	6.6	6.6
pH Value (pH Unit)	7.34		7.42		7.57	
Potassium-Dissolved (mg/L)	69		50		58	
Purge Type					Bail	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	1,700		1,160		877	
Standing Water Level	22.81	23.26	23	23.07	23.37	23.58
Stick up					0.44	
Sulfate as SO4 - Turbidimetric-	460		436		306	
Temperature	6.9	21.5	21.6	20.5	19	19.7
Total Alkalinity as CaCO3 (mg/L)	686		696		716	
Total Anions	132		126		98.5	
Total Cations	138		109		90	
Total Dissolved Solids @180°C-	7,950		7,590		5,640	
Vanadium	0.01		<0.01		<0.01	
Water Depth to Stand	23.25	23.7	23.44	23.51	23.83	24.02
Zinc (total)	0.042		0.031		0.072	

Data Point: P7; Northing: 225185.172; Easting: 6569323.237

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76449	76450	76451	76452	76453	76454	76455	76456	76457	76458	76459	76460	76461
Lab Ref													
Aluminium (total) (mg/L)	0.02		0.03		0.03		0.01		0.1		0.08	0.02	
Appearance													
Arsenic-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Barium (total)	0.047		0.05		0.052		0.055		0.057		0.056	0.058	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	686		729		740		831		828		712	663	
Boron (total)	0.16		0.16		0.16		0.15		0.15		0.18	0.16	
Cadmium-Total (mg/L)	<0.0001		0.0002		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Calcium-Dissolved (mg/L)	124		133		101		93		105		116	129	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	1,050		1,100		932		943		1,090		1,150	1,180	
Chromium-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Cobalt	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Colour													
Comments													Clear
Copper-Total (mg/L)	0.021		0.004		0.001		0.002		<0.001		0.001	0.003	
EC - Field	4,800	4,810	4,670	4,560	4,400	4,510	4,550	4,630	5,020	4,810	4,940	5,380	4,890
Electrical Conductivity @ 25°C	4,940		4,940		4,870		4,790		5,030		4,820	5,460	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	3.16		5.86		4.47		8.22		1.05		0.93	3.29	
Iron-Total (mg/L)	<0.05		0.06		<0.05		0.18		0.18		0.18	0.12	
Lead-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Magnesium-Dissolved (mg/L)	218		244		207		168		211		208	233	
Manganese (total)	0.014		0.012		0.031		0.025		0.01		0.031	0.026	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Nickel-Total (mg/L)	<0.001		0.001		<0.001		0.001		<0.001		0.001	<0.001	
Nitrate as N (mg/L)	4.64		4.7		5.18		4.88		4.7		4.85	5.43	
Nitrite + Nitrate as N (mg/L)	4.64		4.7		5.18		4.88		4.7		4.85	5.43	
Nitrite as N (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76462	76463	76464	76465	75101	78312
Lab Ref					88334	
Aluminium (total) (mg/L)	0.02		0.04		0.04	
Appearance					Clear	
Arsenic-Total (mg/L)	0.001		<0.001		<0.001	
Barium (total)	0.056		0.068		0.068	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	686		715		717	
Boron (total)	0.16		<0.05		0.17	
Cadmium-Total (mg/L)	0.0001		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)	114		115		117	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	1,080		1,370		1,360	
Chromium-Total (mg/L)	0.001		<0.001		<0.001	
Cobalt	0.001		<0.001		0.001	
Colour					Clear	Clear
Comments			Clear			
Copper-Total (mg/L)	0.004		0.002		0.002	
EC - Field	5,160	5,260	5,550	5,580	5,650	5,780
Electrical Conductivity @ 25°C	5,260		5,600		5,360	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	10.2		4.5		2.54	
Iron-Total (mg/L)	0.09		0.06		0.06	
Lead-Total (mg/L)	0.001		<0.001		<0.001	
Magnesium-Dissolved (mg/L)	59.8		229		246	
Manganese (total)	0.029		0.026		0.04	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.002		0.002		<0.001	
Nitrate as N (mg/L)	5.54		0.03		5.48	
Nitrite + Nitrate as N (mg/L)	5.54		5.35		5.48	
Nitrite as N (mg/L)	0.01		5.32		<0.01	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76449	76450	76451	76452	76453	76454	76455	76456	76457	76458	76459	76460	76461
Lab Ref													
Odour													
pH (pH Unit)	7.2	7.3	7.2	7.1	7.1	7.3	7.3	7.3	7.2	7.2	7	7.2	7.3
pH Value (pH Unit)	7.83		7.41		7.49		7.7		7.86		7.49	7.74	
Potassium-Dissolved (mg/L)	16		15		21		14		19		16	17	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Sodium-Dissolved (mg/L)	630		674		628		487		633		610	665	
Standing Water Level	12.3	12.39	12.5	12.26	12.6	12.69	12.8	12.82	13.01	13.12	13.18	10.99	13.09
Stick up													
Sulfate as SO ₄ - Turbidimetric-	260		219		220		191		212		198	237	
Temperature	23.4	21.1	21.7	21.9	22.8	21.6	20.7	21.8	22.6	20.5	21.9	21.5	20.9
Total Alkalinity as CaCO ₃ (mg/L)	686		729		740		831		828		712	663	
Total Anions	48.7		50.2		45.6		47.2		51.7		50.8	51.5	
Total Cations	51.9		56.4		49.9		40		50.6		49.8	55	
Total Dissolved Solids @180°C-	2,970		2,950		2,860		2,540		2,970		3,040	3,600	
Vanadium	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Water Depth to Stand	12.8	12.89	13	12.76	13.1	13.19	13.3	13.32	13.51	13.62	13.68	11.49	13.59
Zinc (total)	0.048		0.027		0.02		0.027		0.016		0.016	0.025	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76462	76463	76464	76465	75101	78312
Lab Ref					88334	
Odour					Nil	
pH (pH Unit)	7.4	7.3	7.3	7.2	7.1	7.2
pH Value (pH Unit)	7.69		7.74		7.78	
Potassium-Dissolved (mg/L)	20		18		26	
Purge Type					Bail	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	777		656		631	
Standing Water Level	13.28	13.42	13.52	13.57	13.62	
Stick up					0.45	
Sulfate as SO4 - Turbidimetric-	221		274		208	
Temperature	20.9	22.1	21.7	20.6	19.3	20.5
Total Alkalinity as CaCO3 (mg/L)	686		715		717	
Total Anions	48.8		58.6		57	
Total Cations	59.8		53.6		54.2	
Total Dissolved Solids @180°C-	3,150		3,340		3,430	
Vanadium	0.01		<0.01		<0.01	
Water Depth to Stand	13.78	13.92	14.02	14.07	14.12	
Zinc (total)	0.041		0.026		0.01	

Data Point: P8; Northing: 225122.483; Easting: 6568894.834

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76504	76505	76506	76507	76508	76509	76510	76511	76512	76513	76514	76515	76516
Lab Ref													
Aluminium (total) (mg/L)	0.16		0.02		0.08		0.02		0.03		0.19	<0.01	
Appearance													
Arsenic-Total (mg/L)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Barium (total)	0.108		0.119		0.116		0.121		0.121		0.136	0.132	
Beryllium (total)	<0.001		<0.001		<0.001		<0.001		<0.001		0.001	<0.001	
Bicarbonate Alkalinity as CaCO3	193		222		213		258		280		258	234	
Boron (total)	<0.05		<0.05		<0.05		<0.05		<0.05		0.05	<0.05	
Cadmium-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Calcium-Dissolved (mg/L)	70		72		61		66		70		74	80	
Carbonate Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Chloride (mg/L)	210		219		228		227		254		273	265	
Chromium-Total (mg/L)	<0.001		0.002		<0.001		<0.001		<0.001		0.001	<0.001	
Cobalt	<0.001		<0.001		<0.001		0.002		<0.001		0.001	<0.001	
Colour													
Comments													clear
Copper-Total (mg/L)	0.007		0.014		0.002		0.001		<0.001		0.009	<0.001	
EC - Field	1,200	1,218	1,230	1,225	1,240	1,336	1,290	1,313	1,448	1,385	1,415	1,500	1,470
Electrical Conductivity @ 25°C	1,220		1,250		1,320		1,300		1,430		14.3	1,380	
Hydroxide Alkalinity as CaCO3	<1		<1		<1		<1		<1		1	<1	
Ionic Balance (%)	0.06		0.09		3.41		2.62		7.6		4.1	0.66	
Iron-Total (mg/L)	1.68		1.27		1.71		1.52		0.32		0.36	0.63	
Lead-Total (mg/L)	0.001		0.002		<0.001		<0.001		<0.001		0.002	<0.001	
Magnesium-Dissolved (mg/L)	46		48		49		56		56		59	60	
Manganese (total)	1.13		1.21		1.24		1.3		1.31		1.5	1.38	
Mercury-Total (mg/L)	<0.0001		<0.0001		<0.0001		<0.0001		<0.0001		0.0001	<0.0001	
Nickel-Total (mg/L)	0.005		0.005		0.004		0.004		0.002		0.003	0.002	
Nitrate as N (mg/L)	0.07		0.07		0.09		0.06		0.22		0.15	0.1	
Nitrite + Nitrate as N (mg/L)	0.07		0.07		0.09		0.06		0.22		0.15	0.1	
Nitrite as N (mg/L)	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	

	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76517	76518	76519	76520	75100	78311
Lab Ref					88333	
Aluminium (total) (mg/L)	0.13		0.01		0.07	
Appearance					Clear	
Arsenic-Total (mg/L)	0.001		<0.001		<0.001	
Barium (total)	0.131		0.145		0.146	
Beryllium (total)	0.001		<0.001		<0.001	
Bicarbonate Alkalinity as CaCO3	260		304		272	
Boron (total)	0.05		0.11		<0.05	
Cadmium-Total (mg/L)	0.0001		<0.0001		<0.0001	
Calcium-Dissolved (mg/L)	80		79		77	
Carbonate Alkalinity as CaCO3	1		<1		<1	
Chloride (mg/L)	271		324		286	
Chromium-Total (mg/L)	0.002		<0.001		<0.001	
Cobalt	0.001		<0.001		<0.001	
Colour					Clear	Clear
Comments			Clear			
Copper-Total (mg/L)	0.004		<0.001		0.007	
EC - Field	1,510	1,575	1,540	1,493	1,450	1,520
Electrical Conductivity @ 25°C	1,540		1,570		1,510	
Hydroxide Alkalinity as CaCO3	1		<1		<1	
Ionic Balance (%)	1.17		9.78		5.37	
Iron-Total (mg/L)	0.29		0.23		0.23	
Lead-Total (mg/L)	0.001		<0.001		<0.001	
Magnesium-Dissolved (mg/L)	15.4		62		60	
Manganese (total)	1.49		1.98		1.68	
Mercury-Total (mg/L)	0.0001		<0.0001		<0.0001	
Nickel-Total (mg/L)	0.002		0.002		0.001	
Nitrate as N (mg/L)	0.11		0.06		0.06	
Nitrite + Nitrate as N (mg/L)	0.11		0.08		0.06	
Nitrite as N (mg/L)	0.01		0.02		<0.01	

	23-Feb-16	10-May-16	30-Aug-16	11-Nov-16	01-Mar-17	14-Jun-17	31-Aug-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19
Rec ID	76504	76505	76506	76507	76508	76509	76510	76511	76512	76513	76514	76515	76516
Lab Ref													
Odour													
pH (pH Unit)	7	7	7	7	6.9	6.9	6.9	6.9	6.9	6.8	6.7	6.8	6.7
pH Value (pH Unit)	7.44		6.97		7.05		7.27		7.53		7.11	7.48	
Potassium-Dissolved (mg/L)	10		9		12		10		10		10	10	
Purge Type													
Selenium-Total (mg/L)	<0.01		<0.01		<0.01				<0.01		0.01	<0.01	
Sodium-Dissolved (mg/L)	95		104		100		100		107		110	115	
Standing Water Level	23.5	23.43	23.4	23.47	23.4	23.4	23.5	23.53	23.31	23.61	23.58	23.57	23.75
Stick up													
Sulfate as SO4 - Turbidimetric-	90		82		90		78		115		91	107	
Temperature	22.6	21.3	21.7	22.3	22.8	21.5	20.7	21.7	22.7	21.1	22.3	22	21
Total Alkalinity as CaCO3 (mg/L)	193		222		213		258		280		258	234	
Total Anions	11.6		12.3		12.6		13.2		15.2		14.8	14.4	
Total Cations	11.7		12.3		11.7		12.5		13		13.6	14.2	
Total Dissolved Solids @180°C-	613		633		741		714		830		834	854	
Vanadium	<0.01		<0.01		<0.01		<0.01		<0.01		0.01	<0.01	
Water Depth to Stand	24.3	24.23	24.2	24.27	24.2	24.2	24.3	24.33	24.11	24.41	24.38	24.37	24.55
Zinc (total)	0.049		0.02		0.021		0.029		0.011		0.048	0.014	

Outliers: 0

Field Name	Result	Outlier Comment
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	10-Sep-19	04-Dec-19	23-Mar-20	04-Jun-20	31-Aug-20	02-Dec-20
Rec ID	76517	76518	76519	76520	75100	78311
Lab Ref					88333	
Odour					Nil	
pH (pH Unit)	6.8	6.9	7	6.9	6.8	6.9
pH Value (pH Unit)	7.35		7.41		7.37	
Potassium-Dissolved (mg/L)	11		10		13	
Purge Type					Bail	
Selenium-Total (mg/L)	0.01		<0.01		<0.01	
Sodium-Dissolved (mg/L)	131		120		114	
Standing Water Level	23.68	23.73	23.61	23.84	23.95	24.06
Stick up					0.75	
Sulfate as SO4 - Turbidimetric-	106		118		104	
Temperature	21.3	6.9	21.8	20.8	19.2	20.4
Total Alkalinity as CaCO3 (mg/L)	260		304		272	
Total Anions	15		17.7		15.7	
Total Cations	15.4		14.5		14.1	
Total Dissolved Solids @180°C-	842		950		907	
Vanadium	0.01		<0.01		<0.01	
Water Depth to Stand	24.48	24.53	24.41	24.64	24.75	24.81
Zinc (total)	0.019		<0.005		0.013	

Data Point: Werona Production; Northing: 222511; Easting: 6570420

	10-May-16	11-Nov-16	14-Jun-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19	10-Sep-19	04-Dec-19	23-Mar-20	31-Aug-20
Rec ID	76916	76917	76918	76919	76920	76921	76922	76923	76924	76925	76926	76927	75098
Lab Ref													88331
Aluminium (total) (mg/L)					1.75		0.53	0.1		0.12		0.23	0.07
Appearance													Clear
Arsenic-Total (mg/L)					<0.001		0.001	<0.001		0.001		<0.001	<0.001
Barium (total)					0.224		0.214	0.163		0.209		0.38	0.325
Beryllium (total)					<0.001		0.001	<0.001		0.001		<0.001	<0.001
Bicarbonate Alkalinity as CaCO3					558		565	452		486		578	643
Boron (total)													0.1
Cadmium-Total (mg/L)					<0.0001		0.0001	<0.0001		0.0001		<0.0001	<0.0001
Calcium-Dissolved (mg/L)					120		91	84		101		152	95
Carbonate Alkalinity as CaCO3					<1		1	17		1		<1	<1
Chloride (mg/L)					1,260		951	823		824		1,080	575
Chromium-Total (mg/L)					0.003		0.001	<0.001		0.001		0.006	0.009
Cobalt					0.001		0.001	<0.001		0.001		<0.001	<0.001
Colour													Clear
Comments	Pump over	Not sampled		Clear	pump	20.85							
Copper-Total (mg/L)					0.002		0.001	0.002		0.001		0.006	<0.001
EC - Field				5,380	4,960	4,250	3,650	3,560		3,720	3,550	3,940	2,900
Electrical Conductivity @ 25°C					4,930		3,740	3,590		3,720		4,060	2,760
Hydroxide Alkalinity as CaCO3					<1		1	<1		1		<1	<1
Ionic Balance (%)					2.02		6.02	3.68		9.59		4.92	6.61
Iron-Total (mg/L)					2.37		0.51	0.13		0.09		0.3	0.13
Lead-Total (mg/L)					<0.001		0.001	<0.001		0.001		0.001	<0.001
Magnesium-Dissolved (mg/L)					223		155	160		174		162	100
Manganese (total)					0.061		0.02	0.027		0.014		0.064	0.059
Mercury-Total (mg/L)					<0.0001		0.0001	<0.0001		0.0001		<0.0001	<0.0001
Nickel-Total (mg/L)					0.002		0.001	0.001		0.001		0.002	<0.001
Nitrate as N (mg/L)					1.08		0.84	0.02		0.64		0.01	0.06
Nitrite + Nitrate as N (mg/L)					1.12		0.84	0.02		0.64		0.16	0.07
Nitrite as N (mg/L)					0.04		0.01	<0.01		0.01		0.15	0.01

	02-Dec-20
Rec ID	78307
Lab Ref	
Aluminium (total) (mg/L)	
Appearance	Clear
Arsenic-Total (mg/L)	
Barium (total)	
Beryllium (total)	
Bicarbonate Alkalinity as CaCO3	
Boron (total)	
Cadmium-Total (mg/L)	
Calcium-Dissolved (mg/L)	
Carbonate Alkalinity as CaCO3	
Chloride (mg/L)	
Chromium-Total (mg/L)	
Cobalt	
Colour	Clear
Comments	
Copper-Total (mg/L)	
EC - Field	3,010
Electrical Conductivity @ 25°C	
Hydroxide Alkalinity as CaCO3	
Ionic Balance (%)	
Iron-Total (mg/L)	
Lead-Total (mg/L)	
Magnesium-Dissolved (mg/L)	
Manganese (total)	
Mercury-Total (mg/L)	
Nickel-Total (mg/L)	
Nitrate as N (mg/L)	
Nitrite + Nitrate as N (mg/L)	
Nitrite as N (mg/L)	

	10-May-16	11-Nov-16	14-Jun-17	06-Dec-17	21-Mar-18	06-Jun-18	19-Sep-18	26-Mar-19	13-Jun-19	10-Sep-19	04-Dec-19	23-Mar-20	31-Aug-20
Rec ID	76916	76917	76918	76919	76920	76921	76922	76923	76924	76925	76926	76927	75098
Lab Ref													88331
Odour													Nil
pH (pH Unit)				7.9	8.4	8.5	7.9	7.9		8.5	7.5	7.5	7.1
pH Value (pH Unit)					8.02		7.92	8.35		8.23		7.64	7.83
Potassium-Dissolved (mg/L)					10		8	9		11		10	12
Purge Type													Bail
Selenium-Total (mg/L)													<0.01
Sodium-Dissolved (mg/L)					527		405	43.5		512		437	299
Standing Water Level												22.16	20.18
Stick up													0.67
Sulfate as SO ₄ - Turbidimetric-					134		72	64		78		112	45
Temperature				25.2	25.8	15.9	22.1	24.9		16	24.2	21.2	18.5
Total Alkalinity as CaCO ₃ (mg/L)					558		565	469		486		578	643
Total Anions					49.5		39.6	33.9		34.6		44.3	30
Total Cations					47.5		35.1	36.5		41.9		40.2	26.3
Total Dissolved Solids @180°C-					3,110		2,240	2,290		2,220		2,470	1,540
Vanadium					<0.01		0.01	<0.01		0.01		<0.01	<0.01
Water Depth to Stand												22.83	20.85
Zinc (total)					0.012		0.005	0.013		0.005		0.043	0.011

Outliers: 0

Field Name	Result	Outlier Comment
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	02-Dec-20
Rec ID	78307
Lab Ref	
Odour	
pH (pH Unit)	7.1
pH Value (pH Unit)	
Potassium-Dissolved (mg/L)	
Purge Type	
Selenium-Total (mg/L)	
Sodium-Dissolved (mg/L)	
Standing Water Level	19.89
Stick up	
Sulfate as SO4 - Turbidimetric-	
Temperature	19.6
Total Alkalinity as CaCO3 (mg/L)	
Total Anions	
Total Cations	
Total Dissolved Solids @180°C-	
Vanadium	
Water Depth to Stand	20.53
Zinc (total)	