SUNRISE PROJECT

ANNUAL REVIEW 2021

MARCH 2022

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SUNRISE PROJECT
2021 Annual Review

Name of Operation/Mine	*Sunrise Project*
Name of Operator	*Sunrise Energy Metals Limited*[1]
Development Consent	*DA 374-11-00 (as modified)*
Name of Holder of Development Consent	*SRL Ops Pty Ltd*
Mining Leases	*ML1770, ML1769*
Name of Holder of Mining Lease	*SRL Ops Pty Ltd*[2]
Environmental Protection Licence (EPL)	*21146*
Name of Holder of EPL	*SRL Ops Pty Ltd*
Water Licences	*WALs 32068, 39837, 28681, 42370, 1798, 6679*
Name of Holder of Water Licences	*SRL Ops Pty Ltd*
Mining Operations Plan (MOP) Commencement Date	*08 August 2020*
MOP Completion Date	*02 July 2022*
Annual Review Start Date	*01 January 2021*
Annual Review End Date	*31 December 2021*
I, Bronwyn Flynn, certify that this audit report is a true and accurate record of the compliance status of the Sunrise Project for the period 01 January 2021 – 31 December 2021 and that I am authorised to make this statement on behalf of Sunrise Energy Metals Limited.	

Name of Authorised Reporting Officer	Bronwyn Flynn
Title of Authorised Reporting Officer	Environment, Approvals & Community Lead
Signature of Authorised Reporting Officer	
Date	31 March 2022

[1] *Sunrise Energy Metals Limited (SEM) was previously Clean TeQ Holdings Limited*
[2] *SRL Ops Pty Ltd was previously Clean TeQ Sunrise Pty Ltd*

1 STATEMENT OF COMPLIANCE

The compliance status of the Sunrise Project (the Project) with its relevant approval conditions as at the end of the reporting period (31 December 2021) is provided in Table 1.

Table 1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
Development Consent DA 374-11-00	YES
Mining Lease (ML) 1769	YES
ML1770	YES

All of the conditions of the relevant approvals (Table 1) were complied with during the reporting period therefore no non-compliances were identified.

2 INTRODUCTION

This Annual Review (AR) has been prepared by Sunrise Energy Metals Limited (SEM) for the Sunrise Project (the Project) for the 2021 calendar year from the 1st January 2021 through to 31st December 2021 (the reporting period).

This AR is generally consistent with the *Annual Review Guideline – Post-approval Requirements for State Significant Mining Developments* [1], *AEMR Guidelines for MOPs prepared to EDG03 Requirements* [2] and also meets:

- the Annual Review requirements of the Department of Planning Industry & Environment (DPIE) (Schedule 5, Condition 5 of the Development Consent DA 374-11-00 granted on 23rd May 2001);
- the Annual Rehabilitation Report (ARR) requirements of the NSW Resources Regulator (NSW RR) under the standard Mining Lease conditions (Condition 3(f)); and
- the routine reporting expectations of the NSW Natural Resources Access Regulator (NRAR).

2.1 CONDITIONS COMPLIANCE TABLE

Table 2 below lists the information requirements in the Development Consent and the corresponding section of this AR where the requirement is addressed.

Table 2 Annual Review Development Consent Information Requirements

Development Consent DA 374-11-00 Schedule 5 Condition 5	Section in this AR document
Annual Review *By the end of March each year, the Applicant must review the environmental performance of the development for the previous calendar year to the satisfaction of the Secretary. This review must:*	This review
describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;	Sections 4, 8 and 12
include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the: relevant statutory requirements, limits or performance measures/criteria; monitoring results of previous years; and relevant predictions in the EIS;	Sections 6 and 9
identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 6
identify any trends in the monitoring data over the life of the development;	Section 6
identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and	Section 6
describe what measures will be implemented over the next year to improve the environmental performance of the development.	Section 6

Table 3 below lists the information requirements in the Mining Lease Conditions and the corresponding section of this AR where the requirement is addressed.

Table 3 Mining Lease Conditions Information Requirements

Mining Lease Conditions Schedule 2 Condition 3 (f)	Section in this AR document
The lease holder must prepare a Rehabilitation Report to the satisfaction of the Minister. The report must:	This document
provide a detailed review of the progress of rehabilitation against the performance measures and criteria established in the approved MOP;	Section 8
be submitted annually on the grant anniversary date (or at such other times as agreed by the Minister); and	This section
be prepared in accordance with any relevant annual reporting guidelines published on the Department's website at www.resourcesandenergy.nsw.gov.au/miners-and-explorers/rules-and-forms/pgf/environmental-guidelines,	This document

Exemption from the ARR commitment for ML 1769 was granted by the Resources Regulator (letter dated 5 July 2019). The Resources Regulator was satisfied that the ARR commitment for ML 1769 is not required until an approved Mining Operations Plan (MOP) is in place. There have been no mining activities undertaken by SEM within ML 1769 since grant of title and therefore a MOP is currently not in place nor required.

In addition, a request by SEM to change the annual submission date of the ARR for ML 1770 from 15 February to 31 March each year to align with the Annual Review was accepted by the Resources Regulator (letter dated 25 March 2020).

2.2 SUNRISE PROJECT BACKGROUND

SRL Ops Pty Ltd owns the rights to develop the Project and is a wholly owned subsidiary of SEM[3].

The Project is a nickel-cobalt-scandium open cut mining project situated near the village of Fifield, approximately 350 kilometres (km) west-northwest of Sydney (Figure 1). The Project includes the establishment and operation of the following:

- mine (including the processing facility) on ML 1770;
- limestone quarry (including limestone processing facility) on ML 1769;
- rail siding;
- gas pipeline;
- borefields, surface water extraction infrastructure and water pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

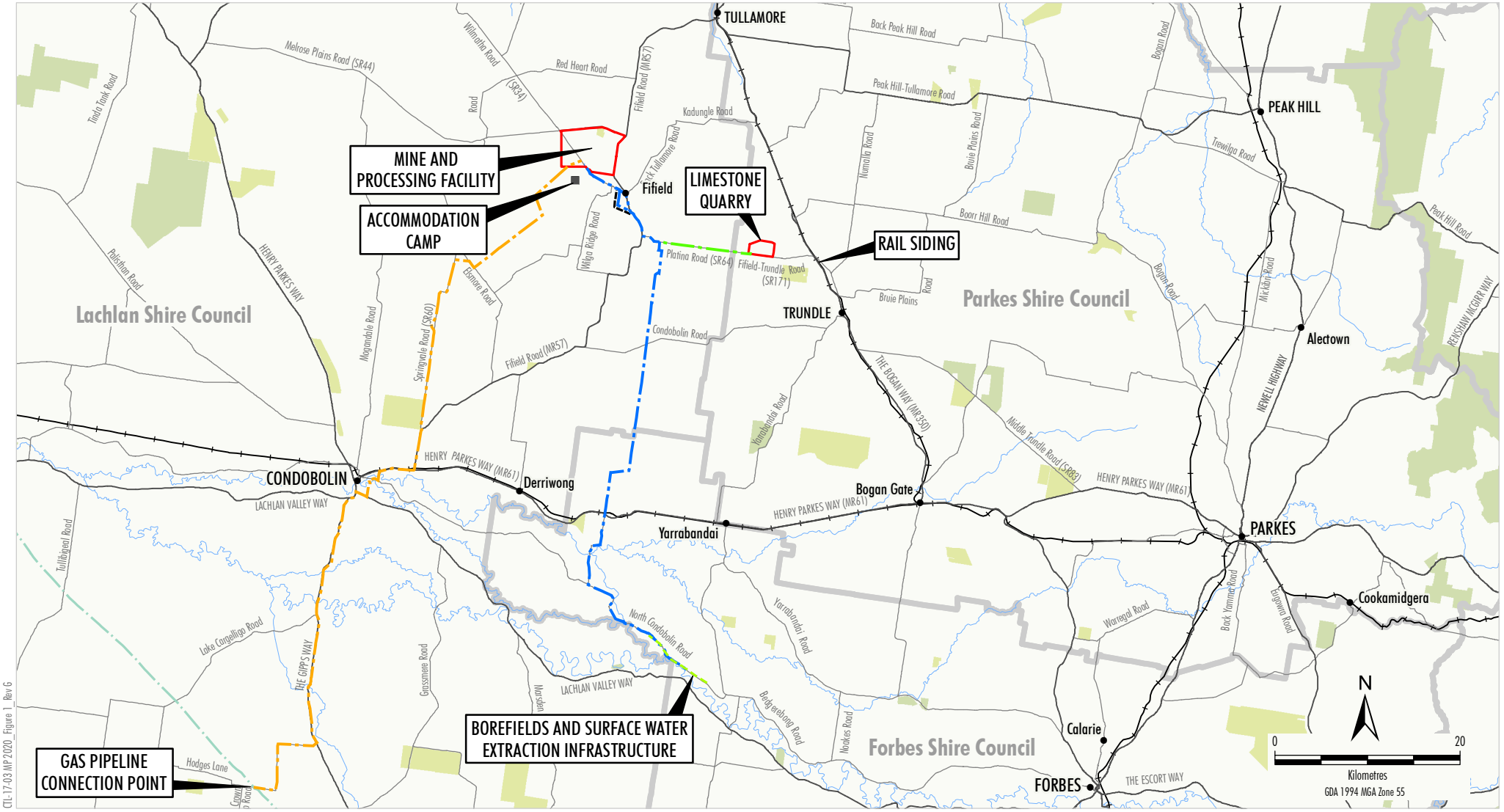
Development Consent DA 374-11-00 (the Development Consent) for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Six modifications to the Development Consent have since been granted under the EP&A Act:

- 2005 - to allow for an increase of the autoclave feed rate, limestone quarry extraction rate and adjustments to ore processing operations;
- 2006 – to allow for the reconfiguration of the borefields;
- 2017 – to allow for the production of scandium oxide;
- 2017 – to amend hazard study requirements;
- 2018 – to relocate the accommodation camp; and
- 2018 – to implement opportunities to improve the overall efficiency of the Project.

The Project was commenced in 2006 with the construction of components of the borefields (i.e. two production bores and associated monitoring wells), however recommencement of construction activities associated with the Project are yet to be initiated.

The land immediately adjacent to and surrounding the Project (ML 1770) consists of farming land and carbon sequestration offsets.

[3] SEM was previously Clean TeQ Holdings Limited (Clean TeQ)



LEGEND

- National Park/Conservation Area
- State Forest
- Local Government Boundary
- Railway
- Existing Gas Pipeline
- Mining Lease Boundary (ML)
- Fifield Bypass
- Gas Pipeline
- Water Pipeline
- Limestone Quarry Water Pipeline
- Borefield Infrastructure Corridor

Source: Black Range Minerals (2000); Clean TeQ (2017, 2018); NSW Department of Industry (2020); NSW Land & Property Information (2017); Office of Environment and Heritage NSW (2017)

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SUNRISE PROJECT

Regional Location

Figure 1

2.3 MINE CONTACTS

Contact details for key SEM personnel responsible for the environmental management of the Project are provided below in Table 4:

Table 4 Key Mine Contacts

Position	Name	Telephone	Email
Sunrise Regional Manager	Michael Wood	0418 818 372	mwood@sunriseem.com
Environment, Approvals and Community Lead	Bronwyn Flynn	0429 066 086	bflynn@sunriseem.com

The postal address for the Sunrise Project is provided below:

Postal Address
PO Box 68
Flinders Lane
Melbourne VIC 8009

3 APPROVALS

3.1 CURRENT LIST OF CONSENTS, LEASES, LICENCES AND PERMITS

The key consents, leases, licences and permits current at the end of the reporting period for the Project are listed in Table 5 below. Any applicable changes to these approvals during the reporting period are also described in Table 5.

Table 5 Key Consents, Leases, Licences and Permits

Instrument	Description	Relevant Authority	Date of Grant	Expiry Date or Duration	Changes During AR Period
Project Approval					
DA 374-11-00	Development Consent	DPIE	23/05/2001	21 years (from commencement of mining operations)	No change
Mining Leases (ML)					
ML 1769	Mining Lease (389.7 ha)	MEG	15/2/2018	21 years	No change
ML 1770	Mining Lease (2676 ha)	MEG	16/2/2018	21 years	No change
Mining Operations Plan					
MOP	Mining Operations Plan 2020-2021	MEG	04/08/2020	02/07/2022	An extension to the MOP term to 2 July 2022, was requested and subsequently granted by the Resources Regulator.
Environment Protection Licence					
EPL21146	Environment Protection Licence (EPL)	NSW EPA	09/01/2019	Until surrendered	No change
Exploration Licences (EL)					
EL8928	Exploration Lease (57.5 km^2)	NSW RR	06/01/2020	3 years	No change
EL4573	Exploration Lease (22.7 km^2)	NSW RR	17/08/2021	3 years	EL renewed during the reporting period
EL8833	Exploration Lease (112.5 km^2)	NSW RR	18/04/2019	3 years	No change
EL8882	Exploration Lease (80.9 km^2)	NSW RR	14/08/2019	3 years	No change
EL8883	Exploration Lease (138.4 km^2)	NSW RR	14/08/2019	3 years	No change
EL9259	Exploration Lease (1229.4 km^2)	NSW RR	06/08/2021	3 years	EL granted 06/08/2021
EL9317	Exploration Lease (72.5 km^2)	NSW RR	29/10/2021	3 years	EL granted 29/10/2021

Table 5 (Cont.) Key Consents, Leases, Licences and Permits

Instrument	Description	Relevant Authority	Date of Grant	Expiry Date or Duration	Changes During AR Period
Permits/Agreements/Licences					
AHIP #C0003049	Aboriginal Heritage Impact Permit	BCS	10/10/2017	10 years	No change
AHIP #C0003887	Aboriginal Heritage Impact Permit	BCS	10/08/2018	23 years	No change
Agreement	Compensation Agreement	FCNSW	17/01/2019	-	No change
119039 v3	Class 2 - Heavy Vehicle Authorisation Permit	NHVR	02/05/2018	30/01/2024	The NHVR permit was renewed for a period of three years
LN 603648	Crown Lands Licence	DPIE-Crown Lands	06/08/2019	-	No change
Agreement	Mining Lease Compensation Agreement	DPIE-Lands and Central West LLS	20/03/2020	Until land becomes freehold or relinquishment of ML (and certificate to say rehab completed etc.)	No change
5099691	Radiation Management License	NSW EPA	01/10/2020	01/10/2022	Licence renewed
5099494	Radiation User License	NSW EPA	25/09/2020	25/09/2024	Licence renewed
Water Licences					
WAL32068	Water Access Licence	NRAR	18/09/2018	Continuing	No change
WAL28681	Water Access Licence	NRAR	18/09/2018	Continuing	Changes made to licence and approval conditions (24/09/2021). Water Sharing Plan replaced by the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020* which commenced 1 July 2020.
WAL39837	Water Access Licence	NRAR	25/10/2018	Continuing	Changes made to licence and approval conditions (03/02/2021). Water Sharing Plan replaced by the *Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020* which commenced 1 July 2020.
WAL6679	Water Access Licence	NRAR	13/03/2019	Continuing	No change
WAL42370	Water Access Licence	NRAR	24/05/2019	Continuing	No change
WAL1798	Water Access Licence	NRAR	03/06/2019	Continuing	No change

Table 5 (Cont.) Key Consents, Leases, Licences and Permits

Instrument	Description	Relevant Authority	Date of Grant	Expiry Date or Duration	Changes During AR Period
Water Supply Works Approvals (WSWAs)					
70CA614098	WSWA	NRAR	14/09/2012	12/03/2026	Amended WSWA issued by NRAR on 22 November 2021 (based on amendment application submitted 2 August 2019).
70WA617095	WSWA	NRAR	13/07/2020	09/07/2030	No change

DPIE: NSW Department of Planning, Industry and Environment.
EPA: NSW Environment Protection Agency – within the Department of Planning, Industry and Environment
NRAR: NSW Natural Resources Access Regulator – within the Department of Planning, Industry and Environment
MEG – Mining, Exploration and Geoscience
BCS: NSW Biodiversity, Conservation and Science Directorate – within the Department of Planning, Industry and Environment
FCNSW: Forestry Corporation of New South Wales
NHVR: National Heavy Vehicle Regulator NSW RR: NSW Resources Regulator - within the Department of Regional NSW

4 OPERATIONS SUMMARY

4.1 MINING

As mining (or construction) has not commenced, SEM did not extract or process any ore or limestone for the Project during the reporting period. Furthermore, no off-site product transport was undertaken from the mine. A production summary is shown in Table 6 below.

Table 6 Production Summary

Material		Approved Limit* (tonnes/calendar year)	Actuals		Forecast
			Previous Reporting Period	This Reporting Period	Next Reporting Period
Autoclave feed rate of ore		2.5 million	0	0	0
Off –site Product Transport	Ni and Co metal equivalents as sulphate precipitate products	40,000	0	0	0
	Scandium Oxide	180	0	0	0
	Ammonium Sulphate	100,000	0	0	0
Limestone	Extracted from ML 1769	790,000	0	0	0

*Source: Development Consent DA 374-11-00

4.2 EXPLORATION

Exploration activities undertaken during the reporting period included completion of the ML 1770 platinum diamond drilling program targeting platinum lodes within identified platinum intersections. Processing of geophysics was also completed to delineate potential platinum mineralisation surrounding the Sunrise resource. A program was also commenced during the reporting period to assay historical sample pulps and to store and organise sample pulps and core located on ML 1770. A summary of exploration activities and all exploration drilling results have been reported in the *Fourth Annual Exploration Report for ML 1770 "Sunrise Project" – 16 February 2021 to 15 February 2022* [3].

Platinum Diamond Drilling

Phase 2 of the platinum diamond drilling program was completed during the reporting period, and included the drilling of four diamond holes. Table 7 presents the drill collar data for each hole, with the location of the drillholes within ML1770 presented in Figure 2.

Table 7 ML 1770 Platinum Exploration Drilling Phase 2 Collar Details

Hole	Collar Grid East	Collar Grid North	Collar Grid RL	Depth (m)	Date Completed
SDD025	540525.2	6375644.4	285.671	288.9	21/06/2021
SDD026	540475.6	6375515.8	285.524	445.7	01/08/2021
SDD027	540429.8	6375548.8	284.891	425.5	15/07/2021
SDD028	540401.7	6375595.4	284.033	444.5	04/09/2021

The diamond drillholes (SDD025, SDD026, SDD027, SDD028) were drilled between 21 June 2021 and 4 September 2021 for a total of 1604.6m with drillhole depths ranging from 288.9m to 445.7m (Table 7). Figure 3 shows the location of the drillhole collars and approximate drill traces. The four drillholes targeted previous platinum intersections in historic reverse circulation drillholes and the potential down dip, up dip and along strike platinum mineralisation intersected in drillhole SDD022 (drilled in 2020).

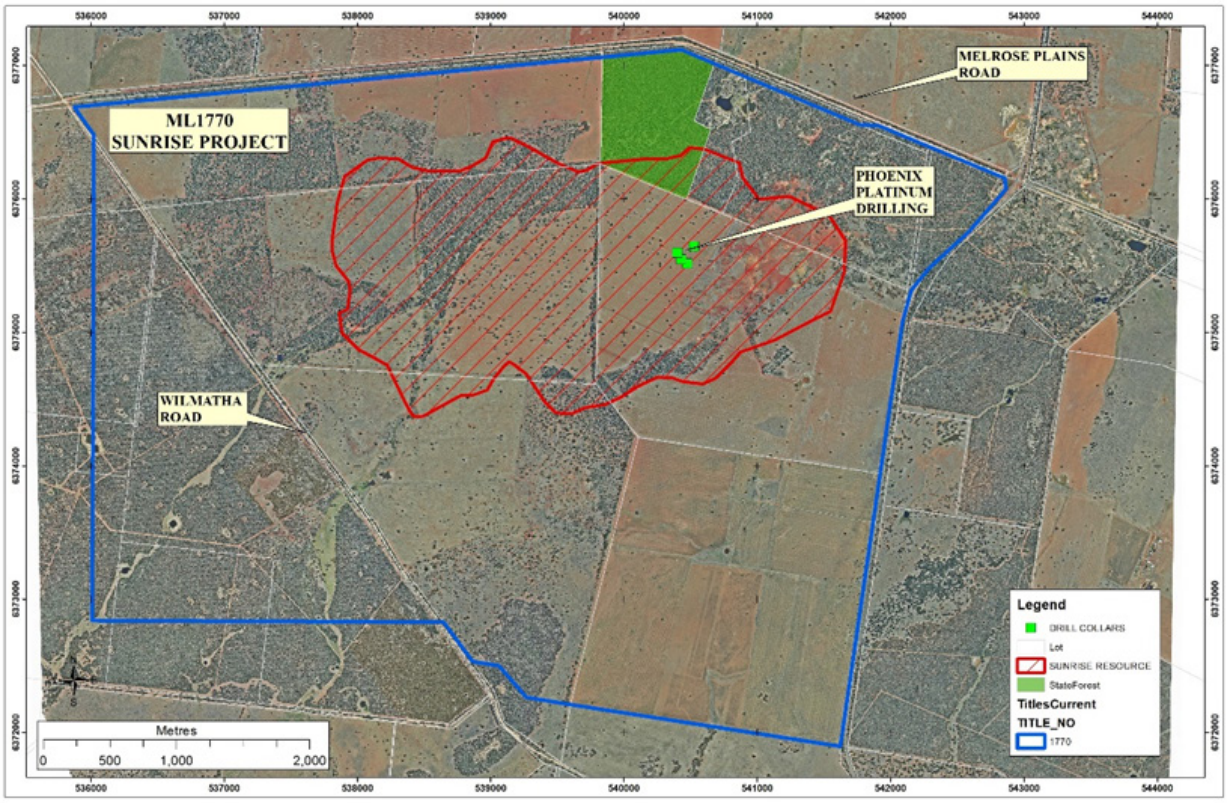

Figure 2 Drilling completed during the reporting period in relation to ML 1770 and Sunrise Resource area

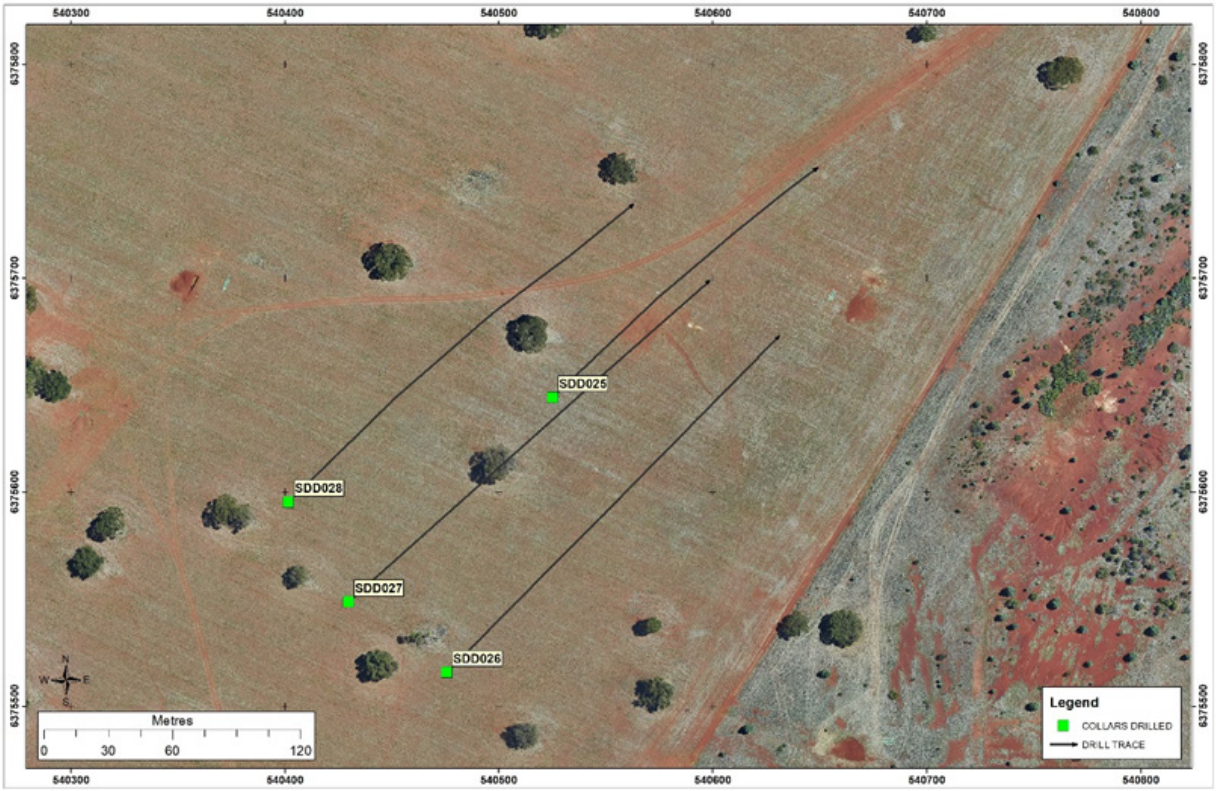

Figure 3 Platinum diamond drill collars and approximate drill traces

Significant intercepts greater than 1.0g/t platinum are included in Table 8 below. Drilling results from the Phase 2 diamond drilling program are described in detail in the *Fourth Annual Exploration Report for ML 1770 "Sunrise Project" – 16 February 2021 to 15 February 2022* [3] submitted in March 2022 to the NSW Resources Regulator.

It was noted that no surface water run on or runoff occurred from the drill pad sites due to the flat nature of the surrounding landforms. Rehabilitation completed during the reporting period included repairing ground disturbance (e.g. wheel ruts) caused during Phase 1 and Phase 2 platinum diamond drilling, however PVC collars remain temporarily sealed at the surface. Rehabilitation of all seven diamond drillholes will be completed during the next reporting period.

Table 8 ML 1770 Platinum Exploration Drilling Phase 2 Significant Platinum Intercepts

Hole	From m	To m	Interval m	Platinum ppm	Association
SDD025	90.0	91.4	1.40	1.57	Dunite
SDD025	132.45	132.87	0.42	1.28	Dunite
SDD025	230.0	231.0	1.00	1.85	Chromite Vein
SDD026	101.57	102.53	0.96	1.05	Pyroxenite Dykes
SDD026	105.65	106.42	0.77	1.02	Pyroxenite Dykes
SDD026	109.07	109.50	0.43	2.19	Pyroxenite Dykes
SDD026	342.40	342.70	0.30	1.35	Chromite Vein
SDD026	392.70	393.45	0.75	3.29	Pyroxenite Dykes
SDD026	393.45	394.00	0.55	1.58	Pyroxenite Dykes
SDD027	148.50	149.35	0.85	1.24	Pyroxenite Dykes

Geophysics - 2D Magnetic Modelling

During the reporting period, Southern Geoscience Consultants remodelled magnetic data and delineated several prospective magnetic dunite-pyroxenite contacts for drill testing and surface sampling campaigns (Figure 4)**.** It is postulated that magnetite and chromite-bearing coarse grained pyroxenites located around the margins of the dunite core at Sunrise comprise a potential exploration target for Platinum Group Elements (PGEs).

Historical Sample Pulps

During the reporting period, SEM relocated all known Sunrise resource sample pulps, diamond drill core and reserved metallurgical bulk samples to a central storage location within ML 1770. This comprises the majority of all sample and core reference material from the Sunrise Project. A project of selecting and assaying historic pulps for PGEs was also commenced during the reporting period.

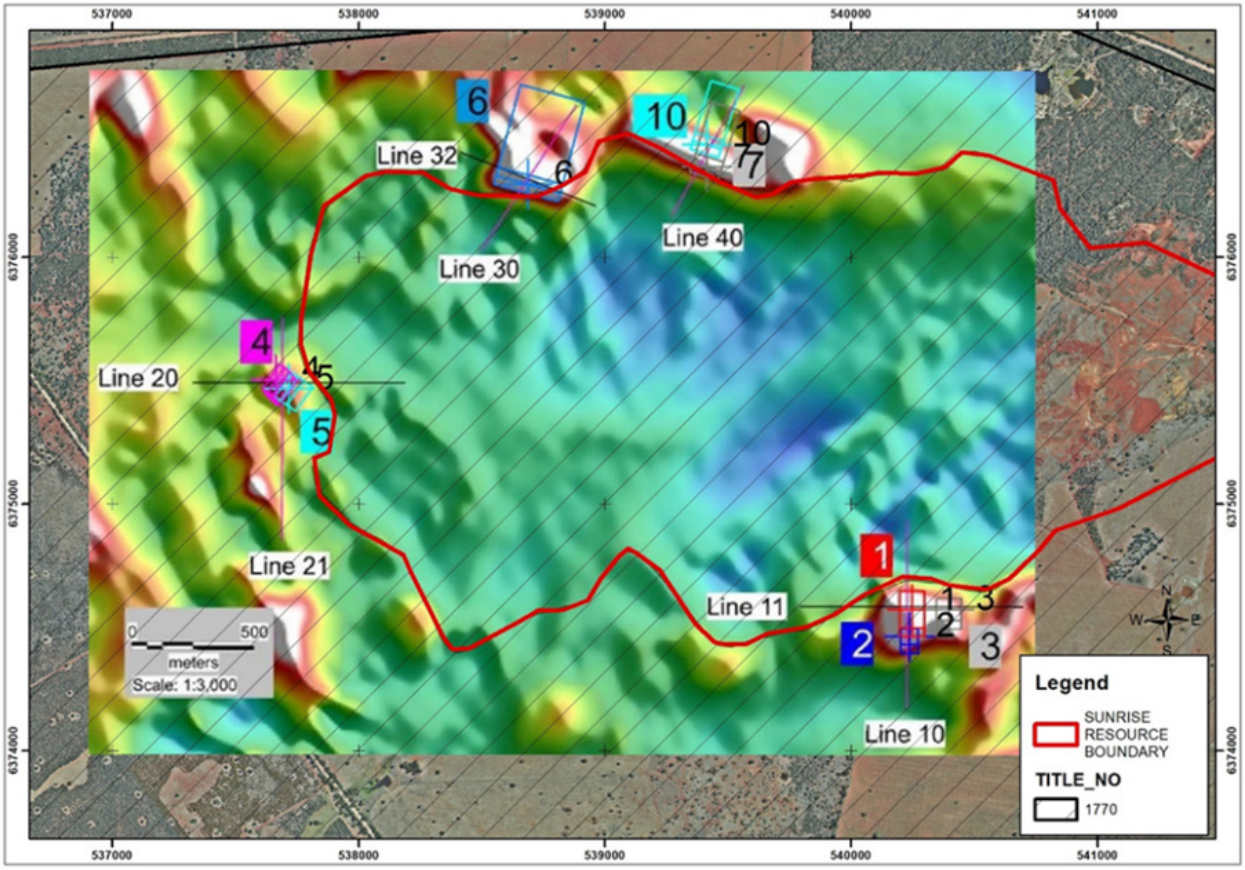

Figure 4 Plan view of modelled dunite-pyroxenite contacts and PGE target areas

4.3 OTHER ACTIVITIES

Boundary Fence Replacement

Approximately four (4) kilometres of the mining lease (ML 1770) boundary fence was replaced with new fencing. The fenceline bounding the Melrose Plains Road reserve between Wilmatha Road and the Fifield State Forest was replaced, with plans to progressively replace other sections.

4.4 NEXT REPORTING PERIOD

No significant changes to operations are forecast for the next reporting period i.e. mining (or construction) are not forecast to commence in the next reporting period. Exploration activities as described in the current MOP are expected to continue throughout 2022. A Rehabilitation Management Plan (RMP) will be prepared to replace the existing MOP due to expire on 2 July 2022.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The previous annual review (2020 Annual Review for the period 1 January 2020 to 31 December 2020) was submitted to the DPIE (the Department) on the 1st of April 2021. The Department responded to the 2020 Annual Review submission (letter dated 16/04/2021) advising they had reviewed the Annual Review and considered that it satisfied the reporting requirements of the approval (the Development Consent) and the Department's *Annual Review Guideline* (October 2015). The Department also requested that a copy of the 2020 Annual Review be made publicly available on the company website (Table 9).

Actions required to be undertaken as an outcome of the previous Annual Review and actions that have been undertaken and when they were completed are identified below in Table 9.

Table 9 Actions from the previous Annual Review

Action required from previous Annual Review	Requested by	Action taken by SEM	Where discussed in Annual Review
Make a copy of the 2020 Annual Review publicly available on the SEM website	DPIE	A copy of the 2020 Annual Review was made publicly available on the SEM website in April 2021.	This section (Section 5)
No requirement	NSW RR	N/A	N/A
No requirement	DPIE - Water	N/A	N/A

6 ENVIRONMENTAL PERFORMANCE

Environmental management at the Project during the reporting period was conducted under the guidance of the approved Mining Operations Plan (MOP) and approved Environmental Management Plans (EMPs). Risks associated with the proposed exploration activities are summarised in section 3.1 of the MOP as follows:

- Adverse noise impacts on surrounding residents;
- Unacceptable dust-related impacts;
- Surface water impacts associated with discharge of produced or other water; and
- Groundwater impacts associated with contamination of aquifers.

EMPs and strategies required under the Development Consent prepared (by SEM) and approved by the DPIE are shown below in Table 10.

Table 10 Environmental Management Plans and Strategies

Description	Current Status		DPIE Approval Date
	Revision	Dated	
Air Quality Management Plan	2	21/08/2019	29/08/2019
Blast Management Plan	1	29/03/2019	12/04/2019
Biodiversity Management Plan and Revegetation Strategy	2	22/07/2019	15/08/2019
Environmental Management Strategy	1	17/09/2019	27/09/2019
Heritage Management Plan	2	12/06/2019	13/06/2019
Noise Management Plan	3	29/05/2020	15/06/2020
Rehabilitation Management Plan	2	11/07/2019	15/08/2019
Road Upgrade and Maintenance Strategy	1	27/03/2019	13/05/2019
Traffic Management Plan	1	8/07/2019	15/08/2019
Water Management Plan	1	3/09/2019	21/01/2020
- Appendix A Water Balance	1	3/09/2019	21/01/2020
- Appendix B Surface Water Management Plan	1	28/10/2019	21/01/2020
- Appendix C Groundwater Management Plan	1	11/12/2019	21/01/2020

Future planned exploration and construction activities will be undertaken in accordance with the commitments outlined in the approved MOP/RMP and relevant approved EMP's. All approved EMPs can be found on the SEM website at https://www.sunriseem.com/sunrise-project/management-plans.

Version 2 of the Groundwater Management Plan was submitted for approval on 14th December 2021, and at the time of writing, is still being assessed by the DPIE.

6.1 AIR QUALITY

The Development Consent (Schedule 3, Condition 23) requires the preparation of an Air Quality Management Plan (AQMP) for the Project. As stated above, a construction phase AQMP was submitted to the DPIE for approval and subsequently approved on the 29 August 2019. The management plan outlines the control strategies for managing air quality, and the monitoring program to measure performance.

6.1.1 Environmental Management

Control Strategies

Dust from exploration activities on ML 1770 and vehicle movements on unsealed roads was identified in the MOP as a potential impact to sensitive receivers surrounding the mine site. Therefore, SEM implemented the following air quality management measures to minimise and mitigate these impacts:

- All drill rigs were fitted with an effective dust suppression and collection system and rigs only operated when that dust suppression system was functional;
- Drilling ceased immediately if dust emissions were visible from more than 250m from the drill rig; and
- Vehicle speeds on-site were limited to 40km/h on formed tracks and 20km/h on unformed tracks.

Effectiveness of Control Strategies

The control strategies implemented during the reporting period were considered to be effective.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

Monitoring Programme

As required by the Development Consent (Schedule 3, Condition 23) and subsequently described in the approved AQMP, the air quality monitoring program for the Project includes the monitoring of:

- PM_{10} (particulate matter with an aerodynamic diameter less than or equal to 10 µm);
- $PM_{2.5}$ (particulate matter with an aerodynamic diameter less than or equal to 2.5 µm); and
- Depositional dust (insoluble solids).

The location of the monitoring stations is shown in Figure 5.

LEGEND

- Mining Lease Boundary (ML)
- Fifield Bypass
- Gas Pipeline
- Water Pipeline
- Clean TeQ Owned Land
- Crown Land
- Fifield State Forest
- Private Landholder
- Dwelling

EIS Monitoring Sites

- Dust Deposition
- Meteorological Station

Construction Phase Monitoring Sites

- Dust Deposition
- $PM_{2.5}$ and PM_{10}
- Meteorological Station

Source: Black Range Minerals (2000); Clean TeQ (2017, 2018); NSW Department of Industry (2018); NSW Land & Property Information (2017)

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Air Quality and Meteorological Monitoring Sites

Figure 5

CTL-17-03 MP 2018_AQ_201J

The real time (continuous) particulate monitors (PM_{10} and $PM_{2.5}$) were required to be in place prior to the commencement of construction activities on ML 1770, in accordance with Condition M2.2 of EPL 21146. Two (solar powered) T640x monitors were installed at two locations in the vicinity of the Project during December 2019. One was installed adjacent to the Automatic Weather Station (AWS) and approved accommodation camp location, and the other on the northern boundary of the mine site (Figure 5). Both monitors have been operating during the reporting period. This allows time for collection of background data, and calibration of the units prior to the commencement of construction activities on ML 1770.

Depositional dust monitoring is undertaken at locations representative of nearby sensitive receivers, via a network of four static dust deposition gauges. In accordance with the approved AQMP, four dust deposition gauges were installed in January 2019 (Figure 5), prior to exploration or construction activities being undertaken. Monitoring was undertaken monthly from the four locations during the reporting period.

6.1.2 Environmental Performance

Depositional Dust Monitoring

Elevated dust deposition results were recorded for some months during 2021 (e.g. June, September, and October) particularly at DG3. It has been assumed that agricultural activities (e.g. ploughing, harvesting and/or stock movements) were responsible for the elevated results, particularly as the high reading was mostly attributed to the combustible portion of the insoluble solids fraction (i.e. organic origin). Results for each month have been published on the SEM website at https://www.sunriseem.com/sunrise-project/reports/ and are presented below in Figure 6.

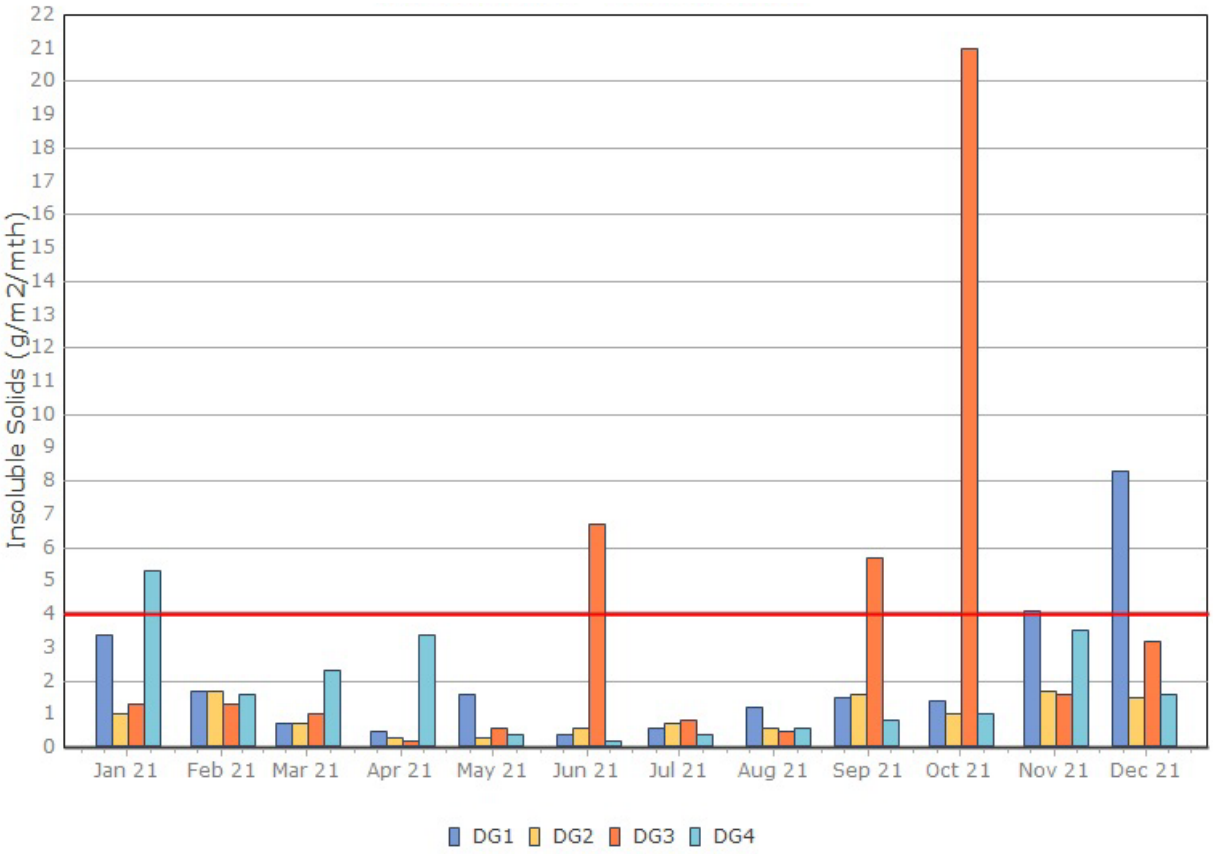


Figure 6 Dust Deposition (insoluble solids) 2021

Table 8, Condition 21, Schedule 3 of Development Consent DA 374-11-00 sets the long-term criteria for deposited dust (insoluble solids). The permitted maximum total deposited dust level averaged over a year is 4 g/m²/month, while the maximum increase (incremental increase due to the development on its own) is 2 g/m²/month. Table 11 shows the 2021

reporting period annual average, along with the previous data. The baseline monitoring data collected for the EIS (September 1997 – August 2000) is also shown as a comparison.

Table 11. Maximum Total Deposited Dust Level - Annual Average

Year	Criterion	DG1	DG2	DG3	DG4	Average
2021	4g/m^2/month	2.1	1.0	3.7	1.8	2.1
2020		3.1	2.6	2.3	3.2	2.8
2019		3.4	2.8	2.5	3.0	2.9
EIS (2000)						2.5

Particulate Matter Monitors

Monitoring results have been reviewed (as per Section 11.1 of the approved AQMP) and a summary is presented below. Daily data for PM_{10} and $PM_{2.5}$ is shown in Appendix 1B, 1C and 1D. One exceedance for the 24 hour average for PM_{10} occurred at each site on different days (see Table 12). As there were no activities on site at the time that could have contributed to these exceedances, and as agricultural activities at neighbouring properties were taking place, it has been assumed these exceedances were not caused by activities on ML 1770.

Table 12. Short term impact assessment criterion for particulate matter - 2021 exceedances

Pollutant	Averaging Period	Criterion	PM2	PM4
PM_{10}	24 hour	50 µg/m³	64.065 µg/m³ on 15/12/2021	59.762 µg/m³ on 24/9/2021
$PM_{2.5}$	24 hour	25 µg/m³	nil	nil

a - excluding extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Table 6, Condition 21, Schedule 3 of Development Consent DA 374-11-00 sets the long-term criteria for particulate matter (excluding extraordinary events such as bushfires, dust storms etc.). Table 13 shows the 2021 results against the criterion. TSP is derived from PM_{10} data, calculated based on an assumption that 40% of TSP is PM_{10} (NSW Minerals Council (2000).

Table 13. Long term impact assessment criterion for particulate matter - 2021 results

Pollutant	Averaging Period	Criterion	PM2	PM4
TSP Matter	Annual	90 µg/m³	31.24	29.48
PM_{10}	Annual	30 µg/m³	12.50	11.79
$PM_{2.5}$	Annual	8 µg/m³	4.18	3.90

a - excluding extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

6.1.3 Reportable Incidents

There were no reportable incidents during the reporting period, however there were two days where the 24 hour average for PM_{10} did exceed the criteria. Upon investigation these exceedances were assumed to be caused by agricultural activity on neighbouring properties as no activities were being undertaken on ML 1770 on the days in question (these records are highlighted in the data tables presented in Appendix 1B and in Table 12).

Furthermore, no community complaints were received regarding air quality from nearby sensitive receivers at any time during the reporting period, including during the exploration activities.

6.1.4 Further Improvements

No further improvements are proposed.

6.2 METEOROLOGICAL MONITORING

The Development Consent (Schedule 3, Condition 25) requires a meteorological station to operate in the vicinity of the mine site for the life of the development (after establishment). Other than described below, no meteorological monitoring was required to be undertaken at other Project areas (e.g. ML 1769) during the reporting period.

6.2.1 Environmental Management

Monitoring Programme

The AWS [meteorological station] (Figure 5), located on the Sunrise Property (in close proximity to ML 1770), continued to collect meteorological data during the reporting period in accordance with the required parameters listed in Condition M4 of the EPL. The AWS (installed in 2018) measures real time wind speed and direction (at 10m), temperature (at 2m and 10m), barometric pressure, humidity, solar radiation and rainfall.

Real time meteorological data from the AWS can be accessed remotely. The data has been used to undertake noise modelling for the Project Execution Plan Modification (Mod 7) as well as proactive rainfall runoff predictions and thereby surface water monitoring opportunities.

Six monthly independent maintenance and calibration of the AWS is also undertaken to ensure valid data is being recorded.

Effectiveness of Monitoring Programme

The strategies implemented during the reporting period were considered to be effective.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.2.2 Environmental Performance

Temperature

Average monthly maximum and minimum temperatures from data recorded (temperature at 2m) by the AWS are shown below in Figure 7. The highest average monthly maximum temperature (31.4°C) occurred in January and the lowest average monthly minimum temperature (2.8°C) occurred in July. This compares to 33.4°C (January) and 2.6°C (July) stated in the Project Environmental Impact Statement (EIS) as recorded at the Condobolin Agricultural Research Station (Station #50052) (Appendix 2). The maximum and minimum daily temperatures for the year were generally lower than average.

The highest maximum daily temperature of 38.6 °C was recorded in January and the lowest minimum daily temperature in July of -2.9 °C. Compared to last year, January 2021 was much cooler than January 2020.

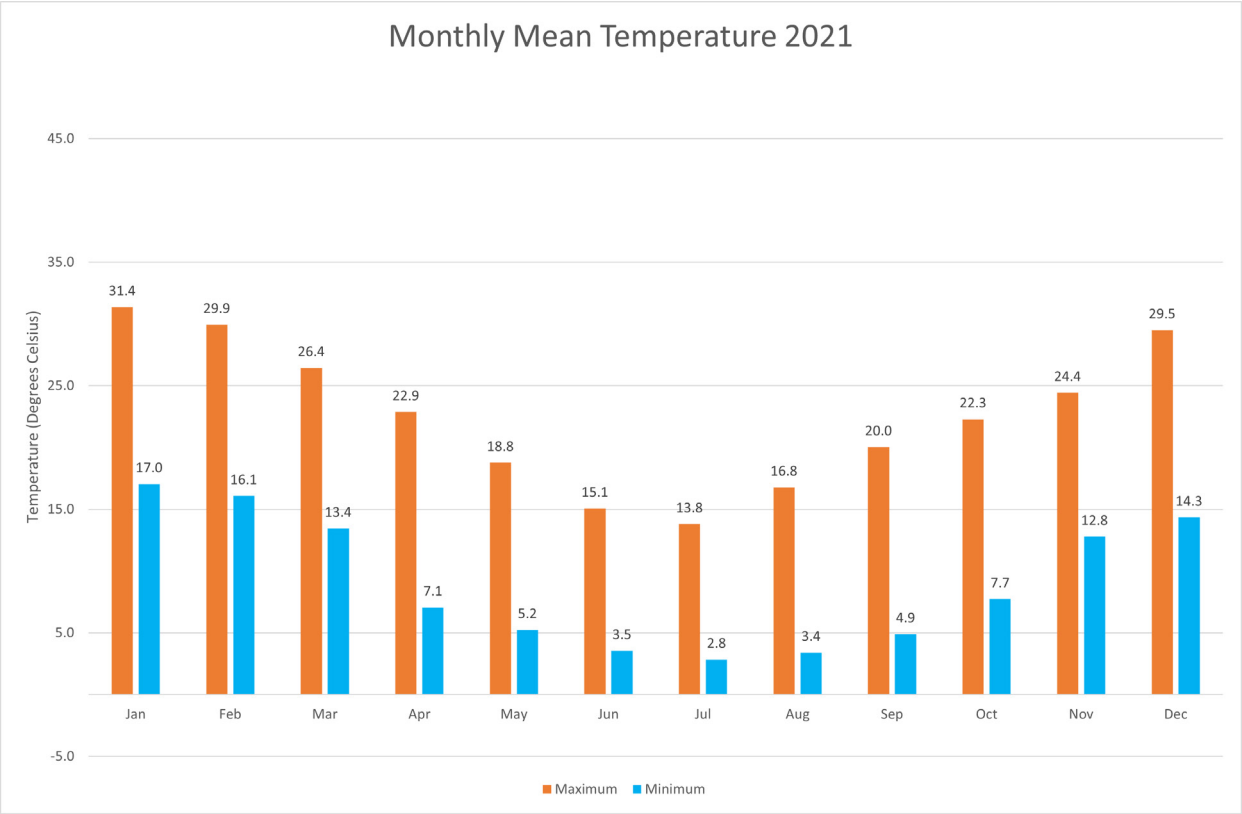


Figure 7 Monthly temperature records for 2021 at the Sunrise AWS

Rainfall

Total rainfall of 1013.6 mm was recorded by the AWS during the 2021 reporting period as shown below in Figure 8, along with monthly totals. This total is well above the mean annual rainfall described in the EIS of 480 mm recorded at the Murrumbogie Station at Trundle. Murrumbogie Station (#50028) is the nearest long-record daily rainfall station located approximately 30 km southeast of the mine site. The 2021 rainfall exceeds the previously recorded highest annual total of 970.8 mm in 1887 at the Murrumbogie Station.

Compared to 2020 (795.2mm), the annual rainfall was significantly higher in 2021. Rainfall was greater than average in most months, with the exception of April, May and October.

Wind

Wind speed and direction (blowing from) data for the 2021 reporting period are presented in the wind rose in Figure 9. Wind speed values are displayed as metres per second (m/s). Monthly wind roses are presented in Appendix 2A.

Analysis of data reveals that winds during the 2021 reporting period were predominantly from the southwest (SW/WSW 21%). An average wind speed of 2.85 m/s was calculated for the period. Calms (wind speed <0.5m/s) were experienced 6% of the time.

The annual wind rose graph from 2021 is more typical to the wind roses from the EIS and from 2019. The overall average wind speed for 2021 was 2.85 m/s, compared to 3.4 m/s in 2019. The EIS noted that wind speeds in summer tended to increase up to and between 5 and 8.3 m/s (18 and 30 km/hr) in the afternoons, this occurred 20% of the time in 2021 compared to 49% in 2019. The percentage of wind speeds between 1.5 and 3 m/s was 35.1% in 2021.

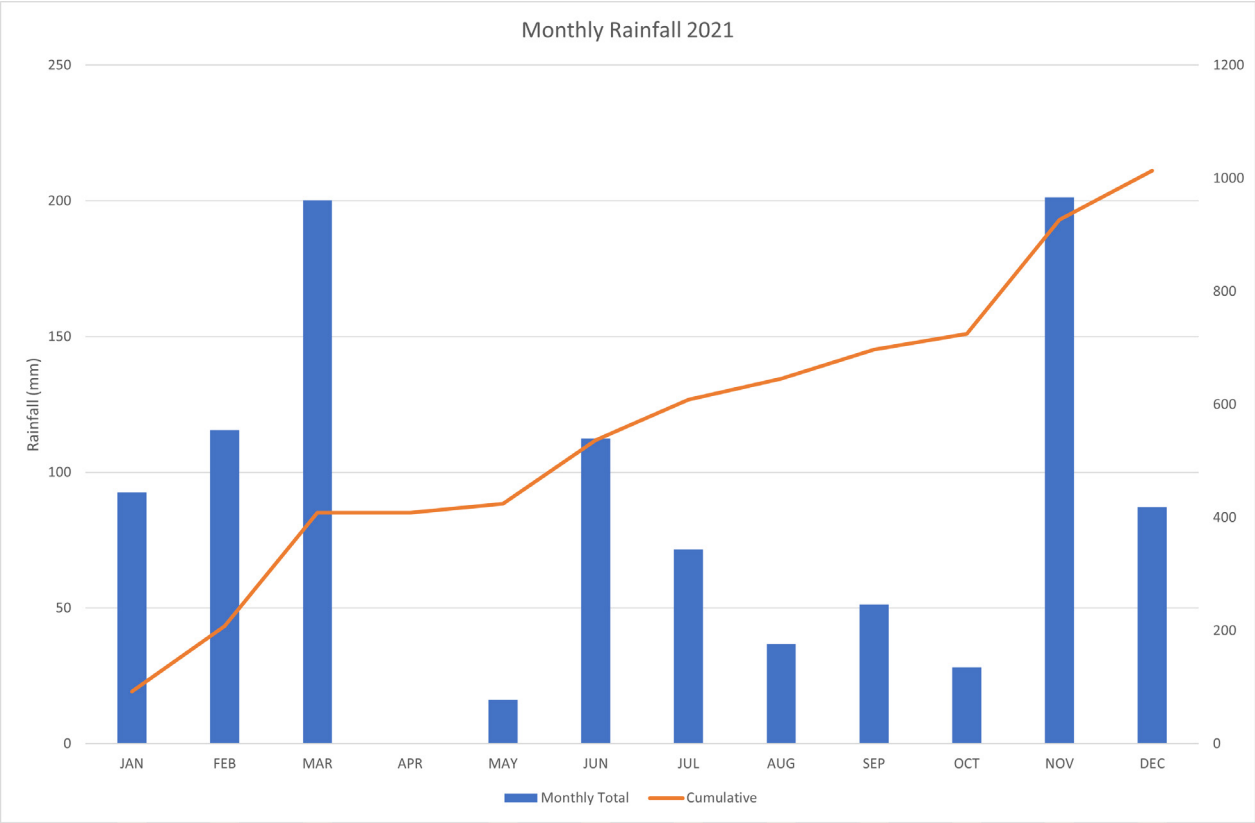


Figure 8 Monthly rainfall records for 2021 at the Sunrise AWS

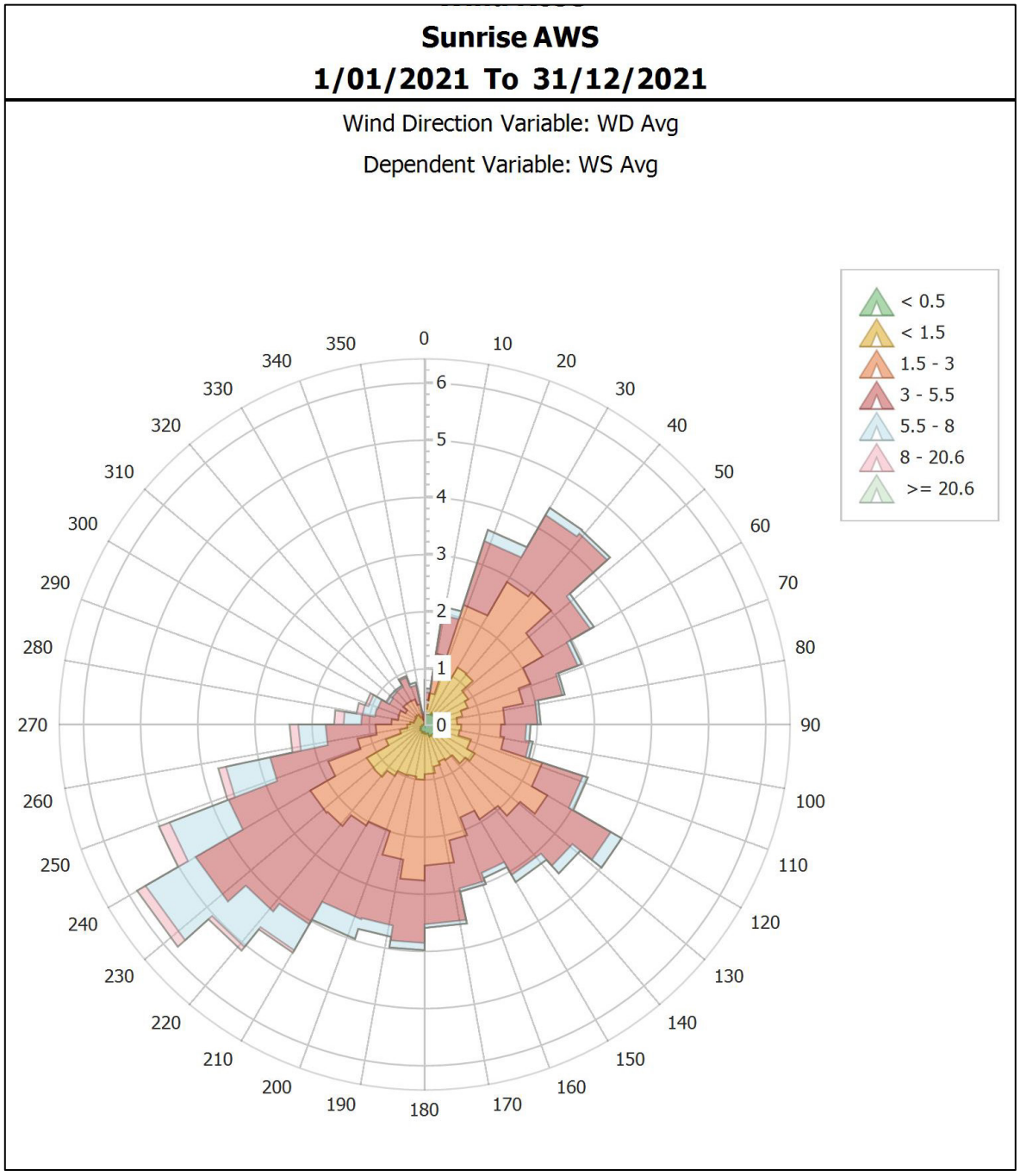


Figure 9 Annual wind rose 2021

6.2.3 Reportable Incidents

There were no reportable incidents during the reporting period,

6.2.4 Further Improvements

No further improvements are proposed for the next reporting year.

6.3 CONSTRUCTION NOISE

The Development Consent (Schedule 3, Condition 9) requires development of a Noise Management Plan (NMP) for the Project. The construction phase NMP (Revision 3) was approved by the DPIE on the 15 June 2020.

Other than described below, no noise monitoring was required to be undertaken at other Project areas (e.g. ML 1769) during the reporting period.

6.3.1 Environmental Management

Control Strategies

Noise from the drilling program was identified in the MOP as a potential impact to sensitive receivers surrounding the mine site. SEM informed surrounding residents of the potential noise emissions and was prepared to implement the following noise-management measures during exploration activities to minimise and mitigate these impacts:

- Limit the number, type and location of drill rigs operating concurrently;
- Install noise barriers at the drill site; and/or
- Modify the hours and/or days of operation.

Effectiveness of Control Strategies

None of the control strategies listed above were required to be implemented during the reporting period. No noise complaints were received during the reporting period.

Variations from Proposed Strategies

There were no variations from the proposed control strategies during the reporting period.

Monitoring Programme

The NMP states the noise monitoring program will commence prior to the commencement of Project construction activities. Attended noise monitoring will be conducted at various locations considered representative of sensitive receivers in the areas that may be potentially influenced by initial construction activities.

Operator-attended noise monitoring will be conducted on a quarterly basis at four locations representative of the privately-owned receivers most likely to be affected by noise generated by the initial construction activities. Monitoring would be conducted in accordance with AS 1055-1997 Acoustics – Description and measurement of environmental noise General procedures, the Noise Policy for Industry and the requirements (including applicable meteorological conditions) of Appendix 4 of Development Consent DA 374-11-00.

Quarterly attended noise monitoring was commenced in Q1 in 2019 and ceased in Q1 in 2020 at four nearby sensitive receivers.

Variations from Proposed Monitoring Programme

No construction activities were planned for 2021, and as more than 12 months of monitoring had already been conducted as a baseline, further monitoring was not deemed necessary. The attended noise monitoring programme will recommence prior to the start of construction activities.

The NMP was updated to reflect this change, and subsequently approved by the DPIE in June 2020.

6.3.2 Environmental Performance

Monitoring Results

Noise monitoring was not undertaken during 2021.

6.3.3 Reportable Incidents

There were no reportable incidents during the reporting period.

6.3.4 Further Improvements

No further improvements are proposed.

6.4 EROSION AND SEDIMENT

The Development Consent (Schedule 3, Condition 30(b)) requires a detailed description of erosion and sediment control strategies in the Surface Water Management Plan (SWMP). A construction phase SWMP for the Project was submitted to the DPIE for approval and subsequently approved on the 21 January 2020.

During the exploration activities described in Section 4.2, it was noted that no surface water run on or runoff occurred from the drill pad sites due to the flat nature of the surrounding landforms. No sediment or erosion control measures were required to be implemented during the exploration program and follow up inspections did not identify any erosion or sedimentation issues.

6.4.1 Reportable Incidents

There were no reportable incidents during the reporting period.

6.4.2 Further Improvements

The erosion control measures outlined in the SWMP will be implemented prior to commencement of initial Project construction activities, including the construction of sediment ponds and installation of silt fences and hay bales where necessary to control erosion. Disturbance areas will also be kept to a minimum to minimise erosion and sedimentation issues.

6.5 FLORA

Management of flora for the initial Project construction activities is described in the approved construction phase Biodiversity Management Plan and Revegetation Strategy (BMP-RS). Small scale vegetation clearing was undertaken during the reporting period along the Melrose Plains Road reserve fenceline to allow the replacement of the boundary fence.

6.5.1 Environmental Management

Control Strategies

Vegetation clearance activities associated with the Melrose Plains Road reserve fenceline were managed using the Ground Disturbance Permit process and Vegetation Clearance Protocol (VCP) as outlined in the BMP-RS. The VCP involves:

- Clearing restrictions;
- Pre-clearance fauna surveys;
- Applying clearing methods to minimise impact on fauna;
- Salvaging of material for habitat enhancement;
- Installation of artificial bat roosts; and
- Reporting.

A corridor approximately 10m wide was selectively cleared to allow for the replacement of 4km of the northern ML 1770 fenceline bordering the Melrose Plains Road reserve between the Fifield State Forest and Wilmatha Road. With the

approval from the Local Land Services, minimal clearing was carried out along the road reserve side of the fenceline. Where possible, large habitat trees were retained within this corridor and clearing kept to a minimum.

Vegetation clearance activities associated with construction of the Project will commence during the next reporting period and will be implemented using the Ground Disturbance Permit process and VCP as outlined in the BMP-RS.

Effectiveness of Control Strategies

Clearing restrictions were imposed during the clearing activities associated with the northern fenceline replacement. These restrictions were effective in minimising impacts on flora.

Variations from proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.5.2 Reportable Incidents

There were no reportable incidents during the reporting period.

6.6 FAUNA

Management of fauna for the initial Project construction activities is described in the approved construction phase Biodiversity Management Plan and Revegetation Strategy (BMP-RS). As described above, vegetation clearing was undertaken along the Melrose Plains Road reserve fenceline to allow the replacement of the boundary fence.

6.6.1 Environmental Management

Control Strategies

Vegetation clearance activities associated with the Melrose Plains Road reserve fenceline were managed using the Ground Disturbance Permit process and Vegetation Clearance Protocol (VCP) as outlined in the BMP-RS. The VCP involved pre-clearance fauna surveys, and a spotter-catcher was employed to assist if fauna was impacted during the clearing activities.

During the clearing activities, a total of 12 habitat trees were removed. One fauna interaction occurred during the clearing, with a hollow bearing habitat tree containing a European Bee nest. The mature Bimble Box tree was felled and the trunk containing the hive was later removed by a local beekeeper.

Vegetation clearance activities associated with construction of the Project will commence during the next reporting period and will be implemented using the Ground Disturbance Permit process and VCP as outlined in the BMP-RS.

The Development Consent (Schedule 3, Condition 35(c)) requires measures to identify and manage significant impacts on threatened fauna species not identified in the EIS. As described in the BMP-RS, no threatened fauna species are likely to be significantly affected by the Project, therefore measures to manage significant impacts are not required and general measures to manage impacts on threatened species will be applied (e.g. implementing the VCP).

Effectiveness of Control Strategies

Implementation of the VCP process and the presence of a spotter/catcher during the clearing activities was considered effective at minimising impacts on fauna.

Variations from proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.7 WEEDS AND PESTS

Weeds and pests were managed as per the approved construction phase BMP-RS.

6.7.1 Environmental Management

Control Strategies

In accordance with the BMP-RS, control strategies for weed management on SEM-owned land include the following:

- identification of weeds by regular site inspections;
- mechanical removal of identified noxious weeds and/or the application of approved herbicides in authorised areas;
- implementing follow-up site inspections to determine the effectiveness of weed control measures; and
- where practicable, prevention of the establishment of new weeds on SEM-owned land by minimising seed transport of weed species to and from the Project through the use of a vehicle inspection process (primarily for use on agricultural and earthmoving equipment that are likely to carry weed seeds),

The implementation of weed management strategies occur according to seasonal and climatic requirements.

The pest control activities within the Project areas are described in the BMP-RS and include the following measures:

- regular property inspections to assess the status of pest populations within SEM owned- land;
- implement pest control methods for declared pests (i.e. rabbits, pigs and wild dogs) in accordance with Pest Control Orders under the NSW *Local Land Services Act, 2013*; and
- inspections to assess the effectiveness of control measures implemented and review these if necessary.

Effectiveness of Control Strategies

The control strategies implemented during the reporting period were considered effective.

Rainfall events during 2021 (Figure 7) continued to provide ideal conditions for weeds to flourish with outbreaks of Bathurst Burr, African Boxthorn, Noogoora Burr and Saffron thistle in some areas.

Several weed spraying events occurred from January to April and another campaign during December following rain. A total of 195-man hours of weed spraying was expended during the year, significantly reducing populations of Bathurst Burr, African Boxthorn and Noogoora Burr species. It is estimated the extent of these weed infestations was reduced by greater than 80%.

In addition, a coordinated fox control program was conducted with surrounding landholders in May 2021. Following the baiting program, visual assessments indicated the fox population had reduced significantly on SEM owned land.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.7.2 Environmental Performance

Monitoring

Weekly and monthly monitoring of weeds and pests continued as described in the BMP-RS.

6.7.3 Performance Outcomes

Weed Management

The performance indicator is the extent of weed species, which will be reduced then maintained at 40% below the baseline weed abundance percentage across the mine site, and that no new priority weed species will be introduced. Weed control actions undertaken, as described above, were considered effective however, the performance indicator was not applicable as described in the further improvement section below.

Pest Management

The performance indicator is the extent of feral animal species, which will be reduced then maintained at 25% below the feral animal abundance baseline across the mine site. Feral animal control actions undertaken, as described above, were considered effective however, the performance indicator was not applicable as described in the further improvement section below.

6.7.4 Reportable Incidents

There were no reportable incidents during the reporting period.

6.7.5 Further Improvements

Consideration will be given to conducting a "secondary" baseline survey in the future as the 2019 "drought" baseline survey [4] is not considered representative. This was confirmed by the baseline survey's findings:

- *Overall the study areas exhibited a low abundance of weeds in line with the presence of stock, the time of year surveys were conducted and the drought conditions.*
- *In general, populations of vertebrate pest species were in low concentrations across the two study sites. This was due mainly to the severe drought conditions experienced translating to meagre food and water available to support significant populations.*

6.8 ABORIGINAL HERITAGE

The Development Consent (Schedule 3, Condition 40) requires the development of a Heritage Management Plan (HMP) for the Project. The HMP was submitted to the DPIE for approval and subsequently approved on the 13 June 2019.

Aboriginal Heritage Impact Permits (AHIPs) (#C0003049 and #C0003887) are issued for the Project. AHIP #C0003049 was issued by the NSW Office of Environment and Heritage (OEH) on the 10th October 2017 for a period of 10 years and covers ML 1770 and other components of the Project (e.g. limestone quarry, rail siding etc) [5]. AHIP #C0003887 was issued by the OEH on the 10th August 2018 for a period of 23 years and covers the accommodation camp on the Sunrise property [6].

6.8.1 Environmental Management

Control Strategies

The HMP and AHIPs set out the salvage, excavation, monitoring and other management measures required to be undertaken for each of the registered archaeological sites and other Aboriginal objects within the Project area. In general, the strategies include protection, investigation, collection, excavation, documentation and storage of Aboriginal objects in an on-site temporary "Keeping Place".

Effectiveness of Control Strategies

No control strategies were required to be implemented during the reporting period.

Variations from Proposed Control Strategies

There were no variations from the proposed control strategies during the reporting period.

6.8.2 Environmental Performance

Monitoring

No activities were undertaken during the reporting period.

Performance Outcomes

No non-compliance issues were identified during the reporting period.

6.8.3 Reportable Incidents

There were no reportable incidents during the reporting period.

6.8.4 Further Improvements

No further improvements are proposed for the next reporting period.

6.9 EUROPEAN HERITAGE

The Development Consent (Schedule 3, Condition 40) requires the preparation of a Heritage Management Plan (HMP) for the Project. The HMP was submitted to the DPIE for approval and subsequently approved on the 13 June 2019.

Sites of known and potential historic heritage have been identified within the Project area and are descried in the HMP. These sites include the old magnesite mining area on ML 1770; the pastoral outstation on ML 1770; and pine trunk telephone poles and a log hut along the gas pipeline route. All of these sites have been assessed as being significant on the local level, however no sites of State significance have been identified in the Project area.

No impact to any sites of historic heritage occurred during the reporting period. Prior to the commencement of construction activities, sites recommended for avoidance (such as the pastoral outstation) will be temporarily fenced to avoid any inadvertent disturbance.

6.9.1 Reportable Incidents

There were no reportable incidents during the reporting period.

6.9.2 Further Improvements

No further improvements are proposed for the next reporting period.

7 WATER MANAGEMENT

7.1 WATER SUPPLY

SEM did not extract any water for the Project during the reporting period (1 January 2021 – 31 December 2021). A summary of the Water Access Licences (WALs) held by SEM is shown in Table 14 below.

Table 14 Summary of Project Water Access Licences

Water Licence #	Water Sharing Plan, Source, Management Zone	Entitlement (Share component - Units)	Passive Take/Inflows (ML)	Active Pumping (ML)	TOTAL (ML)
Groundwater					
WAL32068	*Water Sharing Plan for the Lachlan Alluvial Groundwater Sources 2020.* Upper Lachlan Alluvial Groundwater Source. Upper Lachlan Alluvial Zone 5 Management Zone	3,154	-	0	0
WAL28681 (pit dewatering)	*Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011.* Lachlan Fold Belt Murray Darling Basin Groundwater Source. Lachlan Fold Belt MDB (Other) Management Zone	243	0	0	0
Surface Water					
WAL6679	*Water Sharing Plan for the Lachlan Regulated River Water Source 2016.* Lachlan Regulated River Water Source.	123[1]	-	0	0
WAL42370		0[2]	-	0	0
WAL1798		300[1]	-	0	0

Notes:
ML – megalitre for the previous water year
[1] General Security
[2] High Security

In addition, SEM also holds WAL39837 (766 units) in the Upper Lachlan Alluvial Groundwater Source, Upper Lachlan Alluvial Zone 5 Management Zone however, this WAL does not form part of the Project water supply.

7.1.1 Surface Water

No surface water was extracted or used during the previous water year as shown in Table 14 above.

7.1.2 Groundwater

No groundwater was extracted from the Project borefields during the previous water year (Table 14). As shown in section 7.1 above, SEM holds three groundwater Water Access Licences:

- WAL 32068 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 3,154 share components under the Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2020;

- WAL 39837 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 766 share components under the Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2020 (does not form part of the Project water supply); and

- WAL 28681 in the Lachlan Fold Belt Murray-Darling Basin (MDB) Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2020.

SEM holds Water Supply Works Approval (WSWA 70CA614098) for groundwater bores located at the Project borefields. The WSWA was amended during the reporting period to include the inter linking pipelines connecting the bores. The amended WSWA was issued by the Natural Resources Access Regulator (NRAR) on 22 November 2021.

7.2 SURFACE WATER

The Development Consent (Schedule 3, Condition 30) requires the development of a Water Management Plan (WMP) which must include a Surface Water Management Plan for the Project. The construction phase WMP, including the construction phase Surface Water Management Plan, was approved by DPIE on 21 January 2020.

During the reporting period, minor water requirements for drilling operations were sourced from harvestable rights entitlements from dams located on ML 1770 (those located on first or second order streams).

7.2.1 Environmental Management

Monitoring Programme

Ten rainfall events during the year generated enough surface water flow to enable surface water monitoring to take place, however not all sites were able to be monitored in each event due to insufficient flow. Water quality results from the sampling events are shown in Appendix 4.

Surface water monitoring locations within and surrounding ML 1770 are shown in Figure 10.

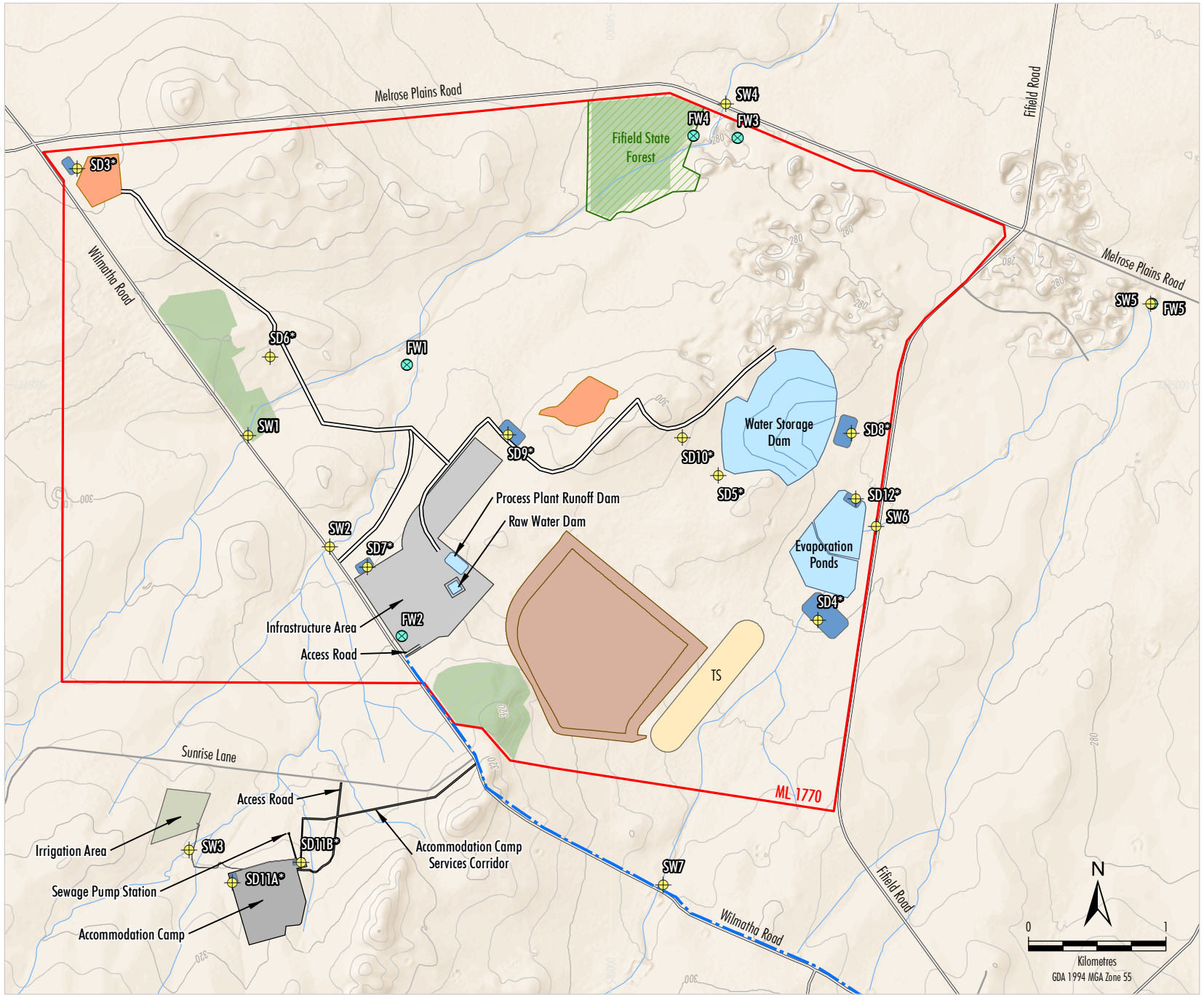
These surface water samples have provided important baseline water quality information for the site and will be used to generate site specific trigger levels for water quality prior to the commencement of construction activities.

7.2.2 Reportable Incidents

There were no reportable incidents for the period.

7.2.3 Further Improvements

No further improvements were implemented during the reporting period.



LEGEND

- State Forest
- Mining Lease Boundary (ML)
- Tailings Storage Facility
- Borrow Pit
- TS — Topsoil Stockpile
- Infrastructure Area
- Water Storage
- Sediment Dam
- Existing Open Woodland to be Maintained
- Water Pipeline
- Proposed Surface Water Quality Monitoring Location
- Baseline Surface Water Quality Monitoring Location

NOTE

* Monitoring to commence once Sediment Dam has been constructed.

Source: Black Range Minerals (2000); Clean TeQ (2017, 2019); NSW Department of Industry (2020); NSW Land & Property Information (2017)

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SUNRISE PROJECT

Surface Water Monitoring Locations Within and in the Vicinity of ML 1770

Figure 10

CTL-17-03 AR 2019_204A

7.3 GROUNDWATER

The Development Consent (Schedule 3, Condition 30) requires the development of a Water Management Plan (WMP) which must include a Groundwater Management Plan for the Project. The construction phase WMP, including the construction phase Groundwater Management Plan, was approved by DPIE on 21 January 2020.

Revision 2 of the Groundwater Management Plan was submitted to DPIE for approval on 14th December 2021. This version includes trigger levels at a number of bores surrounding the Project borefield, that have been agreed between SEM and DPIE Water.

7.3.1 Environmental Performance

Monitoring – Mining Lease

Two groundwater monitoring events occurred during the reporting period, with water samples collected for analysis, and standing water levels (SWLs) measured in April and October 2021. Groundwater monitoring locations within and surrounding ML 1770 are shown on Figure 11. Manually gauged and recorded standing water level results as well as results of continuous measurements recorded by automatic SWL dataloggers are shown in Appendix 5A. Groundwater quality results from the sampling events are shown in Appendix 5B.

The standing water level measurements and water quality data have provided important baseline information for the site.

Monitoring – Borefields

Two groundwater monitoring events at the borefields occurred during the reporting period, with water samples collected for analysis and SWLs measured in April and October/November 2021. Manually gauged and recorded SWL results and results of continuous measurements recorded by automatic SWL dataloggers are shown in Appendix 5A. Groundwater monitoring locations within the borefields are shown in Figure 12. Groundwater quality results from both monitoring events are shown in Appendix 5B.

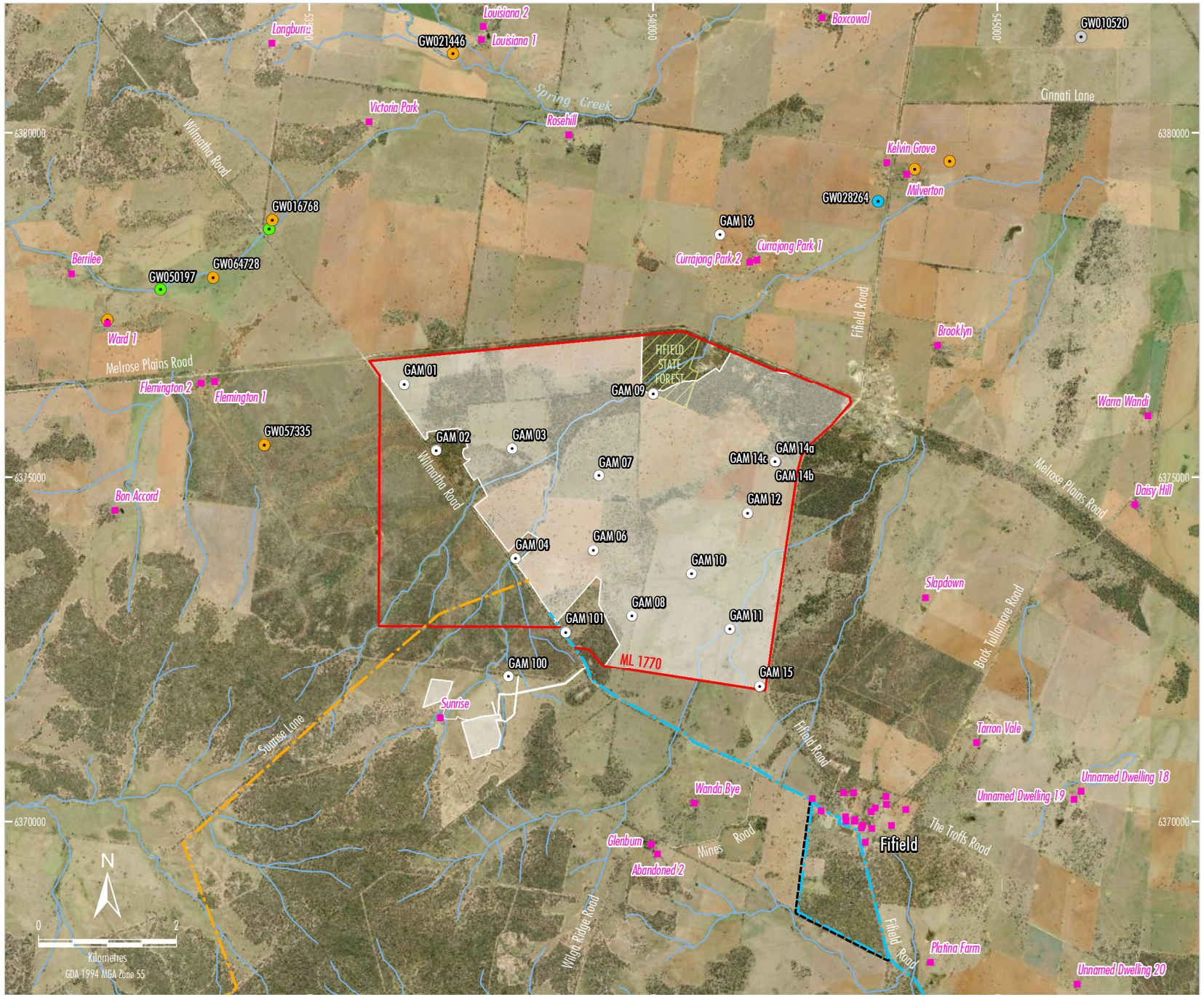
The groundwater standing water level measurements and water quality results have provided important baseline information on the borefields.

7.3.2 Reportable Incidents

There were no reportable incidents during the reporting period.

7.3.3 Further Improvements

No further improvements were implemented during the reporting period.



Source: Black Range Minerals (2005); Clean TeQ (2017, 2018); ENRS (2019); NSW Department of Industry (2020); NSW Land and Property Information (2017); Office of Environment and Heritage NSW (2017)
NSW Imagery: © Department of Finance, Services & Innovation (2018)

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SUNRISE PROJECT

Groundwater Monitoring Locations
Within and in the Vicinity of ML 1770

Figure 11

CTL-17-03 AR 2019_201A

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SUNRISE PROJECT

Groundwater Monitoring Program - Borefields

Figure 12

CTL-17-03 AR 2019_202A

8 REHABILITATION

The Development Consent (Schedule 3, Condition 57) requires the preparation of a Rehabilitation Management Plan (RMP) for the Project. As stated above, the construction phase RMP was submitted to the DPIE for approval and subsequently approved on the 15 August 2019.

8.1 REHABILITATION OF DISTURBED LAND

Exploration drilling operations were undertaken in accordance with the *Exploration Code of Practice: Rehabilitation* [7] and the approved MOP, to ensure that areas disturbed by drilling and other exploration activities are returned to a condition that is safe, stable, secure and non-polluting, and allows the proposed final land uses (secondary domains) to be sustained.

As described in section 4.2, four drillholes were drilled during the reporting period (via diamond drilling methods). Rehabilitation activities during the reporting period included:

- Levelling of drill pads used during the 2021 platinum drilling to remove wheel ruts and allow natural regeneration to occur; and
- Temporary capping of the 2021 diamond drill holes. All seven drillholes associated with the platinum drilling will be permanently capped and rehabilitated during the next reporting period. All drilling and other equipment was also removed from the site.

8.2 REHABILITATION MONITORING

Visual monitoring of rehabilitation resulting from previous exploration activities and the 2021 exploration drilling was undertaken during the reporting period. Due to the higher than average rainfall recorded during the year, significant natural regeneration was observed.

8.3 PERFORMANCE INDICATORS

Performance indicators and completion/relinquishment criteria for each rehabilitation phase are described in Section 6 of the approved MOP. Exploration areas disturbed during the 2019 exploration drilling and test pitting programs reached the phase 3 performance indicator (growth medium development) during the reporting period. Higher than average rainfall during 2021 assisted in achieving natural regeneration of native grasses in these disturbance areas.

The 2021 diamond drilling areas achieved phase 1 (decommissioning) with all equipment removed from site and the boreholes temporarily capped.

No further rehabilitation took place on ML 1770 during the reporting period.

During the next reporting period, rehabilitation activities will continue in accordance with the approved MOP/RMP and Mining Lease conditions.

9 COMMUNITY RELATIONS

SEM communicates with respect and works hard to listen to our communities and achieve constructive dialogue. The company has a Community Engagement Policy, available on its website, that defines the principles guiding the company's interactions with its communities. The policy outlines SEM's commitment to active engagement, clear communication, community investment, dispute resolution and how it works with its local indigenous communities.

SEM actively interacts with the community to leverage its combined capabilities and create mutually beneficial outcomes. The company's intention is to work together with communities to achieve long-term shared value.

SEM also engages with communities early and regularly, listens to their input and aims to communicate with respect and achieve constructive dialogue. Multiple, audience-appropriate communication channels are used to deliver consistent and timely information.

9.1 COMMUNITY COMPLAINTS

The Project Development Consent requires SEM to implement a procedure to receive, handle, respond to and record complaints, and resolve any disputes that may arise. SEM responds quickly to community dissatisfaction. It aims to resolve complaints at the lowest level, as quickly as possible and to deliver long-term resolutions.

SEM has a toll-free, 24-hour community complaint line (1800 952 277) in place to receive community concerns. The phone number is publicised on the SEM Sunrise website and in all community publications. Telephone calls are answered by an operator who records details (date and time of call, name, contact details, details of the complaint and whether an immediate response is required) and emails the record to SEM via community@sunriseem.com. Calls that require an immediate response outside business hours are sent to the Environment, Approvals & Community Lead for immediate response. SEM responds to calls within 24 hours or on the next business day. SEM investigates all complaints thoroughly, always working towards a mutually agreeable and long-lasting solution.

Complaints may also be submitted through stakeholder interactions that may occur between SEM personnel and community members from time to time. All employees and contractors receive information about the SEM Sunrise Complaints Management Process during the general induction process.

Zero community complaints were received during the reporting period.

9.2 COMMUNITY LIAISON

Community Consultative Committee

The Community Consultative Committee (CCC) was re-established in October 2017 and provides a forum for discussion between SEM and representatives of the local community, stakeholder groups and the local councils on issues directly relating to the Project.

During the reporting period, biannual meetings (held in April and December 2021) of the CCC were conducted in accordance with the Development Consent (Schedule 5, Condition 7). An extraordinary meeting was held in July 2021 to discuss the submission of the Project Execution Plan Modification to DPIE. Due to COVID-19, the meetings were offered online and in person.

The CCC met in the Project local government area of Lachlan (Condobolin township). At the meetings, SEM provided Project updates, information relating to environmental management and community engagement activities and addressed questions and concerns raised by CCC members. Information on the progress of the Project Execution Plan Modification was also shared. Minutes were taken from each meeting and published on the SEM webpage (https://www.sunriseem.com/sunrise-project/community-consultative-committee/along with copies of all presentations.

Community Consultation

SEM has a detailed Community Engagement Plan in place, which supports the Community Engagement Policy and provides more detail around the company's commitment to proactive listening, consultation, and communication.

SEM engages through a range of consultation tools including individual stakeholder and public meetings, advertised community events, newsletters and the operation of shop fronts in Condobolin and Parkes as required. SEM policies and guidelines guide interactions with communities affected by SEM's activities.

Unfortunately, due to COVID-19, the number of community meetings during the year were restricted and SEM activities were modified in line with NSW state government guidance. Notwithstanding, during the reporting period, SEM managed to attend meetings with many stakeholders, such as:

- Individual stakeholders;
- Landholders;
- Near neighbours; and
- Local Government and State agencies.

SEM also provided Project update presentations and or briefings to various groups during the reporting period, including:

- Lachlan, Parkes and Forbes Shire Councils; and
- Various State agencies.

Aboriginal Consultation

SEM acknowledges the Indigenous people on whose land the company operates. SEM is committed to working with organisations representing Indigenous people to form partnerships that build capacity and generate long-term value. This commitment is outlined in SEM's Community Engagement Policy.

Through membership on the CCC, the Wiradjuri Condobolin Corporation is provided with regular updates on the Project and SEM has regular contact with this organisation outside of the CCC meetings.

9.3 COMMUNITY INVESTMENT

SEM's guiding principle for community investment is to achieve meaningful outcomes that benefit as many people as possible in the community. For SEM, the definition of community investment includes financial and non-financial contributions.

The current pre-construction investment program includes small-scope direct financial contributions, complemented by important non-financial contributions such as time spent supporting schools and community organisations.

Due to Covid, financial support during the reporting period was limited mainly to primary schools. Unfortunately, the local agricultural shows in the region were cancelled during 2021 due to the pandemic, along with the 2021 Trundle Bush Tucker Day. SEM would normally sponsor these events, however, is now planning to support these events in 2022.

10 INDEPENDENT ENVIRONMENTAL AUDIT

The Development Consent (Schedule 5, Condition 10) requires an Independent Environmental Audit (IEA) to be commissioned within one year of the commencement of the development after 6th May 2017. As the Project has not yet recommenced development, the requirement for an IEA has not been triggered.

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

No reportable incidents or non-compliances occurred during the reporting period.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

12.1 EXPLORATION

The following exploration activities are proposed during the next reporting period:

- Soil and rock chip sampling;
- Ground surveying; and
- Geological mapping.

12.2 PROJECT EARLY WORKS

The following activities are proposed during the next reporting period:

- Minor preparatory works, including installation of services and ancillary infrastructure;
- Further works associated with the partial replacement of the ML 1770 boundary fence; and
- Installation of production bores and monitoring wells at the borefield (excluding pipelines and other associated infrastructure).

12.3 PROJECT MODIFICATION

SEM has continued to review and optimise the Project design as part of preparations for Project execution. The outcomes of this review are detailed in the Project Execution Plan (PEP). The PEP identified a number of changes to the approved mine and processing facility (ML 1770), accommodation camp, rail siding and road transport activities to optimise the construction and operation of the Project.

During the reporting period, SEM prepared and submitted a Modification Report to support a request to modify Development Consent (DA 374-11-00) under section 4.55(2) of the EP&A Act to seek approval for the Project Execution Plan Modification (the PEP Modification).

The Modification Report was placed on public exhibition by the DPIE from 27 July 2021 to 9 August 2021. During and following the public exhibition period, a total of eight submissions on the Modification Report were received from NSW Government agencies and submissions were also received from the Lachlan Shire Council and the Parkes Shire Council. Of these ten submissions, one supported the Modification and the remaining provided comment.

No submissions on the Modification Report were received from non-government organisations or members of the public.

The PEP Modification had not been determined at the end of the reporting period.

12.4 PROJECT DEVELOPMENT

SEM is proposing to commence initial Project construction activities subject to a final investment decision and completion of a financing package. Initial construction activities associated with ML 1770 include commencement of the following:

- Development of the mine, including:
    - Site establishment and earthworks;
    - Construction of site access roads and haul roads;
    - Processing facility earthworks;
    - Establishment of temporary facilities required for construction activities (e.g. offices, laydown areas, communications infrastructure);
    - Construction of the mine infrastructure area including the offices, workshops, warehouse, laboratory and amenities buildings, fuel storage areas, potable water treatment plant and car parking facilities;
    - Construction of the tailings storage facility and evaporation pond;
    - Construction of water management infrastructure including the raw water dam, water storage dam and sediment dams;
    - Construction and operation of the concrete batch plant;
    - Development of gravel and clay borrow pits (including blasting and crushing);
    - Installation of appropriate fencing and barriers for public safety and security for mining and construction; and
    - Other associated minor infrastructure, plant, equipment and activities.
- Development and operation of the accommodation camp;
- Installation of the borefields infrastructure;
- Installation and operation of the surface water extraction and associated infrastructure and water pipeline;
- Road upgrades; and
- Upgrades to the proposed oversized transport route.

The above project development activities are not described in the currently approved MOP. However, a new MOP/RMP will be prepared and submitted to the Resources Regulator prior to construction activities commencing.

13 REFERENCES

[1] NSW Government, “Annual Review Guideline – Post-approval Requirements for State Significant Mining Developments,” 2015.

[2] NSW Department of Primary Industries, “The Annual Enviromental Managment Report (AEMR),” 2006. [Online]. Available: http://www.resourcesandenergy.nsw.gov.au/__data/assets/pdf_file/0003/478461/AEMR-Guidelines-for-MOPs-prepared-to-EDG03-requirements.pdf

[3] Corkery RW, “Fourth Annual Exploration Report for ML 1770 “Sunrise Project” - 16 February 2021 to 15 February 2022.,” 2022.

[4] Area Environmental, “Weeds and Vertebrate Pests Baseline Survey Report ML1770 and Sunrise Accommodation Camp,” 2019.

[5] Landskape, “Analysis of Aboriginal Lithic Assemblages Aboriginal Heritage Impact Permit C0003887,” 2019.

[6] Landskape , “Analysis of Aboriginal Stone Quarry Aboriginal Heritage Impact Permit C0003049,” 2020.

[7] NSW Department of Planning and Environment, Division of Resources and Geoscience, “Exploration Code of Practice: Rehabilitation,” 2015.

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GLOSSARY OF TERMS

AQMP	Air Quality Management Plan
AR	Annual Review
AWS	Automatic Weather Station
BCD	NSW Biodiversity & Conservation Division (formerly OEH)
BCS	NSW Biodiversity, Conservation and Science Directorate (formerly BCD)
BMP-RS	Biodiversity Management Plan and Revegetation Strategy
CCC	Community Consultative Committee
DPIE	Department of Planning, Industry and Environment
MEG	Mining, Exploration and Science (formerly DRG)
EMP	Environmental Management Plan
EPA	NSW Environment Protection Agency
FCNSW	Forestry Corporation of New South Wales
GWMP	Groundwater Management Plan
HMP	Heritage Management Plan
IEA	Independent Environmental Audit
LEP	Local Environmental Plan
ML	Mining Lease
MOP	Mining Operations Plan
NHVR:	National Heavy Vehicle Regulator
NMP	Noise Management Plan
NRAR	NSW Natural Resources Access Regulator
OEH	NSW Office of Environment and Heritage
RAP	Registered Aboriginal Party
RMP	Rehabilitation Management Plan
RR	NSW Resources Regulator
SWL	Standing Water Level
SWMP	Surface Water Management Plan
VCP	Vegetation Clearance Protocol
WMP	Water Management Plan
EIS	Environmental Impact Statement

APPENDIX 1: AIR QUALITY MONITORING RESULTS

1A – Depositional Dust Results

1B – PM2.5 Daily Average Results

1C – PM10 Daily Average Results

1D – Particulate Matter Results (Graphs) 24hr Average

1A – Depositional Dust Results

Summary of depositional dust (insoluble solids) monitoring results 2021

Month			Insoluble Solids (g/m²/month)			
	Start	End	DG1	DG2	DG3	DG4
JAN	1/1/21 -	1/02/2021	3.4	1	1.3	5.3
FEB	1/2/21 -	1/03/2021	1.7	1.7	1.3	1.6
MAR	1/3/21 -	1/04/2021	0.7	0.7	1	2.3
APR	1/4/21 –	30/04/2021	0.5	0.3	0.2	3.4
MAY	30/4/21-	1/06/2021	1.6	0.3	0.6	0.4
JUN	1/6/21-	1/07/2021	0.4	0.6	6.7	0.2
JUL	1/7/21-	2/08/2021	0.6	0.7	0.8	0.4
AUG	2/8/21 -	31/08/2021	1.2	0.6	0.5	0.6
SEP	31/8/21 -	1/10/2021	1.5	1.6	5.7	0.8
OCT	1/10/21 -	1/11/2021	1.4	1	21	1
NOV	1/11/2021 -	30/11/2021	4.1	1.7	1.6	3.5
DEC	30/11/2021	31/12/2021	8.3	1.5	3.2	1.6
ANNUAL AVERAGE (Mean)			2.1	1.0	3.7	1.8
MEDIAN			1.45	0.85	1.3	1.3
MAXIMUM			8.3	1.7	21	5.3
MINIMUM			0.4	0.3	0.2	0.2

1B – PM2.5 Daily Average Results

Annual Summary - Daily AVG For PM2.5 STP (µg/m³) - Site PM2

Excluded - Equipment Failure

Agricultural activities by neighbours

Jan 2021 to Dec 2021

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	2.26	5.99	5.52	5.81	9.96	4.48	3.69	2.11	2.92	2.83	4.57	3.19	
2	2.72	3.94	6.28	5.5	6.08	5.42	1.1	1.79	8.61	2.29	5.05	4.33	
3	1.77	5.66	5.93	4.93	4.74	2.93	1.5	1.69	6.42	2.83	5.82	5.03	
4	3.47	7.57	6.32	4.97	3.13	3.2	1.05	2.38	3.35	4.74	5.78	4.79	
5	3.05	4.83	6.46	8.42	3.99	3.16	1.34	1.01	2.09	5.07	4.83	4	
6	2.85	3.52	7.33	6.72	2.01	2.7	2.57	1.27	2.28	4.51	4.55	3.99	
7	3.73	3.12	8.15	5.35	3.07	2.4	2.62	1.81	3.73	4.91	4.19	4.79	
8	3.38	3.3	8.48	4.27	3.61	2.14	3.2	2.04	3.15	3.14	4.14	4.29	
9	3.08	5.59	7.23	9.11	2.9	0.77	3.52	3.42	5.04	9.88	3.85	3.63	
10	2.38	6.23	8.95	5.78	2.5	0.62	4.87	4.28	4.99	4.98	5.17	2.3	
11	2.22	6.26	5.44	4.94	3.35	1.68	4.63	3.63	4.52	3.78	3.05	2.24	
12	2.84	5.55	3.89	4.79	3.65	1.76	3.32	3.36	4.81	1.54	2.33	2.65	
13	3.04	4.89	5.09	8.27	4.01	1.4	2.54	3.3	2.75	2.48	1.78	4.42	
14	6.58	3.82	3.17	5.05	3.92	2.29	2.71	2.43	1.29	3.31	1.6	7.5	
15	7.01	3.83	2.83	5.71	3.84	2.96	2.77	2.04	2.6	3.11	3.25	12.35	
16	4.47	2.39	5.36	5.85	4.44	2.6	3.07	3.1	5.29	2.62	2.53	4.48	
17	3.42	2.74	3.09	8.89	3.16	1.1	4.8	2.37	8.39	1.56	3.42	8.02	
18	4.84	5.02	2.37	13.99	4.68	0.97	3.47	3.92	4.42	2.35	4.66	6.91	
19	4.19	4.63	2.27	7.82	4.92	2.67	2.37	4.53	4.74	2.43	6.04	3.18	
20	5.91	4.38	2.2	5.09	7.72	1.06	1.2	3.46	7.31	2	5.25	4.62	
21	7.32	4.85	1.96	4.75	7.01	1.48	3.02	3.63	3.17	4.37	2.73	4.08	
22	4.48	7.05	0.66	4.23	4.57	2.94	2.29	3.74	4.11	5.34	2.15	8.19	
23	4.21	6.42	1.56	4.52	4.81	3.09	1.9	3.39	7.32	5.96	2.87	8.27	
24	4.45	4.95	4.08	4.22	4.8	-	1.61	3.9	5.59	2.92	4.43	8.2	
25	4.44	7.56	3.98	5.12	5.13	-	3.48	3.89	4.43	3.7	2.54	5.09	
26	5.01	5.34	2.75	7.8	3.45	-	3.89	2.98	3.93	4.11	1.53	5.02	
27	6.61	7.85	2.61	10.1	3.71	-	3.27	2.57	4.08	4.16	1.22	3.94	
28	3.36	5.16	2.96	10.84	3.69	1.64	2.94	2.44	5.82	5.45	2.55	1.95	
29	3.27	-	2.95	16.69	3.03	2.7	3.76	2.93	3.63	4.15	4.29	2.3	
30	5.1	-	3.86	12.79	2.94	3.85	3.29	1.82	3.4	2.91	4.06	2.91	
31	5.67	-	5.29	-	7.29	-	2.98	3.36	-	2.56	-	4.29	
AVG	4.1	5.09	4.48	7.08	4.39	2.41	2.86	2.86	4.47	3.74	3.67	4.87	4.18

Annual Summary - Daily AVG For PM2.5 STP (µg/m³) - Site PM4

Excluded - Equipment Failure

Agricultural activities by neighbours

Jan 2021 to Dec 2021

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	2.21	5.56	5.48	6.02	6.86	4.68	3.32	2.23	2.62	2.81	4.9	3.16	
2	2.56	3.81	6.41	6.36	5.68	5.54	1	2.34	11.64	2.16	5.27	4.29	
3	1.66	5.65	5.89	5.61	4.62	2.59	1.36	1.74	7.39	2.74	5.08	4.81	
4	3.08	6.59	5.99	4.5	3.1	3.24	0.98	2.31	3.7	4.74	5.52	5.08	
5	2.86	4.63	6.54	-	3.89	3.28	1.43	1.01	1.99	5.03	4.58	4.49	
6	2.83	3.35	7.34	-	2.1	3.11	2.64	1.25	2.05	4.3	4.53	3.8	
7	3.51	3.11	7.31	5.4	2.87	2.34	2.99	1.76	3.65	4.01	4	5.04	
8	3.27	2.89	6.82	4.29	3.71	2.09	4.12	2.01	1.79	3.2	3.92	4.38	
9	3.17	4.94	7.64	7.17	3.09	0.82	3.88	4.18	2.92	5	3.97	3.73	
10	2.47	5.55	8.99	5.93	2.39	0.61	5.04	4.58	3.83	4.67	4.73	2.14	
11	2.26	4.8	4.91	4.99	3.28	1.58	4.43	3.74	3.99	3.59	2.8	1.47	
12	3.02	4.46	3.78	4.76	3.72	1.63	3.33	3.2	4.42	1.57	2.32	2.6	
13	2.99	4.92	5.01	6.04	3.68	1.55	1.67	3.48	2.56	2.21	1.85	4.46	
14	7.19	3.83	3.18	4.6	3.97	2.55	2.62	2.68	1.24	3.12	1.76	4.74	
15	7.17	3.83	3.25	5.46	4.04	2.69	2.64	2.39	1.67	3.21	3.38	7.45	
16	4.65	2.25	5.1	5.46	4.5	2.22	3.13	3.28	2.35	2.57	2.61	4.92	
17	3.63	2.94	3.13	9.1	3.16	1.07	5.41	2.29	3.62	1.55	3.77	8.83	
18	5.21	4.4	2.28	13.3	4.77	1.01	3.61	3.61	4.37	1.66	4.28	6.96	
19	4.16	4.31	2.27	6.54	5.43	2.8	2.35	4.17	3.5	2.42	6.24	3.09	
20	5.71	4.14	2.36	2.81	7.71	1.14	1.16	3.64	3.51	1.94	5.46	4.65	
21	6.65	4.68	1.79	0	6.58	1.79	3.15	2.95	2.97	3.51	2.59	4.18	
22	4.52	6.47	0.58	0	4.25	3.04	2.61	3.75	3.36	5.77	2.34	4.6	
23	4.15	6.91	1.31	0	5.54	3.12	1.88	3.38	5.59	5.95	3.33	5.2	
24	4.38	4.59	3.94	0	4.94	2.17	1.61	3.84	8.27	2.89	4.29	7.28	
25	4.2	6.18	3.98	0.01	4.57	1.63	3.58	3.67	4.31	3.49	2.36	5.22	
26	4.52	5.39	2.55	0.01	3.45	1.57	3.92	2.73	4.02	3.23	1.44	5.06	
27	6.11	7.86	2.47	3.81	3.81	1.6	3.21	2.56	4.03	4.61	1.2	4.04	
28	2.8	4.66	3.06	10.82	3.71	1.6	2.82	2.65	5.34	5.92	2.65	2.21	
29	3.06	-	3.01	11.21	3.26	3	4.2	2.97	3.41	4.51	4.35	1.8	
30	4.89	-	3.74	12.79	2.95	4.18	3.48	1.82	3.32	3	3.82	2.99	
31	5.36	-	5.45	-	3.98	-	3.15	2.25	-	2.31	-	3.9	
AVG	4.01	4.74	4.37	7.24	4.18	2.34	2.93	2.84	3.91	3.47	3.64	4.41	**3.89**

1C – PM10 Daily Average Results

Annual Summary - Daily AVG For PM10 STP (µg/m³) - Site PM2

Excluded - Equipment Failure

Agricultural activities by neighbours

Jan 2021 to Dec 2021

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1	5.98	14.49	24.7	14.4	28.53	14.33	5.79	5.34	10.15	6.01	17.87	6.92	
2	6.5	9.36	25.06	12.5	19.37	16.97	2.43	4.64	28.01	4.45	17.41	10.35	
3	4.68	12.3	26.59	11.26	15.98	5.91	4.35	4.3	23.43	5.76	21.95	15.5	
4	7.83	26.01	24.78	14.29	7.88	5.48	3.15	5.45	7.53	12.96	12.15	21.52	
5	8.18	13.96	27.82	17.59	7.42	6.89	3.07	2.13	5.83	13.56	10.32	15.48	
6	8.78	11.23	27.76	16.76	6.41	6.1	3.74	2.87	5.67	12.86	11.38	10.71	
7	8.26	9.9	26.76	15.58	7.91	5.35	4.07	3.58	9.25	21.77	9.82	12.22	
8	8.69	10.31	29.89	11.4	10.71	6.19	6.65	4.1	7.97	10.36	11.42	15.89	
9	7.9	16.55	25.25	25.76	6.39	1.61	6.71	7.87	11.15	47.95	11.76	13.69	
10	6.72	17.5	27.89	18.36	7.54	1.38	8.43	10.39	13.86	13.31	13.92	11.46	
11	9.19	23.66	15.34	17.1	8.55	2.53	7.85	10.36	12.44	9.92	8.57	10.62	
12	11.34	21.06	8.7	15.9	6.95	3.05	6.68	9.93	13.59	3.85	8.32	11.19	
13	10.99	13.76	19.64	25.28	8.91	2.91	6.27	8	7.49	5.6	5.12	16.45	
14	30.34	9.1	10.36	19.06	11.5	4.52	5.72	6.55	3.95	9.46	5.54	31.92	
15	25.29	10.49	7.09	21.29	12.78	5.28	6.86	4.52	6.81	10.68	8.98	64.06	
16	22.07	7.79	13.89	21.17	12.08	5.28	9.47	7.59	17.23	6.92	8.04	19.16	
17	13.18	9.58	7.92	24.73	9.69	2.96	15.57	6.6	38.79	4.7	12.15	24.14	
18	16.6	17.02	6.44	28.24	11.71	1.97	8.1	9.5	11.09	9.55	17.23	24.76	
19	15.46	14.51	7.83	19.01	12.58	5.12	5.39	13.15	9.93	7.77	24.37	8.25	
20	17.2	12.79	6.56	19.2	16.66	3.3	3.05	8.83	15.8	9.24	16.72	14.03	
21	24.28	15.13	5.64	21.22	18.05	3.79	7.11	9.51	9.73	14.54	6.09	12.96	
22	13.6	23.86	2.82	14.82	11.98	6.05	5.14	9.41	12.72	13.78	6.96	35.74	
23	12.27	22.3	3.17	15.75	10.27	6.74	4.75	8.39	16.55	16.33	8.55	27.35	
24	13.54	17.52	9.3	14.55	13	-	4.6	9.01	18.74	10.31	9.38	26.7	
25	15.34	26.92	9.64	14.86	20.17	-	8.72	8.23	14.01	12.77	5.28	12.48	
26	16.16	19.75	7.6	25.64	9.15	-	9.15	7.17	10.45	15.61	4.41	11.67	
27	16.12	21.86	8.56	23.32	9.04	-	8	5.96	15.04	15.76	4.25	9.52	
28	16.2	15.2	9.18	24.76	8.78	3.89	8.02	6.42	21.7	22.29	6.62	6.59	
29	9.19	-	9.3	49.45	7.66	6.2	9.25	8.12	10.26	19.59	8.88	9.65	
30	11.05	-	12.05	28.38	8.5	6.7	8.38	6.47	6.8	11.07	8.7	10.96	
31	12.55	-	14.37	-	23.98	-	8.78	14.73	-	10.39	-	15.89	
AVG	13.08	15.85	14.9	20.05	11.94	5.46	6.62	7.39	13.2	12.55	10.74	17.35	12.498

Annual Summary - Daily AVG For PM10 STP (µg/m³) - Site PM4

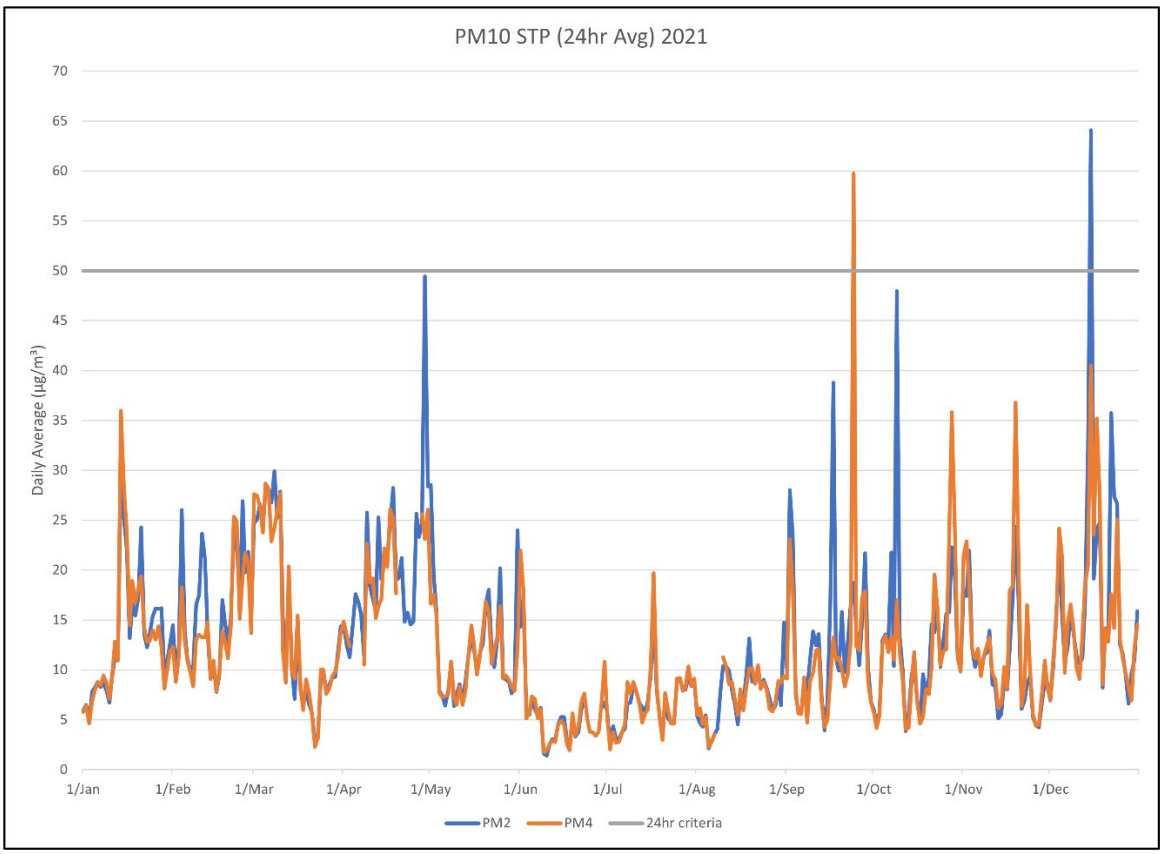
Excluded - Equipment Failure

Agricultural activities by neighbours

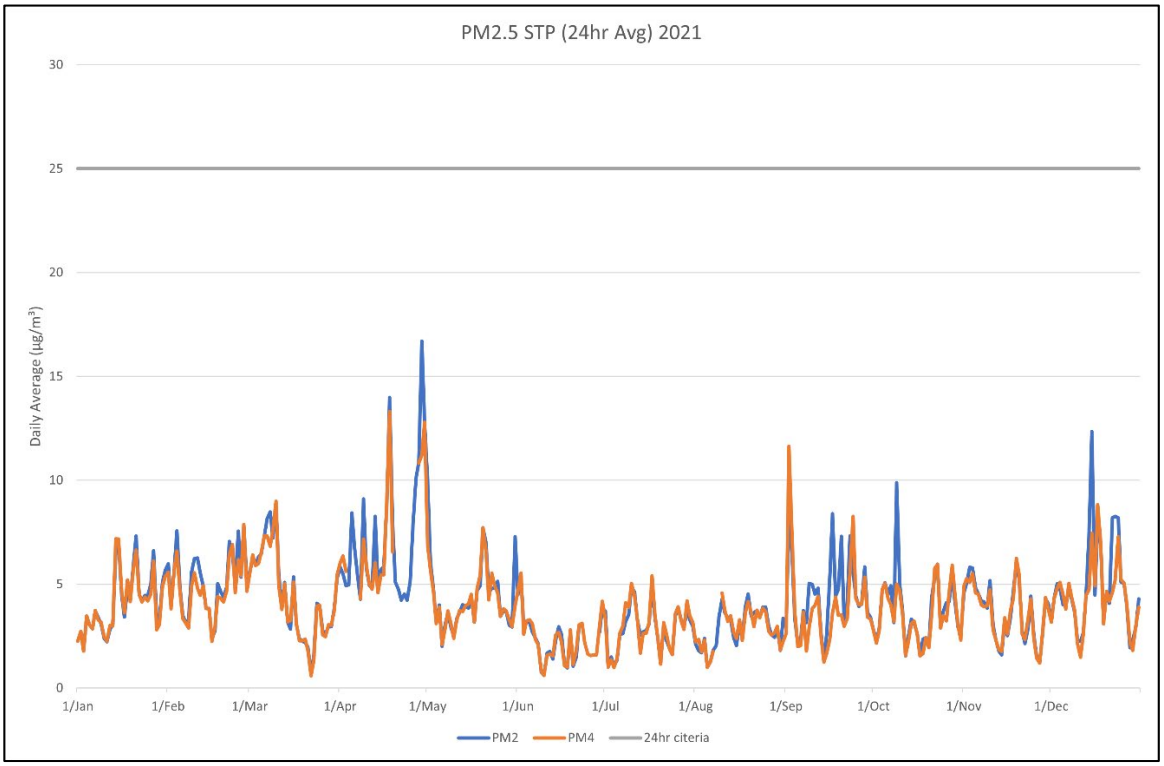
Jan 2021 to Dec 2021

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day
1	5.8	12.29	27.62	14.84	16.61	21.96	5.33	5.49	9.11	5.69	21.46	7	1
2	6.42	8.77	27.48	13.43	17.51	17.98	2.03	6.14	23.1	4.17	22.88	11.1	2
3	4.65	11.33	26.37	12.36	15.6	5.12	3.75	4.57	18.02	5.42	18.61	14.87	3
4	6.82	18.24	23.77	10.12	7.67	5.71	2.7	5.28	8.07	12.59	12.04	24.17	4
5	7.87	12.92	28.67	-	7.25	7.34	2.81	2.27	5.64	13.44	11.14	21.29	5
6	8.75	10.98	28.16	-	7.33	7.07	3.7	2.77	5.57	11.78	12.12	9.72	6
7	8.44	9.78	22.89	14.39	7.49	5.15	4.58	3.52	9.17	13.29	9.37	14.58	7
8	9.4	8.34	24.17	10.51	10.81	6.04	8.8	4.3	4.71	10.99	11.38	16.57	8
9	8.66	13.13	26.02	22.67	7.24	1.74	7.65	14.04	8.9	17	12.48	14.06	9
10	7.09	13.51	27.68	18.75	6.49	1.9	8.8	11.27	9.76	11.64	13.21	10.22	10
11	9.29	13.26	11.9	19.2	8.36	2.57	7.82	10.4	11.96	8.96	9.59	9.09	11
12	12.83	13.24	8.7	15.17	6.5	2.92	6.72	8.57	12.09	4.03	9.04	13.41	12
13	10.95	14.79	20.37	16.41	7.9	2.74	4.71	8.8	6.83	4.21	6.18	18.61	13
14	35.97	9.12	10.02	17.06	11.54	4.51	5.63	7.09	4.29	8.72	6.56	20.43	14
15	28.42	10.94	9.11	22.19	14.44	4.88	6	5.48	5.01	11.79	10.29	40.49	15
16	23.83	7.87	15.43	20.32	12.58	4.55	10.37	8.06	9.19	6.94	8.16	23.53	16
17	14.45	9.95	8.32	26.11	9.52	2.58	19.71	5.93	13.27	4.59	17.96	35.2	17
18	18.91	13.9	5.98	25.19	11.38	1.93	8.54	8.3	10.98	5.26	18.39	27.21	18
19	16.69	12.71	9.04	17.67	13.84	5.63	5.24	10.17	11.28	8.04	36.79	8.53	19
20	18.15	11.15	7.76	9.66	16.86	3.4	2.99	10.15	10.03	7.58	20.88	14.19	20
21	19.39	14.37	5.44	0.06	15.79	4.36	7.66	8.59	8.34	10.22	6.33	12.81	21
22	14.3	25.35	2.29	0.04	10.61	6.74	5.98	10.44	9.56	19.54	8.27	17.58	22
23	12.83	24.93	3.22	0.02	12.03	7.63	4.65	8.07	12.83	16.12	16.48	14.18	23
24	12.88	15.13	10.06	0.05	13.26	5.1	4.66	8.78	59.76	10.46	10.02	25.08	24
25	13.97	19.3	9.99	0.06	16.39	3.79	9.1	8.04	12.39	11.86	5.56	13.01	25
26	13.04	21.73	7.6	0.06	9.16	3.75	9.18	6.07	11.98	12.07	4.37	11.24	26
27	14.38	20.8	8.16	8.19	9.43	3.4	7.91	5.82	17.33	23.5	4.53	9.72	27
28	12.31	13.69	9.39	25.62	8.98	3.78	8.24	6.81	17.87	35.82	7.55	8.24	28
29	8.13	-	9.83	23.09	8.31	6.8	10.35	8.88	8.75	24.48	10.95	6.92	29
30	10.03	-	11.46	26.08	7.9	10.83	8.43	8.7	6.75	11.27	8.23	12.2	30
31	11.81	-	13.76	-	11.95	-	9.12	9.36	-	9.81	-	14.57	31
AVG	13.11	13.98	14.86	19.26	10.99	5.73	6.88	7.37	12.09	11.65	12.36	16.12	11.79

1D – Particulate Matter Results (Graphs) 24hr Average



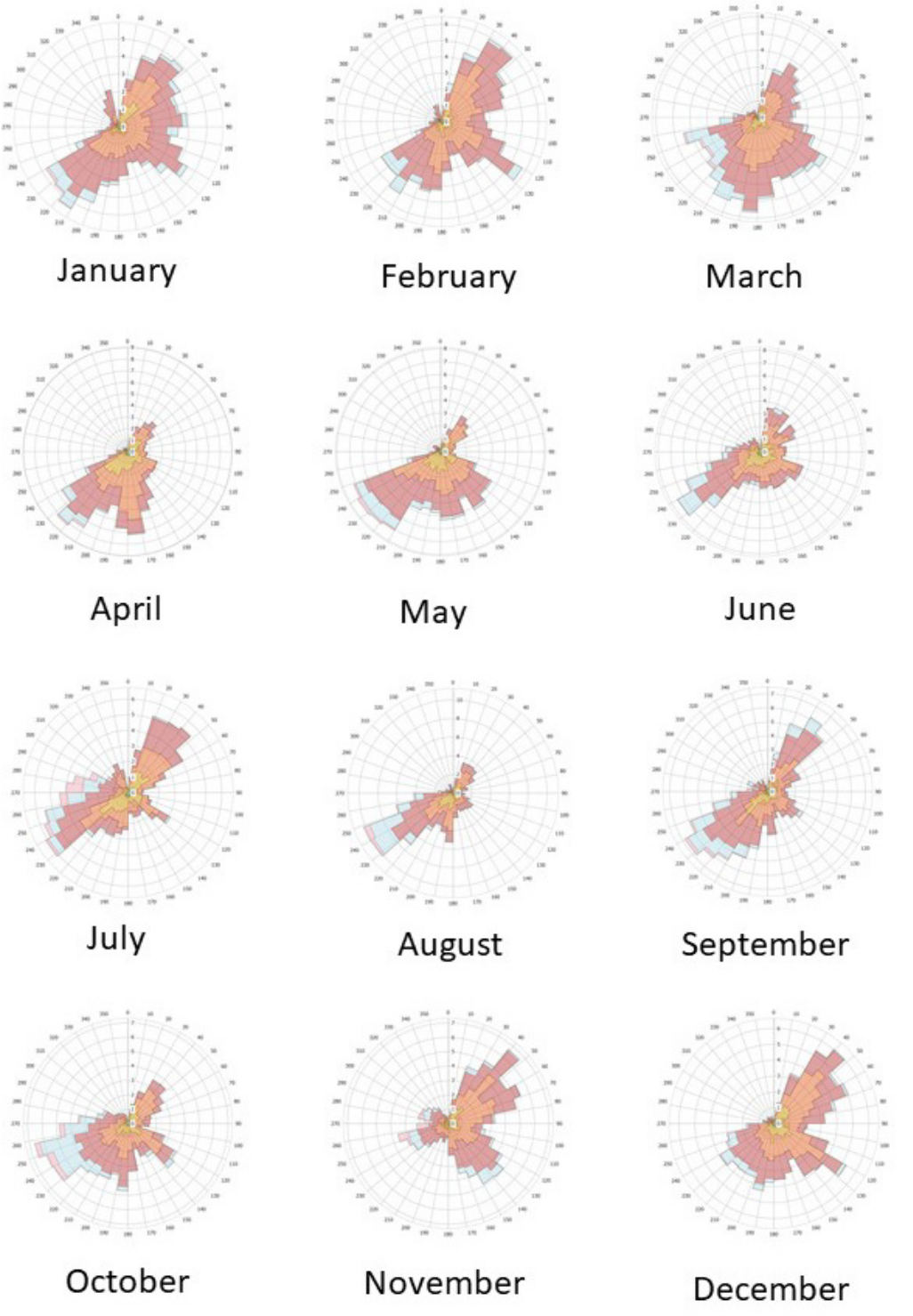
Particulate Matter (PM10) 24 hour average and compliance criteria



Particulate Matter (PM2.5) 24 hour average and compliance criteria

APPENDIX 2: METEOROLOGICAL MONITORING RESULTS

2A – Wind Roses Monthly



2B – Temperature- Monthly

Summary of Mean Daily Temperatures

Month	Mean Daily Temperature					
	EIS (Station #50052)		AWS 2020		AWS 2021	
	Maximum (°C)	Minimum (°C)	Maximum (°C)	Minimum (°C)	Maximum (°C)	Minimum (°C)
January	33.4	17.6	36.7	22.2	31.4	17.0
February	32.5	17.8	29.3	19.3	29.9	16.1
March	29.3	14.8	26.5	15.7	26.4	13.4
April	24.3	9.7	21.3	10.3	22.9	7.1
May	19.4	6.8	17.2	6.6	18.8	5.2
June	15.6	3.8	15.1	4.2	15.1	3.5
July	14.9	2.6	14.1	4.4	13.8	2.8
August	16.8	3.4	14.4	3.5	16.8	3.4
September	19.7	5.4	20.8	6.91	20.0	4.9
October	24.5	9.2	25.4	10.2	22.3	7.7
November	28.2	12.6	30.7	14.3	24.4	12.8
December	31.7	15.5	29.9	14.8	29.5	14.3

APPENDIX 3: NOISE MONITORING RESULTS

APPENDIX 4: SURFACE WATER MONITORING RESULTS

Surface Water Monitoring – Analytical Results 2021

LOC ID	Analytes	Units	LOR	SW1	SW1	SW1	SW1	SW2	SW2	SW2	SW2	SW2	SW2	SW2
Sampling Date				3/01/2021	6/02/2021	13/02/2021	23/03/2021	3/01/2021	23/03/2021	25/06/2021	1/07/2021	24/07/2021	3/08/2021	26/11/2021
Major Cations (mg/L)	Calcium	mg/L	0.5	7.2	1.9	4.9	5	6.6	2.8	4.1		4.8	4.1	6.3
	Magnesium	mg/L	0.5	2.2	1.9	1.4	1.6	2.5	1.5	2.3		2.8	3.5	2.6
	Sodium	mg/L	0.5	5.8	6.3	1.3	3.1	8.3	6.3	8.4		12	19	7
	Potassium	mg/L	0.5	15	7.5	8.6	6.8	16	6.9	11		9.5	11	12
Major Anions (mg/L)	Sulphate	mg/L	5	<5	<5	<5	<5	21	<5	2		3	3.2	<5
	Chloride	mg/L	1	9.5	11	3.1	4	21	5.3	8.9		14	22	17
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	56	23	27	22	49	<20	<20		<20	22	27
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	<10	<10	<10	<10	<10		<10	<10	<10
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	56	23	27	22	49	<20	<20		<20	22	27
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	0.54	0.68	0.51	2.2	1.6	1.7	5.9	0.87	9.1	10	5.3
	Arsenic	mg/L	0.001	0.001	0.002	<0.001	<0.001	0.002	0.001	0.003	<0.001	0.004	0.003	0.003
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	<0.001	<0.001	0.003	0.004	0.002	0.004	0.008	0.002	0.013	0.012	0.006
	Cobalt	mg/L	0.001	0.002	<0.001	0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.003	0.003	0.002
	Copper	mg/L	0.001	0.004	0.001	0.007	0.005	0.004	0.003	0.006	0.003	0.007	0.008	0.007
	Iron	mg/L	0.05	1	2.3	1.2	2.7	1.9	2.1	5.7	0.83	8.4	11	5.9
	Lead	mg/L	0.001	<0.001	<0.001	0.001	0.001	<0.001	0.001	0.003	<0.001	0.004	0.004	0.003
	Manganese	mg/L	0.005		0.031	0.043	0.032		0.01	0.036	0.026		0.043	0.037
	Nickel	mg/L	0.001	0.003	0.002	0.003	0.003	0.004	0.003	0.005	0.002	0.009	0.008	0.006
	Zinc	mg/L	0.005	0.006	<0.005	0.007	0.012	0.006	0.006	0.021	0.012	0.021	0.022	0.029
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.07	0.19	0.26	0.16	0.06	0.16	4.7	3.1	1.6	5.9	1.5
	Arsenic	mg/L	0.001	0.002	0.003	0.005	<0.001	0.002	<0.001	0.002	<0.001	<0.001	0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.004	0.002	0.002	0.005	<0.001
	Cobalt	mg/L	0.001	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.005	0.003	0.008	0.002	0.003	0.001	0.005	0.002	0.002	0.005	0.004
	Iron	mg/L	0.05	0.5	1.1	0.48	0.18	0.26	0.24	2.7	1.5	1.1	2.9	1
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005		0.009	0.028	0.012		<0.005	0.007	<0.005		0.009	0.005
	Nickel	mg/L	0.001	0.002	0.002	0.003	0.001	0.002	0.001	0.003	0.002	0.002	0.004	0.003
	Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.012	0.005
Others	pH (Lab)	pH units	0.1	7	7	6.6	6.5	7	6.6	6.9	7.1	6.8	6.8	6.8
	EC (Lab)			97	68	53	52	110	55	75	43	230	120	110
	TDS	mg/L	10	82	46	54	40	120	58	48	110	330	310	240
	TSS	mg/L	5	11	40	17	15	14	16	53	190	27	29	42
	Hardness mg equivalent CaCO3/L	mg/L	1	27	13	18	19	27	13	20		23	24	26
Field	Turbidity (Field)	NTU			54.6	26.6	48.2		31.2	220	198	186	197	159
	pH (Field)	pH units			6.71	6.58	6.89		7.08	7.28	7.65	7.49	7.18	6.88
	EC (Field)				73.3	88.9	74.9		101.5	155.7	456	313	182.2	150
	Temperature	C^0			22.5	22.7	20.5		21.6	8	12.2	9.12	13.2	19.6

Surface Water Monitoring – Analytical Results 2021 cont.

LOC ID	Analytes	Units	LOR	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW3	SW4	SW4	SW4	SW4
Sampling Date				**3/01/2021**	**6/02/2021**	**13/02/2021**	**23/03/2021**	**25/06/2021**	**1/07/2021**	**24/07/2021**	**3/08/2021**	**26/11/2021**	**3/01/2021**	**23/03/2021**	**26/07/2021**	**3/12/2021**
Major Cations (mg/L)	**Calcium**	mg/L	0.5	1.9	4.2	1.7	1.6	1.6	0.9	2.8	3.1	2.7	8.7	5.2	6.6	13
	Magnesium	mg/L	0.5	1.9	1.5	1.6	1.6	1.7	0.9	2.6	3.8	2.6	3.1	2.3	3.2	5.1
	Sodium	mg/L	0.5	5.8	1.5	4.6	5.3	7.7	4.3	12	18	7.3	6.1	6.1	7.5	10
	Potassium	mg/L	0.5	7.5	8	6	5.3	6	3.1	6.1	8.2	9.9	17	8.2	8.4	15
Major Anions (mg/L)	**Sulphate**	mg/L	5	16	2.3	<5	<5	<5	<5	2.9	3.7	<5	7.8	<5	2.2	3.3
	Chloride	mg/L	1	11	4.2	6.3	6	8	9.5	12	20	17	29	6.2	14	25
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	22	28	<20	<20	<20	<20	<20	<20	26	56	25	30	60
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	22	28	<20	<20	<20	<20	<20	<20	26	56	25	30	60
Heavy Metals (TOTAL) (mg/L)	**Aluminium**	mg/L	0.05	2	0.81	1.5	1.8	3.5	0.25	11	12	8.6	1.2	2.9	8.6	4.3
	Arsenic	mg/L	0.001	0.002	<0.001	0.003	0.001	0.002	<0.001	0.005	0.005	0.005	<0.001	0.002	0.003	0.002
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	0.003	0.006	0.002	0.003	0.004	<0.001	0.013	0.012	0.008	0.003	0.006	0.027	0.01
	Cobalt	mg/L	0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	0.003	0.003	0.002	<0.001	0.002	0.004	0.008
	Copper	mg/L	0.001	0.006	0.008	0.003	0.002	0.004	0.001	0.008	0.008	0.006	0.005	0.005	0.011	0.01
	Iron	mg/L	0.05	2.7	1.5	3	2.1	3.2	0.34	11	14	10	1.5	3.8	10	5.2
	Lead	mg/L	0.001	<0.001	<0.001	0.002	0.001	0.001	<0.001	0.005	0.005	0.004	<0.001	0.002	0.004	0.003
	Manganese	mg/L	0.005		0.041	0.019	0.01	0.02	0.008		0.037	0.045		0.03		0.51
	Nickel	mg/L	0.001	0.004	0.004	0.003	0.003	0.003	0.001	0.009	0.009	0.006	0.005	0.005	0.015	0.01
	Zinc	mg/L	0.005	0.008	0.008	0.01	0.01	0.011	<0.005	0.019	0.017	0.021	0.007	0.01	0.019	0.013
Heavy Metals (Dissolved) (mg/L)	**Aluminium**	mg/L	0.05	1.3	0.74	0.08	0.15	1.5	4.4	1.2	5.9	1.1	0.09	0.24	1.5	1.9
	Arsenic	mg/L	0.001	0.003	0.002	0.004	<0.001	0.002	0.001	0.001	0.002	0.001	0.002	<0.001	<0.001	0.002
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0002
	Chromium	mg/L	0.001	0.002	0.002	<0.001	<0.001	0.001	0.003	0.002	0.004	<0.001	0.001	<0.001	0.002	0.004
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.004	0.009	0.006	0.001	0.006	0.003	0.002	0.005	0.002	0.004	0.002	0.003	0.006
	Iron	mg/L	0.05	1.1	0.57	0.67	0.2	1.3	2.6	1.2	3.3	1	0.24	0.33	1.1	1.4
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005		0.027	0.008	<0.005	<0.005	0.008		0.01	<0.005		0.009		0.011
	Nickel	mg/L	0.001	0.002	0.003	0.002	0.002	0.001	0.003	0.003	0.004	0.002	0.003	0.002	0.003	0.008
	Zinc	mg/L	0.005	0.007	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	0.011	<0.005	<0.005	<0.005	<0.005	<0.005
Others	**pH (Lab)**	pH units	0.1	6.9	6.6	6.6	6.2	6.6	6.9	6.7	6.9	6.6	6.9	6.6	7	7.2
	EC (Lab)			59	56	49	47	54	68	150	110	89	110	65	150	170
	TDS	mg/L	10	64	28	50	40	40	110	320	330	200	110	48	310	110
	Total Suspended Solids	mg/L	5	24	11	26	15	44	26	26	13	29	28	16	25	29
	Hardness mg equivalent CaCO3/L	mg/L	1	13	17	11	11	11	5.7	18	23	18	35	22	30	54
Field	**Turbidity (Field)**	NTU			42.8	69.2	35.2	86.7	142	214	222	178		63.4	215	70.5
	pH (Field)	pH units			7.26	6.77	7	6.99	7.08	7.79	6.86	6.51		7.88	7.39	6.97
	EC (Field)				103.1	68.6	64.7	195.9	129.2	168.8	130.4	105.6		81.7	166.1	329
	Temperature	**C⁰**			23.9	25	21.6	9.7	11.9	9.1	12.3	20.6		20.8	8.4	21.7

Surface Water Monitoring – Analytical Results 2021 cont.

LOC ID	Analytes	Units	LOR	SW5	SW5	SW5	SW5	SW5	SW6	SW6	SW6	SW6	SW6
Sampling Date				3/01/2021	13/02/2021	23/03/2021	26/07/2021	3/12/2021	3/01/2021	6/02/2021	13/02/2021	23/03/2021	26/07/2021
Major Cations (mg/L)	Calcium	mg/L	0.5	3.2	4	2.6	2.6	5.4	5	2.8	3.9	4.7	3.7
	Magnesium	mg/L	0.5	2.6	3.6	2.2	2.5	5.5	3.1	1.6	2	2.9	2.4
	Sodium	mg/L	0.5	6.7	6	5.2	4.4	9.9	3.8	2.5	1.2	5.2	4.4
	Potassium	mg/L	0.5	9.3	9.7	8.4	6.8	13	20	6.5	9.5	15	11
Major Anions (mg/L)	Sulphate	mg/L	5	11	<5	<5	<5	<5	7.1	2.4	<5	<5	<5
	Chloride	mg/L	1	13	4.6	3	4.3	8	16	4.6	4.7	3.8	8.2
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	33	42	24	36	51	51	26	28	42	34
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	33	42	24	36	51	51	26	28	42	34
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	0.75	0.49	1.2	1.7	2.2	0.47	1.2	1.3	1.4	2.4
	Arsenic	mg/L	0.001	<0.001	0.001	<0.001	<0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	0.001	0.002	0.003	0.004	0.004	0.001	0.005	0.007	0.003	0.005
	Cobalt	mg/L	0.001	<0.001	0.001	<0.001	<0.001	0.001	0.002	0.002	0.002	<0.001	<0.001
	Copper	mg/L	0.001	0.005	0.004	0.004	0.004	0.007	0.006	0.006	0.006	0.006	0.007
	Iron	mg/L	0.05	1.2	2.2	1.7	3	3.4	0.69	2.4	3	1.7	2.7
	Lead	mg/L	0.001	<0.001	0.002	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.001
	Manganese	mg/L	0.005		0.087	0.029		0.066		0.082	0.095	0.025	
	Nickel	mg/L	0.001	0.003	0.003	0.003	0.003	0.005	0.005	0.004	0.005	0.003	0.004
	Zinc	mg/L	0.005	0.005	0.006	0.009	0.007	0.012	0.011	0.008	0.011	0.012	0.012
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.23	0	0.09	0.65	0.75	0.39	0.87	0.05	0.08	0.55
	Arsenic	mg/L	0.001	0.002	0.004	<0.001	<0.001	0.001	0.002	0.002	0.003	<0.001	<0.001
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	0.001	<0.001	<0.001	0.001	0.001	0.002	0.002	<0.001	<0.001	0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.004	0.019	0.002	0.003	0.005	0.006	0.007	0.02	0.003	0.004
	Iron	mg/L	0.05	0.49	0.87	0.21	1.4	0.81	0.39	0.68	0.17	0.12	0.49
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005		0.05	0.009		0.006		0.041	0.028	<0.005	
	Nickel	mg/L	0.001	0.002	0.002	0.001	0.002	0.003	0.004	0.003	0.003	0.001	0.002
	Zinc	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.01	0.007	<0.005	<0.005	<0.005
Others	pH (Lab)	pH units	0.1	6.8	7	6.6	7.2	4.7	6.9	6.6	6.7	6.8	7
	EC (Lab)			77	80	56	91	130	98	42	55	82	120
	TDS	mg/L	10	56	56	30	120	330	90	42	58	56	92
	Total Suspended Solids	mg/L	5	24	31	12	20	17	17	47	20	6.2	14
	Hardness mg equivalent CaCO3/L	mg/L	1	19	25	16	17	36	25	14	18	24	19
Field	Turbidity (Field)	NTU			28.1	65.8	44.3	36		141	89.8	56.2	51.1
	pH (Field)	pH units			7.17	7.88	7.44	7.43		6.74	6.77	6.81	7.17
	EC (Field)				90.5	117.5	92.6	155.5		59.2	115.4	41.7	122.6
	Temperature	C^0			27.9	20.9	9.7	36.6		22.6	24.1	21.1	7.8

Surface Water Monitoring – Analytical Results 2021 cont.

LOC ID	Analytes	Units	LOR	SW7	SW7	SW7	SW7	SW7	SW7	Lachlan River	Lachlan River
Sampling Date				23/03/2021	25/06/2021	2/07/2021	24/07/2021	4/08/2021	27/11/2021	16/04/2021	3/11/2021
Major Cations (mg/L)	Calcium	mg/L	0.5	4.4	57	42	33	55	37	29	
	Magnesium	mg/L	0.5	1.8	29	24	17	29	18		11
	Sodium	mg/L	0.5	4.1	25	22	16	25	15		27
	Potassium	mg/L	0.5	9	6.8	6.3	4.7	6.4	7.3		2.6
Major Anions (mg/L)	Sulphate	mg/L	5	<5	<5	<5	<5	<5	<5	19	21
	Chloride	mg/L	1	5.1	5.4	5.5	5	6.8	12	63	49
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	28	240	250	240	290	280	98	88
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	27	<10	<10	<10	<10	<10	<10
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	28	270	250	240	290	280	98	88
Heavy Metals (TOTAL) (mg/L)	Aluminium	mg/L	0.05	1.6	0.18	0.35	1.2	0.25	0.66		
	Arsenic	mg/L	0.001	0.001	<0.001	<0.001	0.001	<0.001	0.002		
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002		
	Chromium	mg/L	0.001	0.003	<0.001	0.005	0.004	0.001	0.001		
	Cobalt	mg/L	0.001	<0.001	0.001	0.001	0.002	<0.001	0.008		
	Copper	mg/L	0.001	0.003	0.002	0.003	0.008	0.002	0.004		
	Iron	mg/L	0.05	2.2	0.58	0.64	2.2	0.65	2.5		
	Lead	mg/L	0.001	0.001	<0.001	<0.001	0.004	<0.001	0.002		
	Manganese	mg/L	0.005	0.016	0.13	0.088		0.073	2.3		
	Nickel	mg/L	0.001	0.003	0.004	0.003	0.005	0.003	0.006		
	Zinc	mg/L	0.005	0.006	0.009	<0.005	0.006	0.005	0.01		
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	0.14	<0.005	<0.005	<0.005	<0.005	<0.005	0.11	<0.005
	Arsenic	mg/L	0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
	Copper	mg/L	0.001	0.002	0.005	0.001	0.01	0.002	0	0.002	0.003
	Iron	mg/L	0.05	0.38	<0.005	<0.005	<0.005	<0.005	0.06	0.32	0.12
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.005	<0.005	<0.005		<0.005	1.2	0.026	
	Nickel	mg/L	0.001	0.001	0.002	0.002	0.002	0.002	0.005	0.002	0.002
	Zinc	mg/L	0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005
Others	pH (Lab)	pH units	0.1	6.7	7.8	7.8	7.5	7.7	7.4	7.5	7.7
	EC (Lab)			63	400	420	410	430	430	430	380
	TDS	mg/L	10	56	280	280	260	200	250	290	230
	Total Suspended Solids	mg/L	5	21	20	8.4	77	8	25		
	Hardness mg equivalent CaCO3/L	mg/L	1	18	260	200	150	260	170		
Field	Turbidity (Field)	NTU		67.4	12.89	17.41	165	21	52.3		
	pH (Field)	pH units		7.05	7.61	7.51	7.52	7.66	7.31	7.63	7.63
	EC (Field)			79.4	493	475	440	534	446	395	356
	Temperature	C^0		20.6	10.7	9.4	9.1	9	16.3	16.4	18.6

APPENDIX 5: GROUNDWATER MONITORING RESULTS

5A - Groundwater Bores – Standing Water Level

5B - Groundwater Monitoring - Water Chemistry

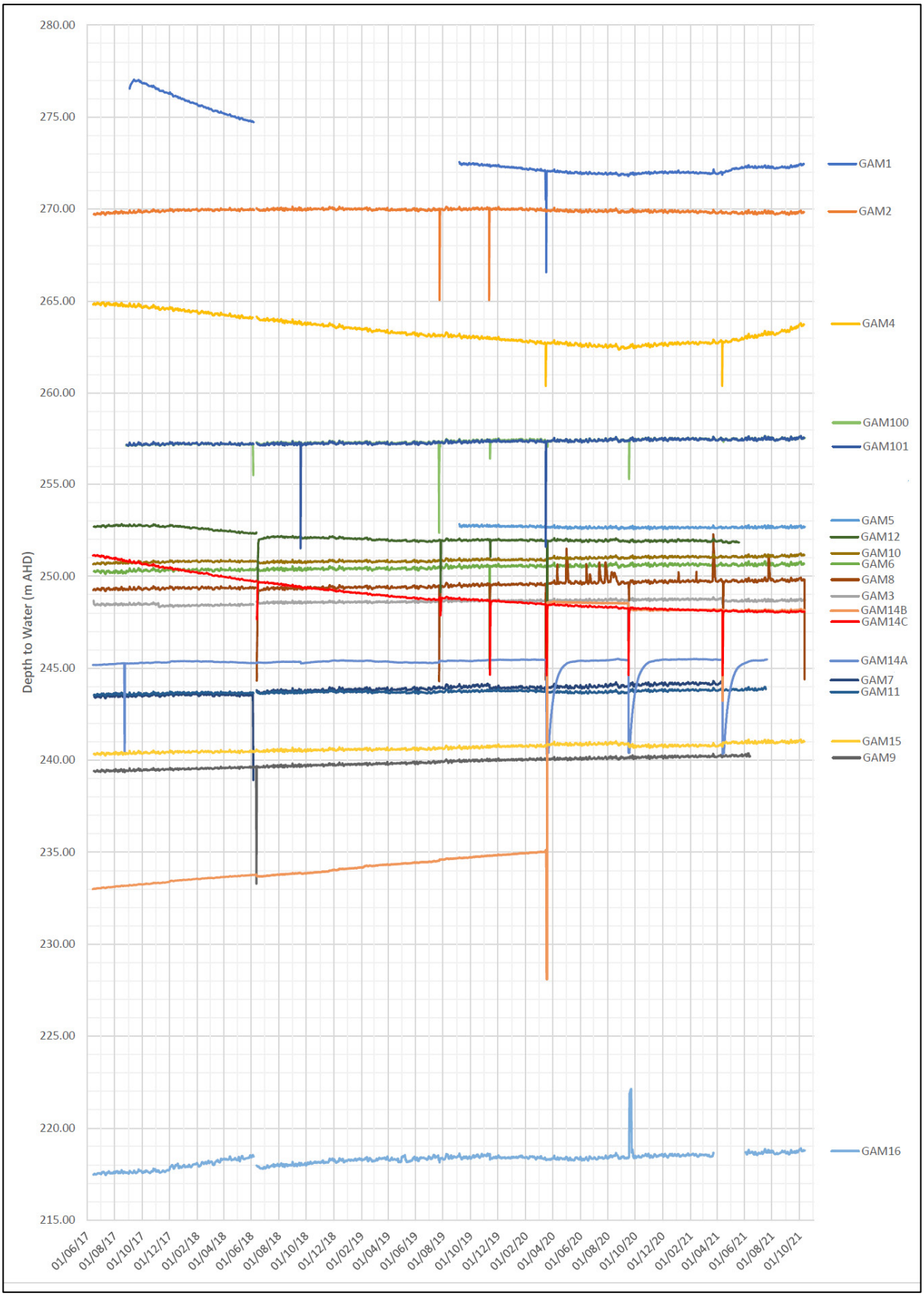
5A - Groundwater Bores – Standing Water Levels

Minesite Groundwater monitoring – Standing Water Levels

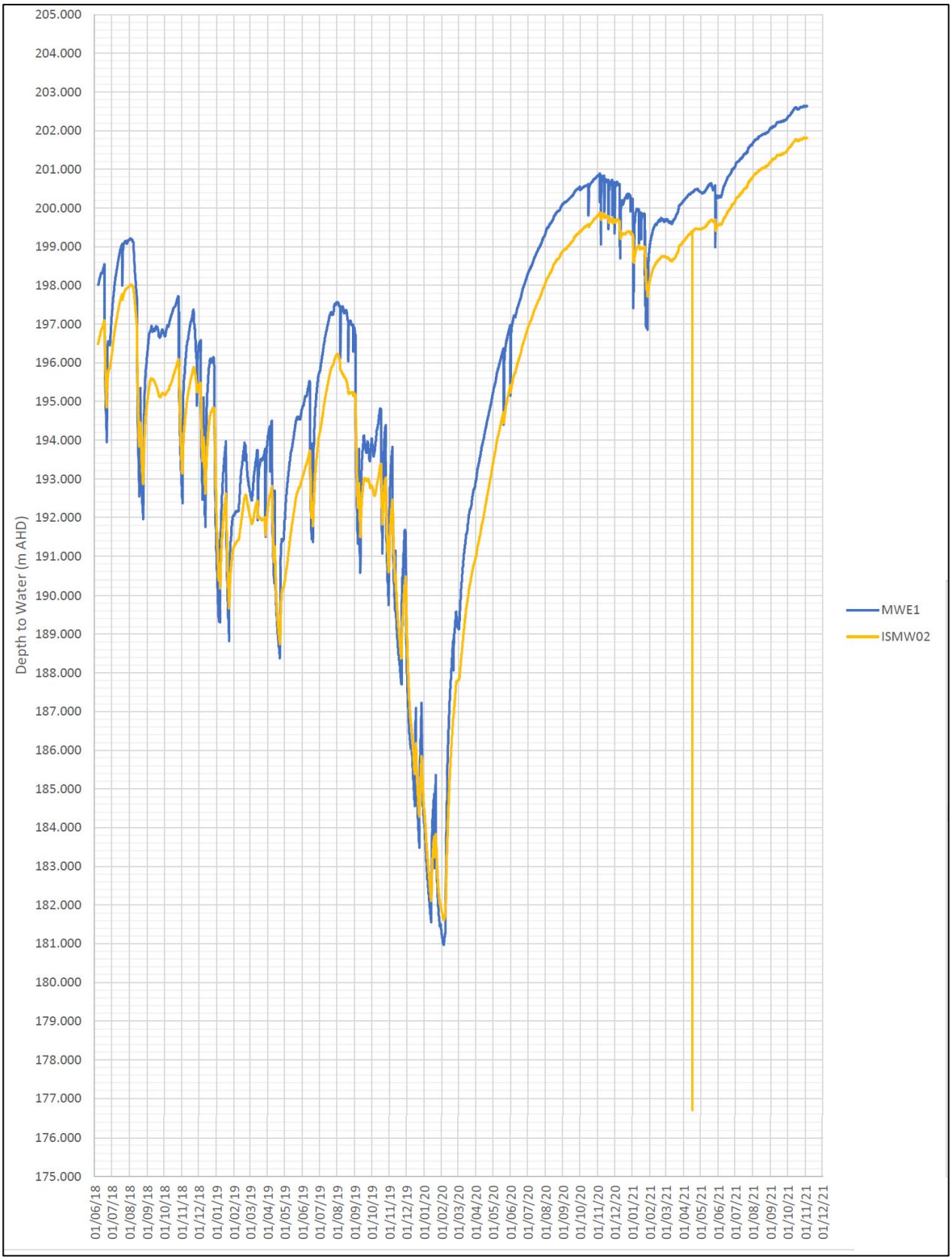
Monitoring Bore ID	Standing Water Level (m AHD)					
	July 2019	Nov 2019	March 2020	September 2020	April 2021	October 2021
GAM01	272.63	272.34	272.04	271.87	271.95	272.43
GAM02	269.96	269.98	269.88	269.82	269.75	269.79
GAM03	248.63	248.67	248.64	248.65	248.68	248.75
GAM04	263.14	263.07	262.67	262.46	262.7	263.69
GAM05	252.67	252.76	252.65	252.59	252.58	252.65
GAM06	250.45	250.63	250.49	250.55	250.55	250.64
GAM07	243.69	243.93	243.87	244.00	244.15	244.34
GAM08	249.47	249.64	249.53	249.67	249.69	249.76
GAM09	239.92	240.03	240.02	240.13	240.18	240.32
GAM10	250.84	250.90	250.84	250.90	250.95	251.03
GAM11	243.70	243.75	243.69	243.74	243.8	243.93
GAM12	252.00	251.98	251.89	251.86	251.85	251.87
GAM14A	245.37	245.45	245.44	245.44	245.47	245.52
GAM14B	234.58	234.81	235.01	248.39	248.21	248.14
GAM14C	248.79	248.65	248.42	248.26	248.11	248.09
GAM15	240.64	240.71	240.71	239.28	240.85	240.91
GAM16	218.24	218.45	218.29	218.46	218.6	218.77
GAM100	257.37	257.40	257.39	257.45	257.49	257.55
GAM101	257.27	257.48	257.32	257.39	257.4	257.5

Borefields Groundwater monitoring – Standing Water Levels

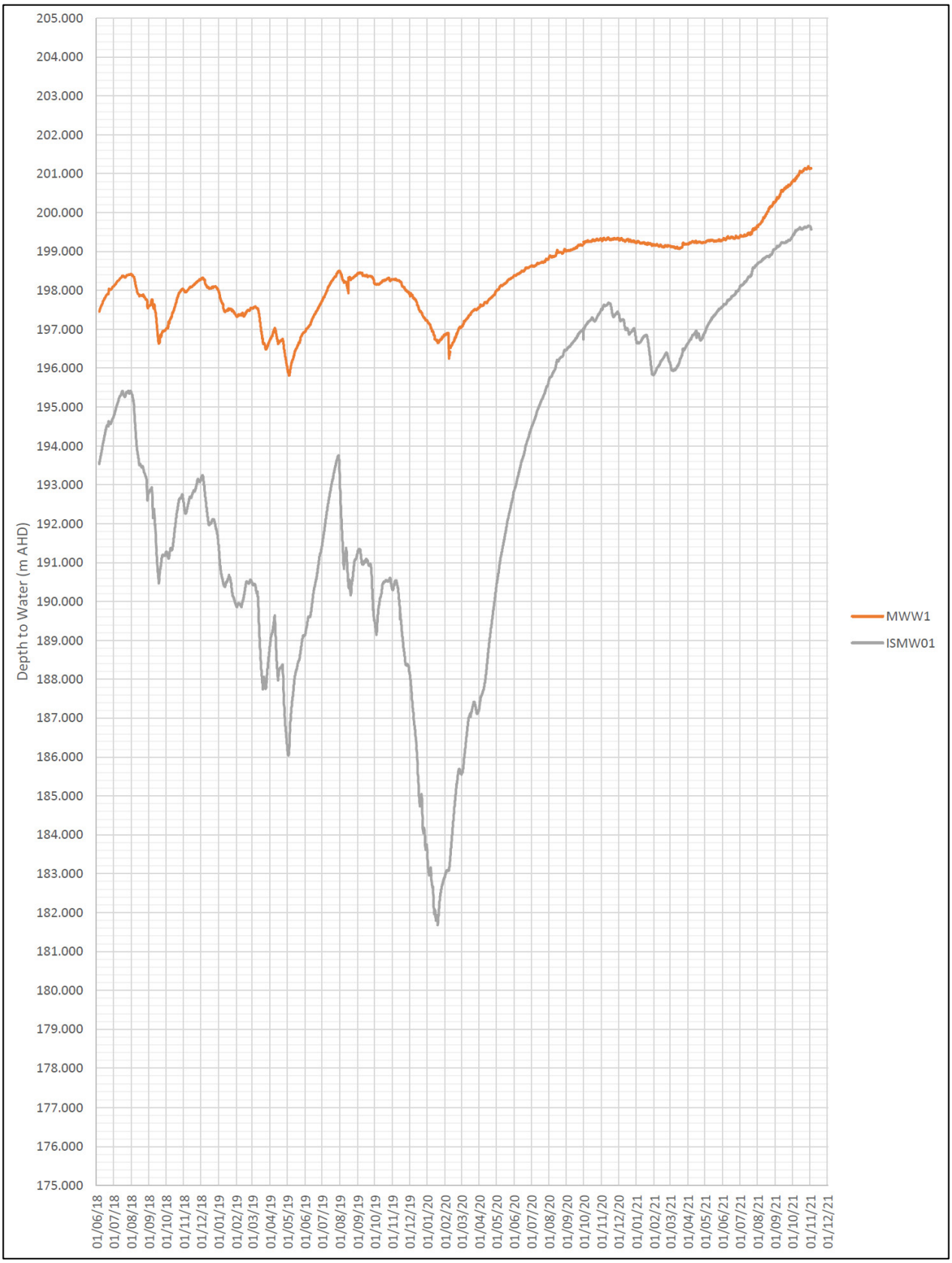
Monitoring Bore ID	Standing Water Level (m AHD)					
	July 2019	Nov 2019	March 2020	September 2020	April 2021	October 2021
Borefields Monitoring Bores - West						
ISMW01	193.58	189.86	185.35	197.02	196.94	199.56
MWW1	198.39	198.22	188.78	199.18	199.23	201.81
Borefields Monitoring Bores - East						
ISMW02	196.01	189.79	189.86	199.40	199.39	201.12
MWE1	197.39	188.99	200.31	200.57	200.22	202.65



Groundwater Monitoring - Minesite Bores - Continuous logger data (Depth to water mAHD)



Groundwater Monitoring – East Borefield Monitoring Bores - Continuous logger data (Depth to water mAHD) vs Time



Groundwater Monitoring – West Borefield Monitoring Bores - Continuous logger data (Depth to water mAHD) vs Time

5B - GROUNDWATER MONITORING – WATER CHEMISTRY

Groundwater Water Monitoring – Minesite Bores - Analytical Results 2021

Bore ID	Analytes	Units	LOR	GAM01	GAM01	GAM02	GAM02	GAM03	GAM03	GAM04	GAM04	GAM05	GAM05	GAM06	GAM06	GAM07	GAM07
Sampling Date				11/10/2021	12/04/2021	11/10/2021	12/04/2021	13/10/2021	12/04/2021	11/10/2021	12/04/2021	13/10/2021	13/04/2021	11/10/2021	12/04/2021	11/10/2021	12/04/2021
Major Cations (mg/L)	**Calcium**	mg/L	0.5	15	12	61	59	21	27	65	72	63	50	330	260	2.4	4.6
	Magnesium	mg/L	0.5	0	0	63	63	200	210	110	97	110	110	510	420	83	64
	Sodium	mg/L	0.5	51	61	38	47	45	47	81	86	30	33	540	500	180	190
	Potassium	mg/L	0.5	1.8	2.9	1.5	1.6	1.6	1.6	2.9	2.9	1.1	1.1	12	9.9	4.1	4.8
Major Anions (mg/L)	**Sulphate**	mg/L	5	39	48	8	11	7.5	11	25	38	15	17	470	470	13	27
	Chloride	mg/L	1	35	30	42	53	49	49	150	150	65	73	1900	1700	220	330
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	130	65	690	390	1500	930	1200	540	590	560	710	830	310	310
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	<10	<10	<10	57	<10	<10	<10	33	<10	<10	37	47
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	130	65	690	390	1500	990	1200	540	590	600	710	830	350	360
Heavy Metals (Dissolved) (mg/L)	**Aluminium**	mg/L	0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Arsenic	mg/L	0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Boron	mg/L	0.05	<0.05	<0.05	0.08	0.07	0.13	0.11	0.15	0.13	0.09	0.06	0.22	0.19	0.06	<0.05
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	<0.001	<0.001	0.023	0.022	0.019	0.019	0.014	0.014	0.072	0.072	0.008	0.008	<0.001	<0.001
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001	<0.001	0.008	0.007	0.003	0.002
	Iron	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001
	Nickel	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	0.03	0.01	0.004	0.002	0.014	0.009	0.017	0.012	0.002	<0.001
	Silver	mg/L	0.005	<0.05	0.02	<0.05	0.02	<0.05	<0.05	0.01	0.01	<0.05	0.01	<0.05	0.02	<0.05	<0.05
	Vanadium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Zinc	mg/L	0.005	0.008	0.007	0.03	0.026	<0.005	<0.005	0.022	0.019	0.006	<0.005	0.013	0.009	<0.005	<0.005
Nutrients (mg/L)	**Nitrate (as N)**	mg/L	0.02	<0.005	<0.005	0.006	0.005	<0.005	<0.005	0.016	0.012	0.008	0.008	0.031	0.019	<0.005	<0.005
	Nitrite (as N)	mg/L	0.02	1.3	1.2	0.52	0.46	0.74	0.56	4.7	3.9	1.9	1.6	0.24	0.16	0.05	0.03
	Ammonia (as N)	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	Total Nitrogen (as N)	mg/L	0.2	0.7	<0.02	0.5	<0.02	1	<0.02	1.7	<0.02	<0.02	<0.02	0.3	<0.02	<0.02	<0.02
	Phosphate total (as P)	mg/L	0.01	1.3	1.2	0.52	0.46	0.74	0.56	4.7	3.9	1.9	1.6	0.24	0.17	<0.02	<0.02
Others	**TDS**	mg/L	10	240	180	540	380	890	890	810	750	690	580	5000	3500	650	570
	Electrical Conductivity (Lab)	uS/cm	10	350	320	900	960	1500	1800	1400	1600	1200	1200	8200	7400	1400	1500
Field	**Temperature**	°C		20	19.6	20.2	20.5	20.2	20.5	19.4	20	19.4	19.7	20.5	21.2	20	20.5
	pH	pH units		8.84	8.9	7.36	7.35	7.29	7.84	6.97	6.94	7.17	7.8	6.69	6.71	8.84	8.79
	Electrical Conductivity	uS/cm		332	300	867	782	1656	1459	1342	1237	1109	992	6842	6234	1298	1178
	Dissolved Oxygen	Mg/L		0.3	0.27	4.65	4.25	3.16	5.18	4.56	3.92	4.11	9.2	3.29	4.42	0.82	0.51

Groundwater Water Monitoring – Minesite Bores - Analytical Results 2021 (cont.)

Bore ID	Analytes	Units	LOR	GAM08	GAM08	GAM09	GAM09	GAM10	GAM10	GAM11	GAM11	GAM12	GAM12	GAM14A	GAM14A	GAM14B	GAM14B
Sampling Date				12/10/2021	14/04/2021	13/10/2021	13/04/2021	12/10/2021	14/04/2021	12/10/2021	13/04/2021	12/10/2021	13/04/2021	12/10/2021	13/04/2021	12/10/2021	13/04/2021
Major Cations (mg/L)	Calcium	mg/L	0.5	77	53	2.1	1.6	170	180	50	350	91	100	69	66	71	63
	Magnesium	mg/L	0.5	170	120	130	140	360	360	130	570	36	30	35	37	92	82
	Sodium	mg/L	0.5	1300	1000	77	82	780	800	1600	2200	220	230	210	250	170	170
	Potassium	mg/L	0.5	17	13	2.7	2.9	14	14	29	23	6.5	6.4	3.8	4.3	5.8	5.1
Major Anions (mg/L)	Sulphate	mg/L	5	1200	1000	28	40	490	500	590	1600	330	360	130	140	75	71
	Chloride	mg/L	1	1300	1200	110	87	1800	1900	1800	5800	180	170	330	340	330	400
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	760	540	530	570	880	860	1500	970	76	47	190	250	400	390
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	34	<10	<10	<10	31	<10	<10	20	<10	<10	13	26
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	760	540	560	570	880	860	1500	970	76	67	190	260	410	420
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	<0.05	<0.05	<0.05
	Arsenic	mg/L	0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	0.003	0.003	0.002	0.002	0.001	<0.001
	Boron	mg/L	0.05	0.18	0.17	0.11	0.1	0.18	0.14	0.16	0.17	0.24	0.18	0.43	0.4	0.26	0.22
	Cadmium	mg/L	0.0002	0.0007	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	<0.001	<0.001	0.059	0.056	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	0.003	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.28	0.068	0.003	0.011	<0.001	0.001	<0.001	0.017	0.008	0.009	<0.001	<0.001	0.01	0.004
	Iron	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.11	0.06	<0.05	<0.05
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	0.14	0.16	0.008	<0.005	<0.005	<0.005	0.22	0.016	0.065	0.031	0.21	0.2	1	0.95
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.001	0.021	0.006	0.009	0.006	0.005	0.003	0.006	0.035	0.005	0.002	0.003	0.002	0.009	0.009
	Silver	mg/L	0.005	0.02	0.02	<0.05	<0.05	0.03	0.03	0.04	0.06	0.03	0.02	0.09	0.13	0.05	0.05
	Vanadium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Zinc	mg/L	0.005	0.015	0.012	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.018	0.016
Nutrients (mg/L)	Nitrate (as N)	mg/L	0.02	0.019	0.009	0.006	0.006	0.016	0.011	0.011	0.02	0.01	0.008	<0.005	0.008	0.01	0.016
	Nitrite (as N)	mg/L	0.02	14	37	0.09	0.1	0.13	0.16	<0.02	2.1	0.13	0.05	<0.02	<0.02	7.3	3.6
	Ammonia (as N)	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.07	1.5
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	0.22	0.39	0.1	0.09	<0.01	<0.01
	Total Nitrogen (as N)	mg/L	0.2	2.2	2	0.4	<0.02	<0.02	<0.02	0.6	1.1	1	0.39	<0.02	<0.02	1.9	<0.02
	Phosphate total (as P)	mg/L	0.01	14	37	0.09	0.1	0.13	0.16	<0.02	2.1	0.13	0.06	<0.02	<0.02	7.4	5
Others	TDS	mg/L	10	4700	3300	750	570	4700	3700	4800	7500	890	840	1000	910	1200	910
	Electrical Conductivity (Lab)	uS/cm	10	6200	6600	1500	1400	5700	7400	9200	16000	1800	1600	2100	1900	2300	2000
Field	Temperature	°C		20.6	21	20.3	20.3	20.1	20.4	19.1	19.9	20.4	21.3	20	21.9	20	21.6
	pH	pH units		6.97	6.95	7.58	7.7	6.71	6.69	6.61	6.61	7.88	9.23	7.67	7.64	7.66	7.68
	Electrical Conductivity	uS/cm		7097	5640	1230	1114	6865	6116	14500	13366	1419	1301	1642	1562	1823	1642
	Dissolved Oxygen	Mg/L		3.04	4.32	2.29	2.2	4.13	8.63	3.15	6.58	0.1	0.21	0.18	0.21	0.57	0.64

Groundwater Water Monitoring – Minesite Bores - Analytical Results 2021 (cont.)

Bore ID	Analytes	Units	LOR	GAM14C	GAM14C	GAM15	GAM15	GAM16	GAM16	GAM100	GAM100	GAM101	GAM101	BERRILEE	BERRILEE	VICTORIA PARK	VICTORIA PARK
Date				12/10/2021	13/04/2021	12/10/2021	13/04/2021	13/10/2021	14/04/2021	11/10/2021	14/04/2021	11/10/2021	12/04/2021	13/10/2021	14/04/2021	13/10/2021	14/04/2021
Major Cations (mg/L)	**Calcium**	mg/L	0.5	45	50	110	99	210	200	16	9.9	400	31	110	110	44	38
	Magnesium	mg/L	0.5	120	140	180	160	480	420	79	68	580	110	190	210	61	47
	Sodium	mg/L	0.5	160	190	530	480	470	460	1500	1500	2400	1500	200	240	98	100
	Potassium	mg/L	0.5	4.3	4.9	7.9	6.6	17	16	40	28	24	20	7.5	8.6	3.4	3.4
Major Anions (mg/L)	**Sulphate**	mg/L	5	36	45	520	590	190	200	460	460	1500	610	86	110	23	33
	Chloride	mg/L	1	410	360	560	490	2200	2300	1400	1300	6000	1600	1000	770	94	68
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	630	720	890	1100	680	630	1800	1600	750	1600	540	560	370	420
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	16
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	630	720	890	1100	680	630	1800	1600	750	1700	540	560	380	440
Heavy Metals (Dissolved) (mg/L)	**Aluminium**	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Arsenic	mg/L	0.001	0.002	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.002	0.001
	Boron	mg/L	0.05	0.23	0.2	0.19	0.15	0.24	0.2	0.16	0.13	0.2	0.14	0.21	0.19	0.17	0.15
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.0004	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	0.003	0.003	<0.001	<0.001	0.003	0.004	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.002
	Cobalt	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.005	0.006	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Copper	mg/L	0.001	0.003	0.004	<0.001	0.002	0.002	0.003	0.003	<0.001	0.017	<0.001	0.002	0.001	0.002	0.007
	Iron	mg/L	0.05	<0.05	<0.05	0.88	1.3	<0.05	<0.05	0.06	0.06	0.09	<0.05	<0.05	<0.05	<0.05	<0.05
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005	<0.005	<0.005	0.15	0.14	<0.005	<0.005	0.55	0.54	0.011	0.2	0.005	0.014	<0.005	<0.005
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.001	0.01	0.015	0.01	0.006	0.008	0.016	0.013	0.006	0.022	0.003	<0.001	<0.001	<0.001	0.008
	Silver	mg/L	0.005	0.03	0.04	<0.05	0.05	0.09	0.04	0.01	0.03	0.03	0.09	0.02		0.02	
	Vanadium	mg/L	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
	Zinc	mg/L	0.005	0.017	0.014	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.034	0.031	0.037	0.033
Nutrients (mg/L)	**Nitrate (as N)**	mg/L	0.02	0.016	0.016	0.023	0.019	0.023	0.016	0.009	0.005	0.037	0.007	0.014	0.009	0.006	0.018
	Nitrite (as N)	mg/L	0.02	3.7	4	<0.02	<0.02	0.38	0.26	<0.02	<0.02	2.3	<0.02	0.68		1.5	
	Ammonia (as N)	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.02	
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.01	
	Total Nitrogen (as N)	mg/L	0.2	1.2	<0.02	0.4	<0.02	<0.02	<0.02	0.4	<0.02	1.9	<0.02	0.8		0.4	
	Phosphate total (as P)	mg/L	0.01	3.7	4	<0.02	<0.02	0.38	0.27	<0.02	<0.02	2.3	<0.02	0.68		1.5	
Others	**TDS**	mg/L	10	1100	980	2500	2200	4400	4200	3600	3900	7500	1000	2000	2100	1600	520
	Electrical Conductivity (Lab)	uS/cm	10	2300	2100	4800	4200	5500	6800	6600	7300	18000	8500	2400	3500	1200	1000
Field	**Temperature**	°C		19.9	21	19.6	20.8	20.2	20.7	19.6	21.8	19.7	22.1	21.8	22.5	20.3	20.3
	pH	pH units		7.12	7.07	6.74	6.7	6.74	6.67	7.08	7.04	7.23	7.15	7.19	7.1	7.31	7.26
	Electrical Conductivity	uS/cm		1834	1714	3780	3478	6806	6126	7007	6596	7650	7298	3031	3001	911	838
	Dissolved Oxygen	Mg/L		4.07	4.69	2.28	7.45	6.64	6.81	2.25	6.92	1.74	3.63	5.56	4.34	7.56	6.09

Groundwater Water Monitoring – Borefield Bores - Analytical Results 2021

Bore ID	Analytes	Units	LOR	ISMW01	ISMW01	ISMW02	ISMW02	MWE1	MWE1	MWW1	MWW1	ISPB01	ISPB01
Sampling Date				3/11/2021	16/04/2021	3/11/2021	16/04/2021	3/11/2021	16/04/2021	3/11/2021	16/04/2021	3/11/2021	16/04/2021
Major Cations (mg/L)	Calcium	mg/L	0.5	21	26	26	29	13	13	35	46	23	23
	Magnesium	mg/L	0.5	21	25	24	24	17	13	30	32	22	22
	Sodium	mg/L	0.5	180	200	180	190	94	33	86	96	180	190
	Potassium	mg/L	0.5	2.9	2.8	2.9	3.2	2.2	1.7	1.9	2.1	2.7	2.8
Major Anions (mg/L)	Sulphate	mg/L	5	67	67	64	54	39	8.2	78	59	66	54
	Chloride	mg/L	1	220	250	570	260	160	27	450	170	210	220
	Bicarbonate Alkalinity (as CaCO3)	mg/L	20	190	190	190	170	130	110	140	140	200	200
	Carbonate Alkalinity (as CaCO3)	mg/L	10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
	Hydroxide Alkalinity (as CaCO3)	mg/L	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
	Total Alkalinity (as CaCO3)	mg/L	20	190	190	190	170	130	110	140	140	200	200
Heavy Metals (Dissolved) (mg/L)	Aluminium	mg/L	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	Arsenic	mg/L	0.001	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.004	<0.001	<0.001
	Boron	mg/L	0.05		0.08		0.07		<0.05		<0.05		0.09
	Cadmium	mg/L	0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	Chromium	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Cobalt	mg/L	0.001	0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.006	0.006	<0.001	<0.001
	Copper	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Iron	mg/L	0.05	<0.05	0.63	<0.05	0.6	<0.05	<0.05	<0.05	7.5	<0.05	0.87
	Lead	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Manganese	mg/L	0.005		0.044		0.038		<0.005		0.78		0.051
	Mercury	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	Nickel	mg/L	0.001	0.005	0.003	0.006	0.004	0.004	0.008	0.007	0.007	<0.001	<0.001
	Silver	mg/L	0.005	0.08	<0.05	0.06	<0.05	0.03	<0.05	1.5	0.06	0.08	<0.05
	Vanadium	mg/L	0.005		<0.005		<0.005		<0.005		<0.005		<0.005
	Zinc	mg/L	0.005		<0.005		<0.005		<0.005		<0.005		<0.005
Nutrients (mg/L)	Nitrate (as N)	mg/L	0.02	0.008	0.006	0.017	0.005	0.01	0.01	0.018	0.017	<0.005	0.013
	Nitrite (as N)	mg/L	0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.16	<0.02	0.02	<0.02	<0.02
	Ammonia (as N)	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Total Kjeldahl Nitrogen (as N)*	mg/L	0.2	0.03	0.04	0.02	0.03	0.01	<0.01	0.07	0.07	0.02	0.04
	Total Nitrogen (as N)	mg/L	0.2	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
	Phosphate total (as P)	mg/L	0.01	<0.02	<0.02	<0.02	<0.02	<0.02	0.16	<0.02	<0.02	<0.02	<0.02
Others	TDS	mg/L	10	640	730	660	660	440	210	570	560	600	620
	Electrical Conductivity (Lab)	uS/cm	10	1300	1300	1400	1100	890	290	1100	890	1400	1100
Field	Temperature	°C		22.7	20.2	22.6	21	21.1	20.3	21.9	19.9	21.8	21.3
	pH	pH units		6.93	6.88	6.85	6.71	6.49	6.23	6.25	6.15	7.76	6.92
	Electrical Conductivity	uS/cm		1251	1233	1318	1128	794	288	1002	862	1258	1125
	Dissolved Oxygen	Mg/L		0.09	2.24	0.14	2.7	0.1	4.04	0.29	5.35	0.87	0.86