

Broken Hill Operations Pty Ltd ABN 95 103 555 862

Rasp Mine


Annual Review

REPORTING PERIOD

1 January 2022 – 31 December 2022

This page has been left blank intentionally.

Title Block

Name of Operation:	Rasp Mine
Name of Operator:	Broken Hill Operations Pty Ltd
Development consent / project approval:	PA 07_0018 (MOD1, MOD2, MOD3, MOD4, MOD5, MOD6, MOD7, MOD8, MOD9, MOD10)
Name of holder of development consent / project approval:	Broken Hill Operations Pty Ltd
Mining Titles / Leases:	Consolidated Mining Lease 7 Mining Purpose Leases 183, 184, 185, 186
Name of holder of mining lease:	Broken Hill Operations Pty Ltd
Water licence:	85WA752823
Name of holder of water licence:	Broken Hill Operations Pty Ltd
AR Commencement Date: 01/01/2022	AR End Date: 31/12/2022
I, Devon Roberts, certify that this report is a true and accurate record of the compliance status of the Rasp Mine for the period 1 May 2021 to 30 April 2022 (Reporting Period as per DA 07_0018 Sch4 Cond3) and that I am authorised to make this statement on behalf of Broken Hill Operations Pty Ltd.	
Name of authorised reporting officer:	Devon Roberts
Title of authorised reporting officer:	Senior Environmental Advisor
Signature of authorised reporting officer:	
Date: 31 March 2023	

This page has been left blank intentionally.

CONTENTS

1. STATEMENT OF COMPLIANCE.....	9
1.1 Actions required from previous Annual Review	13
2. INTRODUCTION	14
2.1 Purpose.....	14
2.2 Location	14
2.2 Mine Level	15
2.3 Mine Contacts.....	15
3. APPROVALS, LICENCES AND PERMITS.....	16
3.1 Approvals.....	16
3.2 Rehabilitation Management Plan.....	17
3.3 Management Plans	17
4. OPERATIONS SUMMARY	17
4.1 Exploration	18
4.1.1 Surface exploration.....	18
4.1.2 Underground exploration	18
4.2 Construction	18
4.2.1 New buildings / structures.....	18
4.2.2 Roads and fencing.....	18
4.3 Mining.....	19
4.3.1 Mine access.....	19
4.3.2 Mining method and sequence	19
4.3.3 Void backfilling.....	19
4.3.4 Waste rock and void backfilling	19
4.3.5 Ore and waste stockpiles	19
4.4 Mineral Processing.....	22
4.4.1 Processing methods and rates.....	22
4.4.2 Mill operating hours	22
4.4.3 Mineral waste - tailings.....	22
4.5 Mining Fleet	23
4.6 Next Reporting Period.....	24
4.6.1 Construction	24
4.6.2 Exploration.....	24
4.6.3 Operations	25
4.6.4 Water structures - maintenance.....	25
4.6.5 Modification applications	25
5. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE.....	27
5.1 Meteorological.....	27
5.2 Environmental Monitoring Locations	28
5.3 Air Quality.....	28
5.3.1 In-stack air quality.....	31
5.3.2 Dust deposition gauges.....	31
5.3.3 High volume air samplers	37
5.3.4 TEOM monitors.....	46
5.4 Erosion and Sediment	51

5.5	Surface Water	51
5.5.1	Water containment structures	57
5.6	Groundwater	57
5.7	Contaminated Land.....	74
5.8	Hydrocarbon and Chemical Management	74
5.8.1	Fuel	75
5.8.2	Grease, oils and lubricants.....	75
5.8.3	Solvents.....	75
5.8.4	Processing reagent storage.....	75
5.9	Hazardous Material Management.....	75
5.9.1	Licensing	75
5.9.2	Dangerous goods management.....	75
5.10	Waste Management.....	76
5.10.1	Mineral wastes.....	76
5.10.2	Non-mineral waste	76
5.11	Flora and Fauna	77
5.12	Weeds.....	77
5.13	Blasting	77
5.14	Operational Noise	81
5.15	Visual, Stray Light.....	84
5.16	Indigenous Heritage	84
5.17	Natural and Social Heritage.....	84
5.17.1	Conservation management strategy	84
5.18	Spontaneous Combustion	84
5.19	Bushfire	84
5.20	Mine Subsidence.....	84
5.21	Methane Drainage/Ventilation	84
5.22	Public Safety	85
5.23	Radiation	85
6.	WATER MANAGMENT.....	85
7.	REHABILITATION	87
7.1	Buildings	87
7.2	Rehabilitation and Disturbed Land.....	87
8.	COMMUNITY RELATIONS.....	88
8.1	Environmental Complaints.....	88
	Date of Complaint	88
	Reason for Complaint	88
	Comment.....	88
8.2	Community Liaison	89
8.3	Community Support.....	90
9.	INDEPENDENT AUDIT	91
10.	INCIDENTS AND NON-COMPLIANCES	91
11.	ACTIVITIES PROPOSED IN THE NEXT REPORTING PERIOD.....	97

TABLES

Table 1-1 Statement of Compliance	9
Table 1-2 Non-Compliances	9
Table 2-1 Mine Contacts	16
Table 3-1 Rasp Mine - Current Approvals	16
Table 3-2 Status of Environmental Management Plans	17
Table 4-1 Production Summary – Cumulative	18
Table 4-2 Ore and Waste Summary for the Reporting Period.....	20
Table 4-3 Mineral Processing Summary for the Reporting Period	22
Table 4-4 Summary of Proposed (EA) and Actual Placement of Waste Rock and Tailings	23
Table 4-5 Mining Fleet	24
Table 4-6 Summary of Planned Production for next reporting period.....	25
Table 5-1 Summary of Wind and Rain Days in Reporting Period.....	27
Table 5-2 Summary of BHO Environmental Monitoring Program.....	28
Table 5-3 Vent and Baghouse Testing Results During the Reporting Period	31
Table 5-4 Dust Deposition Criteria	32
Table 5-5 Dust Deposition Results for the Reporting Period (g/m ² /month)	33
Table 5-6 Impact Assessment Criteria.....	37
Table 5-7 Surface Water Monitoring Requirements	51
Table 5-8 Stormwater Pond Water Quality Results for the Reporting Period.....	53
Table 5-9 Water Containment Structures	57
Table 5-10 Location and Function for Groundwater Monitoring Points	58
Table 5-11 Bore Piezometer Depths.....	59
Table 5-12 Piezometer Monitoring Results for the Reporting Period	61
Table 5-13 Groundwater Monitoring Results for Shaft 7 and Mine Dewatering 2022	69
Table 5-14 Non-mineral Waste Summary for reporting period	77
Table 5-15 Overpressure and Ground Vibration Western Min/Main Lodes (excluding Block 7)	78
Table 5-16 Overpressure and Ground Vibration Block 7 (includes Zinc Lodes)	78
Table 5-17 Western Mineralisation/Main Lodes Summary of Blasts 2022	79
Table 5-18 Western Mineralisation/Main Lodes Blasts > 5 mm/s for the reporting Period.....	79
Table 5-19 Block 7 (and Zinc Lodes) Summary of Blasts 2022.....	80
Table 5-20 Block 7 Blasts Exceeding 3 mm/s for Reporting Period	80
Table 5-21 Ground Vibration Results at Vibration Monitors for the Reporting Period.....	80
Table 5-22 Operational Noise Criteria	81
Table 5-23 Noise Monitoring Results.....	83
Table 5-24 Regulated Radiation Equipment.....	85

Table 8-1 Complaints register	88
-------------------------------------	----

FIGURES

Figure 2-1 Location Map – Plan 1	15
Figure 4-1 Plan 3 Mining Activities in the Reporting Period.....	21
Figure 4-2 Plan 3 - Long Section Planned Stopes for the Next Reporting Period.....	26
Figure 5-5-1 Weather Data for the Reporting Period.....	27
Figure 5-2 Location of Monitoring / Sampling Points	30
Figure 5-3 Monthly Total Deposited Dust for Results for the Reporting Period.....	34
Figure 5-4 Monthly Lead Deposition for the Reporting Period.....	34
Figure 5-5 Total Deposited Dust 2007 – December 2022	35
Figure 5-6 Total Deposited Lead 2007 to December 2022.....	36
Figure 5-7 HVAS TSP Results for the Reporting Period	38
Figure 5-8 HVAS TSP-Lead Results for the Reporting Period	38
Figure 5-9 HVAS TSP and TSP-Lead Results for the Period 2008 to 2022.....	39
Figure 5-10 HVAS1 PM ₁₀ Results for the Reporting Period	40
Figure 5-11 HVAS1 PM ₁₀ -Lead Results for the Reporting period.....	41
Figure 5-12 HVAS2 PM ₁₀ Results for the Reporting Period	41
Figure 5-13 HVAS2 PM ₁₀ -Lead Results for the Reporting Period	42
Figure 5-14 HVAS3 TSP Results for the Reporting Period	43
Figure 5-15 HVAS3 TSP-Lead Results for the Reporting Period	43
Figure 5-16 HVAS1 & HVAS2 PM10 Annual Average Results for the Period 2011 to 2022	44
Figure 5-17 HVAS1 & HVAS2 PM10-Lead Annual Average Results for the Period 2011 to 2022	44
Figure 5-18 HVAS & HVAS3 TSP Annual Average Results for the Period 2008 to 2022	45
Figure 5-19 HVAS & HVAS3 TSP-Lead Annual Average Results for the Period 2008 to 2022.....	45
Figure 5-20 TEOM1 PM ₁₀ 24-hour Average Results for the Reporting Period.....	48
Figure 5-21 TEOM2 PM ₁₀ 24-Hour Average Results for the Reporting Period	48
Figure 5-22 TEOM1 PM _{2.5} 24-hour Average Results for the Reporting Period	49
Figure 5-23 TEOM2 PM _{2.5} 24-Hour Average Results for the Reporting Period.....	49
Figure 5-24 TEOM1 & TEOM2 PM10 Annual Rolling Average for the Reporting Period.....	50
Figure 5-25 TEOM1 & TEOM2 PM10 Annual Rolling Average Results for the Period 2013 to December 2022	50
Figure 5-26 Groundwater Quality Results for the Period 2012 to December 2022	64
Figure 5-27 Shaft 7 & Mine Dewatering Results for Sampled Parameters - Period 2012 to Dec 2022	70
Figure 5-28 Noise Receptors.....	82

1. STATEMENT OF COMPLIANCE

Table 1-1 lists the development consent and mining leases and confirms compliance as at the end of the reporting period. **Table 1.2** lists the non-compliances with relevant approval conditions for the reporting period.

Table 1-1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	(Yes/No)
Project Approval 07_0018 (Consolidated MOD8)	No
Consolidated Mining Lease 7	No
Mining Purpose Lease 183	Yes
Mining Purpose Lease 184	Yes
Mining Purpose Lease 185	Yes
Mining Purpose Lease 186	Yes

Table 1-2 lists conditions that were identified as non-compliant and provides a comment outlining actions undertaken and where appropriate, addressed in this Annual Report. An Independent Environmental Audit was conducted in March 2022 and non-compliances were reported in the Annual Review for the period May 2021 to April 2022.

Table 1-2 Non-Compliances

Relevant Approval	Relevant Condition	Condition description (summary)	Compliance Status	Comment	Annual Review Section
PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	A severe weather event on the 12 January 2022 caused a temporary loss of power disruption to TEOM1 caused the Safety Switch Circuit Breaker to close at approximately 8pm and was not restarted until 8am the following morning. As a result of this the minimum data collection for the 24-hour period was not achieved and BHOP was non-compliant with Schedule 3 Condition 3 Table 2 of PA07_0018.	10
PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	A severe weather event on the 28 February 2022 caused a temporary loss of power disruption to TEOM2 caused an extended power disruption to central Broken Hill and infrastructure at the northern end of the mine site, TEOM2 was affected by this. Power was lost at approximately 7:25pm and wasn't restored until 10am the following morning. As a result of this the minimum data collection for the 24-hour period was not achieved and BHOP was non-compliant with Schedule 3 Condition 3 Table 2 of PA07_0018.	10

PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	On 4 March, during the monthly changeover of depositional dust gauges it was found that the jar in DDG2, located in the Essential Water compound at Block 10, was cracked. This damage is believed to be as a result of the storm that passed through Broken Hill on 28 February 2022. The damage to collection jar rendered the sample void and no sample was recorded for DDG2 over this period, hence, a non-compliance was recorded against PA07_0018 Schedule 3 Condition 3.	10
PA07_0018	Schedule 2 Condition 1	The Proponent shall implement all reasonable and feasible measures to prevent material harm to the environment as a result of the project.	Non-compliant	On 10 March 2022 during an inspection of S49, seepage was observed extending approximately 4m beyond the boundary fence. The seepage occurred as a result of rain on the 28 February and a lack of equipment to move water out of the pond. This	10
PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	Depositional Dust Gauge 7 located at Blackwood TSF2 was collected on 4 April, as per monitoring protocols. It was packaged in the foam boxes in which they were supplied to BHOP and forwarded to ALS Newcastle for analysis. Upon arrival at the laboratory the lid was damaged, likely to have occurred in transport.	10
PA07_0018	Schedule 2 Condition 1	The Proponent shall implement all reasonable and feasible measures to prevent material harm to the environment as a result of the project.	Non-compliant	During an inspection of the storm water storage pond S14 on 28 April seepage was observed flowing into decommissioned transformer cells on a neighbouring uninhabited industrial block, into a vacant residential block and onto Eyre Street.	10
PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	On Tuesday 31 May 2022, TEOM1 was without power for much of the period between 8:00 AM and 4:30 PM due to planned power outages in South Broken Hill. Hence only 67% of the day was monitored and not the required 75%.	10

PA07_0018	Schedule 2 Condition 1	The Proponent shall implement all reasonable and feasible measures to prevent material harm to the environment as a result of the project.	Non-compliant	On 30 July 2022 a join in the poly pipe that was being used in the transfer water out of the Mill Overflow pond had failed during the night, discharging water onto the Mill road. This water has subsequently seeped through the external boundary bund, discharging approximately 15,000L of water off site.	10
PA07_0018	Schedule 2 Condition 1	The Proponent shall implement all reasonable and feasible measures to prevent material harm to the environment as a result of the project.	Non-compliant	On 31 October 2022 oil-contaminated run-off from a disused tank at the rear of the BHO Store building was discovered leaving site.	10
PA07_0018	Schedule 3 Condition 18	The Proponent shall ensure that blasting on the site does not cause exceedances of the criteria in Tables 8 and 9.	Non-compliant	On the morning of Friday 22 July 2022 at 6:58am production blasting occurred in Block 7, this blasting resulted in a ground vibration peak particle velocity of 7.75m/s recorded at the V4 Bowls Club blast monitor. This has been the only blast in Block 7 during the reporting period. Hence, BHOP is non-compliant against PA07_0018 Schedule 3 Condition 18 requirement for no more than 5% of blasting in Block 7 to exceed 3mm/s ground vibration peak particle velocity over a 12 month period.	10
PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	At approximately 12:20am on 1 October 2022 an unidentified individual disconnected power to the TEOM2 enclosure situated on Embankment 2 of TSF2 Blackwoods Pit. As TEOM2 was not collecting data for 6 hours and 40 minutes, the data capture from TEOM2 for the 24-hour period was below the required 75% or 18 hours.	10
PA07_0018	Schedule 3 Condition 3 Table 2	The Proponent shall ensure that all reasonable mitigation measures are employed so that particulate matter emissions generated by the project do not cause an exceedance of the criteria listed in Tables 1, 2 or 4 at any residence on privately-owned land.	Non-compliant	On 12 October 2022 at approximately 2:20pm the Silver Tank High Volume Air Samplers had lost power after a power surge and did not conduct a full monitoring event.	10

PA07_0018	Schedule 2 Condition 1	The Proponent shall implement all reasonable and feasible measures to prevent material harm to the environment as a result of the project.	Non-compliant	On 24 December 2022, whilst depositing tailing into TSF2, a rat hole (flow pathway) developed in the south western side of the facility that resulted in water and tailing reporting on the downstream side at the base of the historic waste dump abutting the mine lease. The offsite release resulted in approximately 200m ³ of tailing being discharge off site and affected one neighbouring residence.	10
-----------	---------------------------	--	---------------	--	----

1.1 Actions required from previous Annual Review

Item	Action	Status
1	Review strategies, plans, and programs required under the consent.	Incomplete - under review for MOD 10
2	Make a copy of the Audit Report, including response to audit actions, available on the company website.	Complete

2. INTRODUCTION

2.1 Purpose

The Annual Review (AR) documents the environmental performance of the Rasp Mine for the reporting period 1 January 2022 to 31 December 2023. It has been prepared in accordance with the NSW Government *Post-approval requirements for State significant mining developments - Annual Review Guideline*, October 2015 to meet the requirements of the relevant mining leases, Project Approval 07_0018, and EPL 12559.

2.2 Location

The Rasp Mine is owned and operated by Broken Hill Operations Pty Ltd (BHO), a wholly owned subsidiary of CBH Resources Ltd (CBH). The Mine is located on Consolidated Mine Lease 7 (CML7) within the City of Broken Hill and includes several Mining Purposes Leases (183,184,185 and 186) with the entire Project extending over Western Land Leases and freehold properties.

The Rasp Mine consists of underground mining operations, a processing plant producing zinc and lead concentrates, a rail siding for concentrate dispatch to shipping facilities within Australia as well as other mining ancillary facilities. In the reporting period all concentrate product was placed in sealed containers and transported by rail to either the Port of Newcastle NSW or smelter operations in Port Pirie SA. Rasp Mine is approved to produce 500,000 tpa of ore and 8,450,000 tonnes of ore over the life of the Project to December 2026.

The Mine is located centrally within the City of Broken Hill (

Figure 2-1) and is surrounded by transport infrastructure, areas of commercial and industrial development and some residential housing. The Mine is bounded by Eyre Street to the south east, Perilya Broken Hill Operations Pty Ltd (Perilya) North Mine to the east and Perilya's South Mine to the west, and the commercial centre of Broken Hill to the north. Two major State roads dissect CML7 - South Road (Silver City Highway SH22) to the southwest and Menindee Road (MR66) to the northeast. These roads form part of the existing road train and B-double routes through Broken Hill. Mawson's Quarry lies to the east of the existing processing plant. The Broken Hill railway station is located within CML7 on a surface exclusion with the main Sydney – Perth railway line also located within the Lease on various surface exclusions. Residential and commercial areas surround the mine with pastureland to the southeast. An aerial view of CML7 is provided in **Plan 1, Figure 2-1**.

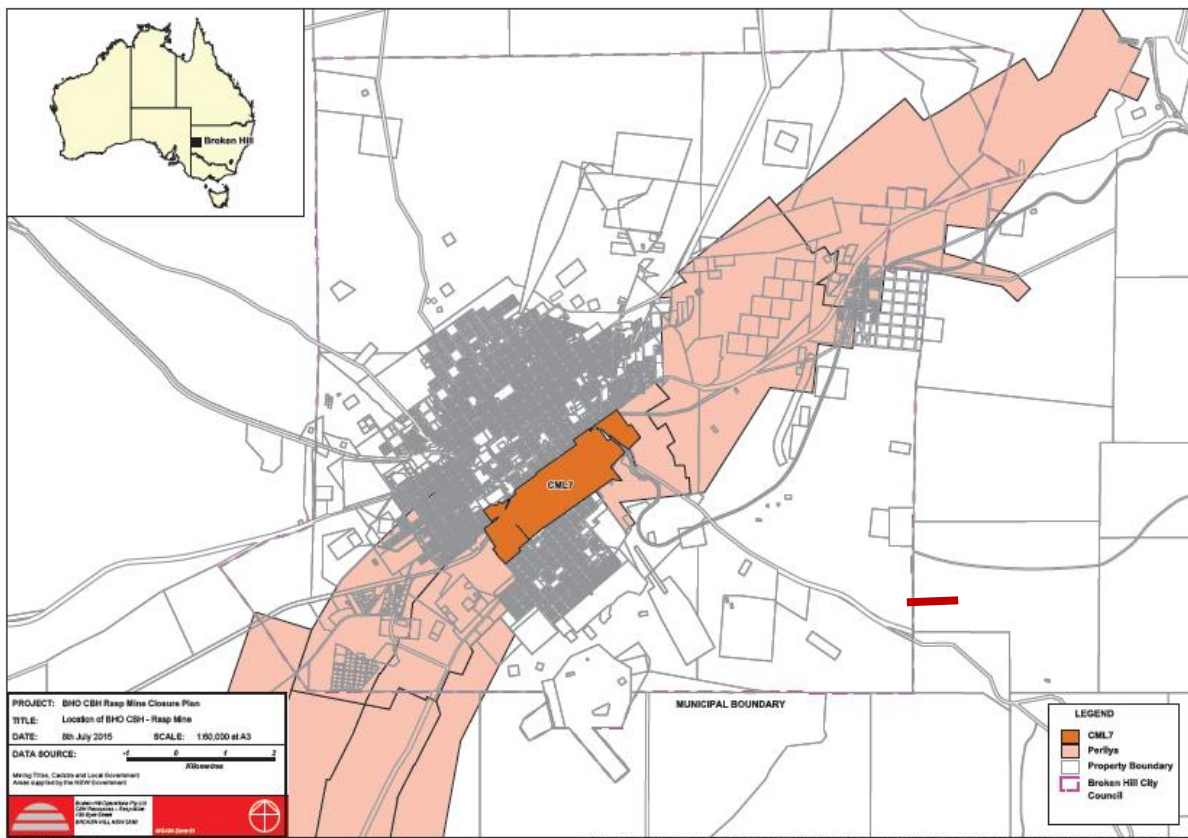
The mining leases occupy a central region of the historic Broken Hill Line of Lode ore body incorporating the original mine areas that commenced operations in the 1880s including a substantial amount of mining infrastructure from various mining phases. The Mine was the birthplace of Broken Hill Pty Ltd (BHP) in 1885. Subsequently several mining companies, including Broken Hill South and Minerals Mining and Metallurgy Ltd (MMM), have operated the mine. This past mining has left the mining lease highly modified and disturbed. The original landform has been significantly altered, the majority of native vegetation removed and soils have been degraded and covered with waste rock.

There are a number of heritage items on the site relating to historic mining activities and the site is recorded on the Register of National Estate for its heritage values. The people of Broken Hill consider the mine as an important historic site for its role in Broken Hill's history. The Broken Hill Miners Memorial and Broken Earth Café are located centrally within CML7.

The Project Area includes additional areas to the south-east located on Western Land leases or freehold properties owned or leased by BHO (highlighted in orange). Located in this area are the current Rasp Mine administration offices and stores.

The AR is distributed to a range of stakeholders that include government authorities and is available on the CBH website at: www.cbhresources.com.au.

Figure 2-1 Location Map – Plan 1



2.2 Mine Level

The Rasp Mine is classified as a Level 1 Mine and in 2018 it was transitioned to a State Significant Development under the *EP&A Act* with development consent determined and authorised by the Minister for the Department of Planning and Environment.

2.3 Mine Contacts

Table 2-1 outlines the contacts for the Rasp Mine.

Table 2-1 Mine Contacts

Name	Title	Contact Details
Giorgio Dall'Armi	BHO General Manager Rasp Mine, Exploration and Strategy	
Carlos Vanegas	BHO Operations Manager	
Joel Sulicich	BHO HSET Manager	
Devon Roberts	BHO Senior Environmental Advisor	
Jacinta Clark	BHO Environmental Graduate	
Complaints Line	Health, Safety and Environment Office	

3. APPROVALS, LICENCES AND PERMITS

3.1 Approvals

Table 3-1 provides a list of all current development consents, mining leases and licences held by the Rasp Mine.

Table 3-1 Rasp Mine - Current Approvals

Approval Number	Date Issued	Expiry	Purpose
Project Approval 07_0018 (Part 3A)	31 Jan 2011	31 Dec 2026	Mining production of 750,000 tpa from Western Mineralisation, Centenary Mineralisation and Main Lode Pillars. Construction and operation of minerals processing plant and rail load out facility. Supported by an EAR and PPR. MOD1 – relocation of primary ventilation shaft (March 2012) MOD2 – 24 hour operation of crusher (August 2014) MOD3 – Mining of Block 14 (Zinc & Main Lodes) (March 2015) MOD4 – Installation of Concrete Batching Plant and Extension to TSF2 (September 2017) MOD5 – Warehouse Extension, Cement Silo and adjustment of air quality monitoring (October 2018) MOD6 – New Tailing Storage Facility and Mine Portal (March 2022) MOD7 – Utilise, crush and screen waste rock in BHP Pit for Embankments construction (July 2019) MOD8 – Mining under a Perilya Sublease (April 2021) MOD9 – Extension of Underground Exploration (December 2021) MOD10 – Temporary tailings placement in TSF2 (December 2022)
CML7	17 Jan 2007	31 Dec 2026	Granted 8 Oct 1987. As per Schedule 2 of the Lease - Open cutting, shaft sinking, stoping, tunnelling, building of dams, extraction and obtaining minerals, generation of electricity, erecting dwellings, storage of fuels, dumping of ore, treatment and dumping of tailing, development of roads
MPL 183	24 Apr 2007	31 Dec 2026	Granted 4 Feb 1981. Dumping of ore and mine residues, treatment of tailing
MPL 184	24 Apr 2007	31 Dec 2026	Granted 4 Feb 1981. Dumping of ore and mine residues, treatment of tailing
MPL 185	24 Apr 2007	31 Dec 2026	Granted 4 Feb 1981. Dumping of ore and mine

Approval Number	Date Issued	Expiry	Purpose
			residues, treatment of tailing
MPL 186	24 Apr 2007	31 Dec 2026	Granted 4 Feb 1981. Dumping of ore and mine residues, treatment of tailing
EPL 12559	EPA	Upon surrender, suspension or revocation.	Authorises the carrying out of scheduled activities: Crushing , grinding or separating >500,000 – 2,000,000T processed. Mining for minerals >500,000 – 2,000,000T produced.
Dangerous Goods Explosives	Work Cover	24 Oct 2027	Store Manufacture
Refrigerant	Refrigerant Trading Council	27 Mar 2025	Use of refrigerant
Water extraction 85WA752823	NOW	29 Mar 2027	To extract 370 ML for use on site or to send to Perilya Broken Hill Operations Pty Ltd.
Radiation #5063802	EPA	26 July 2023	Sell and/or possess radiation apparatus. Sell and/or possess radioactive or items containing radioactive substances.

3.2 Rehabilitation Management Plan

The Rasp Mine has a Rehabilitation Management Plan available on the company website.

3.3 Management Plans

The Rasp Mine has developed a number of environmental management plans as required by PA07_0018. **Table 3-2** provides a list of these Plans together with the date last updated.

Table 3-2 Status of Environmental Management Plans

Environmental Management Plan	Condition	Updated
Environment Management Strategy	Sched 4 Cond 1	04-Mar-22
Air Quality Management Plan	Sched 3 Cond 11	04-Sep-22
Community Lead Management Plan	Sched 3 Cond 13	03-Mar-22
Noise and Blast Management Plan:		
- Noise Management Plan	Sched 3 Cond 20	04-Mar-22
- Technical Blasting and Vibration Management Plan		04-Aug-22
Site Water Management Plan	Sched 3 Cond 23	04-Mar-22

4. OPERATIONS SUMMARY

During the reporting period, the Project Approval was modified twice:

- MOD6 to permit the construction of a new mine portal, Kintore Pit TSF (TSF3), conducting tails harvesting for removal of tails from TSF2 and emplacement in TSF3, and conduct capping of surface areas to progress rehabilitation; and
- MOD10 to permit temporary placement of dried tailings in TSF2.

Construction of the TSF2 Embankment Stage 2 (Embankments 1 and 3) was completed in July 2021.

Table 4-1 outlines the production summary for the reporting period.

Table 4-1 Production Summary – Cumulative

Material	Approved Limit	At end of April 2022 (end previous reporting period)	End of reporting period
Waste rock	NA	3,154,662	3,417,305
Ore	500,000	6,046,645	6,432,905
Processing waste (Tailings)	NA	5,261,606	5,600,206
Product (Concentrates)	NA	725,644	774,304

4.1 Exploration

4.1.1 Surface exploration

The primary exploration focus remained on underground diamond drill testing for continuations/extensions of both the Western Mineralisation and the Main Lode remnant zones. Surface exploration programs targeting the Centenary, Blackwoods and Thompson areas was conducted in the period.

The program was located on land already disturbed by historic mining and no vegetation was removed. Top soils had already been removed from the area by historic mining activities. The drill pads were installed off existing tracks with minimal earthworks required.

No surface rehabilitation activities were undertaken on CML7 during the reporting period as the drill pads were still operational, although drill holes have been capped.

In the next reporting period, surface exploration will target the Western Mineralisation, Main Lode, including Thompsons, Blackwoods and other northern ore deposits.

4.1.2 Underground exploration

During the reporting period, 35,382 m of underground diamond drilling was completed.

The 2023 program will continue to focus on the Western Mineralisation including Siberia and Blackwoods North.

4.2 Construction

4.2.1 New buildings / structures

No new buildings were constructed in 2022.

Construction of the TSF2 cell embankments and surface water storage pond, as approved in MOD6, began in 2022.

4.2.2 Roads and fencing

No new roads were constructed in the reporting period.

Routine maintenance of roads was undertaken as required which includes the application of dust suppressant to infrequently used roads.

Boundary fencing was also inspected and repaired.

4.3 Mining

4.3.1 Mine access

All mining is undertaken underground accessed via the existing portal located at the northern end of Kintore Pit. Mining activities included mining of the Western Mineralisation, Main Lode Pillars and Zinc Lode.

Mining activities were undertaken as follows and met the requirements of the Project Approval:

- Underground operations, 24 hours per day, 7 days per week;
- Truck haulage of ore from underground to ROM Pad 24 hours per day, 7 days per week;
- Production rock blasting between 6.45 am to 7.15 pm, 7 days per week;
- Development blasting concurrently with production blasting where practicable;
- Ventilation fans, 24 hours per day, 7 days per week;

4.3.2 Mining method and sequence

A variety of production methods are utilised, including open stoping (OS), uphole benching, room and pillar and uphole pillar retreat mining. OS is the most prevalent method used in the Western Mineralisation, uphole stoping (with room and pillar) and uphole pillar retreat in the Main Lode Pillars.

The ore was blasted using a bulk emulsion explosive and extracted using load haul dump vehicles (LHD's) either conventionally or under remote control and transported to loading points where mine trucks transported ore to the ROM pad.

A total 432,905t of ore from 51 stopes was mined during the reporting period. This resulted in approximately 9,620 truck movements to the ROM pad. **Figure 4-2** provides a long section indicating location of the stopes mined. A vertical distance of 64 m was maintained (in the Zinc Lodes) from South Rd/Bonanza Street.

4.3.3 Void backfilling

Waste rock was used to backfill mined out stopes with a total of 171,617 t placed during the reporting period. This includes Cemented Rock Fill where conditions and requirements dictate its use.

4.3.4 Waste rock and void backfilling

Waste rock is generated from underground mining operations and is predominantly used underground for backfilling stopes and maintenance of underground roads. During the reporting period 341,782 t was extracted as waste, 171,617 t of waste rock was returned underground as void fill, and 170,165 t to surface pits. At the end of the reporting period, the waste stockpile in Kintore Pit held approximately 1,200,000t and BHP Pit held approximately 200,000t.

Waste rock is also used for road making and repairs underground.

Block modelling is used to identify underground waste material sources. Underground diamond drilling results and assays assist the geological technicians to identify waste materials earmarked for surface.

4.3.5 Ore and waste stockpiles

Ore mined in the reporting period (432,905 t) was transported by truck and stored on the ROM Pad before being processed. The ROM Pad is 32m by 80m and is surrounded by 5 m windbreaks. Water application was used to control dust. No more than a week's processing was stored on the ROM stockpile at any one time. Mined ore in the period (432,905 t) was below the approved maximum rate of 500,000 t/pa.

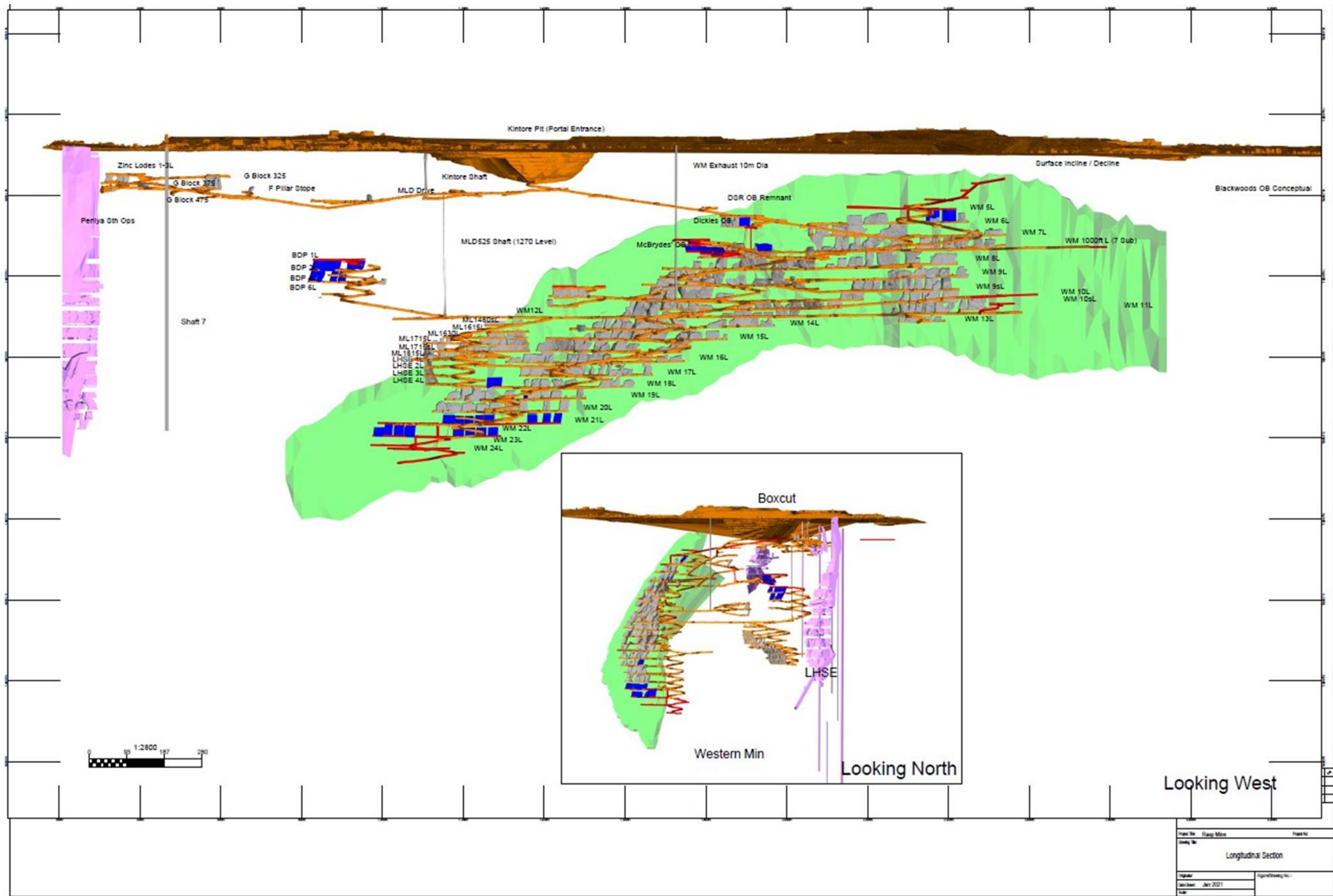
A total of 170,165 t of waste was hauled to the surface from underground during the reporting period and stored in Surface Pits totalling approximately 1,400,000t stored.

Ore and waste production for the reporting period is summarised in **Table 4-2 Ore and Waste Summary for the Reporting Period** .

Table 4-2 Ore and Waste Summary for the Reporting Period

Item	Total Production Tonnes
Topsoil Stripped	N/A
Topsoil Spread	N/A
Ore Tonnes Mined: Dry Tonnes	432,905
Waste Backfill (UG voids): Tonnes	171,617
Waste Trucked to Pits	170,165

Figure 4-1 Plan 3 Mining Activities in the Reporting Period



4.4 Mineral Processing

4.4.1 Processing methods and rates

All mined ore is processed on site in the processing plant. This consists of a single stage crushing circuit with a two stage Semi-Autogenous Grind (SAG) – Ball milling circuit capable of processing ore at the required rate and to the required grind size. Material then passes through differential flotation, which incorporates conventional roughing, scavenging and multi-stage cleaning and includes concentrate regrind, to separate lead and zinc concentrates. Concentrates are dewatered using thickeners and pressure filtration. The filtered concentrates are conveyed directly into containers and sealed. The concentrate is stored in these sealed containers in readiness for loading onto rail wagons for transport to the Aurizon-owned ship loader in Newcastle, NSW or to the Nyrstar Pty Ltd smelter at Port Pirie, SA. In the period all zinc concentrate was sent via rail to the ship loader, and all lead concentrate was sent via rail to the smelter.

Reagents used in the process included pulp pH modifier, flotation frothers, collectors, activators and depressants, used in various combinations in the lead and zinc flotation circuits. Flocculants are used in concentrate and tailing dewatering.

With MOD6 approval, the capacity of TSF2 is extended by employing tailings harvesting with deposit to Kintore Pit TSF3. MOD10 has approved dry stacking of tailings in the western end of TSF2 until TSF3 preparations for accepting tailings is completed.

A summary of mineral processing production rates for the reporting period is presented in **Table 4-3**.

Table 4-3 Mineral Processing Summary for the Reporting Period

Activity	Total in reporting period (t)
Milled	420,294
Lead concentrate	17,140
Zinc concentrate	33,741
Tailings deposited	369,413
Tailings Storage Facility (TSF2) storage capacity as at end of period	To Dec 2026 as per PA with storage and harvesting operations

4.4.2 Mill operating hours

The processing plant operates 24 hours per day in accordance with the Project Approval. Schedule 3 Condition 16 places a restriction on milling activities - (b) *shunting of concentrate wagons shall only occur between 7:00am and 6:00pm on any day*. No shunting of concentrate wagons occurs during the loading or unloading of concentrate containers. Concentrate trains are moved into and out of the loading area by Pacific National operators as one unit and no reordering of wagons occurs. Pacific National conducts this activity twice per week taking 10 to 15 minutes, following inspection of the connection and state of the wagons. Once loaded, the train departs in the same direction as arrival. During the reporting period there were no community complaints related to this activity.

In July 2020 due to operational changes the Mill began operating on a 8 day on/6 day off campaign.

4.4.3 Mineral waste - tailings

All tailings generated from the processing plant are deposited into Blackwood Pit (TSF2). Tailings from the flotation process are pumped to and deposited in one of three cells in TSF2 via a duty/standby configuration of centrifugal pumps. Particle solids settle out of the slurry stream along the length of each TSF2 cell in a north-easterly direction. Any excess water is pumped back into the process water tank via a mobile diesel water pump.

During the reporting period, 369,413t of tailings were pumped to TSF2, on average the tailings contained zinc (0.74%), lead (0.37%), copper (0.02%), Ag (8g/t), and Fe (2.97%).

In the initial Project Approval, BHO underestimated the amount of mine development that was required to access the Main Lode and Western Mineralisation ore bodies. The need to undertake more underground mining development than anticipated has reduced the capacity of underground voids to accept both waste rock and tailings material from the Backfill Plant. In the original EA, it was predicted that approximately 250,000 t of waste rock would be produced each year for a production rate of 750,000 t of ore. BHO has chosen to place the additional waste rock underground to fill voids and stopes, as it is more economical to dispose waste rock underground if possible rather than transporting waste to the surface. Hence, there is no void space underground for the backfill of tailings.

BHO also opted to only deposit tailings in TSF2 as this facility had greater capacity and was economically more viable. In 2024, BHO will deposit tailings in TSF3 Kintore Pit.

Table 4-4 shows past and proposed tailings deposition and waste rock production rates.

Table 4-4 Summary of Proposed (EA) and Actual Placement of Waste Rock and Tailings

Period	EA Tailings in Underground back fill per year (t)	EA Tailings deposited in TSF1 (t)	EA Tailings deposited in TSF2 (t)	EA Waste Rock U/G (t)	Actual ¹ / Predicted ² Tailings in TSF2 (t)	Actual waste rock placed underground (t)	Actual waste rock stored Kintore Pit (t)	Actual Total waste rock (t)
2012	97,969	273,281	0	250,000	322,111 ¹	47,527	150,000 ³	197,527
2013	195,938	195,138	0	250,000	574,833 ¹	230,607	150,000 ³	380,607
2014	195,938	195,138	0	250,000	486,749 ¹	223,473	163,304	386,777
2015	216,563	216,563	0	250,000	499,598 ¹	223,611	228,942	452,553
2016 ¹	247,500	88,281	159,219	250,000	555,837 ¹	265,369	96,888	362,257
2017 ¹	292,475	0	278,438	250,000	622,161 ¹	215,897	76,578	292,475
2018 ¹	309,375	0	309,375	250,000	644,828 ¹	332,702	121,864	444,566
2019 ¹	309,375	0	309,375	250,000	578,472 ¹	357,792 ²	134,706 ¹	492,792 ¹
April 2021 ¹	309,375	0	309,375	250,000	469,049 ¹	318,816	-	338,220
April 2022	309,375	0	309,375	250,000	392,600	197,140	83,923	281,063
May – Dec 2022	206,250	0	206,250	250,000	369,413	114,571	148,072	262,643
TOTALS	2,690,133	968,401	1881,407	2,750,000	5,413,302	2,833,356	1,438,891	4,028,644

Note¹: Actual tailings deposited.

Note²: Predicted .

Note³: Estimated from visual inspection at the time.

4.5 Mining Fleet

Table 4-5 lists the mining fleet as at the end of the reporting period.

Table 4-5 Mining Fleet

Vehicle Category	Number	Vehicle Category	Number
Jumbo drill	2	Grader	1
Production Drill	1	Excavator	1

Haul Truck	2	Service Vehicle	2
Load Haul Dump	4	Wheel Loader	2
Explosive Charger	2	Prime Mover	2
Forklift IT	6	Light Vehicle	34

4.6 Next Reporting Period

4.6.1 Construction

The next reporting period will see BHO continuing Boxcut and TSF3 construction works as approved under MOD6, and storage of tailings in TSF2 as approved in MOD10.

4.6.1.1 MOD4 TSF2 water spray system

The water spray system that was designed and approved as part of MOD4 has been partially installed at the end of the previous reporting period. It is expected that the system will be installed and operational in 2023. The spray system has been redesigned to complement the MOD6 TSF2 harvesting and will also incorporate the MOD10 tailings storage arrangement.

4.6.1.2 MOD 10

Development consent (PA07_0018) MOD 10 was granted in December 2022. This development allows BHO to dry stack tailings in the western end of TSF2 while TSF3 Kintore Pit is being prepared to receive tailings and waste rock.

4.6.1.3 MOD 6

Development consent (PA07_0018) MOD6 was granted on 16 March 2022. This development would see BHOP establish Kintore Pit as a new Tailings Storage Facility (TSF3). In order for this to occur, a new mine portal and access decline will be developed and TSF2 will be redeveloped to allow tailings drying and harvesting for final deposition in Kintore Pit.

Golder Associates (Tailings Storage Facility Options Assessment, September 2017) were engaged to investigate potential sites in and around Rasp Mine for establishment of a new tailing storage facility, concluding that Kintore Pit is the most suitable site. It was established that in order to reduce the risk of inrush to the underground workings, tailings would need to be dewatered further than 35% as is output by milling processes, leading to the decision to dry (naturally) and harvest tailings.

As part of MOD6 approval BHOP will begin monitoring for PM_{2.5} as well as continuing to monitor PM₁₀ and TSP. Noise monitors will be installed on TSF1 to monitor noise from excavation and construction of the boxcut.

4.6.2 Exploration

During 2023, exploration on CML7 will continue to focus on:

- (a) Western Mineralisation:-
 - Extension and infill from 23 through 26 Levels
 - Centenary Mineralisation
 - 15-16L WME Splay
 - Far North Extensions
- (b) Main Lode Mineralisation:-
 - Deep Lead Target
 - McCullochs Extension
 - Patterson's Splay Target
 - Block 11 Close Off
- (c) Surface Exploration: -
 - Western Mineralisation (northern and southern extensions)

- Centenary Mineralisation
- Blackwood's North
- Thompson's North
- Northern Main Lode (Browne's)
- Main lode remnant exploration

4.6.3 Operations

Table 4-6 outlines the planned production rates for 2023. **Figure 4-2** shows the mining areas and stopes. Planned mine production is estimated at 454,218t, tailings deposition is estimated at 392,600t.

Table 4-6 Summary of Planned Production for next reporting period

Activity	Next reporting period (t)
Ore Mined	443,839
Waste Backfill (UG Rock Places)	149,445
Waste Trucked to Surface	158,000
Milled	387,260
Lead concentrate	14,980
Zinc concentrate	33,680
Tailings deposited	338,600
TSF2 storage capacity as at end of period	0.5 years
TSF3 storage capacity as at end of period	13 years

4.6.4 Water structures - maintenance

Surveying of the water storage structures were conducted in 2018.

Inspections of storages for sediment build-up were conducted in 2018 and sediment removal was conducted in sediment pond 17A and Horwood's Dam in 2019. The material recovered from Horwoods Pond was disposed of in the north-eastern end of TSF2 in 2020.

With the construction of Kintore Pit TSF3 an new repository for potentially contaminated sediment will become available.

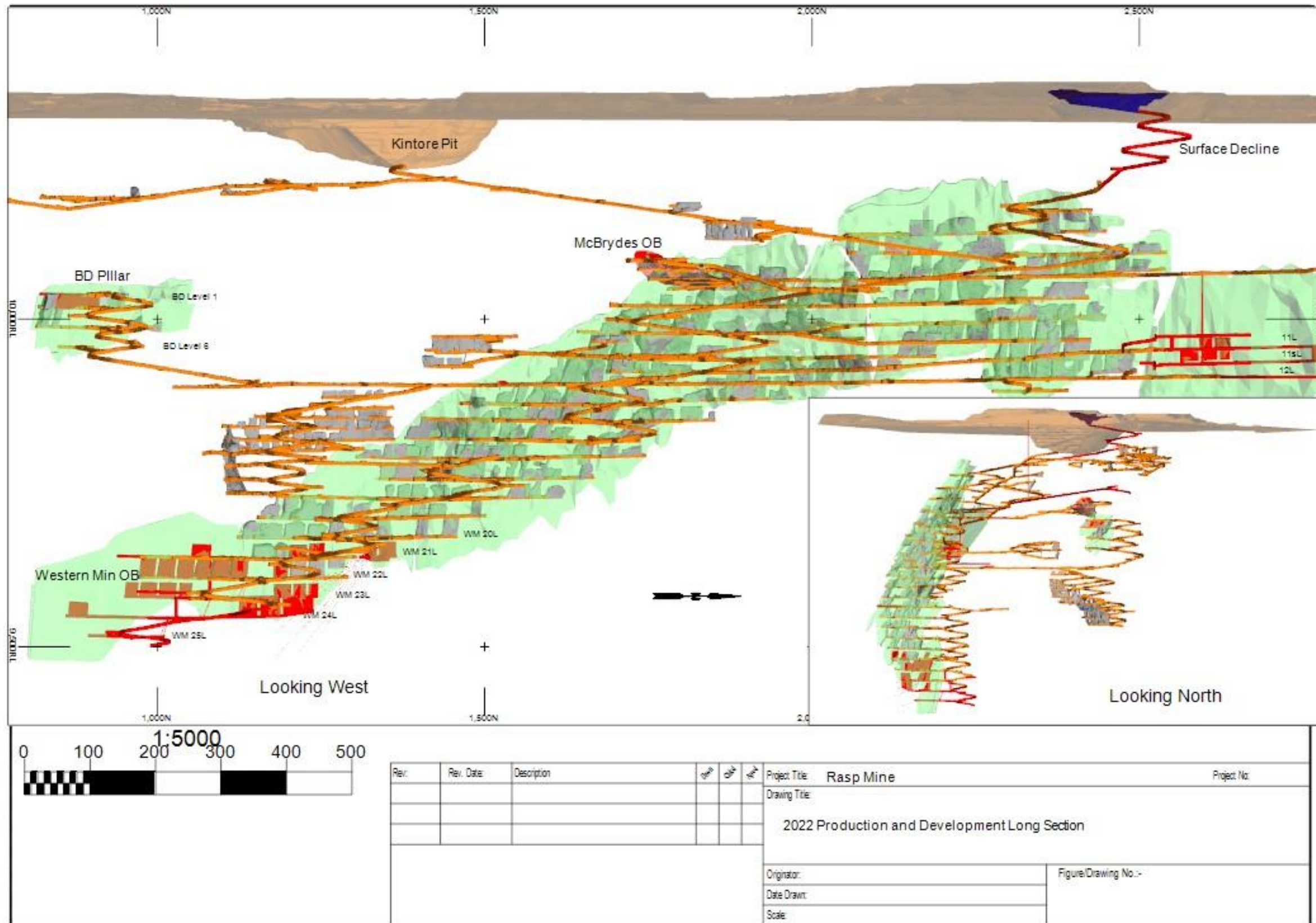
Electric pumps were installed at the S14 and S17 water storage ponds to enable 24-hour transfer of water to Horwoods and S22 storage ponds.

A seepage interception trench was constructed outside the S14 pond after a seepage event in April 2022.

4.6.5 Modification applications

In 2023, BHO will apply for modification (MOD11) of the project to the installation of a new ventilation raise to provide adequate ventilation to northern areas of the mine and conduct further underground development of northern areas of the mine.

Figure 4-2 Plan 3 - Long Section Planned Stopes for the Next Reporting Period



5. ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

5.1 Meteorological

Figure 5-5-1 and

Table 5-1 provide summary weather data. This data is a combination of information from the Rasp Mine weather station and the Bureau of Meteorology station (for rain days and rainfall).

Temperatures and rainfall in the reporting period remained consistent with the BoM's long-term averages, with rainfall (373.6mm) for the period was higher than the BoM's long-term annual average of 246mm. There were 59 rain days for the period. Winds were predominantly from the south with high winds experienced throughout the year.

Figure 5-5-1 Weather Data for the Reporting Period

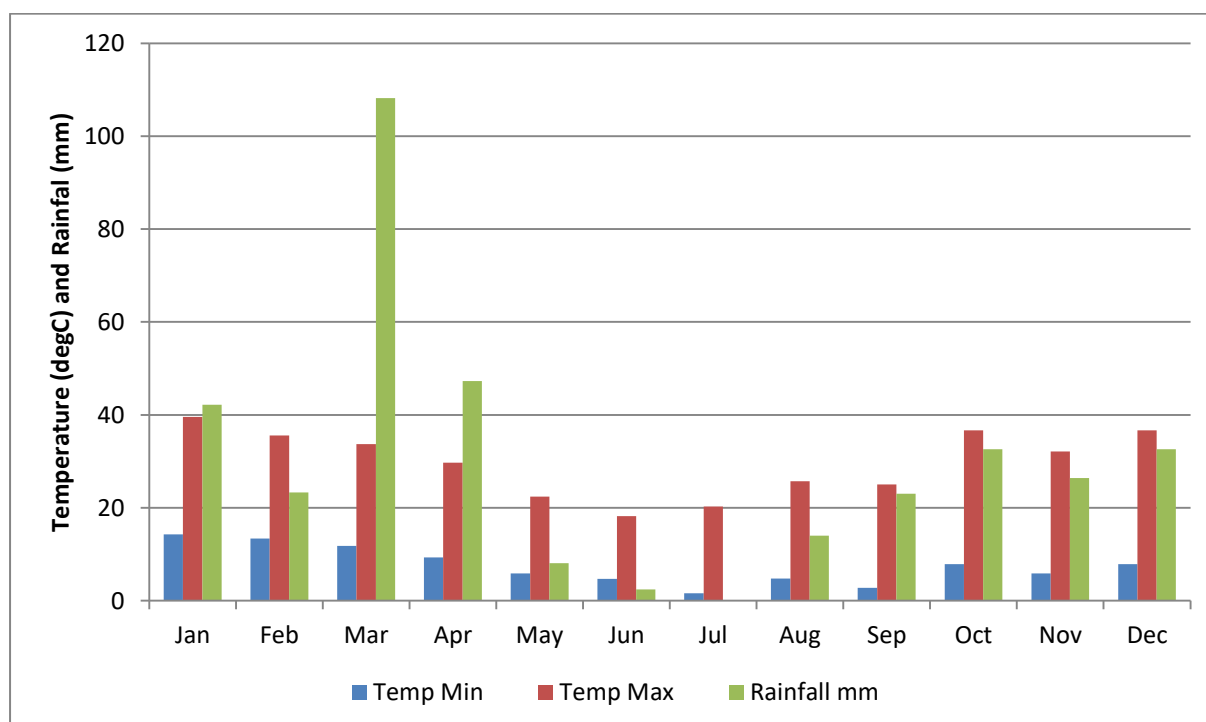


Table 5-1 Summary of Wind and Rain Days in Reporting Period

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Predominant Wind Direction	SSE	SE	SSE	SE	SSE	SW	SSE	SW	S	SE	SSE	SSE
Max wind speed (km/hr)	54.0	49.1	49.1	51.5	52.7	58.6	41.8	56.2	43.5	50.4	64.2	50.4
Days rained in month	7	3	3	5	5	2	0	7	6	8	5	8

5.2 Environmental Monitoring Locations

The BHO site environmental monitoring program is summarised in **Table 5-2**, locations for sampling/monitoring points are shown in **Figure 5-2**. A new weather station was installed on site in January 2019 as the previous weather station could not calculate Sigma Theta, a requirement of EPL 12559.

Table 5-2 Summary of BHO Environmental Monitoring Program

EPA ID	BHO ID	Parameter	Frequency
AIR QUALITY			
1	Primary Vent Shaft	- Oxides of Nitrogen (as NO ₂) - Total solid particles (TSP) - Volatile organic compounds - Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, V	Quarterly (at blasting event)
2	Crusher Baghouse Stack	- Total solid particles (TSP) - Total - Sb, As, Cd, Pb, Hg, Be, Cr, Co, Mn, Ni, Se, V	Quarterly
3 - 9	D1 – D7	Insoluble solids, Lead	Monthly
10, 57	TSP-HVAS	Total Suspended Particulate, Lead on filter paper	Every 6 days
11, 12	HVAS1 & 2	PM10, Lead on filter paper	Every 6 days
13, 14	TEOM 1 & 2	PM10, PM 2.5	Continuous
SURFACE WATER			
29 - 36	S31-1, 44, 49, 1A, 9B-2, Horwood Dam, Upstream and Downstream	pH, EC, TDS, SO ₄ , Cl, Na, Cd, Pb, Mn, Zn	When contain water (at least 2 per 12 mths)
GROUNDWATER			
37 - 52	GW01 – GW16	pH, EC, TDS, SO ₄ , Cl, Ca, Mg, Na, Fe, Cd, Pb, Mn, Zn	Quarterly
53, 54	Shaft 7 & Kintore Pit extraction	pH, EC, TDS, SO ₄ , Cl, Ca, Mg, Na, Fe, Cd, Pb, Mn, Zn	Quarterly
NOISE & BLASTING VIBRATION			
15 - 28	A1 – A14	Leq, 15min/Day Leq, 15min/Evening Leq, 15min/Night	Annually
V1 – V5	V1 – V5	dB mm/ second	Continuous (when blasting)
-	V6	dB mm/ second	Continuous (when blasting)
WEATHER			
55	Meteorological Station	Temperature, wind speed & direction, rainfall, Sigma Theta	Continuous (15 minute intervals)

The following sections provide a summary of these monitoring requirements together with the results for the reporting period. A discussion of any identified trends and a comparison with predictions in the original EA/PPR are also provided where available.

5.3 Air Quality

In accordance with the conditions of PA07_0018 and EPL12259 air quality is monitored:

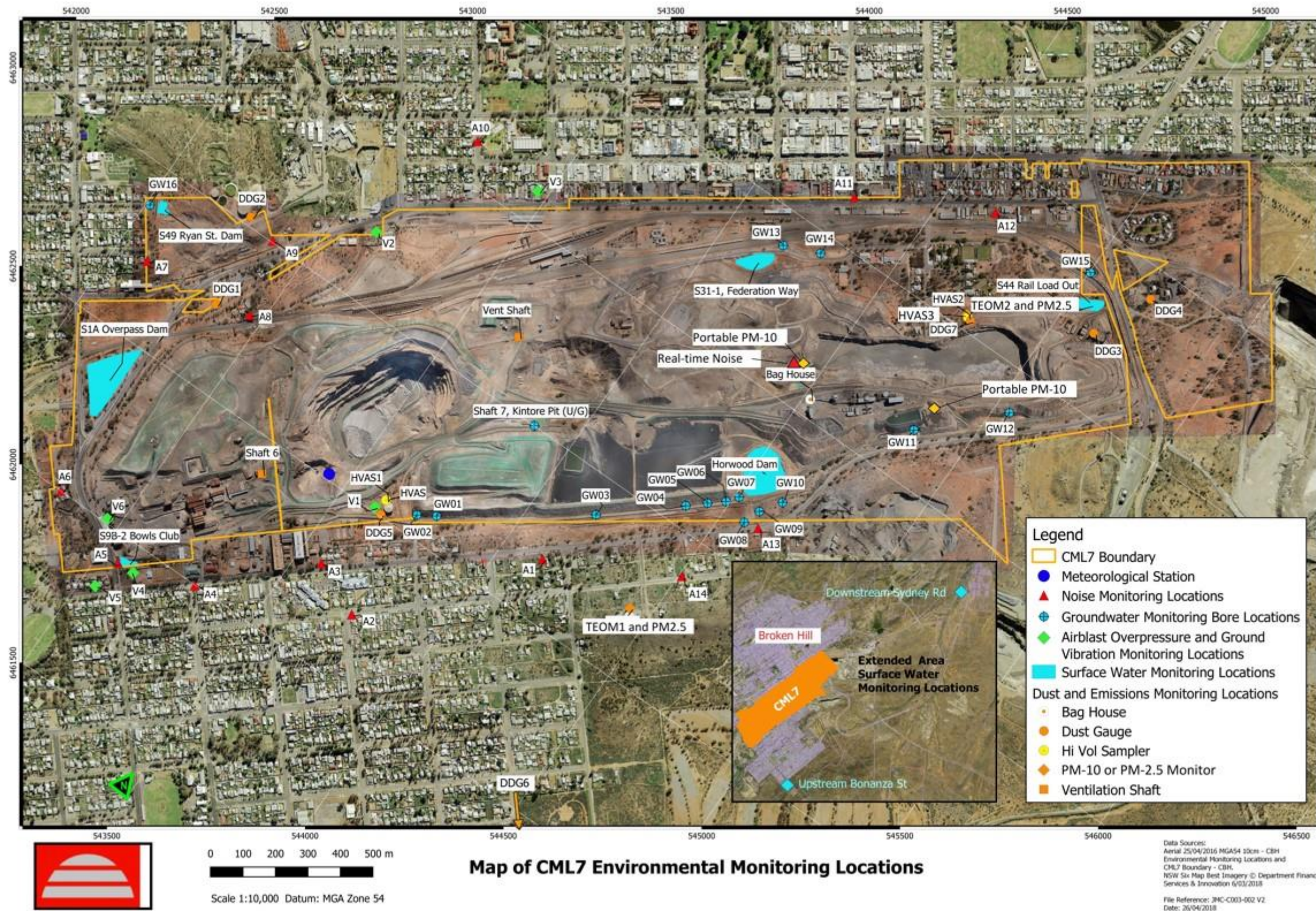
- Air emissions from in-stack mine exhaust ventilation and the crusher baghouse are tested quarterly by an external contractor with specialised equipment;
- Ambient air quality is monitored by BHO personnel via a combination of dust deposition gauges, high volumes air samplers (HVAS) and tapered element oscillating microbalance (TEOM) sampling units; and

Real-time information is downloaded and alerts automatically forwarded to assist in the day-to-day operational management of issues as well as long-term analysis of environmental data.

A Sintrol real-time dust monitor was installed in the crusher baghouse emissions stack in April 2022 to provide early warning of potential damage to the baghouse dust bags.

Figure 5-2 shows the sampling locations for all air quality monitoring units.

Figure 5-2 Location of Monitoring / Sampling Points



5.3.1 In-stack air quality

During the reporting period BHO engaged Assured Monitoring Group (AMG) to conduct testing of the mine ventilation exhaust points and the crusher baghouse. Testing was performed each quarter in accordance with the EPL. AMG are NATA accredited to perform this testing. The EPL Condition L2.1 specifies the in-stack performance criteria for the two ventilation exhaust units - Primary Ventilation Shaft and the Crusher Baghouse. **Table 5-3** provides the results of the testing against the limits as set out in the EPL.

Table 5-3 Vent and Baghouse Testing Results During the Reporting Period

Limit	Primary Vent (EPL1)				Crusher Baghouse (EPL2)				
	Testing Date	22/02	24/05	06/09	22/11	22/02	24/05	06/09	22/11
Nitrogen Oxides (mg/m ³)	350	<2.05	2.67	2.05	5.69	N/A ¹	N/A ¹	N/A ¹	N/A
Volatile Organic Compounds (mg/m ³)	40	0.757	1.38	0.474	0.398	N/A ¹	N/A ¹	N/A ¹	N/A
Total Suspended Particles (mg/m ³)	20	2.81	4.31	2.29	1.67	3.35	3.25	12.09	1.25
Type 1 and Type 2 ² (mg/m ³)	1	0.0669	0.135	0.0326	0.0459	0.141	0.0414	0.4265	0.0887

Note 1 = Not required to be tested.

Note 2 = Type 1 substance Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements. Type 2 substance Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements.

Air Quality Management Plan BHO-PLN-ENV-001 lists the controls that were in place during the reporting period. In summary, the major controls include:

- Automatic watering sprays on the ventilation shafts; and
- Fully enclosed primary crusher operating under negative pressure to a baghouse and continuous stack monitor.

5.3.2 Dust deposition gauges

Dust deposition levels refer to the quantity of dust particles that settle out from the air as measured in grams per square metre per month (g/m²/month) at a particular location. Total fallout dust (depositional dust) is continuously monitored from seven deposition gauges located on and around the Rasp Mine, as shown in **Figure 5-2**. D1 and D6 are located off-site, D1 near the St Johns training facility north of the Rasp Mine and D6 in Casuarina Avenue south of the Rasp Mine. D2 to D5 and D7 are located on the Mine lease in various locations.

Samples are collected monthly and are sent to ALS Laboratory (NATA accredited) in Newcastle and analysed for total deposited dust and deposited lead dust. Deposited dust is assessed as insoluble solids as defined by Standards Australia, 2003, AS 3580.10.1-2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulates - Deposited Matter - Gravimetric Method.

Dust deposition criteria are provided in terms of both an acceptable increase in dust deposition over the existing background levels and an absolute maximum value. These impact assessment criteria are summarised in

Table 5-4.

Table 5-4 Dust Deposition Criteria

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	2 g/m ² /month	4 g/m ² /month

Provided below is a discussion of results for dust deposition during the reporting period (January 2022 to December 2022) and trends over the operational life of the Rasp Mine. Dust deposition results are reported and reviewed internally on a monthly basis.

Figure 5-3 and **Figure 5-4** show the monthly dust deposition and total deposited lead results for the reporting period. There were four occasions where the monitoring location exceeded the depositional dust level of 4 g/m²/month limit (red figures in **Table 5-5**), one less than in the previous reporting period. Highest readings occurred in the summer months when dust storms were more frequent a number of large storms through the region also created an increased amount of sediment through much of Broken Hill, compounding dust storms.

Lead results were frequently above baseline levels throughout the period at D3-Thompsons Shaft and D4-Junction Mine, which are adjacent to the rail loading facility and access road, as well as exposed areas situated on the northern side of the site. Exposed site areas around the Thompson Shaft gauge are sprayed with dust suppressant and a water cart services the haul road while concentrate is being carted to the rail loadout and loaded to trains.

Lead results were significantly elevated in the D4 Junction Mine gauge in June 2022. Although the predominant wind direction for the month of June was from the NW, suggesting that the source of the lead is located off-site, there were also strong winds from the SW and South so there may have been contribution from site activities. Lead levels in the D3 Thompsons Shaft gauge were elevated in June. As the D3 gauge is adjacent to the rail loadout and while the predominant wind direction was from the NW in June, there may have been contribution from rail loadout activities due to strong winds from the SW and South. The haul road and concrete loadout area is regularly swept and watered. A water cart will also attend to the haul road between the concentrate loading shed at the Mill and the rail loadout area when concentrate containers are being transported from the Mill to the rail loadout.

Table 5-5 Dust Deposition Results for the Reporting Period (g/m²/month)

	D1 EPL3 (off site)		D2 EPL4		D3 EPL5		D4 EPL6		D5 EPL7		D6 EPL8 (off site)		D7 EPL9	
Jan-22	2.6	0.00288	2.5	0.00214	2.8	0.018	6.8	0.0186	4.6	0.00662	5.8	0.00319	2.2	0.00774
Feb-22	2.8	0.00221	ns	ns	3	0.0348	7.4	0.0115	3.1	0.00464	3.1	0.00071	1.9	0.00514
Mar-22	1.2	0.00192	1	0.00093	1.4	0.0026	5.9	0.00232	2.7	0.00353	3	0.000738	ns	ns
Apr-22	0.6	<0.000874	0.6	<0.000874	1.1	0.0033	1.5	0.00503	1	0.00181	0.2	<0.000874	0.6	0.0017
May-22	0.6	0.00093	0.4	0.00035	0.8	0.0092	0.9	0.00442	0.9	0.00316	0.3	0.00025	0.2	0.0014
Jun-22	0.2	0.00594	0.5	<0.000141	0.6	0.0281	1	0.24	1	0.00801	<0.1	<0.000141	0.3	0.0126
Jul-22	0.2	<0.00059	0.3	<0.00059	0.7	0.00328	0.5	0.00187	1.8	0.0117	0.4	<0.00059	0.2	0.00123
Aug-22	0.7	0.00167	0.4	0.00042	0.9	0.0087	2.4	0.00711	1.9	0.00695	1.5	0.00131	0.7	0.00159
Sep-22	0.8	0.00158	0.4	0.00052	1.2	0.0109	2.7	0.00763	2	0.0033	1.2	0.00098	0.8	0.00308
Oct-22	0.4	<0.00101	0.6	<0.00101	1.3	0.0092	1.9	0.0106	3.2	<0.00101	0.9	0.00378	0.7	0.00203
Nov-22	1.6	0.00059	1.6	0.00073	2.9	0.00195	4.5	0.00106	7	0.00417	2.5	<0.00017	1.2	0.00043
Dec-22	2	0.00185	1.3	0.00178	17	0.0122	9.1	0.0104	3.1	0.0159	9.1	0.00163	3.6	0.00285
2010	4.0	0.0034	3.1	0.005	4.3	0.005	5.7	0.006	N/A ¹	N/A ¹	5.8	0.004	N/A ¹	N/A ¹

Note 1 = Background is not available for these locations

ns = no sample

Figure 5-3 Monthly Total Deposited Dust for Results for the Reporting Period

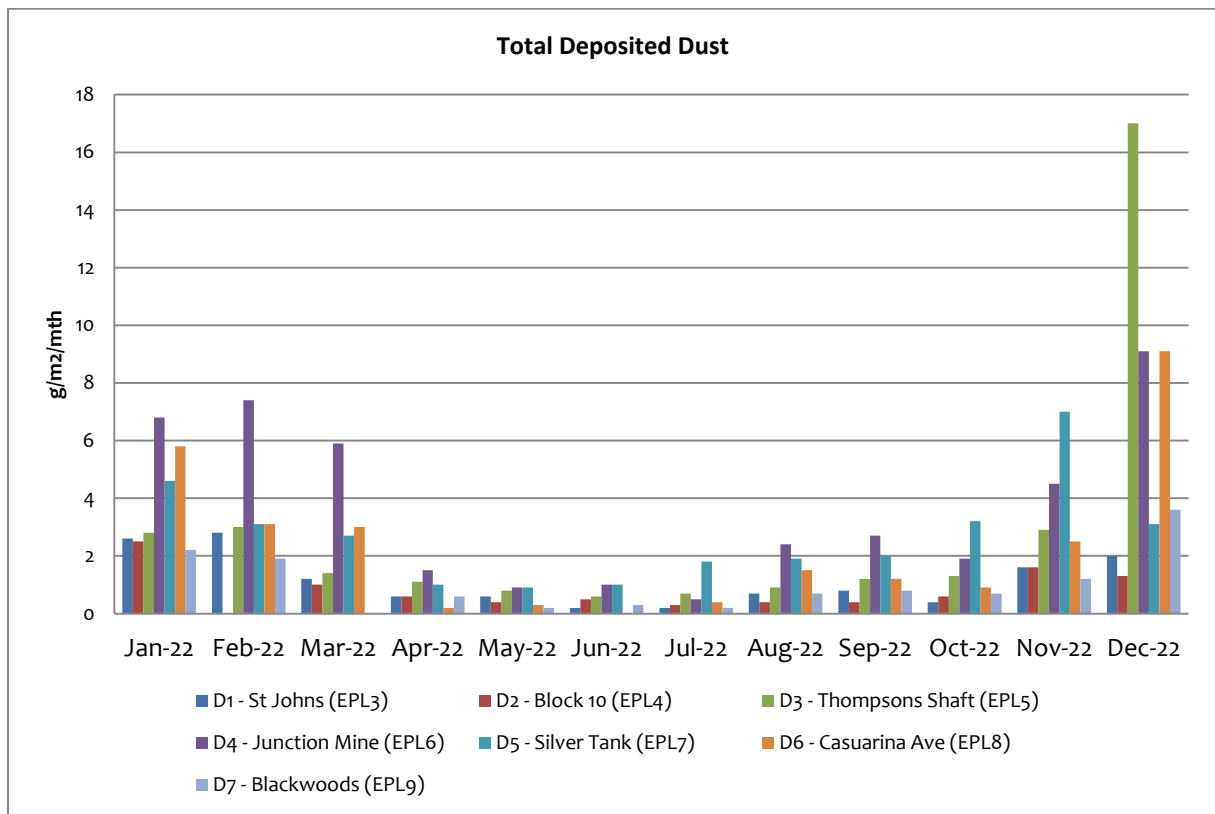


Figure 5-4 Monthly Lead Deposition for the Reporting Period

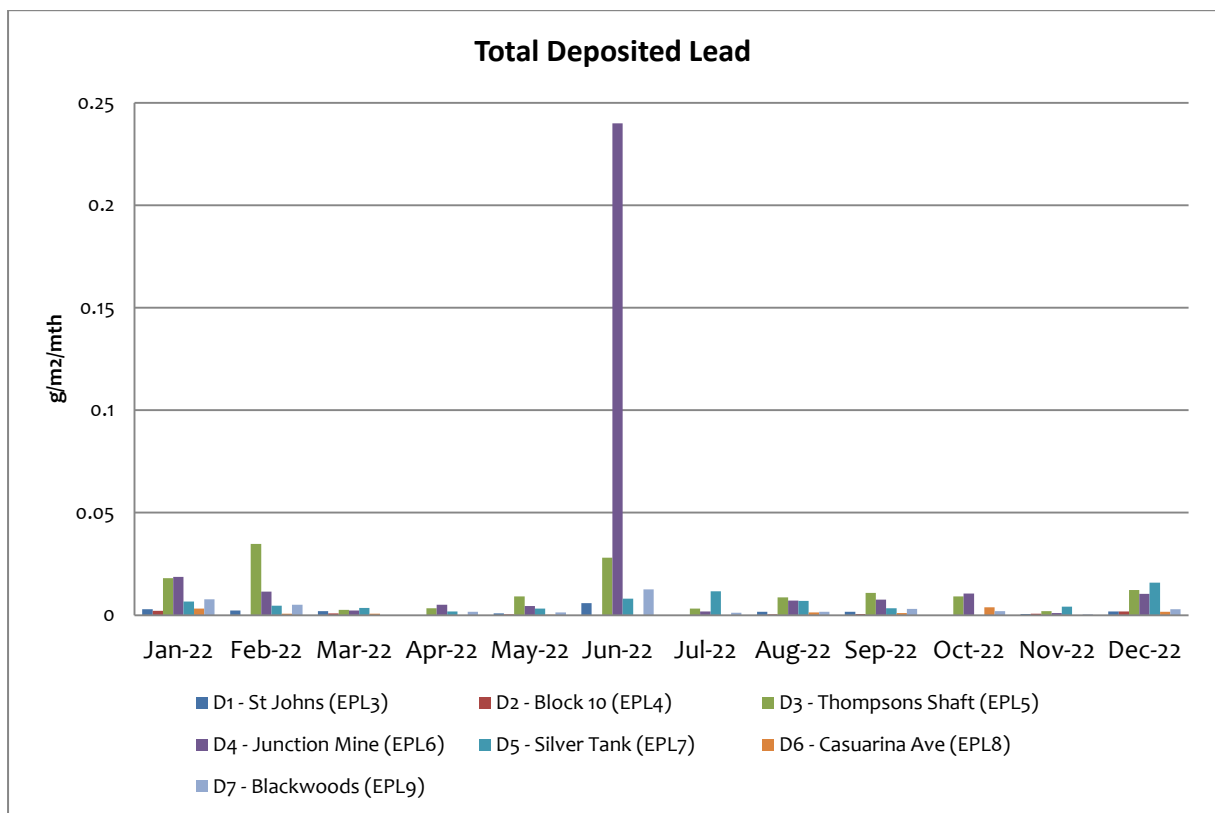


Figure 5-5 Total Deposited Dust 2007 – December 2022

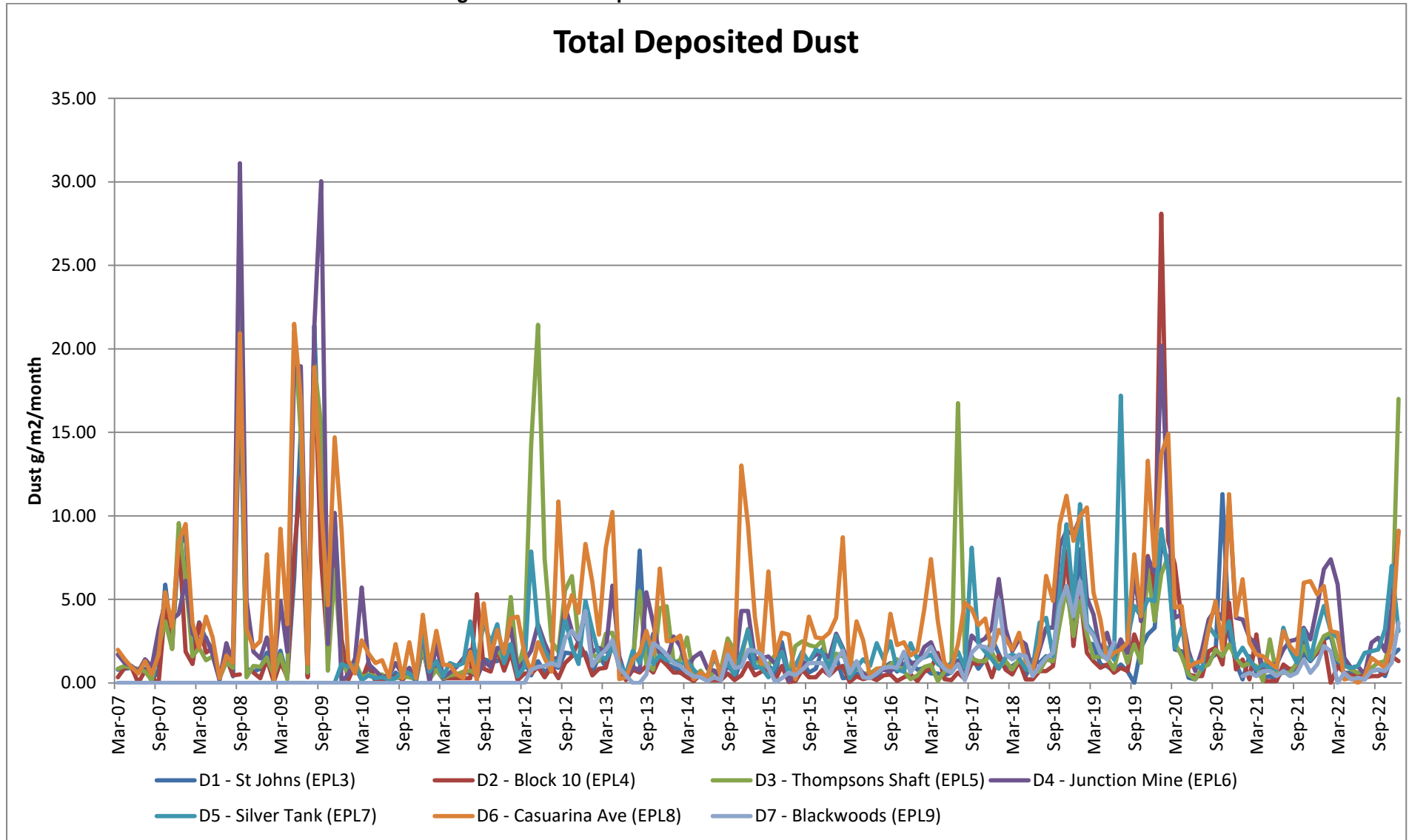
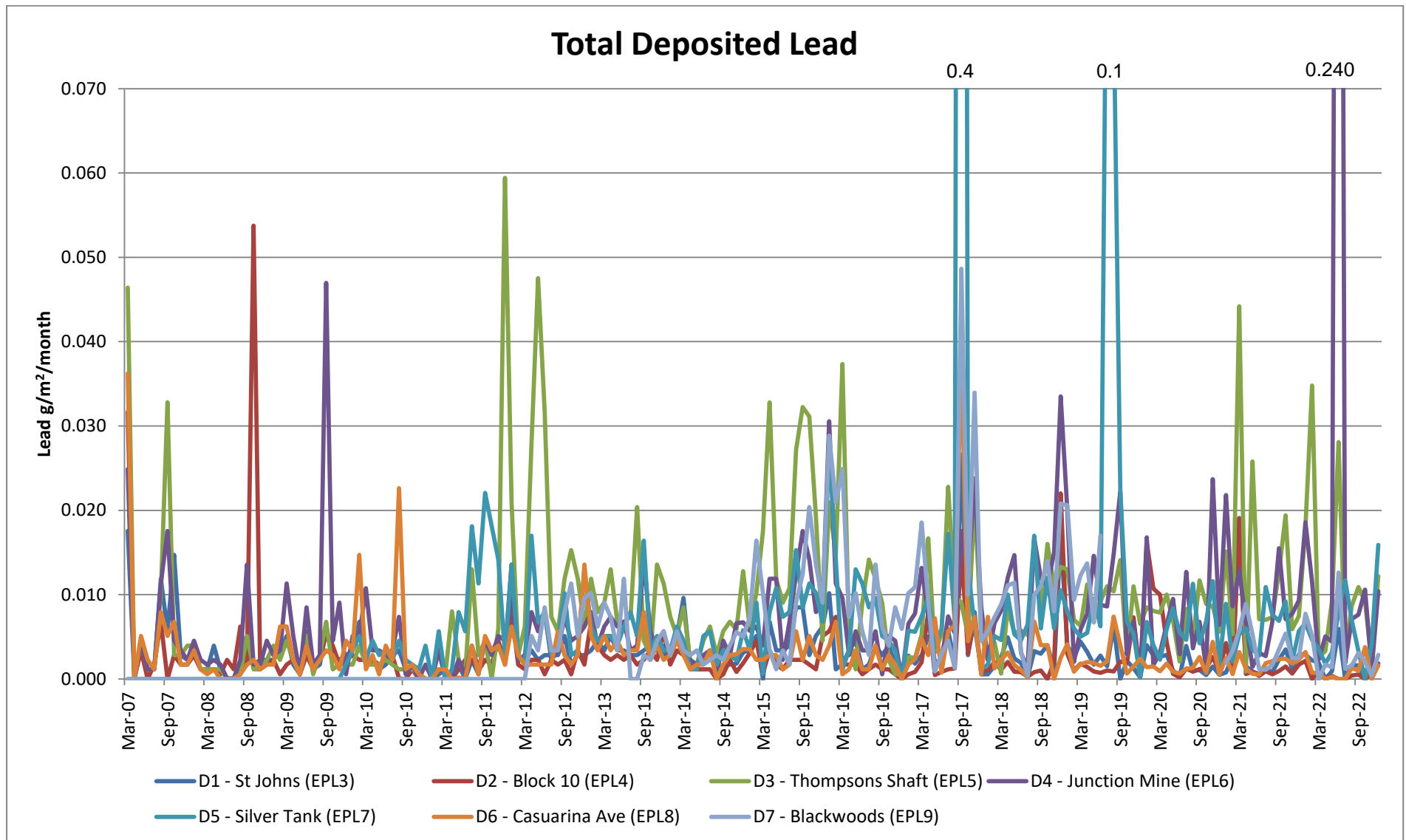


Figure 5-6 Total Deposited Lead 2007 to December 2022



5.3.3 High volume air samplers

There are four high volume air samplers used to measure ambient air quality at the Rasp Mine – HVAS (EPL10) and HVAS1 (EPL11) are located at the Silver Tank, central and to the south of the mine lease, and HVAS2 (EPL12) and HVAS3 (EPL57) are located adjacent to and north of Blackwood Pit. Locations are shown in **Figure 5-2**. HVAS and HVAS3 sample for total suspended particulates (TSP) and lead dust, and HVAS1 and HVAS2 sample for particulate matter less than 10 microns (PM₁₀) and lead dust.

Samples are collected every six days and are sent to ALS Laboratory (NATA accredited) in Newcastle. **Table 5-6** outlines the impact assessment criteria as listed in PA07_0018.

In accordance with the PA07_0018 and the EPA air quality guidelines, from September 2017, the criteria for annual rolling average for PM₁₀ criterion was reduced from 30 µg/m³ to 25 µg/m³. All other air quality criterion remains unchanged.

Table 5-6 Impact Assessment Criteria

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	25 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³

Note: Criteria changed from 30 µg/m³ to 25 µg/m³ in September 2017

Provided below is a discussion of results for each HVAS unit during the reporting period and trends over the operational life of the Rasp Mine. HVAS unit results are reported and reviewed internally on a monthly basis.

HVAS (EPL10)

TSP and TSP-lead results for the period recorded by HVAS are shown in **Figure 5-7** and **Figure 5-8**. These show the results have remained consistent over the reporting period.

The rolling annual average TSP at the HVAS unit recorded 38.97 µg/m³ for the reporting period, an increase over the previous period rolling annual average of 35.98 µg/m³.

The rolling annual average TSP-lead at the HVAS unit has increased to 0.19 µg/m³ from 0.17 µg/m³ at the beginning of the reporting period. The Rasp Mine PA07_0018 does not stipulate any criteria for lead; however the recorded annual average of TSP-lead remains below the NSW EPA guideline of 0.50µg/m³.

The highest TSP-Lead level recorded was on 6 October 2022 (0.91µg/m³) and is likely to be a result of dumping boxcut materials to Little Kintore Pit, with winds from the NW on this day.

Figure 5-9 provides a summary of TSP and TSP-lead results from 2008 to 2022. Rolling annual averages for TSP are well below the annual average criteria of 90µg/m³ and EPA threshold of 0.5 µg/m³ for TSP-lead.

Figure 5-7 HVAS TSP Results for the Reporting Period

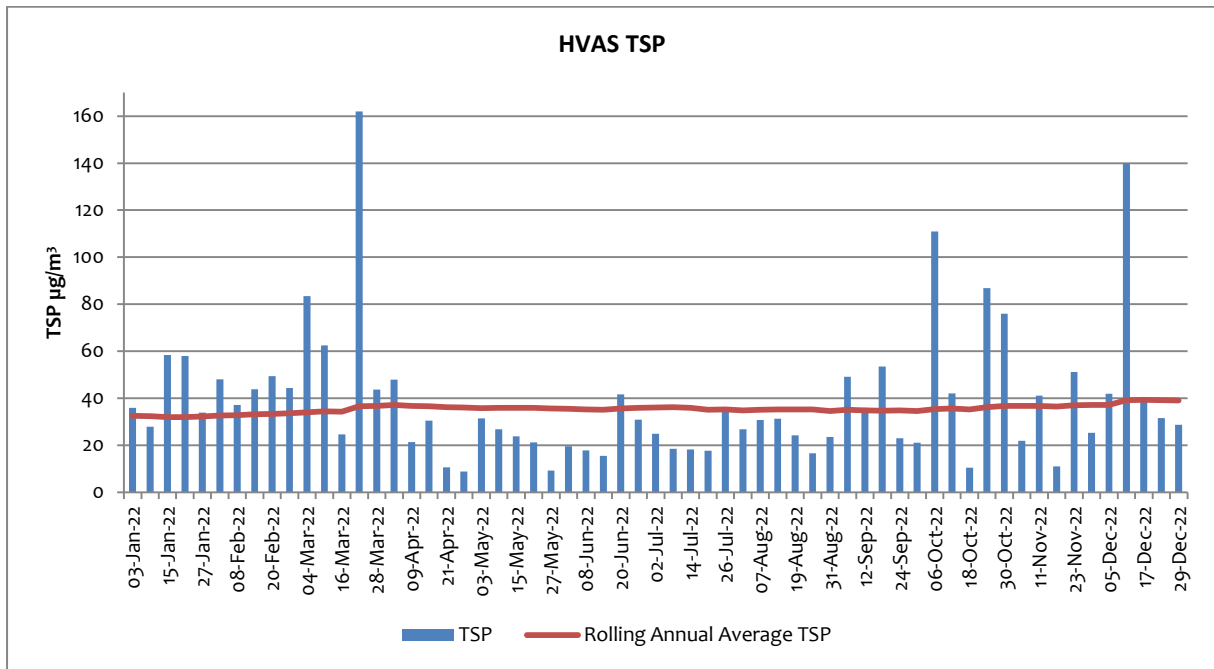
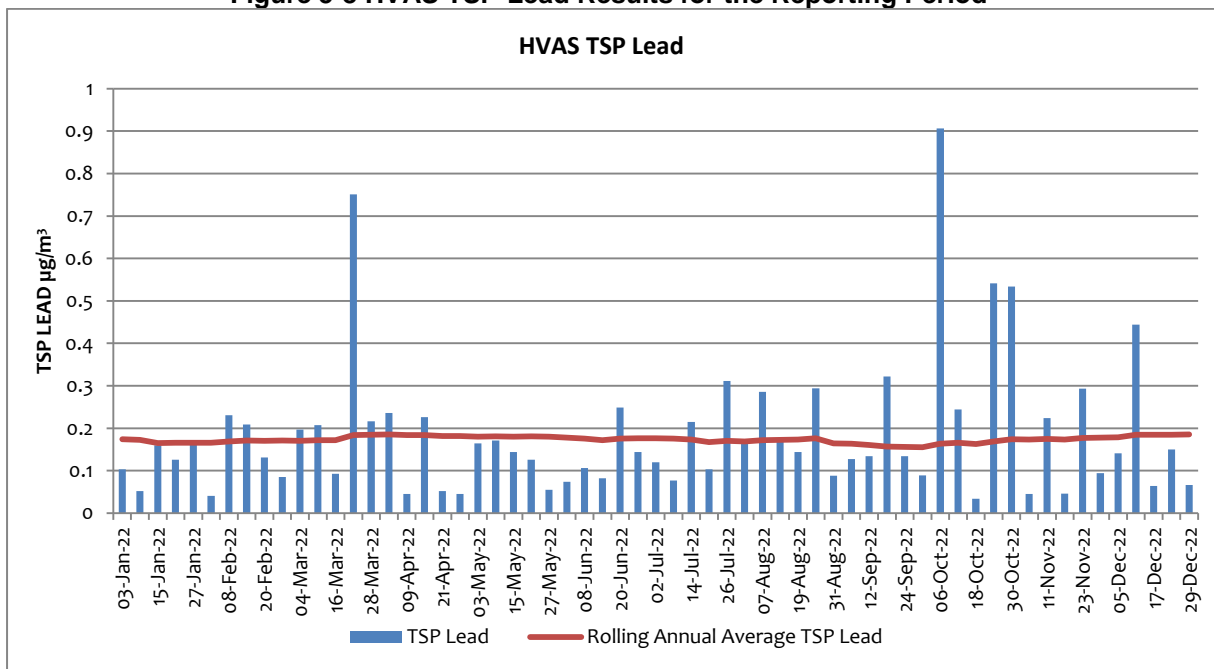


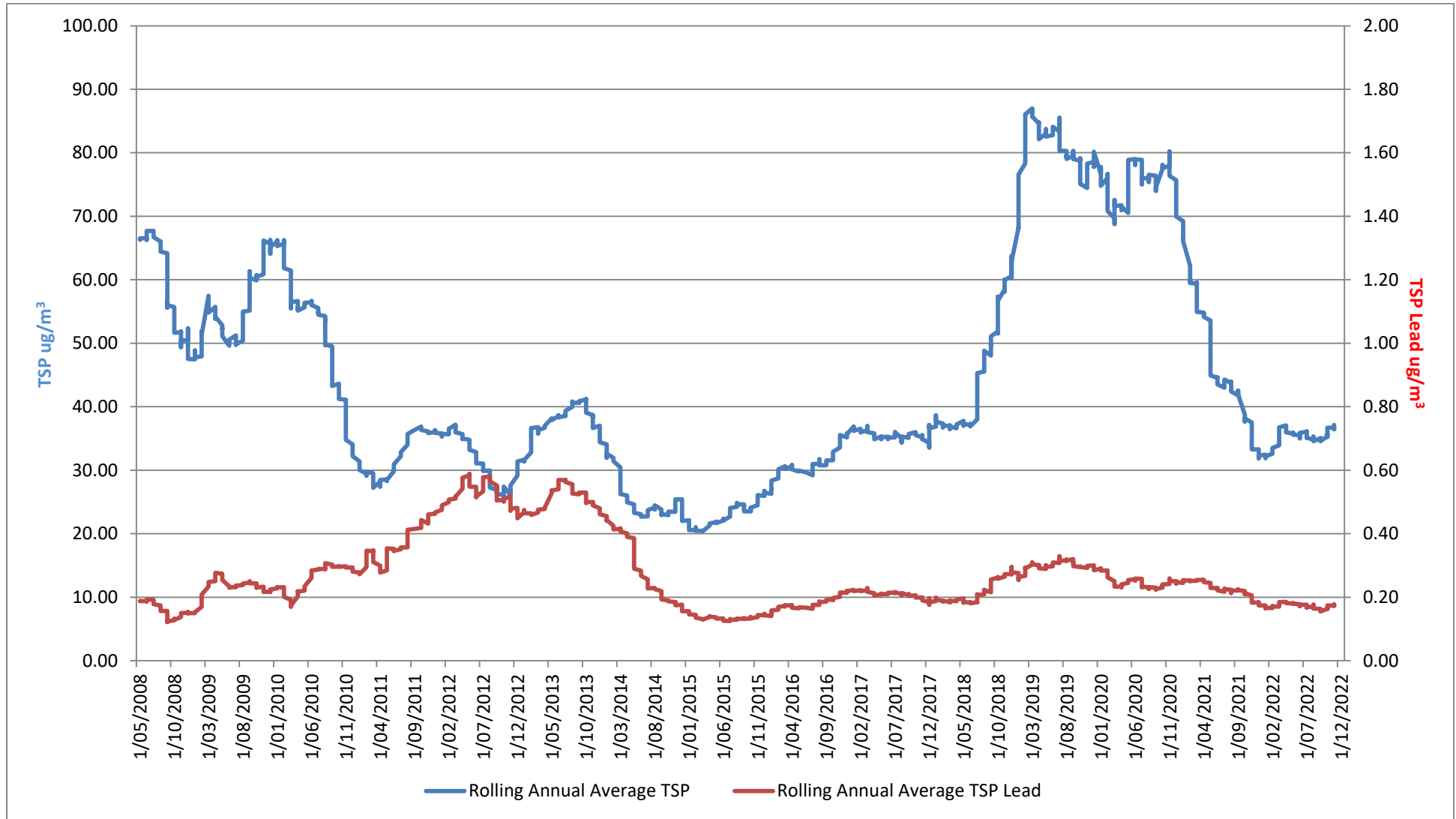
Figure 5-8 HVAS TSP-Lead Results for the Reporting Period



The original EA did not include a receptor close to HVAS in predictions for total suspended particles.

As can be seen in **Figure 5-9**, there is an increase in dust levels recorded in HVAS after 2016 due to the period of drought. Dust levels decreased at the beginning of 2022 due to the heavy rainfall and increased towards the end of the reporting period due to the hotter and windier weather. Lead levels have fallen with slight elevation in levels towards the end of the period. This can indicate contribution from site activities but it has been found that lead levels can be elevated at this location on the southern boundary of the site when winds are predominantly from the South.

Figure 5-9 HVAS TSP and TSP-Lead Results for the Period 2008 to 2022

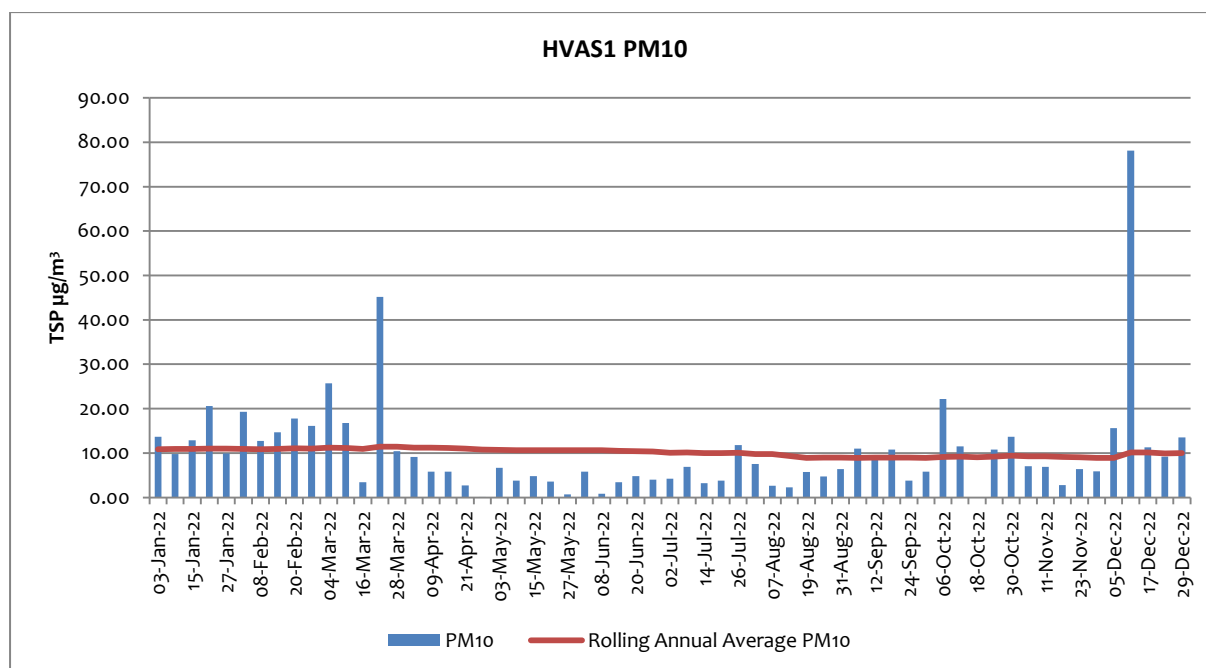


HVAS1 (EPL11)

HVAS1 is used for sampling PM₁₀ and PM₁₀-lead. The average annual PM₁₀ level recorded at this monitoring point at the end of the reporting period was 10.0 µg/m³, which has decreased from the previous reporting period of 11.0 µg/m³ and is well below the background level of 29.1µg/m³ reported in the EA. The average annual PM₁₀ level calculation includes data collected during extreme events. Results for the reporting period are shown in **Figure 5-10** which indicates that the rolling annual average for PM₁₀ is below the criteria of 25 µg/m³, and has remained consistently low during the reporting period.

Results for the period 2011 to 2022 are shown in **Figure 5-14**.

Figure 5-10 HVAS1 PM₁₀ Results for the Reporting Period



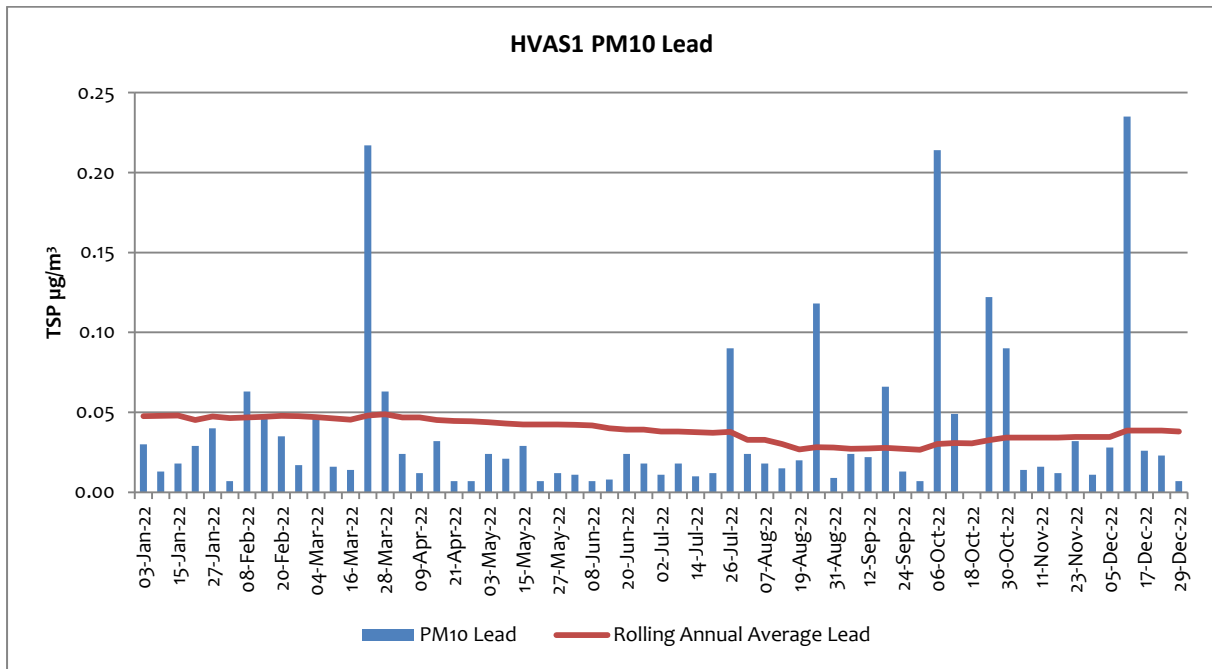
The highest PM₁₀ dust level for December was 78.10 µg/m³ on 11 December when winds were predominantly from the SW and a dust storm moved through the region.

The annual average PM₁₀-lead concentration has remained consistent through the reporting period being 0.04 µg/m³ in January 2022 and December 2022. **Figure 5-11**. The highest HVAS1-Lead level recorded was on 11 December 2022 (0.24 µg/m³).

Since May 2011, when HVAS1 started operating, dust levels have fallen and then risen in the last few years due to the drought and frequent dust storms.

Results for the period 2011 to 2022 are shown in **Figure 5-17**.

Figure 5-11 HVAS1 PM₁₀-Lead Results for the Reporting period

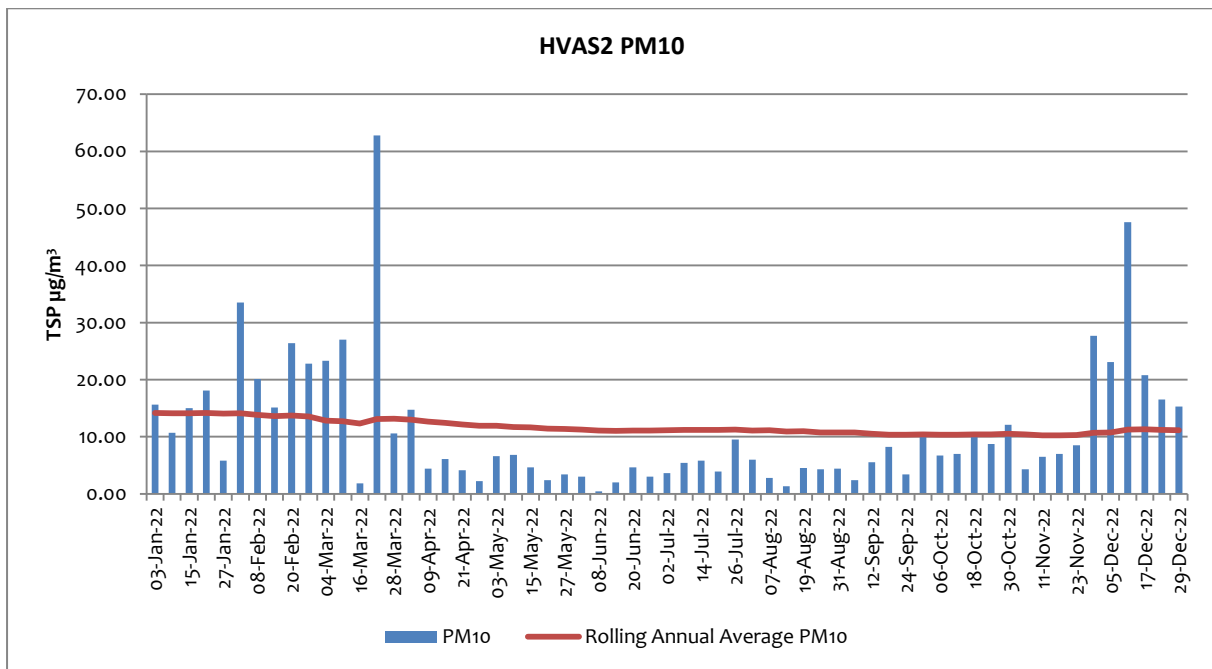


HVAS2 (EPL12)

The average annual PM₁₀ level recorded at this monitoring point was 11.14 µg/m³, which has decreased from the previous reporting period (11.94 µg/m³), below both the background level reported in the EA of 29.1µg/m³ and the criteria of 25µg/m³ (for off-site receptors), **Figure 5-12**. Data presented includes that which may be result of external events, particularly dust storms which are expected in the spring and summer months.

Trends are discussed below and results for the period 2011 to 2022 are shown in **Figure 5-17**. Since May 2011 when HVAS1 started operating dust levels have fallen and then risen in the last year due to the drought and frequent dust storms.

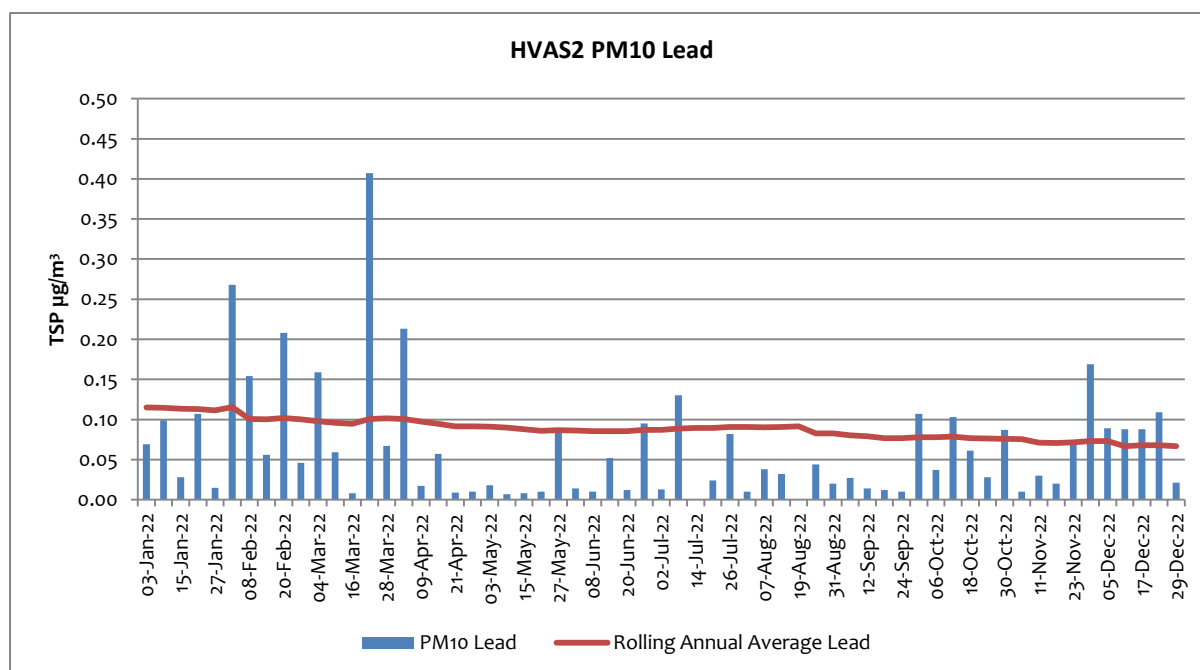
Figure 5-12 HVAS2 PM₁₀ Results for the Reporting Period



The average annual PM₁₀-lead level recorded at this monitoring point was 0.07 µg/m³, which is a decrease over the previous reporting period (0.09 µg/m³), below both the background level reported in the EA of 29.1 µg/m³ and the criteria of 25 µg/m³ (for off-site receptors). **Figure 5-13.**

Results for the period 2011 to 2022 are shown in **Figure 5-17**. Since September 2013 when HVAS2 started operating dust levels have risen in the last few years due to the drought and frequent dust storms.

Figure 5-13 HVAS2 PM₁₀-Lead Results for the Reporting Period



HVAS3 (EPL57)

HVAS3 (EPL57) was included in EPL 12559 on 14 March 2019 to provide for monitoring of TSP Dust on the northern boundary of the site at Blackwoods Pit TSF2.

To 31 December 2022 the rolling average annual TSP level recorded at this monitoring point was 35.23 µg/m³, up from 32.63 µg/m³ at the beginning of the reporting period as seen in **Figure 5-14**. The rolling annual average for TSP Lead in December 2022 was 0.28 µg/m³, a decrease from 0.35 µg/m³ at the beginning of the reporting period. Elevated lead levels were recorded sporadically throughout the reporting period, usually as a result of site activities around TSF2 and the rail loadout area.

Figure 5-14 HVAS3 TSP Results for the Reporting Period

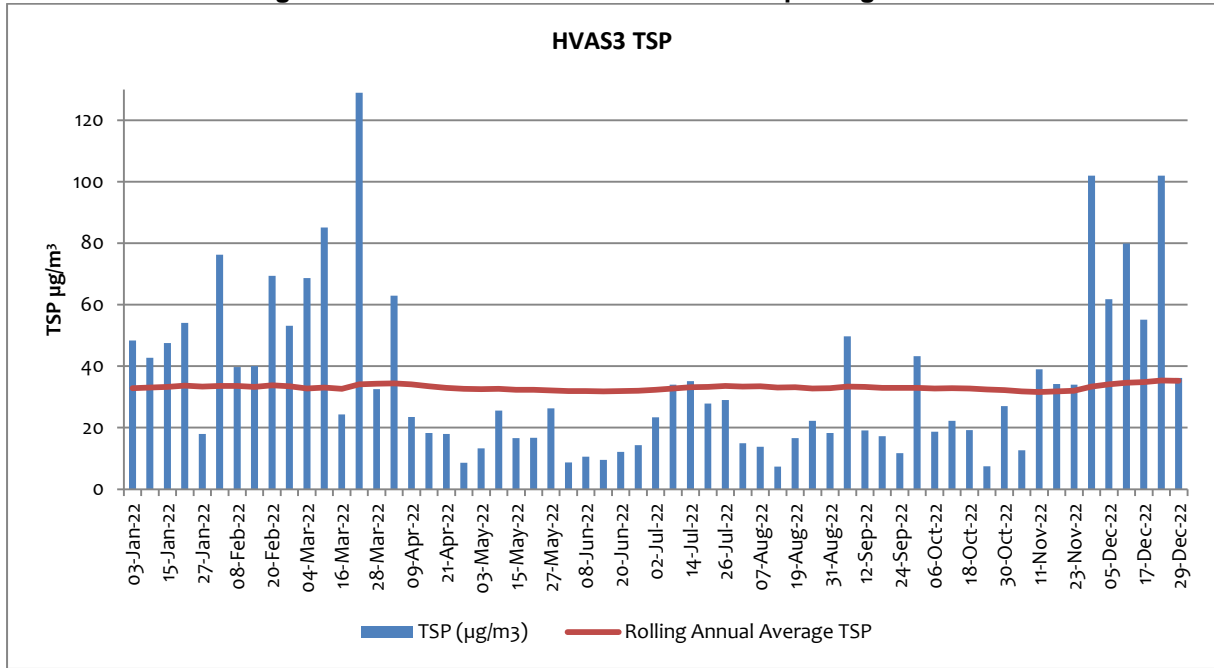


Figure 5-15 HVAS3 TSP-Lead Results for the Reporting Period

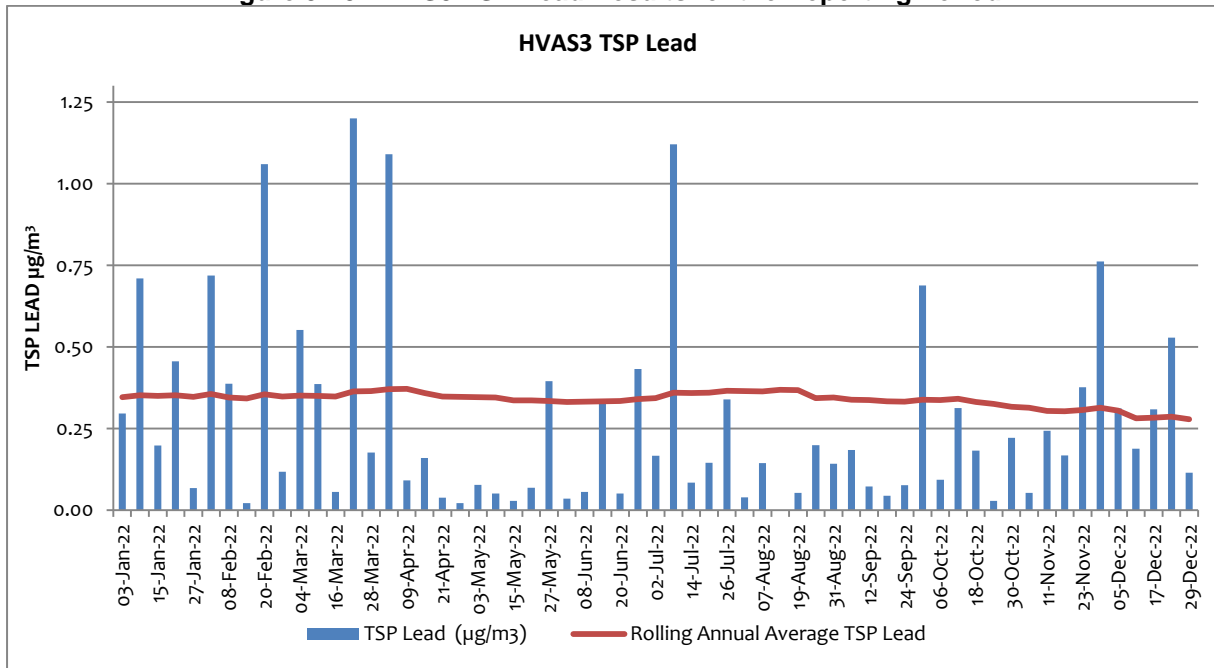


Figure 5-16 HVAS1 & HVAS2 PM10 Annual Average Results for the Period 2011 to 2022

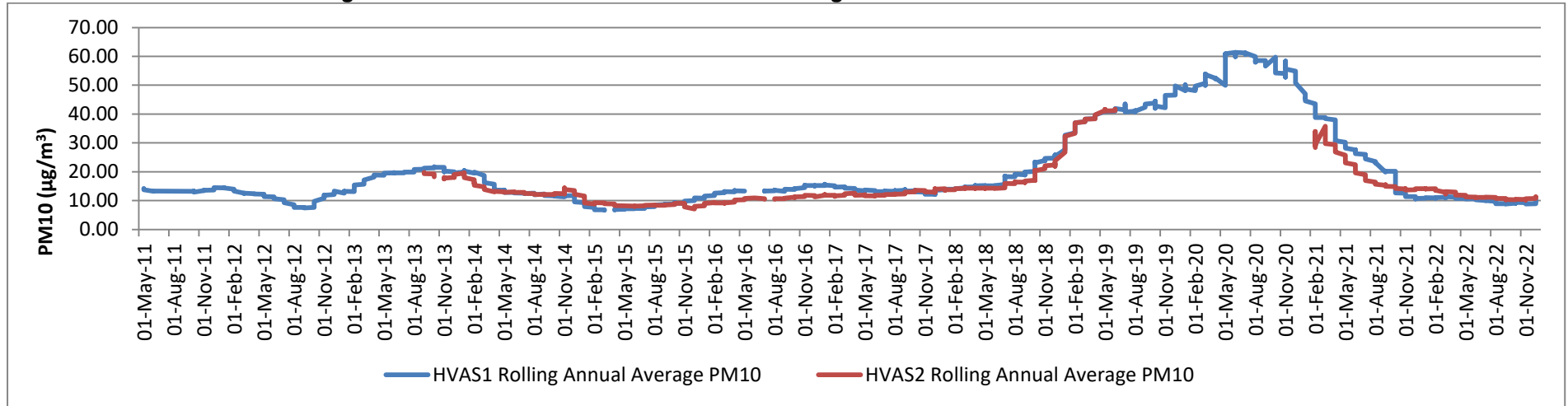


Figure 5-17 HVAS1 & HVAS2 PM10-Lead Annual Average Results for the Period 2011 to 2022

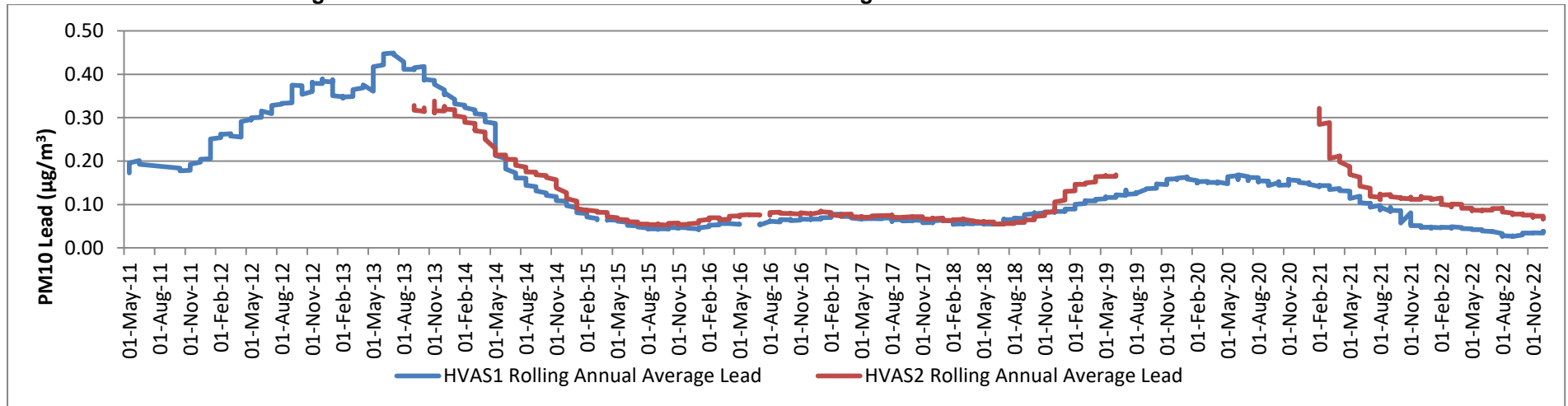


Figure 5-18 HVAS & HVAS3 TSP Annual Average Results for the Period 2008 to 2022

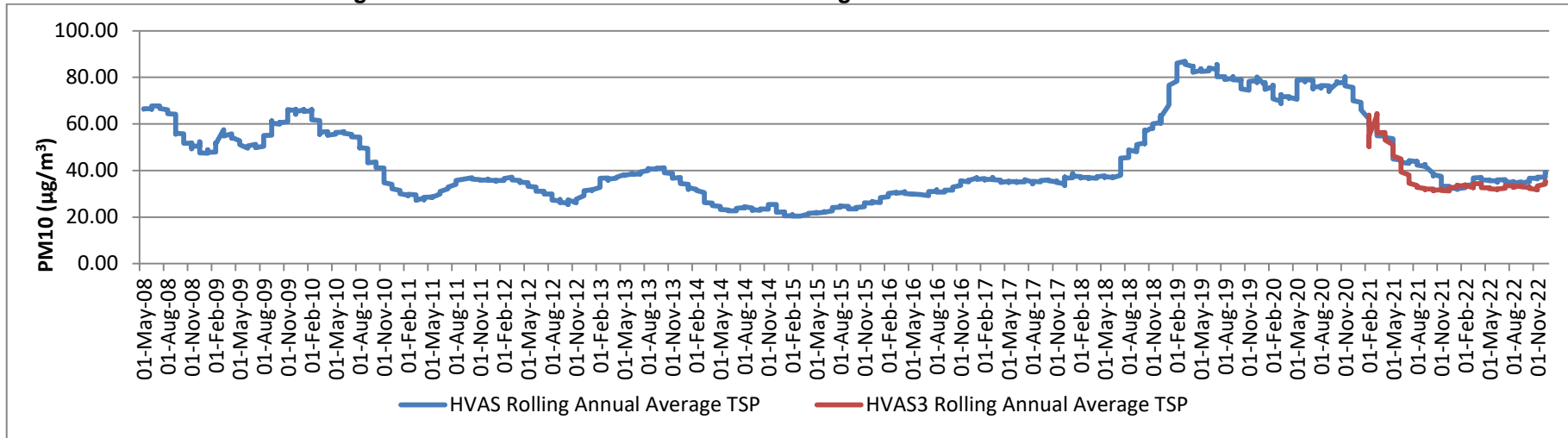
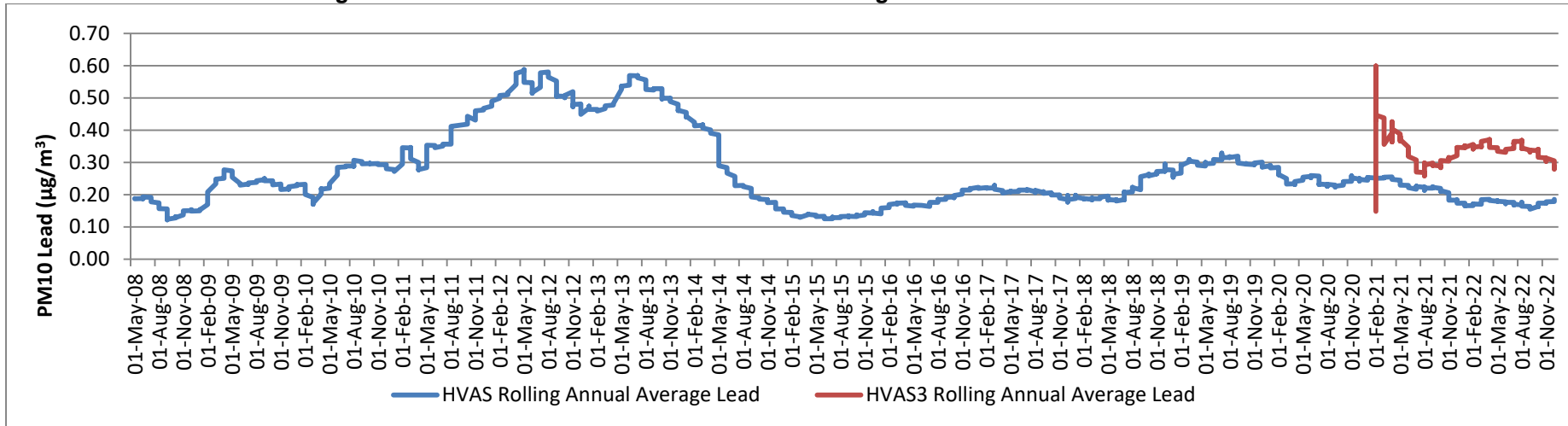


Figure 5-19 HVAS & HVAS3 TSP-Lead Annual Average Results for the Period 2008 to 2022



5.3.4 TEOM monitors

The Rasp Mine has two Tapered Element Oscillating Microbalance (TEOM) air quality monitors, which record real time PM₁₀ and PM_{2.5} data. Figure 5-2 shows the location of these monitors.

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	50 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	25 µg/m ³
Particulate matter < 2.5 µm (PM _{2.5})	24 hour	25 µg/m ³
Particulate matter < 2.5 µm (PM _{2.5})	Annual	8 µg/m ³

Note: Criteria changed from 30 µg/m³ to 25 µg/m³ in September 2017

The monitors operate continuously over a 24-hour period and provide a real time data read out on a kiosk computer in the ESO office. The monitors also provide auto-generated notifications when triggers are exceeded (when the level exceeds 100 µg/m³ expressed as a 1 hour rolling average) the cause is investigated and controlled by the use of the water truck or by modifying work methods.

In August 2022, as a required by the MOD6 Development Approval BHO began real-time monitoring for PM_{2.5}. Dichotomous TEOM units replaced the existing PM₁₀ TEOM units at both monitoring locations. During the reporting period a technician serviced the TEOM units in April, August and November 2022.

The recorded annual average PM_{2.5} results for both TEOM1 and TEOM2 (8.00 µg/m³) are below the listed 24-hour averaging criteria of 25 µg/m³ and at the annual averaging criteria of 8.00 µg/m³.

The corrected results with storm events excluded for TEOM1 PM₁₀ 24-hour average for the reporting period are provided in **Figure 5-20**. A number of dust storm events were recorded on TEOM 1 and 2 during the period. As can be seen in the graphs in **Figure 5-18** and **Figure 5-19**, high-dust events are captured by both monitors so they are unlikely to be the result of site activities.

The corrected results with storm events excluded for TEOM2 PM₁₀ 24-hour average for the reporting period are provided in **Figure 5-21**. The highest recording for the reporting period was on 18 November 2012 (44.6µg/m³).

The PM10 annual rolling average at the TEOM1 monitor at the end of the reporting period was 9.18 µg/m³ (13.06 µg/m³ in the previous year) and is below the listed criteria of 25 µg/m³. The annual rolling average PM₁₀ at TEOM2 was 10.10 µg/m³ which is below the criterion 25 µg/m³ required at the nearest residential location. A graph of results for TEOM1 and TEOM2 are provided in Error! Reference source not found.**20**.

The corrected results with some storm events removed for PM2.5 at either location has not exceeded the 24 hour average of 25 µg/m³ as set out in PA07_0018 as seen in **Figure 5-22** and **Figure 5-23**.

The recorded annual average PM₁₀ result at TEOM2 (10.10 µg/m³) is below the prediction for R28, the closest receptor to this monitoring point (30 m) reported in the EA for MOD4 at 17.54 µg/m³.

Annual average PM₁₀ results for TEOM1 and TEOM2 have reduced after an increase in dust levels in 2019 and early 2020, which is expected considering the severity of the drought over the past four yearsError! Reference source not found..

Air Quality Management Plan BHO-PLN-ENV-001 lists the controls that were in place during the reporting period. In summary, the major controls include:

- The use of chemical dust suppressant on non-active mining areas and roads;
- Sealing of all major roads and the use of a street sweeper and water truck;
- An enclosed crusher building and water sprays on the apron feeder to the crusher;
- Fully enclosed conveyors and transfer points prior to the Sag Mill with installed dust collectors;
- Restricted access to non-active mining areas;
- Concentrate loading into containers occurs in an enclosed building and containers are covered prior to exiting the building; and
- All vehicles leaving site are washed, including trucks taking containers to the rail loadout area.
- Traffic light system informing all staff and contractors of wind speeds on a daily basis.
- Wind speed alerts from the onsite weather station notifying of wind speeds greater than 35 km/hr

Monitoring results indicate that controls have been adequate to manage dust levels during the reporting period.

Figure 5-20 TEOM1 PM₁₀ 24-hour Average Results for the Reporting Period

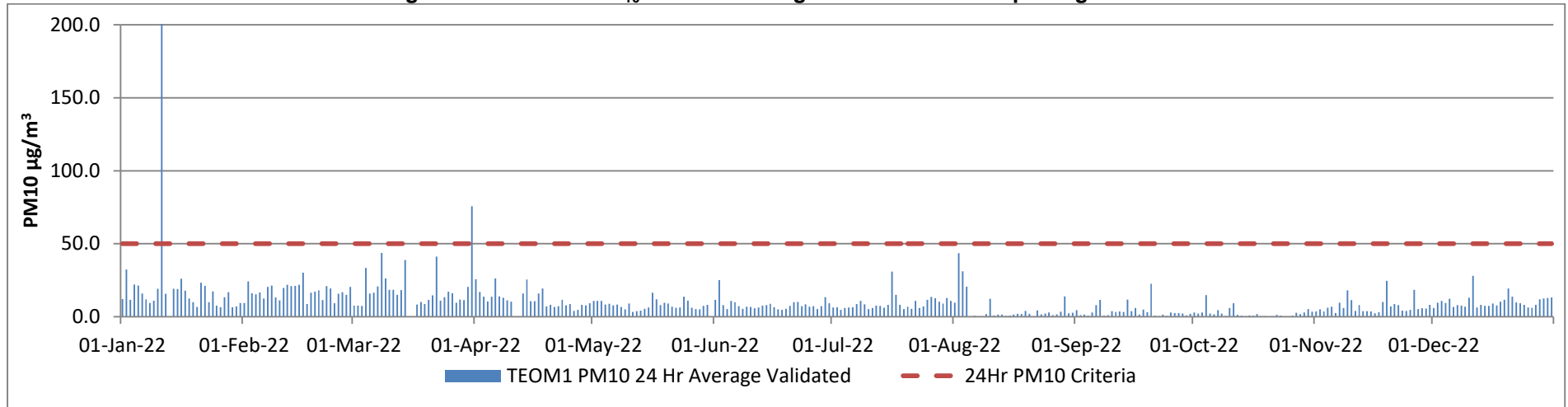


Figure 5-21 TEOM2 PM₁₀ 24-Hour Average Results for the Reporting Period

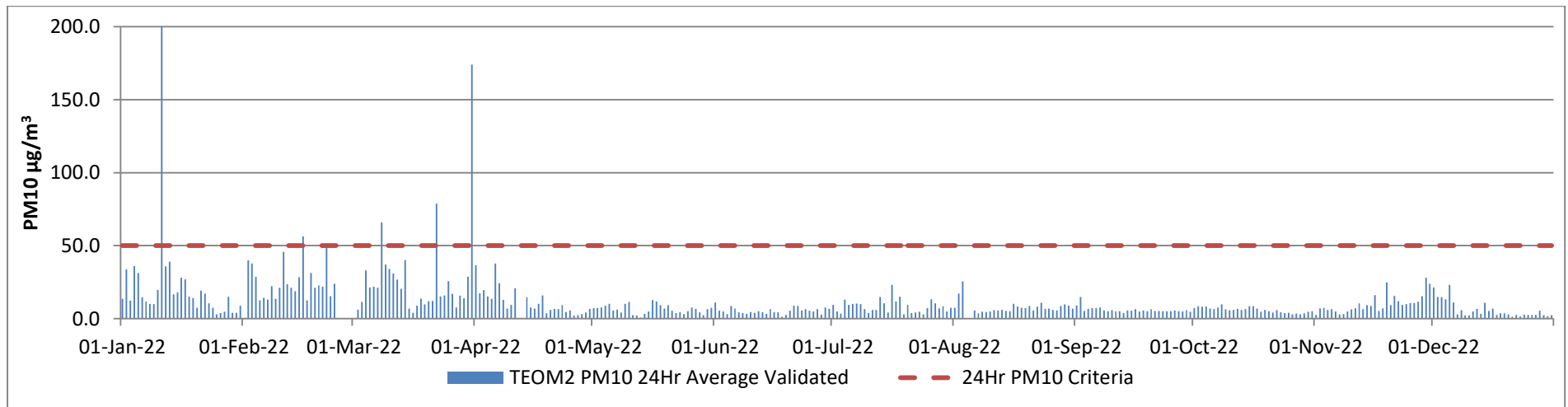


Figure 5-22 TEOM1 PM_{2.5} 24-hour Average Results for the Reporting Period

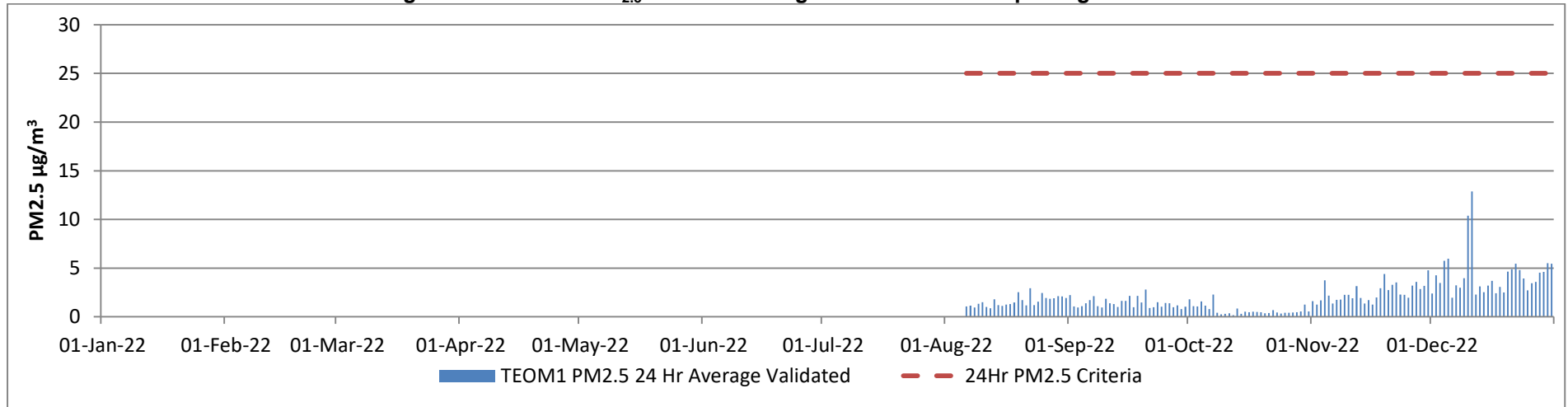


Figure 5-23 TEOM2 PM_{2.5} 24-Hour Average Results for the Reporting Period

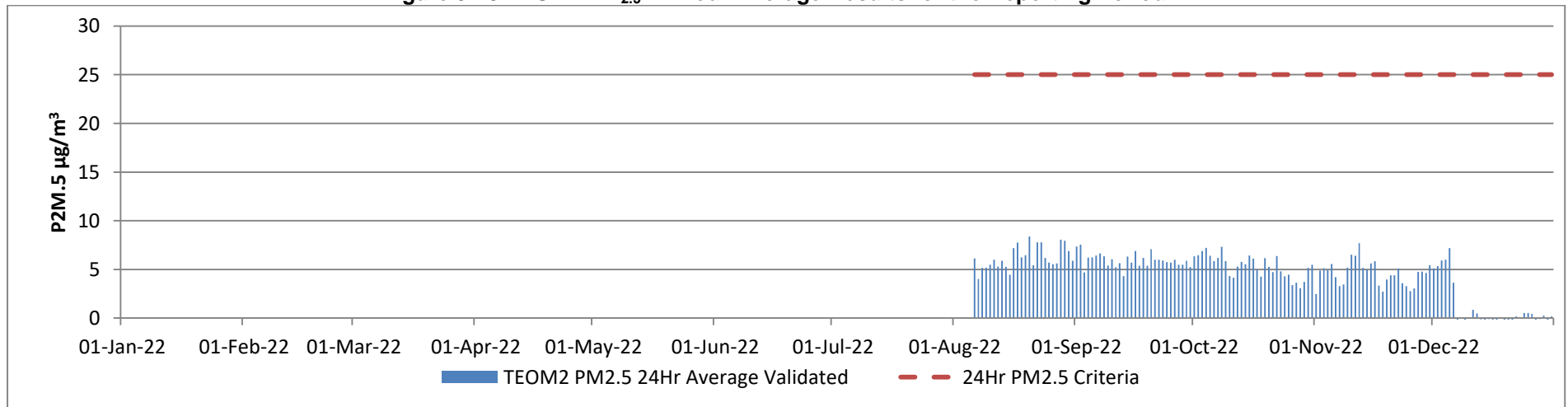


Figure 5-24 TEOM1 & TEOM2 PM10 Annual Rolling Average for the Reporting Period

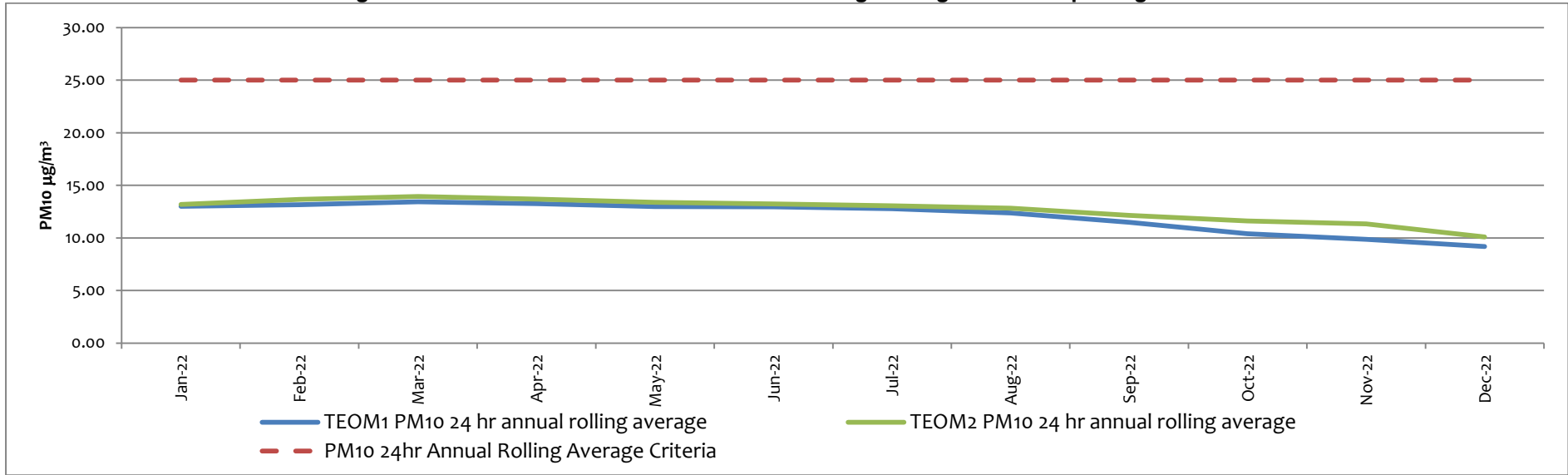
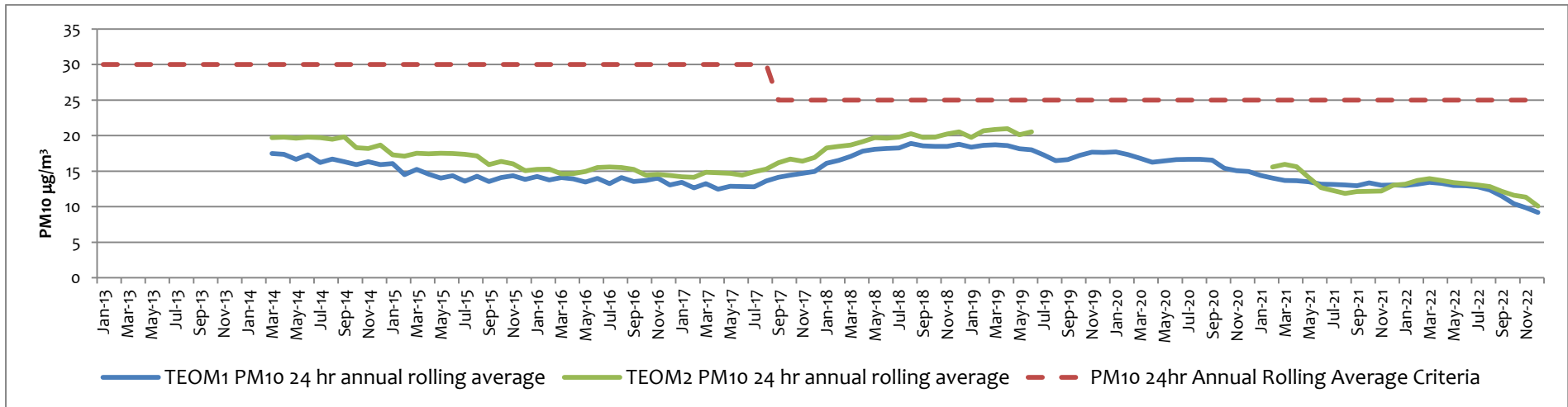


Figure 5-25 TEOM1 & TEOM2 PM10 Annual Rolling Average Results for the Period 2013 to December 2022



5.4 Erosion and Sediment

The majority of the existing batters were constructed during former mining operations and consequently the surfaces of the batters consist predominantly of weathered rock. It is not practical to reshape the slopes, as most of the slopes are steep, on the mine lease boundary and predominantly comprise of large rock aggregate. The process of erosion over the years since the slopes were formed has removed most of the finer materials and the existing surface now comprises relatively large and coarse rock resulting in a self-armoured surface with limited erosion potential.

Inspections consist of a visual assessment for erosion, flooding, rubbish, algal growth or significant sediment build up. No major works were required as a result of these inspections.

5.5 Surface Water

There are no natural watercourses or creeks flowing through the site. The drainage network layout restricts runoff leaving active mine areas of the site for a 1 in 100year 72 hour ARI rainfall event.

Surface water monitoring includes a weekly visual inspection of water storage facilities, freeboard and structural integrity. The tailings storage facility and the processing events dam are inspected and levels checked monthly. Quarterly water quality samples are taken from dams when the water levels are above 20% capacity. Samples are couriered to ALS, a NATA accredited laboratory for analysis.

There are seven sampling locations for surface water, these include surface water basins located on the mine lease to capture and retain rainfall and two locations up and down stream of an ephemeral creek located south of the mine lease boundary. Sampling requirements are provided in **Table 5-7** and locations of sampling points are shown in **Figure 5-2**.

Table 5-7 Surface Water Monitoring Requirements

Description	Frequency	Parameters to be Analysed
Federation Way Culvert EPL29/S31-1	2 x per year , six months apart	cadmium (Cd), chloride (Cl), electrical conductivity (EC), lead Pb), manganese (Mn), pH, sodium (Na), sulphate (SO ₄), total dissolved solids (TDS) and zinc (Zn)
Ryan Street Dam EPL31/S49	2 x per year , six months apart	
Adjacent Olive Grove EPL32/S1A	2 x per year , six months apart	
Adjacent Bowls Club EPL33 /S9-B2	2 x per year , six months apart	
Horwood Dam EPL34/Horwood Dam	2 x per year , six months apart	
Upstream Bonanza St EPL35	2 x per year , six months apart	
Downstream Sydney Rd EPL36	2 x per year , six months apart	

Ponds are sampled at least twice a year when the pond contains water for at least one week and the volume of stored water is at least 20% of the pond capacity. Sampling is expected to be undertaken in April and October, as these are the highest rainfall months as recorded by Bureau of Meteorology. Sufficient rain fell in six months of 2022 allowing sampling to be conducted on eight occasions from most of the monitoring locations. Results of the surface water analysis for the reporting period are provided in **Table 5-8**.

Following heavy rainfall events in March and April 2022 water was able to seep from the S49 Ryan St Dam and S14 House Dam as water could not be transferred from these ponds in a timely manner. Details of the seepage incidents are in Section 10. Lead, Manganese and Zinc levels were slightly elevated in S1-A and S31-1 following heavy rainfalls in February and March which is likely due to receiving contaminated water from adjacent roadways and waste dumps. S49 returned elevated Lead, Manganese and Zinc levels due to it capturing water from Block 10 which, as the former site of a mill, is contaminated. Horwood Dam recorded elevated results which is to be expected as it

captures water from a number of areas on site before the contained water is pumped to the Mill process pond.

Table 5-8 Stormwater Pond Water Quality Results for the Reporting Period

Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			($\mu\text{S}/\text{cm}^2$)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
S31-1 EPL 29	01/02/2022	6.08	993	1030	4	587	12	93	6	17	1.5	1.8	34.2	148	<0.05
	01/03/2022	5.89	2450	3640	4	1940	56	200	31	76	5.36	1.9	183	625	<0.05
	16/03/2022	6.51	1520	1710	2	609	28	128	16	44	1.92	1.89	67.8	201	<0.05
	19/04/2022	6.21	1140	1180	4	672	18	109	8	17	1.42	1.28	40.3	185	<0.05
	27/04/2022	6.21	1040	986	2	579	15	66	8	23	1.06	1.21	42.8	117	<0.05
	08/09/2022	5.91	1850	1700	4	990	40	153	19	44	2.57	1.17	88.8	239	<0.05
	14/10/2022	6.43	944	894	5	473	16	90	8	20	1.1	0.694	30.2	109	<0.05
	27/12/2022	5.94	1780	1940	5	1030	39	173	14	50	2.59	1.97	70.4	250	<0.05
S49 EPL 31	01/02/2022	6.42	484	353	8	207	3	71	4	6	0.178	0.11	9.09	23.8	<0.05
	01/03/2022	6.53	896	818	10	484	9	118	11	17	0.479	0.262	23	63.4	<0.05
	16/03/2022	6.89	512	464	7	226	5	60	6	9	0.23	0.155	8.72	29.7	<0.05
	19/04/2022	6.64	322	292	6	135	2	37	4	5	0.119	0.113	5.63	18.8	<0.05
	27/04/2022	6.52	685	556	7	335	6	74	7	10	0.331	0.134	15	48.3	<0.05
	08/09/2022	6.4	486	325	5	214	5	53	4	6	0.186	0.12	10.1	26.5	<0.05
	14/10/2022	6.58	651	524	4	297	7	78	6	9	0.331	0.173	13.7	45.7	<0.05
	27/12/2022	5.91	1010	1010	11	535	12	102	11	21	0.701	0.54	39.2	104	<0.05

Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			(µS/cm ²)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
S1A EPL 32	01/02/2022	6.62	322	300	17	117	12	43	5	11	0.0946	0.221	2.72	9.79	<0.05
	01/03/2022	5.89	2450	3640	4	1940	56	200	31	76	5.36	1.9	183	625	<0.05
	16/03/2022	6.61	1200	1240	5	618	32	116	19	36	0.879	1.16	28.6	122	<0.05
	19/04/2022	7.02	511	440	9	222	8	81	5	6	0.0992	2.35	0.161	10	<0.05
	27/04/2022	6.96	255	187	13	91	4	30	2	4	0.0556	0.096	1.69	6.79	<0.05
	08/09/2022	6.72	394	243	13	149	11	51	4	8	0.0814	0.104	1.91	8.84	<0.05
	14/10/2022	6.83	212	168	11	74	4	32	2	4	0.054	0.058	1.41	6.23	<0.05
	27/12/2022	6.53	648	528	17	266	28	81	8	30	0.159	0.242	4.63	16.9	<0.05
S9B-2 EPL 33	01/02/2022	6.22	1240	1040	15	544	65	154	22	97	0.479	0.429	11.3	35	<0.05
	01/03/2022	Insufficient sample													
	16/03/2022	7.15	395	332	9	142	16	50	4	15	0.0848	0.334	1.28	6.32	<0.05
	19/04/2022	6.6	375	326	7	147	13	46	5	12	0.114	1.78	0.535	8.36	<0.05
	27/04/2022	6.79	246	162	9	76	11	22	2	11	0.0666	0.272	1.01	5.6	<0.05
	08/09/2022	6.7	570	329	5	198	33	49	8	29	0.222	0.642	3.64	15.8	<0.05
	14/10/2022	6.86	264	196	7	86	14	29	4	13	0.0995	0.341	1.3	7.42	<0.05
	27/12/2022	Insufficient sample													

Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			(µS/cm ²)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
Horwood Dam EPL34	01/02/2022	6.19	6830	6530	7	2990	1180	372	232	1140	2.96	3	147	161	<0.05
	01/03/2022	6.58	9410	12000	10	5190	2300	491	415	1940	6.93	3.12	297	336	<0.05
	16/03/2022	5.39	4500	4010	1	1810	630	287	110	553	2.11	2	75.8	116	<0.05
	19/04/2022	6.44	6690	6920	5	2910	1030	345	187	913	3.32	145	2.02	194	<0.05
	27/04/2022	6.62	5640	4640	6	2090	780	286	135	661	2.4	2.07	96.8	119	<0.05
	08/09/2022	6.21	9410	8560	13	3890	1250	396	217	1120	2.19	2.05	201	452	<0.05
	14/10/2022	6.4	5840	5120	8	2280	839	328	138	704	2.18	1.7	134	265	<0.05
	27/12/2022	6.19	11600	13500	10	5310	1570	494	318	1720	2.66	2.38	308	652	<0.05
Upstream EPL35	01/02/2022	7.09	182	172	39	35	15	23	3	13	0.0041	0.015	0.008	0.574	<0.05
	01/03/2022	Insufficient sample													
	16/03/2022	6.69	2410	2510	24	1200	158	265	44	151	1.38	0.08	33.3	172	<0.05
	19/04/2022	7.18	64	75	24	4	5	10	1	5	0.0017	0.01	0.016	0.067	<0.05
	27/04/2022	6.32	1960	1710	26	893	126	212	35	123	0.783	0.023	16.8	98.1	<0.05
	08/09/2022	6.9	182	104	37	26	16	18	2	10	0.0096	0.011	0.457	1.21	<0.05
	14/10/2022	7.06	276	192	79	34	17	39	4	12	0.0026	<0.001	0.008	0.747	<0.05
	27/12/2022	Insufficient sample													

Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			($\mu\text{S}/\text{cm}^2$)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
Downstream EPL 36	01/02/2022	7.22	238	493	91	16	14	16	4	31	0.0001	<0.001	<0.001	0.008	<0.05
	01/03/2022	7.37	276	248	77	14	19	12	4	34	0.0001	<0.001	<0.001	0.008	<0.05
	16/03/2022	7.76	400	318	81	32	54	26	7	42	0.0022	0.002	0.004	0.204	<0.05
	19/04/2022	7.95	222	407	67	20	20	16	4	29	0.0004	0.009	0.002	0.035	<0.05
	27/04/2022	7.16	224	170	60	22	18	16	4	18	0.005	<0.001	0.004	0.098	<0.05
	08/09/2022	7.25	402	249	75	48	42	25	8	34	0.0013	0.002	0.026	0.17	<0.05
	14/10/2022	7.13	323	239	70	32	35	25	6	28	0.0007	0.001	0.003	0.098	<0.05
	27/12/2022	Insufficient sample													

5.5.1 Water containment structures

All surface runoff on site is captured by diversion trenches or berms and channelled to site water storage structures. No changes were made to this system during the reporting period. Plan 5 shows the water catchments and containment structures. **Table 5-9** provides the capacities and estimated stored water volumes at the end of the reporting period. Detailed surveying of the water storage structures is planned for the next reporting period. Surveys will be used to develop staged storage curves that will enable more accurate capacities and volumes to be determined.

Heavy rainfall on 25 December 2022 resulted in some storages and catchments holding water at the end of the reporting period, 31 December 2022.

Table 5-9 Water Containment Structures

	Pond Identification	Start of reporting period m ³ (1-Jan-2022)	At end of reporting period m ³ (31-Dec-2022)	Storage Capacity m ³
Potable and Raw Water	Workshop	9	9	14
	Boom Gate	22.5	22.5	22.5
	Mill	22.5	1400	1400
	Delprat's Shaft	22.5	22.5	22.5
	Kintore Pit	14	14	18
	Silver Tank	6500	6500	6500
Dirty Water (rain runoff)	S2	0	100	5003
	S14	0	100	7813
	S17	0	100	4265
	S31-2	0	10	225
	S49	0	200	1951
	S35	0	10	6092
Process, underground and used water	Horwood Dam	1000	1000	7663
	Plant Water Pond	1000	1000	2000
	S22 Mine Settlement Ponds	3000	3000	20,489
	S22-A	2000	2000	2000
	Vehicle Wash	22.5	22.5	22.5

5.6 Groundwater

The regional groundwater near the site is depressed due to long term pumping from the underground mines in the area. This results in the depressed groundwater level below the site being more than 100m below the surface level, with a hydraulic gradient into the site at depth. The groundwater monitoring program is undertaken with the purpose of recording perched groundwater movement. Perched groundwater refers to surface water that has infiltrated into the near surface moderate to high permeability material generally comprising of granular soils and rock dill. The perched ground water exists for short periods of time after rainfall events and generally seeps laterally over the low permeability bedrock surface below the near surface permeable material. The rainfall events at Rasp mine site indicate that the perched groundwater has the potential to surface seep rather than seep into the regional groundwater. Considering the depth of the regional groundwater, it is concluded that there is little interaction between the shallow perched groundwater and the regional groundwater.

Rasp's groundwater monitoring plan is outlined in the Site Water Management Plan.

The monitoring program includes eighteen sampling locations for groundwater, GW01 (EPL37) to GW16 (EPL52) are installed piezometers at various locations around the mine site and are sampled quarterly. There are also two sampling locations for water pumped from underground mining, Shaft 7 (EPL53) and Kintore Pit (EPL54), sampled monthly. The locations for these monitoring points are shown in **Figure 3-2**. Groundwater monitoring is scheduled for March, June, September and

December. A number of parameters are required to be analysed including: alkalinity (calcium carbonate (CaCO₃)), cadmium (Cd), calcium (Ca), chloride (Cl), electrical conductivity (EC), iron (Fe), lead (Pb), magnesium (Mg), manganese (Mn), pH, sodium (Na), sulphate (SO₄), total dissolved solids (TDS) and zinc (Zn). **Table 5-10** lists the location and function of each borehole.

Table 5-10 Location and Function for Groundwater Monitoring Points

Bore ID	Location	Function
GW01, GW02	Southeast of Mt Hebbard	Monitor potential seepage from Mt Hebbard
GW03 – GW09	East of TSF1	Monitor potential seepage from TSF1 towards CML7 boundary
GW10	Downstream of Horwood Dam	Monitor potential seepage north of Eyre St Dam
GW11, GW12	East of Blackwood Pit	Monitor perched groundwater mounding from TSF
GW13-GW15	Adjacent to storage areas S44, S31-1 and S31-2	Monitor movement of perched groundwater occurring from the storages
GW16	West of S49	Monitor potential seepage from S49
Shaft 7	Shaft 7	To maintain safety for underground mining at both the Rasp and Perilya South Mines
Kintore Pit (UG) - Mine dewatering	Kintore Pit decline	To maintain safety for underground mining at the Rasp Mine

Groundwater quality monitoring was undertaken in May 2007 and August 2011 at Shaft 7 to establish an initial baseline for parameters and trigger levels for the monitoring program (30% above 2011 results).

The site's groundwater is deep and is extracted as part of mining. The underground extraction system results in inward flow of the groundwater into the mine. Hence, groundwater at the mine is likely to be impacted by off-site sources due to the inward hydraulic gradient into the mine.

Quarterly samples were obtained from 13 of the 16 bores, samples were obtained from ten bores, and no samples could be obtained from bores GW2, GW13, GW14 or GW15.

Results are elevated **in 2022** due to the above average rainfall experienced throughout the year but have overall remained within historic ranges and were consistent with the expectation of Golder as outlined in the Site Water Management Plan, that perched groundwater quality would contain significant concentrations of lead, manganese and zinc due to the seepage contact with the near surface materials on site and the surrounding areas.

Table 5-11 quarterly samples were obtained from 13 of the 16 bores, samples were obtained from ten bores, and no samples could be obtained from bores GW2, GW13, GW14 or GW15.

Results are elevated in 2022 due to the above average rainfall experienced throughout the year but have overall remained within historic ranges and were consistent with the expectation of Golder as outlined in the Site Water Management Plan, that perched groundwater quality would contain significant concentrations of lead, manganese and zinc due to the seepage contact with the near surface materials on site and the surrounding areas.

The majority of piezometers showed a steady or decrease in water levels during the reporting period which can be attributed to the low rainfall. **Table 5-12** provides a summary of groundwater monitoring results for 2020.

Table 5-14 provides a summary of water monitoring results for Shaft 7 and mine dewatering (Kintore Pit), indicating samples above baseline trigger in orange.

Figures 5-20 and 5-21 provide a summary of water monitoring results for the period 2012, commencement of operations, to 2022.

Quarterly samples were obtained from 13 of the 16 bores, samples were obtained from ten bores, and no samples could be obtained from bores GW2, GW13, GW14 or GW15.

Results are elevated in 2022 due to the above average rainfall experienced throughout the year but have overall remained within historic ranges and were consistent with the expectation of Golder as outlined in the Site Water Management Plan, that perched groundwater quality would contain significant concentrations of lead, manganese and zinc due to the seepage contact with the near surface materials on site and the surrounding areas.

Table 5-11 Bore Piezometer Depths

Sample point	Depth mbTOC									Trend
	Avg 2022	Avg 2021/22	Avg 2020/21	Avg 2019	Avg 2018	Avg 2017	Avg 2016	Avg 2015	Avg 2014	
GW01	6.05	8.96	Dry	8.42	8.35	6.85	7.39	7.25	7.25	Falling
GW02	Dry	Dry	Dry	Dry	Dry	3.33	Dry	Dry	Dry	Stable
GW03	3.52	3.66	3.66	3.83	3.6	3.58	3.64	3.62	3.61	Stable
GW04	2.92	3.03	3.42	2.99	2.73	2.87	2.94	2.9	2.83	Rising
GW05	3.25	3.48	4.16	3.76	3.65	3.49	3.53	3.5	3.4	Rising
GW06	2.77	3.26	3.21	3.16	3.10	2.96	2.85	2.76	2.66	Rising
GW07	2.68	3.25	3.80	3.14	3.15	2.58	2.74	2.8	2.54	Rising
GW08	1.48	2.22	3.08	2.53	2.36	1.88	1.81	1.87	2.11	Rising
GW09	2.46	3.34	4.31	3.89	3.84	3.50	2.94	3.07	1.79	Rising
GW10	2.44	4.1	5.2	4.20	3.46	1.90	1.49	1.725	0.83	Rising
GW11	9.9	11.42	13.30	12.17	12.00	10.00	10.10	10.4	10.69	Rising
GW12	34.1	Dry	21.52	21.53	20.47	19.19	34.49	37.1	21.6	Falling
GW13	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Stable
GW14	0.34	0.34	Dry	Dry	Dry	1.3	Dry	Dry	Dry	Rising
GW15	Dry	Dry	Dry	Dry	Dry	2.8	Dry	Dry	Dry	Stable
GW16	1.29	1.14	Dry	Dry	Dry	Dry	1.55	Dry	Dry	Rising

The following provides a discussion of results.

GW01 and GW2 Located Downstream of Mt Hebbard

These water bores are intended to monitor the sub-surface water fluctuations south of Mt Hebbard. GW1 had sufficient water to monitor each quarter while GW2 was dry through the year. GW1 contained water following rainfall in February and March and sample results were consistent with results from previous years. GW2 did not contain water in previous years except for 2017 but this was at bore depth. Error! Reference source not found.22 indicates that results remain within historic anges.

GW03, GW04, GW05, GW06, GW07, GW08, GW09 and GW10 Located Adjacent to TSF1 and Horwood Dam

Groundwater bores are located near the eastern side of the unused historic TSF1 and extend to Horwood Dam. The intent of the monitoring bores is to monitor perched water in the area that may impact on Eyre Street Dam. The monitoring is in response to surface seepage noted in the area during intense 2011 rainfall events. All bores in the series were able to be monitored each quarter. Water levels were stable in GW3 and rising in bores GW4 to GW10 due to the heavy rainfall in the year. Lead results from GW3, GW4, and GW9 were elevated at times and likely due to infiltration of rainfall to TSF1. Error! Reference source not found. indicates that results remain within historic ranges.

GW11 and GW12 located south east of Blackwood Pit

Blackwood Pit is used for the storage of tailings. It forms part of the mining area and is surrounded by historic mine workings. Due to these historic workings, any seepage from the Pit will be intercepted and collected by the underground mine water management system. Due to the north east and south west length of the pit there is a possibility for the formation of a perched aquifer as a result of groundwater mounding around the south east site of the pit once it receives tailings. If a perched water table is measured in the two bores, consideration will be given to the installation of additional bores to assess the local hydrogeological conditions and risk of migration of seepage. On the advice of Golder, bores were installed to the south east of the facility in order to detect any seepage.

The ground water level in GW11 was lower than previous periods due to the increase of tailings levels in TSF2 sealing fractures and stopes in the sides of the Blackwoods Pit and limiting water seepage. GW12 has gone dry which may be due to nearby exploration drilling intercepting an old working in the area. Error! Reference source not found. indicates results remain within historic ranges for GW11.

GW13 and GW14 (adjacent 31-1), GW15 (adjacent rail load out) and GW16 (adjacent S49)

As perched water seepage may occur from ponds located near the CML7 boundary when these ponds store water, bores have been installed adjacent these locations. All bores were dry in the period.

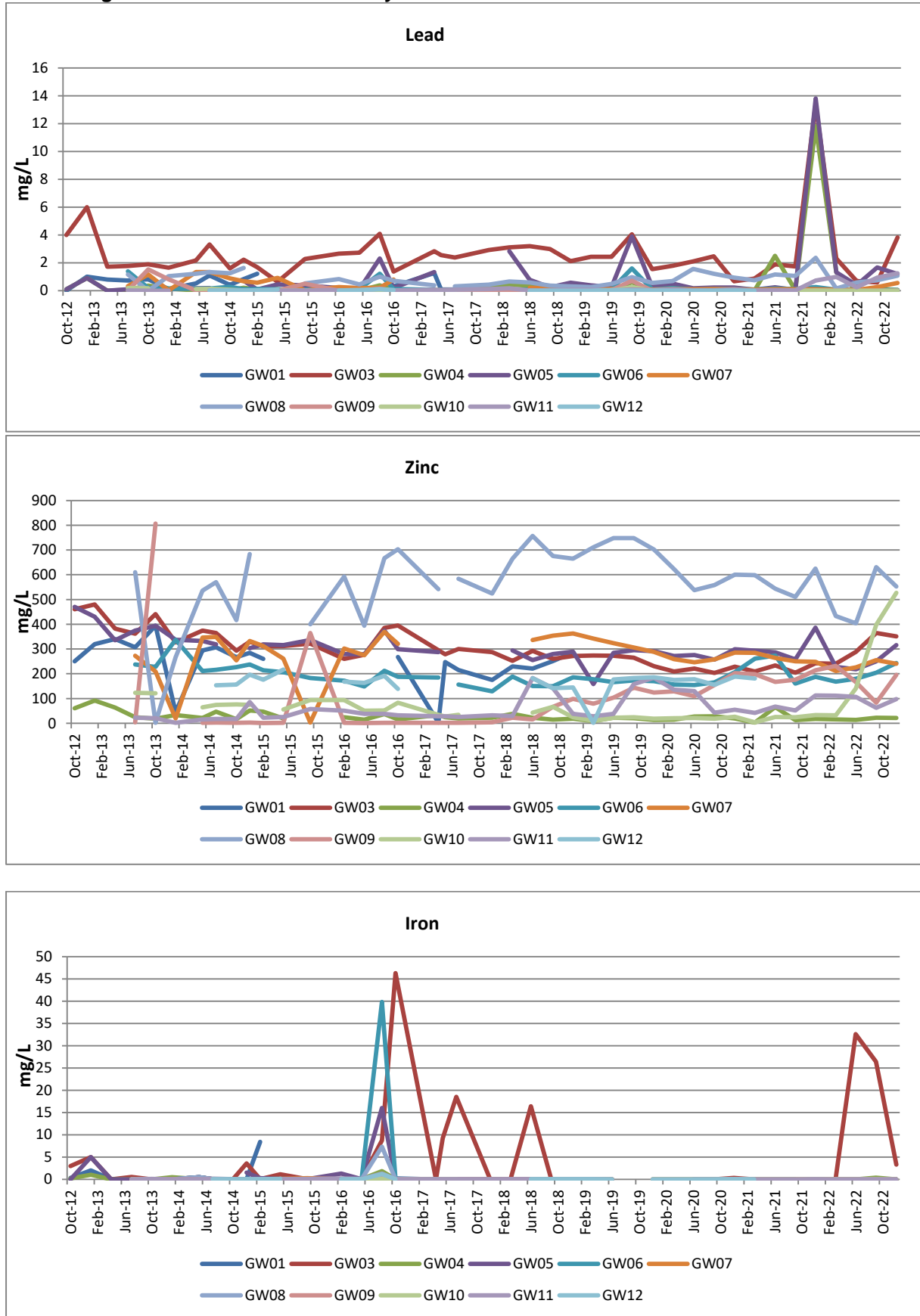
Table 5-12 Piezometer Monitoring Results for the Reporting Period

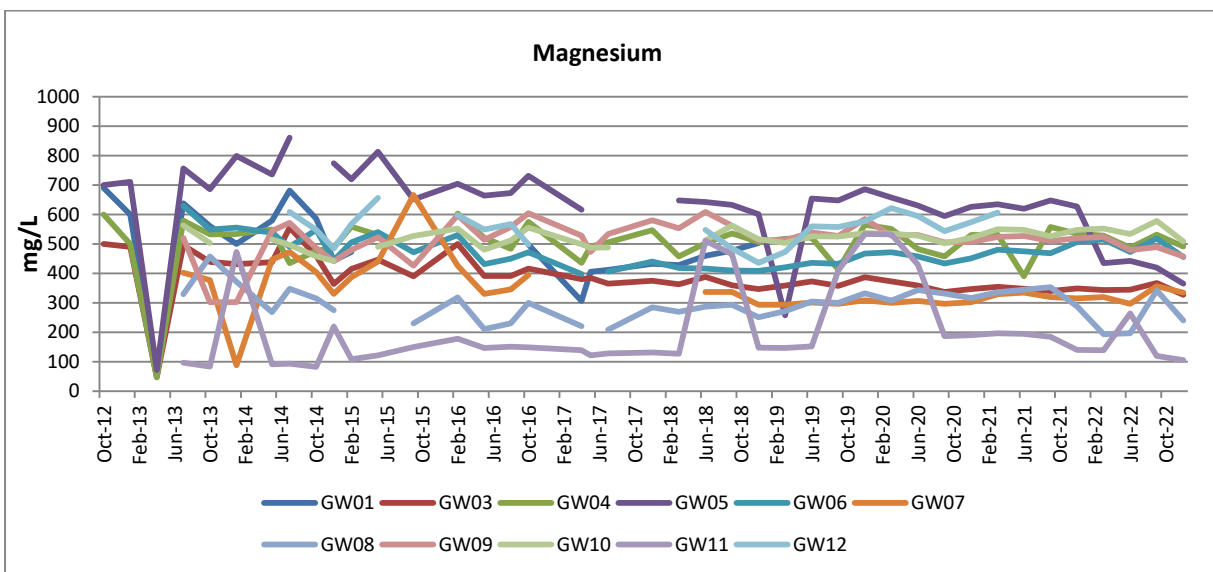
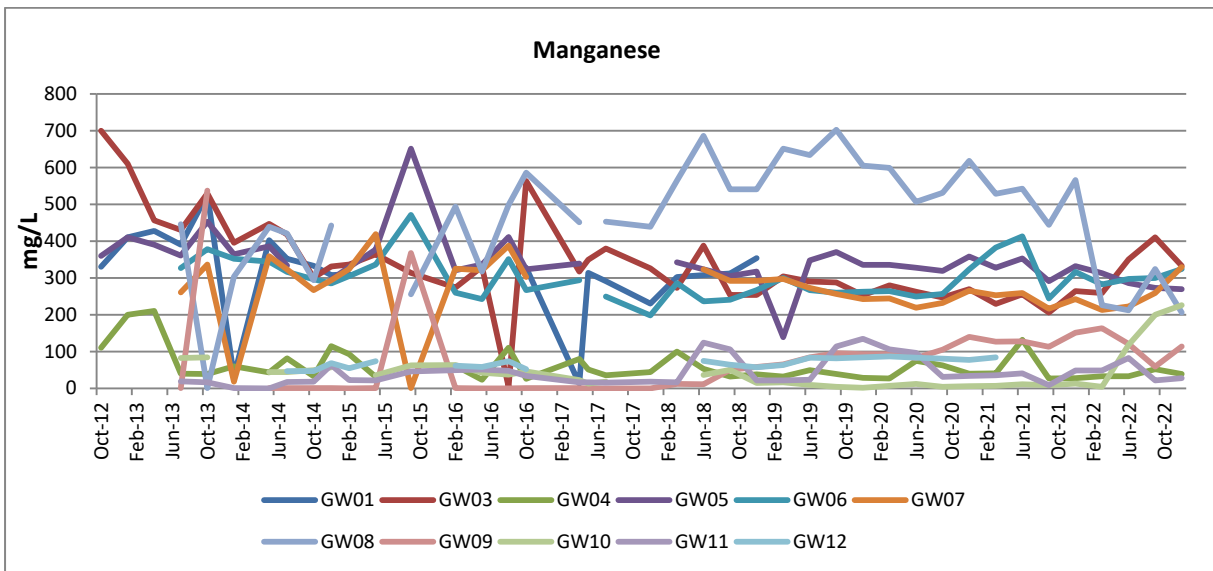
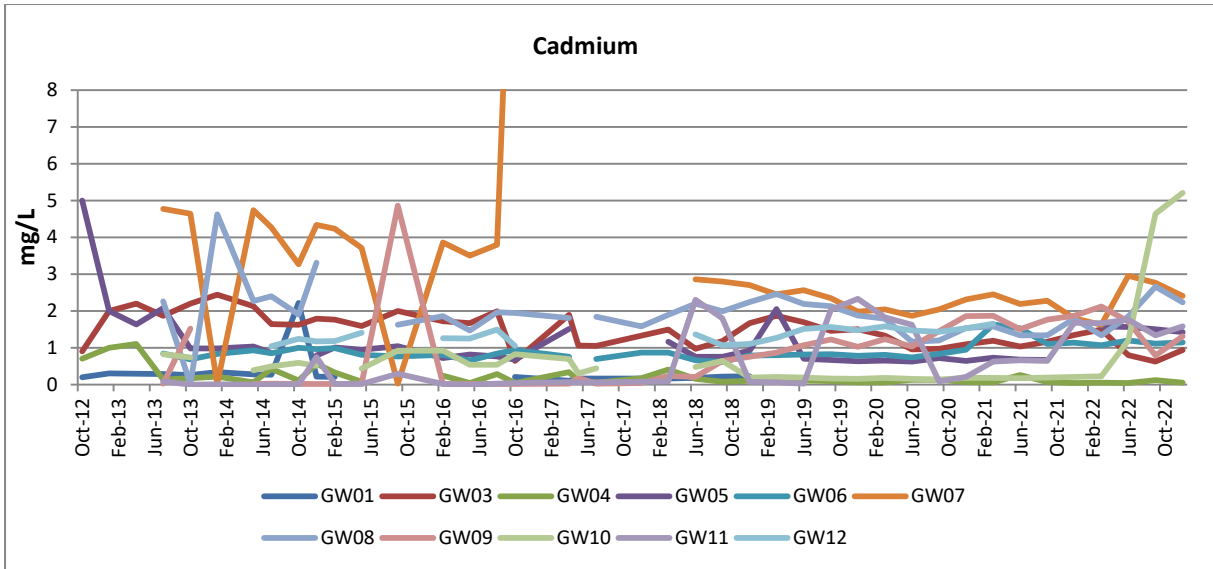
Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			(µS/cm ²)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
GW1 (EPL37)	31/03/2022	4.77	13200	13500	<1	6270	1730	372	586	1820	0.34	0.331	364	290	<0.05
	20/06/2022	5.13	9220	8440	5	4880	804	285	421	1480	0.159	0.121	237	200	<0.05
	26/09/2022	5.15	10200	9570	3	5080	1040	276	426	1460	0.2	0.113	294	280	<0.05
	20/12/2022	6.07	5820	5790	116	3000	386	357	307	684	0.0736	<0.001	98	58.6	<0.05
GW2 (EPL38)	31/03/2022		Dry												
	20/06/2022		Dry												
	26/09/2022		Dry												
	20/12/2022		Dry												
GW3 (EPL39)	31/03/2022	5.83	14800	13700	2	5060	3180	577	544	2160	0.797	0.693	350	288	32.6
	20/06/2022	5.94	12800	12300	32	5110	2820	601	367	2250	0.624	0.581	410	365	26.4
	27/09/2022	5.99	14200	12800	<1	4850	3020	539	327	2070	0.939	3.82	333	351	3.33
	20/12/2022	5.89	14900	13700	5	5000	3070	537	348	2100	0.655	3.38	396	320	<0.05
GW4 (EPL40)	31/03/2022	6.39	14200	12200	233	4862	2760	564	487	2150	0.0417	0.035	32.6	13.1	<0.05
	20/06/2022	6.33	12800	10600	206	4880	2410	629	531	2390	0.121	0.144	51.8	22.4	0.38
	27/09/2022	6.25	13900	12100	205	4710	2740	561	491	2160	0.0498	0.045	39	21.3	<0.05
	20/12/2022	6.29	14300	12200	212	4780	2660	545	512	2240	0.036	26.8	0.004	1.42	<0.05
GW5 (EPL41)	31/03/2022	5.76	14000	12900	39	5330	2680	545	442	2140	1.56	0.388	286	218	<0.05
	20/06/2022	5.65	12100	11600	38	5110	2370	606	419	2240	1.5	1.66	273	250	<0.05
	27/09/2022	5.82	13400	12200	33	5160	2670	530	365	1980	1.42	1.19	269	316	<0.05
	20/12/2022	6	13800	12500	53	4990	2650	521	382	2030	1.49	0.716	227	244	<0.05
GW6 (EPL42)	31/03/2022	5.9	14600	13800	60	5590	2850	531	472	2180	1.2	0.047	297	180	<0.05
	20/06/2022	6.04	13100	11800	61	5390	2490	597	518	2380	1.11	0.054	300	204	<0.05
	27/09/2022	5.85	14200	13200	50	5650	2850	526	455	2080	1.15	0.049	324	243	<0.05
	20/12/2022	5.86	14300	13200	58	5250	2830	510	456	2140	0.975	0.058	282	175	<0.05

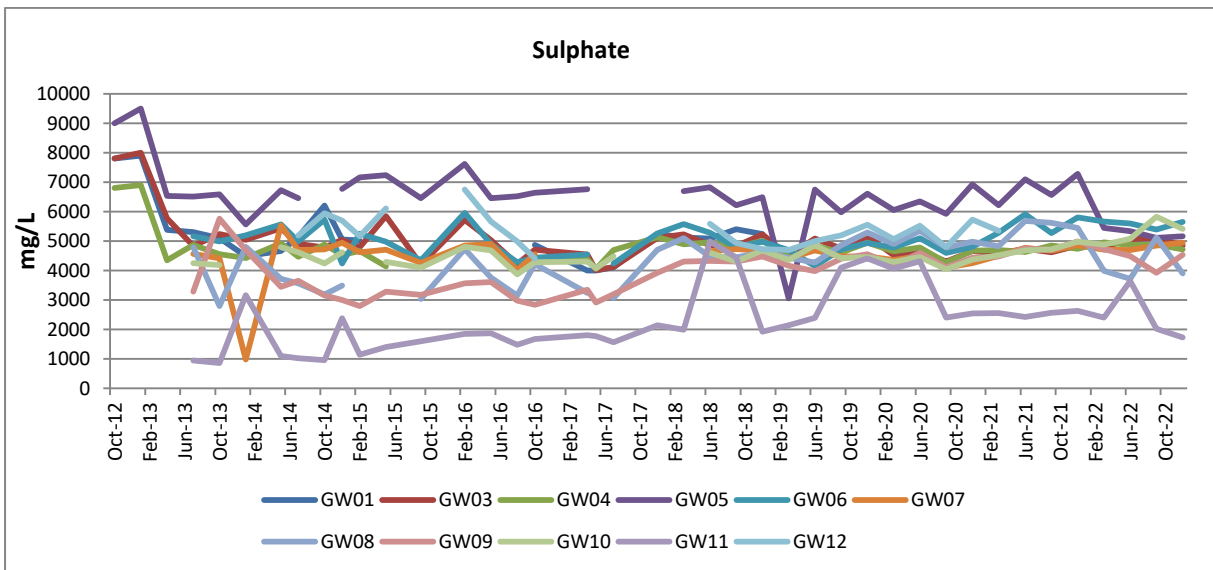
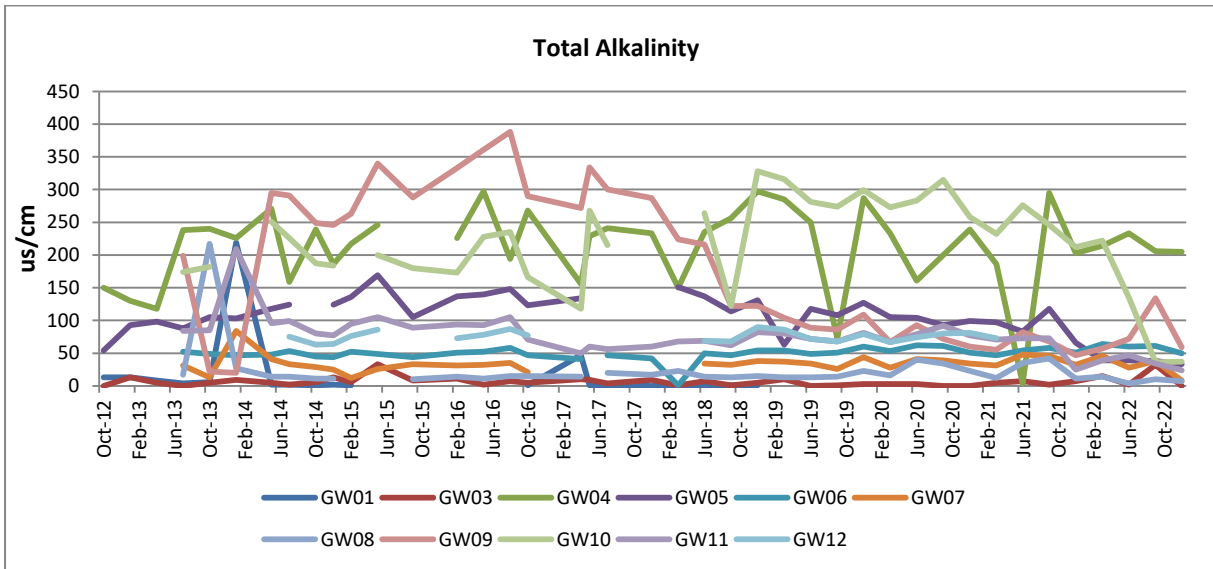
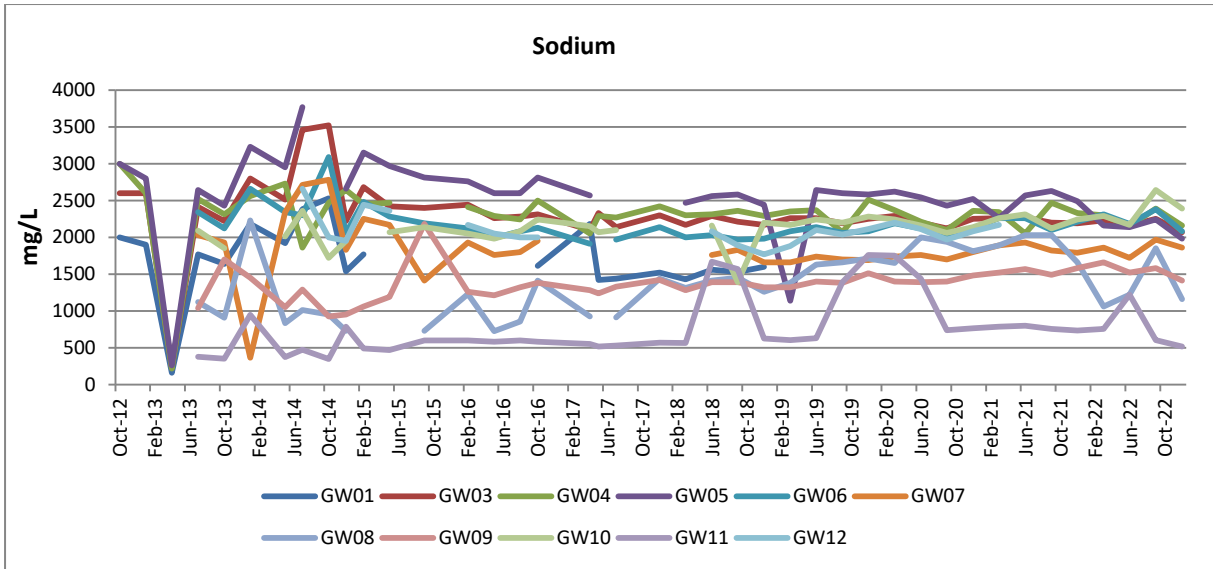
Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			(µS/cm ²)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
GW7 (EPL43)	31/03/2022	6.03	12100	10400	28	4690	1860	519	297	1720	2.95	0.054	222	226	<0.05
	20/06/2022	6.04	10900	10300	38	4850	1870	592	356	1970	2.76	0.262	259	255	<0.05
	27/09/2022	5.93	12800	11800	8	4940	2520	526	334	1860	2.41	0.546	329	240	<0.05
	20/12/2022	5.91	12700	12100	9	4890	2000	504	326	1820	2.16	1.16	295	241	<0.05
GW8 (EPL44)	31/03/2022	5.71	9170	9200	4	3710	1420	601	196	1220	1.85	0.582	212	404	<0.05
	20/06/2022	5.93	11400	11400	10	5120	1960	613	342	1850	2.66	0.746	324	631	<0.05
	26/09/2022	5.47	9770	9410	7	3900	1570	525	240	1160	2.23	1.07	206	552	<0.05
	20/12/2022	5.42	12700	13200	45	4800	2420	532	286	1700	1.74	0.581	409	512	<0.05
GW9 (EPL45)	31/03/2022	6.25	12000	10500	72	4490	2290	606	479	1520	1.71	<0.001	121	166	<0.05
	20/06/2022	6.22	10100	8670	134	3920	1990	715	489	1580	0.791	59.3	<0.001	82.7	<0.05
	27/09/2022	6.02	11000	10400	59	4530	1630	566	457	1410	1.31	0.008	114	195	<0.05
	20/12/2022	6.23	10500	8820	140	3300	1870	603	386	1280	0.267	<0.001	25.7	6.17	<0.05
GW10 (EPL46)	31/03/2022	6.21	14900	13000	135	5070	3150	641	533	2170	1.2	<0.001	118	141	<0.05
	20/06/2022	6.05	14300	13400	36	5820	2850	629	578	2640	4.64	0.001	200	398	<0.05
	27/09/2022	5.94	16000	15000	37	5410	3440	561	508	2390	5.21	0.002	226	527	<0.05
	20/12/2022	5.96	16000	14900	65	5580	3250	533	501	2430	3.68	0.003	197	375	<0.05
GW11 (EPL47)	31/03/2022	6	8850	7800	47	3640	1160	331	264	1220	1.76	0.238	82	106	<0.05
	20/06/2022	6.13	4150	3420	34	2020	443	319	119	603	1.34	0.941	21.9	62.6	<0.05
	27/09/2022	6.18	4440	3730	24	1730	490	286	105	518	1.58	1.25	28	97.7	<0.05
	20/12/2022	5.81	4140	3580	30	1580	457	268	100	483	1.25	0.414	20.1	65.6	<0.05
GW12 (EPL48)	31/03/2022														Dry
	20/06/2022														Dry
	27/09/2022														Dry
	20/12/2022														Insufficient sample
GW13 (EPL49)	31/03/2022														Dry
	20/06/2022														Dry
	27/09/2022														Dry
	20/12/2022														Dry

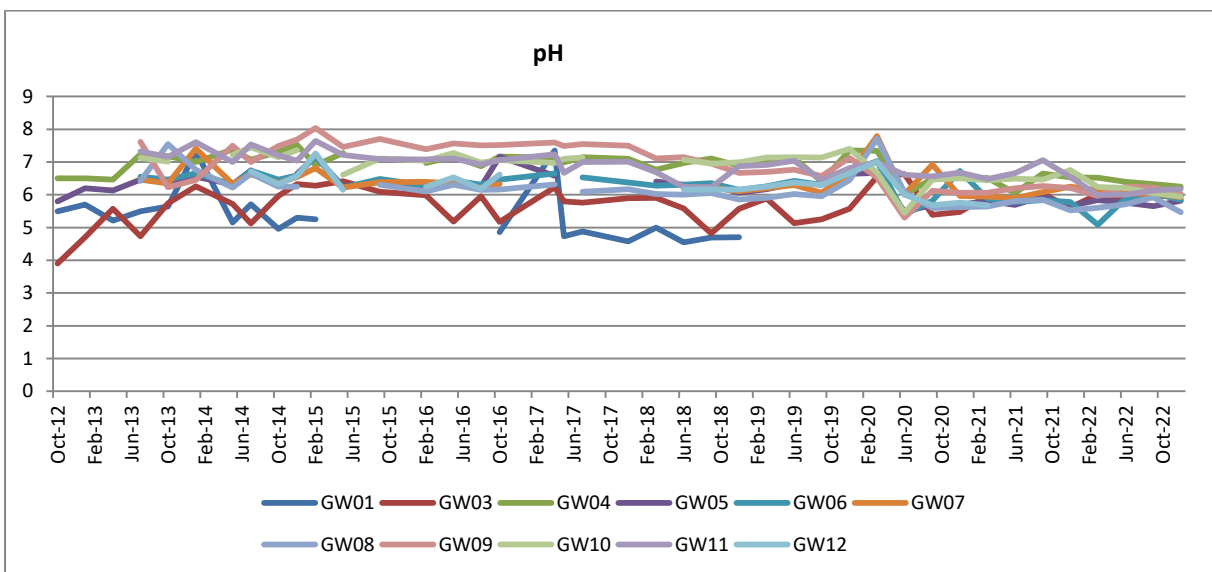
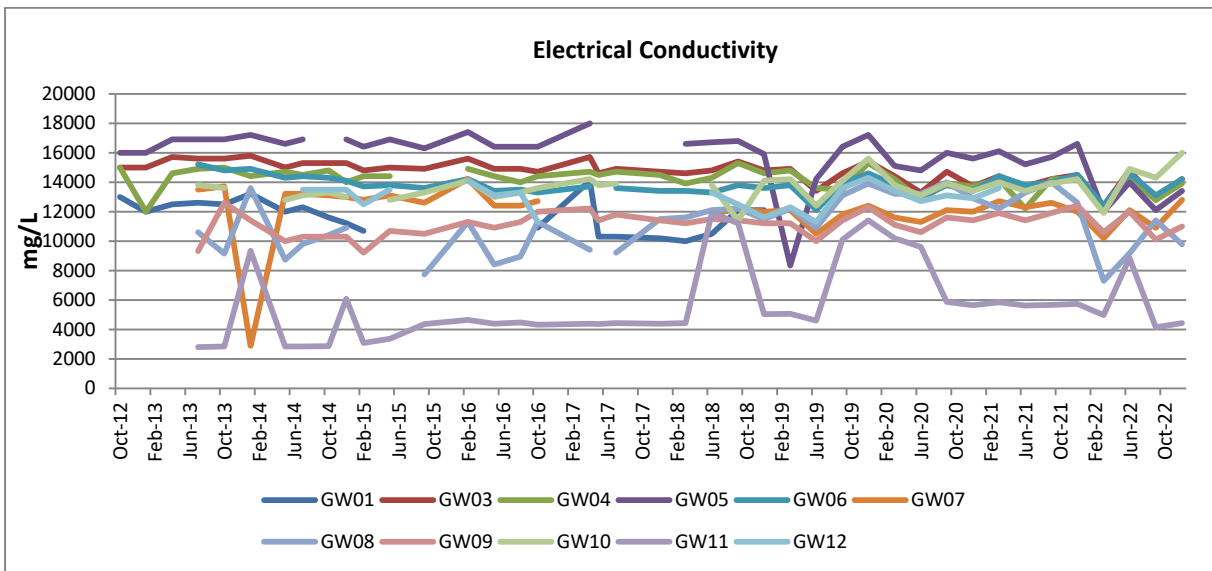
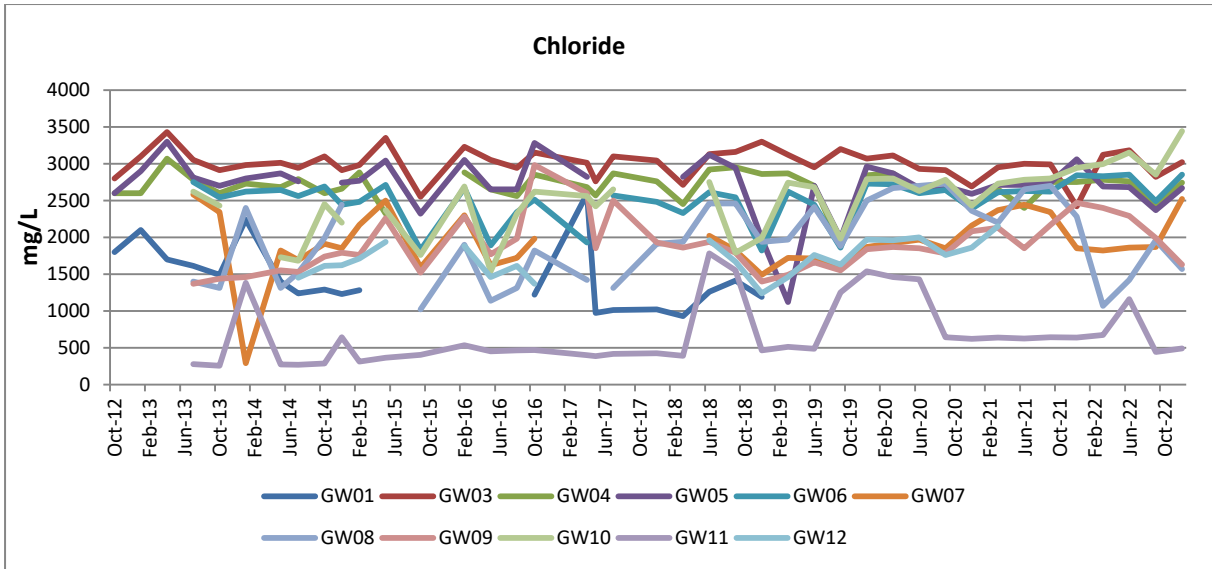
Sample Point	Sample Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			(µS/cm ²)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
GW14 (EPL50)	31/03/2022								Dry						
	20/06/2022								Dry						
	27/09/2022								Dry						
	20/12/2022								Dry						
GW15 (EPL51)	31/03/2022								Dry						
	20/06/2022								Dry						
	27/09/2022								Dry						
	20/12/2022								Dry						
GW16 (EPL52)	31/03/2022								No sample						
	20/06/2022	5.83	4650	4640	33	3300	166	525	267	400	0.652	0.002	8.14	149	<0.05
	26/09/2022								Dry						
	20/12/2022								Dry						

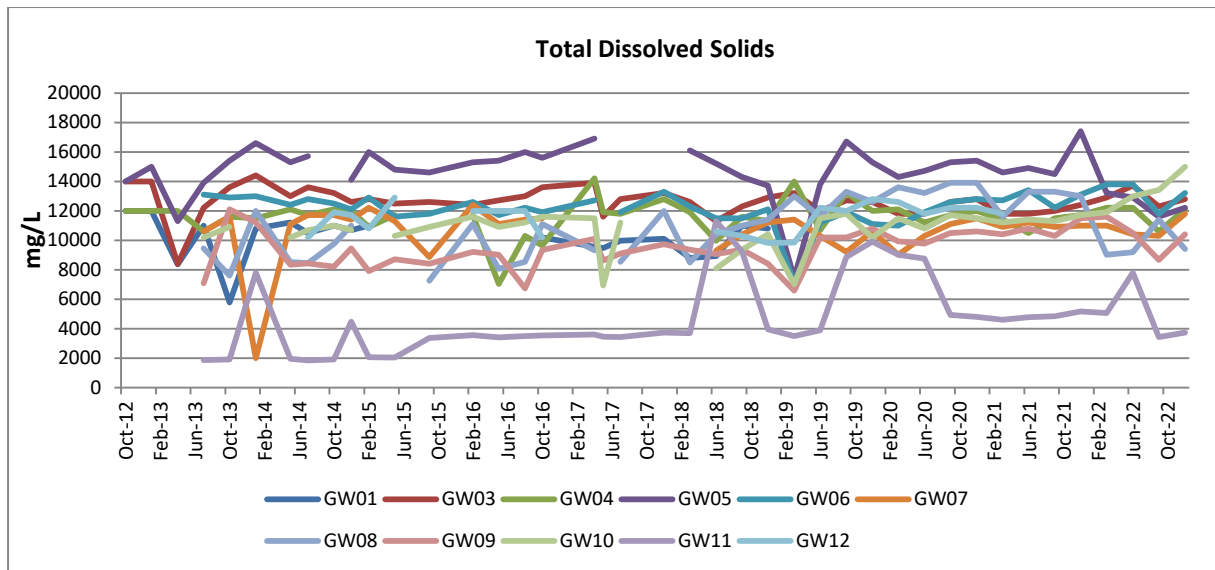
Figure 5-26 Groundwater Quality Results for the Period 2012 to December 2022











Underground Feed Sampling

Results for UG Feed have recently exceeded trigger thresholds for Chloride but are variable. Total dissolved solids (TDS) results were above the trigger threshold for all UG Feed results and all Shaft 7 results, however results were within the historic range for TDS. Water from both sources is only used on site and not discharged. Both the UG Feed and Shaft 7 returned a high result for Lead and Cadmium during 2022 and likely impacted by the mine locations being developed. Samples from both locations were interrupted throughout 2022 as pumping from each location was sporadic.

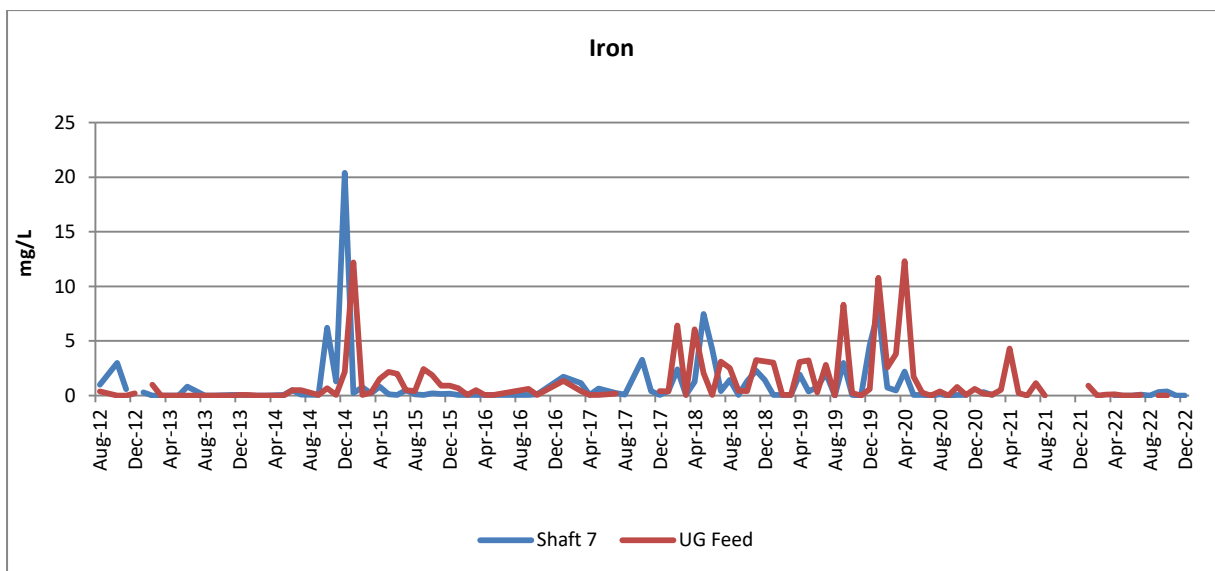
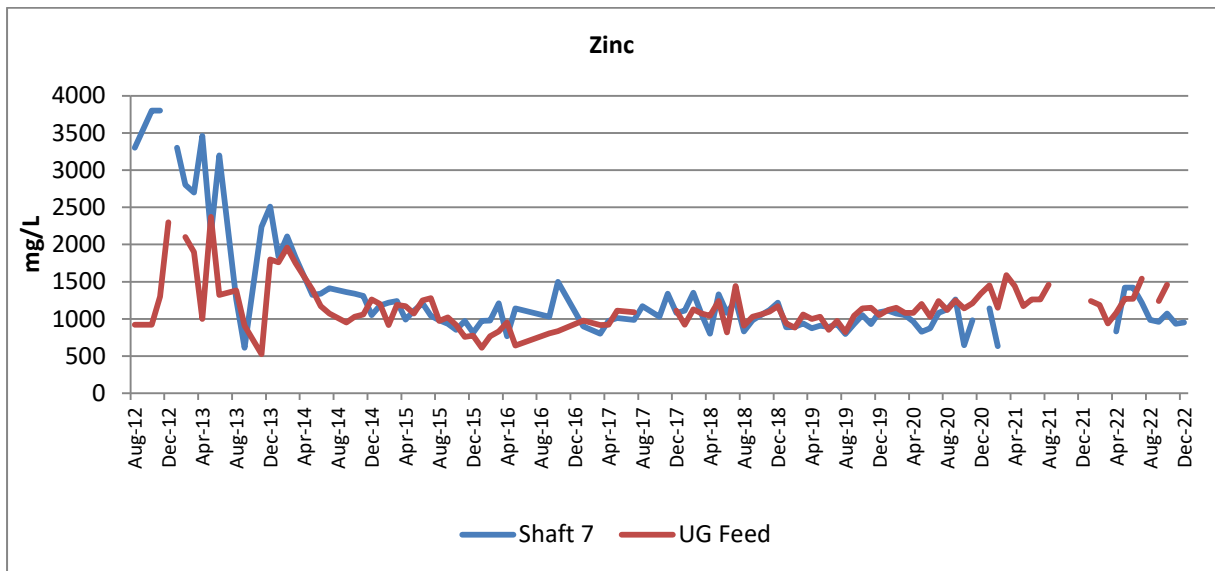
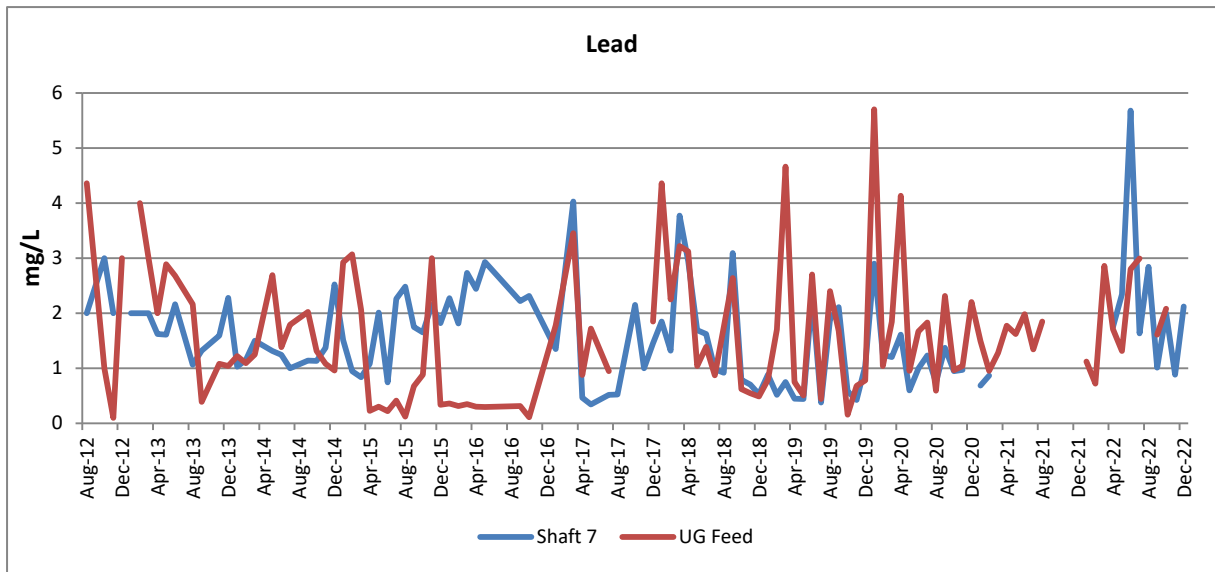
Figure 5-27 provides a series of graphs indicating results from commencement of operations to present (2012-2022). Results are within the historic range for all parameters.

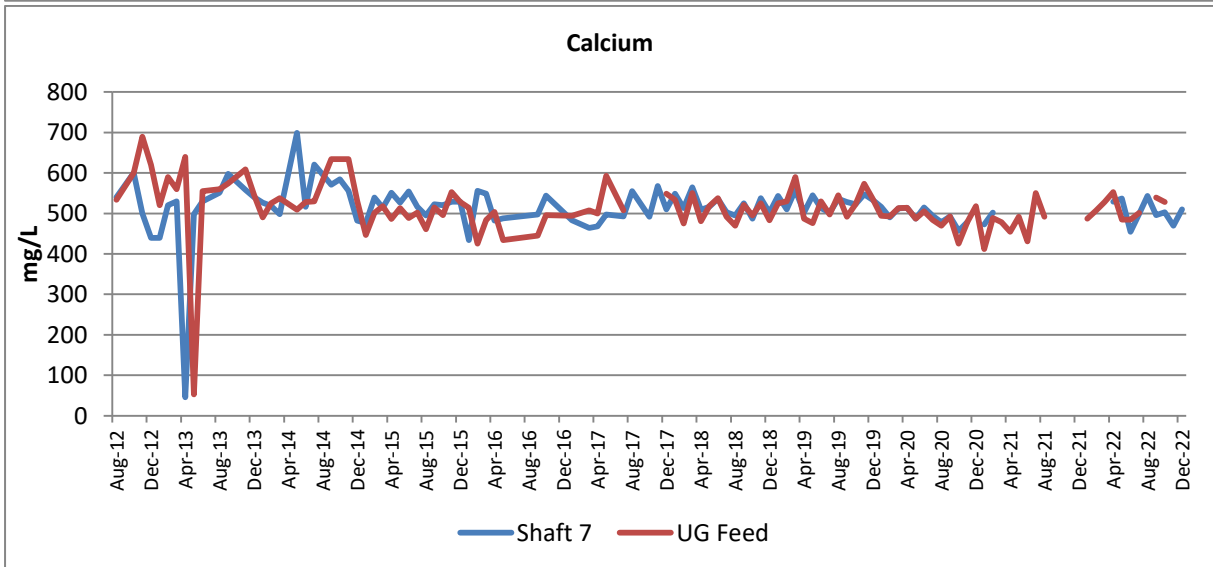
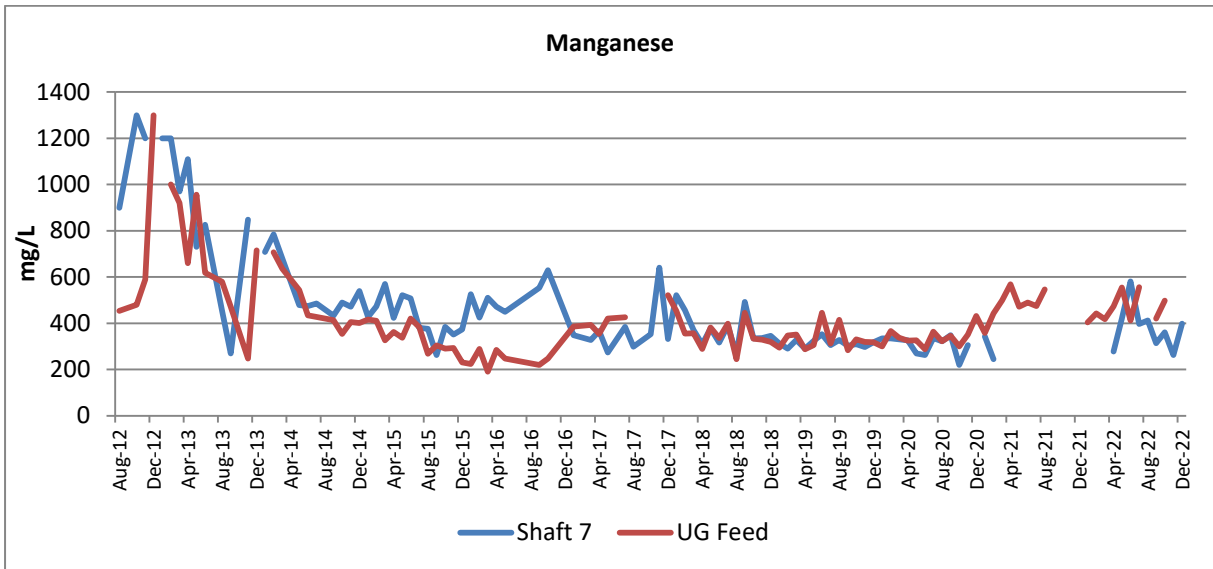
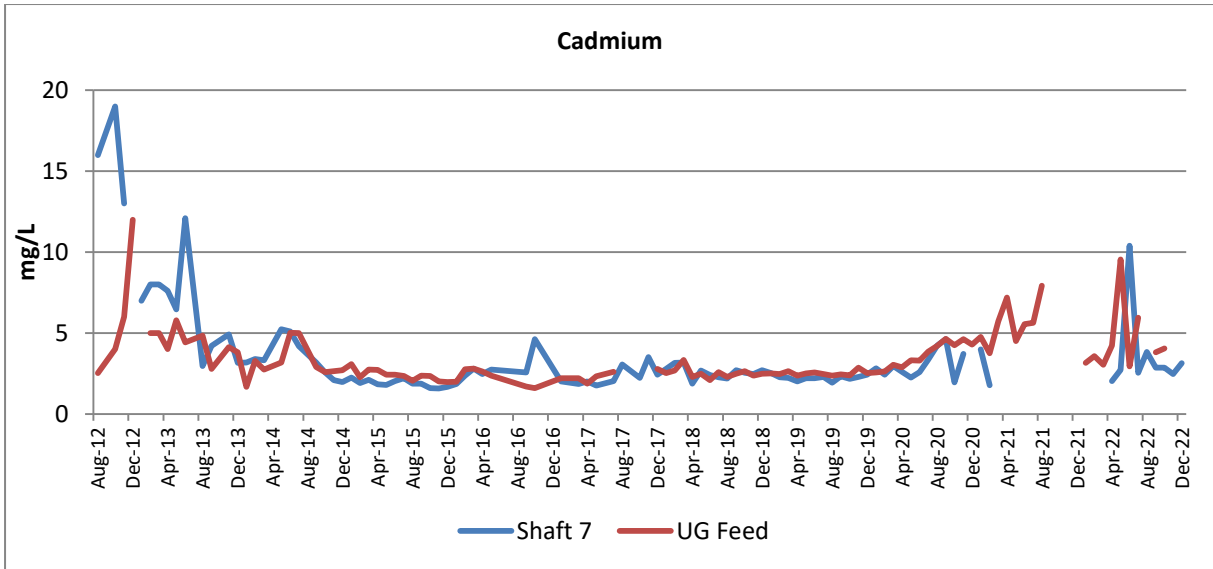
Table 5-13 Groundwater Monitoring Results for Shaft 7 and Mine Dewatering 2022

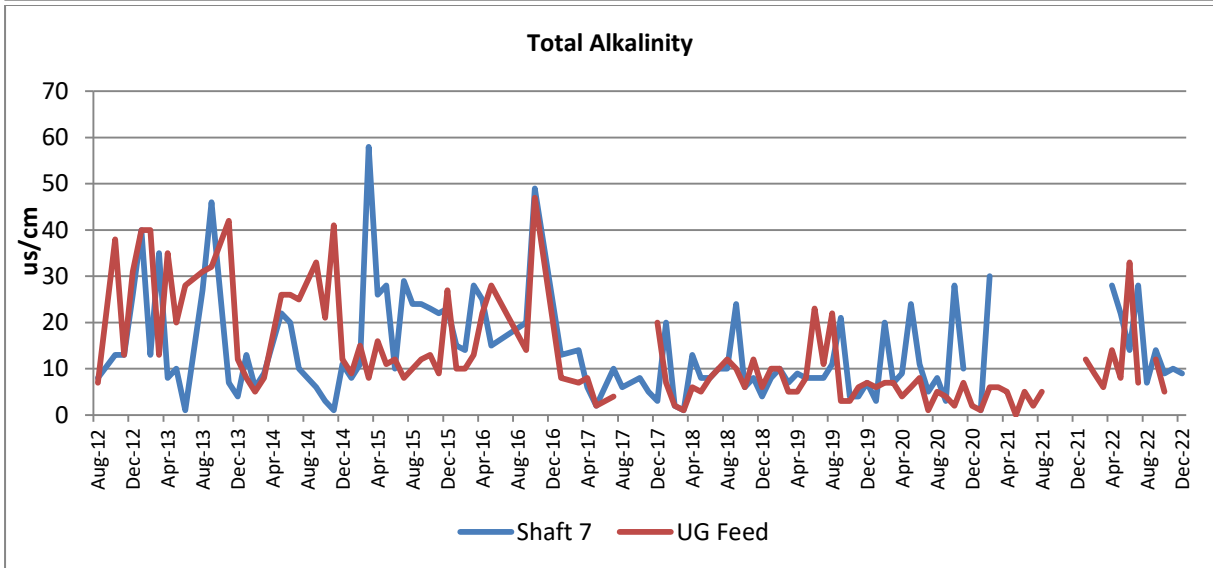
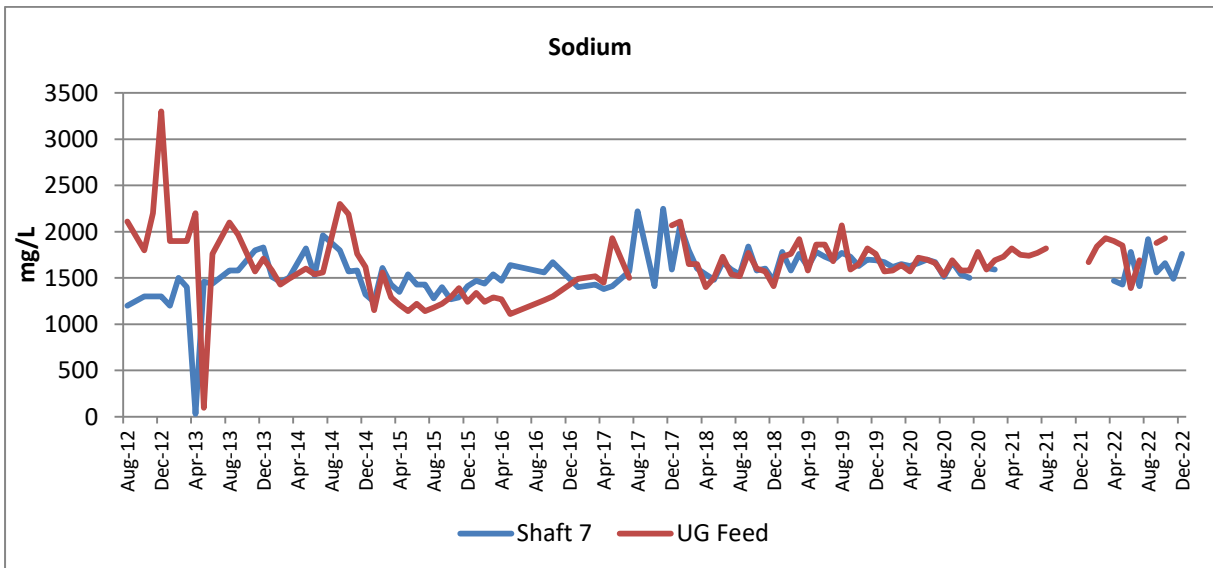
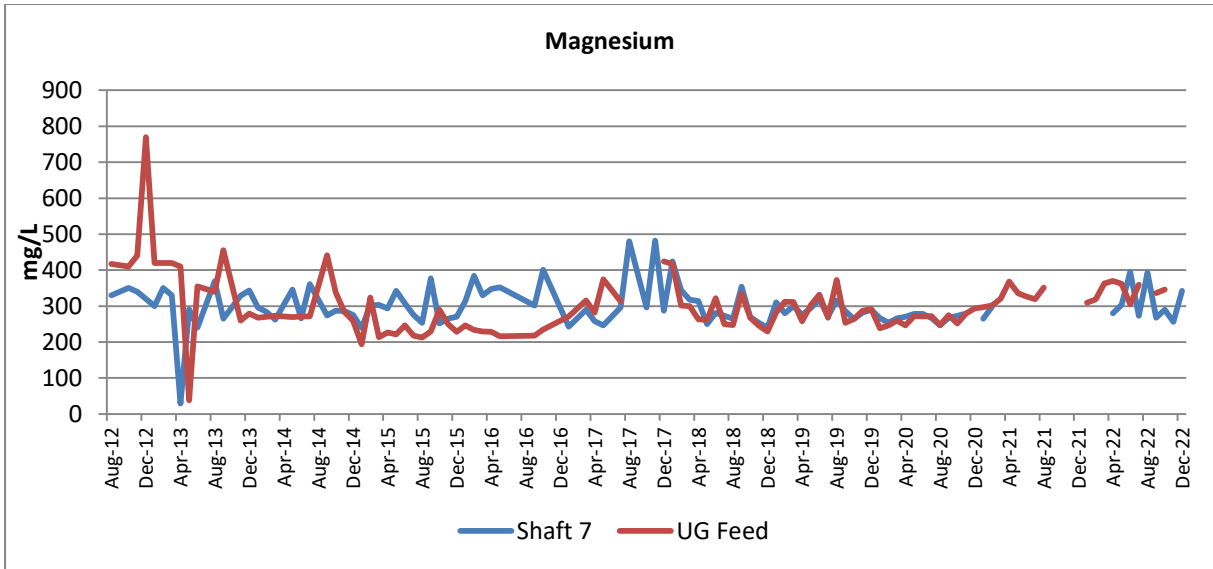
Sample Point	Date	pH	EC	TDS	Alkalinity (CaCO ₃)	SO ₄	Cl	Ca	Mg	Na	Cd	Pb	Mn	Zn	Fe
			(µS/cm ²)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
Shaft 7	12/01/2022	Shaft 7 not pumping													
	01/02/2022	Shaft 7 not pumping													
	24/03/2022	Shaft 7 not pumping													
	08/04/2022	5.56	11200	13000	28	5930	1490	529	280	1470	2.03	1.75	278	831	<0.05
	20/05/2022	6.55	11500	13500	22	7010	1420	537	303	1430	2.73	2.34	420	1420	<0.05
	07/06/2022	5.92	15200	17500	14	7630	1910	395	395	1780	10.4	5.68	581	1420	<0.05
	20/07/2022	6.26	12000	12900	28	6080	1290	499	273	1410	2.55	1.63	397	1200	0.1
	09/08/2022	5.64	12400	13600	7	6580	1930	543	393	1920	3.84	2.84	412	987	<0.05
	14/09/2022	5.78	13300	12500	14	5830	1610	496	268	1560	2.86	1.01	314	962	0.33
	11/10/2022	5.74	12400	14100	9	5860	1740	503	290	1660	2.86	2	361	1070	0.38
	15/11/2022	5.64	11900	12000	10	5840	1490	470	256	1490	2.47	0.881	262	933	<0.05
8/12/2022	5.92	13000	14200	9	6100	1860	510	342	1760	3.14	2.12	398	953	<0.05	
UG/Kintore	12/01/2022	6.03	13800	14600	12	6470	1870	487	309	1670	3.16	1.12	404	1240	0.91
	01/02/2022	5.84	10400	15300	9	6410	1800	507	318	1840	3.58	0.721	443	1190	<0.05
	24/03/2022	5.56	14700	15400	6	6800	2180	528	363	1930	3.03	2.86	418	940	0.1
	08/04/2022	5.85	14300	16500	14	6870	2170	553	370	1900	4.22	1.71	473	1080	0.13
	20/05/2022	5.79	13800	16100	8	7570	2350	485	362	1850	9.54	1.31	555	1270	<0.05
	07/06/2022	5.5	12900	14800	33	6950	1380	485	305	1390	2.94	2.8	412	1270	<0.05
	20/07/2022	5.41	14200	15400	7	6850	1640	501	359	1690	5.94	2.99	556	1540	0.07
	09/08/2022	UG not pumping													
	14/09/2022	5.63	15800	16300	12	6880	1970	539	336	1880	3.81	1.61	420	1240	<0.05
	11/10/2022	5.42	14400	16800	5	7090	2250	528	346	1930	4.04	2.08	498	1460	<0.05
	15/11/2022	UG not pumping													
8/12/2022	5.74	11300	12500	26	5630	1390	488	302	1490	1.66	1.51	335	860	<0.05	
Baseline	5.8	13900	8000	40	9660	1360	472	395	3550	6.32	2.25	907	3330	1.57	
Trigger	7.54	18070	10400	52	12558	1768	614	514	4615	7.57	2.93	1179	4329	2.04	

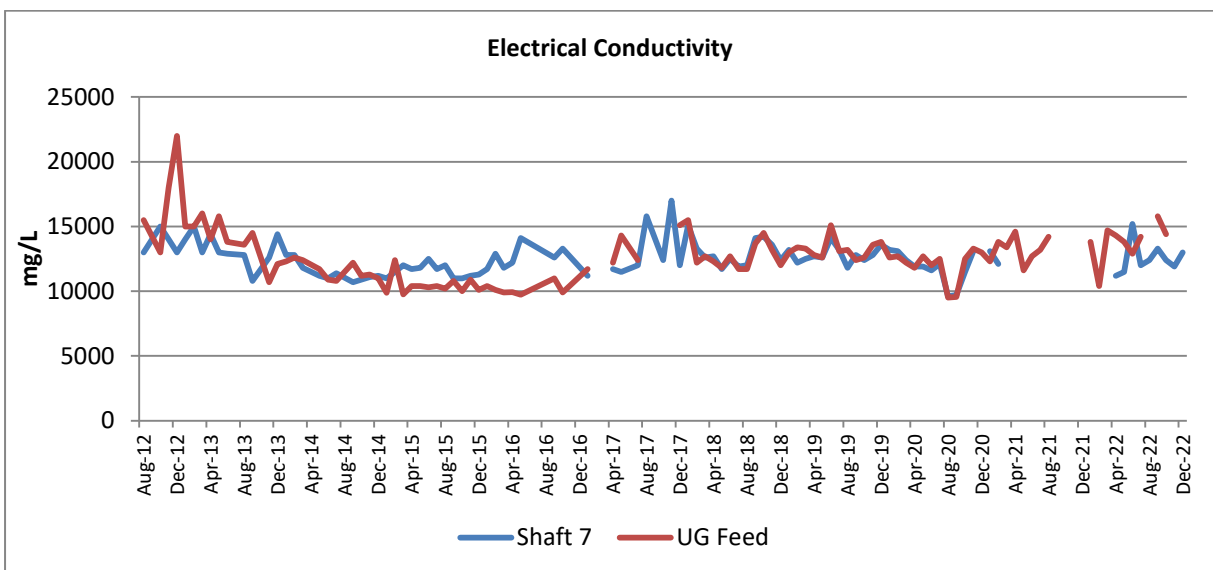
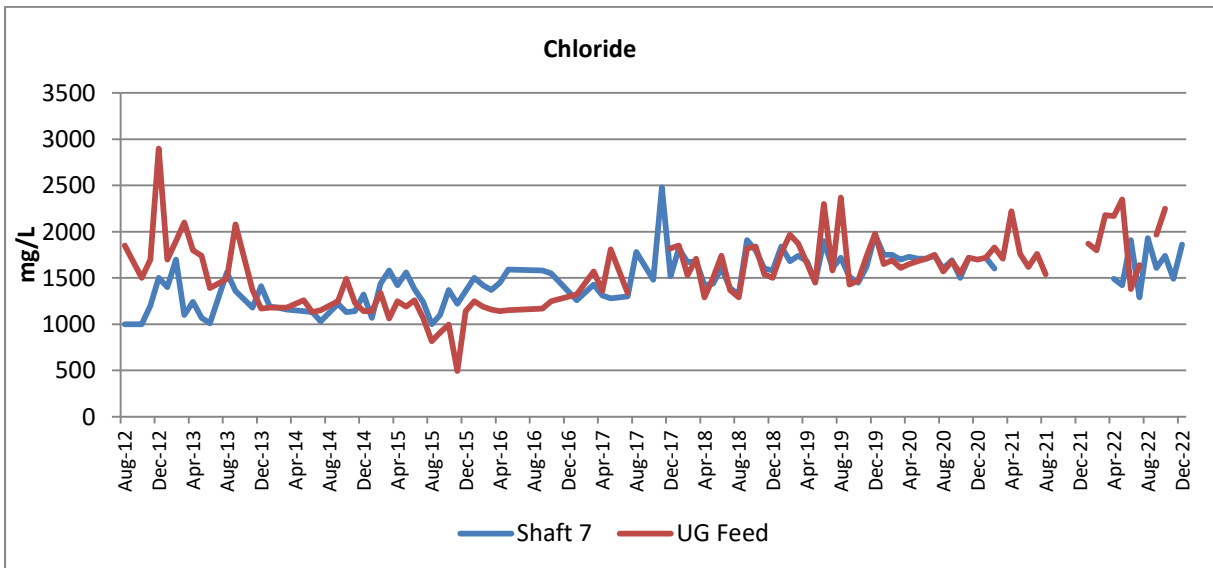
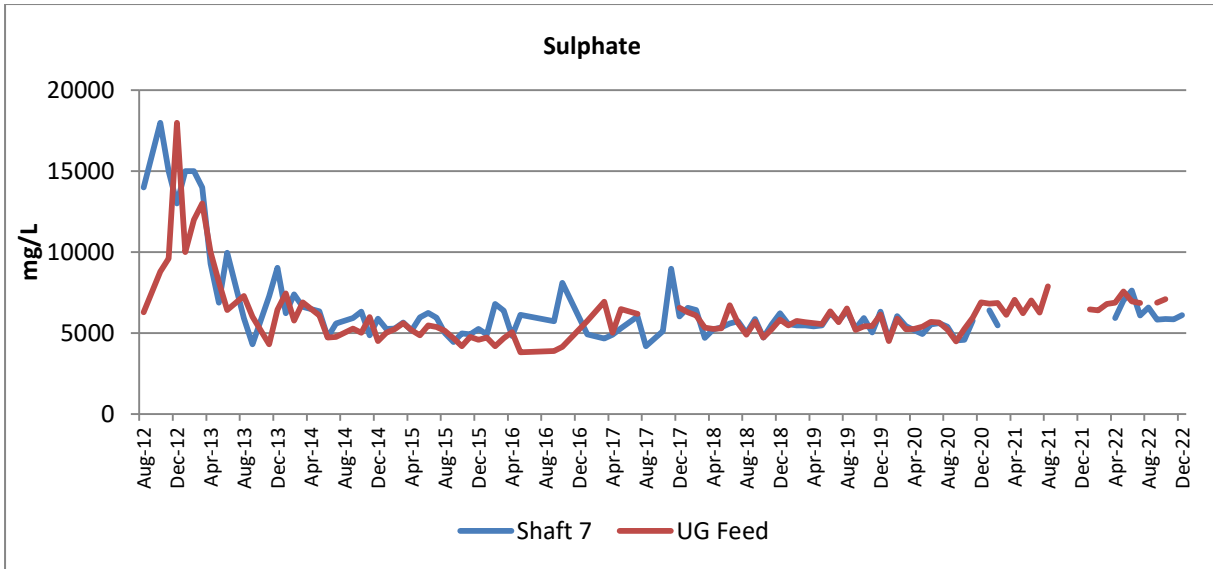
Trigger = Baseline + 30%

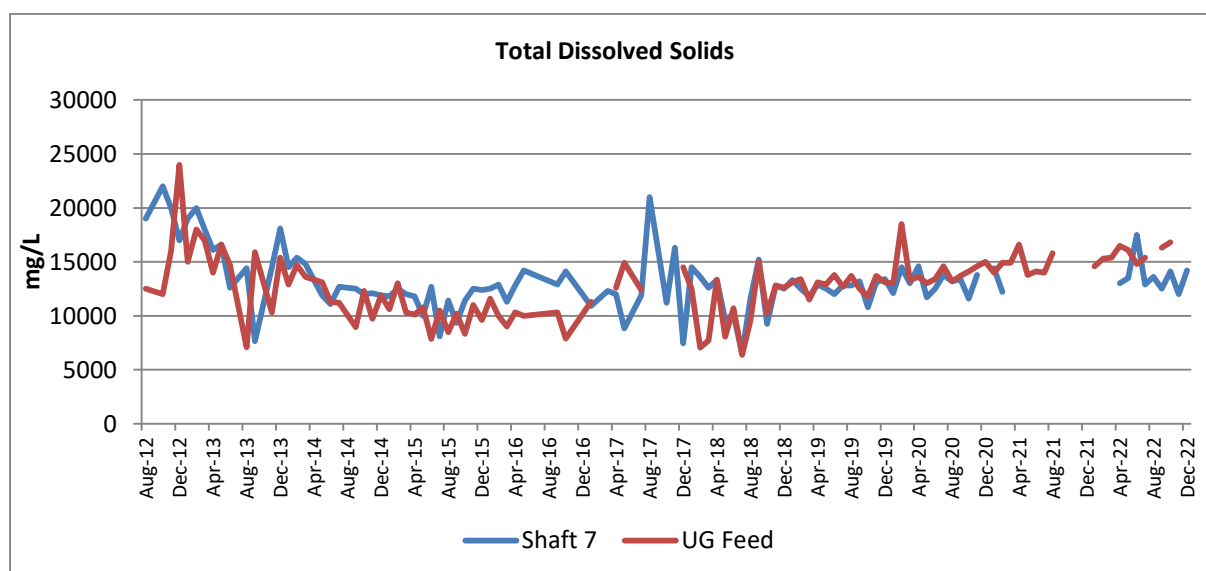
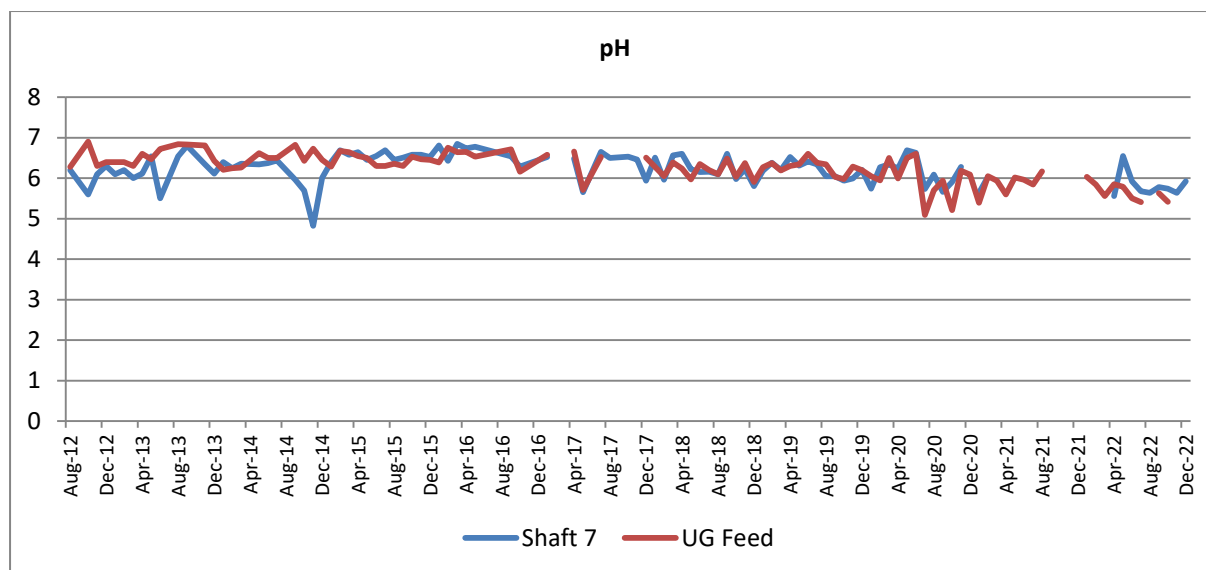
Figure 5-27 Shaft 7 & Mine Dewatering Results for Sampled Parameters - Period 2012 to Dec 2022











5.7 Contaminated Land

The majority of the surface land area that makes up the Rasp Mine is contaminated historic mining waste material including waste rock emplacements and tailings.

The storage and handling of diesel fuels, lubricants and oils, and waste rock material are the only aspects of the operation, which have the potential to contribute to contaminated land. The sections below outline how dangerous goods are handled onsite and procedures in place for managing and reporting spills.

On 24 December 2022 there was an offsite release of tailings (further explained in Section 10) to an area accessible to public north of TSF2 which was quickly remediated. No lasting contamination as a result of this event is likely.

5.8 Hydrocarbon and Chemical Management

The main streams of hydrocarbons managed on site include:

- Fuel (diesel) - storage and distribution;
- Grease oils and lubricants - storage distribution and recovery for recycling; and
- Solvents used in the parts washer.

5.8.1 Fuel

Diesel is stored in two tanks each with a capacity of 68,000L. These self-bunded trans-tanks are located adjacent to the workshop and are sitting on a constructed concrete re-fuelling station. The facility has been designed and manufactured in accordance with AS1940 and AS1692. BHO has provision for diesel storage on its Dangerous Goods Licence, UN 00C1 Diesel 150,000 L. Surface distribution of diesel is by direct collection from the fuel browser. The tanks operate on a float and cut-off system that prevents overfilling of the tanks.

A 10,000L diesel tank was commissioned in October 2017. The tank is situated at the 13L Service Bay underground. It is double skinned and self-bunded.

Rasp's fuel management system enables monitoring of fuel usage by each vehicle and piece of plant. This assists with maintenance and security as well as providing an accurate reporting mechanism for the collecting of data for NPI and NGRS reporting.

5.8.2 Grease, oils and lubricants

Lubricants and oils are stored in individual pods located on a portable bund. A storage facility for these lubricants and oils has been constructed on the western side of the main workshop. It consists of a raised concrete pad incorporating drainage to a sump to facilitate cleaning.

5.8.3 Solvents

Oil solvent used for cleaning of mechanical parts at the workshop is removed by a contractor on a fixed maintenance schedule.

5.8.4 Processing reagent storage

All reagents are stored in a purpose built storage facility designed to prevent contamination and capture spillage.

The reagents stored here include:

- Hydrated Lime
- Copper Sulphate
- Sodium metabisulphite
- Sodium ethyl xanthate
- Flocculant
- InterFroth F228
- Cytec S9232 (zinc collector)
- Antiscalant
- Defoamer
- Zinc Sulphate

All quantities and map with storage locations are reference in the Pollution Incident Response Management Plan which is tested annually and available on the CBH website.

5.9 Hazardous Material Management

5.9.1 Licensing

Rasp holds Licence XSTR100095 for the storage and handling of dangerous goods and Radiation Management Licence 5063802. Additionally, Rasp holds an explosives licence (licence number XMNF200003) to manufacture, possess, store explosives and ammonium nitrate emulsion on site.

5.9.2 Dangerous goods management

Site dangerous goods are managed according to the site Chemical Management Procedure BHO-PRO-SAF-020.

A Safety Data Sheet (SDS) database for each chemical is maintained. SDS's are kept at each location where chemicals are stored and in the mines rescue room. SDS's are also electronically available on the intranet.

General and contractor inductions outline the required actions in the event of a spill, including completing an Incident Report.

All quantities and a map with storage locations are referenced in the Pollution Incident Response Management Plan, which is tested annually and updated as required.

Storage, management and access to explosives onsite is outlined in the Store, Manage and Access Explosives Standard BHO-STD-MIN-001. A security plan compiled and submitted by the supervising licensee detailing the security measures for explosives on the Broken Hill Operations Pty Ltd, Rasp Mine site. (Site Security Plan BHO-PLN-MIN-015)

Explosives are stored both on the surface and underground. The surface explosive magazines (SEM) are located within the BHP Pit approx. 3 km north from the main office on Eyre Street. The area encompasses one detonator magazine (IE), one packaged explosives magazine (HE) and one emulsion bulk storage compound. The magazines are separated by a minimum of 7 metres and are bunded in accordance with AS 2187.1. All gates and magazines are secured with locks, and signage that meet the minimum required standards.

The underground explosive magazines (UEM) are located within the underground operations of Broken Hill Operations Pty Ltd, Rasp Mine. Separate storages are utilised for the storage of (IE) and (HE) Explosives Magazines are secured with locks, and signage that meet the minimum required standards.

SEM & UEM keys are locked in a secured key cabinet in the Broken Hill Operations Pty Ltd, Rasp Mine Site Emergency Services Officer (ESO) Office and are to be issued only by the Emergency Service Officers, who must check the identity and authority of the person wishing to take possession of the keys. The SEM & UEM Explosive Magazine Access Log Book BHO-TRN-REG-004 must be completed prior to issuing and returning the keys. Personnel will only be granted access if they possess a Security Clearance and their name appears on the Key Register (Section 7 of the Site Security Plan).

5.10 Waste Management

Waste management at the mine is classified into two broad categories: mineral wastes (mining and mineral processing wastes discussed above), and non-mineral wastes which include recyclables and non-recyclables.

5.10.1 Mineral wastes

Mineral wastes consist of waste rock from underground workings and tailings residue from the processing of ore.

Waste rock is managed on site through the Waste Rock Management Plan BHO-PLN-ENV-014. Waste rock that cannot be returned underground to fill voids is stored in Kintore and BHP Pit (for embankment material crushing), following testing and confirmation that it contains less than 0.5% lead. In the reporting period 171,617 t of waste rock was placed underground and 170,165 t was placed on the stockpile/tipple in Kintore and BHP Pits.

Tailings is discharged into Blackwood Pit (TSF2) with water recycled for use in processing where possible. In the reporting period 369,413 t of tailings was placed in Blackwood Pit.

5.10.2 Non-mineral waste

Rasp Mine has four main laydown areas where used parts and equipment are stored for future use. The recyclable area has dedicated sections for scrap metal, timber, batteries, rubber, electronic goods and used pods. Used 1000L pods are returned to the manufacturer for reconditioning and reuse or removed by a waste contractor for recycling or disposal.

Waste oil, oily water, coolant, hydrocarbon-contaminated solids (rags, spill control material, etc), grease, oil filters, hydraulic hoses, and batteries are collected by a waste contractor for disposal or recycling.

Paper and cardboard are disposed on in blue recycling bins and skips which are collected by City Council. Printer cartridges are collected in “Planet Ark” disposal bags and delivered to the local Post Office for recycling. Scrap Metal is sold to a local scrap metal merchant.

Waste disposed of in the period is summarised in **Table 5-14**.

No tyres were disposed in underground workings during the reporting period. Tyres for heavy mobile equipment have been stored or reused around the mine site for barricades on roadways and within the laydown yards. All other LV and light truck tyres are removed from site under arrangement with the tyre supplier.

Table 5-14 Non-mineral Waste Summary for reporting period

Waste	Quantity Disposed
Oil	22,000 L
Oily water	4,000 L
Coolant	2,000 L
Scrap metal	137.55 t
Grease	10,000 L
Oil filters, hoses,	18 m ³
Contaminated drums/IBC's	92 m ³
Printer cartridges	4 bags
E-waste	Nil
Waste to Landfill	228.67 t

5.11 Flora and Fauna

The site is a highly disturbed environment that provides little value as native flora and fauna habitat. There have been no threatened flora, fauna or species habitat identified at the Rasp Mine. Goats frequent the site and removal is planned in 2023.

5.12 Weeds

During site inspections in 2020, individual Bush Tobacco (*Nicotiana glauca*) trees and a stand of rhizomatous bamboo (likely *Phyllostachys spp*) have been identified. The Bush Tobacco, which grows along water storages and some isolated locations on dumps, will be removed by cutting at the stump. Native tobacco around the S17 pond were removed using chemical means but have regrown and will have to be targeted with herbicide. The bamboo growing in the Eyre St trench and will likely be sprayed with a Glyphosate-based herbicide.

5.13 Blasting

There are six monitors installed to record blasting vibration and over pressure. Blast monitors are installed at five locations around Broken Hill and there is one monitor located on-site near the core shed (this is used to monitor blast impacts at South Road). Locations are shown on **Figure 6-2**. When a blast complaint is received, the person is given the opportunity to have a roving monitor placed at their location. By doing so BHO can monitor the impact at the location for a time. Normally, a roving monitor is placed at the complainants' location for at least two months to record blast vibration levels and develop an accurate K Factor used in blast design modelling to predict ground vibration at a set location. BHO maintains a spare monitor to replace compliance monitors removed for calibration or

due to fault, and in 2020 has purchased four new monitors to be employed as compliance monitors. In April 2018, blast monitor V4 at 123 Eyre St was removed at the residents request and placed at the Eyre St Bowls Club.

Table 5-16 and **Table 5-17** lists the criteria for blasting ground vibration and overpressure for Western Mineralisation / Main Lodes (Western Min/Main Lodes) and Block 7, respectively.

Table 5-15 Overpressure and Ground Vibration Western Min/Main Lodes (excluding Block 7)

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance
Residence on privately owned land (7am-7pm)	115	5	5% of the total number of blasts over a 12-month period ^{ab}
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Public Infrastructure ^d	-	100	0%

Table 5-16 Overpressure and Ground Vibration Block 7 (includes Zinc Lodes)

Location	Airblast Overpressure (dB(Lin Peak))	Ground Vibration (mm/s)	Allowable Exceedance
Residence on privately owned land (7am-7pm)	115	3 (interim) ^c	5% of the total number of blasts over a 12-month period ^a
(7am-7pm)	120	10	0%
(7pm-10pm)	105	-	-
(10pm-7am)	95	-	-
Broken Hill Bowling Club, Italo (Bocce) Club, Heritage Items within CML7	-	50	0%
Perilya Southern Operations	-	100	0%
Public Infrastructure ^d	-	100	0%

The Project Approval provides the following notes to these **Table 5-15** and **Table 5-19**:

- The allowable exceedance must be calculated separately for development blasts and production blasts;
- The 5% allowable exceedance does not apply to production blasts until the Proponent has successfully completed a Pollution Reduction Program aimed at achieving this goal, as required by the EPA under the Proponent's EPL (No. 12559), or as otherwise agreed with the EPA;
- The interim criteria applies unless and until such time that the Proponent has written consent from the Secretary to apply site specific criteria in accordance with condition 19 of this approval; and
- The Proponent must close South Road to pedestrians if blasts are expected to exceed a peak particle velocity ground vibration of 65 mm/s at the road reserve surface, while the blast firing occurs.

In addition the following conditions also apply:-

- Production blasts may occur between 6.45 am and 7.15 pm on any day
- 1 production blast per day, with 6 per week averaged over a calendar year
- 6 development blasts per day, with 42 per week averaged over a calendar year

In accordance with Project Approval and EP Licence conditions:

- All production-blasting times occurred between 6.45am and 7.15pm on any day.
- Production blasts averaged 2.04 per week over the previous calendar year
- Development blasts averaged 23.96 per week over the previous calendar year

A total of 1,352 blasts were fired during the reporting period, 1,246 for development and 106 for production. **Table 5-18** and **Table 5-20** lists the total number of blasts for each area per month during the reporting period and **Tables 5-19** and **Tables 5-22** summarise the blasts over 5 mm/s (Western Min/Main Lodes) and 3 mm/s (Block 7). “No Trigger” are the number of blasts that did not trigger vibration monitors.

In the Western Mineralisation/Main Lodes mining areas (external to Block 7), 1,352 blasts were fired. Of these, 1,253 were for development and 106 were for production. No blasts exceeded 5 mm/s. The percentage of production blasts exceeding 5 mm/s was 0.0% and the percentage of development blasts exceeding 5 mm/s was 0.0%.

Table 5-17 Western Mineralisation/Main Lodes Summary of Blasts 2022

	Western Mineralisation / Main Lode									
	Production					Development				
	Blasts	< 5	>= 5	>= 10	No Trigger	Blasts	< 5	>= 5	>= 10	No Trigger
Jan-22	11	5	0	0	6	103	0	0	0	103
Feb-22	11	9	0	0	3	88	0	0	0	88
Mar-22	10	8	0	0	2	91	0	0	0	91
Apr-22	11	10	0	0	1	100	0	0	0	100
May-22	7	5	0	0	2	106	0	0	0	106
Jun-22	6	5	0	0	1	110	0	0	0	110
Jul-22	8	6	0	0	2	114	0	0	0	114
Aug-22	8	0	0	0	0	131	0	0	0	131
Sep-22	7	6	0	0	1	114	0	0	0	114
Oct-22	7	6	0	0	1	103	0	0	0	103
Nov-22	9	7	0	0	2	104	0	0	0	104
Dec-22	11	0	0	0	4	89	0	0	0	89
TOTAL	106	67	0	0	25	1253	0	0	0	1253

Table 5-18 Western Mineralisation/Main Lodes Blasts > 5 mm/s for the reporting Period

Production	Blasts >5 mm/s	Exceedance Result
106	0	0%

For the annual period January 2022 to December 2022, Western Mineralisation/Main Lodes production blast levels was compliant with the 5% allowance for ground vibration with 0% of blasts recording ground vibration over 5mm/s.

In the Block 7 mining areas (including the Zinc Lodes), 1 production blasts was fired during the reporting period, which exceeded 3 mm/s at one of the compliance monitors. Block 7 was 0% compliant for the reporting period.

Table 5-19 Block 7 (and Zinc Lodes) Summary of Blasts 2022

	Block 7 (includes Zinc Lode)									
	Production					Development				
	Blasts	< 3	>= 3	>= 10	No Trigger	Blasts	< 3	>= 3	>= 10	No Trigger
Jan-22	0	0	0	0	0	0	0	0	0	0
Feb-22	0	0	0	0	0	0	0	0	0	0
Mar-22	0	0	0	0	0	0	0	0	0	0
Apr-22	0	0	0	0	0	0	0	0	0	0
May-22	0	0	0	0	0	0	0	0	0	0
Jun-22	0	0	0	0	0	0	0	0	0	0
Jul-22	1	0	1	0	0	0	0	0	0	0
Aug-22	0	0	0	0	0	0	0	0	0	0
Sep-22	0	0	0	0	0	0	0	0	0	0
Oct-22	0	0	0	0	0	0	0	0	0	0
Nov-22	0	0	0	0	0	0	0	0	0	0
Dec-22	0	0	0	0	0	0	0	0	0	0
TOTAL	1	1	1	0	0	0	0	0	0	0

Table 5-20 Block 7 Blasts Exceeding 3 mm/s for Reporting Period

Production Blasts	Blasts >3 mm/s	Exceedance Result
1	1	100%

Table 5-21 lists the highest recorded results for ground vibration (mm/s) at each of the vibration monitors.

Table 5-21 Ground Vibration Results at Vibration Monitors for the Reporting Period

Vibration Monitor/Location	Highest Recorded Ground Vibration (mm/s)
V1 Silver Tank (located on CML7)	2.29
V2 Hire yard	4.28
V3 Air Express	4.84
V4 123 Eyre St / Bowls Club	7.75
V5 80 Eyre St	2.84
V6 BHO Core Shed (located on CML7)	2.61

All blasts recorded at off-site monitors were under 10 mm/s.

V4 123 Eyre Street/Bowls Club returned a reading of 7.75mm/s on 22July 2022 as a result of blasting in Block 7, this blast also exceeded criteria for overpressure levels resulting from blasting. This non-compliance was reported to DPE on 5 August 2022.

5.14 Operational Noise

During the reporting period, noise was generated by operational activities, movement of heavy vehicles and delivery trucks leaving and entering site.

Random noise monitoring is conducted by BHO Environmental staff to monitor project noise emissions. Attended noise monitoring is completed annually by consultants at noise monitoring locations shown together with the relevant location criteria in Error! Reference source not found..

Table 5-22 Operational Noise Criteria

Location	Day (dB(A))	Evening (dB(A))	Night (dB(A))
A1 – Piper Street North	40	37	35
A2 – Piper Street Central	40	37	35
A3 – Eyre Street North	44	41	39
A4- Eyre Street Central	44	41	39
A5 – Eyre Street South	44	41	39
A6 – Bonanza and Gypsum Streets	48	41	39
A7 – Carbon Street	45	42	36
A8 – South Road	48	39	39
A9 – Crystal Street	46	39	39
A10 – Barnet and Blende Streets	42	41	35
A11 – Crystal Street	46	39	39
A12 – Crystal Street	46	39	39
A13 – Eyre Street North 2	40	35	35
A14 – Piper Street North	40	35	35
Additional Construction Noise Criteria for the Boxcut Construction			
A1 – Piper Street North	43	NA	NA
A2 – Piper Street Central	45	NA	NA
A3 – Eyre Street North	47	NA	NA
A13 – Eyre Street North 2	48	NA	NA
A14 – Piper Street North	47	NA	NA

During the reporting period EMM Consulting Pty Ltd conducted a noise assessment for these receptors, **Figure 5-28**. Attended noise monitoring was conducted during two consecutive night-time periods from 27 to 29 October 2022 to quantify off-site noise levels from the Rasp Mine. While the EPL nominates noise limits for day, evening and night, attended monitoring was completed during the night-time period to minimise the contamination of monitoring data by extraneous noise sources (e.g. domestic and road traffic noise).

A total of 33 operator-attended noise measurements were completed, including two measurements at each of the 14 monitoring locations and one day period measurement at each other the five locations set out in PA07_0018 Condition 17.

The wind speed was above (greater than) 3 m/s during 23 of the 33 attended measurements and therefore the noise limits did not apply for these periods according to the site's EPL. Regardless of the wind speed, the site noise contribution was below (complied) with the relevant noise limits. The site was inaudible during 16 of the 33 measurements.

Noise monitoring results are shown in **Table 5-23**.

Low frequency noise was assessed by using the Noise Policy for Industry (NPfI) (EPA 2017) methodology for each attended measurement and for audible contributions only. Low frequency noise, as defined in the NPfI, was not identified during the attended measurements.

Rasp Mine LAeq,15min noise contributions (including the addition of the relevant modification factor) satisfied the relevant night-time noise limits at all assessment locations, including during attended measurements when noise limits did not apply due to adverse weather conditions

Figure 5-28 Noise Receptors



Noise attenuation measures on site include:

- Plant and equipment operator training. This included correct gear selection to minimize noise emission, retraining in travelling haul road procedure and educating personnel of the noise criteria for site.
- The use of an “ice-creaming” technique when loading the crusher allows the crusher to be loaded to maximum capacity at all times reducing the noise generated by rock fall onto the grizzly. “Ice-creaming” is where the crusher bin volume is maintained at a high level by the ROM front end loader.
- Optimisation of haul truck speed and gear changing via the use of intermediate markers along haulage route.

- Extension of both length and height of the existing earth bund along the southern haul road (from Kintore Pit to ROM pad).
- Installation of noise abatement material in the crusher house.
- A 2.5 m high by 6 m long tyre wall was constructed to reduce noise transition from the filtration area of the processing plant.

Table 5-23 Noise Monitoring Results

Location	Date	Start	LA _{EQ}	LA _{MAX}	Rasp contribution LA _{EQ(15-min)}	Criteria	Compliant
A12	27/10/22	22:01	54	74	34	39	Y
A13	27/10/22	22:09	56	74	33	35	Y
A11	27/10/22	22:22	54	71	34	39	Y
A14	27/10/22	22:30	41	66	34	35	Y
A10	27/10/22	22:42	48	74	IA	35	Y
A1	27/10/22	22:48	40	59	34	35	Y
A9	27/10/22	23:01	60	83	IA	39	Y
A2	27/10/22	23:08	37	53	IA	35	Y
A8	27/10/22	23:20	45	57	IA	39	Y
A3	27/10/22	23:29	48	69	IA	39	Y
A7	27/10/22	23:40	42	65	IA	36	Y
A4	27/10/22	23:50	54	73	IA	39	Y
A6	27/10/22	23:58	56	74	<30	39	Y
A5	28/10/22	00:08	63	79	IA	39	Y
A13	28/10/22	7:04	60	81	35	48	Y
A3	28/10/22	7:19	61	83	43	47	Y
A14	28/10/22	7:23	45	66	44	47	Y
A2	28/10/22	7:39	51	71	45	45	Y
A1	28/10/22	7:44	52	71	42	43	Y
A12	28/10/22	22:02	52	73	34	39	Y
A13	28/10/22	22:06	56	76	33	35	Y
A11	28/10/22	22:21	56	75	IA	39	Y
A14	28/10/22	22:24	42	69	IA	35	Y
A1	28/10/22	22:44	48	66	34	35	Y
A10	28/10/22	22:45	59	77	30	35	Y
A9	28/10/22	23:04	60	79	IA	39	Y
A2	28/10/22	23:06	48	72	IA	35	Y
A3	28/10/22	23:24	49	71	30	39	Y
A7	28/10/22	23:24	44	55	IA	36	Y
A4	28/10/22	23:43	51	67	IA	39	Y
A8	28/10/22	22:43	54	69	IA	39	Y
A6	29/10/22	00:00	56	75	<30	39	Y
A5	29/10/22	00:01	43	48	IA	39	Y

IA: Inaudible

5.15 Visual, Stray Light

Light towers around machinery, where practicable, are designed to face light away from residents.

There were no light complaints for the reporting period.

5.16 Indigenous Heritage

There are no known significant indigenous sites within CML7.

5.17 Natural and Social Heritage

5.17.1 Conservation management strategy

The Conservation Management Strategy draft has been developed however cannot be finalised until the Line-of-Lode Interagency Panel provides advice.

An Options Analysis Study for mine closure has been developed along with recommendations for rehabilitation methods.

5.18 Spontaneous Combustion

Products with high sulphur content (tailings, ore and concentrate) are prone to spontaneous combustion. Combustion is caused by the oxidation of the sulphides, which is an exothermic chemical reaction that causes heat build-up, and the remaining sulphides begin to start smouldering. In extreme cases the sulphides may burn producing a flame. Requirements for combustion to occur are high sulphur material, oxygen, moisture and sufficient material to generate heat build-up.

No incidences occurred during the period.

5.19 Bushfire

No bushfires affected the site during the reporting period. Broken Hill and surrounding areas have limited potential for bushfires due to the lack of suitable fuel.

The Rasp Mine has a fully equipped fire truck available at all times to respond to fires and has a trained mines rescue team for firefighting. There are fire hydrants and hoses installed at strategic locations across the mine site and within vehicles with deluge systems installed on loaders and in the underground fuel bay.

5.20 Mine Subsidence

Monitoring occurs on Bonanza St/South Road to detect any movement that may be associated with mining activities in the Zinc Lodes.

Surveying results indicate that most of the detected "movement" is due to instrument set-up errors, atmospherics etc. This is evidenced by the fact that the plot for each prism vector looks very similar to the same vector for the other prisms (i.e. all northing plots look the same, all easting plots look the same) indicating that the errors affect all prisms. Mining in the area of the Zinc Lodes has now been completed with the exception of some minor remnant ore extraction, BHO will continue to monitor road movement and has back-filled the mining/production voids in this area.

No subsidence from mining activities was detected in the reporting period.

5.21 Methane Drainage/Ventilation

As the nature of the mine is not gassy (e.g. coal mine), there are no permanent methane monitoring locations. However, all personnel carry gas monitors while performing the following underground activities to monitor any hazardous gases:

- All production rigs while drilling;
- All production loaders (Boggers) while bogging;
- All Jumbos;
- Vent Officer while doing vent surveys;
- Re-Entry Crews while performing re-entry; and

- Service crew when required.

5.22 **Public Safety**

All active mine areas of the Rasp Mine site are signposted and fenced to restrict any unauthorised access. Perimeter fencing is inspected weekly by Emergency Services Officers.

Visitors to the mine are only allowed on site with management approval and are required to undertake a visitor briefing (induction), and are accompanied by a site representative at all times. Visitor briefing cards are distributed to ensure key information is readily at hand for visitors. Visitors must follow site policies and conform to personal protective equipment (PPE) requirements.

All employees and contractors complete a general induction and work area specific inductions where required (e.g. underground, mill).

5.23 **Radiation**

BHO has a Radiation Management Licence, RML5063802 current until 26 July 2023. The Licence permits BHO to “sell, possess, store or give away regulated material (including radiation apparatus, radioactive substances or items containing radioactive substances)”.

Radiation is used in gauges in the processing plant to measure slurry density and identify the percentage of lead/zinc/iron. Radiation is used by technical services to identify the percentage of lead/zinc or other materials. The Rasp Mine Radiation Management Plan outlines how radiation and radiation equipment must be used, stored and disposed. An external contractor conducts biennial inspections of the individual radiation gauges on site while the site RSO conducts semi-annual inspections. During the reporting period no issues were identified during inspections and audits in relation to their use.

The Rasp Mine Radiation Store meets the requirements for storage of fixed radiation gauges, Code of Practice for the Safe Use of Fixed Radiation Gauges, ARPANSA. The Radiation Store is of solid construction (historically in the early 1900's it was used as an explosives magazine store) and is located on the side of a hill so it is not prone to flooding. It is clearly signed and is not accessed by the public.

No radiation apparatus was dismantled during the reporting period.

Table 5-24 lists the regulated materials (fixed radiation gauges) that make up the schedule to the licence.

Table 5-24 Regulated Radiation Equipment

Location	Rasp Mine Asset Number	Type	Equipment	Components	Purpose
Mill - Flotation building	2321727346	Radiation apparatus	X-RF	- Control console / generator - X-ray tube insert	Analysis of materials
Primary cyclone feed	1566643388	Sealed source device	Fixed Radiation Gauge	- Container - Sealed source	Density gauge
Radiation Store 'REMOVED FROM SERVICE'	1570661547	Sealed source device	Fixed Radiation Gauge	- Container - Sealed source	Density gauge
Admin Bld, Geological vault	2321727385	Radiation apparatus	X-RF	- Control console / generator	Analysis of materials
Radiation Store 'REMOVED FROM SERVICE'	1570661354	Sealed source device	Fixed Radiation Gauge	- Container - Sealed source	Density gauge

6. WATER MANAGEMENT

Raw water and potable water are supplied by Essential Water with take off valves at the Eyre Street entrance to the Rasp Mine. Raw water, water from the town supply, is supplied untreated to the mine site via existing connections.

Potable water is supplied direct from the town supply and is used for drinking, safety showers and in the crib rooms and change houses. Water from the town supply is treated at the Mica Street treatment plant and supplied to the Project via existing connections and is used for showers, toilets, and laundry. Average annual usage of potable water is 9 ML supplying the offices, workshop, core shed and processing facility.

BHO are required to dewater the mine workings to ensure the safety of both the employees at the adjacent Perilya South Mine and its own employees. This water is extracted under licence and can be used on the Rasp Mine site or transferred for use at the Perilya operations.

Water is reclaimed onsite from various sources to be recycled for the Project, mainly from underground dewatering. If necessary, the reclaimed water is treated onsite to ensure that it is suitable for use as process water in both the processing plant and underground operations. Reclaimed water is returned after treatment to the process water tank which has a three hour holding capacity or to the Silver Tank which has a capacity of 8ML.

The sources for the reclaimed water include:

- No. 7 Shaft dewatering;
- Underground mine operations dewatering;
- TSF decant pond; and
- Stormwater containment dams (only during extreme rain events)

The Rasp Mine has installed a number of water meters to monitoring water supplies and movements.

Raw water used during the period was 295.9ML, a decrease from 337.1ML used in 2021, likely due to the heavy rainfall in 2022 providing useable water stocks for operations.

Potable water used during the period was 9.3 ML, decreased from 13.4 ML used in the previous period due to an increase in personnel and contractors.

BHOP has a water extraction licence, 85BL256102, to extract by active pumping 370ML pa. In the reporting period, approximately 587 ML was extracted and 96 ML returned to Underground for a Net Extraction 491 MLpa. Higher than average rainfall was received in 2022 and in order to maintain capacity in surface water storages much of the collected water was returned underground using portable, unmetered pumps. As this raised water levels underground the water had to be pumped back to surface as required so there was a recirculation of water between surface and underground which may account for the elevated rate of extraction.

An independent review of the site water balance by EMM in 2021 included investigation into flow meter data records and descriptions of day to day water movements provided by site operators. It was determined that the groundwater take at Rasp Mine is estimated using the water balance as: Groundwater take = Dewatering (pumping from underground to surface) minus the Underground supply (pumping water underground for use in the mining process). During a consultation session between BHO, EMM and DPIE Water held on 15 November 2021, this methodology was discussed and endorsed by DPIE Water representatives as appropriate given the nature of the operation and associated water balance. In 2020, approximately half of the water removed from the underground workings via dewatering pumps was directly attributable to water taken underground for the purposes of operating underground machinery and ancillary uses such as fire water. This water was used in mining activities, collected in sumps within the excavated shafts and drives, and returned to the surface for settling in pond S22 before being recycled. The remainder of the water removed from the underground workings is attributed to groundwater inflows.

Flow meters have been installed on dewatering lines in 2022 as part of the NSW non-urban water-metering framework. BHO has subsequently engaged a Duly Qualified Person to install and verify

pattern approved flow meters. As of March 2023, BHO is awaiting telemetry equipment to be supplied by Water NSW.

No water was transferred to Perilya South Mine Operations, during the reporting period.

7. REHABILITATION

7.1 Buildings

No buildings were constructed on CML7 in the reporting period. The most recent building construction was the extension of the site warehouse in 2019. BHO are currently in the process of sourcing Building Information Certificates for both the Stores Extension and Concrete Batch Plant.

7.2 Rehabilitation and Disturbed Land

A trial to cap Mt Hebbard with waste rock was agreed to by the Resources Regulator to be undertaken in 2018. As BHO was still developing a waste rock testing procedure and were unable to crush extracted material (waste rock) on the surface, waste rock was not applied to the surface of Mt Hebbard in 2019. Waste rock capping operations were further postponed as a site-wide Instability and Inrush Risk Assessment, and slope stability investigation, were conducted on waste dumps in 2020.

Dust deposition gauges were installed on top of the Mt Hebbard waste dump in October 2017 as part of the waste rock trial to be. It was proposed in the MOP to install the gauges to monitor current dust conditions for a 12 month period, then place waste rock capping and re-install the gauges to monitor for another 12 month period and compare results. As 12 months of dust results had been collected from the Mt Hebbard dust gauges, dust suppressant was applied annually to control dust. The surface of Mt Hebbard is one of the "free areas" identified on the site to be potential contributors of dust to the surrounding environment.

The waste rock capping trial for the Mt Hebbard waste dump is expected to progress in 2023 under MOD6 approval for application of 16,000t of waste rock for capping purposes each year.

A rehabilitation strategy has been submitted to the Secretary for approval and revisions are being made at the Secretary's request. The Department of Premier & Cabinet Broken Hill Post Mining Interagency Meeting held in Broken Hill on 13 and 14 August 2019. During the Interagency meeting there was agreement that paddock dumping of waste rock on free areas may be a suitable method of capping them following comments from David Williams, Director of Geotechnical Engineering, University of Queensland.

8. COMMUNITY RELATIONS

8.1 Environmental Complaints

During the reporting period, BHO has maintained a register for community complaints and concerns which is available on the CBH website.

Eight complaints were received over the reporting period compared to six complaints in the previous period. Of those complaints, four related to blast vibration, and others related to surface operations, water use, sediment control, and noise, . **Table 8-1**. All complainants were contacted by BHO if requested and if details were provided.

All blasts were found to be compliant with the applicable licence limits. The finalised data was distributed to the EPA and the affected resident.

Table 8-1 Complaints register

<u>Date of Complaint</u>	<u>Reason for Complaint</u>	<u>Comment</u>
January 2022 INX Event 7692	Vibration	<ul style="list-style-type: none"> • A complainant contacted the NSW EPA about blast vibration from 11 January. The complainant's details were provided to CBH by the EPA. • A blast monitor is installed at the complainant's residence and vibration levels measured at this monitor and nearby compliance monitors were below licence limits. • The blast vibration data for the blast was provided to the NSW EPA. • BHOP have contacted the complainant to discuss the details of the blast.
February 2022	No complaints	
March 2022 INX Event 7765	Sediment	<ul style="list-style-type: none"> • BHOP was contacted on 25 March by the EPA in regards to complaint made about sediment on the road near the Ryan St Dam. • BHOP arranged for a street sweeper to service the area on multiple occasions following this. • No details of the complainant were provided to BHOP.
April 2022 INX Event 7797	Drilling/Noise	<ul style="list-style-type: none"> • On the morning of the 9 April drilling contractors working for BHOP were approached by a resident in regards to noise generated by drilling activities. • BHOP staff contacted the resident and agreed to amend drilling times in certain periods.
May 2022 INX Event 7869	Vibration	<ul style="list-style-type: none"> • A complainant contacted the NSW EPA about blast vibration from 17, 18 and 24 May. BHOP did not conduct a blast on 18 May. • The complainant's details were provided to BHOP by the EPA. • A blast monitor is installed at the complainant's residence and vibration levels measured at this monitor and nearby compliance monitors were well below licence limits. • The blast vibration data for the blast was provided to the NSW EPA.
June 2022	No complaints	

<u>Date of Complaint</u>	<u>Reason for Complaint</u>	<u>Comment</u>
July 2022 INX Event 4899	Vibration	<ul style="list-style-type: none"> • A complainant contacted BHOP about numerous blasts dating back to January 2021, with a request for blast data for each blast. • A blast monitor has previously been installed at the complainant's residence. • Blast results at compliance monitors on the dates identified were within licence limits. • BHOP is collating blast data to report back to the complainant.
August 2022	No complaints	
September 2022	No complaints	
October 2022	No complaints	
November 2022	No complaints	
December 2022 INX Event 8519	Vibration	<ul style="list-style-type: none"> • A complainant contacted the NSW EPA about blast vibration from 10 December. The complainant's details were provided to CBH by the EPA. • A blast monitor is installed at the complainant's residence and vibration levels measured at this monitor and nearby compliance monitors were below licence limits. • The blast vibration data for the blast was provided to the NSW EPA.

8.2 Community Liaison

During the period of the Annual Review, BHO has conducted direct and indirect consultation with neighbours, members of the public, local community organisations, state government agencies and local council.

The major stakeholders include:

- Broken Hill City Council (BHCC)
- Environment Protection Authority (EPA)
- Department of Planning Industry and Environment (DPIE)
- Resources Regulator within the Department of Regional NSW (RR)
- Department of Crown Lands (DCL)
- Essential Energy
- Essential Water
- Australian Rail Track Corporation Ltd (ARTC)
- Transport for NSW (TfNSW)
- Far West Area Health Service, Child and Family Health Centre

The following community communication activities occurred during the period:

- BHO was represented at quarterly meetings of the BHCC Lead Reference Group (BHLRG) during the reporting period.
- Child and Family Health Centre Lead Week – BHO each year BHO would participate in the Lead week program and provide water, fruit, a fruit or vegetable seedling, and bags for these items and information pamphlets provided by the Leadsmart group.

8.3 Community Support

During the reporting period, Rasp provided \$2,551 to community groups.

These groups include:

- BH Aquatic Swimming Club (Swim Carnival Feb 22)
- AFL BH Association (Auskick launch BBQ)
- Globe Timber & Hardware (BH Heel Festival)
- Willyama High School (Annual Presentation Night)
- BH High School (Annual Presentation Night)
- BH Aquatic Swimming Club (Swim Carnival Nov 22)
- BH Public School (Annual Presentation Night)

Moving forward BHO will focus on supporting local education and major events that support the promotion of the Broken Hill Community.

9. INDEPENDENT AUDIT

An independent audit was conducted by Integrated Environmental Systems Pty Ltd in the week of 7 to 11 March 2022. The audit was commissioned by BHO to satisfy Schedule 4, Conditions 7 and 8 of the Project Approval, requiring an audit to be conducted every three years.

The audit was conducted to determine how BHO was maintaining compliance against applicable conditions specified in:

- Project Approval 07_0018 MOD9 approved under the former Part 3A of the Environmental Planning and Assessment Act 1979 (which continues as an approval of a transitional Part 3A project under Schedule 6A of that Act) by the delegate of the NSW Minister of Planning ('Project Approval' or 'PA');
- Environment Protection Licence Number 12559 as at 4 October 2019 ('EPL'); and
- Consolidated Mining Lease Number 7 as renewed on 17 January 2007 ('CML7').

BHO's level of compliance with the applicable conditions (i.e. all conditions except those which were 'not triggered') in each instrument was as follows:

- BHO was compliant with 46 of the 67 applicable Project Approval conditions;
- BHO was compliant with 55 of the 75 applicable EPL conditions;
- BHO was compliant with 24 of the 28 applicable CML7 conditions.

Copies of the Independent Audit report and Action Plan are available on the CBH Website and have been provided to DPIE.

10. INCIDENTS AND NON-COMPLIANCES

Environmental incidents are reported using the Rasp Incident Reporting Procedure BHO-SAF-PRO-101. BHO maintains a Pollution Incident Response Management Plan BHO-ENV-PLN-002 on the CBH website in accordance with EPA requirements.

The Pollution Incident Response Management Plan was tested in July 2022, in accordance with the requirements of EPL 12559.

There were thirteen reportable incidents/non-compliance during the reporting period.

1) TEOM1 /EPL Point 13 data collection non-compliance (Ref MP07_0018-PA-12)

As reported on 18 January 2022, following a severe weather event on 12 January 2022 a temporary power disruption to TEOM1 caused the Safety Switch Circuit Breaker, which regulates power to the unit, to close at approximately 8pm and was not restarted until the 8am the next morning. This resulted in a non-compliance against PA07_0018 Schedule 3 Condition 3 Table 2 as an average for the 24-hour period could not be calculated, as the minimum 75% data capture for the day was not achieved.

It is unlikely that an environmental harm was caused as a result of this non-compliance, as the region experienced a dust storm, followed by a rainfall event. The 24-hour average recorded at TEOM2 for this date was 56.63 $\mu\text{g}/\text{m}^3$, the highest readings for the period were 2,575.17 $\mu\text{g}/\text{m}^3$ and 2,554.67 $\mu\text{g}/\text{m}^3$ at 8:10 and 8:15pm due to the dust storm.

Operation of the TEOM's is monitored 24/7 by Acoem Environmental Reporting Services (ERS), an automated alert was received indicating a brief loss of power, followed later by notification that power had been restored for TEOM2, however no such alerts were received for TEOM1. Both units had been sending alerts for high dust readings in the days prior to this incident indicating the automated alert system was working.

Following this incident, a number of corrective actions have been put in place including:

- Acoem were notified of the failure in automated alerts on this occasion
- Inspection of the circuit breaker that controls power to the TEOM was conducted to ensure it was fit for purpose and operating as intended
- A TARP developed for checks required in the event of power loss; and
- A monitoring display was installed in the ESO office.

2) TEOM2/EPL Point 14 data collection non-compliance (MP07_0018-PA-14)

As reported on 7 March 2022, a severe weather event on the evening of 28 February 2022 caused an extended power disruption to a large part of central Broken Hill and infrastructure at the northern end of the mine site. TEOM2, located on the northern side of TSF2 Blackwood Pit was impacted by this power outage between approximately 7:25pm on 28 February to 10:00am on 1 March 2022. As a result, BHOP was non-compliant with PA07_0018 Schedule 3 Condition 3 Table 2 requirements, as a 24-hour average for 1 March could not be calculated from 14 hours of data, where the minimum required it 75%.

It is unlikely that any environmental harm was caused as result of this outage as dust levels in the lad up to this outage were relatively low and within compliance limits. Data capture at TEOM1 indicate that a dust storm prior to the power loss, which was followed by heavy rainfall.

An automated alert was issued at 8:12pm on 28 February indicating a lack of data capture; however, the on-site ESO along with an electrician had already inspected the unit and identified the lack of power following the thunderstorm. It was determined that the power loss was due to loss of supply to central Broken Hill, the site electrical team maintained watch on reconnection updates from Essential Energy.

Following this incident, the automated alert system was reviewed and tested to ensure intended functionality. As a result of a similar even on 12 January visual displays were already being placed in the ESO office for ongoing real-time monitoring of the units, particularly during night shift, and TARP was previously developed for checks required in response to various alerts from the TEOM units.

3) Cracked Deposition Dust Gauge 2 (MP07_0018-PA-16)

As reported on 10 March 2022, during the monthly change-over of depositional dust gauges DDG2, located in the Essential Water compound at Block 10, it was found that a crack had formed down the side of the collection jar. The ALS Newcastle laboratory was contacted to discuss the incident and it was determined that due to quality control concerns the sample for the month of February was unable to be analysed. Hence, BHOP was non-compliant with PA07_0018 Schedule 3 Condition 3 Table 3 requirements for deposited dust to be collected over a monthly period and EPL 12559 requirements for monthly data collection for Point 4.

The Essential Water compound is fenced and no vandalism of dust gauges has occurred previously at this location, it is likely the damage to the collection jar was caused by heavy winds shaking the gauge during the thunderstorm experienced on 28 February. Following this incident Styrofoam padding has been added within the gauges to prevent movement of the glass jars.

4) S49 Seepage (MP07_0018-PA-13)

As reported on 26 May 2022, on 10 March during an inspection of storm water pond S49 seepage was observed extending approximately 4m beyond the boundary fence with minor pooling, but no surface flow. This seepage potentially resulted in BHOP being non-compliant with:

- PA07_0018 Schedule 2 Condition 1 to minimize any material harm to the environment that might occur as the result of the project; and
- EPL Condition L1.1 & Condition L8.1 as there is the potential that waters located outside the CML7 leave boundary could have become polluted if seepage mixed with stormwater run-off and in that S49 did not indefinitely hold stormwater run-off generated in a rainfall event.

On 28 February 2022 22.3mm of rain was recorded by the Rasp Mine weather station in 30 minutes, following this on 1 March S49 was inspected and it was deemed necessary to pump water out of S49 to another location within CML7. It was at this time that the pump used for this purpose was unable to be located from its normal location at S14. The next inspection of S49 occurred on 10 March and it was at this point that the seepage was first observed, a hire pump was obtained at this point and pumping of water out of S49 began. Following the initial rainfall a number of large rainfall events occurred during March and April recharging the pond and on some occasions restarting seepage that had previously ceased.

Seepage from S49 is a historic issue, occurring on three previous occasions in 2011, 2012 and 2016 all following large rainfall events. A number of seepage mitigation measures have been implemented in an effort to prevent reoccurrences, including excavation of rear ponds to create depth and keep water away from the fill wall, installation of a HDPE liner and installation of a permanent pump. None of which have been successful at preventing seepage incidents from reoccurring.

Following the most recent seepage event BHOP has initiated a number of corrective actions including:

- Pumping of water out of S49 to another holding pond on CML7.
- Water and soil samples taken for investigation.
- Excavation of a seepage interception trench and collection bund outside the wall of S49.
- Engagement of electrical infrastructure to scope installation of a fixed, fit for purpose pump with automated trigger for transfer of water out of S49.
- Capping of unsealed area at the end of the Ryan St cul-de-sac to reduce removal of sediment via vehicle movement and run-off.
- An engineering firm has been engaged to review the integrity of the storm water pond with the intention of improving water retention.
- Engagement of site contamination experts to inspect the surround area and determine appropriate remediation.
- A Trigger Action Response Plan (TARP) has been developed for stormwater retention ponds following rainfall events.
- Long-term rehabilitation of the Block 10 area as part of the Rehabilitation Management Plan due for submission July 2022.

5) Broken Deposition Dust Gauge 7 lid (MP07_0018-PA-18)

As reported on 19 April 2022, Depositional Dust Gauge 7 located at Blackwood TSF2 was collected on 4 April, as per monitoring protocols. It was packaged in the foam boxes in which they were supplied to BHOP and forwarded to ALS Newcastle for analysis. Upon arrival at the laboratory the lid was damaged, likely to have occurred in transport. ALS contacted BHOP in regards to the incident and advised they would not be able to perform analysis on the sample due to the loss of volume and sample integrity. This resulted in BHOP being non-compliant with PA07_0018 Schedule 3 Condition 3 Table 3 for the DG& location. Moving forward dust gauge bottles will be shipping in foam boxes within a cardboard box for additional protection.

6) S14 Seepage (MP07_0018-PA-19)

As reported on 17 May 2022, during an inspection of the storm water storage pond S14 on 28 April seepage was observed flowing into decommissioned transformer cells on a neighbouring uninhabited industrial block, into a vacant residential block and onto Eyre Street. This seepage potentially resulted in BHOP being non-compliant with:

- PA07_0018 Schedule 2 Condition 1 (to prevent and/or minimise any material harm to the environment as a result of the project) and

- EPL 12559 Condition L1.1 (to comply with section 120 of the Protection of the Environment Operations Act 1997) & Condition L8.1 (that all storm water and surface water holding ponds be capable of holding stormwater run-off from a 1:100 ear ARI event).

This seepage was the result of 27.8mm of rain recorded at the Rasp Mine weather station on 26 April, given there have been no previous seepage events at this location, the pond was not inspected following this rainfall event. However, previously rainfall events totalling 152.5mm in March and April meant this pond was already saturated and the added rainfall on 26 April increased the water level to a point that instigated seepage. The pump usually kept in this location was unable to be located in March and BHOP were still awaiting the purchased replacement pumps, for this reason a hire pump was obtained and seepage had ceased from S14 by the afternoon of 29 April.

Following this seepage event electric pumps have been purchased and installed to maintain water levels in S14 and the adjacent stormwater ponds. These units are currently powered by generators, however an electrical engineering company have been engaged to explore installation of a permanent power source in this area. An engineering and environmental consultancy company have also been engaged to review the integrity of multiple water storage ponds across site, S14 included.

7) TEOM1 Power Outage

On Tuesday 31 May 2022, TEOM1 was without power for much of the period between 8:00 AM and 4:30 PM due to planned power outages in South Broken Hill. As a result, BHOP was non-compliant with PA07_0018 Schedule 3 Condition 3 Table 2 and EPL12559 requirements for collection of daily data for Points 13 and 14, as an average for the 24 hour period cannot be calculated due to only 16 hours (of the minimum 18 hours) being monitored during the 24 hour period. Hence only 67% of the day was monitored and not the required 75%.

Environmental harm was not likely as for the period that TEOM1 was without power TEOM2 recorded an average PM10 dust level of 7.7 $\mu\text{g}/\text{m}^3$ (PA07_0018 Short-term Criterion 50 $\mu\text{g}/\text{m}^3$).

A formal letter was issued to Ecotech (the third party contracted to provide 24 hour air quality equipment monitoring and functional alert system) that they conduct an investigation into the failure of the alert system to send appropriate and timely notifications. BHO investigated alternate suppliers of equipment monitoring services and automated alert systems. BHO obtained a backup generator.

8) Holten Drive seepage

On 30 July 2022 during the morning inspections of the Mill Overflow Pond located on the southern boundary of Rasp Mine, Mill operators found that a join in the poly pipe that was being used in the transfer water out of the Mill Overflow pond had failed during the night, discharging water onto the Mill road. This water has subsequently seeped through the external boundary bund, discharging approximately 15,000L of water off site. Once identified, pumping operations ceased. The roadway was dewatered promptly, and bunds were established to prevent further water run-off. Samples were taken of the seepage and from within the pond, and a contractor engaged to extract the water that had made its way offsite.

Environmental harm is not likely to occur as the seepage was contained to the roadside drainage channel and the flow ceased in short order. Water that had made its way off-site was quickly collected by a vacuum truck and returned to site. No impact to plant life or wildlife has been observed and is not likely as the seepage water did not impact local water ways or pool in areas with plant growth. In addition, historic mining activities have likely contributed to the elevated mineral levels in the soil in this area.

In response to the incident BHOP has conducted an incident investigation and a number of corrective actions have been identified, including:

- The poly-pipe used for transfer of water from the Overflow Pond to Horwoods Dam was replaced with a continuous length of pipe (with no joins). The connection of the pipe to the pump has also been welded and not mechanically joined as welded joins are less likely to fail. (Completed)

- Grade the camber of the road to direct water back to site and away from boundary bunds. (Estimated completion date 31 October 2022)
- Conduct an audit of boundary pipe networks and bunds to determine if similar risks exist and implement required controls. (Estimated completion 30 September 2022)
- Recommendations from the site water storage review as required by Condition U1.4 of EPL 12559, including those associated with the overflow pond, will be implemented by the date of 30 April 2022 as specified in EPL 12559 Condition U1.5.
- Utilise specialist consultant to assist with incident site soil sampling of potentially impacted areas to determine remediation requirements and implement as required. (Estimated completion date 31 October 2022).
- Include in the site water management plan, guidance requirements for permanent and temporary pumping/dewatering activities including (but not limited to);

EMM were engaged to inspect, sample and advise on remediation of the site and the final report recommended final remediation at site closure as part of the site wide contaminated site review.

9) Oily Water discharge

On 31 October 2022 at approximately 8:30am a member of the public alerted a BHO staff member to oil contaminated water that was being discharged from a neighbouring site. The Senior Environmental Advisor was alerted to the issue and attended the scene to locate the source. Upon inspection it was determined that the run-off was originating from a disused tank and the rear of the BHO Store building, which with recent rains had filled with water and was beginning to leak contaminated water.

Environmental harm was not expected as the amount of substance released was likely less than 1 litre due to the tank containing what appears to be a residual amount of oil, only 0.8mm of rainfall fell in the 24hrs prior to discovery of the contamination, and quick response in controlling the contaminated runoff.

There had been no previous known events involving this disused tank, the original use of the tank and accompanying structure is not known.

Corrective actions undertaken include:

- Construction of bunds around the tank structure to prevent run-off with any further rain (Appendix 2 Figure 2A & 2B).
- Oil absorbent booms are maintained downstream to contain any residual oil on runoff in the event of rainfall and failure of containment bunds.
- A tarpaulin remains installed over the tank to prevent any water ingress from rain.
- BHO environmental staff check the area each week and post rainfall events to ensure no further runoff occurs and controls remain in good order.
- A registered waste contractor from Adelaide has been engaged to attend site and remove the oily waste and clean all tanks within the structure.

An EMM contaminated land specialist visited site on 3 November and took soil and water samples in the immediate vicinity of the tank to inform their assessment and make recommendations on appropriate remediation. EMM recommended removal of the tank and remediation. BHO have engaged EMM heritage experts to catalogue the tank and assist with decommissioning the structure for removal. Once the tank is removed, remediation of the area will be conducted in accordance with formal advice received from EMM.

10) Block 7 Blast Exceedance

On the morning of Friday 22 July 2022 at 6:58am production blasting occurred in Block 7, this blasting resulted in a ground vibration peak particle velocity of 7.75m/s recorded at the V4 Bowls Club blast monitor. This has been the only blast in Block 7 during the reporting period. Hence, BHOP is non-compliant against PA07_0018 Schedule 3 Condition 18 requirement for no more than 5% of blasting

in Block 7 to exceed 3mm/s ground vibration peak particle velocity over a 12 month period. No future blasting is planned at Block 7.

11) Vandalism of TEOM2

At approximately 12:20am on 1 October 2022 an unidentified individual disconnected power to the TEOM2 enclosure situated on Embankment 2 of TSF2 Blackwoods Pit. The rear access panel on the TEOM enclosure was removed and the data logger and 4G modem were stolen from the enclosure.

As TEOM2 was not collecting data for 6 hours and 40 minutes, the data capture from TEOM2 for the 24-hour period was below the required 75% or 18 hours.

Environmental harm is not likely to have occurred as the average PM10 dust level measured at the collocated Aeroqual Dust Sentry was 1.7 mg/m³, and 2.4 mg/m³ at TEOM1 on Lawton St Hill.

A replacement data logger and modem were installed.

Police inspected the scene and dusted for finger prints.

12) Power loss HVAS and HVAS1

On 12 October 2022 at approximately 2:20pm Environmental personnel conducted run-day inspections of the Silver Tank High Volume Air Samplers and discovered they were not running and had lost power. Once identified, electricians attended the site, restoring power to the units and they were able to complete the latter part of their scheduled sampling time.

Environmental harm is not likely to have occurred as the average PM10 dust level for the day as the measured at the nearest PM10 monitor, TEOM1 on Lawton St Hill, was 1.48 mg/m³ and at TEOM2 on TSF2 6.70 mg/m³. Analysis was completed on the partial run samples both returning consistent results with previous samples from the same location.

Power surges experienced on site on 12 October 2022 at approximately 1:30pm likely contributed to the power supply to the monitors tripping.

13) Tailings Discharge

On 24 December 2022, whilst depositing tailing into TSF2, a rat hole (flow pathway) developed in the south western side of the facility that resulted in water and tailing reporting on the downstream side at the base of the historic waste dump abutting the mine lease. The offsite release resulted in approximately 200m³ of tailing being discharge off site and affected one neighbouring residence (Perilya Employee residence).

Milling operations were immediately shut down and the flow of tailing ceased. A local contractor was immediately mobilised to begin recovery of the tailings and sweep tailings from nearby public roads.

Tailings was recovered and returned to site within the week and the residence remediated.

EMM Consultants have attended the site to collect samples and a report with recommendations for remediation is expected March 2023.

11. ACTIVITIES PROPOSED IN THE NEXT REPORTING PERIOD

The following lists the proposed activities during the next reporting period:

- Submit the revised Rehabilitation Strategy.
- Installation of an automated sprinkler system for dust suppression on TSF2.
- Development of the Boxcut and Kintore Pit TSF as approved under Project Approval 07_0018 MOD6.
- Waste-rock capping.
- Undertake on-going maintenance and inspections of heritage buildings as required.
- Continue application of chemical dust suppressant to 'free areas' and unsealed roads.
- Weed control.
- Stormwater pond maintenance, including sediment removal.