Stawell Gold Mines

Earth Resources Regulation

2022 Public Sustainability Report

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1. INTRODUCTION

This annual Public Sustainability Report for 2022 has been prepared for Mining Licence 5260 in accordance with section 26 4AA of the Mineral Resources (Sustainable Development) Act 1990.

Stawell Gold Mines (SGM) is located approximately 240 km northwest of Melbourne, 70 km southeast of Horsham and 2 km east of the Stawell CBD (**Figure 1**). All surface and underground infrastructure associated with SGM's operations is located within the MIN5260 lease area, which covers approximately 50% of the town.

SGM has operated at its current location since 1983, which has involved the progressive mining of gold in a series of above ground open pits and extensive underground workings. SGM surface operations are situated adjacent to the eastern boundary of the Stawell Township and encompass an approximate area of 380 ha. SGM underground workings extend from the Magdala portal in a north-westerly direction underneath the town, with the current production activities focused on the East Flank of the Magdala Basalt, which hosts the Aurora B discovery which is the new area of production.

The SGM operation hosts the following infrastructure:

- Mill and Run of Mine (ROM) pad;
- Tailings storage facilities;
- Wonga Mining Area;
- Davis pits;
- Magdala portal and support infrastructure for the underground mine (e.g., ventilation shafts, emergency egress, water reticulation, cooling and power);
- Waste rock stockpiles;
- Administration area including buildings, stores and car parks;
- Maintenance workshops;
- Core farm;
- Laydown areas; and
- Tracks, roads and fencing.

SGM operates on land parcels that include both crown land reserves and freehold land (**Figure 2**). The majority of SGM's operation is located on freehold land owned by SGM however, some areas of land that hosts the mine operations area are Unreserved Crown Land managed by the Department of Environment, Land, Water and Planning. Two additional parcels of Unreserved Crown Land host an access road, the Wonga Mining Area and Mt Micke stockpile.

Land that adjoins SGM to the north and east of the mine site is freehold land predominantly used for grazing. The Stawell Township is located to the west and northwest of the mine. Crown Land used for recreation is situated immediately northwest of the mine site. To the south of the mine the land use is a mix of forested Crown Land and rural residential interspersed with agricultural use.

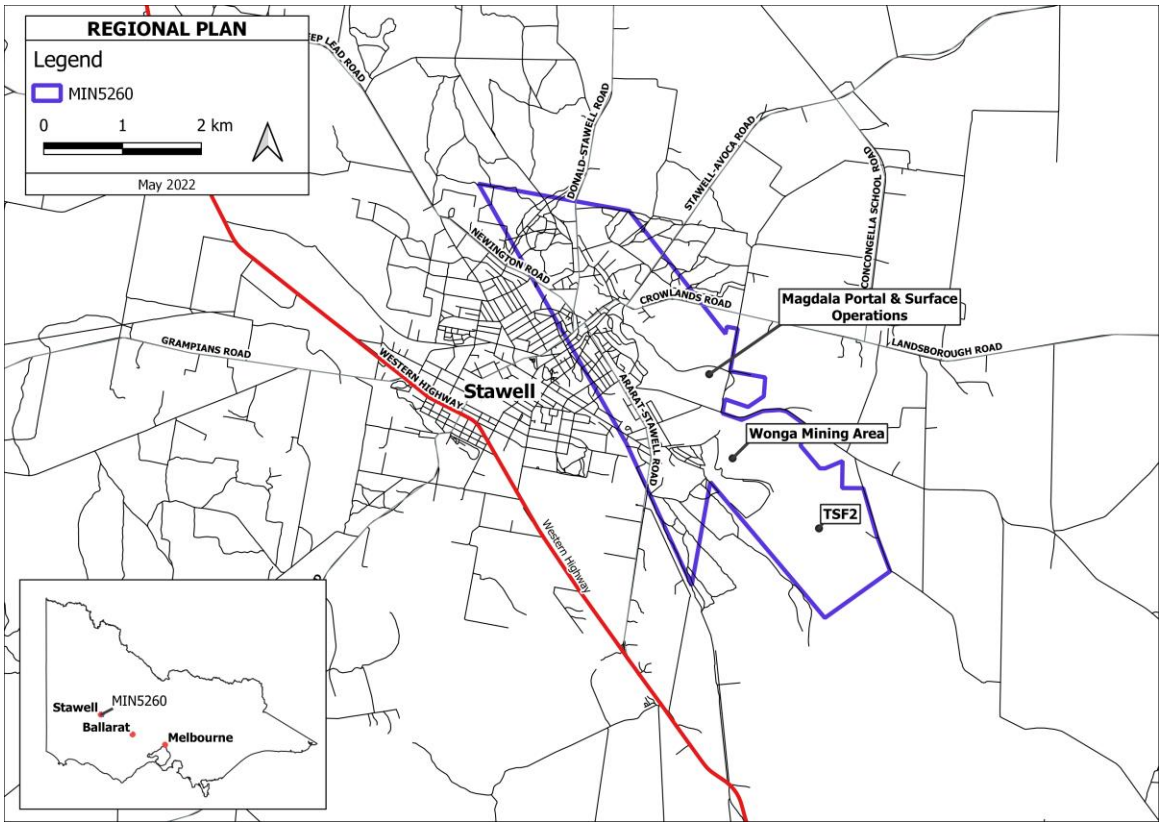


Figure 1 - SGM location plan

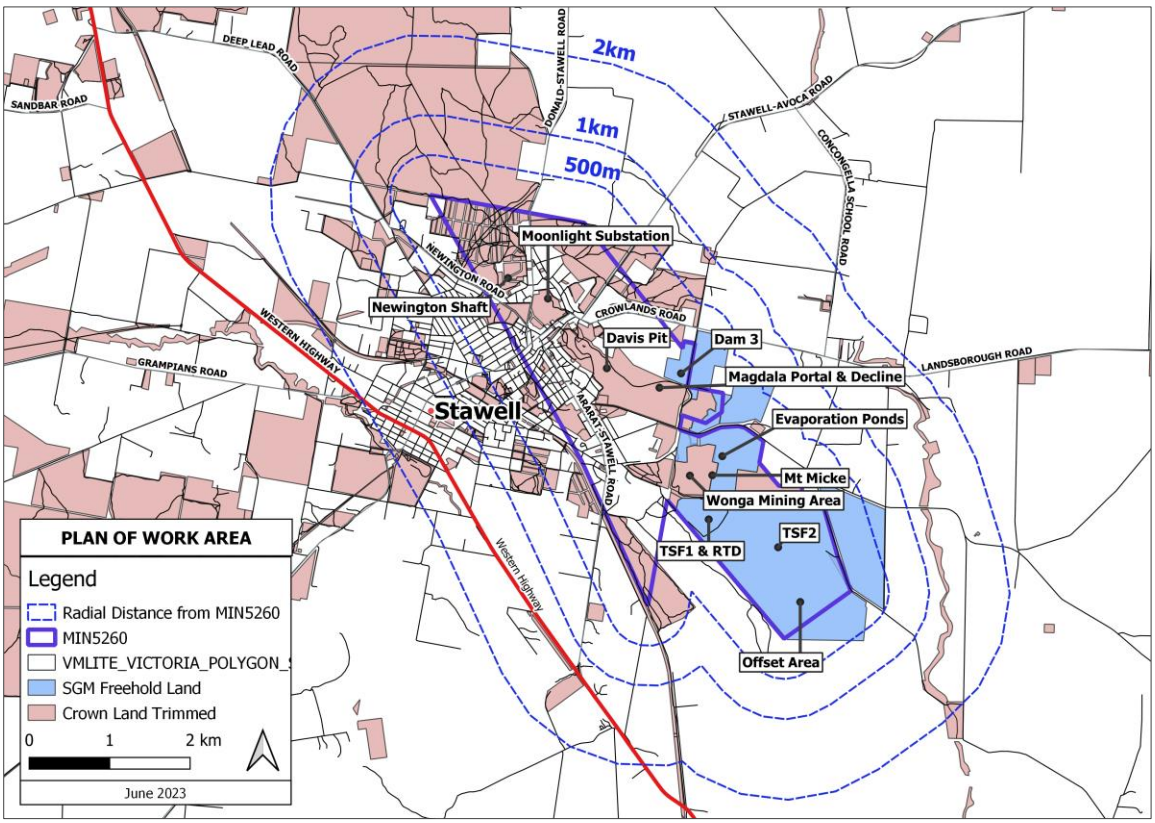


Figure 2 - Land tenure within MIN5260 lease areaEconomic Benefit

Modern era production at SGM began in 1984 and involved the progressive mining of gold in a series of above ground open pits and extensive underground workings.

SGM is capable of processing approximately 850,000 t/year. The processing plant at SGM is a conventional gravity/leaching process which can recover gold from both underground (sulphide) and surface (oxide) ore sources. Processing involves a two-stage crushing, milling and a Carbon in Leach (CIL) circuit. Most ore types require further liberation of the gold from sulphide materials. This is achieved in a two-stage flotation circuit where gold-bearing sulphides (e.g., pyrite, arsenopyrite and some pyrrhotite) are concentrated. The ground sulphides and flotation tail are then recombined and sent to the CIL circuit, where sodium cyanide was used to leach the gold from the slurry.

Gold from SGM is sent to The Perth Mint for further refining and is then able to be used in a variety of products including electronics, aerospace applications, jewellery and medical equipment.

Throughout the life of SGM there has been a substantial contribution directly to the local and regional economy through employment, the supply chain, government revenue, sponsorships, donations and community grants (**Table 1**). As of December 2022, SGM employed approximately 243 full time equivalent (FTE) staff which includes SGM employees and contractors. SGM has provided ongoing in-kind support to the construction of the Stawell Underground Physics Laboratory.

Table 1 - SGM Sponsorship and donations 2022

Contribution	Value
Sponsorship, Grants & Donations	$52,647
SUPL in kind	$400,000+

2. COMMUNITY ENGAGEMENT

2.1. Overview of Community Engagement Plan

SGM's Community Engagement Plan (CEP) was developed to provide a consistent management framework to identify and engage with stakeholders associated with SGM's operations. The CEP outlines the key aspects of community engagement for the company, which include:

- Identify the key stakeholders and assess the level of engagement required;
- Identify community attitudes and expectations with respect to SGM's operations;
- Establish a process for consistent and meaningful engagement with stakeholders;
- Communicate openly and clearly with stakeholders, via a range of engagement methods; and
- Provide a means for registering, documenting and responding to feedback and/or complaints.

Stawell Gold Mines recognize the different needs and expectations of stakeholders with respect to engagement and consultation. Consequently, SGM implements a variety of engagement methods to achieve its engagement objectives, including the following:

- Environmental Review Committee (ERC) - consists of representatives from the community, council and government regulatory authorities. This group reviews environmental performance and raises issues relating to the operations.
- Community meetings and information sessions.
- Direct contact (either in person, via phone, emails or mail, as appropriate).
- Open and information days.
- Community newsletters.
- Local newspaper publications.
- Social media (Facebook & LinkedIn) publications (i.e., fact sheets).
- Website materials.
- Community surveys.
- Company publications and statutory reports.

2.2. Overview of Community Engagement Activities, 2022

Community engagement undertaken by SGM during the 2022 reporting period was severely hindered due to COVID-19 restrictions throughout the year. A summary of SGM's engagement activities conducted in 2022 included:

- The Environment Review Committee (ERC) Meeting was held quarterly (February, May, August & November).
- ERC Snapshot Poster and Meeting Minutes were produced detailing the site activities and a summary of the environmental monitoring data discussed at the meeting were made available to the public though the site Facebook page and Community Hub Website.
- Community newsletter was released in June providing an update on site activities, exploration, production and future blasting locations, which was made available to the public through the site Facebook page and Community Hub website.
- Community Grants Program opened to all local organisations and individuals in June and December.
- Visits to Stawell 502 Primary School, Stawell Historical Society, Skene St School, Grampians Giants Football Team and other community organisations to view items sponsored as part of SGM's community grants program please visit www.stawellgoldminescommunityhub.com.au for information on how to apply.

- School and University visits to site where students and staff were able to speak with SGM staff, view the operation and gain a greater understanding of the mining operation.
- SGM participation in Stawell Agricultural Show with information booth, mine truck, colouring in competition, show bags and gold panning.

3. Environmental Management

3.1. Overview of Environmental Management Plan

SGM's Environmental Management Plan (EMP) was prepared to address the environmental risks associated with site operations. The EMP describes how SGM's Environmental Management System is implemented and details the strategies and control measures for environmental management. The EMP also details monitoring and reporting requirements, key roles and responsibilities, stakeholder engagement processes, and performance indicators for each aspect of environmental or community management.

The EMP is supported by several key documents, such as the environmental risk register, standard operating procedures and an environmental monitoring program, designed to achieve appropriate standards and consistency in SGM's environmental performance. All these documents form part of the site Work Plan approval.

The EMP has been updated to address the new environmental protection regulatory framework which came into force 01 July 2021. Once the updated EMP has been endorsed by the Environment Protection Authority (EPA) (currently under EPA review), monitoring and compliance will be assessed in accordance with the new framework. Until this time, SGM will continue to operate under its endorsed EMP. This framework includes:

- Environment Protection Act (2017)
- General Environmental Duty
- Environment Protection Regulations (2021)
- Environment Reference Standard (2021)
- EPA Publication 1961 – Guideline for assessing and minimising air pollution in Victoria

3.2. Environmental Risk and Monitoring

SGM's environmental risk register identifies relevant environmental aspects and associated potential impacts, along with appropriate control measures and monitoring requirements. Environment risks and associated potential impacts have been assessed in accordance with the methods outlined in the Department of Jobs, Precincts and Regions (DJPR) Risk-based Work Plan - Guidelines for mining industry projects[1]. Environmental control measures have been developed in the context of DJPR's standard controls, industry best practice, Australian and International standards, site characteristics, the nature of the operations, and relevant regulatory and other requirements.

Environmental risks, potential impacts and associated monitoring activities relating to SGM's operations are summarized in the following sections.

3.2.1. Surface Water

Risk Sources, Potential Impacts and Controls

Operational activities on site can present a risk to surface water. Examples of these include:

[1] RRAM Guidelines for Mining industry Projects version 0.7, June 2017

- Landform construction and earthworks that change catchment hydrology;
- Operation of water storage dams associated with the site water management system;
- Storage and use of hazardous materials (e.g. chemicals and hydrocarbons); and
- Storage and transfer of mine tailings and process water.

Potential impacts associated with surface water risk sources can include:

- Sedimentation of surface water systems from exposed areas and stockpiles;
- Contamination from hazardous materials spills and/or septic wastewater systems;
- Contamination from contaminated groundwater or process water entering surface water systems;
- Altered catchment hydrology, resulting in changed water flow paths, quantities and/or velocities; and
- Degradation of surface water ecosystems.

Controls are put in place to ensure that potential risks are mitigated. For surface water management these include:

- Runoff capture systems are created that separate clean and dirty water;
- All hazardous materials are stored in bunding appropriate to Australian Standards;
- Reuse water captured onsite; and
- Design and construct dams and drains to appropriate standards and guidelines.

Surface Water Monitoring

SGM conducted surface water monitoring at seven sites located outside the MIN5260 boundary during the 2022 reporting period (see **Figure 3**). Surface water sites are differentiated into creeks (SW-C) and farm dams (SW-FD).

The standards adopted for surface water quality monitoring is sourced from the:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000).

Surface water quality results for farm dams are assessed against the ANZECC guidelines for stock drinking water and the ANZECC guidelines for irrigation and general use. Natural water bodies (i.e., streams and creeks) are also compared against the guidelines for aquatic ecosystems (80% species protection). The 80% species protection trigger values are adopted for disturbed areas, such as heavily farmed areas and altered landscapes. All surface water quality monitoring results were below guideline values during the 2022 reporting period, except for the following indicated in **Table 2**. All other surface water quality results were below the guideline values for the designated reporting period.

All exceedances and investigations are presented to regulators and community representatives through the Environmental Review Committee.

Table 2 –Surface water quality exceedances or anomalous results 24th July 2022

Location	Analyte	Guideline	Reason	Action
SW-C1 SW-C3	Al	Aquatic Ecosystems - 80% Protection (ANZECC, 2000)	The elevated aluminium concentration is understood to be caused by the aluminium content in localised clays. This result is consistent with historical aluminium concentrations at the	No further action.

Location	Analyte	Guideline	Reason	Action
			respective sites and does not warrant further investigation.	
SW-C3	Ni	Aquatic Ecosystems - 80% Protection (ANZECC, 2000)	The elevated nickel concentration reading this year is similar to a result obtained in 2014 and is likely due to stagnant water at the surface water sampling location.	Observe for any trending
SW-C3	Cu	Aquatic Ecosystems - 80% Protection (ANZECC, 2000)	The elevated copper concentration reading this year is consistent with previous sampling, likely due to stagnant water at the sampling location.	Observe for any trending
SW-C2	Zn	Aquatic Ecosystems - 80% Protection (ANZECC, 2000)	The elevated Zinc concentration at SW-C2 is consistent with some previous readings & this year is likely due to stagnant water at the sampling location.	No further action
SW-FD6	Al	ANZECC Guidelines Stock Water Drinking for Sheep	The elevated aluminium concentration is understood to be caused by the aluminium content in localised clays. This result is consistent with historical aluminium concentrations at the sampling location and does not warrant further investigation.	No further action.
SW-C1 SW-C2	EC	ANZECC Guidelines Stock Water Drinking for Sheep	These elevated electrical conductivity results are a likely reflection of the localised salinity and geology in the region impacting surface water quality.	No further action.
SW-C1	TDS	ANZECC Guidelines Stock Water Drinking for Sheep	Elevated total dissolved solids results is consistent with previous sampling at the location and is likely in part due to localised salinity and geology in the region impacting surface water quality	No further action.

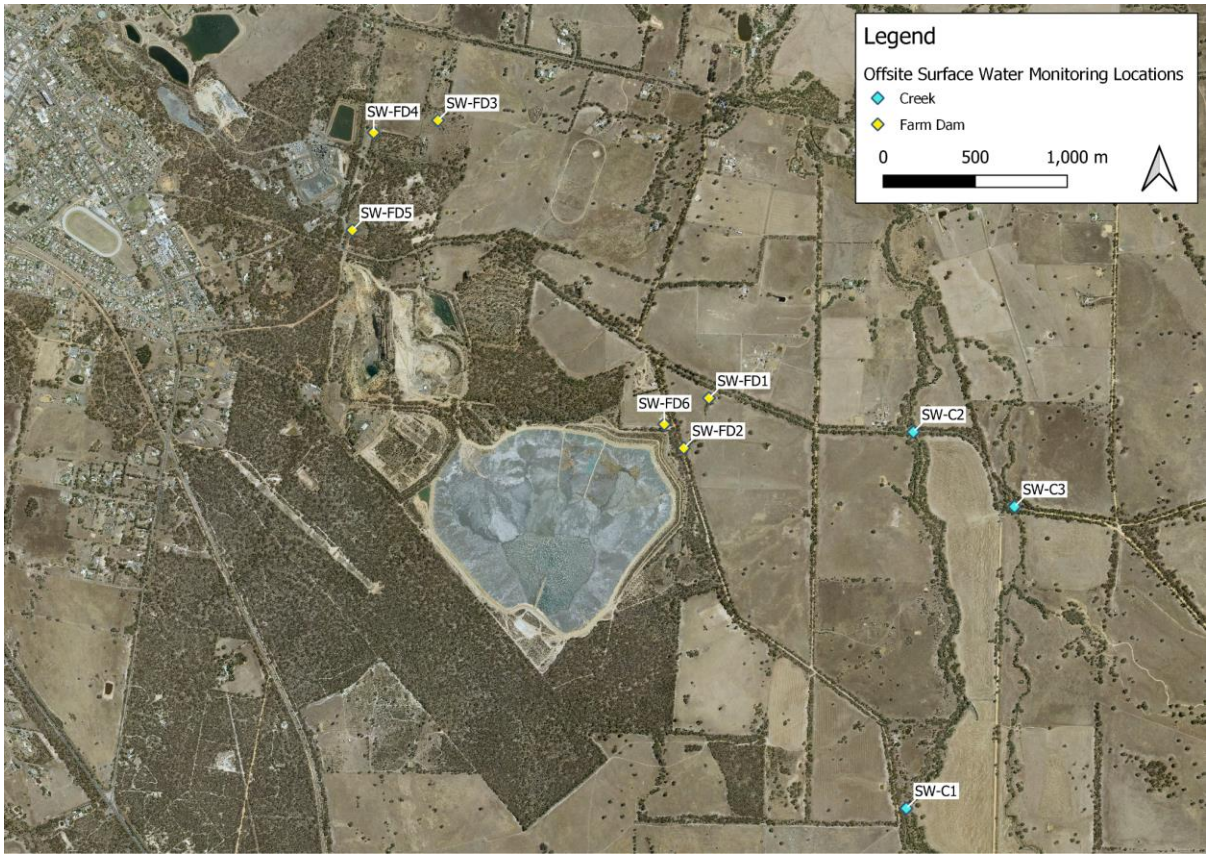


Figure 3 - SGM surface water monitoring locations

3.2.2. Groundwater

RISK SOURCES AND POTENTIAL IMPACTS

Operational activities on site can present a risk to groundwater quality and levels. Examples of these include:

- Dewatering the underground mine and open pits;
- Operation of water storage dams associated with the site water management system;
- Storage and use of hazardous materials (e.g., chemicals and hydrocarbons); and
- Storage of mine tailings and process water.

Potential impacts associated with groundwater risk sources include:

- Decreasing groundwater levels around areas of dewatering affecting vegetation and stability;
- Increasing groundwater levels around tailings storage facilities by increasing hydraulic pressure resulting in areas of water logging and increased salinity;
- Contamination of groundwater from process water or tailings; and
- Contamination from hazardous materials spills and/or septic wastewater systems.

Controls are put in place to ensure that potential risks are mitigated. For groundwater management these include:

- Dewatering is controlled in accordance with a Groundwater Management Plan;
- Storage of process water and mine tailings in appropriately constructed and safe tailings storage facility; and
- A series of bores are installed to create a hydraulic containment system around sources of contamination.

GROUNDWATER MONITORING

All groundwater monitoring undertaken during the 2022 reporting period, was conducted in accordance with the requirements of SGM's EPA approved TSF2 Groundwater Monitoring Plan.

During 2022, SGM monitored groundwater at 30 bores located outside the MIN5260 boundary (**Figure 4**). Groundwater monitoring bores were divided into three sampling frequencies: Quarterly, Annually or Triennially – based on the water chemistry and the determination of trend lines. In addition to monitoring groundwater quality, SGM also monitored standing water levels in the bores to identify any material changes to the water table.

The standard adopted for groundwater quality monitoring is sourced from the:

- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC, 2000).

Groundwater quality results are assessed against the ANZECC guidelines for stock drinking water, despite the natural salinity of the groundwater at most monitoring sites being above the stock drinking water guidelines. Groundwater salinity in the area precludes its use for irrigation.

Thiocyanate (SCN) concentrations are assessed against a risk-based screening level (RBSL) used to assess impacts to groundwater from TSF2 seepage. This RBSL is used as the assessment standard for SCN in the absence of any other guidelines (i.e., ANZECC) and has been endorsed by the EPA.

All groundwater quality monitoring results were below guideline values during the 2022 reporting period, except for the following indicated within**Error! Reference** SOURCE NOT FOUND. – Off Lease Groundwater Quality Exceedance or Anomalous . All exceedances and investigations are presented to regulators and community representatives through the Environmental Review Committee.

ERROR! REFERENCE SOURCE NOT FOUND. – Off Lease Groundwater Quality Exceedance or Anomalous Results

Location	Date(s)	Analyte	Guideline Reference	Reason	Action
SP505	16/08/2022	SO_4	ANZECC Guidelines Stock Water Drinking for Sheep	This result is consistent with historical SO_4 concentrations; and is reflective of regional background geochemistry.	No further action
SP108	01/02/2022 23/02/2022 26/04/2022 26/07/2022 05/12/2022	Al	ANZECC Guidelines Stock Water Drinking for Sheep	This result is consistent with historical Al concentrations; and is reflective of regional background geochemistry.	No further action.
SP604	06/02/2022 08/05/2022 07/08/2022 13/11/2022	Cu	ANZECC Guidelines Stock Water Drinking for Sheep	The latest groundwater monitoring result again observed small decrease in copper over the period. AECOM review of groundwater copper results identified no relation between the copper exceedances at SP604 with any TSF2, or mine related activity.	No further action.
SP585	01/02/2022 23/02/2022 08/03/2022 26/04/2022 26/07/2022	SCN	Clean Up Plan RBSL for Sheep	Groundwater results suggest that SCN is being effectively managed by current hydraulic containment system and has not progressed further from TSF.	Upgrade of the Hydraulic Containment System has been completed, and the TSF2 HCS is currently being assessed as part of

Location	Date(s)	Analyte	Guideline Reference	Reason	Action
	05/12/2022				the TSF2 Clean Up Plan.
SP585	01/02/2022 23/02/2022 08/03/2022 26/04/2022 26/07/2022 05/12/2022	Total CN	ANZECC Guidelines Stock Water Drinking for Sheep	Groundwater monitoring results since May 2017, indicate that Total CN concentrations are relatively stable, ranging between 0.234 to 0.499 mg/L.	Upgrade of the Hydraulic Containment System has been completed, and the TSF2 HCS is currently being assessed as part of the TSF2 Clean Up Plan.

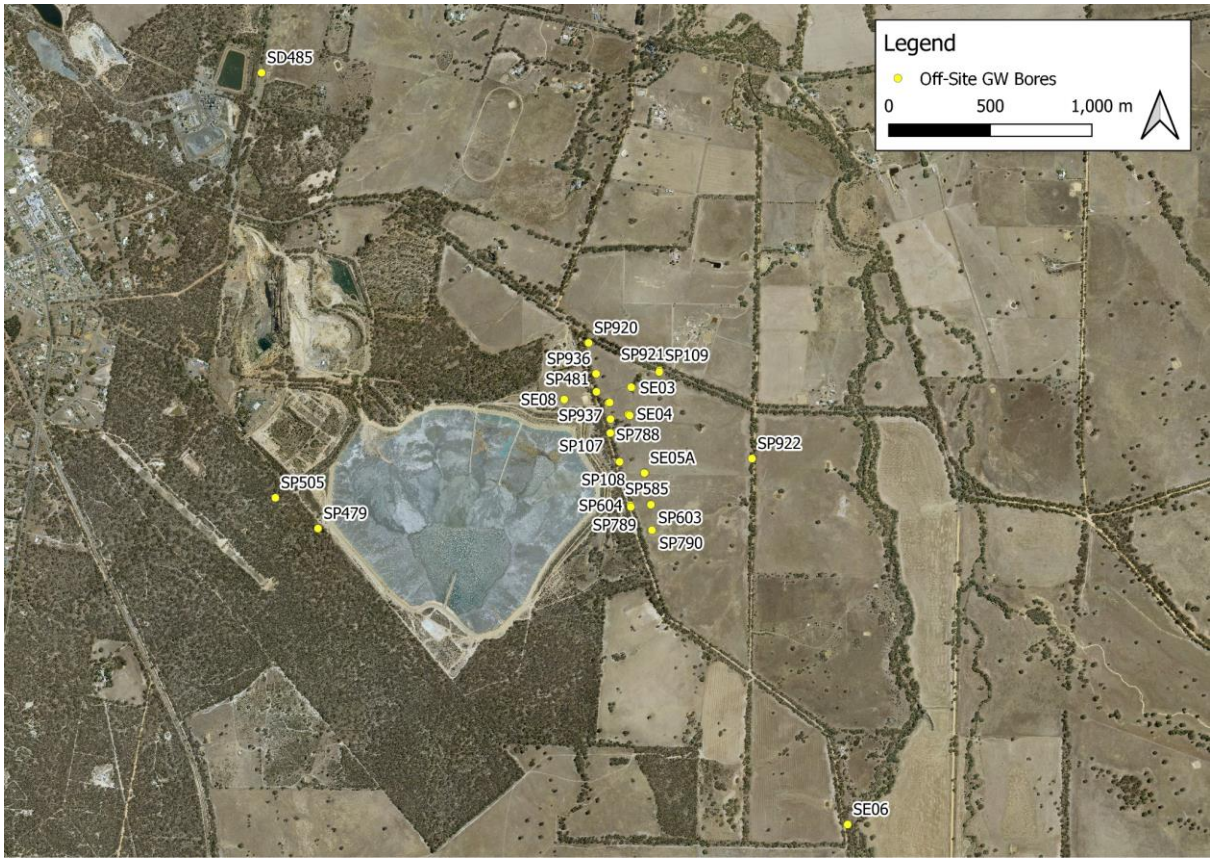


Figure 4 - SGM offsite Groundwater monitoring bore locations

3.2.3. AIR QUALITY

RISK SOURCES AND POTENTIAL IMPACTS

SGM's operations have the potential to impact air quality from a variety of sources. Examples of operational activities and risk sources that may affect the air quality of sensitive receptors include:

- Material handling/earthworks (e.g., truck dumping, excavators, scrapers, bulldozers, graders etc.);
- Processing (e.g., stockpiling, rock breaking, crushing, ore transfers/conveyors etc.)
- Wheel generated dust from mobile fleet movements;
- Wind erosion from stockpiles, tailings storage facilities or exposed areas.
- Odour emissions from underground mine ventilation, ore processing and green waste stockpiles; and
- Fugitive emissions from the storage and use of hazardous materials (e.g., chemicals and hydrocarbons).

Air quality impacts at sensitive receptors vary depending on the location and the nature of the activity/risk source, climatic conditions and ambient air quality conditions.

Potential impacts associated with air quality risk sources can include:

- Reduced amenity at sensitive receptors (e.g., general nuisance, odour and/or discomfort);
- Potential health impacts of sensitive receptors;
- Contamination of soil and/or surface water systems; and
- Vegetation damage.

Controls are put in place to ensure that potential risks are mitigated. Management actions can include:

- Dust suppression either through water sprays and cannons or use of chemical dust suppression and binders;
- Rehabilitation of land once use has completed;
- Limitation of vehicle movements in dust prone areas or during adverse weather conditions; and
- Dust extraction equipment on fixed plant.

DUST DEPOSITION MONITORING

SGM monitored dust deposition at 12 sites during the 2022 reporting period. Dust deposition gauges were located north, south, east and west of the operations area and TSF2, as well as at three background sites (**Figure 6**).

The standard adopted for dust deposition gauge compliance assessment is sourced from the Protocol for Environmental Management – Mining and Extractive Industries (EPA, 2007). The PEM states "results of deposited dust should not exceed 4 g/m^2/month, or no more than 2 g/m^2/month above background levels, as a monthly average".

All dust deposition results were below the assessment criteria during the 2022 reporting period with the exception of those presented in below.

Table 3 - DDG exceedance and anomalous values 2022

Location	Date	Analyte	Guideline Reference	Reason	Action
BG1	02/05/2022 29/11/2022	Total Insoluble Solids	PEM 1992	Field Sheets note high amounts of insect and vegetable matter in these samples. BG1 samples represent a background sampling point located approximately 8.3km NE of the site.	Localised event not resulting from mine activity. No action required.

SGM reported contamination events (**Table 5**) during the 2022 reporting period. Due to the contamination/significant events the dust deposition gauges were not sent to the laboratory and are not presented in **Figure 7**.

Table 4 – Dust Deposition contamination/significant events during the 2022 reporting period

Locations	Month	Reason	Action
BG1	February	DDG broken during transit	No action taken. Sample not sent for analysis.
DG19	March	DDG contaminated with bird faeces.	No action taken. Sample not sent for analysis.
BG1	July	DDG contaminated with bird faeces.	No action taken. Sample not sent for analysis.
DG19	August	DDG contaminated with bird faeces.	No action taken. Sample not sent for analysis.
BG1, DG23 & DG9	September	DDGS contaminated with bird faeces.	No action taken. Sample not sent for analysis.
DG23 & BG3	October	DDGS contaminated with bird faeces.	No action taken. Sample not sent for analysis.
DG16, DG19, DG21 & DG22	November	DDGS lost in transit	No action taken. Samples not arriving for analysis.
BG3		DDGS contaminated with bird faeces.	No action taken. Sample not sent for analysis.

Figure 5 – Dust deposition gauge

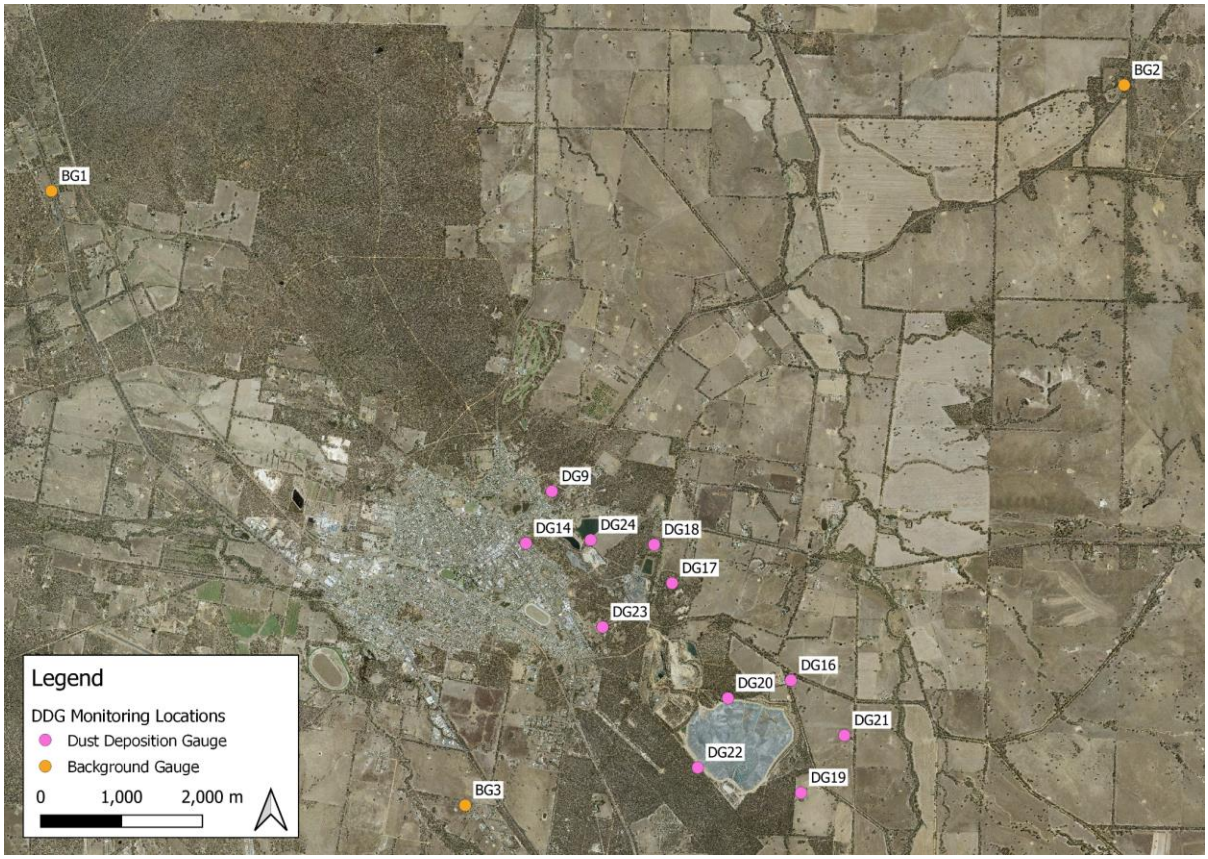


Figure 6 – SGM dust deposition monitoring locations

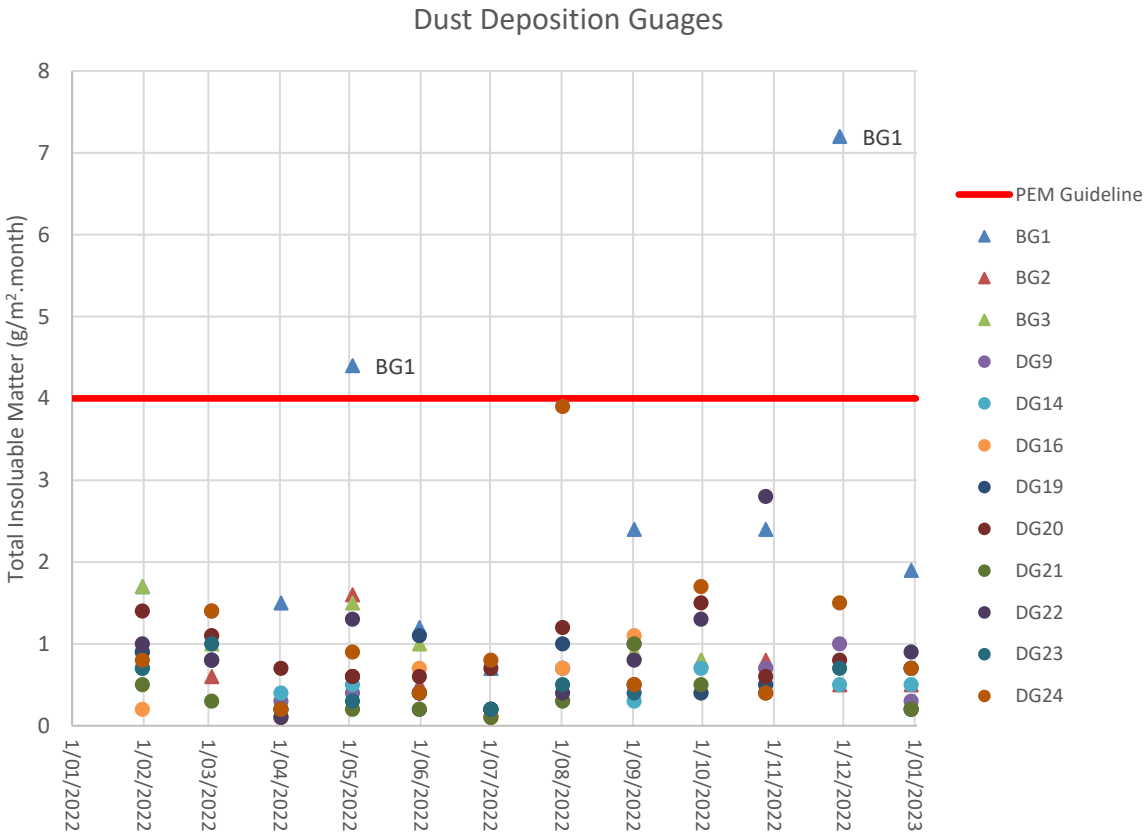


Figure 7 – SGM dust deposition monitoring results for 2022

AMBIENT AIR QUALITY MONITORING

SGM's ambient air quality monitoring station (AAQMS) was reinstated at Fisher Street in October 2020, with the purpose of using this monitor for background and regional monitoring of air quality within the Stawell air shed; and will not be used to assess site compliance against any State or Federal regulatory standards.

Since April 2016, SGM has commissioned four AAQMS to monitor air quality within the vicinity of TSF2. All units are self-sustaining, are powered by solar panels, and measure PM_{10} and $PM_{2.5}$ concurrently using gravimetric photometers. The sequence of AAQMS instatement are as follows:

- April 2016 – TSF2 North
- June 2019 – TSF2 East
- December 2019 – Processing North
- October 2021 – Processing South

The standards adopted for ambient air quality monitoring are sourced from the:

- Protocol for Environmental Management – Mining and Extractive Industries (EPA, 2007).
- State Environment Protection Policy (Air Quality Management) (EPA, 2001).
- State Environment Protection Policy (Ambient Air Quality) (EPA, 1999).

Data exceptions/exclusions from the reporting period include:

- 31/12/2021 to 03/01/2022 – Data loss at TSF2 North due to failure of comms from monitor to server, a delayed response to the incident was experienced as the location of the monitor requires permission to be granted prior to accessing the monitor and this failure occurring on New Year's Eve
- 01/02/2022 to 02/02/2022 – Processing North monitor experienced a breakdown where the DRX filter failed resulting in artificially elevated results.
- 23/05/2022 to 25/05/2022 – Data loss at TSF2 East due to incorrect configuring of internal systems following calibration resulting in stored data being overwritten.

24/07/2022 to 25/07/2022 – Data loss at TSF2 North due to power disconnection. Inspection showed protective fencing damaged, monitor had been tampered with and overturned, disconnecting it from the power source.

All particulate matter results (PM_{10} and $PM_{2.5}$) from the TSF2 North AAQMS, TSF2 East AAQMS and Processing North AAQMS were below regulatory limits for the 2022 reporting period, except for the following event(s) which were unrelated to any activity emanating from SGM's operations (see **Figures Figure 9, Figure 10**, **Figure**

11, Figure 12, Figure 13,Error! Reference source not found.Figure and

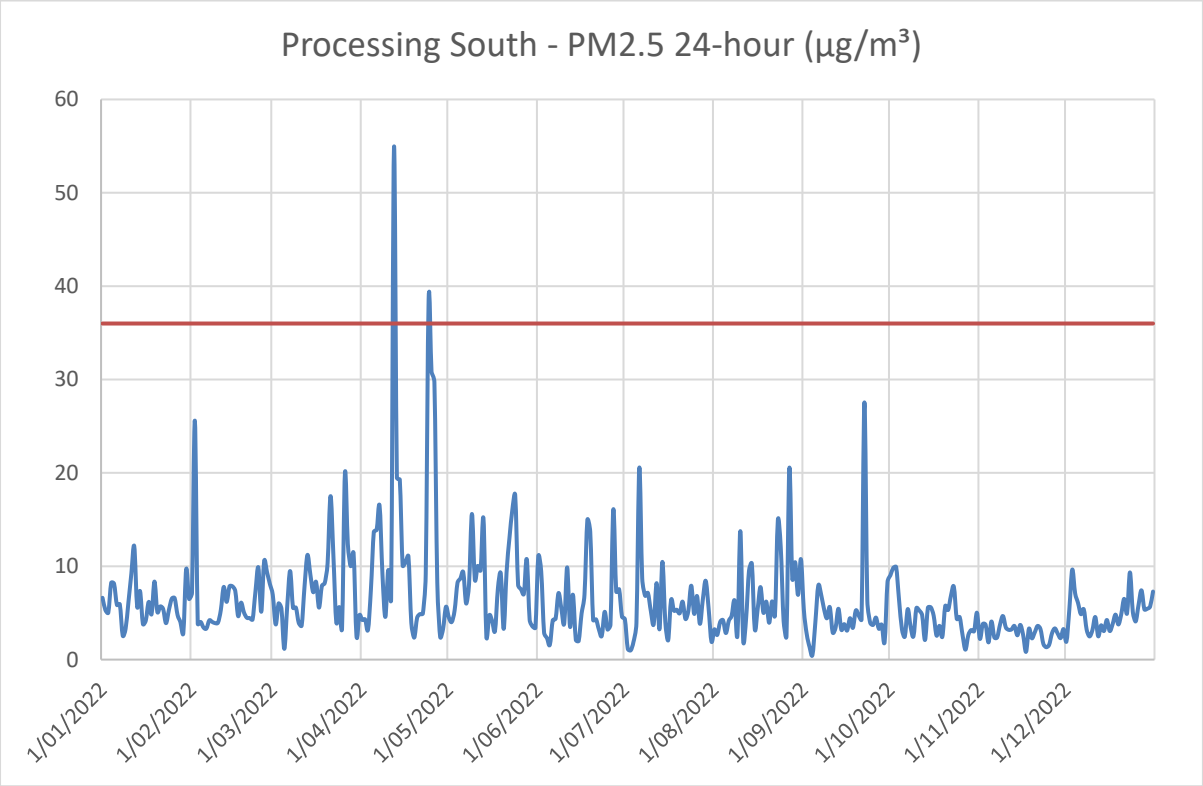


Figure). These events were also recorded by SGM's background monitor at Fisher Street.

- 12/4/2022 to 13/4/2022 – At all Monitoring stations elevated PM2.5 readings were recorded. Elevated readings were also detected at SGM's background monitor during this period. No complaints were received. This exceedance was deemed to be from a regional smoke event and not a mine related activity.
- 24/4/2022 to 27/4/2022 – Elevated readings with respect to the PM2.5 Limit were detected at the Processing South AAQMS. Regional smoke and haze from fuel reduction and stubble burns was noted during the period and similar high levels of particulate matter were recorded at the Fisher Street background monitor during the period.

Figure 8 – SGM AAQMS locations

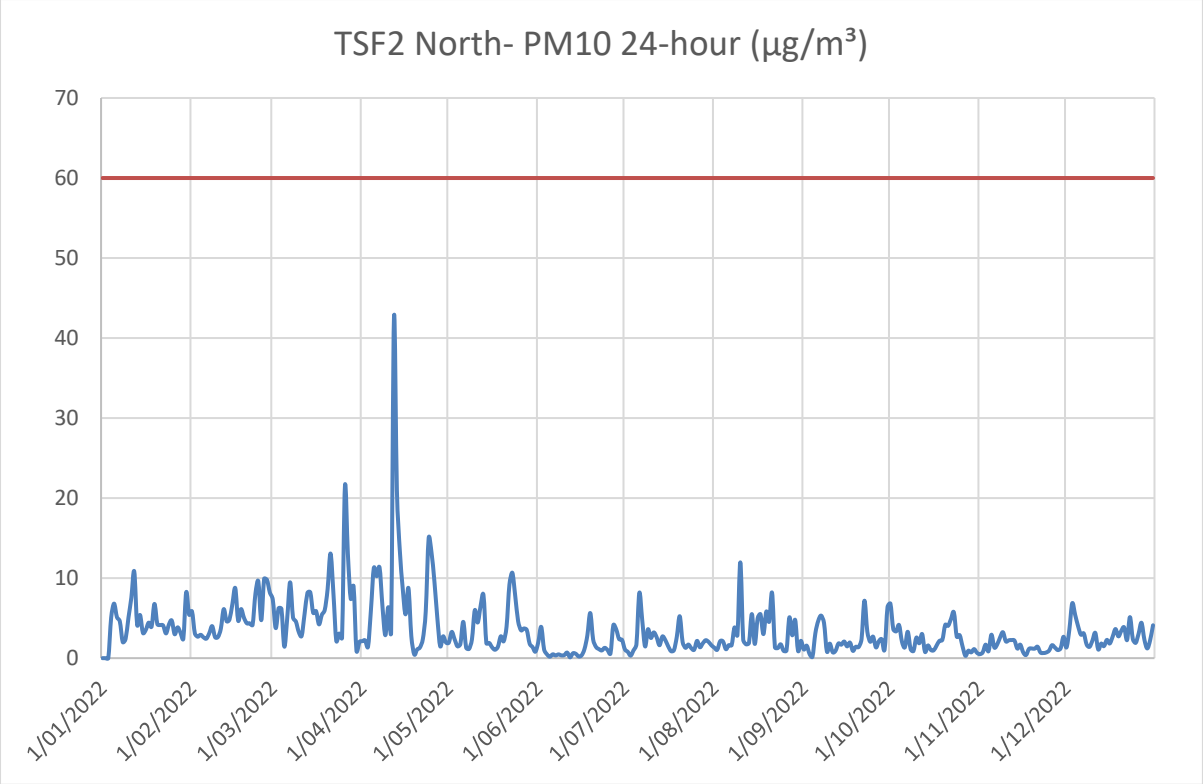


Figure 9 – TSF2 North AAQMS PM_{10} results for 2022

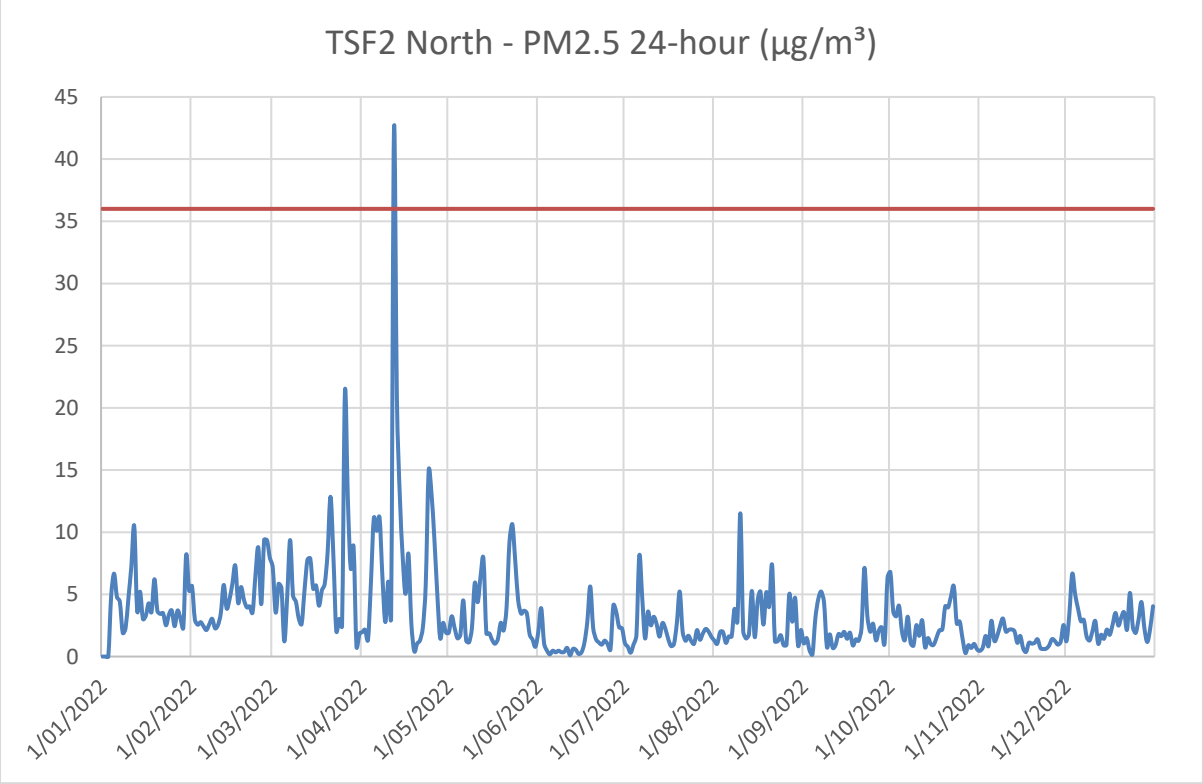


Figure 10 – TSF2 North AAQMS $PM_{2.5}$ results for 2022

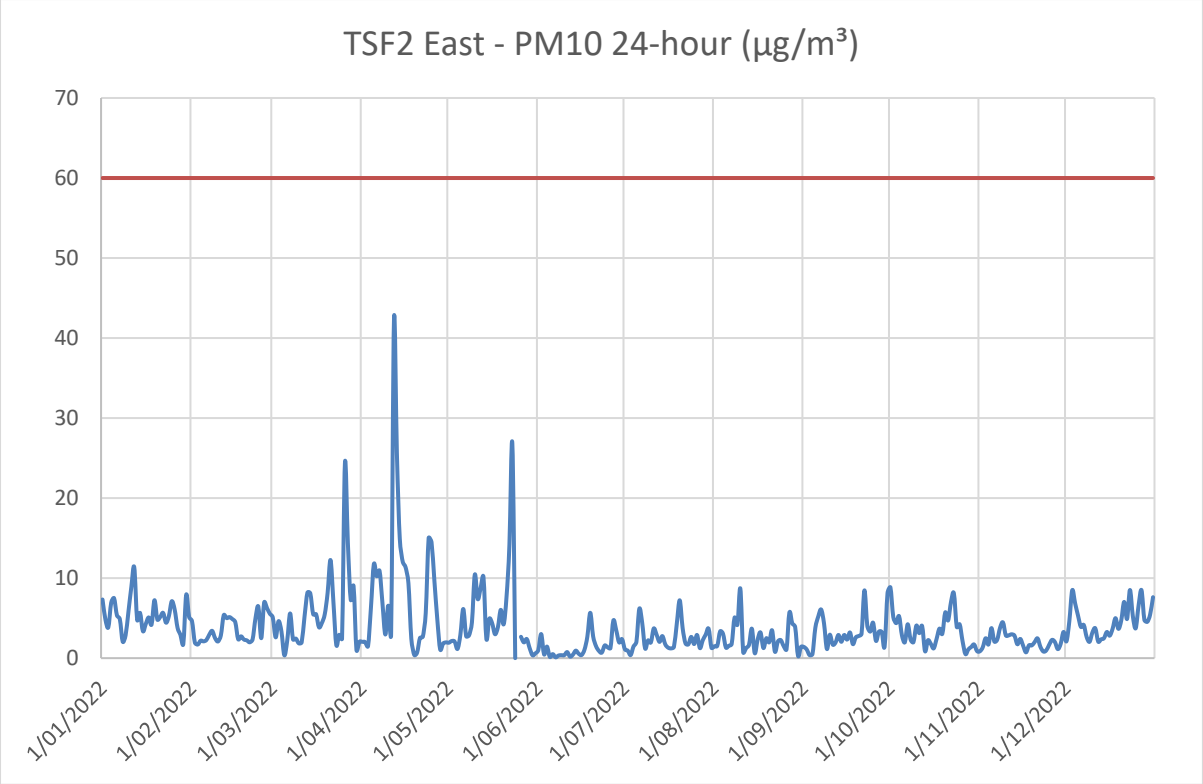


Figure 11 – TSF2 East PM10 Results for 2022

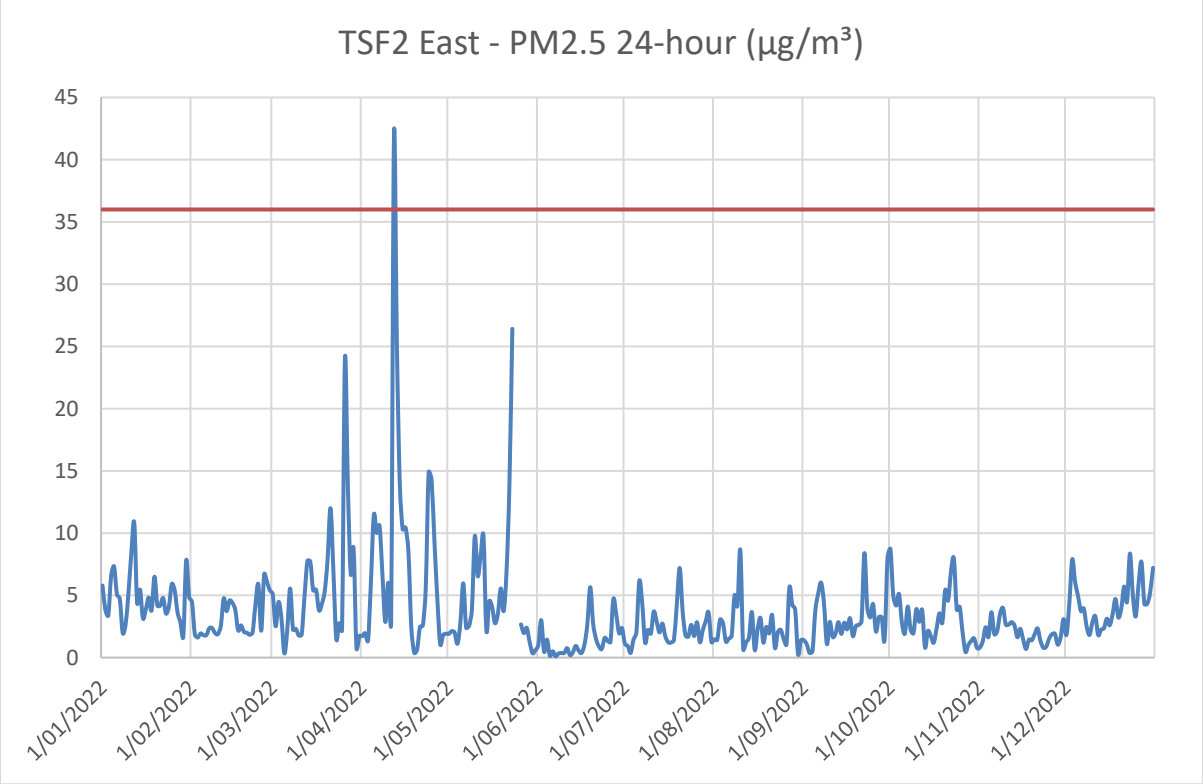


Figure 12 – TSF2 East PM2.5 Results for 2022

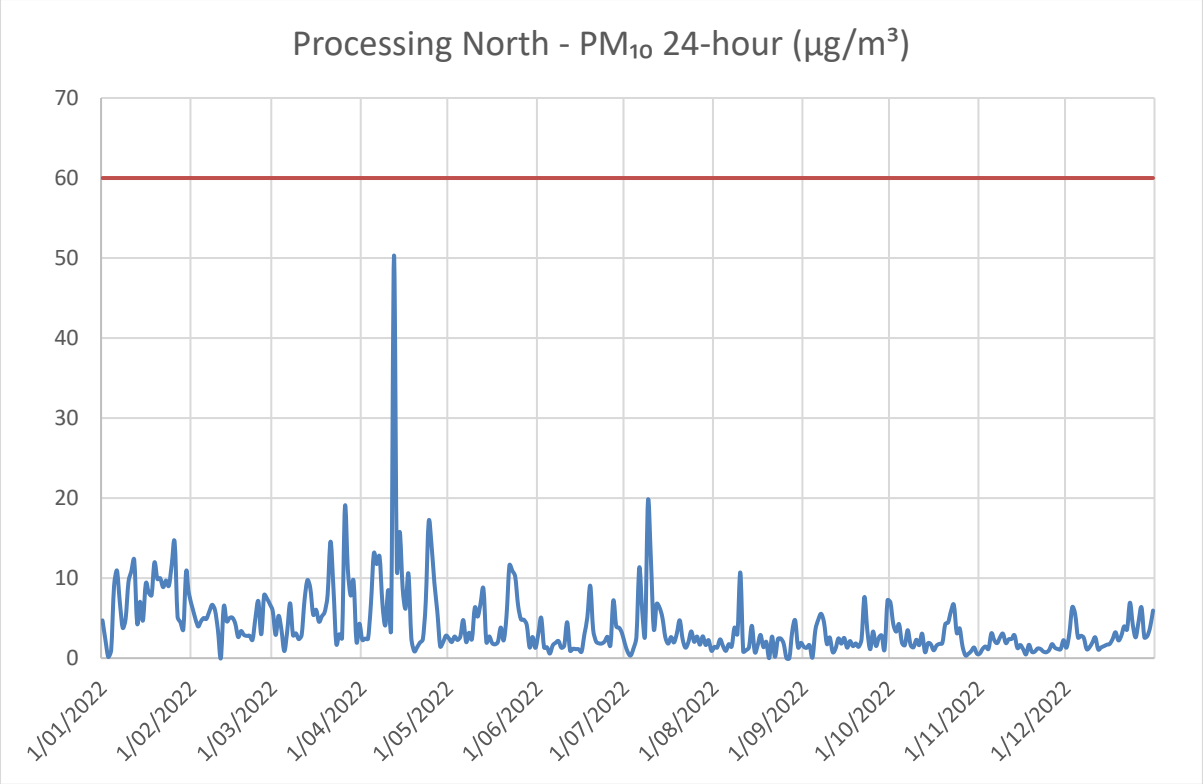
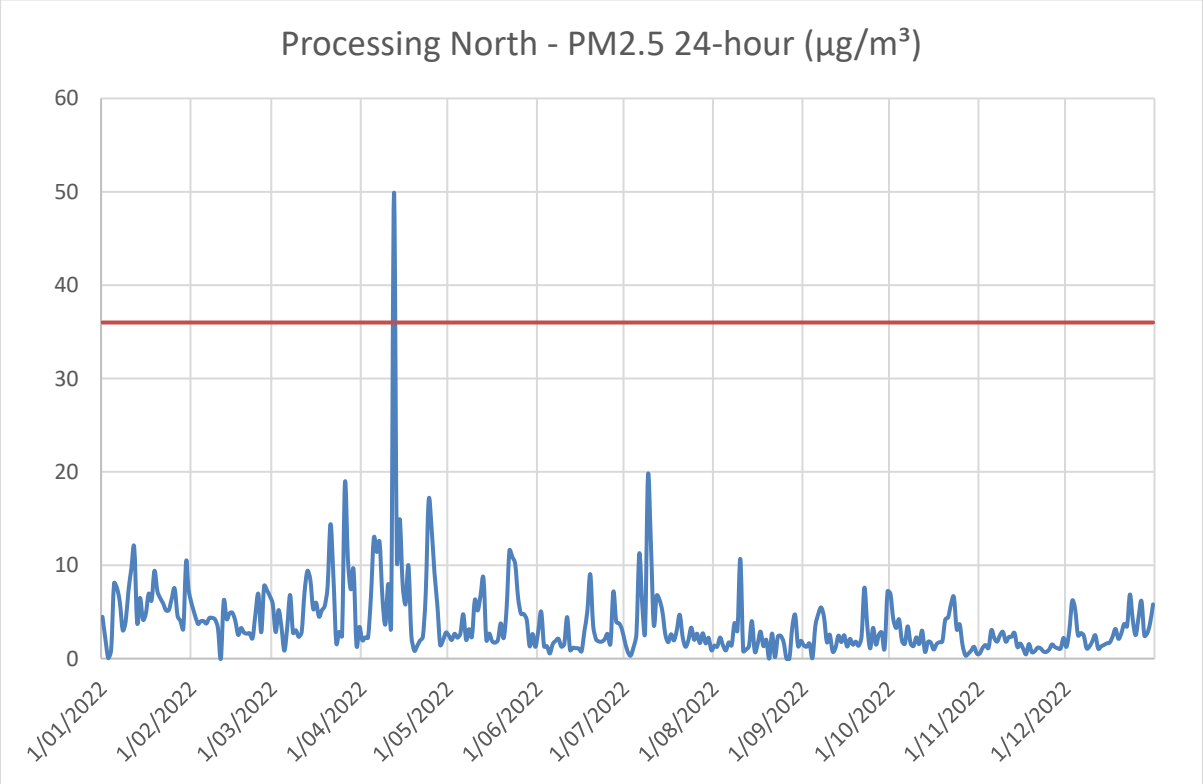


Figure 13 – Processing North PM10 Results for 2022



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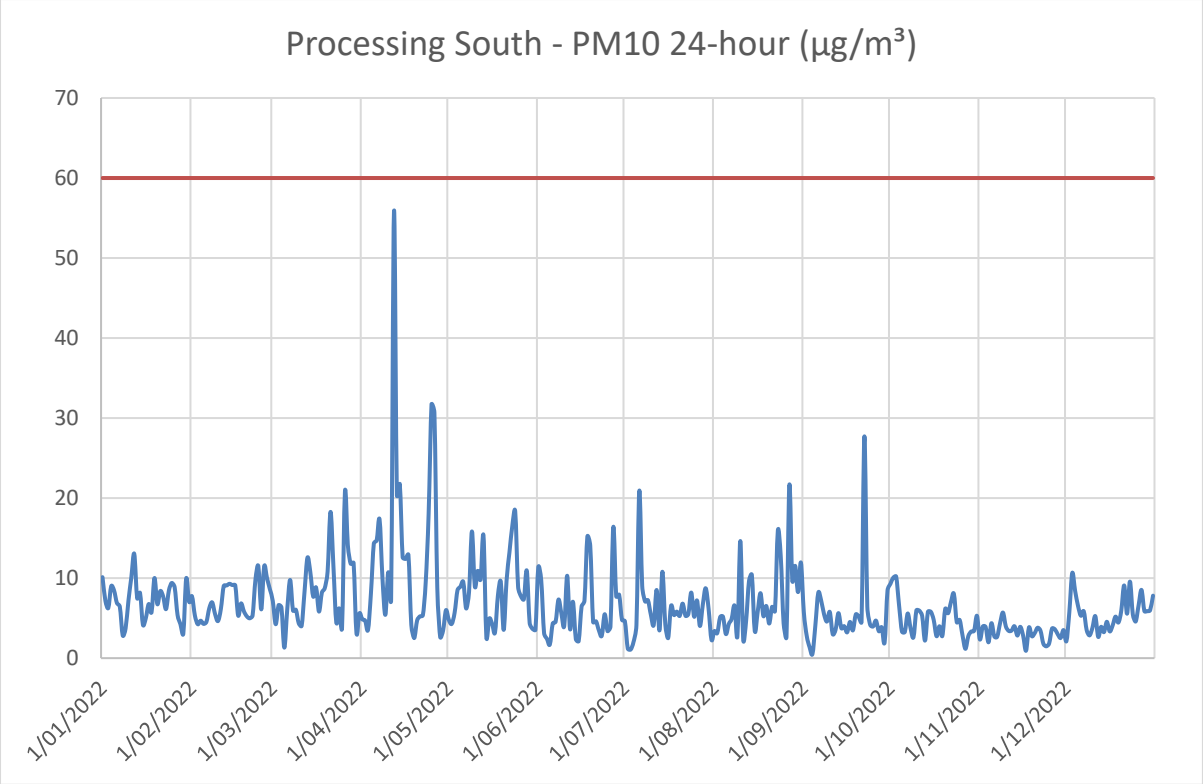


Figure 14 – Processing South PM10 Results for 2022

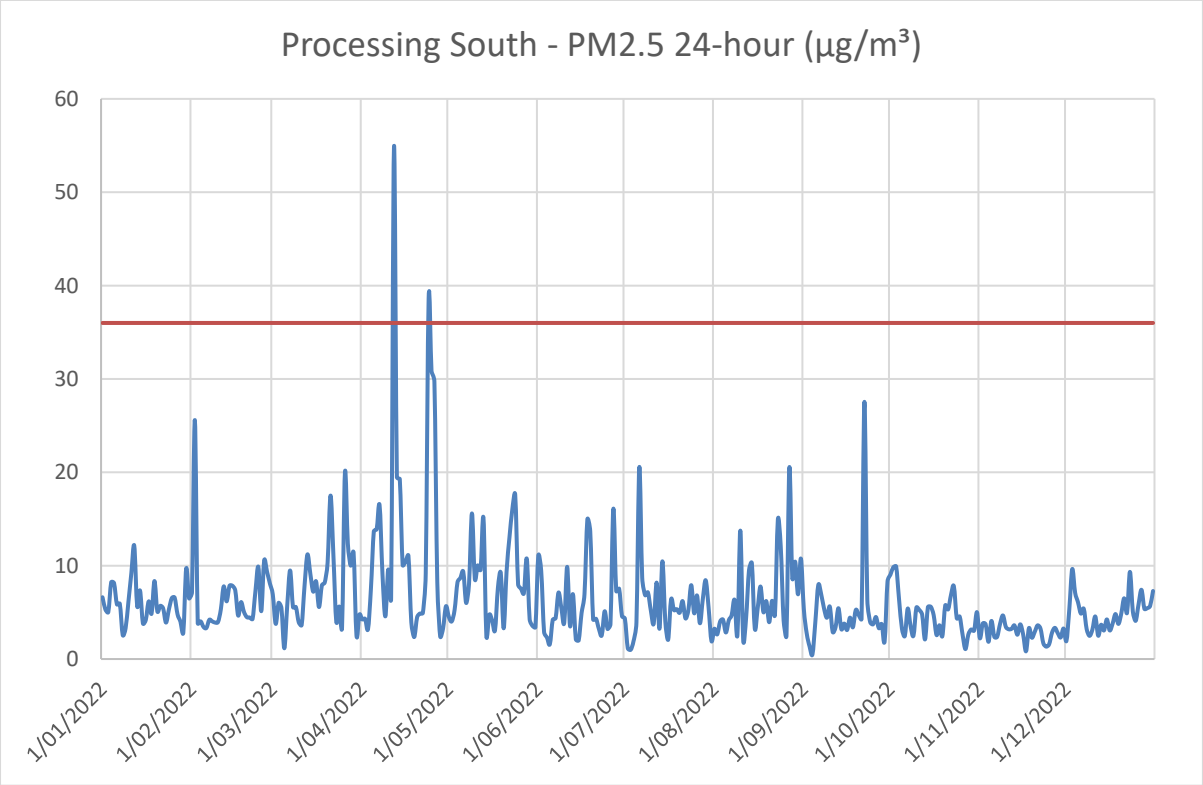


Figure 15 – Processing South PM2.5 Results for 2022

HYDROGEN CYANIDE MONITORING

Cyanide, in the form of sodium cyanide solution, is used to dissolve and separate gold from the ore in the processing facility. Hydrogen cyanide (HCN) gas can be formed under acid conditions through the conversion of cyanide ions in the slurry.

To manage the risk of HCN gas developing during processing SGM implements control measures (e.g. the addition of lime or other alkali solutions) to ensure that the pH of the slurry is maintained at approximately pH 10.

SGM undertakes HCN monitoring between the TSF and the closest sensitive receptor located north of TSF2 (**Figure**). HCN emissions are monitored using HCN GasBadge detectors.

The standards adopted for HCN emissions monitoring are sourced from the:

- Protocol for Environmental Management – Mining and Extractive Industries (EPA, 2007).
- State Environment Protection Policy (Air Quality Management) (EPA, 2001).

All HCN monitoring results from the monitoring point were below regulatory lifetime exposure limits for the 2022 reporting period (**Figure**).

A secondary monitor is located onsite for HCN management purposes on the north bank of TSF2.

Figure 16 – HCN monitoring locations

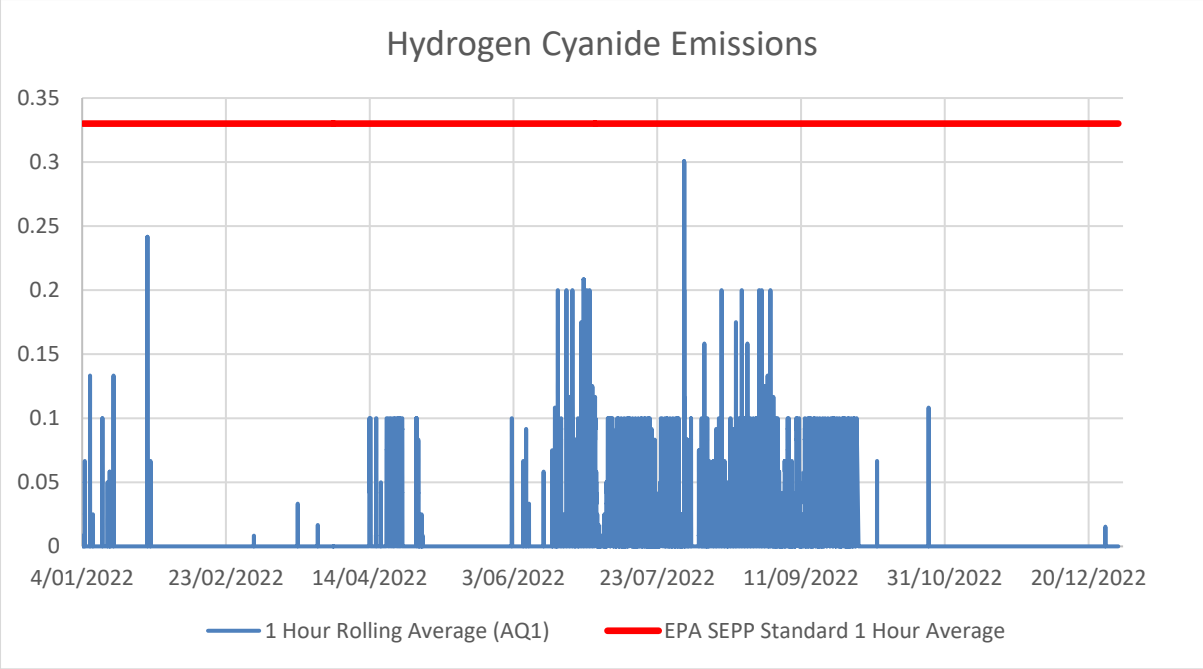


Figure 17 – HCN monitor results for AQ1 TSF2 North off-Site for 2022

Gaseous Emissions Monitoring

Ventilation Shaft

The William McLaughlin Ventilation Shaft (Vent Shaft No. 4) is a critical part of SGM's underground mine ventilation system. Fresh air enters the mine through the Magdala Portal and inlet shafts, and air is extracted from the underground mine into the atmosphere via Vent Shaft No. 4. Mining activities, such as blasting and the operation of diesel powered plant and equipment generate air emissions, including nitrogen dioxide (NO_2), sulphur dioxide (SO_2), carbon monoxide (CO), particulates and odour.

Ventilation shaft monitoring is undertaken at Vent Shaft No. 4 biannually (see **Figure**).

The standards adopted for ventilation shaft emission monitoring are sourced from the:

- Protocol for Environmental Management – Mining and Extractive Industries (EPA, 2007).
- State Environment Protection Policy (Air Quality Management) (EPA, 2001).
- State Environment Protection Policy (Ambient Air Quality) (EPA, 1999).

The assessment criteria detailed in these standards specify air quality concentrations at receptor (not at the emission point source). Emissions monitoring results for Vent Shaft No. 4 from the 2021 reporting period are presented in **Table 5**. The 'less than' (<) results presented are the 'limit of reporting' for these parameters (i.e., the smallest concentration of analyte that can be reported by the monitoring equipment/laboratory). Emissions monitoring results from Vent Shaft No. 4 were all compliant with the modelled point source limits for the May and September 2022 monitoring events.

Table 5 – Gaseous Emission Monitoring Result for No 4 Ventilation Shaft, 2022

Date	Mass Rate (g/min)		
	Carbon Monoxide	Nitrogen Oxide (as NO_2)	Sulphur Dioxide
Point Source Limit	N/A	26	55
May 2022	<20	<30	<40
September 2022	<100	<30	<50

Mill Afterburner

The Mill Afterburner is used by SGM to reactivate carbon utilised in the gold extraction process. Activated carbon is used in the carbon-in-leach process to transfer dissolved gold from cyanide leached slurry to elution where gold is desorbed from the carbon. Prior to reusing the stripped carbon it is necessary to regenerate the carbon by removing the organic and inorganic contaminants absorbed during processing. The carbon regeneration process generates air emissions, including NO_2, SO_2 and CO.

Mill Afterburner monitoring is undertaken at SGM's processing facility biannually (**Figure**).

The standards adopted for the Mill Afterburner monitoring assessment are the same as those applied to the Vent Shaft No.4 monitoring. In September 2016, AECOM undertook emissions modelling for the mill afterburner to determine point source limits for the mill afterburner. These limits are presented in **Table 6**.

Emissions monitoring results for the Mill Afterburner from the 2022 reporting period are presented in **Table 6**. Gaseous emissions concentrations are all below the modelled point source limits and therefore do not present a risk to nearby receptors.

Table 6 – Gaseous Emission Monitoring Result for the Mill Afterburner, 2022

Date	Mass Rate (g/min)		
	Carbon Monoxide	Nitrogen Oxide (as NO_2)	Sulphur Dioxide
Point Source Limit	75,060	511.2	978
May 2022	1.5	6.1	1.6
September 2022	0.15	4	5.2

Figure 18 - SGM gaseous emission monitoring locations

3.2.4. NOISE

RISK SOURCES AND POTENTIAL IMPACTS

SGM's operations generate noise from a variety of sources. Operational activities and risk sources that may generate off-site noise disturbance can include:

- Plant and equipment operation;
- Mobile fleet movement;
- Material handling and processing operations;
- Surface and underground blasting; and
- Exploration activities.

Noise levels at sensitive receptors vary depending on the location and elevation of the noise source, intervening topography, climatic conditions, background noise levels and any engineered noise attenuation barriers present.

Potential impacts associated with noise risk sources include:

- Reduced amenity at sensitive receptors (e.g., general nuisance and discomfort);

- Potential health impacts of sensitive receptors (e.g., sleep disturbance); and
- Fauna disturbance.

Control measures are put in place to limit noise impacts. These can include:

- Placement and orientation of infrastructure, plant and equipment away from sensitive receptors and below topographic features to increase noise attenuation;
- Apply noise mitigation technologies (e.g., mufflers, acoustic screens or enclosures) to existing plant, work areas (such as the ROM pad) and equipment;
- Sourcing plant and equipment that meets specific acoustic qualities during the procurement process; and
- Limiting access or equipment use during evening and night periods.

NOISE MONITORING

SGM undertakes attended noise monitoring at four locations/sensitive receptors situated north, south, east and west of the operations area (**Figure 20**). Four secondary monitoring locations (north 2, south 2, east 2 and west 2) are used in the event an elevated reading is recorded at a primary location as part of the noise monitoring Trigger Action Response Plan (TARP). The TARP was first implemented during the Q3 2021 noise monitoring event.

Noise monitoring is conducted at each location for a period of at least 10 minutes or until the noise (LAeq) is characteristic of the site noise. Noise monitoring is conducted during three periods: Day (07:00 to 18:00), Evening (18:00 to 22:00) and Night (22:00 to 07:00). A noise monitoring audit is undertaken annually by an acoustic consultant.

The standard adopted for noise monitoring is sourced from the:

- State Environment Protection Policy (Control of Noise from Industry, Commerce and Trade) No. N-1 (EPA, 2001).

Compliance monitoring was undertaken in February, May, August and November 2022, and the results of this monitoring are presented in **Tables Table 7**, **Table 9**,

Table 10, **Table 11**, **Table 12**, and **Table 13**.

The dominant noise sources observed at each monitoring location in Quarter 1 were:

- **North:** SGM Site noise audible – trucks, mill and crusher. Non-mine noise audible – traffic, plane, wind, crickets and train.
- **North 2:** SGM Site noise audible – mill, heavy vehicles, and crusher. Non-mine noise audible – traffic, wind, dogs, birds
- **South:** SGM Site noise audible – trucks, rock breaker, pumps, batch plant, mill. Non-mine noise audible: birds, traffic, plane, wind, dogs, crickets, train, leaves.
- **East:** SGM Site noise audible: rock breaker, hammer, crusher, alarm, heavy vehicles, mill. Non-mine noise audible – wind, birds, insects.
- **East 2:** SGM Site noise audible: mill, heavy vehicles, horn. Non-mine noise audible: birds, wind, traffic, crickets. Dogs.
- **West:** SGM Site noise audible: trucks, mill, . Non-mine noise audible – dogs, wind, traffic, school, planes, town clock, people, train,

During the Q1 monitoring period, it was observed that all locations achieved Site noise guideline values during the day period. Elevated readings of 3dB above guideline values were recorded during the evening period at the east monitoring location and the night period at north and east monitoring locations. SGM Site noise included the processing plant that was audible and was continuous throughout the measurements at both locations. There was some minimal ambient noise that included crickets, birds and wind.

The dominant noise sources observed at each monitoring location in Quarter 2 were:

- **North:** SGM site noise audible – mill, heavy vehicles, reverse alarms, crusher, batch plant. Non-mine noise audible – birds, traffic, trees rustling, helicopter, insects, livestock, frogs
- **North 2:** SGM site noise audible – mill, heavy vehicles. Non-mine noise audible – horses, traffic, birds.
- **South:** SGM site noise audible – wonga drilling, reverse alarm, mill, batch plant, heavy vehicles, crusher. Non-mine noise – birds, tree rustling, airplane, traffic.
- **East:** SGM site noise audible – mill, wonga drilling, heavy vehicles, horn, alarm. Non-mine audible noise – birds, trees rustling, traffic, livestock.
- **East 2:** SGM site noise audible – mill. Non-mine audible noise – livestock, dogs, and insects
- **West:** SGM site noise audible – heavy vehicles, and mill. Non-mine audible noise – birds, traffic, school, trains, tree rustling, people shooting, dogs, frogs.

During the Q2 monitoring period, it was observed that all locations achieved Site noise guideline values during the day and evening periods. Elevated readings above guideline values were recorded during the night period at both the north and east monitoring locations. SGM Site noise included the processing plant that was audible and was continuous throughout the measurements at all locations. There was some minimal ambient noise that included crickets, dogs and wind.

The dominant noise sources observed at each monitoring location in Quarter 3 were:

- **North:** SGM site noise audible – mill, trucks. Non-mine noise audible – lawn mower, birds, cars, frogs, crickets, traffic, sheep.
- **North 2:** SGM site noise audible – mill, trucks. Non-mine noise audible – sheep, frogs.
- **South:** SGM site noise audible – heavy vehicles, trucks, mill, batch plant pump. Non-mine noise audible – cars, trees rustling, birds, traffic, frogs, dog.
- **South 2:** SGM site noise audible – mill, truck. Non-mine noise audible – bird.
- **East:** SGM site noise audible – mill, crusher, mill alarm, trucks. Non-mine noise audible – birds. Sheep, rustling trees, cars, crickets, frogs, traffic, sheep, frogs.
- **East 2:** SGM Site noise audible – mill. Non-mine noise audible – insects, frogs, sheep, horses, cars.
- **West:** SGM site noise audible – mill, trucks. Non-mine noise audible – cars, dogs, birds, power tools, plane, frogs, traffic.
- **West 2:** SGM site noise audible – alarm, mill, trucks. Non-mine noise audible – traffic, frogs.

During the Q3 noise monitoring period it was observed that all locations achieved site noise limits during day, and evening periods. Due to the development of a strong inversion layer following the evening monitoring session on the 16th of August the final session was abandoned. Night period monitoring was resumed on the 21st of August. During the follow up night monitoring elevated readings above the guideline value were found at the southern location and its accompanying step-out location. SGM Site noise during the night period included heavy vehicle movements and the processing plant that was audible and was continuous throughout the measurements at all locations. There was some minimal ambient noise that included light wind, frogs & crickets, minor traffic, and dogs.

The dominant noise sources observed at each monitoring location in Quarter 4 were:

- **North:** SGM site noise audible – mill, mill alarm, rock hammer, crusher, trucks. Non-mine noise audible – traffic, wind, birds, frogs, crickets.
- **North 2:** SGM site noise audible – mill, mill alarm, trucks. Non-mine noise audible – frogs, crickets.
- **South:** SGM site noise audible – mill, trucks. Non-mine noise audible – wind, birds, frogs, traffic, highway, crickets.
- **East:** SGM site noise audible – mill, mill alarm, trucks, crusher. Non-mine noise audible – wind, birds, frogs, crickets.
- **East 2**: SGM site noise audible – trucks, mill, crusher. Non-mine noise audible – crickets, frogs, dogs, wind, traffic, rustling trees.
- **West:** SGM site noise audible – trucks. Non-mine noise audible – traffic, sheep, wind, crickets, frogs, highway, birds, dogs, lawn mower.

During the Q4 noise monitoring period it was observed that most locations achieved site noise limits during the day period, and during the evening period excepting the east location. Elevated readings above guideline values were recorded at the east and north monitoring locations during the night period. The processing plant was audible throughout the recorded period at the locations where elevated readings were found, additionally at the northern location HV movement was noted to be a dominant noise source.

Table 7 – Noise monitoring results from location North during 2022

Period (North)	*Limit (dB)*	(dB)			
		Q1	Q2	Q3	Q4
Day (07:00 to 18:00)	*50*	41	45	36	44
Evening (18:00 to 22:00)	*44*	43	41	43	42
Night (22:00 to 07:00)	*39*	44	43	33	41

Table 8 – Noise monitoring results from location North 2 during 2022

Period (North)	*Limit (dB)*	(dB)			
		Q1	Q2	Q3	Q4
Day (07:00 to 18:00)	*50*	-	-	-	-
Evening (18:00 to 22:00)	*44*	-	-	-	-
Night (22:00 to 07:00)	*39*	-	41	-	42

Table 9 – Noise monitoring results from location South during 2022

Period (South)	*Limit (dB)*	(dB)			
		Q1	Q2	Q3	Q4
Day (07:00 to 18:00)	*50*	42	45	30	45
Evening (18:00 to 22:00)	*44*	41	34	35	40
Night (22:00 to 07:00)	*39*	37	34	47	37

Table 10 – Noise monitoring results from location South 2 during 2022

Period (South)	*Limit (dB)*	(dB)			
		Q1	Q2	Q3	Q4
Day (07:00 to 18:00)	*50*	-	-	-	-
Evening (18:00 to 22:00)	*44*	-	-	-	-
Night (22:00 to 07:00)	*39*	-	-	38	-

Table 11 – Noise monitoring results from location East during 2022

Period (East)	*Limit (dB)*	(dB)			
		Q1	Q2	Q3	Q4
Day (07:00 to 18:00)	*50*	41	45	47	48
Evening (18:00 to 22:00)	*44*	45	40	43	45
Night (22:00 to 07:00)	*39*	43	43	38	44

**follow-up monitoring result*

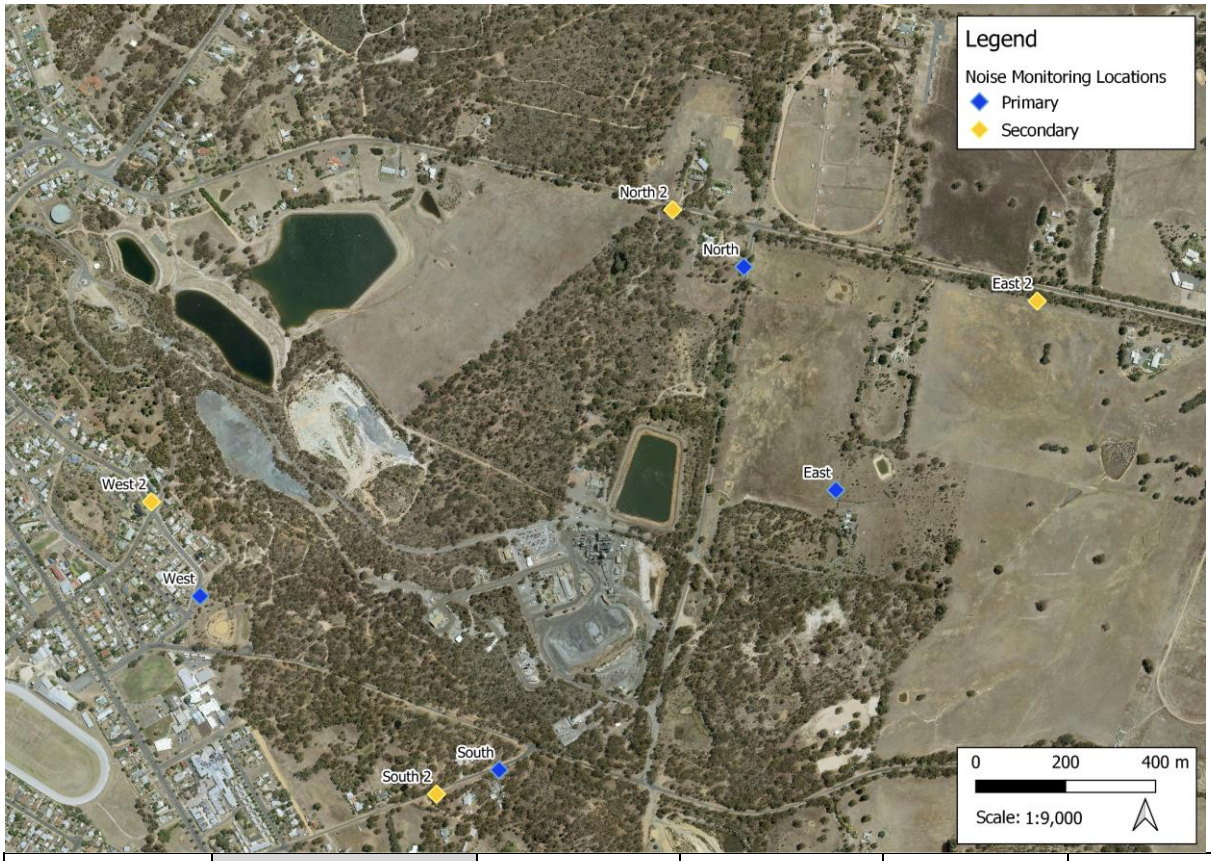
Table 12 – Noise monitoring results from location East 2 during 2022

Period (East)	*Limit (dB)*	(dB)			
		Q1	**Q2**	**Q3**	**Q4**
Day (07:00 to 18:00)	*50*	-	-	-	-
Evening (18:00 to 22:00)	*44*	39	-	-	42
Night (22:00 to 07:00)	*39*	40	36	-	39

**follow-up monitoring result*

Table 13 – Noise monitoring results from location West during 2022

Period (West)	*Limit (dB)*	(dB)			
		Q1	Q2	Q3	Q4
Day (07:00 to 18:00)	*50*	37	24	25	45



Evening (18:00 to 22:00)	*44*	30	38	39	25
Night (22:00 to 07:00)	*39*	33	38	38	18

Figure 19 - Noise monitoring at SGM (West location pictured)

Figure 20 - SGM noise monitoring locations

3.2.5. SURFACE VIBRATION

RISK SOURCES AND POTENTIAL IMPACTS

Operational activities that present a risk relating to surface vibration include:

- Surface and underground blasting;
- Seismic (exploration) activities; and
- Ground failure.

Potential impacts associated with surface vibration include:

- Damage to private/public property and infrastructure;
- Damage to heritage sites;
- Reduced amenity at sensitive receptors (e.g., general nuisance and discomfort); and
- Potential health impacts of sensitive receptors (e.g., anxiety and stress).

Control measures are undertaken to ensure any potential impacts are reduced and within specified licence conditions. These include:

- Engineered designs including pre-calculations of predicted surface vibration for production firings;

- Use of low impact explosives in sensitive areas; and
- Community engagement, information to public and notification system.

Surface Vibration Monitoring

Vibration from SGM's blasting is caused by the release of energy from the explosives as they are set off to fracture rock for mining purposes. SGM undertakes surface vibration monitoring at six locations within the Stawell Township (**Figure 21**). The monitors measure peak particle velocity (PPV) in mm/s.

The standard adopted for vibration monitoring is sourced from SGM's Mining Licence MIN5260. The Mining Licence states that firings must comply with the legislative limits for surface vibration, which are:

- No firings or ground vibration to exceed 10 mm/s at any time; and
- 95% of firings must be less than 5 mm/s within a 12-month period;

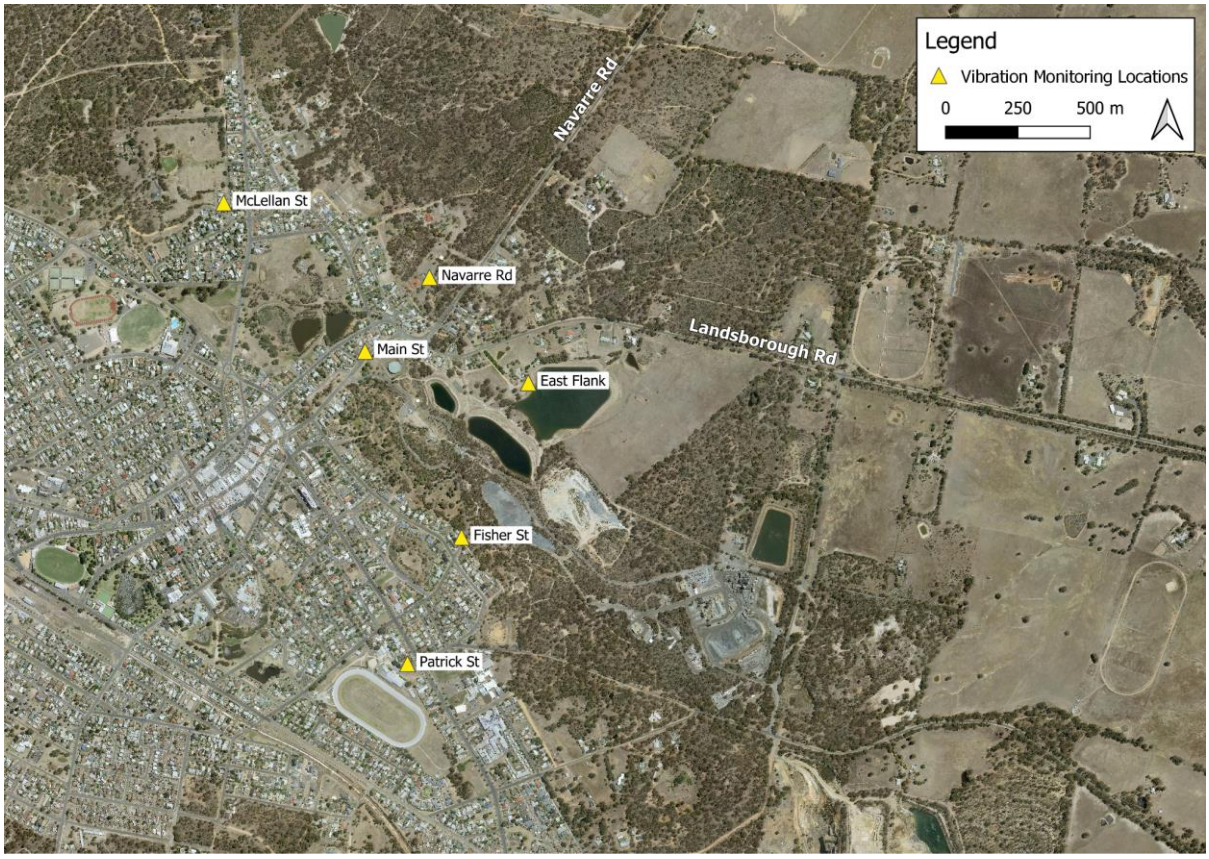
These blasting limits are consistent with the criteria defined in Australian Standard Explosives – Storage and Use – Use of Explosives (AS 2187.2-2006). This standard prescribes vibration levels to ensure there is no potential for any structural damage and for the management of amenity impacts from blasting.

During the 2022 reporting period, SGM undertook a total of 2,001 firings – 185 production firings and 1,816 development firings. All firings were compliant with the blasting limits for surface vibration (**Table 14**).

Table 14 – SGM Surface Vibration Results, 2022

PPV	Number of Firings
>10 mm/sec	0
>5 mm/sec	8
<5 mm/sec	1,993
<0.5 mm/sec	1,267
Total firings for the period	**2,001**

Figure 21 - SGM vibration monitoring locations



3.2.6. HAZARDOUS MATERIAL AND WASTE

RISK SOURCES AND POTENTIAL IMPACTS

Operational activities that present a risk relating to hazardous materials and waste management include:

- Storage and use of hazardous materials (e.g., chemicals and hydrocarbons);
- Storage and transfer of mine tailings and process water;
- Stockpiling of mineral waste overburden and associated runoff (AMD); and
- General/domestic waste management, including recycling.

Potential impacts associated with hazardous materials and waste risk sources can include:

- Contamination/pollution of land, air, surface water and groundwater systems;
- Reduced amenity at sensitive receptors (e.g., nuisance odours and/or discomfort);
- Potential health impacts of sensitive receptors;
- Loss of biodiversity and ecosystem degradation;
- Reduced productivity of surrounding lands (i.e., agricultural land); and
- Potential fire risk.

Control measures are included in the operational management of hazardous materials and waste and include actions such as:

- All hazardous materials stored onsite will be contained in bunded areas and meet Australian Standard transport and storage requirements;
- Use of EPA licenced contractors to transport, recycle and dispose of regulated wastes; and
- Having a process to access new chemical use on site and investigate if alternative chemicals which may be less hazardous will be used where appropriate.

HAZARDOUS MATERIALS AND WASTE MONITORING

There were no reportable releases of material by SGM in 2022. SGM continued to reduce waste output throughout the year with the instillation of a new oil interceptor traps part of the redesigned forecourt of the light and heavy vehicle workshop. This has allowed for the decommissioning of a large oily wastewater container as oils are skimmed from the water concentrating them in the trap and which then allows scrubbed water to pass onward to onsite rain-runoff capture dams.

recycling bins have been added to the mining and processing muster areas with specific paper and comingled bins.

SGM also recycles used batteries, printer cartridges, scrap metal, printer cartridges and empty, cleaned chemical drums

3.2.7. LAND

RISK SOURCES AND POTENTIAL IMPACTS

Operational activities that present a risk to land can include:

- Vegetation clearance and surface disturbance;
- Stockpiling of mineral waste overburden and associated runoff (AMD);

- Landform construction and earthworks;
- Operating water storage dams associated with the site water management system; and
- Works involving ignition sources.

Potential impacts associated with land risk sources could include:

- Loss of biodiversity and ecosystem degradation, through direct flora/fauna disturbance and habitat destruction;
- Increased pest activity from artificial habitat and food sources;
- Increased invasive weed species spread by soil movement, surface water runoff or vehicle access;
- Oxidisation of exposed rock generating acid runoff;
- Sedimentation of surface water systems from exposed areas and stockpiles;
- Increased erosion;
- Reduced productivity of surrounding lands (i.e., agricultural land);
- Damage to heritage sites; and
- Potential fire risk.

Mitigation measures are installed to ensure any potential risks are mitigated or reduced. For Land risks these can include:

- Stockpiles will be profiled and battered to minimise the potential for erosion;
- All removal of vegetation is approved and offset where required;
- Undertaking progressive rehabilitation; and
- Fencing of areas to limit access to sites with ecological or heritage value.

VEGETATION MONITORING

Stawell Gold Mines undertakes vegetation monitoring annually, during Spring. In October 2022, SGM engaged an independent ecologist to assess the condition of the vegetation around TSF2. The vegetation survey was undertaken in accordance with the vegetation management strategy presented in SGM's TSF2 Groundwater Management Plan and the EPA approved TSF2 Clean Up Plan. The previous year due to COVID-19 restrictions the annual assessment was completed during December, this year a return to a more normal schedule was achieved.

The aim of vegetation monitoring is to determine whether any impact(s) (i.e., stressed vegetation) is observed, where it is observed and whether the extent of any impact is increasing or decreasing.

Monitoring was undertaken at nominated locations, including a quadrant within the area of known vegetation stress immediately north of TSF2. Twelve nominated locations were described to represent the whole spectrum of vegetation growing on the perimeter of the dam and on the dam wall. Two belt transects were also positioned in order to systematically monitor the condition of trees and perennial shrubs at the toe of TSF2.

In October 2022 all the monitoring sites as well as the general reconnaissance of the TSF2 area did not show vegetation decline or degradation, therefore the current management procedures indicate that the health of the plant cover is satisfactory to maintain an adequate vegetation community which is necessary to maintain surface stability and control of erosion.

3.2.8. Visual Amenity / Aesthetics

Risk Sources and Potential Impacts

SGM's operations have resulted in changes to the landscape and visual amenity/aesthetics. Aspects of the operation and risk sources that may affect visual amenity/aesthetics include but are not limited to:

- Storage and transfer of mine tailings and process water (e.g., TSF's);
- Siting of overburden dumps and stockpiles;
- Landform construction and earthworks;
- Siting of surface infrastructure;
- Vegetation clearance and surface disturbance;
- Emissions from underground mine ventilation;
- Light from surface plant and equipment during night operations; and
- Exploration activities.

Visual amenity/aesthetic impacts at sensitive receptors vary depending in the location and the nature of the activity/risk source and the sensitivity of the receptor.

Potential impacts associated with visual amenity/aesthetics risk sources include:

- Reduced amenity at sensitive receptors;
- Potential health impacts of sensitive receptors (e.g., sleep disturbance from lights at night);
- Reduced value of private/public property and infrastructure; and
- Fauna disturbance.

Control measures included in site works to reduce amenity impacts include actions such as:

- Pre-planning assessments of amenity impacts;
- Vegetation screens maintained around worksites;
- Use of natural colours on building; and
- Ensuring light spill from site is limited.

Visual Amenity/Aesthetics Monitoring

No changes to visual amenity occurred throughout 2022 and as such, no additional monitoring was undertaken.

Stawell Gold Mines received no complaints or enquiries regarding visual amenity/aesthetics during the 2022 reporting period.

3.2.9. Heritage

Risk Sources and Potential Impacts

Operational activities that present a risk to historical and cultural heritage include:

- Vegetation clearance and surface disturbance;
- Landform construction and earthworks;
- Storage and transfer of mine tailings and process water;
- Drilling and blasting; and
- Exploration activities.

Potential impacts associated with heritage risk sources include:

- Damage or destruction of a historical or cultural heritage feature.

Control measures implemented to reduce heritage impacts include actions such as:

- Pre-works surveys of the land.
- Development of Cultural Heritage Management Plans when appropriate.

HERITAGE MONITORING

Stawell Gold Mines did not identify or disturb any features of historical or cultural heritage during the 2022 reporting period.

4. Compliance Record

4.1. Regulatory Notices

SGM acted upon one compliance notices from EPA Victoria during 2022 in relation to the operation of the TSF2 Groundwater Clean Up Plan.

PAN 90011650 - Continue Implementation of TSF2 Groundwater Clean Up Plan

SGM fully complied with the requirements of this notice on August 31st, 2022 in lieu of notice of revocation or issuing of a new notice to supersede PAN 90011650. SGM continues to report against the requirements of Ground Water Management Plan at each quarterly Environmental Review Committee meeting.

4.2. Reportable Events

Reportable events under Section 41AC of the Mineral Resources (Sustainable Development) Act 1990 are incidents arising out of mining, quarrying or exploration activities that are any of the following:

- Abnormal to what is expected;
- What is expected but *has* resulted in significant impacts to infrastructure, the environment or public safety; and
- What is expected but *may* result in significant impacts to infrastructure, the environment or public safety.

Stawell Gold Mines had no reportable events during the 2022 reporting period.

4.3. Enquires and Complaints

Stawell Gold Mines received 2 enquires and 10 complaints during the 2022 reporting period. All complaints received are responded to in line with the site Community Engagement Plan. A summary of SGM's community complaints and enquiries received for 2022 by issue is provided in **Table 15**.

Table 15 - SGM complaints for 2022

Source/Aspect	Number of Enquiries	Number of Complaints
Vibration / Blasting	0	4
Dust	1	1
Odour	0	0
Noise	1	3
Miscellaneous	0	2
Total	**2**	**10**

Of the complaints summarised in Table 14 one complaint, in relation to water discharge during a high rainfall event, was also directed to the EPA. Attended site visitation was completed by an authorised officer and through onsite investigation complaint was found to be a false accusation with no link to site activity. Follow up water

sampling further supported the conclusions of the EPA visit that there was no link between the complaint and any site related activity.

5. REHABILITATION

SGM undertakes progressive rehabilitation in accordance with MIN5260 mining licence conditions and its approved work plan. Current mine closure concepts and rehabilitation outcomes are detailed within SGM's Mine Closure Plan [2]. Progressive rehabilitation activities undertaken during operations are aligned with the overarching site closure strategy and end-land uses.

5.1. Rehabilitation Objectives

The objectives of SGM's rehabilitation activities are to:

- Ensure that appropriate and sustainable beneficial end land use(s) for disturbed land are identified during the operations planning phase and are established post-closure.
- Ensure that progressive rehabilitation is undertaken to minimise the area of disturbed land and manage potential environmental and social risks during operations and closure;
- Achieve compliance with all regulatory requirements; and
- Satisfy stakeholder expectations with respect to rehabilitation.

5.2. Final Landforms

Post-closure landforms and end-land use outcomes for the entire site are detailed within SGM's Mine Closure Plan. The plan was prepared to provide a model for mine closure and to guide the execution of closure and rehabilitation activities at SGM's site.

Specifically, the Mine Closure Plan aims to:

- Define closure objectives and commitments, and provide a clear outline of how these will be achieved;
- Identify, eliminate and/or mitigate key environmental, social and geotechnical risks associated with closure;
- Outline stakeholder engagement activities relating to mine closure;
- Guide closure activities to achieve long term physical, chemical and biological stability; and protect public health and safety;
- Provide a framework for ongoing review of closure concepts and cost provisions;
- Achieve compliance with all legislative requirements, licence conditions and commitments;
- Establish clear, measurable closure criteria that must be achieved in order to facilitate tenement relinquishment and rehabilitation bond return; and
- Satisfy regulatory and stakeholder expectations with respect to mine closure.

Prior to mine closure, or the closure of particular zones identified in the Mine Closure Plan, detailed design plans must be prepared for key closure aspects, including landform design and drainage. Landforms will be designed and constructed to form safe and self-sustaining stable landforms. Plans will detail proposed earthworks and final landform design considerations, such as:

- Materials balance for all material types, including topsoil and spoil;
- Slope angle and length;
- Surface drainage, including the installation of berms, embankments and culverts;
- Erosion and sediment controls; and

[2] Last updated October 2021.

- Geotechnical stability requirements.

Final landform designs must also consider how the above features are influenced by the progressive revegetation of the site.

Several post-closure concepts and end-land uses have already been identified and realised at SGM's site. These include:

- The Stawell Clay Target Complex (SCTC), located on SGM's rehabilitated Reserve Tailings Dam and TSF1; and
- Land used to accommodate the Stawell Pony Club and Riding for the Disabled.

The objectives and land use requirements of these sites will be considered in the planning of further closure strategies to ensure compatibility with existing land uses. This is particularly relevant to land access and vegetation establishment within and surrounding the SCTC.

Other than the post-closure land uses detailed above, SGM's existing approved closure strategy for the site is to rehabilitate the land to its pre-existing land use, which includes a mixture of productive agricultural land and community space comprising both native bushland and landscaped landforms.

5.3. Progressive Rehabilitation

SGM undertakes progressive rehabilitation of disturbed areas to stabilise and enhance end-land use outcomes for the site. Progressive rehabilitation also assists with ongoing site management and the realisation of closure concepts by stabilising landforms, establishing vegetation, minimising erosion, and preventing sedimentation of surface water features.

5.3.1. Davis Pit

SGM begun progressive rehabilitation activities for backfilling the unused Davis Pit during 2018 and continued to backfill up until 2021 using the mullock from underground. During 2021 backfilling of the first stage of David Pit was completed landscaped to final design. A cap of oxide material was applied to the mullock during the winter/spring of 2022 and a cover crop seeded in late spring. This grass cover crop is intended to provide a level of stability to the oxide cap and gradually introduce a level of organic matter into the soil to encourage future growth. This cover crop also provides a level of dust mitigation during summer months.

Figure 22 Davis Pit Rehabilitation Area Prior to and During 2022 Soil Works

Figure 22 Davis Pit sown grass after approx. 3 months growth.

5.3.2. BIOREMEDIATION PROJECT

Thiocyanate is an environmentally persistent by-product of the tailings liquor deposited in Stawell Gold Mines Tailings Storage Facility. Due to its potential toxicity to vertebrate life and poor rate of natural degradation in the environment, a number of active treatment options have been investigated as part of Stawell Gold Mines Closure Plan and TSF2 Clean Up Plan. The selected treatment option for further study was a bioremediation plant, utilizing indigenous bacterial species to accelerate the natural breakdown process for thiocyanate by amplifying their effects. In partnership with The University of Melbourne the Bioremediation Project was initiated in 2015, with the overarching aim of developing a bioremediation system for the active treatment of thiocyanate (SCN) in groundwater at SGM.

The Bioremediation Project is broken down into 4 distinct phases;

- Phase 1: Initial site visit, water sample collection from thiocyanate impacted bores. Isolation of thiocyanate degrading bacteria & DNA sequencing.
- Phase 2: Bench scale bioreactor at The University of Melbourne. Commencement of field 'tub chemistry', to test importance of different inputs, such as UV, additional nutrients, oxygen
- Phase 3: Bench scale bioreactor at Melbourne University. Commencement of field 'Pilot Plant', to test importance of parameters at minor plant level (~1% of proposed final flow), such as, mixing rate, fill ratio, pH levels.
- Phase 4: Design, construction, and operation of final Proposed Treatment Plant

The Bioremediation Project is currently in phase 3. This stage is potentially the most complicated as controlling the parameters in the pilot plant is much more difficult than at the 'benchtop' scale. Also this stage is where the majority of problems transitioning from lab conditions to real world conditions present themselves.
In brief the Pilot Plant consists of:

- 1 Large holding tank (5000L) to supply the reactor tanks,
- A train of 3 Primary reaction tanks (1000L each), connected in series, partially filled with a buoyant biofilm carrier which provides a surface for bacteria to grow on,
- Air lines and mixers to provide and encourage movement of oxygen to the bacteria in the reactor tanks,
- A series of pumps to supply feed water, nutrient and a pH correcting solution to the reactor tanks
- A water quality monitoring system with probes to record electrical conductivity, pH, dissolved oxygen and temperature in the reactor tanks and control the nutrient and pH pumps.

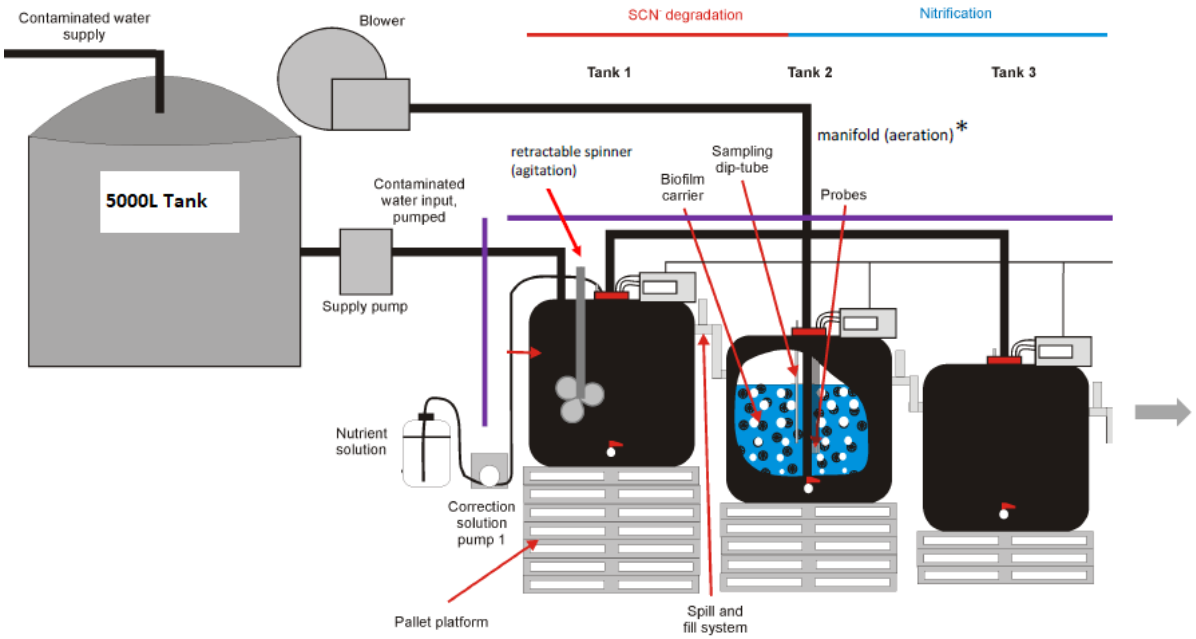


Figure 23 Abbreviated Pilot Plant Schematic circa. 2017

The Pilot Plant scale bioreactor has been fully functional since December 2017 and is currently treating captured seepage from the TSF2 hydraulic containment system and can achieve full destruction of SCN at a rate of ~1,800L/day under optimal conditions. In July 2019, Stawell Gold Mines took over the operation of the facility after a hand-over from the University of Melbourne, with ongoing assistance being provided though renowned PhD of Geomicrobiology John Moreau. Major infrastructure upgrades to upscale the capacity of the system and improve efficiency were completed in August 2021 with fully mechanical agitators to promote greater movement of the bacteria.

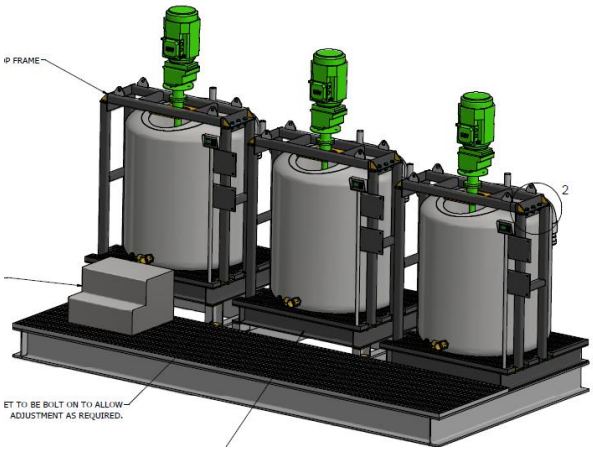


Figure 24 CAD drawing of Mixer Stand with Reactor Tanks.

Figure 25 Biofilm Carriers aka 'Pasta Wheels' with bacterial growth.

Thiocyanate removal rate by the Pilot Plant is assessed bimonthly by Stawell Gold Mines environmental personnel and weekly samples are collected from each reactor tank to determine the success of the plant in removing thiocyanate from the groundwater. These weekly samples are sent onto a nationally accredited laboratory to conduct the thiocyanate analysis and certify the results. To assess the composition of the bacterial community within the reactor tanks DNA testing is undertaken biannually giving an accurate breakdown of the bacteria species present and their populations.

During 2022 trialing a higher media fill ratio (400L of Biofilm Carriers per 1000L reactor tank instead of 200L per tank) in the tank train was undertaken and this has shown generally good results. By doubling the surface the bacteria has to grow on, the net bacterial load was effectively increased leading to more removal of thiocyanate from the feed water and a higher resilience in instances where breakdowns in the Pilot Plant were found. The nutrient supply tank capacity was also increased in to accommodate a and since September nutrient addition has been increased to twice that used over the last 2 years. So far this has shown some improved results in thiocyanate removal particularly in the first treatment tank. As with the increasing the amount of biofilm carrier, poor in-tank conditions at this stage can still limit the rate of SCN destruction by creating suboptimal conditions for bacterial growth.

Full Scale Treatment Plant plans are until this point have been for the development of the full-scale plant at the Tailings Storage Facility but, 2023 Upscale costing assessments are also planned with a focus on reuse of existing pieces of Stawell Gold Mine's processing plant. Plans for the Pilot Plant in 2023 include reinstatement of the air driven treatment train to run in parallel with the currently operational agitator train doubling the throughput of the pilot plant and providing the opportunity for further investigation of final plant configurations.