



OTJIKOTO GOLD MINE

(MINING LICENCE 169)

CONSOLIDATED ENVIRONMENTAL MANAGEMENT PLAN

SEPTEMBER 2021

CONTENTS

1. INTRODUCTION AND BACKGROUND	1
2. OVERVIEW OF OPERATIONS / ACTIVITIES	3
2.1 OPERATIONAL PHASE.....	3
2.1.1 Existing Operations	3
2.1.2 Mining Activities	3
2.1.2.1 Stripping	3
2.1.2.2 Ore excavation	3
2.1.2.3 Drilling and blasting	4
2.1.2.4 Loading and Hauling	4
2.1.2.5 Stockpiling	4
2.1.3 Mineral Processing Activities	4
2.1.4 Engineering Activities	6
2.1.4.1 Site Facilities for Operations	6
2.1.5 Non-mineralised Waste Management Activities	7
2.1.6 Mineralised Waste Management Activities	9
2.1.7 Socio-economic Influence	9
3. APPLICABLE ENVIRONMENTAL LEGAL REQUIREMENTS	10
3.1 ENVIRONMENTAL LICENCES, PERMITS, CERTIFICATES AND APPROVALS	10
3.2 APPLICABLE LEGISLATION AND OTHER COMPLIANCE OBLIGATIONS	12
4. ROLES AND RESPONSIBILITIES	15
5. STAKEHOLDER ENGAGEMENTS	15
6. AUDITING AND REPORTING	16
7. ENVIRONMENTAL MANAGEMENT PLAN	16
7.1 AIR QUALITY MANAGEMENT PLAN.....	17
7.2 SURFACE WATER MANAGEMENT PLAN	22
7.3 GROUNDWATER MANAGEMENT PLAN	36
7.4 BIODIVERSITY MANAGEMENT PLAN.....	45
7.5 RESOURCE MANAGEMENT PLAN.....	53
7.6 SOIL MANAGEMENT PLAN	58
7.7 WASTE MANAGEMENT PLAN	61
7.8 ARCHAEOLOGY MANAGEMENT PLAN	72
7.9 NOISE AND VIBRATIONS MANAGEMENT PLAN	74
7.10 VISUAL MANAGEMENT PLAN	77
7.11 SAFETY AND SECURITY MANAGEMENT PLAN	80
7.12 TRAFFIC MANAGEMENT PLAN	86
7.13 SOCIO-ECONOMIC MANAGEMENT PLAN	88
7.14 STAKEHOLDER CONSULTATION / COMMUNICATION MANAGEMENT PLAN.....	94
7.15 DECOMMISSIONING AND CLOSURE MANAGEMENT PLAN.....	96
8. REFERENCES	107
9. APPENDICES	108
9.1 CURRICULUM VITAE: ENVIRONMENTAL CONSULTANT	108

ACRONYMS

CSI	-	Corporate Social Investment
CSR	-	Corporate Social Responsibility
ECC	-	Environmental Clearance Certificate
EIA	-	Environmental Impact Assessment
EMP	-	Environmental Management Plan
HFO	-	Heavy Fuel Oil
HME	-	Heavy Machinery Equipment
LoM	-	Life of Mine
Mm ³	-	Million cubic metres
Mt	-	Million tonnes
MSDS	-	Material Safety Data Sheets
µg/m ³	-	Micrograms per cubic metre
mg/m ² /day	-	Milligram per square metre per day
MoHSS	-	Ministry of Health and Social Services
MME	-	Ministry of Mines and Energy
ML	-	Mining Licence
NO _x	-	Nitrogen Oxides
NO ₂	-	Nitrogen oxide
OGM	-	Otjikoto Gold Mine
PM	-	Particulate Matter
PPE	-	Personal Protective Equipment
RoM	-	Run of Mine
SO _x	-	Sulphur Oxides
SO ₂	-	Sulphur dioxide
STP	-	Sewage Treatment Plant
TSF	-	Tailings Storage Facility
WRD	-	Waste Rock Dump

1. INTRODUCTION AND BACKGROUND

B2Gold Namibia (Pty) Ltd is a Namibian registered Company and a subsidiary of B2Gold Corp. — based in Vancouver, Canada. It is jointly owned by B2Gold Corp. (90%) and EVI Namibia (10%). Otjikoto Gold Mine (OGM) is operated by B2Gold Namibia (Pty) Ltd and located in the north-central part of Namibia, approximately 70 km north-east of Otjiwarongo and 50 km south-west of Otavi - within the Otjozondjupa region (Figure 1).

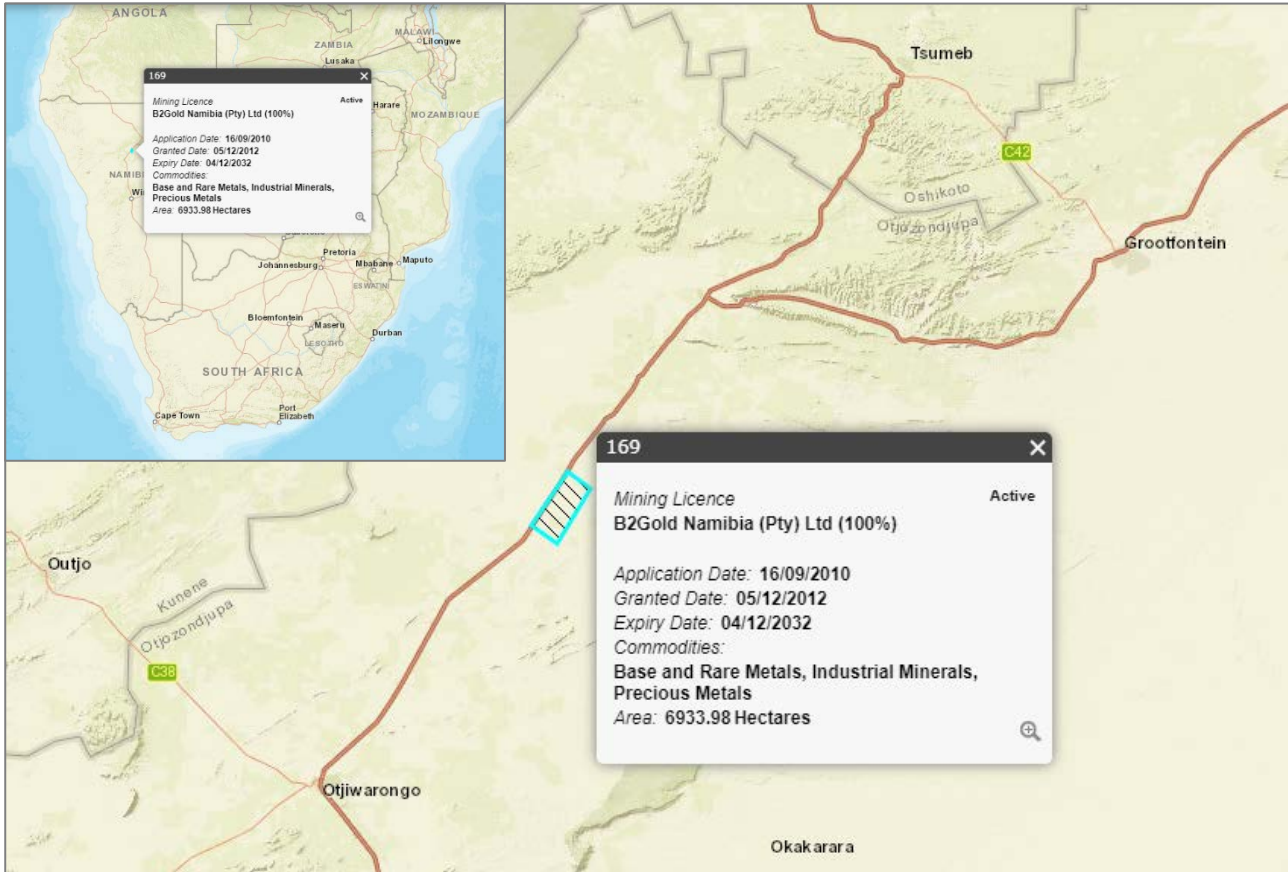


Figure 1: Location of B2Gold Namibia Otjikoto Gold Mine (ML 169)

B2Gold Namibia (Pty) Ltd was granted a Mining Licence (ML 169) in December 2012 after the Environmental Clearance Certificate was issued in August 2012 for the Otjikoto Gold Mine. Mining operations commenced in 2015, whereafter additional upgrades and improvements were introduced.

This document serves as a consolidated Environmental Management Plan (EMP) of the management actions in the initial approved EMP for the Otjikoto Gold Mine Project (SLR, 2012), incorporating management actions listed in EMPs approved since 2012 for the following additional project components:

- 2013: Proposed changes to the Otjikoto Gold Mine Project - Landfill Site and Power Plant;
- 2014: Proposed changes to the Otjikoto Gold Mine Project - Wolfshag Zone;
- 2017: Upgrade of the Existing Power Generation Facility at the Otjikoto Gold Mine by a 10.8 MW Photovoltaic (PV) Solar Plant;
- 2017: Amendment to the Hazardous Waste Management Plan at B2Gold Otjikoto Gold Mine;
- 2019: Otjikoto Gold Mine - Rehabilitation and Closure Plan; and
- 2020: Otjikoto Mine Wolfshag Pit Underground Mining Amendment – B2Gold Namibia.

This EMP includes all existing activities and associated impacts related to the operational and decommissioning phase of the B2Gold Namibia Otjikoto Gold Mine – Mining Licence 169. It is based on a review of findings and recommendations of the EMPs associated with the projects listed above.

This EMP will be reviewed and amended periodically - as and when required - with the change or addition of activities as per Section 50 (g) of the Minerals (Mining and Prospecting) Act, 33 of 1992, which states that the holder of a mining licence shall undertake the periodic review of the EMP(s) should circumstances change. The Environmental Impact Assessment process will be applied to any significant changes to the existing activities, products and services as per the Environmental Management Act, No. 7 of 2007 and the EIA Regulations of 2012.

The following key approvals have been granted by the relevant authorities for the B2Gold Namibia Otjikoto Gold Mine since the inception of the mine:

- August 2012: Environmental Clearance Certificate (ECC) - Otjikoto Gold Mine Project
- December 2012: Mining Licence, ML 169
- October 2013: Amendment to the 2012 ECC – Landfill Facility and Heavy Fuel Oil (HFO) Power Plant
- January 2015: Amendment to the 2012 ECC – Changes to the Otjikoto Mine Operations and the updated 2014 Environmental Management Plan (EMP)
- May 2017: Amendment to the 2012 ECC – Upgrade of the Heavy Fuel Oil (HFO) Power Plant to a Photovoltaic (PV) Solar Power Plant
- May 2017: Amendment to the 2014 EMP, Amendments to the Hazardous Waste Management Plan
- August 2018: Environmental Clearance Certificate for Otjikoto Gold Mine
- August 2019: Otjikoto Gold Mine - Rehabilitation and Closure Plan
- July 2020: Environmental Clearance Certificate for Underground Mining Activities at the Otjikoto Gold Mine

2. OVERVIEW OF OPERATIONS / ACTIVITIES

2.1 OPERATIONAL PHASE

2.1.1 Existing Operations

Opencast mining takes place from two open pit operations, Otjikoto Pit and Wolfshag Pit respectively, while underground mining (Wolfshag Pit) is used to extract ore at depth *via* a portal located in the Otjikoto Pit.

Ore is extracted from mining areas, using truck and shovel operations. Overburden is placed on the waste rock dump (WRD), low-grade ore is stockpiled, and the processed mineral waste is transferred to a lined tailings storage facility (TSF). A return water dam returns water from the TSF to the Plant. Ore is taken to the Plant for processing, where it is crushed, milled, leached and the concentrate smelted into gold bars as the final product.

The operations use water from groundwater abstraction boreholes. Power is generated from Heavy Fuel Oil (HFO) generators and a Photovoltaic (PV) Solar Power Plant. Detailed descriptions of the current operations can be found in the original and amended EMPs for the mine.

2.1.2 Mining Activities

2.1.2.1 *Stripping*

Areas of land is cleared for the establishment of mining infrastructure, pits, waste rock dump(s), stockpiles and haul roads. Stripping or land clearing takes place as mining activities progress into undisturbed areas. Land clearing assessments (flora and fauna) are conducted of the area prior to initiating stripping activities. This includes permitted clearing, accounting for volumes of topsoil stripped, harvested and stockpiled for progressive and future rehabilitation. Records are kept of tonnes of material stripped (topsoil harvested and stockpiled).

2.1.2.2 *Ore excavation*

Truck and shovel operations is used to excavate overburden /waste rock and ore from the opencast (Otjikoto and Wolfshag Pits) and underground (Wolfshag Pit) mining areas. Excavated overburden / waste rock material is stockpiled on the waste rock dump and low-grade ore is stockpiled close to the pits. Medium and high grade ore is taken to the Plant for processing.

With the increase in depth and groundwater seepage, dewatering of the Otjikoto Pit is conducted *via* a pit sumps and dewatering boreholes. The Wolfshag Pit is dewatered *via* a deep borehole towards its south. Excess water is used for processing in the Plant.

Longhole stoping and a modified transverse stoping mining method is used for underground mining (Wolfshag Pit). Existing abstraction boreholes and two dedicated dewatering borehole(s) to the north-east of the mining area is used for mine dewatering.

2.1.2.3 *Drilling and blasting*

All mining material requires rock fragmentation, undertaken by drilling and blasting activities. Drill rigs are used for drilling drill holes required in blasting.

A contractor supplies and transport all required blasting material. The material used for blasting activities is stored on site, managed and used by Otjikoto Gold Mine to carry out blasting activities.

2.1.2.4 *Loading and Hauling*

Excavated ore and waste is loaded by large hydraulic excavators and hauled using rigid dump trucks. The ore is loaded and hauled to a single Run of Mine (RoM) pad. Barren and mineralised (grade lower than 0.25 g/t) waste material is deposited on the waste rock dump. All low-grade material, with a grade range greater or equals to 0.25 g/t is stockpiled separately for post-mining reclamation and processing.

2.1.2.5 *Stockpiling*

Topsoil from stripping activities is stockpiled for rehabilitation purposes. Mineral waste generated from mining is stockpiled as waste rock at the waste rock dump (WRD), and ore stockpiles consist of low-grade material and the run of mine (RoM) ore stockpile. It is expected that the WRD's total footprint approved for the life of mine (LoM), will cover an area of 330 ha and a height of 40 m.

2.1.3 Mineral Processing Activities

Mined ore material is stockpiled at the RoM pad where it is blended and fed for crushing, milling, leaching and gold extraction.

The Processing Plant has capacity for 3.4 mtpa run of mine (RoM) ore feed. RoM ore is fed to the Primary Crusher and a Pebble Crusher. The crushed rock is delivered to the Processing Plant by means of an 800m conveyor belt, that deposits material onto a storage stockpile.

The metallurgical processing route (Figure 2), consists of the following main processes:

- Single Stage Crusher and Pebble Crusher;
- Two stage milling (SAG Mill and Ball Mill), classification and gravity circuit;
- Intensive Cyanidation of the Gravity Concentrate (Knelson Concentrator);
- Cyanide Leaching of the mill cyclone overflow (Leach Tanks);
- Carbon adsorption (Carbon in Pulp (CIP) Tanks); and
- Elution, electro winning, regeneration and smelting (Furnace).

The main resources used in the production of gold are reagents, water and energy.

Primary reagents required in the Processing Plant include: cyanide, caustic soda, hydrochloric acid, flocculent, lime, sodium metabisulphite, copper sulphate, activated carbon, borax, sodium nitrate and silica.

Water is sourced from groundwater *via* boreholes, dewatering of mining areas and return water from the Tailings Storage Facility (TSF). Raw water is pumped from production and pit dewatering boreholes to a receiving tank at the water treatment facility (WTF) and the process water tank. Raw water treatment includes coagulation, settling and filtration. Treated raw water is used in: Crushing and Milling for dust suppression; Potable Water Treatment Plant; Gland Service Water Distribution Tank; and Process Water.

Tailings generated in the leaching section of the Processing Plant is stored in the lined TSF. The TSF is designed and constructed according to international best practice and the International Cyanide Management Code.

Energy is provided via an on-site Heavy Fuel Oil (HFO) Power Plant and a 10.8 MW Photovoltaic (PV) Solar Power Plant. The primary fuel used in the power generation plant is heavy fuel oil (HFO) and the secondary fuel is diesel. Two above ground HFO storage facilities (tanks) with a combined volume of 2000 m³ and one above ground diesel storage tank (300 m³) is installed on site. Adequate bunding capacity and fire protection are incorporated in the design of the facility and sufficient off-loading facilities are provided for on site.

In addition to the HFO and diesel required for the HFO Power Plant, the mine uses **hydrocarbon products** for light vehicles, heavy mobile equipment and the emergency power generation facility. Diesel is the main consumable and is stored in bulk tanks (i.e. 500 000 litres) located in a bunded area at the mining workshop area.

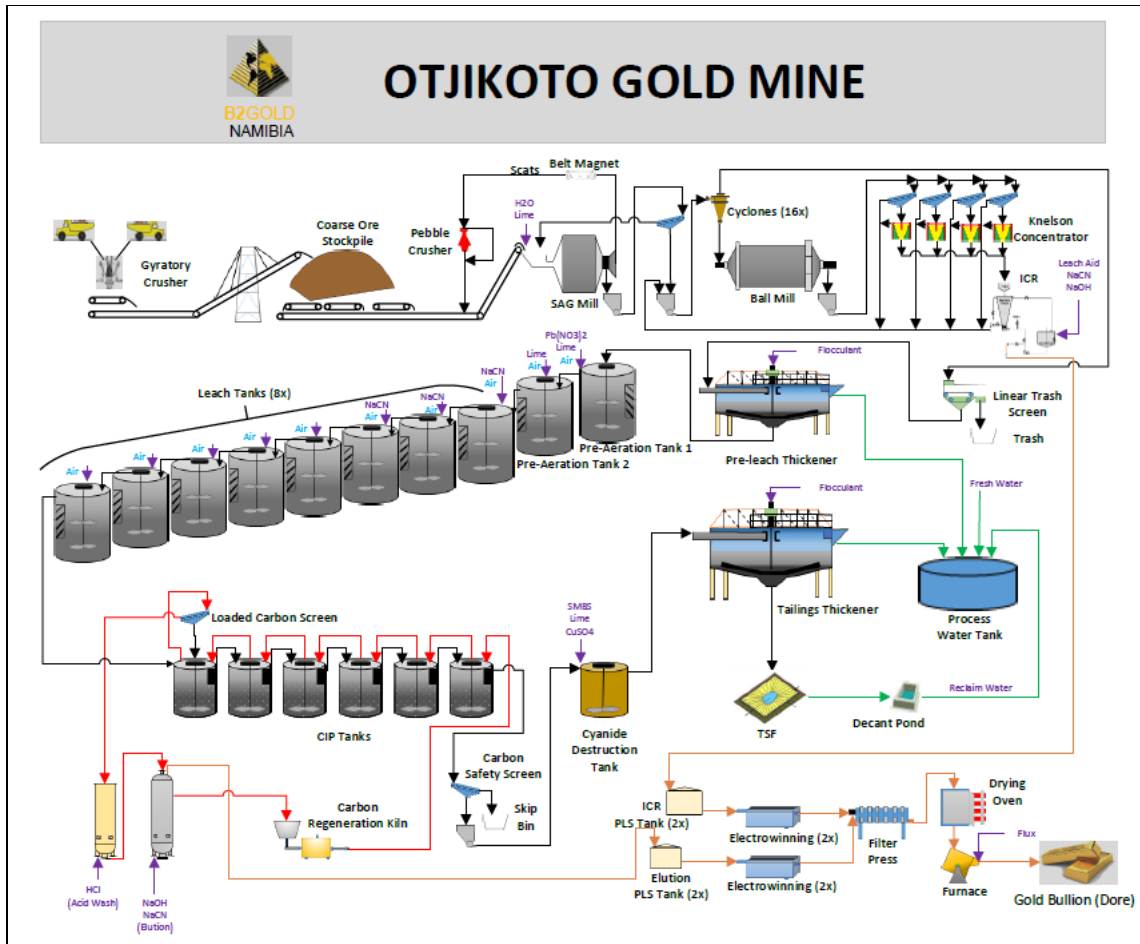


Figure 2: Schematic diagram of the metallurgical process flow

2.1.4 Engineering Activities

Engineering activities include: support services for heavy machinery and equipment; maintenance of the Processing Plant, site facilities and infrastructure; supply of power, water and fuel; sewage treatment and waste management.

2.1.4.1 Site Facilities for Operations

The operational phase consists of the following on-site facilities:

- Two open pits (Otjikoto and Wolfshag);
- Underground pit (Wolfshag);
- RoM stockpiles;
- RoM pad;
- Processing Plant;
- HFO Power Plant with associated fuel (HFO and diesel) storage facilities;
- Mine dewatering sumps;
- Access roads and haul roads;
- Mineralised waste disposal facilities (Waste Rock Dump, Low grade dump, and a tailings facility) and associated Offices and ablution facilities;
- Explosives magazine;
- Topsoil stockpiles;
- Conveyors (in the Plant, between the Plant and RoM complex);
- Contractors workshops;
- Power plant wash bay for washing equipment and vehicles;
- Tyre Bay for tyre services and installation;
- Refuelling areas;
- Hazardous substances storages areas;
- On-site (non-hazardous) landfill facility;
- Salvage yard and temporary non-mineralised waste handling facilities;
- Stores (Plant and mine complexes);
- On-site water supply infrastructure;
- Compressed air supply station;
- Stormwater management facilities;
- Water treatment facility;
- Clean and dirty water holding facilities;
- On-site power supply infrastructure;
- Change houses;
- Sewage treatment plants (STP);
- Weighbridge;
- Loading and off-loading areas;
- Parking areas;
- Security infrastructure;
- Laboratory;
- Communication infrastructure;
- Lighting infrastructure;
- Pit stop fuelling station for heavy machinery and equipment;
- Heavy Machinery Equipment (HME) repair and service workshop;
- General Mine Services (GMS) engineering workshop;
- Processing Plant engineering workshop;
- HME Warehouse for storing new equipment and machinery parts for the HME workshop;
- Lube Oil Facility - Oil lubrication storage tanks;
- Overhead power lines to support dewatering activities;
- Water pipelines to support dewatering and water transfer network;
- On-site Canteen catering for employees, contractors and visitors;
- HME Ablution Block for HME workshop employees;
- Boilermaker workshop for boiler making activities – constructing and repairing metal products and steel structures;
- HME and LDV Wash bays for cleaning heavy machinery / equipment and Light vehicles;
- Incinerator at the Landfill Facility for incineration of selected hazardous waste;
- Sandblasting yard for sandblasting activities;
- Administration building for office space;
- Management Camp for accommodation units;
- Mining haul roads constructed to cater for weather conditions (wider and lifted/higher);
- Mining Office Building including Technical Services;
- HSE Office Building including environmental laboratory and offices;
- Drill equipment service area; and
- Clinic Building including offices, consulting room for Doctor(s) and emergency equipment stores.

2.1.5 Non-mineralised Waste Management Activities

All **non-mineralised waste** is separated at source into hazardous and non-hazardous waste, stored in bins and skips to prevent discharge or contamination to the environment; and recycled or re-used where possible. To further minimise potential risks, secondary containment (designed and constructed to contain all liquid hazardous waste) is used to store hazardous waste. Off-site transportation of hazardous waste is conducted by an appropriate service provider capable of handling hazardous waste. Disposable hazardous waste is disposed of at a registered hazardous waste disposal facility in Walvis Bay.

Records of non-mineralised waste is maintained for both on-site and off-site disposal. These include types and quantities of hazardous wastes, audit and inspection records and waste disposal certificates. All the waste from both surface and underground operations can currently be handled by waste management systems in place at the operations.

Hazardous waste include: hydrocarbon waste (waste oil and fuel, grease, and contaminated soil), fluorescent tubes and bulbs, paint and solvents, batteries, electronic waste, and chemical waste.

- Waste oil and fuel are drained and stored in bunded tanks within a bunded area until removed from site for refining and re-use.
- Hydrocarbon contaminated soil is treated at an on-site **bioremediation facility**.
- Paint thinners, strippers and other solvents generated in small volumes site wide are evaporated and residue transferred into a labelled container for off-site disposal at a registered hazardous waste facility.
- Fluorescent tubes and bulbs are stored in a fluorescent tube drum for periodic removal and final disposal at a registered hazardous waste facility.
- Heavy mobile equipment batteries are stockpiled and periodically removed by a licenced dealer for recycling. Lithium batteries from small equipment and instruments are disposed of in a drum, sealed and removed for final disposal at a registered hazardous waste facility.
- Electronic waste (e-waste) is stockpiled and sent to an appropriate e-service waste provider for recovery and final disposal.

An **incinerator** is used as a hazardous waste treatment process to burn waste material in a furnace. The waste material is converted by high temperature (up to 1000 °C) into ash, flue gas and heat. Following the combustion process, the ash residue is considered safe for disposal at the landfill facility. Incineration is used to reduce the volume of hazardous waste and is considered a safe, hygienic and cost-effective option of disposing of contaminated hazardous waste. Incineration of hazardous waste also detoxifies waste from harmful pathogens, bacteria and toxins. Combustion of waste also prevents wildlife from scavenging on waste.

The following materials are used or destroyed in the incinerator:

- Limited volumes of waste oil are re-used in a burn bunker and incinerator for the destruction of other hazardous wastes. Hydrocarbon contaminated materials not required for re-use or recycling are destroyed in the incinerator as per the operating procedures (rags, cardboards, pellets and other combustible materials).
- Empty reagent bags and packaging are destroyed in the incinerator as per the operating procedures.
- Fat, oil and grease (FOG) from the camp / canteen kitchens are destroyed at the incinerator.
- Any carcass of a dead animal found in the TSF, return water and events pond is destroyed in the incinerator, as there is potential for heavy metal contamination.

Explosive and blasting wastes are destroyed in the on-site burn bunker as per the explosives waste destruction procedure and as required by legislation.

Medical waste generated by the clinic is periodically incinerated in the onsite incinerator as authorised by the Ministry of Health and Social Services.

An on-site **landfill facility** is established and caters for non-recyclable non-hazardous material - primarily product packaging, wood products, organic materials, glass, plastics, metals and food scraps.

The landfill facility is constructed / operated in phases, i.e. one or two sections / cells (containment pits) of the facility will be open at any given time for depositing and covering waste. The next section / cell is opened when the previous one has almost reached its full capacity. The construction and operation of the landfill facility continues throughout the life of mine (LoM), as required.

Prior to the excavation of each containment pit cell, land clearing takes place, i.e. topsoil is stripped and bushes / shrubs removed. Topsoil is stripped to a depth of 300 mm and stockpiled close to the specific excavated section. Using an excavator, material from the containment pit is excavated to a depth of approximately 3 m. The typical size of each of the cells is approximately 15m x 30m. The active area is fenced along its perimeter to control and restrict access by personnel and wildlife, and to assist in further containment of any potential wind-blown refuse.

Two onsite biological wastewater treatment plants are used with suitable capacity for effluent generated from operations. Sewage is collected and transported *via* gravity reticulation buried sewer pipes to the **Sewage Treatment Plant / Facility (STP)** for treatment. The plant (STP) has the capacity to treat sewerage generated on site per day. The water discharged from the Sewage Treatment Plant / Facility (STP) is suitable for use in dust suppression, fire water and process water.

Underground operations generate wastewater effluent within chemical toilets, which is disposed offsite at municipal wastewater treatment plant(s).

2.1.6 Mineralised Waste Management Activities

There are three main stockpile dumps comprising of one large **waste rock** dump and two low-grade material, respectively. The low-grade dumps will be reclaimed and processed at a later stage during the LoM. All non-mineralised waste material generated is disposed of on the waste rock disposal site. During the active waste tipping phase, the waste rock dump is constructed at the material's natural angle of repose of approximately 35 degrees, which is contoured to approximately 17 degrees overall to allow for slope stability and re-vegetation. Waste rock from underground operations is hauled to the WRD and tipped in accordance with the WRD design and tipping plan, which is designed to accommodate volumes from both underground and surface operations.

Tailings from underground operations are disposed of into the TSF as slurry forming part of the overall production waste from the open pit mining. The TSF's capacity caters for both underground and surface operations.

2.1.7 Socio-economic Influence

B2Gold Namibia Otjikoto Gold Mine creates employment and skills development at the local and regional level, increasing job creation and economic growth. The Company also contributes towards empowerment opportunities in a range of skills and activities, while income from employees provides for immediate and extended family members. The Company also focus on giving preference to local, regional and national procurement.

Key focus is placed on economic impacts, in-migration and resulting community needs and changes in land-use and neighbouring communities. Commitments include preference of local procurement, prioritised training and recruitment policies, emphasis on skills development and upgrading, support and promotion of continuous learning programmes, training on personal financial management, promotion of home ownership, support of the local economies of Otavi and Otjiwarongo and supporting social initiatives.

3. APPLICABLE ENVIRONMENTAL LEGAL REQUIREMENTS

B2Gold Namibia Otjikoto Gold Mine is committed to complying with applicable legal requirements and other compliance obligations. Detailed descriptions of legislation applicable to Otjikoto Gold Mine are provided for in the following documents:

- Otjikoto Gold Mine Environmental Impact Assessment for the Proposed Otjikoto Gold Mine Project (SLR, 2012);
- Scoping Report (Including Impact Assessment) for the Proposed Changes to the Otjikoto Gold Mine Project - Landfill Site and Power Plant (SLR, 2013);
- Scoping Report (Including Impact Assessment) for the Proposed Changes to the Otjikoto Gold Mine Project – Wolfshag Zone (SLR, 2014);
- Environmental Scoping Report for the amendment to the Hazardous Waste Management Plan at B2Gold Otjikoto Gold Mine (A. Speiser Environmental Consultants cc, 2017);
- Otjikoto Gold Mine – Upgrade of existing Power Plant by 10.8 MW (ECC, 2017); and
- Otjikoto Mine Wolfshag pit Underground Mining Amendment – B2Gold Namibia (ECC, 2019).

The tables that follow present a list of Applicable Environmental Legislation and Compliance Obligations, and Environmental Licences, Permits, Certificates and Approvals required by B2Gold Otjikoto Gold Mine.

3.1 ENVIRONMENTAL LICENCES, PERMITS, CERTIFICATES AND APPROVALS

LEGAL REQUIREMENT	APPLICABLE LEGISLATION
Environmental Clearance Certificate for the Otjikoto Gold Mine, ML 169	Environmental Management Act, No. 7 of 2007 and EIA Regulations of 2012
Mining licence	The Minerals (Prospecting & Mining) Act, No 33 of 1992, Section 93(1)
Electricity Generation Licence	Electricity Act, No. 4 of 2007, Section 17(1)
Permission to erect accessory works	The Minerals (Prospecting & Mining) Act, No 33 of 1992, Section 90(1)(e) and (2)(a)
Permit for possession of explosives	Explosives Act 1956, No. 26 of 1956, Section 6(1)
Permit for blasting	Explosives Act 1956, No. 26 of 1956, Section 9(1)
Exemption Permit for Wastewater Effluent Disposal	Water Act, 1956, No 54 of 1956, Section 21 and 22; Water Resources Management Act, No.11 of 2013, Section 13
Licence to abstract and use water and permit for drilling of boreholes	Water Act, 1956, No 54 of 1956, Section 2 and 30
Permit for Used Mineral Oil	Petroleum Products and Energy Act, No. 13 of 1990, Section 2(1); Petroleum Products Regulations, No 112 of 1991, Section 3(3)
Consumer Installation Certificate(s)	Petroleum Products Regulations of 2000, Regulation 18(5)
Reporting of major petroleum product spills	Petroleum Products Regulations of 2000, Regulation 49(1)
Grave relocation permit	National Heritage Act, No. 27 of 2004, Section 48 – 52 and 55
Licence to sell Group I hazardous substance; Registration to use, operate or apply Group III hazardous substance; Registration to install or keep installed any Group III hazardous substance	Hazardous Substances Ordinance, No.14 of 1974, Section 5 (1)(a)(b)(c)
Registration Certificate for a Scheduled Process	Atmospheric Pollution Prevention Ordinance, No. 11 of 1976, Section 5(1)

Licence to pick or transport any protected plant	Nature Conservation Ordinance, No. 4 of 1975, Section 73
Licence to sell, donate or export or remove a protected plant	Nature Conservation Ordinance, No. 4 of 1975, Section 74
Licence for Possession and use of Radiation Sources, Registration of Radiation Sources	Radiation Protection and Waste disposal Regulations; Atomic Energy and Radiation Protection Act, 2005 (No. 5 of 2005) Section 18 and section 21(1)(g)

3.2 APPLICABLE LEGISLATION AND OTHER COMPLIANCE OBLIGATIONS

RELEVANT AUTHORITY: MINISTRY OF JUSTICE	
<i>ACTS</i>	
1990	Constitution of the Republic of Namibia, 1990
RELEVANT AUTHORITY: MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM	
<i>ACTS</i>	
2017	Protected Areas and Wildlife Management Bill, 2017
2007	Environmental Management Act, No 7 of 2007
2001 & 2005	Forest Act 12 of 2001 (as amended by Forest Amendment Act 13 of 2005)
1999	Draft Pollution Control and Waste Management Bill, 1999
<i>ORDINANCES</i>	
1975	Nature Conservation Ordinance, No. 4 of 1975
<i>REGULATIONS</i>	
2012	Environmental Impact Assessment Regulations: Environmental Management Act, 2007
<i>POLICIES</i>	
2011	National Policy on Climate Change for Namibia, 2011
1995	Environmental Assessment Policy for Sustainable Development and Environmental Conservation, 1995
1994	Policy for the Conservation of Biotic Diversity and Habitat Protection, 1994
<i>INTERNATIONAL CONVENTIONS</i>	
1998	Kyoto Protocol on the Framework Convention on Climate Change, 1998
1992	The Rio de Janeiro Convention on Biological Diversity, 1992
1992	The United Nations Framework Convention on Climate Change, 1992
1989	The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989
1989	The Rotterdam convention on the Prior Informed Consent Procedure for Certain Hazardous chemicals and Pesticides in International Trade, 1989
1987	Montreal Protocol on Substances that Deplete the Ozone Layer, 1987
1985	Vienna Convention for the Protection of the Ozone Layer, 1985
RELEVANT AUTHORITY: MINISTRY OF AGRICULTURE, WATER AND LAND REFORM	
<i>ACTS</i>	
2013	Water Resources Management Act, No 11 of 2013
1956	Water Act, No 54 of 1956
<i>REGULATIONS</i>	
2016	Water Resources Management Act 11 of 2013 Regulations, 2016 (Draft)
<i>POLICIES</i>	
2000	National Water Policy White Paper
RELEVANT AUTHORITY: MINISTRY OF EDUCATION, ARTS AND CULTURE	
<i>ACTS</i>	

2004	National Heritage Act, 27 of 2004
<i>REGULATIONS</i>	
2005	National Heritage Regulations of 2005
RELEVANT AUTHORITY: MINISTRY OF MINES AND ENERGY	
<i>ACTS</i>	
2007	Electricity Act 4 of 2007
1990, 1994 & 2000	Petroleum Products and Energy Act, 1990 (Act 13 of 1990) — as amended by Petroleum Products and Energy Amendment Act 29 of 1994 and Petroleum Products and Energy Amendment Act 3 of 2000
1992	The Minerals (Prospecting & Mining) Act, No 33 of 1992
1956	Explosives Act 26 of 1956
<i>ORDINANCES</i>	
1968	Mines, Works and Minerals Ordinance 20 of 1968: Regulations (GN143, GG2927 of 1 October 1968)
<i>REGULATIONS</i>	
1991 & 2000	Petroleum Products Regulations of 1991 and 2000
<i>POLICIES</i>	
2002	Minerals Policy of Namibia, 2002
RELEVANT AUTHORITY: MINISTRY OF HEALTH AND SOCIAL SERVICES	
<i>ACTS</i>	
2015	Public and Environmental Health Act 1 of 2015
2005	Atomic Energy and Radiation Protection Act 5 of 2005
<i>ORDINANCES</i>	
1976	Atmospheric Pollution Prevention Ordinance 11 of 1976
1974	Hazardous Substances Ordinance 14 of 1974
<i>REGULATIONS</i>	
2011	Radiation Protection and Waste Disposal Regulations GN 221, GG4835, 11 November 2011
<i>POLICIES</i>	
2010	National Waste Management Policy, 2010
2002	National Environmental Health Policy, 2002
RELEVANT AUTHORITY: MINISTRY OF LABOUR, INDUSTRIAL RELATIONS AND EMPLOYMENT CREATION	
<i>ACTS</i>	
2007	Labour Act 11 of 2007
1997	Regulations relating to the Health & Safety of Employees at Work (promulgated in terms of Section 101 of the Labour Act No 6 of 1992 (GN156, GG 1617 of 1 August 1997))
RELEVANT AUTHORITY: MINISTRY OF WORKS, TRANSPORT AND COMMUNICATION	
<i>ACTS</i>	
1999	Road Traffic and Transport Act 22 of 1999
1994	Namibian Ports Authority Act 2 of 1994

REGULATIONS	
2001	Port Regulations promulgated in terms of this section in GN 117 published in GG2549 of 5 June 2001
B2GOLD STANDARDS	
2021	B2Gold Social Performance Management System Standards
2018	B2Gold Health, Safety and Environment Management System Standards
2018	B2Gold Environmental and Biodiversity Performance Standards
	<i>Standard 1: Hazardous Materials and Dangerous Goods Management</i>
	<i>Standard 2: Cyanide Management</i>
	<i>Standard 3: Tailings Management</i>
	<i>Standard 4: Waste Rock Management</i>
	<i>Standard 5: Non-Process Waste Management</i>
	<i>Standard 6: Water Management</i>
	<i>Standard 7: Air Quality Management</i>
	<i>Standard 8: Closure and Reclamation Planning</i>
	<i>Standard 9: Topsoil and Reclamation Management</i>
	<i>Standard 10: Noise and Vibration Management</i>
	<i>Standard 11: Biodiversity Management</i>
OTHER BEST PRACTICE STANDARDS	
2012	International Finance Corporation (IFC) Standards, 2012
	International Cyanide Management Code

4. ROLES AND RESPONSIBILITIES

The Environmental Clearance Certificate and Environmental Management Plan is a binding document between the Company and the Government of Namibia. The Company is responsible for compliance to the EMP and for providing the necessary resources to implement the management commitments. The successful implementation of the EMP is dependent on clearly defined roles and responsibilities for each of the management actions in the EMP. The table that follows indicates applicable key roles and responsibilities.

ROLES	RESPONSIBILITIES
General Manager	Overall responsible for implementation and compliance to the EMP.
Environmental Manager	Provides support to various departments to implement the EMP commitments.
Financial Manager	Makes financial resources available to implement the EMP commitments - management, remediation, rehabilitation and closure costs.
Technical Services Manager	Provides geological and survey support.
Engineering Manager	Provides engineering, planning and maintenance support for infrastructure, machinery and equipment requirements.
Mining Manager	Responsible for effective operation of open-cast and underground pits, associated mineralised dumps and waste material.
Processing Manager	Responsible for effective operation of the Processing Plant and Tailings Storage Facility.
Procurement Manager	Responsible for implementing processes that minimise business waste, while sourcing products and services for the Company – negotiating and managing contracts and building key relationships with both suppliers and internal management team.
Supply Chain Manager	Responsible for the management of the flow of goods and services, including the movement and storage.
CSR Manager	Creates links / relations between the Company and the community on common commitments towards sustainable social responsibility.
Safety Manager	Provides support to various departments to implement the Safety and Health commitments.
Public Relations Manager	Responsible for all internal and external communications for the Company, navigating public relations, ensuring for a consistent and engaging message (e.g. preparing detailed media reports, press releases, facilitating workshops and marketing materials).
Human Resources Manager	Responsible for effective and efficient management of people in the Company to maximise employee performance.
Security Manager	Responsible for the security of the operations of the Company (e.g. access and product control).

5. STAKEHOLDER ENGAGEMENTS

Detailed stakeholder engagements were conducted during the original Otjikoto Gold Mine Project EIA process and the additional projects that followed, as mentioned in the aforementioned 'Introduction and Background' section of this document.

Communication and stakeholder engagements with government stakeholders, Otjiwarongo and Otavi Town Councils, neighbouring farmers, communities, Non-Governmental Organisations, business partners, investors and interested parties are key to identify and manage opportunities, concerns and improvements of mutual interest.

6. AUDITING AND REPORTING

Compliance, system and functional environmental audits are essential to the operations. Internal and external audits are conducted on scheduled intervals by suitably qualified and experienced environmental auditors. Auditing is important to ensure environmental continual improvement and performance.

Regular reports to stakeholders are compiled as per legal requirements and other compliance obligations.

7. ENVIRONMENTAL MANAGEMENT PLAN

The management plans, listed in the tables below, are a consolidation of all the relevant management objectives, standards, activities, aspects, associated impacts, management actions and responsibilities applicable to Mining Licence 169 of B2Gold Namibia's Otjikoto Gold Mine - during the operational and decommissioning phases. These management plans contain previously approved commitments and updated management commitments where relevant.

The management plans include the following:

- 7.1 Air Quality Management Plan
- 7.2 Surface Water Management Plan
- 7.3 Groundwater Management Plan
- 7.4 Biodiversity Management Plan
- 7.5 Resource Management Plan
- 7.6 Soil Management Plan
- 7.7 Waste Management Plan
- 7.8 Archaeology Management Plan
- 7.9 Noise and Vibrations Management Plan
- 7.10 Visual Management Plan
- 7.11 Safety and Security Management Plan
- 7.12 Traffic Management Plan
- 7.13 Socio-economic Management Plan
- 7.14 Stakeholder Consultation / Communication Management Plan
- 7.15 Decommissioning and Closure Management Plan

7.1 AIR QUALITY MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To prevent unacceptable ambient air quality related pollution impacts.
- To prevent deterioration of air quality and to minimise the potential for emitted dust and airborne pollutants.
- To identify, control and reduce GHG emissions through energy efficiency strategies

MANAGEMENT STANDARDS

- | | | | |
|--|---|--|---|
| <ul style="list-style-type: none"> ▪ Public and Environmental Health Act (No.1 of 2015) ▪ Explosives Act (No. 26 of 1956) ▪ The Minerals (Prospecting and Mining) Act (No. 33 of 1992) ▪ Atmospheric Pollution Prevention Ordinance (No. 11 of 1976) | <ul style="list-style-type: none"> ▪ Labour Act (No. 11 of 2007) ▪ Regulations relating to the Health and Safety of Employees at Work (promulgated in terms of Section 101 of the Labour Act No 6 of 1992 (GN156, GG 1617 of 1 August 1997) | <ul style="list-style-type: none"> ▪ Petroleum Products and Energy (No. 13 of 1990) ▪ B2Gold Health, Safety and Environment Management System Standards ▪ Air Quality Performance Management Plan | <ul style="list-style-type: none"> ▪ NO_x / SO_x Emission Monitoring ▪ Ambient Air Monitoring ▪ Monitoring and Measurement Plan ▪ Air Quality Management Plan |
|--|---|--|---|

ACTIVITY(IES)

- | | | | |
|--|---|---|--|
| <ul style="list-style-type: none"> ▪ Stripping / Clearing of soil / vegetation ▪ Drilling and blasting ▪ Ore excavation | <ul style="list-style-type: none"> ▪ Loading and hauling ▪ Stockpiling ▪ Storage of Tailings | <ul style="list-style-type: none"> ▪ Establishing infrastructure ▪ Removal of infrastructure ▪ Energy/Power Generation | <ul style="list-style-type: none"> ▪ Road construction and maintenance ▪ Operation of machinery, equipment and Plant ▪ Incineration |
|--|---|---|--|

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Generation of Dust (Fall-out dust, PM ₁₀ , PM _{2.5})	<ul style="list-style-type: none"> ▪ Reduced visibility. ▪ Nuisance and Health impacts. ▪ Impact on flora (cover of foliage in dust which reduces growth, health of plant, etc.) 	Develop a dust control and management program with monitoring procedures.	X		Environmental Manager	During operation
		Ensure that material transfer points that generate visible dust, are controlled with effective mitigation measures.	X		Mining Manager, Processing Manager, Engineering Manager and Safety Manager	During design and operation
		Use water sprays with or without suppressants on unpaved roads, unmitigated materials handling points (i.e crusher), WRD and at the RoM pad as needed to ensure compliance with air quality standards.	X		Mining Manager, Processing Manager and Safety Manager	During operation
		Enforce speed limits on all site roads.	X		Safety Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure efficient and adequate monitoring and measurement of dust fall-out onsite and offsite (receptors) does not exceed applicable best practice standards.	X		Environmental Manager	Monthly during operations and post closure
		Ensure efficient and adequate monitoring and measurement of PM ₁₀ dust onsite and offsite (receptors) does not exceed applicable best practice standards.	X		Environmental Manager	Weekly, during operations and post closure
		Ensure that the landfill facility only operates one or two cells at any given time (one operational cell as the next one is being excavated / prepared).	X		Environmental Manager	During daily supervision and inspections
		Minimise hauling distances as far as practically possible (especially in the pit).	X		Mining Manager	During operation
		Ensure wind erosion is managed from exposed storage stockpiles (WRD) and surfaces (e.g TSF) where visible dust generation is controlled with effective mitigation measures.	X	X	Environmental Manager	During operation and rehabilitation
		Ensure that progressive rehabilitation is planned and implemented as soon as practical after earthworks to enhance vegetation cover of the exposed surfaces and slopes.	X	X	Environmental Manager	During operation and rehabilitation
		Conduct monthly visual inspections to ensure sufficient vegetation cover on exposed stockpiles and extend vegetation cover to exposed areas.	X	X	Environmental Manager	Monthly
		Conduct audits and inspections on the air quality monitoring procedure and practices.	X	X	Environmental Manager	As per the Audits and Inspections Schedule
Managing the landfill facility	<ul style="list-style-type: none"> ▪ Reduced visibility. 	Avoid burning of waste, unless the predicted volumes of waste to be landfilled is exceeded (i.e. small controlled aerated burning around mid-day in a dedicated area).	X		Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
	<ul style="list-style-type: none"> ▪ Prevention of potential nuisance and health impact. ▪ 	Compact waste by passing heavy equipment over the deposited waste, as a preferred alternative to burning.	X		Environmental Manager	During operation
		Avoid burning plastics, rubber or tyres.	X		Environmental Manager	During operation
		Place the permanent earthen fill cover over a cell (containment pit) within the landfill facility once it has reached capacity.		X	Environmental Manager	During rehabilitation and closure
		Ensure that the capped area is vegetated to reduce the potential for wind-blown dust.		X	Environmental Manager	During rehabilitation and closure
Gaseous emissions	<ul style="list-style-type: none"> ▪ GHG emission impacts ▪ Nuisance and Health impacts. 	Develop site specific inventory of emissions	X		Environmental Manager	During operation and inspections
		Ensure that a maintenance and repair plan is in place for the mine fleet and equipment for regular service to lower emissions.	X		Engineering Manager	With the acquisition of fleet and equipment
	<ul style="list-style-type: none"> ▪ 	Ensure an inspection and maintenance plan is implemented for the entire mine fleet to ensure proper combustion of fuel.	X		Engineering Manager	With the acquisition of fleet
	<ul style="list-style-type: none"> ▪ Understanding and managing potential impact on air quality. 	Conduct passive diffuse monitoring to confirm SO ₂ and NO _x concentrations.	X		Environmental Manager	During operation
Fall-out dust and PM ₁₀ monitoring	<ul style="list-style-type: none"> ▪ Understanding and managing potential impact on air quality. 	Ensure that dust fall-out monitoring is conducted as per the dust management plan / procedure.	X	X	Environmental Manager	Throughout the LoM
Generation of Fall-out dust, PM ₁₀ and PM _{2.5} from decommissioning	<ul style="list-style-type: none"> ▪ Understanding and managing potential impact on air quality. 	Include decommissioning in the dust and PM ₁₀ management plan.		X	Environmental Manager	During decommissioning
		Use topsoil recovered from stockpiles for rehabilitation and revegetation of surroundings.		X	Environmental Manager	During rehabilitation
		Place topsoil cover onto TSF and vegetate with indigenous grass species.		X	Environmental Manager	During rehabilitation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Contour berm at pit and vegetate with indigenous grass species.		X	Environmental Manager	During rehabilitation
		Replant any previously removed indigenous plant species in disturbed areas.		X	Environmental Manager	During rehabilitation
		Use indigenous plant species in the final landscaping of the rehabilitated mine site.		X	Environmental Manager	During rehabilitation
		Ensure a dense vegetation cover on WRD and TSF as defined by the final closure and decommissioning plan.		X	Environmental Manager	During rehabilitation
		Ensure that mitigation measures are applied should the infrastructure removal at the Processing Plant site, including the Primary Crusher and Conveyors, produce significant dust.		X	Environmental Manager and Engineering Manager	During decommissioning
		Ensure that demolition of infrastructure that necessitates blasting is only done during day-time hours.		X	Environmental Manager and Engineering Manager	During day-time
Dust and fumes from underground operations	<ul style="list-style-type: none"> Potential nuisance and health impact. 	Ensure vehicles adhere to speed limits to avoid producing excessive dust.	X		Engineering Manager and Safety Manager	During operation
		Ensure vehicles and machinery are regularly serviced as per the maintenance and repair plan, according to the manufacturers' specifications and kept in good working condition to minimise exhaust emissions.	X		Engineering Manager	With the acquisition of fleet and equipment
		Minimise the use of diesel-powered machines underground.	X		Engineering Manager	During operation
		Ensure that blasting takes place at fixed times and according to set designs using approved explosives.	X		Mining Manager	During operation
		Implement dust suppression on all dirt roads with high traffic loads.	X		Mining Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Measure particulate matter and fall-out dust from set monitoring stations.	X		Environmental Manager	During operation
		Ensure that underground ventilation is measured frequently, and personal exposure is sampled at regular intervals.	X		Safety Manager	During operation
Air quality from odour and particulate matter from underground operations	<ul style="list-style-type: none"> Potential impact on air quality (deterioration in air quality from odour and particulate matter (i.e. total suspended particulate matter (TSP), PM₁₀ and PM_{2.5} (particulate matter of 2.5 micrometres or less in diameter) and dust deposition) generated from the underground operations. 	Ensure mechanical equipment is maintained and serviced to ensure particulate matter is reduced.	X		Engineering Manager	During operation
		Ensure ventilation systems are providing fresh air to working headings and the underground workings are exhausted after each blast.	X		Engineering Manager	During operation
		Implement a pre-shift access checklist - air quality monitoring and personal exposure monitoring.	X		Mining Manager	Daily
Ventilation discharged from the underground workings <i>via</i> the portal	<ul style="list-style-type: none"> Contribution to offensive odours. 	Implement gas monitoring procedures as part of the daily operations of the underground mine.	X		Mining Manager	During operation
		Ensure adequate ventilation to prevent the build-up of odours and gas within the underground mine.	X		Mining Manager	During operation
		Implement an air quality monitoring and personal exposure monitoring programme.	X		Mining Manager, Environmental Manager and Safety Manager	During operation
Air quality and Greenhouse Gas (GHG) emissions from underground mining activities	<ul style="list-style-type: none"> Impacts to air quality – community, neighbouring farmers and workers 	Ensure mechanical equipment is maintained and serviced to ensure particulate matter is reduced.	X		Engineering Manager	During operation
		Ensure efficient handling of mineral waste material to reduce haul distances thereby reducing potential GHG emissions.	X		Mining Manager	During operation
		Report GHG emissions to key stakeholders.	X		Environmental Manager	During operation

7.2 SURFACE WATER MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To minimise the discharge of contaminated surface water to the surrounding environment to reduce impacts to sensitive receptors.
- To minimise mixing of clean and dirty water systems.
- To prevent pollution of surface water run-off.
- To prevent pollution of surface water due to industrial effluent.
- To prevent pollution of surface water due to domestic effluent.
- To prevent pollution of surface water due to spillages.
- To reduce and prevent pollution of water resources.
- To minimise the run-off of sediment-laden or polluted water into the surrounding environment.

MANAGEMENT STANDARDS

- Water Act (No. 54 of 1956)
- Water Resources Management Act (No. 11 of 2013)
- Petroleum Products and Energy Act (No. 13 of 1990)
- Hazardous Substances Ordinance (No. 14 of 1974)
- B2Gold Environmental and Biodiversity Performance Standards
- Monitoring and Measurement Plan
- Water Management Plan

ACTIVITY(IES)

- Stripping / Clearing of soil / vegetation
- Drilling and blasting
- Ore excavation
- Loading and hauling
- Stockpiling
- Storage of Tailings
- Establishing infrastructure
- Removal of infrastructure
- Road construction and maintenance
- Operation and maintenance of machinery, equipment and Plant

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Natural flow of stormwater (clean and dirty) flowing from surrounding areas into and around the operations	<ul style="list-style-type: none"> ▪ Alteration of natural drainage systems due to mining infrastructure. ▪ Pollution / Contamination of water and surrounding environment. 	Design all stormwater interventions to allow stormwater to bypass major infrastructure (e.g. open pits, tailings storage facility, landfill facility, waste rock dumps, and low-grade stockpiles).	X	X	Engineering Manager	Throughout the LoM
		Ensure that facilities are designed, constructed and operated to provide for flood protection.	X	X	Engineering Manager	Throughout the LoM
		Implement the International Finance Corporation (IFC) guideline principles (IFC Environmental, Health and Safety Guidelines for Mining (2007)).	X	X	Environmental Manager and General Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Flow of dirty stormwater (rainwater that falls onto and flows across the site)	<ul style="list-style-type: none"> Alteration of natural drainage systems due to mining infrastructure. Pollution / Contamination of water and surrounding environment. 	Construct engineered structures to direct contaminated water from the processing areas, landfill facility, roads and office areas to the return water dam circuit for storage and re-use.	X		Engineering Manager	Throughout the LoM
Surface water around landfill facility	<ul style="list-style-type: none"> Alteration of natural drainage systems due to mining infrastructure. Pollution / Contamination of water and surrounding environment. 	Use material excavated from the current active cell of the landfill area to construct embankments / berms to divert clean surface water away from the cell on the upstream side, and to the downstream side of the cell.	X		Engineering Manager and Environmental Manager	During operation
		Place the permanent compacted earthen fill cover over a cell (containment pit) within the landfill facility, once it has reached capacity.		X	Engineering Manager and Environmental Manager	During rehabilitation
		Place the permanent compacted earthen such that the final surface is graded to drain water off the landfill facility and to minimise any "ponding or collecting".		X	Engineering Manager and Environmental Manager	During rehabilitation
Clean and dirty water separation	<ul style="list-style-type: none"> Alteration of natural drainage systems due to mining infrastructure. Pollution / Contamination of water and surrounding environment. 	Design, construct and operate surface water management facilities to keep dirty water separate from clean water run-off through a system of berms, channels, trenches, flood protection measures, erosion protection or dams.	X		Engineering Manager	Throughout the LoM
		Implement suitable measures for the WRD extension to ensure that no run-off from the WRD is allowed to enter the main channel in the downstream part of Catchment 1b (Refer to Groundwater and Surface Water Specialist Report), using stormwater channels and settlement ponds.	X		Engineering Manager	Throughout the LoM
		Re-use contained water or surplus water that cannot be used in the Plant or release it into the	X		Engineering Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		environment as per permit requirements from the relevant authority.				
		Determine the need for long-term controls around the waste rock dump (WRD) and extension as part of closure planning.		X	Engineering Manager	Throughout the LoM
General surface water pollution / spills	<ul style="list-style-type: none"> ▪ Alteration of natural drainage systems due to mining infrastructure. ▪ Pollution / Contamination of water and surrounding environment. 	Ensure that all hazardous chemicals (new and used), dirty water, mineralised waste, concrete batching activities and non-mineralised waste are handled in a manner to prevent contamination of surface water run-off or where this is not possible, demonstrate (through monitoring) that the potential contamination is within acceptable limits (for the environment and human health).	X	X	Environmental Manager, Mining Manager, Processing Manager and Engineering Manager	Throughout the LoM
		Prevent pollution <i>via</i> infrastructure design and education and training of employees and contractors.	X	X	Engineering Manager and Environmental Manager	Throughout the LoM
		Ensure that <i>in situ</i> bioremediation takes place at the point of pollution, or removal of soils for washing and/or bioremediation at a designated area.	X	X	Environmental Manager and Departmental Managers	Throughout the LoM
		Ensure that on-site contractors have all the necessary hazardous protection equipment for people and the environment in the advent of a spill.	X	X	Supply Chain Manager	Throughout the LoM
		Verify the fuel transport company's spill containment (emergency clean up) plan and spill clean-up agreement is in place.	X	X	Supply Chain Manager	Throughout the duration of the contract
		Ensure that fuel transporting companies adhere to the Petroleum Products and Energy Act (13 of 1990) and Regulations.	X	X	Supply Chain Manager	Throughout the duration of the contract

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Establish and maintain concrete bunded areas around all diesel generators, where required.	X	X	Engineering Manager	Throughout the LoM
		Maintain and implement a spill management procedure, including the clean-up of hydrocarbon spills.	X	X	Environmental Manager and Departmental Managers	Throughout the LoM
		Clean up or remediate <i>ad hoc</i> spills immediately in line with the spill management procedure.	X	X	Departmental Managers	Throughout the LoM
		Place spill kits in all areas where hazardous substances are dispensed and stored, and train staff to use it.	X	X	Departmental Managers	Throughout the LoM
		Develop specifications for post-rehabilitation audit criteria to determine whether the remediation has been effective.	X	X	Environmental Manager	Throughout the LoM
Mine infrastructure	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure that where mine infrastructure becomes damaged or cause surface water contamination, it is timeously repaired and maintained.	X	X	Engineering Manager	Throughout the LoM
Emergency preparedness and response	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Handle major spillage incidents that contaminate flood waters in accordance with the emergency preparedness and response procedure and report incidents to relevant authorities.	X	X	Environmental Manager and General Manager	Throughout the LoM
Training and awareness	<ul style="list-style-type: none"> ▪ Awareness creation on the significance of pollution / contamination of water and surrounding environment, and applicable preventative and corrective measures. 	Induct all employees and contractors in the spill management procedure.	X	X	Environmental Manager	With onboarding and refresher inductions
		Train selected employees and contractors in the remediation of soil or water contaminated by hydrocarbon spills.	X	X	Environmental Manager	With onboarding and refresher inductions
Safe disposal and rehabilitation of hydrocarbon	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Develop and implement a hydrocarbon remediation procedure, which includes the treatment of contaminated soil and water.	X	X	Environmental Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
contaminated soil and water						
Monitoring of hydrocarbon spills	<ul style="list-style-type: none"> Pollution / Contamination of water and surrounding environment. 	Include hydrocarbon spills in the daily inspections' checklist.	X	X	Environmental Manager and Departmental Managers	Throughout the LoM
		Report spillages as per the incident management procedure and applicable legal requirements.	X	X	Environmental Manager and Departmental Managers	Throughout the LoM
Managing of the landfill facility	<ul style="list-style-type: none"> Pollution / Contamination of water and surrounding environment. 	Ensure effective supervision of materials taken to the landfill to prevent the illegal / unauthorised dumping of hazardous material at the facility.	X	X	Environmental Manager	Throughout the LoM
Legal compliance	<ul style="list-style-type: none"> Pollution / Contamination of water and surrounding environment. 	Apply to the relevant authority for exemption of certain conditions of the water discharge permit to allow the continued re-use of treated sewage effluent in the process water circuit.	X		Environmental Manager	During operation
Spillage or discharge of industrial effluent	<ul style="list-style-type: none"> Pollution / Contamination of water and surrounding environment. 	Prevent spillages of industrial effluent and ensure any spillages are properly contained.	X		Processing Manager	During operation
		Ensure that checking for industrial effluent spills is included in the daily inspection checklist.	X		Environmental Manager and Processing Manager	During operation
		Report spillages as per the incident management procedure and clean up spills within 24 hours of the incident occurring.	X		Processing Manager and Environmental Manager	During operation within 24 hours
		Investigate discharges of industrial effluent into the environment - stop the spillage as soon as possible and take corrective action to eliminate or control the root cause.	X		Processing Manager and Environmental Manager	During operation
		Maintain pipes, drains, pumps, valves, etc. to minimise the likelihood of leaks.	X	X	Engineering Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Pollution prevention from industrial effluent	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Recycle all process water from the process dam back into the plant as per the design specifications.	X		Processing Manager	During operation
		Ensure that the various effluent streams (tailings decant, treated effluent dirty stormwater, process effluent) are managed to prevent overflow of the return water dam.	X	X	Processing Manager	Throughout the LoM
		Ensure that a freeboard is maintained to accommodate run-off during a 1:50 year storm event.	X	X	Processing Manager	Throughout the LoM
		Monitor the effectiveness of the mitigation measures (e.g. liner) for damage to ensure that seepage does not occur.	X	X	Processing Manager	Throughout the LoM
		Ensure that storage / containment facilities have sufficient capacity to cater for the various sources of water including rainfall.	X	X	Processing Manager	Throughout the LoM
Discharge of industrial effluent to the return water dam and TSF	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure that all the industrial effluent is discharged into the return water dam and the TSF (slurry).	X	X	Processing Manager	Throughout the LoM
		Install oil-water separators at all wash bays to separate hydrocarbons from the water and route the water to the return water dam.	X	X	Engineering Manager	Throughout the LoM
		Skim separators regularly and dispose of hydrocarbons as per the waste management procedure.	X	X	Engineering Manager	Throughout the LoM
Storage and disposal of liquid waste (hydrocarbons)	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Collect and safely store (in sealed drums on impermeable surfaces within bunded areas) all liquid hydrocarbon waste.	X		Engineering Manager	During operation
		Design bunded areas to contain 110% of the volume of one or the largest drum (in a multi-	X		Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		drum setup) and equip the bund with traps and oil-water separators to contain spilled hydrocarbons.				
		Provide used hydrocarbon liquid waste to third parties for recycling and keep related records.	X		Engineering Manager and Environmental Manager	During operation
Discharge of raw sewerage and grey water into appropriate sewage treatment facilities	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Conduct regular monitoring to ensure that effluent is not being discharged into the environment.	X	X	Environmental Manager	Throughout the LoM
		Operate biological sewage treatment plant to treat sewage and grey water generated on site.	X		Engineering Manager	During operation
Spillage of domestic and treated effluent	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Report spillages as per the incident management procedure and clean up spills within 24 hours of the occurrence of the incident.	X	X	Engineering Manager	Within 24 hours
		Investigate discharges of domestic effluent into the environment - stop the spillage as soon as possible and take corrective action to eliminate or control root cause.	X	X	Engineering Manager	Throughout the LoM
		Decontaminate soil or water pollution using appropriate methodology and rehabilitate the area.	X	X	Engineering Manager	Throughout the LoM
Awareness and Training	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Train operators to understand the legal requirements and how to achieve compliance.	X	X	Environmental Manager	With onboarding and refresher inductions
		Induct employees and contractors in the use of the spill management procedure.	X	X	Environmental Manager	With onboarding and refresher inductions
Treatment of sewerage	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Regularly service and maintain sewage treatment plant (STP) to keep it in proper working condition.	X	X	Engineering Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Discharge treated water to the environment or to the tailings storage facility.	X	X	Engineering Manager and Processing Manager	Throughout the LoM
		Remove sewerage sludge from the STP for disposal at the nearest waste drying beds.	X	X	Engineering Manager	Throughout the LoM
		Operate the STP according to the operations manual to ensure optimum performance.	X		Engineering Manager	During operation
Compliance to legal requirements	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Apply to the relevant authority for the relevant permissions for the STP and a possible Wastewater Discharge permit.	X	X	Environmental Manager	Throughout the LoM
		Conduct regular inspections and audits relating to the STP activities and ensure compliance to conditions of applicable permits.	X	X	Environmental Manager	Throughout the LoM
Hydrocarbon spills	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure that the Company is in possession of the relevant licences for surface and underground storage tanks (as per legal requirements).	X	X	Supply Chain Manager	Throughout the LoM
		Ensure that hydrocarbon (used and new fuel and oil) tanks and drums are stored inside bunded areas on impermeable floors with traps and separators to contain spillages.	X	X	Engineering Manager	Throughout the LoM
		Ensure these areas are designed to contain 110% of the volume of one or the largest tank (in a multi-tank setup) and that pumps and pipes are properly maintained.	X	X	Engineering Manager	Throughout the LoM
		Equip all wash bays with oil traps and separators and store all collected oil in waste oil tanks.	X	X	Engineering Manager	Throughout the LoM
		Ensure that all fuel and oil storage facilities (farms) and transport tankers have spill kits.	X	X	Supply Chain Manager and Engineering Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure that the fuel transport company has a system in place to deal with hydrocarbon spills and subsequent clean-up thereof.	X	X	Supply Chain Manager	Throughout the LoM
		Contain the spill and commence with remediation within 24 hours and report as per the incident management procedure.	X	X	Environmental Manager and Departmental Managers	Throughout the LoM
		Separate hydrocarbons from contaminated water and treat water before recycling and re-use.	X	X	Engineering Manager	Throughout the LoM
Domestic and Industrial effluent spillage	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Prevent effluent spills by ensuring that treatment and storage facilities are adequate and pipes in good condition.	X	X	Engineering Manager	Throughout the LoM
		Ensure that capacities of the various facilities and pipes are not exceeded.	X	X	Engineering Manager	Throughout the LoM
		Ensure that all vehicles and equipment are serviced in workshops and wash bays with contained impermeable, floors, dirty water collection facilities and oil traps.	X	X	Engineering Manager	During operation
		Contain spills and clean up within 24 hours and report as per the incident management procedure.	X	X	Engineering Manager	Throughout the LoM
		Pick up, in sealed containers, slurry that spilled the ground and transport to the TSF or emergency stockpile for disposal.	X	X	Processing Manager	Throughout the LoM
		Contain sewerage and industrial effluent spills and treat the pollution by means of <i>in situ</i> bioremediation.	X	X	Processing Manager and Engineering Manager	Throughout the LoM
		Excavate pollution and treat as per the waste management procedure, if <i>in situ</i> treatment is not possible or acceptable.	X	X	Processing Manager and Engineering Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Compliance to legal requirements – all spills	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Comply with all legal requirements regarding spills and containment structures.	X	X	All Departmental Managers	Throughout the LoM
		Report hydrocarbon spills of 200 litres or more to the MME in terms of Section 49 of the Petroleum Products Regulations 2000.	X	X	Environmental Manager and Departmental Managers	Throughout the LoM
Monitoring of all spills	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure that the monitoring of all tanks, pipelines and bunds are included in the daily inspection programme to develop an early detection system for leaks.	X	X	Engineering Manager	During operation
		Update, maintain and implement a maintenance plan for tanks, tankers, pipelines and bunds.	X	X	Engineering Manager	During operation
		Identify post rehabilitation audit criteria for verifying effective remediation.	X	X	Environmental Manager	Throughout the LoM
		Conduct periodic audits of facilities to ensure compliance with legal and Company standards.	X	X	Environmental Manager	Throughout the LoM
Awareness and training – all spills	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Induct all employees and contractors on the Environmental Policy, spill management and incident management procedures.	X	X	Environmental Manager	With onboarding and refresher inductions
		Train selected employees and contractors in the containment, and handling of spills and in the decontamination and rehabilitation of affected environments.	X	X	Environmental Manager	With onboarding and refresher inductions
Large-scale hydrocarbon or reagent spills or remote spills - emergency situations	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Maintain and implement the emergency preparedness and response procedure to address large-scale hydrocarbon or reagent spills on and off site.	X	X	Safety Manager	Throughout the LoM
		Identify and contract a service provider / specialist to assist with the handling and clean-up of emergency spills off site.	X	X	Supply Chain Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Periodically test the emergency preparedness and response.	X	X	Safety Manager	Throughout the LoM
Reagent spills	<ul style="list-style-type: none"> Pollution / Contamination of water and surrounding environment. 	Ensure that the reagent supply and / or transportation company is in possession of the relevant licences (legal requirements) and complies with transport and storage tank requirements.	X		Supply Chain Manager	During operation
		Ensure that reagent tanks are housed inside concrete bunds and that dispensing takes place on an impermeable surface.	X		Supply Chain Manager and Engineering Manager	During operation
		Ensure that bunds are designed to contain 110% of the volume of one or the largest (in a multi-tank setup) tank and that pumps and pipes are maintained in good working order.	X		Engineering Manager	During operation
		Ensure that the reagent supply and/or transportation company has a system in place to deal with the variety of spills that may occur and the subsequent clean-up there-of.	X		Supply Chain Manager	During operation
		Contain spills using appropriate spill kits and clean up within 24 hours as per the MSDS specification and report as per the incident management procedure.	X	X	Processing Manager	Throughout the LoM
		Pick up all solid reagents and place in the relevant reagent tank for use in the Plant.	X	X	Processing Manager	Throughout the LoM
		Dispose polluted reagent in a safe disposal site.	X	X	Processing Manager	Throughout the LoM
		Commence with remediation within 24 hours and report as per the incident management procedure.	X	X	Processing Manager	Within 24 hours

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Contain contaminated water and treat it or direct it into the process dam for use in the Processing Plant.	X	X	Processing Manager	During operation
Process solution spills (Unplanned events – release of large volumes of process solutions)	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure that bunds are designed to capture any release of solution – designed to contain 110 % of the largest tank inside the bunded area.	X		Processing Manager and Engineering Manager	During operation
		Keep bunds clean and empty of any spillage.	X		Processing Manager	During operation
		Ensure that pumps and pipelines are in place to pump solution from the bunds back into the Processing Plant.	X		Processing Manager	During operation
		Maintain and implement an emergency preparedness and response procedure for the containment and clean-up of process solution if bunds are breached and for the treatment of contaminated areas.	X		Processing Manager	During operation
		Identify and utilise a service provider to assist with the clean-up of very large reagent spills (emergency situations).	X	X	Processing Manager	Throughout the LoM
Sediment loading of surface water from decline development activities	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Install structures to divert non-contact surface water away from and around the mining operations.	X	X	Mining Manager and Engineering Manager	Throughout the LoM
		Ensure wastewater produced during the construction of the decline development is directed into the open pit.	X		Mining Manager and Engineering Manager	During operation
		Ensure water is diverted to the Processing Plant for re-use, or if not feasible, ensure an adequately sized sedimentation pond is constructed for handling the wastewater during the decline development phase, or find a suitable re-use strategy for the water, if the volume of	X		Mining Manager, Processing Manager and Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		water is too large and cannot be handled concurrently with open pit mining operations.				
Sediment loading of surface water from uncontrolled surface discharge of underground mine wastewater	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure wastewater produced from underground mining activities is sent to the Processing Plant for re-use.	X		Mining Manager, Processing Manager and Engineering Manager	During operation
		Ensure an adequately sized sedimentation pond is constructed for handling the wastewater from the underground mining operations, if the volume of water is too large and cannot be handled by the Processing Plant for re-use.	X		Mining Manager, Processing Manager and Engineering Manager	During operation
		Investigate the re-use of water back into the underground mine.	X		Mining Manager, Processing Manager and Engineering Manager	During operation
Discharges of chemicals to surface water	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure correct chemical use and clean-up procedures are in place and followed.	X		Mining Manager	During operation
		Ensure chemical spills in the underground mine are cleaned.	X		Mining Manager	During operation
		Prevent spills from entering the dewatering system where water is transferred to surface.	X		Mining Manager	During operation
Potential failure of containment dams that hold underground mine dewatering water	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Ensure water storage facilities are constructed and have capacity to hold the volume of water to be pumped from the underground operations.	X		Mining Manager	During operation
Pollution control measures	<ul style="list-style-type: none"> ▪ Pollution / Contamination of water and surrounding environment. 	Keep visual monitoring and photographic records of any surface and / or groundwater intersected.	X		Environmental Manager	During operation
		Visually monitor during rainfall events for run-off of polluted water.	X		Environmental Manager	During rainfall events

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Service vehicles and machinery regularly to minimise oil and fuel leaks.	X		Engineering Manager	During operation
		Ensure good housekeeping is maintained and chemicals, and fuel are stored securely to prevent any accidental spills.	X		Engineering Manager	During operation
		Construct and maintain lined pollution control dams and silt traps.	X		Engineering Manager	During operation
Sewage management	<ul style="list-style-type: none"> Potential pollution to the environment. 	Portable chemical toilet facilities will be hired for on-site use and the supplier / contactor will manage any sewerage generated.	X		Engineering Manager	During operation
Monitoring of surface water	<ul style="list-style-type: none"> Prevention of potential pollution to the environment. 	Develop and implement a surface water monitoring programme.	X	X	Environmental Manager	Throughout the LoM
		Keep an up-to-date mine water balance.	X	X	Processing Manager, Mining Manager, Engineering Manager and Environmental Manager	Throughout the LoM

7.3 GROUNDWATER MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To minimise the impact of water supply and prevent the loss of groundwater to other users in the area.
- To prevent unacceptable groundwater pollution related impacts.
- To minimise potential impacts on groundwater.

MANAGEMENT STANDARDS

- Water Act (No. 54 of 1956)
- Water Resources Management Act (No. 11 of 2013)
- Petroleum Products and Energy Act (No. 13 of 1990)
- Hazardous Substances Ordinance (No. 14 of 1974)
- B2Gold Environmental and Biodiversity Performance Standards
- Monitoring and Measurement Plan
- Water Management Plan

ACTIVITY(IES)

- Stripping / Clearing of soil / vegetation
- Drilling and blasting
- Ore excavation
- Loading and hauling
- Stockpiling
- Storage of Tailings
- Establishing infrastructure
- Removal of infrastructure
- Road construction and maintenance
- Operation and maintenance of machinery, equipment and Plant

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Water supply	Potential loss of water	Construct adequate pipeline in flood lines to withstand flood conditions.	X		Engineering Manager	During operation
		Ensure that the pipeline is visible and / or marked to prevent damage to pipeline.	X		Engineering Manager	During operation
		Ensure that the pipeline and related infrastructure are designed to minimise evaporation and transmission losses.	X		Engineering Manager	During operation
		Install pressure gauges at the pipeline for the early detection of pressure loss that may indicate leakages.	X		Engineering Manager	During operation
		Conduct monthly visual checks for damp areas around borehole equipment and pipeline.	X		Engineering Manager	Monthly

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Consult communities before construction of the pipeline and for significant maintenance.	X		Engineering Manager	During operation
		Ensure boreholes and related equipment are fenced-in and the pumphouse locked for protection against theft and vandalism.	X		Engineering Manager	During operation
Mine dewatering	<ul style="list-style-type: none"> Depletion of water resource - abstraction and dewatering of mine pits. 	Consult communities in advance about the potential lowering of water levels in their boreholes.	X		Communications Manager	During operation
		Ensure that only permitted abstraction rates are applied and that water abstraction limits are not exceeded from production boreholes.	X		Engineering Manager and Environmental Manager	During operation
		Implement water saving measures in mining, operational and tailings deposition processes to reduce the use of groundwater resources for make-up water.	X		Mining Manager, Processing Manager, Engineering Manager and Environmental Manager	During operation
		Provide community with an alternative water supply source if community supply boreholes are dewatered / depleted.	X		CSR Manager	During operation
		Monitor groundwater levels in all pumping wells throughout the life of the mine.	X		Environmental Manager	Throughout the LoM
		Monitor groundwater levels at all monitoring boreholes.	X		Environmental Manager	Throughout the LoM
		Ensure that the increased groundwater volumes abstracted from the mine pits are used in the process, while reducing the abstraction from production boreholes in the Karibib marble with the same volume.	X		Mining Manager and Engineering Manager	During operation
		Apply for permission to the relevant authority to release surplus groundwater abstracted from the	X		Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		mine pit or dewatering wells into the environment.				
		Reduce or completely abandon abstraction from the Karibib Formation aquifer when dewatering volumes meet the demand of the mining operations to reduce the impact on groundwater resources and the radius of influence (ROI).	X		Engineering Manager and General Manager	During operation
Compliance to Legal requirements	<ul style="list-style-type: none"> Prevention of illegal abstraction and dewatering and compliance to permit conditions. 	Ensure that permits for abstraction and pit dewatering are renewed as required.	X		Environmental Manager	As per permit conditions
		Conduct regular audits to ensure that permit conditions are adhered to.	X		Environmental Manager	As per audit schedule
Groundwater contamination from the TSF	<ul style="list-style-type: none"> Potential contamination of groundwater – quality. 	Ensure that follow-up geochemical studies are conducted in more detail to further constrain sulphide content in the TSF and to better quantify potential leachate and acid formation possibilities.	X	X	Technical Services Manager	During operation
		Consider lining the TSF with a hydrologic ally isolating layer, should potential arsenic and sulphate leaching from the sulphide dump occur – following recommendations from the geochemical studies.	X		Processing Manager	During operation
		Ensure that the detail design consider that secondary containment be built into the TSF base beneath the hydrologic ally isolating layer.	X		Processing Manager	During design
		Implement measures identified during the detail design phase of the mineralised waste facilities and low-grade stockpiles aimed at minimising impacts on the environment and monitoring potential impacts on groundwater pollution.	X		Mining Manager and Processing Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Power Plant drain water	<ul style="list-style-type: none"> Potential contamination of groundwater – quality. 	Ensure that the approximately 0.5 m ³ /h of “drain water” (water phase which is separated from the oily sludge) that is produced from the Power Plant, which must contain no more than 2.5 ppm residual oil, if released into the environment is re-used in the Processing Plant and that a permit is obtained from the relevant authority should discharge into the environment be required.	X		Engineering Manager, Processing Manager and Environmental Manager	During operation
		Sample and monitor the drain water on a regular basis and dilute if necessary.	X		Engineering Manager	As per Monitoring and Sampling schedule
Storage of fuel (diesel and HFO)	<ul style="list-style-type: none"> Potential contamination of groundwater – quality. 	Ensure that hydrocarbons are stored in bunded areas above ground, designed to contain 110% of the volume of one or the largest tank (in a multi-tank setup) and equipped with traps and separators to contain spilled fuel.	X		Engineering Manager	During operation
Groundwater contamination from the operations	<ul style="list-style-type: none"> Potential contamination of groundwater – quality. 	Use properly designed fuel containment facilities.	X		Engineering Manager	During operation
		Control the use of all materials, fuels and chemicals which could potentially leach into groundwater.	X		Departmental Managers	During operation
		Store materials, fuel and chemicals in a bunded and secured area to prevent pollution from spillages and leakages.	X		Departmental Managers	During operation
		Maintain vehicles and machinery properly to ensure that oil spillages are kept at a minimum.	X		Engineering Manager	During operation
		Provide spill / drip trays for refuelling of vehicles.	X		Engineering Manager	During operation
		Provide proper sanitary facilities for all employees and contractors and ensure that chemical toilets are not within proximity of any drainage system and are frequently maintained - including the removal - without spillages.	X		Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure that no uncontrolled discharges - resulting in pollution of the receiving environment and aquifer - is permitted.	X		Environmental Manager and Departmental Managers	During operation
		Ensure that chemical storage areas are sufficiently contained, and the use of chemicals are controlled.	X		Departmental Managers	During operation
		Direct water seeping into the open pit during mining, into a sump and pump it to the surface.	X		Mining Manager	During operation
		Ensure that water pumped from the open pit mine during mining is pumped into a dirty water system and not allowed to enter any clean water system, natural drainage line, or the aquifer.	X		Mining Manager	During operation
		Ensure that potable water is made available to affected users, due to dewatering activities by the mine.	X		CSR Manager	During operation
		Ensure that seepage capturing boreholes, both shallow and deep, is drilled west of the TSF and WRD.	X		Environmental Manager and Engineering Manager	During operation
		Implement a groundwater monitoring programme upstream and downstream from the TSF, specifically sulphate, manganese, nickel, cobalt, arsenic and cyanide – including nitrate in the monitoring protocol on mine waste streams.	X		Environmental Manager	During operation
		All water retention structures, including tailings disposal facilities, return water dams, stormwater dams, retention ponds etc. should be constructed to have adequate freeboard to be able to contain water of 1:50 year rain events.	X		Engineering Manager	During operation
		The groundwater flow model should be updated regularly.	X		Environmental Manager	Every two years

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Emergency preparedness and response	<ul style="list-style-type: none"> Prevention of potential contamination of groundwater resources. 	Handle major spillage incidents in accordance with the emergency preparedness and response procedure.	X		Safety Manager	During operation
		Inform the relevant authorities and surrounding farmers (potential of contamination of farm boreholes) of major spillages.	X		Environmental Manager and Communications Manager	When major spillage occurs
Waste sludge from the Power Plant	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Separate and store the oil phase from the sludge in a tank prior to transporting it off site to a hazardous waste disposal facility.	X		Engineering Manager	During operation
Managing of the landfill facility	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure effective supervision of materials taken to the landfill to ensure no hazardous material is dumped in the facility.	X		Environmental Manager	Daily
Contamination of groundwater from underground mine operations including hydrocarbons and explosives	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure correct chemical use and explosive charging practices are in place and followed for underground mining operations.	X		Mining Manager	During operation
		Ensure bulk fuel is stored aboveground, and that most fleet refuelling occurs on surface.	X		Mining Manager	During operation
		Ensure that refuelling of drills and equipment working at the face is done in a controlled manner following standard underground refuelling procedures.	X		Mining Manager and Engineering Manager	During operation
Modification of hydrologic flow patterns from underground mining operations	<ul style="list-style-type: none"> Potential altering of hydrologic flow during operations exists due to dewatering for the safe access to mining areas. 	Conduct studies into the geochemical characteristics of tailings material to better quantify potential leachate and acid possibilities, as a follow-up on the 2012 geochemical studies.	X		Technical Services Manager	During operation
Infiltration of potential spills or discharges of	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure correct chemical use and clean up procedures are in place and followed for underground mining operations.	X		Mining Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
chemicals into groundwater		Ensure bulk fuel is stored aboveground, and that most fleet refuelling occurs on surface.	X		Mining Manager	During operation
		Ensure all operators are trained on spill response for underground events.	X		Safety Manager	With onboarding and refresher inductions
Potential infiltration of groundwater from the Karibib Marble aquifer into the underground mining operation	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure adherence to the mine plan.	X		Mining Manager	During operation
		Ensure known structures, and water bearing features are mapped and surveyed into the mine plans.	X		Technical Services Manager	During operation
		Ensure monitoring systems are in place to detect potential inflows.	X		Mining Manager	During operation
		Ensure the dewatering plan is implemented, monitored and reported on.	X		Mining Manager and Engineering Manager	During operation
Contamination of the Karibib Marble aquifer by the rebounding water table of potentially polluted water in the underground workings of the Karibib Marble aquifer after closure	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure that the pit design allows for the groundwater level to be intersected and a pit lake to form, which will act as a sink of potentially contaminated water from various sources, including the rebounding water table in the underground workings.	X	X	Mining Manager	During operation
		Conduct ongoing modelling to confirm and refine transport models which indicate that evaporation should keep the free water in the pit from decanting and that it is an acceptable closure option.	X	X	Environmental Manager and Technical Services Manager	Throughout the LoM
		Investigate the option to use the free water in the pit for irrigation after closure.		X	Environmental Manager	During closure planning
Potential run-off of seepage from the solid waste landfill facility	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure the landfill is managed in accordance with site procedures and covered and rehabilitated as required.	X	X	Environmental Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
because of additional solid waste being disposed of in the on-site landfill		Reduce the volume of material entering the landfill by continuing to implement the reduce, re-use and recycle principle used on site.	X		Departmental Managers	During operation
Potential for inrush into the underground mine workings during development and operations	<ul style="list-style-type: none"> Potential pollution of groundwater resources 	Ensure the dewatering plan is implemented, monitored and reported on.	X		Mining Manager	During operation
		Ensure all operations are undertaken in accordance with the mine plan.	X		Mining Manager	During operation
		Ensure all water bearing features are mapped and included in survey plans.	X		Technical Services Manager	During operation
		Ensure emergency preparedness and response procedures are in place to cater for the event of an inrush.	X		Safety Manager	During operation
		Ensure adequate pumping capacity with back-up pumps as critical spares are kept on site.	X		Engineering Manager	During operation
Regional groundwater levels	<ul style="list-style-type: none"> Potential depletion or reduction in neighbouring groundwater levels. 	Manage dewatering and abstraction of water from the aquifer to ensure limited impacts on neighbouring water users.	X		Engineering Manager and Environmental Manager	During operation
		Supply water to any adversely affected neighbouring water user.	X		CSR Manager	During operation
Monitoring of groundwater	<ul style="list-style-type: none"> Preventing potential impact on groundwater. 	Develop and implement a groundwater monitoring programme.	X	X	Environmental Manager	Throughout the LoM
		Keep an up-to-date mine water balance.	X	X	Processing Manager, Mining Manager, Engineering Manager and Environmental Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Monitoring of waste	<ul style="list-style-type: none"> Preventing potential impact on groundwater. 	Minimise waste at source as much as possible to reduce volumes of waste required to be treated or disposed.	X	X	Environmental Manager and Departmental Managers	During operation
		Ensure that records are kept of the types and volume of waste.	X	X	Environmental Manager	Throughout the LoM
Pollution control measures	<ul style="list-style-type: none"> Prevent potential depletion or contamination of groundwater. 	Visually monitor and keep photographic records of any surface and/or groundwater intersected.	X		Mining Manager and Environmental Manager	During operation
		Visually monitor during rainfall events for run-off of polluted water.	X		Mining Manager and Environmental Manager	During rainfall events
		Ensure that chemically laden water is not disposed of into surface water resources or into the bush.	X		Mining Manager and Environmental Manager	During operation
		Ensure vehicles and machinery are regularly serviced to minimise oil and fuel leaks.	X		Engineering Manager	During operation
		Ensure chemicals, oil and fuel are stored securely to prevent any accidental spills.	X		Departmental Managers	During operation

7.4 BIODIVERSITY MANAGEMENT PLAN

MANAGEMENT OBJECTIVES			
<ul style="list-style-type: none"> ▪ To prevent or limit the unacceptable loss of biodiversity and related functionality through physical disturbance. ▪ To prevent the unacceptable loss of biodiversity and related functionality through a reduction in the key ecological drivers of groundwater and temporary surface water flow. ▪ To prevent disturbance to biodiversity. ▪ To limit potential impacts on biodiversity through the minimisation of the footprint and the conservation of residual habitat within the mine area. 			
MANAGEMENT STANDARDS			
<ul style="list-style-type: none"> ▪ Forest Act (No. 12 of 2001) ▪ Nature Conservation Ordinance (No.14 of 1975) 	<ul style="list-style-type: none"> ▪ Water Act (No. 54 of 1956) ▪ Water Resources Management Act (No. 11 of 2013) 	<ul style="list-style-type: none"> ▪ B2Gold Environmental and Biodiversity Performance Standards ▪ Monitoring and Measurement Plan 	<ul style="list-style-type: none"> ▪ Water Management Plan ▪ Biodiversity Management Plan
ACTIVITY(IES)			
<ul style="list-style-type: none"> ▪ Stripping / Clearing of soil / vegetation ▪ Drilling and blasting ▪ Ore excavation 	<ul style="list-style-type: none"> ▪ Loading and hauling ▪ Stockpiling ▪ Storage of Tailings 	<ul style="list-style-type: none"> ▪ Establishing infrastructure ▪ Removal of infrastructure 	<ul style="list-style-type: none"> ▪ Road construction and maintenance ▪ Operation and maintenance of machinery, equipment and Plant

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Physical destruction of biodiversity	<ul style="list-style-type: none"> ▪ Impact on biodiversity areas and of related species - significant because of their status, and/or the role that they play in the ecosystem. 	Clearly demarcate boundaries of the waste rock dump and TSF.	X		Mining Manager	During operation
		Delineate at least a 100 m wide boundary zone (free of developments and mine-related activities) around pans, specifically, the large ephemeral pan located east of the mine site.	X		Technical Services Manager and Environmental Manager	During operation
		Avoid cutting or relocating protected trees and develop plans to care for them during the life of mine until their surroundings have been restored.	X		Environmental Manager and Departmental Managers	During operation
		Obtain relevant permits where disturbance of protected trees is unavoidable.	X		Environmental Manager	During operation
		Evacuate animals of conservation significance from the mining area before disturbance.	X		Environmental Manager and Departmental Managers	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Remove and stockpile topsoil, along with its soil fauna and seed banks, and devise plans for its management during stockpiling and redeployment for restoration.	X		Environmental Manager, Mining Manager and Engineering Manager	During operation
		Remove organic material, including litter and dead wood, and stockpile separately for future use in restoration, investigating appropriate stockpiling methods to promote the viability of the communities they contain.	X		Environmental Manager, Mining Manager, Processing Manager and Engineering Manager	During operation
		Restrict construction crews and mining personnel to stay inside the demarcated boundaries of the construction and mining site areas.	X		Security Manager	During operation
		Earthen-bund the perimeter of the mining pit to reduce the chances of animals being killed or injured by blasting, or incurring damage by mining equipment.	X		Mining Manager	During operation
		Construct roads as narrow as operationally feasible and maintain all roads in good condition so that diversions of roads will not be necessary.	X		Mining Manager and Engineering Manager	During operation
		Locate / site aggregate borrow pits for road construction on the proposed mining site to reduce overburden stockpiling and unnecessary environmental disturbance.	X		Mining Manager and Engineering Manager	During operation
		Develop road use policy, including speed limits, and enforce it.	X		Safety Manager	During operation
		Initiate restoration of all roads and other sites that were only impacted during construction and will not be required for mining operation.	X		Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Increase environmental awareness of employees and contractors, including the ability of key staff to handle animals during evacuation.	X		Environmental Manager	During operation
		Enforce adherence to the environmental rules and invoke penalty clause(s).	X		Environmental Manager and Departmental Managers	During operation
		Erect a fence along the perimeter of the working area of the landfill facility to control ingress by wildlife.	X		Environmental Manager and Engineering Manager	Prior to start of activity
		Collect and dispose of food waste at the landfill facility and cover daily to avoid scavenging animals.	X		Environmental Manager	Daily
Decrease in the water table level	<ul style="list-style-type: none"> Potential depletion of water resource. 	Minimise water abstraction (except dewatering of the pit) by reducing the mine's water requirements where feasible.	X		Processing Manager and Engineering Manager	During operation
		Consider using extracted excess water from the open-cast pits to recharge aquifers, e.g. the Omarassa aquifer providing water to Otjiwarongo, or as bulk water.	X		Environmental Manager, Mining Manager, Processing Manager and Engineering Manager	During operation
	<ul style="list-style-type: none"> Potential loss or decline in trees. 	Investigate measures to improve tree condition declines (if it occurs) without abstracting more water and investigate possibilities for offsetting potential significant tree mortalities.	X		Environmental Manager	During operation
Monitoring of groundwater levels	<ul style="list-style-type: none"> Potential depletion of or reduction in groundwater. 	Monitor groundwater levels in boreholes – as per Groundwater Monitoring Programme.	X		Environmental Manager	Throughout the LoM
		Record the health of a sample of large trees throughout the life of mine in a reasonable radius (i.e. a radius that reflects the outcome of hydrogeological modelling studies) around the mine pit.	X		Environmental Manager	Annually

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Draft a detailed action plan to define and refine further mitigation options, should there be a significant decline in health or increase in mortalities of large trees that can be linked to groundwater changes.	X		Environmental Manager	Annually
		Consider biodiversity offsets, should there be no mitigation options.	X		Environmental Manager	Annually
Disturbance of biodiversity	<ul style="list-style-type: none"> ▪ Encounters with and potential impacts on wildlife. 	Erect and maintain a fence around the working area of the Mining Licence.	X	X	General Manager and Security Manager	Throughout the LoM
		Develop a policy that limits independent movements by staff into the veld outside the fenced-in mining site.	X	X	Security Manager	During operation
		Introduce and enforce a "zero tolerance" rule to prevent poaching and illegal of natural resources (e.g. firewood), or the possession of any such natural materials.	X	X	Security Manager and General Manager	During operation
		Ensure that there is adequate food for workers on site.	X	X	General Manager	During operation
		Allow only mining personnel, service providers and construction staff, and registered visitors on site.	X	X	Security Manager	During operation
		Train all employees and contractors to appreciate the natural non-consumptive values of biodiversity, and the applicable legal requirements relating to protected species.	X	X	Environmental Manager	During operation and with onboarding and refresher inductions
		Raise awareness on the distinction between venomous and non-venomous snakes / invertebrates and ensure that sufficient personnel are trained to handle snakes / invertebrates.	X	X	Environmental Manager	During operation and with onboarding and refresher inductions

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Install 'mosquito' screens on doors and windows, where practicable, for flying insects, e.g. kitchen / canteen area.	X	X	Engineering Manager	During operation
		Assess the possible compensation to farmers for livestock losses, based on valid claims.	X	X	General Manager and Financial Manager	During operation
		Train all drivers of vehicles in the necessary procedures for the safe operation of all vehicles and to maintain regulated speed limits.	X	X	Safety Manager	During operation
		Carry out regular training to instil appropriate vehicle control and a high degree of professional road conduct.	X	X	Safety Manager	During operation
		Enforce speed limits, including speed-reducing methods and speed-monitoring devices.	X	X	Safety Manager	During operation
		Avoid or limit driving to and from the mining sites at night, wherever possible.	X	X	Security Manager and General Manager	During operation
	<ul style="list-style-type: none"> ▪ Disturbance to invertebrates. 	Use yellow outdoor lights (sodium vapour floodlights with orange covers, or yellow bulbs / tubes for incandescent and fluorescent lights) wherever possible, as this is less glaring to invertebrates while meeting requirements for operations.	X	X	Engineering Manager	During operation
		Reduce the attraction to invertebrates to indoor lights by installing self-closing doors and non-opening windows in night-time operations buildings.	X	X	Engineering Manager	During operation
		Keep automated, UV-attractant pest management indoors (e.g. in maintenance sheds, administrative blocks, or production plants) or cover with wire mesh to ensure that	X	X	Supply Chain Manager and Departmental Managers	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		only right size target organisms are exterminated.				
	<ul style="list-style-type: none"> Potential harm / injury to wildlife. 	Ensure that animals have no access to contaminated water sources.	X	X	Processing Manager, Mining Manager and Engineering Manager	Throughout the LoM
		Fence in the TSF and other areas that are regularly artificially watered and use other proven means to deter birds; and limit artificial watering.	X	X	Processing Manager and Engineering Manager	During operation
		Strictly contain and timeously clean or neutralise all chemicals, emissions, and leaching products and tailings, applying best practice.	X	X	Processing Manager, Mining Manager and Engineering Manager	During operation
		Develop a site waste management policy and actively enforce it.	X	X	Environmental Manager	During operation
		Develop a policy for the management of hazardous materials and actively enforce it.	X	X	Environmental Manager and Supply Chain Manager	During operation
		Provide temporary waste deposition facilities on site (rubbish bins, skips), secured from scavengers, storms, or other disturbance.	X	X	Environmental Manager and All Departmental Managers	During operation
		Provide adequate toilet facilities for all workers at work sites.	X	X	All Departmental Managers	During operation
		Apply appropriate hydrocarbon handling and storage principles.	X	X	All Departmental Managers	During operation
		Contain all contaminated water and purify it to potable quality before re-use, or release into the environment.	X	X	Processing Manager and Engineering Manager	Throughout the LoM
		Avoid or limit destruction of trees - for the continued use by wildlife.	X	X	Environmental Manager, Processing Manager, Mining	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
					Manager and Engineering Manager	
		Locate linear infrastructure in a way that minimises new fragmentation, e.g. using infrastructure corridors.	X	X	Engineering Manager	During operation
		Rehabilitate areas around linear infrastructure after installation to minimise habitat fragmentation and to allow populations to be connected.	X	X	Engineering Manager	During operation
		Implement strict controls of movement of material on and off site to minimise the spread of invasive species;	X	X	Supply Chain Manager	During operation
		Monitor the occurrence and spread of invasive species for effective control measures.			Environmental Manager	During operation
		Conduct an expert study on the effects of the mine and its related activities on the cheetah population (effects on the movements and local population of cheetahs) - specifically focusing on those cheetahs whose home ranges are within an area of about 25 km of the mine.	X	X	Environmental Manager	During operation
Emergency preparedness and response	<ul style="list-style-type: none"> Potential major spillages and some occurrences of injury to animals. 	Respond to any incidents related to major spillage and/or injury to animals as per the emergency preparedness and response procedure.	X	X	All Departmental Managers	During operation
Dewatering of mining pit(s)	<ul style="list-style-type: none"> Reduction in the water table could affect deep rooted tree survival during droughts. 	Monitor groundwater levels and physiological stress levels in trees to see if a correlation exists.	X	X	Environmental Manager	During operation
		Identify and map trees and vegetation of importance that may be at risk from dewatering activities – i.e use of the modelled cone of depression maps.	X	X	Environmental Manager and Technical Services Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Determine feasibility for the rescue of identified trees.	X	X	Environmental Manager	During operation
Closure planning	<ul style="list-style-type: none"> ▪ Prevention of potential long-term pollution. 	Take into consideration the requirements for potential long-term pollution prevention and monitoring, with the designs of any permanent and potential polluting structures.		X	Environmental Manager and General Manager	Throughout the LoM
	<ul style="list-style-type: none"> ▪ Prevention of potential contamination and emergency situations due to uncontrolled surface water flow. 	Take into consideration the requirements related to surface water flow in the designs of any permanent structures, as part of closure planning.		X	Environmental Manager and General Manager	Throughout the LoM

7.5 RESOURCE MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To monitor the energy (electricity and diesel) consumption and to find ways to minimise consumption.
- To monitor the water consumption and to find ways to optimise water usage.
- To monitor the use of manufactured materials and to ensure efficient usage.
- To monitor the fuel consumption and to find ways to optimise fuel usage.

MANAGEMENT STANDARDS

- | | | | |
|--|---|---|---|
| ▪ Petroleum Products and Energy Act (No. 13 of 1990) | ▪ Atmospheric Pollution Prevention Ordinance (No. 11 of 1976) | ▪ B2Gold Environmental and Biodiversity Performance Standards | ▪ NO _x / SO _x Emission Monitoring |
| ▪ Water Act (No. 54 of 1956) | ▪ Hazardous Substances Ordinance (No. 14 of 1974) | ▪ Monitoring and Measurement Plan | ▪ Water Management Plan |
| ▪ Water Resources Management Act (No. 11 of 2013) | ▪ Electricity Act (No. 4 of 2007) | | |

ACTIVITY(IES)

- | | | | |
|--|-----------------------|------------------------|---------------------------------|
| ▪ Consumption of Energy (electricity and diesel) | ▪ Consumption of fuel | ▪ Consumption of water | ▪ Use of manufactured materials |
|--|-----------------------|------------------------|---------------------------------|

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Understanding B2Gold's electricity consumption and demand / High consumption of electricity	<ul style="list-style-type: none"> ▪ Improved energy efficiency. ▪ Potential depletion of resources 	Maintain the electricity consumption monitoring system.	X	X	Engineering Manager	During operation
		Monitor and record total consumption and compare with NamPower readings.	X	X	Engineering Manager	During operation
		Maintain the energy management plan that optimises electricity consumption whilst meeting efficiencies, where practicably possible.	X	X	Engineering Manager	During operation
Monitoring of the energy management plan	<ul style="list-style-type: none"> ▪ Compliance with standards / commitments. 	Review energy consumption in relation to the energy management plan.	X	X	Engineering Manager	During operation
Awareness and training	<ul style="list-style-type: none"> ▪ Awareness creation on efficient energy use. 	Continue to implement an awareness programme pertaining to energy usage.	X	X	Engineering Manager and Environmental Manager	During operation and with onboarding and refresher inductions

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Maintenance of electrical equipment	<ul style="list-style-type: none"> Improved energy efficiency. 	Maintain the maintenance plan for all electrical equipment used on site.	X	X	Engineering Manager	During operation
Alternate energy supply	<ul style="list-style-type: none"> Reduction in consumption of non-renewable resources. 	Investigate the possibility of solar energy supply for certain facilities.	X	X	Engineering Manager	During operation
Inefficient electricity use	<ul style="list-style-type: none"> Potential increase in carbon footprint. 	Rely on the use of the PV solar plant for the maximum electricity supply.	X		Engineering Manager	During operation
		Use energy efficient electrical equipment and lighting underground.	X		Engineering Manager	During operation
		Monitor energy usage.	X		Engineering Manager	During operation
Fuel consumption	<ul style="list-style-type: none"> Energy resource depletion, remote impacts (i.e. mining and processing the particular fossil fuel). 	Maintain and implement the preventative maintenance plan for all equipment and mine vehicles using diesel, petrol and gas on site to avoid wastage and leakages.	X	X	Engineering Manager	During operation
		Monitor fuel consumption in all departments.	X	X	Engineering Manager and Environmental Manager	During operation
		Monitor use of diesel heaters.	X	X	Engineering Manager	During operation
Alternative energy sources	<ul style="list-style-type: none"> Energy resource depletion, remote impacts (i.e. mining and processing the particular fossil fuel). 	Explore the use of alternative energy sources (e.g. solar power) to replace or supplement HFO use.	X	X	Engineering Manager	During operation
Water usage and control	<ul style="list-style-type: none"> Reduction in potential wastage of water and improved water consumption. 	Install and calibrate water flow meters on pipes at selected locations (including tailings lines and dewatering boreholes).	X	X	Engineering Manager	During operation
	<ul style="list-style-type: none"> Compliance with permit conditions. 	Monitor monthly abstraction volumes to ensure that the permitted annual volumes are not exceeded.	X	X	Engineering Manager and Environmental Manager	Monthly

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
	<ul style="list-style-type: none"> Potential contamination of fresh / clean water resources and environment. 	Ensure that stormwater falling inside the processing area is captured and directed <i>via</i> drains and pipes to the return water dam and re-used.	X	X	Engineering Manager and Processing Manager	During operation
		Ensure that the design of the relevant clean and dirty water systems is sufficient to cater for the water volumes associated with the infrequent flood events and that unacceptable discharges of polluted water is prevented.	X		Engineering Manager and Processing Manager	During operation
		Optimise the recycling of process water in the Processing Plant to reduce the demand for fresh water.	X		Processing Manager	During operation
		Recycle tailings decant water back to the return water dam in enclosed pipes for re-use in the Processing Plant.	X		Processing Manager	During operation
		Ensure groundwater encountered in the pits is dewatered and re-used (e.g. in the Processing Plant).	X		Mining Manager and Processing Manager	During operation
Maintenance of equipment	<ul style="list-style-type: none"> Potential wastage / loss of water. 	Develop, maintain and implement a comprehensive maintenance programme for tanks, tankers, pumps and pipes.	X	X	Engineering Manager	During operation
Monitoring of water leaks / spills	<ul style="list-style-type: none"> Potential wastage / loss of water. 	Include checking for water spills in the daily inspections.	X	X	Engineering Manager and Environmental Manager	Daily
		Ensure all spillages are reported as per the incident management procedure.	X	X	All Departmental Managers	During operation
Training and awareness	<ul style="list-style-type: none"> Awareness creation on efficient water use. 	Maintain and implement water awareness programme for B2Gold employees and contractors.	X	X	Engineering Manager and Environmental Manager	During operation with onboarding and refresher inductions

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Reporting to Society	<ul style="list-style-type: none"> Improved transparency and accountability in responsible resource consumption. 	Report to stakeholders on water management.	X	X	Environmental Manager and Public Relations Manager	As per legal requirements and other compliance obligations
Inefficient use of water resources	<ul style="list-style-type: none"> Depletion / mis-use of water resources. 	Use water effectively and efficiently by following the reduce-recycle-re-use approach.	X		Engineering Manager and Processing Manager	During operation
		Record volumes of abstraction and supply.	X		Engineering Manager and Processing Manager	During operation
		Keep an up-to-date water balance for the Operations.	X		Engineering Manager and Processing Manager	During operation
Transport of hazardous materials	<ul style="list-style-type: none"> Accidental release of hazardous materials may lead to contamination. 	Conduct routine inspections of the supply companies transporting hazardous materials to and from site.	X	X	Supply Chain Manager	As per the audit and inspections schedule
		Ensure companies compliance to legal and B2Gold requirements and that the contractor has all the necessary hazardous protection equipment for people and environment in the advent of a spill.	X	X	Supply Chain Manager	During operation throughout the duration of the contract
Consumption of reagents and chemicals	<ul style="list-style-type: none"> Natural resource depletion. Loss of land (habitat). Change in land-use. Potential, loss of future economic opportunities. 	Monitor reagent consumption monthly.	X	X	Processing Manager	Monthly
		Monitor, review and implement best practice for the use of cleaning products by contractors.	X	X	Supply Chain Manager and Environmental Manager	As per the audit and inspections schedule and duration of the contract.
		Identify consumables that can be replaced by more environmentally friendly products and conduct market research on such products.	X	X	Supply Chain Manager and Environmental Manager	During operation
		Monitor and update the process flow balance regularly to ensure optimum use of reagents.	X		Processing Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Consumption of consumables (e.g. PPE, paper)	<ul style="list-style-type: none"> ▪ Natural resource depletion. ▪ Loss of land (habitat). ▪ Change in land-use. ▪ Potential, loss of future economic opportunities. 	Calculate the volumes of consumables used and determine ways of reducing consumption.	X	X	Supply Chain Manager	During operation
		Investigate the use of alternative (environmentally friendly) consumables to replace current products (where applicable).	X	X	Supply Chain Manager and Environmental Manager	During operation

7.6 SOIL MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To ensure that all topsoil stripping, stockpiling and replacement operations are undertaken in a manner that limits impacts on the soil functionality and to ensure it can be used for rehabilitation as and when required.
- To ensure that soil is appropriately managed and the impacts of clearing, digging and compaction of sediment and soil are minimised.
- To ensure that soil is not contaminated.
- To minimise the mixing of different soil types and excessive removal of vegetation and topsoil.

MANAGEMENT STANDARDS

- | | | | |
|--|--|--|--|
| <ul style="list-style-type: none"> ▪ Water Amendment Act (No. 54 of 1956) ▪ Water Resources Management Act (No. 11 of 2013) ▪ Forest Act (No. 12 of 2001) | <ul style="list-style-type: none"> ▪ Nature Conservation Ordinance (No. 4 of 1975) ▪ B2Gold Environmental and Biodiversity Performance Standards | <ul style="list-style-type: none"> ▪ Topsoil Management Plan ▪ Topsoil Management Procedure ▪ Land Clearing Permit Application Procedure ▪ Non-Process Waste Management Plan | <ul style="list-style-type: none"> ▪ Rehabilitation Management Plan ▪ Rehabilitation Monitoring Procedure ▪ Monitoring and Measurement Plan |
|--|--|--|--|

ACTIVITY(IES)

- | | | | |
|--|---|--|--|
| <ul style="list-style-type: none"> ▪ Stripping / Clearing of soil / vegetation ▪ Drilling and blasting ▪ Ore excavation | <ul style="list-style-type: none"> ▪ Loading and hauling ▪ Stockpiling ▪ Storage of Tailings | <ul style="list-style-type: none"> ▪ Establishing infrastructure ▪ Removal of infrastructure | <ul style="list-style-type: none"> ▪ Road construction and maintenance ▪ Operation and maintenance of machinery, equipment and Plant |
|--|---|--|--|

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Delineation of stockpiling areas and stockpile management	<ul style="list-style-type: none"> ▪ Potential alteration of soil chemistry and/or composition. ▪ Potential contamination of soil. 	Limit the disturbance of soil to areas where stripping activities are identified.	X		Mining Manager and Environmental Manager	During operation
		Clearly demarcate soil stockpiles to identify the soil type and the intended area of rehabilitation.	X		Environmental Manager	During operation
		Investigate the possibility of establishing stormwater diversion berms to prevent run-off erosion around stockpiles.	X		Mining Manager and Environmental Manager	During operation
		Design safe slopes on stockpiles to ensure maximum security of topsoil and to minimise erosion. –	X		Mining Manager and Environmental Manager	During operation
		Establish erosion control in the form of vegetation for storage periods greater than 3	X		Mining Manager and Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		years - stockpile sides to be stabilised at a slope of 1 in 6 or less, where practicable.				
		Store waste material separate from soil stockpiles.	X		Mining Manager and Environmental Manager	During operation
		Limit equipment movement on top of the soil stockpiles, to minimise compaction.	X		Mining Manager and Environmental Manager	During operation
		Keep a photographic record of soil removal and subsequent replacement.	X	X	Mining Manager and Environmental Manager	During operation
		Avoid mixing topsoil and subsoil.	X	X	Mining Manager and Environmental Manager	During operation
		Ensure wastewater run-off is controlled and intercepted to prevent loss of soil and contamination.	X	X	Mining Manager and Environmental Manager	During operation
		Obtain a permit from the relevant authority prior to clearing or removing vegetation.	X	X	Environmental Manager	Throughout the LoM
		Establish an on-site land clearing permit system that manages the vegetation and soil removal process – keep a photographic record of “before” and “after” clearing.	X		Environmental Manager	During operation
		Consult the Environmental Department immediately for guidance should any groundwater be intersected during trenching operations.	X		Engineering Manager and Mining Manager	During operation
		Restrict the mixing of concrete and the cleaning of mixing equipment to pre-determined areas.	X		Engineering Manager	During operation
		Ensure hydrocarbon products and chemicals are safely stored and handled to prevent contamination of soil.	X		Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Rehabilitate all exposed soils, where practicable, by replanting indigenous vegetation.	X	X	Environmental Manager	During operation and rehabilitation
Stripping and handling of soils	<ul style="list-style-type: none"> ▪ Potential loss of land (habitat) ▪ Potential impact on biodiversity. 	Handle soils in dry weather conditions to cause as little compaction as possible.	X		Mining Manager and Environmental Manager	During operation
		Strip and stockpile together with any vegetation cover present the utilizable soil (top 300mm of soil or until hard rock is encountered where soil depths are <300mm).	X		Mining Manager and Environmental Manager	During operation
Soil erosion	<ul style="list-style-type: none"> ▪ Potential loss in organic and fertile matter present in the soil. 	Clear vegetation only when necessary for the immediate site.	X		Mining Manager and Environmental Manager	During operation
		Visually monitor and keep a photographic record of any surface disturbance and clearing.	X		Mining Manager and Environmental Manager	During operation
		Rip up soils that were compacted during bulk storage and by machinery.	X	X	Mining Manager and Environmental Manager	During operation
		Rehabilitate exposed soils after construction is completed and keep a photographic record.	X	X	Mining Manager and Environmental Manager	During operation
Monitoring of soil degradation and erosion	<ul style="list-style-type: none"> ▪ Preventing soil degradation and erosion. 	Use "before" and "after" photographic records to monitor and minimise the mixing of different soil types and excessive removal of vegetation and topsoil.	X		Environmental Manager and Technical Services Manager	During operation
		Store subsoil stockpiles close to the work-in-progress to avoid mixing of soil types and unnecessary topsoil loss and erosion.	X		Engineering Manager and Mining Manager	During operation
		Ensure that all spills are reported <i>via</i> the Incident Management procedure.	X		All Departmental Managers	During operation
		Keep photographic records of rehabilitated areas.	X	X	Environmental Manager	During operation and rehabilitation

7.7 WASTE MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To ensure proper storage, recycling, re-use, removal, transportation and disposal of non-hazardous solid waste.
- To ensure proper storage, removal, transportation and disposal of hazardous solid waste.
- To ensure proper storage, removal, transportation and disposal of medical waste.
- To ensure the proper storage, transport, treatment and disposal of waste and, where possible, following the waste hierarchy, which encourages waste avoidance and waste reduction followed by re-use, recycling and reclamation, before waste treatment and waste disposal.
- To ensure the storage and use of fuels or other chemicals are managed to minimise the risk of a release.
- To implement measures to promptly address impacts in the event of a fuel and/or chemical release.
- To protect the health and safety of any residents and staff in the vicinity.
- To protect water sources, soil and vegetation.
- To prevent pollution and protect the environment.
- To minimise impacts of waste to the environment i.e. minimal waste disposal, optimal recovery, recycling and treatment.
- To ensure compliance to the wastewater permit.

MANAGEMENT STANDARDS

- | | | | |
|---|--|---|---|
| <ul style="list-style-type: none"> ▪ Hazardous Substances Ordinance (No.14 of 1974) ▪ Atmospheric Pollution Prevention Ordinance (No. 11 of 1976) | <ul style="list-style-type: none"> ▪ Solid Non-hazardous waste specification and collection procedure ▪ Solid hazardous waste specification and collection procedure | <ul style="list-style-type: none"> ▪ Incinerator Operating Procedure ▪ Landfill Operations Procedure ▪ Non-process Waste Management Plan | <ul style="list-style-type: none"> ▪ B2Gold Environmental and Biodiversity Performance Standards |
|---|--|---|---|

ACTIVITY(IES)

- | | | | |
|--|---|---|---|
| <ul style="list-style-type: none"> ▪ Stripping / Clearing of soil / vegetation ▪ Drilling and blasting ▪ Ore excavation | <ul style="list-style-type: none"> ▪ Loading and hauling ▪ Stockpiling ▪ Storage of Tailings | <ul style="list-style-type: none"> ▪ Road construction and maintenance ▪ Establishing infrastructure ▪ Removal of infrastructure | <ul style="list-style-type: none"> ▪ Operation and maintenance of machinery, equipment and Plant ▪ Storage and handling of material |
|--|---|---|---|

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Effective waste management	<ul style="list-style-type: none"> ▪ Potential impact of waste on the environment. 	Develop a waste management procedure that includes the recycling, re-use, storage, handling, transportation and disposal of waste at the on-site landfill facility.	X	X	Environmental Manager	During operation
		Ensure that employees and contractors are aware of the procedure.	X	X	Environmental Manager	With onboarding and refresher inductions

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Collection of waste	<ul style="list-style-type: none"> Prevention of potential impact of waste on the environment. 	Establish sufficient designated waste collection points on site with adequate capacity.	X	X	Environmental Manager	During operation
Waste storage / separation – domestic waste	<ul style="list-style-type: none"> Prevention of potential impact of waste on the environment. 	Collect general domestic and recyclable waste from all offices, tearooms, ablutions, security office, laboratory, workshops and stores and place into wheely or lugger bins and skips.	X	X	Environmental Manager	During operation
		Ensure that all recyclable waste is not disposed of in the landfill site.	X	X	Environmental Manager	During operation
		Investigate and assist with the development of small and medium size waste recycling companies in the surrounding towns (i.e. Otavi and Otjiwarongo).	X	X	CSR Manager	During operation and post-closure
		Separate the discarded domestic general and recyclable waste before placed into the correct wheely or lugger bins and skips.	X	X	All Departmental Managers	During operation
		Provide the recyclable materials to qualified companies that either directly or indirectly recycle the materials themselves or through third party companies.	X	X	Environmental Manager	During operation
		Ensure that waste storage areas and/or containers meet the specific waste types for that area (e.g. impervious floor, bunded areas with drainage / containment systems, lids to prevent light material from blowing away or sealed containers for hazardous material).	X	X	Environmental Manager	During operation
Waste classification (domestic and industrial)	<ul style="list-style-type: none"> Prevention of potential impact of waste on the environment. 	Keep an up-to-date waste inventory.	X	X	Environmental Manager	During operation
Disposal of waste and general operating		Construct / operate the on-site landfill facility in phases (i.e. only one or two sections / cells	X	X	Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
requirements of the landfill facility	<ul style="list-style-type: none"> Minimising potential impact of waste disposal on the environment. 	(containment pits) of the facility to be open at any given time.				
		Ensure that each cell at the landfill facility is no bigger than approximately 15m x 30m and 3m deep.	X	X	Environmental Manager	During operation
		Fence the working area along the perimeter of the landfill facility to control access by unauthorised personnel and wildlife and to assist in further containment of any potential wind-blown refuse.	X	X	Environmental Manager	During operation
		Compact the floor of the containment pits at the landfill facility with calcrete and cover filled pits with excavated material to prevent inflow of rainwater.	X	X	Environmental Manager	During operation
		Dispose of (non-recyclable) waste (i.e. non-hazardous, food scraps) at the on-site landfill facility.	X	X	Environmental Manager	During operation
Burning of waste	<ul style="list-style-type: none"> Minimising potential impact of waste on the environment. 	Avoid burning of waste, except when the predicted volumes of waste to be landfilled are exceeded.	X	X	Environmental Manager	During operation
		Compact waste by using a purpose-built landfill compactor over the deposited waste, to reduce the voids in waste and the overall volume.	X	X	Environmental Manager	During operation
Storage, removal, transportation and disposal of hazardous solid waste	<ul style="list-style-type: none"> Potential impact of waste on the environment. 	Develop a waste management procedure that includes the storage, handling and transportation of hazardous solid waste.	X	X	Environmental Manager	During operation
		Ensure that employees and contractors are aware of the procedure.	X	X	Environmental Manager	With onboarding and refresher inductions

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Collection of hazardous waste	<ul style="list-style-type: none"> Prevention of potential impact of waste on the environment. 	Establish sufficient designated waste collection points on site with adequate capacity for hazardous waste.	X	X	Environmental Manager	During operation
Hazardous waste storage	<ul style="list-style-type: none"> Improved waste separation at source. 	Store hazardous waste in designated suitable containers.	X	X	Environmental Manager	During operation
		Store empty print cartridges in a designated box at the office assistant's desk until removal from site.	X	X	Environmental Manager	During operation
		Store fluorescent tubes in a special labelled steel drum at the engineering workshop.	X	X	Environmental Manager	During operation
		Collect and accumulate other hazardous waste i.e. car batteries, miscellaneous batteries, oil filters, etc. at the engineering workshop until the amounts are sufficient to be removed from site.	X	X	Environmental Manager	During operation
		Safely burn explosives packaging at the magazine site according to permit conditions and procedures.	X	X	Environmental Manager	During operation
		Place oil and greasy cloths / rags into a steel drum and transport off site to the hazardous waste site, when full.	X	X	Environmental Manager	During operation
		Keep empty reagent bags (for a short period of time) at the reagents store until removed by the reagent contractor for refills.	X	X	Supply Chain Manager	During operation
		Ensure that waste storage areas and/or containers meet the needs for that specific type of waste (e.g. impervious floor, bunded areas with drainage / containment systems, lids to prevent light material from blowing away or sealed containers for hazardous material).	X	X	Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Waste classification	<ul style="list-style-type: none"> Improved waste management. 	Keep an up-to-date inventory of waste and include estimated quantities.	X	X	Environmental Manager	During operation
Waste transport	<ul style="list-style-type: none"> Improved waste management. 	Appoint an approved waste management contractor to transport waste.	X	X	Environmental Manager	During operation
Waste Disposal	<ul style="list-style-type: none"> Improved waste management. 	Dispose of waste at appropriate registered / permitted waste disposal facilities.	X	X	Environmental Manager	During operation
Disposal records	<ul style="list-style-type: none"> Improved waste management. 	Keep records of safe disposal of waste.	X	X	Environmental Manager	During operation
Storage, removal, transportation and disposal of medical waste	<ul style="list-style-type: none"> Improved waste management. 	Develop a waste management procedure that includes the storage, handling and transportation of medical waste.	X	X	Environmental Manager	During operation
		Ensure that employees and contractors are aware of the procedure.	X	X	Environmental Manager	With onboarding and refresher inductions
		Incinerate medical waste off-site at an approved medical facility.	X	X	Environmental Manager	During operation
Handling, storage, recycling, treatment and disposal of liquid waste	<ul style="list-style-type: none"> Potential pollution to the environment. 	Ensure registered companies correctly store and dispose of or recycle hydrocarbon and chemical contaminated solids.	X	X	Environmental Manager	During operation
		Ensure waste oil is collected by a reputable oil recycling company.	X		Environmental Manager	During operation
		Keep records of safe disposal certificates - to be readily available on request.	X	X	Environmental Manager	During operation
		Ensure all contaminated water is captured in pollution control structures on-site and re-used in the mineral Processing Plant and mining processes.	X		Engineering Manager, Mining Manager and Processing Manager	During operation
		Ensure proper construction and maintenance of lined pollution control dams and silt traps.	X	X	Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Dispose of sewage at the sewage treatment plant.	X		Engineering Manager	During operation
		Ensure effective operation and maintenance of the sewage treatment works.	X	X	Engineering Manager	During operation
Littering and environmental contamination from waste	<ul style="list-style-type: none"> Potential pollution to the environment. 	Keep the site tidy and free of litter and provide an adequate number of waste bins and skips for collecting and containing domestic and general waste.	X		Environmental Manager and Departmental Managers	During operation
Handling, storage and disposal of mine residue	<ul style="list-style-type: none"> Potential pollution to the environment. 	Dispose of waste rock at the Waste Rock Dump (WRD).	X		Mining Manager	During operation
		Minimise waste rock volumes through effective mining designs and planning.	X		Mining Manager	During operation
		Encapsulate PAF Material as per the on-site procedures and plans.	X		Mining Manager	During operation
		Dispose of tailings at the Tailing Storage Facility (TSF) and ensure strata control is managed for minimum tailings generation.	X		Processing Manager	During operation
Handling, storage and disposal of solid waste	<ul style="list-style-type: none"> Potential pollution to the environment. 	Dispose of domestic waste to a registered landfill facility to prevent the attraction of unwanted scavengers.	X		Environmental Manager	During operation
		Ensure correct storage and disposal of hydrocarbon and chemical contaminated solids.	X		Environmental Manager and Departmental Managers	During operation
Monitoring of waste	<ul style="list-style-type: none"> Responsible management of waste – preventing potential pollution to the environment. 	Keep a record of waste volumes generated to ensure overall waste reduction targets are met.	X		Environmental Manager	During operation
		Keep certificates of safe disposal of waste to a registered waste disposal site.	X		Environmental Manager	During operation
		Store hazardous chemicals in bunded areas.	X		Departmental Managers	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Handling and storage of Hazardous Chemicals	<ul style="list-style-type: none"> Potential pollution to the environment. 	Handle hazardous chemicals (such as fuels) over impervious surfaces.	X		Departmental Managers	During operation
		Contain and clean-up hazardous chemicals spills to ensure protection of the environment.	X		Departmental Managers	During operation
		Provide employees and contractors with the necessary PPE required for the safe handling and use of petrochemicals, oils and acids.	X		Departmental Managers	During operation
Machinery and Equipment Maintenance	<ul style="list-style-type: none"> Potential pollution to the environment. 	Conduct major servicing of equipment in appropriately equipped workshops.	X		Engineering Manager	During operation
		Take all reasonable precautions to avoid oil and fuel spills (e.g. spill trays, impervious sheets) for small repairs and required maintenance activities.	X		Engineering Manager	During operation
		Service vehicles and machinery regularly to minimise oil and fuel leaks.	X		Engineering Manager	During operation
		Provide the relevant PPE to employees and contractors to manage and maintain the machinery and equipment.	X		Engineering Manager	During operation
Spill Prevention	<ul style="list-style-type: none"> Potential pollution to the environment. 	Ensure spill kits (i.e. absorbent materials, chemical resistant shovels, heavy-duty chemical resistant plastic bags, PPE) are available throughout the site.	X		Supply Chain Manager	During operation
		Use drip trays and movable spillage capture equipment where appropriate.	X		Engineering Manager	During operation
		Ensure all machines are subjected to preventative maintenance of hydraulic hoses, oil pumps and fittings to reduce the risk of spillage during operation.	X		Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Undertake major servicing of equipment in appropriately designed and equipped workshops.	X		Engineering Manager	During operation
		Provide employees and contractors with applicable training on spill management, spill response and refuelling.	X		Environmental Manager and Engineering Manager	During operation
		Store fuels, lubricants and chemicals in appropriately sized, impermeable bunds or trays with a capacity not less than 110% of the total volume of products stored.	X		Engineering Manager	During operation
		Ensure proper maintenance of all fuel and chemical storage and handling equipment (including transfer hoses, etc.).	X		Engineering Manager	During operation
		Ensure storage and handling of fuel and chemicals comply with relevant legal requirements.	X		Engineering Manager	During operation
		Prevent refuelling within 50 metres of groundwater boreholes, surface water or streams.	X		Engineering Manager	During operation
		Keep MSDS easily accessible for each chemical used on site.	X		All Departmental Managers	During operation
Spill Response	<ul style="list-style-type: none"> Potential pollution to the environment. 	Develop a Spill Response Plan and ensure employees and contractors receive relevant training and awareness.	X		Environmental Manager and Engineering Manager	During operation
Reporting of Spills	<ul style="list-style-type: none"> Potential pollution to the environment. 	Report all major petroleum product spills to the Ministry of Mines and Energy (MME) on Form PP/11 titled "Reporting of major petroleum product spill".	X		Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Effective management of waste	<ul style="list-style-type: none"> Prevention of potential pollution to the environment. 	Identify all hazardous waste into waste streams from source and storage in durable containers appropriate to the type of waste.	X	X	Environmental Manager	During operation
		Use secondary containment (designed and constructed to contain all liquid hazardous waste) to store hazardous waste to minimise potential risks.	X	X	Environmental Manager	During operation
		Take measures to ensure waste is contained and appropriately handled until it is collected for storage at an engineered facility, i.e. for other activities generating hazardous waste outside engineered facilities.	X	X	Environmental Manager	During operation
		Collect and transfer on-site hazardous waste appropriate to the hazardous nature of the waste and suitable containers, vessels and equipment.	X	X	Environmental Manager	During operation
		Ensure that off-site transportation of hazardous waste be conducted by an appropriate service provider capable of handling hazardous waste.	X	X	Environmental Manager	During operation
		Ensure that disposable hazardous waste be disposed of at a managed / registered facility capable of handling such waste.	X	X	Environmental Manager	During operation
		Monitor waste activities on-site and off-site and keep relevant records.	X	X	Environmental Manager	During operation
		Appoint an appropriate service provider capable of handling hazardous waste to transport hazardous waste off-site at a managed facility capable of handling such waste.	X	X	Environmental Manager	During operation
Availability of hazardous waste	<ul style="list-style-type: none"> Prevention of potential pollution to the environment. 	Ensure appropriate and adequate waste facilities and storage containers are available site wide for	X	X	Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
facilities and infrastructure		temporary storage, and for the treatment of selected hazardous waste.				
Incineration of hazardous waste	<ul style="list-style-type: none"> Potential impact on the environment and health. 	Install an incinerator to burn hazardous waste (e.g. empty reagent and cyanide bags).	X	X	Environmental Manager and Departmental Managers	During operation
		Incinerate hazardous waste to reduce volume and weight; to detoxify waste from harmful pathogens, bacteria and toxins; and prevent wildlife from scavenging on waste.	X	X	Environmental Manager	During operation
		Dispose of the incinerator ash at the Landfill Facility.	X	X	Environmental Manager	During operation
		Introduce stack measurements that include the concentration for all the compounds as per the applicable and relevant best practice standards.	X	X	Environmental Manager	Annually
Training and Awareness	<ul style="list-style-type: none"> Creating awareness and responsibility for preventing pollution and protection of the environment. 	Provide training to the staff operating the incinerator to ensure optimum combustion conditions.	X	X	Environmental Manager	During operation
		Provide training to all employees and contractors in pollution prevention and control; waste management and spill management.	X	X	Environmental Manager	During operation
Management and mitigation of hazardous recyclable and disposable waste	<ul style="list-style-type: none"> Responsible management of waste. 	Develop handling and treatment procedures for specific hazardous wastes and treatment processes.	X	X	Environmental Manager	During operation
Hazardous waste facilities and infrastructure	<ul style="list-style-type: none"> Potential pollution to the environment. 	Provide for appropriate and adequate waste facilities and storage vessels site wide for temporary storage, and for the treatment of selected hazardous waste.	X	X	Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Audits, monitoring and record keeping	<ul style="list-style-type: none"> ▪ Effective waste management. 	Identify the nature, composition and quantities of hazardous waste – i.e. waste stream identification.	X	X	Environmental Manager	During operation
		Develop a waste management plan to ensure proper, planning, handling and record management.	X	X	Environmental Manager	During operation
		Ensure all hazardous waste is separated at source, volumes and mass measured and records kept identifying improvement opportunities.	X	X	Environmental Manager and Departmental Managers	During operation
		Conduct environmental compliance audits of all off-site service providers and facilities.	X	X	Environmental Manager	As per audit schedule
		Keep records of hazardous waste streams for both on-site and off-site disposal – i.e. types and quantities of hazardous wastes, audit and inspection records and waste disposal certificates.	X	X	Environmental Manager	During operation

7.8 ARCHAEOLOGY MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To prevent the unacceptable loss of archaeological sites and related historical information.
- To ensure that areas around archaeological finds remain undisturbed.
- To ensure that correct actions are taken to preserve or document archaeological chance finds.

MANAGEMENT STANDARDS

- | | | | |
|--|--|--------------------------------------|---|
| ▪ National Heritage Act (No. 27 of 2004) | ▪ Archaeological Chance Find Procedure | ▪ Environmental Awareness Assessment | ▪ B2Gold Environmental and Biodiversity Performance Standards |
| ▪ National Heritage Regulations of 2005 | ▪ Environmental Awareness Presentation | ▪ Environmental Induction | |

ACTIVITY(IES)

- | | | | |
|---|-----------------------|-------------------------------|---|
| ▪ Stripping / Clearing of soil / vegetation | ▪ Loading and hauling | ▪ Establishing infrastructure | ▪ Road construction and maintenance |
| ▪ Drilling and blasting | ▪ Stockpiling | ▪ Removal of infrastructure | ▪ Operation of machinery, equipment and Plant |
| ▪ Ore excavation | ▪ Storage of Tailings | | |

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Disturbance of archaeological sites	<ul style="list-style-type: none"> ▪ Potential loss of archaeological sites and related losses to the broader archaeological landscape. ▪ Potential damage to archaeological sites. 	Demarcate and protect all identified archaeological sites and clear the area within of encroaching bush.	X	X	Environmental Manager and General Manager Operations	Prior to start of identified activities
		Re-route the cutline running past archaeological site QRS 83/1 & 2 and provide for a 20m buffer around the site.	X	X	Environmental Manager and General Manager Operations	Prior to start of identified activities
		Clearly indicate all identified archaeological site localities on GIS and relevant field maps.	X	X	Environmental Manager and Technical Services Manager	Prior to start of identified activities
		Ensure that all employees and contractors whose activities may encroach on archaeological sites are aware of the sites and have the relevant maps available.	X	X	Environmental Manager and General Manager Operations	Prior to start of identified activities
		Consider test excavations to confirm the identification of the cairns as burial sites.	X	X	Environmental Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Obtain relevant permissions / permits from the National Heritage Council for the unavoidable disturbance or relocation of archaeological sites – e.g. Sites QRS 83/1, QRS 83/2, QRS 83/3.	X	X	Environmental Manager	Prior to start of identified activities
Chance find of an archaeological object / site	<ul style="list-style-type: none"> Contribution to knowledge / information and protection of heritage. 	Report the discovery of any archaeological object to the National Heritage Council as per Company standards.	X	X	Environmental Manager	Immediately with discovery
		Develop and keep an up-to-date Chance Find Procedure as per the requirements in the National Heritage Act (Act 27 of 2004).	X	X	Environmental Manager	Within first year of operations and review as and when required
		Keep relevant documents and records related to the archaeological chance find.	X	X	Environmental Manager	Throughout the LoM
Management of archaeological No-Go Areas	<ul style="list-style-type: none"> Protection of archaeological sites. 	Ensure that Archaeological No-Go Areas are identified and evaluated by a qualified archaeologist.	X	X	Environmental Manager	Prior to starting new activities
		Develop an archaeological site management plan as per the National Heritage Act, Section 58 (1)(b).	X	X	Environmental Manager	During operation
		Integrate the conservation and management of Archaeological No-Go Areas in the Company's procedures.	X	X	Environmental Manager	During operation
Provision of training and awareness	<ul style="list-style-type: none"> Awareness creation on the importance of archaeological sites / finds. 	Provide all employees and contractors with the relevant training and awareness on the legal requirements, Company procedures and code of conduct related to archaeological sites.	X	X	Environmental Manager	During onboarding and refresher inductions

7.9 NOISE AND VIBRATIONS MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To limit excessive noise pollution.
- To limit excessive blast vibration and fly rock.
- To ensure potential odours, noise and vibration sources are mitigated.

MANAGEMENT STANDARDS

- Labour Act (No. 11 of 2007)
- Regulations relating to the Health & Safety of Employees at Work (promulgated in terms of Section 101 of the Labour Act No 6 of 1992 (GN156, GG 1617 of 1 August 1997)
- Explosives Act (No. 26 of 1956)
- Noise and Vibrations Management Plan

ACTIVITY(IES)

- Drilling and blasting
- Ore excavation
- Loading and hauling
- Road construction and maintenance
- Establishing infrastructure
- Removal of infrastructure
- Operation of machinery, equipment and Plant

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Generation of noise	Impact of noise on the environment / sensitive receptors	Document and investigate all registered complaints and make efforts to address the area of concern where possible.	X	X	Public Relations Manager and Environmental Manager	Throughout the LoM
		Ensure communication channels are established to give prior notice to the sensitive receptor, should activities that generate noise and vibrations are within their vicinity – include proposed working times; duration and purpose of the activity; and Company contact details.	X	X	Public Relations Manager	Throughout the LoM
		Ensure that plant and equipment is well-maintained and fitted with the correct and appropriate noise abatement measures.	X	X	Engineering Manager	Throughout the LoM
		Develop a noise barrier between nearest receptor areas and the open pit development, – i.e. earth berm of a height of at least 5 metres.	X	X	Mining Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Monitoring of noise on environment / receptors	<ul style="list-style-type: none"> ▪ Improved understanding of the potential impact of noise on the environment / receptors. 	Develop and implement a noise monitoring programme.	X	X	Safety Manager, Environmental Manager	Prior to start of operation / noise generating activity.
		Conduct noise monitoring at potential receptor locations and at areas where concerns are raised regarding noise originating from the operations.	X	X	Safety Manager, Environmental Manager	Quarterly
		Provide feedback regarding noise monitoring to key stakeholders and other Interested and Affected Parties in the area.	X	X	Public Relations Manager	Annually
		Use a sound propagation model to illustrate the extent of the noise impact from the operation.	X	X	Safety Manager and Public Relations Manager	Annually
Blasting disturbance	<ul style="list-style-type: none"> ▪ Potential impact on safety of third parties. ▪ Potential impact on property – buildings and other infrastructure ▪ Potential impact on biodiversity 	Develop a blast design, implementation and monitoring programme that include safety and vibration requirements.	X	X	Mining Manager and Safety Manager	During operation
		Ensure that fly rock is contained within a maximum of 500 metres of the blast site.	X	X	Mining Manager	During operation
		Clear third parties to a safe distance determined by applicable legislation and safe working procedures, prior to each blast – sound an audible warning.	X	X	Mining Manager	During operation
		Ensure ground vibration at the closest third-party structures is within acceptable best practice standards.	X	X	Mining Manager	During operation
		Ensure that air blast at the closest third-party structures is within acceptable best practice standards.	X	X	Mining Manager	During operation
		Document and investigate all registered complaints and address areas of concern.	X	X	Communications Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Generation of nuisance odours, noise and vibration	<ul style="list-style-type: none"> ▪ Impact on sensitive receptors within proximity to the site - surrounding farmers, plants and animals. ▪ Potentially impact on the quality of life of neighbouring residents and tourism activities. 	Avoid noise generating activities at night.	X	X	General Manager	During operation
		Ensure blasting is done in a controlled manner and design to reduce vibration impact.	X	X	Mining Manager	During operation
		Ensure appropriate measures are put in place to rectify odours, noise and vibration complaints, should they occur.	X	X	Safety Manager and Engineering Manager	During operation
		Ensure procedures for receiving complaints from nearby land users or residents are in place and mitigation measures are implemented.	X	X	Public Relations Manager	During operation
		Ensure occupational noise and vibration is managed through the health and safety management plan and staff exposure is monitored.	X	X	Safety Manager	During operation

7.10 VISUAL MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- Minimise the visual impacts of mining operations on the community and public through progressive rehabilitation.

MANAGEMENT STANDARDS

- The Minerals (Prospecting and Mining) Act (No. 33 of 1992)
- Forest Act (No. 12 of 2001)
- Nature Conservation Ordinance (No.14 of 1975)
- B2Gold Environmental and Biodiversity Performance Standards

ACTIVITY(IES)

- Stripping / Clearing of soil / vegetation
- Drilling and blasting
- Ore excavation
- Loading and hauling
- Stockpiling
- Storage of Tailings
- Establishing infrastructure
- Removal of infrastructure
- Road construction and maintenance
- Operation and maintenance of machinery, equipment and Plant

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Erecting infrastructure	Visual impact (aesthetic quality of environment) - negative public perception.	Limit OGM signage on the B1 road.	X		General Manager and Safety Manager	During operation
		Rip and rehabilitate areas of the old road not utilised for the mine.	X		Engineering Manager	During operation
		Raise a 2.5 metre berm with local endemic plants to ensure that views down the old road are screened.	X		Engineering Manager	During operation
		Ensure that the trees between the railway line and the road are not removed – in consultation with relevant stakeholder(s).	X	X	Environmental Manager and General Manager	During operation
		Avoid using face brick and shield glass surfaces to avoid glare and reflections.	X		Engineering Manager	During operation
		Blend all painted surfaces into the natural surroundings.	X		Engineering Manager	During operation
Lighting of operations	Alteration in nocturnal activities of fauna and flora.	Keep lighting to a minimum within the requirements of safety and efficiency.	X		Safety Manager and Engineering Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Avoid overly tall light poles and use low wattage and directional lighting.	X		Engineering Manager	During operation
		Shield security and perimeter lighting to ensure no light falls outside the area that requires light.	X		Security Manager and Engineering Manager	During operation
Disturbance of land	<ul style="list-style-type: none"> Change to the visual landscape. 	Develop a process to control unauthorised disturbance of land, vegetation clearing and fauna habitat destruction	X	X	Environmental Manager	Throughout the LoM
		Manage and protect all vegetation within the mine site that does not require removal.	X	X	Environmental Manager and General Manager	Throughout the LoM
		Remove and stockpile topsoil in areas to be excavated, for use in rehabilitation of the Tailings Storage Facility (TSF) and the WRD, Plant and infrastructure areas.	X	X	Environmental Manager and Mining Manager	Throughout the LoM
		Rehabilitate all the faces of the WRD to grass / scrub bushes and some trees - Reduce the angle of the WRD slope if not suitable for rehabilitation.	X	X	Environmental Manager; Mining Manager; Processing Manager and Engineering Manager	During operation
		Progressively rehabilitate the TSF dam walls, as it is raised.	X	X	Environmental Manager and Processing Manager	Throughout the LoM
		Establish a mechanism to ensure that the rehabilitation of the mine is properly funded to ensure that sufficient funds are available to implement the rehabilitation and mitigations required for closure.		X	General Manager and Environmental Manager	During operation
Removal of Infrastructure	<ul style="list-style-type: none"> Preparation of disturbed areas for future land use. 	Remove all components of the infrastructure used during operations.		X	Environmental Manager and Departmental Managers	During decommissioning
		Decontaminate ground where Processing Plants were located and cover with earth used for the		X	Environmental Manager and Departmental Managers	During decommissioning and rehabilitation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		berm and landscape into a natural form in alignment with the natural hydrological patterns.				

7.11 SAFETY AND SECURITY MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To prevent physical harm to third parties and animals from potentially hazardous excavations and infrastructure.

MANAGEMENT STANDARDS

- | | | | |
|--|---|---|---|
| <ul style="list-style-type: none"> ▪ Public and Environmental Health Act (No. 1 of 2015) ▪ Explosives Act (No. 26 of 1956) ▪ The Minerals (Prospecting and Mining) Act (No. 33 of 1992) ▪ Atmospheric Pollution Prevention Ordinance No. 11 of 1976) | <ul style="list-style-type: none"> ▪ Labour Act (No. 11 of 2007) ▪ Regulations relating to the Health and Safety of Employees at Work (promulgated in terms of Section 101 of the Labour Act No 6 of 1992 (GN156, GG 1617 of 1 August 1997) | <ul style="list-style-type: none"> ▪ Petroleum Products and Energy Act (No. 13 of 1990) ▪ B2Gold Health, Safety and Environment Management System Standards ▪ Safety Management Plan | <ul style="list-style-type: none"> ▪ NO_x / SO_x Emission Monitoring ▪ Ambient Air Monitoring ▪ Monitoring and Measurement Plan ▪ Air Quality Management Plan |
|--|---|---|---|

ACTIVITY(IES)

- | | | | |
|--|---|--|--|
| <ul style="list-style-type: none"> ▪ Stripping / Clearing of soil / vegetation ▪ Drilling and blasting ▪ Ore excavation | <ul style="list-style-type: none"> ▪ Loading and hauling ▪ Stockpiling ▪ Storage of Tailings | <ul style="list-style-type: none"> ▪ Establishing infrastructure ▪ Removal of infrastructure | <ul style="list-style-type: none"> ▪ Road construction and maintenance ▪ Operation and maintenance of machinery, equipment and Plant |
|--|---|--|--|

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Access of unauthorised people to the Mining Licence.	<ul style="list-style-type: none"> ▪ Potential risk of injury to third parties with unauthorised access. 	Erect and maintain warning signs at the site boundary.	X	X	Security Manager	During operation
		Fence off the working area of the Mining Licence.	X	X	Security Manager	During operation
		Put security control points in place, to prevent uncontrolled vehicle access to existing and future mining, stockpile and waste facility areas during operation and decommissioning.	X	X	Security Manager	During operation and decommissioning
		Ensure that any person entering the Mining Licence Area (pit and plant) will only be allowed after formal induction.	X	X	Security Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Emergency preparedness and response	<ul style="list-style-type: none"> Potential risk of injury to third parties with unauthorised access. 	Develop and implement an emergency response plan for third parties potentially falling into or off hazardous excavations and causing injury.	X	X	Security Manager and Safety Manager	During operation
Safety Risks	<ul style="list-style-type: none"> Potential impact on health and safety of people and animals. 	Ensure that permanent aboveground waste facilities and stockpiles are rehabilitated in a manner that present landforms that are stable, protected from flood damage, and slopes are re-vegetated.	X	X	Safety Manager and Environmental Manager	During rehabilitation
		Ensure that any mining voids that remain open are made safe to ensure that there is no risk to the safety of people and animals.	X	X	Safety Manager and Mining Manager	During rehabilitation and closure
		Ensure that the permanent aboveground waste facilities are operated in a manner where stability is a priority, flood protection is provided, and the risk of failure is limited to acceptable levels.	X		Environmental Manager and Engineering Manager	During operation
Underground ground control and ground support failures	<ul style="list-style-type: none"> Potential impact on safety of people working underground. 	Ensure that the Company's Safety Management Plan include SOP and golden rules that no person is allowed to go beyond supported ground (ground that has been controlled to an approved standard and made safe).	X	X	Safety Manager	During operation
		Appoint a Ground Control Coordinator.	X		Mining Manager	During operation
		Develop a Ground Control Plan.	X		Mining Manager	During operation
		Ensure the application of a rigorous mine design process.	X		Mining Manager	During operation
		Develop a ground conditions model, prior to mining.	X		Mining Manager	During operation
		Ensure that the evaluation of long-term ground control requirements is incorporated into the sites' technical plans and planning process.	X		Mining Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure that there is a multi-tiered response plan for ground support.	X		Safety Manager	During operation
		Ensure that all underground operators are trained in underground hazard identification.	X		Safety Manager	During operation
		Ensure that the site has ground control monitoring systems in place to proactively measure potential ground movement.	X		Mining Manager	During operation
		Ensure that the ground control requirements are incorporated into shift plans and work plans.	X		Mining Manager	During operation
		Ensure that the site develops a quality assurance program for all areas of ground control / support.	X		Mining Manager and General Manager	During operation
Underground fire incident	<ul style="list-style-type: none"> Potential injury to people working underground. 	Develop a Fire Control Plan through the process of risk assessment.	X		Safety Manager	During operation
		Develop a Maintenance System to prevent the deterioration of equipment condition and performance.	X		Engineering Manager	During operation
		Ensure no petrol is used underground.	X		Engineering Manager	During operation
		Design and control flammable substances use and storage.	X		Mining Manager and Engineering Manager	During operation
		Ensure that the control of hot work through a hot work permit system is in place specifically for underground operations.	X		Safety Manager	During operation
		Ensure the underground operators receive training to be able to identify and provide first response to fire emergencies.	X		Safety Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure that the site has an operational and maintenance procedure for fire control.	X		Safety Manager	During operation
		Ensure that the design requirements for underground mobile equipment factors in fire suppression.	X		Engineering Manager	During operation
		Ensure that the site has specific design requirements for fixed mechanical, electrical and compressor installations.	X		Engineering Manager	During operation
		Design the ventilation system to ensure the least exposure to smoke from underground fires during evacuations.	X		Engineering Manager	During operation
		Ensure that associated infrastructure required for underground operations such as workshops, lunchrooms, toilets and refuge chambers are planned and designed for purpose.	X		Engineering Manager	During operation
Collision of underground mining equipment causing injury to people	<ul style="list-style-type: none"> Potential injury to people working underground. 	Ensure that procedures are in place to minimise the instances where pedestrians and operating mobile equipment are in the same area at the same time.	X		Mining Manager and Safety Manager	During operation
		Ensure that operational Risk Assessments are part of the planning process.	X		Mining Manager and Safety Manager	During operation
		Develop equipment specifications which include minimum safety requirements and the identification of critical control systems for underground equipment.	X		Mining Manager, Engineering Manager and Safety Manager	During operation
		Develop a maintenance system that identifies the maintenance requirements for critical safety systems.	X		Engineering Manager and Safety Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure that design requirements of all underground roads are such to ensure good road conditions underground are maintained.	X		Mining Manager and Safety Manager	During operation
		Ensure suitable control of traffic through the development of SOPs.	X		Mining Manager and Safety Manager	During operation
		Ensure the site makes provision for the use of remote-controlled equipment to ensure high standards of safety.	X		Engineering Manager	During operation
		Ensure all operators understand and are trained for emergency response.	X		Safety Manager	During operation
Inrush or subsidence event within the underground mine causing injury and harm to people and project feasibility	<ul style="list-style-type: none"> ▪ Potential injury to people working underground. 	Ensure that due consideration of inrush and subsidence potential is implemented at the planning phase at each stage.	X		Mining Manager	During operation
		Ensure that the use of a risk assessment process is in place to identify specific hazards.	X		Mining Manager and Safety Manager	During operation
		Implement systematic collection and analysis of data.	X		Mining Manager	During operation
		Evaluate climatic conditions.	X		Mining Manager and Environmental Manager	During operation
		Identify risks of operating near water.	X		Mining Manager	During operation
		Ensure that consideration of pathways for inrushes is evaluated at each phase.	X		Mining Manager	During operation
		Develop, apply and monitor lead indicators.	X		Mining Manager and Safety Manager	During operation
		Develop and apply a response plan for lead indicators.	X		Mining Manager and Safety Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Ensure the site has implemented contingency planning.	X		Mining Manager and Safety Manager	During operation
		Ensure that a Water Control Plan is developed and in place prior to the development of working areas.	X		Mining Manager and Engineering Manager	During operation
		Apply appropriate procedures for surface and underground drilling.	X		Mining Manager	During operation
		Apply a rigorous mine design process.	X		Mining Manager	During operation
		Implement effective ore and waste fill design.	X		Mining Manager	During operation
		Implement effective tailings and surface water storage.	X		Processing Manager and Engineering Manager	During operation
		Implement effective backfill design and procedures.	X		Mining Manager	During operation
		Implement effective underground and surface pumping and drainage systems.	X		Mining Manager and Engineering Manager	During operation
		Ensure that there is a method for open and clear communication of experiences and outcomes of inrush and subsidence events.	X		Mining Manager	During operation

7.12 TRAFFIC MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To reduce the potential for safety and vehicle related impacts on road users.

MANAGEMENT STANDARDS

- Road Traffic and Transport Act (No. 22 of 1999)
- Safety Induction
- Safety Topics and Talks
- Incident Management Procedure
- Corporate Social Responsibility Plan
- Stakeholder Engagement and Communications Management Plan
- B2Gold Occupational Health and Safety Performance Standards

ACTIVITY(IES)

- Road use - infrastructure
- Road construction and maintenance

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Impact on future road use	<ul style="list-style-type: none"> ▪ Increase in traffic on the B1 road. ▪ High speed of traffic using the road and the potential for road traffic accidents. ▪ Loose gravel can lead to damaged windscreens. ▪ Presence of animals and the risk of collision. 	Implement a driver trainer programme for all B2Gold employees and contractors including: complying with speed limits, holding valid licences, ensuring vehicles are roadworthy, zero tolerance for drinking and driving and using lights appropriately for night driving.	X	X	Safety Manager	As part of on-boarding programme
		Include requirement in contracts / agreements for all contractors to comply with Namibian Roads Authority regulations.	X	X	Safety Manager and Procurement Manager	During procurement process
Use of B1 route and T-junction	<ul style="list-style-type: none"> ▪ Potential increase in traffic volume on the B1 road. 	Install appropriate signage at the intersection: i.e. Stop sign at the T-junction; Warning signs on the approach to the T-junction and indicating the presence of heavy vehicles; Mine name board.	X	X	Safety Manager	Prior to start of identified activities
		Assess the safety situation at this intersection / B1 T-junction, considering a northbound passing lane, should traffic increase.	X	X	Safety Manager and General Manager	Annually

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Crossing the railway (Railway Crossings)	<ul style="list-style-type: none"> Potential collision with the train. 	Raise awareness among employees and contractors about the safety aspects related to the use of the railway crossing.	X	X	Safety Manager	During safety talks
	<ul style="list-style-type: none"> Reduced visibility / line of sight due to vegetation growth along the road. 	Obtain permission from the relevant authority to clear vegetation along the rail in the vicinity of D2808, focusing on specific bushes and plants that interfere with clear sight along the rail.	X	X	Safety Manager and Environmental Manager	Prior to start of identified activities
Use of D2808 route and T-junctions	<ul style="list-style-type: none"> Potential vehicle collisions. 	Install proper signage at the intersection on the D2808 and the T-junction at the construction camp: i.e. Stop signs at the T-junctions; warning signs on the approaches to the T-junction and indicating the presence of Heavy vehicles; Mine name board; 80km/h speed limit signs on the D2808.	X	X	Safety Manager	Prior to start of identified activities
	<ul style="list-style-type: none"> Reduced visibility / line of sight due to vegetation growth along the road. 	Clear vegetation from the road reserve south of the D2808 to the west of the intersection to increase sight distance - approximately 50 metres from the intersection.	X	X	Safety Manager and Engineering Manager	Prior to start of identified activities
Emergency Preparedness and Response	<ul style="list-style-type: none"> Potential damage and injuries due to road accidents. 	Respond to any mine related road accident as per the emergency preparedness and response procedure.	X	X	Safety Manager and General Manager	Immediately when emergency occurs

7.13 SOCIO-ECONOMIC MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To enhance the positive impacts associated with job creation and investment.
- To limit the impacts associated with inward migration.
- To reduce negative impacts on land use and neighbouring communities.
- To support initiatives of sustainable economic growth in the Otjozondjupa region.

MANAGEMENT STANDARDS

- | | | | |
|---|---|---|---|
| ▪ Water Act (No. 54 of 1956) | ▪ Labour Act (No.11 of 2007) | ▪ B2Gold Environmental and Biodiversity Performance Standards | ▪ Corporate Social Responsibility Plan |
| ▪ Water Resources Management Act (No. 11 of 2013) | ▪ Public and Environmental Health Act (No. 1 of 2015) | ▪ Monitoring and Measurement Plan | ▪ Stakeholder Engagement and Communications Management Plan |
| ▪ Electricity Act (No. 4 of 2007) | ▪ Road Traffic and Transport Act (No. 22 of 1999) | ▪ Water Management Plan | |

ACTIVITY(IES)

- Provision of employment and housing
- Water supply
- Power supply
- Provision of sanitation facilities

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Employment opportunities and development benefits.	Increase in employment, investment and procurement of goods and services.	Give preference to local procurement for goods and services.	X	X	Procurement Manager	During operation
		Promote small and medium enterprises in the Company's procurement policies and procedures.	X	X	Procurement Manager	During operation
		Adopt a human resources policy that prioritises the selection of women for recruitment, training and development.	X	X	Human Resources Manager	During operation
		Ensure skills development strategies and programmes are in place to maximise the use of local labour force.	X	X	Human Resources Manager	During operation
		Support employees and community members to continue learning and developing skills, to offer labour flexibility and productivity.	X	X	Human Resources Manager and CSR Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Promote continuous learning programmes to diversify and upgrade skills.	X		Human Resources Manager	During operation
		Provide recognise, documented and accredited skills upgrading / training.	X		Human Resources Manager	During operation
		Maximise the recruitment of permanent workforce.	X		Human Resources Manager	During operation
		Provide training on personal financial management.	X		Human Resources Manager	During operation
		Enable and promote home ownership throughout the workforce.	X		Human Resources Manager	During operation
		Assist Otavi and Otjiwarongo town councils to diversify their economic activities.	X		CSR Manager	During operation and post-closure
Perceived job opportunities causing inward migration	<ul style="list-style-type: none"> ▪ Increase in the establishment of informal settlements. 	Promote accommodation integration in existing residential areas, wherever possible.	X	X	CSR Manager	During operation
		Use the Company's Corporate Social Investment (CSI) strategy to give support to local economic development in Otavi and Otjiwarongo - encourage, stimulate and support SME development.	X	X	CSR Manager	During operation and post-closure
		Build up local skills by working with local training establishments, providing bursaries for key skills.	X	X	Human Resources Manager	During operation
		Actively recruit women for training and employment into the mining sector.	X	X	Human Resources Manager	During operation
		Give preferential recruitment to Otjozondjupa residents.	X	X	Human Resources Manager	During operation
		Include recruitment of Grade 10 school-leavers who pass an IQ, English and Maths test.	X	X	Human Resources Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Partner with the National Housing Action group (NHAG) and the Shack Dwellers Federation (SHDF) to enable residents in Otavi's and Otjiwarongo informal settlement to engage with the Town Council.	X	X	CSR Manager	During operation and post-closure
		Assist Otavi and Otjiwarongo Town Council with the provision of essential infrastructure and services (i.e. water, electricity and sanitation) to marginalised residents (informal settlements).	X	X	CSR Manager	During operation and post-closure
		Support the town councils to have enlightened town plans which enable affordable land tenure and business development.	X	X	CSR Manager	During operation and post-closure
		Negotiate with the Ministry of Health and Social Services to provide primary health care services to neighbouring farmworkers around farm Otjikoto, from its mine clinic.	X	X	CSR Manager	During operation
		Support Otavi and Otjiwarongo schools through the CSI programme and focus on the schools' priority requests and assess how best to provide support.	X	X	CSR Manager	During operation and post-closure
		Form a representative stakeholder committee, genuinely representative of those most affected by the B2Gold's operations – e.g. landowners, farmworkers, town councils and residents committees – to assist with the monitoring of social impacts and the effectiveness of the mitigation measures put in place.	X	X	CSR Manager	During operation
		Fence in the working area of the Mining Licence and employ strict security.	X	X	Security Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Regularly communicate to the public the process for recruiting to prevent potential job seekers gathering at the gate of B2Gold operations.	X	X	Human Resources Manager and Public Relations Manager	During operation
		Take measures to prevent Platveld from becoming an informal / squatter settlement.	X	X	CSR Manager and Public Relations Manager	During operation
		Develop and enforce a zero-tolerance procedure to alcohol in the workplace and on site.	X	X	Safety Manager and General Manager	During operation
		Establish a comprehensive HIV / AIDS / TB workplace policy and wellness programme.	X	X	Safety Manager	During operation
		Include HIV requirements for all contractors (HIV policies and programmes).	X	X	Procurement Manager, Supply Chain Manager and Safety Manager	During operation
		Develop community wellness programmes in consultation with the neighbouring towns and farms. (Include HIV / AIDS / TB related issues).	X	X	CSR Manager	During operation and post-closure
		Support partnerships that encourage a sense of community and that combat social ills, e.g. multi-purpose community and skills development centres; networking points for new migrants; sports tournaments, social clubs, youth clubs, activities that promote women's empowerment that can lead to gender equality and community policing.	X	X	CSR Manager	During operation and post-closure
Change of land-use and neighbouring communities	Potential negative impact on neighbouring communities.	Manage the non-mining areas as productively as possible, including restoring bush encroached areas for productive farming.	X	X	CSR Manager	During operation
		Fence mining area to minimise security risks – employees and contractors, and neighbouring farms.	X	X	Security Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Establish a platform for on-going dialogue with neighbouring farmers, as a special interest group and provide a named point of contact.	X	X	Public Relations Manager	During operation and post-closure
		Give neighbouring farms opportunities to provide goods and services, as a form of compensation, e.g. to run a shop, provide farm produce and visitor accommodation.	X	X	CSR Manager and General Manager	During operation
		Enforce strict access rules of personal movement except along well established roads and walkways.	X	X	Security Manager	During operation
		Liaise with farm owner(s) and obtain the necessary authorization before entering these private properties, prior to any person conducting work for/on behalf of B2Gold on neighbouring farms.	X	X	Public Relations Manager and General Manager	During operation and post-closure
Creation of jobs during operational mining	<ul style="list-style-type: none"> Increase in employment opportunities. 	Ensure that local residents get first opportunity for positions employment, were applicable.	X		Human Resources Manager	During operation
		Consider redeploying redundant staff from decommissioned or closed operations.	X	X	Human Resources Manager	During decommissioning or closure of operations
Influx of contractor (workers and families) stimulating the local economy through increase spends	<ul style="list-style-type: none"> Potential increase in local economic growth. 	Engage with the local and regional government to ensure development plans cater for influx.	X		Human Resources Manager and Public Relations Manager	During operation
		Ensure local spend of CSI funding address development needs to cater for influx where applicable.	X		CSR Manager	During operation
Changes to community cohesion	<ul style="list-style-type: none"> Potential improvement in local socio-economic conditions. 	Ensure local spend of CSI funding address development needs to cater for influx where applicable.	X		CSR Manager	During operation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Employees, contractors and community health and wellness	<ul style="list-style-type: none"> Socio-economic impact of Covid 19 Pandemic in the workplace and community. 	Develop and implement a Covid 19 Pandemic policy and procedure in consultation with the MoHSS.	X		Safety Manager, Public Relations Manager and CSR Manager	During operation
		Ensure all employees and contractors are aware of the details of the policy and procedure.	X		Safety Manager, Public Relations Manager	During operation
		Provide support to employees and contractors who are affected by Covid 19 (i.e. physically and mentally).	X		Safety Manager and General Manager	During operation
		Assist the Otavi and Otjiwarongo Town Councils, and the relevant local government departments via the CSI programme with essentials during the management of the Covid 19 pandemic.	X		CSR Manager and Public Relations Manager	During operation

7.14 STAKEHOLDER CONSULTATION / COMMUNICATION MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To ensure that ongoing feedback is provided on the relevant mining activities, together with feedback on the environmental management performance of the mine.
- To ensure that opportunity is provided for interested and affected parties to raise comments and concerns (complaints).
- To ensure communication / engagement strategies meet the needs of stakeholders.

MANAGEMENT STANDARDS

- Environmental Management Act (No. 7 of 2007)
- EIA Regulations of 2012
- Labour Act (No.11 of 2007)
- Public and Environmental Health Act (No. 1 of 2015)
- Road Traffic and Transport Act (No. 22 of 1999)
- B2Gold Environmental and Biodiversity Performance Standards
- Corporate Social Responsibility Plan
- Stakeholder Engagement and Communications Management Plan

ACTIVITY(IES)

- Stripping / Clearing of soil / vegetation
- Drilling and blasting
- Ore excavation
- Loading and hauling
- Stockpiling
- Road construction and maintenance
- Road use - infrastructure
- Establishing infrastructure
- Removal of infrastructure
- Operation of machinery, equipment and Plant
- Provision of water, power, sanitation, employment and housing

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Understanding and identifying key stakeholders	Improved communications with stakeholders.	Maintain and update the stakeholder register with all relevant stakeholder groups, including stakeholders' needs and expectations.	X	X	Public Relations Manager	Throughout the LoM
		Ensure that marginalised and vulnerable groups are considered in the stakeholder communication process.	X	X	Public Relations Manager	Throughout the LoM
		Record partnerships and their roles, responsibilities, capacity and contribution to development.	X	X	Public Relations Manager	Throughout the LoM
Liaising with interested and affected parties at all phases during the life of mine	Improved consultation with interested and affected parties.	Develop and implement a stakeholder communication and engagement strategy.	X	X	Public Relations Manager	Throughout the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Cooperative working relationship with stakeholders	<ul style="list-style-type: none"> Enhanced engagement with affected communities through disclosure of information, consultation, and informed participation, aligned with the risks to and impacts on the affected communities. 	Inform identified stakeholders about the Company's significant activities.	X	X	Public Relations Manager	Throughout the LoM
		Use appropriate communication channels to consult with and disseminate information to the public.	X	X	Public Relations Manager	Throughout the LoM
		Develop a communication procedure.	X	X	Public Relations Manager	Throughout the LoM
Managing perceptions and issues / complaints	<ul style="list-style-type: none"> Enhanced engagement with affected communities through disclosure of information, consultation, and informed participation, aligned with the risks to and impacts on the affected communities. 	Develop and implement a concerns / complaints (grievance) process for the public and publicise the channels through which complaints and comments can be submitted to the Company and responded to timeously.	X	X	Public Relations Manager	Throughout the LoM
		Keep a register or records of all significant communications – complaints / grievances, suggestions, responses and actions taken.	X	X	Public Relations Manager	Throughout the LoM
Safety of third parties	<ul style="list-style-type: none"> Enhanced engagement with affected communities through disclosure of information, consultation, and informed participation, aligned with the risks to and impacts on the affected communities. 	Provide information to educate third parties about the dangers associated with hazardous excavations and infrastructure, through appropriate communication and inductions.	X	X	Public Relations Manager	Throughout the LoM
Monitoring of stakeholder engagement	<ul style="list-style-type: none"> Improved engagement with stakeholders. 	Monitor changes in the communities of interest.	X	X	Public Relations Manager	Throughout the LoM
		Develop audit criteria for monitoring the performance of stakeholder engagement and communication strategies and relations between the Company and the identified stakeholders.	X	X	Public Relations Manager	Throughout the LoM

7.15 DECOMMISSIONING AND CLOSURE MANAGEMENT PLAN

MANAGEMENT OBJECTIVES

- To enable all key stakeholders to have their interests considered during the mine closure process.
- To ensure the process of closure occurs in an orderly, cost-effective and timely manner.
- To ensure the cost of closure is adequately represented in the Company accounts and that the community is not left with a liability.
- To ensure there is clear accountability and adequate resources for implementation of the closure plan.
- To establish a set of indicators which demonstrate the successful completion of the closure process.
- To reach a point where the Company has met agreed completion criteria to the satisfaction of the responsible Government regulator.
- To prepare for changes in employment conditions at closure (negative social effects on people dependent on the mine).
- To understand closure risks and prepare to mitigate impacts on associated communities and dependent businesses.
- To protect public health and safety and the environment by using safe and responsible closure practices.
- To reduce or eliminate adverse environmental effects once the mine ceases operations.
- To establish conditions which are consistent with the predetermined end-use objectives.
- To reduce the need for long-term monitoring and maintenance by establishing effective physical, chemical and ecological stability of disturbed areas.
- To remove as much infrastructure as possible and rehabilitate what remains to resemble the pre-mining land state as closely as practicable.
- To prevent air and water pollution in accordance with the requirements of the relevant regulations and in line with good international practice.

MANAGEMENT STANDARDS

- | | | | |
|---|---|--|---|
| <ul style="list-style-type: none"> ▪ Environmental Management Act (No. 7 of 2007) ▪ EIA Regulations of 2012 ▪ Labour Act (No.11 of 2007) | <ul style="list-style-type: none"> ▪ The Minerals (Prospecting and Mining) Act (No. 33 of 1992) ▪ Water Amendment Act (No. 54 of 1956) ▪ Water Resources Management Act (No. 11 of 2013) | <ul style="list-style-type: none"> ▪ B2Gold Environmental and Biodiversity Performance Standards ▪ Topsoil Management Plan ▪ Topsoil Management Procedure ▪ Rehabilitation Management Plan | <ul style="list-style-type: none"> ▪ Rehabilitation Monitoring Procedure ▪ Monitoring and Measurement Plan ▪ Corporate Social Responsibility Plan ▪ Stakeholder Engagement and Communications Management Plan |
|---|---|--|---|

ACTIVITY(IES)

- | | | | |
|--|---|---|--|
| <ul style="list-style-type: none"> ▪ Stripping / Clearing of soil / vegetation ▪ Drilling and blasting ▪ Ore excavation | <ul style="list-style-type: none"> ▪ Loading and hauling ▪ Stockpiling ▪ Road construction and maintenance | <ul style="list-style-type: none"> ▪ Road use - infrastructure ▪ Establishing infrastructure ▪ Removal of infrastructure | <ul style="list-style-type: none"> ▪ Operation of machinery, equipment and Plant ▪ Provision of water, power, sanitation, employment and housing |
|--|---|---|--|

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Closure	<ul style="list-style-type: none"> ▪ Opportunity to restore environment (soil, vegetation, landscape and land-use) and prevent potential contamination. ▪ Loss of employment. 	Return disturbed areas - other than those comprising the open pits and mineralised waste facilities - to as close to the natural habitat (Thorn Bush Savannah) as practicable.		X	Environmental Manager and Engineering Manager	During remediation and rehabilitation
		Leave permanent visible features such as the mineralised waste facilities and related environmental bunds and safety bunds around the open pits in a form that blends with the surrounding environment.		X	Environmental Manager and Engineering Manager	During remediation and rehabilitation
		Prevent contamination beyond the mine site by wind, surface run-off or groundwater movement through appropriate erosion resistant covers, containment bunds and drainage to the open pit.		X	Engineering Manager	During remediation and rehabilitation
		Remove linear infrastructure comprising roads, pipelines, power lines, conveyors and related components and rehabilitate disturbed land to blend with the surrounding natural environment.		X	Engineering Manager	During decommissioning, remediation and rehabilitation
		Minimise socio-economic impacts (including the loss of employment) through careful planning and preparation for closure.		X	CSR Manager and Human Resources Manager	Three to five years prior to closure
Decommissioning	<ul style="list-style-type: none"> ▪ Opportunity to restore environment (soil, vegetation, landscape and land-use) and prevent potential contamination. 	Demolish and remove surface infrastructure, except for the mineralised waste facilities and open pits which will remain.		X	Engineering Manager	During decommissioning
		Level and restore areas where infrastructure has been removed - in terms of soils horizons, vegetation and drainage.		X	Engineering Manager and Environmental Manager	During remediation and rehabilitation
Open pit decommissioning	<ul style="list-style-type: none"> ▪ Potential impact on safety of humans and animals. 	Construct an exclusion bund around the northern, western and southern rims of the open pits and connect to the mineralised waste facilities which will form the eastern exclusion bund.		X	Mining Manager	During remediation and rehabilitation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Direct seepage water and all other contaminated water that can drain naturally to the open pits to the pits, where it will evaporate.		X	Mining Manager	During remediation and rehabilitation
		Place bunds around the access ramps to the open pits to prevent access down the ramps.		X	Mining Manager	During remediation and rehabilitation
		Slope the top berm to an angle of approximately 20 degrees.		X	Mining Manager	During remediation and rehabilitation
		Assess and stabilise pit slopes to ensure long-term stability performance.		X	Mining Manager	During remediation and rehabilitation
Mineralised waste facilities	<ul style="list-style-type: none"> ▪ Potential contamination of soil. ▪ Opportunity to restore environment (soil, vegetation, landscape and land-use) and prevent potential contamination. 	Take into consideration the prior land-use and the location with respect to current and potential future socio-economic development, for the intended end use.	X	X	Mining Manager and Environmental Manager	At the start and during the LoM
		Ensure that the design, construction and operational procedures are compatible with the achievement of final closure and rehabilitation - to acceptable environmental standards and at a reasonable cost.	X	X	Mining Manager and Environmental Manager	At the start and during the LoM
		Ensure that the non-segregated tailings materials have a low permeability to limit seepage from rainwater infiltration.	X		Processing Manager	At the start and during the LoM
		Ensure that the required final side slope and top surface geometries are achieved during the operational phase.	X	X	Processing Manager and Mining Manager	During the LoM
		Cover the side slopes with topsoil to establish vegetation.		X	Mining Manager	During remediation and rehabilitation
		Cover the top surfaces with a vegetated engineered layer (waste rock and topsoil).		X	Mining Manager and Environmental Manager	During remediation and rehabilitation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Include emergency spillways in the final closure design.		X	Processing Manager and Mining Manager	At the start and during the LoM
		Ensure that storm water storage dams remain in place.		X	Engineering Manager	During decommissioning
		Remove all surface structures (i.e. pumps, pipelines, power lines etc.).		X	Engineering Manager	During decommissioning
Process Plant	<ul style="list-style-type: none"> ▪ Potential income from salvageable structures. ▪ Potential contamination of soil. ▪ Opportunity to restore environment (soil, vegetation and land disturbance). 	Dismantle the processing plant, primary crusher and conveyors, and decontaminate and sell salvageable elements.		X	Engineering Manager	During decommissioning
		Dismantle and dispose of the remainder of the processing plant including steelwork, concrete, liners, brickwork etc. at a site approved by the relevant authorities.		X	Engineering Manager	During decommissioning
		Remove any contaminated soil below the processing plant and dispose of at a site approved by the relevant authorities.		X	Engineering Manager	During remediation and rehabilitation
		Ensure that conveyor belts and concrete footings and non-salvageable steel are disposed of in a similar fashion.		X	Engineering Manager	During decommissioning
		Backfill and level the residual excavations after removal of the processing plant and primary crusher with selected overburden material from the open pit mining operations and cover with a thickness necessary to provide a productive layer for reclamation.		X	Engineering Manager	During remediation and rehabilitation
		Ensure that the plant area is landscaped and levelled to ensure that it is contiguous with, and blends into, the surrounding environment.		X	Engineering Manager	During remediation and rehabilitation

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Direct the run-off from the primary crusher site to the open pit (this area falls within the open pit access exclusion bund) and restore the soil and vegetation function of the land.		X	Engineering Manager	During remediation and rehabilitation
Workshops, diesel and oil storage facilities, and explosive areas	<ul style="list-style-type: none"> ▪ Potential income from salvageable structures. ▪ Potential contamination of soil. ▪ Opportunity to restore environment (soil, vegetation and land disturbance). 	Dismantle all structures associated with these facilities and decontaminate and sell salvageable elements.		X	Engineering Manager	During decommissioning
		Ensure that the remainder of the infrastructure is broken up and disposed of at a site approved by the relevant authorities.		X	Engineering Manager	During decommissioning
		Excavate contaminated soils underlying the structures and dispose of it at a hazardous waste disposal facility or bioremediation facility in the Mining Licence and dispose of treated soil in the open pit.		X	Engineering Manager	During remediation and rehabilitation
		Backfill and level residual excavations using selected overburden material from open pit mining operations.		X	Mining Manager	During remediation and rehabilitation
		Re-establish a landscape that can over time regenerate sustainable endemic vegetation communities.		X	Mining Manager, Engineering Manager and Environmental Manager	During remediation and rehabilitation
		Restore the soil and vegetation function of the land, leaving behind an ecologically functioning (fauna and flora) environment.		X	Environmental Manager	During remediation and rehabilitation
		Direct run-off from these areas to the open pit.		X	Engineering Manager	During remediation and rehabilitation
		Ensure that all other hard surfaces are ripped, and rubble / waste disposed of in the open pit.		X	Engineering Manager	During decommissioning

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Remove pipelines and infrastructure and backfill and level residual excavation with selected overburden material and cover with between 300 mm and 500 mm of stockpiled topsoil.		X	Engineering Manager and Environmental Manager	During decommissioning
Closure activities	<ul style="list-style-type: none"> Opportunity to restore environment and reduce liabilities. 	Ensure that the extent of demolition and rehabilitation efforts during decommissioning are maximised.		X	Engineering Manager and Environmental Manager	During decommissioning, remediation and rehabilitation
Rehabilitation and Closure of underground mining operations	<ul style="list-style-type: none"> Potential impact on water and the environment. 	Reclaim all equipment and cables from the workings before the decline and ventilation shafts will be sealed, at closure.		X	Engineering Manager	During decommissioning
		Install a monitoring casing in the vent shaft seal to monitor the rebounding water table and water quality in the workings.	X	X	Engineering Manager and Environmental Manager	During the LoM
	<ul style="list-style-type: none"> Potential to re-use accumulated water. 	Investigate the potential to use the accumulated water in the underground workings (e.g. for crop irrigation).	X	X	CSR Manager	Prior to initiating reclamation and closure
Photovoltaic Solar Power Plant	<ul style="list-style-type: none"> Potential to generate revenue for CSR projects. 	Investigate opportunity to generate revenue from the sale of electricity to NamPower / Regional Electricity Distributors at the end of LoM.	X	X	Engineering Manager and CSR Manager	Prior to initiating decommissioning, reclamation and closure
		Consider using the revenue from electricity sales to sustain and expand the Company's ongoing CSR projects in the region and support the Otjikoto Nature Reserve and education centre.	X	X	Engineering Manager and CSR Manager	Prior to initiating decommissioning, reclamation and closure
		Investigate the possibility of extending the life of the facility or upgrading the facility to more advantageous renewable technologies at the end of the LoM.	X	X	Engineering Manager and CSR Manager	Prior to initiating decommissioning, reclamation and closure

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
Decommissioning of the Photovoltaic Solar Power Plant	<ul style="list-style-type: none"> Opportunity to restore environment (soil, vegetation, landscape and land-use) and prevent potential contamination. 	Remove and recycle the module components after disconnecting the PV infrastructure from the electricity network.		X	Engineering Manager	During decommissioning
		Dismantle the structures and remove the concrete foundations.		X	Engineering Manager	During decommissioning
		Excavate and remove all underground cables.		X	Engineering Manager	During decommissioning
		Demolish and remove the buildings.		X	Engineering Manager	During decommissioning
		Rehabilitate disturbed areas to restore the land to its original landform.		X	Engineering Manager	During remediation and rehabilitation
Legal Compliance	<ul style="list-style-type: none"> Opportunity to restore environment and reduce liabilities. 	Ensure that all approvals, licences and permits relating to mine closure and reclamation are obtained and complied with.		X	General Manager	Prior to initiating reclamation and closure
Mine Closure Plan Development	<ul style="list-style-type: none"> Opportunity to adequately represent the cost of closure in the Company's accounts. Potential liability to the community. 	Incorporate mine closure into the technical and financial evaluation of a new operation, or a planned major modification / extension of the existing operations - to identify the technical aspects of closure and associated costs.	X	X	General Manager and Financial Manager	At the start and during the LoM
		Define and include preliminary or proposed post-closure mining land-uses during the design of new developments - complying with relevant regulatory requirements or agreements with external stakeholders.	X	X	General Manager	At the start and during the LoM
		Develop a Mine Closure Plan during the design phase of all new operations and maintain the plan.	X	X	General Manager	At the start and during the LoM

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Develop a Social and Labour Plan - including Human Resource Development, Local Economic Development, Responsible Management of Downscaling and Retrenchment – and associated Financial Provisioning.	X	X	General Manager, Financial Manager, Human Resources Manager, CSR Manager	At the start and during the LoM
		Define the relevant regulatory / licence requirements, closure and post-closure monitoring programmes and bond release / licence relinquishment requirements in the Mine Closure Plan.	X	X	General Manager	At the start and during the LoM
		Define reclamation and closure objectives and success / completion criteria based on the agreed post-mining land use in the Mine Closure Plan.	X	X	General Manager	At the start and during the LoM
		Distribute the Mine Closure Plan to relevant stakeholders to incorporate external views and requirements into operational plans to meet reclamation and closure objectives.	X	X	General Manager	During Mine Closure Plan reviews and associated reporting
Mine Closure Plan Review and Update	<ul style="list-style-type: none"> ▪ Improved Closure Planning 	Review the Mine Closure Plan upon completion of the construction phase and at least every five years thereafter.	X	X	General Manager	Every five years
		Review and update the Mine Closure Plan after significant changes to the operations.	X	X	General Manager	When significant changes take place
		Review the Mine Closure Plan annually when the operation is within five years of the end of the life of mine and during the post-closure period.	X	X	General Manager	Annually
Reclamation and Closure Cost Estimates	<ul style="list-style-type: none"> ▪ Opportunity to reduce liability(ies) 	Prepare closure cost estimates using agreed resource industry methodology - Cost estimates to be adequately supported with industry / contracted earthmoving accepted estimates, quotes or actual costs from similar activities.	X	X	General Manager and Financial Manager	During operational phase

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		Prepare closure cost estimates during the operational phase with an accuracy of ± 30 %.	X	X	General Manager and Financial Manager	During operational phase
		Update the Mine Closure Plan to include detailed reclamation and closure designs and cost estimates to an accuracy of ± 10 %.	X	X	General Manager and Financial Manager	Within the last two years of processing ore
		Review and update cost estimates for existing disturbance, reclamation and closure liability.	X	X	General Manager and Financial Manager	Annually
		Ensure that reclamation and closure cost estimates include costs associated with achieving post-closure land-use objectives / criteria and any post-closure maintenance and monitoring activities as defined in the Mine Closure Plan.	X	X	General Manager and Financial Manager	Annually
		Formally approve reclamation and closure cost estimates as part of the annual budget cycle.	X	X	General Manager	Annually
		Track actual costs of progressive reclamation and closure activities against budget.	X	X	General Manager and Financial Manager	Monthly
Final Closure Reports	<ul style="list-style-type: none"> Potential reduction in residual liabilities. 	Ensure that final closure reports detail the reclamation and closure works completed until the relinquishment of any bond release and licence.		X	General Manager	At closure
		Include reclamation and closure objectives and criteria, methods used for the successful reclamation and closure of various aspects of the site (i.e., waste rock disposal facilities, tailing storage facilities), as-built surveys for structures, asset liquidation, and actual costs versus estimated costs in the final closure reports.		X	General Manager	At closure
		Ensure that final closure reports detail ongoing post-closure management and monitoring activities (i.e., landform maintenance, water		X	General Manager	At closure

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		management and erosion control structures) and associated cost estimates.				
Reclamation and Closure Records	<ul style="list-style-type: none"> Potential reduction in residual liabilities. 	Retain comprehensive and accurate records for reclamation and closure activities for at least ten years after final licence relinquishment.		X	General Manager and Environmental Manager	For a period of ten years after licence is relinquished.
Stakeholder Involvement	<ul style="list-style-type: none"> Opportunity to reduce potential liabilities to the community. 	Involve all interested and affected parties (employees, local suppliers, communities (e.g. local business, land owners), government and interested non-governmental organisations) in the development of the Mine Closure Plan and during the periodic review(s) throughout the LoM.	X	X	General Manager and Public Relations Manager	Throughout the LoM
		Develop a targeted communication strategy, which ensures that the needs of stakeholder groups and interested parties are adequately addressed and reflected in the Mine Closure Plan, and review and update periodically.	X	X	General Manager and Public Relations Manager	At the start of the LoM
		Ensure that adequate human and financial resources are allocated from the start of the life of mine to plan for mine closure.	X	X	General Manager and Financial Manager	Throughout the LoM
End state vision	<ul style="list-style-type: none"> Opportunity to reduce potential liabilities to the community. 	Ensure that the mine site is returned to its original condition of conservation / wilderness state (or as close to this condition as possible).	X	X	General Manager	Throughout the LoM
Post-closure / aftercare and maintenance	<ul style="list-style-type: none"> Potential liabilities to the community. 	Develop post-closure / aftercare and maintenance managing and monitoring requirements and action plans (e.g. safety and security, stakeholder engagement / involvement, quality of water, air, soil; vegetation succession, erosion, slope stability, state of fencing and prohibition signs, effectiveness and functionality of water treatment and drainage systems,	X	X	General Manager, Environmental Manager and CSR Manager	During Mine Closure Plan reviews

ASPECT	IMPACT	MANAGEMENT ACTIONS	OPERATION	DECOMMISSIONING	RESPONSIBILITY	TIME FRAME
		surface run-off, pollution control facilities – TSF, evaporation ponds).				
		Ensure that adequate resources and funding are available for post-closure / aftercare and maintenance and that responsibilities and accountabilities are well-defined.	X	X	General Manager, Financial Manager and CSR Manager	Prior to closure
		Identify and ensure adequate documentation and records are retained of post-closure / aftercare and maintenance managing and monitoring activities and results.	X	X	CSR Manager and Environmental Manager	Post-closure

8. REFERENCES

SLR Consulting (Namibia) (Pty) Ltd, July 2012. Otjikoto Gold Mine: Environmental Impact Assessment for the Proposed Otjikoto Gold Mine Project.

SLR Consulting (Namibia) (Pty) Ltd, July 2012. Otjikoto Gold Mine: Mine Closure Framework.

SLR Consulting (Namibia) (Pty) Ltd, August 2013. B2Gold - Otjikoto Gold Mine: Scoping Report (Including Impact Assessment) for the Proposed Changes to the Otjikoto Gold Mine Project - Landfill Site and Power Plant.

SLR Consulting (Namibia) (Pty) Ltd, August 2014. B2Gold - Otjikoto Gold Mine: Environmental Management Plan.

SLR Consulting (Namibia) (Pty) Ltd, October 2014. B2Gold - Otjikoto Gold Mine: Scoping Report (Including Impact Assessment) for the Proposed Changes to the Otjikoto Gold Mine Project - Wolfshag Zone.

B2Gold Namibia (Pty) Ltd Otjikoto Gold Mine, March 2017. Otjikoto Gold Mine – Hazardous Waste Management Plan.

Environmental Compliance Consultancy, April 2017. Otjikoto Gold Mine – Upgrade of existing power plant by 10.8 MW.

A. Speiser Environmental Consultants, May 2017. Environmental Scoping Report for the amendment to the hazardous waste management plan at B2Gold Otjikoto Gold Mine.

B2Gold Namibia (Pty) Ltd Otjikoto Gold Mine, April 2018. Otjikoto Gold Mine - Mining Licence 169 - Environmental Compliance and Performance Report 2015 - 2017 for Renewal Environmental Clearance Certificate (ECC) Otjikoto Gold Mine operations.

SLR Consulting (Namibia) (Pty) Ltd, April 2018. Otjikoto Gold Mine: Rehabilitation and Closure Plan.

B2Gold (Pty) Ltd, May 2018. B2Gold Environmental and Biodiversity Performance Standards.

Environmental Compliance Consultancy, December 2019. Otjikoto Mine Wolfshag pit Underground Mining Amendment – B2Gold Namibia.

9. APPENDICES

9.1 CURRICULUM VITAE: ENVIRONMENTAL CONSULTANT

SHORTENED CURRICULUM VITAE – FIONA OLIVIER (ENVIRONMENTAL CONSULTANT)

<p>PERSONAL INFORMATION</p>	<p>P O Box 11663, Klein Windhoek, NAMIBIA +264 81 748 7488 fiona.olivier1@gmail.com</p> <p>Female Namibian citizen Date of birth: 25 May 1974 English and Afrikaans proficient (speak, read, write)</p>
<p>QUALIFICATIONS</p>	<p>The Australian National University 1999 Degree of Master of Environmental Management and Development 1998 Graduate Diploma in Environmental Management and Development</p> <p>University of Namibia 1996 Degree of Honours Bachelor of Arts (Geography) 1995 Degree of Bachelor of Arts (Geography & Sociology)</p>
<p>PROFESSIONAL PROFILE</p>	<p>More than 15 years' experience in environmental management and development - systems development, implementation, maintenance, and improvement.</p> <p>Key Areas: Environmental Management System development, implementation, maintenance and improvement Standards, policies and procedures development and integration into Company business processes and contracts Legal and other requirements register development, implementation and compliance Identification and prioritisation of environmental aspects (risks and opportunities) Setting environmental management objectives, targets and programmes Environmental training, awareness and competence development and implementation Environmental performance monitoring and reporting Facilitating, coordinating and conducting environmental audits and non-conformance management Conducting environmental management reviews Environmental Strategic Planning, Policy Development, Technical Advice and Coordination of Programmes and Projects Research, Data Analyses, Report Compilation and Reviews Environmental Risk Identification, Management and Mitigation Environmental Monitoring, Measurement and Evaluation Internal and External Environmental Communication / Engagement / Consultation with Stakeholders and Interested and Affected Parties Participation and representation in key stakeholder forums (Industry Associations and Committees, International, Regional and National meetings, workshops and conferences) Environmental Legal Compliance Management Collaboration with experts, scientists and authorities on environmental best practice Management and Coordination of Environmental Impact Assessment process Budget management Management of Contracts / Agreements People Management – performance and development Keeping abreast of environmental best practice Environmental Balanced Score Card development and implementation.</p>

APPLICABLE PROFESSIONAL EXPERIENCE

Fiona Olivier has more than fifteen (15) years of experience in environmental management within the mining industry. Of specific relevance, is her experience in the development, implementation of environmental management plans and/or environmental performance / compliance monitoring, auditing and reporting at the following organisations: Sperrgebiet Diamond Mining (Pty) Ltd; Dundee Precious Metals Tsumeb (Pty) Ltd; Swakop Uranium (Pty) Ltd; Langer Heinrich Uranium (Pty) Ltd; De Beers Marine Namibia (Pty) Ltd; and Namdeb Diamond Corporation (Pty) Ltd.

2020 – 2021	Environmental Consultant Sperrgebiet Diamond Mining (Pty) Ltd Key Role: Providing Environmental Management Services to assist with the Company's environmental management requirements.
2020 – 2021	Environmental Consultant B2Gold Namibia (Pty) Ltd Key Role: Compiling a customized Environmental Legal Compliance Register for Otjikoto Gold Mine.
2018 – 2019	Freelance Environmental Consultant Key Role: Providing <i>ad hoc</i> advice and guidance on environmental management requirements for small-scale projects.
2016 – 2017	Environmental Consultant Dundee Precious Metals Tsumeb (Pty) Ltd Key Role: Providing Environmental Management Services to assist with the Company's environmental management requirements.
2014 – 2015 2013	Environmental Manager Swakop Uranium (Pty) Ltd Environmental Manager Langer Heinrich Uranium (Pty) Ltd – Paladin Energy Ltd
2006 – 2009 2004 – 2006	Environmental Manager De Beers Marine Namibia (Pty) Ltd Environmental Manager Namdeb Diamond Corporation (Pty) Ltd Company Environmental Management Representative for the Environmental Management System Key Role: Developing, implementing, maintaining, and improving the EMS in line with legal and other requirements and strategic objectives reporting EMS performance to top management and recommending improvements.
2010 – 2012	Freelance Environmental Management Consultant Key Role: Advising on developing and implementing Environmental Management Systems (EMS) and providing <i>ad hoc</i> advice and guidance on environmental management requirements for small-scale projects.
2000 – 2004	Senior Environmental Officer Namdeb Diamond Corporation (Pty) Ltd Company Environmental Management Representative for the ISO 14001 EMS from 2002-2004 Key Role: Implementation and maintenance of the Company's ISO 14001 Environmental Management System.
1999 – 2000	Monitoring, Evaluation and Supporting Supervisor Desert Research Foundation of Namibia (DRFN) Key Role: Facilitating work of DRFN Community-Based Natural Resource Management (CBNRM) projects in the four 'O' Regions of Northern Namibia.