QKR NAMIBIA
NAVACHAB GOLD MINE

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REPORT:

NAVACHAB GOLD MINE - TSF 3 ANNEXURE TO OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN

PROJECT NUMBER: ECC-107-408-REP-02-D
REPORT VERSION: REV 01
DATE: 4 -18 AUGUST 2023

TITLE AND APPROVAL PAGE

Project Name:	Navachab Gold Mine - TSF 3 Annexure to Operational Environmental Management Plan
Client Company Name:	Navachab Gold Mine (Pty) Ltd.
Client Name:	Mr. George Botshiwe
Ministry Reference:	APP-0010395
Status of Report:	Annex to Operational Environmental Management Plan
Project Number:	ECC-107-408-REP-02-D
Date of issue:	4 -18 August 2023
Review Period	Draft for public review

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TABLE OF CONTENTS

1 Introduction 5

1.1 Navachab Gold Mine 5
1.2 Surface water quality monitoring 7
1.3 Groundwater quality monitoring 7
1.4 Air quality monitoring 7

Domain TSF 3 annex – Part of Domain 5 – TSF3 8

LIST OF TABLES

Table 1 – Domain 3: Tailings Storage Facility 3 8

LIST OF FIGURES

Figure 1 – Navachab tailings and mine waste areas within mining licences and AWA 6
Figure 2 - TSF 3 northern and southern wall 6

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AMD	Acid Mine Drainage
DWA	Department Of Water Affairs
ECC	Environmental Compliance Consultancy
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMS	Environmental Management System
EPL	Exploration Prospecting Licence
ESIA	Environmental Social Impact Assessment
GHG	Greenhouse Gas
GIS	Geographical Information System
MAWLR	Ministry Of Agriculture, Water And Land Reform
MEFT	Ministry Of Environment, Forestry And Tourism
ML	Mining Licence
MSDS	Material Safety Data Sheet
NHC	National Heritage Council
OEMP	Operational Environmental Management Plan
PCM	Pollution Control Measures
POI	Point Of Interest
SLM	Sound Level Meter
ToR	Terms Of Reference
tph	Tonnes Per Hour
TSF	Tailings Storage Facility
WRD	Waste Rock Dump

1 INTRODUCTION

Environmental Compliance Consultancy (ECC) has been contracted by QKR Navachab Gold Mine (Navachab) to update the consolidated operational environmental management plan (OEMP) for activities on mining licence (ML) 31, ML 180, the accessory works area in ML 31, exclusive prospecting licence (EPL) 999 and EPL 3275.

Navachab is located near the town of Karibib in Namibia. Karibib is situated approximately 170 km northwest of Windhoek, the capital of Namibia. Navachab, mainly an open pit mining operation, started production in 1989. The mine was wholly owned by AngloGold Ashanti Namibia up to 30 June 2014 when shareholding was transferred to QKR and Epangelo Mining. Underground mining activities commenced in the main pit in 2021.

In December 2022 the Ministry of Environment, Forestry and Tourism approved the consolidation of existing environmental clearance certificates (ECC) for ML 31 and the accessory works area in 31 as a standalone ECC for ML 31. This OEMP as revision 1 was in support of that application.

1.1 NAVACHAB GOLD MINE

Navachab has two active EPLs, whereby active fieldwork in the form of soil sampling, geophysical sampling and drilling activities are conducted on a regular basis. Navachab is mined as a conventional open pit mine with the current Carbon-In-Pulp (CIP) plant having a production capacity of 230 tph. The production capacity from this plant will be increased to 330 tph. Underground trial mining designed to access high-grade ore was completed successfully, with a feasibility study now underway. The geology and mineralisation of the underground ore is similar to the existing mine which will be processed after blending with run-of-pit ore. Test results from the trial mining are encouraging.

Navachab is developing an environmental and social impact assessment (ESIA) for the third tailing storage facility (TSF 3), establishment of an additional raw water storage dam and expansion of co-disposal facilities to active waste rock dumps, that falls under the ECC for ML 31. ECC has compiled this operational environmental management plan in terms of the Environmental Management Act (EMA), No.7 of 2007 and its regulations of 2012 to support the amendment application.

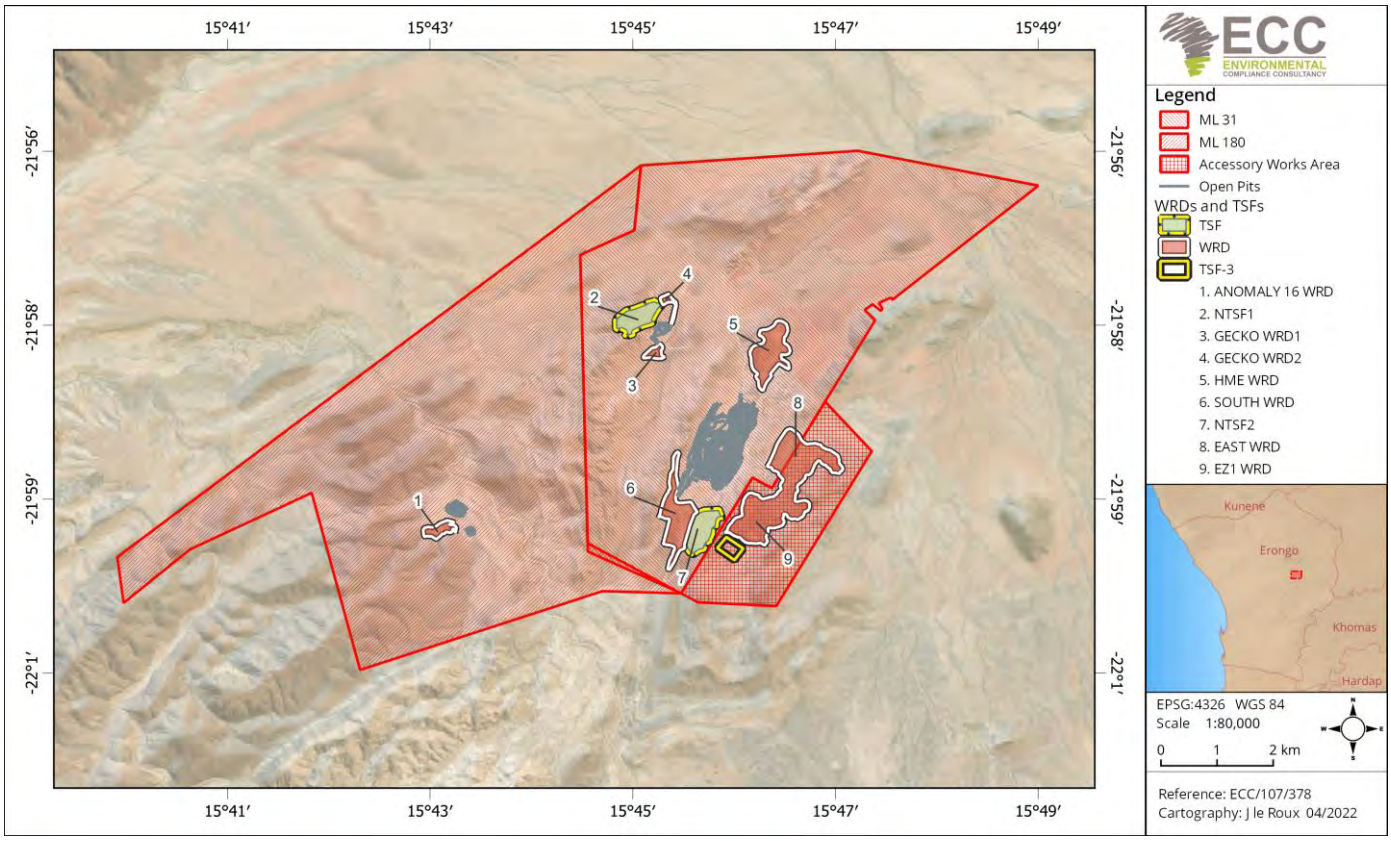

Figure 1 – Navachab tailings and mine waste areas within mining licences and AWA

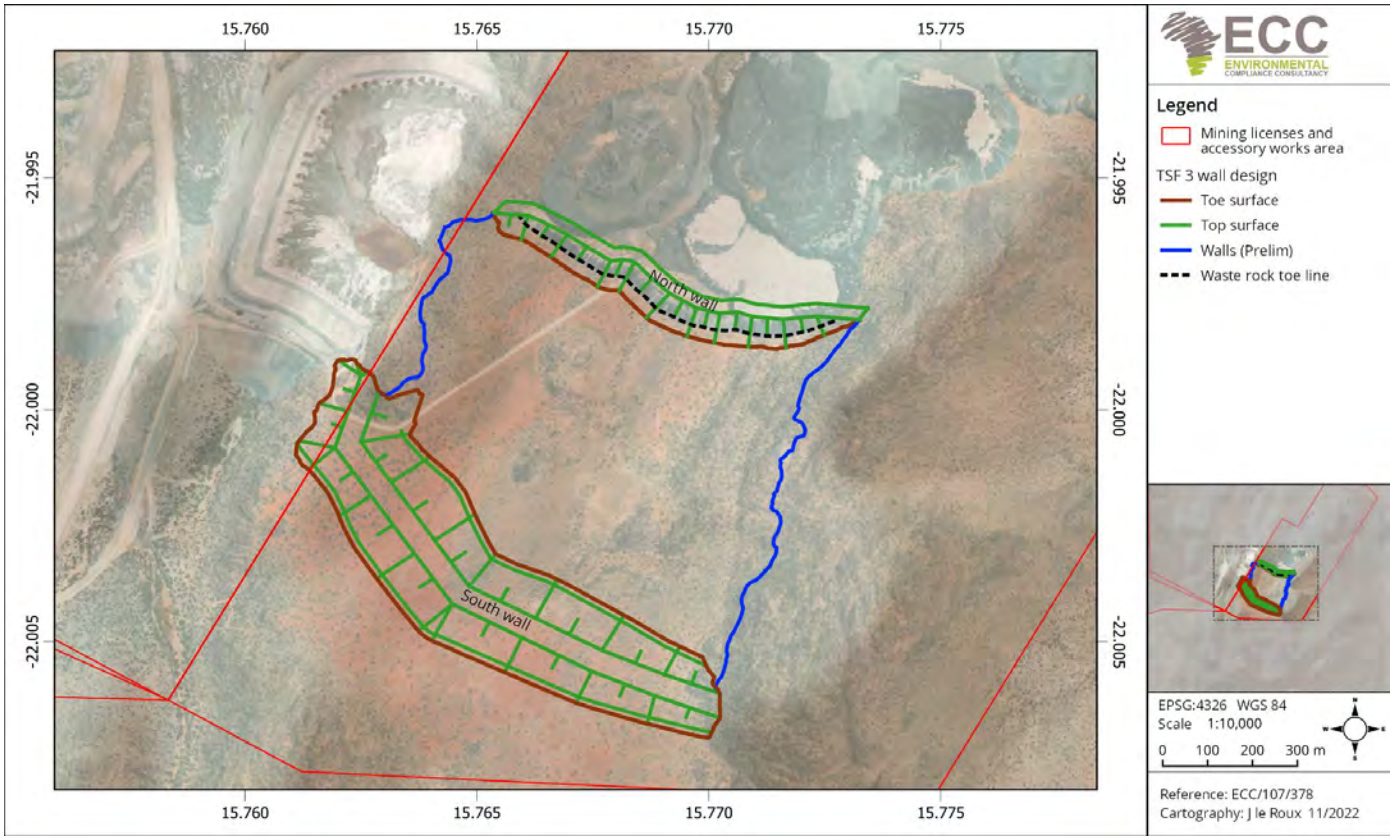

Figure 2 - TSF 3 northern and southern wall

1.2 SURFACE WATER QUALITY MONITORING

The objective of monitoring surface water is to determine baseline and operational trends. Surface water quality monitoring locations will include the TSF 3 decant water once the TSF is operational. Additional surface water monitoring locations will be determined based on the TSF 3 operational manual and will be updated as the TSF 3 operations progress.

1.3 GROUNDWATER QUALITY MONITORING

Groundwater monitoring provides a baseline and ongoing data sets to determine the quality of groundwater prior to and during operations to identify and further mitigate impacts. Groundwater monitoring locations for TSF 3 will be incorporated into the overall design and where required additional boreholes will be drilled within the seepage pathways for ongoing monitoring. Additional groundwater monitoring locations will be determined based on the TSF 3 operational manual and will be updated as the TSF 3 operations progress.

1.4 AIR QUALITY MONITORING

Air quality monitoring is conducted in locations downwind of Project activities. Additional and new depositional dust monitoring stations will be installed in the prevailing wind direction to monitoring potential dust impacts on receptors from the TSF 3. These will be installed prior to construction and for a 12 month period during operations.

DOMAIN TSF 3 ANNEX – PART OF DOMAIN 5 – TSF3

The schedule includes all infrastructure and activities within the operational control of the domain outlined and mapped below:

- Nearby access roads;
- North and south embankments and related landforms;
- Power;
- Barge and pumps;
- Tailings pipeline and spigots and any cyclones that might be in use;
- Reclaim water pipeline;
- Fencing; and
- Monitoring and survey equipment.

The Ore Processing department is responsible for:

- Design, approval, construction, operation, maintenance, surveillance (OMS) of TSF 3

The environmental department and mine surveyors are responsible for respective monitoring.

Table 1 – Domain 3: Tailings Storage Facility 3

Domain 5 – Tailings – TSF 3 Annes to Domain 5			
Environmental risk of domain	**Consequence**	**Likelihood**	**Risk**
	Major 4	Rare 1	Moderate (10)
Domain manager	Ore Processing Manager		
Statutory requirements	**Permit / Permit name**	**Environmental permit conditions**	
	In the event that new tailings storage facility needs to be established: Where practical and required obtained a land clearing permit from the Ministry of Agriculture, Water and Forestry (MAWF) (Only valid for 3 months therefore must be applied for in advance of clearing works)	Stipulated on permit. General conditions may include; Number of protected trees to be removed, area cleared and surveyed, photos and use of resources cleared e.g. rehabilitation	
Potential issues or impacts	**Water** – Potential for water contamination with a third TSF **Biodiversity and ecological function (services, such as soil/ecosystem)** – Excessive clearing of vegetation for footprint and Loss of habitat – Barrier to wildlife movement – Potential for (cumulative) impacts to soils/ecosystems/habitat, flora, fauna due from construction an operation of a third TSF – Infrastructure and water resource impact from (multiple) embankment failure(s) due to earthquake or unusually high pore pressure; affecting farm infrastructure and AN16 to the southwest.		

Domain 5 – Tailings – TSF 3 Annes to Domain 5			
	Air Quality – Dust generated from tailings – Dust generated heavy equipment during construction and maintenance **Social** – Nuisance noise and dust		
Targets	Zero noise and dust complaints from neighbouring community Air quality monitoring reflects that the surfaces have been kept moist with a 90% compliance commitment applied to the dust thresholds 100% prevention of groundwater contamination No clearing for footprint without land clearing permits where recovery of topsoil or substrate material for rehabilitation is possible (10 days notices to be given) Compliant/below threshold on pore water pressure, regular tailings and embankment inspections, maintenance, and audits. TSF operated in accordance with best practices as adopted from various standards.		
Operational management measures	To minimise the effects the above-mentioned impacts may have on the environment and community, the domain manager will ensure the following measures are implemented: – A robust monitoring system is in place to monitor and detect possible mine drainage matters. – Land clearing permits are applied from the appointed ECO in advance. The domain manager should ensure that the Land Clearing permit process is triggered at the mine planning stage and therefore must include environmental consideration for future works, this is important in areas where recovery of topsoil or substrate material for rehabilitation is possible. – If elevate dust readings warrant further mitigation, the site can implement a proactive approach to weather monitoring and when high winds are predicted, ensure an operational water system (spigots/sprinklers) is deployed to prevent excess dust being generated off the surface of the tailings. – Implement measures to reduce noise from the facility (construction and maintenance heavy equipment) if monitoring/community feedback detects noise breaches (especially at night). – Monitor pore water pressure and regular tailings and embankment monitoring, maintenance, inspection and audits – Ensure the closure plan includes provisions for rehabilitation and that the schedule is adhered to prevent visual impacts from unrehabilitated areas.		
Environmental pollution control measures (PCM)	**PCM risk score**	**Function and performance**	**Maintenance frequency**
	Water cart Moderate 8	Water surfaces to prevent dust	As per PMS
	Water Quality		

Domain 5 – Tailings – TSF 3 Annes to Domain 5					
Environment monitoring	**Site code**	**Name**	**Monitoring purpose**	**Frequency**	**Threshold**
	TSF 3 toe	Potential seepage monitoring	Visual monitoring around TSF after rains -signs of ARD	Within 24 – 48 hours rainfall	@ field pH <5 sample to laboratory
	Water	Surface and groundwater sampling	Impacts of TSF 3 on water quality in the area	Within 24 – 48 hours rainfall	OEMP
			Impacts on surface/ground water quality		
			Impacts on ground water quality	OEMP	
	Air Quality				
	Site code	**Name**	**Monitoring purpose**	**Frequency**	**Threshold**
	Deposition al dust	New sites to be installed	Impacts of dust from tailings on workers/farms/ community	Monthly	600 mg/m2/day
Environmental reporting	Domain manager to report to appointed ECO (monthly) – Volume of tailings deposited into TSF monthly. – Record and incidents of high CN results and report to management. – High sulphate seepages from TSF 3 (similar to TSF 2). – Any areas that required vegetation removal for the month ahead. Appointed ECO to report to domain manager – Notify domain manager in advance when high winds are predicated (daily). – Notify domain manager if contamination from TSF 3 detected (as per OEMP).				
Environmental inspection/s	**Daily**	**Weekly**	**Monthly**	**Other**	
	On shift mill supervisor – daily informal inspection of TSF	Domain manager completes weekly domain inspection	Domain manager and appointed ECO to complete	Annual or bi-annual compliance audit incorporated into the TSF engineer on records report.	
Supporting documents	Source: OEMP – Inspection form, – Domain sign off, and – Land clearing permit.				