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ENVIRONMENTAL MANAGEMENT PROGRAMME

RANDFONTEIN ESTATES LIMITED
WEST WITS RECLAMATION AND DEPOSITION PROJECT)
(GP) 30/5/1/1/2/07MR

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ACRONYMS AND ABBREVIATIONS

CA:	Competent Authority
CARA:	Conservation of Agricultural Resources Act, 1983
CBA:	Critical Biodiversity Area
CMA:	Catchment Management Agency
C-Plan:	Conservation Plan
DEA:	Department of Environmental Affairs (now DFFE)
DFFE:	Department of Forestry, Fisheries and the Environment
DMPR:	Department of Mineral and Petroleum Resources
DMRE:	Department of Mineral Resources and Energy (now DMPR)
DSO:	Dam Safety Office
DWS:	Department of Water and Sanitation
EA:	Environmental Authorisation
EAP:	Environmental Assessment Practitioner
ECA:	Environmental Conservation Act
ECO:	Environmental Control Officer
EIA:	Environmental Impact Assessment
EIMS:	Environmental Impact Management Services (Pty) Ltd
ELWU:	Existing Lawful Water Use
EMPr:	Environmental Management Programme
EN:	Endangered



EO:	Environmental Officer
ESA:	Ecological Support Areas
GN:	Government Notice
GNR:	Government Notice Regulation
Ha:	hectare
HIA:	Heritage Impact Assessment
I&AP:	Interested and Affected Party
ICRP:	International Commission on Radiological Protection
IEA:	Integrated Environmental Authorisation
IEM:	Integrated Environmental Management
IWML:	Integrated Waste Management Licence
km:	kilometre
ktpm:	kilotonnes per month
LOM:	Life of Mine
m:	meters
mamsl:	meters above mean sea level
MHSA:	Mine Health and Safety Act 29 of 1996
mm:	millimetres
MPRDA:	Minerals and Petroleum Resources Development Act, 2002
MR:	Mining Right
Mt:	Megatonne
NB:	Nominal Bore
NDCR:	National Dust Control Regulations
NEMA:	National Environmental Management Act, 1998
NEMAQA:	National Environmental Management: Air Quality Act, 2004
NEMWA:	National Environmental Management: Waste Amendment Act, 2008
NEMBA:	National Environmental Management: Biodiversity Act, 2004
NHRA:	National Heritage Resources Act, 1999
NRWMP:	National Resource and Water Management
NWA:	National Water Act, 1998
PPP:	Public Participation Process
RE:	Remaining Extent / Remainder
REM:	Regional Environmental Manager
RWD:	Return Water Dam
SAHRA:	South African Heritage Resources Agency
SANS:	South African National Standards
SCC:	Species of Conservation Concern



SEO:	Site Environmental Officer
SLP:	Social and Labour Plan
SWMP:	Stormwater Management Plan
TOPS:	Threatened or Protected Species
TSF:	Tailings Storage Facility
WMA:	Water Management Area
WML:	Waste Management License
WULA:	Water Use License Application
WUL:	Water Use Licence

GLOSSARY OF TERMS

Alien Invasive Species - *species of plants, animals or other organisms that are not indigenous to a region and which easily spread and destroy the indigenous plant species, taking over an area and causing biological and socio-economic harm.*

Applicant - *a person who has submitted an application for an environmental authorisation to the competent authority and has paid the prescribed fee.*

Aspect *- element of an organisation's activities, products or services that can interact with the environment.*

Auditing *- a systematic, documented, periodic and objective evaluation of how well the Environmental Management Programme (EMPr) is being implemented and is performing with the aim of helping to safeguard the environment by facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems, while keeping track of their compliance with the Environmental Authorization.*

Buffer *- a strip of land surrounding a wetland or riparian area in which activities are controlled or restricted.*

Clearing of vegetation - *clearing refers to the removal of vegetation through permanent eradication and in turn no likelihood of regrowth. 'Burning of vegetation (e.g. fire- breaks), mowing grass or pruning does not constitute vegetation clearance, unless such burning, mowing or pruning would result in the vegetation being permanently eliminated, removed or eradicated.*

Competent Authority *- an organ of state charged by the National Environmental Management Act (NEMA) with evaluating the environmental impact of an activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.*

Contractor *- the Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.*

Corrective (or remedial) action *- response required in addressing an environmental problem that is in conflict with the requirements of the EMPr. The need for corrective action may be determined through monitoring, audits or management review.*

Construction - *according to the regulations this term is defined as – the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity but excludes any modification, alteration or expansion of such a facility, structure or infrastructure and excluding the reconstruction of the same facility in the same location, with the same capacity and footprint'.*

Critical Biodiversity Area - *areas that are deemed important to conserve ecosystems and species. For this reason, these areas require protection.*

Decommissioning *- means to take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily recommissioned.*

Degradation *- the lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.*

Developer *– entity which applies for environmental approval and is ultimately accountable for compliance to conditions stipulated in the EA (Environmental Authorisation) and EMPr.*

Development - *means the building, erection, construction or establishment of a facility, structure, or infrastructure, including associated earthworks or Quarries, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or quarries, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.*

Ecological Support Area - *areas that support the ecological functioning of protected areas or CBAs or provide important ecological infrastructure.*

Environment *- the surroundings within which humans exist and that are made up of land, water and atmosphere of the earth, micro-organisms, plant and animal life: or any part or combination of the two and the interrelationships among them, the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.*

Environmental Assessment Practitioner *- individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations.*

Environmental Authorisation - *this is a decision by a Competent Authority to authorise a listed activity in terms of the National Environmental Management Act (NEMA). The authorisation means that a project, either in totality or partially, can commence subject to certain conditions. The Competent Authority has a right to refuse to grant authorisation for a project in totality or partially.*

Environmental Impact Assessment (EIA) - *an Environmental Impact Assessment (EIA) refers to the process of identifying, predicting and assessing the potential positive and negative social, economic and biophysical impacts of a proposed development. The EIA includes an evaluation of alternatives; recommendations for appropriate management actions for minimising or avoiding negative impacts and for enhancing positive impacts; as well as proposed monitoring measures.*

Environmental Management Programme - *a programme with set objectives and timeframes that seek to achieve a required end state and describes how activities that have or could have an adverse impact on the environment will be mitigated, controlled, and monitored.*

An Environmental Officer - *is typically an internal site-based officer focused on maintaining ongoing, long-term regulatory compliance within a company's development / operations against issued authorisations, licenses and permits.*

Environmental Control Officer - *is typically a qualified independent professional responsible for assessing compliance with environmental legislation, policies, and management plans, particularly during construction or operational phases.*

Environmental Policy *– a statement of intent and principles in relation to overall environmental performance, providing a framework for the setting of objectives and targets.*

Flora *- plant life that occurs in a specific geographical region and/habitat.*

Fauna *- animal life that occurs in a specific geographical region and/habitat.*

Habitat *- a habitat is an ecological or environmental area that is inhabited by a particular species of animal, plant, or other type of organism. It is the natural environment in which an organism lives, or the physical environment that surrounds a species population.*

Hazardous substance *- is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995.*

Heritage Resource *- means any place or object of cultural significance.*

Impact *- a description of the potential effect or consequence of an aspect of the development on a specified component of the biophysical, social or economic environment within a defined time, space, magnitude and intensity.*

Indigenous Vegetation - *plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.*

Indigenous species *- flora and Fauna species that are naturally found in an area.*

Infrastructure *- the network of facilities and services that are needed for economic activities, e.g. roads, electricity, water, sewerage, etc.*

Integrated Environmental Management *- this is a philosophy used in the assessment of and management of the environment, during all actions, plans, activities, etc. that could affect the environment. Its aim is to ensure sustainability.*

Method statement *- means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification.*

The method statement must cover as a minimum, applicable details regarding:

(i) Construction procedures;

(ii) Plant, materials and equipment to be used;

(iii) Transporting the equipment to and from site;

(iv) (iv) How the plant/ material/ equipment will be moved while on site;

(v) How and where the plant/ material/ equipment will be stored;

(vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;

(vii) Timing and location of activities;

(viii) Compliance/ non-compliance; and

(ix) Any other information deemed necessary by the Project Manager.

Mitigation *- measures designed to avoid, educe or remedy adverse impacts. Actions that limit, stop or reverse the magnitude and/or rate of long-term effect on the environment.*

Natural environment *- encompasses all living and non-living things occurring naturally on Earth or some region thereof. It is an environment that encompasses the interaction of all living species. Climate, weather, and natural resources that affect human survival and economic activity.*

Policy *– a set of aims, guidelines and procedures to help you make decisions and manage an organisation or structure. Policies are based on people or an organisation's values and goals.*

Process *- development usually happens through a process - a number of planned steps or stages.*

Resources *- parts of our natural environment that we use and protect, e.g. land, forests, water, wildlife, and minerals.*

Return Water Dam - *a return water dam is a purpose-built facility, often on a mine, that stores and controls process water, which is then pumped back to the plant or to a reclamation site.*

Slope- *means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units.*

Slurry - *in mining, a slurry is a thick, fluid mixture of solids and liquid, usually water, that is used to transport extracted ore and waste materials like tailings from one place to another.*

Solid waste - *means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers).*

Species of Conservation Concern - *IUCN Red List definition: Threatened species, and other species of significant conservation importance: Extinct, Extinct in the Wild, Near Threatened, Data Deficient. In South Africa, the following additional categories are added: Rare, Critically Rare.*

Spoil - *means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works.*

Tailings - *tailings are the leftover, finely-ground rock, minerals, and water that remain after the valuable components have been extracted from mined ore. These waste materials are typically processed into a slurry and pumped into surface storage facilities, called tailings dams or Tailings Storage Facilities where they are stored as fine-grained residue.*

Tailings Storage Facility *- specially engineered structures, often large dams, designed to contain the liquid or slurry waste (tailings) from mining operations, which consist of crushed rock, water, and trace chemicals.*

Threatened or Protected Species *- these refers to either plants or animals that are at a threat of Extinction or are protected due to their high conservation value or national importance.*

Topsoil - *means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil.*

Watercourse Refers to:

- *a river or spring;*
- *a natural channel in which water flows regularly or intermittently;*
- *a wetland, lake or dam into which, or from which, water flows; and*
- *any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks.*

Wetland *- land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.*

Works - *means the works to be executed in terms of the Contract*

1 INTRODUCTION

Randfontein Estates Limited (a subsidiary of Harmony Gold Mining Company) (hereafter referred to as the applicant) has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the required authorisation processes and to compile and submit the required documentation in support of application for the proposed new Deelkraal II Tailings Storage Facility (TSF) project and associated infrastructure on a site located approximately 13km southwest of Carletonville in the Merafong City Local Municipality, West Rand District Municipality, Gauteng Province (i.e. the Proposed Harmony West Wits Reclamation and Deposition Project).

The Applicant requires additional deposition capacity for West Wits region's operations. The applicant plans on constructing the Deelkraal II Tailings Storage Facility (TSF) to cater for the additional future capacity. This TSF will receive residue from Kusasalethu, and Savuka plants and will also assist in returning process water for reclaiming the existing Deelkraal 1 TSF and Kusasalethu TSF for processing at Kusasalethu and Savuka plants. Additional planned infrastructure includes slurry, potable, process sewage and return water pipelines, access roads, pump stations, a return water dam and a power line. Proposed upgrades to the existing Kusasalethu plant are also proposed as part of the project.

The Savuka Plant treats tailings from the Savuka Dormant TSFs (Old North TSFs) at a rate of 330 000 tpm and deposits the subsequent tailings on Savuka 5 & 7 TSFs. Harmony plans on remining Deelkraal 1 Dormant TSF and Kusasalethu TSF amongst other potential future sources. These TSFs will be processed through the Kusasalethu Plant at 500 000 tpm. The planned Life of Mine (LOM) for the West Wits region exceed the available deposition capacity of the existing TSFs. Therefore additional deposition capacity is required.

The Kusasalethu Plant will accommodate future reclamation operations and will therefore need site/s to deposit the tailings. Harmony owns ground, located adjacent to the Deelkraal 1 Dormant TSF, that can be used i.e. for the proposed Deelkraal II TSF. The Deelkraal 1 Dormant TSF and adjacent footprint combined geometry will accommodate the future reclamation operations deposition rate and capacity. The proposed TSF will cover an area of approximately 430 ha.

The West Wits Reclamation (WWR) Concept Study explores ways to unlock the potential of recycling historic gold tailings using the existing Kusasalethu and Savuka process plants and infrastructure. The Concept Study (SGS Bateman, 2024) evaluated different options for the treatment of the Deelkraal 1 and Kusasalethu Tailings Storage Facilities (TSF) at the existing processing plants. The reworked tailings will be deposited on a new TSF, referred to as Deelkraal II, assumed to be constructed on a site adjacent to the existing Deelkraal TSF. While reviewing the preliminary metallurgy testwork results it became evident that the Deelkraal TSF contained higher grades of accessible gold and it was agreed that that TSF would be reclaimed first, with the Kusasalethu TSF being reclaimed thereafter (SGS Bateman, 2024).

In addition to the Deelkraal II TSF, additional infrastructure is also proposed, as follows:

- A new main Return Water Dam (RWD) in the vicinity of the Deelkraal II TSF;
- Two smaller RWDs due to topography in the vicinity of the Deelkraal II TSF;
- Upgrades to the existing Kusasalethu plant including new/upgrade of gold and new uranium sections;
- Slurry pipelines:
    - Reclaimed Slurry from Deelkraal I to Kusasalethu plant (~10,6km);
    - Kusasalethu Barren Tailings to Deelkraal II (~10,2km);
    - Reclaimed Slurry from Kusasalethu TSF to Kusasalethu Plant (~2km);
    - Slurry pipeline from Kusasalethu Plant to Savuka TSF (~4,97km) enabling treatment of either the Deelkraal 1 or Kusasalethu TSF's; and
    - Slurry pipeline from Savuka plant to DF5 TSF (~2,9km).

- Process Water Pipelines:
    - Process Water Feed from Kusasalethu Plant to Deelkraal I Reclamation (~9.54km)
    - Return Water Feed to Deelkraal I TSF Reclamation station and Kusasalethu Process Water Tank (~9,58km);
    - Driefontein DP3 Pump Station to North Boundary Dam (~4,78km);
    - DP3 feed to Tau Tona Reverse Osmosis Plant (~0,1km);
    - Nursery Pumpstation #3 to Kusasalethu Process Water Tank (~9km); and
    - 2 Process Water pipelines from Kusasalethu Plant to Savuka White Tanks (~8km).
- Powerlines (all proposed powerlines will be 22kV or lower):
    - Powerline from Kusasalethu Plant to the existing Deelkraal I and II TSF (~9.2km);
    - Powerline from Kusasalethu Plant to the Kusasalethu TSF (~1.8km); and
    - Powerline from Savuka shaft to Kusasalethu (~8.1km) and or tie into powerline from Kusasalethu Plant to the existing Deelkraal I and II TSF.
- Potable Water pipeline from Rand Water supply point to the Deelkraal TSF (~8.52km).
- Deelkraal I TSF Reclamation Pump Station and Kusasalethu TSF Reclamation Pump Station.
- New Access Roads (2x3,5m double road) adjacent to pipeline routes/OH lines and around Deelkraal II TSF (where no access road is already in place).
- Topsoil Stockpiles and overburden stockpiles.
- Ancillary construction infrastructure including ablutions, workshops and laydown areas, most of which would be temporary and removed at the end of construction.

All pipelines listed above will be flanged steel pipelines installed above-ground on pre-cast concrete plinths and two 3.5m wide access roads, adjacent to the pipelines, will be cleared/graded to provide access for construction, maintenance and inspections (for areas where no access road is already in place).

In accordance with the Regulation 23 of the EIA Regulations (GN R982 of 2014) as amended, Randfontein Estates is required to compile and submit an Environmental Management Programme (EMPr) to support the IEA as well as to support the WUL application. Randfontein Estates appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as independent Environmental Assessment Practitioner (EAP) to undertake the necessary applications as well as compile the supporting documents for the applications. This EMPr was compiled by EIMS as part of the application for an IEA application to be submitted to the Competent Authority, the Department of Mineral and Petroleum Resources (DMPR) for consideration. **This standalone EMPr for the West Wits Reclamation and Deposition Project should be considered as an addendum to the existing approved EMPr (DMPR Reference (GP) 30/5/1/1/2/07MR.**

1.1 PURPOSE OF THE REPORT

An EMPr is an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and that the positive benefits of the projects are enhanced. This EMPr has been compiled as a guideline, in accordance with the EIA Regulations (GN R982 of 2014 as amended) for the requirements of an EMPr, to establish the mitigation and management measures that need to be implemented to avoid, reduce and minimise potential environmental impacts arising out of any of the phases applicable to the proposed project. An EMPr is a working document that should be updated on a regular basis, as and when necessary. The EMPr thus supports an on-going proactive mitigation approach and duty of care to the environment. The EMPr shall allow for risk minimization and will ensure legal compliance.



This document represents the specifics and stipulated level of compliance required for the proposed mining activities for the West Wits Reclamation and Deposition Project. The EMPr contains the following information:

- A description of the work programme and proposed activities;
- An assessment of the potential positive and negative impacts of the proposed activities; and
- An Environmental Management Plan to manage and/or mitigate potential negative impacts.

The EMPr aims to present management measures that will eliminate, offset or reduce adverse environmental impacts, as well as to provide the framework for environmental monitoring. The primary purpose of the EMPr is to ensure that negative environmental impacts of the proposed project are effectively managed within acceptable limits and that the positive impacts are enhanced.

1.2 REPORT STRUCTURE

This report is a new Environmental Management Programme (EMPr) for the proposed project, and as such is compliant with the requirements of NEMA EIA Regulations, 2014 as amended. **Table 1** below provides a summary of the NEMA requirements in terms of Appendix 4 of the EIA Regulations (GNR 982) (EIA Regulations), and an indication in which section the supporting information and documentation can be found**.** As previously indicated, this standalone EMPr for the West Wits Reclamation and Deposition Project should be considered as an addendum to the existing approved EMPr.

Table 1: Report Structure

Environmental Regulation	Description	Section in Report
NEMA Regulation 982 (2014) Appendix 4		
Appendix 4(1)(1)(a):	Details of – i. The EAP who prepared the EMPr; and ii. The expertise of that EAP to prepare an EMPr, including a curriculum vitae;	**Section 1.3**
Appendix 4(1)(1)(b):	A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	**Section 4**
Appendix 4(1)(1)(c):	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	**Section 1.5**
Appendix 4(1)(1)(d):	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified though the environmental impact assessment process for all phases of the development including – i. Planning and design; ii. Pre-construction activities; iii. Construction activities; iv. Rehabilitation of the environment after construction and where applicable post closure; and v. Where relevant, operation activities;	**Section 4 and Section 5**
Appendix 4(1)(1)(f):	A description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to – i. Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	**Section 5**



Environmental Regulation	Description	Section in Report
	ii. Comply with any prescribed environmental management standards or practices; iii. Comply with any applicable provisions of the act regarding closure, where applicable; ands iv. Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable.	
Appendix 4(1)(1)(g):	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Section 3.2**
Appendix 4(1)(1)(h):	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	**Section 2.4** **Section 3.4**
Appendix 4(1)(1)(i):	An indication of the persons who will be responsible for the implementation of the impact management actions;	**Section 3.1** and **3.4** and **5**
Appendix 4(1)(1)(j):	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	**Section 5**
Appendix 4(1)(1)(k):	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	**Section 3.4**
Appendix 4(1)(1)(l):	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	**Section 2.4**
Appendix 4(1)(1)(m):	An environmental awareness plan describing the manner in which – i. The Project Proponent intends to inform his or her employees of any environmental risk which may result from their work; and ii. Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	**Section 2.7**
Appendix 4(1)(1)(n):	Any specific information that may be required by the competent authority.	N/A – no specific information requested

1.3 DETAILS OF THE EAP

EIMS has been appointed by the applicant as the Independent EAP and to assist in preparing and submitting the IEA application, EIA Report, WUL Reports, and undertaking a Public Participation Process (PPP) in support of the proposed project. The contact details of the EIMS consultant and EAP who compiled this Report are indicated in **Table 2**.

Table 2: Details of the Environmental Assessment Practitioner

EAP:	Mr. John von Mayer
Tel No:	+27 11 789 7170
Fax No:	+27 86 571 9047
E-mail:	john@eims.co.za
Qualifications	• BSc Honours Environmental Science; University of the Witwatersrand, 2007 • BSc Environmental Science; University of the Witwatersrand, 2006 • Certificate in Environmental Law, Rhodes University, 2011
Professional Registrations:	• Registered Environmental Assessment Practitioner with Environmental Assessment Practitioner Association of South Africa – EAPASA (Reg. No: 2019/1247)). • Professional Natural Scientist with the South African Council for Natural Scientific Professions – SACNASP (Reg. No: 400336/11)

1.4 EXPERTISE OF THE EAP

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS is an independent specialised environmental consulting firm offering the full spectrum of environmental management services across all sectors within the African continent. EIMS has successfully completed many hundreds of assignments over the years with an excess of 30 years' experience in conducting EIA's for both the government and private sector. Please refer to the EIMS website (www.eims.co.za) for examples of EIA documentation currently available.

In terms of Regulation 13 of the EIA Regulations (GN R. 982) as amended, an independent EAP, must be appointed by the applicant to manage the application. EIMS is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations, as well as Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

- Objective and independent;
- Has expertise in conducting EIA's;
- Comply with the NEMA, the environmental regulations and all other applicable legislation;
- Considers all relevant factors relating to the application; and
- Provides full disclosure to the applicant and the relevant environmental authority.

This EMPr was prepared by John von Mayer, a Registered EAP employed by EIMS. John von Mayer is a senior consultant at EIMS and has been involved in numerous significant projects the past 17 years. He has experience in Project Management, small to large scale Environmental Impact Assessments, Environmental Auditing, Water Use Licensing, and Public Participation.

1.5 DESCRIPTION OF THE PROPERTY

Table 3 provides a description of the property details of the proposed West Wits Reclamation and Deposition Project site as well as the distance to the nearest towns. See **Figure 1** for the locality of the proposed project.

Table 3: Locality details

Application Area (Ha)	The following areas / footprints and distances are relevant: • Approximately 430 ha for the TSF footprint. • Approximately 13 ha for new main Return Water Dam. • Approximately 3 hectares combined area for two smaller Return Water Dams. • Approximately 30 km of new slurry pipelines (with a 4m wide servitude) • Approximately 25 km of new process and potable water pipelines (with a 4m wide servitude) • Approximately 15 km of new 7,5m wide access roads • Approximately 18km of new powerlines. • Approximately 4 ha combined area for new reclamation pump stations. • Approximately 65 ha for new topsoil / overburden stockpiles. • Approximately 35 ha total for the various associated construction laydown areas. Planned upgrades to the Kusasalethu plant will all be within the existing plant footprint.		
Magisterial District	Merafong City Local Municipality within the West Rand District Municipality (Gauteng Province).		
Distance and direction from nearest towns	The site is approximately 13km southwest of Carletonville. The geographic coordinates at the centre of the proposed Deelkraal II TSF site are 26°28'10.51"S, 27°16'56.07"E.		
Property Details	**Farm Name:**	**Portion:**	**21 Digit Surveyor General Code**
	Deelkraal II TSF and associated reclamation pump station, RWDs and associated laydown areas and roads around TSF Centre point: 26°27'58.21"S, 27°17'32.72"E.		
	Kleinfontein 141 IQ	2	T0IQ00000000014100002
	Kleinfontein 141 IQ	4	T0IQ00000000014100004
	Kleinfontein 141 IQ	5	T0IQ00000000014100005
	Kleinfontein 141 IQ	6	T0IQ00000000014100006
	Deelkraal 142 IQ	3	T0IQ00000000014200003
	Deelkraal 142 IQ	23	T0IQ00000000014200023
	Deelkraal 142 IQ	59	T0IQ00000000014200059
	Deelkraal 142 IQ	60	T0IQ00000000014200060
	Additional Associated Infrastructure: pipelines & powerlines, access roads, topsoil stockpiles, additional laydown areas, pump stations and access roads, **New Process Water Pipelines:** **Process Water Feed to Deelkraal Reclamation** Start: 26°27'22.37"S, 27°21'26.43"E Middle: 26°26'37.70"S, 27°19'45.69"E End: 26°27'29.40"S, 27°16'38.62"E **Process Water Feed to Kusasalethu Process Water Tank** Start: 26°27'30.82"S, 27°16'47.64"E Middle: 26°26'55.21"S, 27°19'34.04"E		

End: 26°27'22.29"S, 27°21'25.89"E

DP3 to North Boundary Dam
Start: 26°23'49.17"S, 27°25'58.07"E
Middle: 26°24'52.03"S, 27°25'40.75"E
End: 26°24'45.98"S, 27°24'25.98"E

DP3 feed to Tau Tona RO Plant
Start: 26°24'47.62"S, 27°25'44.70"E
Middle: 26°24'48.26"S, 27°25'45.71"E
End: 26°24'49.05"S, 27°25'46.90"E

Nursery Pumpstation #3 to Kusasalethu Process Water Tank
Start: 26°24'50.97"S, 27°24'25.62"E
Middle: 26°25'41.64"S, 27°22'16.40"E
End: 26°27'22.29"S, 27°21'26.33"E

2 x Process Water Pipelines Kusasalethu to Savuka White Tanks
Start: 26°27'22.27"S, 27°21'26.09"E
Middle: 26°26'4.20"S, 27°21'56.26"E
End: 26°25'24.05"S, 27°23'59.57"E

New Slurry Pipelines:
Reclaimed Slurry from Deelkraal 1 to Kusasalethu
Start: 26°27'29.83"S, 27°16'39.32"E
Middle: 26°26'48.69"S, 27°19'7.82"E
End: 26°27'25.95"S, 27°21'37.98"E

Kusasalethu Barren Tailings to Deelkraal II
Start: 26°27'24.44"S, 27°21'29.53"E
Middle: 26°26'48.69"S, 27°19'7.82"E
End: 26°27'51.94"S, 27°17'20.31"E

Reclaimed Slurry Kusasalethu TSF - Kusasalethu Plant
Start: 26°28'12.30"S, 27°21'45.85"E
Middle: 26°27'44.69"S, 27°21'46.67"E
End: 26°27'22.17"S, 27°21'39.17"E

Savuka Plant to DF5 TSF
Start: 26°25'17.30"S, 27°23'51.83"E
Middle: 26°24'56.58"S, 27°24'13.22"E
End: 26°24'12.61"S, 27°24'28.45"E

Slurry pipeline from Kusasalethu Plant to Savuka TSF
Start: 26°27'21.89"S, 27°21'29.50"E
Middle: 26°26'46.51"S, 27°21'29.25"E
End: 26°26'10.81"S, 27°20'56.45"E

New Potable Water Pipeline:
Start: 26°26'58.81"S; 27°21'15.10"E
Middle: 26°26'51.58"S,27°19'0.95"E
End: 26°27'28.87"S, 27°16'38.14"E

New Powerlines:
Kusasalethu Plant to Deelkraal
Start: 26°27'23.38"S, 27°21'33.53"E
Middle: 26°26'50.14"S, 27°19'9.04"E
End: 26°27'29.55"S, 27°16'38.94"E

Kusasalethu plant - Kusasalethu TSF
Start: 26°27'23.38"S, 27°21'33.53"E
Middle: 26°27'47.43"S, 27°21'50.11"E
End: 26°28'12.37"S, 27°21'44.23"E

	Savuka shaft – Kusasalethu Plant Start: 26°25'27.70"S, 27°24'14.77"E Middle: 26°25'47.77"S, 27°22'7.33"E End: 26°27'27.58"S, 27°21'27.59"E		
	Deelkraal 142 IQ	22	T0IQ00000000014200022
	Doornfontein 118 IQ	1	T0IQ00000000011800001
	Doornfontein 118 IQ	2	T0IQ00000000011800002
	Doornfontein 118 IQ	11	T0IQ00000000011800011
	Doornfontein 118 IQ	12	T0IQ00000000011800012
	Doornfontein 118 IQ	13	T0IQ00000000011800013
	Doornfontein 118 IQ	14	T0IQ00000000011800014
	Doornfontein 118 IQ	25	T0IQ00000000011800025
	Doornfontein 118 IQ	27	T0IQ00000000011800027
	Doornfontein 118 IQ	28	T0IQ00000000011800028
	Buffelsdoorn 143 IQ	1	T0IQ00000000014300001
	Buffelsdoorn 143 IQ	7	T0IQ00000000014300007
	Buffelsdoorn 143 IQ	9	T0IQ00000000014300009
	Buffelsdoorn 143 IQ	13	T0IQ00000000014300013
	Buffelsdoorn 143 IQ	31	T0IQ00000000014300031
	Buffelsdoorn 143 IQ	34	T0IQ00000000014300034
	Buffelsdoorn 143 IQ	35	T0IQ00000000014300035
	Blyvooruitzicht 116 IQ	3	T0IQ00000000011600003
	Blyvooruitzicht 116 IQ	4	T0IQ00000000011600004
	Blyvooruitzicht 116 IQ	5	T0IQ00000000011600005
	Blyvooruitzicht 116 IQ	6	T0IQ00000000011600006
	Blyvooruitzicht 116 IQ	62	T0IQ00000000011600062
	Blyvooruitzicht 116 IQ	93	T0IQ00000000011600093

	Blyvooruitzicht 116 IQ	100	T0IQ00000000011600100
	Blyvooruitzicht 116 IQ	107	T0IQ00000000011600107
	Driefontein 113	1	T0IQ00000000011300001
Existing Kusasalethu Plant (to be upgraded) Centre point: 26°27'26.75"S, 27°21'30.90"E			
	Buffelsdoorn 143 IQ	9	T0IQ00000000014300009
	Buffelsdoorn 143 IQ	35	T0IQ00000000014300035

Environmental sensitivity mapping provides a strategic overview of the environmental, cultural and social assets in a region. The sensitivity mapping technique integrates numerous datasets (base maps and shapefiles) into a single consolidated layer making use of Geographic Information System (GIS) software and analysis tools. Environmental sensitivity mapping is a rapid and objective method applied to identify areas which may be particularly sensitive to development based on environmental, cultural and social sensitivity weightings – which is refined by specialists' input within each respective specialist field based on aerial or ground-surveys. Therefore, the sensitivity mapping exercise assists in the identification of sensitive areas within and surrounding the proposed application area.

This sensitivity mapping approach allows for the identification of lower risk areas for positioning the project infrastructure whilst protecting identified sensitive environmental areas/ features through more rigorous mitigation (where possible). Areas identified as no-go would be fully excluded from any project related development regardless of the level of mitigation put forward. Furthermore, environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of environmental assessment processes.

The compilation of this map has taken into consideration the individual ranking of sensitivity by all the identified specialist disciplines (e.g. Air Quality, Geohydrology, Terrestrial and Aquatic Ecology, Heritage, Social, etc.). Work within the various sensitivity rankings must be managed according to the EMPr as well as the recommendations in the individual specialist reports. This sensitivity mapping approach allows for the proposed activities to be undertaken whilst protecting identified sensitive environmental areas / features. Furthermore, environmental sensitivity is used to aid in decision-making during consultation processes, forming a strategic part of Environmental Assessment processes.

Figure 2 shows the combined sensitivity map for the project. Key Sensitive areas identified to date relate to the presence of ridges and other potential terrestrial biodiversity sensitive areas, wetlands and aquatic areas, as well as potential heritage sites and potential sensitive air quality and noise receptors. This layout has been further refined from the layout presented in the preceding sections of the report to avoid as many identified sensitivities as possible whilst at the same time adhering to identified technical and engineering feasibility constraints. Some topsoil stockpile locations and pipelines have been removed from the application and the location of certain other infrastructure components have been shifted in order to avoid identified sensitive areas.

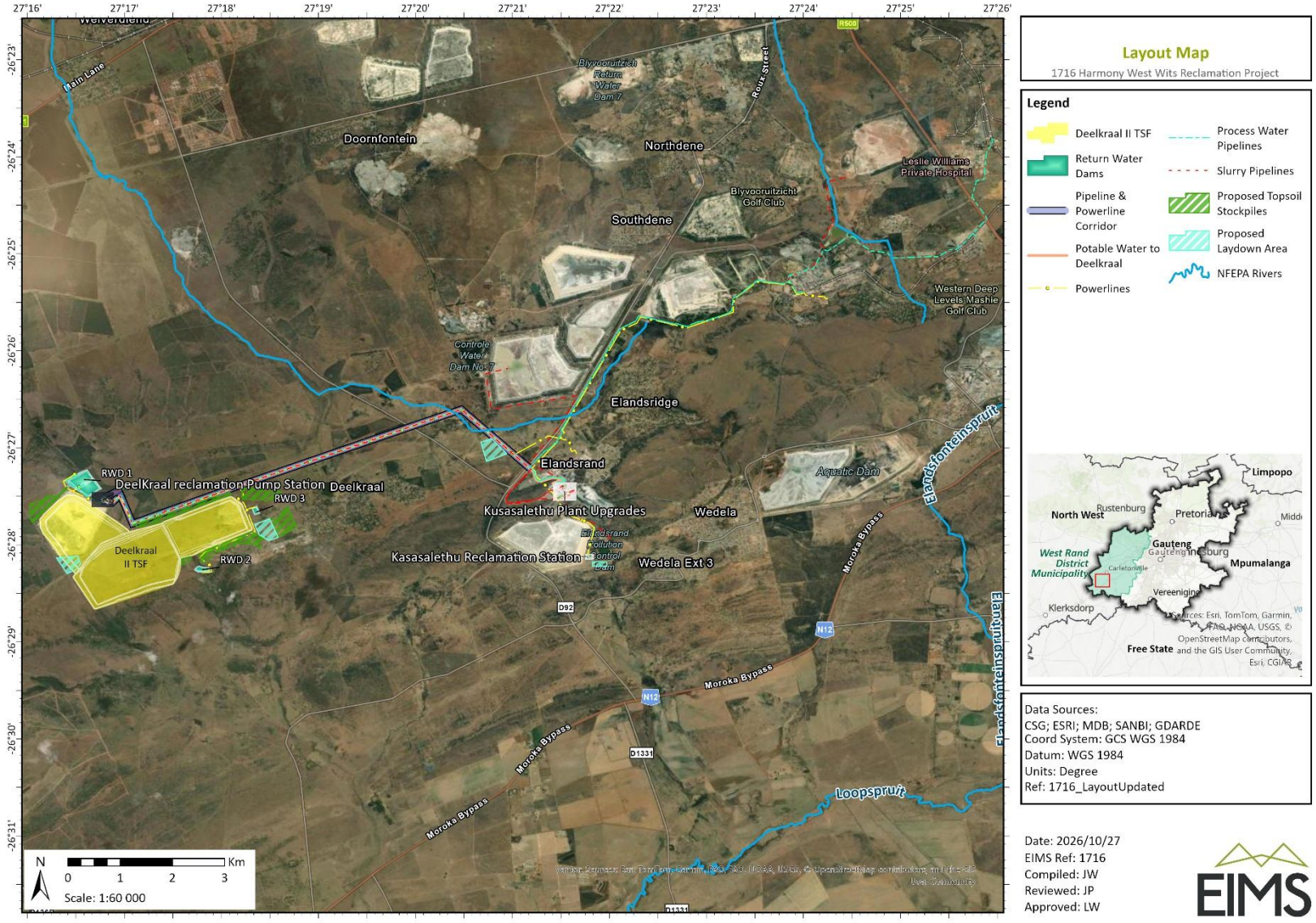


Figure 1: Aerial imagery locality map indicating the location of the proposed West Wits Reclamation and Deposition Project.

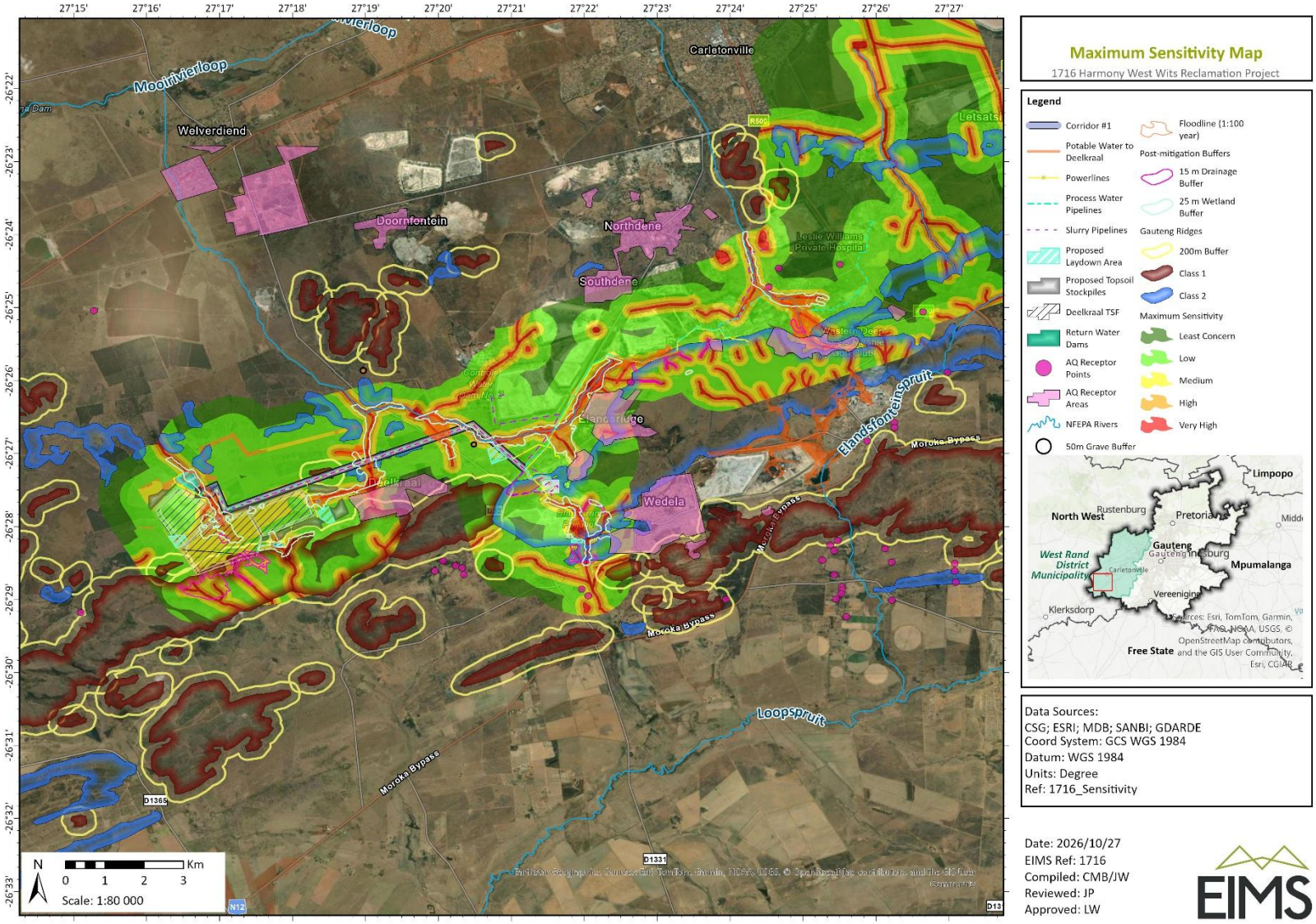


Figure 2: Site-specific environmental sensitivity map

2 ENVIRONMENTAL AND SOCIAL MANAGEMENT SYSTEM

An environmental management approach is a structured, comprehensive framework—often an Environmental Management System (EMS) like ISO 14001—used by organizations to identify, monitor, and minimize their environmental impact. It integrates sustainability into daily operations through policies, planning, and continuous improvement, focusing on pollution prevention, resource efficiency, and regulatory compliance. This section presents the general and specific environmental management approaches for the activities.

Management of operational risk is a key consideration for mines operating within the social and economic context of South Africa. Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. Operational risks and impacts are usually managed through the implementation of the Environmental Management System (EMS) (i.e. ISO 14001:2015-EMS) and Health and Safety (HS) system. An EMS is an important requirement for establishing and maintaining effective environmental management and should be undertaken during the planning phase of the Project. As such the Project Proponent shall be required to ensure all the aspects listed in this section are included as part of the EMS existing on the mine. Adequate resources (people, financial and technical) need to be made available to ensure effective establishment, implementation, maintenance and continual improvements of the EMS. The roles and responsibilities for these key environmental personnel should be clearly defined and communicated throughout the organisation. The EMS should include the requirement to constantly monitor environmental performance and assess the adequacy of environmental resources provided for the mine. If required, the mine would need to procure further environmental resources to ensure the successful implementation of the EMS and EMPr. The development and implementation of an EMS will guide compliance with relevant regulatory and other requirements.

2.1 EMS FRAMEWORK

The West Wits project EMS will be based on:

- The mine's corporate vision;
- South African legal requirements; and
- Mining best practice.

Ultimately an effective EMS should provide for effective management of social and environmental risks and impacts whilst maintaining legal compliance and meeting international standards of best practise where these are feasible and appropriate. Harmony subscribe to ISO 14001:2015-EMS, an EMS which is currently in place which will be applicable to the project.

2.1.1 STAKEHOLDER ENGAGEMENT

Social impacts occur immediately in the planning phase of a project and as such it is imperative to start with stakeholder engagement as early in the process as possible. This report will be placed out for public review in order to encourage stakeholder engagement, in accordance with the relevant legislation. Stakeholder engagement is, however, required on an ongoing basis throughout the operation of the facility. The mine will need to develop and implement a detailed Stakeholder Engagement Plan, designed to work as a living document for implementation over the entire Life of Mine (LoM).

The following stakeholder engagement framework outlines the principles and objectives for stakeholder engagement during all phases of the mining operation.

- To identify and assess the processes and/or mechanisms that will improve the communication between local communities, the wider community and the mine;
- To improve relations between mine staff and the people living in the local communities;
- To provide a guideline for the dissemination of information crucial to the local communities in a timely, respectful and efficient manner; and



- To provide a format for the timely recollection of information from the local communities in such a way that the communities are included in the decision-making process.

This stakeholder engagement plan will assist the Project Proponent to outline their approach towards communicating in the most efficient way possible with stakeholders throughout the life of the project. Such a plan cannot be considered a once off activity and should be updated on a regular basis to ensure that it stays relevant and to capture new information. The Stakeholder Engagement Plan should consist of the following components:

- Stakeholder Identification and Analysis – time should be invested in identifying and prioritising stakeholders and assessing their interests and concerns;
- Information Disclosure – information must be communicated to stakeholders early in the decision-making process in ways that are meaningful and accessible, and this communication should be continued throughout the life of the project;
- Stakeholder Consultation – each consultation process should be planned out, consultation should be inclusive, the process should be documented, and follow-up should be communicated;
- Negotiation and Partnerships – add value to mitigation or project benefits by forming strategic partnerships and for controversial and complex issues, enter into good faith negotiations that satisfy the interest of all parties;
- Grievance Management – accessible and responsive means for stakeholders to raise concerns and grievances about the project must be established throughout the life of the project;
- Stakeholder Involvement in Project Monitoring – directly affected stakeholders must be involved in monitoring project impacts, mitigation and benefits. External monitors must be involved where they can enhance transparency and credibility;
- Reporting to Stakeholders – report back to stakeholders on environmental, social and economic performance, both those consulted and those with more general interests in the project and parent company;
- Management Functions – sufficient capacity within the company must be built and maintained to manage processes of stakeholder engagement, track commitments and report on progress; and
- It is of critical importance that stakeholder engagement takes place in each phase of the project cycle and it must be noted that the approach will differ according to each phase.

2.1.2 GRIEVANCE MECHANISM

The proposed TSF is situated in a mining area where there are already high levels of impact and complex social dynamics. The communities are already exposed to a number of social and environmental impacts from different sources. The impacted urban communities are poor and there are high levels of unemployment. There is likely to be a lot of competition for jobs. Given its proximity to other mining areas, it is not expected that the project will cause a significant influx of people into the area, as there are already people with some skills in the area that the mine could employ and considering the limited additional human resources needed to undertake the proposed recommencement of deposition activities.

From a social perspective, the project will mostly result in existing impacts continuing or slightly increasing, due to the additional deposition and duration of the operational impacts. The additional deposition will not add significant social impacts. It must be considered that there are also positive social impacts, such as skills development, CSI projects and SLP projects that will continue.

In order for the community to be comfortable with the project, it is critical that the mine and the community come to an agreement on how to deal with the issues between themselves and the mine, if any arise. If the mine can resolve some of the current issues, if there are any, and prevent any issues from occurring, but implementing

this EMPr, it will assist with maintaining and improving their social licence to operate. The following recommendations are made:

- The mine must continue to invest in their Stakeholder Relations Division.
- The mine must implement a community-friendly external grievance mechanism in conjunction with communities;
- The mine must develop a community relations strategy to plan for and guide its involvement with the community. The strategy should include feedback mechanisms about aspects of concern to the community;
- The mine should put measures in place to ensure the most effective local employment strategy, in conjunction with local leadership; and
- The mine must ensure that social requirements as specified in the mitigation measures are included in their contracts with sub-contractors.
- All agreements about water provision should be done in writing.

2.1.3 INTERNAL GRIEVANCE PROCEDURE

The applicant shall develop a detailed internal grievance mechanism designed to receive and facilitate resolution of workplace concerns and grievances raised by employees (and their organizations, where they exist). Employees must be informed of the grievance mechanism at the time of recruitment, and it must be made easily accessible to them. The mechanism should involve an appropriate level of management and address concerns promptly, using an understandable and transparent process that provides timely feedback to those concerned, without any retribution. The mechanism should also allow for anonymous complaints to be raised and addressed. The mechanism should not impede access to other judicial or administrative remedies that might be available under the law or through existing arbitration procedures, or substitute for grievance mechanisms provided through collective agreements.

2.2 DOCUMENT CONTROL

A document handling system must be established, if not already established (then maintained), to ensure accurate updating of EMPr documents, and availability of all documents required for the effective functioning of the EMPr. The document handling system must be devised by the project proponent and/or Contractors and agreed upon by all key parties. Responsibilities must be assigned to relevant personnel for ensuring that the EMPr documentation system is maintained and that document control is ensured through access by and distribution to identified personnel.

Supplementary EMPr documentation could include:

- EMPr implementation activity specifications;
- Emergency preparedness and response procedures;
- Incident reports;
- Training records;
- Records of chemicals or hazardous substances kept on site;
- Records of alien invasive plant control activities;
- Site inspection reports;
- Monitoring reports;
- Auditing reports; and
- Complaints received.



The Environmental Officer (EO) and Environmental Manager (EM) should be responsible for ensuring that the registration and updating of all relevant EMPr documentation is carried out. It is usually the responsibility of the Project Manager to ensure that all personnel are performing according to the requirements of this procedure and to initiate the revision of controlled documents, when required by changes in process. Clear procedures must be specified at the beginning of the project for making changes to EMPr documents, circulating updated documents, and destroying obsolete versions. Documents must be revised as required by changing circumstances. Distribution lists and document change control sheets must be kept for all documents.

2.3 RECORD KEEPING

It is essential that an official procedure for control of records be developed to ensure records required to demonstrate conformity to environmental and social standards are maintained. The Project Proponent (Applicant) is, therefore, required to develop and maintain a procedure for the identification, storage, protection, retrieval, retention and disposal of records as part of the EMS. Records must be legible, identifiable and traceable.

2.4 AUDITING AND REPORTING PROCEDURES

Reporting procedures must be developed at the start of the project, for conveying information from the monitoring activities and to ensure that management is able to take rapid corrective action should certain thresholds be exceeded. Different reporting procedures to deal with may include:

- Inspections;
- Accidents and emergencies;
- Measuring performance indicators and interpreting and acting on the indicators;
- Records of monitoring activities to test the effectiveness of mitigation measures and impact controls, as well as for compliance auditing purposes; and
- Training programmes and evidence of appropriate levels/amount of skills/capacities created.

2.5 RESPONDING TO NON-COMPLIANCES

If the mitigation measures stated in the EMPr are not adequately implemented, or do not achieve the desired result, the authorities may stop the project until corrective actions have been taken and the desired environmental objective or target has been met. A system for dealing with non-compliances must be employed to ensure that the EMPr is adequately implemented. The system to be used must be determined described in the EMPr, included in the tender documents and contracts, and made clear to all project workers.

Non-compliance will be identified and managed through the following four key activities including;

- **Inspections** of the site and activities across the site;
- **Monitoring** of selected environmental quality variables;
- **Audits** of the site and relevant documentation as well as specific activities; and
- **Compliance Reporting** to the Department.

An environmental non-conformance and incident register must be prepared and maintained by the Environmental Officer (EO) throughout the lifespan of the operation in order to monitor environmental concerns, incidents, and non-conformances. The register must include details of date, location, description of the NC or Incident, applicable environmental commitment/standard, corrective action taken, adequacy of corrective action, date rectified, etc.

Non-compliance with the EMPr or any other environmental legislation, specifications or standards shall be recorded by the EO in the non-conformance register. This register shall be maintained by the EO and will be sent to the Environmental Manager (EM) on a regular basis (at least quarterly), and the Project Proponent/EM shall

ensure that the responsible party takes the necessary corrective actions. Non-conformances may only be closed out in the register by the EO upon confirmation that adequate corrective action has been taken. The register should be utilised to measure overall environmental performance.

2.6 ENVIRONMENTAL INCIDENTS

For the purposes of this project, environmental incidents will be dealt with according to the incident management and reporting procedure.

In the event of an emergency incident (unexpected sudden occurrence), including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed, the Project Proponent shall notify the relevant authorities, in accordance with legal requirements (e.g. Section 30 of NEMA and Section 20 of the NWA).

2.7 ENVIRONMENTAL AWARENESS PLAN AND TRAINING

Training is essential for ensuring that the EMPr provisions are implemented efficiently and effectively. Training needs should be identified, based on the available and existing capacity of site and project personnel (including the project proponent, Contractors and Sub- contractors) to undertake the required EMPr management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. In addition to these parties, general environmental awareness must be fostered among the general workforce to encourage the implementation of environmentally sound practices. This ensures that environmental accidents are minimized and environmental compliance maximized. Environmental awareness could be fostered by induction course for all workers on site, before commencing work on site, as well as during regular “toolbox talks”. Workers should also be alerted to particular environmental concerns associated with their tasks for the area/habitat in which they are working. Courses must be given by suitably qualified personnel and in a language and medium understood by workers/employees.

2.7.1 MANNER IN WHICH EMPLOYEES WILL BE INFORMED OF ENVIRONMENTAL RISKS

The Human Resources Development Programmes of the Project Proponent, include appropriate training and skills development programmes as required by the workforce in support of operation specific business plans. Training is offered in portable skills, being competencies that will enable employees to find jobs elsewhere within the mining industry, or to become self-employed. Harmony Training Centre will continue to provide skills training to mine workers during their employment at the operation. This training will be fully accredited, ISO registered and all skills development Programmes will be unit standards-driven and thereby portable within the industry. The Workplace Skills Development Plan is formulated; developed and implemented in line with the skills development plan as accorded by the Skills Development Act of 1997 and the Mining Qualifications Authority requirements.

All training, short courses and tertiary studies will adhere to the above-mentioned criteria and will be guided and aligned to affiliate processes inherent of managing downscaling and local economic development. These income-generating skills will be informed by the relative IDP/LED priorities of the relevant municipality and will be facilitated timeously.

There is a Mining Qualifications Authority accredited (Adult Basic Education and Training) ABET Programme in place for the operation offering both part and full-time classes. The venue where these are presented is appropriate and classrooms can adequately accommodate 20 learners per class.

Training initiatives have focused on the development of both technical and managerial skills of senior and middle management. At the operational level, training initiatives include mine management commitment to the ABET initiatives.

Broadly the Skills Development Plan for Harmony details the respective training that is being provided as per the requirements of the shaft business plans and articulates the measures that are in force to ensure that continued career progression of Historically Disadvantaged South Africans (HDSA’s) into management levels and women in the mining industry.

As part of the training process, teams / parties are encouraged to:

- Promote and encourage inspections/reporting on environmental impacting incidents;
- Practice concurrent rehabilitation;
- Support regional environmental management awareness campaigns/programmes and systems; and
- Be aware of your actions on the environment.
- Initial environmental induction and periodic toolbox talks should be made a requirement for all contractors.

2.7.2 MANNER IN WHICH ENVIRONMENTAL RISKS WILL BE DEALT WITH

Environmental incident reporting is a vital part of communication for the Environmental Department at the Operation. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate remedial action can be implemented timeously. Rehabilitation and mitigation capacity resides within the various operational functions, i.e. surface engineering, metallurgical, etc. Where specific engineering or metallurgical capacity is lacking in-house, use will be made of external facilities. Further support for the Environmental Management function is derived from the various departments within the group. The Harmony incident reporting procedure is provided in **Figure 3**.

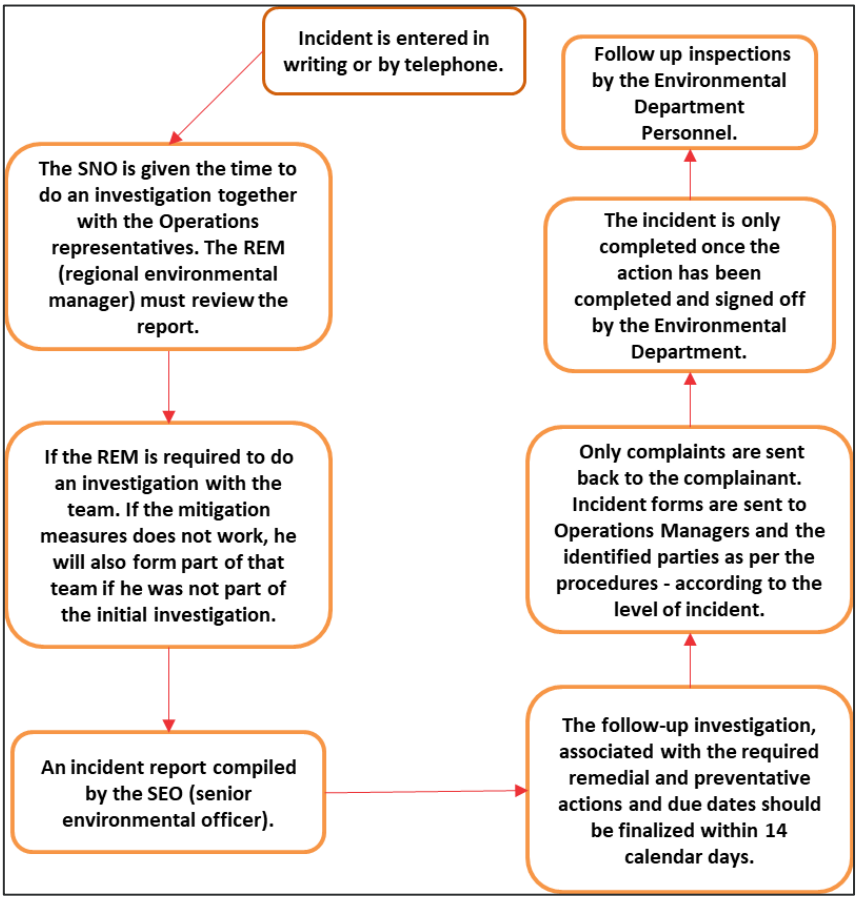


Figure 3: Incident Reporting procedure

Communication is a management responsibility. As mentioned before the Environmental Management Function (EMF) resides within the portfolio of Environmental Management. Structures and reporting mechanisms have been put in place to ensure that the Board is kept fully informed of environmental matters within the group.



2.7.3 EMERGENCY RESPONSE PLAN

It should be noted that the applicant conforms with ISO 14001 and abide by its guidance regarding emergencies and risk & impacts. They should ensure that potential emergencies are identified and their current procedures for preventing and responding to them are adequate. There are several options for dealing with high-priority impacts and risks, as the paradigm has two components, probability and consequence. The design of control measures rest on the understanding the cause and effect. Best practise is to intervene with the ultimate factors were feasible, rather than treat the outcomes. Emergency response therefore has the option of reducing probability, or reducing the consequence, reducing the probability is the preferred option. Below are some common emergency preparedness approaches:

- Threat consequence if and when the risk eventuates, when the risk becomes an issue.
- Combine reducing the probability and treating the consequence.
- Offset environmental losses by investing in other assets.
- Not manage some of the risks because there are too many.
- Make provision to manage residual impacts or issues that arise because of shortcomings in risk identification and rating, avoidance and mitigation or because a rare event has occurred.
- Residual impacts are those impacts that despite reducing the probability and consequence might still occur. In these cases, parties will have to be compensated, pollution cleaned up and damage to the environment remediated.
- The Project Proponent shall be required to develop and implement an Emergency Preparedness and Response Plan prior to commencing work. The Emergency Preparedness and Response Plan should be based on a baseline Hazard and Risk Assessment and should provide for the following as a minimum:
- Risk assessment (identification of areas where accidents and emergency situations may occur, communities and individuals that may be impacted).
    - Response procedures.
    - Provision of equipment and resources.
    - Designation of responsibilities.
    - Communication and reporting (including that with potentially Affected Communities).
    - Periodic training to ensure effective response.
    - Periodic review and revision, as necessary, to reflect changing conditions.
- The Project Proponent must ensure that the Emergency Preparedness and Response Plan makes provision for environmental emergencies, including, but not limited to.
    - Fire Prevention.
    - Fire Emergency Response.
    - Spill prevention.
    - Spill Response.
    - Contamination of a water resource.
    - Accidents to employees.
    - Use of hazardous substances and materials, etc.



The Project Proponent must ensure that lists of all emergency telephone numbers/contact persons (including fire control) are kept up to date and that all numbers and names are posted at relevant locations throughout the lifespan of the project.

2.7.3.1 FIRE

Fires represent a significant risk to mining operations and require special attention in the Emergency Response Plan. Sparks generated during welding, spontaneous combustion, cutting of metal or gas cutting can result in fires. Every possible precaution shall therefore be taken when working with this equipment near potential sources of combustion. The Project Proponent must take all reasonable measures to ensure that fires are not started as a result of activities on site. No smoking is allowed near containers with flammable contents or at areas that are highly flammable. Smoking is only permitted at areas designated for smoking. No open fires are permitted on site and no burning of waste is to be allowed on site. The Project Proponent shall ensure that there is sufficient fire-fighting equipment available on site at all times. Such precautions include having an approved fire extinguisher immediately available at the site of any such activities. The Project Proponent is to ensure that he/she has the contact details of the nearest fire station in case of an emergency. Appropriate and correctly serviced equipment must be available for all activities that are likely to generate fire.

It is further anticipated that firebreaks will be required around the site perimeter. It is recommended that such fire prevention measures are implemented in consultation with adjacent landowners and where necessary that the Project Proponent coordinate fire prevention efforts with local Fire Protection Agency (FPA).

2.7.3.2 HEALTH AND SAFETY

The Project Proponent shall make allowance for the supply, erection, maintenance and removal of the information boards. Information boards shall also provide the name of the process managers, relevant contact person and contact number. This will ensure that the public access to request information and/or to lodge any complaints. The boards will essentially be to advise the public of the construction activities to be undertaken or being undertaken and to advise of the prohibition of entering demarcated “no-go” areas.

The Project Proponent must ensure that compliance with the Mine Health and Safety Act (Act No. 29 of 1996) and the Occupational Health and Safety Act (Act No. 85 of 1993) is strictly adhered to. All reasonable measures must be taken to ensure the safety of all site staff and the surrounding community is not compromised. No weapons may be brought onto the property by any person. Where fencing is temporarily affected, temporary security must be provided at all times until the fence is reinstated.

The Project Proponent must ensure that all vehicles using public roads are in a roadworthy condition, that drivers adhere to the speed limits and that their loads are secured and that all local, provincial and national regulations are adhered to. The Mine shall make provision for flagmen to regulate traffic and construction vehicles when necessary.

The Project Proponent must ensure that all accidents and incidents are recorded and reported to the EO The Project Proponent must have easy access to all relevant emergency numbers for example, spill response teams, fire authorities, fire protection associations, medical emergency, nearest emergency rooms (hospitals) to the site, of both private and public hospitals. The Project Proponent must take all reasonable measures to ensure the health and safety of all employees, visitors and the public.

2.7.3.3 SPILL RESPONSE PROCEDURE

All employees, staff and labourers must be instructed regarding implementation of spill prevention measures and spill response procedures. In the event of a spill, the following general requirements shall apply, and the detailed spill procedure must cater for these requirements. Harmony has a spill response plan in place which should be utilized in case of spills occurring. In terms of the existing Harmony spill response plan the following general actions are recommended:

- Any oil, diesel, petrol, tailings (including slurry) or hazardous chemical spill, must be reported as an environmental incident (by any employee) to the person responsible for coordination of the Corrective action on site.

- The person that first noted the spill must take steps to prevent the spill from spreading and report it.
- Personal Protective Equipment (PPE) must be worn when handling oil, diesel, solvents or other chemicals as required by the Material Safety Data Sheet (MSDS).
- Consult the MSDS to determine the toxicity of the substance and which PPE must be worn.
- Should a spill occur, the person responsible must take the necessary steps to contain the spill to minimize the area affected and prevent contamination of a water source, e.g. storm water.
- Once contained, the spill should be cleaned up in a manner appropriate to the spill.
- If harmful substances, other than oil, fuel or lubricant, are spilled into water the contaminated water must be contained and pumped to an area where it can either be rectified or correctly disposed of.

2.7.3.4 MEASURES TO CONTROL OR REMEDY ANY CAUSES OF POLLUTION OR DEGRADATION

The broad measures to control or remedy any causes of pollution or environmental degradation as a result of the proposed activities taking place are provided below:

- Implementation of secondary containment for the pipelines at water crossings;
- Limit the size of the area to be disturbed as far as is practically possible;
- Conduct regular TSF inspections in line with the regulatory requirements;
- Establish and maintain dirty and clean water systems in line with the regulatory requirements;
- Contain potential pollutants and contaminants (where possible) at source;
- Handling of potential pollutants and contaminants (where possible) must be conducted in bunded areas and on impermeable substrates;
- Ensure the timeous clean-up of any spills;
- Implement a waste management system for all waste stream present on site;
- Investigate any I&AP claims of pollution or contamination as a result of mining activities;
- Rehabilitate the proposed mining site in line with the requirements of the detailed rehabilitation and closure plan; and
- Implement the impact management objectives, outcomes and actions.

It is of critical importance that the broad measures to control or remedy any causes of pollution or environmental degradation are applied during all phases of the proposed TSF operation. This is essential and allows for the operation to be conducted in a manner that will allow for the post-closure goals and objectives to be met.

3 COMPLIANCE MONITORING

3.1 RESPONSIBLE PERSONS

This section includes details as to the roles and responsibilities of responsible persons.

Different parties have different responsibilities and roles in the implementation of the EMPr. A summary is included in **Figure 4**.

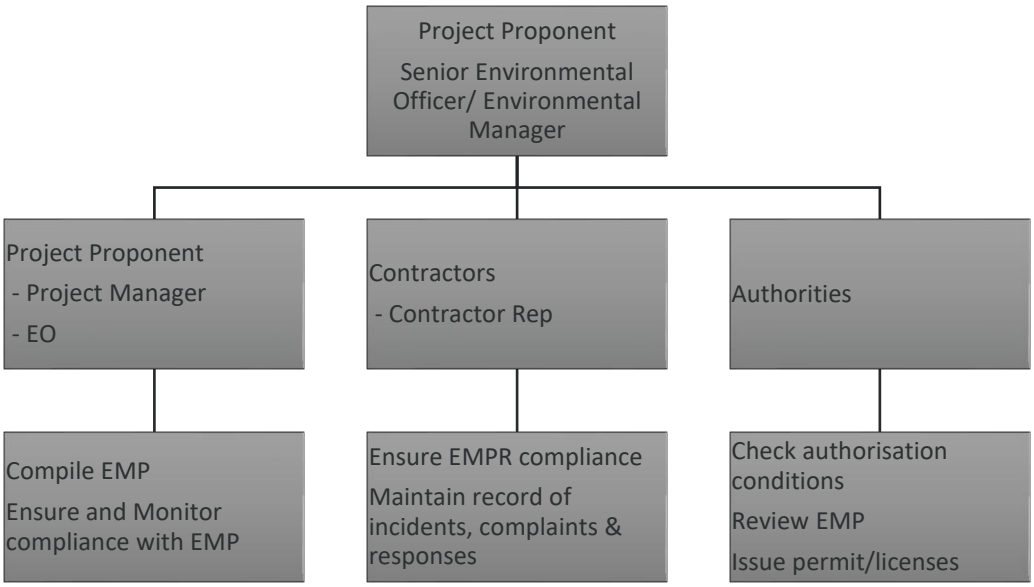


Figure 4: Responsibilities and Roles for Identified Actions

3.1.1 PROJECT PROPONENT

The Project Proponent is the principal party of the project, also known as the Applicant. The accountability for correct implementation of the relevant requirements of the EMPr falls primarily upon the Project Proponent and must therefore be built into all contractor's contractual agreements.

The Project Proponent is responsible for the following tasks:

- Provide for all necessary supervision during the execution of the project including appointment of key personnel to act on his/her behalf during the project (e.g. Regional Environmental Manager/Project Manager). The key personnel will be tasked with ensuring that the various employees and contractors comply with the necessary provisions of the EMPr and relevant legislation and guidelines;
- Ensure that a Senior Environmental Officer (SEO) is employed, ensuring daily compliance with the EMPr and relevant legislation and guidelines by employees, various contractors and applicable sub-contractors, throughout the execution of the relevant project components;
- Ensuring the Regional Environmental Manager with the Senior Environmental Officer undertake periodic audits on the various contractors works;
- Notify the relevant competent authority of any significant environmental impacts;
- Assess the various contractors' environmental performance, in consultation with the Senior Environmental Officer on site and the Regional Environmental Manager;
- Ensure compliance with regulations;
- To implement the projects as per the approved project plan;
- To ensure that implementation is conducted in an environmentally acceptable manner;

- To inform and educate all employees about the environmental risks associated with the different activities that should be avoided and lessen significant impacts to the environment;
- Notify DMPR and / or any other competent authority of changes in the mining operation resulting in significant environmental impacts;
- Assess the Contractors environmental performance during mining in consultation with the Regional Environmental Manager and Senior Environmental Officer; and
- Ensure compliance with regulations.

Therefore, ultimately, the Project Proponent is responsible for the development and implementation of the EMPr and, where relevant, ensuring that the conditions in the authorisation are satisfied. Where mining activities are contracted out (e.g. to Contractors and Subcontractors), the liability associated with non-compliance still rests with the Project Proponent (unless otherwise agreed upon between the authorities, the Project Proponent and the contracting parties). The Project Proponent (and not the Contractor) is therefore responsible for liaising directly with the relevant authorities with respect to the preparation and implementation of the EMPr and meeting authorisation conditions.

3.1.2 REGIONAL ENVIRONMENTAL MANAGER

The Regional Environmental Manager (REM) is accountable for ensuring compliance with the EMPr. The REM will oversee the Senior EO. The Senior EO must objectively monitor the implementation of the EMPr according to relevant environmental legislation and guidelines. The Project Manager is further responsible for providing and giving mandate to enable the EO to perform responsibilities.

During the project, a number of contractors and sub-contractors may be undertaking activities on the project. The Project Manager would oversee all contractors and sub-contractors from a project management point of view.

Responsibilities of the REM include:

- Be fully conversant with applicable environmental legislation and guidelines relating to the project, as well as the EMPr;
- Ensure that all stipulations within the EMPr are communicated and adhered to by the Project Proponent and its Contractor(s);
- Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation;
- Ensure that periodic environmental performance audits are undertaken on the project implementation;
- The Project Manager acts on behalf of the Project Proponent regarding the administration of contracts to sub-contractors, etc.;
- Provides and/or approves scheduling, aspects of co-ordination and estimation;
- Ensures implementation of the project plan within cost, time and quality constraints; and
- Keeps the Project Proponent informed of progress made during the life cycle of the project.

3.1.3 SENIOR ENVIRONMENTAL OFFICER

The Senior Environmental Officer (EO) will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.

Responsibilities:

- Be fully conversant with the EMPr;

- Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures;
- Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) and its sub-contractor(s);
- Confine the development site to the demarcated area;
- Conduct environmental audits with regards to EMPr compliance;
- Assist the contractors in addressing environmental challenges on site;
- Assist in incident management;
- Reporting environmental incidents to the Project Manager (Regional Environmental Manager) and ensuring that corrective action is taken, and lessons learnt shared;
- Assist the contractor in investigating environmental incidents and compile investigation reports;
- Follow-up on pre-warnings, defects, incident reports;
- Measure and communicate environmental performance to the Contractor;
- Conduct environmental awareness training on site;
- Ensure that the necessary legal permits and / or licenses are in place and up to date; and
- Acting as Developer's Environmental Representative on site.

3.1.4 CONTRACTORS

The contractor is usually a third party appointed by the developer/project manager to undertake any activities on the site. For the purposes of this section, any contractor (regardless of who appointed them) is referred to as the "contractor".

The relevant contractors are answerable to the Project Manager (Regional Environmental Manager and Senior EO for all environmental issues associated with the project. Contractor performance will, amongst others, be assessed on health, safety and environmental management criteria. The principal contractor/s, any other contractors and sub-contractors will be required to comply with the provisions contained herein, and accordingly, the EMPr and its provisions must form part of any contractual arrangements between the Developer and contractors, and contractors and their sub-contractors, etc. The contractor must comply with EMPr and ensure that all employees and sub-contractors appointed are familiar with the EMPr. The legal accountability for correct implementation of the relevant requirements of the EA and EMPr must be contractually bound to the appointed contractor.

Responsibilities:

- Project delivery and quality control for the development services as per appointment;
- Employ a suitably qualified person to monitor and report to the Developer's appointed person on the daily activities on-site;
- Ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely;
- To ensure that management of the TSF or any other activities are conducted in an environmentally acceptable manner;
- To fulfil all obligations as per the agreed contract; and

- Ensure that the Contractors staff and employees have received the appropriate environmental awareness training prior to working on site.

The Contractor is answerable to the Project Manager for all environmental issues associated with the project. Contractor performance will, amongst others, be assessed on health, safety and environmental management criteria.

The Project Proponent must inform the Contractor of the EMPr obligations (which have ideally been integrated into the tender document), as well as environmental training to be undertaken by the Contractor in terms of these obligations. Contractors must communicate these obligations to their Sub-contractors, if any and ensure that there is compliance.

3.1.5 AUTHORITIES

The authorities may be required to perform the following roles:

- Participate in a meeting(s) with the Project Proponent at the start of the EMPr process in order to reach agreement on the approach to the EMPr.
- Review the draft EMPr submission.
- Review Monitoring and Audit reports, if required.
- Review whether there is compliance by the Project Proponent and Contractor with the terms of the EMPr and permit/license conditions. Whenever necessary, the authorities should assist the Project Proponent in understanding and meeting the specified requirements.

The authorities may perform random controls to check compliance. In case of persistent non-compliance, the Project Proponent will be required to provide an action plan with corrective measures and have it approved by the authorities. The key authorities that should be involved are the Department of Mineral and Petroleum Resources (DMPR), and Department of Water and Sanitation (DWS).

3.2 METHOD OF MONITORING IMPACT MANAGEMENT ACTIONS

Harmony Gold Mining Company is required to develop an auditing and reporting procedure. The purpose of the auditing and reporting procedure is to clearly define the requirements for compliance monitoring and audits and the reporting of the information gathered. This section provides a framework for the detailed procedure which will be developed by the mine.

Different reporting mechanisms may include:

- Inspections;
- Reporting accidents and emergencies;
- Measuring performance indicators and interpreting and acting on the indicators;
- Records of monitoring activities to test the effectiveness of mitigation measures and impact controls, as well as for compliance auditing purposes; and
- Training programmes and evidence of appropriate levels/amount of skills/capacities created.

All monitoring and auditing must be accompanied by applicable records and evidence (e.g. delivery slips, photographic records, etc.). All reports must be retained and made available for inspection by the Project Proponent and /or the Relevant Competent Authorities. All reports shall be signed by the relevant parties to ensure accountability. Harmony must use the audit report findings to continually ensure that environmental protection measures are working effectively on site through a system of self-checking. The framework for compliance monitoring and auditing is summarised in the table below.

Table 4: Proposed framework for compliance monitoring and audits

Resource	Document	Implementation		Checking/Monitoring/Audit	
		Responsible Party	Frequency	Type	Reporting Frequency
Regional Environmental Manager	ESMS Procedures	Harmony	As Required	Report Review	As Required
	EMP/EMPr	Harmony	As Required	Report Review	As Required
	IWULA	Harmony	As Required	Report Review	As Required
	NEMA EA	Harmony	As Required	Report Review	As Required
	Other Licences, Permits or Approvals	Harmony	As Required	Report Review	As Required
Senior Environmental Officer	ESMS Procedures	Harmony	Weekly	Site Inspection	Weekly
	EMP/EMPr	Harmony	Weekly	Site Inspection	Weekly
	IWULA	Harmony	Weekly	Site Inspection	Weekly
	NEMA EA	Harmony	Weekly	Site Inspection	Weekly
	Other Licences, Permits or Approvals	Harmony	Weekly	Site Inspection	Weekly

3.3 EMPR AUDITING

Audits are required to be undertaken in terms of Regulation 34 of the National Environmental Management Act, Act 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations, 2014. An EMPr audit report shall be submitted to the Department of Mineral and Petroleum Resources (DMPR) on an bi-annual basis or as required in the license. The holder of the mining right may appoint an independent qualified person for the monitoring and to compile a report, but the responsibilities remain the holders. The audit will include:

- The period when the audit was conducted;
- The scope of the assessment;
- The procedures used for conducting the audit;
- Interpreted information gained from monitoring the EMPr (e.g. EO reports);
- Evaluation criteria used during the audit; and
- Results of the assessment are to be discussed and mention must be made of any gaps in the EMPr and how it can be rectified.

3.4 MECHANISMS FOR MONITORING COMPLIANCE

Table 5 below provides a summary of the functional requirements for monitoring that needs to be implemented, identifies who is responsible for the monitoring and the frequency of monitoring and reporting.

Table 5: Mechanisms for monitoring compliance

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
TSF Planning and Design	None	None		
TSF and Pipeline Construction	All Impacts Identified during the EIA	Site Inspections and checklists	Senior Environmental Officer	Weekly inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	Regional Environmental Manager	As Required
		Site Inspections and Audits	Senior Environmental Officer	Weekly inspections
				Monthly Reports
			Environmental Control Officer	Monthly Audit Reports
			Independent Environmental Auditor	Biennial (2-yearly) External Audit Report
TSF Operation	All Impacts Identified during the EIA	Site Inspections and checklists	Senior Environmental Officer	Monthly inspections and checklists and monthly reports
		Report Review and Development of Action Plans for Corrective Action	Regional Environmental Manager	As Required
		Site Inspections and Audits	Senior Environmental Officer	Monthly Reports



Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
			Independent Environmental Auditor	Biennial (2-yearly) External Audit Reports
Decommissioning Activities	All Impacts Identified during the EIA	Site Inspections and checklists	Senior Environmental Officer	Monthly inspections and checklists
		Report Review and Development of Action Plans for Corrective Action	Regional Environmental Manager	As Required
		Site Inspections and Audits	Senior Environmental Officer	Monthly inspections
				Monthly Reports
			Environmental Control Officer	Monthly External Audit Reports
Rehabilitation	All Impacts Identified during the EIA	Report Review and Development of Action Plans for Corrective Action	Regional Environmental Manager	As Required
		Site Inspections and Audits	Senior Environmental Officer	Monthly inspections
				Quarterly Reports
				Biennial (2-yearly) Audit Reports
Closure - Aftercare and Maintenance	All Impacts Identified during the EIA	Report Review and Development of Action Plans for Corrective Action	Regional Environmental Manager	As Required
		Site Inspections and Audits	Senior Environmental Officer	Monthly Inspections

Source Activity	Impacts Requiring Monitoring Programmes	Functional Requirements for Monitoring	Roles and Responsibilities	Monitoring and Reporting Frequency and Time Periods for Implementation
				Quarterly Reports

3.5 REVIEW AND REVISION OF THE EMPR

It is important to note that this EMPr is made legally binding on the Project Proponent at such time as the EMPr is approved by the decision-making authority. It is however also important to consider that the EMPr is a dynamic document which may require such alteration and /or amendment as the project evolves. Conditions under which the EMPr would require revision include:

- Changes in legislation;
- Occurrence of unanticipated impacts or impacts of greater intensity, extent and significance than predicted;
- Inadequate mitigation measures (i.e. where environmental performance does not meet the required level despite the implementation of the mitigation measure); and
- Secondary impacts occur as a result of the mitigation measures.

The Project Proponent should be responsible for ensuring that the registration and updating of all relevant EMPr documentation is carried out. It shall be the responsibility of the Applicant/Mine Manager to ensure that all personnel are performing according to the requirements of this procedure and to initiate the revision of controlled documents, when required by changes in process or operations.

Harmony EMS procedures will be updated and improved over time. The references made to procedures contained in the EMS are subject to change as the system evolves and improves and the EMPr in such instances will change to align with the company system over time.

4 IMPACT MANAGEMENT OUTCOMES

This section of the EMPr provides the impact management outcomes identified for the West Wits TSF project. The impact management objectives, including the standard to be achieved, are summarised in **Table 6** below.

Table 6: Impact Management Outcomes

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Site establishment **Construction** **TSF Operation**	Erosion	Soils Biodiversity Air Quality	Construction Operation Decommissioning Rehabilitation and Closure	Minimise potential for further soil erosion. Avoid and control through preventative measures (storm water infrastructure, erosion control and monitoring)	CARA
Site establishment **Construction** **TSF Operation** **Water management**	Soil Pollution/Contamination	Groundwater Wetlands Soils Biodiversity	Construction Operation Decommissioning Rehabilitation and Closure	Avoid pollution through preventative measures (e.g. bunding, spill kits) Remedy through clean-up and waste disposal	Hazardous Substances Act NWA NEMA Duty of Care NEMWA Incident reporting procedures DWS minimum standards for waste disposal Hazardous Substances Act SANS 10206
Site establishment **Construction** **TSF Operations**	Damage/Disruption of Ecosystem Services	Land Use Biodiversity Wetlands	Construction Operation Decommissioning	Prevent unnecessary clearance of vegetation, loss in habitat and disturbance of species.	NEMBA TOPS



Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities			Rehabilitation and Closure	Control through implementation of EMPr mitigation measures (e.g. limit area of disturbance, training, prevent damage caused by pipe leaks)	
Site establishment **Construction** **TSF Operation** **General decommissioning activities** **Post Closure Monitoring and Maintenance** **Water management**	Direct and indirect mortality of flora and fauna	Biodiversity	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Prevent the injury, trapping or death of local fauna. Prevent unnecessary clearance of vegetation, loss in habitat and disturbance of species. Control through implementation of EMPr mitigation measures (e.g. limit area of disturbance, training, prevent damage caused by pipe leaks)	NEMBA TOPS
Site establishment **Construction** **General Surface Rehabilitation** **TSF operations** **General decommissioning activities** **Post Closure Monitoring and Maintenance** **Water management**	Introduction/invasion by alien (non-native) species	Biodiversity	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Prevent proliferation of alien species. Control through implementation of EMPr mitigation measures (e.g. alien vegetation management plan) Avoid/Stop through preventative measures (e.g. limit extent of disturbance)	NEMBA TOPS Alien vegetation management plan



Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Site establishment **TSF operations** **Post Closure Monitoring and Maintenance** **Water management**	Pollution of surface water resources	Wetlands	Construction Operation Decommissioning Rehabilitation and Closure	Protect watercourses and sources of water. Avoid pollution through implementation of preventative measures (e.g. Bunding, Hazardous materials management, Pollution prevention measures, storm water management) Control through implementation of mitigation measures (water treatment when required)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DWS best practice guidelines Global Industry Standard for Tailings Management
Site establishment **TSF Operations** **General decommissioning activities** **Water management** **Post Closure Monitoring and Maintenance**	Pollution of groundwater/decreased water quality	Groundwater	Construction Operation Decommissioning Rehabilitation and Closure	Avoid contamination of groundwater resources Avoid and control through implementation of preventative measures Control through implementation of mitigation measures (barrier system, monitoring and phytoremediation)	NWA GN704 NEMA Duty of Care NEMA Polluter Pays Principle DWS best practice guidelines Rehabilitation and closure plan
Site establishment **TSF Operations**	Loss and disturbance of wetland habitat	Wetlands	Construction Operation	Protect watercourses and sources of water.	NWA GN704 NEMA Duty of Care

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities **Water management**			Rehabilitation and Closure	Avoid and control through implementation of preventative measures (e.g. limit area of wetland disturbance for wetlands around the edges of the site, maintain stormwater infrastructure)	NEMA Polluter Pays Principle DWS best practice guidelines Rehabilitation and closure plan
General decommissioning activities	General Environmental Pollution	Environmental Pollution	Operation Decommissioning Rehabilitation and Closure	Avoid pollution caused by fuel spillages and improper storage of materials. Avoid and control through implementation of EMPr mitigation measures (e.g. Spill prevention, Hydrocarbon Storage)	Hazardous Substances Act NWA MSDS OHSA MHSA NEMA Duty of Care NEMA Polluter Pays Principle NEMWA Incident reporting procedures DWS minimum standards for waste disposal DMR Code of Practice for Mine Residue Deposits
Site establishment **TSF operations** **Post Closure Monitoring and Maintenance** **Water management**	Hydrocarbon spills/contamination	Environmental Pollution	Planning and Design Construction Operation Decommissioning	Avoid pollution caused by fuel spillages and improper storage of materials Avoid through preventative measures (e.g. bunding, spill kits)	Hazardous Substances Act NWA MSDS OHSA MHSA



Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
			Rehabilitation and Closure	Remedy through cleanup and waste disposal	NEMA Duty of Care NEMWA Incident reporting procedures DWS minimum standards for waste disposal
Site establishment **Construction**	Discovery and preservation of fossils	Palaeontology	Construction	Avoid and control through implementation of preventative measures (e.g. chance find procedure) Modify through removal and curation of fossils	NEMA MPRDA NHRA SAHRA permitting requirements
Construction **TSF Operations** **General decommissioning activities**	Economic growth and Employment Opportunities	Socio-Economic	Construction Operation Decommissioning Rehabilitation and Closure	Maximise through optimisation of economic growth opportunities	SLP Commitments
Closure	Loss of jobs and economic opportunities	Socio-Economic	Construction Operation Decommissioning Rehabilitation and Closure	Minimise impacts of job loss through skills development and livelihood restoration	SLP Commitments
Construction **TSF Operations**	Radiation and health Impacts	Health and Safety	Construction Operation	Ensure safety of property, workers and people living in the vicinity	NRWMP OHSA

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
General decommissioning activities **Rehabilitation and Closure** **Post-Closure**			Decommissioning Rehabilitation and Closure	Check through implementation of mitigation measures (radiation monitoring)	MHSA SLP Commitments Grievance Mechanism Global Industry Standard for Tailings Management DMR Code of Practice for Mine Residue Deposits
Construction **TSF Operations** **General decommissioning activities**	Visual impact of light at night	Visual	Construction Operation	Avoid and control through implementation of EMPr mitigation measures (e.g. directional down lighting)	Security specifications
Construction **TSF Operations** **General decommissioning activities**	Visual impact of mine infrastructure, stockpiles and dust	Visual	Construction Operation Decommissioning Rehabilitation and Closure	Avoid and control through implementation of EMPr mitigation measures (e.g. dust suppression, mine planning and progressive rehabilitation)	Rehabilitation and Closure Plan
Construction **TSF Operations** **General decommissioning activities**	Fugitive emissions (Dust)	Air Quality	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Minimise and prevent dust and air pollution. Avoid through preventative measures (e.g. speed limit enforcement) Control through implementation of EMPr mitigation measures (e.g. dust suppression)	Road Traffic Act NEMAQA Dust regulations

Activity	Potential Impact	Aspects	Phase	Objective / Outcome	Standard to be Achieved
Construction **TSF Operations** **General decommissioning activities**	Disturbing and/or nuisance noise	Noise	Planning and Design Construction Operation Decommissioning Rehabilitation and Closure	Reduce the impact of noise associated with the mining activities on the surrounding area. Avoid through preventative measures (e.g. communication with landowners, timing of activities) Control through implementation of EMPr mitigation measures (e.g. Noise abatement measures)	ECA noise regulations SANS 10103 OHSA MHSA

5 IMPACT MANAGEMENT ACTIONS: MANAGEMENT PROGRAMME

Table 7 below provides measures for management of the environmental aspects that are impacted on during the different phases of the project.

Table 7: Description of the proposed impact management actions.

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
5.1 ENVIRONMENTAL MANAGEMENT SYSTEM						
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant shall implement the existing Environmental Management System (EMS), - The EMS should include and provide for the following as a minimum: • Environmental Policy; • Ongoing Identification of risks and impacts; • Social and Environmental Management programs; • Organisational capacity and competency; • Emergency preparedness; • Stakeholder engagement; and • Monitoring and review.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	Applicant REM	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant shall ensure that Social and Environmental human resources have the knowledge, skills, and experience necessary to perform their work with competence and efficiency.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	Applicant REM	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant shall appoint a suitably qualified and competent ECO who shall preferably be independent from the Project Proponent. The ECO must preferably have a tertiary qualification in an Environmental Management or appropriate field. The ECO should have appropriate qualification and experience in the implementation of environmental management specifications. The ECO shall be tasked with	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	Applicant REM	Throughout LoM, Decommissioning and Rehabilitation and Closure



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			inspecting the applicant's environmental compliance on a regular basis (monthly). The applicant shall provide the ECO with the necessary support to ensure that the environmental aspects relating to the development is adhered to.			
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant must have a copy of this EMPr at the point of use and should be briefed by the applicant's SEO with regards to the use and implementation of the EMPr.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The EMPr must be made binding on all sub-contractors (if utilised) operating on behalf of the Mining Right Holder.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	Applicant	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant shall ensure that all sub-contractors (if utilised) abide by the requirements of the EMPr through the inclusion of the EMPr and applicable environmental requirements in contractual agreements for all sub-contractors.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	REM	Throughout LoM, Decommissioning and Rehabilitation and Closure
5.2 EMERGENCY RESPONSE						
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Emergencies have the potential for large scale and high significance impacts.	The applicant shall maintain and implement an Emergency Preparedness and Response Plan which shall include and provide for the following as a minimum: • Risk assessment; • Response procedures; • Provision of equipment and resources;	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	Applicant REM	Throughout LoM, Decommissioning and Rehabilitation and Closure

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			• Designation of responsibilities; • Communication and reporting (including that with potentially affected communities); • Periodic training to ensure effective response; and • Periodic review and revision, as necessary, to reflect changing conditions. Potential affected groups / communities must be made aware of the emergency plan and how they should react to emergency situations.			
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The necessary provisions (financial, resources, materials) shall be made in order to ensure compliance with the Emergency Preparedness and Response Plan.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	Applicant REM	Throughout LoM, Decommissioning and Rehabilitation and Closure
5.3 HEALTH AND SAFETY						
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	Developer must undertake the Dam Safety Technical Assessment and register with the DWS Dam Safety Office. There must be focus on maintaining geotechnical stability, controlling water, and ensuring structural integrity, as outlined in the Global Industry Standard on Tailings Management (GISTM). The applicant shall ensure that reasonable measures are taken to ensure the safety of all site staff, including induction training for all employees and visitors.	OHS and MHSA	Applicant	Planning Phase Throughout LoM, Decommissioning and Rehabilitation and Closure



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	All staff and sub-contractors must be informed about any community concerns. Toolbox talks can be used for this. Speed limits on the road to the applicant must be enforced. People that do not adhere to the speed limits shall receive the appropriate disciplinary action.	OHS and MHSA	SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	The applicant shall provide appropriate Personal Protective Equipment (PPE) to employees wherever required and in accordance with the risks associated with their activities.	OHS and MHSA	Applicant	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	The applicant shall undertake safety audits to ensure compliance with: • Occupational Health and Safety Act (Act No. 85 of 1993) and associated regulations; and • Mine Health and Safety Act (Act 29 of 1996) as amended and associated regulations.	OHS and MHSA	Applicant	Annually Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	The applicant shall implement a safety reporting procedure to ensure that all accidents and incidents (safety and environmental) are recorded and reported to the applicant's REM and SEO.	OHS and MHSA	Applicant	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning	Health risks are classified as high significance due	The applicant shall implement an infectious diseases management plan to address health issues with the workforce or continue with an existing one.	OHS	Applicant	Throughout LoM, Decommissioning



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Rehabilitation and Closure	to the value of human life.				and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	Any containers in which hazardous substances (e.g. fuel, paints, solvents) are stored shall be clearly marked as to the contents therein (in accordance with OHSA regulations). All hazardous substances must be stored in a hazardous chemical facility which is fully bunded.	OHS and MHSA	REM	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	Health and safety risks are classified as high significance due to the value of human life.	Undertake Weekly inspections for checking of signs of instability and/or structural failure. In the event of dam failure, the applicant's slime dam emergency preparedness and emergency response procedure must be followed. The emergency response and management plan must be available at all times and staff and visitors should receive training and or awareness of this with relevant signs erected where required. Updated designs should be drafted by registered and suitably qualified engineers and submitted and approved by relevant authorities; and The relevant standards and legislation related to the management and design of the TSF described in this report should be adhered to at all times.	OHS and MHSA	Applicant REM SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning	Health and safety risks are classified as high significance due	If a storm of more than 30 mm of rain occurs in a 24-hour period, then the emergency actions noted in Harmony's Mandatory Code of Practice for mine residue deposits should be followed (COP - WS_COP_GEN_002).	OHS and MHSA	SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Rehabilitation and Closure	to the value of human life.				
5.4 ENVIRONMENTAL AWARENESS						
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	All employees and visitors to the site must undergo a visitors induction which shall include basic environmental awareness and site-specific environmental requirements (e.g. site sensitivities and relevant protocols/procedures). This induction should be presented or otherwise facilitated by the SEO wherever possible. Regular toolbox talks can be used for this. Potential affected groups / communities must be made aware of the emergency plan and how they should react to emergency situations.	NEMA	SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure
5.5 ARCHAEOLOGICAL, CULTURAL HERITAGE AND PALAEONTOLOGY						
General Mine Management	Construction	No direct physical disturbance of archaeological, cultural and palaeontological heritage	Archaeological sites WWR001 and WWR021 are to be avoided be avoided by the development. During the construction phase, it is important to recognise any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the Chance Finds Procedure (CFP) should be implemented as indicated in the Heritage Impact Assessment Report for Archaeological and Cultural Heritage while for Palaeontological Heritage, the CPF in the Palaeontological Impact Assessment Report must be followed if any chance finds are encountered during construction.	Adherence to corporate policies	Applicant REM	Planning & Construction Phase.



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
5.6 SOCIAL						
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant shall comply with the conditions of the SLP developed for the applicant to ensure the socio-economic benefits of the mine are maximised. Developer must allow for a transparent employment opportunity for locals. Local suppliers and workers must be prioritised as far as possible for economic and professional growth. Maximise local employment and procurement within realistic skill constraints; operate local labour desks; support SMME participation and capacity building; and prioritise host and neighbouring communities.	SLP commitments	Applicant REM	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning Rehabilitation and Closure	No direct physical disturbance	The applicant shall comply with all relevant legislation pertaining to labour recruitment and employment.	Compliance with legislation including Labour Act and Employment Act.	Applicant	Throughout LoM, Decommissioning and Rehabilitation and Closure
General Mine Management	Operation Decommissioning	No direct physical disturbance	Develop and implement an Influx Management Plan and a Community Safety Plan with local authorities and community-security initiatives, and secure project infrastructure.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework.	REM SEO	Developed as early as possible and implemented throughout LoM.
General Mine Management	Construction	No direct physical disturbance	Develop and implement a transparent communication and expectation-management strategy covering the type, number and timing of opportunities and the recruitment and	Shall adhere to the EMS developed to ensure compliance	Applicant REM	Plan in place prior to construction phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			procurement processes, in Setswana, isiXhosa and Sesotho, supported by Afrikaans and English.	with the regulatory framework		
General Mine Management	Operation Decommissioning	No direct physical disturbance	Maintain and adequately resource a Stakeholder Relations function, including a Stakeholder Relations Manager and a Community Liaison Officer (CLO) who is trusted by, and accessible to, affected communities.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework	Applicant REM	Commence in the operational phase and continue through to the operation phase of the project.
General Mine Management	Construction Operation Decommissioning	No direct physical disturbance	Operate a community-friendly grievance mechanism developed with communities and landowners; maintain a grievance register; check it regularly; and provide regular feedback to communities.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework	Applicant SEO	Throughout the LoM.
General Mine Management	Construction	No direct physical disturbance	Agree farm-access, fencing, communication and compensation protocols with affected landowners before construction, and protect shared water sources.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework	Applicant SEO	Agreements in place prior to construction
General Mine Management	Construction	No direct physical disturbance	Route access away from Deelkraal Village where feasible and maintain any access road used by the project. Implement the dust, noise and visual mitigation measures recommended in this EMPr, with a monitoring programme and results communicated to communities	Shall adhere to the EMS developed to ensure compliance with the regulatory framework	Applicant SEO	Throughout construction
General Mine Management	Construction Operations Closure	No direct physical disturbance	Fully implement the social-performance requirements of the GISTM for the existing and new TSF, including emergency preparedness co-developed with affected people and downstream users, and public disclosure.	Shall adhere to the EMS developed to ensure compliance	Applicant SEO	Throughout the LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			Co-develop Emergency Preparedness and Response Plans with employees, contractors and affected people (including downstream users and vulnerable residents), and engage public-sector agencies on medium- and long-term recovery.	with the regulatory framework		
General Mine Management	Closure	No direct physical disturbance	Plan for closure early, including retrenchment procedures, portable-skills training, progressive rehabilitation, long-term stability monitoring, and clear communication of closure timelines and safety measures.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework	Applicant SEO	Prior to closure commencing
5.7 TERRESTRIAL BIODIVERSITY						
TSF construction and operation **Rehabilitation** **Maintenance and operation of site infrastructure and facilities**	Planning and design	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Linear infrastructure (powerlines and pipelines), with an associated lower impact, are permitted within the high SEI areas, provided that these developments are minimised as far as possible, and that these areas are spanned (powerlines) and avoided as far as feasible. The high SEI Rocky Gauteng Shale Mountain Bushveld and Rocky Carletonville Dolomite Grassland habitats must be avoided as far as possible. Pipeline footprints must be reduced as far as possible. Pylon placement for powerlines must consider the High SEI areas. Pylons must not be placed within these areas. Powerlines may span these areas. It is recommended that the routes avoid Class 1 and Class 2 Gauteng Ridges as far as possible.	NEMA NEMBA CARA	Applicant REM	Planning phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
Post Closure Monitoring and Maintenance **Storm water management**	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	An Alien Invasive Species Management Plan must be compiled and implemented. This should be regularly updated to reflect the annual changes in AIP composition. It must be made an offence for any staff member to remove any indigenous plant species from the project area or bring any alien species in. This is to prevent the spread of exotic or alien species or the illegal collection of plants	NEMA NEMBA CARA	Applicant REM	An acceptable plan must be in place prior to the commencement of construction activities.
	Construction Operation Decommissioning Rehabilitation and Closure	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	GDEnv and DFFE must be further consulted to determine the extent and requirements related to offsets with respect to terrestrial biodiversity. If offsets are required, the offset site must be finalised, and implementation should commence. It is important that any required offset be properly managed according to an Offset Management Plan and the biodiversity monitored through a Monitoring Plan.	NEMA NEMBA CARA	Applicant REM	An acceptable plan must be in place prior to the commencement of construction activities.
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	The development areas and access roads should be specifically demarcated so that during the construction phase, only the demarcated areas may be impacted upon	NEMA NEMBA CARA	Applicant REM	Areas demarcated prior to construction commencing
	Construction	Impacts on biodiversity due to the proposed project have the potential to be	All structure footprints are to be rehabilitated and landscaped after construction is complete. Rehabilitation of the disturbed areas existing in the proposed development area must be made a priority. Topsoil must also be utilised, and any	NEMA NEMBA CARA	Applicant REM SEO	Throughout construction phase

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		of moderate – high significance.	disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type.			
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Keep the surface & sub-surface water and storm water away that may run off from the dumps from the low laying areas, such as wetlands, as well as the surrounding areas, from leaving the project area in an uncontrolled manner. Construct cut-off berms downslope of working areas. o Construct engineered cut-off berms (compacted earth embankments or similar structures) along the downslope perimeter of all active TSF construction and working areas. o Ensure berms are designed to intercept and divert surface water runoff, including potential acid mine drainage, away from undisturbed areas and sensitive receptors (e.g., wetlands, streams, natural drainage lines). o Prevent uncontrolled runoff from entering natural watercourses or adjacent land by directing collected runoff to designated containment or treatment facilities (e.g., pollution control dams, sumps, or water treatment plants). o Use compacted, low-permeability material (such as clay or suitable soil) for berm construction to minimise seepage.	NEMA NEMBA CARA	Applicant REM SEO	Throughout construction phase

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			○ Specify minimum berm height and width based on site hydrology and expected runoff volumes, as determined by a qualified engineer (e.g., typically ≥0.5 m high and ≥1 m wide, but site-specific). ○ Ensure berms are continuous, with no gaps, and maintained throughout the construction phase. ○ Conduct regular inspections (at least weekly and after rainfall events) to check for breaches, erosion, or overtopping. ○ Repair any damaged sections within 24 hours of detection. ○ Remove or rehabilitate berms after construction, unless required for ongoing operational control. Cut-off trenches must be incorporated into the design to decrease contamination of watercourses via runoff.			
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	A pre-construction wet season (October to March, following good rains) walkdown of the high SEI areas within development footprint must be conducted to locate and identify any protected flora or flora SCC. Any individual of any protected plant species that is present needs a relocation or destruction permit in order for any individual that may be removed or destroyed due to the development. High visibility flags must be placed near any threatened/protected plants in order to avoid any damage or destruction of the species. If left undisturbed, the sensitivity and importance of these species needs to be part of the environmental awareness programme. Infrastructure, development areas and routes where protected plants cannot	NEMA NEMBA CARA	REM SEO	Walkthrough to be undertaken prior to construction commencing.



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			be avoided should be removed from the soil and relocated/ re-planted in similar habitats. Vegetation clearing commences only after the necessary permits have been obtained. SEO to provide supervision and oversight of vegetation clearing activities			
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	There should be follow-up rehabilitation and re-vegetation of any remaining denuded areas with local indigenous plants from the area. Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and bare (unvegetated) areas.	NEMA	SEO	Throughout construction phase
	Operation	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	A fire management plan needs to be implemented to restrict the impact fire would have on the surrounding areas.	NEMA NEMBA CARA	Applicant REM	Planning Phase Implement throughout LoM
	Operation Decommissioning	Impacts on biodiversity due to the proposed project have the potential to be of moderate –	Any materials may not be stored for extended periods of time and must be removed from the Project Area, if maintenance is completed. No permanent maintenance structures should be permitted. No storage of vehicles or equipment will be allowed outside of the designated parking areas.	NEMA NEMBA CARA	SEO	Throughout the LoM.



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		high significance.				
	Construction Operation	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	All activities must be restricted to within the authorised areas. Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should not be disturbed further, if not approved. All vehicles and personnel must make use of existing roads and walking paths as far as possible, especially operational vehicles.	NEMA NEMBA CARA	SEO	Throughout LoM
	Operation	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Precautions must be taken against the erosion damage that would be caused by unplanned pipe leaks, such as the planting of dense indigenous pioneer grass seeds across all bare earth areas surrounding the pipes. Monitoring of the pipeline must be undertaken to detect leaks and monitoring should be undertaken at least once a week.	NEMA	Applicant REM SEO	Throughout LoM,
	Operation Decommissioning	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	A hydrocarbon and chemical spill management plan must be put in place to ensure that should there be any hazardous spill out or over that it does not run into the surrounding areas. Any contractors or workers shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath vehicles/machinery and equipment when not in use. Handle hydrocarbons carefully to limit spillage.	NEMA NEMBA CARA	Applicant SEO	Throughout the LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			Ensure vehicles are regularly serviced so that hydrocarbon leaks are limited. No servicing of equipment on site unless necessary. All contaminated soil / yard stone shall be treated in situ or removed and be placed in containers for treatment purposes. Appropriately contain any generator diesel storage tanks, machinery spills (e.g., accidental spills of hydrocarbons oils, diesel etc.) in such a way as to prevent them from leaking and entering the environment. Maintenance activities and vehicles could cause spillages of lubricants, fuels and waste material negatively affecting the functioning of the ecosystem. All vehicles and equipment must be maintained, and all re-fuelling and servicing of equipment is to take place in demarcated areas outside of the Project Area Cement mixing may not be performed on the ground. It is recommended that only closed side drum or pan type concrete mixers be utilised. Any spills must be immediately contained and isolated from the natural environment, before being removed from site.			
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded. No permanent construction phase structures, apart from approved structures, must be permitted. Construction buildings should preferably be prefabricated or constructed of re-usable/recyclable materials. No storage of vehicles or equipment will be allowed outside of the designated areas.	NEMA NEMBA CARA	REM SEO	Throughout construction



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Pest control plan must be put in place and implemented.	NEMA NEMBA CARA	REM SEO	Plan in place prior to construction commencing
	Operation	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Use environmentally friendly cleaning and dust suppressant products.	NEMA NEMBA CARA	REM SEO	Throughout the LoM
	Construction Operation Decommissioning	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	All motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited Measures (for example; speed bumps and signs) should be erected to enforce slow speeds.	NEMA NEMBA CARA Internal speed limits for haul roads and declared legal speed limits for public roads.	SEO	Throughout the LoM.
	Construction	Impacts on biodiversity due to the proposed	All personnel and contractors are to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof.	Induction training shall comply with EMS Framework	SEO	Throughout construction



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		project have the potential to be of moderate – high significance.	Discussions are required on sensitive environmental receptors within the Project Area to inform contractors and site staff of the presence of protected species, their identification, conservation status and importance, biology, habitat requirements and management requirements in line with the Environmental Authorisation and within the EMPr.			
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Contractors and employees must all undergo the induction and must be made aware of any sensitive areas to be avoided.	Induction training shall comply with EMS Framework	SEO	Throughout construction.
	Operation	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	A stormwater management plan must be implemented. • Incorporate green /soft engineering stormwater measures. Avoid unnecessary vegetation clearing and preferential surface flow paths. • Incorporate green or soft engineering stormwater management measures, such as vegetated swales, bio-retention areas, grassed waterways, and infiltration basins, to slow down, filter, and absorb stormwater runoff. • Design stormwater controls to maximise infiltration and natural attenuation of runoff, reducing peak flows and improving water quality.	NEMA NEMBA CARA NWA	REM SEO	Throughout operation.



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			• Retain existing vegetation wherever possible, especially in areas that naturally slow or filter runoff, to maintain soil stability and ecological function. • Avoid unnecessary clearing of vegetation during site preparation and construction, particularly in buffer zones, riparian areas, and natural drainage lines. • Prevent the creation of preferential surface flow paths (e.g., straight, unvegetated channels) that could accelerate runoff and increase erosion or pollution risk. • Where vegetation clearing is unavoidable, re-vegetate disturbed areas promptly with indigenous species to restore stormwater attenuation and filtration functions. • Regularly inspect and maintain green stormwater infrastructure to ensure continued effectiveness (e.g., remove sediment, repair erosion, replace dead plants).			
	Construction Operation	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	No trapping, killing, or poisoning of any wildlife is to be allowed and signs must be put up to enforce this. Monitoring must take place in this regard. Outside lighting, if used, should be designed and limited to minimise impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (green/red) lights should be used wherever possible. Where possible, work should be restricted to one area at a time and be systematic. This is to reduce the number and	NEMA NEMBA CARA	SEO	Throughout the LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			extent of on-site activities, allowing fauna to move off as the Project progresses. This will give the smaller birds, mammals and reptiles a chance to weather the disturbance in an undisturbed zone close to their natural territories. Any holes/deep excavations must be dug in a progressive manner and shouldn't be left open overnight. If any excavations are to be dug these must not be left open for more than a few hours without ramps for trapped fauna to leave and must be filled at night. Holes must be subsequently inspected for fauna prior to backfilling.			
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance	A habitat rehabilitation and revegetation plan must be developed and implemented to reduce the occurrence of bare soil areas and the associated damage due excessive erosion.	NEMA NEMBA CARA	SEO	Plan in place prior to construction commencing
	Construction	Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance	All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited. All vehicles should adhere to a speed limit of maximum 40 km/h to avoid collisions. Appropriate speed control measures and signs must be erected. Environmental Awareness Training discussions/training must include (but not limited to): Speed limits, General rules of road	NEMA NEMBA CARA	SEO	Throughout construction

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			use, not limited to Avoiding the widening of the road and Environmental sensitivity of surrounding habitat. The areas to be disturbed must be specifically and responsibly demarcated to prevent the movement of staff or any individual into the surrounding environments, signs must be put up to enforce this. The duration of the activities should be minimised to as short a term as possible, to reduce the period of disturbance on fauna			
		Impacts on biodiversity due to the proposed project have the potential to be of moderate – high significance.	Monitoring of adjacent watercourses must be undertaken to assess the impact of runoff to these systems. Aquatic monitoring must be done, this includes ground water and surface water. All released water must be within DWAF (1996) water quality standards for aquatic ecosystems, and discharge must be managed to avoid scouring and erosion of the receiving systems. Contain wastewater in a PCD. Contaminated water must not be discharged into the watercourses. Clean and dirty water must be separated. This water should be looked at for treatment and then re-introduced, to mitigate losses to the catchment water hydrodynamics.			
5.8 SOILS						
TSF Construction	Operation Decommissioning	Contaminants have the potential to	All contractors must have spill kits available and be trained in the correct use thereof. All contractors and employees should undergo induction which is to include a component of	CARA NEMA	SEO	Throughout the LoM.



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
TSF operations **Decommissioning** **Rehabilitation and Closure**		pollute the environment and can vary from localized to large scale impacts	environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of spills and leaks and general good "housekeeping".			
	Operation Decommissioning	Contaminants have the potential to pollute the environment and can vary from localized to large scale impacts	Have action plans on site, and training for contactors and employees in the event of spills, leaks and other impacts to the soil. The contractors used for the project should have spill kits available to ensure that any fuel or oil spills are clean-up and discarded correctly.	CARA NEMA	SEO	Throughout the LoM.
	Operation Decommissioning Rehabilitation and Closure	Small scale and localised	A storm-water management plan featuring active energy-dissipating structures must be maintained along graded access roads and pipeline corridors to prevent subsequent erosion and downstream sedimentation. Monitor erosion on site on at least a monthly basis.	CARA NEMA	SEO	SWMP must be in place prior to operations commencing
	Construction Operations Rehab and Closure	Small scale and localised	Topsoil management: Prior to the commencement of site clearance, a formal Topsoil Salvage and Stockpiling Plan must be fully implemented across all active construction zones, including the Tailings Storage Facility (TSF) footprint, dams, and access roads. Unless explicitly instructed otherwise by the geotechnical or project engineer, excavation must adhere to the following depths: • Topsoil: 300 mm	In accordance with Rehabilitation and closure plan	SEO	Throughout construction phase

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			• Subsoil: 1,000 mm • Total Excavation Depth: 1,300 mm To preserve soil fertility, biological activity, and structural integrity for future rehabilitation: • Material Separation: Topsoil and subsoil must be stripped, transported, and stockpiled in strictly separate locations to prevent cross-contamination. • Height Restrictions: All stockpiles must be configured as low-profile mounds with a maximum height limit of 2.0 metres.			
	Construction Operations	Small scale and localised	Following the completion of construction activities, all linear servitudes affected by soil compaction must undergo mechanical subsoiling (ripping). This post-construction remediation process is required to break up compacted subsoil layers, thereby restoring the natural permeability and hydrological function of the soil profile.	In accordance with Rehabilitation and closure plan	SEO	After construction is completed
	Planning / design	Small scale and localised	The Tailings Storage Facility (TSF) and Return Water Dam barrier system must be installed in accordance with approved engineering specifications to mitigate any operational risk of chemical seepage or toxic solute contamination to adjacent agricultural soils.	NEMA Duty of Care	REM	Prior to construction commencing
5.9 POLLUTION PREVENTION						
Water management	Operation Decommissioning	Contaminants have the potential to pollute the	An emergency preparedness plan must be compiled and be implemented for the activities. All staff on site including sub-	NEMA Polluter Pays Principle NEMA Duty of Care	SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
Infrastructure construction **TSF operations** **Maintenance and operation of site infrastructure and facilities**	Rehabilitation and Closure	environment and can vary from localized to large scale impacts	contractors must be informed and trained on the emergency plans through drills. Any equipment that may leak, and does not have to be transported regularly, shall be placed on watertight drips trays to catch any potential spillages of pollutants. The drip trays shall be of a size that the equipment can be placed inside it. Daily inspections shall be carried out to ensure such spill prevention measures are in place and remain effective. Drip trays shall be cleaned regularly and shall not be allowed to overflow. All spilled hazardous substances must be collected and adequately disposed of at a suitably licensed facility. There must be secondary containment along the pipelines at water crossings to capture potential leaks.	NWA OHSA MHSA Shall adhere to the EMS developed to ensure compliance with the regulatory framework		
General decommissioning activities	Operation Decommissioning	Contaminants have the potential to pollute the environment and can vary from localized to large scale impacts	Appropriate measures must be implemented to ensure that rainwater does not run into areas containing cement, oil, diesel etc. as this could result in a pollution threat. Storage areas for these substances should be placed on high-lying ground.	NEMA Polluter Pays Principle NEMA Duty of Care NWA OHSA MHSA Shall adhere to the EMS developed to ensure compliance with the regulatory framework	SEO	Throughout LoM, Decommissioning and Rehabilitation and Closure
	Operation Decommissioning	Contaminants has the potential to	Servicing and maintenance of vehicles may only take place in a workshop area (subject to suitable spill prevention and containment measures). The workshop area should be lined	NEMA Polluter Pays Principle	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		pollute the environment and can vary from localized to large scale impacts	with concrete or alternatively plastic under gravel. If emergency repairs are required elsewhere on site, this shall be undertaken with the necessary spill prevention measures in place.	NEMA Duty of Care NWA OHSA MHSA Shall adhere to the EMS developed to ensure compliance with the regulatory framework		
	Operation Decommissioning	Contaminants have the potential to pollute the environment and can vary from localized to large scale impacts	All hazardous substances (e.g. fuel, grease, oil, brake fluid, hydraulic fluid) must be handled, stored and disposed of in a safe and responsible manner so as to prevent pollution of the environment or harm to people or animals. Appropriate measures must be implemented to prevent spillage and appropriate steps must be taken to prevent pollution in the event of a spill.	NEMA Polluter Pays Principle NEMA Duty of Care NWA OHSA MHSA Shall adhere to the EMS developed to ensure compliance with the regulatory framework	SEO	Throughout LoM
	Operation Decommissioning	Moderate significance and potentially a moderate scale disturbance	Hazardous substances shall be confined to specific and secured areas, and in such a way that does not pose any danger of pollution even during times of high rainfall. Hazardous storage areas shall be bunded (impermeable) with adequate containment (at least 110% the total volume stored) for potential spills or leaks. Bunded storage areas shall be either	NEMA Polluter Pays Principle NEMA Duty of Care NWA	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			provided with an oil separator or sump. Waste from spillages will then be removed and recycled or disposed of responsibly.	OHSA MHSA Shall adhere to the EMS developed to ensure compliance with the regulatory framework		
	Operation Decommissioning	Moderate significance and potentially a moderate scale disturbance	All fuel storage areas shall be bunded to contain at least 110 % of the volume stored and will comply with the relevant environmental and safety regulations. Fuel storage areas must be provided with an impervious surface with the provision to contain any potential fuel spillages during refuelling (e.g. a sealed concrete slab which drains to a sump/oil separator). The Project Proponent must ensure that employees and labourers do not smoke or take part in any activity that may results in sparks in the vicinity of fuels and other flammable substances to prevent ignition.	NEMA Polluter Pays Principle NEMA Duty of Care NWA OHSA MHSA Shall adhere to the EMS developed to ensure compliance with the regulatory framework	SEO	Throughout LoM
	Operation Decommissioning	Moderate significance and potentially a moderate scale disturbance	Refuelling may only take place within a dedicated area inside the mine that is subject to appropriate spill prevention and containment measures Refuelling and transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimise the potential for leakage and to prevent spillage onto the soil. Drip trays should be utilised in relevant locations (inlets, outlets, points of leakage, etc.) during transfer to prevent such spillage or leakage. Any	NEMA Polluter Pays Principle NEMA Duty of Care NWA OHSA MHSA	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			accidental spillages shall be contained and cleaned up promptly.	Shall adhere to the EMS developed to ensure compliance with the regulatory framework		
	Operation Decommissioning	Moderate significance and potentially a moderate scale disturbance	Any excess or waste material or chemicals should be removed from the site and should preferably be recycled (e.g. oil and other hydrocarbon waste products). Any waste materials or chemicals that cannot be recycled shall be disposed of at a suitably licensed waste facility.	NEMWA DWS minimum requirement for waste disposal	REM SEO	Throughout LoM
	Operation Decommissioning	Moderate significance and potentially a moderate scale disturbance	Hazardous waste may only be disposed of at a licensed hazardous waste disposal facility. A specialist waste contractor shall dispose of such waste and shall be required to provide waste manifests and safe disposal certificates. The 'cradle-to-grave' principle must be complied with.	NEMA Polluter Pays Principle NEMA Duty of Care NEMWA DWS minimum requirement for waste disposal	REM SEO	Throughout LoM
	Operation Decommissioning	Potential health risks are considered high significance	All relevant personnel on site must be properly trained concerning the proper use, handling and disposal of hazardous substances applicable to their line of work. If required, advice shall be obtained from the manufacturer with regard to the safe handling and storage of hazardous materials.	MSDS specifications OHSA MHSA	SEO	Throughout LoM
	Operation Decommissioning	No direct physical disturbance	The SEO shall maintain a list of all hazardous materials that would be present on site. The EO shall develop and maintain a hazardous substance register for all hazardous materials that shall be kept on site during all phases of the project. The register shall be provided to the ECO upon request. Safety Data	OHSA MHSA	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			Sheets (SDS) must be available on site at the point of use and readily accessible for all hazardous substances stored.			
5.10 WASTE MANAGEMENT						
Maintenance and operation of site infrastructure and facilities **TSF operations**	Operation Decommissioning	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The applicant shall update, if necessary and implement a waste management plan for the TSF which complies with the principles of the NEMWA and provides a mechanism for the effective management of waste throughout the LoM. This plan shall ensure the appropriate management of all solid waste, including maintenance debris (cement bags, wrapping material, timber, cans, wire, nails, etc.), waste and surplus food, food packaging, organic waste etc.	NEMWA NEMA cradle to grave DWS minimum requirement for waste disposal Shall adhere to the EMS developed to ensure compliance with the regulatory framework	REM SEO	Throughout LoM
Maintenance and operation of site infrastructure and facilities **General decommissioning activities**	Operation Decommissioning	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The waste management system shall provide for adequate waste storage (in the form of waste skips and bins with lids), waste separation for recycling, and frequent removal of non-recyclable waste for permanent disposal at an appropriately licensed waste disposal facility. No waste material is to be disposed of on site.	NEMWA NEMA cradle to grave DWS minimum requirement for waste disposal	REM SEO	Throughout LoM
	Operation Decommissioning	Waste has the potential to pollute the environment and can vary	Waste generated on site should be recycled as far as possible and sold/given to interested contractors. Recyclable waste should not be stored on site for excessive periods to reduce risk of environmental contamination Refuse bins will be	NEMWA NEMA cradle to grave	SEO	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		from localized to large scale impacts.	responsibly emptied and secured. Temporary storage of domestic waste shall be in appropriate receptacles.	DWS minimum requirement for waste disposal		
	Operation Decommissioning	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	The applicant shall implement a waste removal regime that ensures waste skips do not exceed their capacity before being removed from site for disposal.	NEMWA NEMA cradle to grave	REM SEO	Throughout LoM
	Operation Decommissioning	Waste has the potential to pollute the environment and can vary from localized to large scale impacts.	Littering shall be strictly prohibited. The site shall remain in a neat and tidy condition at all times. If required, the applicant shall make use of regular litter patrols to remove litter and ensure the site remains clean, neat and tidy.	NEMWA NEMA cradle to grave	SEO	Throughout LoM
	Operation Decommissioning	No direct physical disturbance.	The applicant shall maintain a waste register which shall be used to track all waste removed from site. Proof of appropriate waste disposal shall be kept on file at the site for auditing purposes.	NEMA cradle to grave	SEO REM	Throughout LoM
	Operation Decommissioning	Waste has the potential to pollute the environment and can vary	The applicant must adopt a cradle-to-grave approach to ensure that the waste is removed and disposed of in the prescribed and correct manner.	NEMA cradle to grave	Applicant SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		from localized to large scale impacts.				
5.11 NOISE						
TSF Construction **Operations** **Decommissioning**	Operation Decommissioning	Noise has the potential to result in low significance impacts to sensitive receptors at a small scale	Ensure that equipment is well maintained and fitted with the correct and appropriate noise abatement measures. Engine bay covers over heavy equipment could be pre-fitted with sound absorbing material. Heavy equipment that fully encloses the engine bay should be considered, ensuring that the seam gap between the hood and vehicle body is minimised.	SANS10103 ECA Noise Regulations World Bank EHS guidelines OHSA MHSA	SEO	Throughout LoM
	Operation Decommissioning	Noise has the potential to result in low significance impacts to sensitive receptors at a small scale	Trucks, machinery and equipment will be regularly serviced to ensure acceptable noise levels are not exceeded. Quieter equipment will be sought where possible when purchasing new equipment. Silencers will be utilised where possible. Point sources will be enclosed where possible. Acoustic screens will be considered if I&AP complaints are received.	SANS10103 ECA Noise Regulations World Bank EHS guidelines OHSA MHSA	REM SEO	Throughout LoM
	Construction Decommissioning		All construction, decommissioning, start-up and maintenance activities are limited to day-time hours (i.e. 06:00 to 18:00).	SANS10103 ECA Noise Regulations	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
				World Bank EHS guidelines OHSA MHSA		
	Operation		Noisy stationery equipment (>85 dBA) must be enclosed at the upgraded gold plant as far as is reasonably practicable.	SANS10103 ECA Noise Regulations World Bank EHS guidelines OHSA MHSA	REM SEO	Throughout LoM
	Construction Decommissioning		Scheduling of construction and decommissioning activities must be communicated and co-ordinated with nearby residents (i.e. Elandsrand and residential areas within 400 m of the construction pipeline and power lines).	SANS10103 ECA Noise Regulations World Bank EHS guidelines OHSA MHSA	SEO	Throughout LoM
	Construction Operations Decommissioning		A noise complaints register must be kept. If complaints are received, they must be promptly investigated, recorded and addressed. Channels for logging of complaints should be communicated to all residents within 850 m of project activities.	SANS10103 ECA Noise Regulations World Bank EHS guidelines	REM SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
				OHSA MHSA		
5.12 AIR QUALITY						
TSF Construction and Operations **General decommission activities**	Operation Decommissioning Rehabilitation and Closure	The additional impacts on air quality will have low significance and may occur at a few sensitive receptors.	The applicant shall comply with the National Dust Control Regulations, Promulgated under the National Environmental Management: Air Quality Act (Act 39 of 2004). If dust levels exceed the specified thresholds in terms of the dust control regulations, the Project Proponent shall appoint a suitably qualified specialist to identify sources of the excessive dust levels and to suggest suitable and reasonable mitigation measures.	NEMAQA Dust regulations	Applicant REM SEO	Throughout LoM
	Operation Decommissioning Rehabilitation and Closure	The additional impacts on air quality will have low significance and may occur at a few sensitive receptors.	The current dust fall monitoring network be maintained and the monthly dust fall results used as indicators to tract the effectiveness of the applied mitigation measures. Dust fall collection should follow the ASTM method. Dust fallout monitor unit DK 1 should be moved to the south-western boundary of the nearby Deelkraal town. It is also recommended that a new dust fallout monitor unit be placed on the south-western boundary of the proposed Deelkraal II TSF. Refer to 7.3.2 of this EMPr for further information.	NEMAQA Dust regulations	SEO	Throughout LoM
	Operation Decommissioning Rehabilitation and Closure	The additional impacts on air quality will have low significance and may occur	• Mitigation measures should be implemented which are aimed at reducing wind erosion from the active TSF, i.e. the grassing of TSF side slopes. • A Dust Management Plan (DMP) for the project should be compiled and should follow an iterative process, including: implementation, monitoring,	NEMAQA Dust regulations	Applicant REM SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		at a few sensitive receptors.	reporting, reviewing and adjustment to the necessary steps.			
	Operation Decommissioning	The additional impacts on air quality will have low significance and may occur at a few sensitive receptors.	Speed limits will be established and enforced to minimise dust generation. When haul trucks need to use public roads, the vehicles need to be cleaned of all mud and the material transported must be covered to minimise windblown dust.	NEMAQA Dust regulations	SEO	Throughout LoM
	Operation Decommissioning	The additional impacts on air quality will have low significance and may occur at a few sensitive receptors.	Machinery and equipment will be regularly serviced to ensure they are in proper working condition and to reduce risk of excessive emissions.	NEMAQA Dust regulations	SEO	Throughout LoM
5.13 WETLANDS						
Design **Construction**	Planning	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to	Refine the layout of those project components for which some flexibility remains to minimise direct disturbance to wetlands, drainage features and their buffers as far as practicable, while recognising that major infrastructure components such as the TSF footprint and return water dam are location-constrained. Peg and demarcate all approved disturbance footprints, no-go areas and retained wetland/buffer areas before site establishment. Where impacts cannot be avoided, limit the	NWA	SEO REM	Planning and design phase

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
TSF Operations **Rehabilitation**		impacts which are large in extent.	disturbance footprint to the minimum practicable extent and implement targeted rehabilitation of the residual and hydrologically connected wetland systems, particularly HGM 3, HGM 5 and HGM 6, together with associated drainage and buffer areas			
General decommission activities	Planning	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Design and construct all crossings of drainage features and wetland margins to maintain surface and shallow subsurface flow. Use above-ground pipelines on pre-cast plinths outside wetland beds and banks as far as practicable; span drainage lines where feasible; place supports outside active flow paths; Size culverts and crossings to pass storm flows; and - reinstate bed and bank profiles immediately after installation or maintenance works.	NWA	SEO REM	Throughout construction phase
			Implement a stormwater, erosion and sediment control plan for the TSF footprint, return water dam, road verges, pipeline corridors, stockpiles and plant upgrade areas. Install cut-off drains, berms, silt traps, sediment barriers and energy dissipaters before major earthworks commence. Stabilise exposed slopes, protect stockpiles, prevent concentrated runoff, and repair erosion features immediately when they develop.			
	Construction Operation Rehabilitation Decommissioning	Impacts on wetlands are considered to be of moderate - low significance in most cases	Store fuels, oils and chemicals in bunded areas outside wetland buffers; refuel and service plant only at designated areas on impermeable surfaces; provide drip trays and spill kits on mobile plant; collect sewage in sealed systems; remove waste regularly; and implement a spill response procedure that	NWA	REM SEO	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		and can range from localized to impacts which are large in extent.	prevents contaminated water, hydrocarbons, sewage or waste from entering wetlands or drainage lines.			
	Construction Operation Rehabilitation Decommissioning	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Sequence reclamation and associated works so that the minimum practicable area of Deelkraal I, Kusasalethu and the Deelkraal II construction footprint is disturbed at any one time. Confine vehicles, laydown areas, workshops, material storage and staff movement to approved footprints and existing or demarcated routes only. N o ad hoc tracks, turning areas or stockpiles are permitted within wetland buffers. Apply speed limits near wetlands, manage dust on roads without causing runoff, and inspect open excavations daily with escape ramps where required.	NWA	REM SEO	Throughout LoM
	Operation	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Maintain the TSF, return water dam and associated slurry and return water pipelines as contained systems. Inspect pipe joints, supports, valves and plinths; maintain freeboard and stormwater capacity; repair leaks immediately; keep return water infrastructure operational; and implement isolation and emergency shutdown procedures where pipelines approach wetlands or drainage features. No overtopping, seepage breakout or dirty water discharge is permitted to wetland systems.	NWA	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Construction Operation Decommissioning	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Maintain roads, culverts, stormwater outlets and access routes so that runoff is dispersed and not concentrated into wetlands or drainage lines. Use existing access routes for inspection and maintenance as far as possible; do not blade material into drainage features; avoid maintenance works during saturated conditions; and reinstate any disturbed verges, side-cast or borrow areas immediately.	NWA	SEO	Throughout LoM
	Construction	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Strip topsoil separately from subsoil in dry conditions, keep wetland-related soils separate from general fill, and stockpile all soils outside wetlands and approved buffers. Protect stockpiles from erosion, compaction and contamination. Replace soils in the correct order during rehabilitation and do not use wetland soils for berms, access roads or general fill.	NWA	SEO	Throughout LoM
	Operation Decommissioning Closure and Rehab	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which	Implement progressive rehabilitation of completed sections of the TSF footprint, pipeline corridors, temporary work areas, laydown areas and decommissioned infrastructure as soon as they become available. Rip compacted surfaces, regrade to stable contours, replace topsoil, re-establish indigenous vegetation appropriate to the receiving habitat, and implement an alien invasive species control programme until acceptable cover is achieved.	NWA	REM SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		are large in extent.				
	Construction Operations	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Undertake routine wetland and drainage line compliance inspections, post-rainfall audits and targeted water quality monitoring at relevant downstream points. Record all non-conformances, implement corrective actions within defined timeframes, and adapt management measures where erosion, sedimentation, pollution, seepage or drainage disruption is recurring.	NWA	REM SEO	Throughout LoM
	Decommissioning Closure	Impacts on wetlands are considered to be of moderate - low significance in most cases and can range from localized to impacts which are large in extent.	Prepare and implement a decommissioning and closure method statement for the removal of temporary infrastructure, decompaction of affected areas, re-establishment of drainage patterns, stabilisation of final landforms, rehabilitation of redundant roads and service corridors, and removal of all waste and contaminated material. Continue monitoring and maintenance until closure criteria for erosion control, pollution prevention and vegetation establishment are met.	NWA	REM SEO	Method statement in place prior to decommissioning phase Ongoing monitoring as required
5.14 IMPACTS ON TRAFFIC, TRANSPORTATION AND INFRASTRUCTURE						
TSF Construction	Operation Decommissioning	Impacts on transportation infrastructure and traffic can have a	The applicant shall ensure that the internal haul roads are adequately maintained, including monthly scraping and removal where required. Together with road maintenance, the storm water system to direct storm water that falls within the roads shall be kept maintained.	Road Traffic Act OHSA MHSA	REM SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
TSF Operations **General decommission activities**		significant extent although typically low in significance.	Conduct regular inspections of all access and haul roads to identify signs of deterioration such as potholes, rutting, erosion, dust generation, inadequate drainage, or surface damage. Record inspection findings, implement routine maintenance, and assess whether road improvements, strengthening, widening, resurfacing, or drainage upgrades are necessary to ensure safe and efficient vehicle movement.			
	Operation Decommissioning	Impacts on transportation infrastructure and traffic can have a significant extent although typically low in significance.	On-site vehicles must be limited to approved access routes and areas (including turning circles and parking) on the site so as to minimise excessive environmental disturbance to the soil and vegetation on site, and to minimise disruption of traffic.	Road Traffic Act OHSA MHSA	SEO	Throughout LoM
	Operation Decommissioning	Impacts on transportation infrastructure and traffic can have a significant extent although typically low in significance.	In the case of dual or multiple use of access roads by other users, arrangements for multiple responsibility must be made with the other users. If not, the maintenance of access roads will be the responsibility of the Project Proponent. Road conditions must be assessed regularly for signs of damage.	Road Traffic Act OHSA MHSA	Applicant SEO	Throughout LoM
	Operation Decommissioning	Impacts on transportation infrastructure and traffic can	All intersections with main tarred roads will be clearly signposted.	Road Traffic Act OHSA MHSA	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		have a significant extent although typically low in significance.				
	Operation Decommissioning	Impacts on transportation infrastructure and traffic can have a significant extent although typically low in significance.	Road signs and safety features such as rumble strips will be maintained to ensure the writing is legible and the haul road crossings are visible to motorists.	Road Traffic Act OHSA MHSA	SEO	Throughout LoM
	Operation Decommissioning	Impacts on transportation infrastructure and traffic can have a significant extent although typically low in significance.	All mining vehicles using public roads shall be in a roadworthy condition and their loads secured. They must adhere to the speed limits and all local, provincial and national regulations with regards to road safety and transport. Ensure vehicles are not overloaded and operate within their legally permitted gross vehicle mass (GVM) and axle load limits.	Road Traffic Act OHSA MHSA	SEO	Throughout LoM
	Construction	Impacts on transportation infrastructure and traffic can have a significant	Scheduling development traffic movement to not coincide with existing peaks where possible and encourage use of public transportation for workers.	Road Traffic Act OHSA MHSA	SEO	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		extent although typically low in significance.				
5.15 VISUAL						
TSF Operations **Rehabilitation** **General decommission activities**	Construction Operation Rehabilitation and Closure	Visual impacts have an impact on the perception and sense of place in the area – added visual impacts for the West Wits are expected to be of moderate - low significance.	Control site access particularly during construction in order to minimise areas of disturbance particularly to areas of vegetation Minimise disturbance and retain and augment existing vegetation as far as possible; Reinstate, augment and maintain retained natural vegetation as far as possible; Monitor rehabilitated areas post-construction and implement remedial actions; Maintain existing vegetation and newly planted vegetation as far as is possible both within and surrounding the development area Undertake rehabilitation of the TSF on an incremental basis in order to help the side slopes of the facility blend visually with the surrounding landform.	In accordance with Rehabilitation and closure plan.	REM SEO	Decommissioning and Rehabilitation
	Rehabilitation and Closure	Visual impacts have an impact on the perception and sense of place in the area – added visual impacts	Remove all temporary works and construction material at the end of construction	In accordance with Rehabilitation and closure plan.	REM SEO	Decommissioning and Rehabilitation



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		for the West Wits are expected to be of moderate - low significance.				
	Operation Decommissioning Rehabilitation and Closure	Visual impacts have an impact on the perception and sense of place in the area – added visual impacts for the West Wits are expected to be of moderate - low significance.	Undertake waste management in order to minimise the spread of waste from the site . "Housekeeping" procedures should be developed for the project to ensure that the project site and lands adjacent to it are kept clean of debris, garbage, fugitive trash, or waste generated onsite; procedures should extend to control of "track out" of dirt on vehicles leaving the active sites and entering the public domain.	N/A	REM	Throughout LoM
	Construction Operations	Visual impacts have an impact on the perception and sense of place in the area – lighting impacts are expected to be of low significance.	Careful design of security and operational lighting to minimise impacts on surrounding areas and receptors; High mast lighting should not be used. Ensure that the intention of the original lighting design is maintained throughout the construction phase.	In accordance with Rehabilitation and closure plan	REM	Throughout construction and operational phases



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Operation Rehabilitation and Closure		Monitor rehabilitated areas post-construction and implement remedial actions; Undertake rehabilitation of the TSF on an incremental basis in order to help the side slopes of the facility blend visually with the surrounding landform; and Locate storage areas outside areas with medium visual sensitivity and away from mine villages.	In accordance with Rehabilitation and closure plan	REM	Operations, closure and rehabilitation
5.16 RADIATION						
TSF Operations **General decommission activities** **Post Closure Monitoring and Maintenance**	Operation Rehabilitation and Closure	The TSF radiation impact has a potentially moderate significance but will be restricted to the site and immediate surrounding areas.	Develop an air quality management plan for the Project, including air quality monitoring to ensure compliance at upwind and downwind locations.	NRWMP ICRP	REM SEO	Throughout operations
	Operation Rehabilitation and Closure	The TSF' radiation impact has a potentially moderate significance but will be restricted to the site and immediate	• The most effective way to reduce the radon exhalation rate for the TSF is to provide a covering layer. This will increase the diffusion length to allow for the decay of the radon progeny before being released from the tailings surface. • Vegetate exposed areas of the TSF and use wind barriers to reduce wind erosion and/or the application of dust suppressants.	NRWMP ICRP	Applicant REM	Throughout operations

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		surrounding areas.	• Apply dust suppressants, i.e., Dust-A-Side, on exposed areas of the TSFs.			
	Operation Decommissioning Rehabilitation and Closure	The TSF' radiation impact has a potentially moderate significance but will be restricted to the site and immediate surrounding areas.	Implementation of a passive groundwater remediation system downstream of the TSF to capture the contaminant plume.	NRWMP ICRP	SEO	Throughout LoM
	Operation Decommissioning Rehabilitation and Closure Post-closure phase	The TSF' radiation impact has a potentially moderate significance but will be restricted to the site and immediate surrounding areas.	Implementation of radiation monitoring programme as described in **Section 7.3.5** of this EMPr.	NRWMP ICRP	Applicant REM	Throughout LoM
5.17 GROUNDWATER						
Maintenance and operation of site	Operation Decommissioning	The TSF' impact on groundwater has a potentially moderate	The applicant must take all reasonable measures to avoid and limit pollution of ground water resources as a result of site activities. Pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, waste water containing organic waste, detergents, solid waste etc. The	NEMA Duty of care NWA GN704	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
infrastructure and facilities **TSF Operations**	Rehabilitation and Closure	significance and at a local scale.	Project Proponent shall comply with the requirements relating to hazardous materials and spill management presented in this EMPr.	DWS best practice guidelines Shall adhere to the EMS developed to ensure compliance with the regulatory framework		
Post Closure Monitoring and Maintenance	Operation Decommissioning	The TSF' impact on groundwater has a potentially moderate significance and at a local scale.	The TSF and RWD should both be lined. .	NEMA Duty of care NWA GN704 DWS best practice guidelines Shall adhere to the EMS developed to ensure compliance with the regulatory framework	SEO	Throughout LoM
	Operation	The TSF' impact on groundwater has a potentially moderate significance and at a local scale.	In the event of pollution caused as a result of activities, the responsible party, according to section 20 of the National Water Act (Act No. 36 of 1998) shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas.	NEMA Duty of care NWA GN704 DWS best practice guidelines Shall adhere to the EMS developed to ensure compliance	Applicant	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
				with the regulatory framework		
	Operation Rehabilitation and Closure	The TSF' impact on groundwater has a potentially moderate significance and at a local scale.	The findings of the modelling should be verified and continued monitoring is recommended. Additional monitoring boreholes are recommended. A minimum of two borehole pairs is recommended north of the new TSF and another two south of the TSF (dependent on the accessibility of the terrain). Refer to **Section 7.3.3** for the monitoring requirements.	NEMA Duty of care NWA GN704 DWS best practice guidelines Shall adhere to the EMS developed to ensure compliance with the regulatory framework	REM SEO	Throughout LoM
	Operation Rehabilitation and Closure	The TSF' impact on groundwater has a potentially moderate significance and at a local scale.	The numerical model should be updated if any deviations from the predicted contaminant migration are noticed. Alternative remedial options such as cut-off trenches can be considered to contain any contamination, if detected.	NEMA Duty of care NWA GN704 DWS best practice guidelines Shall adhere to the EMS developed to ensure compliance with the regulatory framework	REM SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
5.18 HYDROLOGY						
Maintenance and operation of site infrastructure and facilities **TSF Construction** **Operations** **Rehabilitation and Closure**	Operations Decommissioning Rehabilitation and Closure	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Ensure all existing infrastructure has a stormwater management plan that is sufficient per GN 704 and any applicable TSF-specific requirements, and that all proposed infrastructure — including new TSFs, pipelines, power lines, access roads, and associated facilities — is designed and constructed in accordance with GN 704.	NEMA Duty of care NWA GN704 DWS best practice guidelines	SEO	Throughout LoM
		The project impact on surface water has a potentially medium - low significance and at a regional scale.	Further develop the TSF using sound engineering to limit the likelihood of a failure. Pollution potential within watercourses must be considered in the designs to stop an unforeseen failure or breach.	NEMA Duty of care NWA GN704 DWS best practice guidelines	Applicant REM SEO	Throughout LoM
		The project impact on surface water has a potentially medium - low significance and at a regional scale.	Limit the extent of clearing and earthworks to approved construction footprints across all infrastructure components as far as possible.	NEMA Duty of care NWA	SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Appropriate erosion and sediment control measures must be implemented for all construction activities, scaled to the nature and footprint of the infrastructure being constructed. Where possible, construction activities across all infrastructure components should be scheduled outside of peak rainfall periods. For construction periods exceeding six months, activities should be phased such that soil exposure (prior to the addition of hardstanding or rehabilitation) occurs predominantly within the dry season. Clearing of vegetation and associated excavation should be kept to a minimum across all infrastructure corridors and footprints, particularly in areas where soils are identified as unstable or erosion-prone.	NEMA Duty of care NWA GN704 DWS best practice guidelines	REM SEO	Construction Phase
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	All construction activities should be monitored to ensure that areas of potential erosion are identified early and managed appropriately, including along pipeline and power line corridors where linear disturbance increases drainage line crossing risks. Where erosion cannot be avoided, settling facilities or silt fences should be installed to capture mobilised sediment before it reaches downstream watercourses.	NEMA Duty of care NWA GN704 DWS best practice guidelines	REM SEO	Construction Phase
	Construction	The project impact on surface water has a potentially medium - low significance and	Pipeline stability must be maintained by ensuring that the integrity of pre-cast concrete plinths and other pipeline support structures is not compromised by erosion of surrounding soils.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		at a regional scale.				
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	All disturbed areas, including those associated with all infrastructure construction zones, must be rehabilitated as soon as practically possible to restore pre-disturbance conditions in terms of soil profile, land cover, and slope.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Rehabilitated and disturbed areas must be stabilised promptly using vegetation (such as grass cover) or mechanical methods such as slope profiling or erosion control blankets	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase
	Operation	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Monitor the TSFs to ensure areas of potential erosion are identified and managed appropriately. Monitor pipeline corridors throughout the operational phase, with particular attention to drainage line and watercourse crossings where scour and undermining of pipe support structures, including pre-cast concrete plinths, present a persistent erosion risk. Erosion protection at crossing points must be maintained and repaired where necessary. Maintain road drainage structures, including culverts, cut-off drains, and road camber, associated with access roads to prevent road-related erosion and sediment runoff during the	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Throughout operational phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			operational phase. Road verges and disturbed shoulders should be monitored and stabilised where erosion is identified.			
	Construction Operation Rehabilitation Closure	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Rehabilitation should include topsoil replacement, revegetation, and maintenance and aftercare for all disturbed areas across all infrastructure components, including pipeline corridors, access road verges, pump station areas, and plant upgrade footprints, and should not be limited to TSF footprints alone. Concurrent rehabilitation of the TSFs should ideally occur during the operational life of the TSFs, including cladding of side slopes and subsequent revegetation, with final rehabilitation resulting in a fully vegetated site. A rehabilitation plan should be developed for linear infrastructure, covering topsoil replacement, re-grading of trenches to restore natural slope and drainage patterns, and revegetation of all disturbed corridors following decommissioning. Rehabilitated areas across all infrastructure components must be monitored post-closure and corrective actions implemented where erosion persists, with sign-off only once erosion has demonstrably stabilised.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Throughout LoM
	Construction	The project impact on surface water has a potentially medium - low significance and	Ensure RWDs or temporary containment facilities are operational prior to major earthworks commencing on TSF and associated infrastructure. Works should, where possible, not take place nor infrastructure be placed within 100 m of any defined watercourse or within the 1:100 year flood line, given the applicability of GN 704. The linear nature of pipeline	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
		at a regional scale.	infrastructure means that some watercourse crossings, proximity to watercourses, or intersection with flood lines are expected; in these instances, enhanced flood protection and crossing design measures must be applied. All pipeline watercourse crossings must be designed to accommodate the 1:100-year flood event, including appropriate pipe sizing, elevation above flood level, and scour protection at crossing points. Above-ground pipelines installed on pre-cast concrete plinths must make adequate allowance for flooding, whether from a river, drainage canal, furrow, or surface water runoff.			
	Construction		Design and maintain road drainage structures, including culverts and cut-off drains, at all watercourse crossings along access road corridors to prevent flow obstruction during flood events. Restrict access road construction within floodplains where alternative routes are available. Ensure pump stations are designed and located to remain operational during flood events, or that documented backup procedures exist should a pump station be inundated, to prevent disruption to TSF and RWD water management during high rainfall periods. Ensure plant upgrade areas, including pump stations, are protected from surface water run-on through adequate site drainage design, with drainage directed away from sensitive infrastructure and into appropriate containment. Monitor and maintain the capacity of culverts, channels, and diversion structures across all infrastructure components to	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			ensure the unobstructed drainage and downstream movement of water to natural watercourses.			
	Operation	The project impact on surface water has a potentially medium - low significance and at a regional scale.	All slurry and process water pipelines must be pressure tested before commissioning to confirm structural integrity before introduction of process-affected water or slurry. Desilting of pipelines must take place when deemed necessary.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase
	Construction Operation	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Install flow monitoring and leak detection measures along pipeline routes, with particular attention to watercourse crossings and pump station connection points, and establish emergency isolation and shut-off procedures in the event of a pipeline rupture or leak.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Throughout LoM
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Provide secondary containment or bunding at pump stations and pipeline connection points where process-affected water or slurry is handled.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Inspect pipeline corridors and watercourse crossings regularly during construction for signs of seepage or uncontrolled discharge into the surrounding environment. Inspect pipeline crossings, plinth integrity, and scour protection following significant flood or rainfall events, and implement repairs promptly where damage or undermining is identified. Emergency isolation and shut-off procedures must be in place and readily accessible if a flood event causes a pipeline rupture.	NEMA Duty of care NWA DWS best practice guidelines	REM SEO	Construction Phase
	Operation	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Undertake surface water monitoring throughout the construction phase to enable change detection through regular data review relative to contaminants originating from the site. Develop and implement a maintenance plan to monitor the integrity of all infrastructure components and prevent leaks or ruptures during construction and into the operational phase. Maintain all engineered containment systems, including toe paddocks, underdrainage, seepage collection systems, and RWDs, in good working order throughout the operational and decommissioning phases. Maintain adequate freeboard and stormwater diversion capacity across all water management infrastructure for extreme rainfall events. Maintain the integrity of all slurry and process water pipelines through a scheduled inspection and maintenance programme, with emergency isolation and shut-off procedures in place and readily accessible in the event of a rupture or leak.	NEMA Duty of care NWA GN704 DWS best practice guidelines	REM SEO	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			Inspect pipeline corridors and watercourse crossings regularly during operation and decommissioning for signs of leakage or seepage, and implement repairs promptly where uncontrolled discharge is identified.			
	Operation	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Restrict all activities to within designated dirty water management areas wherever possible. Implement spill prevention and response procedures across all infrastructure components, including the availability of spill kits at all active construction areas. Ensure that concrete washout water and other construction wastewater generated across all infrastructure components are contained and not discharged to watercourses or drainage lines. Ensure vehicles and plant are regularly serviced to limit the risk of hydrocarbon leaks. Remove any soil contaminated by hydrocarbon spillage from the site promptly. All construction personnel must be trained on spill prevention and response procedures applicable to their work area and infrastructure component.	NEMA Duty of care NWA GN704 DWS best practice guidelines	REM SEO	Throughout LoM
	Operation	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Chemical and reagent storage areas associated with plant upgrades, including the new uranium processing section, must be bunded and all drainage from these areas directed to a contained dirty water management system. A chemical spill response procedure specific to plant upgrade areas must be established.	NEMA Duty of care NWA GN704 DWS best practice guidelines	REM SEO	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
	Construction	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Limiting the time and area over which machinery operates will limit the compaction of soils on the site. Divert clean water run-on away from the TSF. Undertaking the activities preferably in dry conditions. Avoid construction activities during wet / rainy days or implement adequate additional controls.	NEMA Duty of care NWA GN704 DWS best practice guidelines RSIP	REM SEO	Throughout construction
	Operation Rehabilitation Closure	The project impact on surface water has a potentially medium - low significance and at a regional scale.	Monitor TSFs regularly to detect any signs of instability, slumping, or unusual movement, and ensure that any remedial actions are implemented promptly.	NEMA Duty of care NWA GN704 DWS best practice guidelines RSIP	REM SEO	Throughout LoM
	Decommissioning Rehabilitation Closure	The project impact on surface water has a potentially medium - low significance and at a regional scale.	• Ensure that all residual slurry, process-affected water, and chemical inventories within pipelines, pump stations, and plant upgrade areas are removed and disposed of in a controlled manner before dismantling or abandonment of these structures. • Decommission pipeline infrastructure in a controlled manner, ensuring that all pipeline corridors are cleared of residual fluids and that watercourse crossings are reinstated to prevent ongoing pollutant pathways.	NEMA Duty of care NWA GN704 DWS best practice guidelines RSIP	REM SEO	Throughout LoM



Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			• Avoid rehabilitation and closure activities during periods of high rainfall where practical, to limit the risk of pollutant mobilisation from exposed areas. • Restrict all activities to within designated dirty water management areas wherever possible. • Undertake surface water monitoring throughout the rehabilitation and closure phase to enable change detection through regular data review relative to contaminants originating from the site, and continue post-closure monitoring until background water quality conditions are demonstrably restored.			
	Operation Decommissioning		• Spill kits must be maintained and readily accessible at all operational areas across all infrastructure components. Spill kits must also be maintained and readily accessible at all active rehabilitation and closure work areas. • During decommissioning, ensure that all residual process-affected water, slurry, and chemical inventories are removed and disposed of in a controlled manner prior to dismantling of containment infrastructure. • Undertake surface water monitoring throughout the operational and decommissioning phases to enable change detection through regular data review relative to contaminants originating from the site. • Develop and implement a decommissioning water management plan that addresses the controlled removal of all process-affected water and the	NEMA Duty of care NWA GN704 DWS best practice guidelines RSIP	REM SEO	Throughout LoM

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			progressive rehabilitation of dirty water management areas to prevent post-closure pollutant releases.			
	Rehabilitation Closure		• Progressively rehabilitate all disturbed areas to restore vegetation cover and natural runoff patterns, reducing the volume and velocity of surface water run-on towards infrastructure during rainfall events. • Undertake post-closure monitoring of all rehabilitated infrastructure footprints and drainage structures to confirm that flood risk remains low and that natural drainage patterns have been successfully restored	NEMA Duty of care NWA GN704 DWS best practice guidelines RSIP	REM SEO	Throughout LoM
5.19 CLIMATE CHANGE						
TSF Construction and Operations	Operation		The applicant will be required to report carbon dioxide equivalent (CO^2e) emissions annually. From an adaption perspective, additional support infrastructure can reduce the climate change impact on the employees. For example, improving the thermal and electrical efficiency of buildings to reduce electricity consumption for air conditioning, ensuring adequate water supply for staff drinking water, amending summer operating hours to avoid the hottest part of the day and potential health and safety impacts for employees, having shaded green rest areas for employees during their shift breaks. These options should be investigated by the applicant.	NAAQS	REM SEO	Annual reporting
	Construction		Install facility liners / membranes according to design specifications and industry best practice to prevent UV	Design specifications	REM SEO	Design Phase

Activities	Phase	Impact and Size and Scale of Disturbance	Mitigation Measures / Management Actions	Compliance with Standards	Responsible Person	Time Period
			exposure and degradation. The liner design must be approved by the DWS.			

6 CLOSURE AND REHABILITATION

6.1 CLOSURE AND REHABILIATION GOALS AND OBJECTIVES

Apart from the short-term objectives and strategies that will require implementation and monitoring over the full life of mine, even after closure of operation, the specific objectives that Harmony will adopt for rehabilitation and closure are to:

- Comply with national regulatory requirements;
- Protect the environment and public health and safety by using safe and responsible closure practices;
- Improve water quality;
- Establish self-sustaining vegetation that will stabilize the TSF;
- Develop end land uses that incorporate beneficial uses;
- Prevent health and safety risks to the surrounding community;
- Reduce the requirement for long-term monitoring and maintenance by establishing stable landforms;
- Enhance a positive socio-economic impact by achieving a sustainable land-use condition or alternatively as agreed upon with the applicable government regulator and affected communities; and
- Avoid or reduce costs and long-term liabilities to the company, government and public.

The closure of TSF will involve their rehabilitation. Contour walls will be constructed, after which additives will be applied in order that favourable conditions for plant growth can occur. Once this has been achieved, vegetation will be planted on top and on the sides of the tailings to stabilise the tailings against wind and water erosion. When the vegetation has been established maintenance and monitoring of the tailings dam will take place. The maintenance will take place over a period of three years, while the monitoring will take place over a period of five years on a quarterly basis by analysing samples for pollutants.

The closure components which are applicable to the Deelkraal II TSF include the following:

- Preparation and planning for closure- This includes all of the tasks leading up to the finalisation of the closure plan for implementation.
- Dismantling and removal of any on site infrastructure (apart from the TSF itself which will remain in perpetuity).
- Rehabilitation of access roads. It is anticipated that certain of these access roads will be retained as smaller local access to the site to allow for controlled access during closure and post closure monitoring and maintenance.
- Rehabilitation activities at the TSF side slopes and surface area, until the areas are self-sustaining.
- General surface rehabilitation- including soil amelioration and planting of vegetative cover for the affected natural areas, and planting of crops on the defined arable land areas.
- Limit dust emissions such that dust emission regulations are met.
- Limit ingress and seepage from the tailings.
- Minimize erosion to an acceptable level.
- Management of water within the mine area- this will include the management and maintenance of surface water controls, as well as ongoing closure phase monitoring of the water resources. The management of polluted water into the post-closure phase will be included and dealt with as a residual and latent impact.

- Maintenance and aftercare- Maintenance and aftercare is typically applied during the closure period (i.e. once active rehabilitation and closure is completed). Typically, aftercare and maintenance includes general maintenance activities including, soil amelioration, ongoing monitoring, control of alien invasive, and stability and settlement actions. It should be noted that for the purposes of this report and the associated financial provisions, that the relevant monitoring and maintenance/ aftercare actions are included in the other closure components listed in the Closure Plan.

Table 8 provides procedures for the decommissioning, closure and rehabilitation of the affected site.

Table 8: Decommissioning, Rehabilitation and Closure Actions

Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
Planning and preparation for Closure	- Develop Final Rehabilitation and Decommissioning Closure Plan (FRDCP). - Appointment of dedicated rehabilitation specialist to ensure ongoing implementation of rehabilitation and closure actions and plans. - Ensure that sensitive environmental areas and soil stockpile areas are clearly demarcated to prevent unnecessary disturbance. - Develop a change management procedure to manage the impact of any changes to the mine plan. - Develop a site-specific operational stormwater management plan.	- Compile, review and update FRDCP as and when necessary - including review of monitoring data and updated risk assessment. - 5 yearly review and update of hydrogeological model (or as and when necessary). - Regular consultation with I&AP's on closure planning and rehabilitation progress, and any intrusive activities. - Apply and obtain necessary Authorisations / Licenses for closure (preferably 18 months prior to scheduled closure). - Regular awareness training on rehabilitation and closure commitments to all site staff and contractors- including sensitivity of flora	- Implementation of final FRDCP. - Develop a post closure water balance and Storm Water Management Plan (SWMP).	- Implementation of final FRDCP. - Implementation of SWMP.

Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
		and faunal species, noise control. - Implementation and assessment of environmental monitoring as defined in the FRDCP. - Implement a site-specific operational stormwater management plan		
Dismantling and removal of any on site infrastructure	- Relevant financial provisioning.	Conduct annual liability assessment - update annual rehabilitation plan.	- Removal of all services, structures, machinery, and infrastructure unless these are specifically required for post-mining land-use, - All infrastructure should be broken down to natural ground level (apart from TSF). - Areas where infrastructure was demolished should be assessed through a risk-based system to determine if there is any residual contamination of risk and appropriate remediation measures implemented. - Implementation of the waste management plan.	Ongoing rehabilitation monitoring and maintenance until relinquishment.

Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
			- A waste and infrastructure hierarchical principal should be applied to all decommissioned infrastructure or wastes, as follows: Reduce, re-use, recycle, dispose. - Monitor and manage dust generated from decommissioning activities to relevant standards.	
Rehabilitation of access roads	Develop mine layout plan to utilise existing access routes where possible.	Restrict vehicular movements to designated access and haulage routes to avoid unnecessary soil compaction.	- Conclude final closure layout plan defining access roads required for ongoing monitoring, management and maintenance. - Retained access roads to be designed in accordance with relevant engineering standards and specifications- including specific management of stormwater. - Restrict vehicular movements to designated access and access routes to avoid unnecessary soil compaction.	- Ongoing rehabilitation monitoring and maintenance until relinquishment. - Restrict vehicular movements to designated access routes to avoid unnecessary soil compaction.

Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
			- Closure, decommissioning, and rehabilitation of all access roads (incl associated structures, signage, culverts, etc) unless these are specifically required for post-mining land-use, post-mining SDF projects or have been requested by the post-mining landowner. - Revegetation. - Apply dust suppression (e.g. water sprays) where necessary.	
Rehabilitation of the TSF	- Long term material settlement factors. - Develop an Invasive Species Control and Eradication Plan.	- Manage erosion. - Monitoring of groundwater, air quality and radiation. - Assess findings of monitoring programmes - Develop and implement an Invasive Plant Species Control and Eradication Plan. - Prevent erosion (wind/water) through	- Post-closure Groundwater, air quality and radiation monitoring programmes - The implementation of the National Nuclear Regulator (NNR)-approved decommissioning plan.	- Post-closure Groundwater, air quality and radiation monitoring programmes. - Safety and stability checks.

Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
		implementation of temporary control measures.		
Rehabilitation of soil stockpile areas	Ensure correct placement of soil stockpiles to: - Reduce surface water flows and velocities and associated erosion risks. - Minimise disruption and disturbance by mining or other activities. - Avoid identified wetland areas as far as possible.	- Stockpile footprints to be effectively demarcated to restrict activities which may disturb/ contaminate the stockpiles (e.g. vehicular movement). Compaction and contamination of the stockpiles must be prevented. - Once established the soil stockpiles must not be moved until soil placement for rehabilitation is undertaken.	- Stockpile footprints following removal of all soils for rehabilitation, must be landscaped (shaped and levelled) to natural contours, ripped to loosen all soil, and revegetated. - The rehabilitated area must be re-vegetated in accordance with the post closure mine plan and monitored for success. - Manage and remediate surface erosion.	- Ongoing rehabilitation monitoring and maintenance until relinquishment. - Manage and remediate surface erosion.
Water management	- Develop numerical groundwater model. - Utilise model to define and assess extent and timing of mine affected water pollution plume. - Begin implementation of phyto-remediation	- Continue monitoring including general water quality. - Update numerical groundwater model – every 3 years.	- Continue monitoring including general water quality and water levels in surrounding areas. - Update numerical groundwater model (including monitoring results) – every 3 years.	- Update and implement groundwater management plan. - Update numerical groundwater model. Specific attention to be placed on long term water liability assessment.



Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
	measures (where investigations prove feasible)	- Amend the mine closure plan where necessary based on the results. - Implement and monitor the Groundwater Management Plan. - Installation, operation, and maintenance of phyto-remediation measures.	- Amend the mine closure plan where necessary based on the results. - Implement and monitor the Groundwater Management Plan.	- Amend the residual and latent impacts risk assessment and closure plan associated financial provisions. - Implement and monitor the Groundwater Management Plan. - Install plume interception boreholes and/or trenches as required. - Continue groundwater monitoring.
Social and economic change management	- Public review and comment on rehabilitation, decommissioning and closure planning. - Develop SLP in accordance with relevant regulations and guidelines, and in consultation with local municipality and other authorities.	- Regular consultation with I&AP's on closure planning and rehabilitation progress, and any intrusive activities. - Provide clear communication to the stakeholders to ensure awareness of the mine's limitations in terms of funding and that funding will cease upon mine closure.	- Continued implementation of SLP obligations and commitments. - Implement approved retrenchment mechanisms as per the approved SLP. - Assist employees in accessing available and suitable employment opportunities with other mining companies or within the local agricultural sector.	

Closure component	Planning (pre-commencement)	TSF Progressive Rehabilitation (~8 years)	Decommissioning and Rehabilitation (1-3 years)	Closure and post closure (~50-100yrs) - or until closure certificate is received.
		- Develop mechanisms to assist employees during the transition to closure. - Implement SLP obligations including defined skills development programmes focusing on non-mining supply links to facilitate easier transitioning to local suppliers and industries.		

7 ENVIRONMENTAL MONITORING

7.1 FUNCTIONAL REQUIREMENTS OF MONITORING PROGRAMMES

The purpose of monitoring is not merely to collect data, but to provide information necessary to make informed decisions on managing and mitigating potential impacts. Monitoring therefore serves the following functions:

- Serve as early warning system to detect any potential negative impacts;
- To provide information to feedback into management controls to avoid, prevent or minimise potential negative impacts;
- Provide quantitative data that can serve as evidence for the presence of negative impacts or the lack thereof;
- Allows for trending, modelling and prediction of future conditions or potential impacts;
- Based on the above, the mine must ensure that monitoring programmes comprise of the following (at a minimum) in order to obtain valuable environmental data;
- Environmental aspect monitoring must be a formalised procedure;
- All equipment used in monitoring must be correctly calibrated and serviced regularly;
- Samples required for analysis will be sent to an independent and accredited laboratory;
- Monitoring data must be stored;
- Data must be checked and interpreted and tending undertaken on a quarterly basis;
- Both the date and reports on environmental monitoring must be kept on record for the life of mine and where relevant provided to I&AP's; and
- The general and site-specific parameters to be monitored must be identified by an independent specialist, the authorities and where relevant I&AP's.

7.2 LIST OF ASPECTS THAT REQUIRE MONITORING PLANS

The list of aspects that require on-going environmental monitoring includes the following:

- Noise;
- Air quality;
- Groundwater;
- Surface Water
- Radiation;
- Post-closure.

As mines and the environment are both dynamic it is likely that future scenarios may require the monitoring of additional or unforeseen impacts. As such, the list provided is by no means conclusive and must instead be used as a guideline for the impacts that require monitoring.

7.3 MONITORING PLANS FOR ENVIRONMENTAL ASPECTS

The monitoring of various environmental aspects and the impact on them as a result of the proposed project shall take place by means of both quantitative and qualitative techniques in order to determine whether or not

the requirements of the EMPr are being complied with. The importance and value of detailed environmental monitoring networks cannot be overstated.

Environmental monitoring serves as a tool to track compliance, assist with potential liability identification, and mitigation throughout the life of the proposed project. This is achieved through the provision of actual evidence-based monitoring and reporting thereof. In essence, monitoring is a continuous data-gathering, data interpreting, and control procedure that ranges from visual inspection to in-depth investigative monitoring and reporting.

7.3.1 NOISE

In the event that noise related complaints are received, short-term ambient noise measurements should be conducted as part of investigating the complaints. The results of the measurements should be used to inform any follow up interventions.

The following procedure should be adopted for all noise surveys:

- Any surveys should be designed and conducted by a trained specialist.
- Sampling should be carried out using a Type 1 Sound Level Meter (SLM) that meets all appropriate International Electrotechnical Commission (IEC) standards and is subject to annual calibration by an accredited laboratory.
- The acoustic sensitivity of the SLM should be tested with a portable acoustic calibrator before and after each sampling session.
- Samples sufficient for statistical analysis should be taken with the use of portable SLM's capable of logging data continuously over the time period. Samples representative of the day- and night-time acoustic environment should be taken.
- The following acoustic indices should be recoded and reported: LAeq (T), statistical noise level LA90, LAFmin and LAFmax, octave band or 3rd octave band frequency spectra.
- The SLM should be located approximately 1.5 m above the ground and no closer than 3.5 m to any reflecting surface.
- Efforts should be made to ensure that measurements are not affected by the residual noise and extraneous influences, e.g., wind, electrical interference and any other non-acoustic interference, and that the instrument is operated under the conditions specified by the manufacturer. It is good practice to avoid conducting measurements when the wind speed is more than 5 m/s, while it is raining or when the ground is wet.

A detailed log and record should be kept. Records should include site details, weather conditions during sampling and observations made regarding the acoustic environment of each site.

7.3.2 AIR QUALITY

Source monitoring at operational activities can be challenging due to the fugitive and wind-dependent nature of particulate emissions. The focus is therefore rather on receptor-based performance indicators i.e. compliance with ambient air quality standards and dust fall regulations.

It is recommended that the current dust fall monitoring network (**Figure 5**) be maintained and the monthly dust fall results used as indicators to track the effectiveness of the applied mitigation measures.. Dustfall collection should follow the ASTM method as per the NDCRs. The ASTM method covers the procedure of collection of dustfall and its measurement and employs a simple device consisting of a cylindrical container exposed for one calendar month (30 ±2 days).

It is recommended that dust fallout monitor DK 1 be moved to the south-western boundary if the nearby Deelkraal town, since it falls in the footprint of the proposed Deelkraal II TSF and needs to be moved. It is also recommended that a new dust fallout monitor unit (DMU) be placed on the south-western boundary of the proposed Deelkraal II TSF. Dust fall collection should follow the American Standard Testing Methodology (ASTM) method as per the National Dust Control Regulations (NDCRs). The ASTM method covers the procedure of

collection of dust fall and its measurement and employs a simple device consisting of a cylindrical container exposed for one calendar month (30 ±2 days). The method provides for a dry bucket, which is advisable in the dry environment. The cause of the high dust fall rates should be investigated and these levels should be reduced to be within compliance with the NDCR.

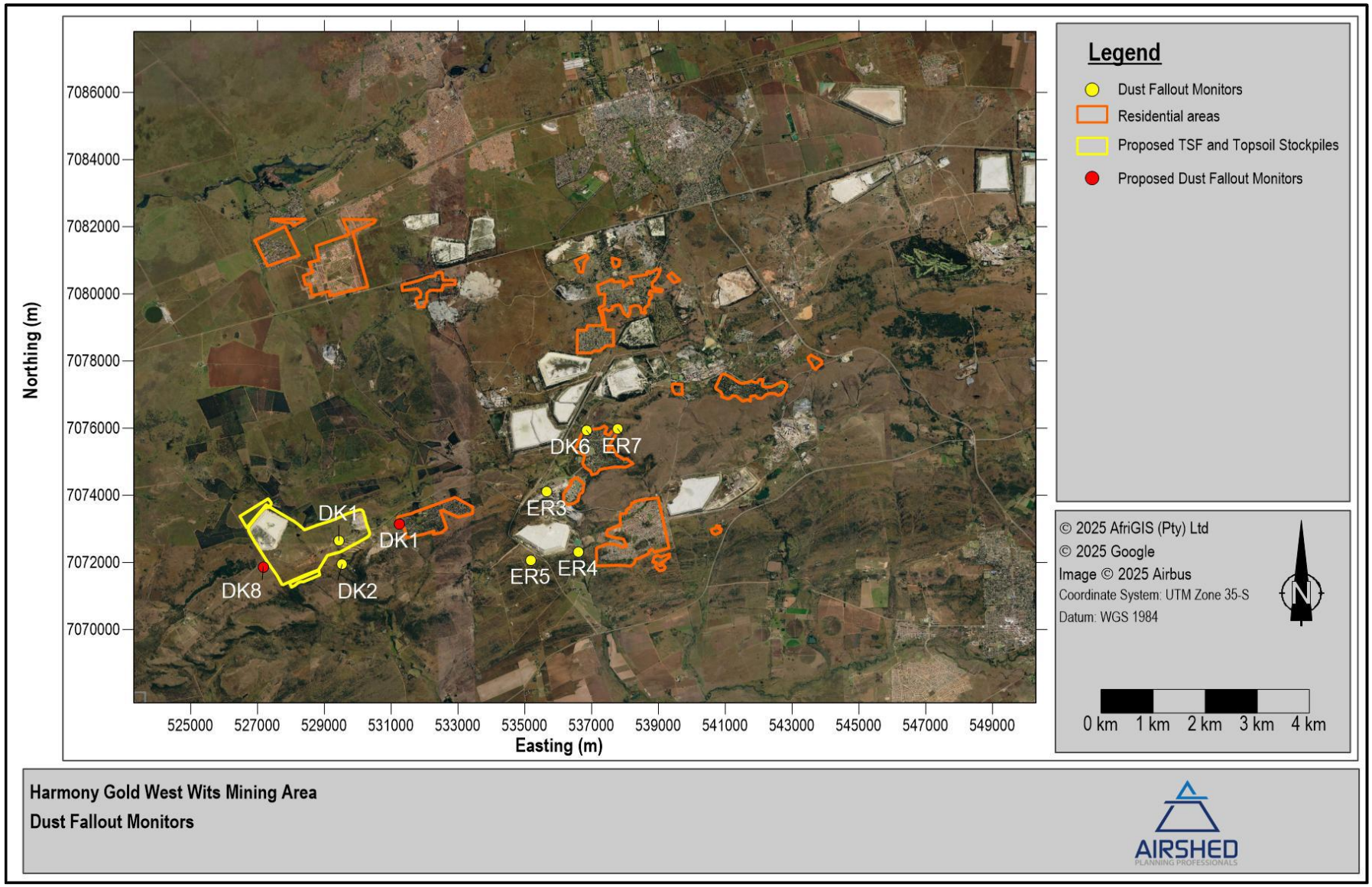


Figure 5: Dust fallout sampling locations

7.3.3 GROUND WATER MONITORING

The findings of the modelling should be verified and continued monitoring is recommended. Additional monitoring boreholes are recommended. A minimum of two borehole pairs is recommended north of the new TSF and another two south of the TSF (dependent on the accessibility of the terrain).

The numerical model should be updated if any deviations from the predicted contaminant migration are noticed. Alternative remedial options such as cut-off trenches can be considered to contain any contamination, if detected.

The following is recommended in terms of monitoring:

- Groundwater levels.
- Groundwater quality.
- Data should be stored electronically in an acceptable database.
- On the completion of every sampling run a monitoring report should be written. Any changes in the groundwater levels and quality should be flagged and explained in the report.
- A compliance report can be submitted to DWS once a year, if required.
- A comprehensive quarterly analysis of the dedicated monitoring boreholes.
- Groundwater levels should be monitored quarterly in the dedicated groundwater monitoring boreholes during construction and operation and biennially post-closure.
- Rainfall should be monitored daily.
- Samples should be submitted to a SANAS accredited laboratory. The following recommended parameters to be analysed for include:
    - pH.
    - Electrical Conductivity.
    - Total Dissolved Solids.
    - Total Alkalinity.
    - Anions and Cations (Ca, Mg, Na, K, NO3, NH4, Cl, SO4, F, Fe, Mn, Al, Cr).

7.3.4 SURFACE WATER MONITORING

Potential contaminants of concern that need to be monitored are expected to have already been identified based on the historical quarterly surface water quality monitoring that has been undertaken. The understanding of the mine's processes and the associated contaminants that might be released in the event of a failure in an aspect of the TSF (e.g., toe paddock rupture or RWD overflow) is likewise expected to be clearly understood, with monitoring reflecting this.

Quarterly monitoring reports should be produced to differentiate seasonal variations and general trends due to the mining activities, with a comparison of water samples to standards and guidelines set by the Department of Water and Sanitation (DWS), and an analysis of parameters over time so that trends can be established. Suggested monitoring points are proposed at seven locations downstream of the proposed construction and operation areas. The recommended monitoring point is illustrated in **Figure 6**.

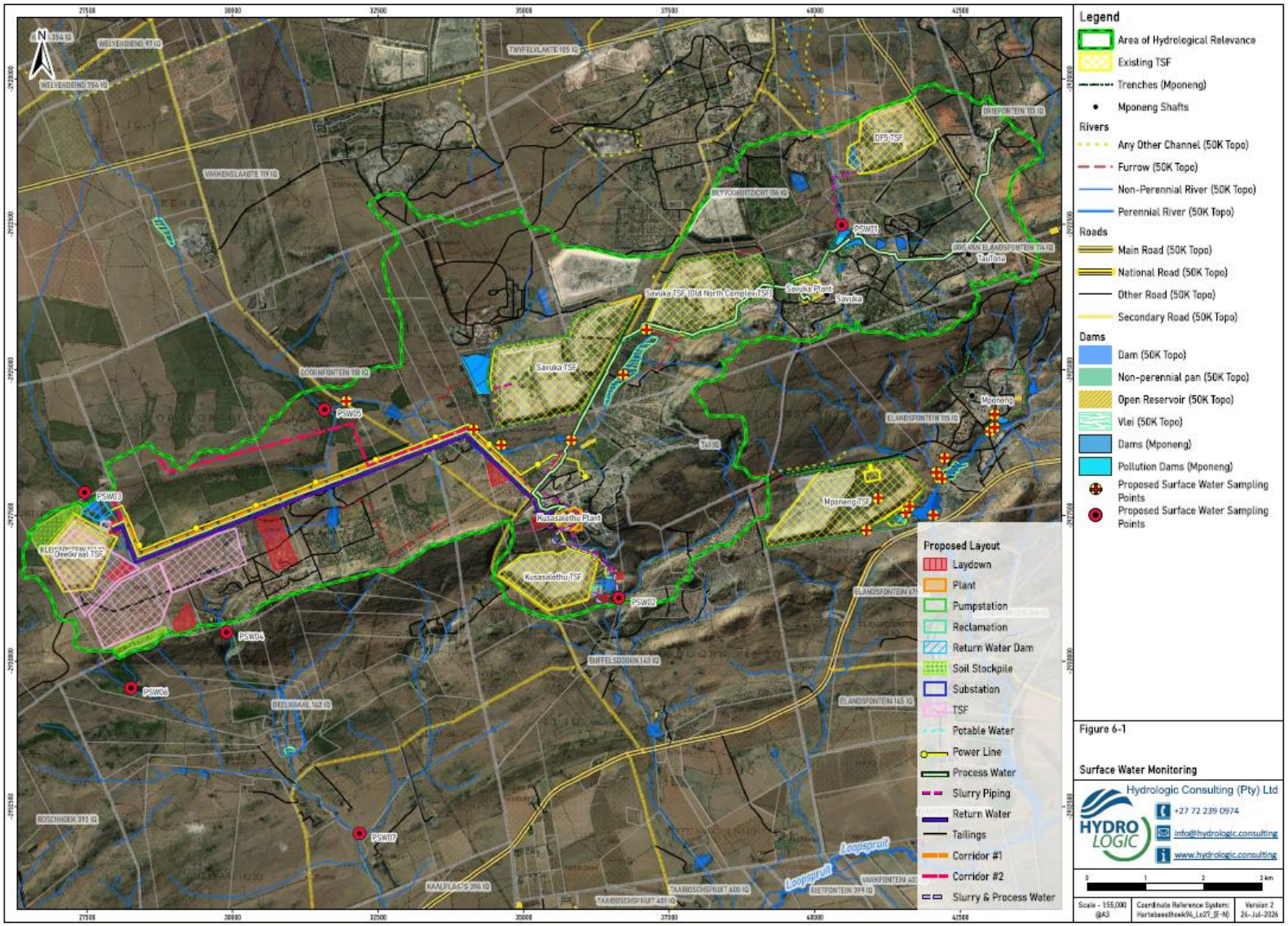


Figure 6: Surface water monitoring locations

7.3.5 RADIATION MONITORING

The following forms part of the radiation monitoring programme proposed for the TSF.

7.3.5.1 BASELINE CHARACTERISATION

The purpose of the radiological baseline characterisation programme is to establish the radiological conditions observed at the site and surroundings before the commissioning of the project. No baseline characterisation has been done in the area yet. It should include, to the extent possible, soil, surface water and groundwater samples, as well as an airborne environmental radon survey in the area using Radon Gas Monitors (RGMs).

In addition to these sampling and analysis, it is proposed that a full gamma radiation and dose rate survey on a grid basis be conducted after site preparation and cleaning. Soil samples should again be collected for full-spectrum radio analysis of the U-238, U-235 and Th-232 decay chains in the affected areas at locations that will be informed by the gamma radiation survey.

7.3.5.2 MONITORING PROGRAMME

The Projects TSF falls within the scope of CoR-58 with an approved public Radiation Protection Programme (RPP), which makes provision for environmental monitoring and analysis to ensure that members of the public are sufficiently protected from releases into the environment. The responsibility for the implementation and execution of the monitoring programme lies with the Radiation Protection Function (RP Function) which may include legally appointed persons consisting of a Radiation Protection Monitor(s) (RPM), a Radiation Protection Officer (RPO), and a Radiation Protection Specialist (RPS).

Table 9 summarises the proposed monitoring programme for the Project aimed at public radiation protection.

Table 9: Summary of the environmental monitoring programme proposed for the Project aimed at public radiation protection (AquiSim Consulting, 2026).

Monitoring Element	Comment	Frequency
Surface water	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Biannually
	Total Uranium and Thorium	Quarterly
Sediments	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Annually
	Total Uranium and Thorium	Biannually
Groundwater	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Once every two years
	Total Uranium and Thorium	Biannually
Radon gas	Environmental radon gas using Radon Gas Monitors (RGMs)	Quarterly for a period of 2 to 3 months
Dust fallout	Total Uranium and Thorium	Annually

The full-spectrum analysis is suitable for detailed dose analysis but is an expensive procedure with long lead times to perform the analysis, which is why less frequent intervals are proposed. The total uranium and thorium analyses are relatively inexpensive with fast turnaround times. These results will monitor variations in activity concentration over the monitoring period.

Large variations in the activity concentration over a short period are not expected in groundwater, as opposed to surface water, for example. Therefore, a less frequent sampling schedule is proposed for groundwater. The same principle applies to the sediment samples at the same locations as the surface water sample.

The RGMs monitor the variation in radon gas works in monitoring periods of 2 to 3 months, after which the RGMs is replaced with new RGMs for the next monitoring period. The dust fallout samples are generated quarterly but are used to generate an annual sample for the total U and Th analysis. The reason for this is that the volume of material collected in a dust bucket is too little for quarterly analysis.

7.3.5.3 PROPOSED MONITORING POINTS

Most monitoring points proposed to be part of the monitoring programme coincide with the monitoring programme for the environmental pathways (e.g., soils surface water and groundwater). Considering the surface infrastructure that will be developed for the Projects, the following can be noted:

- The surface water monitoring locations should coincide with the existing surface water monitoring points currently included in the public RPP. The principle to be applied is that the monitoring locations should be upstream and downstream of the Projects area in potentially affected surface water streams, as well as upstream and downstream of potential discharge points.
- The sediment monitoring locations should coincide with the surface water monitoring points, applying the same principles.
- The groundwater monitoring points should coincide with the existing groundwater monitoring points. The principle to be applied is that the monitoring locations should be upstream and downstream of the Projects area, as well as upstream and downstream of specific surface facilities. The exact location will be determined by the availability of water-bearing boreholes in the specific area.
- The dust fallout monitoring locations should coincide with the monitoring points (dust buckets) proposed in Airshed AQIA (2026).
- The environmental radon monitoring locations do not have to coincide with specific locations. The principle to apply is that it should be widespread over the mining rights area, in the dominant wind direction where receptors are located, complemented with monitoring locations in what can be considered as background. The exact location is often influenced by whether a secured location is available to improve the recovery rate of the RGMs.

7.3.6 POST-CLOSURE MONITORING

Post-Closure monitoring requirements and frequencies are indicated in **Table 10**. The following activities were identified that may result in a radiological impact on the receptors during the post-closure phase:

- Implementation of the approved decommissioning plan;
- Exhalation of radon gas and the emission of particulates matter (PM_{10} and Total Suspended Particulates) that contain radionuclides from the remaining facilities (e.g., TSF); and
- Leaching and migration of radionuclides from the remaining facilities (e.g., TSF).
- The implementation of the NNR-approved decommissioning plan will result in a positive impact in the sense that surface infrastructure that contained or that is contaminated with radionuclides is demolished, decontaminated (to the extent possible) and removed from the site and compliance with clearance criteria has been demonstrated. Generally, this would involve performing a gamma radiation survey supplemented with full-spectrum radio analysis of soil samples performed at the infrastructure sites, followed by appropriate rehabilitation and clean-up operations for conditional or unconditional clearance from the regulatory authority. However, in this case for the TSF that would remain at the surface during the post-closure period, the level of clean-up that can be performed is limited to areas outside the TSF footprint area that may have become contaminated during or because of operational activities. These areas outside the TSF footprint can still be rehabilitated and cleaned-up for conditional or unconditional clearance.

Table 10: Post closure monitoring requirements.

Aspect	Functional Requirement	Performance indicator/ target	Frequency	Reporting Mechanism	Adaptive management action
Groundwater	Standards: - SANS 5667-1:2008/ISO 5667-1:2006 Water Quality – Sampling Part 1: Guidance on the design of sampling programmes and sampling techniques. - SANS 5667-3:2006/ISO 5667-3:2003 Water Quality – Sampling Part 3: Guidance on the preservation and handling of water samples. - SANS 5667-11:2015/ISO 5667-11:2009 Water Quality – Sampling Part 11: Guidance on sampling of groundwater. - Use of SANAS Accredited analytical laboratory. Parameters: pH, Electrical Conductivity, Total Dissolved Solids, Total Alkalinity, Anions and Cations (Ca, Mg, Na, K, NO_3, NH_4, Cl, SO_4, F, Fe, Mn, Al, Cr).	- Monitoring network must comply with the risk-based source-pathway - receptor principle. - Compliance with WUL water quality thresholds. - Trend analysis in relation to identified latent impact trigger.	Biennial	Biennial water quality report.	Undertake a final groundwater model update as and when the indicator parameters reach trigger values at dedicated plume monitoring boreholes. The revised groundwater model to be used to refine and revise the long-term water management actions.



Aspect	Functional Requirement	Performance indicator/ target	Frequency	Reporting Mechanism	Adaptive management action
Radiation	The proposed radiological monitoring programme for the project includes recommendations for the monitoring of surface water, groundwater, sediment, environmental radon, well as dust fallout, including the frequency and type of analysis. Most monitoring points proposed to be part of the monitoring programme coincide with the monitoring programme for the environmental pathways (e.g., soils surface water and groundwater. • Parameters: • Exhalation of radon gas and the emission of particulates matter (PM10 and TSP) that contain radionuclides from the remaining facilities (e.g., TSF).; and • Leaching and migration of radionuclides from the remaining facilities (e.g., TSF).	- Monitoring network must comply with the risk-based source-pathway - receptor principle. - Compliance with WUL water quality thresholds. - Trend analysis in relation to identified latent impact trigger.	Biennial	Biennial monitoring reports.	Under the responsibilities as outlined in the radiation function procedure, specific actions need to be taken the day the incident or accident is identified, while several actions need to be taken as soon as possible after the event. These include, amongst others: • Assessing the extent of physical damage to property, people, and the environment, as well as the extent of the contamination in and around where the event occurred using appropriate radiation survey equipment and taking water samples upstream and downstream of the incident, as appropriate; • Inform the NNR about the event, including the current situation and its development, measures are taken to protect workers and members of the public, and the exposures that have occurred and those expected to be incurred; • Initiate the clean-up process, with due consideration of the extent of the contamination, the potential radiological impact on workers and members of the public, and appropriate mitigation measures that can be implemented in the interim to contain the risks; and • Capture all relevant information in an Occurrence Report to be submitted to

Aspect	Functional Requirement	Performance indicator/ target	Frequency	Reporting Mechanism	Adaptive management action
					the NNR according to the Procedure for the Reporting of Occurrences, taking cognisance of how, when and where the event happened, corrective actions and clean-up operations, and the radiological impact on workers and members of the public.