



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA



**MYEZO ENVIRONMENTAL
MANAGEMENT SERVICES**

Environmental Stewardship

BASIC ASSESSMENT REPORT

And

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED) FOR THE PROPOSED PROSPECTING IRON ORE AND MANGANESE ORE ON THE FARMS THORNS 407, DUINE 437, RECORD 411, LOSKOP 414, OATLANDS 406, AND TOWTON 415, LOCATED APPROXIMATELY 50 KM NORTH WEST OF KATHU TOWN, IN THE MAGISTERIAL DISTRICT OF KURUMAN, WITHIN TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

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ABBREVIATIONS

BAR: Basic Assessment Report

CV: Curriculum Vitae

COVID-19: Corona Virus Disease of 2019

DFFE: Department of Forestry, Fisheries and Environment

DMRE: Department of Mineral Resources and Energy

EA: Environmental Authorisation

EAP: Environmental Assessment Practitioner

GA: General Authorisation

GN: Government Notice

GPS: Global Positioning System

HIV: Human Immunodeficiency Virus

I&APs: Interested and Affected Parties

MPRDA: Mineral and Petroleum Resources Development Act (Act No. 28 of 2002) as amended

Myezo: Myezo Environmental Management Services (Pty) Ltd

NEMA: National Environmental Management Act (Act 107 of 1998)

NEM:BA: National Environmental Management: Biodiversity Act (No. 10 of 2004)

NEM:PAA: National Environmental Management: Protected Areas Act (No. 57 of 2003)

NEM:AQA: National Environmental Management: Air Quality Act (No. 39 of 2004)

NEM:WA: National Environmental Management: Waste Act (No. 59 of 2008)

NHRA: National Heritage Resources Act (Act No. 25 of 1999)

SAHRA: South African Heritage Resources Agency

SDF: Spatial Development Framework

SANBI: South African National Biodiversity Institute

TB: Tuberculosis

TLM: Tsantsabane Local Municipality

Zastrocode (Pty) Ltd - Zastrocode

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act (Act 28 of 2002 as amended) (MPRDA), the Minister must grant a prospecting or mining right if among others the mining “will not result in unacceptable pollution, ecological degradation or damage to the environment”.

Unless an Environmental Authorisation (EA) can be granted following the evaluation of an Environmental Impact Assessment and an Environmental Management Programme report in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA), it cannot be concluded that the said activities will not result in unacceptable pollution, ecological degradation or damage to the environment.

In terms of Section 16(3)(b) of the EIA Regulations, 2014, any report submitted as part of an application must be prepared in a format that may be determined by the Competent Authority and in terms of Section 17 (1) (c) the competent Authority must check whether the application has taken into account any minimum requirements applicable or instructions or guidance provided by the competent authority to the submission of applications.

It is therefore an instruction that the prescribed reports required in respect of applications for an EA for listed activities triggered by an application for a right or a permit are submitted in the exact format of, and provide all the information required in terms of, this template. Furthermore please be advised that failure to submit the information required in the format provided in this template will be regarded as a failure to meet the requirements of the Regulation and will lead to the EA being refused.

It is furthermore an instruction that the Environmental Assessment Practitioner must process and interpret his/her research and analysis and use the findings thereof to compile the information required herein. (Unprocessed supporting information may be attached as appendices). The EAP must ensure that the information required is placed correctly in the relevant sections of the Report, in the order, and under the provided headings as set out below, and ensure that the report is not cluttered with un-interpreted information and that it unambiguously represents the interpretation of the applicant.

2. OBJECTIVE OF THE BASIC ASSESSMENT PROCESS

The objective of the basic assessment process is to, through a consultative process—

- (a) determine the policy and legislative context within which the proposed activity is located and how the activity complies with and responds to the policy and legislative context;
- (b) identify the alternatives considered, including the activity, location, and technology alternatives;
- (c) describe the need and desirability of the proposed alternatives,
- (d) through the undertaking of an impact and risk assessment process inclusive of cumulative impacts which focused on determining the geographical, physical, biological, social, economic, heritage, and cultural sensitivity of the sites and locations within sites and the risk of impact of the proposed activity and technology alternatives on the these aspects to determine;
 - (i) the nature, significance, consequence, extent, duration, and probability of the impacts occurring to; and

- (ii) the degree to which these impacts—
 - (aa) can be reversed;
 - (bb) may cause irreplaceable loss of resources; and
 - (cc) can be managed, avoided or mitigated;
- (e) through a ranking of the site sensitivities and possible impacts the activity and technology alternatives will impose on the sites and location identified through the life of the activity to—
 - i. identify and motivate a preferred site, activity and technology alternative;
 - ii. identify suitable measures to manage, avoid or mitigate identified impacts; and
 - iii. identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

3. Contact Person and correspondence address

a) Details of

i) Details of the EAP

The following are the details of the Environmental Assessment Practitioner responsible for the Zastrocode environmental authorisation application for the proposed prospecting of iron ore and manganese within Tsantsabane Local Municipality, Northern Cape Province:

Name of The Practitioner: Ms. Babalwa Fatyi

Tel No.: +27 12 998 7642

Fax No. : +27 12 998 7642

e-mail address: babalwa@myezo.co.za

ii) Expertise of the EAP

(1) The qualifications of the EAP

(with evidence).

Ms. Babalwa Fatyi is a SACNASP registered Professional Scientist (1993) and a holder of a Master of Science (cum laude) from the Witwatersrand University. She is a registered Environmental Assessment Practitioner (EAP) and an accredited Environmental Auditor with the Institute of Environmental Management and Assessment, Lincoln, UK (0025153). She has several certificates in environmental management including ISO 14001 and Waste Management and Auditing. For copy of qualifications, please refer to Appendix 1.1-1.

(2) Summary of the EAP's past experience.

(In carrying out the Environmental Impact Assessment)

Ms. Babalwa Fatyi's mining environmental impact assessment and management experience is extensive both in the private and government sectors including working with the Council for Scientific and Industrial Research (CSIR) and the Department of Minerals and Energy (DME) (now Department of Mineral Resources and Energy (DMRE)) to develop best practice rehabilitation guidelines for derelict, abandoned and operational mines. Some of Babalwa's vast mining environmental consulting experience include working for SRK Consulting from 1999 to 2002. From 2002 to 2005 she worked for a mining company Trans Hex (Pty) Ltd where she successfully administered the company's compliance with both internal and legislative environmental obligations, and was active in stimulating environmental consciousness through all the different mining development phases. Driven to impart environmental stewardship at personal, societal and corporate levels, her consulting experience gave her an insight with respect to sector-specific environmental requirements ranging from authorizations, implementation and monitoring. A proud and recognised South African female business owner and entrepreneur, she continues to be a voice

of consciousness and a team player for change with regards to how development and environmental matters are handled.

She has a way of teasing environmental and social commitments into manageable components and elements. This also stems from her capability to enable understanding risks, legal framework, biophysical and social risks, and monitoring to ensure that co-operative agreements are established for each development she is supporting, thus creating opportunities for transformation and innovative change.

Focusing on the environmental aspects, she developed a sustainability report for the Wesizwe Platinum. Working with a task team from the Department of Environmental Affairs (now Department of Forestry, Fisheries and Environmental (DFFE)) she played a key role in the fruitful development of the fourth National Country Report in the implementation of the United Nation Convention to Combat Desertification.

Babalwa has resourcefully led, project-managed and participated in over 40 mining environmental impact assessment studies (EIAs) and Environmental Management Plans programmes (EMPrs) including compiling more than 20 Basic Assessment Reports (BARs) within the various sectors and industries. She was also part of industry experts who were selected to partake in the executive preparation programme, a collaboration between Mining Qualification Authority and academia. Cumulatively, she has developed over 50 strategic/management programmes, closure plans, sustainability reports and monitoring protocols for the mining industry. A hardworking researcher, she is an established co-author of several publications in scientific journals since 1999. On her own, she has written and published poetry books and performed poetry presentations, both which promote sustainable means of unlocking the natural resource capital whilst upholding coexistence principles.

Through various roles and innovations, she is well versed with sea mining activities, marine legislation and coastal environmental management. As a Trans Hex operations representative in the provincial coastal committee, from 2003 to 2011 she assisted in tackling impacts related to industrial activities along the coast. The major aim was to promote protection and sustainable utilisation of coastal resources. As part of this committee, she assisted in the spearheading of the integration of coastal management principles and objectives into the plans, programs and policies of other organ of state with jurisdiction over aspects of the coastal environment. Guided by marine legislation, she was involved in the implementation of sea concession EMPs for shallow and deep water operations. She developed the monitoring protocol for the deep sea operations and reviewed the monthly monitoring sheets that the contractors were trained to fill during the sea mining activities. She also represented a company on The Benguela Current Large Marine Ecosystem (BCLME) programme.

She has diverse sector experience and insight with sector specific environmental requirements ranging from EA applications, implementation and monitoring, acquired while working for the mining industry and later while a serving the same mining industry as a consultant. Babalwa is fluent in partnering with both large blue-chip companies and smaller companies, which require her expertise ensuring collaborative design of strategies and methodologies. Subsequently, this kindles sustainable development and enable successful execution of various projects which she directs and participates in. The tenacity and authenticity of a project leader determines its success and Babalwa has personified these traits in the way she applies her experience in dealing with stakeholders, adapting to change, dealing with unexpected parameters and having competence in budget and cost control.

b) Location of the overall Activity

The following details summarise the location of the proposed project and activities

Farm Name:	Thorns 407; Duine 437; Record 411; Loskop 414; Oatlands 406; and Towton 415.	
Application area (Ha)	20 061,27	
Magisterial district:	Kuruman District of Northern Cape Province.	
Distance and direction from nearest town	50 km North West of Kathu town	
21 digit Surveyor General Code for each farm portion	Thorns 407	C04100000000040700000
	Duine 437	C04100000000043700000
	Record 411	C04100000000041100000
	Loskop 414	C04100000000041400000
	Oatlands 406	C04100000000040600000
	Towton 415	C04100000000041500000

c) Locality map

(show nearest town, scale not smaller than 1:250000)

The proposed site falls under Postmasburg town stretching about 110 km to 140 km to the north west of the town. Tswalu Nature Reserve is located about 23 kilometers north west the site, Kathu about 55 km on the south east, Hotazel at about 60 km north east, of is also located about 150 km north east of Upington town, about 100 km west of Kuruman, Beeshoek at approximately 105 km to the south east, Griquatown located about 170 km to the south east, Kuruman about 270 to the south east. In addition, Kimberly is located about 280 km south east of the project area. A project locality map is shown on Figure c1-1. A Regional Map is attached as as Figure c1-2.

d) Description of the scope of the proposed overall activity

Attach a plan drawn to a scale acceptable to the competent authority but not less than 1: 10 000 that shows the location, and area (hectares) of all the aforesaid main and listed activities, and infrastructure to be placed on site

An infrastructure layout plan and camp location map are attached as Appendix d1-1 and Appendix d1-2 respectively.

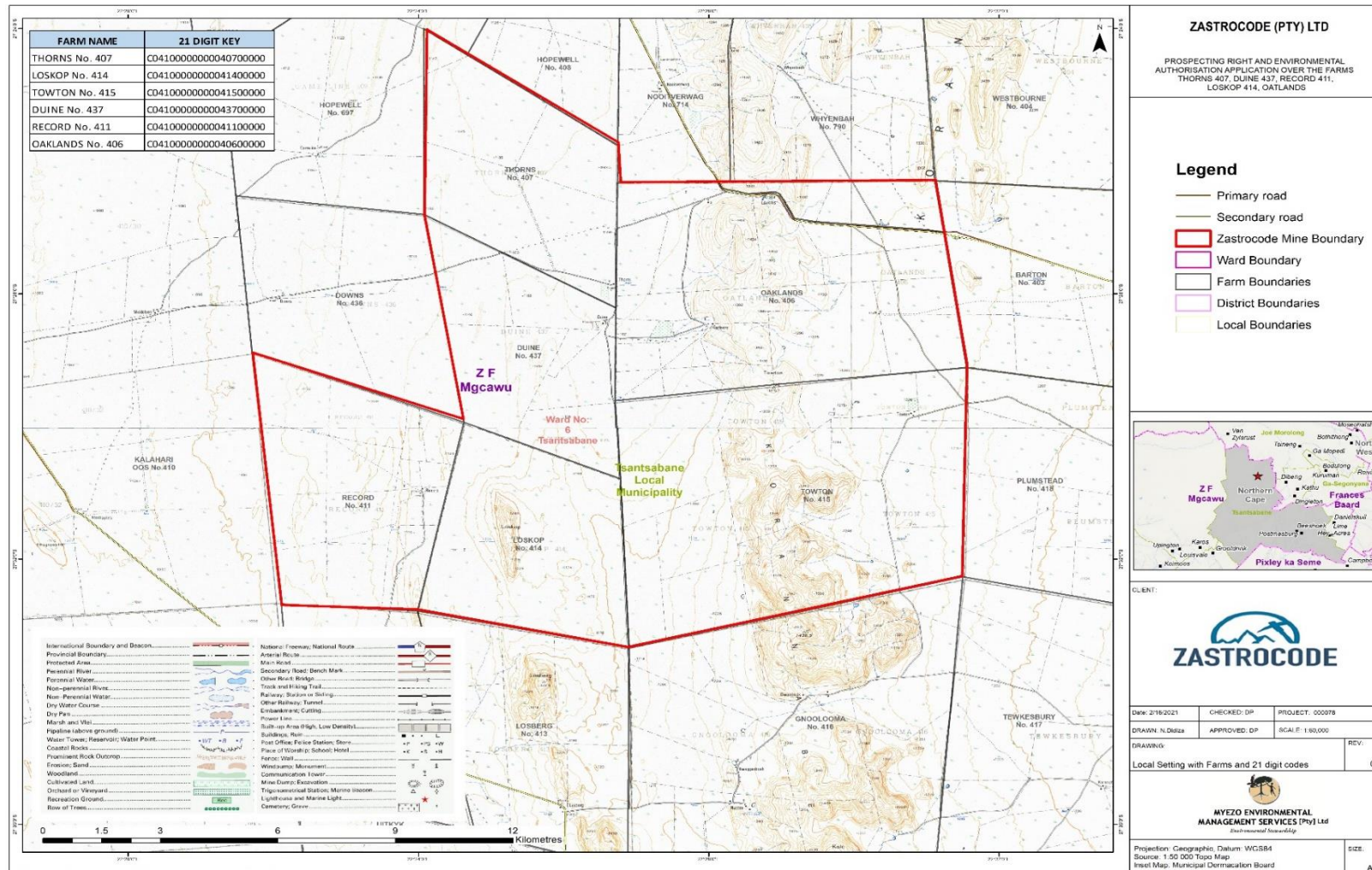


Figure c1-1: Project Locality map

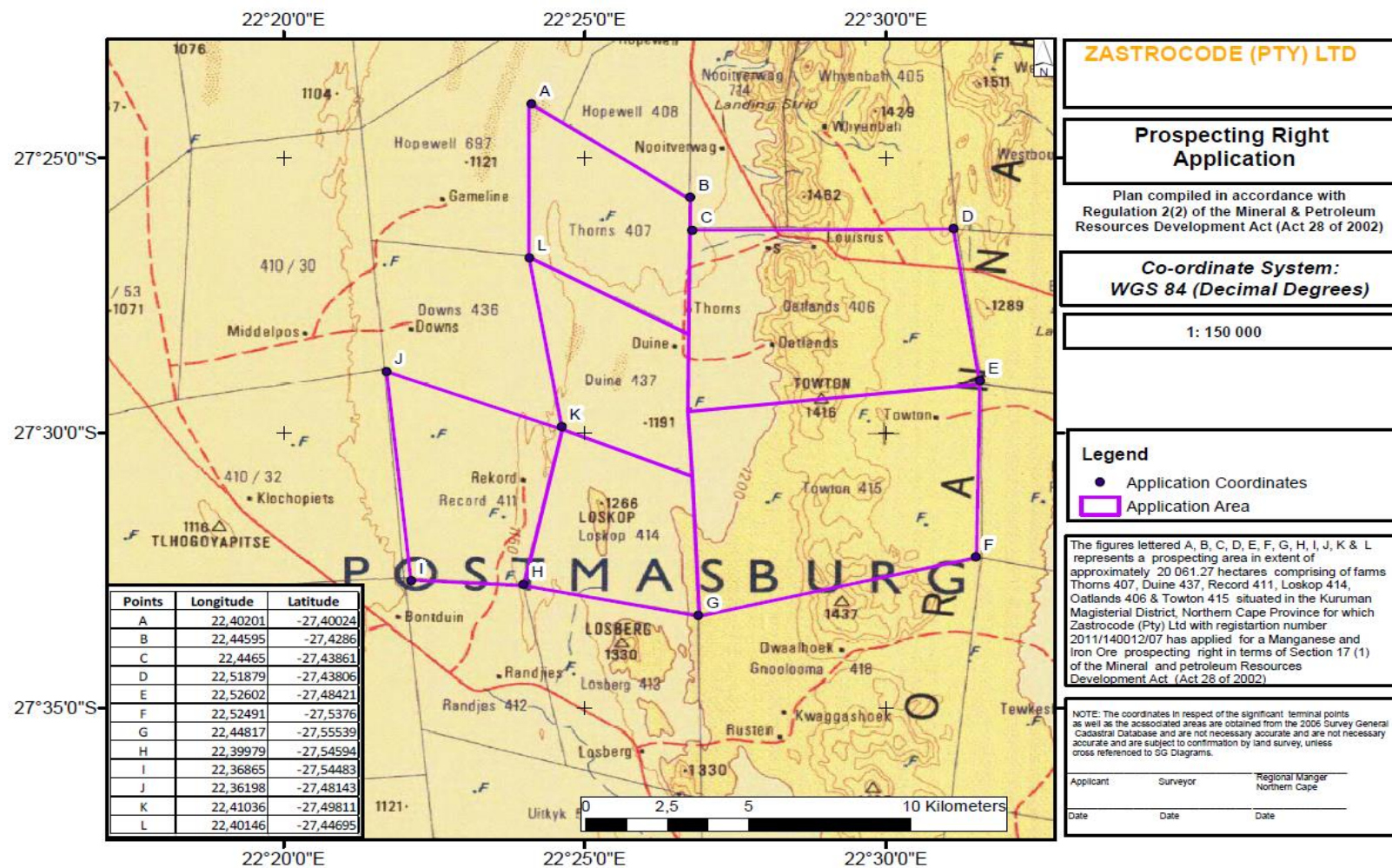


Figure c1-2: Regional Map

(i) Listed and specified activities

Table diii-1: List of Specified Activities

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc. E.g. For mining - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)	AERIAL EXTENT OF THE ACTIVITY (HA OR M ²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985
<p>Prospecting activities which will include non-invasive techniques and drilling to evaluate the potential of the ore deposit within the prospecting area. For the drilling programme, a total of 40 drill holes are planned to depths ranging from 50 m to 100 m. The locations of these holes will be based on results obtained from the geological interpretations during the non-invasive phase.</p> <p>The activities to be undertaken include:</p> <p>Establishment of Drill Site: activities will involve the drilling of a total of 40 boreholes. The drill holes will be drilled in two phases. Phase 1 will involve the drilling of 10 drill-holes at varied depths from 50 to 100m and a further 30 drill-holes totalling about 2000 meters will be drilled depending on the results from Phase 1 which involves desktop studies and data analysis.</p> <p>Establishment of a site camp for prospecting activities</p> <p>Water sumps, where necessary</p> <p>Earthworks directly related to the extraction of a mineral resource, which in this case is the mining of iron ore and manganese ore.</p>	20 061,27 ha	<input checked="" type="checkbox"/>	<p>Government Notice R.983 (04 December 2014) as amended by GNR 327 (07 April 2017)</p> <p>Activity 20: Any activity, including the operation of that activity which requires a prospecting right in terms of Section 16 of the MPRDA including associated infrastructure, structures and earthworks, directly related to prospecting a mineral resource, including activities for which an exemption has been issued in terms of Section 106 of the MPRDA.</p>
The decommissioning of the project, at the end of the prospecting or mining activities, that will require a closure certificate in terms of the MPRDA.	20 061,27 ha	<input checked="" type="checkbox"/>	Government Notice R.983, 04 December 2014) as amended by

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc. E.g. For mining - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)	AERIAL EXTENT OF THE ACTIVITY (HA OR M²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985
			GNR 327 (07 April 2017) Activity 22: The decommissioning of any activity requiring – (i) a closure certificate in terms of Section 43 of the Mineral and Petroleum Resources Development Act (Act No. 28 of 2002).
The clearance of vegetation during the establishment of a camp site and drilling	0.9ha	<input checked="" type="checkbox"/>	Government Notice R.985, 04 December 2014) as amended by GNR 324 (07 April 2017) Activity 12: The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan g. Northern Cape i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in

NAME OF ACTIVITY E.g. For prospecting - drill site, site camp, ablution facility, accommodation, equipment storage, sample storage, site office, access route etc. E.g. For mining - excavations, blasting, stockpiles, discard dumps or dams, Loading, hauling and transport, Water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc.)	AERIAL EXTENT OF THE ACTIVITY (HA OR M²)	LISTED ACTIVITY Mark with an X where applicable or affected	APPLICABLE LISTING NOTICE GNR 983, GNR 984 or GNR 985
			the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans;
		<input type="checkbox"/>	

(ii) Description of the activities to be undertaken

(Describe Methodology or technology to be employed, including the type of commodity to be prospected/mined and for a linear activity, a description of the route of the activity).

Prospecting activities will include non-invasive techniques and invasive (drilling) techniques to be done in two phases. Geological surface mapping will be done to evaluate the potential of the ore deposit within the prospecting area. This will entail surface geological mapping, structural mapping and subsurface interpretations of the structural trends.

Mapping will be performed in conjunction with geophysical surveys, which entails ground magnetics and ground gravity geophysical procedures on a pre-determined grid of 100 m x 100 m, in order to delineate ore formations. Minimal vegetation clearance will be required during the geophysical surveys to provide freedom of movement to the geo-technicians that are traversing the grids.

In-situ ore material across the area will also be analysed to determine the subsurface ore grade variation throughout the prospecting area. The samples will be selected based on the availability of fresh subsurface ore material.

For the drilling programme, a total of 40 drill holes are planned to depths ranging from 50 m to 100 m. The locations of these holes will be based on results obtained from the geological interpretations during the non-invasive phase. Prospecting activities will make use of existing roads and track as far as possible. However, additional tracks estimated at 5 km in length as well as 40 drill-pads will be created

Ultimately, all prospecting data will be validated and captured in order to generate geological models and resource estimates.

Non-Invasive activities:

These are project activities which do not disturb or alter anything in the terrestrial environment. Project activities that are noninvasive include Desktop Study and Pre-feasibility Studies.

- **Desktop Study**

These activities will include:

- i) Data gathering
 - ii) Remote Sensing
 - iii) Geological Mapping
 - iv) Geochemistry
- i. Data Gathering - Detailed geological and structural mapping will also be carried out. Information concerning the project area and applicable spheres of interest will be sought from reliable and reputable sources such as government publications and academic institutions. This will include geological data, environmental baseline information and the socio-economic status. The information will be used not only for mining and environmental applications but for effective decision making. This will involve analysis of data where exploration records of all previous work in the area will be re-examined, and the following studies will be carried out:
 - Literature review
 - Detailed aerial photograph and satellite image interpretation
 - Regional airborne geophysics with main emphasis on magnetic

- Historical drilling review and interpretation
- ii. Remote sensing this involves acquiring information from the project area making use of aerial photographs, satellite imagery, and regional airborne geophysical data.
 - Information from satellite such as the Landsat Thematic Mapper Satellite can detect geological faults and fractures that indicate manganese and iron ore deposits.
 - Existing aerial photography – this information can help photogeologists in determining important information such as lithologies and other geological features.
 - Satellite imagery – satellite imagery helps gather important information such as soil type, water content and drainage without having to disturb the land. The information is important for geological assessments, environmental management and decision-making.
 - Regional airborne geophysical data- this is information describing the region's electromagnetic properties, magnetic field and resistivity (USGS, 2020). Resistivity can help determine the soil's mineral properties due to its conductivity relative to water content.
- iii. Geological mapping – this is field data collection whereby the geologist will record surface features such as outcrops and rock types. Geological mapping will also be applied to identify the manganese and iron ore bearing geological units with their local complexities and variations.
- iv. Geochemistry – reviews of historical drilling will be done. This is analysis of existing data for the chemical composition of the earth's crust in the project area.

These noninvasive activities will be undertaken during the period that the prospecting permit application is being assessed and, presumably, approved. A period of 12 months is estimated for this.

- **Pre-feasibility studies**

- This will be the final stage of the prospecting programme and would involve the following activities:
 - Initial conceptual Mine Planning.
 - Planning the infrastructure requirements
 - Environmental management planning
 - Financial modelling
 - Market analysis
 - Analysis of transport logistics to markets
 - Assessment of personal and training requirements
 - Assessment of socio-economic factors

Invasive activities:

These are project activities that result in the disturbance of the land and this will involve drilling activities and resource generation. Activities to be undertaken include:

1. Initial Drilling

These activities will be undertaken after the issuance of a licence, identified prospective targets will require further subsurface investigation. Thus, drilling will be undertaken and about 10 drill-holes will be drilled initially. Drill holes could vary in depth from 50m to 100m, with an average depth in the order of 50 meters since from the available data for the area the manganese/iron outcrops. The total amount of drilling to be budgeted for at this stage will be 1000 meters and it is assumed that every

meter of the manganese and iron intersections will be analysed. Types of drilling being considered include Diamond, Air Core, Rotary Air Blast (RAB) or Reverse circulation (RC). Drill waste includes non-hazardous muds and fluids. Drilling of the prospective areas will commence to establish presence of mineralization. Geological borehole logging, down the hole logging and sampling will also be carried out this may involve the use of special drills to get cylindrical core samples for continuous data and geological mapping of iron and manganese ore seams.

The geological information generated will be used to model and estimate resource. The resources will at least be expected to be in the Measured and Indicated Category according to the appropriate reporting standard (SAMREC, JORC, or NI43 -101).

2. Resource Drilling

Depending on the the results of the initial drilling, further 30 drill-holes totaling about 2000 meters may be required. The activities will include:

- Resource drilling
- Geological Modelling
- Resource Calculation

3. Prefeasibility Studies

These activities are non-invasive and will include the following:

- Geological modeling and resources evaluation
- Mine planning
- Plant design
- Financial modeling
- Market analysis

e) Policy and Legislative Context

This section provides the legal basis for undertaking developments that affect the environment during the prospecting programmes. This section as such is a key requirement to ensure environmental protection and upholding of the principles of stewardship during design, planning and implementation of any developmental project. It is important that the persons with environmental management responsibility have easy access to the legal requirements to guarantee compliance.

Legal references can be used as source materials to provided text of regulatory or statutory language or provide interpretation of statutes or regulations. Such references are necessary to determine compliance requirements. Without adequate statutory and regulatory references, the parties who would be involved in the mining project would not know which statutes are applicable to the activities and how to comply with the legal requirements.

It is thus important that the legal register be continuously updated:

- To have a conceptual and documented understanding of legal environmental conditions;
- To have a legal basis for undertaking developments that affect the environment;
- To ensure that all the persons with environmental management responsibility have easy access to the legal requirements; and
- To stay updated about current statutory requirements for the sectors in which the division operates

From time to time the legislation changes and new Acts, Regulations and or Guidelines are added. This section does not deal with all environmental statutes, but rather focuses on those that have compliance implications for the mining project.

The Constitution provides the foundation for environmental regulation and policy. Section 24 of the Constitution makes provision for environmental protection for the benefit of present and future generations and the right to an environment that is not harmful to health and well-being. This can only be achieved through a reasonable legislative framework and other measures that prevent pollution and ecological degradation, promote conservation, secure ecologically sustainable development and the sustainable use of natural resources. The responsibility of ensuring a safe and healthy environment rests upon the State, reference can be made to the provisions of Section 7(2) of the Constitution that reads “The State must respect, protect and fulfil the bill of rights”. South Africa, specifically, the mandated DFFE, fulfils these rights through the application of the NEMA and Specific Environmental Management Acts, among other tools.

NEMA provides an overarching framework for the majority of issues relating to environmental management in South Africa. This framework includes the following key pieces of inter-related legislation:

- The National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM:BA)
- The National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEM:BA)
- The National Environmental Management: Air Quality Act (No. 39 of 2004) (NEM:AQA)
- The National Environmental Management: Waste Act (No. 59 of 2008) (NEM:WA)

The NEMA seeks to meet the Constitutional right to an environment that is not harmful to the health and well-being of South African citizens, the equitable distribution of natural resources, sustainable development, environmental protection and the formulation of environmental management frameworks (EMFs).

NEMA’s primary objective is to provide for co-operative governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for coordinating environmental functions exercised by organs of state and to provide for matters connected therewith. Further to the above, the NEMA introduced a number of guiding principles into environmental legislation such as the life-cycle approach to waste management, producer responsibility, the precautionary principle, and the polluter pays principle, as well as ‘duty of care’ which places the onus on any person who causes significant pollution/degradation to the environment to institute measures to prevent pollution from occurring and to minimise and rectify the pollution or degradation where unavoidable. An additional principle, contained within the NEMA, is that of “Sustainable Development” which states that waste generation is to be avoided, or where it cannot be altogether avoided, minimised and re-used or recycled where possible and otherwise disposed of in a responsible manner (the “Waste Hierarchy”).

The NEMA introduced a number of guiding principles into the South African environmental legislation, including the life-cycle approach to waste management, producer responsibility, the precautionary principle and the polluter pays principle. NEMA also places a duty of care on any person who causes significant pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation to the environment, requiring them to institute measures to prevent pollution from occurring, or to minimise and rectify the pollution or degradation where it cannot reasonably be avoided.

The NEMA enables the Minister to identify activities which may not commence without prior authorisation from the Minister or Member of Executive Council (MEC) and may also identify geographical areas in which specified activities may not commence without prior authorisation. The Minister thus published GNR 983, 984 and 985 (2014) which indicates listed activities that may not

commence prior to receipt of authorisation. Should the intended activity trigger a listed activity, the prospector will need to undertake one of the following three processes:

- GNR 983 listed activity trigger – undertake a Basic Assessment (BA) process;
- GNR 984 listed activity trigger – undertake a Scoping and Environmental impact Reporting (S&EiR) process; and
- GNR 985 listed activity trigger – undertake a BA process.

The development of the norms and standards is the foundation of the regulatory system established in terms of Section 7(1) (c) of the NEM: WA.

Chapter 4 of the National Water Act (No. 36 of 1998) (NWA) as amended (Sections 21 to 55) focuses on water use. Generally, a water use must be licensed. Water uses that need to be licensed (Section 21) include:

- Taking of water from a water resource
- Storing of water;
- Impeding or diverting the flow in a watercourse;
- Engaging in a stream flow reduction activity contemplated in Section 36;
- Controlled activities (includes irrigation with wastewater and intentional recharging of aquifers with wastewater);
- Discharging of waste in a manner which may detrimentally impact on a water resource,
- Disposing of waste in a manner which may detrimentally impact on a water resource disposal of wastewater from industrial processes;
- Removing and/ or discharging of underground water if it is necessary for the efficient continuation of an activity or for the safety of people Licences are not required (Section 22) where:
 - Altering the bed, banks, course or characteristics of a watercourse:
 - The water use is an existing lawful use (a use which was authorised before the commencement of the Act) if:
 - The use is permissible under a general authorisation (GA) this will be a measure to avoid a flood of licence applications and will be revoked with time)
 - The water use is listed in Schedule 1 (includes: domestic use, non-commercial gardening and emergency water use such as fire-fighting);

A responsible authority has waived the need for a licence (because it is satisfied that the purpose of the Act will be served by an authorisation under any other law).

In water stressed areas, the responsible authority may override the provision for unlicensed use (Section 43).

Licensing procedures are outlined in Sections 40 to 48 and the review of licences is covered in Sections 49 to 52. Licences can only be granted once a preliminary estimation of the Reserve (water required for basic human and ecological needs) has taken place.

Pollution of water

Section 19 of the NWA states that any person who owns, controls, occupies or uses land is deemed responsible for taking measures to prevent pollution of water resources. If these measures are not taken, the responsible authority may do whatever is necessary to prevent the pollution or remedy its effects and to recover all reasonable costs from the responsible person.

Non-compliance with these provisions constitutes a criminal offence.

The compliance requirement would extend to by-laws. Compliance with the environmental provisions of these by-laws and strategic development plans would be the responsibility of the implementing agencies.

Notwithstanding the above, South Africa is signatory to various international treaties and conventions which have been translated into various pieces of legislation to enable country's compliance with the international agenda and affairs.

Relevant international statutes are indicated on Table e1-1 and relevant national statutes are presented on Table e1-2.

Table e1-1: Relevant International Statutes

International treaties	Some Applicable Sections
Ramsar Convention, 1971	Convention on Wetlands, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The audit was in so far as it pertained to management of wetlands
United Nations Framework Convention on Climate Change, 1994	The ultimate objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." The climate change plans must be incorporated into the environmental planning tools.
United Nations Convention to Combat Desertification, 1994	Convention to combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements. Desertification can be caused by deforestation, soil erosion, creation of dongas and unsustainable practices. As such rehabilitation and avoidance of activities that can induce desertification is a best practice approach.
United Nations Convention on Biological Diversity, 1992	The objectives are the conservation of biological diversity. the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding. Biodiversity management strategies and plans should be part of the mining project implementation process.

Table e1-2: The Legislative Framework for Postmasburg Project

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Environmental & Natural Resources Management				
Constitution of the Republic of South Africa, Act (No 108 of 1996)	Department of Justice and Constitutional Development	The Constitution Africa lay down that efficient, economic and effective use of resources must be promoted and a high standard of professional ethics must be promoted and maintained. Chapter 2 of the Constitution includes a number of fundamental rights, Section 24 lays out the citizens' environmental rights.	No licence requirement, but general respect for the environment and people's rights to a healthy and clean environment during planning, operation and closure of the mine.	Section e) and j) of the BAR Section 1(d) (i); e) and f) of the EMPr
NEMA Chapter 5, Section 23 (e)	DFFE	Ensures the consideration of environmental attributes in project management and decision-making which may have a significant effect on the environment and its resources. It also ensures satisfactory and appropriate opportunity for public participation in decisions that may affect the environment or their lives.	There is an opportunity for the environmental attributes of a proposed project to be considered during the planning stages. Public participation and consultation ensures that their voice is heard in decisions and they provide information vital to the project. Such information may be impossible to find or guess without their participation.	Section h) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Sections 24 and 28		<p>Environmental protection and mitigation against negative impacts the development or rehabilitation might present defines strategic environmental management goals and objectives of government in relation to activities that may significantly affect the environment.</p> <p>The establishment of supporting regulations and delineation of listed activities for which an EA is required prior to their commencement, promotes the application of environmental assessment and management tools to ensure application of integrated environmental management principles. The Act aims to improve the quality of environmental decision-making by setting out principles for environmental management that apply to all government departments and to all organisations that may affect the environment</p> <p>The developer has a general duty of care for the environment and to institute such measures</p>	<p>An EA required for triggered activities. Activities such as Land clearance for the development of the PV Solar Panels and Battery storage. "The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation."</p>	Section h) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		as may be needed to demonstrate duty of care.		
<p>NEMA</p> <p>Chapter 7, Section 28</p>		<p>It stresses on the duty-of-care principle emphasizing that project proponents must put in place measures to avoid environmental degradation or where avoidance is not possible, to take reasonable steps to mitigate and restore the initial environmental status or better.</p>	<p>Suggested mitigation measures must adequately remediate the environment. Avoidance mechanisms must be suggested prior to project commencement. Planning must prioritize options that have minimal environmental damage or those with damages or negative impacts that can be managed and reversed.</p>	<p>Section j); k) and l) of the BAR Section 1(d) (i); e) and f) of the EMPr</p>
<p>NEMA: EIA Regulations of 2014 (GNR 326) and the 3 Listing Notices (GNR 324, 325 & 327) which were amended in 2017 and published as follows:</p> <p>GNR 326 EIA Regulations (7 April 2017), GNR 327 Listing Notice 1 (7 April 2017), GNR 325 Listing Notice 2 (7 April 2017)</p>		<p>Provides for EA requirement for listed activities and for this project listed activities</p> <p>The regulation provides for the following objectives:</p> <p>To regulate the procedure and criteria contemplated in Chapter 5 of the Act relating to the preparation, evaluation, submission, processing and consideration of, and decision on, applications for environmental authorisations for the commencement of activities, subjected to environmental impact assessment, in order to avoid or</p>	<p>All legislative requirements will be applied for following the guidelines and regulations in this legislation.</p>	<p>Section d) iii of the BAR</p>

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
GNR 324 Listing Notice 3 (7 April 2017)		mitigate detrimental impacts on the environment, and to optimise positive environmental impacts, and for matters pertaining thereto.		
National Environmental Management: EIA Regulations of 2014 Chapter 4, Sections 19 and 25		Developmental projects with potential for negative impacts must put in place an Environmental Management Programme and provisions for Compliance Auditing. Activities such as public/stakeholder consultations and participation must be carried out.	An Environmental Management Plan has been developed and issues that will be noted during the public consultation exercise will be used and considered during the development of the final EMPr.	Section 1(d) (i); h); k) and l) of the EMPr
NEM: WA		To reform the law regulating waste management in order to protect health and environment by providing reasonable measures for the prevention of pollution, ecological degradation and for securing ecologically sustainable development. The construction and operation phase of the mining projects.	Amounts and types of waste generated, transported and disposed will require proper licences or permits for disposal or recycling at the licensed landfill or disposal sites. Amounts and type of waste to determine the application process to be required, registration or waste licence application. Since there are water courses which traverse the targeted areas, any sediment waste generated during river crossings must be classified and the	Section 1(d) (i); e); f) and k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
			<p>general waste disposal should be adequately handled</p> <p>Protection of the surrounding environment through efficient waste management by ensuring proper waste collection, transportation, storage, disposal and treatment by the appointed contractor. Should the sediment waste be classified and deemed to be hazardous a licence will be required for its disposal. Waste generated during the clearing of the site.</p>	
National Norms and Standards for the Storage of Waste (Government Notice No. 926 of 2013)		The proper standards to be followed for storage of waste as it is generated.	<p>Waste generated during the clearing of the site and the construction phase of the mining project.</p> <p>Amounts and types of waste generated, transported and disposed will require proper licences or permits for disposal or recycling at the licensed landfill or disposal sites.</p>	Section 1e) and f) of the EMPr Section j) of the BAR
List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment (Government Notice No. 921 of 2013)		Gives activities that may result in negative impacts on the environment or its resources. These activities would have to be carried out with measures in place to minimize or mitigate possible impacts.	To meet the requirements of this regulation, waste generating activities have been mentioned in the impacts section. This is done so they can be managed or avoided where possible.	Section 1e) and f) of the EMPr Section j) of the BAR
National Environmental Management Waste		Provisions for classification of waste at source and handling to minimize negative impacts.	Waste streams have to be classified and then handled according the relevant specifications.	Section 1e) and f) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Classification and Management Regulations (Government Notice No. 634 of 2013)				Section j) of the BAR
National Environmental Management: Biodiversity Act (No. 10 of 2004) (NEM: Biodiversity Act)		Provides for the provision of protection of South African flora and fauna. During clearing and construction, all indigenous flora and fauna must be identified and not disturbed. Permission for removal or relocation must be sought from relevant authority.	The provisions of the Act and Regulations must be utilised in the compilation of any mitigation measures for biodiversity management through proper rehabilitation measures. This includes the protection of species and ecosystems; the sustainable use of indigenous biological resources; the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources; and the establishment of a South African National Biodiversity institute. Care to be given to riparian vegetation in the project area as well as grazing livestock.	Section h) iv); k) and m) of the BAR Section d) i) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Alien and Invasive Species Regulations (Government Notice No. 598 of 2014) National Environmental Management: Protected Areas Act (No. 57 of 2003)		Invasive species are now deemed to be a legal liability of the property owner and it is up to the landowner to ensure that all invasive species are safely removed from their land in accordance with the regulations and permitting requirements.	Where project activities are being done on state land, measures have been outlined in the impacts section so as to minimize the spread of the alien invasive species.	Section h) iv); j) and k) of the BAR Section k) of the EMPr
National Environmental Management: Air Quality Act. (No 39 of 2004) (NEM: Air Quality Act)		Generation of dust during the clearance of vegetation and mining activities	Mitigation measures proposed for dust control and dustfall monitoring.	Section i)
SANS 10103:2008 'The measurement and rating of environmental noise with respect to annoyance and to speech communication', Edition 6.		Generation of noise during the clearance of vegetation and mining activities.	Make sure there is management of noise generation to avoid community disturbances.	Section j) and l) of the BAR Section d) iii) , e); f) and k) of the EMPr
SANS 10357:2004 'The calculation of sound propagation by the Concawe method'. Edition 1.2.		Gives acceptable standards and procedures for the measurement and calculation of sound pressure transmission as outlined by the Concawe Method.	Noise measurements to be done in accordance with the standards	Section k of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
National Dust Control Regulations (Government Notice No 827 of 2013)	City Metros/Local Municipalities	Generation of dust during the clearance of vegetation and construction activities for the mining infrastructure.	Mitigation measures proposed for dust control and dustfall monitoring	Section j) and l) of the BAR Section d) iii) , e); f) and k) of the EMPr
NWA	Department of Human Settlement, Water and Sanitation (DHSW&S)	<p>Provides for all aspects relating to pollution of surface water. To take all reasonable measures to prevent any pollution of a water resource from occurring, continuing or recurring.</p> <p>Provides provisions for the protection, use, development, management, conservation and control of South African's water resources. General respect for non-pollutant water and surrounding environment of the site are to be maintained, as it is used by people and neighbouring habitats of fauna and flora.</p> <p>Pollution Control and Water use.</p> <p>Describes the way water resources in South Africa are to be managed and used. The NWA is founded on the constitutional principle that water belongs to all the people of South Africa. It aims to protect, conserve, manage and</p>	<p>Mitigation measures to protect the water resources and minimise water pollution must be proposed and implemented through the approved EMP.</p> <p>An application for a mining right or an EA must show that the permission of the land-owner to use the land has been attained, if the land is not owned by the develop.</p> <p>Amount of water to be used during the construction phase and operational phase must be taken into consideration.</p>	Section d) i); e); f); h) and k) of the EMPr

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		control water resources as a whole. The basic human needs and the environment, and the Act requires that water is 'reserved' for these needs before water is allocated for other uses. Water use is controlled through regulating the way it can be used. The NWA regulates water use through the registration of water use through different types of authorisations (Water Use Licence (WUL) or GA).		
WUL in terms of NWA for water uses	DHSW&S	Provisions for the issuance of WUL to water users.	Water will be sourced from the local municipality, hence, a water use licence will not be sought. No water use licence will be sought.	Section d) ii) of the EMPr
National Forests Act (No. 84 of 1998)	DFFE	Provisions for management of forests and use of resources from such. It regulates the management of certain tree species that are classified as protected.	Cutting, disturbing, damage or destruction of any protected tree except under licence from the Minister is prohibited (Section 15). As yet no trees have been designated as protected under this legislation. Therefore, regulations in terms of the National Forest Act 122 of 184 are still applicable in this regard until new regulations in terms Sections 53 and 54 of the National Forest Act of 1998 are promulgated. All protected trees	Section d) iii) and f) of the EMPr Section j) of the BAR

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
			are listed in Schedule A of the existing regulations. No cutting of trees is expected.	
Conservation of Agricultural Resources Act (No. 43 of 1983)	Department of Agriculture, Land Reform and Rural Development (DALRRD)	Conservation of Agricultural Resources Act 43 of 1983: Section 5 of the Act prohibits spreading of weeds. Controls the utilisation and protection of wetlands, soil conservation, control and prevention of veld fires, control of weeds and invasive plants. Regulations stipulate that weeds and invader plants should be eradicated or controlled in areas where they are not used for recreational or economic purposes. Clearance of land must be checked if it is not agricultural land	Implementation of control measures for alien and invasive plant species.	Section h) iv); j) and k) of the BAR Section k) of the EMPr
Hazardous Substances Act (No 15 of 1973).		Regulates transportation, use and storage of substances classified as hazardous such as fuel storage on site and use of herbicides for weed control.	Use and storage of hazardous substances to comply with the requirements of this law.	Section 1e) and f) of the EMPr Section j) of the BAR
Occupational Safety				

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Occupational Health and Safety Act (No. 85 of 1993)		<p>General duties of employers to their employees.</p> <p>General duties of employers and their self-employed persons to persons other than the employees. Safety ensured during clearing, construction, operational and maintenance phases of the project.</p>	<p>OHS Act known to all employees. SHE Policy and Plan.</p> <p>Occupational Safety Training.</p> <p>PPE issue, management and compliance.</p>	<p>Section j) of the BAR</p> <p>Section f) of the EMPr</p>
Heritage Resources				
<p>National Heritage Resources Act (Act No. 25 of 1999) (NHRA)</p> <p>Section 5, Subsection 6</p>	<p>South African Heritage Resources Agency (SAHRA)</p>	<p>It governs the integration of heritage resources conservation in economic developmental projects. It states that when any paleontological resources are discovered during developmental work, works must cease and a report done to the SAHRA.</p> <p>Controls for the protection of natural and cultural heritage resources. No person may, without a permit issued by SAHRA or a provincial heritage resources authority— (a) destroy, damage, alter, exhume or remove from its original position or otherwise disturb the grave of a victim of conflict, or any burial ground or part thereof which contains such graves; (b) destroy, damage,</p>	<p>Considerations for the preservation and avoidance of possible paleontological resources disturbance must be made at the planning stage where designs are still in the initial stage. The EMP will have provisions for dealing with such.</p> <p>NHRA requires that an environmental assessment is undertaken for any development exceeding 0.5 ha. All identified archaeological sites must be registered with the SAHRA. A permit in terms of Section 40 of NHRA is required for disturbance of archaeological sites. Permits in terms of Section 41 of the NHRA are required for disturbance of grave sites. These permits are obtained from SAHRA (or the provincial heritage agency).</p>	<p>Section h) iv) and j) of the BAR</p> <p>Section f) of the EMPr</p>

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
		<p>alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a formal cemetery administered by a local authority</p> <p>Section 38: Subject to the provisions of Subsections (7), (8) and (9), any person who intends to undertake a development categorised as— (a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length; must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.</p>		
Provincial and local by-laws				

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
<p>Tsantsabane Local Municipality - Public open spaces By-laws.</p> <p>In terms of Section 13(a) of the Local Government: Municipal Systems Act, 2000 (Act No. 32 of 2000)</p>	<p>Tsantsabane Local Municipality</p>	<p>Provide an effective legal and administrative framework to ensure that the way in which the Council controls, manages and develops public open spaces is environmentally sustainable and is in the long-term interests of the whole community, including future generations and which clearly defines the rights and obligations of the public in relation to public open spaces.</p>	<p>Local council practices will be taken into account in the management of impacts and benefits.</p>	<p>Section d) iii) of the EMPr</p>
Guidelines				
<p>Guidelines: 27 September 2005: Guidelines for clearing invasive alien plants Guidelines for clearing of invasive in terms of Section 75 and 75 of national Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and as required by</p>		<p>Provides guidance on how to clear invasive alien plants NEMBA Sections 75 and 76 are very specific in terms of who must develop these Invasive Species Monitoring, Control and Eradication Plans, what the plans must include and how they should be implemented.</p>	<p>Management of alien invasive species has been incorporated into the EMP.</p>	<p>Section j); l) and m) of the BAR Section d) i); e); f) and k) of the EMPr</p>

REGULATION OR GUIDELINES	RELEVANT AUTHORITY	REQUIREMENTS /IMPLICATIONS FOR THE EXPLORATION PROJECT)	FUTURE PROCESSES/INTERVENTIONS REQUIRED	REFERENCE WHERE APPLIED
Section 76 of this Act				

f) Need and desirability of the proposed activities.

(Motivate the need and desirability of the proposed development including the need and desirability of the activity in the context of the preferred location).

For years, mining has been the driving force behind South Africa's economy and continues to make a valuable contribution to the country's economy contributing. In recent years, there has been an increase in the production of ferrous metals and this increase has given rise to the the mining of iron ore. In 2018, total iron ore rand sales increased by 3.7% and export sales have doubled over the last decade to 61 million tonnes in 2018 up from 32 million tonnes in 2008 (Minerals Council South Africa, 2019). South Africa is the world's leading producer of manganese, accounting for about 75% of the world's identified manganese resources, producing more than 14.9 million tonnes in 2018, up from 14.3 million tonnes in 2017. Most manganese deposits in South Africa are located in the Northern Cape Province (Brynes, 2016) and much of the manganese produced is exported.

In terms of employment, the iron ore industry recorded an increase by 6.2% between 2017 and 2018 to 18,613 and R6.6 billion was paid to employees. In 2018, the manganese industry employed 9 352 direct employees with and employee earnings amounting to R3 billion. Although South Africa is a top producer of a range of minerals and metals, the mining sector has fallen to around 7 % of GDP in 2019 commensurating a drop in employment to around 400 000 (World Bank, 2020). Loss of employment results in reduced standards of living as well as an increase in poverty levels. It is predicted that mining will still play an important role to the economy, most notably through foreign exchange earnings and employment provision. It is also one of the primary sectors that provide employment opportunities for unskilled and semi-skilled people.

The South African mining industry has its origin in small-scale and artisanal mining activities, with these operations offering much needed employment opportunities and entrepreneurship, as well as contributing to the mineral sector and local economy (Ledwaba, 2017). Small-scale mining impact on employment is especially observed in small towns and rural areas where there are limited opportunities; providing significant livelihood for rural communities and a means of alleviating poverty.

The proposed project is for a small-scale mining operation in Postmasburg town, Northern Cape Province and its establishment will create employment opportunities for unskilled and semi-skilled people, thereby improving physical, psychological, developmental, cultural and social needs and interests of the relevant communities.

According to Tsantsabane Local Municipality Integrated Development Plan (IDP) 2020–202, mining has played a major role in shaping the economic development of the area. The area is rich in minerals which has historically been the mainstay of the area's economy with iron and manganese mining crucial mining activities to the economy of the area. In addition, the Tsantsabane Local Municipality IDP indicate that there are significant undeveloped mineral resources left in the area that can contribute to future economic growth in the area depending on the future viability of exploiting the minerals. An assessment undertaken during Phase 1, which entails desktop and data analysis, show that if undertaken, this project will involve the exploration of unexploited mineral resources and this will contribute to local economy growth.

The city makes a commitment to prioritise economic growth and job creation as strategies that can result in employment creation and poverty alleviation. In addition, the city also recognises the availability of manganese and iron ore deposits in the greater ZF Mgcawu district municipal area and how exploration of such resources would contribute to local economy as well as improving the quality of life to the dwellers. Therefore, if granted the proposed project will offer employment opportunities and contribute to the city's local economy as well as improvement to quality of life.

Mining has had a negative impact on land resources within the Tsantsabane Local Municipality and has negatively impacted the environment. Currently the proposed site has been transformed by historic mining activities and the baseline environment of the project area consists of low sensitivity plant species themes (Department of Environmental Affairs, 2021). The project will not have a significant negative impact on the ecological integrity of the surrounding area as the footprint is limited to transformed areas, classified as low ecological sensitivity. The ecological objectives or targets of the area are also limited by the fact that the area has been previously transformed and degraded, resulting in limited conservation potential. To ensure that all identified impacts are addressed, mitigation measures are detailed in the Environmental Management Plan (EMPr). In addition, residual impacts have been identified and the management thereof has been detailed in the EMPr.

g) Motivation for the overall preferred site, activities and technology alternative.

This section outlines the motivation for preferred project alternatives that have been considered for the site, project activities and the technology.

Site Alternatives

Given the extensive and already existing geological mapping and surveys that have been carried out by the Geological Society of South Africa, the project has no site alternatives as there are already maps to select suitable areas for exploration.

Activity Alternatives

The major project activity is exploration. Exploration will determine if there is enough iron ore and or manganese that is economically feasible to extract.

Technology alternatives

A technology alternative has not been selected yet. However, the selected technology will depend on the one with more efficiency, reasonable cost and the least environmental impacts.

h) Full description of the process followed to reach the proposed preferred alternatives within the site.

NB!! – This section is about the determination of the specific site layout and the location of infrastructure and activities on site, having taken into consideration the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

The notification of interested and affected parties will be undertaken at the beginning of the public review and commenting period commencing on 19 April 2021 to 21 May 2021. During the period, I&APs will be awarded an opportunity to comment on the draft BAR and submit their project comments which will then be captured and addressed in the Final BAR to be submitted to the Competent Authority.

i) Details of the development footprint alternatives considered.

With reference to the site plan as provided above and the location of the individual activities on site, provide details of the alternatives considered with respect to:

- (a) the property on which or location where it is proposed to undertake the activity;

The proposed activities will be undertaken on farms Thorns 407, Duine 437, Record 411, Loskop 414, Oatlands 406 and Towton 415. For the site, there were no alternatives as this was the best area for exploration as evidenced by the South African Geological Map.

- (b) the type of activity to be undertaken;

The proposed activities will involve the exploration of iron and manganese ore using invasive and non-invasive techniques. Invasive techniques are those that will result in land disturbances and this will include drilling of a total of 30 holes. An analysis of all the potential manganese and iron intersections will be carried out the drilling (diamond, aircore, or RAB or RC) of the prospective areas will commence to establish presence of mineralisation. Initially, about 10 drill-holes will be drilled at varied depths from 50 to 100m. Depending on the results of the initial drilling, further 30 drill-holes totalling about 2000 meters may be required.

- (c) the design or layout of the activity;

The project **layout plan** is attached as Appendix d1-1.

- (d) the technology to be used in the activity;

Technologies being considered for the proposed activities include diamond, Diamond, Air Core, Rotary Air Blast (RAB) or Reverse circulation (RC) for drilling. In addition, remote sensing including satellite imagery and aerial photography will be used during the mapping of resources.

- (e) the operational aspects of the activity; and

Operational activities will involve the drilling of a total of 40 boreholes. The drill holes will be drilled in two phases. Phase 1 will involve the drilling of 10 drill-holes at varied depths from 50 to 100m and a further 30 drill-holes totalling about 2000 meters will be drilled depending on the results from Phase 1. Operational activities will also include geological trenching and excavations.

- (f) the option of not implementing the activity.

There are no alternatives being considered for this project.

ii) Details of the Public Participation Process Followed

Describe the process undertaken to consult interested and affected parties including public meetings and one on one consultation. NB! The affected parties must be specifically consulted regardless of whether or not they attended public meetings. Information to be provided to affected parties must include sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land.

The Public Participation approach adopted in this process is in line with the processes stipulated in Regulation 40 to 44 of the NEMA: Environmental Impact Assessment Regulations, 2014: GN R326. The process undertaken meet the required standards as listed in the regulations and this is summarised in Table hii1-1.

On 15 March 2020, a National State of Disaster was declared and regulations related to the manner in which the public participation process should be conducted, to comply with COVID-19 regulations and guidelines were promulgated by DFFE. On 05 June 2020, DFFE promulgated Regulation 650, published in Government Gazette 43412 providing directions to be adhered to during public participation process with an aim of addressing, preventing and combating the spread of COVID-19 related to environmental management processes. Following the June 2020 directions, a couple of directions regarding measures to address, prevent and combat the spread of COVID-19 relating to national environmental management permits and licences were promulgated. These regulations will influence the manner in which stakeholder engagement will be undertaken for this project.

Methods of communication

The following notification and communication methods will be applied during the public participation process:

- Email communication
- SMS communication
- Door-to-door notification
- Telephone communication
- Face-to-face meetings, if need be.

The stakeholder engagement process will involve the following activities:

- Stakeholder profiling, data collection and identification of relevant stakeholders and Interested and Affected Parties (I&APs);
- Data verification and preliminary consultation;
- Notification of stakeholders and I&APs;
- Stakeholder Engagement; and
- Collation and consolidating of issues raised during the I&AP engagement and commenting and public review period.

Table hii1-1: Checklist for Compliance with Public Participation Process Regulations

Section of Regulation	Requirement or Description	Activities undertaken to Comply
40 (1) (a)	<p>(1) The public participation process to which the—</p> <p>(a) basic assessment report and EMPr, and where applicable the closure plan, submitted in terms of regulation 19;</p> <p>was subjected to must give all potential or registered interested and affected parties, including the competent authority, a period of at least 30 days to submit comments on each of the basic assessment report, EMPr, scoping report and environmental impact assessment report, and where applicable the closure plan, as well as the report contemplated in regulation 32, if such reports or plans are submitted at different times.</p>	<p>Allowing I&APs an opportunity to submit written comments during notification and public review periods as detailed in Section h) ii. c.</p>
40 (2) (a) (b) (c) (d)	<p>(2) The public participation process contemplated in this regulation must provide access to all information that reasonably has or may have the potential to influence any decision with regard to an application unless access to that information is protected by law and must include consultation with—</p> <p>(a) the competent authority;</p> <p>(b) every State department that administers a law relating to a matter affecting the environment relevant to an application for an environmental authorisation;</p> <p>(c) all organs of state which have jurisdiction in respect of the activity to which the application relates; and</p> <p>(d) all potential, or, where relevant, registered interested and affected parties.</p>	<p>Availing documents for public review as detailed in Section h) ii. c and d.</p>
40 (3)	<p>(3) Potential or registered interested and affected parties, including the competent authority, may be provided with an opportunity to comment on reports and plans contemplated in subregulation (1) prior to submission of an application but must be provided with an opportunity to comment on such reports once an application has been submitted to the competent authority.</p>	<p>Allowing I&APs an opportunity to comment on the documents for a 30-day period as detailed under Section h) ii. d.</p>

Section of Regulation	Requirement or Description	Activities undertaken to Comply
41 (2) (a) (i) (ii)	<p>(a) fixing a notice board at a place conspicuous to and accessible by the public at the boundary, on the fence or along the corridor of—</p> <p>(i) the site where the activity to which the application or proposed application relates is or is to be undertaken; and</p> <p>(ii) any alternative site;</p>	A site notice was erected on site and other strategic points as detailed in Section Section h) ii. c.
41 (2) (b) (i) (ii) (iii) (iv) (v) (vi)	<p>b) giving written notice, in any of the manners provided for in Section 47D of the Act, to—</p> <p>(i) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;</p> <p>(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;</p> <p>(iii) the municipal councillor of the ward in which the site and alternative site is situated and any organisation of ratepayers that represent the community in the area;</p> <p>(iv) the municipality which has jurisdiction in the area;</p> <p>(v) any organ of state having jurisdiction in respect of any aspect of the activity; and</p> <p>(vi) any other party as required by the competent authority;</p>	Notification emails were sent to the stakeholders. In addition, physical notification was also done as detailed in Section h) ii. c.
41 (2) (c) (i) (ii)	<p>c) placing an advertisement in—</p> <p>(i) one local newspaper; or</p> <p>(ii) any official that is published specifically for the purpose of providing public notice of applications or other submissions made in terms of these Regulations;</p>	Placement of newspaper advert in a local newspaper as detailed in Section h) ii. c.
41 (3) (a) (b) (i) (ii) (iii) (iv)	<p>(3) A notice, notice board or advertisement referred to in subregulation (2) must—</p> <p>(a) give details of the application or proposed application which is subjected to public participation; and</p>	A site notice and advertisement containing the required information

Section of Regulation	Requirement or Description	Activities undertaken to Comply
	(b) state— (i) whether basic assessment or S&EIR procedures are being applied to the application; (ii) the nature and location of the activity to which the application relates; (iii) where further information on the application or proposed application can be obtained; and (iv) the manner in which and the person to whom representations in respect of the application or proposed application may be made.	were developed as detailed in Section h) ii. c.
41 (4) (a) (b)	(4) A notice board referred to in subregulation (2) must— (a) be of a size of at least 60cm by 42cm; and (b) display the required information in lettering and in a format as may be determined by the competent authority.	An A2 size site notice was erected on site and other strategic points as detailed in Section h) ii. c.
41 (6) (a) (b)	(6) When complying with this regulation, the person conducting the public participation process must ensure that— (a) information containing all relevant facts in respect of the application or proposed application is made available to potential interested and affected parties; and (b) participation by potential or registered interested and affected parties is facilitated in such a manner that all potential or registered interested and affected parties are provided with a reasonable opportunity to comment on the application or proposed application.	Availing documents for review in electronic format as detailed in Section h) ii. e.
42 (a) (b)	A proponent or applicant must ensure the opening and maintenance of a register of interested and affected parties and submit such a register to the competent authority, which register must contain the names, contact details and addresses of— (a) all persons who, as a consequence of the public participation process conducted in respect of that application, have submitted written comments or attended meetings with the proponent, applicant or EAP; (b) all persons who have requested the proponent or applicant, in writing, for their names to be placed on the register; and (c) all organs of state which have jurisdiction in respect of the activity to which the application relates.	Development and maintenance of an Interested and Affected Parties (I&AP) Register as detailed in Section h) ii. a.

Section of Regulation	Requirement or Description	Activities undertaken to Comply
43 (1)	(1) A registered interested and affected party is entitled to comment, in writing, on all reports or plans submitted to such party during the public participation process contemplated in these Regulations and to bring to the attention of the proponent or applicant any issues which that party believes may be of significance to the consideration of the application, provided that the interested and affected party discloses any direct business, financial, personal or other interest which that party may have in the approval or refusal of the application.	Allowing I&APs an opportunity to submit written comments during notification and public review periods as detailed in Section h) ii. e.
44 (1)	(1) The applicant must ensure that the comments of interested and affected parties are recorded in reports and plans and that such written comments, including responses to such comments and records of meetings, are attached to the reports and plans that are submitted to the competent authority in terms of these Regulations.	Capturing of comments and responses as detailed in Section h) ii. e and Section h) iii.
45	An application in terms of these Regulations lapses, and a competent authority will deem the application as having lapsed, if the applicant fails to meet any of the time frames prescribed in terms of these Regulations, unless extension has been granted in terms of regulation 3(7).	The public participation timeframes were complied with by ensuring that the public review period timeframes are adhered to.

a. Stakeholder profiling and identification of I&APs

During the period of January to February 2021, key stakeholder were identified including national, provincial, local authorities, civil society organisations and landowners. A list of the identified I&APs is attached as Appendix h)ii)a1-1. The process also involved undertaking a desktop review of the project area, document review, analysis and review of relevant legislation. Local setting maps were also used to identify adjacent landowners and current and planned land uses. In addition, winded search was used to identify landowners.

b. Data verification and preliminary consultation

Validation of collated information was done through literature review of existing documents and reports such Tsantsabane Local Municipality 2020-2021 IDP; Tsantsabane Local Municipality Spatial Development Framework, 2015; Local Economic Development Plans; Municipal by-laws, and Provincial ordinances, documents submitted to the Competent Authority by the proponent, local setting maps, and relevant legislation and statutes. Specialist site visits were also undertaken to investigate possible impacts as well as get an understanding of the area. In addition, a request for a land zoning certificate has been sent to Tsantsabane Local Municipality.

c. Notification of stakeholders and I&APs

To ensure that stakeholders are informed of the proposed activities, an advert will be published and site notices will be placed on the project site and at strategic points around the project area. The advert will be published in Kathu Gazette on 17 April 2021 and the site notices will be placed at strategic points around 19 April 2021 marking the beginning of the public review and commenting period. A draft advert to be placed in the newspaper for publishing is attached as hiic1-1. Notification letters will be sent through email and physically distributed to landowners and adjacent landowners around 19 April 2021. A sample of the notification letter to be distributed to I&APs is attached as Appendix hiic1-2. Upon receipt of the notification during physical notification, I&APs will be required to sign an acknowledgement of receipt register, attached as Appendix hiic1-3. An I&AP registration form, Reply Slip, will also be shared with I&APs and it will be indicated that the I&APs may optionally use the form to submit their comments and or concerns. A copy of the Reply Slip is attached as Appendix hiic1-4. As indicated, the I&APs will be awarded a 30-day period to submit written comments during the notification period and the public review period which will commence from 19 April 2021 to 21 May 2021.

d. Stakeholder Engagement

During the stakeholder identification period, telephone engagements were done with the key stakeholders including the Ward Councillors. It was noted that the proposed project is located in Ward 6 of the seven municipalities in Tsantsabane Local Municipality. Upon identification of the relevant ward, telephone engagement was done with the ward councillor and they were notified of the proposed project. During the engagements, stakeholders were requested to confirm their positions and contact details. Following a desktop screening undertaken for the area, it was discovered that the area is not archaeological and palaentological sensitivity. However, SAHRA was identified as a commenting organ as the need to verify the findings by checking the heritage status of the area. As such Draft documents will be uploaded on ISAHRS for commenting at the beginning of the public review period. In addition, I&APs will be awarded a 30-day period to review the Draft

Basic Assessment Report and Environmental Management Programme (EMPr) and comments submitted will be mitigated in the final BAR. Stakeholder engagement is an ongoing process and will be undertaken until the appeals stage of the Basic Assessment Process.

e. Collation and consolidating of issues raised

I&APs will be awarded a 30-day period to submit written comments during the public review period commencing on 19 April 2021 to 21 May 2021. In support of the commenting period, draft documents were made available on request. Initially, it was anticipated that the documents would be placed at public places for public review, however, due to the COVID-19 pandemic, most public places were either closed or did not have the capacity to oversee the review process considering strict covid protocols that need to be followed that might require monitoring. Therefore, I&APs were notified to request electronic formats of the documents should they wish to review the documents. Issues, comments and concerns to be raised by I&APs, during the public review period, will be captured and an issues and response report will be produced as part of the Final BAR ensuring that all issues and concerns raised are address

iii) Summary of issues raised by I&APs

(Complete the table summarising comments and issues raised, and reaction to those responses)

Engagement with stakeholders was done during the stakeholder identification phase and engagement done was to confirm the details of the I&APs. As highlighted in Section h) ii. cc, notification will be done at the beginning of the commenting period commencing on 19 April 2021.

Table hiii1-1: Summary of issues raised by I&APs

INTERESTED AND AFFECTED PARTIES List the names of persons consulted in this column, and Mark with an X where those who must be consulted were in fact consulted	DATE COMMENTS RECEIVED	ISSUES RAISED	EAPs response to issues as mandated by the applicant	Section and paragraph reference in this report where the issues and or response were incorporated.
<u>AFFECTED PARTIES</u>				
Landowner/s				
Jacobus SW Roussouw (Farm Thorns 407)	<input type="checkbox"/>	No comments received		
Johannes Ladewikus (Portion 1 of Oatlands 406)	<input type="checkbox"/>			
Williams Henry (Portion 2 of Oatlands 406)	<input type="checkbox"/>			
Lawful occupier/s of the land				
Kumba Iron Ore	<input type="checkbox"/>	No comments received		
	<input type="checkbox"/>			
Landowners or lawful occupiers				

on adjacent properties				
	<input type="checkbox"/>			
	<input type="checkbox"/>			
Municipal councillor (if more than one, attach list as an Annexure)				
Mpho Mashila (Ward 6)	<input checked="" type="checkbox"/>	04 February 2021	No comments were submitted.	The EAP made a telephone call to the Ward Councillor notifying them of the proposed project.
Local Municipality (if more than one, attach list as an Annexure)				
Tsantsabane Local Municipality	<input type="checkbox"/>		No comments were submitted.	
Organs of state (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA e)				
ZF Mgcawu District municipality			No comments were submitted	
South African Heritage Resources Agency	<input type="checkbox"/>		No comments were submitted	
Department of Public Works and infrastructure: Pretoria regional office			No comments were submitted	
The Department of Labour			No comments were submitted.	

Department of Human Settlements, Water and Sanitation			No comments were submitted.		
Department of Public Works			No comments were submitted.		
South African National Biodiversity Institute (SANBI)					
South African Weather Services					
South African National Parks (SANparks)					
South African Police Service					
Communities					
Dept. Land Affairs					
			No comments were submitted.		
Traditional Leaders					
None					
Dept. Environmental Affairs					
Department of Forestry, Fisheries and the Environment			No comments were submitted.		
Other Competent Authorities affected					

Department of Agriculture, Land Reform and Rural Development			No comments were submitted.		
Department of Mineral Resources and Energy			No comments were submitted.		
<u>OTHER AFFECTED PARTIES</u>					
Birdlife SA			No comments were submitted.		
Endangered Wildlife Trust (EWT)			No comments were submitted.		
Agri-SA			No comments were submitted.		
African Farmers Association of South Africa			No comments were submitted.		
<u>INTERESTED PARTIES</u>					
Postmasburg Magistrate Court			No comments were submitted.		

iv) The Environmental attributes associated with the alternatives.

(The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

An environmental screening report was generated using the DFFE screening tool and the report is attached as Appedix hiv1.1. The report has been used as reference to the biodiversity and heritage status of the project area, among other referenced documents.

(1) Baseline Environment

(a) Type of environment affected by the proposed activity.

(its current geographical, physical, biological, socio- economic, and cultural character).

A description of the environment to be affected by the proposed project is detailed below

i. Geographical

The project site is located in the TLM , which is situated in the northern-eastern part of the Northern Cape Province. Tsantsabane Municipality is one of the five municipalities in the ZFMDM (previously Siyanda District Municipality). It is a category B municipality, and is bordered by Siyancuma LM, //Khara Hais LM, !Kheis LM, Gamagara LM and Kgatelopele LM. The municipality is divided into 7 wards, and the main routes that run through Postmasberg to Beeshoek are the R385 from Kimberly, the R309 and the R325 to Kathu. Postmasburg is approximately 170 km from Kimberly and 210 km from Upington. The area consists of major towns that were established as part of the land redistribution projects in the area (Aurecon and Assmang. 2014, ZF Mgcawu District Municipality, 2019-2020). These include Biochoko, Postdene, New Town, Stasie, Groen Water, Skyfontein, Jean Heaven, marenane and the Loatlha Army Battle School. The municipal falls within the Gamagara Corridor, which is a mining belt of the John Taolo Gaetsewe and Siyanda Districts, and it further extends from Lime Acres and Danielskuil to Hotazel in the north (ZF Mgcawu District Municipality, 2017-2022). The belt is largely known for its rich iron and manganese minerals. Tsantsabane Local Municipality (TLM) is approximately 588714,56704 ha. About 98.96 % of the municipal area is pristine, with very little development, which covers only 1.04% of the land area (BGIS, 2021).

ii. Physical

The ZFMDM is dominated by two biomes which are the Nama-Karoo and Savannah. TLM is characterised by Savannah Biome, covering about 95,49% (approximately 562187,6 ha) of the local municipal area with small potions of the Nama-Karoo biome, covering about 4,51% of the municipal area (Tsantsabane Spatial Development Framework 2015-2020). According to the South African National Biodiversity Institute (SANBI) BGIS portal system, the vegetation type happening within TLM are: Kalahari Mountain Bushveld, Kalahari Plains Thorn Bushveld, Kalahari Plateau Bushveld, Kalahari Karroid Bushveld, Shrubby Kalahari Dune Bushveld, Ghaap Plateau Vaalbosveld, Kathu Bushveld, Kuruman Mountain Bushveld, Kuruman Mountain Bushveld, Kuruman Thornveld, Northern Upper Karoo, Olifantshoek Plains Thornveld, Postmasburg Thornveld, Southern Kalahari Mekgacha, and Southern

Kalahari Salt Pans. The proposed project site falls within the savannah biome and the major vegetation types happening in the area are the Kuruman Mountain Bushveld and Kuruman Thornveld Tsantsabane Spatial Development Framework 2015-2020). There is no critically endangered or threatened EcoSystems in the Municipality (BGIS, 2021).

iii. Climate

The Northern Cape Province's coastline, rainfall including the Namaqualand coastal region, falls within the cool temperate region that is extremely dry with erratic rainfall, thus, the region is characterised by hot dry climate receiving only 100mm of rainfall annually (ZF Mgcau District Municipality, 2016). The ZFMDM is a semi-desert area, with extremely low summer rainfall. Extreme weather condition, such as flooding and prolonged droughts are common in the area. The area experiences low summer rainfall. The project area falls within a rain shadow, where rain generally occurs in spring and again between February and April of each year (ZF Mgcau District Municipality, 2019-2020). The average annual rainfall ranges between 150 mm and 200 mm per annum. The average summer temperatures range between 18 and 20°C, with the highest temperatures reaching 43°C and winter average temperatures range between 3°C and 20°C and very occasionally do temperatures drop to -10°C. The maximum temperatures are experienced between November and March of each year. The Minimum temperatures are experienced between May and August (Aurecon and Assmang, 2014).

iv. Biological

The ZFMDM is dominated by two biomes which are the Nama-Karoo and Savannah. TLM is characterised by Savannah Biome, covering about 95,49% (approximately 562187,6 ha) of the local municipal area with small portions of the Nama-Karoo biome, covering about 4,51% of the municipal area (Tsantsabane Spatial Development Framework 2015-2020). According to the South African National Biodiversity Institute (SANBI) BGIS portal system, the vegetation type happening within TLM are: Kalahari Mountain Bushveld, Kalahari Plains Thorn Bushveld, Kalahari Plateau Bushveld, Kalahari Karroid Bushveld, Shrubby Kalahari Dune Bushveld, Ghaap Plateau Vaalbosveld, Kathu Bushveld, Kuruman Mountain Bushveld, Kuruman Mountain Bushveld, Kuruman Thornveld, Northern Upper Karoo, Olifantshoek Plains Thornveld, Postmasburg Thornveld, Southern Kalahari Mekkacha, and Southern Kalahari Salt Pans. The proposed project site falls within the savannah biome and the major vegetation types happening in the area are the Kuruman Mountain Bushveld and Kuruman Thornveld Tsantsabane Spatial Development Framework 2015-2020. There is no critically endangered or threatened EcoSystems in the Municipality (BGIS, 2021)

The DFFE describes the biodiversity of the area as mixed low and "very high sensitivity" theme as presented on Figure hiv1iv-1. According to the DFFE (2021) a very high sensitivity rating means critical biodiversity Area 2, Ecological Support Area or South African Protected Areas. Tswalu Kalahari Nature Reserve is located about 12 km north of the project site, thus, this can attribute to the rating of the area.

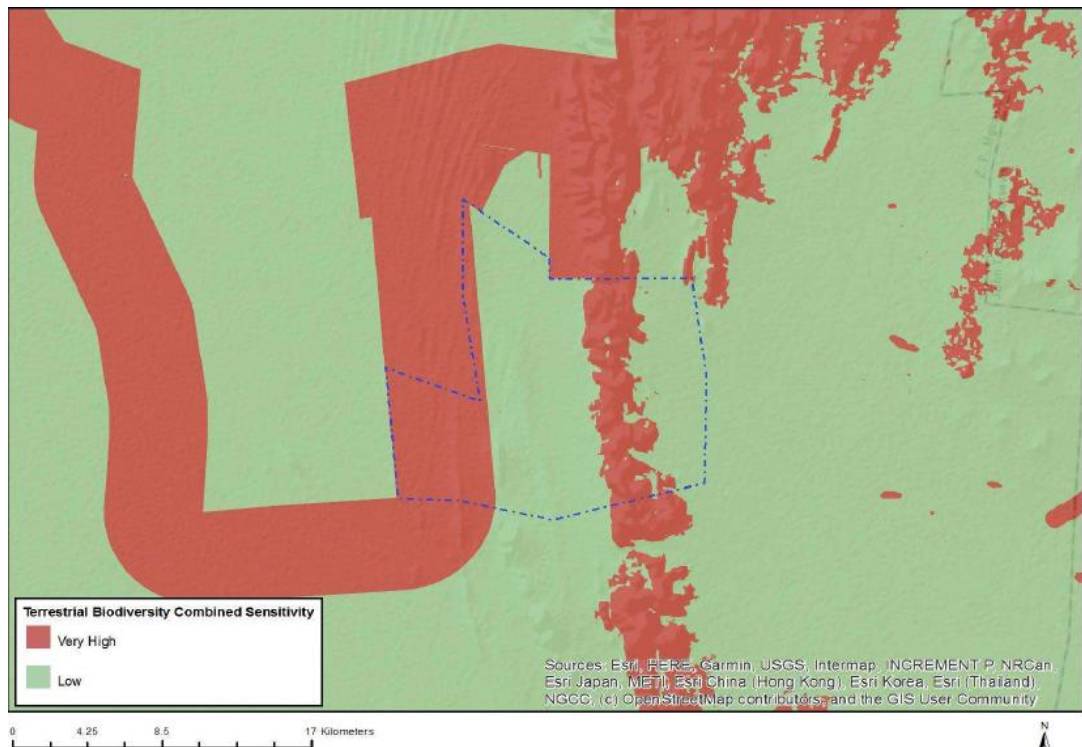


Figure hiv1iv-1: Biodiversity Map (Source: DFFE, 2021).

v. Flora

The vegetation cover in the northern parts of the municipality consists of Bushveld, while the southern parts have Karoo vegetation cover, which is often succulent. The South African National Biodiversity Institute (SANBI) has classified the ZFM Municipality, and subsequently the Tsantsabane Local Municipality as “Least Threatened” the area consist of a high blend of hydrous and drought resistant plant species due to the Orange River that flows through the district municipality. The vegetation includes Wild Olive and River Willow, versus Aloe, Quiver and Camel Thorn Tree (ZF Mgcawu District Municipality, 2017-2022).

DFFE describes the area to consist of flora that fall within the “Low Sensitivity” theme as presented on Figure hiv1v-1.

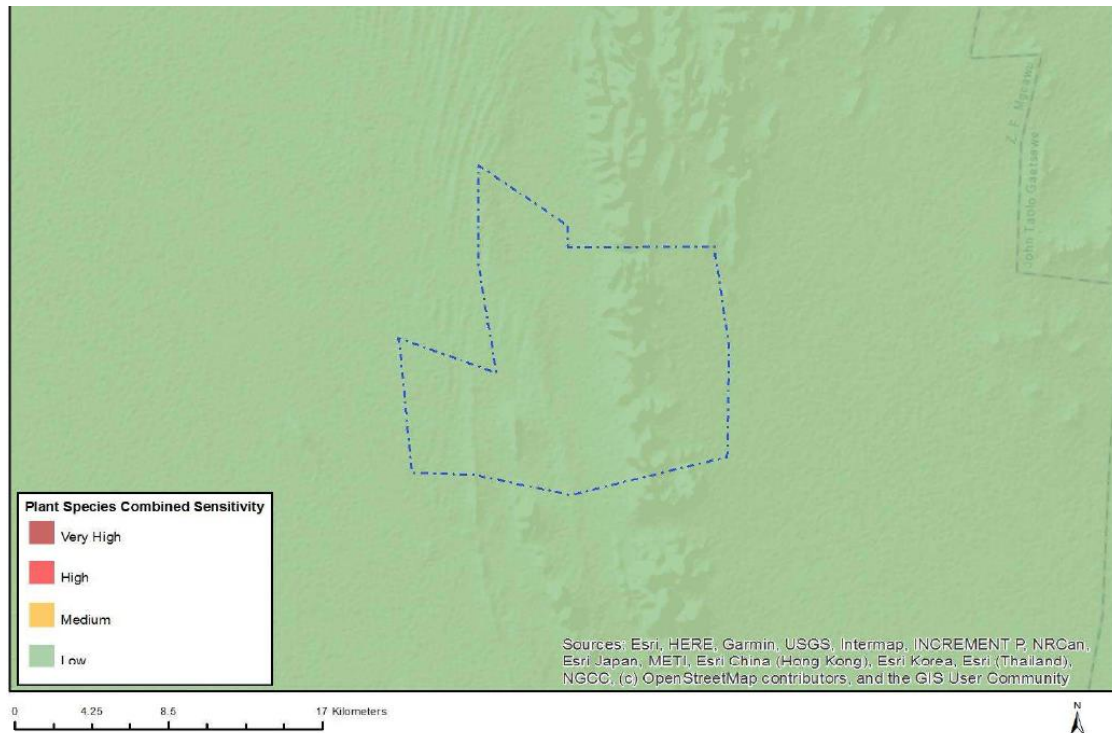


Figure hiv1v-1: Plant Species Map (Source: DFFE, 2021).

vi. Fauna

The animal species in the area are overall classified under the very low with some few occurrences of medium and low sensitivity themes as presented on Figure hiv1v-1. Falling under high sensitivity are the following species: *Aves-aquila verreauxii*, a large bird of prey and *Mammalia-Smutsia temminckii*, ground pangolin also known as the Cape of Steppe pangolin which is one of the four species of pangolins found in Africa. Under the medium sensitivity are the *Aves- Ciconia nigra* a stock bird, *Aves- Aquila verreauxii* large prey bird, *Aves-Sagittarius serpentarius* which is also a large terrestrial prey bird (DFFE, 2021).

vii. Hydrology

The Orange River is the perennial streams that flows through the municipality and sustains most of the development that takes place in the area. The flow of the Orange River is often controlled by the release of stored water in the Bloemhof, Gariiep and Van der Kloofdams, which are located upstream from the river. The three main rivers that flow within the Tsanstabane Municipality are Ga-Mogara, Skeiffonteinspruit and another river, that is not known by the BGIS portal system. There is one wetland in the municipal area, covering 9321,3 ha (1,58%), as a result, this water resource is classified under the "Very High sensitivity" theme in the DFFE screening tool. This means that the proposed project should administer environmental management practices that will not have a negative impact on the wetland system. The ground water systems are the only water source for a majority of the rural population. The characteristics of the aquifer in the area, are mostly unfavourable, except for the Western parts of the municipality that are underlain by dolomitic Karst aquifer. The tributaries for the Orange River are mostly supplied by groundwater sources. More than 50% of the rural water supply is dependent on groundwater for domestic use (Aurecon and Assmang, 2014).

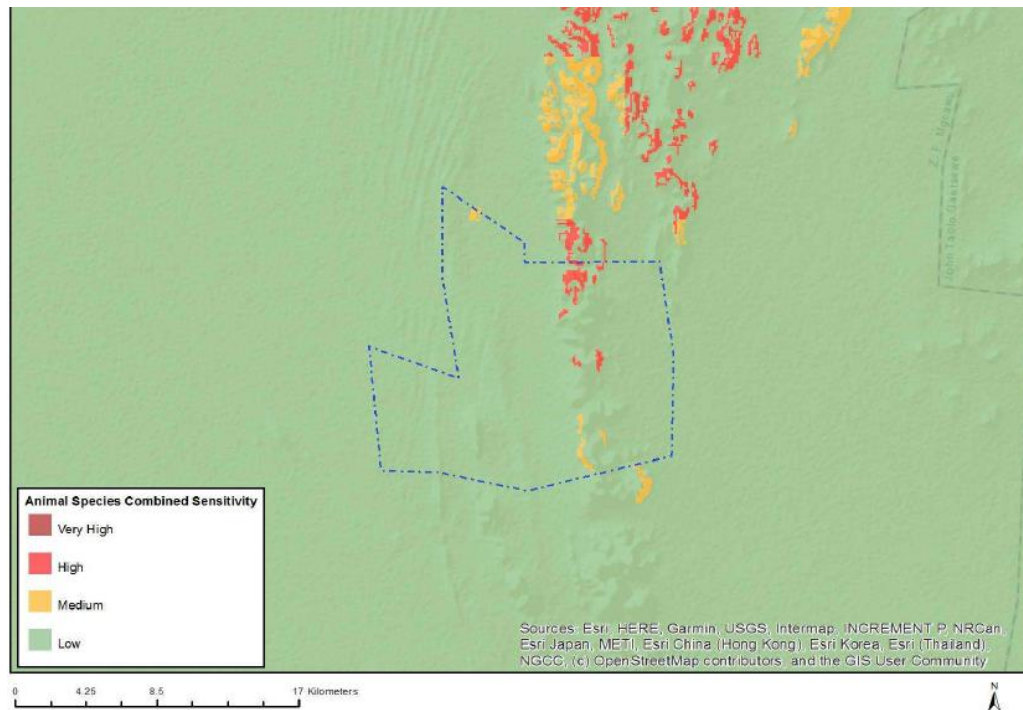


Figure hiv1vi-1: Animal Species Map (Source: DFFE, 2021).

viii. Heritage (Archaeology and Palaeontology)

According to DFFE Screening Tool (2021), the project area is categorised as “medium sensitivity” palaeontological classification theme with medium palaeontological features and the archaeological and cultural heritage sensitivity is classified under “ low sensitivity” theme group. Figure hiv1vii-1 and Figure hiv1vii-2 show the palaeontological and archaeological and cultural heritage sensitivity maps respectively.

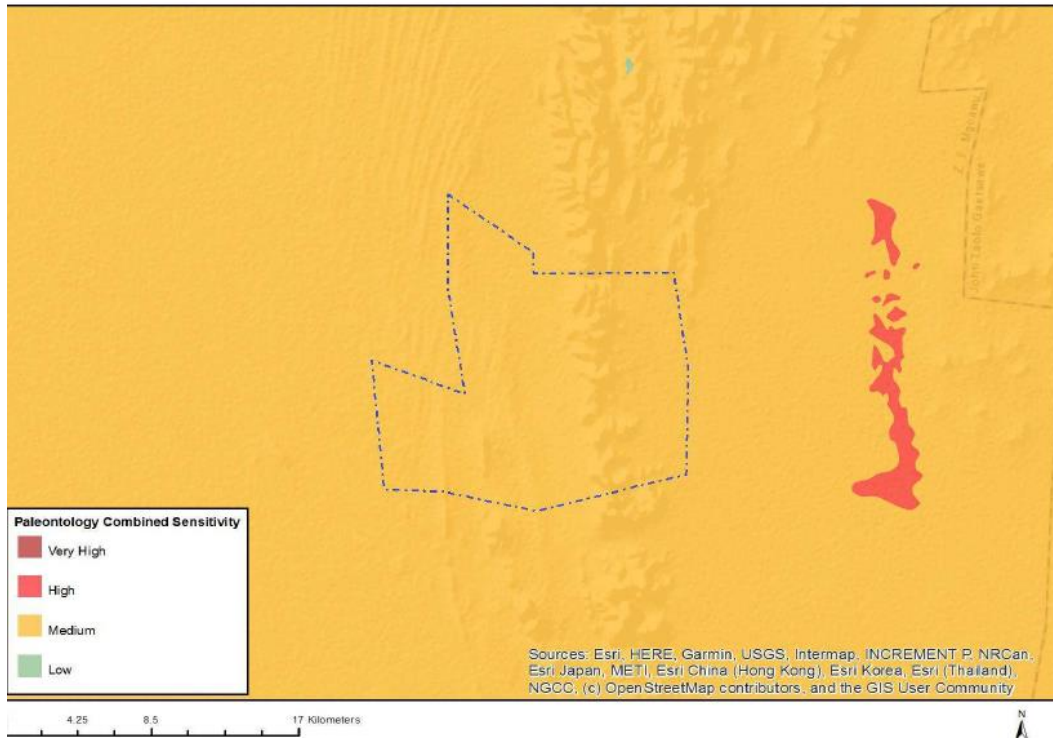


Figure hiv1vii-1: Palaeontological Sensitivity Map (Source: DFFE, 2021).

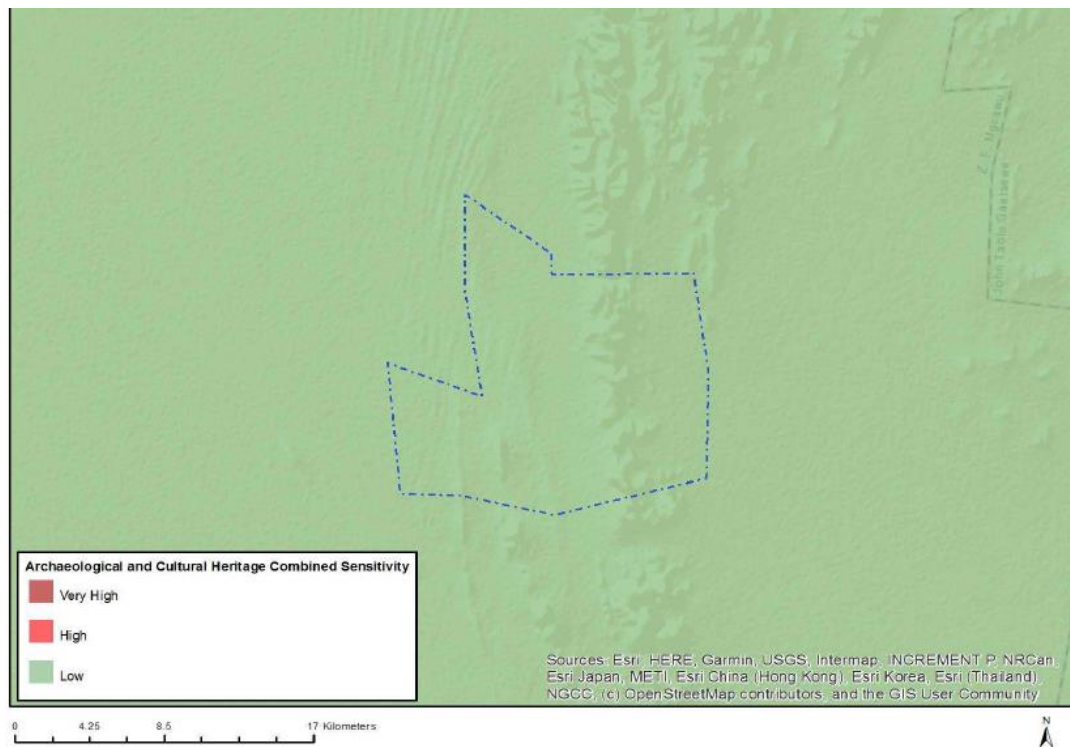


Figure hiv1vii-2: Archaeological and Cultural Heritage Sensitivity Map (DFFE, 2021).

ix. Soils (agricultural capability)

About 450 mm depth of the soils in the municipality are generally over exposed metamorphic rocks originating mostly from intrusive rocks of the folded sedimentary and volcanic rocks. The soils within the interior of the Tsantsabane Municipality, are more than 750 mm deep and thick and sanding or alluvium. Area with greater soil depth are often more arable and should therefore be protected. As such the municipal area is sensitive to wind erosion and overgrazing, therefore increased disturbance from any developmental activity may destabilize the soils and subsequently affect floral and faunal species populations. This coincides with the “very high sensitivity” theme or classification by the DFFE screening tool report. These soils are generally either red, yellow, and greyish in colour and excessively drained sandy soils which are prone to erosion. The eastern parts of Tsantsabane have between 15% and 35% clay in the soils.

The agricultural activities involved in Municipality include agri-tourism, livestock farming and irrigation dependent crop farming, particularly grapes (ZF Mgcawu District Municipality, 2016). The soil quality of the District is considered unsuitable for dry land crop production. The crop production that is present in the Municipality, is mainly along the Orange River, with irrigated areas expanding well beyond the moist soil areas, innovative water technologies allow for the production of crops such as grapes, raisins, pistachio nuts. Field crops include wheat, cotton and lucerne. However, due to the limited water resource, Tsantsabane municipality has a very low annual crop cultivation and land capability potential. Highveld biomes are characteristic of diverse geology, that is very often closely associated with the high plant species richness (SANBI, 2017).

DFFE Screening Tool (2021) indicate that the project area falls under “medium sensitivity” for agricultural themes with land capability of 06. Low-Moderate/07. Low-Moderate/08. Moderate and low sensitivity themes with land capability of 01. Very low/02. Very low/03. Low-Very low/04. Low-Very low/05 as shown in Figure 1ix-1.

x. Socio-economic

According to Yu (2009) a socio-economic profile indicates how economic activities affect and are shaped by social processes. For this reason, social and economic attributes of the project area will be discussed in this section. Municipal Integrated Development Plans and Spatial Development Frameworks provide a strategic guidance to municipalities, and link and coordinate the many different sectoral plans

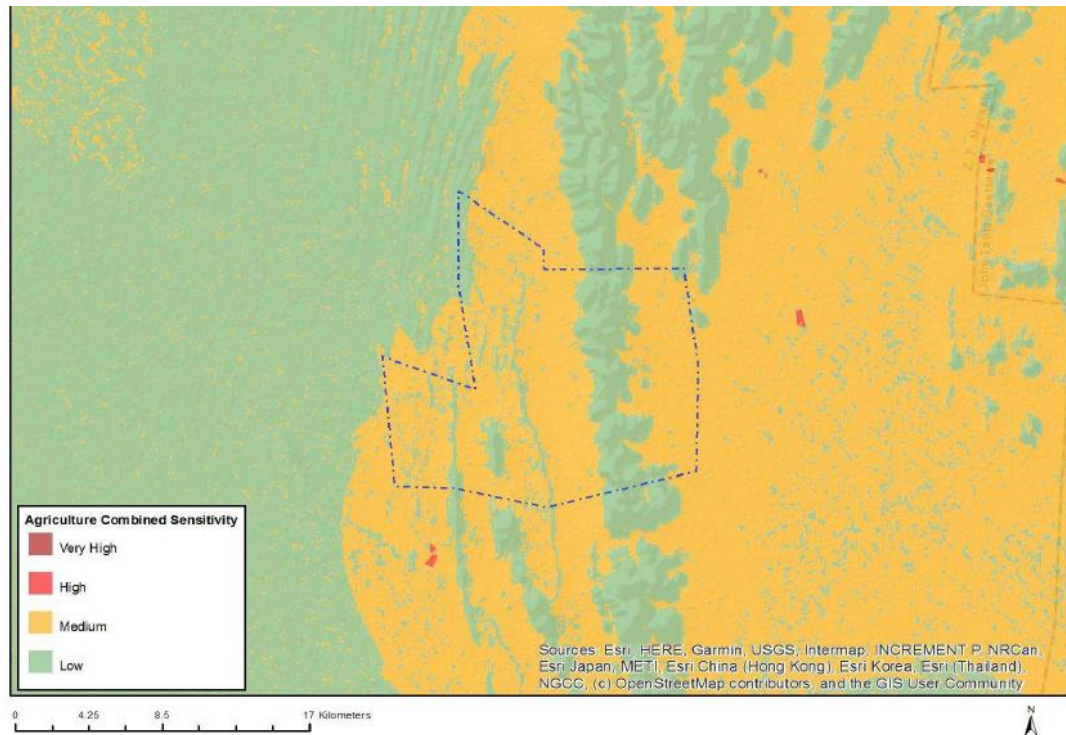


Figure hiv1ix-1: Agricultural Sensitivity Map (Source: DFFE, 2021).

and planning processes (Harrison, 2001), therefore, information used to compile this section is largely derived from Tsantsabane Local Municipality 2020-2021 Integrated Development Plan and Tsantsabane Local Municipality Spatial Development Framework, 2015. In addition, Statistics South Africa provide crucial data. However, it should be noted that other sources were also consulted and referenced. The socio-economic indicators are presented on Table hiv1x-1 and a detailed Socio-economic Report is attached as Appendix t1-1.

Table hiv1x-1: Socio-economic Indicators

Key Indicator	ZF Mgcawu District Municipality	Tsantsabane Local Municipality
Population		
Population under 15	26.9%	25.9%
Population 15 to 64	68.1%	69.9%
Population over 65	5.0%	4.2%
Sex Ratio		
Males per 100 females	105.0	115.5
Education		
1. No schooling	6.1%	13.7%
2. Matric	28.5%	25.3%
3. Higher education	5.1%	6.3%

Key Indicator	ZF Mgcawu District Municipality	Tsantsabane Local Municipality
Labour Market		
Unemployment rate	19.2%	26.1%
Youth unemployment rate (official) 15-34	22.7%	32.3%
Health Facilities		
Clinics	52	7 (3 fixed and 4 mobile)
Community Health Centres	2	0
Regional Hospital	5	1
Household Dynamics		
Households	74 091	11 821
Average household size	3.4	3.3
Female headed households	35.5%	32.0%
Formal dwellings	75.9%	77.9%
Housing owned	62.5%	67.5%
Access to Basic Services		
Water (Piped)	45.6%	44.6%
Sanitation (Flush)	65.7%	76.1%
Electricity/Solar	85.5%	84.9%
Weekly Refuse Removal	67.6%	52.5%
Economy		
Major sectors		
Mining	22%	74%
Agriculture	12%	20%
Community Services	21%	4%

Sources: Stats SA Community Survey 2016; Tsantsabane Local Municipality 2020- 2021 Integrated Development Plan; Tsantsabane Local Municipality Spatial Development Framework, 2015.

xi. Cultural

In the late 1820's a mass-movement of Dutch speaking people in the Cape Colony started advancing into the northern areas. This was due to feelings of mounting dissatisfaction caused by economical and other circumstances under British rule in the Cape. This movement later became known as the Great Trek. This migration resulted in a massive increase in the extent of that proportion of modern South Africa dominated by people of European descent (Ross 2002: 39).

As can be expected, the movement of whites into the Northern provinces would have a significant impact on the black people who populated the land. The Northern Cape is the largest province in South Africa, but has the least number of inhabitants and the and is mostly desert, including Namaqualand, great parts of the Karoo and parts of the Kalahari desert. These deserts were the home of many Khoikhoi and San groups, and there are still examples of San Rock Art (South African History, 2011).

Postmasburg was originally the site of a mission station named Sibihong, founded by the London Missionary Society. Later it was named Blinkklip by the former tribes and for many years it acted as an outpost for the Griqua people and as the church centre for the European farming community (Tsantsabane Local Municipality, 2018). However, archaeological findings indicate that Khoisan mined specularite there from at least AD 700. The town was eventually proclaimed on 6 June 1892 and was renamed Postmasburg in honour of Reverend Dirk Postma, the first minister of the Reformed Church. The discovery of diamonds in 1918, followed by manganese assisted in the growth of this small village.

(a) Description of the current land uses

The current land uses were identified using GIS maps as well as on site observation. The proposed site is made up of six privately owned farms which are Thorns 407, Duine 437, Record 411, Loskop 414, Oatlands 406 and Towton 415. Falling within the Savannah biome, the area is dominated woodlands and grasslands as indicated in Section hiv of this Report. Farm Loskop 414 has a dry pan and water pumps that are used to pump water were observed on the site. In addition, a non-perennial river was observed. On Farm Duine 437 livestock kraals, build-up area and wind pump situated close to the kraal were observed. Farm Towton 415 has cultivated land, windpumps and a non-perennial river stretching out on the whole farm. Farm Oaklands 406 has cultivated land with a perennial river running through the farm and wind pumps were also observed on the farm. In addition, hiking trails and powerlines were also observed on the project area.

Mining (manganese and iron ore) and Agriculture are the major landuses in the region and from the discussion above, it can be concluded that agricultural activities are taking place in the area highlighted by the presence of cultivated land, kraals and wind and water pumps. Currently, there are no mining activities that were observed on site and the surrounding farms.

In addition, an aerial view and topographical map showing environmental features, such as rivers, protected areas, watercourses, pans, coastal rocks, marshes and vleis, cultivated lands, woodlands, orchards or vineyards, trees built-up areas, and many other infrastructure was generated and is presented on a map, Figure iv1b1-1. The generated map show that agricultural activities are being undertaken on some parts of the proposed site.

(b) Description of specific environmental features and infrastructure on the site.

Some environmental features observed on the proposed project site include perennial and non-perennial water and some coastal rocks. Current infrastructure include: build-up areas, powerlines, wind pumps, and access roads.

(c) Environmental and current land use map.

(Show all environmental, and current land use features).

Currently, the land is used for mining and minerals such as diamonds are being mined.

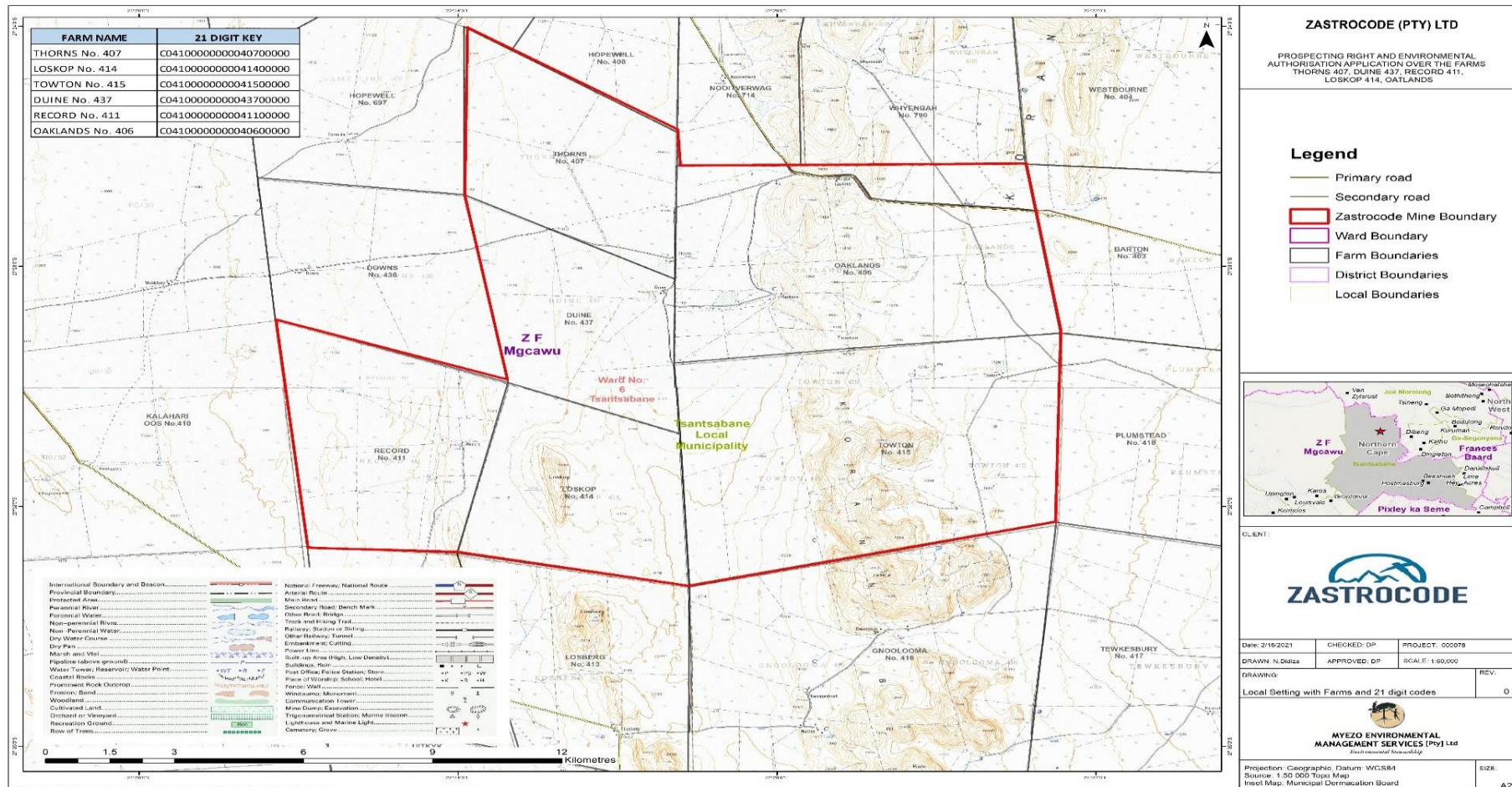


Figure v1b1-2: Current Land Use Map

v) Impacts and risks identified including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts.

(Provide a list of the potential impacts identified of the activities described in the initial site layout that will be undertaken, as informed by both the typical known impacts of such activities, and as informed by the consultations with affected parties together with the significance, probability, and duration of the impacts. Please indicate the extent to which they can be reversed, the extent to which they may cause irreplaceable loss of resources, and can be avoided, managed or mitigated).

Potential impacts are presented in Table j1-1.

vi) Methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks;

(Describe how the significance, probability, and duration of the aforesaid identified impacts that were identified through the consultation process was determined in order to decide the extent to which the initial site layout needs revision).

The methodology given below was used to rank the impacts.

In order to identify and assess impacts, a site surveillance was undertaken to support desktop studies, specialist studies, Geographic Systems Information and through the use of tools and standards provided by NEMA, IFC and UNEP.

Nature of Impact – describes the impact. It shows how the impacts arise. For example “emissions by machinery” describes the production of air pollutants from vehicles that use fossil fuels.

Magnitude – describes the level to which the impact’s effects affect the environment. It is the severity of the impact rated as minimal, moderate, severe or extremely severe. In this case, minimal magnitude means that level of catastrophic effects is low whilst severe magnitude means that the level of adverse effects is high.

Extent – this is the geographical radius, size or range of the impact’s influence described as localised or widespread. For example, air pollution is widespread as the contaminants are carried by air across large areas whilst vegetation clearing is limited to one site which is described as localised.

Probability – describes the chances or likelihood of an event occurring (in this case the impact). It is described as unlikely, likely or highly likely. Impacts such as soil erosion where there is no vegetation clearing are unlikely whilst they are highly likely where vegetation is cleared.

Duration – this is the period during which the impact continues to have a harmful effect on the environment or local communities. The impact is rated as short-term, medium-term or

long-term. Some impacts such as noise can have a duration of one day whilst some such as spillage of chemicals into water last until the chemical is biodegraded.

Significance – describes the importance of the impact depending on the consequences and secondary effects arising. The significance rating gives an indication of the potential of impacting on the environment and hence the need to focus a certain level of attention there to reduce the impacts. Significance rating is explained below: Rated as insignificant, significant or highly significant.

Reversibility – describes the degree to which the impact can be restored to its original or preferred state. It is rated as reversible or irreversible. Impacts such as vegetation clearing can be reversed whilst those such as loss of human life are irreversible.

METHODOLOGY FOR RATING AND DETERMINING IMPACTS

IMPACT STATUS		
Positive –impacts that are beneficial to the environment or community or economy		
Negative–these are impacts that are detrimental to the environment, community or economy		
SEVERITY		
How severe does the aspects impact on the resource quality i.e. flow regime, water quality, geomorphology, biota, habitat?		
Scale	Positive/Beneficial	Negative/Detrimental
1	Insignificant	Non-harmful
2	Slightly significant	Potentially harmful
3	Significant	Slightly harmful
4	Very significant	Harmful
5	Extremely beneficial	Extremely harmful
IMPACT PROBABILITY		
Probable – impact or benefit is most likely to occur		
Improbable – impact of benefit is most unlikely to occur		
Definite – impact or benefit will occur		
REVERSIBILITY		
Reversible – benefits are for a short time and will eventually return to initial state. Negative impacts are short lived and affected aspects can be restored back to original state.		
Irreversible - defines impacts that are permanent and cannot be restored back to original state.		
SPATIAL SCALE		
Defines how big the area that the aspect is impacting on?		
Scale	Description	
1	Restricted to a portion of project site	
2	Entire project site	

3	Within village and surrounding communities
4	Impacting beyond provinces
5	Transboundary
DURATION	
Rates how long the impact or benefits lasts	
Scale	Description
1	One month to a year
2	One year to five years
3	Five to ten years
4	Ten to thirty years
5	Permanent or over 30 years
Calculations;	
Consequence = Severity + Spatial Scale + Duration	
Significance\Risk = Consequence x Likelihood	
Likelihood/Probability of occurrence = Frequency of Activity + Frequency of Incident	

Once the significance of an impact has been determined, the CONFIDENCE in the assessment of the significance rating is ascertained using the rating systems outlined below.

DEFINITION OF CONFIDENCE RATINGS

CONFIDENCE RATINGS*	CRITERIA
High	Wealth of information on and sound understanding of the environmental factors potentially influencing the impact. Greater than 70% sure of impact prediction
Medium	Reasonable amount of useful information on and relatively sound understanding of the environmental factors potentially influencing the impact. Between 35% and 70% sure of impact prediction.
Low	Limited useful information on and understanding of the environmental factors potentially influencing this impact. Less than 35% sure of impact prediction.

The level of confidence in the prediction is based on specialist knowledge of that particular field and the reliability of data used to make the prediction.

FREQUENCY OF THE ACTIVITY		
How often do you do the specific activity?		
Annually or less	1	
6-monthly	2	
Monthly	3	
Weekly	4	

Daily	5	
FREQUENCY OF THE INCIDENT/IMPACT		
How often does the activity impact on the resource quality?		
Almost never / almost impossible / >20%		1
Very seldom / highly unlikely / >40%		2
Infrequent / unlikely / seldom / >60%		3
Often / regularly / likely / possible / >80%		4
Daily / highly likely / definitely / >100%		5
Remote and difficult to observe		4
Covered		5

DEFINITION OF LOSS OF RESOURCES

LOSS OF RESOURCES	CRITERIA
Low	Where the activity results in a loss of a particular resource but where the natural, cultural and social functions and processes are not affected.
Medium	Where the loss of a resource occurs, but natural, cultural and social functions and processes continue, albeit in a modified way.
High	Where the activity results in an irreplaceable loss of a resource.

The degree to which the impact can be mitigated or enhanced is shown below

DEGREE TO WHICH IMPACT CAN BE MITIGATED

DEGREE TO WHICH IMPACT CAN BE MITIGATED	CRITERIA
None	No change in impact after mitigation.
Very Low	Where the significance rating stays the same, but where mitigation will reduce the intensity of the impact.
Low	Where the significance rating drops by one level, after mitigation.
Medium	Where the significance rating drops by two to three levels, after mitigation.
High	Where the significance rating drops by more than three levels, after mitigation.

SIGNIFICANCE RATING

RATING	CLASS	MANAGEMENT DESCRIPTION
1 – 55	(L) Low	Acceptable as is or consider requirement for mitigation. Impact to easily mitigated.

56 – 169	M) Moderate Risk	Risk and impact are notably and require mitigation measures on a higher level, which costs more and require specialist input.
170 – 300	(H) High Risk	Impacts by the activity are such that they impose a long-term threat on a large scale. Mitigation measure will have to be more stringent and require dedicated monitoring and enforcement.

vii) The positive and negative impacts that the proposed activity

(in terms of the initial site layout) and alternatives will have on the environment and the community that may be affected.

(Provide a discussion in terms of advantages and disadvantages of the initial site layout compared to alternative layout options to accommodate concerns raised by affected parties).

Notification of I&APs will be undertaken at the beginning of the public review which will commence on 19 April 2021. I&APs will be awarded an opportunity to submit environmental concerns during this period and these will be documented and addressed in the Final BAR to be submitted to the competent authority.

Impacts are divided into environmental and socio-economic.

Environmental impacts

The proposed activity will result in the following impacts.

Positive impacts

- Rehabilitation of existing erosion;
- Use environmentally friendly drill technologies and drill fluids; and
- Possibility of finding iron ore and manganese reserves.

Negative impacts

- Vegetation loss
- Soil erosion can result from vegetation clearing;
- Dust can be produced during clearing of land for establishment of camp site;
- Drainage Surface disturbance can occur during drilling;
- Noise and vibrations produced by drill rigs can be a nuisance;
- Undiscovered artefacts can be unintentionally disturbed by drilling activities;
- Photo-pollution can occur when drill rigs operate at night;
- Water wastage during drilling;
- Ground water contamination by ablution waste;
- Fuel and oil storage present a veld fire hazard;

- Sewage and general waste present a health hazard;
- Occupational injuries can result from the operations of a drill rig;
- Water and soil contamination can occur due to spill of fuel and lubricants;
- Dust production during drilling is a health hazard to workers and community;
- Emissions by drill rigs contribute to global warming;
- Disturbance of community privacy;
- Water and soil contamination from used oil; and
- Siltation can occur if water sumps are not rehabilitated properly.

Socio-economic impacts

The proposed activity will have socio-economic impacts to the surrounding areas due to activities which might trigger change to the environment. These can be positive or negative effects.

Positive impacts

The project is its generous contribution to local, provincial and national economies. The following positive impacts will emanate from the project:

- Mining industry is among the major economic contributors in the area and this will be manifested through tax revenues remitted to local, provincial and national governments.
- The project will create new direct jobs for skilled and unskilled workforce as well as an indirect job from suppliers and businesses from which services will be sourced from resulting in an improved standard of living to the residents in the area and alleviation of poverty.
- Support will be given to Small, Medium and Micro Enterprises (SMMEs) where procurement of services will prioritise this group.
- The project will trigger migration and this will in turn provoke an increase in the demand of goods and services thus promoting growth of the available businesses and economic growth in the area.
- The developer will commit to community projects through the municipalities' Local Economic Development department, thus contributing to service delivery.
- The Tsantsabane Local municipality is facing a decline in economic growth, the operation of the mine will contribute to regional economic development thereby positively contributing to the provincial economy.

Negative impacts

The following negative will emanate from the project:

- During the operation of the project, there will be increased transportation activities and this can causes disturbances to people residing in the area, those who work

around and even the animals which are in the poultry farming. Thus, this needs to be mitigated.

- The operations at the mine might result in increased noise levels, therefore mitigation measures to manage noise pollution should be put in place.
- Congestion might also result from activities both during construction and operational phase.
- The project will trigger migration of people and employment of immigrants might cause tension between local people and the migrants people. To mitigate this, local people must be given preference when it comes to hiring short term labour. Air pollution from iron ore and manganese dust which might cause adverse health effects may result from the project, thus management measures should be developed.
- The influx of migrants might also increase the occurrence of crimes in the area. Measures need to be put in place to avoid an increase in crime and tensions between local people and migrants.
- The development might trigger migration and as people concentrate in the area, this might increase the prevalence of communicable diseases such as HIV and TB, thus there is need to undertake health awareness campaigns.

viii) The possible mitigation measures that could be applied and the level of risk.

(With regard to the issues and concerns raised by affected parties provide a list of the issues raised and an assessment/ discussion of the mitigations or site layout alternatives available to accommodate or address their concerns, together with an assessment of the impacts or risks associated with the mitigation or alternatives considered).

Notification of I&APs will be undertaken at the beginning of the public review which will commence on 19 April 2021. I&APs will be awarded an opportunity to submit environmental concerns during this period and these will be documented and addressed in the Final BAR to be submitted to the competent authority.

ix) Motivation where no alternative sites were considered.

There were no alternatives considered for the project site due to the limitations concerning land and areas available for mining as well as the occurrence of manganese ore and iron ore deposits. Given the extensive and already existing geological mapping and surveys that have been carried out by the Geological Society of South Africa, the project has no site alternatives as there are already maps available to select suitable areas for exploration.

x) Statement motivating the alternative development location within the overall site.

(Provide a statement motivating the final site layout that is proposed)

The whole of the project site will be used for exploration. However, sites to be drilled will depend with the outcome of the non-invasive exploration methods.

- i) Full description of the process undertaken to identify, assess and rank the impacts and risks the activity will impose on the preferred site**

(In respect of the final site layout plan) through the life of the activity. (Including (i) a description of all environmental issues and risks that were identified during the environmental impact assessment process and (ii) an assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures).

Full description of how processes to be undertaken in the identification, assessment and ranking of impacts is detailed in Section vi. Also, identified potentially significant impacts are presented on Table j.

j) Assessment of each identified potentially significant impact and risk

(This section of the report must consider all the known typical impacts of each of the activities (including those that could or should have been identified by knowledgeable persons) and not only those that were raised by registered interested and affected parties).

Table j1-1: Potentially Significant Impacts and Risks

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	If mitigated	Significance
PLANNING AND SETUP PHASE											
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental. <i>Impact Status:</i>	Land, Soil, Water and Air	1 + 5 = 6	Irreversible	5 Very beneficial as this is the core of the proposed project	1 + 2 = 3	8 x 6 = 48	There is another iron ore mine close to the proposed project site. If proactive approaches such as selecting the correct technology are not taken, there may be large cumulative effects for negative	Modification through the use of alternatives has been done. Selected alternatives such as RC drilling have less impacts on soil and ground water.		8 x 6 = 48

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Positive</i>							impacts such as noise and erosion.		
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds. <i>Impact status: negative</i>	Biodiversity , water, soil	1 + 4 = 5	Reversible	5 Very severe	3 + 1 = 5	10 x 9 = 90	There are likely to be no cumulative impacts on the biodiversity.	Access roads will avoid sensitive areas An environmental specialist will be involved in the selection of an access road	8 x 3 = 24
	Since the proposed project area is close to communities, access roads may tamper with and damage existing infrastructure and community properties.	Social and economic	1 +3 = 4	Reversible at a cost of repairing or replacing	4 Severe since this results in conflicts with the locals and this may not distort project support	3 + 1 = 4	8 x 4 = 32	There are existing unpaved access roads being used by the community. The presence of a nearby mining activities to the east can result in a medium cumulative effect of damage to public infrastructure and	The local community and local municipality must be informed of the project before any work is done. They must also be involved in the planning, selection and construction of the access road.	5 x 4 = 20

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>							community properties.		
Selection of exploration drilling contractor	Contractors, depending on their institutional capability and resources, may have different abilities to avoid or manage adverse environmental impacts. Selecting the wrong contractor may result in worsening of impacts. <i>Impact status: negative</i>	Land, Soil, Water and Air	1 + 4 = 5	Reversible at a cost of avoidable mitigating impacts.	5 Very severe since several avoidable negative impacts will be experienced	2 + 1 = 3	8 x 5 = 40	Most or all existing negative such as air noise and air pollution due to the existing mine near project site will result in a medium cumulative effect when considered collectively with those of the proposed project.	A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous clients and previous works will also be done.	5 x 5 = 25
Selection of site for	There is possibility of conflicts with	Social	1 + 2 = 3	Reversible through conflict	4	3 + 1 = 4	8 x 3 = 24	We have no similar or any project in the area which	Since there will be work close to houses, owners have informed	5 x 3 = 15

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
contractor camps	locals when planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy. <i>Impact status: negative</i>			management and issuing out apologies.	Severe since this may result in loss of community support for the project.			have resulted in conflicts with the community. As such, there will be no cumulative impacts.	and consulted. Drill workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	
	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.	Social, cultural, religious	1 + 2 = 3	Reversible through consultations and conflict resolution.	3 Moderately severe since conflicts with local people can result in loss of project support	2 + 1 = 3	7 x 3 = 21	There were no areas of cultural or religious significance identified near or within the proposed project area. Therefore, there will be no	Even though no sites of significance were identified, local traditional leaders will be consulted and informed of the project as a precautionary step.	7 x 3 = 21

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>							cumulative effects on this impact.		
	Water resources conflicts can arise when exploration activities start to use scarce or sensitive resources being used by the community. <i>Impact status: negative</i>	Social	1 + 3 = 4	Reversible through remedy or stop measures.	3 Moderately severe since conflicts with local people can result in loss of project support	3 + 1 = 4	7 x 4 = 24	There is a iron ore adjacent to the project site. Drilling activities may result in an increase of pressure on water resources. Viewed alone, the use of water by the drilling activities will not put a strain on the resources but when viewed together with the existing mining operations, the cumulative effect is evident.	The local municipality and ward councillors will be consulted before choosing a water source for drilling purposes. If a homestead water source is to be used, an agreed payment should be done.	5 x 3 = 15
Clearing of land for camp and	Soil erosion can result from removal of	Soil, aquatic resources	1 + 3 = 4	Reversible but at very high costs	5 Very severe	3 + 2 = 5	10 x 4 = 40	Due to mining activities happening in the	Mechanically stabilised earth walls and other best practice methods	6 x 3 = 18

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	If mitigated	Significance
drill site preparation	vegetation during preparation of land for the contractor camp. <i>Impact status: negative</i>							area erosion is happening in the area. As such, erosion by drilling activities will result in high cumulative effects.	will be used to control erosion and stop eroded soil from reaching any watercourses. the area has existing erosion which must be rehabilitated prior to any project activity.		
	Clearance of vegetation for the establishment of a camp site will result in vegetation / biodiversity loss. <i>Impact status: negative</i>	Soil, biodiversity	1 + 3 = 4	Reversible through rehabilitation	5 Very severe since vegetation clearing results in loss of biodiversity.	2 + 2 = 4	9 x 4 = 36	Vegetation clearing has already occurred to some extent in the area due to cultivation. Viewed together with vegetation clearing by project activities, the cumulative effect is medium.	The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the least disturbance to vegetation i.e., minimum clearance of vegetation.		
	There will be generation of dust	Soil, Air	1 + 2 = 3		3	3 + 1 = 4	7 x 3 = 21	Existing erosion and bare soil in the	Control through water spraying and/or other	6 x 3 = 18	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	due of vehicular movement and vegetation clearing. <i>Impact status: negative</i>			Reversible through rehabilitation	Moderately severe since vehicle movement will not be intense			project area due to cultivation. Bare and cultivated soil can result in dust generation. Taken into consideration with dust generation due to project activities, the cumulative effect is high.	dust-allaying agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.	
	Spread of alien invasive species can occur during land preparation for contractor camp. This results in a threat to During site visit, alien invasive forbs (grasses) were observed.	Biodiversity	1 + 2 = 3	Reversible through control of alien species	4 Forbs are generally known to damage grazing lands and upset soil phosphorus balance	3 + 2 = 5	9 x 3 = 27	Cultivation is one way in which alien invasive species spread. However, cultivation will not be occurring concurrently with drilling activities therefore there will be no cumulative effect.	If any alien invasive species are encountered, they must be removed and burnt or sprayed with approved herbicides.	7 x 3 = 21

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>									
	Temporary ablation facilities can result in pollution of groundwater. <i>Impact status: negative</i>	Soil and water	1 + 5 = 6	Reversible since ablation wastes are biodegradabl e	5 Very severe since ablation waste can pollute ground water and threaten human health	3 + 1 = 4	9 x 6 = 54	Currently, there is no evidence of any existing activities polluting groundwater. As such, there are no cumulative impacts at the moment.	Proper temporary ablation facilities will be used with approved ferrying and dumping.	6 x 4 = 24
CONSTRUCTION PHASE										
Movement of drill rig workers	Drill workers can cause deforestation and / or conflicts with local communities by cutting down trees for firewood.	Social, biodiversity	1 + 4 = 5	Reversible but costs time and resources	4 Severe since deforestation is a global problem and conflicts with locals can result in loss	3 + 2 = 5	9 x 5 = 45	Viewed as a global problem, cutting down of trees by project workers creates a high cumulative effect	No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner/tenant.	5 x 3 = 15

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>				of project support.					
	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity. <i>Impact status: negative</i>	Social, biodiversity	1 + 3 = 4	Irreversible in extreme cases such as the loss of life	5 Very severe since fires can result in loss of life	3 + 1 = 4	9 x 4 = 36	Currently, there are no known cases of veld fires therefore there are no cumulative effects.	Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	6 x 3 = 18
Water Sump	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication.	Natural resources	5 + 3 = 8	Reversible since water is renewable	4 Severe since water is a critical resource necessary for the support of life	2 + 1 = 3	7 x 8 = 56	Taking into consideration water use by the nearby mine to the east and water use by the drilling activities, the cumulative effects will be medium.	Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency.	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>									
Drilling	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system.	Air quality, human health	5 + 4 = 9	Reversible but at a high cost	4 Severe due to widespread aspects affected	2 + 1 = 3	7 x 9 = 63	Due to the presence of some areas with uncovered soil, there is a possibility of dust generation occurring naturally. Combined with dust from drilling, the cumulative effect is low.	Drilling activities will make use of water to reduce dust. Water will be sprayed where there is constant movement of traffic.	6 x 7 = 42

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>									
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming. <i>Impact status: negative</i>	Air quality, global warming	5 + 2 = 7	Reversible but over a long period of time	4 Severe since global warming is a global issue	5 + 2 = 7	11 x 7 = 77	Global warming due to emissions is an ongoing challenge. The cumulative effect when this project is considered is high.	Drill rigs with better emission technology will be used. Catalytic converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.	6 x 4 = 24
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities.	Social	5 + 3 = 8	Irreversible	3 Moderately severe since modern rigs produce less noise	2 + 2 = 4	7 x 8 = 56	Currently there are no other activities producing noise in the surroundings of the project area.	Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>									
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals. <i>Impact status: negative</i>	Biodiversity , occupational health	5 + 3 = 8	Irreversible	3 Moderately severe since modern rigs produce less noise	2 + 2 = 4	7 x 8 = 56	Currently there are no other activities producing vibrations in the surroundings of the project area.	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	6 x 7 = 42

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	Drill rigs normally operate around the clock and make use of lighting for security and making work easier. Photo-pollution can result from the lighting. Light and noise can disturb the local community. <i>Impact status: negative</i>	Social, Biodiversity	$5 + 3 = 8$	Reversible since there will not be permanent impacts	3 Moderately severe	$2 + 2 = 4$	$7 \times 8 = 56$	Currently there are no activities in the project area which are causing photo-pollution.	The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp. Low frequency lighting will be used. Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.	$6 \times 6 = 36$
	Risk of occupational injuries is high from the drill rig which makes use of moving parts.	Occupational safety	$5 + 2 = 7$	Irreversible since some injuries can result in permanent disability or death	5 Very severe since there can be loss of life or	$2 + 2 = 4$	$9 \times 7 = 63$	Currently there are no activities in the project area which can result in occupational risks to the drill workers.	Workers at drill sites must be trained on proper safety practices and potential occupation safety hazards.	$7 \times 6 = 42$

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	If mitigated Significance
	<i>Impact status: negative</i>				permanent disability.				Drilling must be done in accordance with the contractor's relevant internal standards.	
	Drainage Surface disturbance can occur during drilling.	Drainage	$5 + 2 = 7$	Reversible but at a cost	3 Moderately severe	$3 + 2 = 5$	$8 \times 7 = 56$	Currently there are no known drilling activities in the project area which can result in drainage disturbance.	Appropriate technologies that have been selected for the proposed project have less chances of disturbing the drainage surface.	$7 \times 6 = 42$
	Fly rock can be produced during drilling and can result in injuries to the workers or local communities. <i>Impact status: negative</i>	Occupation al and community safety	$5 + 1 = 6$	Irreversible since some injuries can result in permanent disability or death	4 Severe since there can be loss of life or permanent disability, even though the occurrence is unlikely.	$2 + 2 = 4$	$8 + 6 = 48$	Currently there are no known drilling activities in the project area which can result in fly rock.	Drilling will make use of water for lubrication and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	$6 \times 6 = 36$

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	Surface water contamination can occur due to spill of drill fluid or effluent water. <i>Impact status: negative</i>	Water resources	5 + 1 = 6	Reversible but over a long time	4 Severe	3 + 2 = 5	9 x 6 = 54	Currently there is no evidence of an existing activity causing surface water contamination.	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
									disposing of them at a suitable, licensed facility.	
	Undiscovered artefacts can be unintentionally disturbed by drilling activities. <i>Impact status: negative</i>	Cultural heritage	$5 + 2 = 7$	Irreversible since artefacts take a very long time to form	4 Severe	$2 + 2 = 4$		Since some of the area within the project site has been cultivated before, the chances of disturbance of artefacts is high. Viewed together with drilling activities however, the cumulative effect is low since the project will have no excavation or digging activities.	Any artefacts found must result in cessation of works and report the findings to SAHRA. In addition, an Environmental Control Officer must familiarise him- or herself with the formation present and its fossils.	
Fuel and lubricant	Due to use of high volumes of oil and	Water, soil	$5 + 2 = 7$	Reversible but at a cost	4 Severe	$2 + 2 = 4$	$8 \times 7 = 56$	Currently there is no evidence of any	No oil or lubricant storage site will be	$6 \times 7 = 42$

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
storage on site	lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination. <i>Impact status: negative</i>			and over a long time				activities that result in water or soil contamination hence there is no cumulative effect.	located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has 150% bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g. Peat Sorb) on site to ensure that any oil spillages resulting in	

Significance If mitigated	Mitigation Type Modify, remedy, control, or stop through	Cumulative Impacts	Significance Consequence x Probability	Spatial Scale + Duration	Severity	Reversibility	Impact Probability Activity Frequency + Impact Frequency	Aspects Affected	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	NAME OF ACTIVITY
	soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest licensed landfill site. The hydrocarbon fluids will be transported to site on drums. Only amounts which will be utilised during the drilling operation will be available on site at any one time. Therefore, there will not be any storage facilities on site.									

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
									Suitable personal protective equipment (PPE) and protective clothing will be provided.	
	Fuel and oil storage present a fire hazard. Fire can result in loss of biodiversity, injuries or loss of life. <i>Impact status: negative</i>	Air, Biodiversity	5 + 1 = 6	Irreversible since fire damage can be permanent	5 Very severe since the effects can be catastrophic	3 + 2 = 5	10 x 6 = 60	Currently, there is no known fuel or oil storage near the project area hence there will be no cumulative effect.	All vehicles and heavy machinery that use combustion engines will have approved fire extinguishers. The ECO / SHE officer will carry out a fire hazard assessment. Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel & cleared of dry combustible vegetation	7 x 6 = 42
Waste generation from	Sewage waste is generated from the contractor	Soil, water	5 + 2 = 7	Reversible but at a cost	4 Severe since sewage	3 + 2 = 5	9 x 7 = 63	At the moment, there is no evidence of any	Contractor camps can make use of mobile toilets whose waste	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
contractor camps	camps on a daily basis. This can pose a health risk if not disposed of properly. <i>Impact status: negative</i>				waste can cause algal blooms and disturb wetlands			activities that threaten to pollute the environment with sewage waste hence there will be no cumulative effect.	must be collected and disposed of into the nearest sewer system or other appropriate methods approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
									domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for appropriate disposal at a licensed facility.	
	Solid waste will be generated daily from the contractor camps. This can distort the environment and pollute water resources. <i>Impact status: negative</i>	Soil, Water, Biodiversity	5 + 1 = 6	Reversible but at a cost	2 Almost severe	2 + 2 = 4	6 x 6 = 36	At the moment, there are no known activities generating waste in the vicinity of the project area. Therefore there will be no cumulative effect.	Drill contractor will put in place measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass	4 x 6 = 24

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
									bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.	
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause	Soil	5 + 2 = 7	Reversible but at a cost	4 Severe	2 + 2 = 4	8 x 7 = 56	The project site is in an area cultivated before and there has been erosion. Most of the project area has farms, fields and communal	Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and	6 x 6 = 36

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	sedimentation of water bodies. <i>Impact status: negative</i>							lands which are already cleared of vegetation. The cumulative effect will be high.	stones will be stored separately for use in filling dongas Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion	
REHABILITATION										
Rehabilitatio n of drill holes	Drill holes must not be left uncovered. They must be rehabilitated. Uncovered drill boreholes can result in aquifer contamination.	Water	1 + 2 = 3	Reversible but over time	2 Almost severe	3 + 1 = 4	6 x 3 = 18	Currently there is no evidence of aquifer contamination from any activity in the project area.	Drill holes will be plugged if they must be used again or filled there is no further use for them.	6 x 3 = 18

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>									
Rehabilitation of access roads	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field. <i>Impact status: negative</i>	Soil	1 + 2 = 3	Reversible but over a long period of time	3 Potentially severe	2 + 2 = 4	7 x 3 = 21	Currently there are no other known access roads passing through fields.	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	6 x 3 = 18
Rehabilitation of camp sites	Soil erosion can worsen after the contractor camps	Soil	1 + 4 = 5	Partially reversible as soil lost by	4 Severe as there is	2 + 2 = 4	8 x 5 = 40	Viewed alone, soil erosion due to project closure will	Once the contractor camp has been removed, vegetation	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	have been removed as soil previously covered by structures will be left bare. <i>Impact status: negative</i>			erosion is hard and costly to recover	already soil erosion occurring in the area emanating from agricultural activities.			be high. Combined with the already moderately high erosion rate due to cultivation, the cumulative effect is high.	will be planted to control soil erosion. The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora.	
	Contractor camp must be disbanded properly after exploration. If not done properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur.	Land, Soil	1 + 3 = 4	Partially reversible	3 Potentially severe	2 + 3 = 5	8 x 4 = 32	During the site visits, no activities causing environmental distortion or compaction were observed therefore there will be no cumulative effects	Metal components can be stowed away for reuse or recycling. Any gate or fence erected by the applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites have been rendered devoid of vegetation / grass or where soils have been	7 x 4 = 28

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	<i>Impact status: negative</i>								compacted owing to traffic, the surface will be scarified or ripped. All infrastructure, equipment, plant, temporary housing and associated infrastructure used during the prospecting period will be removed from the site	
Rehabilitation of water abstraction sites and water sumps	Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated whilst uncovered water sumps can pose a risk to	Social, water	1 + 5 = 6	Partially reversible and at a cost	3 Potentially severe since the water bodies in the area are undisturbed.	3 + 2 = 5	8 x 6 = 48	Currently there are no activities in the area resulting in disturbance of water bodies therefore there will be no cumulative effects	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and covered with a final layer of topsoil to a height of 10cm above	6 x 4 = 24

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	humans and livestock. <i>Impact status: negative</i>								the surrounding ground surface.	
Collection and transportatio n of drill and camp site waste	Campsite waste can pollute land, water and soil resources. <i>Impact status: negative</i>	Land, water and soil	1 + 3 = 4	Partially reversible at a high cost	3 Potentially severe	2 + 3 = 5	8 x 4 = 32	There is currently no evidence of any activities causing contamination of water or soil resources therefore there will be no cumulative effects	Campsite waste will be recycled or send to a landfill where not possible. All waste material of any nature, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area. and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.	7 x 4 = 28
	Water resources can be contaminated by leftover oil or drill	Water	1 + 3 = 4	Reversible at a high cost	3 Potentially severe	3 + 2 = 5	8 x 4 = 32	There is currently no evidence of any activities causing contamination of	Care will be taken to avoid spills and leakages when camp site is being closed.	

NAME OF ACTIVITY	POTENTIAL IMPACT Including the potential impacts for cumulative impacts	Aspects Affected	Impact Probability Activity Frequency + Impact Frequency	Reversibility	Severity	Spatial Scale + Duration	Significance Consequence x Probability	Cumulative Impacts	Mitigation Type Modify, remedy, control, or stop through	Significance If mitigated
	fluid during the decommissioning of the campsite. <i>Impact status: negative</i>							water resources therefore there will be no cumulative effects	Water samples will be taken close to where the site was after site closure.	

The supporting impact assessment conducted by the EAP must be attached as an appendix, marked **Appendix**

Impact assessment attached as Appendix j1-1.

k) Summary of specialist reports.

(This summary must be completed if any specialist reports informed the impact assessment and final site layout process and must be in the following tabular form): Following environmental screening undertaken, using the DFFE screening tool, GIS and desktop surveys, it was discovered that specialist studies were not necessary for the project.

Table k1-1: Summary of Specialist Reports

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS THAT HAVE BEEN INCLUDED IN THE EIA REPORT (Mark with an X where applicable)	REFERENCE TO APPLICABLE SECTION OF REPORT WHERE SPECIALIST RECOMMENDATIONS HAVE BEEN INCLUDED.
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Attach copies of Specialist Reports as Appendices. Upon conduction desktop screening, it was noted that no specialist studies were required for this project.

I) Environmental impact statement

(i) Summary of the key findings of the environmental impact assessment;

Based on the baseline studies carried out and a comprehensive impact assessment, several impacts were noted for the iron ore and manganese project. The first activity will be the establishment of the drilling / camp site and the construction of access roads. This step will result in vegetation clearing which results in spread of alien invasive species, dust and soil erosion. Any identified alien invasive species will be cut and burnt. Eroded soil may be washed by rain water and impact watercourses. It was observed that there is existing erosion in the area and made a recommendation for erosion control mechanisms to be installed prior to starting invasive exploration activities.

Drill rigs will be operating during the exploration activities with water for cooling and fly rock being obtained from the local municipality and being stored in plastic-lined water sumps before being mixed with drill fluids and additives. It will be recycled to reduce water use. Rigs produce vibration and noise. This will be mitigated by operating during the day as well as bringing in well serviced machinery. Well serviced machinery produce less vibrations, noise and emissions. Additional devices can be fitted to the drill rigs and generators to reduce noise and greenhouse gas emissions. Biodegradable drill fluids and additives will be used to reduce the contamination of soil and ground water.

In spite of the many impacts that seem possible from the exploration activities, the actual project spatial footprint is very small and will be deliberately minimised to keep the significance and extent of negative impacts minimal. For example, the camp site will take up about 0.09 hectares and each drilling site will use 1 metre by metre of space. An ECO will also be on site to ensure that mitigation, minimisation and avoidance measures are effectively put in place. Should economically viable iron ore and manganese resources be discovered, the mining activities that follow will result in benefits such as local community development, economic growth, employment creation and availability of a market for local goods and services. At the end of this exploration project, the drill boreholes will be backfilled, access roads ripped and revegetated and all campsite equipment removed. The goal will be to rehabilitate the project site to its original state or better.

(ii) Final Site Map

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associates structures and infrastructure on the environmental sensitivities of the preferred site indicating areas that should be avoided, including buffers.

The site layout maps for the proposed overall activity and its associated structures and infrastructure are attached as Appendix d1-1 and d1-2. There are no sensitive environmental features on site.

(iii) Summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;

Below is a summary of the expected positive and negative impacts. The positive impacts are the benefits that are expected to be experienced from the project whilst the negative impacts are the detriments and damages that will result. There were no project site alternatives due to only that area having the required resource.

Table liii1-1: Summary of Impacts

Positive Impacts	Negative Impacts
Planning and setup phase	
Rehabilitation of existing erosion	Vegetation loss
	Soil erosion can result from vegetation clearing
	Dust can be produced during clearing of land for establishment of camp site
Exploration phase	
Use environmentally friendly drill technologies and drill fluids	Drainage Surface disturbance can occur during drilling
Possibility of finding iron ore and manganese reserves	Noise and vibrations produced by drill rigs can be a nuisance
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.
	Photo-pollution can occur when drill rigs operate at night
	Water wastage during drilling
	Ground water contamination by ablution waste
	Fuel and oil storage present a veld fire hazard
	Sewage and general waste present a health hazard
	Occupational injuries can result from the operations of a drill rig
	Water and soil contamination can occur due to spill of fuel and lubricants
	Dust production during drilling is a health hazard to workers and community
	Emissions by drill rigs contribute to global warming
	Surface water contamination can occur due to spill of drill fluid or effluent water
	Disturbance of community privacy

Rehabilitation	
Rehabilitation of existing erosion	Soil erosion
	Water and soil contamination from used oil
	Siltation can occur if water sumps are not rehabilitated properly.

m) Proposed impact management objectives and the impact management outcomes for inclusion in the EMPr;

Based on the assessment and where applicable the recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr as well as for inclusion as conditions of authorisation.

The main objectives of impact management are outlined below:

- To ensure the availability of sufficient finances to attain the set environmental measures to be executed at the planning stage and during implementation of the EMP report.
- To ensure maintenance of the biodiversity on site
- To ensure re-establishment and sustainability of vegetation in the rehabilitated land, and thereby avoiding loss of any species habitat
- To Ensure that the rehabilitated land is in the state that is suitable for its agreed upon post-closure uses
- To develop good remediation methods and proper closure plans, so as to minimize degradation of the environment
- Rehabilitate disturbed land and drill deposits to a state that:
 - facilitates compliance with applicable environmental quality objectives (air quality and water quality guidelines);
 - reduces visual impact of the disturbed land;
 - limits post closure management.
- To ensure that the infrastructure is safe after rehabilitation
- To keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities as required.
- Maintain required pollution control facilities and rehabilitated land until closure

(1) General Management Objectives

- To assign time frames for achieving those set objectives.
- To have a system of ensuring that environmental requirements are updated as modifications occur in activities and structures.
- To ensure that responsible parties to be involved in environmental management planning process have set time frames, and these are agreed with the environmental impact generating divisions
- Environmental Management System (EMS) to include designation of responsibility for achieving objectives at each function
- Targets to be developed in line with EMPr commitments and acceptable standards for:
 - Solid, liquid waste and gaseous emissions
 - Waste reduction, reuse and recycling
 - Rehabilitation KPAs
 - Biodiversity management
 - Eco-efficiency such as electricity consumption

(2) Emergency preparedness and Response objectives

Zastrocode's environmental emergency procedures will ensure appropriate responses to unexpected / accidental actions/incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

It is intended that all environmental emergency situations are identified and are linked to the identified significant risks, made known to employees and surrounding communities that proper response action are in place and are communicated to those who might encounter such emergency situations.

(3) Biodiversity objectives

Vegetation

- To ensure long-term survival of the ecosystem where the mining activity will be conducted
- To prevent loss of vegetation due to unnecessary clearing during construction activities.
- To limit and prevent the establishment of invasive and/or alien vegetation.
- To limit the impact on the flora within the stipulated footprints of the infrastructural areas.

Animals

- To prevent loss of biodiversity.
- To limit the impact on the fauna in the area of the mine complex and related infrastructure sites over which the applicant has control.
- To prevent the incidents of snaring, poaching and accidental killings of wildlife and livestock within the area over which the applicant has control.

(4) Soils, land capability and land use objectives**Soils**

- To preserve as much soil as possible from areas to be disturbed to ensure that the maximum amount of soil is available for future use during rehabilitation.
- To preserve soil horizons and group similar soil units together in stockpiles.
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To maintain the fertility of the soils so as to ensure good re-vegetation of the rehabilitated areas.
- Prevent soil loss through wind and water erosion.
- Prevent reduction of soil quality through contamination
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To ensure the correct rehabilitation of contaminated soils.
- To ensure the correct placement, sequence and depths of soils during rehabilitation.
- To encourage re-growth and biological activity within the replaced soils and to minimise the loss of soil.

Land capability

- To minimise the area to be disturbed during construction and operational activities.
- To manage and rehabilitate the disturbed areas to an appropriate level.
- To minimise soil erosion.

Land use

- To limit the impact of the mining operations to as small a footprint as is possible.
- To manage and rehabilitate the disturbed areas to an appropriate level.

(5) Cultural Heritage

- To ensure the preservation of identified sites of cultural importance (such as graves, should there be any of such encounters)
- To ensure that any necessary, destruction of identified cultural sites that fall within the mine foot print is done in accordance with the NHRA and under the guidance of SAHRA.

(6) Contamination control – cleanup of machine fluid spills

To ensure that:

- Ensure that polluted soil is removed from the spillage site to an approved treatment site where it will be rehabilitated.

(7) Waste management

Solid Waste

- Records of waste produced and volumes disposed of will be kept
- Targets for waste reduction at source will be determined and thus waste production targets will be set for each month
- Recyclable waste should be recycled at an appropriate recycling facility.
- A temporary transfer station or collection point will be demarcated and fenced off
- Skip bins will be provided for collection of domestic waste from various sources around the mine

Sewage Effluent

- Portable toilets will be used for the project. These will be transported and disposed of in approved treatment and disposal sites by a registered service provider.

Hazardous Waste

- All hazardous waste should be collected on site at a temporary storage facility
- Streams of hazardous substances stored on site should be recorded and Materials Safety Data Sheets kept for all of these. The hazardous substances waste streams (type of waste, volumes, where generated, current disposal strategy) should form part of the overall waste register for the mine. Ensure that safety disposal certificates are obtained from the supplier.
- Materials safety data sheets will be kept for all materials stored on site and shall be displayed at the stores and well as at points of use.
- The hazardous waste should be collected by a registered hazardous waste carrier and disposed of at a registered H:H site. A certificate for the safe disposal of hazardous waste will be supplied to the mine.

(8) Surface water management (Natural resource use and eco-efficiency)

- To reduce the area of the catchment not contributing to runoff to minimise the impact on the catchment yield.
- To keep clean and dirty water separate.
- To minimise water consumption from external sources and recycle as much water as possible.
- To prevent contamination of the watercourses.
- To ensure compliance with all legal obligations.
- All plant and surface infrastructure (including the TSF and Overburden dumps) to be designed and constructed according to national standards and applicable legislative requirements, to prevent surface water contamination.
- To maximise the re-use of water during the operational phase in order to minimise the use of clean water. To recycle water from points such as return water dams to avoid water wastage
- To minimise the risk of polluted water leaving each site and to prevent the contamination of local watercourses.
- To ensure that water in sumps is recycled and not contaminated
- To keep clean and dirty water separate.
- At closure, to ensure that the existing surface water flow is returned to as close as is possible to the original flows through contouring of the site during rehabilitation.

(9) Ground water

- To minimize impacts on the volume of ground water available for use.
- To prevent pollution of groundwater.
- To minimize the impact of dewatering along preferential pathways.
- To gather sufficient information to allow future interpretations and to guide planning for closure.

(10) Visual

- To limit the perception of visual intrusion of the mining activities, where reasonably possible.

n) Aspects for inclusion as conditions of Authorisation.

(Any aspects which must be made conditions of the Environmental Authorisation)

EAP (2021)

- Proponent must commit to follow and implement recommended mitigation measures outlined in the EMP. However, the ECO can substitute or improve on the measures for best results and intended outcomes.

- The proponent must produce evidence of consulting and cooperating with landowners / occupiers in the vicinity of the project site.
- There must be a qualified ECO at the site for the duration of the project.
- Proponent must put in place erosion control mechanisms before starting drilling activities.

o) Description of any assumptions, uncertainties and gaps in knowledge.

(Which relate to the assessment and mitigation measures proposed)

The description of assumptions is given for the studies that were undertaken for this project which are the Basic Assessment Process.

1. Basic Assessment Process

The assessment was based on the assumption that all the information gathered in during desktop studies is correct and gathered professionally. Using all information gathered during desktop studies and site visit, enough evidence is available to predict possible impacts and avert them. It must also be noted that in the process of converting spatial data to final output drawings, several steps were followed and these may affected the accuracy of delineated areas even though due diligence was done to preserve accuracy.

Filed survey was conducted during the early summer season and is was a daytime survey only. Most of the different habitats at the site were investigated and it was therefore possible to complete a rapid survey and obtain information on the habitats that are present and the site, or that are likely to occur there. Access to portions of the nature reserve were not possible.

No assumptions should be made unless opinions are specifically indicated and provided.

Data presented in this BAR may not explain all possible conditions that may exist given the limited nature of the enquiry.

p) Reasoned opinion as to whether the proposed activity should or should not be authorised

i) Reasons why the activity should be authorized or not.

Taking into account Zastrocode's commitment towards environmental management and their effort to follow the laws that preserve the environment, it is the EAP's opinion that the activity must be authorised.

ii) Conditions that must be included in the authorisation

The activity must be authorised on condition that the applicant puts in writing, their commitment to follow measures recommended in the Environmental Management Programme. Proof of free and informed consent by the affected landowner must be provided before authorisation is granted.

q) Period for which the Environmental Authorisation is required.

The exploration is expected to take 6 months but an authorisation for 12 months is requested in order to make allowance for any unforeseen circumstances that may delay the expected time.

r) Undertaking:

Confirm that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the Basic Assessment Report and the Environmental Management Programme Report.

The EAP makes a confirmation that the undertaking required to meet the requirements of this section is provided at the end the EMPr and is aplicabe for bothe the Basic Assessment Report and Environmental Management Programme.

s) Financial Provision:

State the amount that is required to both manage and rehabilitate the environment in respect of rehabilitation.

A total amount of **R 140 921.00** will be needed as indicated on the illustration below.

i) Explain how the aforesaid amount was derived.

A project costing sheet was developed. All tasks or activities to be undertaken resources as well needed were captured and an estimate for each of task or resource was done. Contingencies and taxes were then added and the project total was generated.

ii) Confirm that this amount can be provided for from operating expenditure. (Confirm that the amount, is anticipated to be an operating cost and is provided for as such in the Mining work programme, Financial and Technical Competence Report or Prospecting Work Programme as the case may be).

A confirmation is made that the amount will be is an operating cost and is provided in the Mining Work Programme and Prospecting Work Programme.

t) Specific Information required by the competent Authority**i) Compliance with the provisions of Sections 24(4) (a) and (b) read with Section 24 (3) (a) and (7) of the National Environmental Management Act (Act 107 of 1998). the EIA report must include the:-****(1) Impact on the socio-economic conditions of any directly affected person.**

(Provide the results of investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any directly affected person including the landowner, lawful occupier, or, where applicable, potential beneficiaries of any land restitution claim, attach the investigation report as an **Appendix**)

ZASTROCODE (PTY) LTD (DMR Ref No: NC30/5/1/1/2/12709 PR)					
FINANCIAL PROVISION IN SUPPORT OF AN ENVIRONMENTAL AUTHORISATION APPLICATION (BASIC ASSESSMENT PROCESS) IN TERMS OF NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 IN RESPECT OF LISTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED) FOR THE PROPOSED PROSPECTING IRON ORE AND MANGANESE ORE ON THE FARMS THORNS 407, DUINE 437, RECORD 411, LOSKOP 414, OATLANDS 406, AND TOWTON 415, LOCATED APPROXIMATELY 50 KM NORTH WEST OF KATHU TOWN, IN THE MAGISTERIAL DISTRICT OF KURUMAN, WITHIN TSANTSABANE LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE					
BUDGETED QUANTUM OF FINANCIAL GUARANTEE REQUIRED					
No.		Unit	Quantity	Rate Rands	Amount
1	Machinery/Equipment: Part of drilling cost paid to subcontractor, no additional provision required Transportation of machinery will be from the nearest recognized city			0 R	-
2	Drilling Drilling (DD, Aircore, RAB or RC) (50X 50 m drill spacing, 10 drill holes -Total 1000m; Drilling depth 50-100m) (It will take human resource Data from the drilling will be analysed and prospecting permit for bulk sampling will be applied for should results prove positive Resource Drilling (50 X 50 m drill spacing, Total 2000m; Drilling depth 50-100m) - 30 drill holes	m m m	40	600 R 0 R R	24 000 - -
3	Size of Excavations/trenches Sampling excavation trenches and extent covered by these excavations/trenches *No excavation will be done only drilling will be conducted	m ² m ² m ²		R R R	- - -
4	Cost of decommissioning of plant and associated infrastructure Commissioning and decommissioning part of establishment cost paid to subcontractor, no additional provision required All structures and equipment to be cleared from site, inspected by site geologist			0 R	-
6	Labour Costs All labour costs included in subcontractor fees			0 R	-
7	Cost of profiling disturbed areas - (Filling and compaction) All drill holes will be filled up	hour hour		R R R	- - -
8	Cost of ripping topsoil . No treatment area on site			R	-
9	Cost of replacing topsoil. Part of backfill process	m ³	4000	20 R	80 000
10	Cost of surface preparation. No treatment area on site. General rehabilitation (sumps, storage reas etc)	hour	1	1000 R	1 000
11	Cost of revegetation N/A, natural re-seeding by replacement of top soil	R/Kg	500 kg/ha	3 R	1 500
12	Internal storm water control - N/A			0 R	-
13	Aftercare and Maintenance - N/A on drilled and small backfilled areas (will be evaluated after 6 months for growth)		1	2500 R	2 500
14	Contingency	hour	8	300 R	2 400
SUB TOTAL				R	111 400,00
Add 10% for Supervision Fees					11 140,00
Add 15% VAT				R	18 381,00
TOTAL				R	140 921,00
COMPLETED REHABILITATION					
Extent of Area Backfilled (ha)		ha			
Cost of Rehabilitation Backfilling (50% of total; R)					
Extent of Area Sloped (ha)		ha			
Cost of Sloping (R)					
Cost of Other Rehabilitation (Ripping, removal of rubble etc)					
Total				R	-
TOTAL OUTSTANDING REHABILITATION				R	140 921,00

Figure:s1-1: Financial Provision

A social and economic assessment on the impact of the mining activities on directly affected persons was undertaken. Impacts are listed on Section vii. A socio-economic report is attached as Appendix ti1-1.

(2) Impact on any national estate referred to in Section 3(2) of the NHRA.

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national

estate referred to in Section 3(2) of the NHRA with the exception of the national estate contemplated in Section 3(2)(i)(vi) and (vii) of that Act, attach the investigation report as Appendix 2.19.2 and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6.and 2.12.herein).

The investigations undertaken shows that there are significant no heritage and or national estates to be impacted by the proposed activities. As such, no evaluation of impacts was done.

u) Other matters required in terms of Sections 24(4) (a) and (b) of the Act.

(the EAP managing the application must provide the competent authority with detailed, written proof of an investigation as required by Section 24(4)(b)(i) of the Act and motivation if no reasonable or feasible alternatives, as contemplated in sub-regulation 22(2)(h), exist. The EAP must attach such motivation as an **Appendix**).

There are no alternatives to this project and a motivation is attached as Appendix u1-1.

v) References

Aurecon and Assmang. 2014. Tsantsabane Local Municipality; Spatial Development Framework (SDF).

BGIS Website. <http://bgis.sanbi.org/LUDS/Home/Municipality/218> (Site visited on 24 February 2021)

Department of Fisheries Forestry and Environmental, 2021. Zastrocode Postmasburg Project Screening Report.

ZF Mgcawu District Municipality, 2016. Climate Change Vulnerability Assessment and Response Plan.

<https://municipalities.co.za/overview/138/zf-mgcawu-district-municipality> (Site visited on 11 February 2021).

ZF Mgcawu District Municipality, 2017-2022. Integrated Development Plan 2018/2019

PART B

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

1) Draft Environmental Management Programme.

- a) Details of the EAP**, (Confirm that the requirement for the provision of the details and expertise are already included in Part 1, Section (a) herein as required).

Please refer to Part A (BAR), Section 1. For ease of reference this information is described in this section as well.

i) Details of the EAP

The following are the details of the Environmental Assessment Practitioner responsible for the Zastrocode environmental authorisation application for the proposed prospecting of iron ore and manganese within Tsantsabane Local Municipality, Northern Cape Province:

Name of The Practitioner: Ms. Babalwa Fatyi

Tel No.: +27 12 998 7642

Fax No.: +27 12 998 7642

E-mail address: babalwa@myezo.co.za

ii) Expertise of the EAP

1. The qualifications of the EAP

Ms. Babalwa Fatyi is a SACNASP registered Professional Scientist (1993) and a holder of a Master of Science (cum laude) from the Witwatersrand University. She is a registered Environmental Assessment Practitioner (EAP) and an accredited Environmental Auditor with the Institute of Environmental Management and Assessment, Lincoln, UK (0025153). She has several certificates in environmental management including ISO 14001 and Waste Management and Auditing. For copy of qualifications, please refer to Appendix 1.1-1 of the Basic Assessment Report.

2. Summary of the EAP's past experience.

Ms. Babalwa Fatyi's mining environmental impact assessment and management experience is extensive both in the private and government sectors including working with the Council for Scientific and Industrial Research (CSIR) and the DME to develop best practice rehabilitation guidelines for derelict, abandoned and operational mines. Some of Babalwa's vast mining environmental consulting experience include working for SRK Consulting from 1999 to 2002. From 2002 to 2005 she worked for a mining company Trans Hex (Pty) Ltd where she successfully administered the company's compliance with both internal and legislative environmental obligations and was active in stimulating environmental consciousness through all the different mining development phases. Driven to impart environmental stewardship at personal,

societal and corporate levels, her consulting experience gave her an insight with respect to sector-specific environmental requirements ranging from authorizations, implementation and monitoring. A proud and recognised South African female business owner and entrepreneur, she continues to be a voice of consciousness and a team player for change with regards to how development and environmental matters are handled.

She has a way of teasing environmental and social commitments into manageable components and elements. This also stems from her capability to enable understanding risks, legal framework, biophysical and social risks, and monitoring to ensure that co-operative agreements are established for each development she is supporting, thus creating opportunities for transformation and innovative change.

Focusing on the environmental aspects, she developed a sustainability report for the Wesizwe Platinum. Working with a task team from the Department of Environmental Affairs, she played a key role in the fruitful development of the fourth National Country Report in the implementation of the United Nation Convention to Combat Desertification.

Babalwa has resourcefully led, project-managed and participated in over 40 mining environmental impact assessment studies (EIAs) and Environmental Management Plans programmes (EMPrs) including compiling more than 20 Basic Assessment Reports (BARs) within the various sectors and industries. She was also part of industry experts who were selected to partake in the executive preparation programme, a collaboration between Mining Qualification Authority and academia. Cumulatively, she has developed over 50 strategic/management programmes, closure plans, sustainability reports and monitoring protocols for the mining industry. A hardworking researcher, she is an established co-author of several publications in scientific journals since 1999. On her own, she has written and published poetry books and performed poetry presentations, both which promote sustainable means of unlocking the natural resource capital whilst upholding coexistence principles.

Through various roles and innovations, she is well versed with mining activities, marine legislation and coastal environmental management. As a Trans-Hex Operations representative in the provincial coastal committee, from 2003 to 2011 she assisted in tackling impacts related to industrial activities along the coast. The major aim was to promote protection and sustainable utilisation of coastal resources. As part of this committee, she assisted in the spearheading of the integration of coastal management principles and objectives into the plans, programs and policies of other organ of state with jurisdiction over aspects of the coastal environment. Guided by marine legislation, she was involved in the implementation of concession EMPs for mining operations. She developed the monitoring protocol for the deep-sea operations and reviewed the monthly monitoring sheets that the contractors were trained to fill during the sea mining activities. She also represented a company on The Benguela Current Large Marine Ecosystem (BCLME) programme.

She has diverse sector experience and insight with sector specific environmental requirements ranging from EA applications, implementation and monitoring, acquired while working for the mining industry and later while a serving the same mining industry as a consultant. Babalwa is fluent in partnering with both large blue-chip companies and smaller companies, which require her expertise ensuring collaborative design of strategies and methodologies. Subsequently, this kindles sustainable development and enable successful execution of various projects which she directs and participates in. The tenacity and authenticity of a project leader determines its success and Babalwa has personified these traits in the way she applies her experience in dealing with stakeholders, adapting to change, dealing with unexpected parameters and having competence in budget and cost control.

- b) Description of the Aspects of the Activity** confirm that the requirement to describe the aspects of the activity that are covered by the draft environmental programme is already included in Part A, Section 1(h) herein as required.

Prospecting activities will include non-invasive techniques and invasive (drilling) techniques to be done in two phases. Geological surface mapping will be done to evaluate the potential of the ore deposit within the prospecting area. This will entail surface geological mapping, structural mapping and subsurface interpretations of the structural trends.

Mapping will be performed in conjunction with geophysical surveys, which entails ground magnetics and ground gravity geophysical procedures on a pre-determined grid of 100 m x 100 m, in order to delineate ore formations. Minimal vegetation clearance will be required during the geophysical surveys to provide freedom of movement to the geo-technicians that are traversing the grids.

In-situ ore material across the area will also be analysed to determine the subsurface ore grade variation throughout the prospecting area. The samples will be selected based on the availability of fresh subsurface ore material.

For the drilling programme, a total of 40 drill holes are planned to depths ranging from 50 m to 100 m. The locations of these holes will be based on results obtained from the geological interpretations during the non-invasive phase. Prospecting activities will make use of existing roads and track as far as possible. However, additional tracks estimated at 5 km in length as well as 40 drill-pads will be created

Ultimately, all prospecting data will be validated and captured in order to generate geological models and resource estimates.

Non-Invasive activities:

These are project activities which do not disturb or alter anything in the terrestrial environment. Project activities that are noninvasive include Desktop Study and Pre-feasibility Studies.

- **Desktop Study**

These activities will include:

- (i) Data gathering
 - (ii) Remote Sensing
 - (iii) Geological Mapping
 - (iv) Geochemistry
- i. Data Gathering - Detailed geological and structural mapping will also be carried out. Information concerning the project area and applicable spheres of interest will be sought from reliable and reputable sources such as government publications and academic institutions. This will include geological data, environmental baseline information and the socio-economic status. The information will be used not only for mining and environmental applications but for effective decision making. This will involve analysis of data where exploration records of all previous work in the area will be re-examined, and the following studies will be carried out:
- Literature review
 - Detailed aerial photograph and satellite image interpretation
 - Regional airborne geophysics with main emphasis on magnetic
 - Historical drilling review and interpretation
- ii. Remote sensing this involves acquiring information from the project area making use of aerial photographs, satellite imagery, and regional airborne geophysical data.
- Information from satellite such as the Landsat Thematic Mapper Satellite can detect geological faults and fractures that indicate manganese and iron ore deposits.
 - Existing aerial photography – this information can help photogeologists in determining important information such as lithologies and other geological features.
 - Satellite imagery – satellite imagery helps gather important information such as soil type, water content and drainage without having to disturb the land. The information is important for geological assessments, environmental management and decision-making.
 - Regional airborne geophysical data- this is information describing the region's electromagnetic properties, magnetic field and resistivity (USGS, 2020). Resistivity can help determine the soil's mineral properties due to its conductivity relative to water content.
- iii. Geological mapping – this is field data collection whereby the geologist will record surface features such as outcrops and rock types. Geological mapping will also be applied to identify the manganese and iron ore bearing geological units with their local complexities and variations.

- iv. Geochemistry – reviews of historical drilling will be done. This is analysis of existing data for the chemical composition of the earth's crust in the project area.

These noninvasive activities will be undertaken during the period that the prospecting permit application is being assessed and, presumably, approved. A period of 12 months is estimated for this.

- **Pre-feasibility studies**

- The will be the final stage of the prospecting programme and would involve the following activities:
- Initial conceptual Mine Planning.
- Planning the infrastructure requirements
- Environmental management planning
- Financial modelling
- Market analysis
- Analysis of transport logistics to markets
- Assessment of personal and training requirements
- Assessment of socio-economic factors

Invasive activities:

These are project activities that result in the disturbance of the land and this will involve drilling activities and resource generation. Activities to be undertaken include:

1. Initial Drilling

These activities will be undertaken after the issuance of a licence, identified prospective targets will require further subsurface investigation. Thus, drilling will be undertaken and about 10 drill-holes will be drilled initially. Drill holes could vary in depth from 50 to 100m, with an average depth in the order of 50 meters since from the available data for the area the manganese/iron outcrops. The total amount of drilling to be budgeted for at this stage will be 1000 meters and it is assumed that every meter of the manganese and iron intersections will be analysed. Types of drilling being considered include Diamond, Air Core, Rotary Air Blast (RAB) or Reverse circulation (RC). Drill waste includes non-hazardous muds and fluids. Drilling of the prospective areas will commence to establish presence of mineralization. Geological borehole logging, down the hole logging and sampling will also be carried out this may involve the use of special drills to get cylindrical core samples for continuous data and geological mapping of iron and manganese ore seams.

The geological information generated will be used to model and estimate resource. The resources will at least be expected to be in the Measured and Indicated Category according to the appropriate reporting standard (SAMREC, JORC, or NI43 -101).

2. Resource Drilling

Depending on the the results of the initial drilling, further 30 drill-holes totaling about 2000 meters may be required. The activities will include:

- Resource drilling
- Geological Modelling
- Resource Calculation

3. Prefeasibility Studies

These activities are non-invasive and will include the following:

- Geological modeling and resources evaluation
- Mine planning
- Plant design
- Financial modeling
- Market analysis

c) Composite Map

Provide a map (Attached as an Appendix) 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 any areas that should be avoided, including buffers.

The site locality Plan (composite map) is included as Appendix C1-1.

d) Description of Impact management objectives including management statements

- i) Determination of closure objectives.** (ensure that the closure objectives are informed by the type of the environment described)

The main objectives of the rehabilitation are outlined below:

- To ensure the availability of sufficient finances to attain the set environmental measures to be executed at the planning stage and during implementation of the EMP report.
- To ensure maintenance of the biodiversity on site
- To ensure re-establishment and sustainability of vegetation in the rehabilitated land, and thereby avoiding loss of any species habitat
- To Ensure that the rehabilitated land is in the state that is suitable for its agreed upon post-closure uses
- To develop good remediation methods and proper closure plans, so as to minimize degradation of the environment
- Rehabilitate disturbed land and drill deposits to a state that:

- facilitates compliance with applicable environmental quality objectives (air quality and water quality guidelines);
- reduces visual impact of the disturbed land;
- limits post closure management.
- To ensure that the infrastructure is safe after rehabilitation
- To keep relevant authorities informed of the progress of the decommissioning phase.
- Submit monitoring data to the relevant authorities as required.
- Maintain required pollution control facilities and rehabilitated land until closure

The rehabilitation of the site will involve:

(1) Water sumps management

After the completion of the construction of the drill site, all the proposed water management structures will be removed, as they are all temporary. The water sumps will be designed in a way that will not cause any spillages of wastewater.

(2) Flora and fauna rehabilitation plan

Disturbance of critical biodiversity areas will be avoided. Activities related to clearing vegetation will be limited to the area where the boreholes and site camps. Rehabilitation and vegetation will be done for all cleared areas. Should there be a need to alter a listed species, a permit will be sought from the relevant authority first, before commencement.

(3) Haul Roads

Haul roads will be remediated through vegetation, and the applicant will ensure that the revegetation is done using the original type of vegetation as before.

(4) Mobile offices and workshops

As part of recycling, the hired mobile offices will be returned to the suppliers. Re-vegetation will be done through preparing soil and levelling to ensure growth of the Impacted vegetation.

(5) Waste bins and chemical toilets

A collection of waste bins and chemical toilets that have been emptied will be done. These will be cleaned by a chosen waste collection company.

(6) Topsoil

Landscaping, replacement of topsoil and vegetation establishment will be done to rehabilitate disturbed areas.

Closure objectives and measures will be done according to the type of environment in question.

(7) General Management Objectives

- To assign time frames for achieving those set objectives.
- To have a system of ensuring that environmental requirements are updated as modifications occur in activities and structures.
- To ensure that responsible parties to be involved in environmental management planning process have set time frames, and these are agreed with the environmental impact generating divisions
- Environmental Management System (EMS) to include designation of responsibility for achieving objectives at each function
- Targets to be developed in line with EMPr commitments and acceptable standards for:
 - Solid, liquid waste and gaseous emissions
 - Waste reduction, reuse and recycling
 - Rehabilitation KPAs
 - Biodiversity management
 - Eco-efficiency such as electricity consumption

(7.1) Resources, Structure and Responsibility objectives

To ensure that:

- There is allocation of sufficient personnel and other resources to meet objectives and targets.
- EMS procedures to stipulate equipment requirements and personnel requirements to ensure that there is clearly defined roles and responsibilities
- Compliance roles and responsibilities of environmental protection personnel to be clearly defined and incorporated into key performance areas as a comprehensive part of the performance management system
- Accountability for achieving and maintaining compliance is set through formal appointments for any delegated environmental roles
- Accountability of general impact generating personnel is formally controlled through key performances areas (KPAs)

(7.1)1. Guidelines for attaining the objectives

- Develop a procedure for ensuring that the company identifies and allocates human, technical and financial resources necessary to meet its environmental objectives and targets

- Develop a procedure for tracking costs and benefits of environmental activities
- Review environmental management system procedures and ensure that human resources are allocated to set environmental management objectives
- Define roles and responsibilities
- Describe how environmental performance and compliance information will be communicated to employees, on-site service providers and contractors
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed
- Develop procedures to ensure that responsibilities and accountability of personnel who manage, perform, verify work affecting environment are defined and documented
- Key performance areas of identified environmental responsible personnel to include environmental obligations
- All EMP commitments to be included in contractor's contracts

(7.2) Emergency preparedness and Response objectives

Zastrocode's environmental emergency procedures will ensure appropriate responses to unexpected / accidental actions/incidents that could cause environmental impacts. Such incidents may include:

- Accidental discharges to water (i.e. into the watercourse) and land;
- Accidental spillage of hazardous substances (typically oil, petrol, and diesel);
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

It is intended that all environmental emergency situations are identified and are linked to the identified significant risks, made known to employees and surrounding communities that proper response action are in place and are communicated to those who might encounter such emergency situations.

(7.2)1 Guidelines for attaining the objectives

- Develop emergency preparedness and response procedure with respect to environmental management to:
- Identify potential for accidents and emergency situations

- Respond to accidents and emergency situations
- Prevent and mitigate environmental impacts
- Review emergency procedures (particularly after emergency situations) and periodical test such procedures where practicable.
- Identify and draw term of reference for the rescue team
- Significant environmental aspects and their associated environmental impacts will be identified for all operational areas.
- In formulating the emergency plan the following factors should be taken into consideration:
 - All significant environmental aspects likely to result to emergency conditions;
 - Historic emergency events of activities, products and services on/off the site;
 - Chemicals, oils and other materials used on site;
 - Activities of contractors;
 - Concerns of communities and authorities were submitted;
 - Proximity to sensitive area such as residential areas, schools, wetlands, rivers Availability of local emergency services;
 - Availability of local emergency services;
 - Availability of trained, on-site personnel for emergency situations.
- Potential emergency situations identified should include petrochemical/chemical spillages, hazardous material spillages, fires, storage failures, untreated effluent spillages, explosions and natural disasters, and electrical failure.
- A risk assessment should be undertaken to identify such potential emergency risk situations.
- Emergency plans should be documented for each of these stipulated emergencies, which include responsibilities in emergency situations, corrective and preventative actions and the reporting of such emergencies.
- Identification of evacuation routes;
- Identification of safety showers and eye-wash stations;
- Identification of fire extinguishers;
- Identification of spill containment equipment;

- Effluent drains, storm water channels, and other water systems;
- Site infra-structure such as bulk storage facilities;
- Prevailing wind direction and neighbouring communities and facilities; and
- Emergency generators.

(7.3) Biodiversity objectives

(7.3)1 Vegetation

- To ensure long-term survival of the ecosystem where the mining activity will be conducted
- To prevent loss of vegetation due to unnecessary clearing during construction activities.
- To limit and prevent the establishment of invasive and/or alien vegetation.
- To limit the impact on the flora within the stipulated footprints of the infrastructural areas.

(7.3)2 Animals

- To prevent loss of biodiversity.
- To limit the impact on the fauna in the area of the mine complex and related infrastructure sites over which the applicant has control.
- To prevent the incidents of snaring, poaching and accidental killings of wildlife and livestock within the area over which the applicant has control.

(7.4) Soils, land capability and land use objectives

(7.4)1 Soils

- To preserve as much soil as possible from areas to be disturbed to ensure that the maximum amount of soil is available for future use during rehabilitation.
- To preserve soil horizons and group similar soil units together in stockpiles.
- To encourage re-growth and biological activity within the soils, while they are stockpiled.
- To maintain the fertility of the soils so as to ensure good re-vegetation of the rehabilitated areas.
- Prevent soil loss through wind and water erosion.
- Prevent reduction of soil quality through contamination
- To encourage re-growth and biological activity within the soils, while they are stockpiled.

- To ensure the correct rehabilitation of contaminated soils.
- To ensure the correct placement, sequence and depths of soils during rehabilitation.
- To encourage re-growth and biological activity within the replaced soils and to minimise the loss of soil.

(7.4)2 Land capability

- To minimise the area to be disturbed during construction and operational activities.
- To manage and rehabilitate the disturbed areas to an appropriate level.
- To minimise soil erosion.

(7.4)3 Land use

- To limit the impact of the mining operations to as small a footprint as is possible.
- To manage and rehabilitate the disturbed areas to an appropriate level.

(7.5) Cultural Heritage

(7.5)1 Objectives

- To ensure the preservation of identified sites of cultural importance (such as graves, should there be any of such encounters)
- To ensure that any necessary, destruction of identified cultural sites that fall within the mine foot print is done in accordance with the NHRA and under the guidance of SAHRA.

(7.5)2 Guiding principles to achieve the objectives

- Any earthmoving activities, establishment of roads and areas for setting up processing plants in areas immediately behind beaches and bays hold the possibility of impacting some of the many shell middens and other archaeological sites that exist close to the shoreline, in particular, estuaries, rocky headlands and sheltered bays tend to be very archaeologically rich. Pro-active measures will involve contracting an archaeologist to survey and mitigate the coastal zone adjacent to beach mining operations, as well as any proposed roads and infrastructure. This work may happen on a periodic basis to coincide with mining schedule.
- Relevant construction staff will receive training in basic archaeological identification and the communication routes to follow in the case of a discovery since additional heritage resources may be unearthed during construction, should this occur, work in that area should be halted until such

time as an appropriately qualified person can make an expert decision on the mitigation measures required. A responsible archaeologist will be identified for this commission.

- The expert would notify SAHRA (in line with the provisions of Schedule 35 of the NHRA and carry out an emergency recovery.
- Identified archaeological sites and stone cairns will be monitored. In such cases where the archaeologist spots, investigate and report fossil material, a separate monitoring by a palaeontologist would not be necessary. According the specialist report (Volume 4 of the EIAr) most areas have relatively low potential for fossil bone material and it is expensive and impractical to have excavations constantly monitored by a professional during the construction phase. Notwithstanding, the sporadic fossil occurrences are then particularly important. In order to spot the rare occurrences, would be crucial to have the co-operation of the personnel responsible for mining activities such as excavations.
- Awareness training would be conducted and guidelines for potential finds and a reporting/action protocol would be in place when finds are uncovered.
- Zastrocode will contribute towards research by fostering a relationship with a paleontologist and where necessary (as per results of the monitoring exercise) a paleontologist will inspect pits and profiles before they are rehabilitated, since deep excavation contains some form of paleontology that is exposed in the stratigraphy.
- Should destruction of the cultural sites, necessary permits should be in place from SAHRA prior to construction activities commencing at or near the relevant identified sites. Through induction training, staff on site will be mindful of artefacts that may appear in the project area. Such material can include lumps of iron, ballast stones or ingots, pieces of rope, wood, leather as well as ceramics and porcelain. In the event of a find, an archaeologist will be consulted.

(7.6) Contamination control – cleanup of machine fluid spills

(7.6)1 Objectives

To ensure that:

- Ensure that polluted soil is removed from the spillage site to an approved treatment site where it will be rehabilitated.

(7.6)1 Guiding principles to attain the objectives

- It is the responsibility of the person (s) causing or involved in the spilling of the machine fluids to report it to the supervisor responsible for the area in which the spill happened. The responsibility is however not limited to the persons involved in the incident, but also transferred to each person

observing a polluted area to investigate whether the incident has been reported.

- Any spill incidents will be reported internally, as soon as possible (within 24 hours) by completion the Accident / Incident Report.
- NEM:WA and associated regulations and standards must be followed with respect soil decontamination site.

(7.7) Waste management (Natural resource use and eco-efficiency)

Waste sources identified as part of the mining activities will include:

- Filter cloths.
- Contaminated process water.
- Steel balls.
- Scrap metal.
- Dirty water.
- Used oils and grease.
- Paint and paint tins.
- Aerosol cans.
- Batteries.
- Hazardous material packaging.
- Office waste and domestic waste.
- Recyclable, including
 - Paper
 - Glass
 - Metals
 - Plastic

Volumes of produced materials should be recorded in a waste register

(7.7)1 Solid Waste

- Records of waste produced and volumes disposed of will be kept
- Targets for waste reduction at source will be determined and thus waste production targets will be set for each month
- Recyclable waste should be recycled at an appropriate recycling facility.
- A temporary transfer station or collection point will be demarcated and fenced off

- Skip bins will be provided for collection of domestic waste from various sources around the mine

(7.7)2 Sewage Effluent

- Portable toilets will be used for the project. These will be transported and disposed of in approved treatment and disposal sites by a registered service provider.

(7.7)3 Hazardous Waste

- All hazardous waste should be collected on site at a temporary storage facility
- Streams of hazardous substances stored on site should be recorded and Materials Safety Data Sheets kept for all of these. The hazardous substances waste streams (type of waste, volumes, where generated, current disposal strategy) should form part of the overall waste register for the mine. Ensure that safety disposal certificates are obtained from the supplier.
- Materials safety data sheets will be kept for all materials stored on site and shall be displayed at the stores and well as at points of use.
- The hazardous waste should be collected by a registered hazardous waste carrier and disposed of at a registered H:H site. A certificate for the safe disposal of hazardous waste will be supplied to the mine.

(7.8) Surface water management (Natural resource use and eco-efficiency)

(7.8)1 Objectives

- To reduce the area of the catchment not contributing to runoff to minimise the impact on the catchment yield.
- To keep clean and dirty water separate.
- To minimise water consumption from external sources and recycle as much water as possible.
- To prevent contamination of the watercourses.
- To ensure compliance with all legal obligations.
- All plant and surface infrastructure (including the TSF and Overburden dumps) to be designed and constructed according to national standards and applicable legislative requirements, to prevent surface water contamination.
- To maximise the re-use of water during the operational phase in order to minimise the use of clean water. To recycle water from points such as return water dams to avoid water wastage

- To minimise the risk of polluted water leaving each site and to prevent the contamination of local watercourses.
- To ensure that water in sumps is recycled and not contaminated
- To keep clean and dirty water separate.
- At closure, to ensure that the existing surface water flow is returned to as close as is possible to the original flows through contouring of the site during rehabilitation.

(7.8)2 Guiding principles

- All applicable water uses to be licensed.
- Temporary storm water diversion berms to be constructed around all construction sites to divert clean water around and away from the sites.
- Water consumption to be managed by setting key performance indicators to achieve water reduction based on the current water balance and the implementation of annual water audits.
- All chemicals, bulk fuels, oils and grease and any other hazardous substance, to be stored and handled as per all applicable legislation and national standards.
- All vehicle transfer of hazardous materials must be done within bunded areas to minimise potential effects of spills.
- All surface water management measures to be implemented in accordance with the Integrated Water and Waste Management Plan (IWWMP) and IWUL.
- The pollution control facilities (pollution control dams and return water dam) to be placed on planned maintenance, routine inspections to be implemented and they to be de-silted periodically to ensure effective performance.
- Recycled water from sumps to be used for road watering when it can no longer be recycled.
- Drill fluid, fuel, chemical and hydrocarbon spillages from trucks, conveyors and pipelines to be cleaned up timeously to prevent contamination.

(7.9) Ground water

(7.9)1 Objectives

- To minimize impacts on the volume of ground water available for use.
- To prevent pollution of groundwater.

- To minimize the impact of dewatering along preferential pathways.
- To gather sufficient information to allow future interpretations and to guide planning for closure.

(7.9)2 Guiding principles

- All plant and surface infrastructure (such as water sumps) to be constructed in accordance with national standards and applicable legislative requirements, to prevent ingress of surface water into the groundwater regime.
- All groundwater management measures to be implemented in accordance with the Integrated Water and Waste Management Plan (IWWMP) and IWUL.
- Clean and dirty water to be separated.
- Groundwater quality and level monitoring to be conducted monthly as per the water management plan. Internal quarterly reporting to be undertaken and an annual report to be submitted.
- All hydrocarbon spills should be cleaned up, as soon as possible, to prevent seepage of pollutants into the ground water regime.
- Surface water quality needs to be monitored until any impacts attributable to mining have been eliminated and are acceptable to the receiving water environment.

(7.91) Visual

(7.91)1 Objectives

- To limit the perception of visual intrusion of the mining activities, where reasonably possible.

(7.91)2 Guiding principles

- Mining infrastructure is generally designed as per functional engineering requirements. Efforts will be made, where possible, to design structures with a more aesthetic appeal.
- The final design will be concluded prior to the commencement of the construction phase and will be signed off by a professional engineer.
- The design will include both visual and noise design criteria.
- Designs will be optimised to try to decrease visual exposure of mining infrastructure.
- Exclusive use of lay down areas will be enforced and the uncontrolled dumping of waste or construction material will be prohibited.

- This will be undertaken where the visual impact on sensitive receptors is considered high.
- Uncontrolled, open fires will be prohibited on site.
- Dust will be controlled using appropriate dust suppression measures.
- The mine and plant will operate on a 24-hour basis. Lighting is thus required for safe operating conditions. As far as is possible, without compromising safety of mine personnel and operating processes, all light sources will be directed downwards and away from the public roads and surrounding communities.
- All light sources will be directed downwards and away from the public roads and surrounding communities.
- Rehabilitated areas will be maintained and monitored.

The process for managing any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of undertaking a listed activity.

The environmental management measures developed for all the identified impacts will be implemented and incorporated into the plant daily activities. The effectiveness of management measures in mitigating the impacts will be monitored. Compliance with environmental conditions of approval will be assessed through undertaking of performance audits.

Throughout the life of the operating, it will be checked that closure objectives are clearly defined and that monitoring data collected will be meaningful at closure and that management measure are monitored timeously to minimize environmental liabilities at closure.

(7.91)3 General Management

The activities will be managed and operated:

- In accordance with EMPr that inter alia identifies and minimizes risk pollution, including those arising from operations, maintenance, accidents, incidents and non-conformances and those drawn to the attention of the developer as a result of stakeholder complaints.
- In accordance with the requirements of the issued licenses and associated conditions of those licenses such as water use license or waste license.
- In accordance with conditions of this license
- By sufficient persons, who are competent in respect of the responsibilities to be undertaken by them, in connection with the operation of the activities.

- Any persons having duties that are or may be affected by the matters set out in the EMPr will have convenient access to a copy of it, kept at or near the place where those duties are carried out.

The EMPr specifies the minimum requirements to be implemented, according to the scope of work and the scope of the environmental authorisation. This is done to reduce and manage the potential environmental impacts for sustainable environmental management practices. The EMPr is binding to any party which responsibility for the mining activities has been delegated to, until such time that the competent authority has been formally released Zastrocode from its responsibilities in terms of this EMPr.

It is essential that the EMPr requirements be carefully studied, understood, implemented, and adhered to at all times. The key environmental elements which are necessary for the implementation of the EMPr requirements are outlined below.

(7.92) Environmental Policy

Zastrocode recognizes that concern for the environmental impact of our operations is an integral part of best practice and is committed to meeting the challenges this represents.

Where practicable Zastrocode will contribute to sustainable development by integrating environmental consideration into the design and management of our procurement of goods and services and the development, operation and maintenance of sites and facilities.

The Environmental Policy assigns responsibility for environmental implementation to all appointed personnel who perform activities with environmental potential impacts. The overall responsibility for ensuring implementation lies with the company Chief Executive Officer.

The policy which is the cornerstone for ensuring environmental consciousness and responsibility, is thus provided below.

Zastrocode will:

- Adopt a systematic approach to environmental management in order to achieve continual improvement of our contribution to the protection and enhancement of both the local and global environment;
- Commit to the reduction and prevention of pollution and waste and take positive action to conserve water, energy and other resources (particularly where non-renewable); and ensure waste disposal is dealt with in a responsible manner;
- Promote environmental awareness and appreciation through our research and through our interactions with all other stakeholders;

- Ensure compliance with all applicable environmental legislation and other environmental requirements to which the company subscribes and which relate to the company environmental aspects.
- Co-operate with environmental regulatory bodies;
- Provide information and training necessary for employee involvement in meeting the objectives of this policy;
- Maintain contingency plans to minimize the impact of foreseeable environmental incidents;
- Assess and monitor the environmental impacts of our activities and develop ways of minimizing these impacts;
- Establish programs for achieving environmental objectives and progress these through management review.
- Individual, employees or individuals who are working for or on behalf of Zastrocode are required to co-operate with the company in the implementation of this policy by:
 - Ensuring that waste is correctly handled, stored and disposed-off;
 - Promptly reporting all accidents or incidents which could lead to pollution;
 - Feeding back any suggestions for pollution prevention, waste reduction or energy conservation.

(7.93) Organisational Structure and responsibility

This section also indicates the party responsible for implementing the environmental measures and action plans laid out in the EMPr. Responsible personnel with respect to the roles highlighted under the management commitments in Section 2, Table 1 (d) – 1 are outlined in Table 1 (e) - 1.

Figure d)1-1 provides a guideline for the team structure that plays a role in the successful implementation of the EMPr. It is aimed to indicate the intended plans and commitment by Zastrocode to execute the management commitments within an organised structure, to ensure accountability as well as responsibility of the successful compliance with the conditions of authorisation. Therefore, this chart structure is going to just be utilised as a reminder that the implementation of the EMPr does not solely rest with a single party within the organisation as well as a guide to determine specific role players. It will be updated continuously as part of reporting procedures as per the actual operational activities on site and as new role key players are identified.

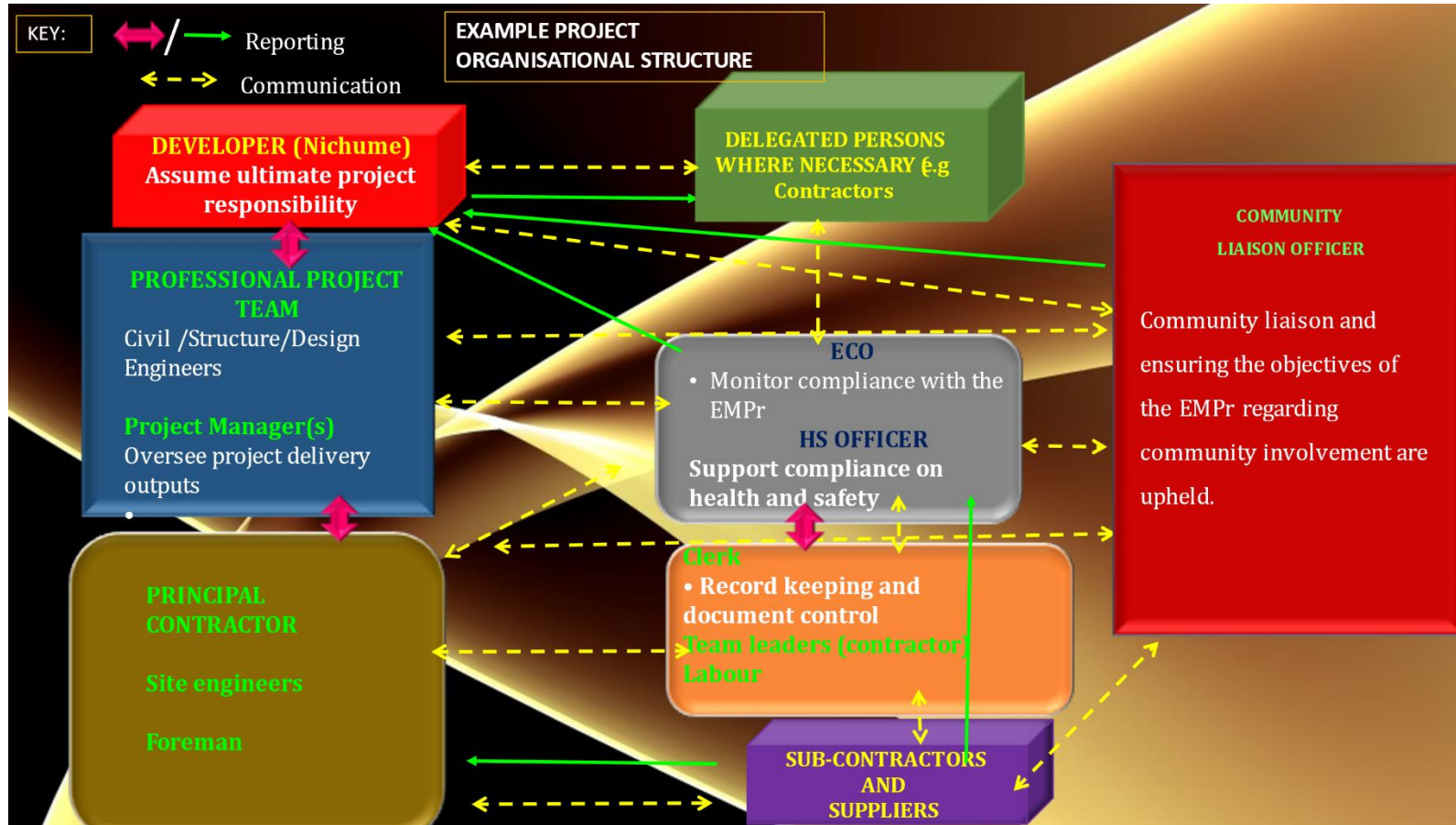


Figure d1-2: Example of a Project Organisational Structure

(7.93)1 Appointment of contractor

- Zastrocode will ensure that this EMPr forms part of any contractual agreements with a Contractor(s) and sub-contractors for the execution of the proposed project. The contractor must make adequate provision in their budgets for the implementation of the EMPr.
- The principal contractor (including sub-contractors and suppliers) will comply with the relevant provisions of the EMPr, applicable environmental legislation, by-laws and associated regulations promulgated in terms of these laws. Tender documents should include statements to include the use of local communities or local community organisation where possible in supplying services and labour to the construction activities.
- Tender documents for any procured services regarding implementation of the EMPr, should include statements to include the use of local communities or local community organisation where possible in supplying services and labour to the construction activities.

(7.93)2 Preparation of Method Statements and procedures

- Method Statements will be submitted by the contractor to the SHE Officer and will be adhered to by the Contractor and project engineers. These relate to water and storm water management requirements, traffic requirements, solid waste management requirements, fuel storage and filling and dispensing of fuel (diesel and petrol), hydrocarbon spills, contaminated soil disposal, the storage of hazardous materials, standard emergency procedures, amongst others.
- The ECO will monitor the implementation of the statements and as such all copies of the statements and plans will be submitted to the appointed ECO;
- The recommendations of the specialists regarding sensitive site features will be upheld and recommendation of a site ecologist will be sought, when necessary, prior to vegetation clearing.

(7.93)3 Appointment of ECO

- ECO will be appointed to monitor the implementation of the EMPr;
- The monitoring of the success of the implementation in the form of internal audits and progress reports will be the role of the ECO

(7.93)4 The developer / Zastrocode

The developer is ultimately responsible for ensuring compliance with the environmental specification and upholding the team to environmental commitment to compliance with all national, provincial and local legislation that relates to management of this environment.

- May on the recommendation of the engineer and/or ECO and Community Liaison Officer (CLO) order the contractor to suspend any or all works on site if the contractor or his sub-contractor/supplier fails to comply with the said environmental specifications;

- More specifically Zastrocode shall:
 - Ensure that it complies with the requirements of this operational EMPr
 - Designate a staff member as ECO, who will assess compliance with the office of EMPr;
 - Maintain a record of all environmental management activities relating to the site (including all environmental reports, complaints made by the public, etc.)
 - Appoint an independent Environmental Auditor to undertake operational phase environmental audits every two years, to determine compliance with the operational EMPr.
 - Implement the recommendations made by the EA timeously

(7.93)5 The engineer and professional project team

The engineer will:

- Enforce the environmental specification on site;
- Monitor compliance with the requirements of the specification;
- Assess the contractor's environmental performance in consultation with the ECO, from which a brief monthly statement of environmental performance is drawn up for record purposes and to be reported to project meetings; and
- Ensure the documentation, in conjunction with the contractor, the state of the site prior to construction activities commencing. This documentation will be in the form of photographs or video record.

(7.93)6 The contractor (including sub-contractors)

The contractor is required to:

- Be fully conversant with the EMPr and all conditions of the EA;
- Provide information on previous environmental management experience and company environmental policy in terms of the relevant forms contained in the contract document;
- Supply method statements timeously for all activities requiring special attention as specified and/or requested by the developer, ECO and/or engineer during the duration of the contract;
- Be conversant with the requirements of this environmental specification/EMPr. Brief all his/her staff about the requirements of the environmental specification;
- Comply with requirements of the ECO in terms of this specification and the project specification, as applicable, within the time period specified;
- Ensure any sub-contractors/suppliers who are utilised within the context of the contract comply with the environmental requirements of the project, in terms of the specifications. The contractor will be held responsible for non-compliance on their behalf;
- Bear the cost of any delays, with no extension of time granted, should he or his sub-contractors/suppliers contravene the said specifications such that the engineer

orders a suspension of work. The suspension will be enforced until such time, as the offending party(ies), procedure, or equipment is corrected;

- Be conversant with the requirements of this environmental specification/ EMPr. Brief all his/her staff about the requirements of the environmental specification.

(7.93)7 Environmental Control Officer

The ECO shall be a Zastrocode or a qualified environmental professional or professional firm with the relevant environmental expertise and shall be responsible for:

- Informing key, on-site staff through initial environmental awareness training of their roles and responsibilities in terms of the EMP and ensuring that such roles are included in their key performance areas
- Undertaking site inspections to determine compliance with the EMP;
- Identifying areas of non-compliance, and recommending measures to rectify them;
- Compiling a checklist of areas of non-compliance;
- Ensuring follow-up and resolution of all non-compliance;
- Acting as a community liaison officer to receive and respond to complaints raised by the public.
- Monitor that the principal contractor, sub-contractors, construction teams and the developer are in compliance with the EMPr, at all times during the construction and rehabilitation phases of the project;
- Monitor all site activities monthly for compliance;
- Conduct monthly audits of the site according to the EMPr, and report findings to the developer/contractor;
- Attend monthly site meetings;
- Recommend corrective action for any environmental non-compliance at the site;
- Compile a monthly report highlighting any non-compliance issues as well as progress and compliance with the EMPr prescriptions.
- Conduct training with the contractor on the EMPr and general environmental awareness.
- It must be noted that the responsibility of the ECO is to monitor compliance and give advice on the implementation of the EMPr and not to enforce compliance. Ensuring compliance is the responsibility of Zastrocode.
- Be fully conversant with all relevant environmental legislation applicable to the project, and ensure compliance with them;
- Compilation of method *statements* together with the principal contractor that will specify how potential environmental impacts in line with the requirements of the

EMPr will be managed, and, where relevant environmental best practice and how they will practically ensure that the objectives of the EMPr are achieved;

- Convey the contents of this EMPr to the construction site staff and discuss the contents in detail with the contractor;
- Undertake regular and comprehensive inspection of the site and surrounding areas in order to monitor compliance with the EMPr;
- Take appropriate action if the specifications contained in the EMPr are not followed;
- Monitor and verify that environmental impacts are kept to a minimum, as far as possible;
- Order the removal from the construction site of any person(s) and/or equipment in contravention of the specifications of the EMPr;
- Report any non-compliance or remedial measures that need to be applied to the appropriate environmental authorities, in line with the requirements of the EMPr;
- Submitting a report at each site meeting which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that the list of transgressions is available on request; and
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
 - Public involvement/complaints.
 - Health and safety incidents.
 - Incidents involving hazardous materials stored on site.
 - Non-compliance incidents.

(7.93)8 Occupational Health and Safety Officer

The Occupational Health and Safety (OHS) Officer will be responsible for undertaking of the following:

- Compilation of a comprehensive project Health and Safety Risk Assessment (HSRA);
- Compilation of health and safety specifications based on risks identified;
- Reviewing and approval of health and safety plan(s) submitted by appointed principal contractor(s);
- Conducting monthly health and safety inspections and compiling monthly OHS reports;
- Conducting monthly health and safety audits with audit reports;
- Assisting the developer/contractor in the investigation of major accident/incidents;
- Monitoring of site activities for compliance to the Occupational Health and Safety Act, (Act No. 85 of 1993) (OHSA) and Regulations;
- Establishment and monitoring of project health and safety file;

- Monitoring the principal contractor(s') health and safety performance; and
- Preparation of project close-out reports and submission of project health and safety files to the Client.

(7.94) Legal Compliance

(7.94)1. Compliance with Environmental Development

The EMPr will form part of the contract documentation for any contractors who will be responsible for environmental responsibilities, and this EMPr will be a legally binding document. As such, contractors will be held liable for failure to implement environmental responsibilities. Evidence of contravention of clauses within the boundaries of the site, site extensions and haul/access roads will be subjected to internally agreed penalties. There will be enforced dedication to comply with corrective or other instructions issued by the developer, Environmental Control Officer (ECO) or engineer within a specified time by all contractors

Zastrocode will ensure that the provisions of the NEMA Section 28 are also upheld in that a responsibility to avoid environmental damage, the preventative measures to reduce or prevent additional pollution and/or environmental damage from occurring will be developed and implemented.

ii. Volumes and rate of water use required for the operation.

An expected volume of 7500 litres/borehole may be used per day.

iii. Has a water use licence has been applied for?

The water will be sourced from the local municipality. Another alternative supply would be to purchase water from suppliers who would bring it to site via mobile water bowser tanks. There will be no application for water use licence for the prospecting phase of this development since there is no triggered water use in terms of Section 21 of the NWA. It is not anticipated that more than 1000 l per hole will be used. The RC drilling method uses compressed air and does not utilise water. Only when Diamond Core drilling is used, will water be required.

iv. Impacts to be mitigated in their respective phases

Table div1-1: Measures to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
PLANNING AND SETUP PHASE					
Selection of routes for access roads as listed in GN. R 985 or R 324 as amended in April 2017 (Listing Notice 3) The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. Prospecting activities will make use of existing roads and track as far as possible. However, additional tracks estimated	Access roads may disturb sensitive areas such as wildlife breeding grounds.	Prospecting activities will make use of existing roads and track as far as possible.	Access roads will avoid sensitive areas. An environmental specialist will be involved in the selection of an access road. However, about 300 square metres of vegetation will be cleared, since it is determined that minimal vegetation clearance be undertaken just to allow for access during the geophysical survey.	Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector (2013) encourages minimising activities that result in vegetation clearing and disturbance	During the planning phase, before any setting up of equipment is done.
	Since the proposed project area is close to communities, access roads may tamper with and damage existing infrastructure and community properties.	Proposed project area is 14 573,11 hectares but to some extent, sphere of influence may go within a 2 km radius of its boundaries	The local community and local municipality will be informed of the project before any work is done. They will also be involved in the planning, selection and construction of the access road.	Critical Infrastructure Act, 2019 prohibits the intentional damage to public infrastructure. The project will avoid such damage	During the planning phase. However, this will be a continuous process throughout the entire project

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
at 5 km in length as well as 30 drill-pads will be created.					
Any development within a watercourse, or within 500 meters as listed in GA in terms of NWA, will be sought during next stages of the development, where necessary.	Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into rivers and results in aquatic resources deterioration.	Development will be done more than 500 metres from any identified rivers.	Rivers will be avoided at all costs. Mechanically stabilised earth walls and other best practice methods will be used to control erosion and stop eroded soil from reaching the rivers or streams.	NEMA prescribes a general duty of care not to cause significant pollution or degradation of the environment (including wetlands). Such will thus be avoided as a measure to conform to this legislation.	During the setup phase, erosion control mechanisms and buffer zones will be established
OPERATIONAL / CONSTRUCTION PHASE					
Drilling and Exploration activities as listed in Government Notice R.983,	Drill workers can cause deforestation and / or conflicts with local	Each drill site will cover about 40 square metres.	No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless	No trees or shrubs will be felled for firewood in accordance with	Measures will be put in place prior to setting up.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
Activity 20: Any activity, including the operation of that activity which requires a prospecting right in terms of Section 16 of the MPRDA including associated infrastructure, structures and earthworks, directly related to prospecting a mineral resource, including activities for which an exemption has been issued in terms of Section 106 of MPRDA.	communities by cutting down trees for firewood.	There will be a total of 30 drill locations	agreed to by the landowner/tenant.	National Forests Act No. 30 of 1998	
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.	There will be clearance of an area of 300 square metres or more for access road maintenance. Total project drill sites will take 40 square metres X 30 sites giving 1200 square metres.	Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion	In accordance with the Soil Conservation Act 76 of 1969, soil conservation and erosion prevention mechanisms will be put in place.	The measures will be implemented during the setup phase whilst clearing is being done.
	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.	The selected project area covers 3 314 hectares but wild fires can spread further than that.	Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	The National Veld and Forest Fire Act 101 of 1998 has the provision for veld fire prevention and fighting such as fire breaks. These will be put in place prior to starting the project.	Fire equipment and firebreaks must be installed before any work commences.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication	Each borehole will use an estimate of 7500 litres per day	Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency. Water will be sourced from the local municipality.		Water purchase and acquisition planning will be done before the project begins.
	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system.	This is expected not to go beyond 2 metres from both sides of the road. Water will be sprinkled on the dust roads whenever it is windy	Drilling activities will make use of water to reduce dust. Water will be sprayed where there is constant movement of traffic, especially on windy days. Traffic will move in the project area below 40 kilometres per hour to reduce dust.	NWA promotes the sustainable conservation of water. This will be done through recycling.	This will be implemented once the exploration has started and where there will be movement of vehicles frequent enough to generate dust
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such	Transboundary. Fumes will be immediately	Drill rigs with better emission technology will be used. Catalytic converters and emissions trapping mechanisms	Air Quality Act No 39 of 2004 requires that reasonable measures	Drill rigs with higher emissions will be fitted with catalytic converters and

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
	as carbon dioxide and nitrous oxide. These cause global warming.	dispersed by wind upon release.	will be used. Machinery will be serviced regularly so that they emit less.	be put in place to control, reduce and mitigate against air pollution	serviced before they are brought to the project site.
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities	Sound Pressure Levels Decrease with 6dB – with the Doubling of Distance from the drill rig	Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.	Noise Control Regulations PN 627 of 1998 prohibits outdoor noise due to drilling from exceeding 65 dB.	Silencers will be installed on noisy drill rigs prior to use.
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals.	Within 100 metres of the drill rig, vibrations may not exceed 5mm/s ²	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	Occupational Injuries and Diseases Act No 130 of 1993 regards vibration as an occupational hazard.	Vibration monitoring can be done following feedback from nearby communities and drill workers.
	Surface water contamination can occur due to spill of drill fluid or effluent water.	Any rivers and streams in the vicinity	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a	NWA requires the prevention and remediation of water pollution.	Water samples can be collected on a monthly basis to test for contamination.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
			monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.		
Waste generation from contractor camps	Sewage waste is generated from the contractor camps on a daily basis. This can pose	1200 square metres. However, contaminants in water can spread over larger areas.	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods	NWA requires the prevention and remediation of water pollution.	Waste storage, collection and disposal mechanisms will be

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
	a health risk if not disposed of properly.		approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for appropriate disposal at a licensed facility.		in place prior to setting up.
	Solid waste will be generated daily from the contractor camps. This	1200 square metres	Drill contractor will put in place measures to reduce waste, for example workers will be	NWA requires the prevention and remediation of water	Waste storage, collection and disposal

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
	can distort the environment and pollute water resources.		provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.	pollution. MEN:WA promotes the principles of reduce, re-use, recover, recycle.	mechanisms will be in place prior to setting up.
REHABILITATION PHASE					
Rehabilitation of access roads as related to GN. R 985 or R 324 as amended	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the	5 km in length	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the	NEMA promotes ecologically sustainable development and rehabilitation of	This will commence as soon as the project construction phase has ended.

ACTIVITIES (listed only)	POTENTIAL IMPACT	SIZE AND SCALE (of disturbance)	MITIGATION MEASURES how each recommendation will remedy the cause of pollution or degradation and migration of pollutants	COMPLIANCE WITH STANDARDS how recommendations will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities	TIME PERIOD FOR IMPLEMENTATION at the earliest opportunity
in April 2017 (Listing Notice 3)	environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field.		regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	environmental impacts from such.	
Any development within a watercourse, or within 500 meters as listed in GA in terms of NWA, will be sought during next stages of the development, where necessary.	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Depending on concentration or volume, contaminants such as oil can travel up to over 2 kilometres.	Care will be taken to avoid spills and leakages when camp site is being closed. Oil storage should have at least 120% bunding. Water samples will be taken close to where the site was after site closure.	By implementing 120% or more self bunding, the project complies with SANS 310:2011	As soon as the operational phase ends. This will be done within 60 working days.

e) Impact Management Outcomes

Table e1–1: Impact management outcomes

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental.	This will have an effect on the whole prospecting operation and how impacts will be managed or mitigated	Controlled through selection of exploration alternatives such as RC drilling which have less impacts on soil and ground water.	Major impacts will be minimised or avoided. For example, air emissions will be reduced significantly, noise will be cancelled through use of silencers, etc.
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds.	Soil, Biodiversity	Avoid through avoidance of sensitive areas such as rivers. An environmental specialist will be involved in the selection of an access road.	Impact will be avoided. Rivers or streams must not be disturbed or passed through.
	Since the proposed project area is close to communities, access roads may tamper with and damage existing infrastructure and community properties.	Social. economic	Control through preparing local communities and authorities for the disturbances by informing them of the project before any work is done. They must also be involved in the planning, selection and construction of the access road.	Impact controlled and minimised
Selection of exploration drilling contractor	Contractors, depending on their institutional capability and resources, may have different abilities to avoid or manage adverse environmental impacts. Selecting the wrong contractor may result in worsening of impacts.	All aspects: social, economic, biodiversity, soil, water resources	A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous	Impact controlled and minimised through good operating practices and procedures and institutional capability.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			clients and previous works will also be done.	
Selection of site for contractor camps	There is possibility of conflicts with locals when planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy.	Social	Control through employee movement management. Since there will be work close to houses, owners have informed and consulted. Drill workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	Impact avoided through respecting community privacy and communicating. Good relations must be maintained between community and developer.
	Disturbance of farming land will occur due to drilling activities taking up some of the land being used for cultivation	Social	Controlled through avoidance of sensitive areas. Since mining land is being used, the owner will be compensated and assisted to restore their livelihoods where necessary.	Impact will be managed. At the end, affected parties must maintain their level of benefit or better, which they used to experience from use of their field.
	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.	Cultural heritage	Control through avoidance of any identified areas. Even though no sites of significance were identified, local traditional leaders will be consulted and informed of the project as a precautionary step.	Impact avoided. There will be no areas of cultural and religious significance disturbed by the project activities or workers.
	Water resources conflicts can arise when exploration activities start to use scarce or sensitive resources being used by the community.	Water resources, social	The local municipality and village heads will be consulted before choosing a water source for drilling purposes. If a homestead water source is to be used, an agreed payment should be done.	Impact avoided. There will be no use of scarce community resources. Even when abundant, use of community resources will result in a significant benefit of some sort to the whole community.
Clearing of land for camp	Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into	Soil, aquatic resources	Controlled through management and monitoring. Impact spatial scale will be greatly limited through erosion control mechanisms such as mechanically	Impact managed and minimised. Rivers will not be disturbed. Its quality will be maintained.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
and drill site preparation	streams resulting in quality deterioration.		stabilised earth walls and other best practice methods to control erosion and stop eroded soil from reaching rivers.	
	Clearance of vegetation for the establishment of a camp site will result in vegetation / biodiversity loss.	Soil, vegetation	Controlled through minimisation of impact spatial scale. The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the least disturbance to vegetation i.e., minimum clearance of vegetation.	Impact minimised through control of vegetation clearing.
	There will be generation of dust due of vehicular movement and vegetation clearing	Occupational safety	Controlled through water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.	Impact minimised. There will be low levels of dust enough to allow for visibility and good working environment.
	Spread of alien invasive species can occur during land preparation for contractor camp. This results in a threat to biodiversity.	Biodiversity	Controlled through appropriate measures. If any alien invasive species are encountered, they must be removed and burnt or sprayed with approved herbicides.	Impact minimised. Alien invasive species will not be spread.
	Temporary ablution facilities can result in pollution of groundwater.	Water resources	Avoided through adoption of best practice methods. Proper temporary ablution facilities will be used with approved ferrying and dumping.	Impact will be avoided. Approved temporary ablution facilities and disposal will be used.
Movement of drill rig	Drill workers can cause deforestation and / or conflicts with local	Biodiversity, Social	Controlled through management, collaboration and monitoring. No trees	Impact will be avoided. No trees will be felled for firewood.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
workers and vehicles	communities by cutting down trees for firewood.		or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner / tenant.	
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.	Soil, water resources	Controlled and remedied through erosion control and rehabilitation, respectively. Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion.	Impact will be minimised. Rehabilitation will restore the environment to its original state or better.
	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.	Social, biodiversity	Controlled and avoided through strict control of fire use. Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	Impact will be avoided. There will be designated fire-use stations.
Water Sump use	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication	Water resources	Control through conservative practices. Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency.	Impact will be reduced through limiting volumes of water used daily.
Drilling and exploration	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers	Biodiversity, Occupational safety	Controlled through dust management measures. Drilling activities will make use of water to reduce dust. Water will	Impact will be minimised. Dust levels will not be so intense that it affects visibility or make breathing difficult.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	by causing eye damage and irritation to the respiratory system.		be sprayed where there is constant movement of traffic.	
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming.	Air quality	Minimised through selection of drill rigs with better emission technology. Catalytic converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.	GHG emissions will not exceed stipulated quantities per day.
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities	Social, occupational safety	Avoided through use of silencers. Machinery will be well serviced therefore will make less noise.	Impact will be minimised or avoided. Ambient noise levels must not exceed 65 dB
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals.	Biodiversity, occupational safety	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	Impact will be minimised or avoided. Vibration levels must not exceed 5mm/s ²
	Drill rigs normally operate around the clock and make use of lighting for security and making work easier. Photo-pollution can result from the lighting. Light and noise can disturb the local community.	Biodiversity, social	The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp. Low frequency lighting will be used. Lighting and noise disturbance or any other form of disturbance that may have an effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.	Impact will be minimised or avoided.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	Risk of occupational injuries is high from the drill rig which makes use of moving parts.	Occupational health and safety, community safety	Workers at drill sites must be trained on proper safety practices and potential occupation safety hazards. Drilling must be done in accordance with the contractor's relevant internal standards.	The project will strive to end without injuries and without death. If any injuries occur, emergency care will be immediately administered whilst waiting for an ambulance.
	Drainage Surface disturbance can occur during drilling.	Water resources	Appropriate technologies that have been selected for the proposed project have less chances of disturbing the drainage surface.	No drilling will be done in a wetland, close to a river or in proximity to a water body.
	Fly rock can be produced during drilling and can result in injuries to the workers or local communities.	Occupational safety, community safety	Drilling will make use of water for lubrication and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	Drill site enclosures will stop fly rock from travelling beyond 4 metres from the drill.
	Surface water contamination can occur due to spill of drill fluid or effluent water.	Aquatic resources	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.	Water and soil near the drill sites will remain uncontaminated.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.	Cultural heritage	Any artefacts found must result in cessation of works and report the findings to SAHRA. The Environmental Control Officer must familiarise him or herself with the formation present and its fossils.	Any identified artefacts will be preserved.
Fuel and lubricant storage on site	Due to use of high volumes of oil and lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination.	Soil and water resources	No oil or lubricant storage site will be located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has 150% bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g., Peat Sorb) on site to ensure that any oil spillages resulting in soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest licensed landfill site. The hydrocarbon fluids will be transported to site on drums. Only amounts which will be	Impact will be avoided through the use of bunding, proper storage and spill cleaning kits. Where spills occur, the soil must be remediated to its original state.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			utilised during the drilling operation will be available on site at any one time. Therefore, there will not be any storage facilities on site. Suitable personal protective equipment (PPE) and protective clothing will be provided.	
	Fuel and oil storage present a fire hazard. Fire can result in loss of biodiversity, injuries or loss of life.	Biodiversity, occupational safety, community safety	All vehicles and heavy machinery that use combustion engines will have approved fire extinguishers. The ECO / SHE officer will carry out a fire hazard assessment. Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel & cleared of dry combustible vegetation	Impact will be avoided at all costs. At project end, no fires uncontrolled would have been experienced.
Waste generation from contractor camps	Sewage waste is generated from the contractor camps on a daily basis. This can pose a health risk if not disposed of properly.	Occupational safety, community health	Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable	Impact will be avoided. No sewage will be released into the environment, treated or not. All sewage waste will be collected and disposed of in an approved manner.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
			receptacle and removed from the site, for appropriate disposal at a licensed facility.	
	Solid waste will be generated daily from the contractor camps. This can distort the environment and pollute water resources.	Biodiversity, water resources	Drill contractor will put in place measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.	Impact on the environment will be avoided through proper storage, transport, recycling and disposal.
REHABILITATION				
Rehabilitation of drill holes	Drill holes must not be left uncovered. They must be rehabilitated. Uncovered drill boreholes can result in aquifer contamination.	Soil, groundwater resources	Drill holes will be plugged if they must be used again or filled there is no further use for them.	Impact will be minimised through rehabilitation that will eventually result in no contamination occurring.
Rehabilitation of access roads	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation	Soil, biodiversity	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may	Rehabilitation will achieve soil and vegetation quality equal to or better than before.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
	difficult where an access road passes through arable land or a crop field.		hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	
Rehabilitation of camp sites	Soil erosion can worsen after the contractor camps have been removed as soil previously covered by structures will be left bare.	Soil, aquatic resources	Once the contractor camp has been removed, vegetation will be planted to control soil erosion. The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora	Impact of soil erosion on aquatic resources will be avoided. Rehabilitation of cleared and already eroded soil will restore the land vegetation to its original state or better.
	Contractor camp must be disbanded properly after exploration. If not done properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur.	Soil, biodiversity	Metal components can be stowed away for reuse or recycling. Any gate or fence erected by the applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites have been rendered devoid of vegetation / grass or where soils have been compacted owing to traffic, the surface will be scarified or ripped. All infrastructure, equipment, plant, temporary housing and associated infrastructure used during the prospecting period will be removed from the site	Rehabilitation will ensure that the effects of the impact are totally reversed through the removal of all camp components from the environment.
Rehabilitation of water abstraction sites and water sumps	Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated whilst uncovered water sumps can pose a risk to humans and livestock.	Soil, water resources	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.	Impact will be totally reversed to its original state or better through rehabilitation.

ACTIVITY (listed or not)	POTENTIAL IMPACT	ASPECTS AFFECTED	MITIGATION TYPE	STANDARD TO BE ACHIEVED
Collection and transportation of drill and camp site waste	Campsite waste can pollute land, water and soil resources	Soil, water resources	Campsite waste will be recycled or sent to a landfill where not possible. All waste material of any nature, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area. and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.	Impact on the environment will be avoided through proper storage, transport, recycling and disposal.
	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Water resources	Care will be taken to avoid spills and leakages when camp site is being closed. Water samples will be taken close to where the site was after site closure.	Impact will be avoided through the use of proper storage, transport, spill cleaning kits and disposal. Where spills would have occurred, the soil must be remediated to its original state.

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved).

Table f1-1: Impact management actions

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
PLANNING AND SETUP PHASE				
Selection of exploration technology	Selected exploration technologies (i.e., RC drilling & RAB) will have minimal and manageable impacts on the environmental.	The selected alternatives for exploration technology such as RC drilling all have less impacts on soil and ground water.	Before commencement of drilling activities	ISO 18758-2:2018 gives the standards for the best and recommended exploration drilling technologies.
Selection of routes for access roads	Access roads may disturb sensitive areas such as wildlife breeding grounds.	Access roads will avoid sensitive areas such as the identified and undisturbed wetland to the west. An environmental specialist will be involved in the selection of an access road.	Before commencement of drilling activities	Mining and Biodiversity Guideline: Mainstreaming biodiversity into the mining sector (2013) encourages minimising activities that result in vegetation clearing and disturbance
	Since the proposed project area is close to communities, access roads may tamper with and damage existing	The local community and local municipality must be informed of the project before any work is done. They must also be involved	This will take a few days and will be done before exploration. This will also be a continuous	Critical Infrastructure Act, 2019 prohibits the intentional damage to public infrastructure. The project will avoid such damage

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	infrastructure and community properties.	in the planning, selection and construction of the access road.	process till project ends.	
Selection of exploration drilling contractor	Contractors, depending on their institutional capability and resources, may have different abilities to avoid or manage adverse environmental impacts. Selecting the wrong contractor may result in worsening of impacts.	A contractor with a good record of environmental management will be engaged. They also be selected based on the presence of an internal environmental policy which they use for their drilling activities. Tracing and consulting their referees, previous clients and previous works will also be done.	This will be done throughout the planning stage and before anything is set up.	Even though the project is not following it, the IFC's Environmental & Social Performance Standards are some of the best in the world and require that environmental management capability be part of the criteria for contractor selection.
Selection of site for contractor camps	There is possibility of conflicts with locals when planning to work close to community buildings. Drill workers may encroach into homesteads and undermining privacy.	Since there will be work close to houses, owners have informed and consulted. Drill workers will not be allowed to be within 50 metres of local homesteads without approval from the supervisor.	This will be done before anything is setup. Communication with local communities will be a continuous process.	Constitution of the Republic of South Africa No. 108 of 1996: Bill of Rights recognises the right to privacy for individuals. The community's privacy will be respected and upheld.
	Disturbance of farming land will occur due to drilling activities taking up some of the land being used for cultivation	Sensitive areas will be avoided. Since farming land is being used, the owner will be compensated and assisted to restore their livelihoods where necessary.	Sensitive areas have already been identified and have been avoided in the planning.	NEMA: EIA Regulations requires consultation of interested and affected parties before development is done. Landowners are affected parties

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
			Landowners have been engaged.	
	Areas of cultural and religious importance may be disturbed by movement of traffic and people to and from the exploration sites.	Even though no sites of significance were identified, local traditional leaders will be consulted and informed of the project as a precautionary step.	Local leaders will be consulted during the planning phase.	The NHRA provides for the protection and management of conservation-worthy places.
	Water resources conflicts can arise when exploration activities start to use scarce or sensitive resources being used by the community.	The local municipality and village heads will be consulted before choosing a water source for drilling purposes. If a homestead water source is to be used, an agreed payment should be done.	Local leaders will be consulted during the planning phase. Alternatively, water may be purchased from nearby suppliers who will bring it to site using bowsers.	NEMA: EIA Regulations requires consultation of interested and affected parties before development is done. Communities are affected and interested parties.
Clearing of land for camp and drill site preparation	Soil erosion can result from removal of vegetation during preparation of land for the contractor camp. Eroded soil can be carried by water into the wetland to the west and results in wetland quality deterioration. The Digital Elevation Model by Prism EMS (2020) shows that the project site slopes to the west towards the	Mechanically stabilised earth walls and other best practice methods will be used to control erosion and stop eroded soil from reaching the wetland. The area has existing erosion which must be rehabilitated prior to any project activity.	Mechanically stabilised earth walls or other control mechanisms will be installed during the setup phase and before any drilling begins.	NEMA prescribes a general duty of care not to cause significant pollution or degradation of the environment (including wetlands). The wetland will thus be avoided as a measure to conform to this legislation.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	wetland thereby eroded soil can easily be carried from project site to the wetland.			
	Clearance of vegetation for the establishment of a camp site will result in vegetation / biodiversity loss.	The area chosen for the establishment of the camp site will be the minimum reasonably required and will involve the least disturbance to vegetation i.e., minimum clearance of vegetation.	This will take a few days and impact mitigation and avoidance measures will be put in place at the beginning of the setup phase.	No trees or shrubs will be felled for firewood in accordance with National Forests Act No. 30 of 1998
	There will be generation of dust due of vehicular movement and vegetation clearing	Control through water spraying and/or other dust-allaying agents. The speed of haul trucks and other vehicles will be strictly controlled to avoid dangerous conditions, excessive dust or excessive deterioration of the road being used.	This will be implemented as soon as the activity starts during the setup phase.	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to control, reduce and mitigate against dust.
	Spread of alien invasive species can occur during land preparation for contractor camp. This	If any alien invasive species are encountered, they must be removed and burnt or sprayed with approved herbicides.	The removing and burning of alien invasive species will be done as soon as they are	National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Regulations, 2014 gives a list

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	results in a threat to biodiversity.		encountered regardless of the project phase.	of alien and invasive species and the regulations prohibiting spread or transport of such.
	Temporary ablation facilities can result in pollution of groundwater.	Proper temporary ablation facilities will be used with approved ferrying and dumping.	Ablution facilities will be among the first infrastructure to be setup.	Occupational Health and Safety Act 1993 Act 85 of 1993 has provisions for proper ablation facilities for employees
CONSTRUCTION PHASE				
Movement of drill rig workers	Drill workers can cause deforestation and / or conflicts with local communities by cutting down trees for firewood.	No trees or shrubs will be felled or damaged for the purpose of obtaining firewood, unless agreed to by the landowner/tenant.	No trees will be cut during all project phases.	No trees or shrubs will be felled for firewood in accordance with National Forests Act No. 30 of 1998
	Soil erosion may result from the movement of workers and vehicles into and out of the drill site. Eroded soil can cause sedimentation of water bodies.	Where soil clearing is done, it will be done in stages; top soil removed first and stored carefully to preserve its functions as a seed bank, the soil after top soil and stones will be stored separately for use in filling dongas. Riparian ecosystem will not be disturbed since it buffers rivers and wetlands from being silted by eroded soil. Where necessary, drainage systems will be made to reduce erosion	Erosion control mechanisms will be implemented just before the setup phase. They will be maintained throughout all the project phases.	In accordance with the Soil Conservation Act 76 of 1969, soil conservation and erosion prevention mechanisms will be put in place.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	There is risk of veld fires which can damage properties and result in injuries or loss of life. Fires disturb and reduce biodiversity.	Fires will only be allowed in facilities or equipment specially constructed for this purpose. If required by applicable legislation, a fire-break will be cleared around the perimeter of the camp and office sites.	Fire control mechanisms will be installed and implemented during the setup phase and maintained throughout the entire project.	The National Veld and Forest Fire Act 101 of 1998 has the provision for veld fire prevention and fighting such as fire breaks. These will be put in place prior to starting the project.
Water Sump use	Water can be wasted during drilling activities that have high water consumption for purposes such as cooling and lubrication	Water used for drilling purposes or to dilute drill fluid will be recycled in open pits to increase water use efficiency.	Water recycling in the sumps will be done whenever the sumps are in use and this starts as soon as they become operational.	NWA promotes the sustainable conservation of water. This will be done through recycling.
Drilling and exploration	During drilling and movement of vehicles, dust is produced. Dust can fall on vegetation reducing the surface for photosynthesis. It also poses a risk to the health of workers by causing eye damage and irritation to the respiratory system.	Drilling activities will make use of water to reduce dust. Water will be sprayed where there is constant movement of traffic. Generally, there is expected to be little movement of traffic during this project phase.	Dust control mechanisms will be implemented and intensified during dry and windy days, especially when an increase in traffic movement is anticipated.	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to control, reduce and mitigate against dust.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	Drill rigs run on diesel and continuously produce fumes that have potent greenhouse gases such as carbon dioxide and nitrous oxide. These cause global warming.	Drill rigs with better emission technology will be used. Catalytic converters and emissions trapping mechanisms will be used. Machinery will be serviced regularly so that they emit less.	Drill rigs will be fitted with catalytic converters and serviced before they are brought to the project site.	Air Quality Act No 39 of 2004 requires that reasonable measures be put in place to control, reduce and mitigate air pollution.
	Drill rigs are made up of several heavy equipment. Noise is produced by the equipment during drilling activities	Drill rigs will make use of silencers. Machinery will be well serviced therefore will make less noise.	Where there is need, drill rigs will be fitted with silencers and serviced before they are brought to the project site.	Noise Control Regulations PN 627 of 1998 prohibits outdoor noise due to drilling from exceeding 65 dB.
	Vibration is produced by the drill rigs and can disturb underground animals. Workers exposed to vibration over a long period can develop 'shaking syndrome'. Vibration affect underground animals.	Machinery will be serviced regularly so that they vibrate less. Vibration monitoring will be carried out on all machinery on a regular basis to ensure workers' exposure is below recommended duration and levels.	Vibration monitoring on the drill rigs will be done on the first day of drilling and once every 2 months after that.	Occupational Injuries and Diseases Act No 130 of 1993 regards vibration as an occupational hazard.
	Drill rigs normally operate around the clock and make use of lighting for security and making work easier. Photo-pollution can result from the lighting. Light and noise can	The use of the drill rig will be limited to day time operational hours. Lighting used will be within the workspace and outside of the drill camp. Low frequency lighting will be used. Lighting and noise disturbance or any other form of	For this particular project, drill rigs are highly likely to operate during the day only. However, if there is need to operate at night,	<i>No standard exists locally for this. Recommendations based on the EAP's ability to give best practice based on intended outcome.</i>

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	disturb the local community.	disturbance that may have an effect on the landowner / tenant / persons lawfully living in the vicinity shall be kept to a minimum.	additional measures will be put in place in time. These measures include use of low lighting and advising nearby community in time.	
	Risk of occupational injuries is high from the drill rig which makes use of moving parts.	Workers at drill sites must be trained on proper safety practices and potential occupation safety hazards. Drilling must be done in accordance with the contractor's relevant internal standards.	The measures will be implemented for a day before drilling commences. Safety briefings will also be done at least twice weekly and at the discretion of the ECO or drill supervisor.	Occupational Health and Safety Act 1993 Act 85 of 1993 states that an employer must make reasonable steps to eliminate or mitigate against occupational hazards and risks. Such steps include training employees and use of PPE.
	Drainage Surface disturbance can occur during drilling.	Appropriate technologies that have been selected for the proposed project have less chances of disturbing the drainage surface.	Measures have already been implemented through the selection of best drill technology alternatives.	<i>No standards were identified locally for this. Recommendations based on the EAP's ability to give best practice based on intended outcome.</i>

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	Fly rock can be produced during drilling and can result in injuries to the workers or local communities.	Drilling will make use of water for lubrication and reduction of fly rock. Drill rig will have a safety enclosure to prevent fly rock from hitting workers or locals.	Water for drilling and safety enclosures will be in place before drill rigs start operating.	Occupational Health and Safety Act 1993 Act 85 of 1993 states that an employer must make reasonable steps to eliminate or mitigate against occupational hazards and risks. Such steps include training employees and use of PPE.
	Surface water contamination can occur due to spill of drill fluid or effluent water.	Drilling will make use of biodegradable drill fluid and additives such as Black-Bear & Bentonite, respectively. Water samples will be taken on a monthly basis from nearby water bodies to test for contamination. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Any spills must be immediately to the satisfaction of the ECO by removing the spillage together with the polluted soil and by disposing of them at a suitable, licensed facility.	Biodegradable drill fluids and additives use will be part of the selection criteria when choosing a drilling contractor.	NWA requires the prevention and remediation of water pollution.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	Undiscovered artefacts can be unintentionally disturbed by drilling activities.	Any artefacts found must result in cessation of works and report the findings to SAHRA. According to Fourie (2020), The Environmental Control Officer must familiarise him- or herself with the formation present and its fossils.	Any findings will be reported immediately as drilling would have been temporarily stopped whilst awaiting response from SAHRA.	The NHRA provides for the protection and management of conservation-worthy places and artefacts.
Fuel and lubricant storage on site	Due to use of high volumes of oil and lubricants by the rig, there is a high possibility of oil leaks and spills which results in water and soil contamination.	No oil or lubricant storage site will be located closer than 100 metres from a stream, river, spring, dam or pan. Machinery will be checked daily and serviced regularly to reduce the chances of oil leaks. Oil trays will be used during servicing and refuelling, which will be done on impermeable surfaces. Oils residues will be disposed to approved oil recyclers. Storage of fuels and oils will be done in proper containment which has 150% bunds. There will be a soil decontaminant or hydrocarbon absorbent (e.g. Peat Sorb) on site to ensure that any oil spillages	Measures will be implemented as and when necessary and also at the discretion of a qualified ECO.	NWA requires the prevention and remediation of water pollution. NEMA prohibits pollution of water and soil. Measures will be put in place to reduce this.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
		<p>resulting in soil contamination are treated. The treated soil will be removed and disposed separately from domestic waste. Oil spills from machinery, will be collected and stored in waste collection bins and transported to the nearest licensed landfill site. The hydrocarbon fluids will be transported to site on drums. Only amounts which will be utilised during the drilling operation will be available on site at any one time. Therefore, there will not be any storage facilities on site.</p>		
	<p>Fuel and oil storage present a fire hazard. Fire can result in loss of biodiversity, injuries or loss of life.</p>	<p>All vehicles and heavy machinery that use combustion engines will have approved fire extinguishers. The ECO / SHE officer will carry out a fire hazard assessment. Burning of waste will be avoided. Use of fire for cooking must be done in a safe zone that is far or buffered from fuel & cleared of dry combustible vegetation</p>	<p>Fire extinguishers will be installed on drill rigs before they are brought to the project site. Cooking and smoking zones will be designated during the planning phase.</p>	<p>The National Veld and Forest Fire Act 101 of 1998 has the provision for veld fire prevention and fighting such as fire breaks and fire extinguishers. These will be put in place prior to starting the project.</p>
<p>Waste generation from contractor camps</p>	<p>Sewage waste is generated from the contractor camps on a daily basis. This can pose</p>	<p>Contractor camps can make use of mobile toilets whose waste must be collected and disposed of into the nearest sewer system or other appropriate methods</p>	<p>Mobile toilet providers will be contracted during the planning phase.</p>	<p>NWA requires the prevention and remediation of water pollution. NEMA prohibits pollution of water and soil.</p>

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	a health risk if not disposed of properly.	approved by law. Use of 'bush toilets' must be prohibited. Chemical toilet facilities will be used and sited on the camp site in such a way that they do not cause water or soil pollution. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain, situated as far as possible, but not less than 200 metres, from any stream, river, pan, dam or borehole. Only domestic type wash water shall be allowed to enter this drain and any effluents containing oil, grease or other industrial substances must be collected in a suitable receptacle and removed from the site, for appropriate disposal at a licensed facility.		
	Solid waste will be generated daily from the contractor camps. This can distort the	Drill contractor will put in place measures to reduce waste, for example workers will be provided with metal cutlery and not use disposables. Use of Styrofoam	Waste bins sites will be designated during the planning phase.	NWA requires the prevention and remediation of water pollution. NEM: WA promotes the principles of reduce, re-use, recover, recycle.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
	environment and pollute water resources.	will be avoided at all cost. Non-biodegradable refuse such as glass bottles, plastic bags, metal scrap, etc., will be stored in a container at a collecting point and collected on a regular basis and disposed of at a recognised disposal facility. Specific precautions will be taken to prevent refuse from being dumped on or in the vicinity of the camp site.		
REHABILITATION PHASE				
Rehabilitation of drill holes	Drill holes must not be left uncovered. They must be rehabilitated. Uncovered drill boreholes can result in aquifer contamination.	Drill holes will be plugged if they must be used again or filled there is no further use for them.	Upon cessation of drilling.	NEMA promotes ecologically sustainable development and rehabilitation of environmental impacts from such.
Rehabilitation of access roads	Unrehabilitated access roads can promote soil erosion and can distort the natural look of the environment. This can also make future cultivation difficult where an access road passes through arable land or a crop field.	Roads will be ripped or ploughed, and if necessary, appropriately fertilised (based on a soil analysis) to ensure the regrowth of vegetation. Imported road construction materials which may hamper regrowth of vegetation will be removed and disposed of in an approved manner prior to rehabilitation.	Upon cessation of drilling and removing of all infrastructure or equipment from the project site	NEMA promotes ecologically sustainable development and rehabilitation of environmental impacts from such.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Rehabilitation of camp sites	Soil erosion can worsen after the contractor camps have been removed as soil previously covered by structures will be left bare.	Once the contractor camp has been removed, vegetation will be planted to control soil erosion. The site shall be seeded with a vegetation seed mix adapted to reflect the local indigenous flora	Upon cessation of drilling and the removal of drill rigs / infrastructure from the project site.	NEMA promotes ecologically sustainable development and rehabilitation of environmental impacts from such.
	Contractor camp must be disbanded properly after exploration. If not done properly, non-degradable waste can pollute or distort the environment whilst soil compaction can occur.	Metal components can be stowed away for reuse or recycling. Any gate or fence erected by the applicant which is not required by the landowner/tenant, shall be removed and the area restored to the pre prospecting condition. Where office/camp sites have been rendered devoid of vegetation / grass or where soils have been compacted owing to traffic, the surface will be scarified or ripped. All infrastructure, equipment, plant, temporary housing and associated infrastructure used during the prospecting period will be removed from the site	Upon cessation of drilling activity.	NWA requires the prevention and remediation of water pollution. NEM:WA promotes the principles of reduce, re-use, recover, recycle.

ACTIVITIES	POTENTIAL IMPACT	MITIGATION TYPE	TIME PERIOD FOR IMPLEMENTATION	COMPLIANCE WITH STANDARDS
Rehabilitation of water abstraction sites and water sumps	Water sumps and water abstraction sites must be rehabilitated. Water abstraction sites can result in siltation if not rehabilitated whilst uncovered water sumps can pose a risk to humans and livestock.	Pits will be filled after exploration has been finished since people and animals may fall resulting in injuries or loss of life or livestock. Areas containing French drains will be compacted and covered with a final layer of topsoil to a height of 10cm above the surrounding ground surface.	Upon cessation of the exploration activities.	NEMA promotes ecologically sustainable development and rehabilitation of environmental impacts from such
Collection and transportation of drill and camp site waste	Campsite waste can pollute land, water and soil resources	Campsite waste will be recycled or send to a landfill where not possible. All waste material of any nature, including receptacles, scrap, rubble and tyres, will be removed entirely from the prospecting area. and disposed of at a licenced landfill facility. No waste will be permitted to be buried or burned on site.	Upon cessation of drilling activities.	NWA requires the prevention and remediation of water pollution. NEM:WA promotes the principles of reduce, re-use, recover, recycle.
	Water resources can be contaminated by leftover oil or drill fluid during the decommissioning of the campsite.	Care will be taken to avoid spills and leakages when camp site is being closed. Water samples will be taken close to where the site was after site closure.	Upon cessation of exploration activities.	NWA requires the prevention and remediation of water pollution.

g) Financial Provision

(1) Determination of the amount of Financial Provision.

a) Describe the closure objectives and the extent to which they have been aligned to the baseline environment described under the Regulation.

The closure objectives are outlined in Section m) and Section (d) (i).

b) Confirm specifically that the environmental objectives in relation to closure have been consulted with landowner and interested and affected parties.

The closure objectives will be consulted with the landowner and other stakeholders during the notification and public review period and this section will be updated.

c) Provide a rehabilitation plan that describes and shows the scale and aerial extent of the main mining activities, including the anticipated mining area at the time of closure.

See d) i) and f) of this EMPr and Section j) of the BAR

d) Explain why it can be confirmed that the rehabilitation plan is compatible with the closure objectives.

See d) i) and f) of this EMPr.

- A summary of the results of the environmental risk report and details of identified residual and latent impacts were incorporated into the costing;
- A summary of the results of progressive rehabilitation undertaken were considered;
- A description of the methods to decommission each prospecting component and the mitigation or management strategy proposed to avoid, minimize and manage residual or latent impacts influenced the overall calculation;
- Details of any long-term management and maintenance expected were considered;
- Details of a proposed closure cost and financial provision for monitoring, maintenance and post closure management;
- A final and future land use proposal and arrangements for the site was an input into the calculations;
- A record of interested and affected persons consulted was considered.

- e) Calculate and state the quantum of the financial provision required to manage and rehabilitate the environment in accordance with the applicable guideline.**

A surveyed plan of the areas on the site was provided as input into the Quantum Calculation. All the disturbances were categorised using the DMR guideline document for finance calculation. The machinery requirements and volumes of materials to be moved were determined, and rates for such rehabilitation was determined. Requirements for aftercare and maintenance was understood, and allocations of rates and fees for such was provided. In addition, closure objectives and how these relate to the mine operation, and its environmental and social setting also form the basis of the closure calculation. The estimated cost for rehabilitation is **R 140 921.00**.

- f) Confirm that the financial provision will be provided as determined.**

The financial provision will be provided by Zastrocode as per the quantum calculation included in Section s) of the BAR

Mechanisms for monitoring compliance with and performance assessment against the environmental management programme and reporting thereon, including

g) Monitoring of Impact Management Actions

This section indicates when the actions for that specific aspect must be implemented and/or monitored and all these are captured under Table I1-1.

h) Monitoring and reporting frequency

1. Reporting Documentation

The following documentation must be kept on site in order to record compliance with the EMPr:

- An environmental file which includes:
 - Copy of the EMPr;
 - Copy of the Environmental Authorisation;
 - All necessary authorisations, permits and licences must be obtained by the Developer prior to the commencement of construction
 - Copy of all rehabilitation plans;
 - Copy of the rehabilitation interventions
 - Copy of relevant legislation;
 - Environmental Policy
 - Environmental method statements compiled by the contractor;
 - Non-conformance reports;

2. Environmental register, which shall include:

- Communications Register—including records of complaints, and minutes and attendance registers of all environmental meetings;
- Monitoring Results – including environmental monitoring reports, register of audits, Non-Conformance Reports (NCR);
- Incident book – including copies of notification of Emergencies and Incidents, this must be accompanied by a photographic record
- Waste Documentation
- Material Safety Data Sheets for all hazardous substances;
- Dust suppression register;
- Water Quality Monitoring reports (if necessary);
- Written Corrective Action Instructions; and

- Notification of Emergencies and Incidents.

3. Environmental Register

Zastrocode as the developer will put in place an environmental register. Zastrocode will ensure that the following information is recorded for all complaints/incidents:

- Nature of complaint/incident;
- Causes of complaint/incident;
- Party/parties responsible for causing complaint/incident;
- Immediate actions undertaken to stop/reduce/contain the causes of the complaint/incident;
- Additional corrective or remedial action taken and/or to be taken to address and to prevent reoccurrence of the complaint/incident;
- Timeframes and the parties responsible for the implementation of the corrective or remedial actions;
- Procedures to be undertaken and/or penalties to be applied if corrective or remedial actions are not implemented;
- Copies of all correspondence received regarding complaints/incidents.

The above records will form an integral part of the contractors' records. These records will be kept with the EMPr, and will be made available for scrutiny if so requested by the developer.

4. Non-Conformance Report

A NCR will be issued to the contractor as a final step towards rectifying a failure in complying with a requirement of the EMPr. This will be issued by the ECO to the contractor in writing. Preceding the issuing of an NCR, the contractor must be given an opportunity to rectify the issue.

Should the ECO assess an incident or issue and find it to be significant (e.g. non-repairable damage to the environment), it will be reported to the relevant authorities and immediately escalated to the level of a NCR.

The following information should be recorded in the NCR:

- Details of non-conformance;
- Any plant or equipment involved;
- Any chemicals or hazardous substances involved;
- Work procedures not followed;
- Any other physical aspects.
- Nature of the risk.

- Actions agreed to by all parties following consultation to adequately address the non-conformance in terms of specific control measures and should take the hierarchy of controls into account.
- Agreed timeframe by which the actions documented in the NCR must be carried out.
- ECO should verify that the agreed actions have taken place by the agreed completion date, when completed satisfactorily; the ECO and contractor should sign the close-out portion of the Non-Conformance Form (NCF) and file it with the contract documentation.

The performance Assessment Report will be submitted every two years.

The WRC will within 24 hours notify the relevant Government Department of the occurrence or detection of an incident on the site, or incidental to the operation of the site, which has the potential to cause, or has caused pollution of the environment, health risks, nuisance conditions or water pollution.

Zastrocode will within 14 days, from detection of any incident mentioned in the above sentence, submit an action plan, which will include a detailed time schedule, and resource allocation providing measures.

- a) Correct the impact resulting from the incident;
- b) Prevent the incident from causing any further impact; and
- c) Prevent a recurrence of a similar incident.

Zastrocode will keep an incident report and complaints register, which must be made available to external auditor, Departmental auditors for the purpose of audit.

The relevant departments with jurisdiction over the incident or environmental components affected by the incident must be notified without delay in the case of the following:

- Any malfunction, breakdown or failure of equipment or techniques, accident or fugitive emission which caused, is causing or may cause significant pollution;
- The breach of this license and
- Any significant adverse environmental and health effects.

i) Responsible persons

(1) Objectives

To ensure that:

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- There is allocation of sufficient personnel and other resources to meet objectives and targets.
- The budget should provide a clear indication of the capital and annual maintenance costs associated with dust control measures and dust monitoring plans. It may be necessary to make assumptions about the duration of aftercare prior to obtaining closure. This assumption must be made explicit so that the financial plan can be assessed within this framework. Costs related to inspections, audits, environmental reporting and I&AP liaison should also be indicated where applicable. Provision should also be made for capital and running costs associated with dust control contingency measures and for security measures and other monitoring requirements.
- EMS procedures to stipulate equipment requirements and personnel requirements to ensure that there is clearly defined roles and responsibilities
- Compliance roles and responsibilities of environmental protection personnel to be clearly defined and incorporated into key performance areas as a comprehensive part of the performance management system
- Accountability for achieving and maintaining compliance is set through formal appointments for any delegated environmental roles
- Accountability of general impact generating personnel is formally controlled through KPAs.

j) Time period for implementing impact management actions

This is provided in Table f)1-1 for both listed and non-listed activities.

k) Mechanism for monitoring compliance

This is provided in Table k)1-1.

a. Monitoring Objectives

Monitoring objectives will be to ensure that:

- There is assessment of compliance with dust fall limits within the main impact zone of the operation.
- There is facilitation of the measurement of progress against environmental targets within the main impact zone of the operation.
- There is temporal trend analysis to determine the potential for nuisance impacts within the main impact zone of the operation.
- There is tracking of progress due to pollution control measure implementation within the main impact zone of the operation
- There is information of the public of the extent of localized dust nuisance impacts occurring in the vicinity of the proposed operations.

(1.1) Objectives

- Measure environmental performance by conducting regular audits and assessment of compliance with company and legal requirements
- Develop corrective and preventative actions to allow for continual improvement

(1.2) Guidelines

- Conduct annual external and quarterly internal environmental performance assessment of the EMPr
- Define roles and responsibilities and link these to key performance areas to ensure that (Key performance areas of identified environmental responsible personnel to include environmental obligations);
- Describe how environmental performance and compliance information will be communicated to employees, on-site service providers and contractors;
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed;
- Develop procedures to ensure that responsibilities and accountability of personnel who manage, perform, verify work affecting environment are defined and documented;
- Document findings reached during audits and provide corrective actions
- Design a formal process of ensuring that corrective actions are implemented
- Design systematic follow-up to ensure effectiveness of the implemented actions
- Develop a monitoring plan with a detail of items to be monitored, parameters to be monitored, frequency of monitoring and reporting schedule
- Monitoring plan to include all set targets listed under objectives and targets
- Keep records of inspections, calibration and maintenance activity
- Ensure that test results to be distributed to relevant personnel for analysis and action

- Install sufficient flow meters to develop adequate water balance and for adequate water management
- Monitor use of natural resources such as electricity and water
- Monitor rehabilitation
- Keep all monitoring records
- Report annually or according to set time frames stipulated in the monitoring plan

(1.3) Performance assessment

An internal Environmental Auditor will be appointed by Zastrocode. The environmental auditor shall be commissioned to undertake an environmental audit on a yearly basis. The yearly audits shall include:

- Undertaking site inspections to determine whether compliance with this operational EMPr;
- Compilation of annual audit reports;
- Identifying areas of non-compliance, and recommending measures to rectify.

Zastrocode will conduct these internal audits, to check compliance of project activities with the approved EMP. The site will be visited and any non-compliance will be addressed through development of corrective actions. The corrective actions will be assigned to responsible personnel who will then implement them. EMP performance will be part of weekly project meetings.

Internal audits will be conducted six monthly and on each audit occasion an official report will be compiled by the relevant auditor to report the findings of the audits, which must be made available to the external auditor.

Zastrocode will appoint an independent external auditor to audit the site bi-annually and this auditor will compile an audit report documenting the findings of his audit, which will then be submitted by DMR and any other regulatory authorities affected by the activities covered in the audit, if necessary.

All site personnel will be given a copy of the management measures committed to in this EMPr, to keep with them during the duration of the construction activities. Internal audits will be conducted on a weekly and monthly basis to check compliance with the approved EMP. During the internal audits, the site will be visited and any non-compliance identified will be addressed through development of corrective actions. The corrective actions will be assigned to site safety representative on site, who will then implement them. The project/site engineer will follow-up on the corrective actions on a weekly basis and sign them off once satisfied that they have been implemented.

In addition to the above-mentioned performance and monitoring commitments, Zastrocode shall adopt the following strategies to ensure that the commitments stipulated in this EMP are adhered to:

- Develop a procedure for ensuring that the company identifies and allocates human, technical and financial resources necessary to meet its environmental objectives and targets;
- Review EMS procedures and ensure that human resources are allocated to set environmental management objectives;
- Define roles and responsibilities and link these two key performance areas to ensure that key performance areas of identified environmental responsible personnel to include environmental obligations;
- Review complaints registers or other procedures to ensure that concerns concerning environmental performance and compliance raised by personnel are received and addressed;
- Update environmental awareness plan annually and implement;
- Focus training on means on enhancing ability of personnel to ensure compliance with environmental requirements;
- Conduct environmental inductions for contractors and subcontractors; and
- Conduct environmental inductions for employees.

In addition, the following initiatives will be adhered to:

- New opportunities to be communicated to relevant affected parties through an agreed formal communication channel and concerns to be incorporated into feasibility decisions;
- Complaints registers to be utilised and reviewed and corrective actions done;
- Interested and affected parties (I&APs) concern to be incorporated into project implementation;
- Internal communication to be strengthened to support continual improvement.

Table k1 - 1: Mechanisms for monitoring compliance

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
Drilling and exploration activities	Potential contamination of surface water due to oil / fuel / lubricant / drill fluid spill	<p>Chemical water tests at designated points. Build up database and graph the results. Compare with limits and take action on non-conformances.</p> <p>It is proposed to regularly sample for those constituents found in the potential contaminants and parameters affected by such i.e. Total Petroleum Hydrocarbon, Electrical Conductivity, pH, TDS, SS, Cl, SO₄, Na, F, Fe, Al, Mn, Zn, Total Alkalinity, turbidity</p>	ECO and designated project managers	<p>All the data will be in a data base from Zastrocode will be compiled in accordance with legal requirements and the requirements of the Water Monitoring and Measurement Guideline.</p> <p>Trend analysis will be conducted to assess possible trends and/or changes with regard to water quality by tracking the contaminants of concern as indicators of pollution.</p> <p>Reporting on the surface water quality will be done by means of monthly, quarterly and annual reports. frequency of reporting will be as follows:</p> <p>Monthly -Internal Data Report Quarterly-Data Report to Authorities</p>

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
				Annually -Annual Status / Audit Report
		<p>The objective of the groundwater monitoring system is the following:</p> <p>Assess possible trends and/or changes with regard to groundwater quality by tracking contaminants of concern as indicators of pollution;</p> <p>To monitor the water quality of the groundwater monitoring boreholes, in order to gather more data to inform the calibration and updating of the</p>	ECO	<p>The quarterly reports will be guided by the authority requirements and might contain brief compliance assessment description, brief description of monitoring actions performed and flow characteristics as well as geographic presentations of monitoring points.</p> <p>The annual reports will also be guided by the applicable statutory requirements and relevant resource quality objectives and</p>

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		<p>numerical groundwater model; and</p> <p>To monitor the water quantity of the groundwater in order to assess compliance with water quantity requirements stipulated by regulatory authorities.</p> <p>A groundwater monitoring programme has been developed for implementation and the locations of the sampling points.</p> <p>In addition, the recommendations contained in the DW&S's Best Practice Guideline: 'Water Monitoring Systems', dated July 2007, will be taken into consideration when groundwater monitoring is conducted in mining operation.</p> <p>Samples will be analysed for chemical and physical</p>		<p>SANS 241 and other applicable standards.</p>

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		constituents normally associated with expected contaminants.		
		If in the opinion of the ECO, environmental pollution nuisance or health risks maybe or are occurring on site, Zastrocode will initiate an investigation into the cause of the problem or suspected problem. Such investigation will include monitoring of the relevant environmental pollution, nuisance and health risk variables, at those monitoring points and such frequency to be determined in consultation with the ECO. Should the investigation reveal any unacceptable levels of pollution, the Zastrocode will prepare	ECO	Quarterly monitoring reports

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		mitigatory measures and rectify the pollution concern.		
Water abstraction points and water reticulation output outlet points	Water conservation	All information obtained during the sampling and analyses of the water samples will be entered into an electronic database. This will allow for structured data storage, and also facilitate optimal information generation. Record total water use Ensure compliance with DW&S standards	ECO	Impact management actions to be implemented on a daily basis. Monitoring reports will be produced quarterly and supported by daily records or checklists.
Natural revegetated areas	Vegetation clearing and dust generation	Map all rehabilitated areas Determine extent of the treated areas Foot inspection Photographs every two weeks for the first month and thereafter every month Keep photographs with detailed record of vegetation establishment	ECO	Monitoring reports will be produced quarterly.

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Camps site All cleared areas	Erosion	Visual inspection Walk over landscaped areas. Check pipelines and pumps; Record and Photograph.	ECO	Quarterly, until closure
Whole site.	Alien infestation	Visual inspection on foot patrol. Map presence of invasive plants. Plan removal, remove and document area covered on monthly basis. Verify. Photographs.	ECO	On-going until under control – then every 6 months.
Monitoring of maintenance of general waste disposal	All loads of waste to be recorded and quantity also recorded	Running total of loads of waste taken.	Until closure	Waste inventory and records to be done weekly with monitoring reports produced quarterly
Fly rock enclosure	Safety and security	Visual inspection	ECO and drilling supervisor	Daily inspection with weekly inspection reports

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Drill borehole rehabilitated areas Old roads	Scarring of the landscape Drainage disturbance	Determine use of borehole plugs or backfill Disturbed areas should be monitored for at least 12 months after the rehabilitation is initiated to check on progress of vegetation rehabilitation and any alien invasion. Visual inspection	ECO and Geologist	At project end
Biodiversity monitoring should be undertaken. This program	Disturbed areas and loss of vegetation	Will include, but is not limited to: Monitoring of the condition of habitats, ecosystems, topsoil stockpiles, species inventory and alien vegetation control.	ECO and designated ecological specialist	Quarterly audit of condition of vegetation around drill sites and submit report at the end of project.
Monitoring of erosion Roads Rehabilitated drilling sites Any other areas	Every 2 months and following any heavy rainfall	Visual inspection Walk over rehabilitated areas Drive along roads Photographic records	DMR and DW&S	
Monitoring of disposal of metal scrap, drill fluids / additives, old oil, oil filters, old oil drums, oily cloths,	Pollution of surrounding environment	Record each load sent off the site	ECO and Designated engineer	Monthly report and submit quarterly

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batteries, tyres and contaminated soil. (Hazardous waste site)		Ensure safe disposal certificates are obtained from suppliers if the material are given back to them		
General waste disposal	Odours and pollution of the surrounding environment	Running total of loads of waste taken. Record of waste taken to waste disposal site Keeping records of waste taken to disposal site All loads of waste to be recorded and quantity extrapolated. Covering of waste segregation bins	ECO and Support Services Managers	Monthly
Sewage facilities / portable toilets	Condition and overflow	Visual inspection. Record condition.	ECO and drilling site supervisor	Every 2 months and end of project report

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Bunded areas around diesel / fuel tanks, refueling area, old oil tank; and petrol tanks	Risk of failure and leak and contamination of soils	Visual inspection	ECO and drilling site supervisor	Monthly
Observations of any excavation or ground breaking activities during the construction phase in accordance with the Heritage impact assessment report.	Disturbance of heritage resources	Survey to identify the status of existing heritage sites during operation	Drilling site supervisor and ECO and Commissioned Heritage Specialist	End of project report
Waste manage sections	Storage and disposal of general waste	Quantities, glass, paper, tins, plastic recycled	ECO and drilling site supervisor	Monthly
Waste management and recycling stations	Storage and disposal of paper waste	Quantities shredded for packaging	ECO and drilling site supervisor	Monthly
Recycling or transfer stations	Generation storage of cardboard boxes	Quantities recycled	ECO and drilling site supervisor	Monthly
Potential release of ozone depleting substance	Potential release of ozone depleting substance	Amount of equipment using this substance	ECO and drilling site supervisor	Annual

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Waste drum generation and storage areas	Storage and disposal of empty drums	Amount back for reuse by supplier	ECO and drilling site supervisor	3 Monthly
Storage and disposal of hazardous(hazardous) waste areas	Storage and disposal of hazardous(hazardous) waste	Amount generated for disposal	ECO and drilling site supervisor	Ad hoc
Storage and use of hazardous substances and raw material areas	Storage and use of hazardous substances and raw material	Number of spillages reported	ECO and drilling site supervisor	Ad hoc
EMPr	Objectives and targets achieved exceeding target dates and those that are overdue	Numbers	ECO and drilling site supervisor	Monthly
Awareness training plan	Awareness training and effectiveness Conducted training Training schedule	Perceptions and number of trained, aware and competent and numbers scheduled.	ECO and drilling site supervisor	Report at the end of the project
Complaint registers	Complaint received	Numbers	ECO and drilling site supervisor	Monthly

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Communication plan	Communiqués sent out	Numbers	ECO and drilling site supervisor	2 Monthly
Emergency response plans	Emergency plans tested	Numbers	ECO and drilling site supervisor	2 Monthly
Internal Audits	Internal Audits done and scheduled	Numbers	ECO and drilling site supervisor	2 Monthly
Management review	Management Review done and scheduled	Numbers	ECO and drilling site supervisor	2 Monthly
Management commitment	Management commitment	Perceptions	ECO and drilling site supervisor	Ad hoc
Management commitment	Management commitment	Resources allocated	ECO and drilling site supervisor	2 Monthly
Dust sources Attenuating fall-out dust relates to all mining and site development activities and relies on pre-establishment consideration of dust risk in terms of location relative to downwind uses, planned disturbance of vegetation exposing the surface to	Dust fall out	Monitoring of fall-out dust would best be achieved by using the DustWatch™ equipment or similar equipment Assess dust source, wind-path and affected receiving environment.	ECO and air quality specialist	Regular periods preferably once per month, collect the dust cups and weigh the dried dust content To be done until project end

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wind generated dust, trafficking of roads and areas where soils are pulverised to significantly increase dust generation potential and to processing activities which may be related to the specific project and present as high dust generating sources.				
Dust sources	Dust plume extent and intensity	As measurement of sand mass in drifts is extremely difficult, the monitoring of dust plumes is to be based on: Visual observation and photographic recordal of plumes within the categorisation of low, medium and high (To be expanded on by the E.C.O.	<ul style="list-style-type: none"> • ECO and air quality specialist 	Regular periods preferably once per month, collect the dust cups and weigh the dried dust content To be done until project end

SOURCE ACTIVITY	IMPACTS REQUIRING MONITORING PROGRAMMES	FUNCTIONAL REQUIREMENTS FOR MONITORING	ROLES AND RESPONSIBILITIES (FOR THE EXECUTION OF THE MONITORING PROGRAMMES)	MONITORING AND REPORTING FREQUENCY and TIME PERIODS FOR IMPLEMENTING IMPACT MANAGEMENT ACTIONS
		<p>based on further observations and categorisation definition).</p> <p>Aerial photo record of plume extent/ advance and intensity.</p> <p>Capture of the plume extent and intensity by .shp polygon overlays and hectarage measurement expressed in a tabled record of measurement plume mapping .shp files as the current baseline data.</p>		
Dust fall out	Intervention success and failures	By DustWatch™ result recordal in spreadsheets and graph generation of the data over the period when attenuations have been applied, the success of intervention can be assessed in terms of reduction of dust expressed in grams/ m ² / day.	ECO and air quality specialist	Over the period when attenuations have been applied

l) Indicate the frequency of the submission of the performance assessment/ environmental audit report.

A performance assessment or environmental audit report will be submitted on a quarterly report. However, for internal purposes, there will be a monthly audit report.

m) Environmental Awareness Plan

(1) Manner in which the applicant intends to inform his or her employees of any environmental risk which may result from their work.

It is important to ensure that the employees have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental harm. Training needs will be identified based on the available and existing capacity of site personnel (including the contractors and sub-contractors) to undertake the required EMP management actions and monitoring activities. It is vital that all personnel are adequately trained to perform their designated tasks to an acceptable standard. The environmental training is aimed at:

- Promoting environmental awareness;
- Informing the contractor of all environmental procedures, policies and programmes applicable;
- Providing generic training on the implementation of environmental management specifications; and
- Providing job-specific environmental training in order to understand the key environmental features of the construction site and the surrounding environment.

(1.1) Objectives

- To ensure the ongoing involvement of representatives in the planning, development and management of the rehabilitation interventions.
- To ensure that there is sufficient training of on-site service providers/contractors whose job responsibilities affect the ability to achieve EMS objectives
- To ensure that training objectives to be set in line with the EMP requirements
- To ensure that personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and /or experience
- To develop a change from a paper system to an effective system of implementing provided training (training translated into observable skill)

(1.2) Guiding principles to achieve the objectives

- Develop environmental awareness implementation plan in line with approved EMPR
- Develop procedure to facilitate training of employees, on-site service providers and contractors
- Training to focus on means on enhancing ability of personnel to ensure compliance with environmental requirements
- Procedures to be established and maintained to make appropriate employees aware of:
 - The significant environmental impacts, actual or potential, of their work activities and environmental benefits of improved personal performance;
 - Their roles and responsibilities in achieving conformance with environmental policy, procedures and any implementation measures
 - The potential consequences of departure from specified operating procedures;
- Identify training and development needs through analysis of role descriptions. The role description is used to confirm the category of occupation as per Zastrocode's structure templates.
- Source descriptions of activities, aspects and impacts from the Environmental Implementation Plan Section/department and use this information to derived a training and development needs matrix
- Compile a training and development needs matrix displaying the environmental responsibility/role, required knowledge and outputs, intervention required and interval of intervention.
- Evaluate training received
- Top management to build awareness and motivate and reward employees
- Environmental policies to be availed to contractors
- Conduct environmental inductions for contractors
- Conduct environmental inductions for employees
- Employees will adequately be educated, as to the provisions included in the EMPr and general environmentally friendly practice;
- The training will, as a minimum, include the following:
 - The importance of conformance with all environmental policies;
 - The environmental impacts, actual or potential, of their work activities;

- The environmental benefits of being accountable and improved personal performance;
- Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirement of the consultant's environmental management systems, including emergency preparedness and response requirements; and
- The mitigation measures required to be implemented when carrying out their work activities.

The matrix below provides a guideline of the sequential process that will be followed to attach the stipulated goals and objectives.

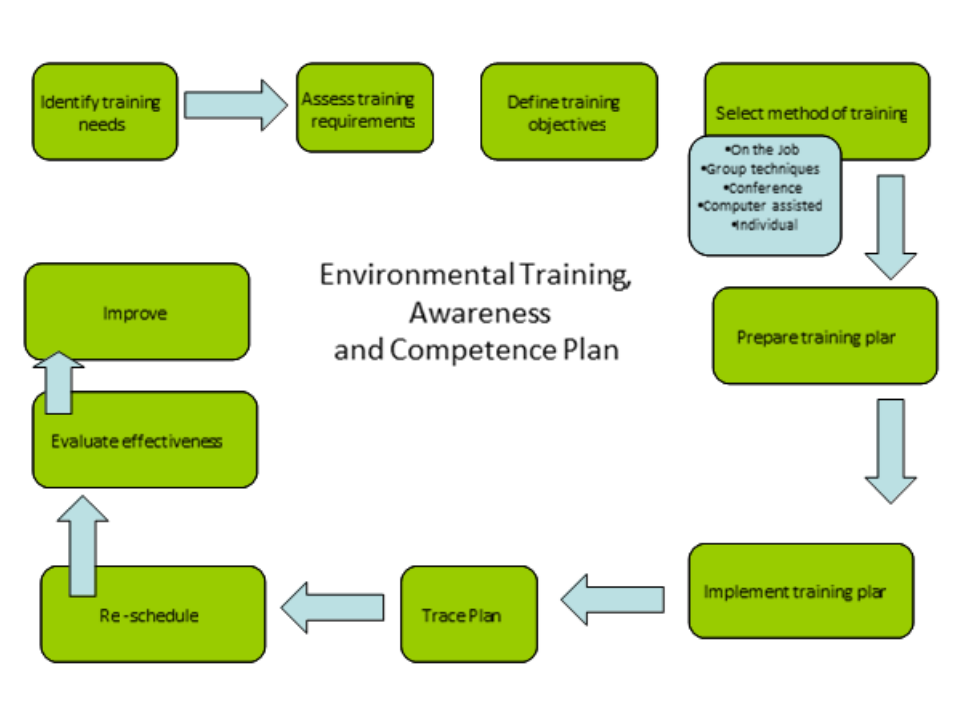


Chart 2: Training matrix

(1.3) Shareholders involvement during all stages of the project

(1.3)1 Objectives

- To ensure the ongoing involvement of representatives in the planning, development and management of the rehabilitation interventions.
- To ensure that the adjacent landowners are informed and updated throughout the development phases.

(1.3)2 Mitigation Measures

- Develop and implement effective mechanisms for ongoing communications with local stakeholders and neighbouring communities.

- Actively participate in local and regional conservation and socio-economic development initiative that may affect or benefit the project during all development phases developmental stages.
- Identify and enable access to employment empowerment and capacity building opportunities for the local community.

(2) Manner in which risks will be dealt with in order to avoid pollution or the degradation of the environment.

(2.1) Risk Documents

This section provides details of the supporting documentation that has been and will be used to identify risks and as such will be utilized during the EMPr implementation process, to ensure management of environmental damage. These are the documents used to identify, track and control risks to the project up to the decommissioning and closure phases. This section will support during the implementation process to ensure that the risks associated with activities, especially closure related risks are captured and addressed promptly.

The numbering is aligned with the title called Risk and as such tables will commence with R for Risk, RR is Risk Register, RG is General Risks, RL is Legislation Related Risks, RM is Management Related Risks, RC is Closure Related Risks.

n) Specific information required by the Competent Authority

(Among others, confirm that the financial provision will be reviewed annually).

The financial provision presented herein will be reviewed annually.

2) UNDERTAKING

The EAP herewith confirms

- a. the correctness of the information provided in the reports;
- b. the inclusion of comments and inputs from stakeholders and I&As;
- c. the inclusion of inputs and recommendations from the specialist reports where relevant; and
- d. that the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein .

BAMT613

Signature of the environmental assessment practitioner:

Myezo Environmental Management Services

Name of company:

14 April 2021

Date: