mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

and

ENVIRONMENTAL MANAGEMENT PROGRAMME REPORT

SUBMITTED FOR ENVIRONMENTAL AUTHORIZATIONS IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 AND THE NATIONAL ENVIRONMENTAL MANAGEMENT WASTE ACT, 2008 IN RESPECT OF LISTTED ACTIVITIES THAT HAVE BEEN TRIGGERED BY APPLICATIONS IN TERMS OF THE MINERAL AND PETROLEUM RESOURCES DEVELOPMENT ACT, 2002 (MPRDA) (AS AMENDED)

NAME OF APPLICANT:	**WEPEX TRADING (PTY) LTD**
CELL NO:	**060 377 3891**
TEL NO:	**010 443 6452**
POSTAL ADDRESS:	**Postnet Suite 246** **Private Bag X43** **SUNNINGHILL** **2157**
PHYSICAL ADDRESS:	**24 Nanyuki Road** **27 Sunninghill Brooke Estates** **SUNNINGHILL** **2157**

FILE REFERENCE NUMBER SAMRAD: **(NC) 30/5/1/2/2/10186 MR**

1. IMPORTANT NOTICE

In terms of the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002 as amended), 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 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, 1998 (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 environmental authorisation 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 Environmental Authorisation being refused.

It is therefore 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 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS

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

(a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;

(b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;

(c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;

(d) determine the—

  (i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and

  (ii) degree to which these impacts—

    (aa) can be reserved;

    (bb) may cause irreplaceable loss of resources; and

    (cc) can be avoided, managed or mitigated.

(e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;

(f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;

(g) identify suitable measures to manage, avoid or mitigate identified impacts; and

(h) identify residual risks that need to be managed and monitored.

PART A

SCOPE OF ASSESSMENT AND ENVIRONMENTAL IMPACT ASSESSMENT REPORT

3. Contact Person and Correspondence Address

a) Details of

i) Details of the EAP

Name of the Practitioner:	**ROELINA OOSTHUIZEN**
Tel No.:	**053 8320029**
Cell No.:	**084 208 9088**
Fax No.:	**086 510 7120**
E-mail address:	**roosthuizen950@gmail.com**

ii) Expertise of the EAP

(1) **The qualifications of the EAP**

Masters in Environmental Management (UFS)
B-Comm in Human and Industrial- Psychology (NWU)
(With evidence attached as **Appendix 1**)

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

(In carrying out the Environmental Impact Assessment Procedure)

Relevant past experiences in carrying out the Environmental Impact Assessment Procedures include Environmental Impact Assessments, Environmental Management Plans/Programmes/ Reports, Performance assessments, Rehabilitation progress assessments, Environmental Liability assessments, Environmental compliance monitoring, Scoping Reports, etc.
Please refer to attached CV.
(with evidence attached as **Appendix 2**)

b) Description of the property

Farm Name:	**Remaining Extent of Gloucester No. 674, situated in the magisterial district of Kuruman.**
Application area (Ha):	**1165.8 ha (One thousand one hundred and sixty-five comma eight hectares in extent)**
Magisterial district:	**Kuruman, Northern Cape Province**
Distance and direction from nearest town:	**The application area is situated ±28km north of Postmasburg and ±54.7km south of Kathu along the R325 provincial road.**
21 digit Surveyor General Code for each farm portion:	**C04100000000067400000**

c) Locality map

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

Figure 1. 1:250 000 topocadastral map indicating the locality of the proposed mining right in red.

d) Description of the scope of the proposed overall activity

(provide 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)

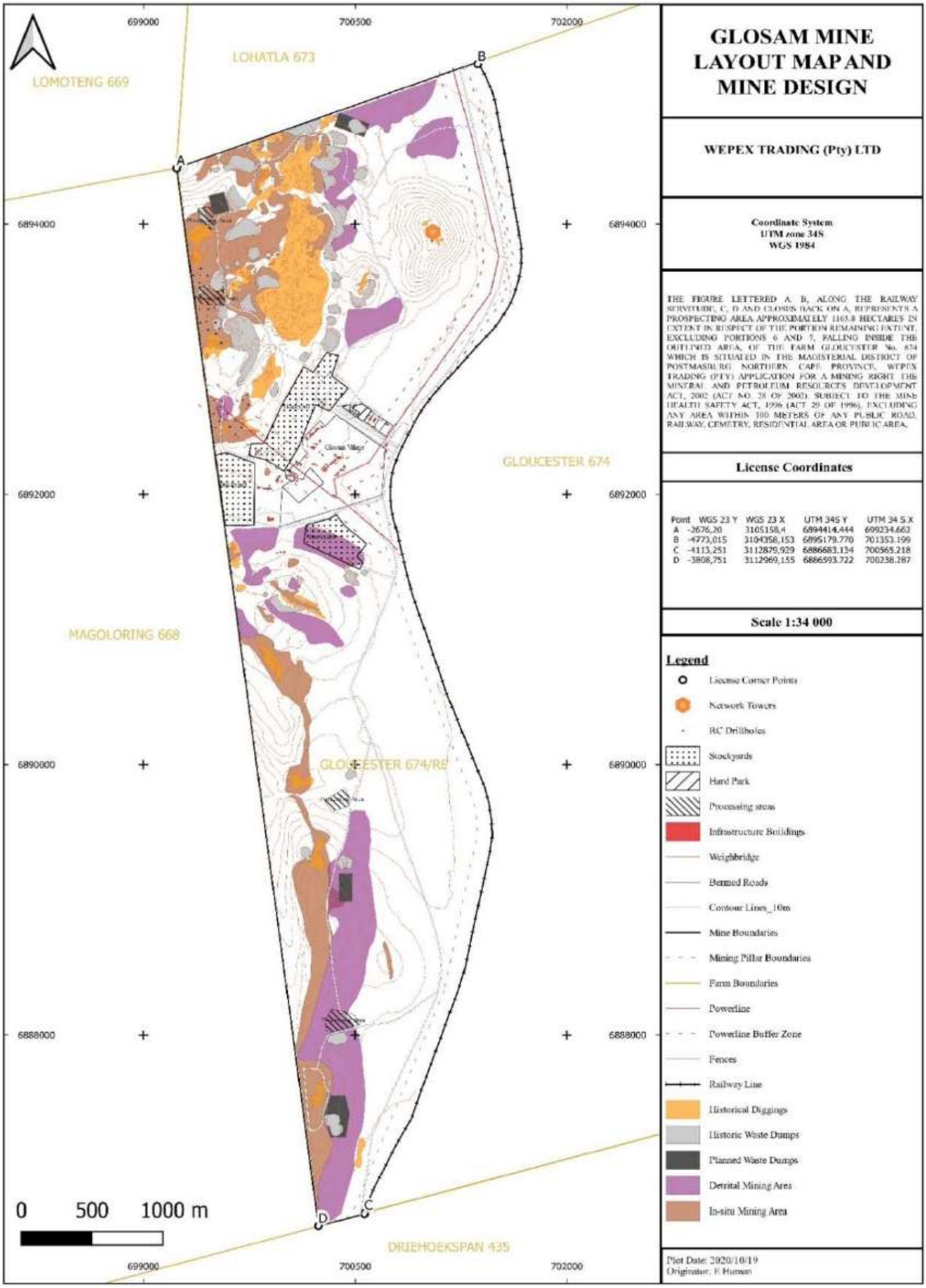


Figure 2. Infrastructure and pit design.

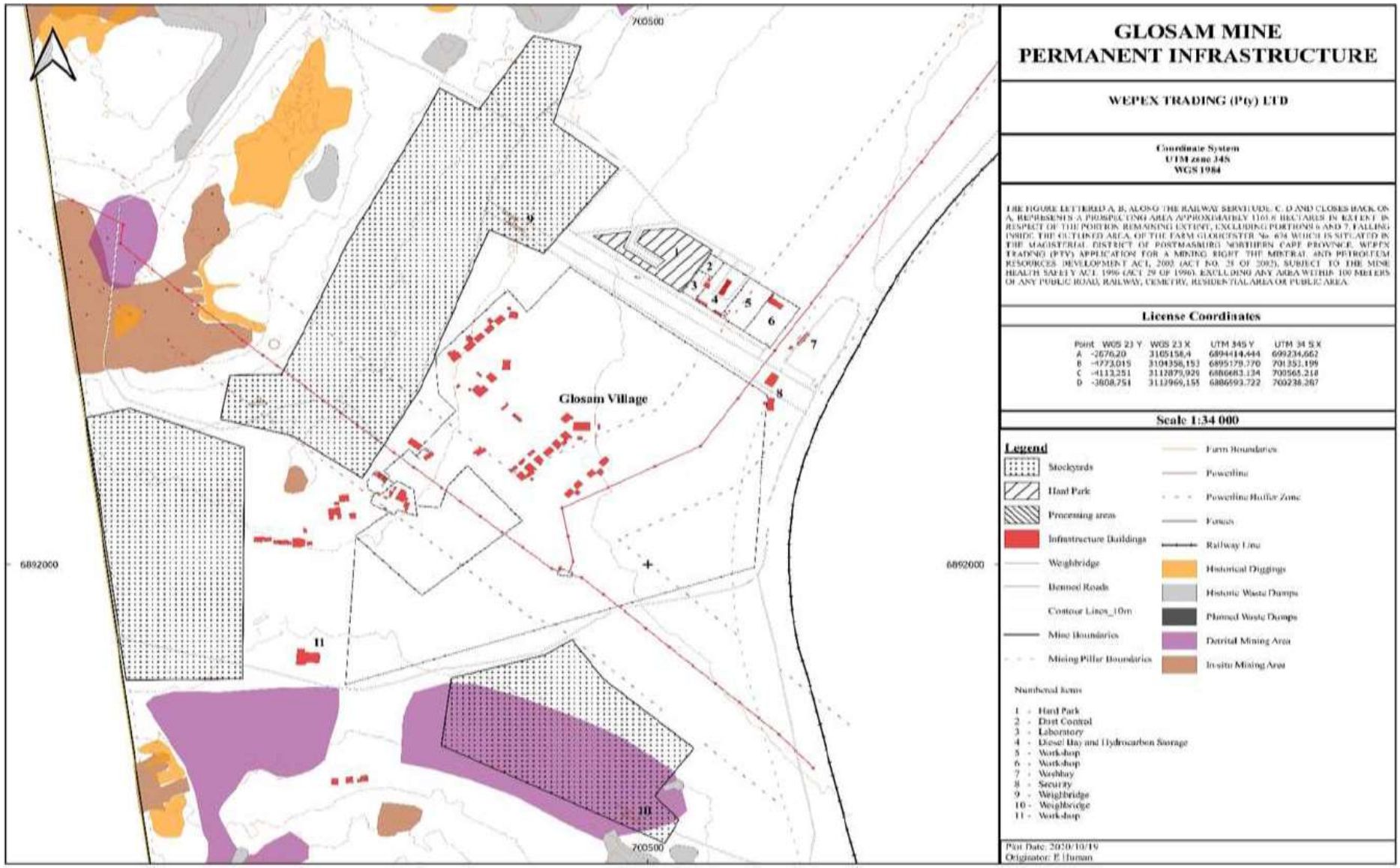


Figure 3. Layout of permanent infrastructure.

i) Listed and specified activities

Table 1: Listed and Specified Activities

Name of activity (e.g. 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…etc…etc.)		Aerial extent of the activity (Ha or m²)	Listed Activity (mark with an X where applicable or affected)	Applicable Listing Notice (GNR544, GNR545 or GNR546 / Not listed GNR983, GNR984, GNR985/ Not listed)
1	Blasting: The mine may if necessary, blast blocks with a typical dimension of 25-meter x 50-meter x 10 meter. A mining block will typically have 128 holes with a hole diameter of 165-171mm, a depth of 10 meter with a sub drill of 1 meter. Eleven blocks will be blasted on average per month. Blasting will be conducted once a week when the mine is in full production. Approximately 164kg of explosives is placed in one blast hole.	The size of the blasts will be determined if and when necessary, by the practical blast block design and the production rate required from the mine.	X	GNR 325[1]: Activity 15: *"The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for:* *(i) The undertaking of a linear activity; or* *(ii) Maintenance purposes undertaken in accordance with a maintenance management plan."* GNR 325: Activity 17: *"Any activity including the operation of that activity which requires a mining right [section 22 of MPRDA], including-* *a) Infrastructure, structures and earthworks, directly related to the extraction of a mineral resource…"* or *b) The primary processing of a mineral resource including winning, extraction, classifying, concentrating, crushing, screening or washing; but excluding the secondary processing of a mineral resource, including the smelting, beneficiation, reduction, refining, calcining or gasification of the mineral resource in which case activity 6 in this notice applies."* GNR 327: Activity 30: "Any process or activity identified in terms of section 53(1) of the National Environmental

				Management: Biodiversity Act, 2004 (Act No. 10 of 2004)."
2	Explosive Magazine: The mine may need two magazines to store the different explosive products namely • 200 case detonator and accessories magazine (3 meter x 6 meter) • 200 case explosives magazine (3 meter x 6 meter) The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meter away from the magazine. The CIE determines the safety radius necessary, but the typical approved radiuses have been • 90 meter for the inner radius • 180 for the outer radius No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius. The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.	This will only be indicated on the layout plan when and if it becomes necessary. 50m x 40m = 2000m² Inner radius area = 3.14 x (radius squared) = 25 434 m² Outer radius area = 3.14 x (radius squared) = 101 736 m² (10.1736ha)		GNR 327: Activity 27 "The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or (ii) maintenance purposes undertaken in accordance with a maintenance management plan." GNR325: Activity 17 (Keep in consideration Mine Health and Safety Act, 29 of 1996 and regulations specifically Section 23.4(o) and Regulation 4, as well as Explosives Act 15 of 2003).
3	Sewage facilities x 2 Ablution facilities	Footprint included into the office space.	X	GNR 327: Activity 25: "The development and related operation of facilities or infrastructure for the treatment of effluent, wastewater or sewage with a daily throughput capacity of more than 2000 cubic metres but less than 15000 cubic metres."

4	Clean & Dirty water system: Stormwater dam It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.	The size and length of the berms, trenches and stormwater dam will be directly affected by the topology of the area and the locality of the infrastructure. During the development of the infrastructure plan provision was made for an area of 45m x 35m as part of the plant area to create different dams for fresh water, process water and water from sewage plants and oil separator (specific capacities for these dams have not been calculated).	X	GNR 327: Activity 12: "The development of— (i) canals exceeding 100 square metres in size; (ii) channels exceeding 100 square metres in size; (iii) bridges exceeding 100 square metres in size; (iv) dams, where the dam, including infrastructure and water surface area, exceeds 100 square metres in size; (v) weirs, where the weir, including infrastructure and water surface area, exceeds 100 square metres in size; (vi) bulk storm water outlet structures exceeding 100 square metres in size; (vii)buildings exceeding 100 square metres in size; or (xi) infrastructure or structures with a physical footprint of 100 square metres or more; The development of i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse"

				Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) GNR325: Activity 17 Consideration of GN704 – MPRDA
5	Fuel Storage facility (Diesel tanks): It is anticipated that the operation will utilize 4 x 17 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place. Re-fuel and lube station.	5 196m² Fenced off and cleared area Concrete, bricks, and steel 310 m2 Bund Walls 600m² Concrete Floor Pipes, concrete, bricks and steel	X	GNR325: Activity 17 GNR 327: Activity 14: "The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 80 but not exceeding 500 cubic meters."
6	Mining Area: The mining process will be initiated by drilling of blast holes if necessary. These holes will then be blasted if necessary, where after the ore will be loaded from the open excavations and hauled to the processing plant.	Provision is made for a maximum footprint (at full production) of 3 500 000m² or 350 hectares of open excavations at any one time.	X	GNR325: Activity 15 GNR325: Activity 17
7	Generator: (8 X 30-100 KW) The mine infrastructure plan made provision for a brick building that will house the generators for power generation on site if power will be generated by means of diesel generators. Electricity will be distributed on site per overhead powerlines as indicated on the infrastructure plan.	2m x 1.5m = 3.5m² 3.5m2 x 8 = 28m² Generator, Electric wires/powerlines, building of concrete, bricks and steel	X	GNR325: Activity 17

8	Office 1 x Lab and Diesel bay Office 1 x Lab Building	Weighbridge Offices 2 x100m² = 200m² Lab and Diesel bay Office 150m² Lab Building 120m2 Bricks, concrete, doors, windows or pre-fabricated office blocks on concrete	X	GNR325: Activity 17
9	Parking Bay: It is anticipated that vegetation will be cleared in this area and superfine material will be used as groundcover.	100m x 150m = 1.5Ha	X	GNR325: Activity 15 GNR325: Activity 17 GNR327: Activity 30
10	Processing plant: The processing of ore will be a dry process, with the option to convert to a 'wet' process after full production has been reached. Crushing and screening will be done by mobile plants without the construction of any permanent buildings. After full production a semi-permanent separation plant and semi-permanent crushing plant will be constructed.	300m² Steel, concrete, electric wires	X	GNR325: Activity 15 GNR325: Activity 17
11	Roads (both access and haulage road on the mine site): Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 7-8 km of roads, with a width of 20 meter. The width of the road is based on an operating width of the haul trucks of 5 meter. Best practice and the guideline from the DMR is to allow for 4 x Operating width of haul truck, in	Additional mine haul road = 8 000 meter x 20 meter wide = 160 000 m²	X	GNR3272: Activity 24(ii): "The development of a road – (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 meters." GNR327: Activity 56(ii): "The widening of a road by more than 6 meters, or the lengthening of a road by more than 1 kilometer – (iii) where no reserve exists, where the existing road is wider than 8 meters… "

	this case 20 meter wide roads. An existing service road providing access to the north and the south of the farm will be upgraded to DMR regulations and be used as the main service road. The current access road next to the railway line is deemed adequate for a service road into the mine.			GNR325: Activity 17 GNR325: Activity 27 (iv): "The development of a road— (iv) catering for more than one lane of traffic in both directions;"
12	Salvage yard (Storage and laydown area)	2 000m² or 2ha No construction material, area to be levelled with a grader and fenced with a gate and access control	X	GNR325: Activity 17
13	Security Gate and guard house at access control point	675m² Concrete, bricks, steel and levelled parking area.	X	GNR325: Activity 17
14	Product Stockpile area	Provision is made for a maximum footprint (at full production) of 500 000 m² or 5 hectare for the stockpile area at any one time.	X	GNR325: Activity 15 GNR325: Activity 17
15	Ore Stockpile dumps	79 000m² Run of Mine dumps	X	GNR325: Activity 15 GNR325: Activity 17
16	Storage facility: Drill Cores Currently not planned	150m² Concrete and Steel	X	GNR325: Activity 17
17	Stormwater dam It is anticipated that the operation will construct a stormwater dam.	20m X 50m = 0.1 Ha	X	GNR325: Activity 17
18	Mining Area: The mining process will be initiated by drilling of blast holes if necessary. These holes will then be	Provision is made for a maximum footprint (at full production) of	X	GNR324: Activity 12(g)(i)"Within any critically endangered or endangered ecosystem listed in terms

	blasted if necessary, where after the ore will be loaded from the open excavations and hauled to the processing plant.	3 500 000m² or 350 hectares of open excavations at any one time.		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 the National Spacial Biodiversity Assessment 2004; (ii) Within critical biodiversity areas identified in bioregional pans."
19	Subgrade stockpile area 5 stockpiles 5 x 1.5 hectare	Provision is made for a maximum footprint (at full production) of 7.5 hectare for this stockpile area at any one time.	X	GNR325: Activity 15 GNR325: Activity 17
20	Topsoil storage area (temporary) Topsoil dumps X3 3 x 0.5 hectare	Provision is made for a maximum footprint (at full production) of 15 000 m2 or 1.5 hectare for this area at any one time.	X	GNR325: Activity 15 GNR325: Activity 17
21	Waste disposal site (domestic and industrial waste): It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area: • Small amounts of low-level hazardous waste in suitable receptacles. • Domestic waste. • Industrial waste.	7 x 20m² = 140m²	X	GNR325: Activity 17
22	The rock dump will be rehabilitated by sloping it to an angle of 18 degrees and revegetate it by the end of life of mine.	Provision is made for a maximum footprint (at full production) of 100	X	GNR325: Activity 15 GNR325: Activity 17 NEMWA: Category B

	The mine will include the concurrent rehabilitation in future mine planning. Waste will be backfilled into historically excavated areas	000 m² or 10 hectares for waste rock dumps at any one time.		GNR 633: Activity 11: "The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right …"
23	Workshop and Wash bay	245m² Concrete and Steel	X	GNR325: Activity 17
24	Water distribution Pipeline	HDPE Pipes	X	GNR325: Activity 9 "…"
25	Water tanks: It is anticipated that the operation will establish a minimum of 8 x 10 000 litre water tanks with purifiers for potable water.	3m x 3m = 9m² each	X	GNR325: Activity 17
26	Weighbridge	600m² Concrete platforms/ramps, steel	X	GNR325: Activity 17
27	Weighbridge control room – two offices	2 x 9m x 20m = 360m² (included on mine lay-out plan)	X	GNR325: Activity 17

ii) Description of the activities to be undertaken

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

- **Mining Method:**

  Where present, vegetated soil overlying the planned mining area will be stripped prior to mining and stockpiled on a dedicated dump to be used for rehabilitation purposes at a later stage. Mining will be done by the conventional opencast mining method. Access to the opencast mining areas will be provided by a number of haul roads to the crushing and screening plant.

  The overview of the mining method will be an open cast mining whereby the ore will be excavated with excavators, sand removed, the ore loaded onto articulated dump trucks from the open pit and hauled to the crushing and screening plant.

  Production drilling of the mine, if required, will utilize a standard hole diameter which will be 165 mm and the hole depth about 20 m allowing for the 15m bench height and 0.5m for sub drilling in ore.

  Loading of waste and ore respectively will use the excavators; ADTs, Front End Loaders and TLBs. Waste material of manganese will be loaded separately on the articulated dump trucks and hauled to their destination.

  Hauling of manganese to the modular crusher and screening plant where the ore will be dumped on the crushing floor for processing through the plant or hauled to the sub-grade stockpile area. The ore will be utilized in the future mine plan for blending purpose. And the waste will be hauled to the permanent waste rock dumps and also to the mined-out areas for backfilling purposes.

- **Processing Method:**

  Technique

  During the mining process overburden (waste material) will be removed from the manganese ore. The manganese ore will be mined selectively to ensure that only on-grade material is transported to the Run of Mine (ROM) stockpile at the plant. The mining equipment selected for the mine will enable the mine to carry out the selective mining process. The selective mining process will be controlled by the mine's geologists. From the mine the manganese ore will be transported to the plant. The plant process is a standard crushing and screening process to create a marketable product with a particle sizing of -100mm +8mm.

  Technology

  The technology applied will be a jaw crusher, a cone crusher (if required) and a multi-deck screen. The final product will have a particle sizing of -100mm to +8 mm and a manganese content of +28%Mn. A laboratory will be established on site to supply chemical values for analysis by the geologist for production grade control and final product grade control. The laboratory will utilise an XRF-analyser (x-ray fluorescence) to determine the manganese content for samples from above mentioned processes.

Equipment that will be utilised in and at the processing plant including:

- Crushers
- 8 x Genset (30 - 100 Kva) (Standby)
- Various Conveyers
- Excavators
- Front end Loaders
- Water trucks for dust suppression

- Production Rates:

Wepex Trading (Pty) Ltd is on site and therefore production will continue with the current plant and equipment.

Expansions on the current infrastructure and plant will be undertaken in 2022 in order to ramp up production to produce approximately 500 000 tonnes per annum of marketable manganese.

All legal and other processes will be undertaken during 2020 and 2021 for obtaining the Mining Right including the technical sign-off on additional plant and mining infrastructure and equipment and based on the assumption that the Mining Right will be issued by the Department of Mineral Resources.

Wepex Trading is already on site and has been issued with an authorisation for bulk sampling on the property. Screening and crushing operations are therefore already taking place, not to the extent that the Mining Right will allow but the production build-up period is envisaged to be 6 – 8 months to full production.

The period applied for is 12 years, and is calculated at 11 years including 6-8 months for the production build-up period.

Current production and economic (low price and production) factors including recovering a sealable product from dumps through the application of technology may further increase the production period of the mine.

New Technology available to operators also increase the efficiency of the mining operations and even provides opportunity for reworking waste dumps and old "mined out" areas with remarkable results and profit margins.

The production rate is calculated on the assumption that the mine is fully operational for the entire year and does not consider weather patterns, mine stoppages or labour unrest which may have considerable negative effects on production.

A comprehensive fleet determination was done by Wepex Trading considering the material that need to be excavated, and hauled from the opencast mining operation.

Wepex determined the fleet based on a 1000 000 tonne per annum ROM with a stripping ratio of 1.9. Most of the Equipment will be secured through rental agreements with contractors. Wepex Trading has most of the agreements in place as bulk sampling activities will continue until the Mining Right is secured.

The plant will operate for 264 days per year for ~9 hours per day (Sundays, public holidays and days when rain prevent production have been taken in consideration).

The average plant production per day will thus be ~2,638 tonnes/day at an average of 293 tonnes/hour.

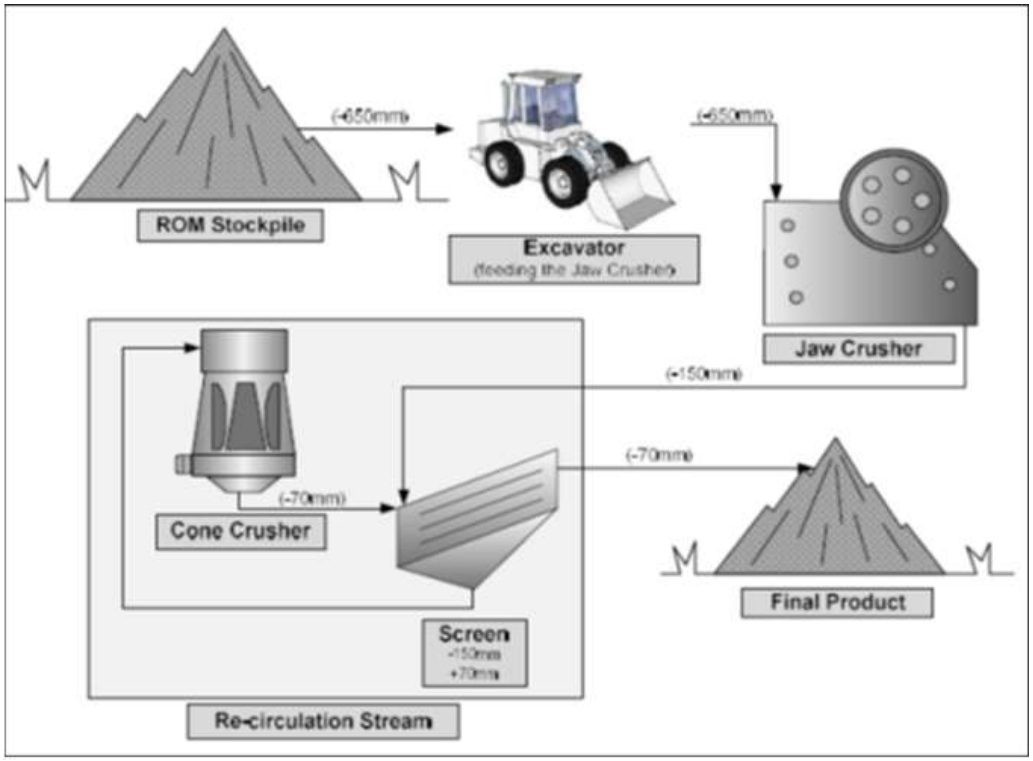


Figure 4. Conceptual Schematic Flow Diagram of the Plant Layout.

e) Policy and Legislative Context

Applicable Legislation and Guidelines used to compile the report (a description of the policy and legislative context within which the development is proposed including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process.)	Reference where applied	HOW DOES THIS DEVELOPMENT COMPLY WITH AND RESPOND TO THE POLICY AND LEGISLATIVE CONTEXT (E.g In terms of the National Water Act:-Water Use License has/has not been applied for).
Conservation of Agricultural Resources Act (Act 43 of 1983) and Regulations (CARA)	- Section 5: Implementation of control measures for alien and invasive plant species; - Section 6: Control measures. - Regulation GN R1048, published on 25 May 1984, in terms of CARA	- Control measures are to be implemented upon the approval of the EMPR.
Constitution of South Africa (Act 108 of 1996)	- Section 24: Environmental right - Section 25: Rights in Property - Section 27: Water and sanitation right	- To be implemented upon the approval of the EMPR.
Environment Conservation Act (Act 73 of 1989) and Regulations (ECA)	- Sections 21, 22, 25, 26 and 28: EIA Regulations, including listed activities that still relate to the existing section of ECA. - Section 28A: Exemptions.	- To be implemented upon the approval of the EMPR.
Fencing Act (Act 31 of 1963)	- Section 17: States that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5m on each side thereof and remove any tree standing in the immediate line of	- Control measures are to be implemented upon the approval of the EMPR.

	the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.	
Hazardous Substances Act (Act 15 of 1973) and Regulations read together with NEMA and NEMWA	- Definition, classification, use, operation, modification, disposal or dumping of hazardous substances.	- Noted and Considered measures are to be implemented upon the approval of the EMPR.
Intergovernmental Relations Act (Act 13 of 2005)	- This Act establishes a framework for the National, Provincial and Local Governments to promote and facilitate intergovernmental relations.	
Mine, Health and Safety Act (Act 29 of 1996) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Mineral and Petroleum Resources Development Act (Act 28 of 2002) and Regulations as amended	- Entire Act. - Regulations GN R527	- A Mining Right has been applied for (NC) 30/5/1/2/2/10186 MR. - Rights and obligations to be adhered to.
National Environmental Management Act (Act 107 of 1998) and Regulations as amended	- Section 2: Strategic environmental management principles, goals and objectives. - Section 24: Foundation for Environmental Management frameworks. - Section 24N: - Section 24O: - Section 28: The developer has a general duty to care for the environment and to institute such measures to demonstrate such care. - Regulations GN R547, more specifically Chapters 5 and 7, where applicable (the remainder was repealed) published on 18 June 2010 in terms of	- Control measures are to be implemented upon the approval of the EMPR.

	NEMA (Environmental Management Framework Regulations) - Regulations GN R982 to R985, published on 4 December 2014 in terms of NEMA (Listed Activities) - Regulations GN R993, published on 8 December 2014 in terms of NEMA (Appeal) - Regulations GN R994, published on 8 December 2014 in terms of NEMA (exemption) - Regulations GN R205, published on 12 March 2015 in terms of NEMA (National appeal Amendment Regulations) - Regulations GN R1147, published on 20 November 2015 in terms of NEMA (Financial Provision)	
National Environmental Management: Air Quality Act (Act 39 of 2004)	- Section 32: Control of dust - Section 34: Control of noise - Section 35: Control of offensive odours - Regulation GN R551, published on 12 June 2015 (amended Categories 1 to 5 of GN 983) in terms of NEM: AQA (Atmospheric emission which have a significant detrimental effect on the environment) - Regulation GN R283, published on 2 April 2015 in terms of NEM: AQA (National Atmospheric Emissions Reporting Regulations) (Group C-Mines)	- Control measures are to be implemented upon the approval of the EMPR. - This is also legislated by Mine Health and Safety from DMR and is to be adhered to.
National Environmental Management: Biodiversity Act (Act 10 of 2004)	- Section 52 of The National Environmental Management Act: Biodiversity Act (NEMBA) (Act 10 of 2004) states that the MEC/Minister is to list ecosystems that are threatened and in need of protection.	- A permit application regarding protected plant species needs to be lodged with DENC if any protected species is encountered.

	- Section 53 states that the Minister may identify any process or activity in such a listed ecosystem as a threatening process. - A list of threatened and protected species has been published in terms of Section 56(1) GG 29657 GNR 151 and GNR 152, Threatened or Protected Species Regulations. Commencement of Threatened or Protected Species Regulations 2007 : 1 June 2007 GNR 150/GG 29657/23-02-2007 Publication of lists of critically endangered, vulnerable and protected species GNR 151/GG 29657/23-02-2007 * Threatened or Protected Species Regulations GNR 152/GG 296547/23-02-2007 * - Sections 65 – 69: These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species. - Sections 71 and 73: These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.	

	- Regulation GN R151, published on 23 February 2007 (List of Critically Endangered, Vulnerable and Protected Species, 2007) in terms of NEM: BA - Regulation GN R152, published on 23 February 2007 (TOPS) in terms of NEM:BA - Regulations GN R507 to 509 of 2013 and GN 599 of 2014 in terms of NEM:BA (Alien Species)	
The National Environmental Management Act: Protected Areas Act (NEMPAA) (Act 57 of 2003) provides for the protection of ecologically viable areas that are representative of South Africa's natural biodiversity and its landscapes and seascapes.	- Chapter 2 lists all protected areas.	-
National Environmental Management: Waste Management Act (Act 59 of 2008)	- Chapter 4: Waste management activities - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations) - Regulations GN R921 published on 29 November 2013 in terms of NEM: WA (Categories A to C – Listed activities) - National Norms and Standards for the Remediation of contaminated Land and Soil Quality published on 2 May 2014 in terms of NEM:WA (Contaminated land regulations) - Regulations GN R634 published on 23 August 2013 in terms of NEM: WA (Waste Classification and Management Regulations)	- To be implemented upon the approval of the EMPR.

	- Regulations GN R632 published on 24 July 2015 in terms of NEM: WA (Planning and Management of Mineral Residue Deposits and Mineral Residue Stockpiles) - Regulations GN R633 published on 24 July 2015 in terms of NEM: WA (Amendments to the waste management activities list published under GN921)	
National Forest Act (Act 84 of 1998) and Regulations	- Section 15: No person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.	- A permit application regarding protected tree species needs to be lodged with DAFF if necessary. - Control measures are to be implemented upon the approval of the EMPR.
National Heritage Resources Act (Act 25 of 1999) and Regulations	- Section 34: No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority. - Section 35: No person may, without a permit issued by the responsible heritage resources authority destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or paleontological site. - Section 36: No person may, without a permit issued by SAHRA or a provincial heritage resources authority destroy, damage, alter, exhume, remove from its original position or otherwise disturb any grave or burial ground older than 60 years which is situated outside a forma cemetery administered by a local authority.	- Control measures are to be implemented upon the approval of the EMPR. Fossil finds procedure are attached to the PIA.

	- Section 38: This section provides for HIA which are not already covered under the ECA. Where they are covered under the ECA the provincial heritage resources authorities must be notified of a proposed project and must be consulted during HIA process. - Regulation GN R548 published on 2 June 2000 in terms of NHRA	
National Water Act (Act 36 of 1998) and regulations as amended, *inter alia* Government Notice No. 704 of 1999	- Section 4: Use of water and licensing. - Section 19: Prevention and remedying the effects of pollution. - Section 20: Control of emergency incidents. - Section 21: Water uses In terms of Section 21 a licence is required for: (a) taking water from a water resource; (b) storing water; (c) impeding or diverting the flow of water in a watercourse; (f) Waste discharge related water use; (g) disposing of waste in a manner which may detrimentally impact on a water resource; (i) altering the bed, banks, course or characteristics of a watercourse;	- A water use application must be submitted and will be submitted as soon as the EIA EMP had been finalized. - Control measures are to be implemented upon the approval of the EMPR.

	(j) removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people; and; - Regulation GN R704, published on 4 June 1999 in terms of the National Water Act (Use of water for mining and related activities) - Regulation GN R1352, published on 12 November 1999 in terms of the National Water Act (Water use to be registered) - Regulation GN R139, published on 24 February 2012 in terms of the National Water Act (Safety of Dams) - Regulation GN R398, published on 26 March 2004 in terms of the National Water Act (Section 21 (j)) - Regulation GN R399, published on 26 March 2004 in terms of the National Water Act (Section 21 (a) and (b)) - Regulation GN R1198, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i) – rehabilitation of wetlands) - Regulations GN R1199, published on 18 December 2009 in terms of the National Water Act (Section 21 (c) and (i)) - Regulations GN R665, published on 6 September 2013 in terms of the National Water Act (Amended GN 398 and 399 – Section 21 (e), (f), (h), (g), (j))	

Nature Conservation Ordinance (Ord 19 of 1974)	- Chapters 2, 3, 4 and 6: Nature reserves, miscellaneous conservation measures, protection of wild animals other than fish, protection of Flora.	- Control measures are to be implemented upon the approval of the EMPR.
Occupational Health and Safety Act (Act 85 of 1993) and Regulations	- Section 8: General duties of employers to their employees. - Section 9: General duties of employers and self-employed persons to persons other than their employees.	- Control measures are to be implemented upon the approval of the EMPR.
Road Traffic Act (Act 93 of 1997) and Regulations	- Entire Act.	- Control measures are to be implemented upon the approval of the EMPR.
Water Services Amendment Act (Act 30 of 2007)	- It serves to provide the right to basic water and sanitation to the citizens of South Africa (giving effect to section 27 of the Constitution).	- Control measures are to be implemented upon the approval of the EMPR.
National Land Transport Act, (Act 5 of 1998)		- To take note.
Spatial Planning and Land Use Management (Act 16 of 2013 (SPLUMA) and regulations	- To provide a framework for spatial planning and land use management in the Republic; - To specify the relationship between the spatial planning and the land use management, amongst others - Regulations GN R239 published on 23 March 2015 in terms of SPLUMA	- To be implemented upon the approval of the EMPR.
Subdivision of Agricultural Land Act, 70 of 1970 and regulations	- Regulations GN R373 published on 9 March 1979 in terms of Subdivision of Agricultural Land	- To take note.
Basic Conditions of Employment Act (Act 3 of 1997)) as amended	- To regulate employment aspects	- To be implemented upon the approval of the EMPR

Community Development (Act 3 of 1966)	- To promote community development	- To be implemented upon the approval of the EMPR
Development Facilitation (Act 67 of 1995) and regulations	- To provide for planning and development	- To take note.
Development Facilitation (GNR1, GG20775, 07/01/2000)	- Regulations re application rules S26, S46, S59	- To take note.
Development Facilitation (GN732, GG14765, 30/04/2004)	- Determines amount, see S7(b)(ii)	- To take note.
Land Survey Act (Act 8 of 1997) and regulations, more specifically GN R1130	- To control land surveying, beacons etc. and the like; - Agriculture, land survey S10	- To take note.
National Veld and Forest Fire Act (Act 101 of 1998) and regulations, more specifically GN R1775	- To regulate law on veld and forest fires - (Draft regulations s21)	- To be implemented upon approval of the EMPR

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)

A prospecting right has been issued in terms of Section 19 of the MPRDA with a prospecting right number of (NC) 11815 PR which was executed on behalf of the Minister of Mineral Resources on 3 July 2017 on the same property for Wepex. Wepex have also lodged a Mining Right application on the property.

The activity is based on manganese deposits of the Postmasburg Manganese Field that were discovered in 1922 and mined up to 1989. Numerous mining companies of which Associated Manganese Mines of South Africa Ltd (Assmang) and South African Manganese Ltd (Samancor) were the predominant role players in exploiting these deposits. In Figure 5 the manganese ore zone as well as the Reivilo and Gamagara Formations are indicated.

The Gamagara sediments dipping 6° west cover the deposit and where the strip ratio exceeds the economical mining cost, exploitation of the deposit ceased. This deposit might extent westwards (Beukes, 1978), but due to the nature of the deposit no drilling was done to test the continuation. Post-depositional thrusting associated with the Keis Orogeny is visible north-west of Glosam where the Ongeluk Formation has been thrust on the Gamagara Formation.

Younger detrital manganese associated with the presentday erosional surface accumulates along slopes and exposed karst topography. This is visible as scree and gravel on the floor of the mining operation.

- Need:

  Global manganese reserves averaged 680 million tons (Mt) in 2017, with South Africa leading at 29.4 percent, followed by Ukraine and Brazil at 20.6 percent and 17.6 percent, respectively. Global manganese ore production averaged 22.7 Mt, a 42.1 percent increase compared with 2016, with South Africa contributing 62.1 percent, followed by China and Australia at 15.6 percent and 9.7 percent respectively. The increase in global manganese ore production was due to an increase in South Africa's production by 3.1 percent from 13.4kt in 2016.

  South Africa's manganese ore production increased by 2.9 percent to 14.1Mt in 2017 compared to 13.7 Mt in 2016 (Table 2). Export mass increased by 19.2 percent, due to demand for lower grade ore, especially from China. Mines such as Tshipi e Ntle, exported most of the lower grade manganese ore (35 percent and lower manganese ore content), which was previously considered as waste, and formed part of the mine's stockpiles, apart from their higher-grade ore export, thus increasing export mass. South Africa's manganese alloys are dominated by high carbon ferromanganese (HCFeMn), which accounts for about 57.5 percent of the total alloy production, followed by silico-manganese (SiMn) and medium carbon ferromanganese (MCFeMn), at about 34.9 percent and 12.9 percent respectively.

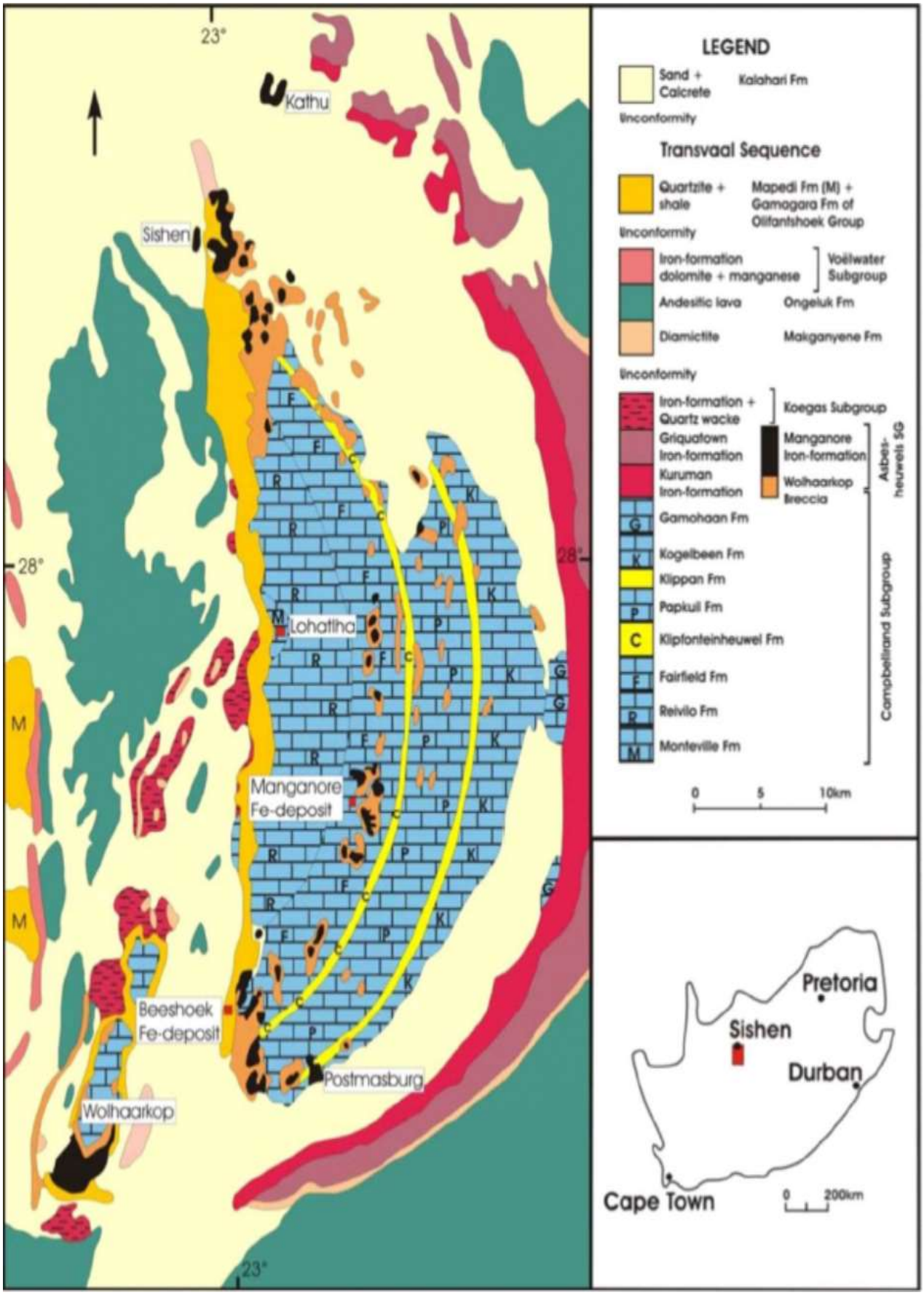


Figure 5. Geological Map of the area (Map out of the Prospecting Work Programme by Minrom).

Table 2: World Manganese ore reserves, production and exports 2016-2017 (Source: DMR Directorate Mineral Economics: 2017)

COUNTRY	RESERVES#			PRODUCTION*			EXPORTS#		
	MT	%	Rank	Mt	%	Rank	Mt	%	Rank
South Africa	200	29.4	1	14.1*	62.1	1	13.4	38.1	1
China	48	7.1	5	2.5	15.6	2	0.36	1.7	7
Australia	94	13.8	4	2.2	9.7	3	5.5	15.6	2
Gabon	20	2.9	7	1.6	7.0	4	4.3	12.2	3
India	34	5.1	6	0.79	3.5	6	1.1	3.1	5
Brazil	120	17.6	3	1.2	5.3	5	2.6	7.4	4
Ukraine	140	20.6	2	0.38	1.7	7	0.8	2.3	6
Other	24	3.5		0.76	3.3		7.1		
2017	680	100		22.7	100		35.2	100	
2016	690			16			21.6		

*Source: +USGS 2018 # CRU Group 2017 # Directorate Mineral Economics, DMR**

Table 3: South Africa's Manganese Ore Production and Sales 2008 to 2017 (Source: DMR Directorate Mineral Economics: 2017)

Year	Production	Local sales		Export sales	
		Mass	Value	Mass	Value
	Kt	Kt	R'000	kt	R'000
2008	6 807	*	1 761	4 689	15 581
2009	4 578	*	583	3 975	5 003
2010	7 171	*	1 320	5 986	9 340
2011	8 651	*	1 325	6 772	8 569
2012	8 943	*	1 134	7 497	9 685
2013	10 957	*	1 506	7 961	12 969
2014	14 051	*	1 644	9 644	14 734
2015	15 952	*	703	10 026	12 657
2016	13 735	*	827	11 245	18 861
2017	14 140	*	1 671	13 403	30 403

Source: DMR, Mineral Economics, 2017, (*) – withheld

Table 4: South Africa's Production and Sales of other Manganese Alloys, 2008 to 2017 (Source: DMR Directorate Mineral Economics: 2017)

Year	Production	Local sales			Export sales		
	mass	Mass	Value	Unit Value	Mass	Value	Unit value
	Kt	kt	R'million	R/kt	kt	R'million	R/kt
2008	762	126	1 767	14 037	682	1 190	17 451
2009	404	68	597	8 839	413	3 624	8 772
2010	790	65	600	9 264	751	7 015	9 338
2011	1 064	54	482	8 927	854	7 407	8 673
2012	882	60	526	8 749	681	6 158	9 037
2013	787	82	737	8 955	577	4 927	8 539
2014	970	104	1 020	9 780	659	6 334	9 619
2015	614	34	365	10 557	496	4 756	9 572
2016	370	25	249	9597	341	3095	9056
2017	458	38	592	15464	271	4068	14968

Source: DMR Directorate, Mineral Economics, 2017

The world's output of manganese ore increased in 2018 for the second consecutive year, on rising demand from manganese alloy smelters. It reached 20.3 million dry mt (Mn contained), up by 6% or 1.2 million dry mt from 2017, exceeding 2014 production of 19.3 million mt and marking a new record high. The additional supply mostly came from Africa and Australia, driven by China, where output decreased because of mine depletion and stricter safety regulations.

- Industrial Application Manganese
  Approximately 85 percent of the manganese units mined from the ground is used in the production of mild and carbon steels. The other, more minor, uses of manganese are in the manufacture of non-ferrous alloys, dry cell batteries, chemicals and agricultural products. Recently the use of manganese in steel making was extended into the production of speciality steels, valve and engineering steels and in the Series Stainless Steels, in which a combination of manganese and nitrogen replace nickel as the austenitizing agent. In its use in steelmaking, manganese is mainly used in the form of bulk alloys (High-Carbon Ferromanganese and Silico Manganese) or in speciality sheets as refined alloy (Medium-Carbon Ferromanganese or Low-Carbon Ferromanganese). Electrolytic Manganese Metal is used as an alloying agent in non-ferrous alloys or as a substitute for refined manganese alloys in the steel industry.

  In its use in crude steel production, the manganese serves to de-sulphurise the molten steel as well as to control the shape of the residual sulphur inclusions in rolled steel products. In addition, manganese is used as an alloying agent, which imparts toughness and hardness to the steel. The extreme example of the application of manganese in this respect is the ultra-hard Hadfield and Rail Steels, which contain 15% manganese.

- Global Street Market
  World crude steel production reached 1 691.2 million tons (Mt) for the year 2017, increasing by 4.0 percent compared to 2016. Crude steel production increased in all regions in 2017, except in the CIS, which remained stable. China's crude steel production in 2017 reached 831.7 Mt, up by 5.7 percent, compared with 2016, with the countries share in steel production increasing to 49.6 percent compared from 49.4 percent. The European Union, an economic and political block, which consists of 28 countries, Belgium, Bulgaria, Czech Republic, Denmark, Germany, Estonia, Ireland, Greece, Spain, France, Croatia, Italy, Cyprus, Latvia, Lithuania, Luxembourg, Hungary, Malta, Netherlands, Austria, Poland, Portugal, Romania, Slovenia, Slovakia, Finland, Sweden, United Kingdom, (EU-28), produced 168.7 Mt of crude steel, an increase of 4.1 percent compared to the previous year.

  There are in excess 700 Steel Producers world-wide producing a total of 1.69 billion tonnes of steel in total. Based on manganese pre-dominant use in steel making, manganese market trends closely follow that of the steel market. However, in the last fifteen years, the production of steel has grown by 1% to 1.5% while the growth in the use of manganese remained static as a result of increased efficiencies in the application of manganese in the steel making process. At present, further increases in the efficiency of manganese application are limited and thus the market for manganese should closely follow that of steel as there is no current or potential substitute for manganese in steelmaking.

In modern steel making practice approximately seven (7) kilograms of manganese alloys are added per tonne of crude steel produced. High rates of growth in China have resulted in a recent increase in the Global unit consumption of manganese to 10.4 kilograms per tonne steel.

The current market for manganese alloys (High-Carbon Ferromanganese, Silico manganese and Medium-Carbon Ferromanganese) is approximately 7.4 Mt of contained manganese per annum (10 Mt of alloy). The production of alloys follows demand fairly closely as stocking and de-stocking cycles as well as scrap returns do not have a major influence within the industry, although purchases from the National Defence Stockpile in the United States of America have an influence on the industry. Manganese ore and alloy production is dominated by the high-grade manganese ore producers namely, BHP Billiton (Samancor), Eramet, CVRD and Assmang although the influence of the low-grade ore producers, particularly in China, has grown in recent years.

The importance of the non-integrated alloy producers is also diminishing as the major producers increase their level of integration. The production volumes in the industry are summarised in Table 5.

Table 5: Production Summary of the Manganese Industry (Rosskill Manganese 2003, International Manganese Institute, Market Research Report, Dec 2005)

Ore Grade	Company	Country	Annual Production Tonnes	
			Ore	Alloy
High	BHP Billiton	South Africa	2 500 000	545 000
		Australia	1 400 000	220 000
	Eramet	Gabon	3 700 000	
		Europe		725 000
		China		250 000
	CVRD	Brazil	2 700 000	243 000
		Europe		185 000
	Assmang	South Africa	2 000 000	227 000
	CML	Australia	1 000 000	
Low	Various	China	9 600 000	4 510 000
	Various	India	2 000 000	756 000
	Various	Ukraine	800 000	336 000
	GML	Ghana	1 500 000	
	Other	Various	6 570 000	
No Ore	Various	Japan		524 000
	Nikopol	Ukraine		970 000
	Other	Various		1 109 000
Total			**32 770 000**	**10 600 000**

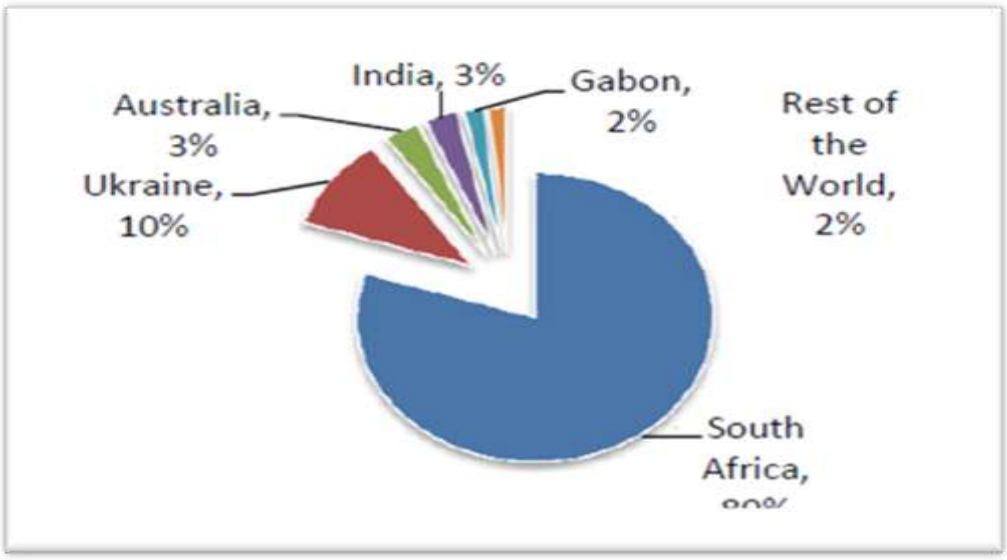


Figure 6. Global Manganese reserves in 2009

- **Desirability:**

  The manganese value chain consists of three segments namely:
  - Ore Producers
  - Alloy Producers
  - Steel Producers

  The ore industry is segmented by ore characteristics and comprises of:
  - High grade ore (Typically ore with more than 35% manganese content producers account for two thirds of production)
  - Low grade ore (Contributing to a third of production)

  The end use customers are primarily steel producers (94%) of demand. Chemical and specialist metallurgical segments contribute the balance of the demand.
  The chemical market demand is for the following:-
  - Dry Cell Manufacture
  - Glass Industry
  - Pigments and Dyeing Material
  - Paint and Varnish Driers
  - Fertiliser
  - Uranium Industry

  The chemical market is a very small proportion of ore used and as the ore produced at Wepex Trading is not intended for this market the main focus will be placed on the Metallurgical Market. Both iron and manganese are used to manufacture steel, ferrous and non-ferrous alloys and pig iron. At least 95% of all ore mined are used in these processes.

  The main buyers of raw iron and manganese ore are India and China, with South Africa having a small local market that is already oversupplied.

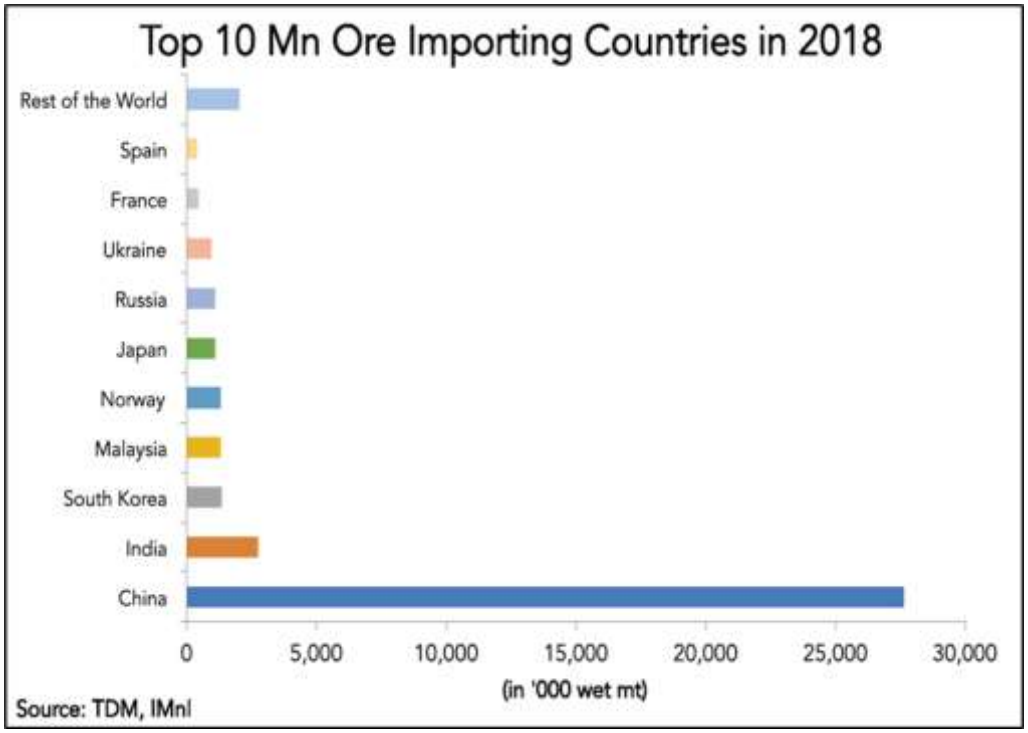


Figure 7. Top ten Ore importing Countries in 2018.

g) Motivation for the preferred development footprint within the approved site including a full description of the process followed to reach the proposed development footprint within the approved 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.

In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. Motivation for the footprint of the actual mining operation (i.e. excavations) will not be provided here, as the location of the mine is determined by the geological location of the mineral resource.

Mine Site Location

Site infrastructure was strategically placed by incorporating mining project demands, environmental sensitivities and IAP concerns, as identified during the EIA process. Thus, the site location is primarily based on proximity to the access roads, proximity to the areas earmarked for mining and limited additional impact on the environment and heritage resource. This renders the consideration of further alternative locations in terms of the mine site location, unnecessary.

The consideration of alternatives is a critical component of the EIA process, where an appropriate range of alternatives require consideration whilst achieving the desired objective of the proposed project. In order to ensure that the proposed development enables sustainable development, a number of feasible options must be explored. The various alternatives were assessed in terms of logistical practicality, environmental acceptability and economic feasibility. Alternatives for the locality of the mining operation do not form part of the discussion as the location of the mine is determined by the geological location of the mineral resources.

Project Infrastructure

Alternatives and considerations pertaining to the project infrastructure were discussed in section g.

The ore is mined by means of conventional opencast techniques (drilling-blasting-load-haul) and requires heavy earth-moving equipment. Vegetated soil is stripped; whereafter, if required, drill rigs are used to drill and blast overburden and ore separately. Bench blocks are drilled using drill rigs to produce blast holes, which are then charged with emulsion explosives if necessary. The Run of Mine (ROM) will be crushed and screened by using the crushing and screening plant. The blasted rock is loaded with excavators into articulated dump trucks and the ore is hauled to the crusher and ore stockpiles. The expected lifespan of the mine is 11 years.

Mining activities will primarily make use of existing roads created by previous mining activities, but additional roads will most likely be created. A crushing and screening plant will also be erected on site.

Land Use

The current land use is grazing, with a low stocking rate for the farm. If the mining operation does not continue, the farming of cattle, sheep and game will persist. The most significant activity associated with grazing is the provision of water. The mining operation will not abstract any ground water.

However, the farm has been mined extensively in the past and various dumps and pits are scattered around the property. Therefore, mining has been determined as the most feasible alternative.

Socio-Economy

Wepex Trading's mining project plan is to employ ±178 people. The non-approval of this mining operation would impact negatively on the employment rate for the region and the families who are likely to benefit from the positive employment opportunities. Simultaneously, it may have a negative effect on the economy of South Africa and the mining industry as a whole. Substantial tax benefits to the State and Local Government will also be lost.

Furthermore, the mining operation's commitment to invest in Human Resource Development, Infrastructure Development Projects, Sustainable Local Economic Development and Small and Medium Enterprises will be lost.

Biodiversity

The implementation of Wepex Trading's mining will have a potential impact on the biodiversity through removal of indigenous vegetation and destruction of habitats. If no mining activities were to continue, the status quo would apply and no damage would accrue to the environment.

Heritage and Cultural Resources

In the event that the mining operation does not proceed, the heritage resources will remain as is. The protection and preservation of these resources are therefore not guaranteed. However, if the mining operation is approved, the heritage resources will be protected through the demarcation of no-go zones and fencing off of graves.

i) Details of the development footprint alternatives considered

With reference to the site plan provided as Figure 2 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;
(b) the type of activity to be undertaken;
(c) the design or layout of the activity;
(d) the technology to be used in the activity;
(e) the operational aspects of the activity; and
(f) the option of not implementing the activity.

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

The registered description of the land to which the Mining Right application relates:

Farm Name	Title Deed	In Extent
Remaining Extent of the Farm Gloucester No. 674, located in the Kuruman District, Northern Cape Province	T654/1966	1 165.8 ha

The property on which the Mining Right was applied for is determined by the geological location of the mineral resource. Therefore, there are no alternatives for the location of the activity, except for not proceeding with the operation. This will however cause the underutilisation of a national economic resource.

The area has been extensively mined in the past, more recently by Assmang (manganese ore). Large scale mining in the past has disturbed the area extensively, with open pits, access roads and mining infrastructure found throughout the application area.

The property is accessible via decent roads from different directions.

Infrastructure in the Tsantsabane area is well developed with good road and rail networks, electricity grid and water. Experienced labour is available in the area as is an extensive network of secondary industries geared towards small and large-scale mining. ESKOM grid power is available on site. There is also a well-established rail network which is operated by Transnet. Road transport service providers are well established.

Alternatives considered:-
Alternatives for land are thus not available, as the mining right was applied for over this area with proven reserves which has been prospected by Wepex.

(b) The type of activity to be undertaken:

Opencast Mining activities for Manganese and Iron Ore.

Alternatives considered:-

The only alternative land use is livestock and game farming; however, the applicant's main economic activity is mining and for this reason does not favour any other alternative land use.

(c) The design or layout of the activity:

The site infrastructure will need to be strategically placed by incorporating mining project demands and environmental sensitivities identified during the Environmental Impact Assessment process. Thus, the site layout will primarily be based on proximity to the nearby access roads, proximity to the areas earmarked for mining as well as limited additional impact on the environmental (wind direction), heritage resources and discussions with the relevant Departments.

The following infrastructure will be established and will be associated with the mining operation:

- Explosive Magazine (if required and when necessary)
  If required the mine will need two magazines to store the different explosive products namely:
  - 200 case detonator and accessories magazine (3 meter x 6 meter)
  - 200 case explosives magazine (3 meter x 6 meter)

  The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meters away from the magazine.

  The CIE determines the safety radius necessary, but the typical approved radiuses have been 90 meters for the inner radius & 180 for the outer radius.

  No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius.

  The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.

- Ablution blocks (sewage facilities)

- Clean and Dirty water system:
  It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.

- Fuel Storage facility (Diesel tanks): 10m^2
  It is anticipated that the operation will utilize 4 x 17 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.

- Re-fuel and lube station

- Mining area: 350 Ha
  If required, the mining process will be initiated by drilling of blast holes and then blasting said holes. The ore will be loaded form the open pits and hauled to the crushing and screening plant.

- Generator (if required): 28m^2
  The mine infrastructure plan made provision for a brick building that will house the generators (8 x 30-100 KW) for power generation on site.

- Office and Office Parking Bay: 4.547 Ha
  It is anticipated that vegetation will be cleared in this area and superfine material will be used as groundcover in the parking area.

- Crushing and Screening Processing plant: 300 m^2
  The processing of the ore will be a dry process, with the option to convert to a 'wet' process after full production has been reached. Crushing and screening will be done by mobile plants without the construction of any permanent buildings. After full production a semi-permanent separation plant and semi-permanent crushing plant will be constructed.

- Roads (both access and haulage road on the mine site): 16 Ha
  Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 7-8 km of roads, with a width of 20 meters. The width of the road is based on an operating width of the ROM haul trucks of 5 meters. Best practice and the guideline from the DMR is to allow for 4 x Operating width of haul truck, in this case 20 meters wide roads. An existing service road providing access to the north and the south of the farm will be upgraded to DMR regulations and be used as the main service road. The current access road next to the railway line is deemed adequate for a service road into the mine.

- Salvage yard (Storage and laydown area): 2 Ha

- Security Gate and Guard house at access control point: 675 m^2

- Product Stockpile area: 5 Ha

- Ore stockpile dumps

- Subgrade stockpile area: 7.5 Ha

- Topsoil storage area (temporary): Topsoil dumps x 3: 4.5 Ha

- Waste disposal site (domestic and industrial waste): 140 m^2
  It is anticipated that the operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following typed of waste will be disposed of in this area:

- Small amounts of low-level hazardous waste in suitable receptacles.
- Domestic waste
- Industrial waste

- Workshop and Wash Bay: 245m^2

- Water distribution Pipeline

- Water tank
  It is anticipated that the operation will establish a minimum of 8 x 10 000 litre water tanks with purifiers for portable water.

- Weighbridge: 600m^2

- Weighbridge control room: Two offices: 360m^2

Alternatives considered: -

Alternatives for fuel storage include surface storage, underground storage and the storage of fuel in mobile tanks with a metal bund wall. Underground storage has an adverse negative pollution potential, because it is not easy to monitor leakages. Remediation measures are also not as effective as compared to surface storage tanks. Mobile tanks are a viable option for infield screening activities, but the best viable long-term option is the instalment of fuel tanks within a concrete bund wall. The final location of the fuel storage tanks will be determined based on proximity to site operations.

Blasting have been included into the document but it is not envisaged that it will be used on the site.

Wepex Trading (Pty) Ltd secured water from the Sedibeng Water pipeline for use on the mine. The surrounding area relies on groundwater for both domestic and livestock watering purposes.

Therefore, a pipeline route will be designed based on the principle of minimum impacts on the environment. Alternatives in terms of altering the characteristics of drainage lines include avoidance and demarcation as a no-go zone.

In terms of power generation, the options available was for Generators or ESKOM power. Wepex Trading (Pty) Ltd will only utilise diesel generators as a backup electricity supply during times of electricity interruptions.

In terms of sewage the decision was made to use ablution blocks facilities with closed French drains.

(d) The technology to be used in the activity:

- Technique
  During the mining process overburden (waste material) will be removed from the manganese ore. The manganese ore will be mined selectively

to ensure that only on grade material is transported to the Run of Mine (ROM) stockpile at the plant. The mining equipment selected for the mine will enable the mine to carry out the selective mining process. The selective mining process will be controlled by the mine's geologists. From the mine the manganese ore will be transported to the plant. The plant process is a standard crushing and screening process to create a marketable product with a particle sizing of -100mm +8mm.

- Technology
  The technology applied will be a jaw crusher, a cone crusher and a multi-deck screen. The final product will have a particle sizing of -100mm to + 8mm and a manganese content of +28% Mn (Manganese) average. An independent laboratory will visit the site on a daily basis.

Alternatives considered: -
The planned mining activities, include the excavation of a pit with continued backfilling if possible. The operation is also associated with processing techniques that make use of a modern technologies. These are the most economic viable method currently being used by the manganese fraternity. There is no other feasible, alternative mining method for the mining and extraction of manganese.

(e) The operational aspects of the activity:

The ore is mined by means of conventional opencast techniques (drilling-blasting-load-haul) and requires heavy earth-moving equipment. Vegetated soil is stripped; whereafter, **if required**, drill rigs are used to drill and blast overburden and ore separately. Bench blocks are drilled using drill rigs to produce blast holes, which are then charged with emulsion explosives. The Run of Mine (ROM) will be crushed and screened by using the crushing and screening plant. The rock is loaded with excavators into articulated dump trucks and the ore is hauled to the crusher and ore stockpiles. The expected lifespan of the mine is 11 years.

Mining activities will primarily make use of existing roads created by previous mining activities, but additional roads will most likely be created. A crushing and screening plant will also be erected on site.

Alternatives considered: -
The conventional opencast drill-blast-load-haul-mining method has been proven to be the most economic viable method currently being used by the manganese fraternity. There is no other feasible, alternative mining method for the mining and extraction of manganese.

(f) The option of not implementing the activity:

Potential land use includes grazing and mining. The majority of the area is classified to have low to moderate potential for grazing land and not suitable for crop yield. Apart from the manganese deposits, there are also potential for iron ore mining on the property. Therefore, this mining activity are believed to be the most economically beneficial option for the area. Whether

the iron ore mining operation continues or not, the other mining operation already granted will most likely persist. The farming of livestock will only be able to continue in areas not affected by mining operations. The most significant impacts associated with grazing activities include the provision of water. These are not expected to have a serious impact on the existing groundwater features. (Hydrological impact assessment,2021) The "major" identified impacts are expected to be from the open pit mining operations and possible dewatering operations which may draw the water table down and create a "cone of depression", which may impact surrounding users. However, at the pre-mining a stage and for the duration of most of the operational phase where the pit floor is well above aquifer water table levels, this impact is identified as reasonably low. Cumulative impacts associated to grazing include overgrazing and destruction of natural vegetation, but the cumulative effect of mining activities on the property are expected to outweigh any potential negative effects that agriculture might have.

The Wepex Trading Mining project aims to uplift the local community. If the operation does not continue it would hold back any potential employment for the region and the families who are likely to benefit from the positive employment opportunities. Simultaneously, it may have a stagnant effect on the economy of South Africa and the manganese industry as a whole. Substantial tax benefits to the State and Local Government will also be inhibited.

Mining forms an integrated part of the social and economic growth of South Africa and more specifically the Northern Cape Province.

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.

Identified interested and/or affected parties were notified of the acceptance of the application as follows:

- Notification letters were sent to all identified interested and / or affected parties on the 26 of November 2020. Attached to each of these letters was a Background Information Document, containing information relating to the proposed mining project application and the Environmental Authorisation.
- A newspaper advert was placed in the Kathu Gazette on 6 March 2021 which are local newspaper in the project area.
- Notices was placed at the Municipal Offices Postmasburg, South African Police Services Offices, Magistrates Court Postmasburg.
- The Scoping report was also sent out per registered mail on 24 February 2021 with a comments form to all registered interested and affected parties.

Proof of notification is attached as Appendix '3'.
If necessary and requested a public meeting will be advertised and held after all specialist reports have been received and after the first draft Environmental Impact Assessment have been compiled in terms of the Mineral and Petroleum Resources Development Act, 28 of 2002 and distributed for comments.

Registered letters with the draft EIA EMP on a disc and a comments form will also be send to all registered interested or affected parties on 22 July 2021.

iii) Summary of issues raised by I&APs

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

Table 6: Consultation with I&Aps

(i) Summary of issues raised by I&AP's

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

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
AFFECTED PARTIES					
Landowner/s	**X**				
Wepex Trading Pty Ltd	X				
Lawful occupier/s of the land					
Arengo 352 Pty Ltd PO Box 978 Bloemfontein 9300 21 Gerrit Schouten Street Kimberley 8300 22 Gerrit Schouten Street Kimberley 8301	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	21 January 2021 21 April 2021 29 January 2021 15 April 2021 29 January 2021 15 April 2021	Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping) Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping) Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping)		
Landowners or lawful occupiers on adjacent properties	**X**				
Mr A.C. & Mrs E.C. Claassens P.O. Box 735 Postmasburg 8420	X Registered Letter with the BID were sent on 26 November 2020	11 February 2021 3 April 2021	Registered letter returned by Post Office as unclaimed (BID)		

	Registered Letter with Scoping Report was sent on 24 February 2021		Registered letter returned by Post Office as unclaimed (Scoping)		
Maremane Communal Property Association 162 George Street Kimberley 8301	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	19 January 2021 15 April 2021	Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping)		
Municipal Councillor	**X**				
Municipality	**X**				
Municipal Manager and Mayor Tsantsabane Municipality P.O. Box 5 Postmasburg 8420	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	19 January 2021	Registered letter returned by Post Office as unclaimed (BID)		
ZF Mgcawu District Municipality Private Bag X 6039 Upington 8800	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				

Organs of State (Responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWA					
ESKOM Holdings SOC Ltd, NC Operating Unit Land Development P O Box 606 Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
Eskom Environmental Division PO Box 356 Bloemfontein 9300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	21 January 2021 21 April 2021	Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping)		
SANRAL P.O. Box 415 Pretoria 0001	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	11 February 2021 21 April 2021	Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping)		
Transnet P.O Box 72501 Parkview	X Registered Letter with the				

2122	BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
Dept. of Agriculture, Land Reform & Rural Development Private Bag X5018 Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	19 January 2021 8 April 2021	Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping)		
Department of Rural Development and Land Reform PO Box 5026 Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
Department of Cooperative Governance, Human Settlements and Traditional Affairs HOD Private Bag X5005 Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report	8 April 2021	Registered letter returned by Post Office as unclaimed (Scoping)		

	was sent on 24 February 2021				
Dept. of Agriculture, Forestry & Fisheries Directorate: Forestry Management P.O. Box 2782 Upington	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
Department of Environment & Nature Conservation HOD Private Bag X6102 Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021	19 January 2021	Registered letter returned by Post Office as unclaimed (BID)		
Department of Water & Sanitation Private Bag X6101 Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
National Department of Public Works PO Box 224 Olifantshoek 8450	X Registered Letter with the BID were sent	14 January 2021	Registered letter returned by Post Office as unclaimed (BID)		

	on 26 November 2020. Registered Letter with Scoping Report was sent on 24 February 2021	27 May 2021	Registered letter returned by Post Office as unclaimed (Scoping)		
SAHRA P.O. Box 4637 Cape Town 8000	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
Northern Cape Department of Roads and Public Works HOD PO Box 3132 Squirehill Park Kimberley 8300	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report was sent on 24 February 2021				
Communities					
Maremane Communal Property Association 162 George Street Kimberley 8301	X Registered Letter with the BID were sent on 26 November 2020 Registered Letter with Scoping Report	19 January 2021 15 April 2021	Registered letter returned by Post Office as unclaimed (BID) Registered letter returned by Post Office as unclaimed (Scoping)		

	was sent on 24 February 2021				
Traditional Leaders					
No Traditional Leaders					
Other Competent Authorities affected					
Albertus Viljoen CEO-Tshiping WUA info@tshiping.co.za PO Box 434 Postmasburg 8420	Registered as an interested and affected party via e-mail after noticing the process.	9 March 2021	Good Morning Mr. Oosthuizen I have noted the proposed public participation process and hereby register as a I and Affected party. Best regards Albertus Viljoen CEO Tshiping WUA	Thank you for your e-mail we will keep you informed of the process	
OTHER AFFECTED PARTIES					
INTERESTED PARTIES					
Tshenolo Marotobolo thesurvivorsbusiness@gmail.com	Registered as an interested and affected party via e-mail after noticing the process.	23 March 2021	Afternoon Mr Oosthuizen This email serves as an official objection of your application for Mining Right. The reason for objection is that Glosam Mine as the mining contractor takes all business opportunities and distribute to the internal employees and Senior Managers for example we approached Mr Hugo for Wash bay. He took our proposal and gave her to her daughter in law. Thanks Tseno 0782293394	25 March 2021 Dear Mr. Marotobolo Thank you for registering as an interested party. Would you please be so kind as to fill in the registration form attached and declare your interest - business, financial or other interest w.r.t application. Regards Roelien Oosthuizen (for Willie Oosthuizen 087 527 0713))	

* Note: The contents of this table have been recorded up to 22 July 2021 as the process of public participation is an ongoing process.

iv) The Environmental attributes associated with the development footprint alternatives (The environmental attributed described must include socio-economic, social, heritage, cultural, geographical, physical and biological aspects)

(1) Baseline Environment

(a) Type of environment affected by the proposed activity

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

(1) *GEOLOGY:*

The Bishop Glouchester iron-ore and manganese deposits are symmetrically situated on the Maremane Dome. The dome is defined by carbonate rocks of the Campbellrand Subgroup and the iron formation of the Asbesheuwels Subgroup of the Transvaal Sequence, dipping gently at less than 10 degrees in an arc to the north and south. Only the eastern half of the dome is exposed. To the west, the Transvaal strata is overlain along and angular unconformity by red beds, conglomerate, shale and quartzite of the Gamagara Formation of the Olifantshoek Group. Further to the west, some Koegas iron formation, Makganyene Diamictite and Ongeluk Lava of the Transvaal Sequence are thrust over the Gamagara Formation along a north-south striking, westerly dipping low-angle thrust fault. The Gamagara Formation also strikes north-south and dips to the west. A unit of ferruginous chert breccias (Wolhaarkop Breccia) grading upwards into a distorted iron formation (Manganore Iron Formation) is wedged unconformably between the Gamagara Formation and the Campbellrand carbonate sequence along the northern and southern extremities of the Maremane Dome.

The Bishop Gloucester iron-ore and manganese deposits are situated along the contact between the Gamagara Formation and the underlying Manganore Iron Formations in the southern part of the dome. In general, two ore types are present, namely laminated hematite ore, forming part of the Manganore Iron Formation, which is more restricted than that of the Wolhaarkop Breccia and is only preserved in pockets above the latter, below the Gamagara unconformity. The basal Doornfontein Conglomerate Member of the Gamagara appears to the best development above the Manganore Iron Formation along the east-central perimeter of the Maramane Dome and pinches out towards the centre of the dome. During the Carboniferous Period the Dwyka glacial event (Karoo Sequence) eroded portions of older sequences. A cover of tertiary soil, rubble and calcrete (Kalahari Formation) masks parts of the detail of the geology, with the result that geological modelling is almost exclusively based on exploration boreholes.

The erosion of the southern Bishop Gloucester deposit is fairly high. The result is that the Bishop Gloucester deposits are not uniform and preserved pods of ore are found below the overburden and post-Manganore sediments.

The manganese ore deposit of Glosam is extremely irregular and has been deposited on the karstic Landscape of the Reivilo Formation of the Cambpellrand Subgroup. Further development of karst caused slumping of the deposit. This landscape might have formed during periods of chemical erosion (Grobbelaar and Beukes, 1986).

The bixbyite ore occur as lenticular and irregular-shaped ore zones along the base of the Sishen Shale within large solution cavities. This iron-rich manganese ore was deposited as a wad trapped is in karst hollows near surface together with exogenic detrital material (Gutzmer and Beukes, 1995). The proto-ore changed to crystalline bixbyite through lithification and recrystallization. The coarse crystallinity, open textures and veining of the deposit were caused by further fluid induced remobilization and recrystallization (Gutzmer and Beukes, 1995). This supergene alteration could have taken place during the deposition of the remainder of the Olifantshoek Group, but prior to the deposition of the Karroo Supergroup (Grobbelaar and Beukes, 1986). Younger Cenosoic erosion re-activated the karst surface introducing psilomelane crusts and pyrolusite nodules (De Villiers, 1960).

The Gamagara sediments dipping 6° west cover the deposit and where the strip ratio exceeds the economical mining cost, exploitation of the deposit ceased. This deposit might extend westwards (Beukes, 1978), but due to the nature of the deposit no drilling was done to test the continuation. Post-depositional thrusting associated with the Keis Orogeny is visible north-west of Glosam where the Ongeluk Formation has been thrust on the Gamagara Formation.

Younger detrital manganese ore associated with the present day erosional surface accumulates along slopes and exposed karst topography. This is visible as scree and gravel on the floor of the mining operation.

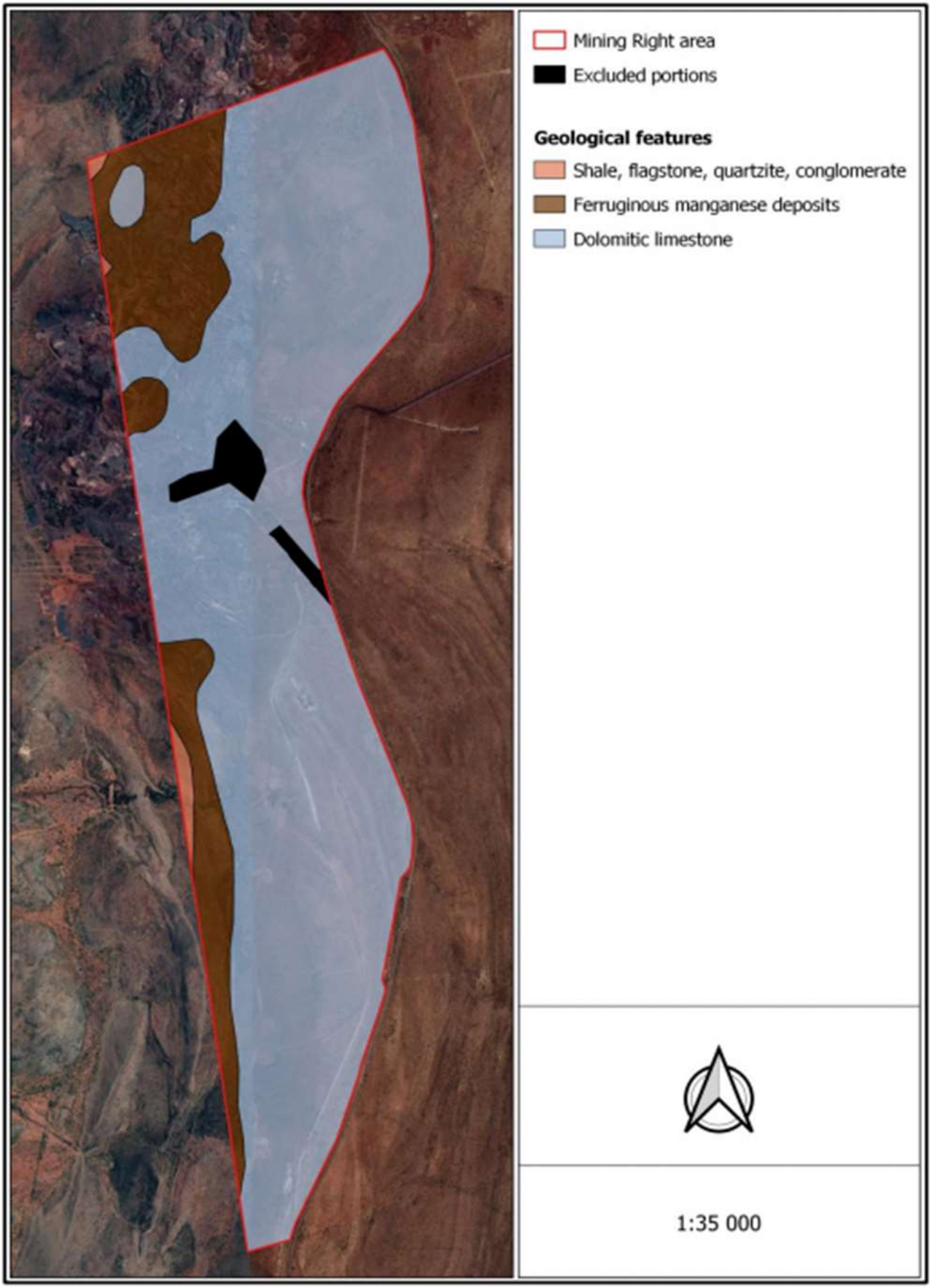


Figure 8. The distribution of geological features in the study area (map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021).

(2) ***CLIMATE:***

O van Antwerpen of Minrom Consulting Pty Ltd has been appointed by Wepex Trading (Pty) Ltd to provide a hydrological and Hydrogeological Impact Assessment in order to highlight the surface and ground water characteristics of the proposed mining area and to determine the possible impact of mining on the surface and groundwater status of the application area. Climate was described and included in this report as part of the Hydrological and hydrogeological Impact study (The complete study is appended as Appendix 8).

The Glosam project area is a hot, semi-arid area of the Northern Cape with mean annual temperatures between 17-19°C yearly. The hottest months of the year are December to January, with average high temperatures exceeding 30°C and low temperatures around 20°C. The coldest months are May to August, with average high temperatures around 15-20°C and average low temperatures around 5-7°C (Figure 9). The Postmasburg area receives most of its precipitation during late spring and summer (October to March), with a peak in January at around 140 mm. The average annual rainfall of 300-400 mm/a, and annual evaporation is between 1400–1500 mm/a.

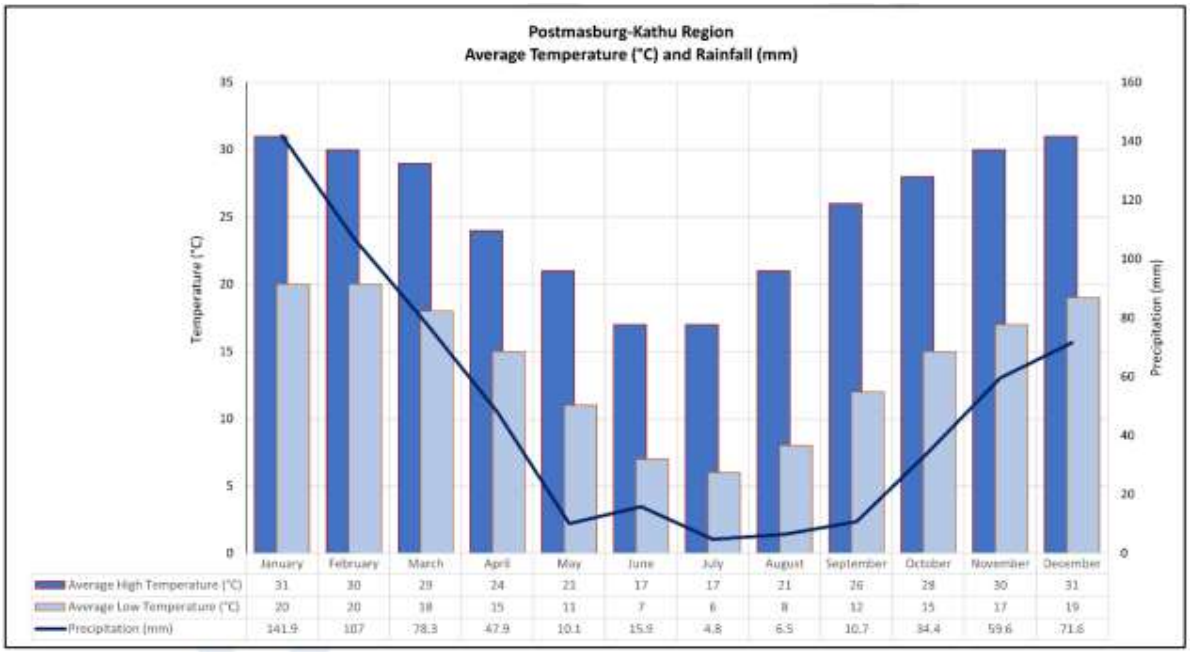


Figure 9. Postmasburg climate data.

According to the internationally recognised Köppen-Geiger Climate Zone Index3, the Postmasburg-Kathu region falls within a "BSh" and/or "BSk" classification. This means the region is a Dry Climate (B), which is Semi-Arid (S) and can either be hot (h) or cold (k) depending on the seasonal variations.

This project site climate data was obtained from the Water Resources study (WR2012) study (WRC, 2021), which comprises the climatic and catchment information of each QC in South Africa. The catchment's Mean Annual

Precipitation (MAP) and Mean Annual Evaporation (MAE), respectively, are said to range between 323–358 mm and 2351–2450 mm, respectively. The evaporation in the area is higher than the amount of rainfall the catchment receives. The monthly distribution of the rainfall and evaporation are presented in Figure 10 and Figure 11.

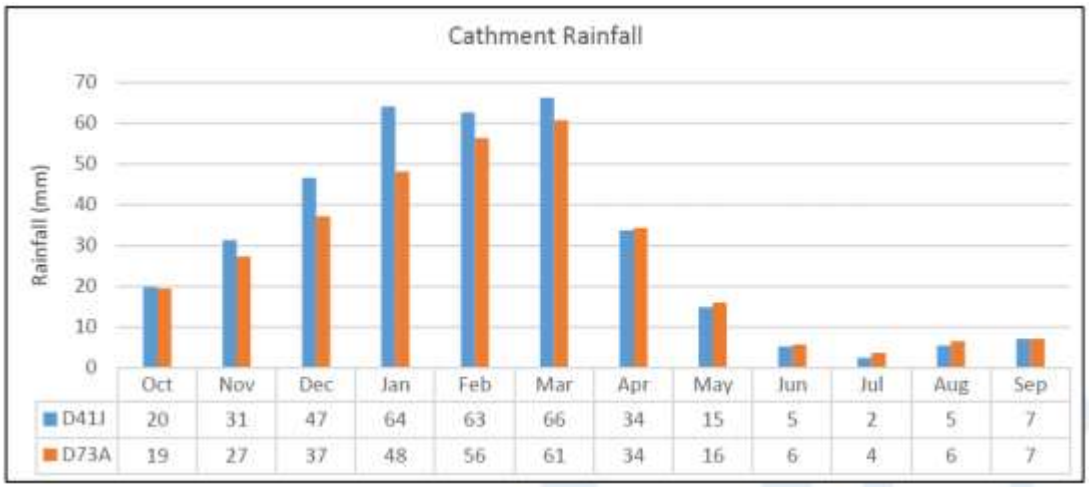


Figure 10. Monthly distribution of rainfall.

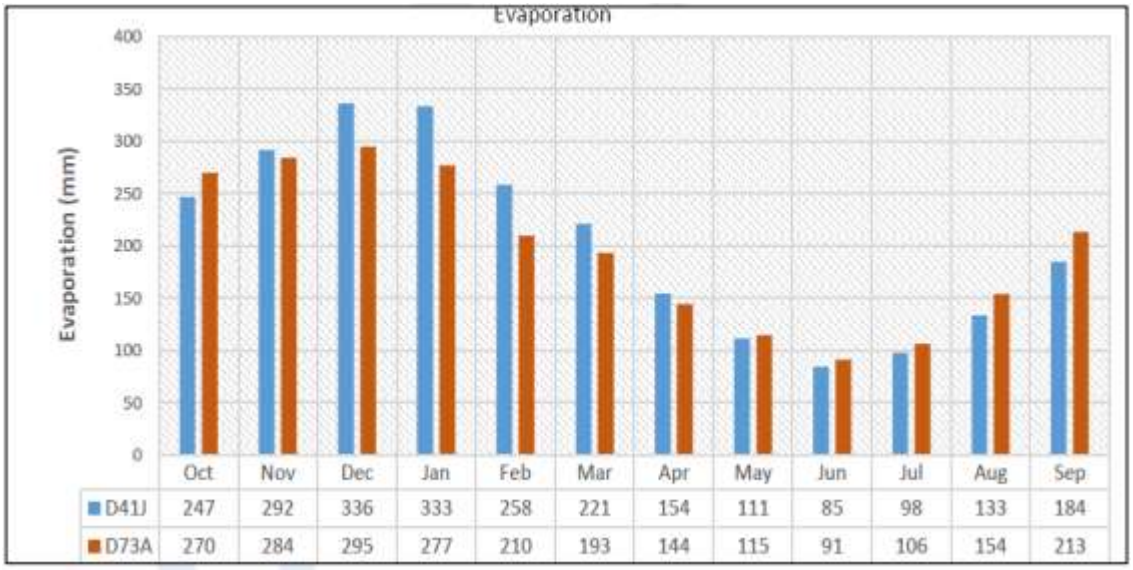


Figure 11. Evaporation distribution around the project site.

The hydro-meteorological parameters for QC D41J and D73A as obtained from the WRC database are summarised in Table 7.

Table 7: Catchment climate parameters.

Catchment	Area	MAP	MAE	MAR
D41J	3878	358	2351	7.26
D73A	3238	323	2450	47.2

MAP = mean annual precipitation, MAE = mean annual evaporation, MAR = mean annual rainfall

(3) **Topography and Soils:**

O van Antwerpen of Minrom Consulting Pty Ltd has been appointed by Wepex Trading (Pty) Ltd to provide a hydrological and Hydrogeological Impact Assessment in order to highlight the surface and ground water characteristics of the proposed mining area and to determine the possible impact of mining on the surface and groundwater status of the application area. Topography was described and included in this report as part of the Hydrological and hydrogeological Impact study (The complete study is appended as Appendix 8).

The topography of the area surrounding the Glosam mine is associated with prominent hills, surrounded by vast areas of flat lying plains. The Glosam licence itself is situated upon one of these hills which reaches around 1480 metres above mean sea level (mamsl). These are the hills which host the manganese and iron ore of interest to the mine and are "positively" weathered or weathering resistant features. The vast flats, conversely, are situated at elevational lows of around 1380–1400 mamsl. These flat-lying areas are dominated by basement dolomites of carbonate chemistry. The Glosam licence area is classified within the "Ag" and "Ib" land types – typically an area that is uniform with respect to terrain form, soil patterns and climate. The land is generally "non-arable" low potential grazing land, with a grazing capacity between 16-29 ha per LSU (hectares per large stock unit).

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Wepex Trading (Pty) Ltd to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impact of mining on the diversity and ecological status of the application area. Topography and soil was described and included in this report as part of the ecological study.

The study area is predominantly underlain by the rocks of the Transvaal Supergroup, Griqualand West Sequence. Here, dolomitic limestone with subordinate coarsely crystalline dolomite of the Ghaapplato formation from the Campbell group covers a large area in the eastern half of the study area. Shale, flagstone, quartzite and conglomerate from the Gamagara Formation of the Postmasburg group are found in west, while the iron and manganese deposits are associated with the unconformity between the latter formations.

The manganese ore deposit of Glosam is extremely irregular and has been deposited on a karstic landscape of the Cambellrand Subgroup, where the ferruginous manganese ore occur within large solution cavities. This was deposited as a wad trapped in karst hollows near the surface together with exogenic detrital material. Younger detrital manganese ore associated with the present day erosional surface accumulates along slopes and exposed karst

topography. This is visible as scree and gravel on the floor of the historic mine pits.

Level plains with some relief (4), is the dominant terrain unit of the landscape in the eastern half of the mining area, which is closely associated with the Ag111 landtype (Figure 12 and Figure 13). The western half is however dominated by open hills and ridges, closely associated with the Ib238 landtype. These hills are rocky with minimal soil cover and the steep slopes produce high runoff erosion risks. On the plains, red-yellow apedal, freely drained soils with high base status are found. These soils have minimal development and are shallow (< 300 mm), occurring on hard or weathering rock. The rather flat terrain has low potential for runoff erosion. The sandy soils of the study area are prone to wind erosion. If badly eroded, the soils on Glosam have a very low potential to regenerate.

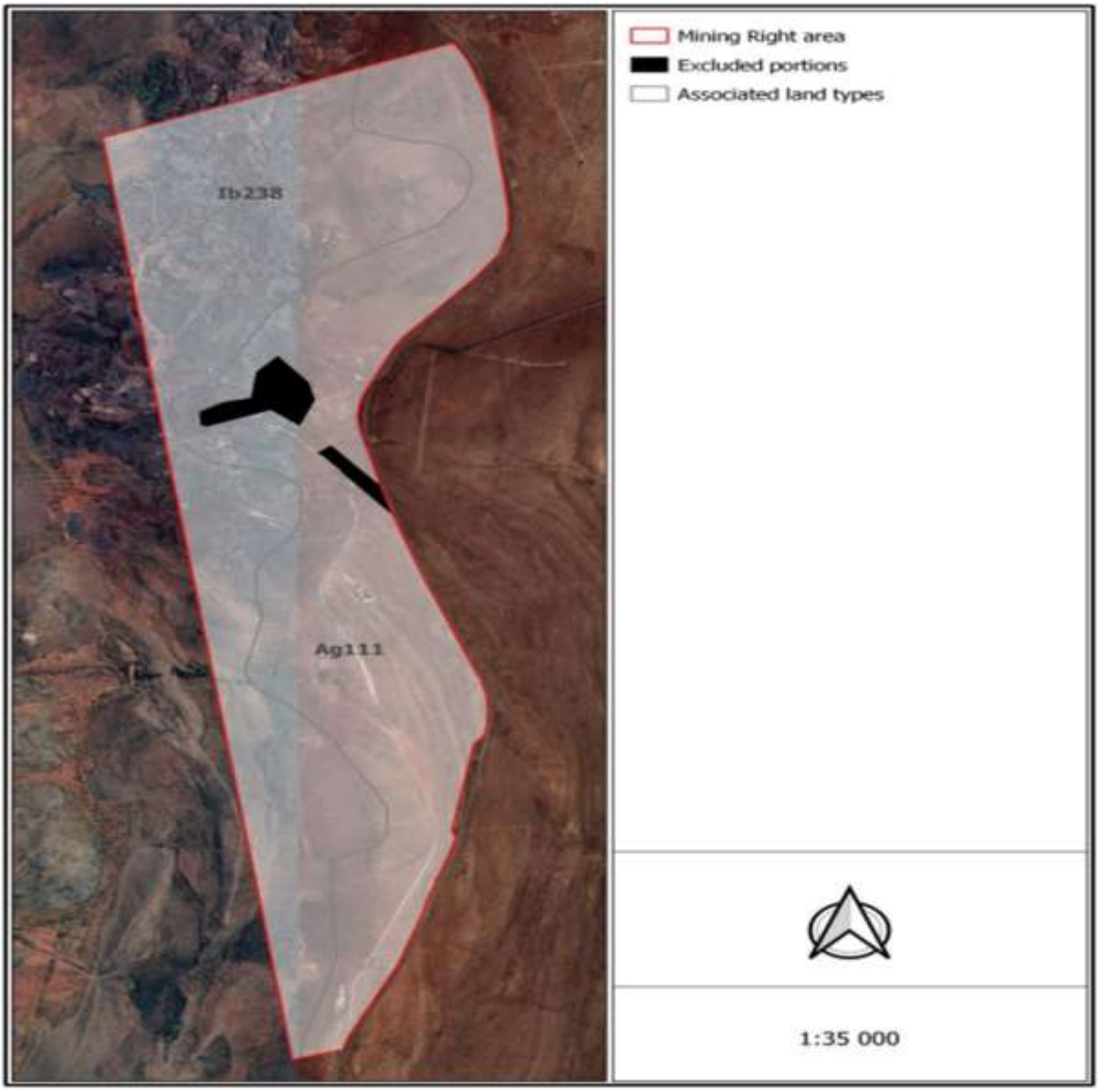


Figure 12. The dominant land types found in the study area (Map taken out of the ecological study of Boscia Ecological Consulting, January 2021).

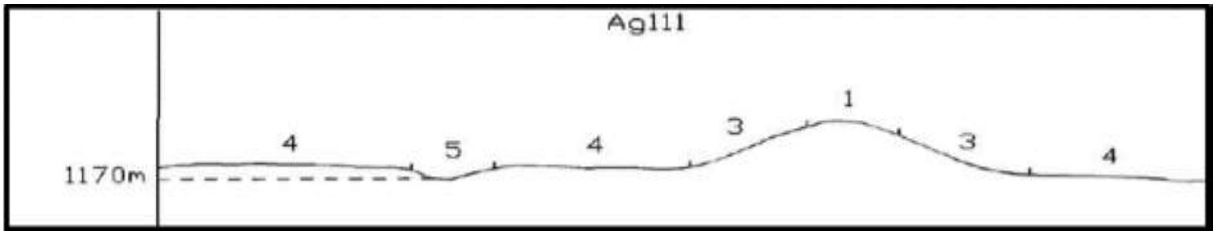


Figure 13. Terrain from Sketch for the Ag111 land type of the study area. No terrain sketch is available for the Ib238 landtype. (Map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021)

(4) *LAND CAPABILITY AND LAND USE:*

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Wepex Trading (Pty) Ltd to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impact of mining on the diversity and ecological status of the application area. Land Capability and Land use was described and included in this report as part of the ecological study. (The study is attached as Appendix 4)

The major land uses in the region are mining (manganese and iron ore) and agriculture. According to the Southern Africa Agricultural Geo-referenced Information System, the land capability of the plains in the east is non-arable with low potential grazing land, while the hills in the west are considered to be wilderness. The grazing capacity is between 18 and 30 ha/AU, with the agricultural region being demarcated for cattle farming. The property is categorised to have no suitability for crop yield.

Glosam is characterised by a fairly complex mining history. Various formal and informal mining companies have mined the area for iron ore and manganese between the late 1920's and 1984. This produced numerous open pits scattered across the site. These pits and associated road networks are still visible today as well as various buildings and structures related to the past mining activities; some of which are of archaeological significance. Exploration activities have also been performed over the past decade.

Current land use activities on the mining right area are indicated in Figure 14 and include existing infrastructure from the Wepex prospecting activities, two cell phone reception towers managed by MTN and Cell C, and a number of ESKOM power lines. Areas in the south of the mining right area are mainly used for grazing by livestock and wildlife and a Transnet railway track lines the eastern border of the mining right area.

This railway line links the Kalahari mines with Port Elizabeth via Kimberley.

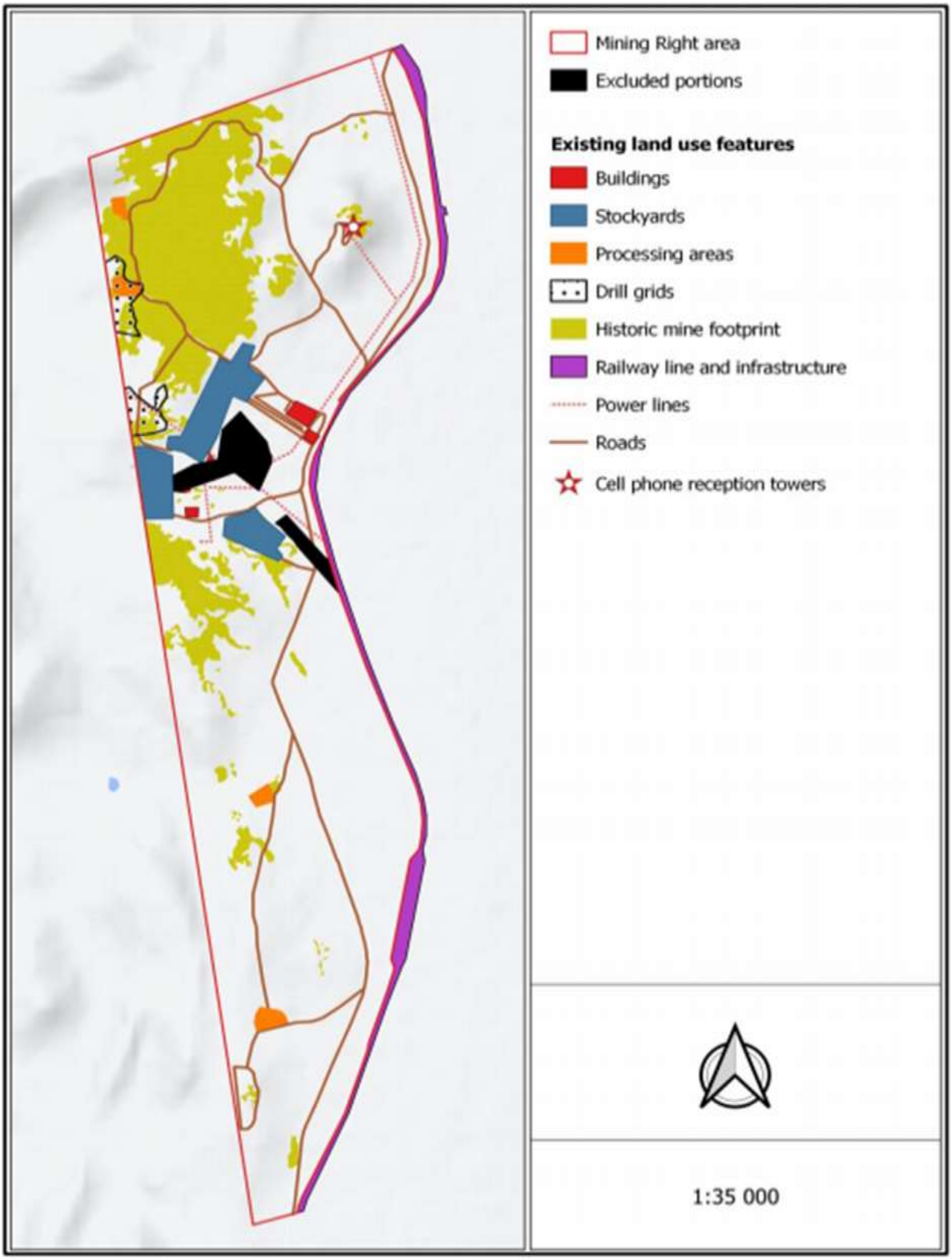


Figure 14. Current and Historic land use features of the area. (Map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021).

(5) ***NATURAL FAUNA:***

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Wepex Trading (Pty) Ltd to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impact of mining on the diversity and ecological status of the application area. Natural Fuana was described and included in this report as part of the ecological study. (The study is attached as Appendix 4).

A desktop survey was undertaken to obtain lists of mammals, reptiles, amphibians and birds which are likely to occur in the study area. These were derived based on distribution records from the literature, including Friedmann and Daly (2004) and Stuart and Stuart (2015) for mammals, Alexander and Marais (2007) and Bates et al. (2014) for reptiles, Du Preez and Carruthers (2009) for amphibians and Taylor et al. (2015) for birds.

Additional information on faunal presence was extracted from the various databases hosted by the ADU web portal, http://adu.org.za, as well as from Robert's Multimedia Birds of Southern Africa (Gibbon 2006). A map of important bird areas (BirdLifeSA 2015) was also consulted. The faunal species lists provided are based on species which are known to occur in the broad geographical area, as well as a preliminary assessment of the availability and quality of suitable habitat at the site.

The likelihood of Red Data species occurring on site has been determined using the distribution maps in the Red Data reference books (Friedmann and Daly 2004; Bates et al. 2014; Taylor et al. 2015; ADU 2016) and comparing their habitat preferences with the habitat described from the field survey. The conservation status of each species is also listed, based on the IUCN Red List Categories and Criteria (IUCN 2015) and/or the various red data books for the respective taxa.

Field survey

The faunal field survey was conducted concurrent with the vegetation survey. The habitats on site were assessed to compare with the habitat requirements of species determined during the literature survey.

The presence of faunal species was determined as follows:

- Identification by visual observation
- Identification of bird and mammal calls
- Identification of signs (spoor, faeces, burrows and nests)

This ecological assessment report attached as Annexure 4 describes the ecological characteristics of the proposed mining area, identifies the source of impacts from mining operation, and assesses the impacts, as well as the residual impacts after closure.

Assumptions and limitations

Due to the brief duration of the survey and the lack of seasonal coverage, the species list obtained during the site visit cannot be regarded as comprehensive. Ideally, a site should be visited several times during different seasons to ensure that the full complement of plant species present is captured. However, this is rarely possible due to time and cost constraints. The survey was nevertheless conducted in such a manner to ensure all representative communities are traversed and therefore is likely to have included the majority of the dominant and common species present.

The site visit for the study took place during winter, which is not an optimal time of the year. Most grasses and annuals present were not flowering, and was therefore not in a favourable state for the assessment at the time of the site visit. The best time to evaluate vegetation in the study area is after at least some summer or late-summer rain when the vegetation has had a chance to respond and is in an actively growing state. The urgency of the survey for this project dictated that it should be done by July 2017. The results presented here can therefore only reflect the condition of the vegetation. Consequently, the timing of the site visit is considered to be a limiting factor which might compromise the results, as it is likely that there are species of conservation concern that were not visible at the time of sampling.

Faunal communities

According to Section 3(a) and 4(a) of the Northern Cape Nature Conservation (NCNCA) Act No. 9 of 2009, no person may, without a permit by means of hunt, kill, poison, capture, disturb, or injure any protected or specially protected animals. Furthermore, Section 12(1) of NCNCA states that no person may, on a land of which he or she is not the owner, hunt a wild animal without the written permission from the landowner.

A number of the listed species are expected to occur on site either as residents or by occassionally passing over the area. None were however observed during the site visit. In general, bird species of the study area are likely to experience very limited disturbances in the form of noise and movement and small-scale local habitat loss as a result of the proposed mining activities. This will especially impact those birds that rely on the affected habitats for breeding, nesting and foraging. The disturbances will be confined to the drilling grids and habitat loss is associated with the construction of drill pads. Birds are however highly mobile and are expected to move to similar adjacent habitats, if necessary.

Apart from general disturbances and limited habitat loss, other potential impacts would come from the additional or intentional killing of birds. Species that are likely to get killed intentionally include vultures and owls, which often fall victim to religious beliefs or the medicinal trade. Monitoring and

environmental inductions during the operation would be vital in order to ensure no or low impact.

(6) ***NATURAL VEGETATION:***

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Wepex Trading (Pty) Ltd to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impact of mining on the diversity and ecological status of the application area. Natural Fuana was described and included in this report as part of the ecological study. (The complete study is appended as Appendix 4 to the Document).

Data collection

The study comprised a combination of field and desktop surveys for data collection on fauna and flora in order to obtain the most comprehensive data set for the assessment. The fieldwork component was conducted on 17 June 2017 and most data for the desktop component was obtained from the quarter degree square that include the study area (2824AD).

Field survey

For the field work component, satellite images were used to identify homogenous vegetation units within the proposed mining area. Representative sampling plots were allocated in these units and sampled with the aid of a GPS in order to characterise the species composition.

The following quantitative data was collected:

- Species composition
- Species percentage cover
- Amount of bare soil and rock cover
- Presence of biotic and anthropogenic disturbances

Additional checklists of plant species were compiled during the surveys by traversing a linear route and recording species as they were encountered in each unit.

Broadscale vegetation patterns

The study area falls within the Savanna Biome (Mucina and Rutherford 2006), and according to the vegetation map of Mucina et al. (2005) two vegetation units are present on site, i.e. Kuruman Mountain Bushveld and Postmasburg Thornveld. This map has however not been mapped at a very fine scale and therefore does not reflect the true character of the site.

Kuruman Thornveld is distributed in the North-West and Northern Cape Provinces, and lies at altitudes between 1 300 and 1 500 m. This unit is distributed East of Kuruman to Lykso, and south of Bendell towards Good Hope. The unit is

presented as flat rocky plains and some sloping hills with very well-developed, closed shrub layer and well-developed open tree stratum consisting *Vachellia erioloba*. This unit mainly consists of Superficial Kalahari Group sediments, with deep red wind-blown sand, but Campbell Group dolomite and chert also occur. The dominant land types are Ae, Ai, Ag and Ah. The unit is not currently conserved within any formal conservation areas and is classified as being least threatened with a very low erosion and 2% transformation. The herb *Gnaphalium englerianum* is the only endemic plant species known to occur in this unit.

Kuruman Mountain Bushveld is distributed in the Northern Cape and North-West Provinces at altitudes between 1 100 and 1 800 m. It stretches from the Asbestos Mountains southwest and northwest of Griekwastad, along the Kuruman Hills north of Danielskuil, passing west of Kuruman and re-emerging as isolated hills. The unit is typically presented as rolling hills with gentle to moderate slopes and hill pediment areas with an open shrubveld. Here, *Calobota cuspidosa* is conspicuous within a well-developed grass layer. The Hills consist of banded iron formation, with jasper, chert and riebeckite-asbestos of the Asbestos Hills Subgroup of the Griqualand West Supergroup. Soils are shallow, sandy and of the Hutton form. The most common land types are Ib, followed by Ae, Ic and Ag. The unit is considered to be least threatened and very little is transformed and with little erosion being present. The unit is considered to be least threatened and very little is transformed and with little erosion being present. It is not currently conserved within any formal conservation areas and the succulent *Euphorbia planiceps* is the only endemic species known from this unit.

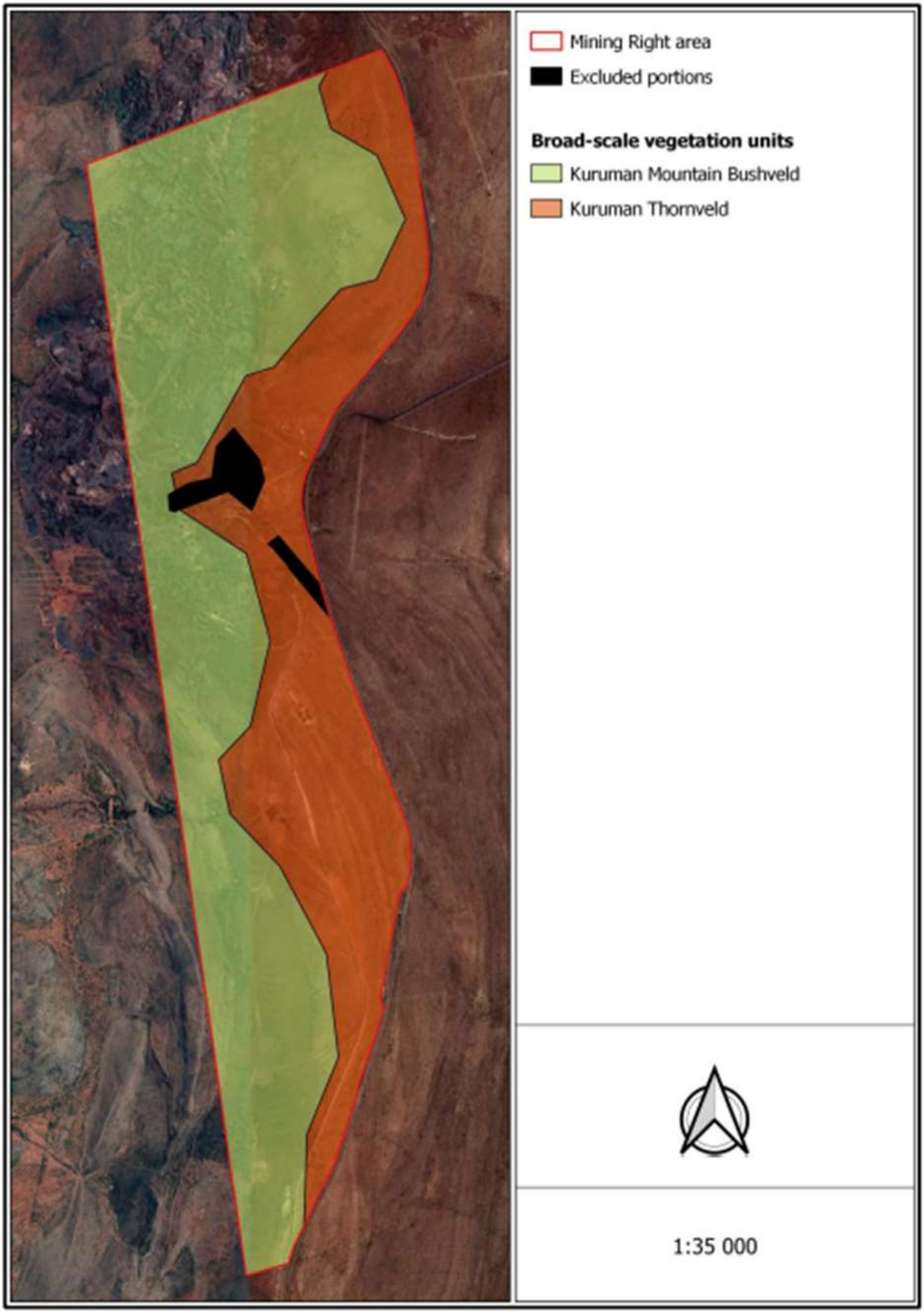


Figure 15. The distribution of broad-scale vegetation units in the study area.

(7) *SURFACE WATER*

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Wepex Trading (Pty) Ltd to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impact of mining on the diversity and ecological status of the application area. Surface water was described and included in this report as part of the ecological study. (The study is attached as Appendix 4).

Informed by the site layout, baseline hydrology, floodline results and conceptual stormwater management plan, the potential impacts of the proposed activities on surface water receptors and the sensitivity of the surface water resources were presented, along with mitigation measures and monitoring requirements. The impacts of the proposed activities and the infrastructure were identified and assessed based on the impact's magnitude, duration, probability, extent, severity and consequences, and the receptor's sensitivity.

This analysis then culminated in the determination of the impact significance which indicated the most important impacts and those that required stringent management. The local surface water resources were considered to be of low sensitivity. Mitigation and monitoring measures were specified throughout the report. All measures implemented for the mitigation of impacts should be regularly reviewed as required by best practice and to comply with the various licences issued on site by authorities. The purpose of the mitigation measures was to ensure that the pre-mining/current water resource status is not deteriorated by the mining activities.

The project site is situated between QC D41J and D73A. These catchments are mostly taken up by rural areas where natural flows are through preferential flow and natural drainage as such, the probability of the catchment self-rehabilitating is high. The peak flows were computed and have resulted in flood lines which are encroaching on the promised land stockyard and the north process area. While the streams in this area are intermittent, the possibility of flooding must not be ignored. The stormwater management plan has been developed to ensure that dirty water is contained. The development of the stormwater implies that surface runoff will be limited as it is contained around the mine infrastructure. The bulk of the mine layout generates dirty runoff, thus the stormwater will ensure that surface water contamination is also minimised. Both these quaternary catchments has been allocated a Present Ecological State (PES) of 'Largely natural' (B) by Delport and Mallory (2002) and Smook et al. (2002), and information regarding mean annual rainfall, evaporation potential and runoff for these quaternary catchments are provided in Table 8.

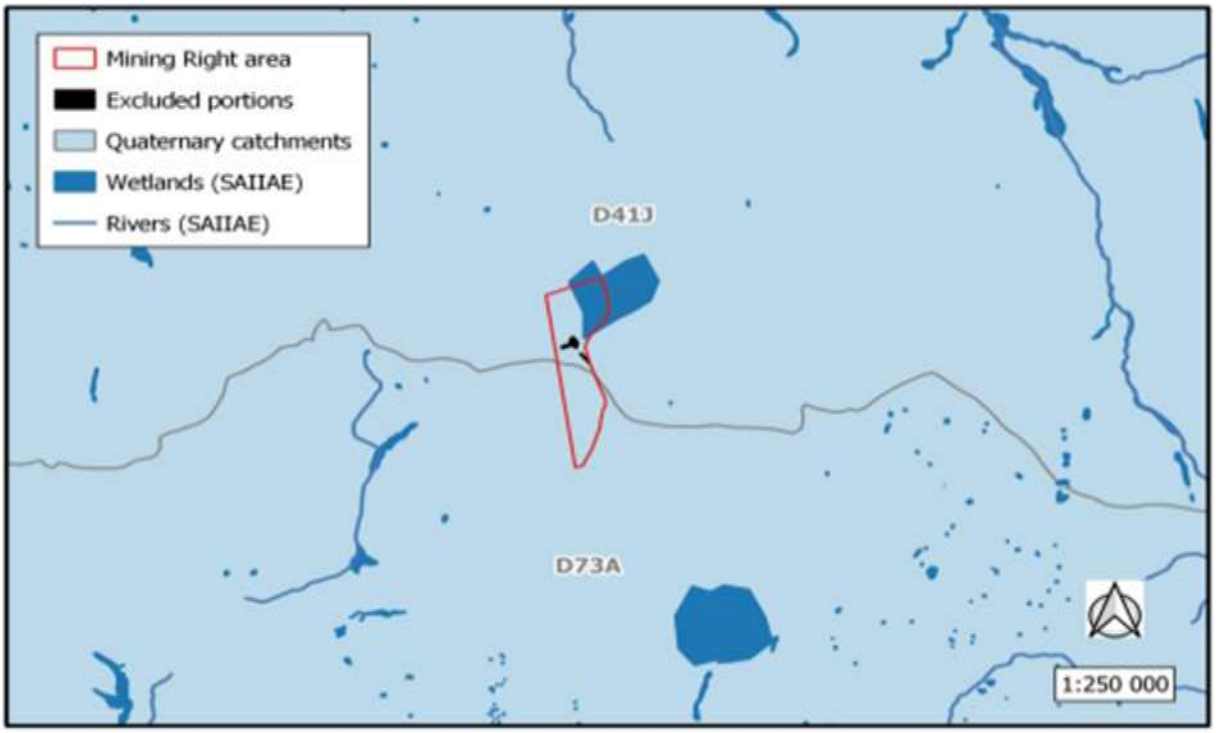


Figure 16. The locality of the proposed Glosam Mine in relation to quaternary catchments.

Table 8: Catchment characteristics for the Molopo- (Delport and Mallory 2002) and Neuserg (Smook et al. 2002) quaternary catchmentas in which the study area fall.

WMA	Quaternary catchment	Catchment Area (km^2)	Mean Annual Rainfall (mm)	Mean Annual Evaporation (mm)	Mean Annual Runoff ($10^6 m^3$)
Lower Vaal	D41J (Molopo)	3 878	358	2 350	4.85
Lower Orange	D73A (Neusberg)	3 238	*Not provided*	*Not provided*	*Not provided*

According to The South African Inventory of Inland Aquatic Ecosystems (SAIIAE), Glosam falls within the Eastern Kalahari Bushveld Bioregion, where 1.3 % of the land area is covered by inland wetlands, including depressions, floodplains, seeps and valley-bottom wetland types (Van Deventer et al. 2019). The spatial extent according to the present ecological status per wetland type is depicted in Table 9. Depressional wetlands are most abundant in this bioregion, with the majority being severely modified. Most of the remaining wetland types in this Bioregion are also moderately- to severely modified.

Table 9: Percentage of inland wetland spatial extent according to the present ecological status per wetland type of the Bioregion in which the proposed mining area falls.

Bioregion	Wetland type	Total Extent (%)	% Natural or near-natural (A/B)	% Moderately modified (C)	% Heavily to severely/critically modified (D/E/F)
Eastern Kalahari Bushveld	Depression	57.1	70.5	5.7	23.8
	Floodplain	2.2	0.6	48.8	50.5
	Seep	17.2	10	15.1	75
	Valley-bottom	23.5	0.9	29.6	69.5

One seep wetland occurs in the north-eastern corner of Glosam (Figure 16). According to SAIIAE it has already been critically modified by roads, railways and historic mining activities. Many of the drainage lines on Glosam have also already been destroyed by historic mining activities. However, an ephemeral stream and its associated drainage lines are still present in the southern half of the property (Figure 16).

No activity may take place within a watercourse unless it is authorised by the Department of Water and Sanitation (DWS). Any area within a wetland or riparian zone is therefore excluded from development unless authorisation is obtained from the DWS in terms of Section 21 (c) and (i).

O van Antwerpen of Minrom Consulting Pty Ltd has been appointed by Wepex Trading (Pty) Ltd to provide a hydrological and Hydrogeological Impact Assessment in order to highlight the surface and ground water characteristics of the proposed mining area and to determine the possible impact of mining on the surface and groundwater status of the application area. Surface water was described and included in this report as part of the Hydrological and hydrogeological Impact study (The complete study is appended as Appendix 8).

Floodlines for the 1:50-year and 1:100-year recurrence intervals were determined for the river passing through the project site. The proposed project and mine surface infrastructure are located outside the 1:50- and 1:100-year floodlines. The delineated floodlines are presented in Figure 17 and Figure 18. The promised land stockyard and the north processing areas are located within the 1: 100-year floodlines. All other infrastructure is located outside of the floodlines. Condition 4 of the GN704 indicates that no residue deposit or associated activity may be located or placed within the 1:100-year flood line or within a horizontal distance of 100-metre from any watercourse, whichever is greatest. It should be noted that the natural boundary for watercourses includes the best estimate of the edge of dormant or old side channels. It is therefore recommended that mitigation measures be implemented to prevent flood water from entering these areas, such as the construction of berms, drainage trenches and/or dirty water containment systems. These systems can be designed and implemented as part of further, more detailed mine design studies beyond the conceptual stage.

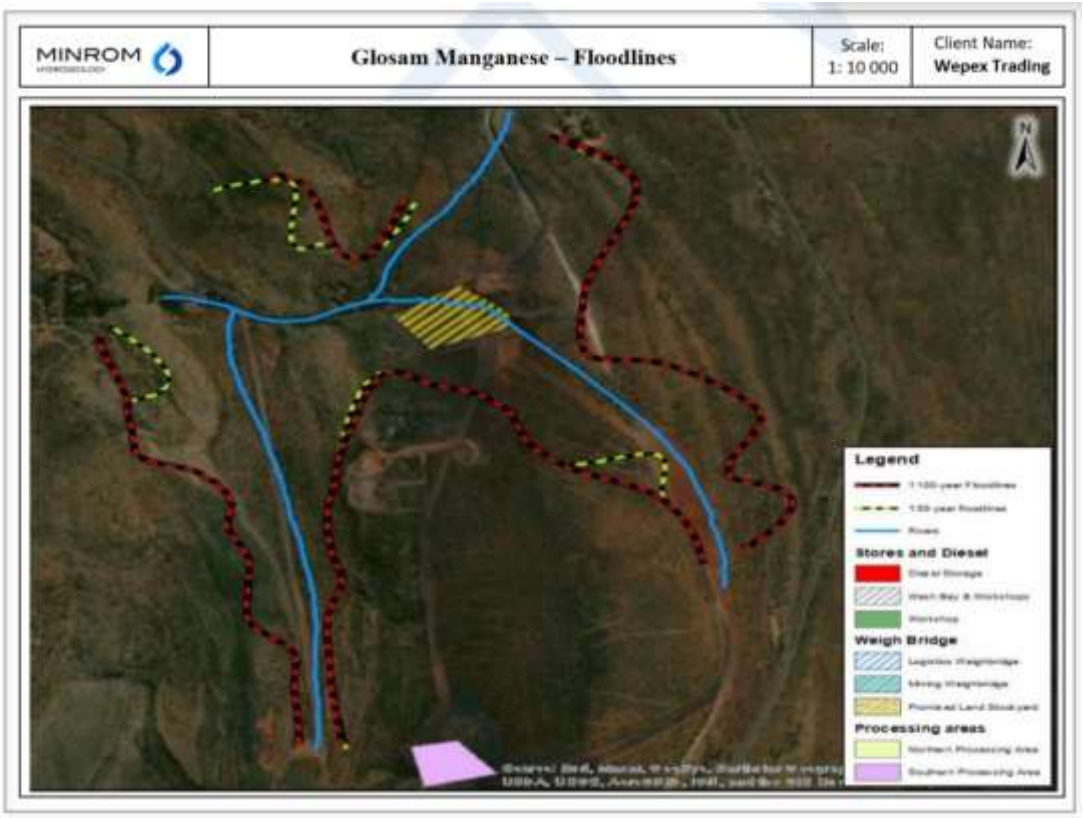


Figure 17. 1:50-year and 1:100-year flood lines for the unnamed streams near the project site. (taken out of the Hydrological report by minrom)

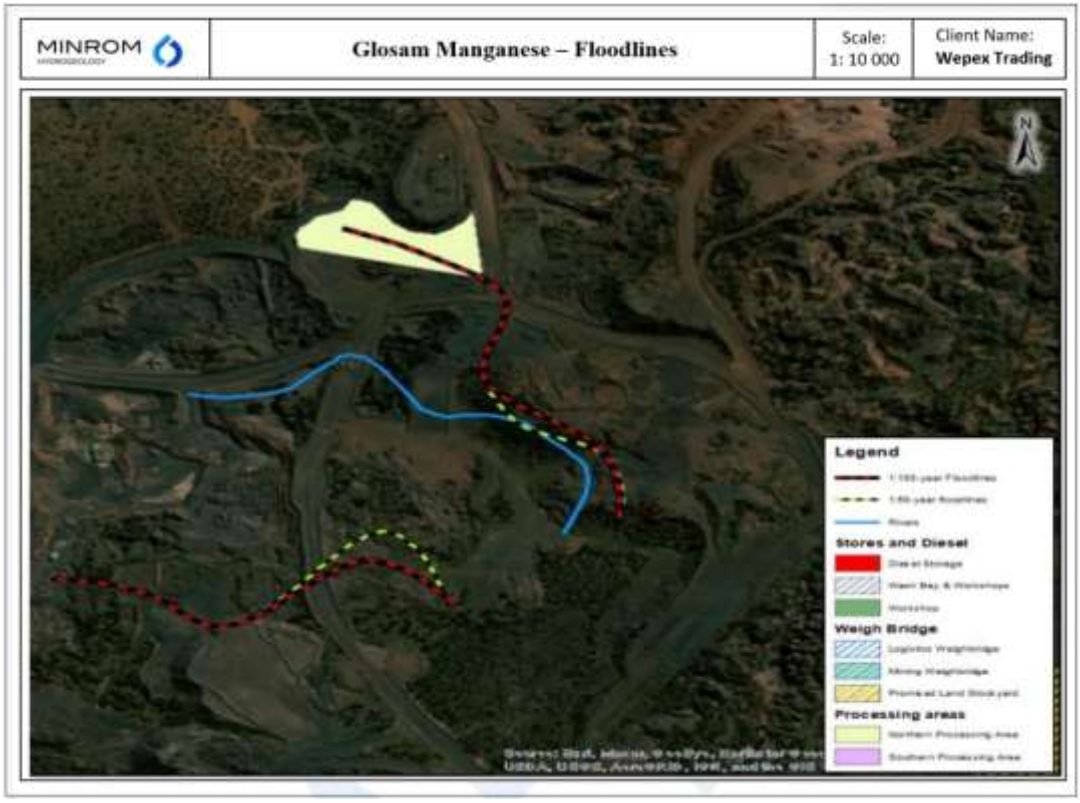


Figure 28. 1:50-year and 1:100-year flood lines for the unnamed streams near the project site. (taken out of the Hydrological report by minrom)

To ensure that 'clean' and 'dirty' waters generated from the sites are adequately contained and routed as per GN704, a conceptual stormwater management plan was developed for the Glosam mine. The GN704 states the following regarding capacity requirements of clean and dirty water systems:

- Confine any unpolluted water to a 'clean' water system, away from any 'dirty' areas.
- Design, construct, maintain and operate any 'clean' water system at the mine or activity so that it is not likely to spill into any 'dirty' water system more than once in 50 years.
- Collect the water arising within any 'dirty' area, including water seeping from mining operations, outcrops, or any other activity, into a dirty water system.
- Design, construct, maintain and operate any dirty water system at the mine or activity so that it is not likely to spill into any clean water system more than once in 50-years; and
- Design, construct, maintain and operate any dam or tailings dam that forms part of a dirty water system to have a minimum freeboard of 0.8 metres above full supply level, unless otherwise specified in terms of Chapter 12 of the Act.
- Design, construct and maintain all water systems in such a manner as to guarantee the serviceability of such conveyances for flows up to and including those arising as a result of the maximum flood with an average period of recurrence of once in 50 years.

(8) GROUND WATER:

O van Antwerpen of Minrom Consulting Pty Ltd has been appointed by Wepex Trading (Pty) Ltd to provide a hydrological and Hydrogeological Impact Assessment in order to highlight the surface and ground water characteristics of the proposed mining area and to determine the possible impact of mining on the surface and groundwater status of the application area. Groundwater was described and included in this report as part of the Hydrological and hydrogeological Impact study (The complete study is appended as Appendix 8).

The proposed mining area is underlain by two (2) different types of minor secondary aquifer each providing different qualities and quantities of groundwater:

1. **A fractured aquifer system (FAS) – low potential**
   High permeability fault and fracture networks within the overlying iron/manganese-bearing units. The groundwater potential of these overlying sedimentary units is particularly variable and highly dependent on "fracture interconnectivity". However, local borehole yields of up to 2 L/s can be obtained in joints and fractures associated with the fault margins of diabase dyke networks. The aquifer yield may be as high 40 L/s in mainly chert breccia, bander iron and iron ore formations.

2. **A Karst Aquifer System (KAS) – generally good potential**

The carbonaceous nature of the dolomitic basement makes it susceptible to the formation of cracks, joints, solution cavities and faults due to chemical weathering. If interconnected, these structures act as conduits for groundwater movement, with yields > 2 L/s to be encountered. They can also be identified on surface by the occurrence of calcrete mounds and trees.
The difference between these two secondary systems, as well as a primary aquifer system.

Aquifer Susceptibility & Vulnerability

Aquifer Susceptibility is the general qualitative measure of the relative ease with which a groundwater body can be potentially contaminated by a variety of anthropogenic activities and includes both aquifer vulnerability and the relative importance of the aquifer in terms of its classification. Given (1) the secondary nature of the aquifers, (2) the high permeability of both the fractured and karst aquifers and (3) the vast extent of the solution cavities and karst aquifer system , the aquifer is highly susceptible and vulnerable to both point (borehole) and disperse (surface leakage) sources of contamination.

The groundwater in the area, therefore, has high to very-high vulnerability to surface based contamination, whether point or disperse sources of pollution. This is to be expected as a result of high hydraulic conductivity experienced in secondary aquifer conduits and the extensive nature of the karst aquifer system within the Transvaal Dolomites. Karst aquifers are generally highly permeable ad have a good water quality with regards to electrical conductivity. The groundwater in the area is of high-to very-high vulnerability.

Aquifer Groundwater Levels

The regional water table in the Postmasburg-Kathu area sits at around 20 mbgl. Although from the various boreholes in the area, the water table can vary anywhere between 3–90 mbgl, depending on the position of the borehole structure and the fluid conduit(s) intersected.

Groundwater Quality

The groundwater quality in the area is generally good, with low electrical conductivity (charged ions) dissolved in solution. The groundwater in the area, according to the Department of Water Affairs & Forestry (DWAF) 500k hydrogeological map, falls within a range of electrical conductivity between 70 – 300 mS/m – which is average to good quality - higher EC values can generally be linked to groundwater pollution from potential sources such as Wastewater Treatment Plants (WWTP), homesteads, kraals, overflowing dams and stock water points and pans. The pH of the groundwater in the area is generally alkaline (pH 7–8).

The aquifers in the area are secondary by nature and therefore little-to-no intergranular residence time is expected, and major contamination and

pollution sources are likely to be introduced via secondary pathways, and surface sources of pollution which affect the weathered zone (0–25 mbgl). Most boreholes in the area are drilled into the karst dolomite which considerably deeper. In general, groundwater in dolomite aquifers is characterised by the dissolved elements, Ca^{2+}, Mg^{2+} and HCO_3, where half the HCO_3 is balanced by Ca^{2+} and half by Mg^{2+}, and ultimately coming into equilibrium with calcite and dolomite. In practice, the establishment of equilibrium with dolomite is slow because such waters usually contain more calcium than magnesium.

Dolomite groundwater is characterised by a consistent composition, due to the consistent composition of the dolomite forming the aquifer across the area. The groundwater in the area can therefore be expected to have a dolomite chemical "signature" and deviations in the chemistry, especially in Fe^{2+} and Mn^{2+} can be likely linked to contamination by mining activities and processes, deviations in the bacterial contents to biological waste contamination and hydrocarbon presence to fuel and oil spillages.

Aquifer Recharge

The aquifers in the area are dependent on precipitation for recharge, which varies with the frequency of precipitation, rock type and soil and plant cover. The dolomitic aquifers cover the majority of the project area and contribute to the relatively high recharge rates. The unconsolidated Kalahari sands and low clay content present in the low-lying areas also contribute to this. The mean annual recharge at Glosam is approximately 9.0-10.5 mm/a. The aquifer recharge rate is important in considering sustainable abstraction.

HYDROCENSUS

A field Hydrocensus is one of the most important aspects of the Hydrogeological study, especially where the potential for contamination is present. The proposed mining activity on Glosam Mine has the potential to contaminate groundwater through both (1) point source contamination (boreholes, wells) and (2) disperse contamination (oil, fuel, waste leakages etc.) through infiltration of the sub-surface. This contamination will have an adverse impact on boreholes and/or water sources down-gradient (flow) from the mine.

As per Chapter 3 of the National Water Act (Act 36 of 1998), it is required that any person or entity who owns, controls, occupies or uses the land is responsible for preventing pollution of water resources and is also responsible to remedy (correct) the effects of the pollution. It is with relevance to this Act that the hydrocensus was deemed necessary to gather all relevant information from the mining site related to groundwater and its related potential impacts.

The Hydrocensus was performed over four (4) days, visiting two (2) farms per day to liaise with the landowners, gain access and collect the necessary information. The Hydrocensus involves visiting all the known boreholes on each property and collecting basic information about each, including borehole X/Y coordinates, collar information, borehole depth (mbgl), diameter (mm), casing type, size, and depths, pumping rates, pump information, water level, usage and basic chemistry data with a handheld ExTech meter, such as Electrical Conductivity (EC), pH, Salinity and Total Dissolved Solids (TDS). Samples were also collected, if the borehole was deemed representative of the groundwater aquifer as a whole – i.e., the borehole was pumping and not a stagnant water column.

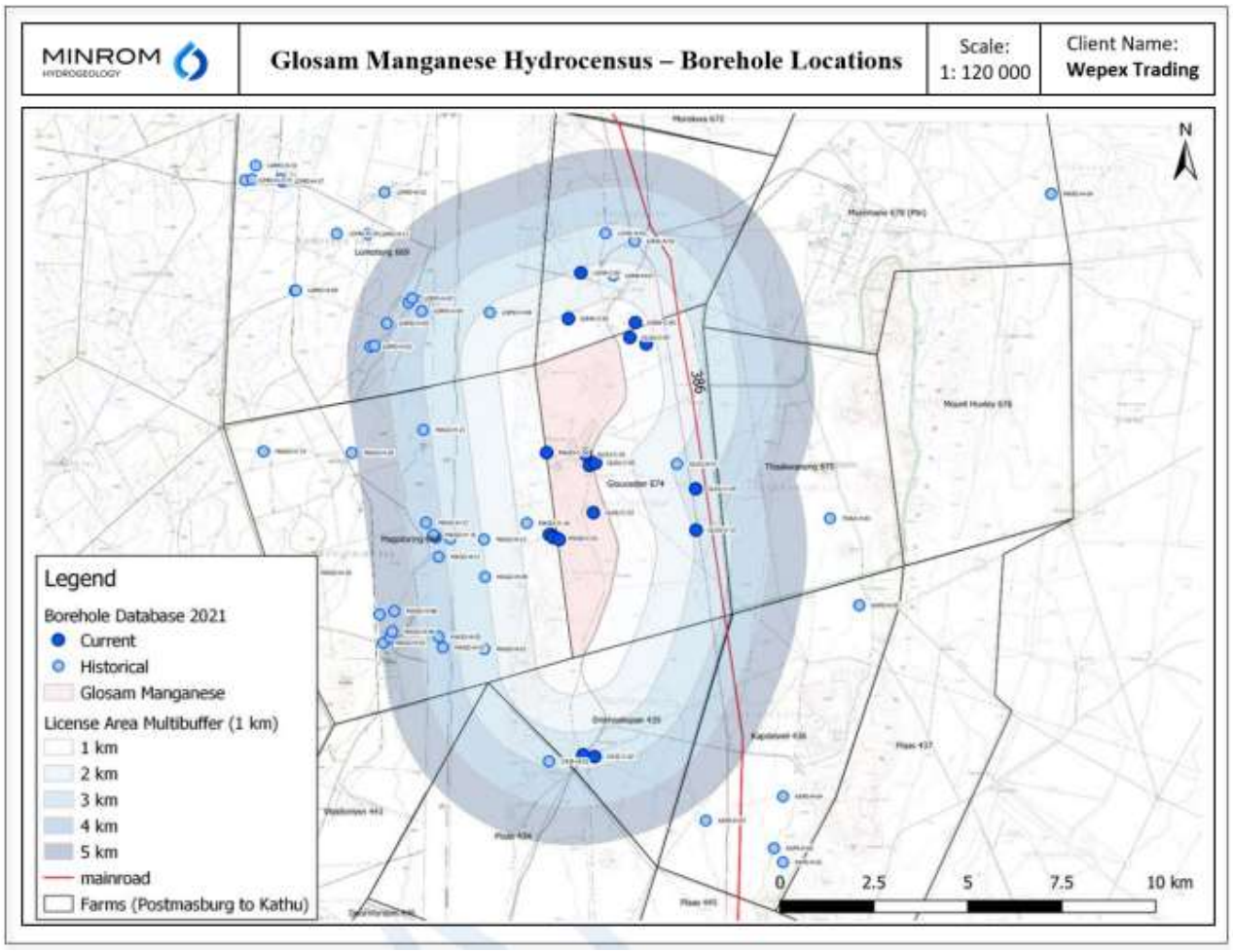


Figure 19. Glosam Manganese 2021 Hydrocensus boreholes.

The majority of boreholes are 152 mm (6.0") in diameter, with steel casing. There are also instances of wider diameter holes (177 mm and 212 mm) on the properties. Borehole depths vary significantly, from shallow < 20 mbgl, to 40-80 mbgl and up to the deepest recorded of 120 mbgl. Water level depths also vary significantly from 3–90 mbgl. In general, where mining activities are present, the water levels are noted to be deeper than in areas surrounding the mine.

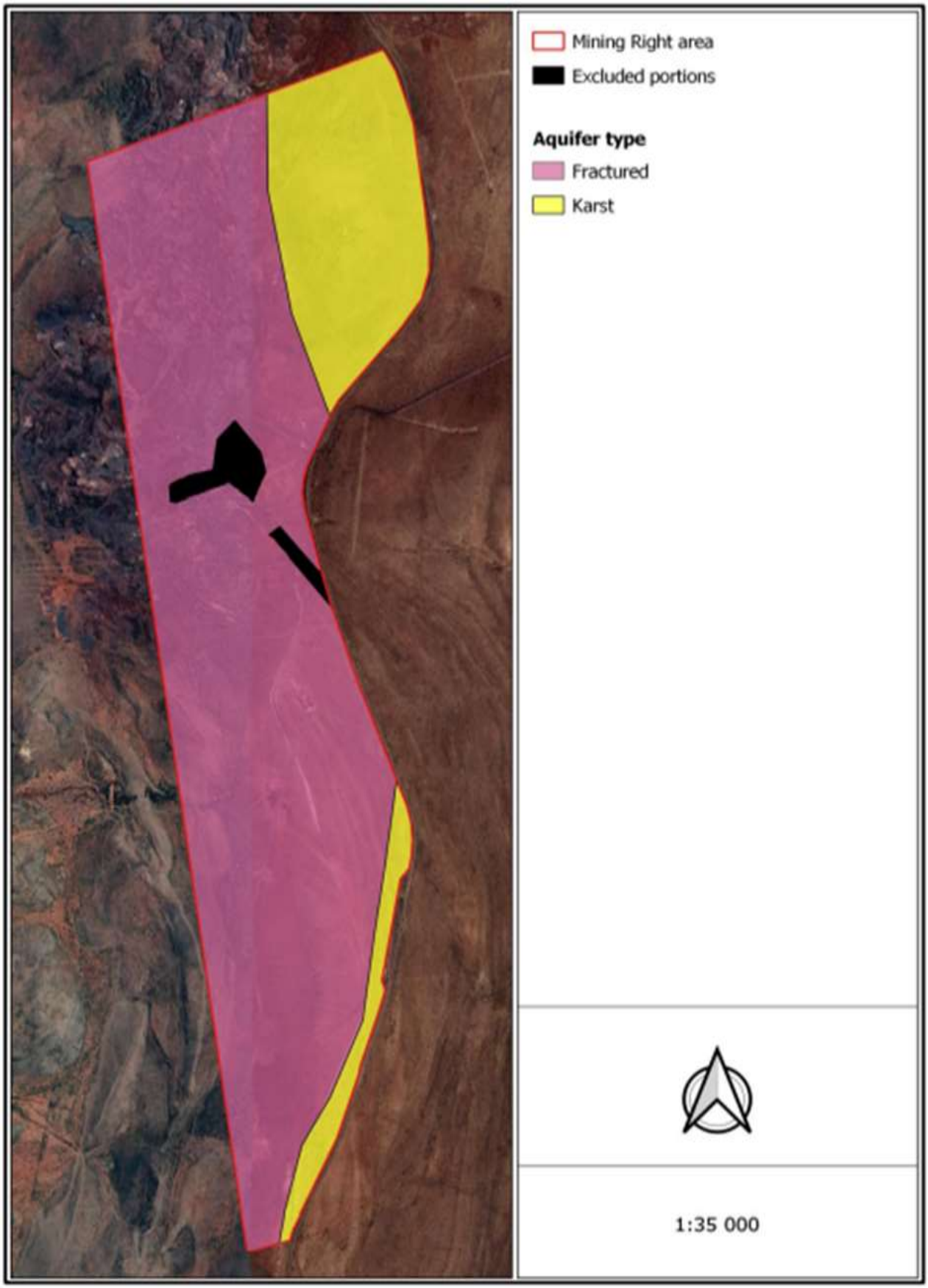


Figure 20. The location of aquifer systems in relation to the proposed mining right area. (taken out of the Ecological study).

(10) ***AIR QUALITY AND NOISE:***

With reference to the listed activities and associated minimum emission standards identified in terms of section 21 of the National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004).
NOTICE OF INTENTION TO AMEND THE LIST OF ACTIVITIES WHICH RESULT IN ATMOSPHERIC EMISSIONS WHICH HAVE OR MAY HAVE A SIGNIFICANT DETRIMENTAL EFFECT ON THE ENVIRONMENT, INCLUDING HEALTH, SOCIAL CONDITIONS, ECONOMIC CONDITIONS, ECOLOGICAL CONDITIONS OR CULTURAL HERITAGE, Ore mining is a scheduled process that relates to the mining activity.

The current source of air pollution in the area stems from mining operations near Postmasburg and from vehicles travelling on the gravel roads of the area. No farming activities related to dust generation, such as ploughing, are known to occur in the area.

The potential source of air pollution on Glosam will be nuisance dust generated by the mining activities such as the blasting, hauling, crushing & screening as well as from the movement of vehicles on the site roads. Generated dust will be visible from the secondary gravel road and to local farm residents. Any potential fall-out dust will impact those who reside on the farm.

Noise on site will be generated by the possible if necessary blasting and yellow gear. Although these activities do generate noise, the overall impact can be described as negligible. The most susceptible receptors of noise will be the local farm neighbours' residents.

(11) ***VISUAL ASPECTS:***

The mining site is not at all visible from any main tourist route or main route. The mining operation will also not be visible to the neighbour since it is located within a rural landscape and shaded by vegetation. The negative visual impacts associated with open excavations. There is however no method of reducing the impact during mining operations (operational phase), it can only be mitigation by doing concurrent rehabilitation of open excavations as mining progress.

(12) **Site Sensitivity & *BROAD-SCALE ECOLOGICAL PROCESSES:***

Dr. Betsie Milne from Boscia Ecological Consultants has been appointed by Wepex Trading (Pty) Ltd to provide an ecological study in order to highlight the ecological characteristics of the proposed mining area and to determine the possible impact of mining on the diversity and

ecological status of the application area. Site sensitivity and broad scale ecological processes was described and included in this report as part of the ecological study. (The study is attached as Appendix 4).

Northern Cape Critical Biodiversity Areas

The proposed mining site falls within critical biodiversity areas, as defined by the Northern Cape Critical Biodiversity Areas Map (Holness and Oosthuizen 2016). This map identifies biodiversity priority areas, called Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs), which, together with protected areas, are important for the persistence of a viable representative sample of all ecosystem types and species as well as the long-term ecological functioning of the landscape as a whole. Almost the entire study area comprises of Ecological Support Areas and Other Natural Areas. No Critical Biodiversity Areas One, Critical Biodiversity Areas Two, or Protected Areas occur in or near the study site.

Mining and Biodiversity Guidelines

Similarly, the Mining and Biodiversity Guidelines (DENC et al. 2013) does not classify any section of the study area to have biodiversity importance, and therefore does not constitute a high risk for mining. These guidelines were developed to identify and categorize biodiversity priority areas sensitive to the impacts of mining in order to support mainstreaming of biodiversity issues in decision making in the mining sector.

Conservation planning

Furthermore, the broad-scale vegetation units that cover the study area (Kuruman Mountain Bushveld and Kuruman Thornveld) is classified as least threatened and therefore no formal fine scale conservation planning has been conducted. Kuruman Mountain Bushveld has however been identified as a medium conservation priority area within the Siyanda Environmental Management Framework. The study area does however not fall within a proposed conservation area for the District Municipality, but has been included within the Siyanda Environmental Control Zone 1; i.e. a zone with potential sensitive groundwater resources. The karst aquifers that occur in the dolomite and lime stone rocks in the area represent a major strategic water resource. It is sensitive both in respect to the abstraction and potential pollution of groundwater. Therefore, a suggested management parameter is to prohibit the bulk storage of hazardous substances as well as unrehabilitated spoil heaps and mine dumps. However at the pre-mining stage and for the duration of most of the operational phase where the pit floor is well above aquifer water table levels, this impact is identified as reasonably low. The prevalent aquifer systems are (1)

extensive (especially the karst dolomite) and (2) hydraulically conductive and as such, the residence times and infiltration of the contamination entering the systems are expected to be considerable and impact the area on a large scale. Therefore, appropriate mitigation and monitoring measures need to be in place and be continuously implemented to ensure the risk is appropriately

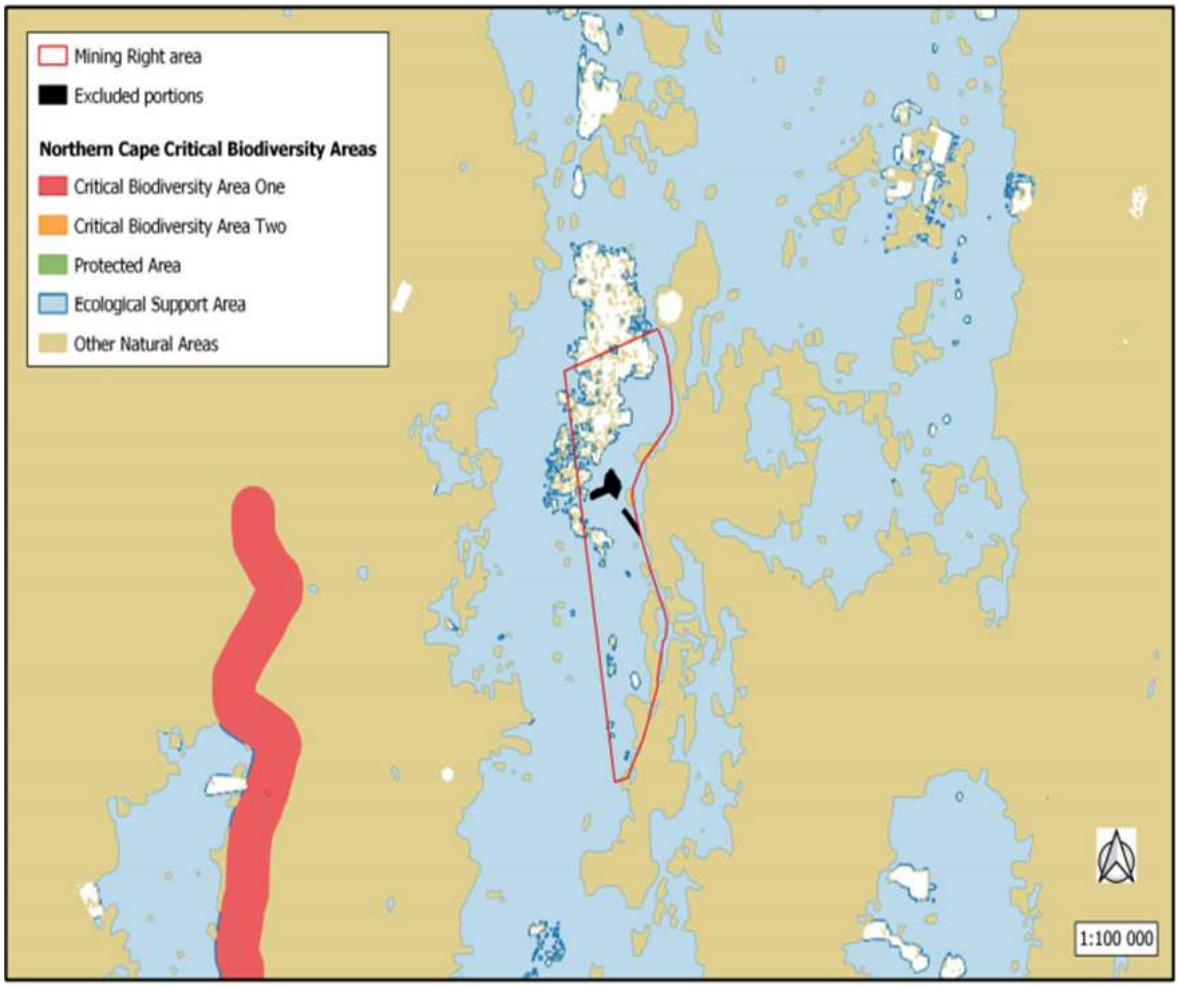


Figure 21. The study area in relation to the Northern Cape Critical Biodiversity Areas. (Map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021).

Environmental Screening

The National Web based Environmental Screening Tool does consider parts of the study area to be sensitive. This tool is a geographically based web-enabled application which allows a proponent intending to submit an application for environmental authorisation in terms of the Environmental Impact Assessment (EIA) Regulations 2014 (as amended), to screen their proposed site for any environmental sensitivity. Glosam is considered to be of low sensitivity based on the Plant- and Animal species Themes. Large parts of the study area are however considered to be of very high sensitivity based on the Aquatic- and Terrestrial Biodiversity Themes. The Terrestrial Biodiversity sensitivity is a direct

function of the Ecological Support Areas classification on the Northern Cape Critical Biodiversity Areas Map. The Aquatic Biodiversity sensitivity is attributed to two factors. The seep wetland in the north-east of Glosam is regarded as a sensitive water resource, while quaternary catchment D73A, which comprise the southern half of Glosam, falls within a freshwater ecosystem priority area quinary catchment.

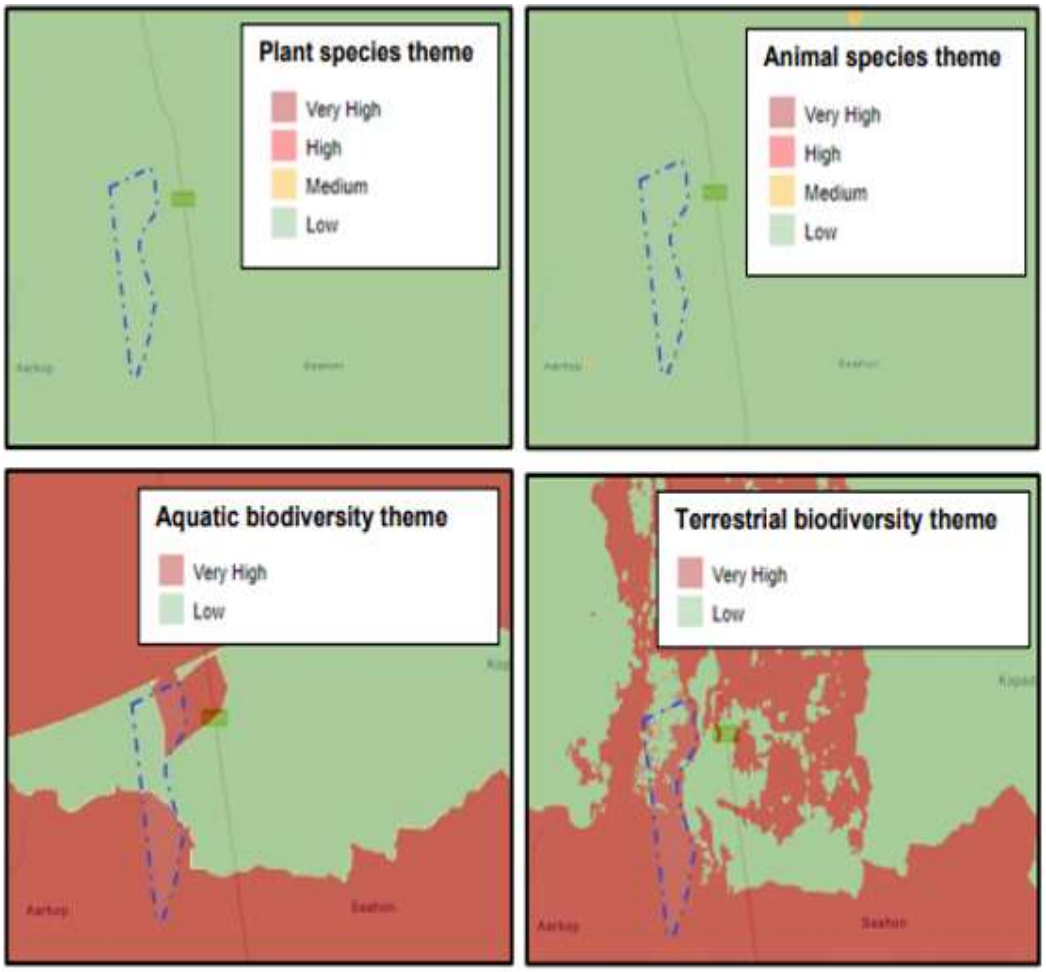


Figure 22. Environmental Sensitivities associated with the study area, according to the National Web based Environmental Screening Tool.

Centres of Endemism

The study area also falls within the core area of the Griqualand West Centre (GWC) of Endemism (Frisby et al. 2019). A centre of plant endemism is an area with high concentrations of plant species with very restricted distributions, known as endemics (Van Wyk and Smith 2001). Relatively small disturbances in a centre of endemism may easily pose a serious threat to its many range restricted species. Endemics are specifically vulnerable due to their restricted distribution ranges. Glosam falls within the Ironstone Hills - Asbestos Hills floristic region of the GWC. Fifteen of the 25 endemic and near endemic taxa identified in the GWC occur in this floristic region.

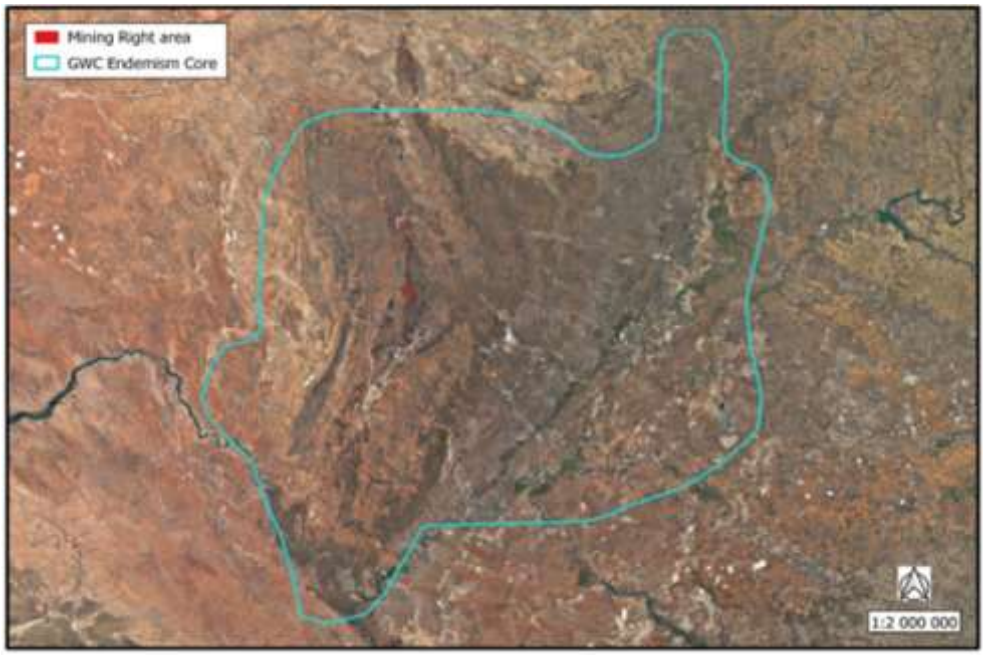


Figure 23. The Glosam Mining Right Application area in relation to the GWC core, according to Frisby et al. (2019).

Landscape-level wetland threat status

Within the vicinity of the proposed mining operation, the ecosystem threat status for most wetlands has been classified as Least Concern. However, two seeps, including the one occurring on site, are classified as Critically Endangered (Figure 24) and both are poorly protected.

Figure 24. The ecosystem threat status of wetlands occurring is the vicinity of the proposed mining right area.

Cumulative mining status overview

The study area falls within a zone where South Africa's largest economically most important deposits of manganese and the principal deposits of iron ore are found. The manganese zone extends northwards over a distance of 150 km, from just south of Postmasburg to as far as the Wessels and black rock Mines north of Hotazel, while the most significant iron ore deposits occur in the vicinity of Postmasburg and Sishen (Figure 25). The Glosam mining activities are therefore expected to contribute to the cumulative effect of mining in the region.

Site Sensitivity

The sensitivity map for the proposed mining operation is illustrated in Figure 26. The ephemeral stream and seep is considered to be of very high sensitivity. Both these are watercourses, protected in terms of the National Water Act (Act No 36 of 1998) and play important hydrological functional roles in the catchment area. Furthermore, the seep is classified as a Critically Endangered Wetland Ecosystem. The ephemeral stream is also thought to host unique species adapted to ephemerality, which causes them to respond only when conditions are ideal. Very little is known about the ecological functioning of ephemeral streams, but it can be expected that when such habitats are destroyed, species are lost, along with potentially valuable scientific information.

The small pocket of sand in the south-western corner of the study area are also considered to be of very high sensitivity due to the high density of species of conservation concern, particularly *Boscia albitrunca,* found here. Such isolated communities are islands that usually host unique species assemblages compared to the surrounding communities and should be preserved.

The hills and ridges in the north and south-west of the study area, as well as the thornveld on historic mine footprint are considered to be of high sensitivity. Even though some of these areas have been mined historically, dense vegetation has re-established in the old pits over the past 30 years. Not only does a number of protected plant species occur here, but the rocky- and dense shrubland habitats are expected to provide unique micro habitats to various small mammals, reptiles and birds. Their steep slopes also provide high erosion risks during runoff. The ridges and historic mine footprint in particular fall within the core area earmarked for mining activities.

The remaining shrubland on the plains is considered to be of medium sensitivity on account of the low density of protected plant species found here. Even though this area is underlain by a karstic aquifer, the core mining activities are not expected to take place here. Any mining

associated activities should nonetheless be strictly controlled in order to limit impacts on the species of conservation concern that do occur within the unit and any to prevent potential pollution to the aquifer.

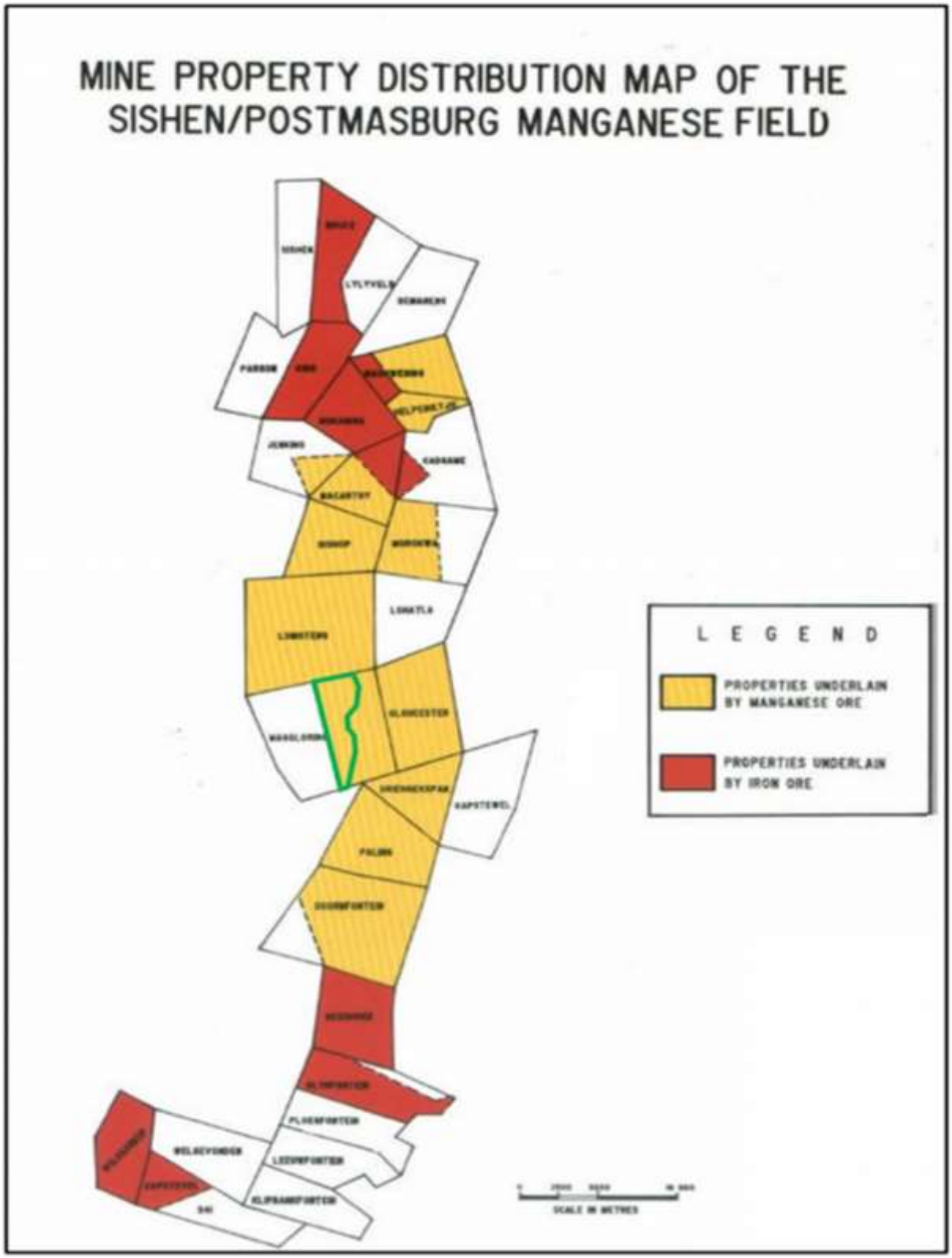


Figure 25. The distribution of mining properties in the Sishen/Postmasburg Manganese Field (Bonga 2005), with the proposed mining area indicated in green. (Map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021)

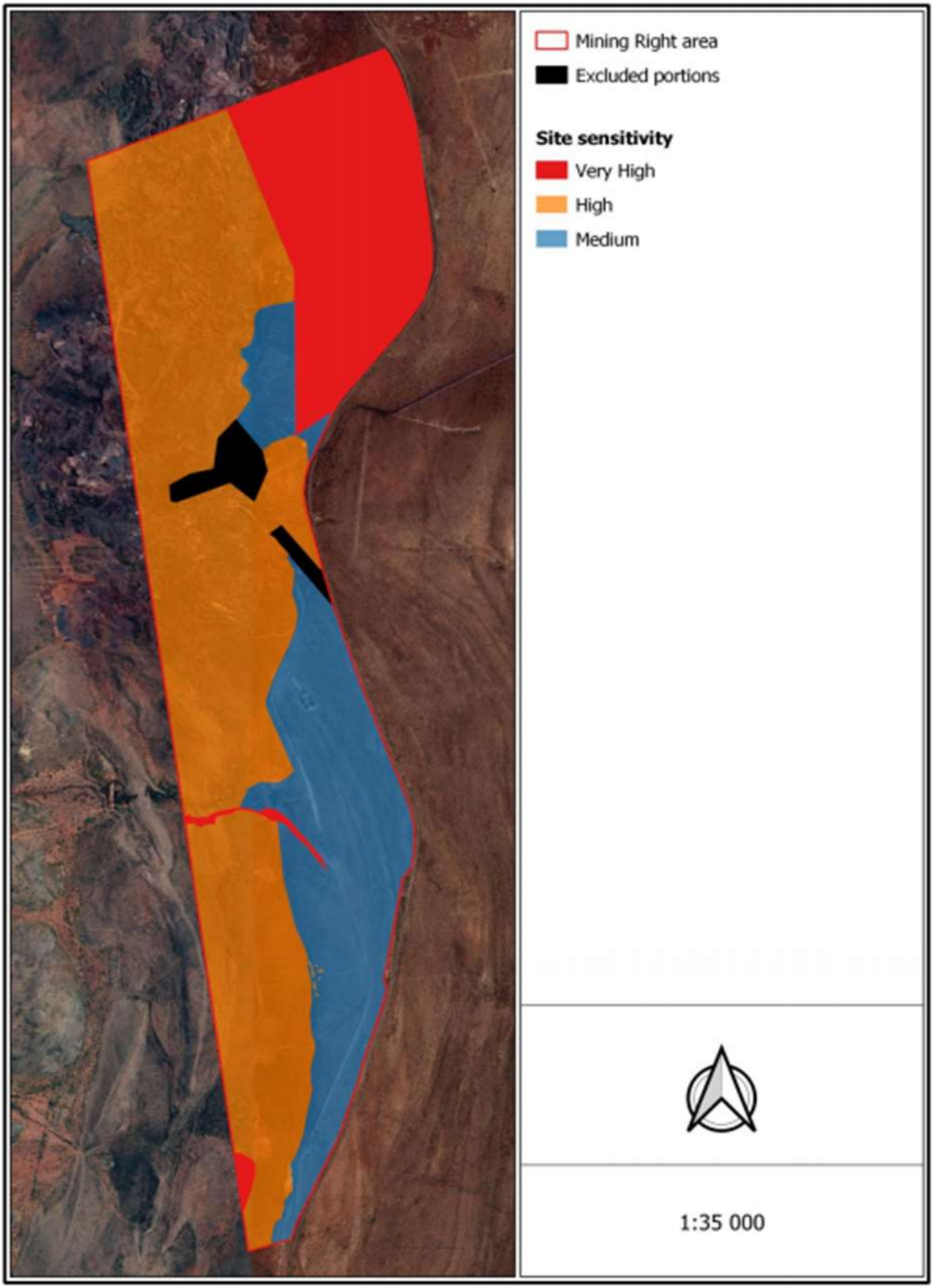


Figure 26. A sensitivity map of the proposed mining area. (Map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021).

(12) *SOCIO-ECONOMIC STRUCTURE OF THE REGION:*

Ms Ingrid Snyman from Batho Earth Consultants has been appointed by Wepex Trading (Pty) Ltd to provide a Social Impact Assessment study in order to highlight the social characteristics of the proposed mining area and to determine the possible impact of mining on the social status of the application area. (The study is attached as Appendix 7).

DESCRIPTION OF THE BASELINE ENVIRONMENT

Each community is unique as it is shaped by its social networks, cultural influences, values and norms, politics and the infrastructure in the area. The report therefore provides an overview of the social characteristics of the area in order to determine its current capacity and its ability to manage change.

General Description of the Study Area

ZF Mgcawu District Municipality

The ZF Mgcawu District Municipality was formerly known as the Siyanda District Municipality. It lies within the mid-northern section of the Northern Cape Province, bordering with Botswana in the north and Namibia in the west and covers an area of 102 484 km2.

The ZF Mgcawu District comprises five Local Municipalities with the Tsantsabane Local Municipality (TLM) as the relevant municipality for this application. The main towns that are scattered through the area are Brandboom, Danielskuil, Eksteenskuil, Groblershoop, Kakamas, Keimoes, Kenhardt, Lime Acres, Mier, Postmasburg, Rietfontein, and Upington. The latter serves as the district municipal capital.

The ZF Mgcawu District Municipality accounts for approximately 30% of the Northern Cape economy. ZF Mgcawu's economy is largely dominated by mining and agriculture. Mining activity mainly occurs in the local municipalities of Tsantsabane and Kgatelopele, where manganese, diamonds and the raw materials are found. Agricultural enterprises are found along the Orange River with table grape and dried fruit production, processing and packaging. Livestock farming is undertaken throughout the area with varying land unit sizes due to the diverse carrying capacity in the different sections of the district. A large variety of game can also be found on both private and conservation areas in the region.

Tourism is one of the most important economic sectors in the Northern Cape as well as within the ZF Mgcawu District Municipal boundaries. The industry is noted as the fastest growing component of the economy by

the ZFM IDP (2012– 2017). The world famous Kgalagadi Transfrontier Park is found in this region.

The spatial vision of the ZF Mgcawu District Municipality thus include:

- Tourism: Cultural, wilderness, floristic, river tourism ranging from the Kgalagadi international trans frontier park to the culture of the Riemvasmaak community to river tourism on the Orange River;
- Mining and mining beneficiation;
- Agriculture: Riverbank vineyards and expansive stock and game farming in the Kalahari; and
- Renewable energy technology opportunities.

Tsantsabane Local Municipality

The Tsantsabane LM falls under the jurisdiction of the ZF Mgcawu District Municipality formerly known as the Siyanda District Municipality. The extent of the geographical area of the municipality is 18 317 km2. The TLM falls in the Gamagara Corridor, which the Northern Cape Provincial Spatial Development Framework (NCPSDF) (2012) defines as "comprises the mining belt of the John Taolo Gaetsewe and ZF Mgcawu districts and runs from Lime Acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron and manganese.

The TLM area consists of various wards as indicated in the table below. The study area falls within Ward 6 that spans a vast area. The ward includes Stasie, White City and areas of Beeshoek near Postmasburg with the Olifantshoek area forming the eastern boundary of the ward, and the western boundary just extending to the east of the R325. Ward 6 further stretches northwards to an area near the Olifantshoek – Upington crossing of the N14 and R325.

Table 10: Wards and settlements in the study area

WARDS	AFFECTED SETTLEMENTS IN WARD
Ward 1	Part of Postdene and Carnation
Ward 2	Newtown
Ward 3	Groenwater, Jenn Haven, part of Postdene and Kolomela houses
Ward 4	Boichoko
Ward 5	Skeifontein, Soetfontein, Strathmore, Part of Boichoko and Postmasburg Town
Ward 6	White City, Glosam, Maremane, Beeshoek, Stasie
Ward 7	Maranteng, Kanonbult

Postmasburg is the main town within the Tsantsabane LM, with various other small rural settlements such as Jenn-Haven, White City, Groenwater and Skeyfontein. New settlements developments include Mountainview, Greenfields, and Postdene Phase 1 & 2.

Postdene is situated to the north of Postmasburg and just east of the R325. Newtown is to the west of Postmasburg and south of the R385 (Main Road) with Boichoko further west of both these settlements. Biochoko and Postdene settlement is spatially separated from Postmasburg town, while residents of Newtown access Postmasburg via R385, Main Road and Boom Street.

The Maremane settlement is situated on the farm Driehoekspan 432 which is situated to the south of the proposed mining activity and to the west of the R325. The Maremane community was removed from the region during the late 1970's, partly to make room for the SA Defence Force (Lohatlha) at the time. The resettlement process of the Maremane community started during 1997.

The Maremane area includes a formal village and informal section. The formal settlement housed approximately 400 families and the informal section consisted of approximately 40 families. The Maremane community falls under the jurisdiction of the Maremane Traditional Authority, with the Maremane Communal Property Association (MCPA) managing its affairs. The ZF Mgcawu District Municipality IDP stated that township establishment must still be conducted by the Department of Land Reform and a new CPA must be elected. In the absence of the CPA and township establishment, the TLM must explore alternative service delivery options to assist the Maremane community.

The main route in the area is the R325 to Kathu and is characterised by high levels of movement. This opens up economic opportunities for the TLM along this and other secondary routes.

Economically, Tsantsabane is known for being rich in minerals, and for its mining, agriculture, manufacturing and farming sectors. Tsantsabane has become one of the leading investment areas in the Northern Cape.

The key Municipal priorities as set out in the TLM's IDP include:

- Bulk Infrastructure services;
- Revenue Collection and Enhancement;
- Provision of Sustainable Basic Services (Water, Electricity & Sanitation);
- Local Economic Development and Job Creation;
- Education: access to land for educational purposes;

- Access to land for residential and business erven;
- Library services for rural areas;
- Refurbishment of community halls; and
- Access to health services.

The study area

The farm Gloucester is approximately 28 km north of the town of Postmasburg and falls within the jurisdiction of the Tsantsabane Local Municipality (TLM) and the ZF Mgcawu District Municipality.

The land uses in the study and municipal area are mainly focused on mining (manganese and iron ore) and agriculture (grazing), although of a low potential. Various mines exist within the TLM and in close proximity to the farm Gloucester. Local mines include:

- Beeshoek Iron Ore Mine (directly west of Postmasburg) (Assmang);
- Kolomela Iron Ore Mine (southeast of Postmasburg) (Anglo American group company Kumba Iron Ore);
- Manganore Mine (southeast of Lohatlha and the farm Gloucester on the farms Klipfontein and Kapstewel) (Assmang);
- Sedibeng Iron Ore Mine (20 km north of Postmasburg on the farm Klipfontein);
- Lomoteng Manganese Mine (farm Lomoteng approximately 2km from Sedibeng Mine) (Strata Africa Resources);
- Emang Mmogo Manganese Project (farm Japies Rus, directly to the west of the farm Gloucester) (Segue Resources);
- Paling Manganese Mine (south of the farm Gloucester on the farm Paling) (PMG Mining); and
- Bishop Manganese Mine (north of the farm Gloucester on the farm Bishop) (PMG Mining).

The site area has been extensively mined in the past, and more recently by Assmang (manganese ore). Historical mining and more recent exploration thus disturbed the area significantly. Various mining related infrastructure are found throughout the application area, e.g. open pits, access roads and various buildings and mining related structures. Other infrastructure refers to cellular masts, the Sedibeng Water pipeline and Eskom power lines. The Paling Mine is located to the southeast. The security office of Emang Mmogo Mine is to the west of the farm Gloucester.

The Transnet Rail Freight railway line passes on the eastern border of the mining rights area. The R325 that links Kathu and Postmasburg are further to the east of the proposed site. The Lohatlha Military Training Base is located to the east of the R325 and the farm Gloucester.

The larger study area is also used for livestock grazing and wildlife. The Assmang owned game farm is situated southwest of the farm Gloucester.

The Glosam mining village which was developed in the 1950's is still present on the farm Gloucester. It consists of approximately 30 houses, a recreational area (sports field and braai area) as well as other structures including a recreation hall. Remnants of other buildings associated with mining are also present.

Social Profile

Population Figures

The population profile of the TLM and Ward 6 can be summarised as follows:

Table 11: Population Profile

POPULATION PROFILE				
AREA	Total Population (Community Survey 2016)	Average population density	Number of households	Average household size
TLM	39 344	2.1 persons per km^2	11 820	3.5
Ward 6	5 541	0.4 persons per km^2	1 798	3

The population in Ward 6 comprises 14% of the population in the TLM if compared to the total population as recorded in 2016. Ward 6 is less densely populated than the other wards and the majority of the residents are located within the settlements such as White City and Maremane. There is an average of 3 individuals per households which is similar to that of the TLM.

According to the 2011 statistics , Glosam had a total population of 119 residents. This could have changed significantly since then.

The population figures of the TLM and Ward 6 are in line with medium to high growth rate predictions made in 2011 based on the population figures at that stage. The high-growth scenario of Postmasburg took into account the trend breaks which could occur due to the increase in mining activities in the Postmasburg area that is expected to continue until approximately 2035.

Age Groups and Gender

The age groups and gender of the TLM and Ward 6 in comparison with the district and province can be summarised as follows:

Table 12: Age Groups and Gender

AREA	% Population under 18 years	Median age	% Working Age (18-64)	% Males of total population
Northern Cape Province	36%	25 years	59%	49%
ZF Mgcawu District Municipality	34%	26 years	61%	51%
TLM	34%	26 years	66%	54%
Ward 6	30%	27 years	66%	56%

The TLM's population indicates a predominantly young age structure with 34% of the population under 18 years and 62% between 18 and 64 years. The median age within Ward 6 and the Northern Cape Province varies between 25 to 27 years. Within the TLM, the highest percentage (23%) of people fall between 20 and 29 years of age. Those within the working age category (18-64 years) are approximately 10% higher than the rate in the Northern Cape and also slightly higher than the district rate . At Glosam, 25% of the population was under the age of 14 years in 2011, which would result in some of those residents also now falling within the working age category which made up 75% of the population in 2011 . These figures indicate the critical need for employment opportunities within the area.

The male population (21 086 individuals) within the municipality are at 54% and even higher in Ward 6 at 56%. In 2011, the male population within Glosam, also constituted 56.5% of the Glosam residents, with a significantly higher number of males within the 20–40 year age category . The number of males within the study area is thus again approximately 8% higher than the rate within the province and slightly higher than the district rate . The main reason for this situation in the area is attributed to the influx of various workers from outside the province in search of work at the different mining and solar developments and mining being a more male dominant employment industry.

Population Stability

The majority of the individuals residing in the TLM are originally from the Northern Cape Province. Approximately 11% of the population within the TLM area are from outside the province . The cause for immigration may largely be attributed to the presence of various mining activities and mainly due to the sources of employment within this sector.

The in-migration, and the fact that mining cannot absorb all the job seekers, results in a population instability which in turn creates various challenges in terms of the provision of infrastructure and services.

Education and Skills Levels

The proportion of the adult population within the TLM area with no schooling amounts to 7%, with only 2% having obtained a tertiary level of education. The statistics indicate that although a high number of

students enroll for primary school, a very low number of students complete Grade 12. Furthermore, only 5% of those who enrolled for Grade 1 endure it into a tertiary level.

Approximately 36% within the TLM, however has a matric certificate, which is about 20% higher than the rate in the district and 10% higher than the provincial rate. The education profile of Ward 6 shows that only 12% have completed matric (thus much lower than the TLM area), but 3% have some form of higher education.

In 2011, the education levels within Glosam were as follows: 2.4% of the population did not have any schooling, 41% of those above 20 years had completed Grade 12 and 12% had completed some form of higher education. It is thus highly possible, if these residents still stay at Glosam, that that they could still be suitably qualified for employment opportunities at the proposed mining activity.

The ZF Mgcawu District Municipality stated in the IDP that within Maremane community there is a need for a mobile library, early childhood development centres, schools and even ABET classes.

With the low number of the population within the TLM having a tertiary qualification or having completed Grade 12, it can be assumed that the skills levels are also low. This results in a very low probability for employment. Unemployment and low skills remain a major concern within the TLM area.

Within the TLM and Ward 6, the educational profile of those of 20 years and older is as follows :

Table 13: Educational Profile of Population in TLM

EDUCATIONAL PROFILE						
Area	No Schooling	Some primary	Completed primary	Some secondary	Completed secondary	Higher
TLM	7.3%	9.1%	5.9%	36%	36%	2.2%
Ward 6	17%	13%	5%	30%	12%	3%

It must, however, be noted that the education level is further being negatively affected by the urbanisation process, with a lack of sufficient schools for the increase in people coming to Postmasburg and surrounds in search of employment . Learners from all over the TLM area are transported to attend school in Postmasburg. Overcrowding in the classrooms is a serious challenge which hampers the learning experience. There is thus an urgent need for additional school facilities, especially primary schools. The challenges in this regard relate to:

- An urgent need for additional school facilities in Newtown (Postmasburg) and Groenwater / Skeyfontein;

- Lack of a Setswana medium school/s;
- Lack of specialised schools focusing on specialised traits i.e. Technical or Agricultural;
- Lack of proper water and sanitation services at schools;
- Not enough classrooms and high learners and teacher ratio; and
- A need for an additional technical high school that will respond/address for the needs of the mining sector.

Employment and Income

The mining sector, followed by the agricultural sector, is the main employment sectors within the local study area. The mining industry's contribution to the GDP of TLM increased from R1,5bn in 2002 to R3,9bn in 2012. During 2012 the mining industry employed 54.5% (6 648 persons) of the employed population.

The employment profile of persons 15 years and older is as follows:

Table 14: Employment Profile

EMPLOYMENT PROFILE				
Area	Employed	Unemployed	Discouraged work-seeker	Other non-economically active
Northern Cape Province	38.4%	14.5%	5.4%	41.6%
ZF Mgcawu District	47.3%	11.3%	3.2%	38.3%
TLM	45.3%	16%	1.8%	36.9%
Ward 6	55%	7%	1%	37%

Although various mines operate in the TLM area, these mines cannot accommodate all the jobseekers. According to the Census of 2011, the employment rate in the municipality is slightly less compared to the district rate, but significantly higher than the provincial rate. The employment rate in Ward 6, however, is 10% higher than that of the TLM. The non-economically active people are still of concern as they would thus be dependent on the employed.

From the statistics of 2011, and the income profile of the residents in Glosam, there were 12.5% of the households who had no income. One can thus conclude that at that stage, the majority of households had an individual that was employed . It is unclear what the situation at Glosam is currently.

Due to the existing socio-economic circumstances in South Africa as a result of the negative impact of Covid-19, the unemployment figures can now be even higher. More up to date figures, however, were not available. Job creation in the TLM among the youth will remain a challenge with limited sectors available.

The average annual income in the TLM is calculated at R57 700 per annum , approximately 29% of the households within the TLM fall within the lower bound income brackets of below R20 000 per year. The average annual income is almost double that of the Northern Cape Province (R30 000) and the district figures. Employment figures for the TLM, is again slightly lower than that of the District, but higher than the Provincial figures.

Poverty levels in the study area remain high which indicates a higher dependency ratio and it can lead to higher crime rates.

Community Resources and Infrastructure

Land-Use

The larger study area is characterised by various type of infrastructure such as railway lines, power lines, communication masts, roads and various different type of mining infrastructure, mining developments and agricultural farming practices (commercial livestock and subsistence grazing), with limited game farming.

Natural Resources

The proposed mining project and site is located within an area that is semi-arid with no large dams or rivers. There is a dependency on the existing limited groundwater sources for agricultural activities and provision of water to some settlements.

In Tsantsabane the natural resource base is threatened or under pressure due to the mining developments. Concerns relate to habitat transformation and degradation, the generation and disposal of various types of waste, the invasion of alien species, air quality impacts, impacts on ground and surface water sources, as well as the overall climate change. The management of these is critical in ensuring effective conservation and sustainable use of the biodiversity. Further issues of concern in the TLM area relate to the over-exploitation of natural resources and the pressure on development also places additional strain on water as natural resource.

To ensure sustainable livelihoods, it is important that economic opportunities are expanded in local areas, in a way that takes both people and biodiversity into account. Nature-based tourism should encourage local economic development. There is also a huge need to expand the skills of local communities and encourage entrepreneurs in the tourism industry, the game farming industry and commercialization enterprises, through training and support on access to finances and marketing.

Safety, Security and Health

Postmasburg has one police station which has to serve the entire municipal area, except for the Maremane area which is attended to by the Dingleton and Kathu Police Stations. Police are understaffed and lack enough vehicles to respond to all the crime related issues. Due to the influx of more individuals to the area, as well as an increase in alcohol and drug abuse, the crime levels in the study area have increased over the past couple of years.

There are no disaster management services as part of the TLM. The communities are dependent on Assmang Mine to provide firefighting services.

Postmasburg has one hospital that is usually functioning at capacity, three Primary Health Care clinics (Postdene, Boichoko and Newtown) and four mobile clinics . The hospital received some upgrades in 2019 undertaken by Anglo American Group of Companies' Kumba Iron Ore (Kolomela Mine) as part of their community investment programme. These included the construction of an additional primary health care facility next to the hospital and mobile care for rural areas; retention and attraction of key health professionals as well as the construction of doctor's living unit; and a focus on secondary healthcare which included the hospital upgrade.

However, there remains additional needs for more clinics and even mobile clinics for outlying areas such as Maremane. The TLM should work with provincial departments to ensure the development of community infrastructure such as schools and clinics is properly co-ordinate the development of these with the informal settlements upgrade programme.

Further health challenges that were highlighted are:

- HIV/AIDS increase and Tuberculosis (TB) increase;
- High rate of teenage pregnancies;
- Lack of sufficient and qualified staff with limited skills amongst current nurses and nursing sisters;
- Lack of sufficient facilities to render a proper health service to all communities; and
- Lack of necessary health equipment and medication at clinics.

Housing and Related Infrastructure

Human settlements are scattered throughout the municipal area resulting in some areas still lacking services and infrastructure in comparison to other areas in the Municipality. Due to the increase in mining activities, the demand for housing has also increased.

There are 11 820 households in TLM, with an average household size of 3.5 people. 72% of the residents live in formal dwellings. According to the Community Survey of 2016, this figure increased with approximately 80% of the residents living in formal dwellings.

The TLM is continuously aiming to address the issues of basic service delivery and the provision of housing. The TLM has made some progress with regards to the provision of housing, but due to the influx of outsiders to the area, it seems as if the need remains higher than the actual approved allocations.

Challenges in this regard that still remain include:

- Proper maintenance of existing infrastructure;
- Economic and social development at risk due to infrastructure deterioration,
- Adherence to statutory plans such as the Strategic Development Framework (SDF),
- Verification process as per the Department of Human Settlement's Standards,
- Housing need (demand) that is higher than the actual approved allocation (supply)

However, projects are underway to supply the residents with improved services and infrastructure.
In line with the Mining Charter, Wepex Trading aims to facilitate and assist with the process of homeownership for its employees.

Basic Service Delivery

Currently the municipality is experiencing high development backlogs as a result of increasing population figures and socio-economic growth underpinned mainly by the solar and mining sector investments. This has resulted in massive pressure on the delivery of basic services within the TLM area.

There are 11 820 households in the municipality and these households have access to the following basic services :

- 91.2% of the households have access to water from a regional or local service provider;
- 45% have piped water inside their homes;
- 67% of the households have access to flush or chemical toilets;
- 91% have access to electricity which includes in-house pre-paid meters, in-house conventional meters and other sources;
- 67% of households have access to different types of internet facilities, although the majority of these obtain access via their cellular telephones; and

- 57% of households receive weekly refuse removal.

The above figures should take note of the fact that approximately 20% of the households in the TLM live in informal type of dwellings and that these households might not have access to the above services. The rural settlements and the informal settlements of TLM mostly do not have access to solid waste removal systems and services, which results in polluted informal settlements Internal settlement roads are also in poor conditions. There is furthermore a need to develop and upgrade and register landfill sites in order to prevent environmental degradation and to meet the needs of the communities. Wastewater treatment plants would require upgrading.

In Maremane the upgrading of roads, the extension of infrastructure for water and prepaid communal taps, sewage infrastructure, electricity and schools are required. The formal establishment of the township also need to be undertaken which could attend to some of these critical needs.

Tourism Industry

The local tourist attractions in the Postmasburg area include accommodation facilities such as hotels, guest houses and caravan parks. Attractions include hiking trails, hunting opportunities, war graves of the Galeshewe War, San rock art, the Howitzer Gun Civic Centre, Blinkklipkop, meaning "Shining Rock Hill" which boasts indications that the Khoisan attempted mining in this area as early as 700 AD, historic buildings, mine tours and the Witsand Nature Reserve, situated 80km south-west of Postmasburg.

A focused tourism strategy needs to be developed in order to create a tourism package comprising of a number of activities in the areas, rather than the current fragmented approach towards tourism. The SDF recommended the development of a circular route from Postmasburg to Witsand that could attract general tourists and 4 x 4 enthusiasts.

The Northern Cape Province Growth and Development Strategy stated that the tourism potential in the Northern Cape has not been exploited to its full potential. Should the industry be developed, it could result in the creation of significant labour-intensive employment opportunities.

Local Economic Profile

As with the province's economy, the economies of the ZF Mgcawu District Municipality and the TLM are largely dominated by mining, agriculture and manufacturing. Mining in TLM is the highest contributor to both its economic growth and job creation.

In 2014 it was indicated that the primary sector contributed 74% of all the sectors' contribution to the GDP of TLM. Mining was then still the single biggest contributor of all industries within the district and province. Expansions in the mining sector over the past couple of years led to the growth in the local economy. However, downscaling in this regard, however also had a significant impact on the local economy's dependent on mining with long term negative consequences.

According to the TLM IDP, mining accounts for 55% of the GDP within the region. Postmasburg, and the surrounding area, had positive local business-related impacts from mining due to the development of the Kolomela Mine and the constant input from the Assmang Beeshoek Mine. Individual new businesses, include retail and wholesale (53%), personal services (19%), transport (16%), catering and accommodation (6%), as well as financial services (3%).

It should be noted that this situation is a high potential risk for the TLM due to its overdependence on mining. There must be efforts from the TLM to diversify the economy and maybe focus on labour intensive job opportunities through the diversification of the economic base e.g. agriculture, agro-processing and manufacturing.

Furthermore, tourism could be a relatively small but important contributor to the local economy as more tourists are attracted to the distinguishing desert landscape with relative accessibility. This sector, however, was also negatively impacted by the Covid-19 Pandemic and associated lockdown restrictions.
Financial resources of the TLM are further limited due to ongoing poor payment levels by consumers. This has resulted in declining cash inflows for the municipality, which has necessitated restrained expenditure to ensure that cash outflows remain within the affordability parameters of the Municipality's finances. The effect of the COVID-19 pandemic further resulted in inability for them to effectively implement credit control and debt collection measures. In 2020 Eskom identified the TLM as one of the defaulting Northern Cape Municipalities that failed to pay Eskom large amounts for the service delivery. Continued stable electricity provision thus hangs in the balance. Possible future disconnections of electricity supply may cause undue hardship to consumers and members of the community, and may adversely affect the delivery of other services.

In order to ensure further economic growth in the region, the TLM's Local Economic Development strategy should ensure the utilisation of the economic potential to the benefit of the broader community.

Projects would include supporting the establishment of various industries and businesses and the promotion of tourism through the development of a Tourism Marketing Strategy.

The above could link with the efforts to identify skills to be developed to respond to the economic opportunities in the municipality. In this regard, the municipality, with the assistance of Kumba Resources, established the Tsantsabane Youth Service Centre in 2009. The focus of the Centre is skills development of youth in the area in order to empower them to play a vital role in the economy of the area. Specific programmes include life skills training, leadership training, computer training and so forth.

As part of local growth further key investment opportunities within the TLM relate to:

- public-private partnerships to speed up development in the area;
- developmental assistance to the agricultural sectors with the focus on the emerging farmers;
- the development of a manufacturing strategy including the availability of serviced plots and the development of local skills;
- identification of export opportunities and international markets;
- the establishment of a permanent working group between the mining companies and the municipalities to ensure an effective relationship together with the development of skills training and support programmes;
- investigating and exploiting activities related to road-transport routes or corridors due to the suitable location of the municipality;
- The establishment of a local business support centre for the benefit of local entrepreneurs and informal traders;
- Exploit possible benefits of solar development projects in the area (e.g. Lesedi, Jasper and Red Stone projects) to the benefit of the local communities; and
- The development and implementation of an aggressive tourism marketing strategy.

In this regard it must be noted that the objectives of Wepex Trading are to :

- build capacity to address sustainable development;
- increase the employee's strength, effectiveness and also having skilled labour would yield to the increase in productivity;
- build expertise, share skills in administration, professional, technical, management, finance and operations; and
- Develop skills that would yield to enabling employees to participate in economic activities in this sector.

(15) ARCHAEOLOGICAL

Prof. AC van Vollenhoven from Archaaetonos Culture en Cultural Resources Consultants were appointed by Wepex Trading (Pty) Ltd to provide an Cultural Heritage Impact assessment study in order to highlight the cultural characteristics of the proposed mining area and to determine the possible impact of mining on the cultural status of the application area. (The study is attached as Appendix 5)

Findings: During the survey twenty-one sites of cultural heritage significance were identified within the immediate project area.

Recommendations:

- Site 12 (farm yard) and 15 and 20 (railway sidings) are all outside of the development boundary. Site 12 has no cultural heritage value and this report is seen as ample mitigation. The structures are younger than 60 years. It needed, may be demolished without a permit from SAHRA.
- The railway sidings receive a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction if needed.
- The remains of industrial building (site 6), the base of a water reservoir (site 9), the office complex remains (site 10), various remains of brick buildings (site 11) and the farm yard (site 18) has no cultural heritage value. This report is seen as ample mitigation. The structures are younger than 60 years and in a very poor condition. It may be demolished without a permit from SAHRA. .
- The foundation (site 5), concrete building remains (site 16) and metal framework of an industrial building (site 21) has no cultural heritage value and may therefore be demolished. Since it is older than 60 years, a permit would be required from the SAHRA.
- For the three mine houses (site 4) the field rating of the site is Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. The mine does not currently have any plans that will impact here. Also, since the buildings are younger than 60 years, no permit is currently required.
- The old hostel area and recreation hall (site 2) is regarding as having a field rating of Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction. As both structures are younger than 60 years, no permit from SAHRA is needed.

- The field rating for the ore loading bays (site 7, 14 and 19) Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction. Since these sites are all younger than 60 years and in a very poor condition, it may be demolished without a permit from SAHRA.
- The field rating of the Glosam Mine Village (site 3) is Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.
- The village is older than 60 years and is regarded as being very unique and typical of such a mining village. Therefore at least the first sixteen houses, social area, hall and other structure within the inner circle of the village should be preserved. It may however be utilized for another purpose, being a youth camp, holiday resort or guest house. It would be good to also preserve the outer circle as it is part of the original lay-out plan, although most of the buildings are much younger.
- The mine does not intend to do any work here at present. If needed, for any changes to the buildings older than 60 years, a permit would be required from the SAHRA.
- The Miners boxes (sites 1, 13 and 17) are regarded as having a field rating of Local Grade IIIB. The sites should be included in the heritage register and may 5 be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.
- In this case, site 1 should be kept intact and preserved, meaning that a management plan should be drafted for the site. It should also be fenced in.
- Sites number 13 and 17 may be demolished, but only after complete documentation thereof and only if site number 1 remains intact. This documentation includes doing test excavations and drawing a site map.
- The loading platform (site 8) has a field rating of Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. As it is typical of a certain era in the mining industry, it should be preserved, perhaps as part of an interpretive route. It may be utilized in further mining activities, but a management plan would be needed for that.
- The proposed development may continue, but only after receiving the necessary approval from SAHRA.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation, it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible

unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.

- In This regards the following 'Chance find Procedure' should be followed:
  1. Upon finding any archaeological or historical material all work at the affected area must cease.
  2. The area should be demarcated in order to prevent any further work there until an investigation has been completed.
  3. An archaeologist should be contacted immediately to provide advice on the matter.
  4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
  5. SAHRA's APM Unit may also be notified.
  6. If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
  7. The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
  8. Work on site will only continue after removal of the archaeological/ historical material was done.

Prof. Marion Bamford (Palaeobotanist) from archaeological & Heritage Services Africa (Pty) Ltd Consultants were appointed by Wepex Trading (Pty) Ltd to provide a palaeontological Impact assessment study in order to highlight the palaeontological characteristics of the proposed mining area and to determine the possible impact of mining on the cultural status of the application area. (The study is attached as Appendix 6).

Executive Summary

A palaeontological Impact Assessment was requested for the prospecting rights applications for Glosam Mine, approximately 20 km north of Postmasburg, Northern Cape Province. To comply with the South African Heritage Resources Agency (SAHRA) in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA), a desktop Palaeontological Impact Assessment (PIA) was completed for the application.

The proposed site lies on the dolomites of the Reivilo Formation (Campbell Rand Subgroup, Ghaap Group, Transvaal Supergroup) that is composed of giant stromatolites in some areas.

Since there is a very small chance of fining fossil algal cells in the traces fossils, i.e. stromatolites, a Fossil Chance Find Protocol should be added to the EMPr.

Based on this information it is recommended that no palaeontological site visit is required unless the geologist, environmental office or responsible person finds fossils, sends photographs to a palaeontologist to be assessed and the palaeontologists recommends collection, with a valid SAHRA permit. It is the opinion of the palaeontologist that the prospecting right be granted.

(b) Description of the current land uses

- ***Land Use before Mining:***

The major land uses in the region are mining (manganese and iron ore) and agriculture. According to the Southern Africa Agricultural Geo-referenced Information System, the land capability of the plains in the east is non-arable with low potential grazing land, while the hills in the west are considered to be wilderness. The grazing capacity is between 18 and 30 ha/AU, with the agricultural region being demarcated for cattle farming. The property is categorised to have no suitability for crop yield.

- **Evidence of Disturbance:-**

Glosam is characterised by a fairly complex mining history. Various formal and informal mining companies have mined the area for iron ore and manganese between the late 1920s and 1984. This produced numerous open pits scattered across the site. These pits and associated road networks are still visible today as well as various buildings and structures related to the past mining activities; some of which are of archaeological significance. Exploration activities have also been performed over the past decade.

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

The infrastructure on site is comprehensively discussed in section d(ii) as part of the mining methodology discussion, as well as in section g as part of the mine footprint description. Furthermore, a comprehensive description of the environment was presented in section g (iv) (A) as part of the baseline report.

- **Existing Structures:-**

Current land use activities on the mining right include site infrastructure and security office for the neighbouring Emang Mmogo Mine, two cell phone reception towers managed by MTN can Cell C, a number of ESKOM power lines and Sedibeng Water reservoir and pipeline infrastructure. Areas in the south of the mining right area are mainly used for grazing by livestock and wildlife and a Transnet railway track lines the eastern border of the mining right area. This railway line links the Kalahari mines with Port Elizabeth via Kimberley.

(d) Environmental and current land use map

(Show all environmental, and current land use features)

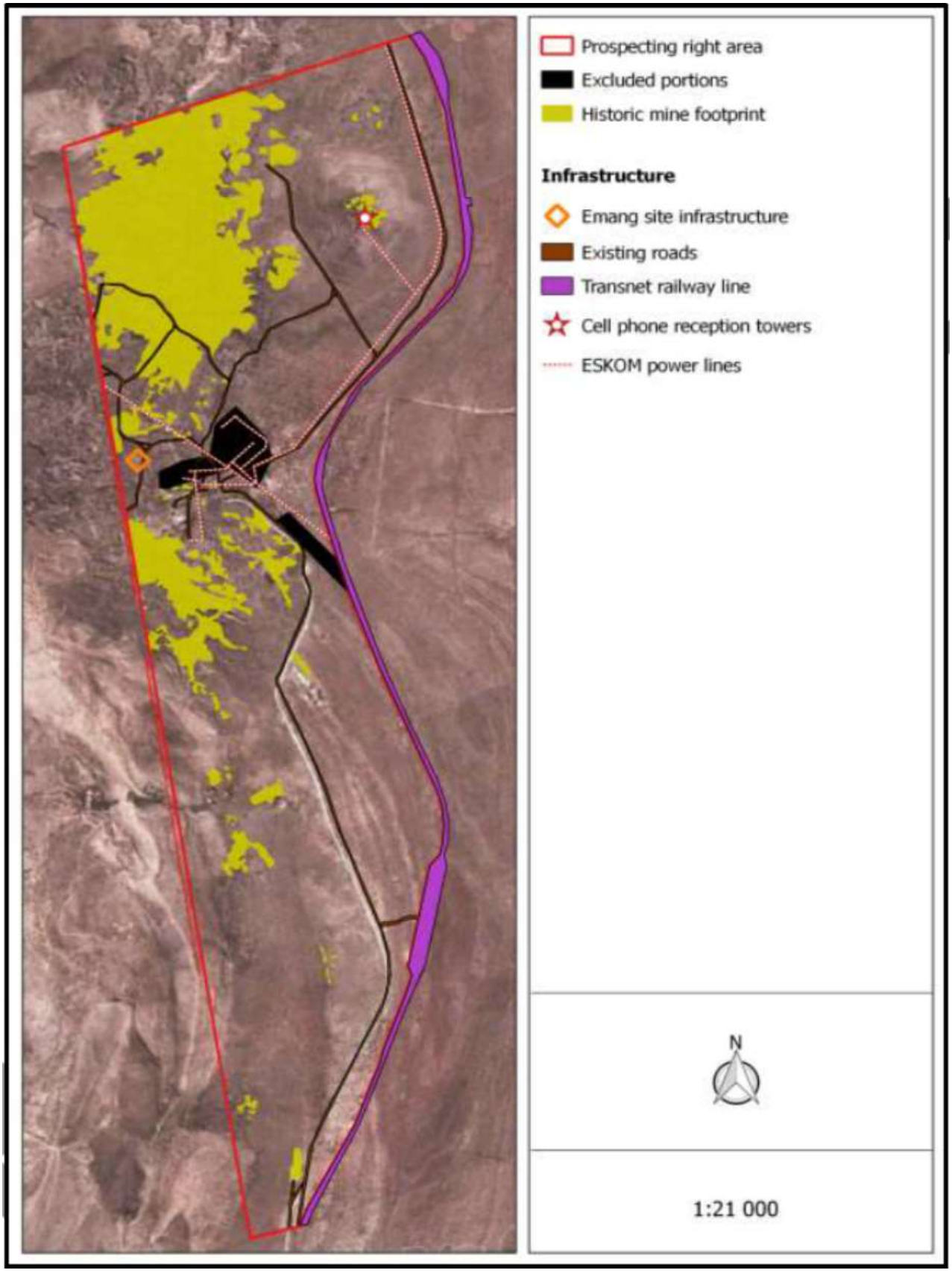


Figure 27. Environmental and current land use map (map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021).

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)

Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
PHYSICAL						
Geology and Mineral Resource	Sterilisation of mineral resources	Very low	Highly unlikely	Operational and Decommissioning	Insignificant Local	Ensure that optimal use is made of the available mineral resource.
Topography	Changes to surface topography Development of infrastructure; and residue deposits.	Medium	High	Construction and Operational	Low Local	• Mining of all manganese and iron ore continuously, if possible and does not influence mining and safety requirements. • Employ effective rehabilitation strategies to restore surface topography of excavations, dumps and plant site. • Stabilise the mine residue deposits. • All temporary infrastructures should be demolished during closure.
Soils	Soil Erosion Infrastructure; Excavations.	Medium-high	Certain	Decommissioning	Medium-high Regional	• Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased. • Ground exposure should be minimised in terms of the

						surface area and duration, wherever possible. • Run-off from exposed ground should be controlled with flow retarding barriers. • All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses. • Stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate. • Audits must be carried out at regular intervals to identify areas where erosion is occurring. • Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation

	Loss of soil fertility During the removal of topsoil; stockpiling.	Low-Medium	Possible	Residual	Low-medium Local	• Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions. • Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired. • Topsoil stockpiles must be kept separate from sub-soils. • The topsoil should be replaced as soon as possible onto the cleared areas, thereby allowing for the re-growth of the seed bank contained within the topsoil.
	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Soil pollution Spillage of hazardous material; runoff.	Medium	Medium	Construction and Operational	Low Local	• Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. • Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. • Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.

						• All facilities where dangerous materials are stored must be contained in a bund wall. • Vehicles and machinery should be regularly serviced and maintained.
Land Capability	Loss of land capability through topsoil removal, disturbances and loss of fertility.	Very Low	Possible	Short term	Minimal Local	Employ appropriate rehabilitation strategies to restore land capability.
Land use	Loss of land use due to poor placement of surface infrastructure and ineffective rehabilitation	Very low	Possible	Short term	Minimal Local	Carefully plan the placement of infrastructure and employ rehabilitation strategies to restore land capability.
Ground Water Quantity	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
	Excessive Drainage of the Open Pit During the creation of an open pit, if the water table is above the floor elevation of the open pit, groundwater will percolate into the pit, hindering mine operations. To eradicate this issue, the mine will continuously pump water out of the pit, and also drill	Low	Remotely Possible	Life of operation	Regional	Dewatering operations should be planned and designed carefully, with abstraction of water carefully controlled to minimise cone of depression impacts. However, the pit depths at Glosam are expected to be relatively shallow (15-20m bench), which may be just above the water table.

	"Dewatering Boreholes" around open pits to pump large amounts of water out of the aquifer immediately surrounding the pit. If not carefully managed, this operation can lead to excessive drawdown of the water table, so much so that surrounding users may be affected.					
Ground Water Quantity	Over-pumping of production boreholes Production boreholes on the mine may be excessively pumped without regard for sustainable abstraction of groundwater, this can lead to dewatering of the fracture system, or "drying up" of the borehole and/or cone of depression drawdown of the local water table, thereby deepening the groundwater	Low-medium	Definite	Permanent	Immediate surroundings/ Local/ outside	Groundwater abstraction should be first tested by means of a pump testing programme to determine the sustainable yield of each borehole and the aquifer. Regular monitoring of the groundwater levels should be undertaken, during a Hydrocensus either bi-monthly or quarterly

	levels in the local aquifer, which may impact surrounding users.					
Groundwater Quality	Hydrocarbon Spills Hydrocarbon spills from construction vehicles and fuel storage areas may contaminate the groundwater resource locally	Medium	Possible	Construction	Low Local	Staff at Workshop areas, yellow metal laydown zones and fuel storage areas should be sufficiently trained in hydrocarbon spill response. Each area where hydrocarbons are stored or likely to spill should be equipped with sufficient spill response kits and personnel, contaminated soil should be disposed of correctly at a suitable location.
Groundwater Quality	Mineralisation in stockpiles, dumps, and processing floors. Mineralisation and mined material is stockpiled for transport or processing and the residence times of the piles may place the groundwater system at risk should soluble minerals leach into the sub-surface and percolate down into the below aquifer	Very Low	Only remotely possible	Life of operation	Medium Regional Effect	Stockpiles and dumps should be kept within their defined footprints, and be underlain by a floor of fine, highly impervious waste material which minimises downward percolation of acidic water. However, due to the relative insolubility of iron and manganese in water, and the absence of significant sulphides which cause Acid Mine Drainage (AMD) this is expected to be an impact of minor significance.

	during and after rainfall events.					
	Contamination of groundwater systems by introduction of Hydrocarbons Hydrocarbons such as diesel, petrol and oils are hazardous materials which may contaminate both surface and groundwaters if spilled on a mining site, or improperly stored and leaked.	Low	Certain	Life of operation	High/ critical/ Serious Immediate surroundings/ local/ outside mine fence	All hydrocarbon spills, whether major or minor, should be immediately attended to and cleaned with the appropriate spillage kits, and the soil excavated to minimise downward percolation. All hydrocarbons and fuels should be appropriately stored within containing bunds and in demarcated storage areas.
	Contamination of groundwater systems by introduction of biological waste and bacteria Mining operations and staff produce a considerable amount of waste material, including human waste, effluent, and disposable waste. This may degrade and contaminate groundwater sources	Very Low	Only remotely possible	Life of operation	High/ critical/ Serious Immediate surroundings/ local/ outside mine fence	All waste material produce by the mining operations and staff must be (1) appropriately contained in suitable containers for the duration of which it is on site. This potentially polluting waste must then be transported off site and disposed of accordingly.

	if not properly treated and disposed of.					
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management / mitigation
Surface Water	• Ground works and stripping of vegetation resulting in a changed land profile. • Runoff from stockpiled soil and vegetation may contain high levels of silt.	Medium to Low	Possible	Construction	Low Local	Water Quality deterioration: change in water quality is caused by a change in natural conditions and/or an enhancement of pollution from sources. Dirty storm water trenches should be inspected regularly (once before the rainy season and after each occurrence of a storm) to clean the trench from excess soil particles to prevent overtopping of the channel wall during a sudden storm which will result in mixing of the dirty and clean water systems. Mitigation measures (or safety precautions) that are taken in order to eliminate any risk the project area could have on the natural, cultural and social environment of the concerned area and that must be implemented during the different phases i.e. construction, operational and post closure to
	• Spillages that may occur on access and haul roads may impact negatively on surface water quality. This issue is dealt with in the EMP. • A high potential of soil erosion exists due to an increased percentage of bare surfaces.	High	Possible	Operational	Low to Moderate Local	

	• Possible leaching of polluted soil through infiltration and runoff resulting in surface water pollution. • Removal of vegetation could lead to erosion and sediment transportation. • Significant dust levels will emanate from the use of heavy construction vehicles.	Moderate to High	Possible	Closure	Low Local	minimize the impacts are as follows: • Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment. • Non mining waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area. • The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation. • In case of the occurrence of a discharge incident that could result in the pollution of surface water resources, the emergency response procedure should be implemented. • Phasing/scheduling of earthworks should be implemented in order to minimise

						the footprint that is at risk of erosion at any given time, or schedule works according to the season i.e. earthworks during the dry winter season pose less impact. • In the case of linear earthworks, phasing of working areas and progressive rehabilitation will be necessary to minimise the footprint of the extent of the disturbance at any given time. • Water quality monitoring will be undertaken as per the monitoring programme outlined below. • A post-rehabilitation audit should be undertaken during the end of life of mine to ascertain whether the remediation has been successful as recommended and if not, further measures should be recommended and implemented; • Pollutant storage – any substances which may potentially pollute surface water must be stored within a suitably sized bunded area and where practicable covered by a roof to prevent contact with rainfall and/or runoff. Monitoring and inspection of channels, silt traps, culverts,

						pipelines, dam walls and dams for signs of erosion, cracking, silting and blockages of inflows, to ensure the performance of the storm water infrastructure is recommended should a flood protection berm be developed as a mitigation measure. Monitoring should be undertaken monthly during wet season and after storm events or as per the site management schedule. In order to minimise the alteration of flow, clean water around the mine must be diverted around the infrastructure then allowed to get to preferential flow into the environment. The impacts of subsidence on surface water resources are inevitable and cannot be minimised. However, the probability of subsidence can be assessed in a separate study to curb its magnitude should it occur. A substantial natural environment must be maintained in order to allow the catchment to rehabilitate faster and more frequently. Condition 4 of the GN704 indicates that no residue deposit or

						associated activity may be located or placed within the 1:100-year flood line or 100 m horizontal distance, whichever is greatest. The Promised Land stockyard and the North Processing Area at Glosam fall within the 1:50 and 1:100-year floodlines, however there are a number of easily implemented measures which can ensure mitigation, and that flood water does not enter the stockyard and processing area, and these are (1) construction of berms between the identified areas and the 1:50 and 1:100-year floodlines; (2) construction of drainage trenches and a drainage channel between the identified areas and the 1:50 and 1:100-year floodlines. Alternatively, if flood water should enter these areas, a dirty water containment system should be put in place to ensure water entering the stockyard is not re-introduced into the natural water system. These systems can be designed and implemented in future detailed design work beyond the conceptual stage.

						• Good housekeeping practices must be implemented and maintained by clean-up of accidental spillages, as well as ensuring all dislodged material like run-of-mine stockpile are kept within the confined storage footprints. In addition, clean-up material and materials safety data sheets for chemical and hazardous substances should be kept on site for immediate clean-up of accidental spillages of pollutants. • Vehicles and plant equipment servicing must be undertaken within suitably equipped facilities, either within workshops or within bunded areas from which any stormwater is conveyed to a pollution control dam, after passing through an oil and silt interceptor.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Indigenous Flora	**Loss of and disturbance to indigenous vegetation** Construction of roads, plant site, as well as other necessary infrastructure;	Low to medium	Certain	Life of Operation	Low to Medium Local	• Minimise the footprint of transformation. • Encourage proper rehabilitation of prospected areas. • Encourage the growth of natural plant species. • Ensure measures for the adherence to the speed limit.

	placement of stockpiles; and the clearing of vegetation for mining, materials storage and topsoil stockpiles; vehicular movement.					
	Loss of flora with conservation concern Removal of listed or protected plant species; during Construction of new roads and other necessary infrastructure, the placement of stockpiles; and clearing of vegetation for excavations.	Low to medium	Possible	Life of Operation	Low to Medium Local	• Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining. • It is recommended that these plants are identified and marked prior to mining • These plants should, where possible, be incorporated into the design layout and left in situ. • However, if threatened of destruction by mining, these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible. • A management plan should be implemented to ensure proper establishment of ex situ individuals and should include a monitoring programme for at least two years after re-establishment in order to ensure successful translocation.

						• The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental induction prior to commencing with work on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
	Proliferation of alien vegetation Clearing of vegetation; mining activities	Medium-High	Possible	Residual	Medium High Regional	• Minimise the footprint of transformation. • Encourage proper rehabilitation of mined areas. • Encourage the growth of natural plant species. • Mechanical methods (hand pulling) of control to be implemented extensively. • Annual follow-up operations to be implemented.
	Encouragement of bush encroachment	Low-Medium	Possible	Residual	Low-medium Local	• Minimise the footprint of transformation.

	Clearing of vegetation; disturbance through mining activities.					• Encourage proper rehabilitation of mined areas. • Encourage the growth of natural plant species. • Mechanical methods (hand pulling) of control to be implemented extensively. • Annual follow-up operations to be implemented.
Fauna	**Loss, damage and fragmentation of natural habitats** Clearance of vegetation; mining activities	Medium-High	Certain	Decommissioning	Medium-high Regional	• Mining activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type. • Those pristine areas surrounding the earmarked area that are not part of the demarcated area should be considered as a no go zone for employees, machinery or even visitors
	Disturbance, displacement and killing of fauna Vegetation clearing; increase in noise and vibration; human and vehicular movement	Low-Medium	Possible	Decommissioning	Low -Medium Regional	• Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint.

	on site resulting from mining activities.					• The appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. • All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. • All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. • The environmental induction should occur in the appropriate languages for the workers who may require translation. • Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or

						translocation by a qualified expert. • If any mortalities resulting from mining occur, it should be recorded with the date of the observation, the species affected and any other relevant information. • Employ measures that ensure adherence to the speed limit.
Air Quality	Sources of atmospheric emission associated with the mining operation are likely to include fugitive dust from materials handling operations, wind erosion of stockpiles, and vehicle entrainment of road dust.	Low	Certain	Decommissioning	Low Local	Effective soil management; identification of the required control efficiencies in order to maintain dust generation within acceptable levels.
Environmental Factor	Nature of Impact	Significance	Probability	Duration	Consequence Extent	Management
Socio-Economic	**Employment and Income Opportunities (Construction)**	Medium Positive	Probable	Short term	Medium Positive Local and regional	• Prioritise any possible new local labour in the recruitment process as part of the company's own recruitment policy or as part of the contractor management plan and stipulate the procurement of new employees, especially

						in the unskilled category, from the local communities. • Provide up-skilling opportunities for unskilled and semi-skilled local workers during the construction phase to allow them to attain the necessary requirements for operational employment opportunities. • Explore possible placement of local construction workers in mining operations.
	Employment and Income Opportunities (Operational)	Medium Positive	Highly Probable	Medium term	Medium Positive Local and regional	• Wepex Trading must prioritise local labour in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan. • Sub-contractors should adopt a recruitment policy to enhance employment positive impacts, limit in-migration of outside jobseekers and mitigate the potential impact of residual in-migration. • Communities within the TLM area, and where possible residents from Maremane, should be given preference if any new employment opportunities will be created, as these communities will be

						mostly affected by the existing approved mining activities and proposed infrastructure development. The ideal objective should be to reach 100% recruitment of semi-skilled and unskilled labour from local communities. • Wepex Trading to adhere to the Social and Labour Plans as per the Regulation 46 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and the Mining Charter (2018). • Wepex Trading, as indicated in the draft SLP, to undertake the annual skills audit among its employees to establish training needs and areas for skills development. The Workplace Skills Plan to then be developed and implemented. • Wepex Trading, through their SLP (Workplace Skills Plan), to provide skills development opportunities for employees that could include learnerships, functional literacy and numeracy programmes, ABET programmes, career

						progression plans, up-skilling for hard to fill vacancies and management positions, bursary and internships and portable skills training. • Wepex Trading to develop a database of SMME's for the procurement of goods and services that could potentially be outsourced to the local communities.
	Project induced in-migration (Construction)	Medium Negative	Probable	Short term	Medium Negative Local and regional	• Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process. • The development, publication and widespread dissemination of a recruitment policy could serve to encourage local employment and reduce the potential influx of jobseekers to the area. • The communication strategy should ensure that unrealistic employment expectations are not created. • A representative of Wepex Trading could liaise with the local leaders and local councillors to either attend key community meetings arranged within the affected

						wards to discuss the possible employment and recruitment process; or liaise with the local leaders and local councillors to ensure that the correct information regarding this issue is portrayed to the communities. • Wepex Trading should, where possible, support efforts by TLM to limit squatting and sub-letting in the area, e.g., no informal settlements should be allowed within the mining rights area. • Review and updates of the draft SLP must specify efforts by Wepex Trading to continue to seek sustainable solutions to the issue of housing for employees.
	Project induced in-migration (Operation)	Medium Negative	Probable	Short/ Medium term	Medium Negative Local and regional	• Local labour must be prioritised in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan. • Sub-contractors should adopt a recruitment policy to enhance employment positive impacts, limit in-migration of outside jobseekers and

						mitigate the potential impact of residual in-migration. • Communities within the TLM area, and where possible residents from Maremane, should be given preference if any new employment opportunities will be created, as these communities will be mostly affected by the existing approved mining activities and proposed infrastructure development. The ideal objective should be to reach 100% recruitment of semi-skilled and unskilled labour from local communities. • The Social and Labour Plans as per the Regulation 46 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and the Mining Charter (2018) must be adhered to. • Wepex Trading to adhere to the Statutory Plans such as the Spatial Development Framework (SDF) with regards to infrastructure and housing. • Some form of housing assistance or allowance to employees as part of the

						remuneration must be considered.
	Community Safety and Security (Construction)	Medium Negative	Probable	Short term	Medium Positive Local	• Maximise the use of local labour and contractors where possible by developing a strategy to involve local labour in the construction process to limit the inflow of outsiders. • Construction vehicles must adhere to all mine related safety regulations and drivers must adhere to road regulations. • Drivers and operators must have the necessary qualifications to operate the vehicles and equipment they are assigned to. • Construction vehicles must be in a good working order. Inspections of vehicles, as well as maintenance must be undertaken on a regular basis.
	Community Safety and Security (Operational)	Medium Negative	Highly probable	Medium term	Medium Negative Local	• Compulsory health and safety training to be implemented. • A Fire/Emergency Management Plan should be developed and implemented, if not yet in place. It would be important to regularly review the functionality and efficiency of such a plan in conjunction with the local emergency

						teams, mine management and affected communities as well as neighbouring landowners. • Unauthorised entry onto the mining area must be avoided. Fencing of the site and access control should continue to be implemented. • Mining areas must be sufficiently secured and fenced. • Warning signs indicating the movement of heavy vehicles to be erected at entrance from the R325 to the mining site. • Occupational safety risks (e.g. mining related accidents) would have to be dealt with under the Occupational Health and Safety Act (1993).
	Visual Impact and Sense of Place (Construction)	Medium Negative	Probable	Short term	Medium Negative Local	• Environmental management of the mining activities must adhere to environmental regulations and strive towards international best practice. • Rehabilitation of areas to be undertaken as soon as the mining programme allows.
	Visual Impact and Sense of Place (Operational)	Medium Negative	Highly probable	Medium term	Medium Negative Local	• Concurrent rehabilitation to be undertaken where feasible. Mining areas should be rehabilitated as soon as the

						Mining Works Programme allows. • Un-rehabilitated and poorly rehabilitated mining areas must not be allowed to remain. • Environmental management of the mining activities must adhere to environmental regulations and strive towards international best practice. • The eradication of alien invasives, aimed at ensuring the integrity of the biodiversity, should form part of the mitigation to limit further negative impacts on the overall sense of place. • Placement of lighting at infrastructure should be optimally placed with the least negative visual impacts possible.
	Traffic Movement	Medium Negative	Probable	Short term	Medium Negative Local	• Unauthorised entry onto the mining area must not be allowed. Access control should continue to be implemented. • Mining areas must be secured and fenced. • All construction vehicles should be in a good condition

						and adhere to road worthy standards. • Construction vehicles must keep to speed limits. • Limit construction hours to daylight hours e.g., 6am to 6 pm.
	Traffic Movement (Operational)	Medium Negative	Highly probable	Medium term	Medium Negative Local	• Unauthorised entry onto the mining area must not be allowed. Access control should continue to be implemented. • Mining areas must be secured and fenced. • All mining vehicles should be in a good condition and adhere to road worthy standards. • Mining vehicles must keep to speed limits. • Mining vehicles must not be overloaded.
	Air Quality Impacts	Medium Negative	Highly probable	Short term	Medium Negative	• Dust suppression (if feasible) to be implemented on the frequently used gravel roads on site, especially during windy conditions. • Construction vehicles should keep to speed limits. • Construction vehicles must be in a good working order. Inspections of vehicles, as well as maintenance must be undertaken on a regular basis.

						• Concurrent rehabilitation to be undertaken e.g., establishment of vegetation or covers (where feasible) to assist with dust suppression. • A dust management plan to be strictly implemented.
	Air quality (Operational)	Medium Negative	Highly Probable	Medium term	Medium Negative Local	• Dust suppression methods as recommended by a specialist study should be strictly implemented as required. • An approved dust management plan and ongoing monitoring of dust fallout rates and emissions must be implemented. • Dust buckets can be considered in areas close to the surrounding communities. • Wepex Trading to keep a grievance register that is easily accessible and regularly monitored.
	Noise Impacts	Medium Negative	Probable	Short term	Medium Negative	• Mitigation measures with regards to noise impacts as per the EIA Report should be implemented. • All construction vehicles should be in a good condition and adhere to road worthy standards.

						• Maintenance of vehicles and machinery should be done regularly. • Construction hours must preferably be limited to daylight day hours e.g., 6 am to 6 pm where possible.
	Noise impacts (Operational)	Medium Negative	Highly Probable	Medium term	Medium Negative Local	• Minimise noise impacts and implement all mitigation measures as specified in the EMPr. • All vehicles should be in a good condition and adhere to road worthy standards. • Maintenance of vehicles and machinery should be done regularly. • Limit significant noise generating activities to normal daytime hours e.g. 6 am to 6 pm where possible.
	Impact on socio-economic development	Medium high positive	Highly probable	Medium term	Medium high positive	• The Social and Labour Plans as per the Regulation 46 of the Mineral and Petroleum Resources Development Act (Act 28 of 2002) and the Mining Charter (2018) must be adhered to. • Wepex Trading, as indicated in the draft SLP, to undertake the annual skills audit among its employees to establish training needs and areas for

						skills development. The Workplace Skills Plan to then be developed and implemented. • Through the SLP (Workplace Skills Plan), the applicant must provide skills development opportunities for employees that could include learnerships, functional literacy and numeracy programmes, ABET programmes, career progression plans, up-skilling for hard to fill vacancies and management positions, bursary and internships and portable skills training. • Wepex Trading to develop a LED programme with the aim of strengthening the local economy and assist with socio-economic upliftment through sustainable initiatives. • The Social Development Fund should be aligned with the requirements as set out in the Mining Charter of 2018. • The mine to ensure that the allocation as per the Mine Works Programme for the updated SLP is in line with the

						targets of the Mining Charter of 2018.
	Impact on Resource Use	Medium Negative	Highly probable	Medium term	Medium negative Local	• Wepex Trading can develop a resource use plan with the specific objective to minimise the mining operations' energy and water use as far practical. • The water quality and quantity issues must be managed through engineering controls and through regular and required quality and quantity groundwater monitoring.
	Health related risks	Medium Negative	Probable	Medium term	Medium Negative Local	• The Social and Labour Plan (SLP) of Wepex Trading should make provision for addressing any possible direct health related risks and providing a supporting role to minimise the vulnerabilities of the communities, without having to take over the role of the local health services and municipality. • On site, all the appropriate health, hygiene and distancing measures aimed at protecting the employees' safety and health, must be implemented. • Wepex Trading can investigate ways to support to the local clinics through their community support

						programmes and SLP initiatives. • Educational videos on COVID-19, and general health and hygiene measures associated with the pandemic should be provided to employees. • Wepex Trading can consider as part of the SLP, to redirect corporate social investment (CSI) and SLP funding to Covid-19 lockdown mitigation. • Care should be taken to limit any possible health related impacts by striving towards international best practice.
Interested and Affected Parties	Loss of trust and a good standing relationship between the IAP's and the mining company.	Low to medium	Possible	Construction, Operational and Decommissioning	Low Local	Ensure continuous and transparent communication with IAP's

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)

Methodology used in determining and ranking the nature, severity, consequences, extent, duration and probability of potential environmental impacts and risks

The Different environmental components on which the project (can) have an impact are:

1. **Geology**
2. **Topography**
3. **Soil**
4. **Land Capability**
5. **Land Use**
6. **Flora (Vegetation)**
7. **Fauna**
8. **Surface Water**
9. **Ground Water**
10. **Air Quality**
11. **Noise and vibration**
12. **Archaeological and Cultural Sites**
13. **Sensitive Landscapes**
14. **Visual Aspects**
15. **Socio-Economic Structures**
16. **Interested and Affected Parties**

Impact Assessment

Before the impact assessment could be done the different project Activities/infrastructure components were identified.

1. **Explosive Magazines (If required):**
   If required the mine will need two magazines to store the different explosive products namely:
   - 200 case detonator and accessories magazine (3 meter x 6 meter)
   - 200 case explosives magazine (3 meter x 6 meter)

   The magazine area will be fenced to comply with the guidelines set out by the Chief inspector of Explosives (CIE). The fence must be further than 10 meter away from the magazine.

   The CIE determines the safety radius necessary, but the typical approved radiuses have been 90 meter for the inner radius & 180 for the outer radius.

   No structures are allowed in the area contained by the inner radius and only structures approved by the CIE, for example a guard house, will be allowed in the area contained in by the outer radius.

   The construction of the magazines and the safety and security measures for the magazines and the magazine area are regulated by the Explosives Act.

2. **Ablution Facilities:**
   In terms of sewage the decision was made to use ablution block facilities.

3. **Clean & Dirty water system: Berms**
   It is anticipated that the operation will establish stormwater control berms and trenches to separate clean and dirty water on the mine site.

4. **Fuel Storage facility (Concrete Bund walls and Diesel tanks):**
   It is anticipated that the operation will utilize 4 x 17 000 litre diesel tanks. These tanks must be placed in bund walls, with a capacity of 1.5 times the volume of the diesel tanks. A concrete floor must be established where the re-fuelling will take place.

5. **Re-fuel and lube station**

6. **Mining Area (Glosam):**
   If required, the mining process will be initiated by drilling of blast holes and then blasting said holes. The ore will be loaded from the open pit and hauled to the crushing and screening plant.

7. **Generators (if required):**
   The mine infrastructure plan made provision for a brick building that will house the generators (8 x 30-100KW) for power generation on site.

8. **Office and Office Parking Bay:**
   It is anticipated that vegetation will be cleared in this area and superfine material will be used as groundcover in the parking area.

9. **Crushing and Screening Processing Plant:**
   The processing of ore will be a dry process, with the option to convert to a 'wet' process after full production has been reached. Crushing and screening will be done by mobile plants without the construction of any permanent buildings. After full production a semi-permanent separation plant and semi-permanent crushing plant will be constructed

10. **Roads (both access and haulage road on mine site):**
    Although it is recommended that the operation utilize existing roads as far as possible, it is anticipated that the mining operation will create an additional 7-8 km of roads, with a width of 20 meters. The width of the road is based on an operating width of the ROM haul trucks of 5 meters. Best practice and the guideline from the DMR is to allow for 4 x Operating width of haul truck, in this case 20 meters wide roads. An existing service road providing access to the north and the south of the farm will be upgraded to DMR regulations and be used as the main service road. The current access road next to the railway line is deemed adequate for a service road into the mine.

11. **Salvage yard (Storage and laydown area).**

12. **Security Gate and Guard house at access control point**

13. **Product Stockpile area.**

14. **Ore Stockpile area**

15. **Subgrade stockpile area**

16. **Topsoil storage area (temporary)**

17. **Waste disposal site**
    The operation will establish a dedicated, fenced waste disposal site with a concrete floor and bund wall. The following types of waste will be disposed of in this area:
    - Small amounts of low level hazardous waste in suitable receptacles;
    - Domestic waste;
    - Industrial waste.

18. **Workshop and Wash Bay**

19. **Water distribution Pipeline.**

20. **Water tank:**
    It is anticipated that the operation will establish 8 x 10 000 litre water tanks with purifiers for potable water.

21. **Weighbridge**

22. **Weighbridge control room**

The criteria used to assess the significance of the impacts are shown in the table 15 below/overleaf. The limits were defined in relation to mining characteristics. Those for probability, intensity/severity and significance are subjective, based on rule-of-thumb and experience. Natural and existing mitigation measures were considered. These natural mitigation measures were defined as natural conditions, conditions inherent in the project design and existing management measures, which alleviate impacts. The significance of the impacts was calculated by using the following formula:

(Severity + Extent + Duration) x Probability weighting

For the impact assessment, the different project activities and associated infrastructure were identified and considered in order to identify and analyse the various possible impacts.

Table 15: Significance of impacts is defined as follows.

SIGNIFICANCE				
Colour Code	**Significance rating**	**Rating**	**Negative Impact**	**Positive Impact**
	Very low	3 -16	Acceptable/Not serious	Marginally Positive
	Low	17 - 22	Acceptable/Not serious	Marginally Positive
	Medium-Low	23 -33	Acceptable/Not desirable	Moderately Positive
	Medium	34 - 48	Generally undesirable	Beneficial
	Medium-High	49 - 56	Generally unacceptable	Important
	High	57 - 70	Not Acceptable	Important
	Very High	90 - 102	Totally unacceptable	Critically Important

Significance of impacts is defined as follows:

Very Low - Impact would be negligible. Almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple.

Low - Impact would have little real effect. Mitigation and/or remedial activity would be either easily achieved or little would be required or both.

Medium Low- Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and fairly easily possible.

Medium - Impact would be real but not substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be feasible and possible.

Medium High- Impact would be real but could be substantial within the bounds of those which could occur. Mitigation and/or remedial activity would be both feasible and possible but may be difficult and or costly.

High - Impacts of substantial order. Mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these.

Before any assessment can made the following evaluation criteria need to be described.

Table 16: Explanation of PROBABILITY of impact occurrence

Weight	Probability of Impact Occurrence	Explanation of Probability
1	Improbable	<20% sure of particular fact or likelihood of impact occurring
2	Low Probability Possible	20 – 39% sure of particular fact or likelihood of impact occurring
3	Probable /Likely	40 – 65% sure of particular fact or likelihood of impact occurring
4	Highly Probable /Likely	66 – 85% sure of particular fact or likelihood of impact occurring
5	Definite	86% - 100% sure of particular fact or likelihood of impact occurring

Table 17: Explanation of EXTENT of impact

Weight	Extent of Impact	Explanation of Extent
1	Footprint	Direct and Indirect impacts limited to the activity, such as footprint occurring within the total site area of impact only.
2	Surrounding Area **Site**	Direct and Indirect impacts affecting environmental elements **within 2 km of site**
3	Local Municipality **Local**	Direct and Indirect impacts affecting environmental elements within the **Tsantsabane / Postmasburg area**
4	Regional/District **Regional**	Direct and Indirect impacts affecting environmental elements within District **(Postmasburg / Tsantsabane District)**
5	**Provincial**	Direct and Indirect impacts affecting environmental elements in the **Northern Cape Province**

Table 18: Explanation of DURATION of impact

Weight	Duration of Impact	Explanation of Duration
1	Temporary (Very Short)	Less than 1 year
2	Short term	1 to 5 years
3	Medium term	6 to 15 years
4	Long term (Life of project)	16 to 50 years
5	Very Long term	Longer than 50 years
6	Permanent	Permanent

Table 19: Explanation of SEVERITY of the impact

Weight	Impact Severity	Explanation of Severity
1	No Impact	There will be no impact at all – not even a very low impact on the system or any of its parts.
2	Very Low	Impact would be negligible. In the cast of negative impacts, almost no mitigation and/or remedial activity would be needed, and any minor steps which might be needed would be easy, cheap and simple. In the case of positive impacts alternative means would almost all likely to be better, if one or a number of ways, then this means of achieving the benefit.
3	Low	Impact would be of a low order and with little real effect. In the case of negative impacts, mitigation and/or remedial activity would be either easily achieved or little would be required or both. In the case of positive impacts alternative means for achieving this benefit would be easier, cheaper, more effective, less time-consuming, or some combination of these.
4	Moderately Severe	Impact would be real but not substantial within the bounds of those which could occur. In the case of negative impacts, mitigation and/or remedial activity would be both feasible and fairly easily possible. In the case of positive impacts other means other means of covering these benefits would be about equal in cost and effort.
5	High Severance	Impacts of substantial order. In the case of negative impacts, mitigation and/or remedial activity would be feasible but difficult, expensive, time consuming or some combination of these. In the case of positive impacts other means of achieving this benefit would be feasible, but these would be more difficult, expensive, time-consuming or some combination of these.
6	Very High Severity	Of the highest order possible within the bounds of impacts which could occur, in the case of negative impacts, there would be no possible mitigation and/or remedial activity to offset the impact at the spatial or time scale for which was predicted. In the case of positive impacts there is no real alternative to achieving the benefit.

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)

During the operational stages of the mining operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. The infrastructure and excavations /dumps will alter the topography by

adding features to the landscape. Removal of iron ore and manganese will unearth the current topography. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and making excavations, and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper placement of infrastructure. Most of the site has a land capability for grazing, but the area has been converted due to the dumping of the manganese material and excavations with the dolomite pinnacles with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be affected, if any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Mining activities on site will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and mining activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the mining site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

During the operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will

typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

Based on the social assessment, the following concluding remarks should be noted:

- From a social perspective it can be concluded that the socio-economic benefits associated with the project outweigh the negative social impacts, which mainly relate to intrusion impacts that can be successfully mitigated if appropriate and successful environmental management, as well as the strict implementation of pro-active mitigation and management measures are applied.
- There are a range of positive impacts associated with the proposed project, such as the creation of employment and income generation, local procurement and social development and services support, as well as the stimulation of local economic growth.
- There are however several potential negative socio-economic impacts of the proposed project that may affect surrounding landowners and communities. These negative impacts associated with the proposed project include the visual impact and possible impact on sense of place, nuisance factors (dust levels, noise and traffic movement), and community safety impacts (health risks and concerns, and general community safety). These impacts would respond to mitigation.
- The proposed mining project is anticipated to facilitate economic benefits to the local area, currently faced with relative high rates of unemployment and poverty.
- Local labour must be prioritised in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan, as this would assist in mitigating various social impacts, and it would also enhance the potential benefits of the proposed project to the local community members.
- Local procurement, especially during the operational phase, would have various trickle down positive socio-economic impacts on the beneficiary communities and local businesses. This aspect should thus be pursued as far as possible.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other similar environments.
- Socio-economic issues and concerns could arise during the implementation of the project. These should be thoroughly dealt with taking the sensitivities into consideration.

From a socio-economic perspective it is concluded that the project can be supported. It is therefore recommended that the development of the proposed Glosam Mine on the farm Gloucester be approved by the relevant authorities.

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)

Geology and mineral resource

Level of risk: Very low

Mitigation measures

- Ensure that optimal use is made of the available mineral resource through proper planning.
- The mining of manganese and iron ore should be well planned and all infrastructure positions should be selected with the main aim of avoiding sterilization of future resources.
- No dumping of materials prior to approval by mine manager.

Topography

Level of risk: Low

Mitigation measures

- Mining of manganese and iron ore continuously if possible, otherwise when they become available;
- Employ effective rehabilitation strategies to restore surface topography of and controlled backfilling at excavations and plant site;
- Stabilise the mine residue deposit;
- All temporary infrastructures should be demolished during closure.

Soil erosion

Level of risk: Low-Medium

Mitigation measures

- At no point may plant cover be removed within the no-development zones;
- All attempts must be made to avoid exposure of dispersive soils;
- Re-establishment of plant cover on disturbed areas must take place as soon as possible, once activities in the area have ceased;
- Ground exposure should be minimised in terms of the surface area and duration, wherever possible;
- The mining operation must co-ordinate different activities in order to optimise the utilisation of the Mining of manganese and iron ore and thereby prevent repeated and unnecessary dumping;
- The soil that is stockpiled during construction should be stock-piled in layers and protected by berms to prevent erosion;
- All stockpiles must be kept as small as possible, with gentle slopes (18 degrees) in order to avoid excessive erosional induced losses;

- Stockpiled soil material are to be stored and bermed on the higher lying areas of the footprint area and not in any storm water run-off channels or any other areas where it is likely to cause erosion, or where water would naturally accumulate;
- Stockpiles susceptible to wind erosion are to be covered during windy periods;
- Audits must be carried out at regular intervals to identify areas where erosion is occurring;
- Appropriate remedial action, including the rehabilitation of eroded areas, must occur;
- Dust suppression should take place;
- Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion;
- Topsoil stockpiles must be kept as small as possible in order to prevent compaction and the formation of anaerobic conditions;
- Topsoil must be stockpiled for the shortest possible timeframes in order to ensure that the quality of the topsoil is not impaired;
- Topsoil stockpiles must be kept separate from sub-soils;
- The topsoil should be replaced as soon as possible on to the backfilled areas, thereby allowing for the re-growth of the seed bank contained within the topsoil;
- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution;
- Spill kits to clean up accidental spills from earthmoving machinery must be well marked and available on site;
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures;
- All facilities where dangerous materials are stored must be contained in a bund wall;
- Vehicles and machinery should be regularly serviced and maintained.

Soil pollution

Level of risk: Low

Mitigation measures

- Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution.
- Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site.
- Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures.
- All facilities where dangerous materials are stored must be contained in a bund wall.
- Vehicles and machinery should be regularly serviced and maintained.

Land capability and land use

Level of risk: Low

Mitigation measures

- Ensure that optimal use is made of the available land through consultation with land owner and proper planning of miningg activities.
- Employ effective rehabilitation strategies to restore land capability and land use potential of the site.
- All activities to be restricted within the demarcated areas.

Ground water

Level of risk: Low

Mitigation measures

Dewatering operations should be planned and designed carefully, with abstraction of water carefully controlled to minimise cone of depression impacts. However, the pit depths at Glosam are expected to be relatively shallow (15-20m bench), which may be just above the water table.

Groundwater abstraction should be first tested by means of a pump testing programme to determine the sustainable yield of each borehole and the aquifer. Regular monitoring of the groundwater levels should be undertaken, during a Hydrocensus either bi-monthly or quarterly.

Stockpiles and dumps should be kept within their defined footprints, and be underlain by a floor of fine, highly impervious waste material which minimises downward percolation of acidic water. However, due to the relative insolubility of iron and manganese in water, and the absence of significant sulphides which cause Acid Mine Drainage (AMD) this is expected to be an impact of minor significance.

All hydrocarbon spills, whether major or minor, should be immediately attended to and cleaned with the appropriate spillage kits, and the soil excavated to minimise downward percolation. All hydrocarbons and fuels should be appropriately stored within containing bunds and in demarcated storage areas.

All waste material produce by the mining operations and staff must be (1) appropriately contained in suitable containers for the duration of which it is on site. This potentially polluting waste must then be transported off site and disposed of accordingly.

Groundwater monitoring should be conducted to assess the following:
The impact of mine dewatering on the surrounding aquifers. This will be achieved through monitoring of groundwater levels in the selected monitoring boreholes.

- Groundwater inflow into the mine workings. This will be achieved through monitoring of groundwater
- levels in the monitoring boreholes as well as measuring water volumes pumped from mining areas (if applicable).
- Groundwater quality trends. This will be achieved through the monitoring and sampling of the groundwater in the Hydrocensus boreholes at the prescribed frequency.

- Training and awareness
    - Make all employees aware of water conservation/water demand management, water pollution avoidance and minimization measures reporting procedure and registry of incidents.
    - Train all employees to reduce water consumption.
    - Make one (1) individual person at a management level responsible for the management of the overall mine water balance. Train employees in the managing of water balance, water pollution and water conservation within their sectors.
    - Train all employees in the implementation of standard operating procedures (SOP's) (e.g. hydrocarbon management, sewerage plant management, monitoring and record keeping).
    - Minimise and manage the loss in water resource
    - Allow for a safe working environment

Surface water

Level of risk: Low - Medium

Mitigation measures

Water Quality

- In case of the occurrence of a discharge incident that could result in the pollution of surface water resources, the emergency response procedure should be implemented.
- Phasing/scheduling of earthworks should be implemented in order to minimise the footprint that is at risk of erosion at any given time, or schedule works according to the season i.e. earthworks during the dry winter season pose less impact.
- In the case of linear earthworks, phasing of working areas and progressive rehabilitation will be necessary to minimise the footprint of the extent of the disturbance at any given time.
- Water quality monitoring will be undertaken as per the monitoring programme.
- A post-rehabilitation audit should be undertaken during the end of life of mine to ascertain whether the remediation has been successful as recommended and if not, further measures should be recommended and implemented; and
- Pollutant storage – any substances which may potentially pollute surface water must be stored within a suitably sized bunded area and where practicable covered by a roof to prevent contact with rainfall and/or runoff.

Sedimentation and Erosion

Monitoring and inspection of channels, silt traps, culverts, pipelines, dam walls and dams for signs of erosion, cracking, silting and blockages of inflows, to ensure the performance of the storm water infrastructure is recommended should a flood protection berm be developed as a mitigation measure. Monitoring should be undertaken monthly during wet season and after storm events or as per the site management schedule.

Alteration of Flow and Drainage

In order to minimise the alteration of flow, clean water around the mine must be diverted around the infrastructure then allowed to get to preferential flow into the environment. The impacts of subsidence on surface water resources are inevitable and cannot be minimised. However, the probability of subsidence can be assessed in a separate study to curb its magnitude should it occur. A substantial natural environment must be maintained in order to allow the catchment to rehabilitate faster and more frequently.

Flooding

Condition 4 of the GN704 indicates that no residue deposit or associated activity may be located or placed within the 1:100-year flood line or 100 m horizontal distance, whichever is greatest. The Promised Land stockyard and the North Processing Area at Glosam fall within the 1:50 and 1:100-year floodlines, however there are a number of easily implemented measures which can ensure mitigation, and that flood water does not enter the stockyard and processing area, and these are (1) construction of berms between the identified areas and the 1:50 and 1:100-year floodlines; (2) construction of drainage trenches and a drainage channel between the identified areas and the 1:50 and 1:100-year floodlines. Alternatively, if flood water should enter these areas, a dirty water containment system should be put in place to ensure water entering the stockyard is not re-introduced into the natural water system. These systems can be designed and implemented in future detailed design work beyond the conceptual stage.

Additional Mitigation Measures

In addition to the measures presented and discussed throughout this report, the following management measures should be implemented:

- Good housekeeping practices must be implemented and maintained by clean-up of accidental spillages, as well as ensuring all dislodged material like run-of-mine stockpile are kept within the confined storage footprints. In addition, clean-up material and materials safety data sheets for chemical and hazardous substances should be kept on site for immediate clean-up of accidental spillages of pollutants.
- Vehicles and plant equipment servicing must be undertaken within suitably equipped facilities, either within workshops or within bunded areas from which any stormwater is conveyed to a pollution control dam, after passing through an oil and silt interceptor.

All measures implemented for the mitigation of impacts should be regularly reviewed as required by best practice and to comply compliance with the various licences issued on site by authorities. The purpose of the mitigation measures is to ensure that the pre-mining/current water resource status is not deteriorated by the mining activities.

- Sufficient care must be taken when handling hazardous materials to prevent pollution.
- If servicing and washing of the vehicles occur on site, there must be specific areas constructed for these activities, which must have concrete foundations, bunding as well as oil traps to contain any spillages.

- A walled concrete platform, dedicated store with adequate flooring or bermed area and ventilation must be used to accommodate chemicals such as fuels, oils, paints, herbicide and insecticides.
- Oil residue shall be treated with oil absorbent and this material removed to an approved waste site.
- Spill kits must be easily accessible and workers must undergo induction regarding the use thereof.
- At all times care should be taken not to contaminate surface water resources.
- Provide bins for staff at appropriate locations, particularly where food is consumed.
- The mining site should be cleaned daily and litter removed.
- Conduct ongoing staff awareness programmes in order to reinforce the need to avoid littering, which can contribute to surface water pollution.
- Only environmentally friendly materials must be used during the construction phase to minimize pollution of surface water runoff and/or underground water resources.
- Proper clean and dirty water separation techniques must be used to ensure uncontaminated water returning to the environment.
- Non mining waste i.e. grease, lubricants, paints, flammable liquids, garbage, historical machinery and other combustible materials generated during activities should be placed and stored in a controlled manner in a proper designed area.
- The topography of rehabilitation disturbed areas must be rehabilitated in such a manner that the rehabilitated area blends in naturally with the surrounding natural area. This will reduce soil erosion and improve natural re-vegetation.

Indigenous flora

Level of risk: Low to medium

Mitigation measures

- Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining;
- It is recommended that these plants are identified and marked prior to mining.
- These plants should where possible, be incorporated into the design layout and left in situ.
- However, if threatened of destruction by mining these plants should be removed (with the relevant permits from DAFF and DENC) and relocated if possible.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- Minimise the footprint of transformation
- Encourage proper rehabilitation of mined areas
- Encourage the growth of natural plant species (diverse selection of natural plant species).
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.
- Ensure measures for the adherence to speed limit.
- Maintenance of firebreaks;
- No trees felled for firewood;

Alien invasive plants

Level of risk: Low to medium

Mitigation measures

- Minimise the footprint of transformation.
- Encourage proper rehabilitation of mined areas.
- Encourage the growth of natural plant species.
- Mechanical methods (hand-pulling) of control to be implemented extensively.
- Annual follow-up operations to be implemented.

Fauna

Level of risk: Medium - high

Mitigation measures

- Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).
- Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.
- All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition.
- All those working on site must be educated about the conservation importance of the fauna and flora occurring on site.
- The environmental induction should occur in the appropriate languages for the workers who may require translation.
- Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert.
- Employ measures that ensure adherence to the speed limit.
- Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint.
- The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining;
- Snares & traps removed and destroyed; and

Habitat

Level of risk: Medium - High

Mitigation measures

- Mining activities must be planned, where possible in order to encourage faunal dispersal and should minimise dissection or fragmentation of any important faunal habitat type.
- The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance).

Air quality

Level of risk: Low-Medium

Mitigation measures

- Vegetation must be removed when soil stripping is required only. These areas should be limited to include those areas required for mining only, hereby reducing the surface area exposed to wind erosion. Adequate demarcation of these areas should be undertaken.
- Control options pertaining to topsoil removal, loading and dumping are generally limited to wet suppression.
- Where it is logistically possible, control methods for gravel roads should be utilised to reduce the re-suspension of particulates. Feasible methods include wet suppression, avoidance of unnecessary traffic, speed control and avoidance of track-on of material onto paved and treated roads.
- The length of time where open areas are exposed should be restricted. Mining should not be delayed after vegetation has been cleared and topsoil removed.
- Dust suppression methods should, where logistically possible, must be implemented at all areas that may / are exposed for long periods of time.
- For all mining activities management should undertake to implement health measures in terms of personal dust exposure, for all its employees:
    - Speed limits;
    - Spraying of surfaces with water;
    - Mining of iron ore and manganese and rehabilitation of disturbed areas; and

Noise and vibration

Level of risk: Medium

Mitigation measures

- Machinery with low noise levels which complies with the manufacturer's specifications to be used.
- Noise monitoring on a quarterly basis.
- Vehicles to comply with manufacturers' specifications and any activity which will exceed 90.0dBA to be done during daytime only.
- Emergency generators to be placed in such a manner that it is away from any residential area.
- Haul roads to be levelled on a regular basis to avoid the formation of potholes.
- Actively manage the process and the noise management plan must be used to ensure compliance to the noise regulations and/or standards. The levels to be evaluated in terms of the baseline noise levels.

- Actively manage the process and noise and vibration impact assessment to determine compliance to the noise regulations and/or vibration standards. The levels to be evaluated in terms of the baseline noise levels.

Visual impacts

Level of risk: Low Medium

Mitigation measures

Mitigation measures may be considered in two categories:

Primary measures that intrinsically comprise part of the development design through an iterative process. Mitigation measures are more effective if they are implemented from project inception when alternatives are being considered; and

Secondary measures designed to specifically address the remaining negative effects of the final development proposals:

- Primary measures that will be implemented should mainly be measures that minimise the visual impact by softening the visibility of the mining activities, by "blending" with the surrounding areas. Such measures will include rehabilitation of the disturbed area, such as the excavations by re-vegetation of the area and using an aesthetically pleasing design for the proposed development.
- During the construction phase the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that rubble, litter and disused construction materials are managed and removed regularly.
- Ensure that all infrastructure and the site and general surrounds are maintained in a neat and appealing way.
- Reduce and control construction dust emitting activities through the use of approved dust suppression techniques; and
- During operational phase, the following mitigation measures should be implemented to minimise the visual impact.
- Ensure that all infrastructure and the site and general surroundings are maintained in a neat and appealing way;
- Rehabilitation of disturbed areas and re-establishment of vegetation;

Traffic and road safety

Level of risk: Low

Mitigation measures

- Implement measures that ensure the adherence to traffic rules.

Heritage resources

Level of risk: Low

Mitigation measures

- The heritage and cultural resources (e.g. stone age sites and Mining Heritage etc.) must be protected and preserved by the delineation of a no go zone.

- Should any further heritage or cultural resources be disturbed, exposed or uncovered during site preparations, these should immediately be reported to an accredited archaeologist.

Socio-economic

Level of risk: Low-Medium

Mitigation measures

In order to ensure that negative impacts are minimised and positives are enhanced, the following is recommended:

- Implement the mitigation measures as proposed in this report.
- Wepex should assist their employees to find suitable housing in the towns surrounding the mining area to limit additional impacts on the provision of services and infrastructure by the SPM.
- Possible SMME links to the mine should be pursued to maximise local business benefits;
- Wepex should communicate and present their involvement in the community (goodwill, social responsibility, capacity building programmes, skills development, general development support and so forth) to obtain community support.

Interested and affected parties

Level of risk: Low

Mitigation measures

- Maintain active communication with IAPs.
- Ensure transparent communication with IAPs at all times.
- IAPs must be kept up to date on any changes in the mining operation.
- A complaints management system should be maintained by the mine to ensure that all issues raised by any interested and affected parties are followed up and addressed appropriately.

ix) Motivation where no alternative sites were considered

No alternative location for the proposed mining operation was considered, as the manganese and iron ore has been deposited in this area. The Mining Right application is also on the same property as the Prospecting Right held by Wepex Trading (Pty) Ltd. There is therefore no other alternative with regard to the overall operation footprint.

x) Statement motivating the alternative development location within the overall site (Provide a statement motivating the final site layout that is proposed)

Not applicable. There is no alternative development location for the site as this is the area with the mineable resource.

h) 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 are 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)

Not applicable. There is no alternative development location for the site and therefore the initial site locality is considered to be the final site locality. The impact assessment provided in section g(v) is therefore sufficient and the process undertaken to identify impacts is the same as in section g(vi).

i) 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)

ACTIVITY Whether listed or not listed.	POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….	ASPECTS AFFECTED	PHASE In which impact is anticipated (e.g. construction, commissioning, operational, Decommissioning, closure, post closure)	SIGNIFICANCE IF NOT MITIGATED	MITIGATION TYPE (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	SIGNIFICANCE IF MITIGATION
Processing Plant: Material excavated from the trenches and historical dump cuttings will be selected and processed through a crush-and-screen processing plant. Mineralized material is delivered to the plant area a point within 50m from the front end of the mobile plant. The material is then fed with earthmoving	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Medium	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing suitable mufflers on engine exhausts and compressor components; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding;	Medium

equipment into the mobile plant's vibrating feeder bin which then feeds a crusher. The crusher crushes the ore down to smaller fractions. This material is then fed into the mobile plant's multiple deck screen. The screen separates different size fractions which are then temporarily stockpiled. From the stockpiles the material is loaded onto independent transport contractor tipper trucks which transport the material to the market after being weighed on a weighbridge.					Develop a mechanism to record and respond to complaints.	
Ablution Facilities	Soil contamination	Soil Groundwater	Construction Commissioning Operational	Low	Maintenance of sewage facilities on a regular basis.	Very Low

	Possible Groundwater contamination		Decommissioning Closure			
Clean & Dirty water systems:	Surface disturbance Soil contamination Surface water contamination	Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Low	It will be necessary to divert storm water around excavations and dumps areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage areas. Excavations for iron ore and manganese, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipes will be inspected at least monthly to check that the associated	Low

					water management infrastructure is effective in controlling erosion.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Low
Mining area.	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Medium	Access control Dust control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays MRD stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels;	Low

	Surface disturbance Surface water contamination				Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). Those areas surrounding the mine site that are not part of the demarcated development area should be considered as a no-go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site.	

					All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to minimise the overall mining footprint. The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed	

Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Low
Product Stockpile area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Medium	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components;	Low

					Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Low
Roads (both access and haulage road on the mine site):	Dust Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components;	Low

	Surface disturbance				Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Temporary Workshop Facilities and Wash bay	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Medium	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Low
Water tanks: 8 X 10 000 litre water tanks and purifiers for potable water.	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Medium	Maintain water tanks and structures	Low

j) 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):-

LIST OF STUDIES UNDERTAKEN	RECOMMENDATIONS OF SPECIALIST REPORTS	SPECIALIST RECOMMENDATIONS HTAT 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
Annexure 4 TERRESTRIAL ECOLOGICAL ASSESSMENT REPORT Wepex Trading (Pty) Ltd Iron and Manganese Mining Site Remaining extent of the farm Gloucester 674 (Glosam) January 2021 By Boscia Ecological Consulting, Dr Betsie Milne	**CONCLUSION, RECOMMENDATIONS AND OPINION REGARDING AUTHORISATION** Seven plant communities were identified on site of which the thornveld on historic mine footprint, shrubland on manganese ridges and woodland along the ephemeral stream are associated with the core mining area. These areas are considered to be of high and very high sensitivity respectively. The most profound impacts are expected to be related to alterations and the possible destruction of the ephemeral stream, alteration to soil character as well as loss of soil fertility, loss of plant species of conservation concern and contribution to the cumulative effects of other mining activities in the region. A number of species of conservation concern is found in the earmarked habitats and will most certainly be damaged or removed. The most severe effect will be on the protected Boscia albitrunca, which is widespread across the study area. A licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries prior to any potential disturbances to these trees. Boscia albitrunca is also protected in terms of the NCNCA, along with species like Gymnosporia buxifolia, Olea europaea subsp. africana and Pelargonium minimum, which also occur	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes (A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()

	in the earmarked area. A permit application regarding protected flora as well as the harvesting of indigenous vegetation need to be lodged with the Northern Cape Department of Environment and Nature Conservation prior to any clearance of vegetation. To conclude, the proposed mining activities will impact the ecological integrity of Glosam, with associated impacts mainly considered to be moderately high. If the mining operation is managed with best environmental practise in mind, followed by effective rehabilitation efforts, these impacts can be reduced. Therefore, environmental authorisation should only be granted on condition thatthe applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.		
Annexure 5 **A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED PROSPECTING OF THE GLOSAM MINE CLOSE TO POSTMASBURG, NORTHERN CAPE PROVINCE** **For:** **WAPEX TRADING (PTY) LTD** **19 January 2018** **REPORT NO.: AE01802V** **By: Prof. A.C. van Vollenhoven (L.AKAD.SA.)**	The following is recommended: • Site 12 (farm yard) and 15 and 20 (railway sidings) are all outside of the development boundary. Site 12 has no cultural heritage value and this report is seen as ample mitigation. The structures are younger than 60 years. It needed, may be demolished without a permit from SAHRA. • The railway sidings receive a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction if needed. • The remains of industrial building (site 6), the base of a water reservoir (site 9), the office complex remains (site 10), various remains of brick buildings (site 11) and the farm yard (site 18) has no cultural heritage value. This report is seen as ample mitigation. The structures are younger than 60 years and in a very poor condition. It may be demolished without a permit from SAHRA. • The foundation (site 5), concrete building remains (site 16) and metal framework of an industrial building (site 21) has no	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes (A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()

Accredited member of ASAPA (Accreditation number: 166) **Accredited member of SASCH (Accreditation number: CH001)**	cultural heritage value and may therefore be demolished. Since it is older than 60 years, a permit would be required from the SAHRA. • For the three mine houses (site 4) the field rating of the site is Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. The mine does not currently have any plans that will impact here. Also, since the buildings are younger than 60 years, no permit is currently required. • The old hostel area and recreation hall (site 2) is regarding as having a field rating of Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction. As both structures are younger than 60 years, no permit from SAHRA is needed. • The field rating for the ore loading bays (site 7, 14 and 19) Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction. Since these sites are all younger than 60 years and in a very poor condition, it may be demolished without a permit from SAHRA. • The field rating of the Glosam Mine Village (site 3) is Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. • The village is older than 60 years and is regarded as being very unique and typical of such a mining village. Therefore at least the first sixteen houses, social area, hall and other structure within the inner circle of the village should be preserved. It may however be utilized for another purpose, being a youth camp, holiday resort or guest house. It would		

	be good to also preserve the outer circle as it is part of the original lay-out plan, although most of the buildings are much younger. • The mine does not intend to do any work here at present. If needed, for any changes to the buildings older than 60 years, a permit would be required from the SAHRA. • The Miners boxes (sites 1, 13 and 17) are regarded as having a field rating of Local Grade IIIB. The sites should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. • In this case, site 1 should be kept intact and preserved, meaning that a management plan should be drafted for the site. It should also be fenced in. • Sites number 13 and 17 may be demolished, but only after complete documentation thereof and only if site number 1 remains intact. This documentation includes doing test excavations and drawing a site map. • The loading platform (site 8) has a field rating of Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. As it is typical of a certain era in the mining industry, it should be preserved, perhaps as part of an interpretive route. It may be utilized in further mining activities, but a management plan would be needed for that. • The proposed development may continue, but only after receiving the necessary approval from SAHRA. • It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore		

	be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence. • In This regards the following **'Chance find Procedure'** should be followed: 1. Upon finding any archaeological or historical material all work at the affected area must cease. 2. The area should be demarcated in order to prevent any further work there until an investigation has been completed. 3. An archaeologist should be contacted immediately to provide advice on the matter. 4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit. 5. SAHRA's APM Unit may also be notified. 6. If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist. 7. The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter. 8. Work on site will only continue after removal of the archaeological/ historical material was done.		
Annexure 6 **A PALAEONTOLOGICAL IMPACT ASSESSMENT FOR THE PROPOSED MINING AREA OF THE GLOSAM MINE CLOSE TO**	Recommendation Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the stromatolites of the Reivilo Formation. Since there is very small chance that fossils may a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once excavations have commenced then	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes

POSTMASBURG, NORTHERN CAPE PROVINCE **By:** **Prof. Marion Bamford from Archaeological & Heritage Services Africa (Pty) Ltd**	they should be rescued, photographs sent to a palaeontologist to assess and if deemed important then to collect a representative sample, with the relevant SAHRA permit.		(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()
Annexure 7 **SOCIAL IMPACT ASSESSMENT: DRAFT REPORT** **Submitted by:** Batho Earth PO Box 35130 MENLO PARK 0102	**CONCLUSION AND RECOMMENDATION** Based on the social assessment, the following concluding remarks should be noted: • From a social perspective it can be concluded that the socio-economic benefits associated with the project outweigh the negative social impacts, which mainly relate to intrusion impacts that can be successfully mitigated if appropriate and successful environmental management, as well as the strict implementation of pro-active mitigation and management measures are applied. • There are a range of positive impacts associated with the proposed project, such as the creation of employment and income generation, local procurement and social development and services support, as well as the stimulation of local economic growth. • There are however several potential negative socio-economic impacts of the proposed project that may affect surrounding landowners and communities. These negative impacts associated with the proposed project include the visual impact and possible impact on sense of place, nuisance factors (dust levels, noise and traffic movement), blasting and community safety impacts (health risks and concerns, and general community safety). These impacts would respond to mitigation.	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes (A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()

	• The proposed mining project is anticipated to facilitate economic benefits to the local area, currently faced with relative high rates of unemployment and poverty. • Local labour must be prioritised in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan, as this would assist in mitigating various social impacts, and it would also enhance the potential benefits of the proposed project to the local community members. • Local procurement, especially during the operational phase, would have various trickle down positive socio-economic impacts on the beneficiary communities and local businesses. This aspect should thus be pursued as far as possible. • Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other similar environments. • Socio-economic issues and concerns could arise during the implementation of the project. These should be thoroughly dealt with taking the sensitivities into consideration. From a socio-economic perspective it is concluded that the project can be supported. It is therefore recommended that the development of the proposed Glosam Mine on the farm Gloucester be approved by the relevant authorities.		
Annexure 8 Hydrological & Hydrogeological Impact Assessment Surface and Groundwater	A hydrological and Hydrogeological impact study was undertaken by suitably qualified Hydrologists and Hydrogeologists and the following conclusions were drawn: • Floodlines for the 1:50-year and 1:100-year recurrence intervals were determined for the current river network passing through the project site and the proposed mine infrastructure. The local surface water resources are considered to be of low sensitivity because of their shallow	X	i) Details of the development footprint alternatives considered e) Impact Management Outcomes

For Glosam Manganese Mine Prepared by Minrom Consulting (PTY) Ltd	nature and sporadic flow**. However, the possibility of flooding in the promised land stockyard and the north processing area should not be ignored.** • A conceptual SWMP has been developed to ensure compliance with the requirements of GN 704. A geotechnical investigation is required to assess the structural integrity of the existing embankment as well as to determine the dam footprint for the lining, compaction, flood protection berm and storage estimates. • Impacts have been identified, and recommendations of mitigation measures outlined in the report. All measures implemented for the mitigation of impacts should be regularly reviewed against best practice guidelines and to achieve compliance with the various licences issued on-site by the authorities. • A monitoring programme is an essential tool to identify any risks of potential impacts as they arise and to assist in impact management plans by assessing if mitigation measures are operating effectively. Monitoring should be implemented throughout the life of the mine for both surface water and groundwater. The project can continue if all mitigation and monitoring measures are implemented as recommended.		(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()

Attach copies of the Specialist Reports as appendices (All studies attached as Annexures from 4 – 8)

k) Environmental impact statement

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

Based on the **social assessment**, the following concluding remarks should be noted:

- From a social perspective it can be concluded that the socio-economic benefits associated with the project outweigh the negative social impacts, which mainly relate to intrusion impacts that can be successfully mitigated if appropriate and successful environmental management, as well as the strict implementation of pro-active mitigation and management measures are applied.
- There are a range of positive impacts associated with the proposed project, such as the creation of employment and income generation, local procurement and social development and services support, as well as the stimulation of local economic growth.
- There are however several potential negative socio-economic impacts of the proposed project that may affect surrounding landowners and communities. These negative impacts associated with the proposed project include the visual impact and possible impact on sense of place, nuisance factors (dust levels, noise and traffic movement), and community safety impacts (health risks and concerns, and general community safety). These impacts would respond to mitigation.
- The proposed mining project is anticipated to facilitate economic benefits to the local area, currently faced with relative high rates of unemployment and poverty.
- Local labour must be prioritised in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan, as this would assist in mitigating various social impacts, and it would also enhance the potential benefits of the proposed project to the local community members.
- Local procurement, especially during the operational phase, would have various trickle down positive socio-economic impacts on the beneficiary communities and local businesses. This aspect should thus be pursued as far as possible.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other similar environments.
- Socio-economic issues and concerns could arise during the implementation of the project. These should be thoroughly dealt with taking the sensitivities into consideration.

From a socio-economic perspective it is concluded that the project can be supported. It is therefore recommended that the development of the proposed Glosam Mine on the farm Gloucester be approved by the relevant authorities.

Ecological

Seven plant communities were identified on site of which the thornveld on historic mine footprint, shrubland on manganese ridges and woodland along the ephemeral stream

are associated with the core mining area. These areas are considered to be of high and very high sensitivity respectively. The most profound impacts are expected to be related to alterations and the possible destruction of the ephemeral stream, alteration to soil character, loss of soil fertility, loss of plant species of conservation concern and contribution to the cumulative effects of other mining activities in the region. A number of species of conservation concern is found in the earmarked habitats and will most certainly be damaged or removed. The most severe effect will be on the protected Boscia albitrunca, which is widespread across the study area. A licence application regarding protected trees should be lodged with Department of Agriculture, Forestry and Fisheries prior to any potential disturbances to these trees. A permit application regarding protected flora as well as the harvesting of indigenous vegetation also need to be lodged with the Northern Cape Department of Environment and Nature Conservation prior to any clearance of vegetation.

Overall, the proposed mining activities will impact the ecological integrity of Glosam, with associated impacts mainly considered to be moderately high. If the mining operation is managed with best environmental practise in mind, followed by effective rehabilitation efforts, these impacts can be reduced. Therefore, environmental authorisation should only be granted on condition that the applicant commits to the adherence of effective avoidance, management, mitigation and rehabilitation measures.

Hydrological & Hydrogeological Impact Assessment

Surface and Groundwater

The study area spans over two quaternary catchments (QCs), namely: QC D41J and D73A of the Lower Vaal Water Management Area (WMA). The catchment's Mean Annual Precipitation (MAP) and Mean Annual Evaporation (MAE) are said to range between 323 mm – 358 mm and 2351 mm – 2450 mm, respectively. The evaporation in the area is higher than the amount of rainfall the catchment receives.

The project area is underlain by two (2) dominant groundwater aquifer types – the first being a secondary fractured aquifer bound by the Black Ridge Thrust (BRT) as a likely natural conduit, and the second being an extensive karst aquifer system holding permeable solution cavities within Transvaal dolomite. The groundwater in the area is relatively shallow, ranging between 3–90 metres (incl. historical data) below ground level (mbgl). Recharge of the aquifers is dependent upon rainfall infiltration and percolation, which is far outweighed by evaporation.

Flood line Determination

Sub-catchments were delineated for the determination of flood lines on the nearby unnamed streams that could be potentially influenced by the proposed project. The topographical data formed the foundation for the HEC-RAS model and was used to extract elevation data for the river profiles, together with the river cross sections. The topographical data was also used to determine the positions at which the cross-sections were taken along the river profile so that the watercourse could be accurately modelled.

Floodlines for the 1:50-year and 1:100-year recurrence intervals were determined for the streams passing through the project site. The promised land stockyard and the north processing area infrastructure were found to be located within the 1:50- and 1:100-year floodlines.

There are a number of easily implemented measures which can ensure that flood water does not enter the stockyard and processing area, and these are (1) construction of berms between these identified areas and the 1:50 and 1:100-year floodlines; (2) construction of drainage trenches and a drainage channel between these identified areas and the 1:50 and 1:100-year floodlines. Alternatively, if flood water should enter these areas, a dirty water containment system should be put in place to ensure water entering the stockyard is not
re-introduced into the natural water system. These systems can be designed and implemented in future detailed design work beyond the conceptual stage.

Conceptual Stormwater Management Plan

A review of the proposed surface infrastructure was undertaken, and a series of design principles for stormwater management were developed to ensure compliance with the requirements of Government Notice (GN) Regulation 704. In order to meet the design principles detailed above, conceptual design details for the proposed stormwater management measures were recommended for each layout of infrastructure, along with the specific hydraulic design standards, methodologies, assumptions, and input parameters for each management measure proposed.

The channels were sized to accommodate the maximum flow calculated for the downstream end of the contributing catchment and the channel sizing was uniform along the entire length. Some cutting and filling may be required along the length of the channels to achieve the required gradient to ensure that water flows freely within these channels. The clean water will be kept out of the dirty water channels by construction of a linear bund upstream of the channel with material excavated from the channel.

Surface Water Impact Assessment

Informed by the site layout, baseline hydrology, floodline results and conceptual stormwater management plan, the potential impacts of the proposed activities on surface water receptors and the sensitivity of the surface water resources were presented, along with mitigation measures and monitoring requirements.

The impacts of the proposed activities and the infrastructure were identified and assessed based on the impact's magnitude, duration, probability, extent, severity and consequences, and the receptor's sensitivity.

This analysis then culminated in the determination of the impact significance which indicated the most important impacts and those that required stringent management. The local surface water resources were considered to be of low sensitivity. Mitigation and monitoring measures were specified throughout the report. All measures implemented for the mitigation of impacts should be regularly reviewed as required by best practice and to comply with the various licences issued on site by authorities. The

purpose of the mitigation measures was to ensure that the pre-mining/current water resource status is not deteriorated by the mining activities.

Groundwater Impact Assessment

As for the surface water, an impact assessment was compiled for the groundwater system(s) underlying the project. The major identified impacts are expected to be from the open-pit mining operations and possible dewatering operations which may draw the water table down and create a "cone of depression", which may impact surrounding users. However, at the pre-mining stage and for the duration of most of the operational phase where the pit floor is well above aquifer water table levels, this impact is identified as reasonably low.

Additional risk may include the contamination of the groundwater systems through either point source or disperse contamination sources such as stockpiles, processing areas, hydrocarbon spillage and human waste.

The contamination of groundwater from iron and manganese mined material is negligible, owing to the poor solubility of both metals in groundwater and the additional absence of sulphides contributing to Acid Mine Drainage (AMD).

However, the prevalent aquifer systems are (1) extensive (especially the karst dolomite) and (2) hydraulically conductive and as such, the residence times and infiltration rate of contamination entering the systems are expected to be considerable and impact the area on a large scale. Therefore, appropriate mitigation and monitoring measures need to be in place and be continuously implemented to ensure the risk is appropriately nullified.

Recommendations

The following are recommendations for the project:

- Separation of clean and dirty water through the development of stormwater structures. It must be ensured that diverted runoff from disturbed areas is collected in dirty areas and clean water freely discharges to the surrounding clean catchment.
- It is proposed that stormwater from dirty catchments is contained and reused at the processing plant and as dust suppression. Alternatively, it must be treated and discharged, effectively reducing the catchment area draining to the local watercourses.
- Management of silt by ensuring that the disturbance of topsoil is minimised, management of sediment source and erosion control, phasing of earthworks activities, diversion of upslope runoff to prevent it from entering the earthworks areas, and downstream treatment of any collected sediment runoff i.e., use of silt traps.
- Schedule regular inspection and maintenance of water management facilities: this should include the inspection of drainage structures and liners for any in channel erosion or cracks, the de-silting of silt traps/sumps and PCDs, and the

maintenance of any pumps and pipelines according to manufacturer's specifications.

- Infrastructure design: the design of all on-site access roads, plant areas, stockpiles, pump station, etc. must include stormwater management and erosion control during both the construction and operation phases.
- Any water abstracted from the ground needs to be appropriately extracted and not re-introduced into the aquifer. All boreholes should be routinely monitored to timely identify any changes in hydrochemistry and/or water table which may indicate contamination or depressed water levels from excessive pumping, or mining activities.

Heritage and Cultural

Findings: During the survey twenty-one sites of cultural heritage significance were identified within the immediate project area.

Recommendations:

- Site 12 (farm yard) and 15 and 20 (railway sidings) are all outside of the development boundary. Site 12 has no cultural heritage value and this report is seen as ample mitigation. The structures are younger than 60 years. It needed, may be demolished without a permit from SAHRA.
- The railway sidings receive a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction if needed.
- The remains of industrial building (site 6), the base of a water reservoir (site 9), the office complex remains (site 10), various remains of brick buildings (site 11) and the farm yard (site 18) has no cultural heritage value. This report is seen as ample mitigation. The structures are younger than 60 years and in a very poor condition. It may be demolished without a permit from SAHRA.
- The foundation (site 5), concrete building remains (site 16) and metal framework of an industrial building (site 21) has no cultural heritage value and may therefore be demolished. Since it is older than 60 years, a permit would be required from the SAHRA.
- For the three mine houses (site 4) the field rating of the site is Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. The mine does not currently have any plans that will impact here. Also, since the buildings are younger than 60 years, no permit is currently required.
- The old hostel area and recreation hall (site 2) is regarding as having a field rating of Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction. As both structures are younger than 60 years, no permit from SAHRA is needed.
- The field rating for the ore loading bays (site 7, 14 and 19) Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it

may be granted destruction. Since these sites are all younger than 60 years and in a very poor condition, it may be demolished without a permit from SAHRA.

- The field rating of the Glosam Mine Village (site 3) is Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.
- The village is older than 60 years and is regarded as being very unique and typical of such a mining village. Therefore at least the first sixteen houses, social area, hall and other structure within the inner circle of the village should be preserved. It may however be utilized for another purpose, being a youth camp, holiday resort or guest house. It would be good to also preserve the outer circle as it is part of the original lay-out plan, although most of the buildings are much younger.
- The mine does not intend to do any work here at present. If needed, for any changes to the buildings older than 60 years, a permit would be required from the SAHRA.
- The Miners boxes (sites 1, 13 and 17) are regarded as having a field rating of Local Grade IIIB. The sites should be included in the heritage register and may 5 be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.
- In this case, site 1 should be kept intact and preserved, meaning that a management plan should be drafted for the site. It should also be fenced in.
- Sites number 13 and 17 may be demolished, but only after complete documentation thereof and only if site number 1 remains intact. This documentation includes doing test excavations and drawing a site map.
- The loading platform (site 8) has a field rating of Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. As it is typical of a certain era in the mining industry, it should be preserved, perhaps as part of an interpretive route. It may be utilized in further mining activities, but a management plan would be needed for that.
- The proposed development may continue, but only after receiving the necessary approval from SAHRA.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation, it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.

In This regards the following 'Chance find Procedure' should be followed:

1. Upon finding any archaeological or historical material all work at the affected area must cease.
2. The area should be demarcated in order to prevent any further work there until an investigation has been completed.

3. An archaeologist should be contacted immediately to provide advice on the matter.
4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
5. SAHRA's APM Unit may also be notified.
6. If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
7. The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
8. Work on site will only continue after removal of the archaeological/ historical material was done.

Palaeontology

Based on the geology of the area and the palaeontological record as we know it, it can be assumed that the formation and layout of the dolomites, sandstones, shales and sands are typical for the country and do not contain fossil plant, insect, invertebrate and vertebrate material. The stromatolites of the Reivilo Formation might preserve fossil algae.

Based on experience and the lack of any previously recorded fossils from the area, it is extremely unlikely that any fossils would be preserved in the stromatolites of the Reivilo Formation. Since there is very small chance that fossils may a Fossil Chance Find Protocol should be added to the EMPr: if fossils are found once excavations have commenced then they should be rescued, photographs sent to a palaeontologist to assess and if deemed important then to collect a representative sample, with the relevant SAHRA permit.

From the assessment of impacts throughout all the phases it is clear that though the impacts may occur directly as a result of the minting operations, the impacts are mostly of medium significance before mitigation. According to the assessment carried out by the EAP the majority of the impacts can be reduced to a low significance with the appropriate mitigation measures in place.

The EAPs and environmental consultants responsible for the compilation of this document, and the associated PPP are of the opinion based on the presented specialist assessments and impact assessment that the Environmental Authorization application should be authorised.

The following mitigation measures are crucial and should form part of the environmental authorisation to ensure that the applicant manages impacts adequately:

- Adhere to the approved Environmental Management Programme
- Adhere to the Emergency procedures Report and implement spill clean-up procedures

- Apply for relevant permits with authorities for the removal of indigenous tree species and indigenous vegetation if applicable.
- Major spills should be reported within 24hr to the Department of Water and Sanitation and the NCDENC.

The nature of impacts can vary widely depending on the type of physical environment, the size of the activity and the perceptions and values of each of the affected parties. It was the objective of the assessment to identify both positive and negative impacts. The existing information was reviewed to assess the present status of the environment and the extent to which they have already been modified. The planned activities and associated infrastructure were used as reference to assess potential impacts.

In general, the environmental impacts associated to the mining operation are rather negative, while the social impacts are more beneficial. Impacts on vegetation are likely to be most profound, because the mining operation will constitute large-scale clearance of indigenous vegetation and most likely also the removal of protected species if any is encountered. Soil erosion and surface water deterioration are likely to be possible important impacts if appropriate management strategies are not practised.

Positive impacts include the demarcation and subsequent protection of heritage resources and the eradication of alien invasive species. Positive social impacts include the creation of jobs, social upliftment, training opportunities, community development and numerous economic benefits.

To conclude, it must be accepted that any activities will have both physical and social impacts. Therefore, the destruction of the natural environmental features within the mining area is inevitable. The significance of the impacts will however be affected by the success of the mitigation measures implemented and the rehabilitation programme for the mining area.

(ii) Final Site Map;

Provide a map at an appropriate scale which superimposes the proposed overall activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicated any areas that should be avoided, including buffers. Attach as **Figure 29**

The final site map below indicates the Mining right application area in which all mining will take place. Existing roads are also depicted. The associated infrastructure relating to the mining site is also indicated.

Floodlines for the 1:50-year and 1:100-year recurrence intervals were determined for the river passing through the project site. The proposed project and mine surface infrastructure are located outside the 1:50- and 1:100-year floodlines. The promised land stockyard and the north processing areas are located within the 1: 100-year floodlines. All other infrastructure is located outside of the floodlines. Condition 4 of the GN704 indicates that no residue deposit or associated activity may be located or placed within the 1:100-year flood line or within a horizontal distance of 100-metre from any

watercourse, whichever is greatest. It should be noted that the natural boundary for watercourses includes the best estimate of the edge of dormant or old side channels. It is therefore recommended that mitigation measures be implemented to prevent flood water from entering these areas, such as the construction of berms, drainage trenches and/or dirty water containment systems. These systems can be designed and implemented as part of further, more detailed mine design studies beyond the conceptual stage.

No mining operations are carried out within a horizontal distance of 100 (one hundred) metres from reserve land, buildings, roads, railways, dams, waste dumps, or any other structure whatsoever including such structures beyond the mining boundaries, or any surface, which it may be necessary to protect in order to prevent any significant risk, unless a lesser distance has been determined safe by risk assessment and all restrictions and conditions determined in terms of the risk assessment are complied with; **Please see Final Site Map below.**

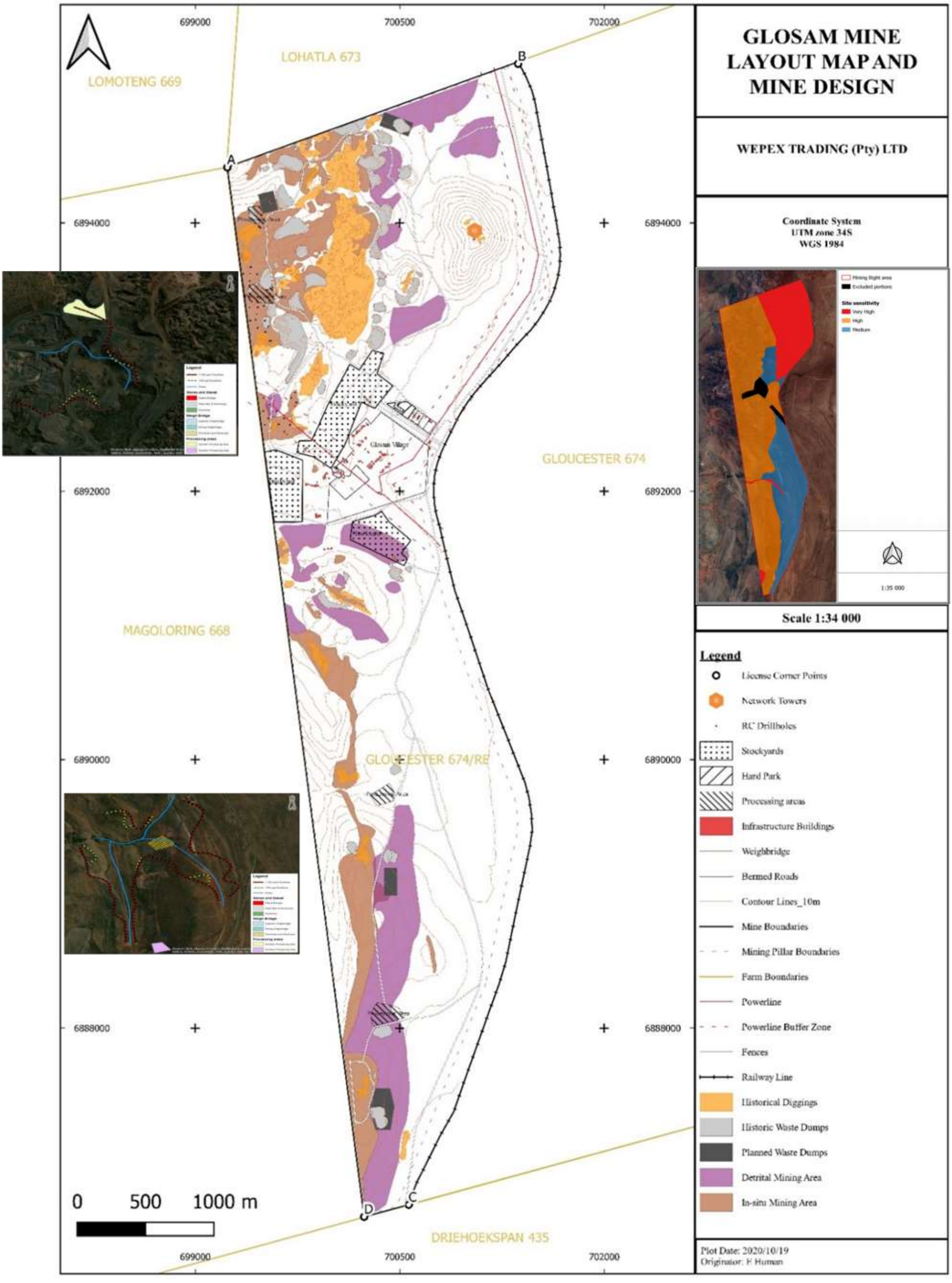


Figure 28. Final Site Layout Map**.**

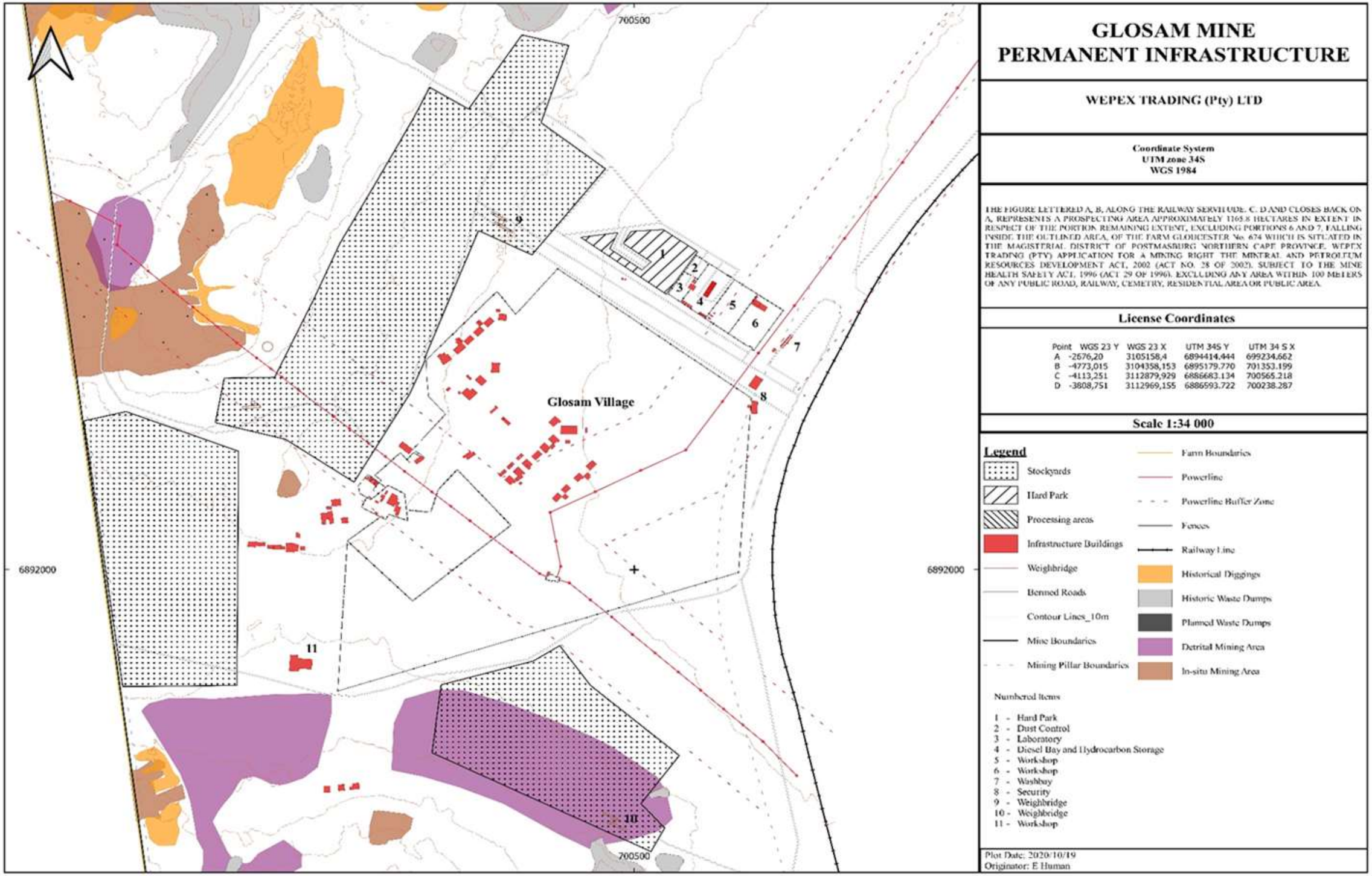


Figure 29. Final Site Surface layout map.

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

As mentioned before, the specific occurrence of iron ore and manganese in the area dictates the selection of the specific mining site and there are no alternatives in terms of project location.

In terms of alternative land use, the proposed mining operation will be done in such a way that residential living and (grazing) will still be possible as the site will be rehabilitated in such a way that it allows the establishment of grass cover again.

The mining operation will provide ±178 jobs and will also add to the increased economic activity and the area surrounding the farm.

Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration.

During the operational stages of the mining operation, there is a possibility of sterilisation of the mineral reserves and resources due to improper placement of infrastructure. However, the site layout plan has been developed not to place any infrastructure where resource materials could be located. The infrastructure and excavations /dumps will alter the topography by adding features to the landscape. Topsoil removal and Mine Residue Dumps will change the natural topography. The construction of infrastructure and various facilities in the mining area can also result in loss of soil due to erosion. Vegetation will be stripped in preparation for placement of infrastructure and mining of manganese and iron ore, and therefore the areas will be bare and susceptible to erosion.

The topsoil that is stripped and piled on surrounding areas can be eroded by wind and rain. The soil will be carried away during runoff. The cleared areas will be rehabilitated, but full restoration of soils might only occur over a number of years, subsequent to the re-establishment of vegetation. Furthermore, improper stockpiling and soil compaction can result in soil sterilisation. Leaching can also occur, resulting in the loss of nutrients.

There is also a possibility that equipment might leak oil, thus causing surface spillages. The hydrocarbon soil contamination will render the soil useless unless they are decontaminated. The storage of fuels on site might have an impact on soil if the tanks that are available on site are not properly monitored and maintained to avoid leakages. Then there is the potential that contaminated soil can be carried through runoff to contaminate water resources and soil stockpiled for rehabilitation. Soil pollution is therefore possible, but through mitigation it can be minimised.

The loss of land capability and land use can occur in two ways. Firstly, through topsoil removal, disturbances and loss of soil fertility; and secondly through the improper

placement of infrastructure. Most of the site has a land capability for grazing, but grazing activities can still be performed in areas not earmarked for the operation, and with proper rehabilitation the land capabilities and land use potential can be restored.

Groundwater could be directly affected if excessive abstraction or or dewatering takes place, also any oil and fuel spillages occur during these scenarios and activities, then groundwater will be directly contaminated. Similarly, hazardous surface spillages will seep into the underlying aquifers and contaminate ground water. Improper handling of hazardous material will cause contamination of nearby surface water resources during runoff episodes. Lack of storm control structures will lead to erosion of stockpiles during heavy rains and runoff will carry suspended solids into the downstream environment. This might cause high silt load and affect stream flow. If no, or inadequate ablution facilities are available then workers might feel the need to use the veld for this purpose, which can contaminate natural resources.

Any dumping within the drainage lines will impact on the surface water environment by altering their physical characteristics. These impacts include the alteration of flow patterns, ponding and an increase in the concentration of suspended solids and sedimentation.

Mining activities on site will reduce the natural habitat for ecological systems to continue their operation. While general clearing of the area and mining activities destroy natural vegetation, invasive plants can increase due to their opportunistic nature in disturbed areas. If invasive plants establish in disturbed areas, it may cause an impact beyond the boundaries of the mining site. These alien invasive species are thus a threat to surrounding natural vegetation and can result in the decrease of biodiversity and ecological value of the area. Therefore, if alien invasive species are not controlled and managed, their propagation into new areas could have a high impact on the surrounding natural vegetation in the long term. With proper mitigation, the impacts can be substantially reduced.

The transformation of natural habitats to mining and associated infrastructure will result in the loss of habitat affected individual species, and ecological processes. In turn this will result in the displacement of faunal species dependent upon such habitat. Increased noise and vibration due to operational activities will disturb and possibly displace birds and other wildlife. Fast moving vehicles take a heavy toll in the form of road kills of small mammals, birds, reptiles, amphibians and a large number of invertebrates.

During the operation the abovementioned activities have potential for dust generation. It is anticipated that the extent of dust emissions would vary substantially from day to day depending on the level of activity and the specific operations. The operation will typically have low to moderate levels of noise, along with man-influenced sounds such as traffic on the secondary road, activities on the residential areas and very occasional air traffic. The proposed operation will add a certain amount of noise to the existing noise in the area.

The impact of site generated trips on the traffic and infrastructure of the existing roads is expected to be moderate. Furthermore, if road safety is not administered it can have a high impact on the safety of fellow road users.

The activities on site have the potential to impact upon heritage resources. Heritage sites are fixed features in the environment, occurring within specific spatial confines. Any impact upon these resources will be permanent and irreversible. Any movement of vehicles, equipment or personnel through areas containing these artefacts could result in the permanent destruction of the artefacts and loss of heritage resources.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.
Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and operation-related businesses.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

In terms of the Social Impact Assessment findings derived from the Social Impact Assessment conducted by "Batho Earth Social and Environmental Consultants". The mining sector, followed by the agricultural sector, is the main employment sectors within the local study area. The mining industry's contribution to the GDP of TLM increased from R1,5bn in 2002 to R3,9bn in 2012. During 2012 the mining industry employed 54.5% (6 648 persons) of the employed population.

Mining developments are usually perceived as a positive injection to the economic standard of an area as it could lead to further developments in the regional area. It is anticipated that the TLM would be positive towards the proposed development due to the additional employment creation and the positive economic spin-offs that could occur.

Local procurement could have some local economic benefits, should community members within the TLM be involved in the procurement of capital goods, consumables and services.

Targets for the procurement of capital goods, consumer goods and services should be set and action plans to meet these targets should be developed accordingly. These plans should include, but are not limited to, the development of Economic Empowerment (EE) policies, procedures and guidelines, as well as the development of a database of local small businesses (entrepreneurs and SMME's).

In terms of local contributions, mining legislation specifies that mining operations should contribute to the economic development of the affected local community as per a Social and Labour Plan (SLP). The 2018 Mining Charter targets an equity equivalent benefit to the minimum of 5% to be allocated to the socio-economic development of local communities. The Mining Works Programme (MWP) for this project must thus make provision for the local economic development over the lifetime of the project.
Through the SLP, the mine, will provide skills development opportunities for employees that could include learnerships, functional literacy and numeracy programmes, ABET programmes, career progression plans, up-skilling for hard to fill vacancies and management positions, bursary and internships and portable skills training. In an area such as the TLM, with relative low skill levels, this skills development will make a positive contribution to the overall socio-economic development of the resident communities.

Impact on Resource Use

The farm Gloucester where the mining activities are proposed has already been disturbed and prospecting has been undertaken on site. No agricultural activities have taken place on the property for quite some time. The impact on the land-use is thus negligible.
The TLM IDP stated that groundwater is mainly used for rural domestic water supplies, stock watering and water supplies to towns and settlements. Low rainfall patterns are also experienced over the area. Recharging of groundwater aquifers is therefore limited, and only small quantities can be abstracted on a sustainable basis. Careful groundwater utilization is thus important in the area and constitutes the only source of water over much of the rural areas.
Energy and water infrastructure in the municipal area is under pressure in terms of challenges related to the provision of bulk infrastructure development, high electricity and water distribution losses as well as high municipal debts to Eskom and Sedibeng Water. The impact of mining on the groundwater sources can result in water service provision challenges for the TLM. The possible impact on the water quality and quantity would also always be of concern to the neighbouring farmers, property owners and the communities in close proximity to the mining area. Any negative impact on this resource use could result in negative impacts on the farming practices with subsequent financial losses, and possibly impact on the quality of life of the residents of these communities.

Health Related Risks

Concerns could revolve around the possible public health impact of the general mining activities due to possible air/dust pollution, as well as noise pollution and a possible impact on the water quality. Should it be found that any pollution occurs, the existing health services such as the clinics in Postmasburg, Boichoko and Postdene would come

under additional pressure especially in light of the Covid-19 pandemic which also puts strain on the health services.

In mining areas there are further concerns relating to migrant employees bringing health risks and nowadays the threat of Covid-19 infection to small towns. Postmasburg and surrounds is already characterised by vulnerable households and inadequate public health services that cannot always effectively deal with the health risks associated with the pandemic. With regards to the proposed mining at Glosam, limited in-migration is anticipated. It will however remain the responsibility of mining companies to continue their support to surrounding communities to reduce vulnerability.
The storage of hazardous substances (diesel and explosives) on site furthermore creates safety risks. Even though all precautionary safety measures will be implemented with regards to the storage, transportation and handling of these substances, this remains a concern as there are limited firefighting services provided by the TLM. The residents are mainly reliant on the service provided by mining companies.

SOCIO-ECONOMIC IMPACTS DURING DECOMMISIONING AND POST-CLOSURE
Decommissioning refers to the actual closure of the mine, the dismantling of the infrastructure and/or replacement of the infrastructure with newer technology, as well as the final rehabilitation process.
Possible social impacts to be experienced during decommissioning (closure of the mine) could include the following:

- Job losses due to mine closure;
- Decline in the sustainability of the local economy as a result of the loss of employment, household income and capital investments;
- Reduced economic activities within the area with subsequent negative impacts on smaller businesses;
- A decline in the local economy would also have a direct impact on the financial status of the TLM;
- Negative impact on the revenue base of the TLM;
- Population changes and out-migration of people from the area, as well as relocation of families;
- Negative impact on the social fabric and social networks;
- A new class of jobseekers targeting other mines in the area;
- Skilled workers moving out of the area in search of employment elsewhere;
- Decrease in the quality of life of the surrounding communities due to the discontinuation of social development support and local economic development programmes;
- Negative impact on infrastructure development and maintenance;
- A change in community infrastructure;
- Disruptions and nuisance factors associated with the actual decommissioning such as noise, visual and traffic related impacts;
- Increased safety risks associated with the decommissioning of the infrastructure;

- Possible negative impact on the crime levels due to increased unemployment rate;
- Remnants of possible environmental impacts; and
- Remaining visual impact as a result of mining.

Decommissioning and its associated closure programmes must ensure that communities are not left stranded without alternative forms of livelihoods, with subsequent degradation of the communities' socio-economic quality of life.
As the timing with regards to decommissioning or the replacement of the infrastructure cannot be determined at this stage, it is recommended that a detailed Social Impact Assessment be undertaken at the time of decommissioning to determine the actual impacts on the changing social environment at that stage. No rating will thus be provided, but mitigation measures have been included as part of Section 11: Socio-economic Risk Management and Monitoring Plan.

THE NO-GO ALTERNATIVE
Should the proposed project not proceed, the status quo in terms of the existing social impacts in the area would therefore remain. The most significant social impact with regards to the no-go alternative relates to the loss in employment opportunities and the overall direct and indirect economic impacts for the region.

As Wepex Trading, through the SLP will be involved in various corporate social investment programmes it would impact on poverty alleviation as a result of such programmes. The potential loss in terms of employment and economic benefits to the local communities is considered as a critical negative impact.

The 'no-go alternative' should thus not be considered from a social point of view as the negative social impacts anticipated with the proposed mining project are deemed low. The negative impacts would further respond to mitigation as proposed. The proposed activities further fall within the mining rights area and the area is already characterised by and surrounded by various mining infrastructure.

Based on the social assessment, the following concluding remarks should be noted:

- From a social perspective it can be concluded that the socio-economic benefits associated with the project outweigh the negative social impacts, which mainly relate to intrusion impacts that can be successfully mitigated if appropriate and successful environmental management, as well as the strict implementation of pro-active mitigation and management measures are applied.
- There are a range of positive impacts associated with the proposed project, such as the creation of employment and income generation, local procurement and social development and services support, as well as the stimulation of local economic growth.
- There are however several potential negative socio-economic impacts of the proposed project that may affect surrounding landowners and communities. These negative impacts associated with the proposed project include the visual

impact and possible impact on sense of place, nuisance factors (dust levels, noise and traffic movement), blasting and community safety impacts (health risks and concerns, and general community safety). These impacts would respond to mitigation.

- The proposed mining project is anticipated to facilitate economic benefits to the local area, currently faced with relative high rates of unemployment and poverty.
- Local labour must be prioritised in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan, as this would assist in mitigating various social impacts, and it would also enhance the potential benefits of the proposed project to the local community members.
- Local procurement, especially during the operational phase, would have various trickle down positive socio-economic impacts on the beneficiary communities and local businesses. This aspect should thus be pursued as far as possible.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive portable skills to enable them to also find work elsewhere and in other similar environments.
- Socio-economic issues and concerns could arise during the implementation of the project. These should be thoroughly dealt with taking the sensitivities into consideration.

From a socio-economic perspective it is concluded that the project can be supported. It is therefore recommended that the development of the proposed Glosam Mine on the farm Gloucester be approved by the relevant authorities.
The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

Negative impacts on the area are expected to be temporary and can be mitigated to a large extent if the recommendations of the EMPR are adhered to e.g. ongoing environmental management and rehabilitation once the mine reaches its end of life.

l) 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 conditions of authorisation.

Air Quality

- To limit the creation of nuisance, dust the following management guidelines must be followed:
    - Avoidance of unnecessary removal of vegetation.
    - Routine spraying of unpaved site areas and roads utilized by the mining operation with water.

- Speed limits of vehicles inside the mining area must be strictly controlled to avoid excessive dust or the excessive deterioration of the roads to be used.
- Continuous dumping and rehabilitation of disturbed areas.
- All cleared, disturbed or exposed areas must be re-vegetated as soon as practically possible to prevent the formation of additional sources of dust.

Archaeology:

- All operators of equipment should be made aware of the possibility of the occurrence of sub-surface heritage features and the following procedures should they be encountered:
  - All construction in the immediate vicinity (50m radius of the site) should cease.
  - The heritage practitioner should be informed as soon as possible.
  - In the event of obvious human remains the SAPS should be notified.
  - Mitigation measures (such as refilling) should not be attempted.
  - The area in a 50m radius of the find should be cordoned off with hazard tape.
  - Public access should be limited.
  - No media statement should be released until such time as the heritage practitioner has had sufficient time to analyse the finds.

Fauna

- To ensure a minimum of impact to animals the following management guidelines will be followed:
  - Speed limits of vehicles inside the application area must be strictly controlled to avoid road kills.
  - Continuous controlled dumping.
  - Operational areas must be low angled as a preventative measure to ensure an escape route for animals.
  - No hunting (snares) must be allowed at the application area or in the surrounding area.
  - All mining and access roads must be fenced.

Flora

- No trees or shrubs must be felled or damaged for the purpose of obtaining firewood.
- Management must take responsibility to control declared invader or exotic species on the site. The following control methods must be used:
  - The plants will be uprooted, felled or cut off and can be destroyed completely.
  - The plants will be treated with an herbicide that is registered for use in connection therewith and in accordance with the directions for the use of such an herbicide.
- Valid permits from DAFF must be obtained before any protected plant species are removed or damaged if encountered.
- Continuous controlled dumping and spreading of previously stored topsoil over the rehabilitated areas.
- All rehabilitated areas, where applicable and possible must be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to mining activities commenced if the natural succession of vegetation is unacceptably slow.
- Fires may only be allowed in facilities or equipment specially constructed for this purpose.

- The end objective of the re-vegetation program must be to achieve a stable self-sustaining habitat unit.

Groundwater

- Vehicle- and equipment maintenance must only be allowed within the maintenance area. Only emergency breakdowns may be allowed in other areas.
- The following procedure must be followed if a vehicle or piece of equipment would break down inside an excavation and outside of the maintenance area.
    - Drip pans must be placed at all points where diesel, oil or hydraulic fluid may drip and in so doing contaminate the soil.
    - All efforts must be made to move the broken-down vehicle or piece of equipment to the maintenance area.
    - If the vehicle/piece of equipment cannot be moved, the broken part must firstly be drained of all fluid. The part must then be removed and taken to the maintenance area.
- No repairs may be allowed outside the maintenance area except for emergencies.
- Equipment used as part of the proposed operation must be adequately maintained so as to ensure that the oil, diesel, grease or hydraulic fluid does not leak during the operation.
- Fuel and other petrochemicals must be stored in steel receptacles that comply with SANS 10089-1:2003 (SABS 089-1:2003) standards. An adequate bund wall, 150% of volume of the largest storage receptacle, must be provided for fuel and diesel areas to accommodate any spillage or overflow of these substances. The area inside the bund wall must be lined with an impervious lining to prevent infiltration of the fuel into the soil (and ultimately groundwater).
- Proper sanitation facilities must be provided for employees. No person may pollute the workings with faeces or urine, misuse the facilities provided or inappropriately foul the surrounding environment with faeces or urine.
- Acceptable hygienic and aesthetic practices must be adhered to.
- The workshops, washing bays and sewage tanks should be constructed far away from significant aquifer systems.
- SOP for storage, handling and transport of different hazardous materials.
- Place oil traps (drip trays) under stationary vehicles, only re-fuel al fuelling stations, construct structures to trap fuel spills at fuelling stations, immediately clean oil and fuel spills and dispose of contaminated material at licensed sites only.
- Ensure good housekeeping rules.

Noise

- Working hours must be kept between sunrise and sunset as far as possible.
- As a minimum, ambient noise levels emanating from the mining activities may not exceed 82 dB (A) at the site boundary.
- The Company must comply with the Occupational Noise Regulations of the Occupational Health and Safety Act, Act 85 of 1993.
- The company must comply with the measures for good practice with regard to management of noise related impacts during construction and operation.

- The management objective must be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the plant area and that which may migrate outside the plant area.
- When the equivalent noise exposure, as defined in the South African Bureau of Standards Code of Practice for the Measurement and Assessment of Occupational Noise for Hearing Conservation Purposes, SABS 083 as amended, in any place at or in any mine or works where persons may travel or work exceeds 82 dB (A), the site manager will take the necessary steps to reduce the noise below this level.
- Hearing protection must be provided to all employees where attenuation cannot be implemented.
- If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.

Mechanical equipment

- All mechanical equipment must be in good working order and vehicles must adhere to the relevant noise requirements of the Road Traffic Act.
- All vehicles in operation must be equipped with a silencer on its exhaust system.
- Safety measures, which generate noise such as reverse gear alarms on large vehicles, must be appropriately calibrated / adjusted.

Screening / Migration Control:

- Appropriate measures must be specifically being installed and / or employed at the plant to act as screen and to reflect/reduce the noise.
- Appropriate non-metallic washers/insulation must be used with any joining of apparatus made from materials such as corrugated iron. Such apparatus must be maintained in a fixed position.

Safety

- No employees may reside on the mine site.
- Access and haul roads must be maintained.
- Security access point to ensure monitoring of access to the site.

Soil

- In all places of development, the first 300mm of loose or weathered material found will be classified as a growth medium. The topsoil must be removed where possible, from all areas where physical disturbance of the surface will occur.
- In all areas where the above growth medium will be impacted on, it must be removed and stockpiled on a dedicated area. The maximum height of stockpiles may not exceed 2 meters.
- The growth medium/topsoil must be used during the rehabilitation of any impacted areas, after sloping in order to re-establish the same land capability.
- If any soil is contaminated during the life of the mining area, it must either be treated on site or be removed together with the contaminant and placed in acceptable containers to be removed with the industrial waste to a recognized facility or company.

- Erosion control in the form of re-vegetation and contouring of slopes must be implemented on disturbed areas in and around the site.
- Topsoil must be kept separate from overburden and may not be used for building or maintenance of access roads.
- The stored topsoil must be adequately protected from being blown away or being eroded.
- Compacted areas must be ripped to a depth of 300mm, where possible, during the continuous rehabilitation, decommissioning and closure phases of the operation in order to establish a growth medium for vegetation.
- Vehicle movement must be confined to establish roads for as far as practical in order to prevent the compaction of soils.

Surface water

In case of the occurrence of a discharge incident that could result in the pollution of surface water resources, the emergency response procedure should be implemented.

- Phasing/scheduling of earthworks should be implemented in order to minimise the footprint that is at risk of erosion at any given time, or schedule works according to the season i.e. earthworks during the dry winter season pose less impact.
- In the case of linear earthworks, phasing of working areas and progressive rehabilitation will be necessary to minimise the footprint of the extent of the disturbance at any given time.
- Water quality monitoring will be undertaken as per the monitoring programme.
- A post-rehabilitation audit should be undertaken during the end of life of mine to ascertain whether the remediation has been successful as recommended and if not, further measures should be recommended and implemented; and
- Pollutant storage – any substances which may potentially pollute surface water must be stored within a suitably sized bunded area and where practicable covered by a roof to prevent contact with rainfall and/or runoff.
- The disposal of oil, grease and related industrial waste must be transported to the stores area where it will be stored in steel containers supplied by an oil recycling contractor. All oil and grease must be removed on a regular basis from the operation by a registered approved contractor.
- All refuse and waste from the different sections must be handled according to NEMA Guidelines. Recycling of waste is encountered in all the consumer sections of the operation, where recyclable materials must be collected before dumping them in the domestic waste disposal area.
- All non-biodegradable (recyclable) refuse such as glass bottles, plastic bags and metal scrap must be stored in a container in the waste area and collected on a regular basis and disposed of at a recognized disposal facility.
- Erosion and storm water control measures must be implemented.
- An application for an integrated Water Use Licence must be submitted at the Department of Water and Sanitation for all actions to be performed which requires authorization in terms of water uses.

- Vehicle repairs must only take place within the maintenance area for vehicles. Repairs within open excavations must be limited to emergency break downs with drip trays.
- Re-fuelling must only take place in the re-fuelling area. If this is found not to be practical, drip trays must be used whenever re-fuelling takes place outside of this area.
- During rehabilitation the application must endeavour to reconstruct flow patterns in such a way that surface water flow is in accordance with the natural drainage of the area as far as practically possible.

Ground water

Dewatering operations should be planned and designed carefully, with abstraction of water carefully controlled to minimise cone of depression impacts. However, the pit depths at Glosam are expected to be relatively shallow (15-20m bench), which may be just above the water table.

Groundwater abstraction should be first tested by means of a pump testing programme to determine the sustainable yield of each borehole and the aquifer. Regular monitoring of the groundwater levels should be undertaken, during a Hydrocensus either bi-monthly or quarterly.

Stockpiles and dumps should be kept within their defined footprints, and be underlain by a floor of fine, highly impervious waste material which minimises downward percolation of acidic water. However, due to the relative insolubility of iron and manganese in water, and the absence of significant sulphides which cause Acid Mine Drainage (AMD) this is expected to be an impact of minor significance.

All hydrocarbon spills, whether major or minor, should be immediately attended to and cleaned with the appropriate spillage kits, and the soil excavated to minimise downward percolation. All hydrocarbons and fuels should be appropriately stored within containing bunds and in demarcated storage areas.

All waste material produce by the mining operations and staff must be (1) appropriately contained in suitable containers for the duration of which it is on site. This potentially polluting waste must then be transported off site and disposed of accordingly.

Topography

- All manganese excavations must be rehabilitated if and when possible and made safe so as to reflect as far as possible the pre-mining topography of the area.
- All temporary features e.g. plant, containers and stockpiling must be removed and handled in the prescribed manner during rehabilitation.

Visual

- Security Lights must be fixed at an angle to ensure that it does not cause a disturbance to the surrounding environment at night.
- Excavations must be subject to progressive backfilling and made safe (including the re-establishment of vegetation).

- Permanent structures or features that are part of the proposed mining operation must be kept neat and well presented.
- Waste material of any description must be removed from the mining area on a regular basis and be disposed of at a recognized landfill facility.

The impact management objectives for the Wepex planned mining operation should include:

- To ensure efficient extraction of the manganese and to prevent the sterilization of any manganese reserves.
- To limit the alteration of the surrounding topography
- To manage and preserve soil types
- To prevent the loss of land capability
- To ensure the continuation of economically viable land use.
- To ensure that the surrounding ground water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quality of ground water resources.
- To ensure that the surrounding surface water resources are not adversely affected to the detriment of the health and welfare of nearby communities; and to ensure suitable quantity and quality of ground water resources.
- Rehabilitation of disturbed areas during the mine life cycle as well as during closure phase has to be done to minimize erosion and/or pollution of natural streams.
- To contain soils and materials within demarcated areas and prevent contamination of storm water runoff.
- To minimise the loss of natural vegetation.
- To prevent the proliferation of alien invasive plants species.
- To protect the wildlife and bird species.
- To protect the natural habitat of wildlife and bird species.
- To maintain visual integrity; and to minimise the extent of the generation of dust in order to minimise the aspect of nuisance and health impacts to sensitive receptors.
- To minimise noise and vibration to a level that disturbances felt by the communities are limited.
- To reduce the impact on visual quality due to intrusive mine infrastructure, activities and facilities.
- To ensure that all traffic generated by the proposed mining development does not negatively impact on existing road networks and infrastructure; and to ensure traffic safety.
- To preserve the historical and cultural artefacts located on site in compliance with the South African Heritage Resources Act, 1999 (Act No 25 of 1999).
- To ensure that the current socio-economic status quo is improved.
- To be transparent and practise effective communication; in order to maintain good relationships with all interested and affected parties.

m) Final proposed alternatives

(Provide an explanation for the final layout of the infrastructure and activities on the overall site as shown on the final site map together with the reasons why they are the final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment)

The location of the central mining site and associated infrastructure is primarily based on proximity to the access roads, proximity to the areas earmarked for mining and limited additional impact on the environment and heritage resource.

The mining activities and methodologies associated with mining of iron ore and manganese is the only economic viable method currently being used by the manganese fraternity. There is no alternative mining method for the mining of iron ore and manganese.

n) Aspects for inclusion as conditions of Authorisation

Any aspects which have not formed part of the EMPr that must be made conditions of the Environmental Authorisation

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

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

(Which relate to the assessment and mitigation measure proposed)

The above mitigation measures are tried and tested over many years in the manganese industry. The Company must monitor the potential impacts throughout the life of operation, and mitigate any deviations detected. This has been proven to be very effective in existing operations.

The EAP who compiled this document and the specialists who compiled the respective specialist reports have extensive knowledge in their field and it is therefore assumed that the above assumptions are adequate and that the information provided is correct.

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.

There are no significant reasons why the activity should not be authorised. However, if the proposed management and mitigation measures are not properly applied or if the mining operation intentionally disregards any of these measures, it will negatively affect the environment and have more long-term consequences. Therefore, the competent authority should take all the necessary steps to ensure that the mining operation complies with the conditions set out in the approval of the EMPR.

ii) Conditions that must be included in the authorisation.

(1) Specific conditions to be included into the compilation and approval of EMPr

The general conditions; including management of activity, monitoring, recording and reporting to the Department, commissioning of the activity, operation of the activity, site closure and decommissioning as well as non-compliances; as required in terms of the Environmental Impact Assessment Regulations promulgated in terms of NEMA (Act 107 of 1998) as well as objectives and requirements of relevant legislation, policies and guidelines must be included in the Authorization.

(2) Rehabilitation requirements

Infrastructure areas

On completion of the mining operation, the various surfaces, including the access road, the office area, storage areas and the plant site, will finally be rehabilitated as follows: All other material on the surface will be removed to the original topsoil level where possible. This material will then be backfilled into any open pits. Any compacted area will then be ripped to a depth of 300mm, where possible, the topsoil or growth medium returned and landscaped.

All infrastructures, equipment, plant, and other items used during the operational period will be removed from the site. On completion of operations, all buildings, structures or objects on the office site will be dealt with in accordance with regulation 44 of the Minerals and Petroleum Resources Development Act, 2002.

Topsoil and Stockpile Deposits:

Disposal Facilities: Waste material of all description inclusive of receptacles, scrap, rubble and tyres should be removed entirely from the mining area and disposed of at a recognized landfill facility. It should not be permitted to be buried or burned on the site.

Ongoing Seepage, Control of Rain Water:

Water Quality Management in accordance with the South African Water Quality Guidelines must be adhered to in order to provide timely and accurate water data to the Department of Water and Sanitation (DWS) as well as to manage impacts caused by the activity. Specific objectives of such a program are to:

- Determine whether water quality comply with water quality standards.
- Provide timely data for intervention as and when required.
- Assess the status of water quality in the surrounding areas.

- Provide analytical water quality information describing trends (present conditions and changes).

The objectives are to limit the adverse effect of pollutants in the water resource. The setting of in-stream Resource Water Quality Objectives (RWQO) is based on the South African Water Quality Guidelines.

Water Monitoring Points

A monitoring programme is an essential tool to identify any risks of potential impacts as they arise and to assist in impact management plans. Monitoring should be implemented throughout the life of the project.

Surface water monitoring programme.

Description	Monitoring Location	Frequency of sampling	Frequency of Reporting
Soil Erosion			
Soil erosion and sedimentation monitoring in all soil erosion potential sources	Cleared and compacted areas where the infrastructure will be built. The downstream areas of dams and road crossings.	Monitoring of erosion should occur during construction after every rainstorm or flood event. During operational phase, monthly monitoring should be undertaken.	After every major rainstorm/flood. Monthly monitoring report compiled by the appointed ECO during the construction phase.
Surface Water Quality			
Ensure that monitoring is implemented up and downstream at the periphery of the 100 m working area	Monitoring must be undertaken at precisely the same locality as the pre-construction, operation and closure phases monitoring.	After storm events.	As and when monitored
Leakage events			
A leak and spill management plan must be formulated to monitor and detect as soon as possible. Site walkovers to determine the condition of facilities and identify any leaks or overflows, blockages, overflows, and system malfunctions for immediate remedial action	Roads and areas where vehicles commute and areas where chemical storage containers are located. Areas where leakage is visible/detected	Identification of any leakage events should occur monthly during the rehabilitation and construction phase, or directly after a leakage has been detected and for the operational phase, during maintenance activities	Monthly monitoring report compiled by the appointed ECO during the construction, operational and closure phases; and Report should be compiled for all the three phases of the project
Leakage events			
Inspection of the temporary channels, and bridges for signs of erosion, cracking and silting to ensure the performance of these remains acceptable.	All proposed infrastructure	Daily during maintenance	Daily. Should erosion occur, measures should be reinstated.

Groundwater Monitoring

The objective of a groundwater monitoring plan is to detect any changes that the mining activities have on water quality and ground water levels in the area. The boreholes identified in the monitoring network should be able to assess contaminant sources, receptors, potential contaminant plumes and aquifer responses. Furthermore, monitoring of the background groundwater quality and levels are also required on a regular basis.

Groundwater monitoring should be conducted to assess the following:

- The impact of mine dewatering on the surrounding aquifers. This will be achieved through monitoring of groundwater levels in the selected monitoring boreholes.
- Groundwater inflow into the mine workings. This will be achieved through monitoring of groundwater levels in the monitoring boreholes as well as measuring water volumes pumped from mining areas (if applicable).
- Groundwater quality trends. This will be achieved through the monitoring and sampling of the groundwater in the Hydrocensus boreholes at the prescribed frequency.

Groundwater monitoring should be undertaken according to international best practices with the schedule presented in Table 20. It is envisaged that the frequency of monitoring remains on a biannual basis for quality, while water level monitoring should be conducted on a bi-monthly to quarterly basis.

Table 20: Water monitoring programme.

Monitoring BHs	Sampling Interval	Analysis	Water Quality Standards
All Monitoring sites (all identified boreholes – see Figure 16	Quarterly	Water Levels	N/a
Selected Monitoring Sites *(to be advised depending on sample results)*	Biannual	Chemistry & Microbiology (Full Suite)	WHO Drinking Water Standards, South African National Standard (SANS 214: 2015):
Rainfall	Daily (at mine)	N/a	N/a
Monitoring programme to be implemented at all stages during Construction, Operational, Decommissioning and Post Closure Phases			

Long Term Stability and Safety: It should be the objective of mine management to ensure the long term stability of all rehabilitated areas including the backfilled excavations. This should be done by the monitoring of all areas until a closure certificate has been issued.

Final rehabilitation in respect of erosion and dust control: Self-sustaining vegetation will result in the control of erosion and dust and no further rehabilitation is deemed necessary, unless vegetation growth is not returned to a desirable state by the time of mine closure.

Final Rehabilitation Roads:

- After rehabilitation has been completed, all roads should be ripped or ploughed, fertilized and providing the landowner does not want them to remain that way and with written approval from the Director: Mineral Development of the Department of Mineral Resources.

Submission of Information:

- Reports on rehabilitation and monitoring should be submitted annually to the Department of Mineral Resources – Kimberley, as described in Regulation 55 and NEMA.

Maintenance (Aftercare):

- Maintenance after closure should include the regular inspection and monitoring and/or completion of the re-vegetation programme.
- The aim of the Environmental Management Programme is for rehabilitation to be stable and self-sufficient, so that the least possible aftercare is required.
- The aim with the closure of the mine should be to create an acceptable post-mine environment and land-use. Therefore, all agreed commitments should be implemented by Mine Management.

After-effects Following Closure:

Acid Mine Drainage:

Ore mining and processing activities have potential for generating highly acidic wastewater and high concentrations of heavy metals and other toxic contaminants. In this environment, this type of pollution may be identified as Acid Rock Drainage (ARD). The collection of such pollutants involves interception ditches, catchment dams and ponds.

The project area is exceptionally dry, and it can be expected that little to no discharge will take place from mining activities which will subsequently reduce the risks of potential pollution sources. Also, the presence of sulphide material in the ore and waste is low; therefore, even with the addition of water the ARD risk is low. There are no existing major rivers or streams within the Prospecting Right area and surface monitoring is therefore limited.

Long Term Impact on Ground Water:-

Within the study area, the quality of water can be affected by three major categories of physical and chemical stress factors:

- The potential discharge into the environment of wastewater generated by ore mining, and processing, and containing relevant pollutants – acidity, copper, iron, manganese, arsenic, cadmium, nickel, lead, mercury, selenium, chromium, sulphate, dissolved salts.
- The area's potential for a high degree of mineralisation.

- Potentially high sediment loads generated in the very intense rainfall events (short term).

Long-term Stability of Rehabilitated Land: One of the main aims of any rehabilitated ground should be to obtain a self-sustaining and stable end result. The concurrent monitoring of all material and replacement of topsoil where available should be ensured.

q) Period for which the Environmental Authorisation is required

The Mining Right application was made for 12 years

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 undertaking required to meet the requirements of this section is provided at the end of the EMPR and is applicable to both the Environmental Impact Assessment Report and the Environmental Management Programme Report.

s) Financial Provision

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

i) Explain how the aforesaid amount was derived

The total cost to rehabilitate and mitigate the Wepex site as it stands currently (risking premature rehabilitation) is estimated to be R 21 248 395,81 according to the DMR calculations.

ii) Confirm that this amount can be provided 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)

It is confirmed that the amount for outstanding rehabilitation can be provided from operating expenditure.

t) Deviations from the approved scoping report and plan of study

i) Deviations from the methodology used in determining the significance of potential environmental impacts and risks

(Provide a list of activities in respect of which the approved scoping report was deviated from, the reference in this report identifying where the deviation was made, and a brief description of the extent of the deviation)

Not applicable – No deviations from the methodology proposed in the Scoping Report.

ii) Motivation for the deviation

Not applicable – No deviations from the methodology proposed in the Scoping Report.

u) Other 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 **Appendix 2.19.1** and confirm that the applicable mitigation is reflected in 2.5.3; 2.11.6 and 2.12 therein)

Information taken out of the SIA by Ms Ingrid Snyman from Batho Earth, July 2021.

The operation will create a number of new employment opportunities and uplift the local community. The magnitude of this impact will depend on the number of people that will be employed and the number of contractors sourced. An influx of people into the area could possibly impact on safety and security of local residents. During the decommissioning and at closure of the site, staff will most likely be retrenched, resulting in people being unable to find new employment for a long period of time.

Economic slump of the local towns after site closure is not considered to be an associated potential impact, because there are numerous other mining operations in the region. However, income streams from wage bills as well as goods and services contracts (at all geographical levels) will come to an end, reducing the monetary income of individuals and operation-related businesses.

It is likely, however that there will be residual positive economic impacts that are not fully reversed with the closure of the site, and that the economy will not decline to its original level prior to the development of this project. This is because the operation will generate substantial income for the regional and local economy, both directly and indirectly, during its life.

In terms of the Social Impact Assessment findings derived from the Social Impact Assessment conducted by "Batho Earth Social and Environmental Consultants". The mining sector, followed by the agricultural sector, is the main employment sectors within the local study area. The mining industry's contribution to the GDP of TLM increased from R1,5bn in 2002 to R3,9bn in 2012.

During 2012 the mining industry employed 54.5% (6 648 persons) of the employed population.

Mining developments are usually perceived as a positive injection to the economic standard of an area as it could lead to further developments in the regional area. It is anticipated that the TLM would be positive towards the proposed development due to the additional employment creation and the positive economic spin-offs that could occur.

Local procurement could have some local economic benefits, should community members within the TLM be involved in the procurement of capital goods, consumables and services.
Targets for the procurement of capital goods, consumer goods and services should be set and action plans to meet these targets should be developed accordingly. These plans should include, but are not limited to, the development of Economic Empowerment (EE) policies, procedures and guidelines, as well as the development of a database of local small businesses (entrepreneurs and SMME's).

In terms of local contributions, mining legislation specifies that mining operations should contribute to the economic development of the affected local community as per a Social and Labour Plan (SLP). The 2018 Mining Charter targets an equity equivalent benefit to the minimum of 5% to be allocated to the socio-economic development of local communities. The Mining Works Programme (MWP) for this project must thus make provision for the local economic development over the lifetime of the project.

Through the SLP, the mine, will provide skills development opportunities for employees that could include learnerships, functional literacy and numeracy programmes, ABET programmes, career progression plans, up-skilling for hard to fill vacancies and management positions, bursary and internships and portable skills training. In an area such as the TLM, with relative low skill levels, this skills development will make a positive contribution to the overall socio-economic development of the resident communities.

Impact on Resource Use
The farm Gloucester where the mining activities are proposed has already been disturbed and prospecting has been undertaken on site. No agricultural activities have taken place on the property for quite some time. The impact on the land-use is thus negligible.

The TLM IDP stated that groundwater is mainly used for rural domestic water supplies, stock watering and water supplies to towns and settlements. Low rainfall patterns are also experienced over the area. Recharging of groundwater aquifers is therefore limited, and only small quantities can be abstracted on a

sustainable basis. Careful groundwater utilization is thus important in the area and constitutes the only source of water over much of the rural areas.

Energy and water infrastructure in the municipal area is under pressure in terms of challenges related to the provision of bulk infrastructure development, high electricity and water distribution losses as well as high municipal debts to Eskom and Sedibeng Water. The impact of mining on the groundwater sources can result in water service provision challenges for the TLM. The possible impact on the water quality and quantity would also always be of concern to the neighbouring farmers, property owners and the communities in close proximity to the mining area. Any negative impact on this resource use could result in negative impacts on the farming practices with subsequent financial losses, and possibly impact on the quality of life of the residents of these communities.

Health Related Risks

Concerns could revolve around the possible public health impact of the general mining activities due to possible air/dust pollution, as well as noise pollution and a possible impact on the water quality. Should it be found that any pollution occurs, the existing health services such as the clinics in Postmasburg, Boichoko and Postdene would come under additional pressure especially in light of the Covid-19 pandemic which also puts strain on the health services.

In mining areas there are further concerns relating to migrant employees bringing health risks and nowadays the threat of Covid-19 infection to small towns. Postmasburg and surrounds is already characterised by vulnerable households and inadequate public health services that cannot always effectively deal with the health risks associated with the pandemic. With regards to the proposed mining at Glosam, limited in-migration is anticipated. It will however remain the responsibility of mining companies to continue their support to surrounding communities to reduce vulnerability.

The storage of hazardous substances (diesel and explosives) on site furthermore creates safety risks. Even though all precautionary safety measures will be implemented with regards to the storage, transportation and handling of these substances, this remains a concern as there are limited firefighting services provided by the TLM. The residents are mainly reliant on the service provided by mining companies.

SOCIO-ECONOMIC IMPACTS DURING DECOMMISIONING AND POST-CLOSURE

Decommissioning refers to the actual closure of the mine, the dismantling of the infrastructure and/or replacement of the infrastructure with newer technology, as well as the final rehabilitation process.

Possible social impacts to be experienced during decommissioning (closure of the mine) could include the following:

- Job losses due to mine closure;

- Decline in the sustainability of the local economy as a result of the loss of employment, household income and capital investments;
- Reduced economic activities within the area with subsequent negative impacts on smaller businesses;
- A decline in the local economy would also have a direct impact on the financial status of the TLM;
- Negative impact on the revenue base of the TLM;
- Population changes and out-migration of people from the area, as well as relocation of families;
- Negative impact on the social fabric and social networks;
- A new class of jobseekers targeting other mines in the area;
- Skilled workers moving out of the area in search of employment elsewhere;
- Decrease in the quality of life of the surrounding communities due to the discontinuation of social development support and local economic development programmes;
- Negative impact on infrastructure development and maintenance;
- A change in community infrastructure;
- Disruptions and nuisance factors associated with the actual decommissioning such as noise, visual and traffic related impacts;
- Increased safety risks associated with the decommissioning of the infrastructure;
- Possible negative impact on the crime levels due to increased unemployment rate;
- Remnants of possible environmental impacts; and
- Remaining visual impact as a result of mining.

Decommissioning and its associated closure programmes must ensure that communities are not left stranded without alternative forms of livelihoods, with subsequent degradation of the communities' socio-economic quality of life.
As the timing with regards to decommissioning or the replacement of the infrastructure cannot be determined at this stage, it is recommended that a detailed Social Impact Assessment be undertaken at the time of decommissioning to determine the actual impacts on the changing social environment at that stage. No rating will thus be provided, but mitigation measures have been included as part of Section 11: Socio-economic Risk Management and Monitoring Plan.

THE NO-GO ALTERNATIVE

Should the proposed project not proceed, the status quo in terms of the existing social impacts in the area would therefore remain. The most significant social impact with regards to the no-go alternative relates to the loss in employment opportunities and the overall direct and indirect economic impacts for the region.

As Wepex Trading, through the SLP will be involved in various corporate social investment programmes it would impact on poverty alleviation as a result of such programmes. The potential loss in terms of employment and economic benefits to the local communities is considered as a critical negative impact.

The 'no-go alternative' should thus not be considered from a social point of view as the negative social impacts anticipated with the proposed mining project are deemed low. The negative impacts would further respond to mitigation as proposed. The proposed activities further fall within the mining rights area and the area is already characterised by and surrounded by various mining infrastructure.

Based on the social assessment, the following concluding remarks should be noted:

- From a social perspective it can be concluded that the socio-economic benefits associated with the project outweigh the negative social impacts, which mainly relate to intrusion impacts that can be successfully mitigated if appropriate and successful environmental management, as well as the strict implementation of pro-active mitigation and management measures are applied.
- There are a range of positive impacts associated with the proposed project, such as the creation of employment and income generation, local procurement and social development and services support, as well as the stimulation of local economic growth.
- There are however several potential negative socio-economic impacts of the proposed project that may affect surrounding landowners and communities. These negative impacts associated with the proposed project include the visual impact and possible impact on sense of place, nuisance factors (dust levels, noise and traffic movement), blasting and community safety impacts (health risks and concerns, and general community safety). These impacts would respond to mitigation.
- The proposed mining project is anticipated to facilitate economic benefits to the local area, currently faced with relative high rates of unemployment and poverty.
- Local labour must be prioritised in the recruitment process as part of the company's own recruitment policy or as part of the Contractor Management Plan, as this would assist in mitigating various social impacts, and it would also enhance the potential benefits of the proposed project to the local community members.
- Local procurement, especially during the operational phase, would have various trickle down positive socio-economic impacts on the beneficiary communities and local businesses. This aspect should thus be pursued as far as possible.
- Capacity building and skills training among employees are critical and would be highly beneficial to those involved, especially if they receive

portable skills to enable them to also find work elsewhere and in other similar environments.

- Socio-economic issues and concerns could arise during the implementation of the project. These should be thoroughly dealt with taking the sensitivities into consideration.

From a socio-economic perspective it is concluded that the project can be supported. It is therefore recommended that the development of the proposed Glosam Mine on the farm Gloucester be approved by the relevant authorities. The socio-economic benefits associated with the mine outweigh the negative social impacts. It is thus concluded that the proposed project is acceptable from a social point of view, provided that mitigation measures are implemented.

(2) Impact on any national estate referred to in section 3(2) of the National Heritage Resources Act

(Provide the results of investigation, assessment, 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 National Heritage Resources Act, 1999 (Act No. 25 of 1999) 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)

Prof Anton van Vollenhoven from Archaetnos Culture & Cultural Resource Consultants BK 98 09854/23 has been appointed by Wepex to provide an Heritage Impact Assessment (**Annexure 5)** in order to highlight the Heritage of the proposed prospecting area, and to determine the possible impact of prospecting on the Heritage of the application area.

Findings:

During the survey twenty-one sites of cultural heritage significance were identified within the immediate project area.

Recommendations:

- Site 12 (farm yard) and 15 and 20 (railway sidings) are all outside of the development boundary. Site 12 has no cultural heritage value and this report is seen as ample mitigation. The structures are younger than 60 years. It needed, may be demolished without a permit from SAHRA.
- The railway sidings receive a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction if needed.
- The remains of industrial building (site 6), the base of a water reservoir (site 9), the office complex remains (site 10), various remains of brick buildings (site 11) and the farm yard (site 18) has no cultural heritage value. This report is seen as ample mitigation. The structures are younger than 60 years and in a very poor condition. It may be demolished without a permit from SAHRA.

- The foundation (site 5), concrete building remains (site 16) and metal framework of an industrial building (site 21) has no cultural heritage value and may therefore be demolished. Since it is older than 60 years, a permit would be required from the SAHRA.
- For the three mine houses (site 4) the field rating of the site is Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. The mine does not currently have any plans that will impact here. Also, since the buildings are younger than 60 years, no permit is currently required.
- The old hostel area and recreation hall (site 2) is regarding as having a field rating of Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction. As both structures are younger than 60 years, no permit from SAHRA is needed.
- The field rating for the ore loading bays (site 7, 14 and 19) Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction. Since these sites are all younger than 60 years and in a very poor condition, it may be demolished without a permit from SAHRA.
- The field rating of the Glosam Mine Village (site 3) is Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.
- The village is older than 60 years and is regarded as being very unique and typical of such a mining village. Therefore at least the first sixteen houses, social area, hall and other structure within the inner circle of the village should be preserved. It may however be utilized for another purpose, being a youth camp, holiday resort or guest house. It would be good to also preserve the outer circle as it is part of the original lay-out plan, although most of the buildings are much younger.
- The mine does not intend to do any work here at present. If needed, for any changes to the buildings older than 60 years, a permit would be required from the SAHRA.
- The Miners boxes (sites 1, 13 and 17) are regarded as having a field rating of Local Grade IIIB. The sites should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.
- In this case, site 1 should be kept intact and preserved, meaning that a management plan should be drafted for the site. It should also be fenced in.
- Sites number 13 and 17 may be demolished, but only after complete documentation thereof and only if site number 1 remains intact. This documentation includes doing test excavations and drawing a site map.

- The loading platform (site 8) has a field rating of Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. As it is typical of a certain era in the mining industry, it should be preserved, perhaps as part of an interpretive route. It may be utilized in further mining activities, but a management plan would be needed for that.
- The proposed development may continue, but only after receiving the necessary approval from SAHRA.
- It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.

  In This regards the following **'Chance find Procedure'** should be followed:

  1. Upon finding any archaeological or historical material all work at the affected area must cease.
  2. The area should be demarcated in order to prevent any further work there until an investigation has been completed.
  3. An archaeologist should be contacted immediately to provide advice on the matter.
  4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
  5. SAHRA's APM Unit may also be notified.
  6. If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.
  7. The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.
  8. Work on site will only continue after removal of the archaeological/ historical material was done.

v) 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 **Appendix 4**)

There are no alternatives, as the application area applied for is the area where the applicant has proven iron ore and manganese and has found potential for an iron ore and manganese mining operation.

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 of the EAP are already included in PART A, section 1(a) herein as required)

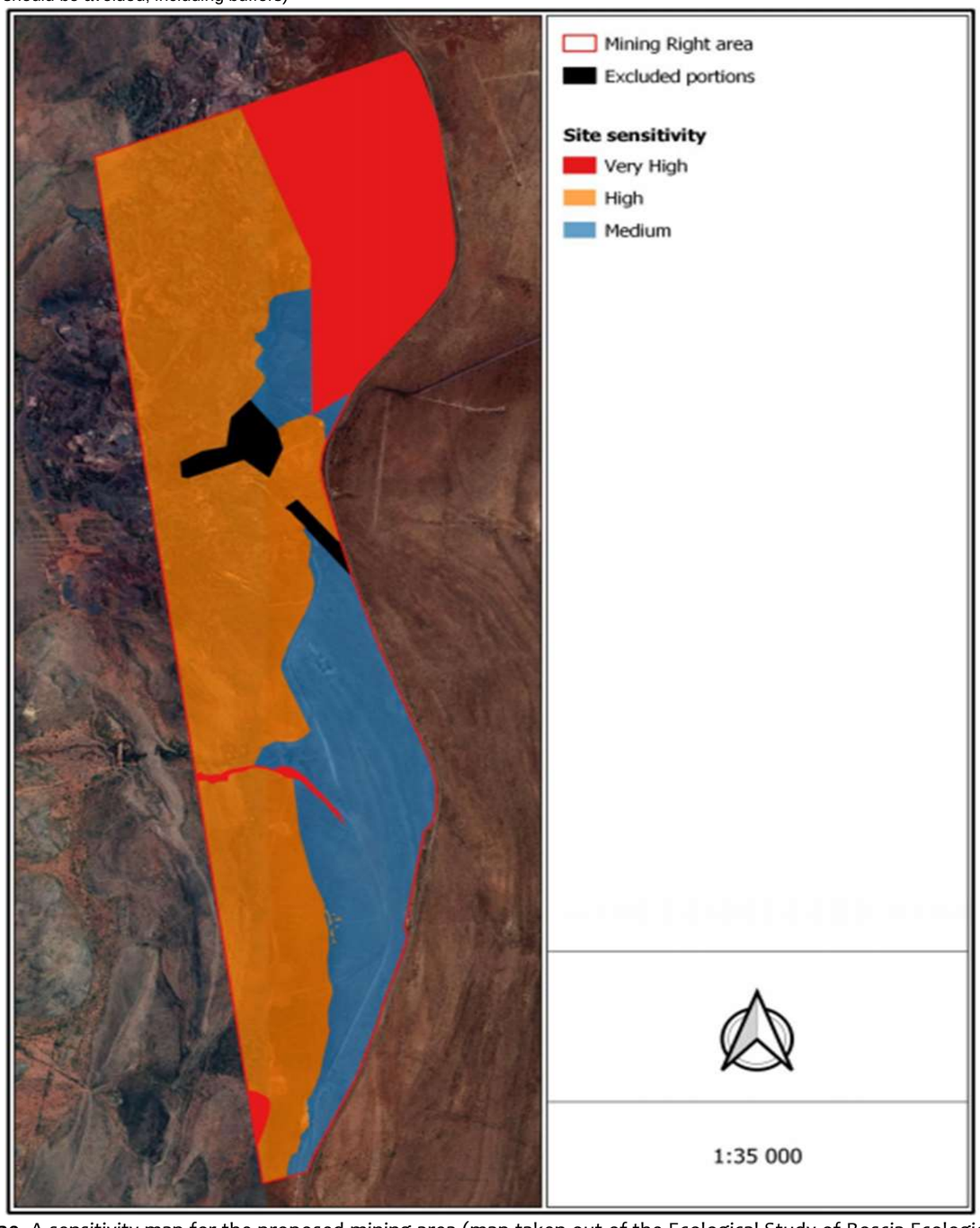
I hereby confirm that the requirement for the provision of the details and expertise of the EAP is already included in Part A as required.

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 management programme is already included in PART A, section (1)(h) herein as required)

I hereby confirm that the requirement for the aspects of the activity is already included in Part A as required.

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)



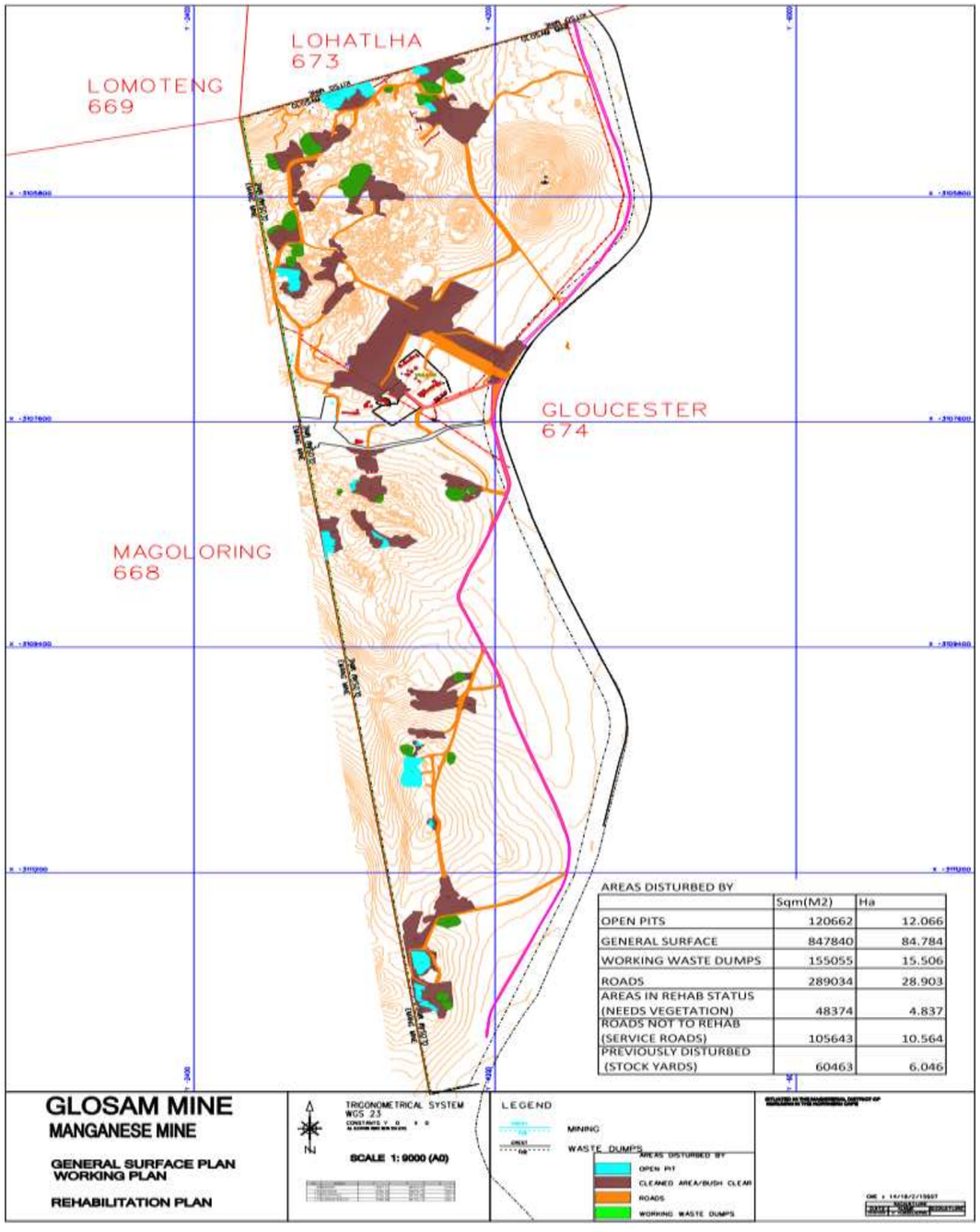


Figure 30. A sensitivity map for the proposed mining area (map taken out of the Ecological Study of Boscia Ecological Consulting, January 2021).

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 environment described in 2.4 herein)

The main closure objectives of the planned mining operation are:

- To restore the site to its current land capability in a sustainable manner.
- To prevent the sterilization of any manganese and iron reserves.
- To prevent the establishment of any permanent structures or features.
- To manage and limit any impact to the surface and groundwater aquifers in such a way that an acceptable water quality and yield can still be obtained when a closure certificate is issued.
- To establish a stable and self-sustainable vegetation cover.
- To limit and rehabilitate any erosion features and prevent any permanent impact to the soil capability.
- To limit and manage the visual impact of the mining activities.
- To safeguard the safety and health of humans and animals on the site.
- To close the mining operation efficiently, cost effectively and in accordance with Government Policy.

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas should be left in a stable, self-sustainable state. Proof of this should be submitted at closure. Specific objectives include:

Rehabilitation of infrastructure areas

The objectives for the removal of infrastructure and the subsequent rehabilitation of the areas they occupied include:

- To ensure that infrastructure identified for removal is successfully demolished and removed.
- To ensure that infrastructure identified to remain after mine closure is maintained until the issue of a closure certificate.
- The removal, decommissioning and disposal of all mining infrastructure, will comply with all conditions contained in the MPRDA. To this end, decommissioning and rehabilitation of all infrastructure areas will follow the following principles:
- The plant and associated disused infrastructure will be dismantled or demolished. Any building foundations will be removed and land exposed to the demolition and dismantling of infrastructure and all other disturbed land will be rehabilitated.
- Rubble will be disposed of at a suitable site. The site will be selected in consultation with DENC.

- Any surface water management infrastructure will be maintained to ensure they are stable and functional.
- Just before closure, when disturbed land has been rehabilitated and erosion is controlled by vegetation cover, all disused surface water management facilities will be decommissioned.

Mine Residue Dump

The objectives pertaining to the effective management and rehabilitation of the Mine Residue Dumps include:

- To ensure that the Mine Residue Dump deposits are stable and that there is an acceptably low risk of failure of these deposits during the decommissioning phase and following mine closure;
- To establish self-sustainable vegetation cover on the Mine Residue dump so that the visual impact of the Mine Residue dump is improved and in order to prevent erosion.

Management principles pertaining to Mine Residue dump include:

- The Mine Residue dump will continuously be inspected by a suitable qualified professional engineer to ensure their stability. If they are unstable, the appropriate remedial measures will be implemented.
- Inspection and monitoring should continue until a suitable qualified profession engineer has confirmed the long-term stability of the Mine Residue dump.
- Any infrastructure or facilities that serve the Mine Residue dump will be maintained to ensure that they are both stable and functional.

Maintenance

The necessary agreements and arrangement will be made by the Wepex to ensure that all natural physical, chemical and biological processes for which a closure condition were specified are monitored until they reach a steady state or for three (3) years after closure or as long as deemed necessary at the time.

- Such processes include erosion of the Mine Residue dump, rehabilitated surfaces, surface water drainage, air quality, surface water quality, ground water quality, vegetative re-growth, weed encroachment.
- The closure plan will be reviewed yearly.
- Rehabilitation of the land will be maintained until a closure certificate is granted or until the land use is regarded as sustainable.
- All rehabilitated areas will be monitored and maintained until such time as required to enable the mine to apply for closure of these different areas.

Performance assessments

As per the MPRDA and associated Regulations, as well as NEMA and associated Regulations, this Environmental Management Programme will be continually

assessed in terms of its appropriateness and adequacy. In order to achieve this, Wepex will undertake the following:

- Implement the necessary monitoring programmes, as discussed as part of this EMPR;
- Conduct performance assessments of this EMPR; and
- Compile and submit the afore-mentioned performance assessment reports to the DMR. The frequency of the performance assessments will be annually. An independent and competent person will undertake all performance assessments.

Decommissioning and closure objectives

The key aim decommissioning and closure is to ensure that all the significant impacts are ameliorated. All rehabilitated areas will be left in a stable, self-sustainable state. Proof of this will be submitted at closure. Specific objectives include:

- To identify potential post-closure land uses in consultation with the surrounding land owners and land users. This should be done during the operational phase of the mine;
- Rehabilitate disturbed land to a state suitable for its post-closure uses;
- Rehabilitate disturbed land and mine residue deposits to a state that facilitates compliance with applicable environmental quality objectives;
- Limit the impact on staff whose positions become redundant at the time of mine closure, as addressed in the SLP;
- Keep relevant authorities informed of the progress of the decommissioning phase;
- Submit monitoring data to the relevant authorities;
- Maintain required pollution control facilities and rehabilitated land until closure.

Negative economic impacts

The objective is to alleviate the negative socio-economic impacts that will result from mine closure. Management principles to achieve this include:

- Wepex will undertake a carefully planned step-wise decommissioning process.
- Closure planning will form an integral part of mine planning.
- Strategies for sustainable development have been and will continue to be developed by the project in collaboration with district and local authorities, local businesses and other interested parties. Early warning of impending closure will be given to IAPs.
- In conjunction with long-term closure planning, the mine will actively participate in regional and local planning to enhance the economic benefits of the project through development of alternative forms of income generation.

- Wepex will initiate and participate in regional planning exercises that will mitigate the impacts of closure of the mine, the local and regional economies and associated abandonment of community infrastructures surrounding the mine.
- The mine will fulfil the requirements for closure.

ii) 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

There won't be a need for this, as based on the specialist reports. The project area is exceptionally dry, and it can be expected that little to no discharge will take place from mining activities which will subsequently reduce the risks of potential pollution sources. Also, the presence of sulphide material in the ore and waste is low; therefore, even with the addition of water the ARD risk is low. There are no existing major rivers or streams within the Prospecting Right area and surface monitoring is therefore limited.
Dewatering operations should be planned and designed carefully, with abstraction of water carefully controlled to minimise cone of depression impacts. However, the pit depths at Glosam are expected to be relatively shallow (15-20m bench), which may be just above the water table.

iii) Potential risk of Acid Mine Drainage (Indicate whether or not the mining can result in acid mine drainage)

Acid Mine Drainage:-
Ore mining and processing activities have potential for generating highly acidic wastewater and high concentrations of heavy metals and other toxic contaminants. In this environment, this type of pollution may be identified as Acid Rock Drainage (ARD). The collection of such pollutants involves interception ditches, catchment dams and ponds.

The project area is exceptionally dry, and it can be expected that little to no discharge will take place from mining activities which will subsequently reduce the risks of potential pollution sources. Also, the presence of sulphide material in the ore and waste is low; therefore, even with the addition of water the ARD risk is low. There are no existing major rivers or streams within the Prospecting Right area and surface monitoring is therefore limited.

Long Term Impact on Ground Water:-
Within the study area, the quality of water can be affected by three major categories of physical and chemical stress factors:

- The potential discharge into the environment of wastewater generated by ore mining, and processing, and containing relevant pollutants –

acidity, copper, iron, manganese, arsenic, cadmium, nickel, lead, mercury, selenium, chromium, sulphate, dissolved salts.

- The area's potential for a high degree of mineralisation.
- Potentially high sediment loads generated in the very intense rainfall events (short term).

iv) Steps taken to investigate, assess, and evaluate the impact of acid mine drainage

The project area is exceptionally dry, and it can be expected that little to no discharge will take place from mining activities which will subsequently reduce the risks of potential pollution sources. Also, the presence of sulphide material in the ore and waste is low; therefore, even with the addition of water the ARD risk is low. There are no existing major rivers or streams within the Prospecting Right area and surface monitoring is therefore limited.

v) Engineering or mine design solutions to be implemented to avoid or remedy acid mine drainage

Drainage Channels

Following estimations of the design flows for each diversion channel, the channels have been sized using Manning's Equation to ensure that the flow capacity of the channel is sufficient to convey the 1:50-year flow. The recommended channel sizes are presented in Table 7, together with the typical cross-section through the channel shown in Figure 31.

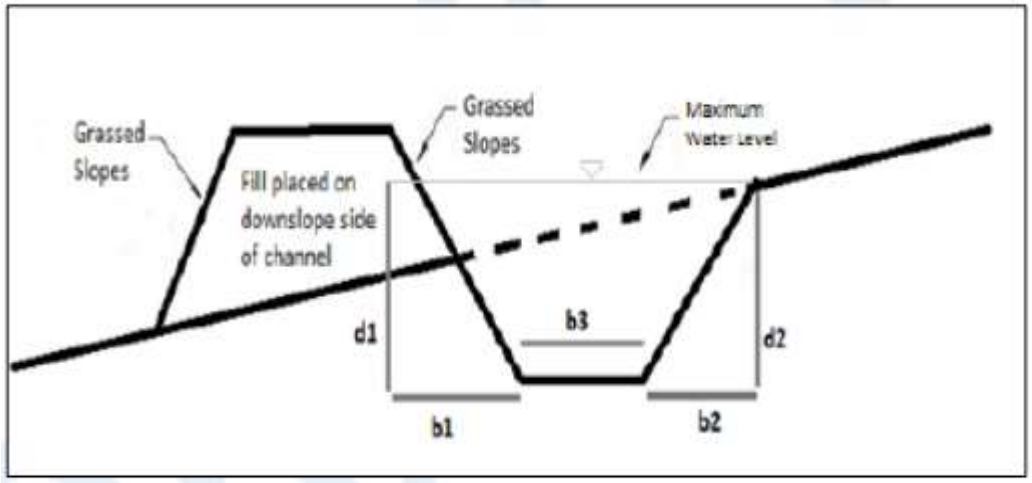


Figure 31. Stormwater Diversion Channel cross-section.

Proposed Stormwater Channel Management

- All conceptual diversion channels have been sized to divert runoff for the 50-year return period flood peak, as per GN 704.
- Clean stormwater should be prevented from entering into the mine area footprints through upstream diversion berms; this will be in addition to the perimeter berms that are normally part of infrastructure designs.

- At water release points, where necessary, flow dissipation measures must be installed at the ends of diversion channels to help prevent/minimise erosion by dissipating the energy from those flows.

The capacity of dirty water containment facilities is based on the containment of the 1:50-year design rainfall (24-hour) of 135.7 mm. Stormwater from the PCD must be pumped to the plant for reuse. The remaining amount of water in the dams may be pumped for dust suppression around the mine and stockyards.

vi) Measures that will be put in place to remedy any residual or cumulative impact that may result from acid mine drainage

Stockpiles and dumps should be kept within their defined footprints, and be underlain by a floor of fine, highly impervious waste material which minimises downward percolation of acidic water. However, due to the relative insolubility of iron and manganese in water, and the absence of significant sulphides which cause Acid Mine Drainage (AMD) this is expected to be an impact of minor significance.

vii) Volumes and rate of water use required for the mining, trenching or bulk sampling operation

Wepex Trading secured water from the Sedibeng Water pipeline for use on the mine. The surrounding areas rely on groundwater for both domestic and livestock watering purpose. Water will be used for dust suppression in the mining area and on the roads when hauling and transporting material to the mining plant.

During the creation of an open pit, if the water table is above the floor elevation of the open pit, groundwater will percolate into the pit, hindering mine operations. To eradicate this issue, the mine will continuously pump water out of the pit, and also drill "Dewatering Boreholes" around open pits to pump large amounts of water out of the aquifer immediately surrounding the pit. If not carefully managed, this operation can lead to excessive drawdown of the water table, so much so that surrounding users may be affected.

Dewatering operations should be planned and designed carefully, with abstraction of water carefully controlled to minimise cone of depression impacts. However, the pit depths at Glosam are expected to be relatively shallow (15-20m bench), which may be just above the water table.

viii) Has a water use licence been applied for?

A WULA application has been prepared and submitted.

ix) Impact to be mitigated in their respective phases

Measure to rehabilitate the environment affected by the undertaking of any listed activity

ACTIVITY Whether listed or not listed. (E.g. 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…etc…etc.).	**PHASE** of operation in which activity will take place. State; Planning and design, Pre-Construction' Construction, Operational, Rehabilitation, Closure, Post closure.	**SIZE AND SCALE** of disturbance (volumes, tonnages and hectares or m²)	**MITIGATION MEASURES** (describe how each of the recommendations in herein will remedy the cause of pollution or degradation and migration of pollutants)	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)	**TIME PERIOD FOR IMPLEMENTATION** Describe the time period when the measures in the environmental management programme must be implemented Measures must be implemented when Required. With regard to Rehabilitation specifically this must take place at the earliest opportunity. .With regard to Rehabilitation, therefore state either:-.. Upon cessation of the individual activity or. Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.
Processsing Plant Material excavated from the trenches and historical dump cuttings will be selected and processed through a crush-and-screen processing plant. Mineralized material is delivered to the plant area a point within 50m from the front end	Construction Commissioning Operational Decommissioning Closure	0.5 ha Steel, concrete, electric wires	Access control Maintenance of processing plant Dust control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills		Removal of processing plant upon closure of mining right.

of the mobile plant. The material is then fed with earthmoving equipment into the mobile plant's vibrating feeder bin which then feeds a crusher. The crusher crushes the ore down to smaller fractions. This material is then fed into the mobile plant's multiple deck screen. The screen separates different size fractions which are then temporarily stockpiled. From the stockpiles the material is loaded onto independent transport contractor tipper trucks which transport the material to the market after being weighed on a weighbridge.			Rip disturbed areas to allow re-growth of vegetation cover		

Ablution facilities	Construction Commissioning Operational Decommissioning Closure	This area is included in the office footprint area.	Maintenance of Chemical Toilets Removal of chemical toilets upon closure		Removal of ablution facilities upon closure of the Mining Right.
Clean & Dirty water systems: Berms	Construction Commissioning Operational Decommissioning Closure	This area also includes the re-fuel and lubrication station, wash bay and office area.	Maintenance of berms and trenches Oil traps used in relevant areas. Drip trays used. Immediately clean hydrocarbon spill.		Upon cessation of the individual activity (continuous rehabilitation)
Fuel Storage facility (Diesel tanks)	Construction Commissioning Operational Decommissioning Closure	5 196m² Concrete, bricks, and steel	Maintenance of diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point Immediately clean hydrocarbon spill.		Removal of diesel tanks upon closure of Mining Right.
Mining Area	Commissioning Operational Decommissioning Closure	Provision is made for a maximum footprint of 350 hectares of excavations.	No dumping of materials prior to approval by exploration geologist; Proper planning of excavations Access control Dust control and monitoring Noise control and monitoring		Upon cessation of the individual activity (continuous rehabilitation)

			Continuous rehabilitation Stormwater run-off control Immediately clean hydrocarbon spill Drip trays Dump control and monitoring Erosion control		
Salvage yard (Storage and laydown area)	Construction Commissioning Operational Decommissioning Closure	2000m² or 2 ha No construction material, area to be levelled with a grader and fenced with a gate and access control	Access control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill		Removal of fence around salvage yard and ripping of salvage yard area upon closure of the Mining Right.
Waste disposal site (domestic and industrial waste):	Construction Commissioning Operational Decommissioning Closure	7 x 20m² = 140m²	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals		Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of Mining Right.
Roads (both access and haulage road on the mine site):	Construction Commissioning Operational Decommissioning Closure	Additional mine haul road = 160 000m²	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control		Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the Mining Right.

			Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover		
Workshop and Wash bay	Construction Commissioning Operational Decommissioning Closure	245m² Concrete and Steel	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills		Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of Mining Right.
Water distribution Pipeline	Construction Commissioning Operational Decommissioning Closure	HDPE Pipes	Maintain water pipeline and structures		Removal of pipeline upon closure of the Mining Right.
Water tanks:	Construction Commissioning Operational Decommissioning Closure	3m X 3m = 9m²	Maintain water tanks and structures		Removal of water tank and steel structure upon closure of the Mining Right.

e) Impact Management Outcomes

(A description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph()

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**ASPECTS AFFECTED**	**PHASE** **In which impact is anticipated** **(e.g. construction, commissioning, operational, Decommissioning, closure, post closure)**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**STANDARD TO BE ACHIEVED** **(impact avoided, noise levels, dust levels, rehabilitation standards, end use objectives) etc.**
Processing Plant	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Air Quality Fauna Flora Noise Soil Surface water Safety	Construction Commissioning Operational Decommissioning Closure	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components;	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Develop a mechanism to record and respond to complaints.	
Ablution facilities	Soil contamination Possible Groundwater contamination	Soil Groundwater	Construction Commissioning Operational Decommissioning Closure	Maintenance of sewage facilities on a regular basis. Removal of container on closure	Minimize the potential for a chemical spill on soil, which could infiltrate to groundwater.
Clean & Dirty water systems:	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	Soil Groundwater Surface Water	Construction Commissioning Operational Decommissioning Closure	The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	Safety ensured. Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Soil Groundwater Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that	Minimize potential for hydrocarbon spills to infiltrate into groundwater. Rehabilitation standards and closure objectives to be met.

				they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	
Mining Area.	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Air quality Fauna Flora Groundwater Noise and vibration Soil Surface Water Topography Safety	Commissioning Operational Decommissioning Closure	Access control Dust control and monitoring Noise and vibration control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans;	Safety ensured. Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				Installing suitable mufflers on engine exhausts and compressor components; Installing vibration isolation for mechanical equipment; Develop a mechanism to record and respond to complaints. Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection or fragmentation of any important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mine site that are not part of the demarcated	

				development area should be considered as a no go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna	

				and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint. The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed; and	

				Maintenance of firebreaks. It will be necessary to divert storm water around dump areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the drainage lines. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.	
Salvage yard (Storage and laydown area)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna	Fauna Flora Groundwater Soil Surface Water	Construction Commissioning Operational Decommissioning Closure	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Minimize potential for hydrocarbon spills to infiltrate into groundwater Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

	Soil contamination Surface disturbance Surface water contamination				
Product Stockpile area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Surface disturbance	Air Quality Fauna Flora Noise Soil Surface Water	Commissioning Operational Decommissioning Closure	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing acoustic Installing vibration isolation for mechanical equipment;	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.

				Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	
Waste disposal site (domestic and industrial waste):	Groundwater contamination Contamination of soil Surface water contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Storage of Waste within receptacles Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met.
Roads (both access and haulage road on the mine site):	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Air quality Fauna Flora Noise and vibration Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives met. Erosion potential minimized.

	Surface disturbance			Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components; Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least	

				monthly to check that the associated water management infrastructure is effective in controlling erosion.	
Workshop and Wash bay	Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Groundwater Soil Surface water	Construction Commissioning Operational Decommissioning Closure	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water distribution Pipeline	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Rehabilitation standards and closure objectives to be met. Erosion potential minimized.
Water tanks:	Surface disturbance	Fauna Flora Surface Water	Construction Commissioning Operational Decommissioning Closure	Maintain water tanks and structures	Safety ensured. Rehabilitation standards and closure objectives to be met.

f) Impact Management Actions

(A description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraph (c)

ACTIVITY **Whether listed or not listed.**	**POTENTIAL IMPACT** **(e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater, contamination, air pollution)….**	**MITIGATION TYPE** (modify, remedy, control or stop) through (e.g. noise control measures, storm water control, dust control, rehabilitation, design measures, blasting controls, avoidance, relocation, alternative activity	**TIME PERIOD FOR IMPLEMENTATION** **Describe the time period when the measures in the environmental management programme must be implemented. Measures must be implemented when required.** **With regard to Rehabilitation specifically this must take place at the earliest opportunity.** **With regard to Rehabilitation, therefore state either:- Upon cessation of the individual activity or Upon the cessation of mining, bulk sampling or alluvial diamond prospecting as the case may be.**	**COMPLIANCE WITH STANDARDS** (A description of how each of the recommendations in 2.11.6 read with 2.12 and 2.15.2 herein will comply with any prescribed environmental management standards or practices that have been identified by Competent Authorities)
Processing Plant: Material excavated from the trenches and historical dump cuttings will be selected and processed through a crush-and-screen processing plant. Mineralized material is delivered to the plant area a point within 50m from the front end of the mobile plant. The material is	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Access control Maintenance of processing plant Dust control and monitoring Noise and vibration control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Installing silencers for fans; Installing suitable mufflers on engine exhausts and compressor components;	Removal of processing plant upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

then fed with earthmoving equipment into the mobile plant's vibrating feeder bin which then feeds a crusher. The crusher crushes the ore down to smaller fractions. This material is then fed into the mobile plant's multiple deck screen. The screen separates different size fractions which are then temporarily stockpiled. From the stockpiles the material is loaded onto independent transport contractor tipper trucks which transport the material to the market after being weighed on a weighbridge.		Installing vibration isolation for mechanical equipment; Re-locate noise sources to areas which are less noise sensitive, to take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.		• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

Ablution Facilities	Soil contamination Groundwater contamination	Maintenance of sewage facilities on a regular basis.	Removal of facility upon closure of the Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres

				to the contents of the EIA and EMPr documents.
Clean & Dirty water systems: Berms	Surface disturbance Groundwater Contamination Soil contamination Surface water contamination	It will be necessary to divert storm water around dump areas by construction of a temporary gravel cut-off berm that will prevent surface run-off into the Mining area. Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away. Maintenance of trenches Monitoring and maintenance of oil traps in relevant areas. Drip trays used. Immediately clean hydrocarbon spill. Linear infrastructure such as roads and pipelines will be inspected at least monthly to	Upon cessation of the individual activity (continuous rehabilitation) Levelling of storm water berms upon closure of Mining Right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum

		check that the associated water management infrastructure is effective in controlling erosion.		Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Fuel Storage facility (Diesel tanks)	Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance	Maintenance of Diesel tanks and bund walls. Oil traps Drip tray at re-fuelling point. Refuelling must take place in well demarcated areas and over suitable drip trays to prevent soil pollution. Spill kits to clean up accidental spills from earthmoving machinery must be well-marked and available on site. Workers must undergo induction to ensure that they are prepared for rapid clean-up procedures. All facilities where dangerous materials are stored must be contained in a bund wall. Vehicles and machinery should be regularly serviced and maintained.	Removal of diesel tanks upon closure of Mining Right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto.

				Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Mining Area	Dust Noise Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Access control Dust control and monitoring Continuous rehabilitation Storm water run-off control Immediately clean hydrocarbon spill Drip trays Dump stability control and monitoring Erosion control Noise control Well maintained equipment Selecting equipment with lower sound power levels; To take advantage of distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Mining activities must be planned, where possible in order to encourage (faunal dispersal) and should minimise dissection	Upon cessation of the individual activity (continuous rehabilitation)	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the

		or fragmentation of any important faunal habitat type. The extent of the mining area should be demarcated on site layout plans (preferably on disturbed areas or those identified with low conservation importance). No construction personnel or vehicles may leave the demarcated area except those authorized to do so. Those areas surrounding the mining site that are not part of the demarcated development area should be considered as a no-go zone for employees, machinery or even visitors. Appointment of a full-time ECO must render guidance to the staff and contractors with respect to suitable areas for all related disturbance, and must ensure that all contractors and workers undergo Environmental Induction prior to commencing with work on site. All those working on site must undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises		contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

		and owls which are often persecuted out of superstition. All those working on site must be educated about the conservation importance of the fauna and flora occurring on site. The environmental induction should occur in the appropriate languages for the workers who may require translation. Reptiles and amphibians that are exposed during the clearing operations should be captured for later release or translocation by a qualified expert. Employ measures that ensure adherence to the speed limit. Careful consideration is required when planning the placement for stockpiling topsoil and the creation of access routes in order to avoid the destruction of habitats and minimise the overall mining footprint. The Footprint areas of the mining activities must be scanned for Red Listed and protected plant species prior to mining; Snares & traps removed and destroyed; and Maintenance of firebreaks.		

		Excavations, where and when applicable, should be rehabilitated concurrently as mining progresses. The re-vegetation of disturbed areas is important to prevent erosion and improve the rate of infiltration. Erosion channels that may develop before vegetation has established should be rehabilitated by filling, levelling and re-vegetation where topsoil is washed away.		
Salvage yard (Storage and laydown area)	Surface Water contamination Groundwater contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Access Control Maintenance of fence Storm water run-off control Immediately clean hydrocarbon spill	Removal of fence around salvage yard and ripping of salvage yard area upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

				• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Product Stockpile area	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination Surface disturbance Surface water contamination	Dust Control and monitoring Noise control and monitoring Drip trays Storm water run-off control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints.	Dust levels minimized Minimize potential for hydrocarbon spills to infiltrate into groundwater Noise levels minimized Rehabilitation standards and closure objectives to be met. Erosion potential minimized	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees.

				• The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Waste disposal site (domestic and industrial waste):	Groundwater contamination Surface Water contamination Contamination of soil Surface water contamination	Storage of Waste within receptacles Storm water control Ground water monitoring Storage of hazardous waste on concrete floor with bund wall Removal of waste on regular intervals	Removal of waste receptacles, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto.

				• Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Roads (both access and haulage road on the mine site):	Dust Surface Water contamination Groundwater contamination Noise Removal and disturbance of vegetation cover and natural habitat of fauna	Maintenance of roads Dust control and monitoring Noise control and monitoring Speed limits Storm water run-off control Erosion control Immediately clean hydrocarbon spills Rip disturbed areas to allow re-growth of vegetation cover Noise control Well maintained equipment Selecting equipment with lower sound power levels; To take advantage of	Upon cessation of the individual activity (continuous rehabilitation) Ripping of roads upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's Management and staff must be trained to understand the

	Soil contamination Surface disturbance	distance and natural shielding; Taking advantage during the design stage of natural topography as a noise buffer; Develop a mechanism to record and respond to complaints. Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.		contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Workshop and Wash bay	Surface Water contamination Removal and disturbance of vegetation cover and natural habitat of fauna Soil contamination	Concrete floor with oil/water separator Storm water run-off control Immediately clean hydrocarbon spills	Removal of wash bay equipment, breaking and removal of rubble from the concrete floors and bund walls upon closure of mining right	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

				Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water distribution Pipeline	Surface disturbance	Monitor pipeline for water leaks Maintenance of pipeline Linear infrastructure such as roads and pipelines will be inspected at least monthly to check that the associated water management infrastructure is effective in controlling erosion.	Removal of pipeline upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's • SOP's

				Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.
Water tanks:	Surface disturbance	Maintain water tanks and structures	Removal of water tank and steel structure upon closure of the mining right.	The following must be placed at the site and is applicable to all activities: • Relevant Legislation; • Acts; • Regulations • COP's

				• SOP's Management and staff must be trained to understand the contents of these documents and to adhere thereto. • Environmental Awareness training must be provided to employees. • The operation must have a rehabilitation and closure plan. • Management and staff must be trained to understand the contents of these documents, and to adhere thereto. Biennial performance Assessment Reports and annual quantum Calculations must be done to ensure that the operation adheres to the contents of the EIA and EMPr documents.

i) 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 Regulation 22(2)(d) as described in 2.4 herein.

Closure:

The main closure objective of this operation is to rehabilitate the mined areas in such a way to ensure that the rehabilitated topographical landscape would blend in with the surrounding landscape, would not pose a safety hazard for human and animal, but at the same time allow a certain alternative land use. Establish a self-sustaining and stable vegetation cover in order to mitigate the visual impact, to control erosion and to create some habitat for animals. The rehabilitated environment also needs to be aesthetically acceptable according to the principle of BPEO.

Wepex will ensure that the site is:

- Neither a danger to public health and safety nor to animal health and safety.
- Not a source of any pollution.
- Stable (ecological and geophysical).
- Rehabilitated to the state that is suitable for the predetermined and agreed land use.
- Compatible with the surrounding biophysical environment.
- A sustainable environment.
- Aesthetically acceptable.
- Not an economic, social or environmental liability to the local community or the state now or in the future.

Wepex will ensure that the physical and chemical stability of the rehabilitated mining site will be such that risk to the environment is not increased by naturally occurring forces to the extent that such increased risk cannot be contended with by the installed measures.

Wepex will subscribe to the optimal exploitation and utilization of South Africa's mineral resources (iron ore and manganese).

Wepex will ensure that the mining site is closed efficiently and cost effectively.

Wepex will ensure that the operation is not abandoned but closed in accordance with the relevant requirements.

Wepex will ensure that the interest of all interested and affected parties will be considered.

Wepex will ensure that the all-relevant legislation regarding mining closure will be adhered to, and all relevant application procedures followed.

The management of environmental impacts:
With regard to the extension, the mitigation of all environmental impacts on all applicable aspects uses BPEO (Best practical environmental option) principles.

- Optimal utilization and maintenance of existing mine facilities in a well-planned manner.
- To take care that no new land surface, habitats of vegetation and animals are destroyed, disturbed or alienated unnecessarily.
- To contain and prevent any pollution (physical and chemical) from the mining operation within structures, facilities provided therefore.
- To ensure an effective surface run-off control system in order to deal with the separation of clean and dirty water environment.
- The sustainable and responsible utilization (re-use) of all water resources and the prevention of pollution thereof.
- The sustainable rehabilitation of the mining site (bulk sampling sites, topsoil- & overburden stockpiles, rest of terrain) in order to address all environmental impacts as far as practical.

Historical and Cultural aspects:

The mining right area has been disturbed by previous mining activities.

A number of sites of cultural (archaeological and historical) heritage significance were found in the area. Some of the historical sites are related to past mining activities on the area.

Findings:
During the survey twenty-one sites of cultural heritage significance were identified within the immediate project area.
Recommendations:
Site 12 (farm yard) and 15 and 20 (railway sidings) are all outside of the development boundary. Site 12 has no cultural heritage value and this report is seen as ample mitigation. The structures are younger than 60 years. It needed, may be demolished without a permit from SAHRA.

The railway sidings receive a field rating of Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction if needed.

The remains of industrial building (site 6), the base of a water reservoir (site 9), the office complex remains (site 10), various remains of brick buildings (site 11) and the farm yard (site 18) has no cultural heritage value. This report is seen as ample mitigation. The structures are younger than 60 years and in a very poor condition. It may be demolished without a permit from SAHRA.

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The foundation (site 5), concrete building remains (site 16) and metal framework of an industrial building (site 21) has no cultural heritage value and may therefore be demolished. Since it is older than 60 years, a permit would be required from the SAHRA.

For the three mine houses (site 4) the field rating of the site is Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction at the discretion of the relevant heritage authority without a formal permit application, subjected to the granting of Environmental Authorisation. The mine does not currently have any plans that will impact here. Also, since the buildings are younger than 60 years, no permit is currently required.

The old hostel area and recreation hall (site 2) is regarding as having a field rating of Local Grade IIIC. The description in this phase 1 heritage report is seen as sufficient recording and it may be granted destruction. As both structures are younger than 60 years, no permit from SAHRA is needed.

The field rating for the ore loading bays (site 7, 14 and 19) Local Grade IIIC. The description in the phase 1 heritage report is seen as sufficient recording and it may be granted destruction. Since these sites are all younger than 60 years and in a very poor condition, it may be demolished without a permit from SAHRA.

The field rating of the Glosam Mine Village (site 3) is Local Grade IIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.

The village is older than 60 years and is regarded as being very unique and typical of such a mining village. Therefore at least the first sixteen houses, social area, hall and other structure within the inner circle of the village should be preserved. It may however be utilized for another purpose, being a youth camp, holiday resort or guest house. It would be good to also preserve the outer circle as it is part of the original lay-out plan, although most of the buildings are much younger.

The mine does not intend to do any work here at present. If needed, for any changes to the buildings older than 60 years, a permit would be required from the SAHRA.

The Miners boxes (sites 1, 13 and 17) are regarded as having a field rating of Local Grade IIIB. The sites should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority.

In this case, site 1 should be kept intact and preserved, meaning that a management plan should be drafted for the site. It should also be fenced in.

Sites number 13 and 17 may be demolished, but only after complete documentation thereof and only if site number 1 remains intact. This documentation includes doing test excavations and drawing a site map.

The loading platform (site 8) has a field rating of Local Grade IIIB. The site should be included in the heritage register and may be mitigated. Mitigation is subject to a permit application lodged with the relevant heritage authority. As it is typical of a certain era in the mining industry, it should be preserved, perhaps as part of an interpretive route. It may be utilized in further mining activities, but a management plan would be needed for that.

The proposed development may continue, but only after receiving the necessary approval from SAHRA.

It should be noted that the subterranean presence of archaeological and/or historical sites, features or artifacts is always a distinct possibility. Due to the density of vegetation it also is possible that some sites may only become known later on. Operating controls and monitoring should therefore be aimed at the possible unearthing of such features. Care should therefore be taken when development commences that if any of these are discovered, a qualified archaeologist be called in to investigate the occurrence.

In This regards the following 'Chance find Procedure' should be followed:

1. Upon finding any archaeological or historical material all work at the affected area must cease.
2. *The area should be demarcated in order to prevent any further work there until an investigation has been completed.*
3. *An archaeologist should be contacted immediately to provide advice on the matter.*
4. Should it be a minor issue, the archaeologist will decide on future action, which could include adapting the HIA or not. Depending on the nature of the find, it may include a site visit.
5. SAHRA's APM Unit may also be notified.

6. *If needed, the necessary permit will be applied for with SAHRA. This will be done in conjunction with the appointed archaeologist.*
7. *The removal of such archaeological material will be done by the archaeologist in lieu of the approval given by SAHRA, including any conditions stipulated by the latter.*
8. *Work on site will only continue after removal of the archaeological/ historical material was done.*

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

The surface owner is Wepex Trading (Pty) Ltd.

(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.

The rehabilitation of land disturbed by the operation during the life of the mining right will be accompanied by ongoing monitoring of the environment, until a stable state is reached. The main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the area and habitats to a condition acceptable for obtaining a closure certificate.

Final rehabilitation of the site is expected to be within 15 years (2 to 3 years of aftercare and maintenance added) after the right has been granted and all deposits mined out. Final rehabilitation will be executed systematically and will consist of the elements and procedures as listed below. More realistic closure elements will be fully determined by a Professional Mine Surveyor once the operation is active.

Dismantling of processing plant and related structures: Crushing and Screening Processing plant: 300m2

- The processing of ore will be a dry process, with the option to convert to a 'wet' process after full production has been reached. Crushing and screening will be done by mobile plants without the construction of any permanent buildings. After full production a semi-permanent separation plant and semi-permanent crushing plant will be constructed.
- The processing plant in total is expected to cover an area of ± 300 m2, of which all should be dismantled and removed. This includes related infrastructures, equipment, machinery, screening plant, and

other items used during the processing activities, such as conveyor belts, pipelines and power lines.

- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of steel buildings and structures:
Workshop and Wash bay :245m²

- All steel buildings and structures are expected to amount to 1500 m2. These include mobile stores, workshops, offices, ablutions, water tanks, etc. Those in disuse and which cannot be sold, donated, or used for future purposes should be dismantled and removed or demolished.
- Any associated foundations associated with dismantled steel buildings and structures should also be demolished to 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition of reinforced concrete buildings and structures (Office and Office Parking Bay: 1.547 ha) Generator (if required): 28m²
The mine infrastructure plan made provision for a brick building that will house the generators (8 x 30-100KW) for power generation on site.
Office and Office Parking Bay: 1.547 Ha
Security Gate and guard house at access control point 675m².
Weighbridge: 600m2; Weighbridge control room: – Two offices :(360 m2).

- All brick buildings and concrete structures are expected to amount to ± 250 m2. These include French drains, wash bays, refuelling depots and concrete floors. Those in disuse and which cannot be donated or used for future purposes should be demolished.
- The foundations of these buildings should also be demolished and to a depth of 1 m below ground level;
- The topography should then be restored to its natural contours, and any compacted area should be ripped to a depth no deeper than 300 mm;

- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Rehabilitation of access roads (Roads (both access and haulage road on the mine site): 16 Ha)

- Mine roads in total, is expected to cover an area of 10 000 m2. After general site rehabilitation has been completed, all redundant roads should be ripped or ploughed.
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Demolition and rehabilitation of electrified railway lines

- There are no electrified railway lines associated with the mining activities.

Demolition and rehabilitation of non-electrified railway lines

- There are no non-electrified railway lines associated with the mining activities.

Demolition of housing and/or administration facilities

- The Glosam Village does not form part of the Mining area and is older than 60 years which warrant anyone who wants to demolish to get a permit from SAHRA.

Opencast rehabilitation including final voids and ramps (Mining Area: 350 Ha)

- Opencasts and ramps associated with the mining activities are expected to cover ±350ha.
- In-filling of the pits should take place concurrently and by obtaining material from the closest adjacent excess material heaps;
- The topography should then be shaped to the natural contours;
- The prepared surfaces should finally be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation.

Sealing of shafts, adits and inclines

- There are no shafts associated with the mining activities.

Rehabilitation of overburden and spoils
Product Stockpile area: 5 Ha
Ore Stockpile dumps.
Subgrade stockpile area : 7.5 Ha

Topsoil storage area (temporary):
Topsoil dumps X3: 1.5 Ha

- The total final overburden and spoils are estimated to amount to ±15 – 20 ha and includes waste dumps as well as earth walls. Pre-planning should be conducted in order decide the fate of these features. For example, if the material from these features will be used for in-filling, or if the features will remain after closure and will be sloped and vegetated.
- The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Rehabilitation of processing waste deposits and evaporation ponds with no pollution potential

- The processing waste deposits on the mining area is estimated to cover an area of ± 0.3 ha. Pre-planning should be conducted in order decide the fate of this feature. For example, if the material from these features will be used for in-filling, or if the features will remain after closure.
- The toe trenches should be backfilled by obtaining material from the closest adjacent heaps deemed appropriate for such purpose;

The slopes of those features selected to remain after closure, should be downgraded to such an extent that they are not visually intrusive to the skyline after closure, and/or at least have an average outer slope of 1:3 (18°); or as predetermined by a specialist, depending on the type of material;

- For backfilled trenches the topography should be shaped to be in line with the natural contours, but where compaction occurred, the areas should be ripped to a depth no deeper than 300 mm;
- The prepared surfaces should then be covered with 300 mm of topsoil or suitable growth medium, which includes a viable seed bank; in order to encourage restoration of natural vegetation, to ensure stability, improve the visual impact, and minimise erosion.

Storm water management
Storm water runoff arising from the upper and outer slopes of the stockpile area and waste dumps should be managed to

(1) prevent uncontrolled runoff from the waste dumps, which in turn creates surface erosion and resultant damage to the cover material and could also expose deposited material;
(2) route the runoff arising from the rehabilitated waste dump into the created trenches in a manner that would limit the creation of secondary erosion in the receiving surface water environment and/or possible damage to downstream surface infrastructure; and
(3) allow for the control routing of the runoff collected on the rehabilitated waste dump across cut-off, seepage or solution trenches provided to handle excess contaminated seepage from the waste dump.

Rehabilitation of subsided areas
The EAP is not currently aware of any areas of subsidence on site. However, any potential for such occurrences should be actively investigated and should be included in the rehabilitation plan, if and when such areas are identified.

General surface rehabilitation

- Final surface rehabilitation of areas disturbed by mining and related activities should be aligned to the selected final land use. General surface rehabilitation encompasses the reinstatement of natural topography, the top soiling and the re-vegetation of all those areas where infrastructure have been dismantled and removed or demolished. It also includes any industrial waste or scrap material that need to be removed from site.

River diversions
No river diversions are planned.

Fencing
It is not known at this stage if any fencing is planned.

Water management
No treatment of water will be necessary for the Prospecting activities.

Maintenance and aftercare
Maintenance and aftercare should be planned for two to three years after mine production have ceased and should include the following:

- Annual fertilising of rehabilitated areas.
- Monitoring of surface and subsurface water quality,
- Control of alien plants, and
- General maintenance, including rehabilitation of cracks and subsidence.

- Erosion control and monitoring of the slopes of the waste dump and stockpile areas;

Specialist study
A screening level risk assessment should be completed by a specialist environmental practitioner during mine closure in order to ensure that all of the rehabilitation objectives have been met and that all of the potential risks have been eliminated and/or are controlled. This assessment should specifically emphasis on those risks relating to drainage disturbances, groundwater quality and slope stabilities, but should not neglect progress made in natural vegetation restoration or success in alien invasive eradications. The current average specialist fees are estimated at R 50 000.

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

The rehabilitation plan was primarily designed with the closure objectives in mind and therefore it relates to all the various objectives as set out above in Section 1) g) 1) a) of this EMPR. In general, the main objectives are to have an uncontaminated, rehabilitated and safe environment, and to restore the mining area to a condition acceptable for obtaining a closure certificate. Each and every element in the rehabilitation plan was designed in order to meet these closure objectives.

The ultimate rehabilitation of the site that involves the sloping, levelling, replacement of topsoil and the seeding of a grass seed mix in areas that does not recover acceptably as agreed to by the land owner will ensure that the site could be regarded as safe for humans and animals and will also ensure that the site is stable from an erosion point of view and also ensuring that the site could be used for grazing again.

The removal of waste material of any description from the area and the disposal thereof at a recognised landfill facility.

- ❖ The removal of infrastructure, equipment, plant and other items from the site.
- ❖ The ripping of compacted areas to a level of 300mm and the levelling of such areas in order to re-establish a growth medium for plants (such areas will furthermore be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the mining operation, if the re-establishment of vegetation is unacceptably slow.

- The mining for manganese and the backfilling and covering thereof with previously stored topsoil where possible and (where-after this area will also be seeded with a vegetation seed mix adapted to reflect the local indigenous flora that was present prior to the proposed operation, and seedlings protected for a period of one) if the re-establishment of vegetation is unacceptably slow.

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

The total cost to rehabilitate and mitigate the Wepex site as it stands currently (risking premature rehabilitation) is estimated to be R 21 248 395,81 according to the DMR calculations. The detailed calculation DMR quantum is presented in Table 21. The total rehabilitation costing is based on the assumption that the mining operation will do continuous concurrent rehabilitation throughout the project.

Table 21.financial quantum

No.	Description	Unit	A	B	C	D	E=A*B*C*D
			Quantity	Master Rate	Multiplication factor	Weighting factor 1	Amount (Rands)
Remark:							
1	Dismantling of processing plant and related structures (including overland conveyors and powerlines)	m3	16 095	15,68	1	1,00	252 369,60
2 (A)	Demolition of steel buildings and structures	m2	797,45	218,41	1	1,00	174 171,93
2(B)	Demolition of reinforced concrete buildings and structures	m2	1 164,73	321,86	1	1,00	374 880,96
3	Rehabilitation of access roads	m2	289 033,70	2,00	1	1,00	578 067,40
4 (A)	Demolition and rehabilitation of electrified railway lines	m	-	379,34	1	1,00	-
4 (A)	Demolition and rehabilitation of non-electrified railway lines	m	-	206,91	1	1,00	-
5	Demolition of housing and/or administration facilities	m2	-	436,81	1	1,00	-
6	Opencast rehabilitation including final voids and ramps	ha	12,08	222 313,32	1	0,52	1 396 173,54
7	Sealing of shafts adits and inclines	m3	-	117,25	1	1,00	-
8 (A)	Rehabilitation of overburden and spoils	ha	15,51	152 653,61	1	1,00	2 366 975,28
8 (B)	Rehabilitation of processing waste deposits and evaporation ponds (non-polluting potential)	ha	-	190 127,32	1	1,00	-
8 (C)	Rehabilitation of processing waste deposits and evaporation ponds (polluting potential)	ha	-	552 219,84		1,00	-
9	Rehabilitation of subsided areas	ha	-	127 824,41	1	1,00	-
10	General surface rehabilitation	ha	87,32	120 927,41	1	1,00	10 559 665,50
11	River diversions	ha	-	120 927,41	1	1,00	-
12	Fencing	m	1 638,00	137,94	1	1,00	225 945,72
13	Water management	ha	0,00	45 980,00	1	1,00	82,76
14	2 to 3 years of maintenance and aftercare	ha	-	16 093,00	1	1,00	-
15 (A)	Specialist study	Sum	-			1,00	-
15 (B)	Specialist study	Sum				1,00	-
					Sub Total 1		15 928 332,69
1	Preliminary and General			955 699,96	weighting factor 2 1,00		955 699,96
2	Contingencies					1 592 833,27	1 592 833,27
					Subtotal 2		18 476 865,92
					VAT (15%)		2 771 529,89
					Grand Total		**21 248 395,81**

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

It is hereby confirmed that the financial provision will be provided as determined.

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

g) Monitoring of Impact Management Actions

h) Monitoring and Reporting Frequency

i) Responsible persons

j) Time Period for Implementing Impact Management Actions

k) 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
Topography	To minimise the reduction of land capability.	To ensure that rehabilitation post-mining slopes are stable, free draining and no slopes have an angle in excess of 20°.	Site Manager/ Environmentalists	Monitoring will be done on an *annual basis* to ensure that the levels and the slopes are in order.
Soil	To prevent soil pollution; To limit soil compaction; To curb soil erosion; and To reinstate a growth medium able to sustain plant life.	Soil depth and chemical composition will be tested and possible erosion damage will be assisted and rectified.	Site Manager/ Environmentalists	Monitoring will be done on an *annual basis* or after a heavy rain event.
Air Quality	To control the incidence of unacceptable levels of dust pollution on site.	To ensure that the mine minimizes dust omissions, so that dust does not become a nuisance for affected parties and a health hazard.	Site Manager/Foreman appointed SHE Consultant	Visual inspections will be done and managed by dust suppression by a water tanker. Quarterly tests will also be conducted by a Safety Health and Environmental Consultant and submitted to Mine Health and Safety for monitoring purposes.
Fauna	To minimise vegetation destruction in mining areas, and therefore a habitat for wildlife; and	To ensure that the species diversity and abundance is not significantly reduces.	Site Manager/ Environmentalists	Monitoring will be done at rehabilitated area on an *annually basis* to investigate species diversity and abundance.

	To eliminate poaching and the extermination of animal species within the boundaries of the study area as well as the surrounding areas.			
Flora	To minimise the destruction of vegetation units; and To control invasion of exotic and invasive plant species.	To ensure that the rehabilitated areas become self-maintaining.	Site Manager/ Environmentalists	Monitoring will be done at the rehabilitated areas on a *twice a year basis* (mid-summer and mid-winter), where species diversity and vegetation cover will be investigated.
Noise and Vibration	To ensure that the legislated noise and ground vibration levels will be adhered to at all times. To control the incidence of unacceptable noise levels on site.	The management objective will be to reduce any level of noise, shock and lighting that may have an effect on persons or animals, both inside the area and that which may migrate outside the area.	The manager .	Quarterly reports on fall-out dust and noise monitoring will be conducted as required by legislation. If any complaints are received from the public or state department regarding noise levels the levels will be monitored at prescribed monitoring points.
Surface Water	To conserve water; and To eliminate the contamination of run-off.	There are no Rivers in the vicinity of the mining operation. A borehole will be used for water and will be monitored by collecting water samples quarterly.	Site Manager/Water Supply	Monitoring takes place by collecting surface water samples every quarter.
Groundwater	The priority for monitoring should be to ensure water released into the environment does not cause pollution. The monitoring regime should be designed with appropriate measures to ensure that discharges are kept within the appropriate limits.	Specific objectives of the water quality monitoring program are as follows: • Determine whether the water quality at the sampling sites exceeds water quality standards. • Assess the status of water quality in the surrounding areas. • Provide analytical water quality information that describes present conditions and changes (trends).	Site Manager Water	All Monitoring sites (all identified boreholes) Selected Monitoring Sites (to be advised depending on sample results) It is envisaged that the frequency of monitoring remains on a biannual basis for quality, while water level monitoring should be conducted on a bi-monthly to quarterly basis.

		Within the study area, the quality of water can be affected by three major categories of physical and chemical stress factors: • The potential discharge into the environment of wastewater generated by ore mining, and processing, and containing relevant pollutants – acidity, copper, iron, manganese, arsenic, cadmium, nickel, lead, mercury, selenium, chromium, sulphate, dissolved salts. • The area's potential for a high degree of mineralisation. • Potentially high sediment loads generated in the very intense rainfall events (short term).		

l) Indicate the frequency of the submission of the performance assessment report

The performance assessment report will be submitted biennially and the financial quantum report annually.

m) Environmental Awareness Plan

The objective of the environmental awareness plan is to ensure that:

- Training needs are identified and all personnel whose work may create a significant impact upon the environment have received appropriate training;
- All employees are aware of the impact of their activities
- Procedures are 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 policies, procedures, and any implementation measures,
    - The potential consequences of departure from specified operating procedures.
- Personnel performing tasks, which can cause significant environmental impacts, are competent in terms of appropriate education, training and / or experience.

Environmental awareness will be part of the existing training and development plan. Key personnel with environmental responsibilities will be identified and the following principles will apply:

- Procedures will be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness will focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;

Top management will build awareness and motivate and reward employees for achieving environmental objectives;

- Environmental policies will be availed to mine employees and contractors;
- Environmental inductions will be conducted for employees, contractors and visitors;
- There will be an ongoing system of identifying training needs.

General environmental awareness training as part of the induction at the Wepex Operation should focus on the following:

- General environmental awareness
- The mine policies and vision concerning environmental management

- Legal requirements
- Mine activities and their potential impacts
- Different management measures to manage identified impacts
- Mine personnel's role in implementing environmental management objectives and targets

(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 the responsibility of management to ensure that all employees, contractors and visitors are trained to understand the impacts of their tasks on the environment and to reduce them wherever possible. Environmental awareness should be part of the existing training and development plan. Key personnel with environmental responsibilities should be identified and the following principles should be applied:

- Procedures should be developed to facilitate training of employees, on-site service providers and contractors;
- Environmental awareness should focus on means to enhance the ability of personnel and ensure compliance with the environmental requirements;
- Top management should build awareness and motivate and reward employees for achieving environmental objectives;
- There should be an ongoing system of identifying training needs.
- An environmental, health and safety induction programme should be provided to all employees, contractors and visitors prior to commencing work or entering the site, and they should sign acknowledgement of the induction. An attendance register and agenda/programme should be filed for each induction.
- A daily "toolbox talk" should be held prior to commencing work, which will include discussions on health, safety and environmental considerations. The toolbox talks should be led by the site manager or the appointed supervisor/s.
- Refresher training should also be given to permanent employees and long-term contractors on an annual basis, to ensure that all are competent to perform their duties, thereby eliminating negative impacts on their safety, health and environment.

General environmental awareness training as part of the induction at Wepex should focus on the following:

- General environmental awareness, which incorporates environmental, ecological and heritage elements;
- The mine policies and vision concerning environmental management;
- Legal requirements;
- Mine activities and their potential impacts;

- Different management measures to manage identified impacts;
- Mine personnel's role in implementing environmental management objectives and targets.

Environmental awareness topics to be covered in training should include:

- Natural resource management and conservation;
- Biodiversity awareness and conservation principles;
- Heritage resource awareness and preservation principles;
- Hazardous substance use and storage;
- Waste management; and
- Incident and emergency actions and reporting;

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

Environmental incident reporting will be a vital part of communication in order to deal with risks and ultimately avoid pollution or the degradation of the environment. Such communication should take place through the management, administrative and worker sectors of the operation, as well as contractors and visitors. Employees should be required to report any and all environmentally related problems, incidents and pollution, so that the appropriate mitigation actions can be implemented timeously. In the event of an environmental incident, the reporting procedure as indicated in the table below should be followed.

ENVIRONMENTAL INCIDENT REPORTING STRUCTURE	ACTIONS REQUIRED
Person causing or observing the incident	The first person causing or observing the incident shall report the incident to an immediate supervisor where the environmental incident is observed.
Line management in the relevant area of responsibility where the incident occurred	Line management in the relevant area of responsibility where the incident occurred shall: • Investigate the incident and record the following information: - How the incident happened; - The reasons the incident happened; - How rehabilitation or clean up needs to take place; - The nature of the impact that occurred; - The type of work, process or equipment involved; - Recommendations to avoid future such incidents and/or occurrences; • Inform the environmental manager/ECO and the Operations Manager on a daily basis of all incidents that were reported on site; • Consult with the relevant department/person for recommendations on actions to be taken or implemented where appropriate (e.g. clean-ups). • Assist the Environmental Manager and/or Operations Manager with applicable data in order to accurately capture the incident into the reporting database; • Ensure that remediation measures are implemented as soon as possible.

Site managers	The site managers shall: • Forward a copy of the incident form to other line managers; • Forward a copy of the incident form to the Environmental manager/ECO; • Inform the relevant department/person on a weekly basis of the incident by e-mail or by submitting a copy of the incident report. Once a High-Risk Incident (any incident which results from a significant aspect and has the potential to cause a significant impact on the environment) occurred it must be reported immediately to the Environmental Manager and the Operations Manager by telephone or email to ensure immediate response/action. • Forward a copy of the completed Incident Reporting Form (and where applicable a copy of the incident investigation) to the relevant department/person.
Environmental manager/ECO	The appointed environmental manager or ECO shall: • Complete an incident assessment form to assess what level of incident occurred; • Make recommendations for clean-up and/or appropriate alternate actions; • Enter actions necessary to remediate environmental impacts into the database in conjunction with the responsible line manager; • Enter the incident onto the database in order to monitor the root causes of incidents; • Include the reported incidents in an appropriate monthly/quarterly report; • Highlight all incidents for discussion at HSEC meetings.

n) Specific information required by the Competent Authority

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

According to Section 41(3) of the MPRDA the holder of a Mining right must annually assess (and revise, if necessary) the total quantum of environmental liability for the operation and ensure that financial provision are sufficient to cover the current liability (in the event of premature closure) as well as the end-of-operation liability.

An Annual Rehabilitation Plan should be developed to match the various requirements set out in the NEMA regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).

Officials in the DMR Regional Offices are required to assess, review and approve the quantum of financial provision submitted (that is, the monetary value of the financial provision that has been computed by the holder of a prospecting right, mining right or mining permit during the annual review) as being sufficient to cover the environmental liability at that time and for closure of the site at that time.

It is hereby confirmed that the financial provision shall 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&APs;

c) the inclusion of inputs and recommendations from the specialist reports where relevant; and

d) the acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

_____

Signature of the Environmental Assessment Practitioner:

Wadala Mining and Consulting (Pty) Ltd

_____

Name of Company:

Date: 22 July 2021

- END –

APPENDIX 1

DIE UNIVERSITEIT VAN DIE ORANJE-VRYSTAAT

THE UNIVERSITY OF THE ORANGE FREE STATE

HIERMEE WORD VERKLAAR DAT DIE GRAAD THIS IS TO CERTIFY THAT THE DEGREE

Magister in Omgewingsbestuur

Master in Environmental Management

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

ROELINA HENRIËTTE OOSTHUIZEN

NADAT AAN DIE STATUTE EN REGULASIES VAN DIE UNIVERSITEIT VOLDOEN IS. AS BEWYS DAARVAN PLAAS ONS ONS ONDERSKEIE HANDTEKENINGE EN DIE SEëL VAN DIE UNIVERSITEIT HIERONDER.

IN ACCORDANCE WITH THE STATUTES AND REGULATIONS OF THE UNIVERSITY. AS WITNESS OUR RESPECTIVE SIGNATURES AND THE SEAL OF THE UNIVERSITY BELOW.

VISEKANSELIER/VICE-CHANCELLOR

DEKAAN/DEAN

REGISTRATEUR/REGISTRAR

BLOEMFONTEIN
2000-09-16

CURRICULUM VITAE

Roelina Henriette Oosthuizen

Cell: 084 208 9088

E-Mail: roosthuizen950@gmail.com

1. PERSONAL INFORMATION

Name: Roelina Henriette Oosthuizen

Surname: Oosthuizen (Maiden: Alberts)

Identity number: 7004180037082

Date of birth: 18 April 1970

Gender: Female

Marital status: Married (26 years) with 3 children

Driving license: Yes, Code EB

Languages: Fluent in Afrikaans and English

Nationality: South African

Criminal offences: None

Health: Excellent, fit

2. SYNOPSIS OF PROFESSIONAL CAREER

Roelina Henriette Oosthuizen has 22 years of experience in the environmental management field. She started her career in the area of Environmental Management and Environmental Impact Assessment (EIA) evaluation in 1997 at the Department of Minerals and Energy. After moving to industry in 2005, Roelien became involved in the practical aspects of environmental management. A major project during her early years outside of government was that of the EIA for a Game Reserve and Lodge development near Barkly-Wes, she did this project together with a consultancy firm from Kimberley AWS water solutions (Mr. Adriaan du Toit). In 2007 the Company she worked for was bought by a Canadian Group of Companies and she became more involved in practical aspects of the operations and worked closely with operations personnel in dealing with ongoing management of environmental impacts at the Mine (e.g. monitoring, auditing, operating procedures). She was also centrally involved in liaison with the authorities and with stakeholders in neighbouring areas.

During her time at the Canadian Group of Companies, Roelien was the environmental manager overseeing operations in the Barkly-West, Prieska and Douglas areas. She was responsible for preparing the environmental compliance documents for each operation which included Performance Assessments (Audit reports) and Financial Quantum submissions as well as new applications for Prospecting Rights and Mining Rights with the relevant Scoping, EIA / EMP documents. Her activities included liaison with stakeholders and also with the relevant Departments. During this time, Roelien became increasingly involved in environmental policy and strategy work, as well as the environmental aspects of corporate governance.

She has assisted a range of clients with Environmental Due Diligence audits and compliance audits. Roelien has also undertaken numerous environmental audits, particularly compliance and due diligence audits for clients in the mining industry. Thus, she is familiar with best practice standards in environmental auditing.

Roelien have also represented the South African Diamond Producers Organisation (SADPO) on the Environmental Policy Committee (EPC) at the Chamber of Mines between 2005 and 2011.

In a nutshell, Roelien has wide ranging experience and is thus well-positioned to assist clients in any matter related to sustainability and environmental management. This is achieved through her own skills base and on drawing on specialists.

3. QUALIFICATIONS

MEM (Master in Environmental Management) University of the Orange Free State (2000)
B – Comm NWU (1991)

4. TRAINING COURSES

Roelien have attended various mining and environmental conferences and seminars to stay abreast with the latest changes in legislation, legal compliance and policy positions in the sector.

October 1997	Mineral Laws Administration & Environmental Management (University of Pretoria)
July 2002	Project Management for Environmental Systems (University of the Orange Free State)
August 2004	Environmental and Sustainability in Mining Minerals and Energy Education and Training Institute (MEETI)
September 2005	Converting Old Order Rights to New Order Rights in Mining International Quality & Productivity Centre Johannesburg)
November 2006	Mine waste disposal and Achievement of Mine Closure
February 2007	Introduction to ArcGis 1
April 2010	Mining Law Update Conference (IIR BV South Africa)
November 2010	Social Labour Plans for Mining Workshop (Melrose Training)
August 2011	Mineral Resources Compliance and Reporting (ITC)
May 2012	Enviro Mining Conference 2012 (Sustainability and Rehabilitation) (Spectacular Training Conferences)
August 2012	Mineral Resources Compliance and Reporting 4th Annual (ITC)
March 2013	1st EnviroMining-Ensuring Environmental Compliance and reporting
March 2014	4th Annual EnviroMining Conference
March 2015	5th Annual EnviroMining Conference
February 2018	Seminar by the Department of Environmental Affairs on knowledge sharing workshops on the Screening Tool
August 2020	**SAHRA Workshop for EAP's and Heritage Practitioners**
October 2020	**IAIAsa Simposium**

5. PROFESSIONAL REGISTRATION

Registered Environmental Practitioner : Number 2019/1467 at EAPASA
Registered as a professional at IAIAsa (International Association for Impact Assessment South Africa). IAIAsa is a voluntary organisation and is not a statutory body regulating the profession. Its members are however expected to abide by the organisations code of ethics.

6. PROFESSIONAL EXPERIENCE

Projects are listed below by area of expertise.

Environmental Management Systems (EMS) and Environmental Auditing

Development of EMS and Compilation of INCIDENT REPORT AND INVESTIGATION FORMS for the EMS of the Canadian group of Companies on various sites.

Undertaking of a range of due diligence and performance audits for operations, including those listed below:

Performance Assessment reports for a mining company with various infrastructure and mining operations near Barkly-West and Windsorton.

Performance Assessment reports for a mining company near Douglas.

Preparation of an environmental auditing checklist / protocol for a Community project with restitution ground in assisting the community to determine environmental legal compliance at their operations.

Environmental audit as part of a closure with Dr. Betsie Milne another specialist. This Annual Rehabilitation Plan has been developed to match the various requirements set out in the National Environmental Management Act (No 107 of 1998) (NEMA) Regulations pertaining to the financial provision for prospecting, exploration, mining or production operations (as amended in 2015).This project had the objective of ensuring that this company are accounting for environmental liabilities and risks adequately. The plan distinguishes between (a) those environmental rehabilitation liabilities pertaining to drilling, for which the Company was legally responsible and (b) those environmental rehabilitation liabilities pertaining to historic mining activities, for which the Company is not legally responsible, but consider performing as part of their best practice environmental principals. Three costing scenarios were explored in order to evaluate the most feasible rehabilitation plan, i.e. (1) Total cost (worst-case scenario) including risks, (2) legally required cost and (3) features currently available that do not involve any risks.

Sustainability projects: policies, guidelines, strategies and performance reporting

Involved in the compilation of 43-101 technical documents for listed companies which included information on sustainability and performance in rehabilitation and sustainable mining.

Alien species eradication project guideline and strategy near Barkly-Wes in terms of Regulations that have been promulgated in terms of the Conservation of Agricultural Resources Act, No. 43

of 1983 further make it unlawful to allow various species of weeds and invader plants to grow. The target species was Wild tobacco (declared weed), Pink Tamarisk (declared weed) and Mexican poppy, it also involved the community for job creation and training (2008).

Investigations for a Company near Prieska on Development of a biodiversity offsets policy for the applications for forestry tree licences for protected tree species.

Strategic Environmental Studies and Environmental Impact Assessment (EIA)

Undertaking of a Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2006 for a Private Individual which involved the proposed extension of a roof over an existing deck with two wood pillars by means of the excavating of 0.5m X 0.5m X 1m X 2 (½m^2) OF SOIL WITHIN 100M OF THE HIGH WATER MARK OF THE SEA. A Positive Record of Decision (ROD) Granted (2010).

Undertaking of an ENVIRONMENTAL IMPACT ASSESSMENT & ENVIRONMENTAL MANAGEMENT PROGRAMME SUBMITTED FOR AN APPLICATION FOR A MINING RIGHT IN TERMS OF SECTION 39 & OF REGULATION 50 & 51 OF THE MPRDA, 2002 (ACT NO. 28 OF 2002) near Boshof for a kimberlite Diamond Mining Company (2015)

Undertaking of a strategic environmental review and amendment for a Chinese group of Companies near Postmasburg. The study provided baseline environmental information and a high-level review of the potential impacts of various components of the development (2014 – 2016). Roelien worked as a member (EAP) of a large team consisting of a project Coordinator, attorneys, water specialists, other specialist and an engineer.

Environmental Impact Assessments for various developments including the proposed mining project for the former retrenchees of De Beers in Kimberley. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialist with contributions of specialist reports to compile the EIA EMP report (2017). Roelien worked as a member (EAP) of a team consisting of De Beers (attorneys and environmentalists), the retrenchees, the appointed contractor, EKAPA, and specialist appointed for the studies.

Environmental Impact Assessments for a Salt operation near Upington. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as part of a team with the Company and another consultant that started with the Water Use Licence application. The public participation was done to include the water use activities.

Environmental Impact Assessment for a change in scope of a prospecting right application consisting of the sole and exclusive right to prospect for iron, silver, zinc, copper and sulphur ore. This project involved coordination of the process, liaison with the authorities and compilation as well as appointment of specialists with contributions of specialist reports to compile the EIA EMP report (2019). Roelien also worked as a member (EAP) of a team consisting of the directors of the company and specialists appointed for the studies

7. CAREER PATH

01 April 1997 to 28 February 2005
DEPT OF MINERALS & ENERGY
Senior Environmentalist - Assistant Director Environment

MAIN JOB FUNCTIONS

- Collect analyse and interpret information regarding the measurement of impacts of mining operations on the environment, the rehabilitation of land surfaces.
- The prevention, control and combating of pollution.
- Co-ordinate and prioritise the rehabilitation of derelict and ownerless mines.
- Co-ordinate, investigate, audit and resolve environmental problems in conjunction with the Department of Water Affairs and Forestry, Department of Agriculture and the provincial Department of Tourism, Environment and Conservation.
- Address complaints and inquiries received from the public and mining industry.
- Consult with relevant authorities and interested and affected people regarding the approval of Environmental Management Programmes.
- Ensuring that rehabilitation standards are applied.
- Ensuring that the requirements stated in Environmental Management Programme Reports are adhered to.
- Conduct inspections and recommendations on mines that apply for closure.
- Evaluate mining licences and prospecting applications and recommend site-specific conditions according to legislative requirements.
- Constant liaison with the public, the mining industry and other government authorities on environmental matters, legislation and agreements.
- Influence new development processes through participation in the EMPR and EIA processes and give guidance through education and awareness programmes.
- Calculate and verify financial provision for outstanding rehabilitation.

01 March 2005 – 30 September 2012
Appointed as professional Mineral Law Administration and Environmental Manager for HC van Wyk Diamonds which was bought over in 2007 by a **Canadian group of Companies.**

MAIN JOB FUNCTIONS

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans:
Formulation of an environmental policy and guidelines for the Group.
Participation in the development of the budget for environmental expenditure.
Co-ordination of technical studies (e.g. monitoring of groundwater quality).
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. Forestry Licences and water sampling for Water Use Licences).
Development of environmental guidelines for contractors on sites.
Liaison with regulatory authorities on compliance with environmental legislation.
Documentation of environmental incidents.
Environmental awareness and training.

Development of a public participation strategy.
Formulation of a complaint's procedure.

01 October 2012 to 01 March 2020
Appointed as professional Mineral Law Administration and Environmental Manager for **Mentor Trade and Investments Pty Ltd**

MAIN JOB FUNCTIONS

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans.
Formulation of an environmental policy and guidelines for the Mine.
Co-ordination of technical studies (e.g. monitoring of groundwater quality) as well as updating of the Mine's IWWMP.
Environmental compliance measurement and reporting with respect to environmental permit conditions (e.g. as water sampling and effluent).
Development of environmental guidelines for contractors.
Liaison with regulatory authorities on compliance with environmental legislation.
Documentation of environmental incidents.
Environmental awareness and training.
Development of a public participation strategy.
Formulation of a complaint's procedure.

01 March 2020 to Present
Appointed EAP on some projects for ***Wadala Mining and Consulting Pty Ltd***

Conducting of Environmental Impact Assessments (EIAs), including the implementation of public participation programmes, for a variety of projects.
Undertaking of environmental reviews, audits and management plans.
Liaison with regulatory authorities on compliance with environmental legislation.
Environmental awareness and training.

APPENDIX 3

PUBLIC PARTICIPATION