



mineral resources

Department:
Mineral Resources
REPUBLIC OF SOUTH AFRICA

DRAFT SCOPING REPORT

FOR LISTED ACTIVITIES ASSOCIATED WITH MINING RIGHT AND/OR BULK SAMPLING ACTIVITIES INCLUDING TRENCHING IN CASES OF ALLUVIAL DIAMOND PROSPECTING.

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

NAME OF APPLICANT: Tawana Hotazel Mining (Pty) Ltd

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FILE REFERENCE NUMBER SAMRAD: NC 30/5/1/2/2/10197MR

AUGUST 2021

IMPORTANT NOTICE

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

1. The objective of the scoping process is to, through a consultative process—

- (a) identify the relevant policies and legislation relevant to the activity;
- (b) motivate 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 and confirm the preferred activity and technology alternative through an impact and risk assessment and ranking process;
 - (d) identify and confirm the preferred site, through a detailed site selection process, which includes an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified alternatives focusing on the geographical, physical, biological, social, economic, and cultural aspects of the environment;
 - (e) identify the key issues to be addressed in the assessment phase;
 - (f) agree on the level of assessment to be undertaken, including the methodology to be applied, the expertise required as well as the extent of further consultation to be undertaken to determine the impacts and risks the activity will impose on the preferred site through the life of the activity, including the nature, significance, consequence, extent, duration and probability of the impacts to inform the location of the development footprint within the preferred site; and
 - (g) identify suitable measures to avoid, manage, or mitigate identified impacts and to determine the extent of the residual risks that need to be managed and monitored.
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ACRONYMS

| | |
|---------|---|
| AEL | Atmospheric Emission Licence |
| BID | Background Information Document |
| CA | Competent Authority |
| CBA | Critical Biodiversity Area |
| CR | Critically Endangered |
| CRR | Comments and Response Report |
| DFFE | Department of Forestry, Fisheries and the Environment |
| DMR | Department of Mineral Resources (now DMRE) |
| DMRE | Department of Mineral Resources and Energy (previously DMR) |
| DWS | Department Water and Sanitation |
| EA | Environmental Authorisation |
| EAP | Environmental Assessment Practitioner |
| EC | Electrical Conductivity |
| EIA | Environmental Impact Assessment |
| EIAR | Environmental Impact Assessment Report |
| EMPr | Environmental Management Programme |
| EN | Endangered |
| ESA | Ecological Support Area |
| GIS | Geographic Information Systems |
| HIA | Heritage Impact Assessment |
| HMM | Hotazel Manganese Mine |
| IAPs | Interested and Affected Parties |
| IDP | Integrated Development Plan |
| JMLM | Joe Morolong Local Municipality |
| JTGDM | John Taolo Gaetsewe District Municipality |
| LED | Local Economic Development |
| LoM | Life of Mine |
| mamsl | Metres above mean sea level |
| mbgl | Metres below ground level |
| MEC | Member of the Executive Council |
| MPRDA | Minerals and Petroleum Resources Development Act (No. 28 of 2002) |
| MR | Mining Right |
| NBA | National Biodiversity Assessment (2018) |
| NCNCA | Northern Cape Nature Conservation Act (No. 9 of 2009) |
| NC DENC | Northern Cape Department of Environment and Nature Conservation |
| NAEIS | National Atmospheric Emissions Inventory System |
| NDCR | National Dust Control Regulations |
| NEMA | National Environmental Management Act (No. 107 of 1998) |
| NEMAQA | National Environmental Management Air Quality Act, No. 39 of 2004 |
| NEMBA | National Environmental Management: Biodiversity Act, No. 10 of 2004 |
| NEMPAA | National Environmental Management Protected Areas Amendment Act, No. 31 of 2004 |
| NEMWA | National Environmental Management Waste Act, No. 59 of 2008 |
| NFEPA | National Freshwater Ecosystem Priority Areas (2011) |
| NHRA | National Heritage Resources Act, No. 25 of 1999 |
| NPAES | National Protected Area Expansion Strategy (2011) |
| NWA | National Water Act, No. 36 of 1998 |
| PES | Present Ecological State |
| PIA | Palaeontological Impact Assessment |
| RE | Remaining Extent |
| ROD | Record of Decision |
| RoM | Run of Mine |

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|--------|---|
| RSDF | Regional Spatial Development Framework |
| SAAQIS | South African Air Quality Information System |
| SAHRA | South African Heritage Resources Association |
| SAHRIS | South African Heritage Resources Information System |
| SANS | South African National Standards |
| SCC | Species of Conservation Concern |
| TDS | Total Dissolved Solids |
| THM | Tawana Hotazel Mine |
| TOPS | NEMBA Threatened or Protected Species |
| VU | Vulnerable |
| WMA | Water Management Area |
| WML | Waste Management Licence |
| WUL | Water Use Licence |
| WULA | Water Use Licence Application |

SCOPING REPORT

2. Contact Person and Correspondence Address

a. Details of:

i. The EAP who prepared the report

| | |
|---|--|
| Name of Environmental Assessment Practitioner: | Prime Resources (Pty) Ltd |
| Physical Address: | 70 - 7 th Avenue, Parktown North, Johannesburg |
| Postal Address: | PO Box 2316, Parklands, 2121 |
| Telephone Number: | 011 447 4888 |
| Fax Number: | 086 604 2219 |
| Email: | prime@resources.co.za |
| Professional Affiliations: | EAPASA; PrEng; PrSciNat; SAImm; IAIAAsa |

ii. Expertise of the EAP

1) *The qualifications of the EAP (With evidence attached as Appendix 1)*

Prime Resources (Pty) Ltd (Prime Resources) is a specialist environmental consulting firm providing environmental, social, and related services, which was established in 2003. Prime Resources was founded by Peter Theron (PrEng, SAImm), the Managing Director and Principal Environmental- and Civil Engineer of the firm. Peter has a GDE Environmental Engineering from the University of Witwatersrand and over 30 years' experience in the field of environmental science and engineering.

Jonathan van de Wouw (BSc Hons) is a Principal Environmental Consultant and Registered EAP (EAPASA Reg No 2019/909) with thirteen years' experience managing projects in the mining and industrial sectors, including financial liability assessments associated with mine closure and rehabilitation, mine waste and water management planning, environmental impact assessments and management planning and environmental auditing. He also has a detailed knowledge of environmental law and precedents, both locally and internationally.

Louise Jones is a Senior Environmental Scientist with eight years' experience in the field of environmental science. Her expertise includes environmental impact assessments and management planning in the mining sector as well as environmental compliance auditing in the waste management sector.

Dr Bronwyn Grover, Senior Environmental Geochemist, has a PhD in Environmental Analytical Chemistry from the University of the Witwatersrand and four years' experience in the field of geochemistry and environmental science.

Key Prime Resources Personnel CVs are attached as Appendix 1.1.

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

The EAP's past experience is fully described in the Prime Resources Company Profile (attached as Appendix 1.2) when read together with the personnel CVs in Appendix 1.1.

b. Description of the Property

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|---|---|
| Farm Name: | Farm York A 279 (Portion of Portion 1 (RE)) RE Farm Hotazel 280 (Portion of RE) |
| Application area (Ha) | The overall area applied for is 154 Ha Which includes: <ul style="list-style-type: none"> • Mining Right (MR) Application area: 145.1 Ha • Access road area outside of MR Application area: 8.9 Ha |
| Magisterial district: | Joe Morolong Local Municipality and the Magisterial District of John Taolo Gaetsewe, Northern Cape Province. |
| Distance and direction from nearest town | The area is located approximately 1km south-east of Hotazel. |
| 21-digit Surveyor General Code for each farm portion | C0410000000027900001 - Farm York A 279 (Portion of Portion 1 (RE)) C0410000000028000000 - RE Farm Hotazel 280 (Portion of RE) |

c. Locality map

(shownearest town, scale not smaller than 1:250 000 attached as Appendix 2)

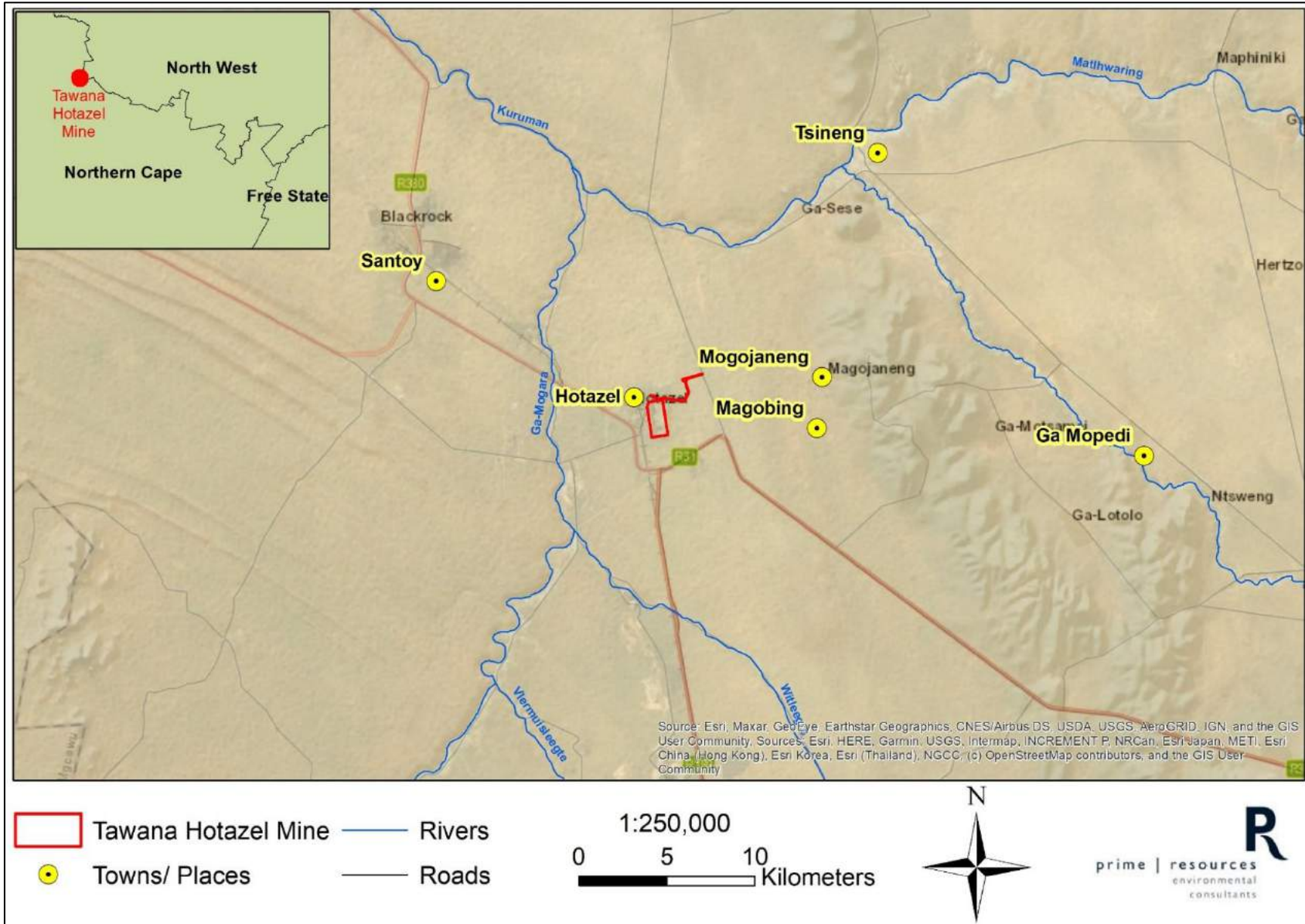


Figure 1: Locality map for the proposed Tawana Hotazel Mine

d. Description of the scope of the proposed overall activity

i. Listed and specified activities

(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 – refer to Figure 3).

| NAME OF ACTIVITY (All activities including activities 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.) | AERIAL EXTENT Ha or m² | LISTED ACTIVITY Mark with an X where applicable or affected. | APPLICABLE LISTING NOTICE |
|--|--|--|--|
| MR Application area | 145.1 Ha | | |
| Surface infrastructure that falls within the MR Application area as well as the access roads that are outside of the MR Application area. Surface infrastructure will include the opencast pit (incorporating the historical HMM void and further expansion of the opencast footprint), in-pit waste dumps (residue material), surface residue handling / storage, vehicle yard, workshop, access and haul roads, offices, stores, processing plant, product stockpile area, run of mine pad, refuel bay and water management infrastructure. | 77 Ha | X | Listing Notice 2 (GNR984 of 2014) (As amended) Activity 17 Any activity including the operation of that activity which requires a mining right as contemplated in section 22 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), <i>as well as any other applicable activity as contained in this Listing Notice, in Listing Notice 1 of 2014 or Listing Notice 3 of 2014, required to exercise the mining right (as amended by GN517 of 2021).</i> |
| <i>In accordance with the above, the following applicable listed activities are required to exercise the Mining Right</i> | | | |
| Vehicle yard, workshop, stores, refuel bay, ammonium nitrate prill and emulsion silos. | 1.5 Ha | Applicable activities required to exercise the Mining Right | Listing Notice 1 (GNR983 of 2014) (As amended) Activity 14 The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres. |
| New on-site hauls roads | 5.6 Ha | | Listing Notice 1 (GNR983 of 2014) (As amended) Activity 24 The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or |

| <p>NAME OF ACTIVITY (All activities including activities 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.)</p> | <p>AERIAL EXTENT Ha or m²</p> | <p>LISTED ACTIVITY Mark with an X where applicable or affected.</p> | <p>APPLICABLE LISTING NOTICE</p> |
|---|--|--|--|
| | | | <p>(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road— (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter.</p> |
| <p>Areas to be cleared for surface infrastructure that falls within the MR Application area as well as the access roads that are outside of the MR Application area.</p> | <p>77 Ha</p> | | <p>Listing Notice 1 (GNR983 of 2014) (As amended) 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.</p> |
| <p>Widening of the existing access roads that fall outside of the MR Application area.</p> | <p>8.9 Ha</p> | | <p>Listing Notice 1 (GNR983 of 2014) (As amended) Activity 56 The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.</p> |
| <p>Handling, storage and disposal of residue material to in pit dumps, surface residue handling / storage and reclamation of residue material.</p> | <p>54.7 Ha</p> | <p>X</p> | <p>Listing Notice 1 (GNR983 of 2014) (As amended) Activity 21F Any activity including the operation of that activity required for the reclamation of a residue stockpile or a residue deposit as well as any other applicable activity as contained in this Listing Notice or in Listing Notice 3 of 2014, required for the reclamation of a residue stockpile or a residue deposit. <i>A date for the commencement of this activity has not yet been published.</i></p> <p>GNR921 of 2013, Category B of the National Environmental Management: Waste Act 2008 (No. 59 of 2008) (NEMWA) Activity 7 Disposal of waste on land The disposal of any quantity of hazardous waste to land.</p> <p>Activity 10 Construction of facilities and associated structures and infrastructure</p> |

| <p>NAME OF ACTIVITY (All activities including activities not listed)</p> <p>(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.)</p> | <p>AERIAL EXTENT</p> <p>Ha or m²</p> | <p>LISTED ACTIVITY</p> <p>Mark with an X where applicable or affected.</p> | <p>APPLICABLE LISTING NOTICE</p> |
|--|---|---|--|
| | | | <p>The construction of a facility for a waste management activity listed in Category B of this Schedule (not in isolation to associated waste management activity).</p> <p>Activity 11 Residue stockpiles or residue deposits The establishment or reclamation of a residue stockpile or residue deposit resulting from activities which require a mining right, exploration right or production right in terms of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).</p> |
| <p>Project activities that entail waste-related Water Uses and therefore require a WUL include – dewatering, dust suppression, mechanical evaporation, the construction and management of product stockpiles and waste rock dumps (residue material) and the operation of water management infrastructure (pollution control dam, trenches and berms to separate clean and dirty water).</p> | <p>77 Ha</p> | <p>X</p> | <p>Listing Notice 2 (GNR984 of 2014) (As amended)</p> <p>Activity 6 The development of facilities or infrastructure for any process or activity which requires a permit or licence in terms of national or provincial legislation governing the generation or release of emissions, pollution or effluent, excluding: (i) activities which are identified and included in Listing Notice 1 of 2014; (ii) activities which are included in the list of waste management activities published in terms of section 19 of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) in which case the National Environmental Management: Waste Act, 2008 applies; or (iii) the development of facilities or infrastructure for the treatment of effluent, wastewater or sewage where such facilities have a daily throughput capacity of 2000 cubic metres or less; or (iv) where the development is directly related to aquaculture facilities or infrastructure where the wastewater discharge capacity will not exceed 50 cubic metres per day.</p> |



Figure 2: Proposed THM with associated farm portions and adjacent farms



Figure 3: Proposed mine layout

ii. Description of the activities to be undertaken

(Describe Methodology or technology to be employed, and for a linear activity, a description of the route of the activity)

Tawana Hotazel Mining (Pty) Ltd has submitted an application for a Mining Right (MR) to the Department of Mineral Resources and Energy (DMRE) for the proposed Tawana Hotazel Mine (THM). The MR application area is 145.1026 Ha. The types of minerals applied for are: all (Code UN); Iron and Iron bearing minerals including hematite, goethite, specularite and limonite (Code (Fe) Type (B)) and Manganese and manganese bearing minerals (Code (Mn) Type (B)).

The THM covers portions of two farms within the Joe Morolong Local Municipality (JMLM) in the Northern Cape Province; Hotazel 280 and York 279 and is located approximately 1 km south-east of the town of Hotazel. The THM largely incorporates the historical Hotazel Manganese Mine (HMM), including the residual opencast void, surface dumps of low-grade material and the mothballed processing plant and rail loadout facility. HMM stopped production in 1989. The area was historically mined by both opencast and underground means and yielded high grade manganese ore. All current plans for the project specifically exclude underground mining.

The overall area applied for is approximately 154 Ha (inclusive of the MR application area and access road). Surface infrastructure will include the opencast pit (incorporating the historical HMM void and further expansion of the opencast footprint), in-pit waste dumps (residue material), surface residue handling / storage, vehicle yard, workshop, access and haul roads, offices, stores, processing plant for the crushing and screening of mined ore, product stockpile area, run of mine pad, refuel bay and water management infrastructure. Refer to Figure 3.

Mining

- Opencast mining methods will be used to a maximum depth of 95 m.
- The orezone of the various seams is found at depths from 25 to 91 m below the surface and the manganese seam thicknesses varies from 3 to 27 m.
- The proposed mining process is as follows: drilling → blasting → load and haul → dry crushing and screening plant → product stockpiling → road truck loading.
- The annual Run of Mine (RoM) ore production is estimated at 0.5 Mt.
- The mining of the opencast pit will require as many as two active work areas in certain schedule overlap years.

Blasting

- The blast designs will aim for productive blasting, whilst achieving the environmental controls that are needed for mining safely at the proposed THM.
- The blast designs (including timing and stemming requirements) will take the rock type descriptions, mining methods including planned bench height and hole diameter and the distribution of sensitive receptors surrounding the mine into account.
- The following limits will be applied:
 - **Ground vibration:** A maximum peak particle velocity (PPV) of 6 mm/s for the closest house.
 - **Air blast:** A peak air blast level of 120 dBL.
 - **Maximum fly rock range:** Three fly-rock limits will apply using a factor of safety of two for the safety of people, these being 100 m maximum for all blasts, a 300 m alert or exceedance range for which a special internal investigation is needed if fly rock occurs in this range at distances more than 100 m, and a 500 m clearance zone.
- Cartridge explosives and detonators will be sourced from a licensed explosive magazine provided for use by the blasting contractor, the location which will not be situated within the mining area and adjacent residential area. The blasting contractor office and ammonium nitrate silos and emulsion tank will be stored within a fenced compound to be developed in accordance with the legislated requirements.
- At a later stage and through thorough risk assessment and on approval from the relevant regulatory authorities, the ammonium nitrate prill and emulsion silos may be located within the MR area.

Loading and hauling

- Due to the mixing requirements, where high-grade ore will be mixed with the lower grade material from the lower benches within the pit, the loading equipment will be mobile.
- The excavators will load the 40t haulage units with three to four passes and will be supported by a bulldozer to assist with oversize handling, ore crowding and road construction.

- RoM ore will be trucked out of the open pit and tipped onto the RoM ore stockpile.

Processing

- From the RoM stockpile, front end loaders (FELs) will feed the ore into the primary crusher (jaw crusher).
- The primary crusher will feed the screening plant. In the initial stages these will be mobile units.
- The different size fractions will be sampled and stockpiled into separate stockpiles according to grade and size at the dedicated stockpile area.
- From these stockpiles, the product will be loaded onto road trucks using a FEL according to the customer's requirements in terms of size and grade (some blending may be required).
- Water mist will be added to all processes to reduce dust generation.
- Fines will be stockpiled for sale as and when the demand arises.
- The mobile crushing and screening plant is currently planned to be located at the southern end of the new open pit. The final placement of the plant will however be guided by the results of the dust and noise specialist studies.
- Road transport loading with suitable weighbridges will take place via a dedicated loading facility. Road trucks will then transport product to Lohatla for train loading, after passing over the weighbridge.

Mine entrance and access roads

- There will be two main access points into the mine and all-weather access roads (12 m wide) will need to be upgraded / constructed.
- The main transport route to the east will be for Heavy Vehicles (HVs), potentially 80 – 100 trucks per day, and the main entrance to the west (near Hotazel) will be for Light Delivery Vehicles (LDV's).
- In addition, on-site access roads (12 m wide) will be required for use by the secondary support fleets and earthmoving haul trucks.
- The design of the roads needs to cater for loads associated with product haulage and stores delivery truck loads.
- THM will be responsible for the construction and maintenance of the access roads on a continuous basis.

Electricity

- The mine reticulation will be provided at 11 kV from the Hotazel substation.
- A single Eskom 132 kV line will be brought into the main substation switching yard.
- The expected full load power requirement is calculated as 3 326 kVA. An application for 4.0 mVA has been submitted to cover the power requirements for the proposed THM.
- The entire processing plant will be diesel operated.
- Until such time as power infrastructure is installed on site a mix of solar and diesel generators will be used as an alternate supply source.

Water

- All potable water will be supplied through the Vaal Gamagara water scheme via a bulk water meter, managed by Sedibeng Water.
- Water will be required for processing, mining, change houses, offices, and workshops. Each supply area will be individually metered to enhance control and minimize wastage.
- It is estimated that the total mine potable water consumption will be 370 m³ per day assuming that this water will be used for processing, haul road dust suppression and consumption. This estimation is an upfront requirement, until the pit has developed to an extent where it produces enough groundwater for dust suppression and process water purposes. In this steady state, potable water demand will reduce to the levels required for change house and office use only. This is estimated at approximately 25 m³ per day.
- Due to the expected higher upfront requirement of water consumption, the application for potable water that has been submitted to the authorities (Sedibeng Water) is based on the total requirement of 380 m³ per day.
- The following two sources of raw water are anticipated:
 - Groundwater inflows reporting to the pit, which is estimated to provide sufficient water for the mine's service and process water requirements. This water will be pumped from the open pit to the storage dam on surface and subsequently to the storage tanks.

- Water from the storm water reticulation system. Diversion trenches will be located above the open pit areas to intercept water flows. This water will be redirected to the dedicated PCD or diverted to existing natural drainages dependent on the management procedures on site.
- Precipitation has collected in the open void and underground workings since the mine stopped production in 1989. Thus this water will need to be fully removed before mining work can commence.
- Current plans are for this water to be pumped to a 25000 m³ lined PCD, to be used for dust suppression and industrial use on site.
- Mine dewatering will be carried out using diesel powered submersible pumps installed in sumps at the bottom of the pit. Water will be pumped from the open pit and discharged into the freshwater tank for use in the plant with any excess water discharged to the PCD.
- A forced-evaporation system to eliminate water from the initial void may be implemented for water management purposes.

Waste

- The mining project will generate general (domestic) waste and mining waste.
- An estimated stripping ratio is set at 2.98 t of waste per tonne of ore. Residue material (overburden and waste rock) arising from the development and ongoing operation of the opencast mine pit will be disposed back into the existing historical opencast void and the trailing mined out opencast void through backfilling.
- Non-hazardous domestic and industrial waste will be stored temporarily within a hard-standing area for covered bins / skips.
- All recyclable waste will be collected by a contractor where it will be recycled off-site. Only materials which cannot be reused, recycled or recovered will be disposed of at an appropriately licensed facility by a licensed contractor.
- Access to the nearby sewerage works will be sought from HMM for human waste generated on site.

Operating hours and staff

- The mine and plant will operate on a continuous basis, with 330 working days per annum.
- The mine will employ approximately 177 people (inclusive of outsourced service providers).

Timeframes and scheduling of phases

- 2 years have been allowed for pre-stripping and mining infrastructure construction.
- The Life of mine (LoM) indicated by the conversion of the resource to reserve is 30 years for the open pit operation.
- Backfilling/rehabilitation will commence immediately after the commencement of the mining operation and its advance will match the depletion rate of the open pit.
- A period of 3 years is expected for final rehabilitation after closure.

e. Policy and Legislative Context

| <p>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)</p> | <p>REFERENCE WHERE APPLIED (i.e. Where in this document has it been explained how the development complies with and responds to the legislation and policy context)</p> | <p>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 Licence has/ has not been applied for)</p> |
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| <p>The Mineral and Petroleum Resources Development Act (No. 28 of 2002) (MPRDA) is the key legislation governing mining activities within South Africa. It details the requirements and processes which need to be followed and adhered to by mining companies. The Department of Mineral Resources and Energy (DMRE) is the competent authority that deals with all mining related applications.</p> | <p>An integrated application in terms of the MPRDA and NEMA is being undertaken. While the NEMA process is being followed, the DMRE is considered the Competent Authority. The NEMA process for the proposed project is described below.</p> | <p>An application for a MR was submitted to the DMRE in terms of Section 22 of the MPRDA on 11 June 2021 through the SAMRAD online system. Per Section 38(A) of the MPRDA, “An environmental authorisation <i>in terms of NEMA</i> shall be a condition prior to the issuing of a permit or the granting of a right in terms of this Act. The DMRE accepted the MR application per letter dated 29 July 2021.</p> |
| <p>The National Environmental Management Act, No. 107 of 1998 (NEMA) is enabling legislation intended to provide a framework for integrating environmental management into all developmental activities to promote co-operative environmental governance with regard to decision making by state organs on matters affecting the environment.</p> <p>The Environmental Impact Assessment (EIA) Regulations of GNR982, December 2014 <i>as amended in 2021</i> serve to regulate the procedure and criteria for submitting, processing and considering decisions for applications for Environmental Authorisation. These Regulations provide details on the process to be followed for the consultation of stakeholders and Interested an Affected Parties (IAPs), the identification of the Competent Authority, and the various timeframes and application requirements for Environmental Authorisation. A further three Regulations, GNR983, GNR984, and GNR985 (all of 2014 <i>as amended in 2021</i>), provide lists of activities for which Environmental Authorisation, either in the form of a Basic Assessment or Scoping and Environmental Impact Assessment Report (EIAR) / Environmental Management Programme (EMPr), is required before the activity can commence.</p> | <p>This Scoping Report has been prepared to meet the requirements of the EIA Regulations (GNR982 of 2014 <i>as amended</i>).</p> <p>Refer to Section 2.d.i for the applicable listed activities.</p> | <p>An application for Environmental Authorisation for the activities described in the table in Section 2.d.i above in terms of Section 24 of NEMA was submitted for the NEMA listed activities on 11 June 2021. The DMRE acknowledged receipt of the application per letter stamped 25 June 2021.</p> <p>According to the EIA Regulations (2014) the following are to be submitted in support of the application:</p> <ul style="list-style-type: none"> • Scoping Report (this document) together with the results of consultation with IAPs and State Departments, to be submitted to the Competent Authority within 44 days of receipt of the application by the DMRE; and the • EIAR and EMPr together with the results of consultation with IAPs and State Departments within 106 days of acceptance of the Scoping Report (acceptance date not yet known). |

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| <p>Since the enactment of the “One Environmental System” on 8 December 2014, the Environmental Authorisation process in terms of the NEMA must be followed for any mining activities requiring a right or permit in terms of the MPRDA to fulfil the requirements of Section 5A(a) of the Act. In instances where Environmental Authorisation is required for a mining project, the DMRE is identified as the Competent Authority.</p> | | |
| <p>The National Screening Tool is a geographically-based web-enabled application that allows the proponent seeking environmental authorization, in terms of EIA Regulations 2014, to screen their proposed site for any environmental sensitivity. The tool also provides site-specific EIA process and review information, and identifies related exclusions and/or specific requirements, including specialist studies applicable to the proposed site and/or development, based on the national sector classification and the environmental sensitivity of the site.</p> <p>As per GN960 of 2019, read with Section 24(5)(a) of the NEMA, an Environmental Screening Report (ESR) must be generated for the Environmental Authorisation application using the National Web-based Screening Tool. As per the requirement of GN320 and GN1150, prior to commencing with a specialist assessment, the current use of the land and the environmental sensitivity of the site under consideration identified by the national web based environmental screening tool (screening tool), where determined, must be confirmed by undertaking a site sensitivity verification.</p> <p>The application classification for this report is: Mining => Mining Right => Mining - Mining Right.</p> <p>GN320 and GN1150 prescribes the following for the site sensitivity verification:</p> <ol style="list-style-type: none"> 1. The Site Sensitivity Verification must be undertaken by an environmental assessment practitioner or a specialist. 2. The Site Sensitivity Verification must be undertaken through the use of <ol style="list-style-type: none"> a. a desktop analysis, using satellite imagery; b. a preliminary on-site inspection; and c. any other available information. 3. The outcome of the Site Sensitivity Verification must be recorded in the form of a report that: <ol style="list-style-type: none"> a. confirms or disputes the current use of the land and the environmental sensitivity as identified by the screening tool, such as | <p>Refer to:</p> <ul style="list-style-type: none"> • Section 2.h.iv where the baseline conditions are described • Section 2.h.v where the potential impacts of the proposed activities on all aspects of the physical and socio-economic environment are assessed. • ESR in Appendix 4 • Site Sensitivity Verification Report in Appendix 5 | <p>The ESR (refer to Appendix 4) indicates that no intersection with any development zones was found.</p> <p>The following Environmental Sensitivities were identified:</p> <ul style="list-style-type: none"> • Agriculture Theme – medium sensitivity • Animal Species Theme – low sensitivity • Aquatic Biodiversity Theme – low sensitivity • Archaeological and Cultural Heritage Theme - low sensitivity • Civil Aviation Theme – high sensitivity • Defence Theme – low sensitivity • Palaeontology Theme – medium sensitivity • Plant species Theme – low sensitivity • Terrestrial Biodiversity Theme – low sensitivity <p>A Site Sensitivity Verification Report (refer to Appendix 5) was compiled to verify the sensitivity of the environmental themes raised in the ESR.</p> |

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| <p>new developments or infrastructure, the change in vegetation cover or status etc.;</p> <p>b. contains a motivation and evidence (e.g. photographs) of either the verified or different use of the land and environmental sensitivity; and</p> <p>c. is submitted together with the relevant reports prepared in accordance with the requirements of the NEMA Environmental Impact Assessment (EIA) Regulations (2014).</p> | | |
| <p>The National Environmental Management Air Quality Act, No. 39 of 2004 (NEMAQA) has placed the responsibility for air quality management on local authorities that will be tasked with baseline characterisation, management and operation of ambient monitoring networks, licensing of listed activities, and emissions reduction strategies. GN893 of 2013 provides the list of activities in terms of Section 21(1)(a) for which for which licensing is required in terms of Chapter 5 of the Act. This notice further establishes minimum emission standards for the listed activities.</p> <p>The National Ambient Air Quality Standards (NAAQS) (GN1210 of 2009) were determined based on international best practice for PM₁₀ (particulates with an aerodynamic diameter of 10 micron), dust-fall, sulphur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃), carbon monoxide (CO), lead (Pb), benzene and recently PM_{2.5}. The PM_{2.5} standards were published in GN486 of 2012. Section 32 of NEMAQA allows for the promulgation of measures to control and monitor dust. The National Dust Control Regulations (NDCR) (GNR827 of 2013) prescribe general measures for the control of dust in all areas, including residential and light commercial areas.</p> <p>The National Atmospheric Emission Reporting Regulations were published in 2015 and aims to standardise the reporting of data and information from an identified point, non-point and mobile sources of atmospheric emissions to an internet-based National Atmospheric Emissions Inventory System (NAEIS), towards the compilation of atmospheric emission inventories. The NAEIS is a component of the South African Air Quality Information System (SAAQIS). Regulations pertaining to Greenhouse Gas reporting using the NAEIS were published in 2017 (as amended by GNR994 of 2020) with the objective to provide all stakeholders with relevant, up to date and accurate information on South Africa's emissions profile. The South African mandatory reporting guidelines focus on the reporting of Scope 1 emissions only. The three broad scopes for estimating GHG are:</p> | <p>Refer to Section 2.d.i for the applicable listed activities.</p> <p>Refer to Section 2.h.iv for a description of the ambient air quality within the proposed THM.</p> <p>Refer to Section 2.h.v for the potential impacts on ambient air and Section 2.h.viii for potential mitigation.</p> <p>Refer to Section 2.i for the plan of study for the EIA phase.</p> | <p>The proposed project does not trigger any listed activities in terms of GN893. Therefore, no Atmospheric Emission Licence (AEL) is required.</p> <p>The ability of the project to comply with the air quality standards will be modelled as part of the air quality specialist study and the outcomes will determine the degree of management necessary to reduce emissions / fallout to within the air quality standards.</p> |

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| <ul style="list-style-type: none"> • Scope 1: All direct GHG emissions. • Scope 2: Indirect GHG emissions from consumption of purchased electricity, heat or steam. • Scope 3: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities not covered in Scope 2, outsourced activities, waste disposal, etc. | | |
| <p>The National Heritage Resources Act, No. 25 of 1999 (NHRA) serves to protect and manage South African heritage and cultural resources, which include places, buildings, structures and equipment of cultural significance, historical settlements and townscapes, archaeological and paleontological sites, graves and burial grounds. The Act protects any heritage resources from damage by developments by stipulating in Section 38 that any person intending on undertaking any form of development which involves the activities listed below must, at the earliest stage of initiation, notify the South African Heritage Resources Association (SAHRA) specifically the Northern Cape Heritage Resources Authority:</p> <ol style="list-style-type: none"> A. the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length; B. the construction of a bridge or similar structure exceeding 50 m in length; C. any development or other activity which will change the character of a site— <ol style="list-style-type: none"> i. exceeding 5 000 m² in extent; or ii. involving three or more existing erven or subdivisions thereof; or iii. involving three or more erven or divisions thereof which have been consolidated within the past five years; or iv. the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority; D. the re-zoning of a site exceeding 10 000 m² in extent; or E. Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority. <p>Section 38(8) of the Act states that if heritage considerations are taken into account as part of an application process undertaken in terms of NEMA and the</p> | <p>Refer to Section 2.h.iv for a description of the cultural and heritage resources within the proposed THM.</p> | <p>A Palaeontological Impact Assessment and a Baseline Report for the Heritage Impact Assessment were carried out.</p> <p>The potential impact to fossil heritage resources is extremely low. Due to the disturbed nature of the proposed THM, the existence of any graves within the proposed THM is very unlikely. Mitigation measures for potential chance finds are included in the EMPr.</p> |

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| <p>EIA process, there is no need to undertake a separate application in terms of the NHRA. Heritage considerations will form part of this environmental process.</p> | | |
| <p>The National Water Act, No. 36 of 1998 (NWA) regulates all matters relating to inland water resources. It thus operates as a management instrument with the lead authority being the Department of Water and Sanitation (DWS). This Act provides mechanisms for the prevention of the pollution of water resources to support the management of water as a renewable resource. Section 21 of the NWA lists water uses for which authorisation is required from the DWS.</p> <p>Regulation GN704 of 1999 provides regulations for the use of water for mining and related activities and is aimed to further protect water resources. These regulations describe how mining activities should be managed to protect water resources. The Act thus plays a crucial role in the mining process as many mining-related activities use water as listed in Section 21, thereby requiring approval from DWS.</p> <p>Regulation GN267 of 2017 describes the procedural requirements for WUL applications and appeals.</p> | <p>Refer to Section 2.d.i for the applicable listed activities.</p> <p>Refer to 2.h.iv for a detailed description of the groundwater and surface water resources within the proposed THM.</p> <p>Refer to Section 2.h.v for the potential impacts on water resources and Section 2.h.viii for potential mitigation.</p> <p>Refer to Section 2.i for the plan of study for the EIA phase.</p> | <p>The process of applying for a Water Use Licence (WUL) from DWS for the full set of water uses associated with the mine (as described elsewhere) has commenced through the submission of a pre-application enquiry via the eWULAAS portal. The application has been assigned reference no. WU21348.</p> <p>Confirmation of the above is attached as Appendix 3.</p> |
| <p>The National Environmental Management Waste Act, No. 59 of 2008 (NEMWA) regulates waste management in order to protect public and environmental health by providing various waste management measures for the prevention of pollution and ecological degradation and to provide defining requirements for the licensing and control of waste management activities. It also describes measures related to the management of contaminated land, waste handling and transport, describes the general duty of care regarding waste management activities, establishes powers for compliance and enforcement and lays the foundation for waste information systems. GN921 of 2013 provides definitions for activities which require a Waste Management Licence (WML) and identifies the relevant EA's which are further required for said activities.</p> <p>The Waste Classification and Management Regulations (GN634 of 2013) and the related National Norms and Standards (GN635- and GN636 of 2013) provide the requirements by which waste is to be classified, labelled and the requirements related to the disposal thereof depending on the classification.</p> <p>The storage of waste above the specific thresholds (in excess of 100 m³ of general waste or 80 m³ of hazardous waste) for a period of more than 90 days triggers a Category C activity which requires compliance with the National Norms and</p> | <p>This is an integrated EA application for activities considered both in terms of NEMA and NEMWA.</p> <p>Refer to Section 2.d.i for the applicable listed activities.</p> <p>Refer to Section 2.i for the plan of study for the EIA phase.</p> | <p>A WML is to be applied for in combination with the NEMA process.</p> <p>A commitment to abide by the Norms and Standards will be included in the EMP, should waste be stored in excess of threshold values and for longer than 90 days.</p> |

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| <p>Standards for the Storage of Waste (GN926 of 2013). Similar National Noms and Standards have been published for the Sorting, Shredding, Grinding, Crushing, Screening and Baling of General Waste (GN1093 of 2017).</p> <p>Mine residue stockpiles were included in list of NEMWA activities as Activity 11, Category B in 2015. The existing residue stockpiles at the THM were established before the coming into effect of the above and therefore the Transitional Provisions of GN921 apply which state that “A person who lawfully conducts a waste management activity listed in this Schedule on the date of the coming into effect of this Notice may continue with the waste management activity until such time that the Minister by notice in a Gazette calls upon such a person to apply for a WML.” Furthermore, Section 43(a)(1) of NEMWA states that residue stockpiles and residue deposits must be managed at the location described for that purposes in the manner prescribed in the approved EMPr.</p> <p>GN632 of 2015 provides regulations regarding the Planning and Management of Residue Stockpiles and Residue Deposits from a Prospecting, Mining, Exploration or Production Operation. These regulations advocate a risk-based approach regarding the planning, management and reporting of residue stockpiles and deposits. The transitional arrangements described in GN632 are noted as follows as they pertain to the THM:</p> <p>13. (1) Anything done in terms of regulation 73 of the Mineral and Petroleum Resources Development Regulations, 2004 relating to the management of residue stockpiles and residues deposits which can be done in terms of a provision of these Regulations must be regarded as having been done in terms of the provision of these Regulations.</p> <p>(2) Management measures of residue stockpiles and residue deposits approved in terms of the Mineral and Petroleum Resources Development Regulations, 2004, at the time of the coming into operation of these Regulations, must be regarded as having been approved in terms of these Regulations.</p> <p>(3) A holder of a right or permit in terms of the Mineral and Petroleum Resources Development Act, 2002 must continue the management of the residue stockpiles and residue deposits in accordance with the approved management measures.</p> | | |
| <p>The Hazardous Substances Act, No. 15 of 1973 aims to control substances that may cause injury, ill-health, or death through their toxic, corrosive, irritant, strongly sensitising or flammable nature, or by the generation of pressure. The Act provides</p> | <p>To be addressed in the EMPr during the EIA phase</p> | <p>Management measures for the handling of hazardous substances will be incorporated into the EMPr in the EIA phase of the project.</p> |

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| <p>for the division of such substances or products into groups in relation to the degree of danger as well as the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products. Hazardous materials such as explosives and hydrocarbons will be handled on site. The Applicant will ensure that any hazardous materials on site are handled in a manner in line with that described in the Act.</p> | | |
| <p>The Mine Health and Safety Act, No. 29 of 1996 (MHSA) and Regulations provide for protection of the health and safety of staff and other persons at mines and, for that purpose to promote a culture of health and safety; to provide for the enforcement of health and safety measures; to provide for appropriate systems of employee, employer and State participation in health and safety matters; to establish representative tripartite institutions to review legislation, promote health and enhance properly targeted research; to provide for effective monitoring systems and inspections, investigations and inquiries to improve health and safety; to promote training and human resources development; to regulate employers' and staff' duties to identify hazards and eliminate, control and minimise the risk to health and safety; to entrench the right to refuse to work in dangerous conditions; and to give effect to the public international law obligations relating to mining health and safety.</p> | <p>A commitment to abide by the Act and Regulations has been included in the EMP</p> | <p>Tawana Hotazel Mining (Pty) Ltd will ensure that operations at the proposed THM are in line with the requirements of the Act and Regulations.</p> |
| <p>The purpose of the National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEMBA) is to provide for the management and conservation of South Africa's biodiversity within the framework of the NEMA. This includes, among others, the protection of species and ecosystems.</p> <p>Section 52 of the Act provides for listing of threatened or protected ecosystems, in one of four categories: Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Protected. The main purpose of listing threatened ecosystems is to reduce the rate of ecosystem and species extinction and includes the prevention of further degradation and loss of structure, function and composition of threatened ecosystems. Threatened terrestrial ecosystems have been delineated based on the South African Vegetation Map, national forest types and priority areas identified in a provincial systematic biodiversity plan.</p> <p>Section 53 of the Act goes on to provide the Minister with power to publish a list of threatening activities within a Section 52 listed ecosystem for which EA is required and this activity becomes triggered. While the Minister has published a</p> | <p>Refer 2.h.iv where the current biodiversity in the proposed THM is characterised.</p> <p>Refer to Section 2.h.v for the potential impacts on ecology and Section 2.h.viii for potential mitigation.</p> | <p>A Terrestrial Biodiversity Assessment was undertaken.</p> <p>A limited portion, along the existing haul roads and access roads, is located within remaining extent of Kathu Bushveld [Threat Status: Least Concern (LC); Protection Level: Poorly Protected] in terms of the National Biodiversity Assessment (NBA): Terrestrial Remnant Vegetation (2018).</p> <p>One faunal Species of Conservation Concern, namely Verreaux's eagle (<i>Aquila verreauxii</i>), utilises the proposed THM area for nesting, breeding and foraging purposes. One Threatened or Protected Species- listed floral species, namely <i>Harpagophytum procumbens</i> was recorded. Two nationally protected tree species in terms of the National Forests Act (Act No. 84 of 1998) occur, namely <i>Vachellia erioloba</i> in relatively low abundance and <i>V. haematoxylon</i> in high abundance. One provincially protected floral species in terms of Schedule 1 of the NCNCA, namely <i>H. procumbens</i>, and several floral species</p> |

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| <p>list of ecosystems in need of protection, to my knowledge, no list of threatening activities has been published to-date.</p> <p>Chapter 4, Part 2 of the Act provides for listing of species as threatened or protected. If a species is listed as threatened, it should be further classified as critically endangered, endangered or vulnerable (GNR151 of 2007). The Act also defines restricted activities in relation to a specimen of a listed threatened or protected species (GNR152 of 2007).</p> | | <p>listed under Schedule 2 of this Act, namely <i>Plinthus sericeus</i>, <i>Ammocharis coranica</i>, <i>Boophone disticha</i>, <i>Crinum sp.</i>, <i>Orphanthera jasminiflora</i>, <i>Albuca seineri</i> (= <i>Ornithogalum seineri</i>), <i>Albuca setosa</i> (= <i>Ornithogalum setosum</i>) were recorded.</p> |
| <p>The National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEMPAA) was promulgated in order to provide for (among other things) the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national Register of Protected Areas, and for the management of those areas in accordance with national norms and standards.</p> <p>The South African Protected Areas Database (SAPAD, 2020) and South African Conservation Areas Database (SACAD, 2020) are Geographic Information System (GIS) inventories of all Protected and Conservation areas in South Africa.</p> <p>The National Protected Areas Expansion Strategy (NPAES; 2010) are focus areas for land-based protected area expansion are large, intact and unfragmented areas of high importance for biodiversity representation and ecological persistence, suitable for the creation or expansion of large protected areas. The focus areas were identified through a systematic biodiversity planning process undertaken as part of the development of the National Protected Area Expansion Strategy (NPAES, 2008). According to the NPAES database (2010), the project area is not located within an NPAES Focus Area.</p> | <p>Refer 2.h.iv where the current biodiversity in the proposed THM is characterised.</p> | <p>According to the most recently published SAPAD (2020) and SACAD (2020) databases, the proposed THM is not located within or within 10km of any formally protected areas such as nature reserves or other conservation areas.</p> <p>The closest protected areas are located further than 40km from the proposed THM.</p> <p>The closest NPAES Focus Area (the Eastern Kalahari NPAES Focus Area) is located approximately 18km to the northwest and west of the proposed THM.</p> |
| <p>The Conservation of Agricultural Resources Act, No. 43 of 1983 (CARA) provides for the conservation of the natural agricultural resources through the maintenance of the production potential of land, through combating and prevention of erosion and weakening or destruction of the water sources, and through the protection of the vegetation and the combating of weeds and invader plants.</p> <p>Amendments to regulations under the CARA (Act No. 43 of 1983) provide for the declaration of weeds and invader plants, with weeds regarded as alien plants with no known useful economic purpose, while invader plants may serve useful</p> | <p>Refer 2.h.iv where the current biodiversity, agricultural potential, soil and land-use in the proposed THM is characterised.</p> | <p>A Terrestrial Biodiversity Assessment was undertaken and a list of alien floral species recorded in the proposed THM, including an indication of the weeds and invader species categories in terms of CARA was compiled.</p> <p>The region is characterised by red aeolian sand and surface calcrete, and deep sandy soils of Hutton and Clovelly soil forms. Land types are mainly Ah and Ae, with some Ag. The deep aeolian Kalahari sands are underlain by hardpan calcretes of the Mokalanen Formation (Kalahari Group). The deep sand</p> |

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| <p>purposes as ornamentals, as sources of timber and may provide many other benefits, despite their aggressive nature. Declared weeds are described as Category 1 plants, while declared invader plants with a commercial or utility value are described as Category 2 plants and ornamental species as Category 3 plants. CARA indicates that Category 1 weeds are prohibited, and that Category 2 and 3 plants must be controlled.</p> | | <p>reaches high temperatures during the summer months and has poor water retention. Soils generally have a high base status with a clay composition usually <15%. The soils are therefore shallow and of low agricultural potential and have rock, calcrete or weathered rock underlying material. As the proposed THM is situated within a historically mined area, grazing is also not a compatible land use as animals are likely to be injured and the area is not considered to be feasible or compatible with agriculture.</p> <p>The EMP will commit the proponent to appropriate topsoil conservation and the regular control of weeds and invader species.</p> |
| <p>The National Forests Act (No. 84 of 1998) is enabling legislation providing for sustainable forest use and management and provides special measures to protect trees and forests by prohibiting the destruction of natural forests, protecting areas and individual tree species and further providing measures to control and remedy deforestation. The Department of Forestry, Fisheries and the Environment (DFFE) are the custodians of the National Forests Act. No person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister of the DFFE to an applicant and subject to such period and conditions as may be stipulated.</p> <p>An updated list of protected tree species was published under section 12(1) (d) of the National Forests Act (Act No. 84 of 1998) on 6 December 2019.</p> | <p>Refer 2.h.iv where the current biodiversity in the proposed THM is characterised.</p> <p>Refer to commitments in the EMP</p> | <p>A Terrestrial Biodiversity Assessment was conducted no indigenous forests occur in the proposed THM. Protected tree species in terms of the National Forests Act (Act No. 84 of 1998) that have been recorded with the proposed THM during the field assessment are <i>Vachellia erioloba</i> (Camel thorn) and <i>V. haematoxylon</i> (Grey camel thorn). <i>Boscia albitrunca</i> (Shepherd's tree), although known from the region, was not recorded; this does not however exclude its presence from the proposed THM.</p> |
| <p>The Northern Cape Nature Conservation Act (No. 9 of 2009) (NCNCA) provides for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province.</p> <p>The Act also lists invasive species in Schedule 6, Especially Protected plant and animal species in Schedule 1, Protected plant and animal species in Schedule 2 and common plant and animal species in Schedule 3. A permit is required to undertake restricted activities involving species listed in Schedule 1 and 2 which include hunting, importing, exporting, transporting, keeping, possessing (unless</p> | <p>Refer to:</p> <ul style="list-style-type: none"> • Section 2.h.iv where the baseline conditions are described • Baseline Terrestrial Biodiversity Assessment Report in Appendix 14 • Commitments in the EMP | <p>A Terrestrial Biodiversity Assessment was undertaken. Provincially protected floral species in terms of the NCNCA recorded within the proposed THM are the Schedule 1 species <i>Harpagophytum procumbens</i>, and the Schedule 2 species <i>Plinthus sericeus</i>, <i>Ammocharis coranica</i>, <i>Boophone disticha</i>, <i>Crinum</i> sp., <i>Orphanthera jasminiflora</i>, <i>Albuca seineri</i> (= <i>Ornithogalum seineri</i>), <i>Albuca setosa</i> (= <i>Ornithogalum setosum</i>).</p> |

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| <p>occurring naturally), breeding or trading in with respect to animal species listed and picking, importing, exporting, transporting, possessing (unless occurring naturally), cultivating and trading in with respect to plant species listed. A permit would therefore be required from the Northern Cape Department of Environmental Affairs and Nature Conservation (NC DENC) to destroy, remove or relocate any provincially listed Specially Protected or Protected species from the site.</p> | | |
| <p>The Northern Cape Conservation Plan (C-Plan; 2016) identifies biodiversity priority areas, namely 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 a landscape as a whole.</p> <p>CBAs are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan, while ESAs are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of CBAs and/or in delivering ecosystem services. The primary purpose of a map of CBA and ESAs maps is to guide decision-making about where best to locate development and to encourage appropriate land uses that are compatible with the desired state of CBAs and ESAs. It should inform land-use planning, environmental assessment and authorisations, and natural resource management, by a range of sectors whose policies and decisions impact on biodiversity. It is the biodiversity sector's input into multi-sectoral planning and decision-making processes.</p> | | <p>The proposed THM is not associated with CBA or ESA sites, and is mostly located within previously modified areas. Limited portions of natural habitat are indicated to remain along existing haul roads within the opencast void and along the access road in the east, with these areas designated as Other Natural Area (ONAs). ONAs are defined as natural or semi-natural areas that are not required to meet biodiversity targets or support natural ecological processes. The desired state of ONAs is best determined through multi-sectoral planning processes and from a biodiversity perspective, these areas can be used for a range of intensive land uses.</p> |
| <p>The Northern Cape Province 2018 Spatial Development Framework (PSDF) Review was commissioned by the Office of the Premier, Northern Cape Province. Key requirements of the PSDF review included:</p> <ul style="list-style-type: none"> • consistency with the PGDP, NDP and National Spatial Development Framework (NSDF) (representation of key national and provincial strategies, policies and plans); • application of the Spatial Planning and Land Use Management Act 16 of 2013 (SPLUMA) principles; • review and update of the Northern Cape Socio Economic Potential of Towns Study completed in 2011 towards the development of the 2012 PSDF document; • promotion of Sectoral involvement in the development of the reviewed PSDF; | <p>This has been taken into consideration in determining the need and desirability of the project, refer to Section 2.f.</p> | <p>From the PSDF Composite Spatial Vision, the THM falls within an area classified as the Gamagara corridor, a mining belt focussing on the mining of manganese and iron.</p> <p>Based on GIS data, the land use and land cover of the proposed THM is mining or mining related infrastructure including mines and mining buildings over majority of the land. Other pockets comprise of bare non-vegetated land, grassland, low shrubland and thickets/bush.</p> |

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| <ul style="list-style-type: none"> • update and review of the Implementation Framework, as proposed in the 2012 PSDF; • evaluation of the current PSDF, looking at core challenges and recommendations; • coordination of Municipal Spatial Development Frameworks; • update, review and improve data (spatial and non-spatial) used for the 2012 PSDF; • verify or update desired and undesired land use patterns; • assess and update current strategy(ies) of the 2012 PSDF; • identify and/or update issues deemed to be of provincial, regional and national interest together with strategic interventions; and • addressing the issue of spatial governance. <p>The THM falls within the Joe Morolong Local Municipality and the Magisterial District of John Taolo Gaetsewe. Kuruman is the administrative capital of the John Taolo Gaetsewe District Municipality and this area is referred to as the Kalahari 'macro-region'. The Gamagara corridor comprises the mining belt of the John Taolo Gaetsewe and Siyanda districts and runs from Lime Acres and Danielskuil to Hotazel in the north. The corridor focuses on the mining of iron ore and manganese.</p> | | |
| <p>The Integrated Development Plan (IDP) of the John Taolo Gaetsewe District Municipality (JTGDM) (2019/2020) and the IDP of the JMLM (2017/2018)</p> <p>JTGDM development priorities are 1. Water & Sanitation 2. Roads & Transport 3. Local economic development 4. Land development and reform 5. Integrated human settlements 6. Sustainable Development Orientated Municipality 7. Environmental management and conservation and climate change management 8. Promotion of health in the District and 9. Disaster management.</p> <p>The JMLM IDP includes Key Performance Areas (KPAs) for the wards and for the municipality which cover 1) Basic Service Delivery, 2) Local Economic Development (LED), 3) Municipal Transformation and Organizational Development, 4) Municipal Finances and Financial Viability, and 5) Good Governance and Community participation. The IDP identifies the following issues as significant challenges for the JMLM:</p> <ul style="list-style-type: none"> • Service delivery and backlog challenges • Maintenance of aging infrastructure • Poverty | <p>Refer to the social baseline in Section 2.h.iv. This has also been taken into consideration in determining of the need and desirability of the project, refer to Section 2.f.</p> | <p>The IDPs have been taken into account in determining the need and desirability of the project and in the formulation of the SLP.</p> |

| | | |
|--|--|--|
| <ul style="list-style-type: none">• Unemployment• Low Economic Growth• Rural development | | |
|--|--|--|

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)

This Section has been prepared in accordance with the 2017 DFFE Integrated Environmental Management Guideline on Need and Desirability.

South Africa's Constitution guarantees all its citizens the right to an environment that is not harmful to their health and/or wellbeing; and to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation. The Constitutional obligations of the State to protect the environment with respect to new developments can only be met through the implementation, enforcement and monitoring of effective legislation. In order to protect the environment and ensure that the proposed project is undertaken in an environmentally responsible manner, the relevant national and local legislation, policies and guidelines were reviewed and incorporated into this Scoping Report.

In terms of **securing ecological sustainable development and use of natural resources** the impact of the proposed project on the biophysical and social environment will be considered in more detail during the EIA phase. The current biodiversity and cultural heritage in the proposed THM is characterised in Section 2.h.iv and includes a description of the Habitat Units and Environmental Sensitivity, Species of Conservation Concern, Protected and NEMBA Threatened or Protected Species and Endemic Species, Alien and Invasive Floral Species and Ecological Drivers and Processes. Section 2.h.v details the potential high level impacts that have been identified and Section 2.h.viii describes the potential mitigation measures.

The aim of the THM is to extract remaining resources which were not previously exploited at the historic HMM, thereby extracting minerals whilst limiting the creation of potential new impacts. Prospecting activities have also confirmed suitable mineralisation including a mix of high-grade ore and lower grades which can be economically and feasibly mined. The project has a long life (~30 years), and will be felt directly by future generations.

The proposed THM is located in an area where there is limited natural vegetation due to the historical mining activities that were undertaken. The proposed THM contains mining and mining related infrastructure over the majority of the area. The surrounding area is characterized by mining. Mining is not considered an environmentally sustainable land development practice, however the footprint of the THM is also limited to the footprint of the MR area and as far as possible the surface infrastructure will be placed on the already disturbed areas and away from the orezone, so as not to sterilise the resource. The proposed THM is not located within or within 10km of any formally protected areas such as nature reserves, Ramsar Sites or other conservation areas. The closest protected areas are located further than 40km from the proposed THM. The closest NPAES Focus Area (the Eastern Kalahari NPAES Focus Area) is located approximately 18km to the northwest and west of the proposed THM. The proposed THM is not associated with CBA or ESA sites, and is mostly located within previously modified areas. Other pockets comprise of bare non-vegetated land, grassland, low shrubland and thickets/bush. From the Northern Cape PSDF, the THM falls within an area defined as the Gamagara Corridor, an area comprising the mining belt of the John Taolo Gaetsewe and the Siyanda districts. It runs from Lime Acres and Danielskuil to Hotazel in the north and focuses on the mining of iron and manganese. According to the industrial areas spatial vision, proposed THM is located within industrial areas and in close proximity to mining focus areas. Access to the area is good, consisting of paved main roads and secondary gravel roads. The proposed THM boundaries are within previously disturbed (mined) land and do not coincide with-, nor are within close proximity to any sensitive environmental features, therefore, limiting the potential for negative environmental impacts. Mining in the area will assist in alleviating unemployment. Poverty alleviation in the area is needed as the official unemployment rate of the District Municipality is 29.7%, and the youth unemployment rate is 37.2%. Mining activities would further allow for the proper and beneficial rehabilitation of areas previously affected by mining activities which have not been rehabilitated to reflect

the surrounding land-use or a suitable alternative. Alternatives considered are described in detail in Section 2.h.i.

Currently there are no other developments planned for within the proposed THM. The existing Hotazel municipal waste site (G:S:B- , Permit No.: B33/2/441/20/P156, licence date 20 February 1995) is located within the proposed THM. Apart from the town of Hotazel, the area immediately surrounding the proposed THM is unpopulated and undeveloped. There is a proposed solar farm, called the Hotazel 2 project, to be located on the remaining extent (Portion 0) of the farm York A 279, and associated infrastructure on Portion 11 of farm York A 279, Remaining extent of Portion 3 of the farm York 279 and the Remaining extent (Portion 0) of the farm Hotazel 280.

Non-renewable resources which will be utilised for the project include water and electricity. All potable water will be supplied through the Vaal Gamagara water scheme via a bulk water meter, managed by Sedibeng Water. The mine will use electricity sourced from Eskom, diesel operated equipment and solar and diesel generators as an alternate supply source. Service water will be pumped from the pit water. Mitigation measures will be put in place to minimise water contamination. Soil is also considered a non-renewable resource. The soils in the area are shallow, limited natural soil resources remain on-site and the overall soil quality is considered poor and of low agricultural potential. However where topsoil is present it will be stockpiled during construction and will be utilised during the rehabilitation process.

Independent specialists were appointed to identify and assess potential positive and negative impacts, including cumulative impacts, of the project. In terms of the gaps, uncertainties and assumptions, these are addressed to some extent in the specialist studies conducted (refer to various appendices). These will be further addressed and consolidated in the EIAR. The level of risk associated with the limits of current knowledge include that the quantification of potential impacts in terms of dust fallout, groundwater, blasting and noise which will be determined by modelling the impacts to be further investigated during the EIA phase. Due to palaeontological and archaeological sites being subterranean in essence, it is possible that all sites may not have been. Blasting impacts and levels of influence are calculated using standard accepted methodology according to international and local regulations, however due to the locality of the mine's opencast pit, careful management and control of blast preparation and blasting is necessary to mitigate any risks. The negative environmental impacts will be contained as far as possible to within the surface infrastructure footprint. The project will generate nuisance noise, fine particulates (dust), traffic impacts, and will potentially impact on groundwater resources – all outside of the infrastructure footprint. Mitigation measures to address the impacts will be included in the EMP.

It is anticipated that the project may result in an improved environmental condition at closure if the recommended rehabilitation measures be implemented, as the proposed THM is currently considered significantly impacted by historical mining activities with vegetation not being representative of the natural indigenous vegetation. Geochemical analysis of the waste material will be undertaken to ensure that positive impacts are improved at closure, to reduce or eliminate potential negative long term groundwater impact after closure. If the mine were to improve the environment through rehabilitation measures and the removal of invasive species it could potentially improve the functioning of the ecosystems and reinstate indigenous and healthy environments that would be of benefit to the surrounding communities from an ecosystem services and beneficial / suitable end land-use perspective. The backfilling and rehabilitation of the currently open pit void would also improve the safety of the area, for both livestock and people. Section 28 of NEMA relates to the duty of care and remediation of environmental damage and states that anyone who causes, has caused or may cause significant pollution or degradation of the environment is strictly liable and must take reasonable measures to prevent the pollution or degradation from occurring, continuing or recurring. A preliminary cost for rehabilitation and closure of the THM has been calculated at approximately R 43.7 million excl. VAT. In line with the requirements of Regulations 5 and 6 of the NEMA Regulations on Financial Provisioning (GNR1147 of 2015 *as amended in 2020*), the closure cost estimate will be further refined and included in the EIAR.

In terms of **promoting justifiable economic and social development** the current socio-economic context of the proposed THM is characterised in Section 2.h.iv and includes a description of the provincial, regional

and local context and the receiving socio-economic environment. The latest IDP of the JTGDM and the JMLM and associated LED strategies were also consulted in characterising the socio-economic context of the area. No Environmental Management Frameworks relevant to the area were found. The public participation process followed meets the requirements of Chapter 6 of the NEMA EIA Regulations, (GNR982 of 2014 as amended in 2017) as described in Section 2.h.ii.

Tawana Hotazel Mining (Pty) Ltd is committed to making changes that contribute positively to social and economic development, poverty eradication and community upliftment in surrounding communities. The overall aim of the SLP and LED projects is to provide provision for skills development and infrastructure improvement for community members.

The THM SLP makes provision for the following proposed LED initiatives:

- Enterprise Development
- Refurbishment of Rural Village Infrastructure
- Water Infrastructure Development

As per the SLP, the focus of the THM will be on local recruitment of the workforce within the local labour sending areas and that employees should have the opportunity to live with their families in a sustainable social environment and have the opportunity to participate in wealth accumulation through ownership of property. The THM will employ approximately 177 people (inclusive of outsourced service providers). The bulk of these positions will consist of semi-skilled labour. Once the mine is operational, the employment of a local workforce will translate into more individuals being impacted through direct and indirect income. THM will therefore promote the importance and benefits of home ownership by educating employees regarding living budgets, housing options, accessing government housing loans and subsidies; and will review current financial status of employees interested in home ownership and assess, together with the employee, what steps could be taken in order for the employee to be able to participate in the home ownership arena.

Globally, Asia is the largest market for Manganese Lumpy and Fines Ore and South African Manganese producers, such as Tawana Hotazel Mining are well placed as suppliers to this market. The principal end-use for manganese ore, after conversion to either silico-manganese or ferro-manganese alloys, is a critical input to the global steel manufacturing industry, which produced approximately 1.7 billion tonnes (Bt) of raw steel in 2019, up by 3.4% compared to 2018 (World Steel Association, 2020). China (996Mt), India (111Mt), Japan (99Mt), and the United States (88Mt) represent the top four steel producing countries in 2019, contributing some 76% to current global steel production, (World Steel Association, 2020). It is noteworthy that this level of steel production represents only 80% utilisation of the installed 2.4Bt of global steel production capacity, arising from the last two decades of unprecedented steel production capacity expansion in Asia.

While the bulk of the world's manganese alloy is produced in China and India, in support of their domestic steel production capacity, China's diminishing primary manganese ore supply is typically of low grade and is insufficient to meet domestic demand, while India relies on imported manganese ore feedstock to augment constrained domestic ore sources. Japan and the United States have no domestic manganese ore sources. Subordinate applications for manganese include use in speciality alloys, batteries and chemicals.

Manganese ore is not exchange traded, and prices are largely determined by supply and demand dynamics linked to the global steel industry production levels. Manganese ore is priced in US\$/ Dry Metric Tonne Unit (dmtu), and consequently ore grade is directly reflected in the price per tonne of ore.

g. Period for which the Environmental Authorisation is Required

The period for which authorisation is required will be for 30 years.

h. Description of the Process Followed to Reach the proposed Preferred Site

(NB!! – This section is not about the impact assessment itself; It is about the determination of the specific site layout having taken into consideration (1) the comparison of the originally proposed site plan, the comparison of that plan with the plan of environmental features and current land uses, the issues raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout as a result.)

The THM is located in an area where there is limited natural vegetation due to the historical mining activities that were undertaken. The footprint of the THM is also limited to the footprint of the MR area and as far as possible the surface infrastructure must be placed on already disturbed areas and away from the orezone, so as not to sterilise the resource. Other factors include the location of existing infrastructure such as the access roads and the municipal waste dump.

i. Details of all Alternatives Considered

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

- the property on which or location where it is proposed to undertake the activity;
- the type of activity to be undertaken;
- the design or layout of the activity;
- the technology to be used in the activity;
- the operational aspects of the activity; and
- the option of not implementing the activity.)

1) Property/ Location

No alternative sites were assessed as the proposed location was selected based on the location of the MR area, surface access rights, as well as the location of the orezone within the property determined from the exploration results.

2) Type of Activity

The mining activity will comprise of opencast mining operations in the historical void and associated activities, including, blasting, loading, hauling and processing to extract the ore. Supporting surface infrastructure will be developed on site.

Underground mining methods were used in the past, however such methods of mining the Hotazel ore body would no longer be economical and thus the opencast option is preferred.

3) Design or Layout

The design and layout prioritises compatible land-use, namely the existing void, which correlates with the location of the orezone within the property, the boundary of the MR area and the existing infrastructure on surface.

The chosen layout is also the most suitable in terms of fitting the required infrastructure within the boundary of the MR area while taking cognisance of surrounding sensitive receptors.

4) Technology to be used and Operational aspects

The proposed operation involves the use of existing infrastructure, mobile loading equipment and a mobile crushing and screening plant as far as possible in order to limit capital expenditure. Trade-off studies were undertaken for the following technological and operational aspects of the project:

| Item | Alternative / Trade-off | Preferred option |
|--------------|--|--|
| Power | <ul style="list-style-type: none"> • Electrical power and/or diesel power for the plant and mine. • Feasible renewable energy solutions. | <ul style="list-style-type: none"> • The plant and office infrastructure will be powered using electricity produced by Eskom. • The mine currently plans to also operate with diesel powered equipment. • Until such time as power infrastructure is installed on-site a mix of solar and diesel generators will be used as an alternate supply source. |

| | | |
|--|---|---|
| Operation | Owner-operated versus contractor-operated plant and mine | <p>The mine will be owner-operated aside from the following statutory key areas that will be outsourced:</p> <ul style="list-style-type: none"> • Occupational Health and Emergency Medical services • Occupational Hygiene services • Part time Rock Engineering and Geotechnical services • Mine surveyor • Blasting services • Sampling • Security • Logistics |
| Bulk water supply and management of Pit Water | <p>Solutions for impounded water within the historical mine void include:</p> <ul style="list-style-type: none"> • Re-use of water for service needs and dust suppression (high-cost of treatment for potable use vs Vaal Gamagara Regional Water Supply Scheme) • Pumping full volume to service impoundment (limitations on space for impounding full volume, prohibitive cost of liner system) • Options for water storage including use of stored water, or evaporation opportunities to minimise the size of the PCD required | <ul style="list-style-type: none"> • Current plans are for impounded water in the historical void to be pumped to a 25000 m³ lined PCD, to be used for dust suppression and service use on site. • Evaporators will also be used to manage excess water volumes. • All potable water will be supplied through the Vaal Gamagara water scheme via a bulk water meter, managed by Sedibeng Water. |
| Blasting | Alternative blasting parameters (fragmentation optimisation, noise, vibration etc influencing hole size, explosive types and drilling equipment). | <p>The blast designs selected aim to achieve productive blasting while achieving the environmental controls that are needed for mining safely at the proposed THM.</p> <p>The blast designs (including timing and stemming requirements) will take the rock type descriptions, mining methods including planned bench height and hole diameter and the distribution of sensitive receptors surrounding the mine into account.</p> <p>The following limits will be applied: Ground vibration: A maximum peak particle velocity (PPV) of 6 mm/s for the closest house. Air blast: A peak air blast level of 120 dBL. Maximum fly rock range: Limiting fly rock to within a maximum risk range of 300 m.</p> |
| Ore and processing | Wet versus dry processing plant / beneficiation process. | Due to the scarcity of water in the area, a dry processing plant was selected as the preferred option. |
| | Grade and size optimisation versus value | <p>The product split will be:</p> <ul style="list-style-type: none"> • Lumpy (-75+6mm) – 80% • Fines (-6 mm) – 17% • Other - 3% |
| | Permanent/ fixed location crushing and screening plant versus mobile crushing and screening plant and mobile loading equipment. | <ul style="list-style-type: none"> • The capital expenditure required for a mobile plant was found to be less. • Due to the need to mine high-grade ore in the pit and mix with the lower grade material from the |

| | | |
|---------------------------------------|---|---|
| | | lower benches of the pit, the loading equipment needs to be mobile. |
| Transportation of ore off site | Road trucks versus rail. | <ul style="list-style-type: none"> Transportation of ore by road was elected because the rail capacity is currently constrained. Transnet will only be in a position to place trains at Hotazel from 01 April 2023. |
| Municipal waste dump | Moving of the municipal waste dump, versus alternative access versus replacement with a waste-to-energy plant versus providing an alternate entrance to the waste dump. | The municipal waste dump will remain in place due to factors regarding closure- and rehabilitation of the existing site, identifying a suitable alternative location and cost / permitting aspects entailed in closure and rehabilitation of both old- and new sites. |

5) *The “No-Go” Option*

Should the proposed development of the THM not proceed, the associated positive socio-economic and environmental benefits identified will not be realised (i.e. those related to partaking within the regional developmental goals, upliftment within labour-sending areas, contribution of royalties and taxes, opportunities for the rehabilitation of historical workings), while the potential negative impacts (described elsewhere in this SR) will also not materialise to the same extent.

ii. **Details of the Public Participation Process Followed**

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

The public participation process aims to conduct meaningful consultation with landowners, lawful occupiers, owners and occupiers of adjacent land, municipal councillor of the ward, organisation of ratepayers that represent the community in the area, municipality, organ of state having jurisdiction in respect of any aspect of the activity and other Interested and Affected Parties (IAPs). Refer to the detailed Public Participation Plan attached as Appendix 6.1.

Scoping phase public participation process

The Scoping phase public commenting period runs from **10 August 2021 to 9 September 2021**.

Registration of IAPs

An IAP register has been opened and representatives from the organs of state which have jurisdiction applicable to the Tawana Hotazel Mine have been included. Any IAPs who submit written comments, attend meetings or request to register pursuant to the project announcement phase (see means described below), will also be added to the database (refer to Appendix 6.2).

The IAP register will be maintained throughout the authorisation process.

Written notification and consent

Written notice, as required by NEMA Regulations Section 41(2)(b), was provided to the following recipients:

- Lawful occupant / landowner on the site over which the application has been submitted.
- Land owners, lawful occupiers and persons in control of land adjacent to the site.
- The municipality and municipal councillor of the ward in which the site is situated.
- Organs of state having jurisdiction in respect of any aspect of the activity.
- Any other parties identified by the Competent Authority as requiring notification.

In terms of Section 41(2)(b) of the NEMA Regulations, with the intention of promoting social distancing, notices will be provided to the above-mentioned parties via email and media notice (see below).

The current landowner of the farm portions subject to the MRA was provided with written notification of the project on 30 July 2021.

Media notice

Media notices (in English) were published in the Noordkaap Bulletin on 05 August 2021 and the Kathu Gazette on 07 August 2021. The media notice shall be prepared in accordance with Section 41(2)(c) of the NEMA EIA Regulations for the purposes of announcing the project, identifying IAPs and inviting IAPs to register on the database of IAPs, during the Scoping phase of the process. The notice will announce the project and indicate that Scoping and Environmental Impact Reporting processes are being undertaken in terms of NEMA, and will indicate: the nature and location of the activity to which the application relates, the process to be followed to register as an IAP and otherwise make representations regarding the proposed application, locations where the Scoping Report will be available for review, and contact details of the EAP from whom more information can be obtained. The timeframes for the public commenting periods and deadlines for submission of comments will be clearly indicated (refer to Appendix 6.3).

Site notices

Site notices were displayed on-site and at conspicuous locations within the surrounding communities during the Scoping phase of the project. The site notices will be prepared in accordance with Section 41(3) of the NEMA EIA Regulations and will provide a brief project description, that Scoping and Environmental Impact Reporting processes are being undertaken in terms of NEMA (and other applicable legislative requirements), the nature and location of the activity to which the application relates, the process to be followed to register as an IAP and otherwise make representations regarding the proposed application, locations where the Scoping Report will be available for review, and contact details of the EAP from whom more information can be obtained. The timeframes for the public commenting periods and deadlines for submission of comments will be clearly indicated (refer to Appendix 6.4).

Background Information Document (BID) and meetings

The Background Information Document (BID) is a non-technical document which provides a brief description of the project, the nature and location thereof, potential impacts being investigated, the legislated environmental process, availability of the reports for review, the process to follow to register as an IAP, and contact details for queries and to whom representations can be made.

The BID was provided to State Departments and IAPs via email on 10 August 2021, and to surrounding residents in Hotazel by hand on 10 August 2021 (refer to Appendix 6.5).

Any representation or other participation between the EAP and IAPs, stakeholders and representatives from State Departments, will be undertaken, telephonically or via an online platform (Zoom, Google Meet, Microsoft Teams etc). Where digital engagement is not feasible, an attempt will be made to facilitate meetings commensurate with limitations imposed by the applicable Alert Level.

Provision of reports and documents

The Scoping Report and any other relevant document (“information containing all relevant facts in respect of the application”) for review and comment by IAPs, stakeholders and the relevant State Departments was provided digitally, where possible, directly via email or, via an email containing a link to a download platform (on the Prime Resources website: www.resources.co.za) during the 30-day commenting periods. Where hard copies of any documents are submitted, they will be sanitized.

Hard copies of reports will only be made available in accordance with Appendix 3 of GN650 and GN970 of 2020 which states that “reports may not be made available at any public places or premises closed to the public.” Therefore, hard copies of documents will only be placed at the Hotazel Public Library if the facility is open to the public (depending on the prevailing Covid-19 lockdown Alert Level and the Covid-19 protocols implemented at the proposed location). Documents will be sanitised according to the Covid-19 protocol implemented by the party hosting the documents.

Comments and Responses Report

A Comments and Responses Report will be prepared, containing all comments received and responded to and any other representations made during the respective 30-day commenting periods, and will be provided to the DMRE with the final Scoping and EIA / EMPr reports. The Comments and Responses Report and IAP database may only be disclosed to the Competent Authority in accordance with the Protection of Personal Information Act, No. of 2013 (POPI Act).

In order to fulfil the requirements for meaning public consultation in terms of the MPRDA, NEMA and the EIA Regulations, Prime Resources is required to process the personal information (as defined in the POPI Act) of IAPs and relevant Stakeholders. Such personal information may include full names, addresses, designations and any comments or representations. This data will be captured either through wilful disclosure by IAPs and Stakeholder, or, where necessary, from data published on the internet (for example on Departmental Websites). This data will be retained on the IAP database for the duration of the Environmental Authorisation application process- and, if awarded, the duration of any Environmental Authorisation awarded, after which it will be destroyed. In order to uphold the interests of IAPs and Stakeholders, certain elements of the data processed will be disclosed in the reports produced by the EAP, however, full names and contact information will only be disclosed to the Competent Authority.

EIA phase public participation process

The EIAR and EMPr will be made available, for review and comment by IAPs, stakeholders and the relevant State Departments, during the 30-day commenting period for the EIA phase. The EIAR and EMPr will further be updated with any comments received and will be submitted to the DMRE at the end of the commenting period for consideration.

iii. Summary of issues raised by IAPs

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

This table will be completed once the Scoping phase public participation process has ended. The table is also referred to as the Comments and Response Report.

| INTERESTED AND AFFECTED PARTIES | DATE & METHOD NOTIFIED | DATE COMMENTS RECEIVED (METHOD) | ISSUES RAISED | (DATE & METHOD OF RESPONSE) EAP'S RESPONSE TO ISSUES AS MANDATED BY THE APPLICANT | CONSULTATION STATUS |
|--|------------------------|---------------------------------|---------------|---|---------------------|
| Landowner/s and lawful occupier/s of the land where the activity will take place | | | | | |
| | | | | | |
| Landowners or lawful occupiers on adjacent properties | | | | | |
| | | | | | |
| Municipal ward councillor | | | | | |
| | | | | | |
| Municipality | | | | | |
| | | | | | |
| Organs of state (responsible for infrastructure that may be affected Roads Department, Eskom, Telkom, DWS etc.) | | | | | |
| | | | | | |
| Department Land Affairs | | | | | |
| | | | | | |
| Traditional Leaders | | | | | |
| | | | | | |
| Department Environmental Affairs | | | | | |
| | | | | | |
| Other Competent Authorities affected | | | | | |
| | | | | | |
| Organisations | | | | | |
| | | | | | |
| Surrounding communities | | | | | |
| | | | | | |

iv. The Environmental Attributes Associated with the Site – Baseline Environment

1) *Type of environment affected by the proposed activity* (its current geographical, physical, biological, socio- economic, and cultural character)

a) Climate and Ambient Air Quality

The information presented in this section was obtained from following reports:

- Air Quality Baseline Report for the Proposed Tawana Hotazel Mine in Northern Cape Province compiled by Airshed Planning Professionals (Pty) Ltd (February 2021) (refer to Appendix 7)
- Air Quality Management Plan (AQMP) for the Northern Cape: Air Quality Baseline Assessment Report developed by uMoya-NILU (December 2017)

The Northern Cape is generally hot and dry. Maximum summer temperatures often exceed 40°C. During winter, the average daytime temperatures are mild and night time temperatures may drop below 0°C. There are four climatic zones in the Northern Cape: hot desert, cold semi-arid, cold desert and hot semi-arid. Hotazel (the closest town, situated adjacent to the proposed THM) is classed as a cold semi-arid area. Monthly mean, maximum and minimum temperatures are shown in Table 1 below.

Table 1: Monthly temperature summary (AERMET processed WRF data, January 2017 to December 2019)

| Minimum, Average and Maximum Temperatures (°C) | | | | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Hourly Minimum | 12 | 12 | 9 | 5 | 0 | -3 | -5 | -4 | -4 | -1 | 6 | 11 |
| Monthly Average | 28 | 27 | 25 | 22 | 17 | 13 | 12 | 14 | 19 | 22 | 25 | 27 |
| Hourly Maximum | 39 | 37 | 37 | 34 | 30 | 26 | 27 | 30 | 35 | 36 | 38 | 39 |

The wind roses comprise 16 spokes, which represent the directions from which winds blew during a specific period. The colours used in the wind roses below, reflect the different categories of wind speeds; the yellow area, for example, representing winds between 6 and 8 m/s. The dotted circles provide information regarding the frequency of occurrence of wind speed and direction categories. The frequency with which calms occurred, i.e. periods during which the wind speed was below 1 m/s are also indicated. The period wind field and diurnal variability in the wind field are shown in Figure 4, while the seasonal variations are shown in Figure 5. The wind field is dominated by winds from the north-easterly sector. The strongest winds (>6 m/s) occurred mostly from the northerly sectors. Calm conditions occurred 3.66% of the time, with the average wind speed over the period of 4.36 m/s. Wind speeds are stronger during the day but with a higher frequency of calm conditions (4.01% during the day) than during the night (3.31% during the night). Night-time shows dominant north-easterly, east-north-easterly, south-south-easterly and southerly components to the wind field and during the day these winds decrease, and the northerly winds dominate. Strong winds exceeding 6 m/s occurred most frequently during summer and spring, followed by winter. Calm conditions occurred most frequently during the autumn and winter months.

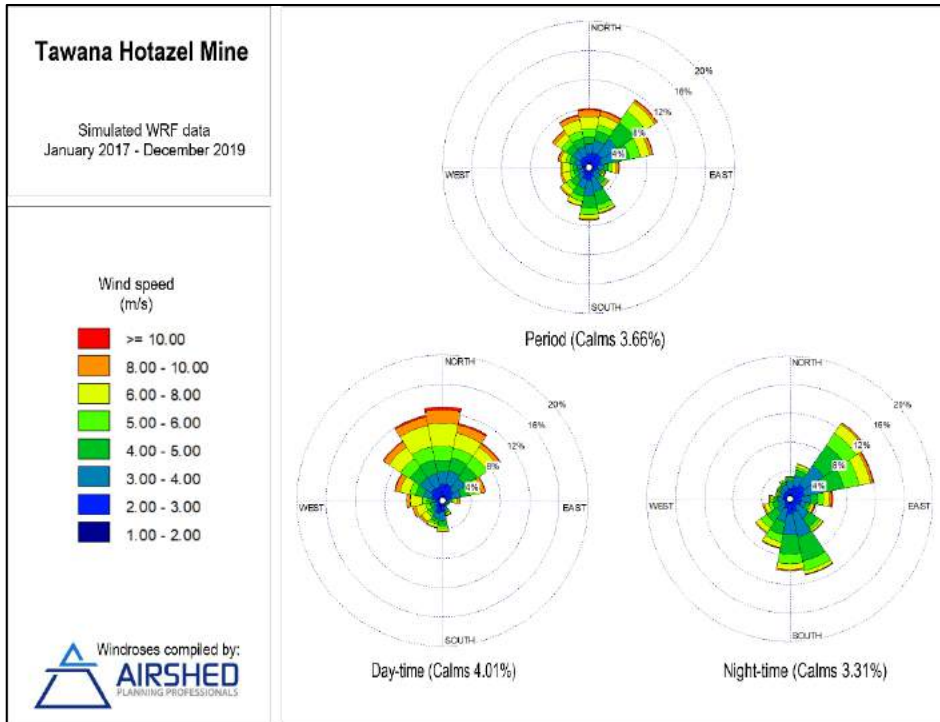


Figure 4: Period, day- and night-time wind roses (AERMET processed WRF data, January 2017 to December 2019)

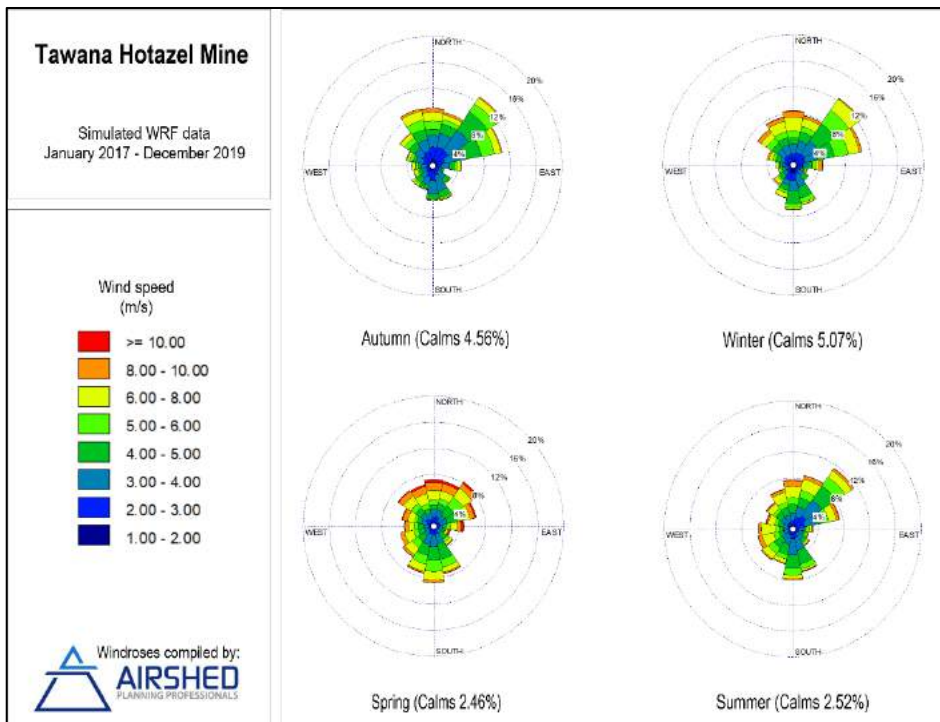


Figure 5: Seasonal wind roses (AERMET processed WRF data, January 2017 to December 2019)

The proposed THM falls within the summer rainfall region of South Africa, in which more than 80 % of the annual rainfall occurs from October to April, during the summer months although it also rains during spring and autumn while the winter months are dry even through the relative humidity is greater during the winter period than other seasons. Colder air can hold less moisture than warmer air and thus the percentage saturation is higher at a lower moisture quantity resulting in higher relative humidity during colder periods than warmer periods. Monthly rainfall and relative humidity data obtained from the Weather Research and Forecasting data is presented in

Figure 6 below. Total average annual rainfall from January 2017 to December 2019 is 161 mm. The rainfall for 2017, 2018 and 2019 was 199 mm, 86 mm, and 198 mm, respectively.

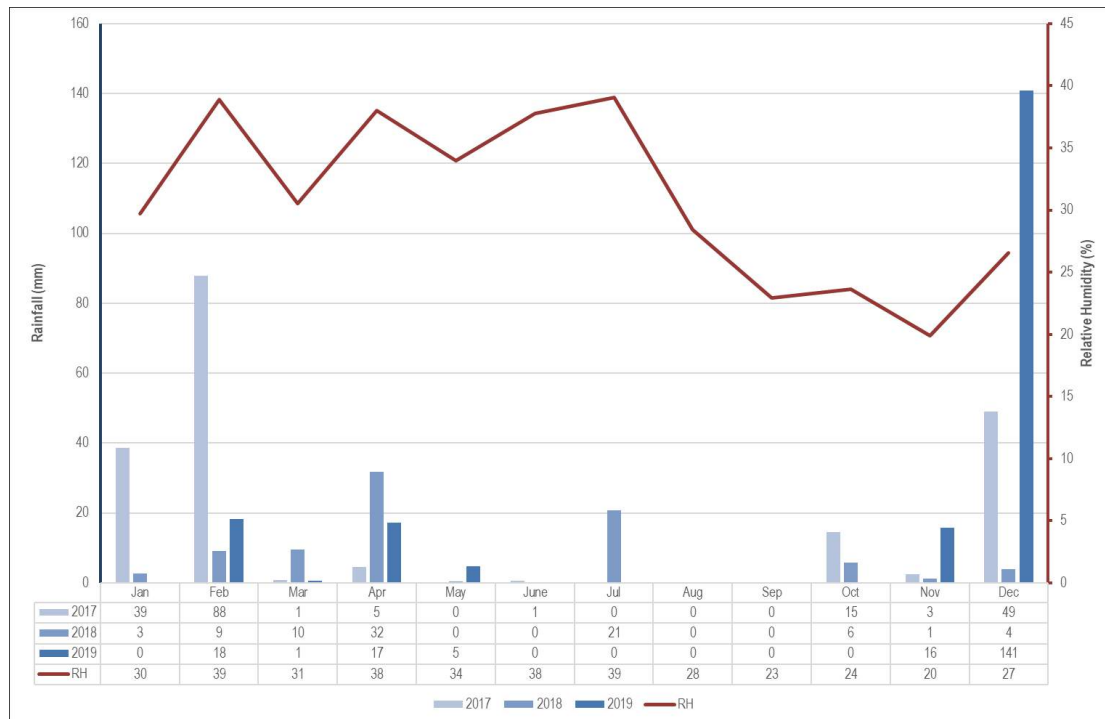


Figure 6: Monthly rainfall and relative humidity (AERMET processed WRF data, January 2017 to December 2019)

The main sources of air pollution in the Northern Cape are biomass burning and mining, followed by industry and motor vehicles. Biomass burning is a major contributor of carbon monoxide (CO) whereas mining contributes particulate matter (PM₁₀, PM_{2.5}) and total suspended particles (TSP). Motor vehicles are the largest source of Oxides of nitrogen (NO_x) and Volatile organic compounds (VOC) emissions, although these are relatively small and it is likely that these emissions have been underestimated. Long range atmospheric transport of air pollutants from the industrialised Highveld and biomass burning in southern and central Africa may influence ambient air quality over parts of the Northern Cape. Emissions within the Northern Cape in 2015 are summarised in Table 2.

Table 2: Estimated emissions (tons/annum) during 2015 in the Northern Cape (uMoya-NILU, 2017)

| | PM ₁₀ | PM _{2.5} | TSP | SO ₂ | NO _x | CO | VOC |
|--------------------|------------------|-------------------|--------------|-----------------|-----------------|---------------|-------------|
| Industrial sources | 1452 | | 133 | 289 | 333 | 79 | 24 |
| Mining | 32248 | 22315 | 61453 | | | | |
| Residential fuels | 42 | | | 2 | 6 | 315 | |
| Biomass burning | | | 15978 | 695 | 3917 | 115525 | |
| Motor vehicles | 517 | | | 253 | 6574 | 15433 | 3067 |
| Airports | | | | 3 | 11 | 9988 | 158 |
| Total | 34259 | 22315 | 77564 | 1242 | 10841 | 141340 | 3249 |

Existing Air Quality

The current air quality in the study area is mostly influenced by mining and processing activities at other surrounding operations, as well as farming activities, domestic fires, vehicle exhaust emissions and dust entrained by vehicles. These emission sources vary from activities that generate relatively coarse airborne particulates (such as dust from paved and unpaved roads, and the mine sites) to fine PM such as that emitted by vehicle exhausts, diesel power generators and processing operations.

Emissions from unpaved roads constitute a major source of emissions to the atmosphere in South Africa. When a vehicle travels on an unpaved road, the force of the wheels on the road surface causes pulverization of surface

material. Particles are lifted and dropped from the rolling wheels, and the road surface is exposed to strong turbulent air shear with the surface. The turbulent wake behind the vehicle continues to act on the road surface after the vehicle has passed. Dust emissions from unpaved roads are a function of vehicle traffic and the silt loading on the roads. Emissions from paved roads are significantly less than those originating from unpaved roads, however they do contribute to the particulate load of the atmosphere. Particulate emissions occur whenever vehicles travel over a paved surface. The fugitive dust emissions are due to the re-suspension of loose material on the road surface. Emissions generated by wind erosion are dependent on the frequency of disturbance of the erodible surface. When a surface is disturbed e.g. by mining, agriculture and/or grazing activities, its erosion potential is restored.

Dustfall Sampling Rates

No site-specific ambient air quality data is available. A site visit was undertaken by specialists from 30 November 2020 to 4 December 2020 where dustfall units were installed to undertake three months of dustfall sampling.

The dustfall sampling network included four locations: three classified as non-residential sites and one as a residential site according to the NDCR (refer to Figure 7).

Dustfall rates at the sampling sites from 4 December 2020 to 5 March 2021 are summarised in Table 3. There was one exceedance of the NDCR limit for non-residential areas at D1 (north of mine access road) in Month 2 (value in red); determination of the organic matter content of this filter may be requested in the future. The dustfall rates at the unit on the boundary of Hotazel is below the NDCR limit for residential areas for all three months. The sampled dustfall rates are compliant with the NDCR based as the three months results as there were no exceedances of the applicable limit more than two times in the sampling period at a site or for consecutive months at a site.

Table 3: Dustfall rates summary

| <i>NDCR Limit for Residential Areas = 600 mg/m²-day</i> | | | | | |
|--|---|-----------------------|------------------------|------------------------|------------------------|
| <i>NDCR Limit for Non-Residential Areas = 1 200 mg/m²-day</i> | | | | | |
| Map ID | Location | Applicable NDCR Limit | Month 1 ^(a) | Month 2 ^(b) | Month 3 ^(c) |
| D1 | East of the proposed THM | Non-Residential | 137 | 3 376 | 266 |
| D2 | North of the proposed THM | Non-Residential | 77 | 911 | 655 |
| D3 | East of Hotazel near Dwarsstraat, West of the proposed THM | Residential | 79 | 375 | 190 |
| D4 | South of the proposed THM | Non-Residential | 165 | 320 | 673 |

Notes:

(a) Sampling period from 4 December 2020 to 5 January 2021 = 32 days exposure

(b) Sampling period from 5 January 2021 to 5 February 2021 = 31 days exposure

(c) Sampling period from 5 February 2021 to 5 March 2021 = 28 days exposure

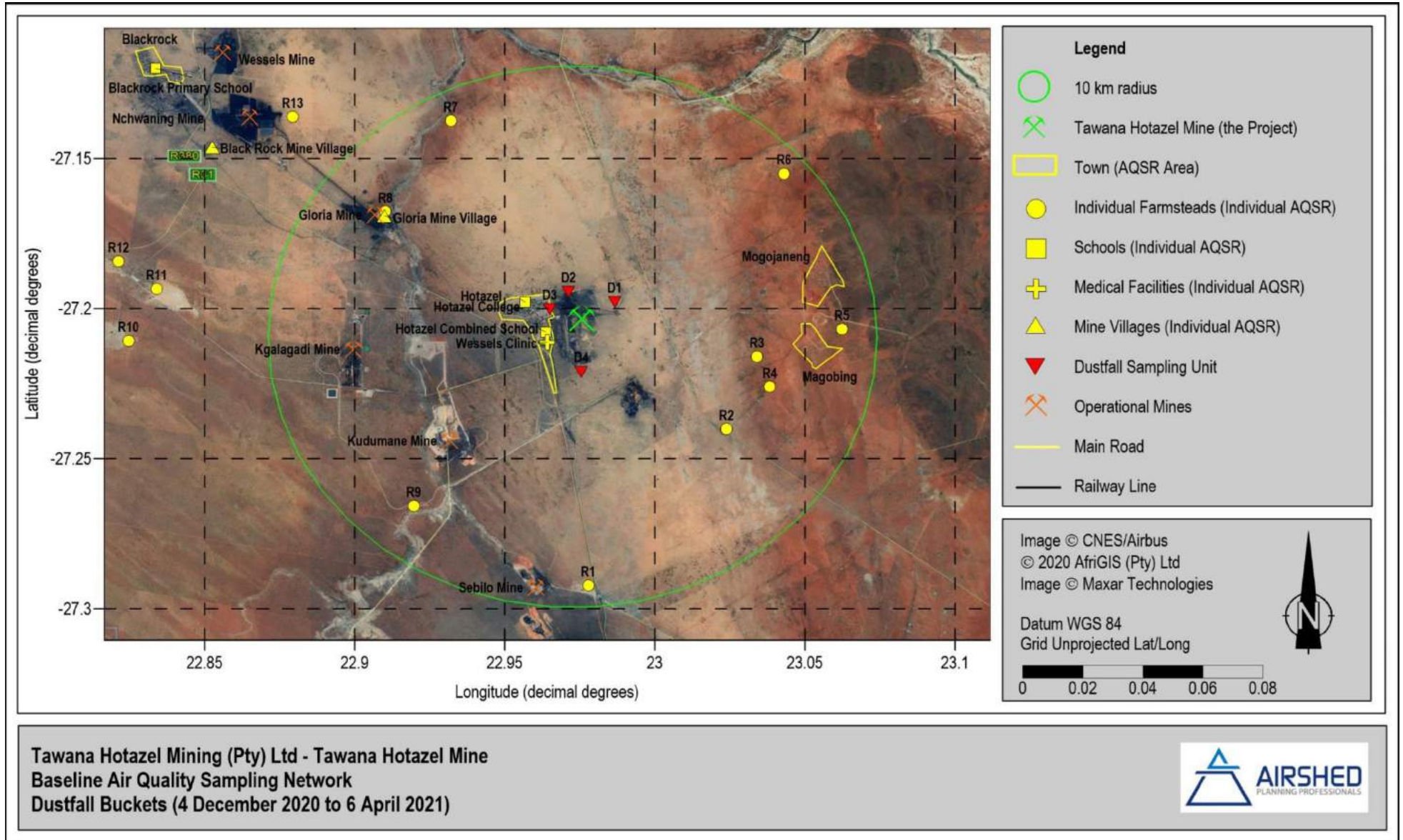


Figure 7: Air Quality Sensitive Receptors within a 10 km radius of the proposed THM and the dustfall bucket locations

b) Greenhouse Gas Emissions and Climate Change

The information presented in this section was obtained from following report:

- Air Quality Baseline Report for the Proposed Tawana Hotazel Mine in Northern Cape Province compiled by Airshed Planning Professionals (Pty) Ltd (February 2021) (refer to Appendix 7)

Greenhouse gases (GHG) are “those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth’s surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the Earth’s atmosphere.

Moreover, there are a number of entirely human-made GHGs in the atmosphere, such as the halocarbons and other chlorine and bromine containing substances, dealt with under the Montreal Protocol. Beside CO₂, N₂O and CH₄, the Kyoto Protocol deals with the greenhouse gases sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) (IPCC, 2007). Human activities since the beginning of the Industrial Revolution (taken as the year 1750) have produced a 40% increase in the atmospheric concentration of carbon dioxide, from 280 ppm in 1750 to 406 ppm in early 2017 (NOAA, 2017). This increase has occurred despite the uptake of a large portion of the emissions by various natural “sinks” involved in the carbon cycle (NOAA, 2017). Anthropogenic CO₂ emissions (i.e., emissions produced by human activities) come from combustion of fossil fuels, principally coal, oil, and natural gas, along with deforestation, soil erosion and animal agriculture (IPCC, 2007).

South Africa ratified the United Nations Framework Convention on Climate Change (a framework for international cooperation to combat climate change by limiting average global temperature increases and the resulting climate change, and coping with impacts) in August 1997 and acceded to the Kyoto protocol in 2002, with effect from 2005. However, since South Africa is an Annex 1 country it implies no binding commitment to cap or reduce GHG emissions. The National Climate Change Response White Paper stated that in responding to climate change, South Africa has two objectives:

- to manage the inevitable climate change impacts and
- to contribute to the global effort in stabilising GHG emissions at a level that avoids dangerous anthropogenic interference with the climate system.

The White Paper proposes mitigation actions, especially a departure from coal-intensive electricity generation, be implemented in the short- and medium-term to match the GHG trajectory range. Peak GHG emissions are expected between 2020 and 2025 before a decade long plateau period and subsequent reductions in GHG emissions. The White Paper also highlighted the co-benefit of reducing GHG emissions by improving air quality and reducing respiratory diseases by reducing ambient particulate matter, ozone and SO₂ concentrations to levels in compliance with National Ambient Air Quality Standards by 2020. In order to achieve these objectives, the DFFE appointed a service provider to establish a national GHG emissions inventory, which will report through the SAAQIS.

The Carbon Footprint and the potential GHG Emissions from the proposed THM will form part of the potential impacts.

c) Topography

Site specific topographical elevations ranges between 1 063 and 1 070 m above mean sea level (mamsl). The topography within the proposed mining area is best described as gently sloping from the east (at approximately 1 071 mamsl) towards the Gamagara River west of the proposed mining area (at approximately 1 063 mamsl). The topographical gradient ranges around 1:280.

The only distinct topographic features in the greater area are a small inselberg at Black Rock mine, the north-south trending Kuruman Hills toward the east and the Korannaberge to the west. With the exception of the existing opencast void and surface dumps in the south and east of the proposed THM, no significant landforms such as hills, valleys or outcrops could be discerned from available elevation and relief data, although surface mine dumps are present within the east and south of the proposed THM.

d) Geology

On a regional scale, the proposed THM is located on the relatively young Kalahari Group. The Kalahari Manganese Basin is situated within the Kuruman district of the Northern Cape Province and lies at approximately 1000 mamsl. The property is in the northern portion of the Kalahari Manganese Field (KMF). The KMF is an erosional basin spanning approximately 40 km in the North-South dimension and 15 km in the East-West dimension. The regional strike in the study area is 330 degrees with a westward dip of around 7 degrees.

Locally, within the bounds of the MR area, only the Hotazel Formation and overlying Kalahari Group Sediments are preserved, with all three manganese units (UB, Middle Body and LB) present; refer geological map in Figure 9. The MR area is unique in that both ore types of the Kalahari Manganese field (i.e. Wessels Type and Mamatwan Type) appear to be present. There are also numerous fractures and potential faults which have allowed for deleterious ferruginization (replacement of manganese by iron).

The lithologies in the study area belong to the Griqualand West sequence of the Transvaal Supergroup. The base of the study area is formed by the Ongeluk Lava consisting of an amygdaloidal Andesite. The Hotazel formation overlies the lava and consists of a 40 – 100 m thick Banded Iron Formation (BIF). Intercalated in the BIF a total of 3 Manganese seams can be found. The lowermost of these seams (LMO) is followed by the Manganese Marker seam (MMO) about 2 to 4 m above it. The upper Manganese seam (UMO) normally occurs about 20 m above the No 1 seam. The LMO has been extensively exploited in the past. The Hotazel formation is overlain by a sequence of Shales and Quartzites of the Mapedi Formation. Glacial sediments of the Dwyka Formation were observed and is thought to occupy NE – SW trending glacial valleys. The Mapedi Formation is followed by the recent Kalahari Formation consisting of a series of Aeolian sands, clays, and gravels.

The major rock types that occur in the study area include dolomite, limestone and chert of the Ghaap Group, BIF within the Griquatown West Sequence and shales and schists of the Ecca Group of the Karoo Supergroup.

e) Soil, Land Capability and Agricultural Potential

Information for this section has been sourced from:

- The Department of Agriculture, Forestry and Fisheries (now called the Department of Agriculture, Land Reform and Rural Development (DALRRD)) Generalized soil patterns: A simplified baseline of the soils of the country, 2004
- The Department of Agriculture, Forestry and Fisheries (now called the Department of Agriculture, Land Reform and Rural Development (DALRRD)) National land capability evaluation: Long term grazing capacity map for South Africa, 2016
- The Institute for Soil, Climate and Water (ISCW) of the Agricultural Research Council (ARC) Land Type and Land Capability database of South Africa
- Southern African Agricultural Geo-referenced Information System (AGIS) data
- Agricultural Compliance Statement for the Proposed Tawana Hotazel Mine compiled by Digital Soils Africa (Pty) LTD (DSA) (July 2021) (refer to Appendix 8)

The Compliance Statement was compiled according to the protocol for the specialist assessment and minimum report content requirements for the environmental impacts on agricultural resources (GN320 of 2020).

The National Land Capability Classification was undertaken at a national scale, using the landtype data on a scale of 1:250 000 (DAFF National land capability evaluation raster data layer, 2017). The National Land Capability has fifteen classes, as opposed to the eight classes described by Schoeman et al. (2002). Classes 1 to 7 are of low land capability and only suitable for wilderness or grazing. Classes 8 to 15 are considered to have arable land capability with the potential for high yields increasing with the land capability class number.

The feature which increases the low Agricultural sensitivity to medium sensitivity are Land capability values of between 6 and 8, which are considered moderately arable soils.

The mean annual rainfall distribution is between 200 and 400 mm and the site falls within the arid climate. The current land use is dominated by historic open cast mining and mining infrastructure. The access road intersects natural grasses.

There is only one land type occurring in the study area, namely Ah9 (Figure 8). Ah9 is dominated by freely drained and structureless soils (93%). Most of the soils are deeper than 1200 mm (96%) and have less than 6% clay. Soils in the area have limited pedological development and the texture of soil in this land type is dominated by sand with the clay fraction estimated as less than 10%. Deep Hutton and Clovelly soil forms (>1.2m) constitutes the largest portion of this land type. The landtypes of the area predict deep red sandy soils. These soils will have a low water holding capacity which will limit crop production in the arid climate. Therefore, the soil capability is considered low, and therefore a low Land Capability of less than 5. Most of the site footprint is dominated by historic mining activities and therefore minimal soil is present.

The site falls in a low grazing capacity of 13 hectares per large stock unit (ha/LSU). Most of the site is sparsely vegetated mine site; therefore, the grazing potential would be very limited as most the area is bare mine discard with small areas of tree cover.

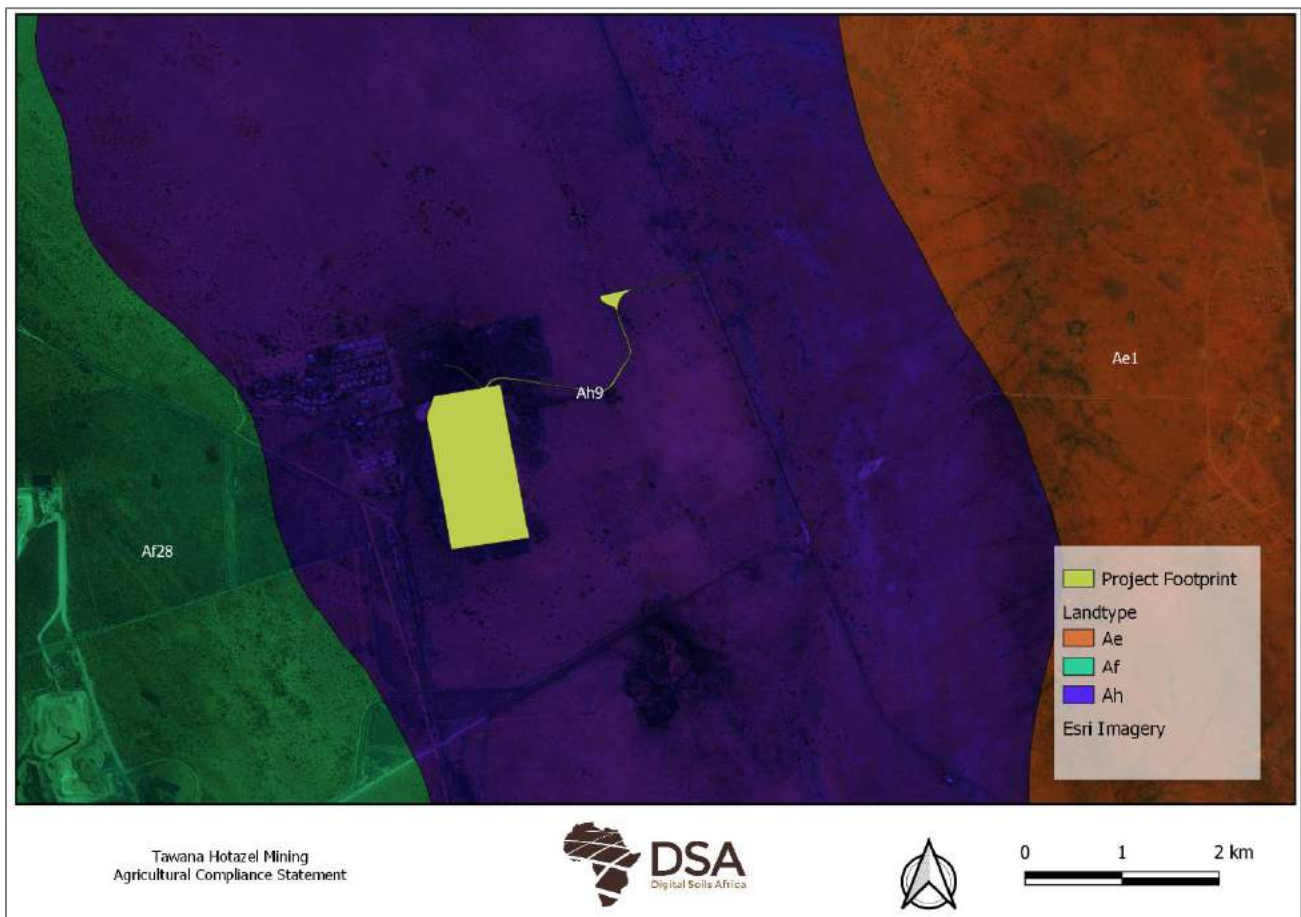


Figure 8: Land types occurring in the study area (Land Type Survey Staff, 1972 – 2002)

f) Palaeontology, Archaeology and Cultural Heritage

The information presented in this section was obtained from following reports:

- Palaeontological Impact Assessment (PIA) for the proposed Hotazel Mining Right application, Northern Cape Province compiled by Prof Marion Bamford (November 2020) (refer to Appendix 9)

- Baseline Report for the Heritage Impact Assessment (HIA) related to the proposed THM, Hotazel, Northern Cape Province compiled by Archaetnos Culture & Cultural Resource Consultants (December 2020) (refer to Appendix 10)

From the South African Heritage Resources Information System (SAHRIS) Palaeontology (fossil) sensitivity map, the area is indicated as moderately sensitive (green) and this applies to the Kalahari sands (refer to Figure 10). The map indicates that the area is of moderate sensitivity and therefore only a desktop study is required.

From a palaeontological perspective, there are no UNESCO World Heritage Sites in the vicinity of the proposed THM. The mining area lies on the aeolian sands of the Kalahari Group (Quaternary age). Rocks bearing iron and manganese are below the surface and they do not preserve any fossils. Aeolian sands do not preserve fossils as they are windblown. Rarely the sands will entrap more robust fossils, such as fragments of bones or wood, but these are not in situ. If palaeopans or palaeosprings are in the area they might preserve fossils. No such deposits have been recorded from the proposed THM, most of the area has been disturbed by previous mining operations and the Google Earth imagery does not show any pan or spring deposits. Taking account of the defined criteria, the potential impact to fossil heritage resources is extremely low.

From a cultural perspective, known heritage sites are situated at a distance to the west of the proposed THM on the opposite side of the town of Hotazel and are therefore not threatened by the proposed development. No sites of cultural heritage importance were identified within the surveyed area.

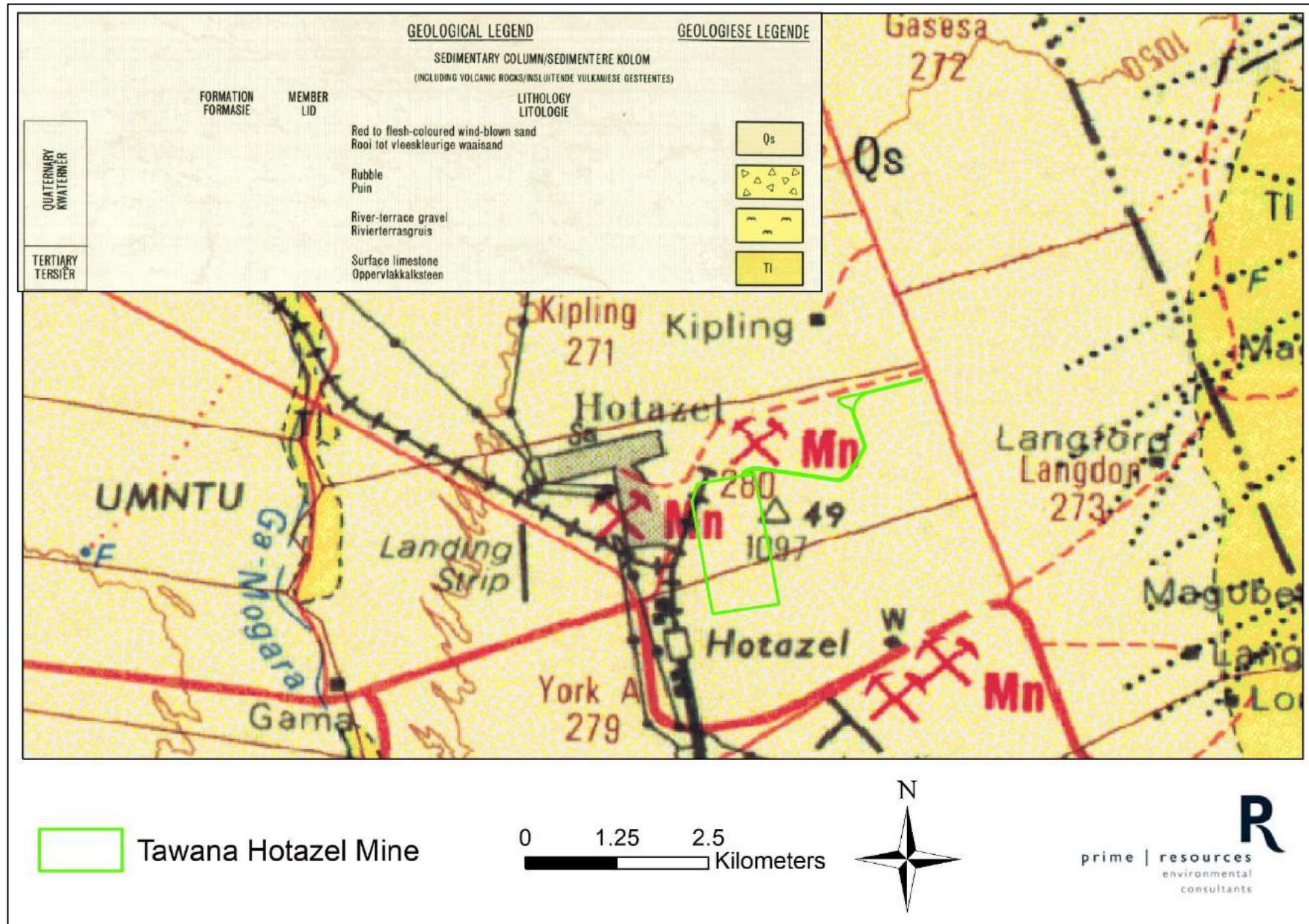


Figure 9: Geological map

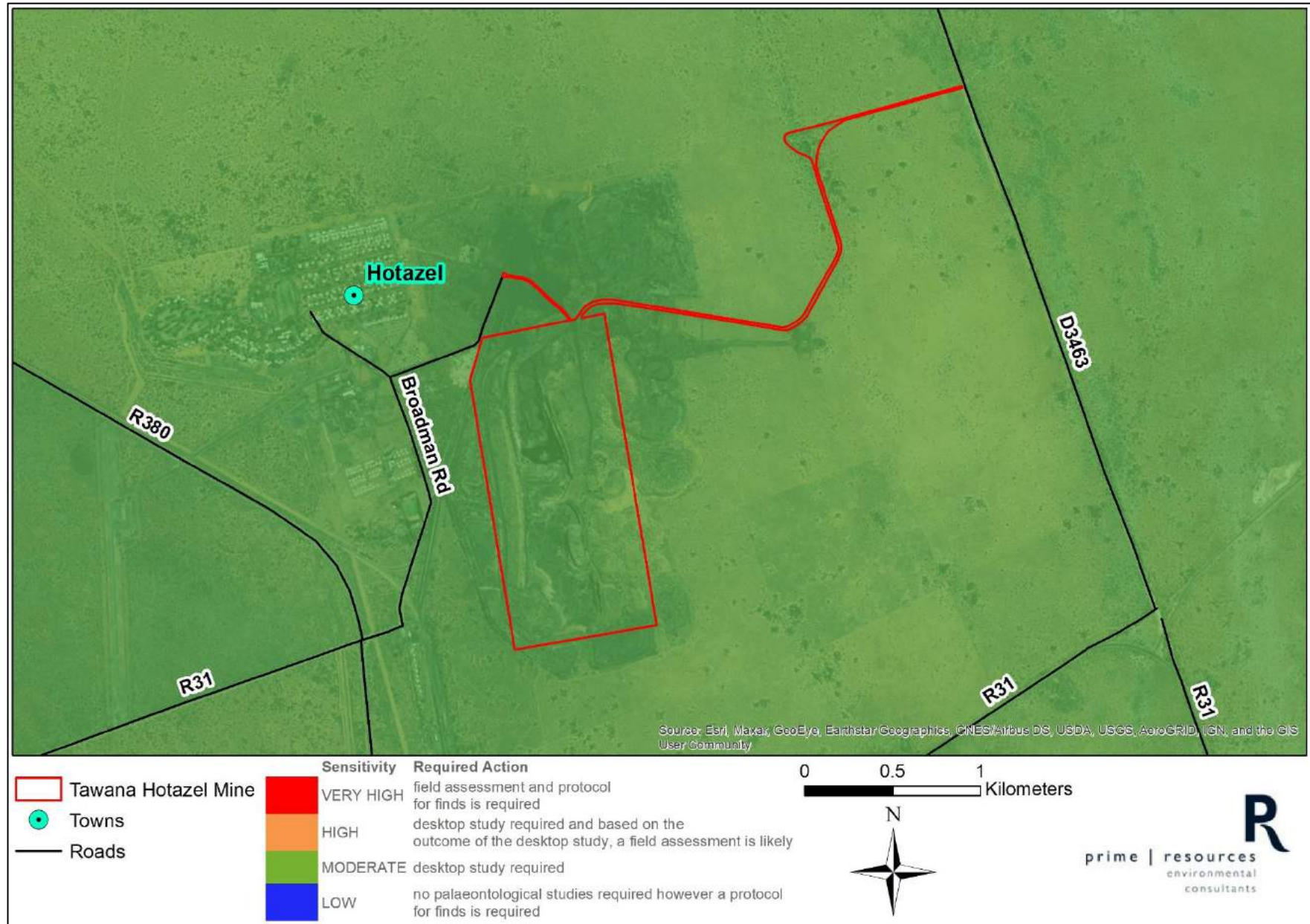


Figure 10: Palaeosensitivity map (SAHRIS, 2020)

g) Noise

The information presented in this section was obtained from following report:

- Noise Baseline Report for the Proposed Tawana Hotazel Mine in Northern Cape Province compiled by Airshed Planning Professionals (Pty) Ltd (March 2021) (refer to Appendix 11)

Typical rating levels for noise

SANS 10103 (2008) prescribes the manner in which environmental noise is measured and assessed in South Africa. Table 4 provides the typical rating levels for noise in various districts per SANS 10103 (2008).

Table 4: Typical rating levels for outdoor noise

| Type of district | Equivalent Continuous Rating Level ($L_{Req,T}$) for Outdoor Noise | | |
|--|--|-------------------------------------|---------------------------------------|
| | Day/night $L_{R,dn}^{(c)}$ (dBA) | Day-time $L_{Req,d}^{(a)}$ (dBA) | Night-time $L_{Req,n}^{(b)}$ (dBA) |
| Rural districts | 45 | 45 | 35 |
| Suburban districts with little road traffic | 50 | 50 | 40 |
| Urban districts | 55 | 55 | 45 |
| Urban districts with one or more of the following: business premises; and main roads | 60 | 60 | 50 |
| Central business districts | 65 | 65 | 55 |
| Industrial districts | 70 | 70 | 60 |

Notes

- $L_{Req,d}$ = The L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the day-time period, i.e. from 06:00 to 22:00.
- $L_{Req,n}$ = The L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the night-time period, i.e. from 22:00 to 06:00.
- $L_{R,dn}$ = The L_{Aeq} rated for impulsive sound and tonality in accordance with SANS 10103 for the period of a day and night, i.e. 24 hours, and wherein the $L_{Req,n}$ has been weighted with 10dB in order to account for the additional disturbance caused by noise during the night.

Noise sensitive receptors

Noise sensitive receptors (NSRs) generally include places of residence and areas where members of the public may be affected by noise generated by the proposed activities. Only those within a 5 km radius of activities are likely to be affected; however, all NSRs within a 10 km radius were identified.

Receptors located within 10 km of the proposed THM include residences, schools and medical facilities within the town of Hotazel as well as farmsteads/homesteads and the Gloria Mine village (refer to Figure 11).

Local environmental noise propagation and attenuation potential

The main meteorological parameters affecting the propagation of noise include wind speed, wind direction and temperature. Refer to Section 2.h.iv Climate and Ambient Air Quality.

During the day, the wind field is dominated by winds from the northern sectors. During the night, the wind field is mostly from the northeast, east-northeast and south-southeast. Given the predominant wind direction noise impacts are expected to be slightly more notable to the south of the proposed THM during the day and to the southwest and north-northwest of the proposed THM during the night.

Noise reduction caused by a barrier (i.e. natural terrain, installed acoustic barrier, building) depends on two factors namely the path difference of a sound wave as it travels over the barrier compared with direct transmission to the receiver and the frequency content of the noise. The topography of the surrounding area is mostly flat with the main terrain features in the study area being lower lying riverbeds. Sound reflected by the ground interferes with the directly propagated sound. The effect of the ground is different for acoustically hard (e.g., concrete or water), soft (e.g., grass, trees or

vegetation) and mixed surfaces. Ground cover was found to be acoustically mixed surrounding the proposed THM.

Current noise levels and existing acoustic climate

A short-term noise sampling campaign was carried out on the 1st and 2nd of December 2020 at six locations during which day- and night-time noise measurements were taken per the methods described in SANS 10103 (2008) the NEMA protocols published in GN 320.

The day-time and night-time acoustic climate at the six sampling points was heavily influenced by local noise generating sources, with the R31 (regional main road) activities only audible at Site 1; and railway operations at Site 5. Noise sources at Sites 3, 4 and 5, which were located either in- or near to- Hotazel residential areas were mostly influenced by local sources such as community activity, vehicle traffic and domestic animals. The acoustic sources at Point 6, located close to what appeared to be an unused mine access road, included insects, birds, cows and community activity.

Refer to Table 5 and Figure 11 below for the results and map showing the sensitive receptors and sampling locations.

Table 5: Noise measurement sites and levels

| Site | Location and visual and acoustic observations | Continuous day-time noise levels (L _{Req,d}) | Continuous night-time noise levels (L _{Req,n}) |
|------|---|--|--|
| 1 | South of R31 <i>Shrubs, trees, uncultivated land, R31 road to the north and unoperational mine to the south. Noise sources included birds (day-time and evening), vehicle traffic from the R31 and insects (day and night).</i> | Typical of urban district with main roads | Typical of urban districts |
| 2 | North of HMM <i>Shrubs, trees, uncultivated land, unoperational mine to the south. Noise sources included insects, birds (day and evening) and dogs (night).</i> | Typical of urban districts | Lower than rural districts |
| 3 | East of Hotazel near Dwarsstraat <i>Uncultivated land, short grass, near residential properties and road. Noise sources included birds (day), insects (day and evening), dogs (evening and night), music (evening), community noise (evening) and vehicle traffic from the residential road.</i> | Lower than rural districts | Typical of suburban districts |
| 4 | Between Wessels Clinic and Hotazel Combined School in Hotazel <i>Uncultivated land, near unused sports field. Noise sources included insects (day and evening), birds (night), dogs (evening and night), community noise (evening and night), and vehicle traffic (night).</i> | Typical of rural districts | Lower than rural districts |
| 5 | Residential area near railway line <i>Uncultivated land within residential area and near railway line. Noise sources included birds (day and night), insects (evening), dogs, music (day), community noise (day and evening), vehicle traffic from the residential road (day and evening), and cows (day).</i> | Lower than rural districts | Typical of urban districts |
| 6 | North of proposed THM access road <i>Uncultivated land, long grass and shrubs near mine access road. Noise sources included birds and insects.</i> | Typical of suburban districts | Typical of rural districts |

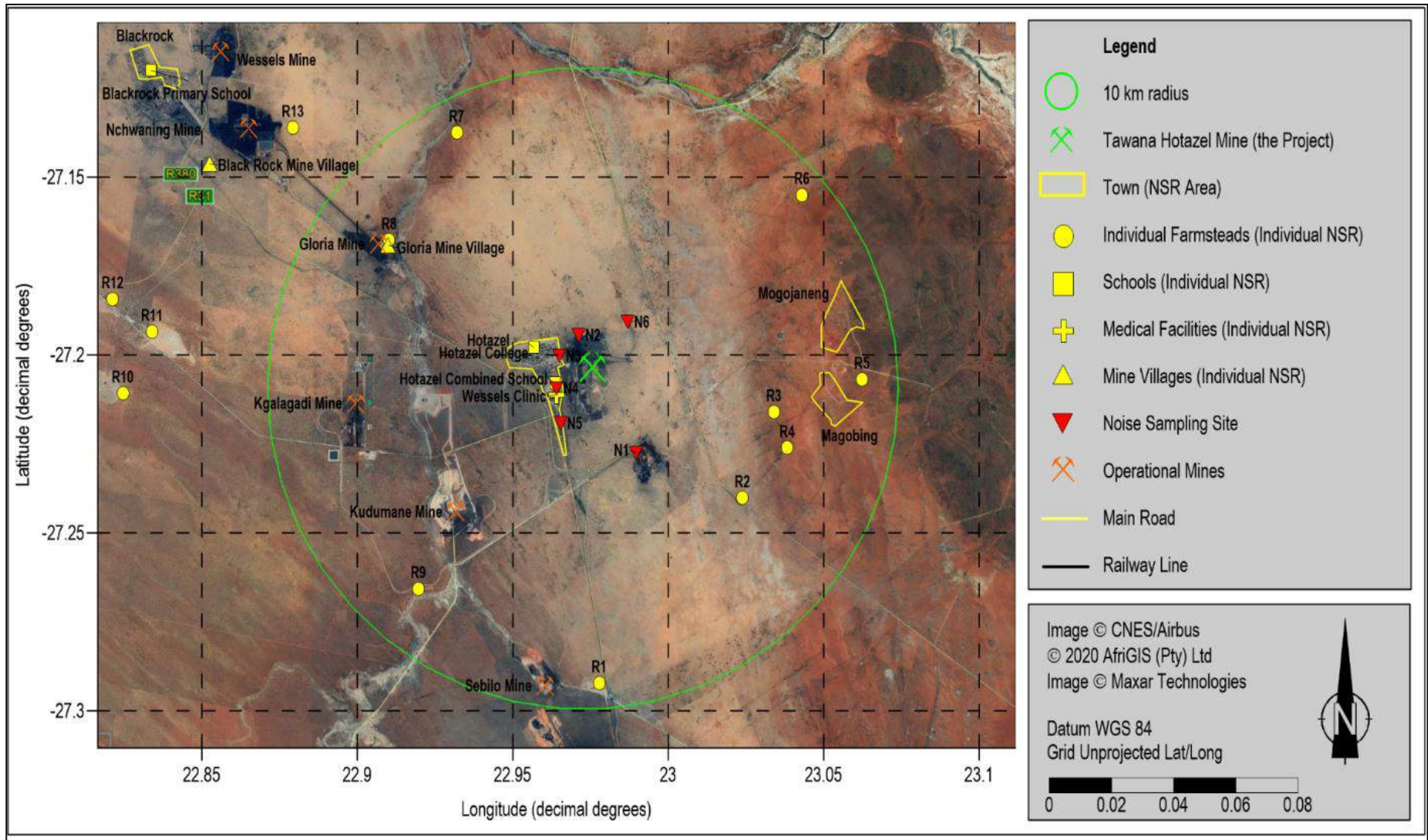


Figure 11: Noise sensitive receptors within a 10 km radius of the proposed THM and noise sampling locations

h) Surface Water

The information presented in this section was obtained from following reports:

- Baseline Surface Water Report compiled by iLanda Technologies (Pty) Ltd (January 2021) (refer to Appendix 12)
- Water Research Commission (WRC). The South African Mine Water Atlas (WRC Project No. K5/2234/3)
- Department of Water and Sanitation. 2014. A Desktop Assessment of the Present Ecological State, Ecological Importance and Ecological Sensitivity (PESEIS) per Sub Quaternary Reaches for Secondary Catchments in South Africa
- MS Basson and JD Rossouw, 2003. Lower Vaal Water Management Area: Overview of Water Resources Availability and Utilisation

Catchment Description and Surface Water Resources

The proposed THM is located within the newly revised Vaal WMA within Quaternary Catchment D41K between the Kuruman and the Gamagara Rivers within the Molopo River catchment. The Gamagara River confluences with the Kuruman River to the north of the proposed THM, which eventually joins the Molopo River further downstream to the west. The Gamagara River may be regarded as Largely Natural and non-perennial in nature, while the portion of the Kuruman River directly north of THM may be regarded as Largely Natural and perennial due to its source, a natural spring known as the 'eye of Kuruman' further upstream. The Gamagara River is classified as Critically Endangered, and with the river signature not considered to be adequately protected, while the Kuruman River is classified as Critically Endangered with the river signature considered to be poorly protected according to the latest NBA, 2018 (Van Deventer et al., 2019).

As shown in Figure 12, the proposed THM does not contain rivers or streams within the boundaries of the MR application area. The closest rivers are the Gamagara River (5 km west) and the Kuruman River (10 km north). The area drains generally to the west towards the Gamagara River, which flows from south to north. Within the quaternary catchment, the Witleegte, Gamagara and Vlermuisleegte Rivers are present; these are, however, at a distance greater than 5 km from proposed THM. During the site visit in mid-January 2021, the Kuruman River was flowing strongly (visually estimated at a rate of more than 1 m³/s). The Gamagara River was dry. The Gamagara River bed is being mined near the R380 highway. A large river diversion appears to have been constructed and significant construction is underway in the riverbed.

The catchments are largely undeveloped, although significant iron ore and manganese deposits are being mined in the Gamagara River catchment. The Kuruman River catchment comprises mostly agricultural activities.

The proposed THM is not located within a surface water or groundwater Strategic Water Source Area (SWSA) WRC, 2018, with the closest SWSA being the Northern Ghaap Plateau groundwater SWSA, approximately 12 km east and the Sishen/ Kathu groundwater SWSA located approximately 11 km south (WRC, 2017).

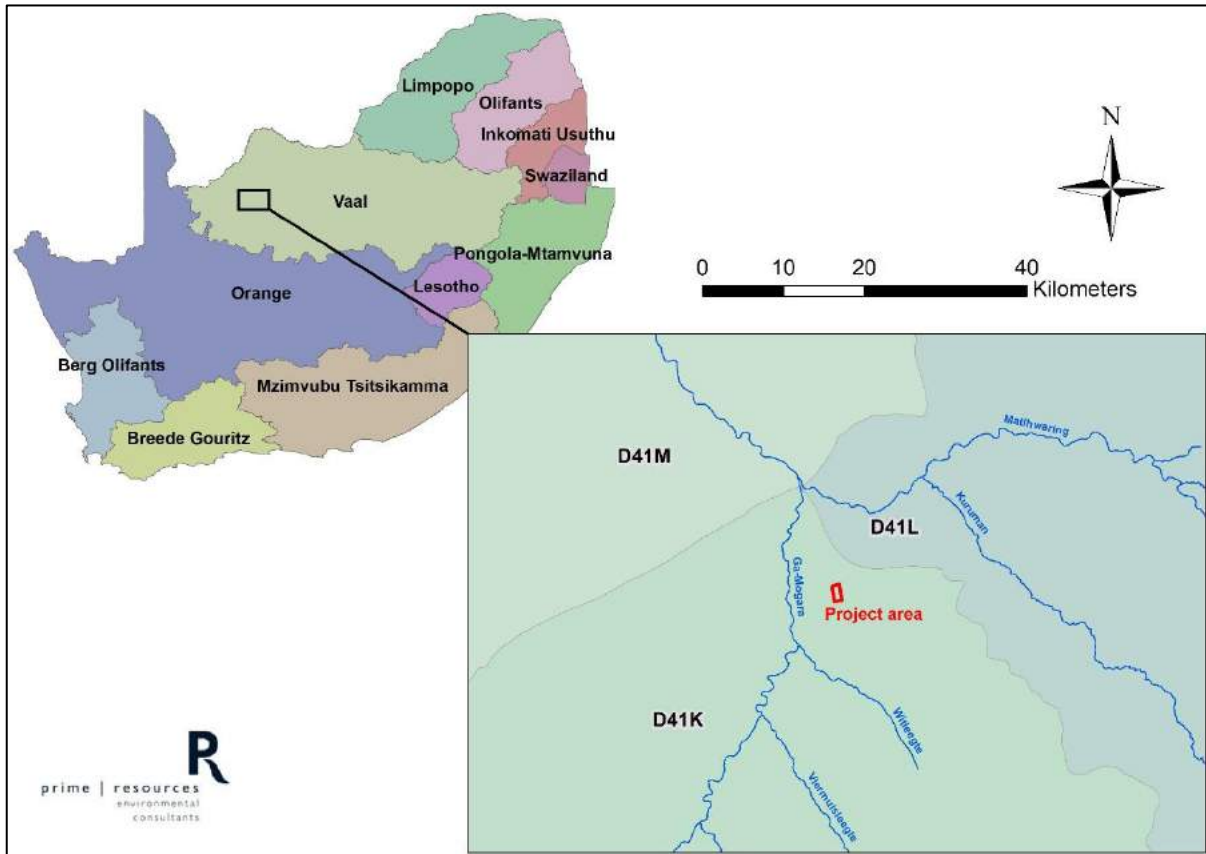


Figure 12: Water Management Area (WMA) and quaternary catchment map

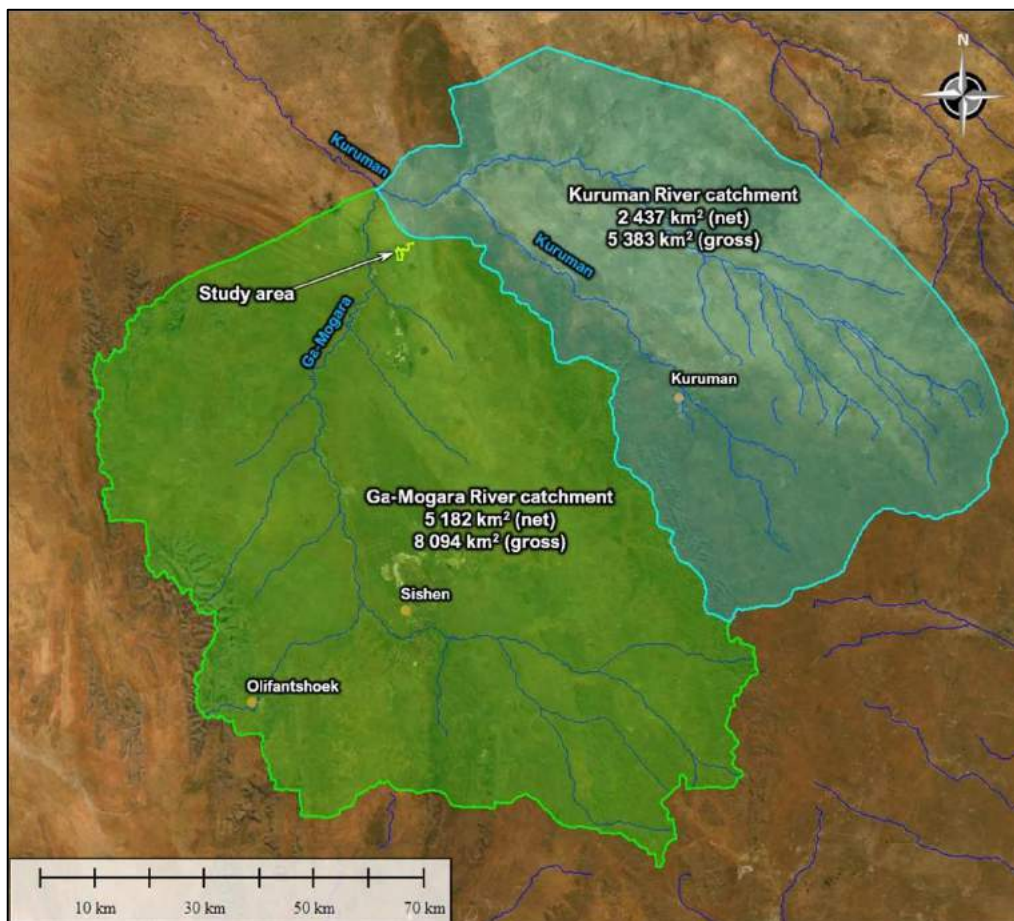


Figure 13: Catchment delineation

Mean Annual Precipitation and Evaporation

The mean annual rainfall in the Gamagara River catchment is approximately 350 mm, decreasing from south to north. The mean annual precipitation of the MR area is 270 mm. The mean annual evaporation of the MR area is 2 375 mm (S-Pan).

Climatic water balance

November to April is wetter than May to October. From historical records, 2009 was recorded as having the highest total rainfall between November and April, with 465.2 mm (refer to Table 6 below).

Table 6: Wettest Years Between November And April

| Rating | Hydrological year | Total rainfall between November and April (mm) |
|-------------------------------|-------------------|--|
| Wettest year | 2009 | 465.2 |
| 2nd Wettest year | 1955 | 426 |
| 3 rd Wettest year | 1999 | 424.8 |
| 4 th Wettest year | 2005 | 386.5 |
| 5 th Wettest year | 1964 | 372.3 |
| 6 th Wettest year | 1987 | 366.4 |
| 7 th Wettest year | 1954 | 340.7 |
| 8 th Wettest year | 1945 | 334.7 |
| 9 th Wettest year | 1942 | 305.1 |
| 10 th Wettest year | 2007 | 301.8 |

Peak Rainfall Data

The following maximum monthly rainfall data (refer to Table 7 below) was obtained from the daily rainfall records obtained for the Baseline Surface Water Report (iLanda Technologies, 2020). The daily rainfall record, was analysed and the annual maximum series was extracted from the data. This annual maximum series was used to determine 24-hour storm depths at various yearly recurrence intervals (peak rainfall scenarios) presented in Table 8 below.

Table 7: Maximum Monthly Rainfall Data (mm)

| Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
|-------|-------|-----|-------|-------|-------|-------|------|-------|------|------|-----|
| 115.9 | 101.5 | 271 | 238.6 | 169.3 | 209.5 | 173.1 | 81.8 | 127.1 | 24.9 | 50.9 | 53 |

Table 8: Peak 24-Hr Rainfall Depths for the proposed THM

| Recurrence Interval (year) | 24-hour rainfall depth (mm) |
|----------------------------|-----------------------------|
| 2 | 39 |
| 10 | 71 |
| 20 | 84 |
| 50 | 103 |
| 100 | 117 |
| 200 | 132 |

Baseline hydrology

The catchments were delineated from the quaternary catchments. Many portions of the catchments are endorheic (do not drain to the sea) so these areas are excluded when calculating the net catchment areas. The Gamagara River Catchment has a net area of 5 182 km² and a gross area of 8 094 km², with a net mean annual run-off of 3.65 Mm³/a (Figure 13 and Table 9).

Both rivers experience occasional dry season surface flows as well as subsurface flows. Both of these contribute to higher-than-expected dry season average flows. The 50-year and 100-year flood peaks for the streams and rivers are shown in Table 10.

Table 9: Mean annual runoff

| Stream | Mean annual run-off (Net Mm ³ /a) |
|----------------|--|
| Gamagara River | 3.65 |
| Kuruman River | 3.36 |

Table 10: Peak flows in the rivers and streams

| Stream | 50-yr | 100-yr |
|----------------|-----------------------|-----------------------|
| Gamagara River | 621 m ³ /s | 789 m ³ /s |
| Kuruman River | 427 m ³ /s | 543 m ³ /s |

Buffer Zones

There are no water courses in close proximity to the proposed THM (the closest rivers are the Gamagara River - 5 km west, and the Kuruman River - 10 km north) and therefore no surface water buffer zones are relevant.

Surface Water Users

The operations may affect the Gamagara River and the Kuruman River. The following likely downstream users were determined from aerial photography, literature surveys and observations made during a site visit of the catchment:

- Domestic users – limited drinking water, but farm labourers and local inhabitants may consume this river water and use it for laundry and cleaning when water is available.
- Recreational users – it is likely that farm labourers and local inhabitants may swim in the rivers when they are flowing and may use the water for washing.
- Industrial users – there are no water quality sensitive industrial users on the Gamagara and Kuruman rivers downstream of the study area.
- Aquatic users – the catchments are impacted by agriculture and mining and sensitive aquatic users are unlikely to be present. Some less sensitive aquatic species may still be present. Further considerations regarding baseline aquatic ecology are described in Section k) below.
- Irrigation users – the river water may be used for opportunistic irrigation.
- Livestock watering – the river water may be used for opportunistic livestock watering.

Water Quality

The Gamagara River was dry during the site visit. The Kuruman River was flowing. These rivers are normally dry, so obtaining any water quality sample is opportunistic and fortunate. Water quality monitoring data was collected on 20 January 2021 from the Kuruman River and analysed by an accredited laboratory (Figure 14).

The results shown in Table 11 below indicate that the background water quality in the Kuruman River is good, with only elevated calcium, resulting in elevated TDS and electrical conductivity. This is considered naturally occurring calcium.

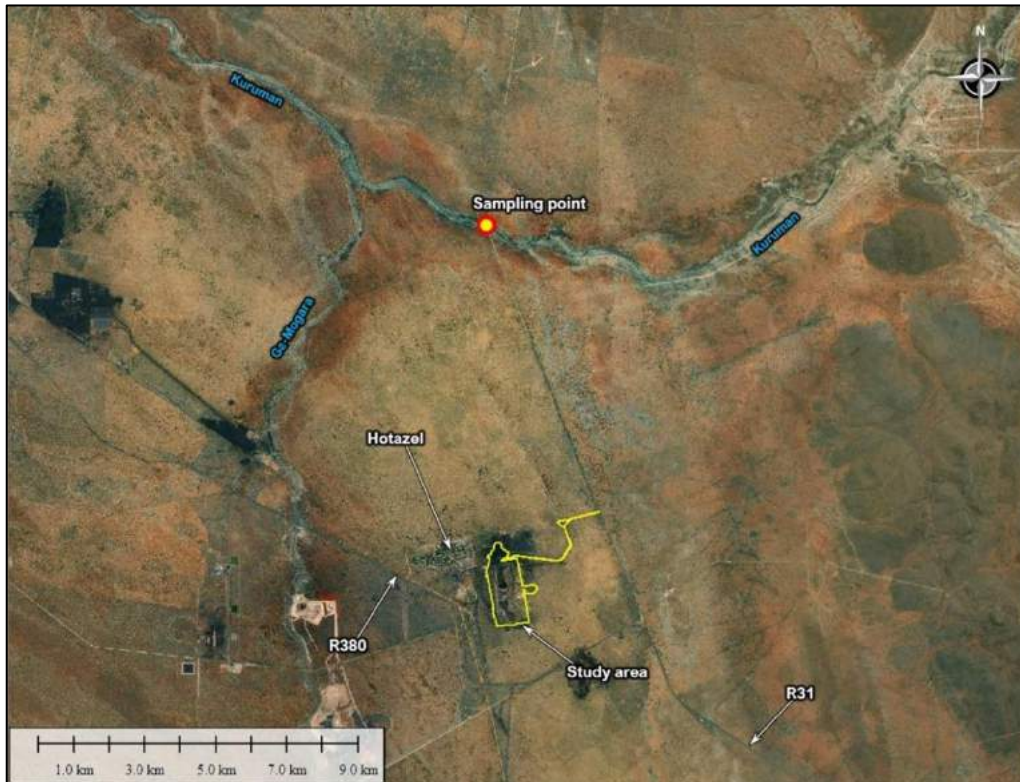


Figure 14: Water Quality Sampling Point

Table 11: Kuruman River Water Quality Data

| Parameter | 20/01/21 | Comments |
|--|----------|---|
| pH Value @ 25°C | 7.7 | |
| Conductivity @ 25°C(mS/m) | 47.2 | The water quality exceeds the Irrigation guideline value of (40mS/m) on 20/01/2021. |
| Total dissolved solids, TDS(mg/l) | 336.00 | The water quality exceeds the Irrigation guideline value of (260mg/l) on 20/01/2021. |
| Calcium as Ca(mg/l) | 49.20 | The water quality exceeds the Domestic guideline value - Class O (32mg/l) on 20/01/2021. |
| Calcium Hardness as CaCO ₃ (mg/l) | 123 | |
| Total suspended solids, TSS(mg/l)* | <1 | |
| Magnesium as Mg(mg/l) | 31.00 | |
| Magnesium Hardness as CaCO ₃ (mg/l) | 126 | |
| Total Hardness as CaCO ₃ (mg/l)* | 249 | The water quality exceeds the Domestic guideline value - Class I (200mgCaCO ₃ /l) on 20/01/2021. |
| Sodium as Na(mg/l) | 16 | |
| Potassium as K(mg/l) | 5.4 | |
| Total Alkalinity as CaCO ₃ (mg/l) | 211.00 | |
| Chloride as Cl(mg/l) | 28.00 | |
| Sulphate as SO ₄ (mg/l) | 15.03 | |
| Nitrate as NO ₃ (mg/l) | 0.20 | |
| Nitrate as N(mg/l) | <0.100 | |
| Nitrite as NO ₂ (mg/l) | <0.1 | |
| Nitrite as N(mg/l) | <0.1 | |
| Fluoride as F(mg/l) | 0.20 | |
| Turbidity(N.T.U)* | 1.20 | |
| LEGEND | | |
| RECREATION WATER GUIDELINE EXCEEDANCES | Value | |
| DOMESTIC WATER GUIDELINE EXCEEDANCES | Class O | Class I |
| | Class II | Class III |
| IRRIGATION WATER GUIDELINE EXCEEDANCES | Value | |
| LIVESTOCK WATER GUIDELINE EXCEEDANCES | Value | |

i) Groundwater

The following information was obtained from

- Tawana Hotazel Mine Groundwater Study Baseline Report compiled by Future Flow Future Flow Groundwater and Project Management (February 2021) (refer to Appendix 13)
- WRC. The South African Mine Water Atlas (WRC Project No. K5/2234/3)
- Development of Internal Strategic Perspectives (ISP): Groundwater Overview for the Lower Vaal Catchment Management Area (prepared for Directorate Water Resource Planning, 2003)
- Internal Strategic Perspectives (ISP) for the Lower Vaal Management Area (WMA No 10, 2004)
- The online DWS Resource Quality Information Services (RQIS) (<http://www.dwa.gov.za/iwqs/>)
- MS Basson and JD Rossouw, 2003. Lower Vaal Water Management Area: Overview of Water Resources Availability and Utilisation

Structural geology

The hydrogeological maps of the area show the presence of north-south trending regional fault lines that divide the Makganyene and Danielskuil Formations into blocks with north / south displacement noted along these faults. Based on the size of the regional faults and the large displacement along the fault lines it is assumed that the faults will extend below the sandy gravel cover and possibly reach the proposed THM.

Aquifer systems

Three aquifers occur in the area. These three aquifers are associated with a) the primary sandy gravel material, b) the fractured rock and leached banded iron formation aquifer, and c) the dolomitic aquifers of the Griqualand West Sequence.

The fractured rock aquifers are not high yielding, but the dolomitic karst aquifer is well known for its high potential (Van Dyk and Jones, 2006). The following is a description of the natural aquifer systems in the area.

Upper primary sandy gravel aquifer

- Forms due to the vertical infiltration of recharging rainfall through the primary sandy gravel material being retarded by the lower permeability of the underlying competent rock. In the region this aquifer ranges between 3 and 10 m in thickness. Groundwater collecting above the sandy gravel / competent material contact migrates down gradient along the contact to lower lying areas.
- Expected to be dry in large portions of the study area for large parts of the year.
- Seasonal and mostly carries water only during and shortly after rainfall events when rainfall recharges into the material. The relatively high transmissivity of the sandy gravel material allows the recharging water to migrate quickly through and out of the material. This high transmissivity rate combined with the high positive evaporation rate of 2 026 mm/a results in the material dry for large portions of the year.
- The borehole yield in this aquifer is seasonally variable due to the strong dependence on rainfall recharge.

Fractured rock and leached banded iron formation aquifer

- Although the lower permeability of the competent rock material will retard vertical infiltration of groundwater, some of the water in the upper aquifer will recharge the lower aquifer through faults and fractures. The geological map does not show major faults or fractures in the area, however, large portions of the area are covered by the sandy gravel, therefore surface mapping of fault and fractures is hampered. The hydrogeological map of the area does show the presence of some regional faults in the Makganyene (Vm) and Danielskuil (Vad) Formations that outcrop 8 to 12 km to the east.
- Groundwater flows in the fractured rock aquifer are associated with the secondary fracturing in the competent rock that was formed by the major north / south striking faulting seen from the hydrogeological maps. As such, groundwater flows and contaminant transport will be along discrete pathways associated with the fractures.

Dolomitic aquifer

- Dolomitic aquifers are recognised to be of potential concern to mining activities due to the potential large inflow volumes in areas where karstic dolomite is intersected. The dolomitic karst aquifer in the region is well known for its high potential.
- Inspection of exploration drilling core from a neighbouring farm show that the dolomite in the area appears to be competent, with no indication of weathering or karstification (dissolution of soluble dolomite). Karstic dolomite is highly variable in competence and transmissivity over short distances and this is no guarantee that karstic dolomite won't be found on site, however, based on the general constant high competence and total absence of indications of karstic dolomite, it can be concluded that the likelihood of intercepting karstic dolomite is very low.

The aquifers present in the area are classified as minor aquifers. The aquifers are of high importance to the local landowners outside of town as it is their only source of water for domestic, gardening, and agricultural purposes.

The ISP categorises the supply of water to the town of Hotazel as coming from both groundwater sources and from the Vaal-Gamagara pipeline. As the 2011 Census, 15.6% of households in the local municipality rely on borehole water.

Aquifer transmissivity

The site-specific aquifer transmissivity will be determined from aquifer tests to be performed on boreholes drilled on site. Current available information show that the aquifer transmissivity in the region ranges between 0.51 and 0.69 m²/day.

Hydrocensus and Groundwater levels

During the November 2020 hydrocensus, a total of eleven boreholes were identified (Table 12). Some of the boreholes were inaccessible as the borehole was locked, dry or because the hole had collapsed. The depth to groundwater level was measured for eight boreholes and current groundwater quality was analysed in three boreholes.

Six of the boreholes belong to South 32 (HMM, which is a neighbouring mining company) and is used for monitoring purposes. Boreholes BH1 and BH3 are included in these boreholes.

The measured depth to groundwater level ranges between 20.3 - 32.0 m with an average of 26.8 m.

In areas where there are no large-scale external impacts on the groundwater environment, such as the lowering of groundwater level through dewatering, and where the geology and aquifer interactions are not excessively complex, it is expected that the groundwater level contours will reflect topographical contours, although at a moderated gradient (Figure 15). Plotting the depth to groundwater level in the aquifer against topography shows a 62.5 % correlation. It has to be cautioned that the correlation is based on only seven data points and therefore may not be statistically significant.

Table 12: Hydrocensus results

| Point | Owner | East | South | Elevation mamsl | SWL | | Use type | Comment |
|-------|-----------|-------------|------------|--------------------|-------|----------|---------------------|---|
| | | LO27, WGS84 | | | mbgl | mamsl | | |
| BH1 | South 32 | -2 328 | -3 010 838 | 1 080.88 | N/A | | Monitoring | Hole locked. Located on landfill |
| JB 39 | South 32 | -2 041 | -3 009 900 | 1 061.00 | 32 | 1 029.00 | Monitoring | Hole located next to landfill |
| JB 38 | South 32 | -3 101 | -3 009 489 | 1 063.97 | 21.44 | 1 042.53 | Monitoring | Hole located between sewerage plant and old mine pit |
| NG | NG Church | -4 242 | -3 009 547 | 1 060.17 | 20.23 | 1 039.94 | Domestic/ garden | Hole located on Church premises |

| | | | | | | | | |
|-------|----------------------|--------|------------|----------|-------|----------|-------------------------|---|
| BH 2 | Olivier Construction | -3 152 | -3 010 203 | 1 052.44 | 33.74 | 1 018.70 | Industrial | Dynamic water level |
| JB 41 | South 32 | -1 197 | -3 009 874 | 1 058.67 | 25.51 | 1 033.16 | Monitoring | Hole located next to old shooting range |
| JB 40 | South 32 | -1 210 | -3 008 916 | 1 052.90 | 26.56 | 1 026.34 | Monitoring | Hole located on the farm Hotazel |
| BH 3 | South 32 | -1 215 | -3 008 918 | 1 063.32 | N/A | | Monitoring | Dry at 26 m. |
| BH 4 | Pieter Jansen | -463 | -3 012 087 | 1 069.65 | 30.28 | 1 039.37 | Not in use | Located on the farm York |
| York | Pieter Jansen | -369 | -3 012 080 | 1 075.72 | 31.33 | 1 044.39 | Domestic/ York wash bay | Located on the farm York |
| BH 5 | Pieter Jansen | 567 | -3 011 539 | 1 076.08 | N/A | | Not in use | Hole collapsed |

N/A = Not available

mbgl = metres below ground level

mamsl = metres above mean sea level

All coordinates are provided in Transverse Mercator projection, LO23, and WGS84 datum

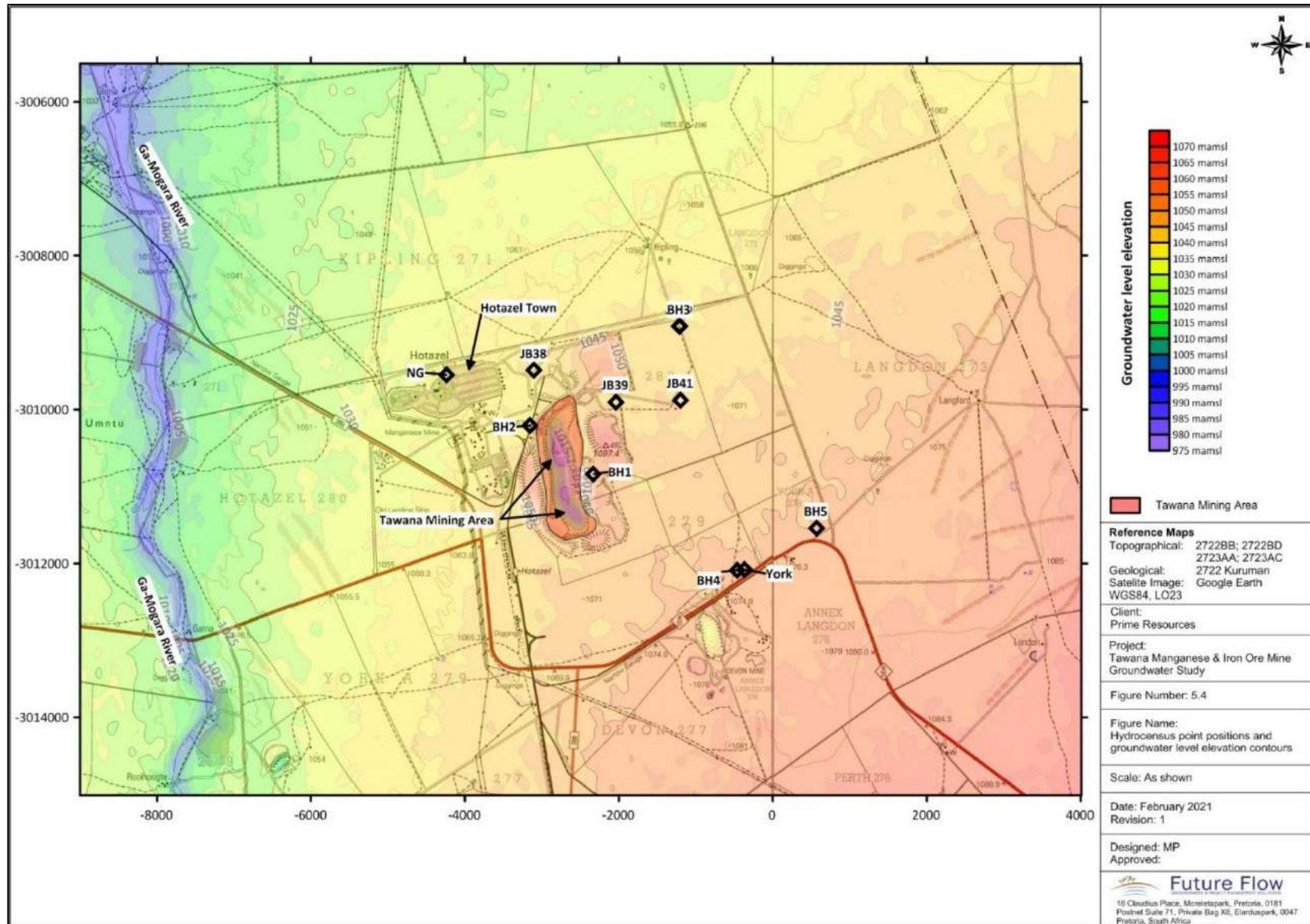


Figure 15: Hydrocensus borehole positions and groundwater level elevation contours

Groundwater Quality and Character


Groundwater samples were collected from:

- 3 of the 11 hydrocensus points – (Boreholes NG, JB40 and York); and
- The main existing opencast pit (sample HP).

The sample from the church in town (sample NG) differs notably from the other three samples. None of the elements exceed the SANS241:2015 guideline values in sample NG, while chloride and nitrate exceed the SANS241:2015 guideline value in all three other samples. Nitrite, sodium and manganese also exceed the guideline values in individual samples. Due to the high chloride and nitrate concentrations the total dissolved solids (TDS) and electrical conductivity (EC) also exceed the SANS241:2015 guideline values in samples HP, JB40 and York (Table 13).

Table 13: Groundwater chemical analysis results

| Analysis | Units | SANS 241:2015 guideline value | HP | NG | JB40 | York |
|------------------------------|------------------------|-------------------------------|---------|---------|---------|---------|
| pH | | ≥ 5 - ≤9.7 | 7.84 | 8.13 | 7.41 | 7.58 |
| EC | mS/m | ≤170 | 456 | 73.5 | 365 | 394 |
| TDS | mg/L | ≤1 200 | 4144 | 458 | 3036 | 3230 |
| Total Alkalinity | mg/L CaCO ₃ | N/G | 150 | 316 | 30 | 288 |
| Total Hardness | mg/L CaCO ₃ | N/G | 2080.8 | 404.1 | 1454.3 | 1992 |
| Chloride (Cl) | mg/L | ≤300 | 774.9 | 24 | 748.3 | 665.8 |
| Sulphate (SO ₄) | mg/L | ≤500 (health) | 199 | 23.6 | 117 | 35.7 |
| Nitrate (NO ₃) | mg/L | ≤50 | 992.8 | 18.5 | 529.5 | 989.9 |
| Nitrite (NO ₂) | mg/L | ≤3 | 1.2 | <0.02 | 0.23 | <0.02 |
| Ammonium (NH ₄) | mg/L | N/G | <0.03 | <0.03 | 1.65 | <0.03 |
| Phosphate (PO ₄) | mg/L | N/G | 0.12 | 0.15 | 0.24 | 0.2 |
| Fluoride (F) | mg/L | ≤1.5 | <0.3 | 0.3 | 0.5 | <0.3 |
| Bromide | mg/L | N/G | 6.95 | 0.12 | 7.26 | 6.31 |
| Calcium (Ca) | mg/L | N/G | 384.6 | 76.3 | 277.8 | 311.6 |
| Magnesium (Mg) | mg/L | N/G | 266.5 | 50.8 | 180.9 | 288.8 |
| Sodium (Na) | mg/L | ≤200 | 239.3 | 20.7 | 182.5 | 150.5 |
| Potassium (K) | mg/L | N/G | 5.4 | 2.2 | 3.9 | 4.4 |
| Aluminium (Al) | mg/L | ≤0.3 | <0.02 | <0.02 | <0.02 | <0.02 |
| Arsenic | mg/L | ≤0.01 | <0.0025 | <0.0025 | <0.0025 | <0.0025 |
| Cadmium (Cd) | mg/L | ≤0.003 | <0.0005 | <0.0005 | <0.0005 | <0.0005 |
| Chromium (Cr) | mg/L | ≤0.05 | 0.002 | <0.0015 | 0.0018 | <0.0015 |
| Cobalt (Co) | mg/L | N/G | <0.002 | <0.002 | <0.002 | <0.002 |
| Copper (Cu) | mg/L | ≤2 | <0.007 | <0.007 | <0.007 | <0.007 |
| Iron (Fe) | mg/L | ≤2 (health) | 0.08 | 0.051 | 0.389 | 0.034 |
| Lead (Pb) | mg/L | ≤0.01 | <0.005 | <0.005 | 0.037 | <0.005 |
| Manganese (Mn) | mg/L | ≤0.4 (health) | 0.007 | 0.003 | 0.408 | <0.002 |
| Nickel (Ni) | mg/L | ≤0.07 | <0.002 | <0.002 | 0.003 | <0.002 |
| Selenium | mg/L | ≤0.04 | <0.003 | <0.003 | <0.003 | 0.011 |
| Vanadium | mg/L | N/G | 0.0082 | 0.0051 | 0.0015 | 0.0078 |
| Zinc (Zn) | mg/L | ≤5 | 0.007 | 0.183 | 0.026 | 0.044 |

 Exceed SANS241:2015 guideline value

mS/m = milliSiemens/metre

mg/L = milligram per litre

N/A = Not analysed

N/G = No SANS241:2015 guideline value

Analysis of the water character shows that, in terms of cations, the samples are magnesium dominant.

Anion analysis shows that:

- In general the groundwater is chloride dominant;
- Sample NG is bi-carbonate dominant.

The water from the area in general shows a high degree of ion exchange having taken place (implying that water hasn't been recently recharged). Only sample NG shows a recently recharged character (Figure 16).

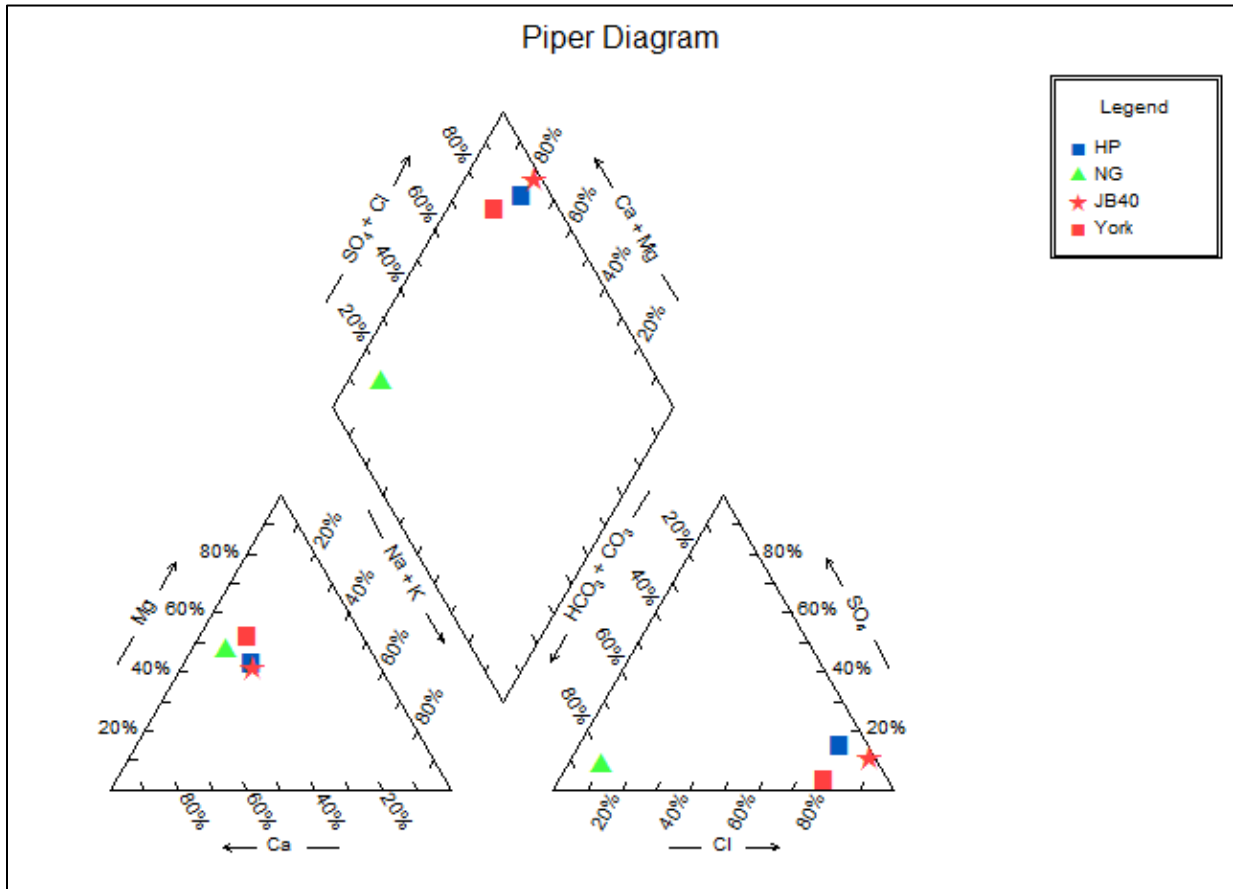


Figure 16: Piper Diagram

j) Terrestrial Biodiversity

The information presented in this section was obtained from following report, which was undertaken in line with the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the NEMA:

- Baseline Component Terrestrial Biodiversity Assessment for the Proposed Tawana Hotazel Mining THM, Northern Cape compiled by Field and Form Landscape Science in collaboration with Malachite Ecological Services (January 2021) (refer to Appendix 14).

The proposed THM falls within the Savanna Biome, in the Eastern Kalahari Bushveld Bioregion, in Quarter Degree Square 2722BB and the Kathu Bushveld vegetation type, which is considered to have a conservation status of Least Threatened (Mucina & Rutherford, 2006). The greater area falls within the Griqualand West Centre of Endemism, however the proposed THM is not located within the core geological areas of this centre of floristic endemism, and endemic and near-endemic species are unlikely to occur within the proposed THM. A limited portion, along the existing haul roads and access roads, is located within remaining extent of Kathu Bushveld [Threat Status: Least Concern (LC); Protection Level: Poorly Protected] in terms of the NBA: Terrestrial Remnant Vegetation (2018) (refer to Figure 17). According to the Northern Cape Conservation Plan (C-Plan; 2016) there are Other Natural Areas (ONAs) indicated to remain along existing haul roads within the opencast void and along the access road in the east.

The proposed THM does not fall within a Listed Threatened Ecosystems (2011), Protected and Conservation Areas (PACA; 2020), a National Protected Area Expansion Strategy (NPAES) Focus Areas (2010), an Important Bird and Biodiversity Areas (IBA; 2015) or a SWSA; 2017.



Figure 17: Northern Cape National Biodiversity Assessment: Terrestrial Remnant Vegetation (2018) associated with the proposed THM and surrounds

Habitat Units and Environmental Sensitivity

A detailed field assessment of the proposed THM was undertaken from the 23 - 24 November 2020 to determine the ecological condition of the proposed THM and its surrounds. During the field assessment four broad habitat units were identified within the proposed THM (refer to Figure 19). All habitat units have historically been subject to varying degrees of disturbance due to mining activities and construction and operation of associated infrastructure. Ongoing disturbances due to grazing and trampling by livestock, horses and donkeys is taking place along the main access road in the east.

The habitat units identified and associated terrestrial ecological sensitivity (refer to Figure 20) are as follows:

Existing Infrastructure and Alien Vegetation Communities (Low Sensitivity)

Comprises the majority of the proposed THM, specifically occurring within the residual opencast void within the centre of the MRA and historical processing plant and rail loadout facility in the north of the proposed THM. This habitat unit is characterised by the absence of vegetation and where vegetation is present, these communities are dominated by alien species. These areas have been significantly impacted by historical mining activities and development within this habitat unit will not lead to the significant loss of natural habitat.

In-Pit Aquatic habitat unit (Medium – Low Sensitivity)

Associated with water contained in the historical opencast workings. Development within this habitat unit will lead to the loss of aquatic habitat that has established within the opencast void. Although having certain faunal biodiversity and habitat value when considering the semi-arid surrounds, this habitat unit is not considered natural, and hosts an overall low floral diversity.

- Vegetation within this habitat unit is dominated by hydrophytic vegetation, most notably dense stands of *Phragmites australis*.

- Various waterfowl were noted within this habitat unit, while adits surrounding the area provide habitat for swallow and swift species, as well as bats.

Modified Kathu Bushveld habitat unit (Medium Sensitivity)

Includes areas that have not previously been cleared for mining and associated activities. Remnant Kathu Bushveld vegetation occurs in the vicinity of historical disturbance where, although dominated by indigenous species, alteration to the vegetation structure and composition has taken place. Remnant Kathu Bushveld vegetation also occurs adjacent to the main access road in the east and is currently impacted by ongoing grazing and trampling by livestock, horses and donkey. Development within this habitat unit will lead to the direct loss of reasonably intact bushveld habitat with increased floral and faunal biodiversity, particularly in comparison with the adjacent and surrounding mine-impacted areas. Given historic disturbances within this habitat unit, modifications to faunal assemblages within this habitat have likely occurred, with species utilising these habitats displaying a high degree of behaviour plasticity.

- Tree and shrub species characterising the vegetation within Modified Kathu Bushveld habitat unit include the invasive alien species *Prosopis glandulosa* var. *torreyana* and *P. velutina*, indigenous species such as *Vachellia hebeclada* subsp. *hebeclada*, *Grewia flava* and *Lycium hirsutum*, as well as the nationally protected tree species *Vachellia erioloba* and *V. haematoxylon*. *Tarchonanthus camphoratus* and *Terminalia sericea* occur in low abundance and were only occasionally encountered during the field assessment.
- A moderate diversity of forb species is present with prominent species including *Senna italica* subsp. *arachoides*, various *Hermannia* spp., *Hermbstaedtia odorata*, *Peliostomum leucorrhizum*, *Crotalaria spartioides*, *Orphanthera jasminiflora*, *Geigeria* spp., *Ipomoea* spp., *Kyllinga alba*, *Rhynchosia holosericea*, *Pavonia burchellii* and *Acanthosicyos naudinianus*, amongst others.
- Grasses are relatively sparse, tufted, and dominated by *Aristida* spp., *Eragrostis lehmanniana*, *Schmidtia* spp., with *Pogonarthria squarrosa* and *Setaria verticillata* also recorded.
- Several faunal species were noted during the floral field assessment (either directly, or through discussions with mine personnel) including Rock Hyrax (*Procavia capensis*), Cape Porcupine (*Hystrix africaeaustralis*), Cape Hare (*Lepus capensis*), Ground Squirrel (*Xerus inauris*) and *Gerbilliscus* sp.



Figure 18: Photos of the Modified Kathu Bushveld habitat unit, within the MR area (top) and adjacent to the access road (bottom)

(Photos taken by Field and Form Landscape Science on 23/10/2020)

Secondary Thornveld habitat unit (Medium – Low Sensitivity)

Restricted to historical surface dumps and comprises mostly indigenous vegetation that have re-established on these areas over time. Vegetation in this habitat unit has a lowered biodiversity and hosts a high proportion of pioneer forb and grass species, with a low abundance of alien vegetation also present. Development within this habitat unit will not lead to the significant loss of natural habitat.

- Vegetation in these areas is dominated by *Senegalia mellifera* subsp. detinens, an indigenous pioneer thorn tree/ large shrub species that rapidly establishes on shallow soils and within previously disturbed areas provided that growing medium is available.
- Forb species recorded include *Ipomoea* spp., *Felicia muricata* and *Senecio inaequidens*, while the most prominent graminoid recorded was *Stipagrotis uniplumis*, a species that plays an important role in soil stabilisation.

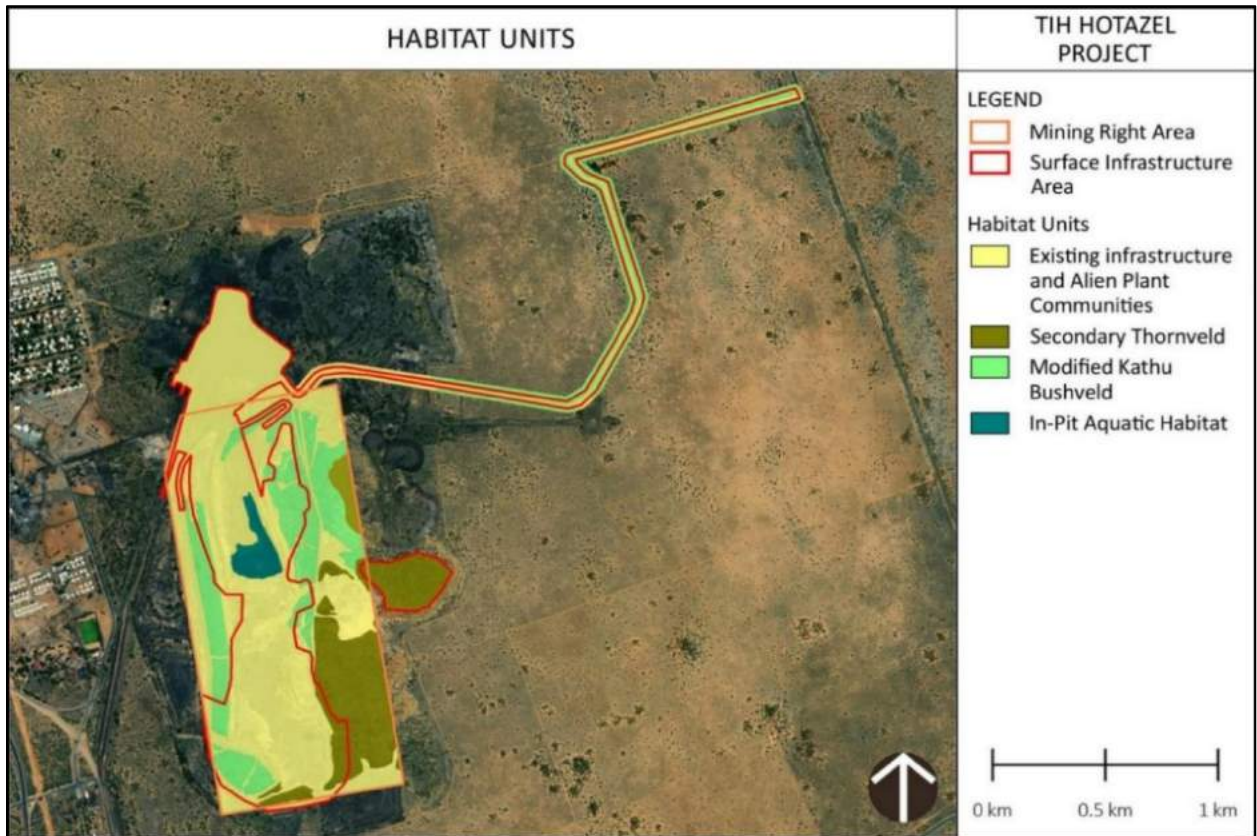


Figure 19: Habitat Units associated with the proposed THM

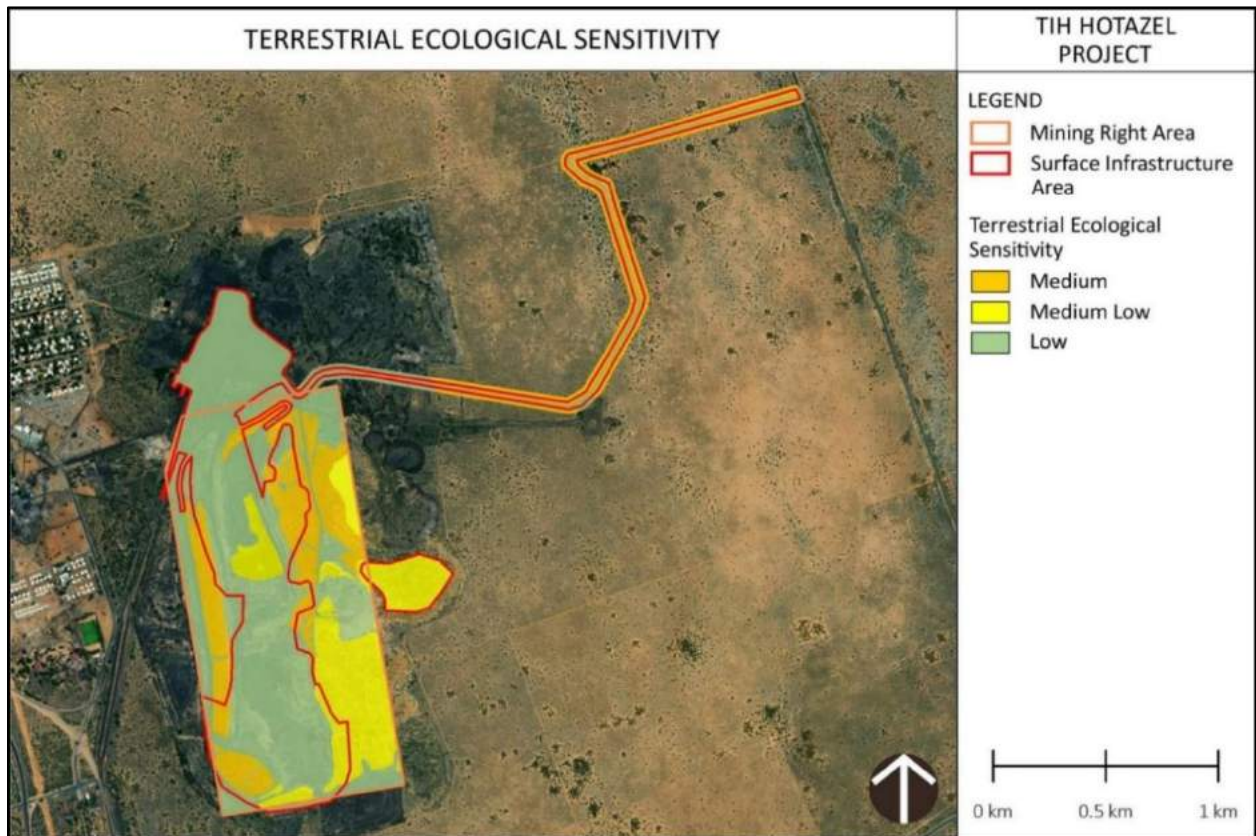


Figure 20: Terrestrial ecological sensitivity of the habitat units associated with the proposed THM

Species of Conservation Concern (SCC), Protected and NEMBA Threatened or Protected Species (TOPS) listed and Endemic Species

Most indigenous floral and faunal species in the Northern Cape Province are protected under the NCNCA, and species listed under Schedule 1 (Specially Protected) and Schedule 2 (Protected), for which permits are required from the NC DENC prior to disturbing such species, are listed below.

The SCC, Protected and TOPS-listed and Endemic Species occurring within the proposed THM are as follows:

Existing Infrastructure and Alien Vegetation Communities

- No floral SCC, protected or TOPS listed species were recorded within this habitat unit, and such species have a low probability of occurrence due to past disturbances within this habitat unit.
- No nationally protected or TOPS-listed faunal were recorded or are likely to permanently inhabit this habitat unit.
- One faunal SCC namely Verreaux's eagle (*Aquila verreauxii*) utilises this habitat unit for nesting, breeding and foraging purposes.

In-Pit Aquatic habitat unit

- Fish species, *Tilapia sarrmanii*, is listed as Protected under the NCNCA.
- No other floral or faunal SCC, protected or TOPS-listed species were recorded within this habitat unit, and such species have a low probability of occurring/ residing within this habitat unit.

Modified Kathu Bushveld habitat unit

- No floral SCC species were recorded or are likely to occur. One TOPS-listed floral species, namely *Harpagophytum procumbens* was recorded.
- Two nationally protected tree species in terms of the National Forests Act (Act No. 84 of 1998) occur, namely *Vachellia erioloba* in relatively low abundance and *V. haematoxylon* in high abundance.

- One provincially protected floral species in terms of Schedule 1 of the NCNCA, namely *H. procumbens*, and several floral species listed under Schedule 2 of this Act, namely *Plinthus sericeus*, *Ammocharis coranica*, *Boophone disticha*, *Crinum sp.*, *Orphanthera jasminiflora*, *Albuca seineri* (= *Ornithogalum seineri*), *Albuca setosa* (= *Ornithogalum setosum*) were recorded.
- No faunal SCC were noted during the field assessment or are likely to occur based on the desktop investigation. Signs of TOPS-listed Aardvark (*Orycteropus afer*) were however noted during the field assessment in the vicinity of the access road. Other faunal TOPS-listed species that may occur are Bat-eared Fox (*Otocyon megalotis*) and Cape Fox (*Vulpes chama*).
- The arachnid species *Harpactira* spp. and *Pterinochilus* spp. are provincially protected under Schedule 1 of NCNCA (Act No. 9 of 2009) and may occur within this habitat unit.
- Based on distributional data, the South African Python (*Python natalensis*) is the only SCC whose distribution includes the proposed THM and historically would have occurred within wooded communities with rocky elements. Although regionally listed as Least Concern (LC), *P. natalensis* is a registered TOPS-listed species. Sundevall's Shovel-snout (*Prosymna sundevallii*) is a near-endemic reptile species with an overlapping distribution with the proposed THM and may occur in more intact Kathu Bushveld along the access road.

Secondary Thornveld habitat unit

- No floral or faunal SCC, provincially protected or TOPS-listed species were recorded within this habitat unit, and such species have a low probability of occurrence due to past disturbances within this habitat unit.
- *Vachellia haematoxylon*, a national protected tree species in terms of the National Forests Act (Act No. 84 of 1998) occurs scattered within this habitat unit.
- The arachnid species *Harpactira* spp. and *Pterinochilus* spp. are provincially protected under Schedule 1 of NCNCA (Act No. 9 of 2009) and may occur within this habitat unit.

Alien and Invasive Floral Species

Although a relatively low diversity of alien and invasive floral species is present within the proposed THM, a large proportion of the vegetation, particularly considering the Existing Infrastructure and Secondary Bushveld habitat, are alien or encroacher species, mostly attributed to *Prosopis glandulosa* var. *torreyana*. As a result, the overall floral and faunal species assemblages have an overall reduced biodiversity (based on historic habitat transformation and mining activities) when compared to intact natural habitat in the region and reference state Kathu Bushveld.

Alien and invasive floral species identified within the boundaries of the proposed THM are listed in Table 14 below. A high proportion, but of a relatively low diversity, of alien species is present, when considering the high degree of disturbance within the majority of the proposed THM.

The listed invasive species' categories as indicated by the NEMBA Alien and Invasive Species Lists (2020) as well as the categories as per CARA (Act No. 43 of 1983) are shown. Schedule 6 of the NCNCA (Act No. 9 of 2009) also lists invasive species, none of which were recorded within the proposed THM, which the exception of those species listed under CARA.

Four of the species are NEMBA listed invasive species that require mandatory control, while spreading or allowing the spread of *Prosopis* spp. is prohibited.

Table 14: Alien floral species identified during the field assessment

| Species | Common name | NEMBA Category* | CARA Category* |
|--|------------------------------|-----------------|----------------|
| <i>Argemone ochroleuca</i> | White-flowered Mexican poppy | 1b | 1 |
| <i>Boerhavia diffusa</i> var. <i>diffusa</i> | Red spiderling | N/L | N/L |
| <i>Chenopodium album</i> | White Goosefoot | N/L | N/L |
| <i>Hypochaeris radicata</i> | False dandelion | N/L | N/L |
| <i>Nicotiana glauca</i> | Wild tobacco | 1b | 1 |
| <i>Opuntia ficus-indica</i> | Sweet prickly pear | 1b | 1 |
| <i>Pennisetum setaceum</i> | Fountain grass | 1b | 1 |
| <i>Prosopis glandulosa</i> var. <i>torreyana</i> | Honey mesquite | 3 | 2 |

| Species | Common name | NEMBA Category* | CARA Category* |
|-----------------------------|---------------------|-----------------|----------------|
| <i>Prosopis velutina</i> | Velvet mesquite | 3 | 2 |
| <i>Schinus molle</i> | Pepper tree | N/L | N/L |
| <i>Verbesina enceloides</i> | Wild sunflower | N/L | N/L |
| <i>Washingtonia robusta</i> | Washington fan palm | N/L | N/L |

*N/L – Not Listed

NEMBA

Category 1b – Invasive species that must be controlled.

Category 3 – Ornamentally used plants that may no longer be planted. Existing plants may remain, except within the flood line of watercourses and wetlands, as long as all reasonable steps are taken to prevent their spread.

CARA

Category 1 – Declared weeds that are prohibited.

Category 2 – Invader plants with a commercial value that must be controlled.

Herpetofauna

The proposed THM falls within the interface between the grasslands and arid savanna macro-habitat. Based on available aerial imagery in combination with findings from the floral field investigation, limited intact amphibian habitat occurs within the proposed THM and species present will likely comprise of those with a wide distribution and the ability to utilise suboptimal water resources. Six amphibians from four families are confirmed to occur within the 2722BB QDS. Seven reptile species, belonging to six families have been confirmed to occur within the 2722BB QDS however over 30 species are likely to utilise suitable available habitats within the QDS.

- Amphibian species, if present, will likely include Red Toad (*Schismaderma carens*), Power's Toad (*Sclerophrys poweri*) and Boettger's Caco (*Cacosternum boettgeri*).
- Reptile species likely to utilise intact habitats within the proposed THM include Southern Rock Agama (*Agama atra*), Western Ground Agama (*Agama aculeata aculeata*), Namaqua Sand Lizard (*Pedioplanis namaquensis*), Spotted Sand Lizard (*Pedioplanis lineocellata lineocellata*), Kalahari Tree Skink (*Trachylepis spilogaster*), Puff Adder (*Bitis arietans*), Cape Cobra (*Naja nivea*) and Forked-marked Sand Snake (*Psammophis trinasalis*).
- Discussion with mine personnel confirmed the presence of *B. arietans* and *N. nivea* within the proposed THM, while several *P. namaquensis* were noted during the floral field investigation within the Modified Kathu Bushveld habitat unit.

Avifauna

The information presented in this section was obtained from following report:

- Avifaunal Scoping Report for the Tawana Hotazel Mining (Pty) Ltd: Mining Right Application, compiled by Feathers Environmental Services (May 2021) (refer to Appendix 15)

An assessment of the current Southern African Bird Atlas Project 2 (SABAP2) data yielded a total of 139 bird species that have been recorded within the nine-pentad broader study area during the SABAP2 atlassing period to date. The presence of these species in the broader study area provides an indication of the diversity of species that could potentially occur in areas where pockets of natural vegetation/habitats persist. Of the 139 species, six of these are considered to be of conservation concern (Kori Bustard *Ardeotis kori*, Martial Eagle, *Polemaetus bellicosus*, Verreaux's Eagle *Aquila verreauxii*, Lanner Falcon *Falco biarmicus*, European Roller *Coracias garrulus* and White-backed Vulture *Gyps africanus*). The SABAP2 reporting rates of Red List birds potentially occurring in bushveld habitat in the proposed THM are low, indicating that human activity has impacted on the avifaunal community and that levels of disturbance are high. These areas are likely to provide foraging and roosting habitat for the large diversity of passerine species recorded in the area. Despite anthropogenic impacts, mostly in the form of mining practices that have largely transformed the landscape resulting in a negative impact on avifaunal abundance, potentially sensitive habitat persists within the proposed THM area.

In order to describe the avifaunal community present, a rapid field survey was conducted in May 2021 to sample the avifauna in all of the primary habitats available within the proposed THM. During the survey, 35 species that are common to this area, 32 of which have been previously recorded by SABAP2 were

recorded. The water contained within the open pit and the island in the centre of the water-filled pit have created an ideal breeding habitat for various water dependent species i.e. herons, cormorants, ibis, grebes, moorhens and coots - species that have not been previously recorded by SABAP2 given the absence of water habitats within the broader area.

Verreaux's Eagle *Aquila verreauxii* is a large, territorial bird of prey with a distribution inextricably linked to mountainous habitat and its main prey of rock hyraxes, a prey base that features prevalently in the study area. Verreaux's Eagle has recently been classified as *Vulnerable* in southern Africa due to a decrease in its range and abundance. Despite the relatively disturbed nature of the proposed development site, the historical open-cast pit has provided suitable nesting platforms and prey base for this species to thrive over the last 11 years. Two nest locations have been observed within the proposed THM (refer to Figure 21). Both the site visit conducted by the vegetation specialist in November 2020 and the more recent rapid field survey conducted as part of this avifaunal assessment in May 2021, confirmed the location of one of the two nests previously observed. The nest at the second location no longer exists and may have been washed away during a heavy rainfall episode in November 2020. Observations of the nest at the first location yielded an inactive nest and no observations of the Verreaux's Eagle (refer to Figure 22). Reports from mine staff and contractors suggest that Verreaux's Eagle still utilise the project area extensively, but they have not observed that eagles on the nest this season (at the time of the May 2021 field survey). It is important to note that prospecting (i.e. drilling) was underway, within 300m of the Verreaux's Eagle nest, during the November 2020 and May 2021 surveys. It is likely the disturbance associated with the noise of the drilling equipment and the vehicle and pedestrian traffic at the prospecting site, may have temporarily displaced the eagles from the nest and the immediate area.



Figure 21: Location of the Verreaux's Eagle nest locations within the proposed THM area



Figure 22: Photo of one of the Verreaux's Eagle nest locations that occur within the proposed THM area

(Photo taken by Feathers Environmental Services on 10/05/2021)

Ecological Drivers and Processes

A key event driving the ecology within the majority of the proposed THM is direct disturbance due to the historical construction and operation of mining and related infrastructure. The direct loss of surface vegetation cover, displacement of suitable soils as growing medium and subsequent loss of the indigenous seed bank, have resulted in large areas of the proposed THM being either devoid of vegetation, particularly along steep embankments of the open-cast void.

Although vegetation re-establishment, another key ecological processes taking place within the proposed THM area, has occurred and continues to take place within disturbed habitats, this increase in vegetation cover is mainly characterised by invasive alien species encroachment and indigenous bush encroachment. Ecological drivers governing vegetation re-establishment processes within the proposed THM are mainly controlled by climatic conditions, which are characterised by low, variable regional rainfall and seasonal droughts. High temperatures and low surface moisture availability, coupled with generally slow growth rates and episodic recruitment of indigenous species in the region leads to natural indigenous vegetation recovery being slow, allowing opportunity for alien and pioneer woody species, to rapidly establish and persist within disturbed areas. Other drivers include higher CO₂ levels experienced in the historic development of the savanna biome (CEN, 2016) as well as rising CO₂ concentrations due to climate change, that may aggravate bush thickening; as well as fire management, overgrazing, groundwater availability for phreatophytes, and the exclusion of larger browsers from the historical mining area.

k) Wetlands and Aquatic Biodiversity

The information presented in this section was obtained from following report, which was undertaken in line with the Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes in terms of Sections 24(5)(A) and (H) and 44 of the NEMA:

- Aquatic Biodiversity Compliance Statement, Hotazel Mine, compiled by Ecology International (Pty) Ltd (January 2021) (refer to Appendix 16)

The proposed THM is located within the Southern Kalahari freshwater ecoregion, the Vaal WMA and Quaternary Catchment D41K between the Kuruman and the Gamagara Rivers within the Molopo River

catchment. The closest aquatic systems to the proposed mining activities were determined to be the Gamagara and Kuruman Rivers approximately 5 km and 9 km away, respectively. According to the NFEPA (2011), NBA Wetland Map 5 (2018) databases and from the site inspection, no natural aquatic or wetland systems were identified within the proposed project footprint areas or within the 500 m zone of regulation in accordance with Government Notice 509 as it relates to the NWA. The closest wetland features to the proposed THM, indicated to be depression (pan) wetlands, are shown to occur more than 4km to the east and west (refer to Figure 23). The proposed THM is located within a listed Upstream Management Area. Upstream Management Areas are sub-quaternary catchments in which human activities need to be managed to prevent degradation of downstream river NFEPA's and Fish Support Areas. Further, no NFEPA-classified wetlands or wetland clusters were noted to be associated with the proposed THM.

The opencast pit void within the proposed THM, which is associated with the historical mine workings, is comprised of a moderately sized and relatively deep, artificial pit lake. The pit lake appeared to support both aquatic vegetation that had established within the pit lake, as well as fauna that had been artificially translocated to the pit lake. Dense stands of *Phragmites australis* were observed in shallower areas making access to the deeper water areas more difficult. Thick layers of detritus and sediment (likely rich in diatoms) were observed in the shallows, where what was recognised as *Tilapia sparmanii* (provincially Protected fish species) were feeding and taking refuge. The lake water was noted to be very clear with recharge likely mainly associated with seepage associated with interception of the water table together with direct inflows during rainfall events. Substrate within the pit lake comprised mainly of coarse waste rock associated with the historical mine workings and isolated areas of fine sediments and detritus. In most areas, the pit lake was deep with steep high-walls and rocky deposits of waste rock.

Given the lack of naturally occurring surface water features within the general study area, a detailed aquatic assessment was not warranted. The area associated with the proposed mining activities is confirmed to have a low sensitivity from the perspective of natural surface water features. Further, the lack of natural surface water within the proximity of the proposed project means that the impact of the proposed mining activity on the surrounding natural freshwater ecosystem is likely to be low.

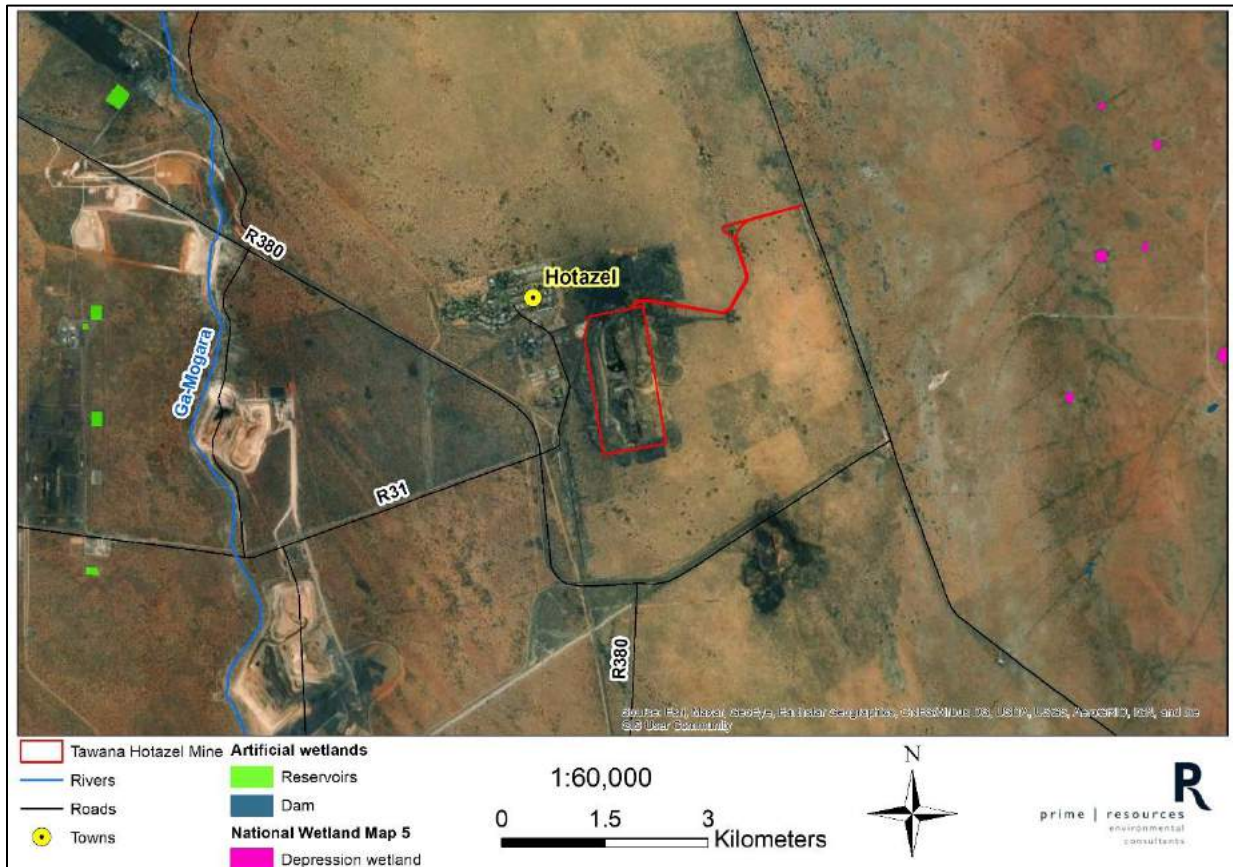


Figure 23: Regional wetlands associated with the proposed THM

l) Socio Economic

The following information was obtained from the 2019/2020 IDP of the JTGDM, the 2017/2018 IDP of the JMLM (adopted by the Council on 30 March 2017) as well as Census 2011 data and Community Survey 2016 data, provided by Statistics South Africa (Stats SA).

Provincial context

The Northern Cape is the largest of the South African provinces, covering an area of 372 889 km². The province is also the least populous of the country's provinces, with a total population of only 1 193 780 (Community Survey 2016). Only 2.1% of the country's total households reside in the Northern Cape.

The capital city of the province is Kimberley. Other important towns include Upington, Springbok, Kuruman and De Aar.

Mining and agriculture are the primary economic sectors of the province. There are alluvial diamonds, iron ore, copper, asbestos, manganese, fluorspar, semi-precious stones and marble resources which have been mined in the region.

The province has fertile agricultural land in the Orange River Valley where grapes and fruit are cultivated intensively. Sheep farming takes place in the interior Karoo. Wheat, fruit, peanuts, maize and cotton are also produced at the Vaalharts Irrigation Scheme near Warrenton.

The Northern Cape is subdivided into five district municipalities: Francis Baard, John Taolo Gaetsewe, Namakwa, Pixley Ka Seme and ZF Mgcawu. The THM is located in the John Taolo Gaetsewe District Municipality.

Regional context

The JTGDM (previously Kgalagadi) is located to the north east of the province and borders Botswana. It is comprised of three local municipalities: Gamagara, Ga-Segonyana and Joe Morolong. Joe Morolong is the largest of these municipalities in terms of area.

The JTGDM comprises of 186 towns and settlements of which the majority (80%) are villages in the Joe Morolong Municipality.

The District has an established rail network from Sishen South and between Black Rock and Dibeng. It is characterised by a mixture of land uses, of which agriculture and mining are dominant.

The population of the JTGDM was 242 264 (Community Survey 2016), of which 63.3% were aged between 15 and 64 years and 31.9% of the population was under the age of 15. The official unemployment rate of the District Municipality is 29.7%, while the youth unemployment rate is 37.2%.

Local context and receiving environment

The primary labour sending areas for the THM are predicted to be the community of Hotazel and other surrounding farms and villages within the JMLM.

The THM is situated within the JMLM, Ward 4. JMLM is the District's largest local municipality in terms of area size; covering an extent of 20 215 km². JMLM is mostly rural, with virgin land surface comprising about 60% of the surface. Agriculture, mining and community services are the primary economic sectors. JMLM has three main nodes where relatively higher economic activity takes place, namely Vanzylsrus, Hotazel and Blackrock. Mining is the predominant economic activity in Hotazel and Blackrock. Vanzylsrus operates as service centre for the surrounding area.

The population of the JMLM was 84 201 (Community Survey 2016), of which 52 % were aged between 15 and 64 years and 38 % of the population was under the age of 15. There has been a major decline of about 25% in the population of JMLM in the 10 year period between 1996 and 2016; this is mainly due to the out-migration from the municipality to the Ga-Segonyana and Gamagara Local Municipalities.

The JMLM has the highest unemployment rate in the JTGDM of 40%. According to 2011 data, there are 7 828 employed, 4 912 unemployed, 6 200 discouraged work seekers and 29 569 other not economically active.

Setswana is the most prevalent language spoken in the community with 90% of people listing it as their first language. Afrikaans and English are the first languages of 4% and 2% of the population respectively.

Of the population aged 20 years and older, 5% have completed primary school, 28% have some secondary education, 13% have completed matric, 4% have some form of higher education and 23% have no form of schooling.

There are 168 schools, 4 police stations, 24 clinics and 3 community health centres located in JMLM. There is no hospital in JMLM. According to the IDP, there are 23 707 households with a population growth of -1%. The average household size is 3.4 persons per household.

JMLM does not own any land in its jurisdiction. Most of the land either belongs to the State or falls under the jurisdiction of the Traditional leaders.

As per the IDP, JMLM itself is not responsible for the implementation of electrification projects. The Municipality acts as a project coordinator for projects implemented by Eskom and the DMRE. Within JMLM, 86% of households have access to electricity. Electricity is used for cooking in 59% of households, while wood is used for cooking in 36% of households.

Groundwater is a major source of water and factors affecting the quality include agricultural activities and environmental issues. Currently, most of the communities within JMLM receive water for free. Of all households, only 7% have access to piped water either in their dwelling or in the yard. As per the 2011 Census, 72% sourced water from a water services provider (municipality or other), 16% used borehole water and 6% received water via a water truck. Vanzylsrus and Hotazel are the only areas that have piped water system in JMLM. According to the IDP, there are 24 villages that are without access to piped water. They receive water by means of truck delivery or through a windmill equipped with a tap. The IDP identified the following as challenges to the provision of water:

- Community disruptions;
- Vandalism of infrastructure equipment;
- Insufficient funding; and
- Illegal water connections.

Due to the shortage or lack of water supply, JMLM is unable to provide adequate sanitation to its communities. The majority of the population (81%) make use of pit latrines with or without ventilation, 7% of the population have no access to toilet facilities and 6% are connected to a sewerage system.

JMLM collects refuse in Hotazel and Vanzylsrus, serving 1 144 households in the two areas, with 3% of the population having access to such a service. While 84% of households rely on their own refuse dump and 3% do not have access to refuse removal and disposal.

JMLM conducts Environmental Awareness campaigns in all resident wards annually. The communities are given information on issues that need to be taken care of in their respective environmental areas. The most challenging issue of environmental management in JMLM is veld fires and to minimize that the municipality has entered into an agreement with Working on Fire through an Expanded Public Works Programme.

The town of Hotazel consists of approximately 1755 people and 600 households (Census 2011). The majority of the population in Hotazel reside in house or concrete block structures on a separate stand (82%). Hotazel has a large number of households that have access to flush toilets (97%) and piped water into their dwellings (89%). This may be attributed to the area being more urbanized having been developed and supported by surrounding mines in recent years.

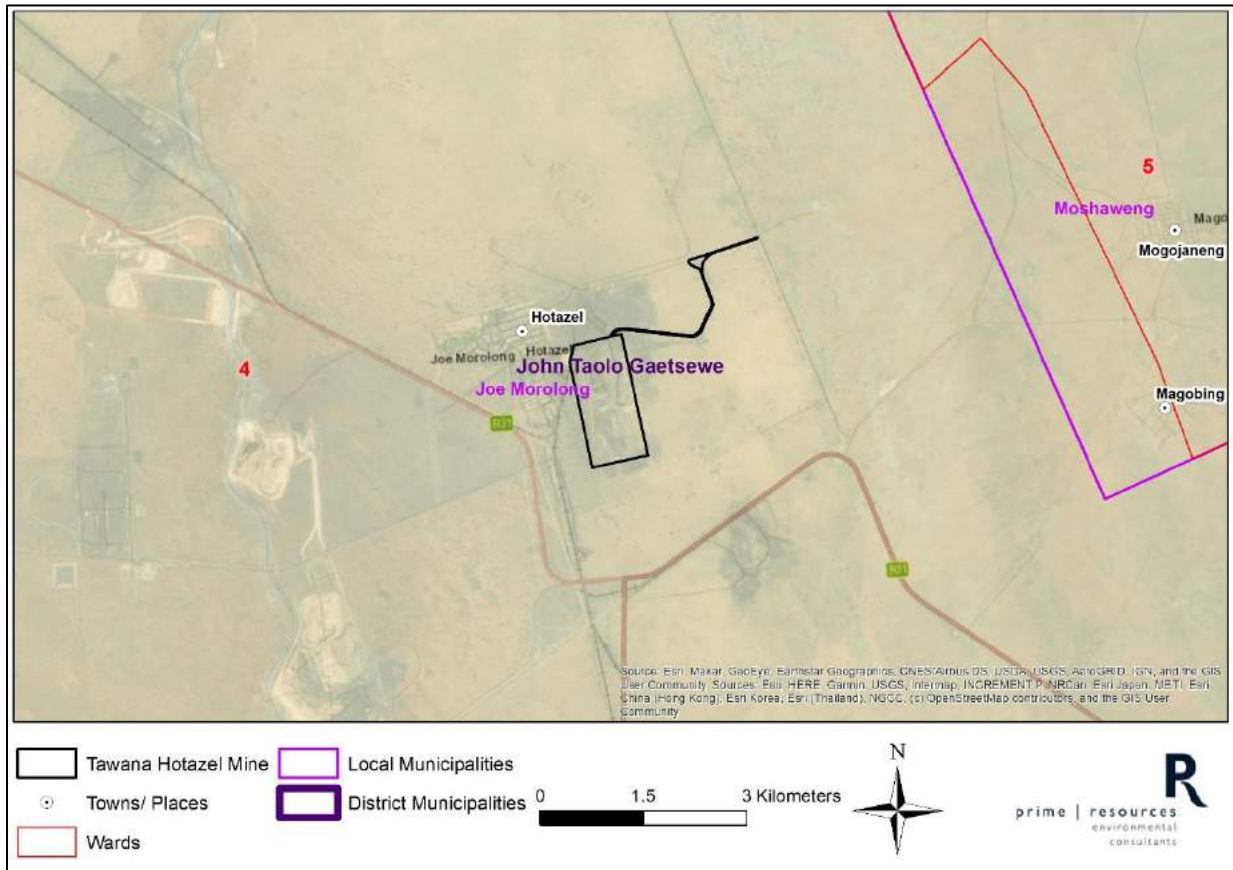


Figure 24: Surrounding settlements and wards

m) **Blasting and Vibration**

The information presented in this section was obtained from following reports:

- Blast and Vibration Assessment Scoping Report for the Proposed Hotazel Project, compiled by Blast Management and Consulting (November 2020) (refer to Appendix 17)
- Blast designs and Control Recommendations, compiled by A J Rorke – Explosives Application Specialist (March 2021) (refer to Appendix 18)

Source Environment

The source environment will consist of blasting operations in the planned opencast area. A typical manganese type mining operation is envisaged. Detail of exact drill and blast designs for the different lithographic structures will be confirmed prior to the impact assessment phase.

Receiving Environment

The receiving environment is the area expected to be influenced by the THM and which is directly adjacent to mine, specifically the area adjacent to the opencast pit area. The area of influence is not expected to exceed a distance range of 3500m radius around the opencast pit.

The receiving environment can be classed into three areas:

- Highly Sensitive: 0 to 500 m which is considered the most sensitive. Ground vibration and air blast will be most significant within the 500 m radius. The levels of ground vibration will be very dependent on the drilling and blasting parameters applied. In most blasting operations this area is considered the unsafe zone and is normally cleared of all people and animals when blasting is done in a mining environment. Specific legal requirements from the MHSA are also applicable for mining within 500 m from private infrastructure
- Lesser sensitive or medium sensitivity is the 500 m to 1500 m reference area. The 1500m radius is considered as a range where influence may be less but still requires active monitoring.

- The lowest critical or low sensitivity area is the 1500 m to approximately 3500 m radius. In this area the effects have more possibility of creating a disturbance than causing damage to structures.

Various installations were identified within 3500 m from the opencast operations associated with the proposed THM (refer to Figure 25 below). Receptors that will require strict blast control and effective design include:

- Houses;
- Structures including towers and industrial buildings;
- Roads;
- Railway lines;
- Powerlines;
- Telephone towers; and
- A planned PV solar farm is also located to the south east of the proposed mining area.

Of the installations identified, there are three within 500 m of the opencast pit. These are a railway line, communication tower and a structure. The infrastructure is considered private property.

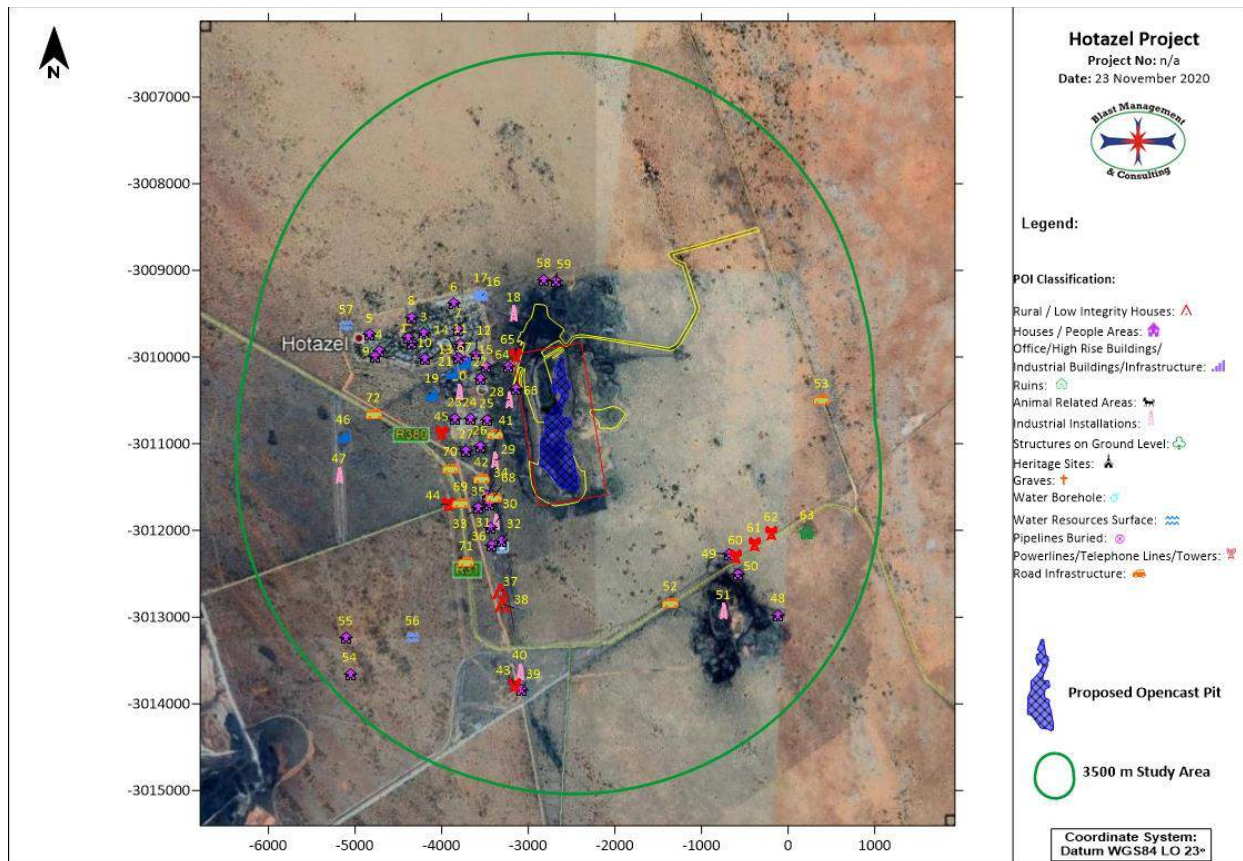


Figure 25: Anticipated Blasting and Vibration receiving environment

n) Visual Context/ Landscape

The visual character of the regional landscape is already considerably impacted on by mining. The following existing landscape features dominate the character of the project site and surrounds:

- Mining and associated infrastructure (including voids below natural ground-level and large residue deposits above ground-level);
- Overhead railway structures/ lines and power lines;
- Rural and residential land-use features.

The town of Hotazel is expected to be the main sensitive visual receptor. Historic mining, evidenced by the remaining void, adits, stockpiles of residue material and infrastructure can be seen within and around the proposed mining area (Figure 27). The historical residue deposits and berms can be seen from viewpoints within Hotazel town (Figure 27 and Figure 28).

Through the desktop investigation and site confirmation, the existing historical mine infrastructure and residue deposits surrounding the proposed site results in a low visual sensitivity. Furthermore, the proposed THM will have a comparably similar height and therefore, will minimally alter the visual landscape further. Backfilling/ rehabilitation will also commence immediately after the commencement of the mining operation and this may improve the current visual landscape to a degree.

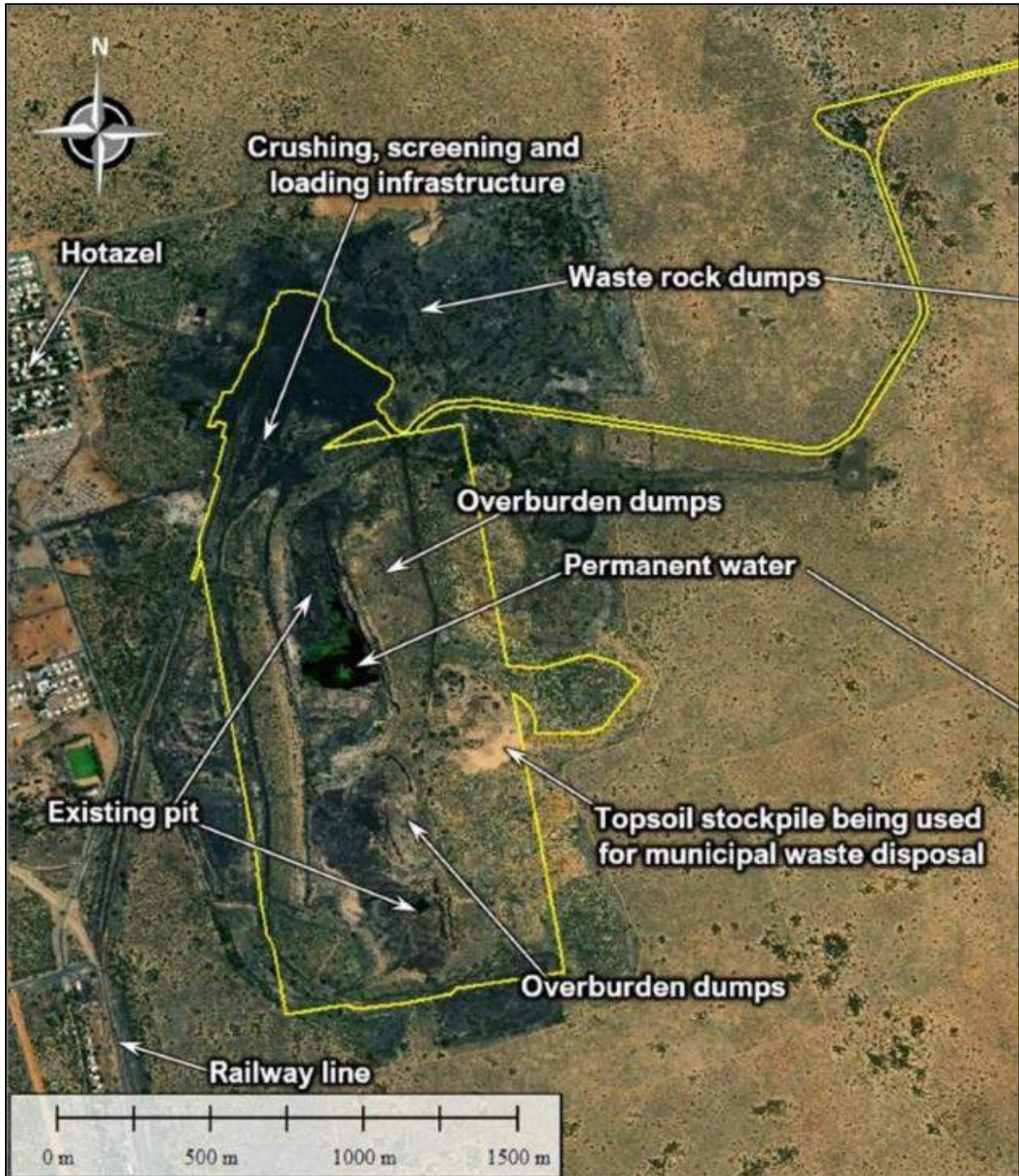


Figure 26: Land uses and existing landscape features associated with the proposed THM
(Map compiled by Dr Bruce Randell on 20/01/2021)

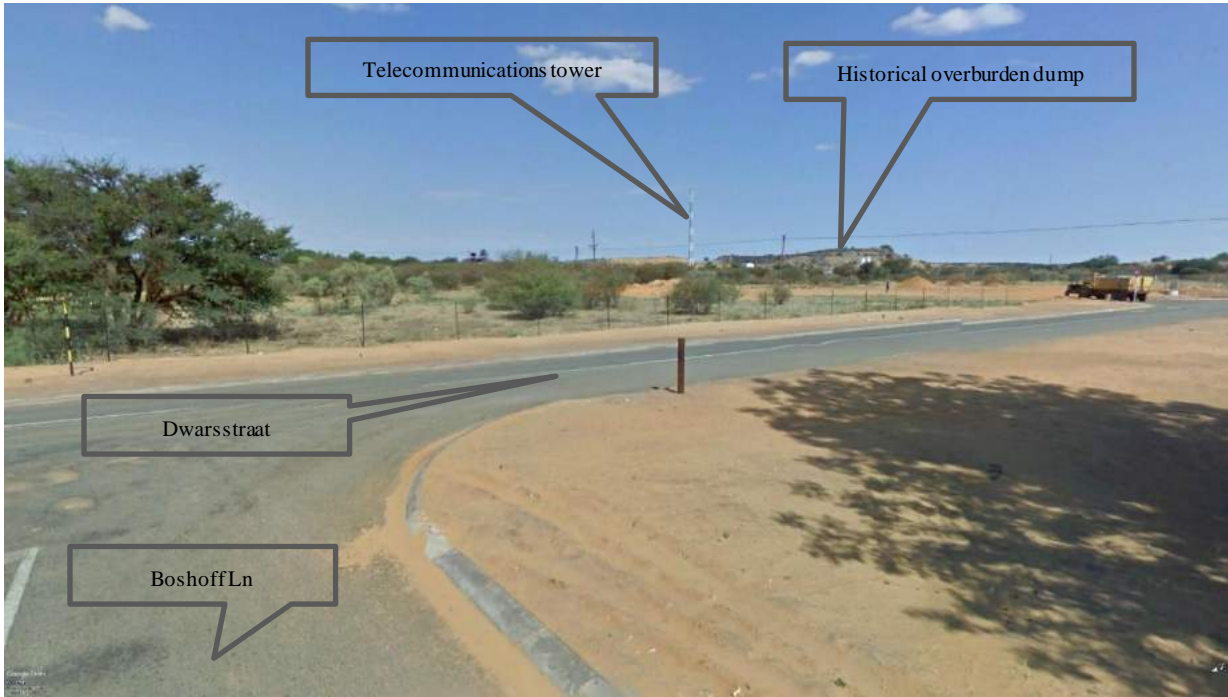


Figure 27: View of the proposed site from a vantage point in Hotazel, north west of the proposed THM, photo facing east
(Google, Image captured 2010)

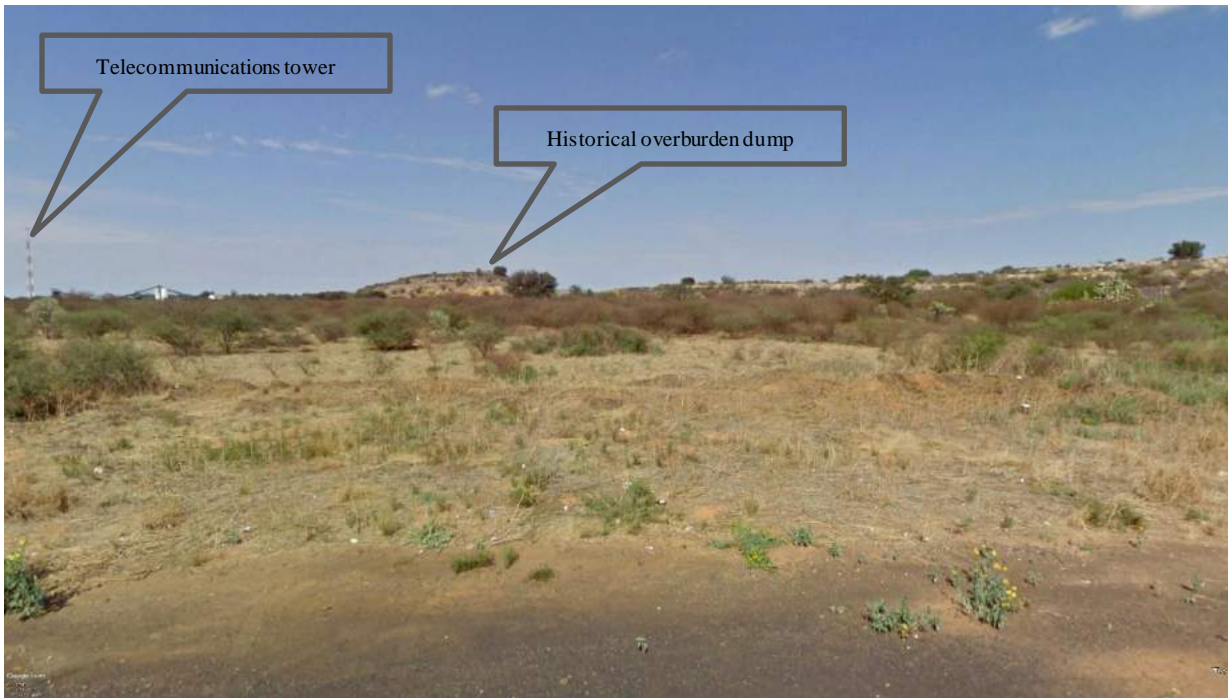


Figure 28: View of the proposed site from a vantage point on Broadman Rd in Hotazel, west of the proposed THM, photo facing east
(Google, Image captured 2010)

o) Roads and Traffic

The information presented in this section was obtained from following report, which was undertaken in accordance with the Manual for Traffic Impact Studies of the Department of Transport and with reference to the COTO TIA Guidelines:

- Traffic Baseline Study compiled by Merchelle's Collective (Pty) Ltd (April 2021) (refer to Appendix 19)

The proposed THM is well-located in terms of road infrastructure, being located adjacent to some of the major north-south and east-west roads in the area (R31 and R380). The primary labour sending areas for the THM are predicted to be the community of Hotazel and other surrounding farms and villages within the JMLM. It is therefore anticipated that trips to the mine originate from Hotazel and surrounds (Tsineng, Kathu and Kuruman) (refer to Figure 29).

The road network connecting the proposed THM to the surrounding towns and suburbs consists of the following:

N14

The N14 is a Class 1 national road under the jurisdiction of SANRAL that cuts across the mining corridor in the Northern Cape linking Upington in the west and ultimately to Gauteng in the east. The road has a 2-lane single carriageway configuration and is located over 50km south-east of the development site. The overall pavement structure appears to be in fair condition, however, in the section near the R31 Intersection, the road has no shoulders and edge breaks were observed, indicating a worn road wearing surface.

R31

The R31 is a provincial road that can be classified as a Class R2 Rural Major Arterial linking the towns of Hotazel, Kuruman and Kimberley. The road is surfaced and tends to carry significant HV traffic volumes. The pavement condition of the road is poor having severe edge breaks and surface bleeding. Longitudinal cracks and potholes were also observed on the road. As a National road, the maintenance and rehabilitation of the R31 is the responsibility of the South African National Roads Agency SOC Ltd (SANRAL) and mitigation measures should be developed in conjunction with the road agency.

R380

The R380 is a provincial road that can also be classified as a Class R2 Rural Major Arterial running north-south and linking Hotazel, Kathu and Postmasburg. The road is surfaced and has similar features as the R31 where the pavement condition of the road is poor; characterised by severe edge breaks. A section of the road is currently being rehabilitated by the Northern Cape Department of Roads and Public Works.

D3463

Road D3463 is a provincial district road and can be classified as a Class R3 Rural Minor Arterial. The road is a low volume surfaced road providing access to mining activity in the north. The road is surfaced up to its intersection with a local road towards Tsineng, where after it continues as a gravel road. The pavement is in fair condition.

Broadman Road

Broadman Road is a collector-distributor road running in the north-south direction in Hotazel town. The road intersects with the R31 and provides direct access into Hotazel and towards the development site. Broadman Road also comprises several at-grade rail intersections as well as non-motorized transport infrastructure such as sidewalks and raised pedestrian crossings.

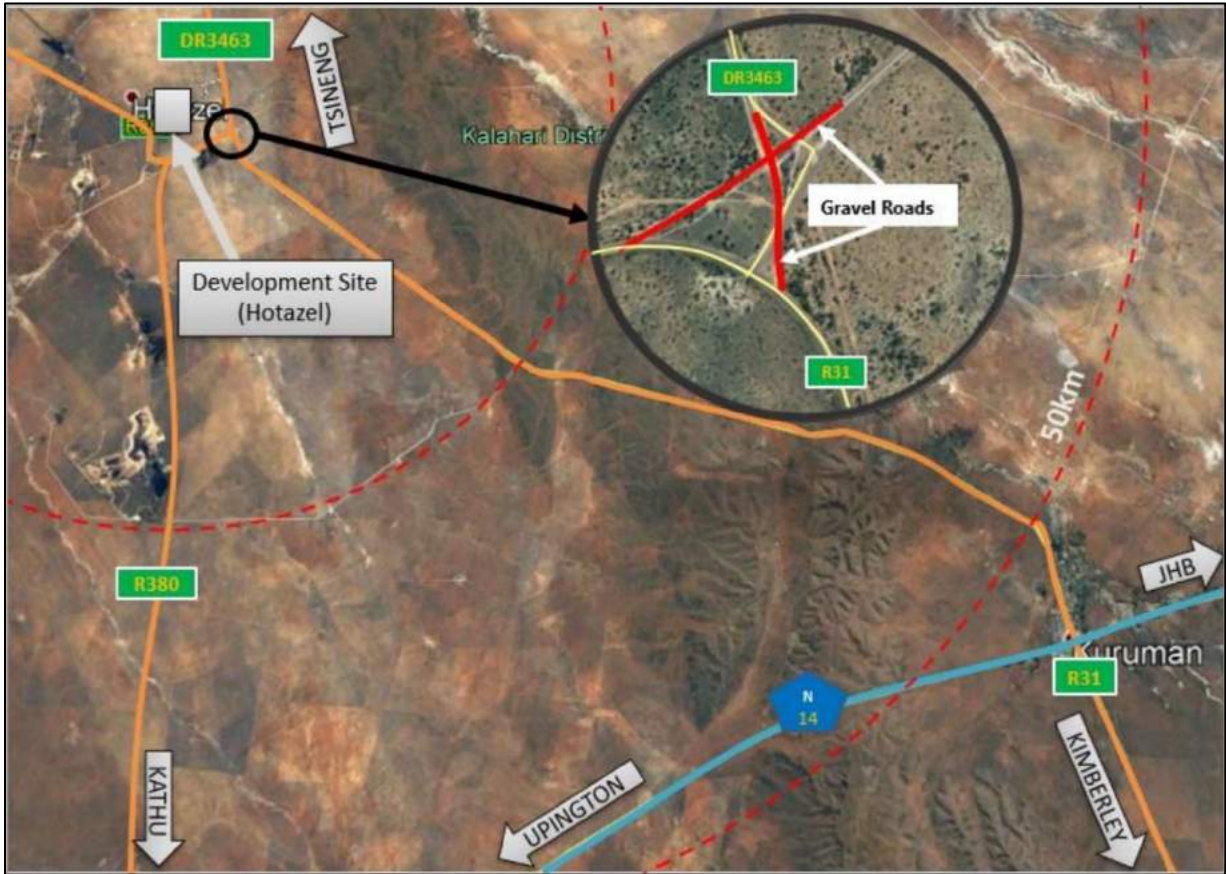


Figure 29: Existing Road Network around the proposed THM
(Map compiled by Merchelle's Collective)

Proposed Access Roads

Existing on-site roads will be utilised as access roads into the mine with two main access points as shown in Figure 30 below.



Figure 30: Proposed access roads
(Map compiled by Merchelle's Collective)

The main entrance to the mine will use the access road off Broadman road and will facilitate access for light vehicles and light delivery vehicles. This existing road has a cross-section width varying between 8 m and 16 m. The pavement condition is fair (refer to Figure 31 below). This access road is currently utilised by light and HVs.



Figure 31: Proposed main entrance access road to the west of the mine
(Photo taken by Merchelle’s Collective on 26/10/2020)

The transport route to the east, connecting to road DR3463, will facilitate access for HVs. The proposed HV access road has a cross-section width varying between 9 m and 20 m. The pavement condition of this road was observed to be poor (refer to Figure 32 below) and this road will be upgraded. Currently, access onto road DR3463 is closed-off with a sand heap.



Figure 32: Proposed heavy vehicle access road to the east of the mine
(Photo taken by Merchelle’s Collective on 26/10/2020)

Intersections and Intersection Capacity Evaluation

The base year for analysis was taken as year 2020. The operation of four critical intersections were evaluated and 12-Hour manual, classified traffic count surveys were commissioned. This represents a study area which extends approximately 5km to the south and 1.8km to the west of the proposed THM. The operating performance was evaluated under existing traffic conditions and lane configuration during the AM and PM peak hours. The AM Peak Hour was taken as 06:00-07:00 and the PM Peak Hour as 15:45-16:45.

Broadman Road and Mine Access Rd Intersection

Four-way stop-controlled junction providing access towards the proposed mine from the Hotazel town and nearby residences.

- The intersection operates well within capacity at a “B” Level of Service (reasonably free flow conditions) during the AM and PM peak hours.
- The intersection is a raised brick paved intersection encouraging motorists to slow down on approach, making it safe for pedestrians and cyclists.

R31 and Broadman Road Intersection

Two way stop controlled intersection providing access to Hotazel town off the provincial route R31, with a generous geometric design with left turn slip lanes along the major road (R31).

- There are several at-grade rail and road intersections along Broadman Rd resulting in a mix of vehicular, rail and pedestrian traffic.
- The intersection has adequate capacity and operates satisfactorily during both the AM and PM peak hours an “A” Level of Service (free flow conditions) during the AM and PM peak hours.

R31 and R380 Intersection

Two way stop control (T-junction) junction of two provincial routes located 3km south of the development site.

- Pavement settlement present on road which could be attributed to significant volume of HVs coming the western approach (from Tshipi Mine) and turning left from the southern approach. The pavement structure was likely under designed for current HV volumes.
- Sight distance from the western approach of the intersection is inadequate and motorists must drive further into the intersection to see clearly before turning.
- The intersection has adequate capacity to process current traffic volumes operating at satisfactory at an “A” Level of Service (free flow conditions) during the AM and PM peak hours.
- The approach on R380 operates at a slightly low “C” Level of Service (stable flow, at or near free flow) which may be attributed to the queue of HVs.

R31 and DR3463 Intersection

Two way stop control junction linked to the proposed HV mine access road off DR3463.

- Sight distance from the eastern approach (DR3463) is inadequate for right-turn movements towards Tsineng. This is due to the R31 (main road) curving at the intersection location. The sight distance could be improved through complete removal of trees and grass in the vicinity of the intersection.
- The intersection appears to be recently improved with left and right turn lanes along the R31.
- The intersection has adequate capacity and operates satisfactorily during both the AM and PM peak hours an “A” Level of Service (free flow conditions) during the AM and PM peak hours.

The identified critical intersections therefore have adequate capacity to process current traffic volumes and movements safely and efficiently on the road network and no capacity improvements are triggered.

Existing Traffic Volumes

In the vicinity of the proposed THM, Broadman Rd. carries low traffic volumes with majority of the commuters travelling from the Hotazel residential areas to the HMM plant located west of the intersection of Broadman Rd. and Road A, during the AM peak period. The low volumes can be attributed to the low population level.

Along the R31, only 7% of the traffic stream turns towards the Hotazel town during the AM peak indicating that the town does not attract significant work trips. The afternoon peak reflects the same number of trips leaving the town.

The majority of observed traffic volumes is through traffic along the R31 from Kuruman passing Hotazel and going towards the Black Rock Mine Offices and Plant in the town of Santoy further north.

p) Civil aviation

The proposed THM is located within 8 km of the Hotazel Airstrip. From the Obstacle Application Process as per the Obstacle Inspectorate of the South African Civil Aviation Authority, all objects, whether temporary or permanent, which project above the horizontal surface within a specified radius of 8 km as measured from the aerodrome reference point should be marked as specified in the South African Civil Aviation Technical Standards List of 2011 (Document SA-CATS 139 - Aerodromes and heliports) and permission letters must be obtained from the licensed aerodrome.

Obstacles include:

- Any communications structure, building or other structure, whether temporary or permanent, which has the potential to endanger aviation in navigable airspace, or has the potential to interfere with the operation of navigation or surveillance systems or Instrument Landing Systems, including meteorological systems for aeronautical purposes.
- Structures to be marked include:
 - Any structure exceeding 45 m above ground level, or structures where the top of the structure exceeds 150 m above the MEAN ground level, like on top of a hill, the mean ground level considered to be the lowest point in a 3 km radius around such structure. Structures lower than 45 m, which are considered as a danger or a potential danger to aviation, shall be marked as such when specified.
 - Overhead wires, cables, etc., crossing a river, valley or major roads shall be marked and in addition, their supporting towers marked and lighted if an aeronautical study indicates that it could constitute a hazard to aircraft.

The desktop analysis identified several existing structures within the 8 km of the aerodrome reference point which may be considered obstacles restricting the overhead movement of air traffic (including the processing plant, power lines, telecommunication tower, rail loadout facility railway structures). These existing features all have a similar- or higher elevation than any new infrastructure proposed as part of the proposed THM. Furthermore, in accordance with SA-CATS 139, none of the proposed structures forming part of the proposed THM are expected to exceed 45 m above ground level or 150 m above the mean ground level.



Figure 33: Location of the proposed THM in relation to the Hotazel Airstrip
(Google Earth Imagery dated 12/25/2018)

1) Description of the current land uses

Land Use

Land use is defined as the operations that are occurring on land, as carried out by humans, with the intention to obtain products and/or benefits through using land resources. Land use therefore refers to the purpose the land serves, such as recreation, natural or agriculture.

From Google Earth satellite imagery, ground-truthed during site-visits undertaken in 2018, 2020 and 2021, the land use associated with the proposed THM is historic mining evidenced by the remaining void, adits, stockpiles of residue material and infrastructure (Figure 26 and Figure 34). No mining was currently taking place at the proposed THM and the mine has been disused since 1989, with the infrastructure appearing old and in a state of disrepair. The land use in the vicinity of the proposed THM comprises primarily mining, residential and grazing. The Hotazel municipal waste site (G:S:B-, Permit No.: B33/2/441/20/P156, licence date 20 February 1995) is located within the proposed THM. Some of the topsoil stockpiles are being used to cover the waste. Apart from the town of Hotazel, the area immediately surrounding the proposed THM is unpopulated and undeveloped.

Land Cover

Land cover is defined as the physical coverage on the earth’s surface, such as the vegetation (natural or cultivated) or man-made constructions (buildings, etc.) which occur on the earth surface. Land cover data for the proposed THM was obtained from the SANBI GIS Land Cover Map 2015. The land cover associated with the proposed THM is classified mostly as a mining area with pockets of shrubland, grassland and thicket/bush. There is some mining infrastructure that partially falls within the proposed THM bounds, however the majority is outside, represented by Figure 37. The surrounding area, including the proposed access roads, are indicated as low shrubland, with urban and industrial land uses associated with the town of Hotazel and surrounds.

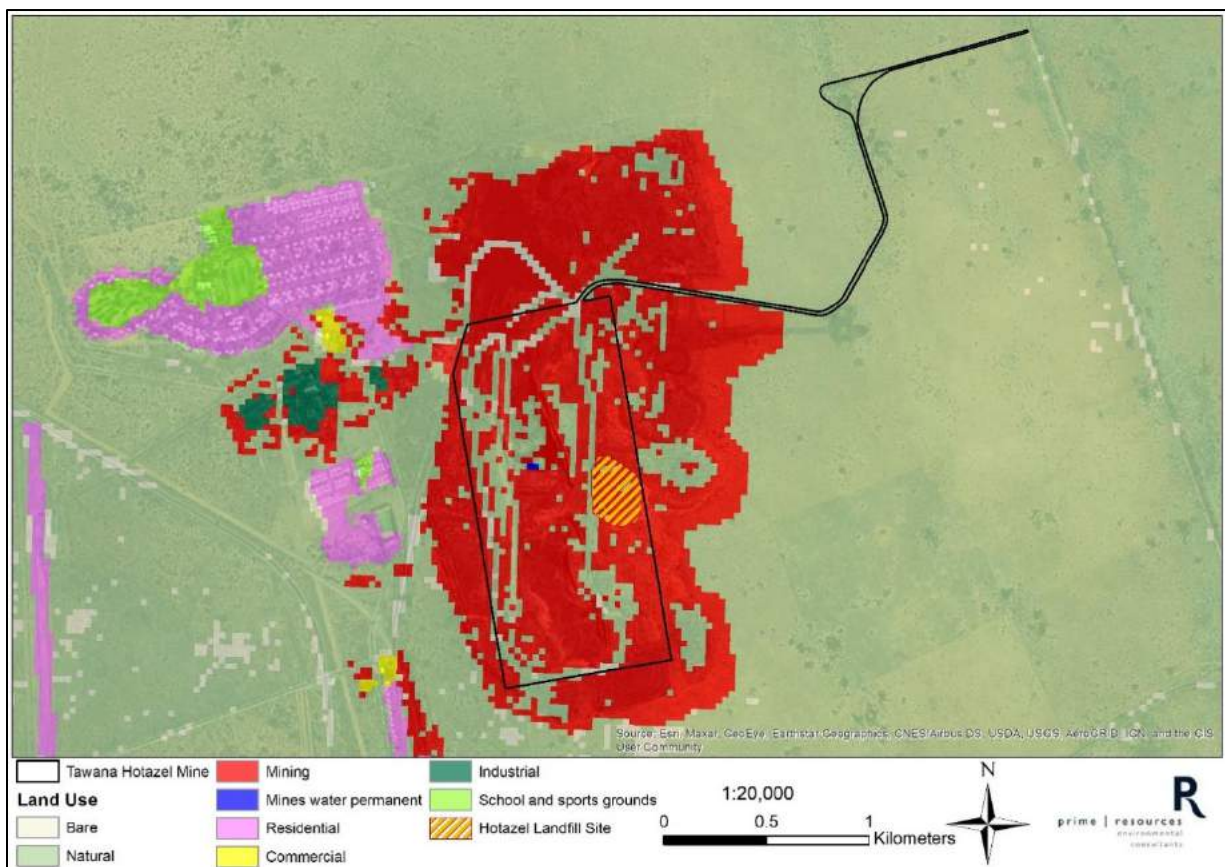


Figure 34: Land Uses associated with the proposed THM and surrounds



Figure 35: Google Earth Imagery of the Hotazel municipal waste site located within the proposed THM



Figure 36: Hotazel municipal waste site located within the proposed THM
(Photos taken by Dr Bruce Randell on 20/01/2021)

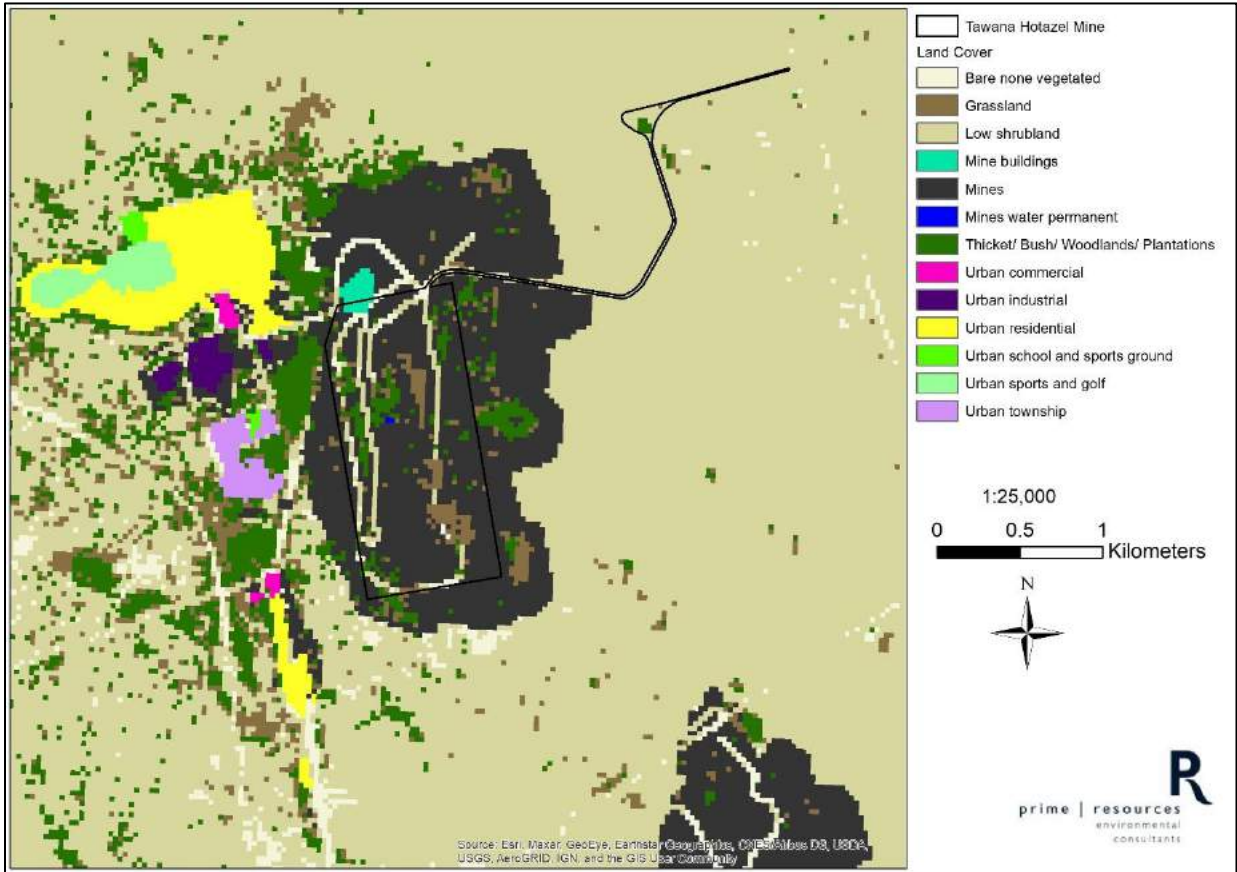


Figure 37: Land Cover associated with the proposed THM



Figure 38: Photographs showing the state of the proposed THM (04/07/2018)



Figure 39: Photos from the site visit showing the opencast void and adits
(Photos taken by Field and Form Landscape Science on 23/10/2020)

2) Description of specific environmental features and infrastructure on the site

Three aquifers occur in the area. These three aquifers are associated with a) the primary sandy gravel material, b) the fractured rock and leached banded iron formation aquifer, and c) the dolomitic aquifers of the Griqualand West Sequence. The aquifers present in the area are classified as minor aquifers. The aquifers are of high importance to the local landowners outside of town as it is their only source of water for domestic, gardening, and agricultural purposes.

The Kathu Bushveld ecosystem type which is represented on the regional scale, is considered to be Least Threatened, however, features of the ecosystem are underrepresented on-site due to extensive transformation due to historical mining activities. A limited portion, along the existing haul roads and access roads, is located within remaining extent of Kathu Bushveld. According to the Northern Cape Conservation Plan (C-Plan; 2016) there are Other Natural Areas (ONAs) indicated to remain along existing haul roads within the opencast void and along the access road in the east. The greater area falls within the Griqualand West Centre of Endemism, however the proposed THM is not located within the core geological areas of this centre of floristic endemism, and endemic and near-endemic are unlikely to occur within the proposed THM.

One faunal SCC namely Verreaux's eagle (*Aquila verreauxii*) utilises the site for nesting, breeding and foraging purposes. One TOPS-listed floral species, namely *Harpagophytum procumbens* was recorded on site. Two nationally protected tree species in terms of the National Forests Act (Act No. 84 of 1998) occur, namely *Vachellia erioloba* in relatively low abundance and *V. haematoxylon* in high abundance. One provincially protected floral species in terms of Schedule 1 of the NCNCA, namely *H. procumbens*, and several floral species listed under Schedule 2 of this Act, namely *Plinthus sericeus*, *Ammocharis coranica*, *Boophone disticha*, *Crinum sp.*, *Orphanthera jasminiflora*, *Albuca seineri* (= *Ornithogalum seineri*), *Albuca setosa* (= *Ornithogalum setosum*) were recorded on site. Signs of TOPS-listed Aardvark

(*Orycteropus afer*) were however noted during the field assessment in the vicinity of the access road. Other faunal TOPS-listed species that may occur are Bat-eared Fox (*Otocyon megalotis*) and Cape Fox (*Vulpes chama*). The arachnid species *Harpactira* spp. and *Pterinochilus* spp. are provincially protected under Schedule 1 of NCNCA (Act No. 9 of 2009) and may occur on site. Based on distributional data, the South African Python (*Python natalensis*) is the only SCC whose distribution includes the proposed THM and historically would have occurred within wooded communities with rocky elements. Although regionally listed as Least Concern (LC), *P. natalensis* is a registered TOPS-listed species. Sundevall's Shovel-snout (*Prosymna sundevallii*) is a near-endemic reptile species with an overlapping distribution with the proposed THM and may occur in more intact Kathu Bushveld along the access road.

There are no water courses or wetlands on the site aside from the moderately sized and relatively deep, artificial pit lake formed in the historic void, which supports both aquatic vegetation that had established within the pit lake, as well as fauna (*Tilapia sparmanii* a provincially Protected fish species) that had been artificially translocated to the pit lake.

In terms of infrastructure, the R380 and the R31 roads run in close proximity to the proposed THM. There is also a small section of historic mining infrastructure and gravel roads located within the proposed THM. There are no areas of cultural or historic significance associated with the proposed THM.

The Hotazel municipal waste site (G:S:B, Permit No.: B33/2/441/20/P156, licence date 20 February 1995) is located within the proposed THM.

3) *Environmental and current land use map*

(Show all environmental, and current land use features)

Figure 40 below, provides an indication of the land uses associated with the proposed THM. The area reflects that it is historically mined with remnants of Kathu Bushveld.



Figure 40. Environmental and current land use map

v. Impacts Identified

(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)

The proposed site layout is reflected in Figure 3. The town of Hotazel is located approximately 1km north-west of the proposed THM and therefore situates within the zone of influence for certain impacts which may arise due to the construction, development and operation thereof.

The potential positive and negative impacts, including cumulative impacts, of the THM will be assessed during the EIA phase. From an initial high-level assessment, the impacts (**prior to mitigation**) and associated significance are assessed in Table 15. The potential impacts will be updated after consultation with IAPs.

Table 15. Potential impacts related to the proposed THM (preliminary assessment)

| Activity | Potential impact | Magnitude | Scale | Duration | Probability | Significance | |
|--|---|-----------|-------|----------|-------------|--------------|----------|
| Surface preparation, clearing of land and construction of surface infrastructure including the construction of new on-site hauls roads and widening of the existing access roads | Air quality impacts due to dust and particulate matter / gaseous emissions. | 8 | 2 | 2 | 3 | 36 | Med (-) |
| | Further reduction in floral and faunal diversity, increased alien vegetation proliferation and encroachment and edge effects. | | | | | | |
| | Further disturbance within the proposed THM is likely to lead to increased proliferation of such species, may introduce additional alien species to the proposed THM, and may lead to alien invasive species encroachment into adjacent areas. An increase in alien invasive species could continue during the operational phase should eradication and control measures not be implemented. Alien and invasive floral species have the potential to outcompete indigenous vegetation and reduce faunal habitat quality. | 4 | 1 | 4 | 4 | 36 | Med (-) |
| | Displacement of fauna due to habitat loss or transformation, disturbance to and mortality of fauna, disturbance to the resident pair of Verreaux's Eagle (<i>Aquila verreauxii</i>) and its progeny and likely displacement of the birds from the open-cast pit nesting platform. The loss of the breeding habitat contained within the existing pit lake is likely to be permanent, since similar habitat is not available on this property. The water dependent species observed utilising this key habitat, may move to the adjacent mine (south east of the proposed THM) where surface water habitat occurs. | 8 | 0 | 5 | 5 | 65 | High (-) |
| | Disturbance to/ removal of aquatic vegetation that has established within the pit lake, as well as fauna that has been artificially translocated to the pit lake such as <i>Tilapia sparrmanii</i> (provincially Protected fish species). | | | | | | |
| | Loss of subterranean / previously unidentified heritage and paleontological resources. | 4 | 1 | 4 | 2 | 18 | Low (-) |
| | Erosion from stormwater runoff. | 4 | 2 | 4 | 4 | 40 | Med (-) |
| | Contamination of soils or groundwater from machinery and spills. | 4 | 1 | 2 | 3 | 21 | Low (-) |
| | Greenhouse Gas Emissions and Climate Change <ul style="list-style-type: none"> • There will be an initial carbon sink loss due to vegetation removal. • The main CO₂ contribution from the project will be based on the clearing of vegetation. | 2 | 1 | 4 | 3 | 21 | Low (-) |
| The site has a low agricultural sensitivity, with minimal soil present and a small portion of grazing land will be lost. | 4 | 1 | 3 | 2 | 16 | Low (-) | |

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| Activity | Potential impact | Magnitude | Scale | Duration | Probability | Significance | |
|---|--|-----------|-------|----------|-------------|--------------|---------|
| Mining activities including stockpiling of topsoil and subsoil, opencast mining and blasting, loading and hauling, processing, ore stockpiles and mechanical evaporation of pit water | Air quality impacts due to dust and particulate matter / gaseous emissions. | 8 | 2 | 4 | 4 | 56 | Med (-) |
| | Nuisance noise <ul style="list-style-type: none"> • Blasting and mobile crushing and screening • Operational traffic • Product loading /hauling | 6 | 2 | 4 | 4 | 48 | Med (-) |
| | Blasting damage from ground vibration, air blast and fly rock. | 4 | 2 | 4 | 2 | 20 | Low (-) |
| | Contamination of soils and groundwater from machinery, spills, mining and dirty water handling and leaching from surface stockpiles / residue . | 6 | 2 | 5 | 2 | 39 | Med (-) |
| | Erosion from stormwater runoff. | 4 | 1 | 4 | 2 | 18 | Low (-) |
| | Impacts on the surface water quality due to contaminant migration away from the mining area <ul style="list-style-type: none"> • There are no water courses in close proximity to the proposed THM. The closest rivers are the Gamagara River (5 km west) and the Kuruman River (10 km north) | 4 | 1 | 4 | 1 | 9 | Low (-) |
| | Greenhouse Gas Emissions and Climate Change <ul style="list-style-type: none"> • The community are likely to be negatively impacted by climate change. | 2 | 5 | 4 | 3 | 33 | Med (-) |
| | Visual/ aesthetics <ul style="list-style-type: none"> • The existing historical mine infrastructure and residue deposits surrounding the proposed site results in a low visual sensitivity. • The proposed THM will have a comparably similar height and therefore, will minimally alter the visual landscape further. • Backfilling/ rehabilitation will also commence immediately after the commencement of the mining operation and this may improve the current visual landscape to a degree. | | | | | | |
| | Safety risks to third parties and animals on site will reduce as the mine will be fenced with access controls in place. <ul style="list-style-type: none"> • Direct and indirect socio-economic benefits from the generation of employment (wages), taxes and profits and from the procurement of goods and services, and the increased spending power of employees. • Direct and indirect socio-economic benefits from skills development and SLP initiatives. | 4 | 1 | 4 | 4 | 36 | Med (+) |
| | | 6 | 2 | 4 | 3 | 36 | Med (+) |

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| Activity | Potential impact | Magnitude | Scale | Duration | Probability | Significance | |
|---|--|-----------|-------|----------|-------------|--------------|----------|
| | Possible in-migration of job seekers into the area resulting in the formation of new informal settlements as well as secondary impacts of in-migration including pressure on existing infrastructure, an increase in crime and social ills and mining may lead to a reduction in property value. | 6 | 3 | 4 | 3 | 39 | Med (-) |
| Handling, storage and disposal of residue material to in pit dumps. | Contamination of soils and groundwater from mining and dirty water handling and leaching from surface stockpiles/residue. | 6 | 2 | 5 | 2 | 39 | Med (-) |
| Storage and handling of dangerous goods (bulk fuel storage and explosives handling) | Contamination of soils and groundwater from spills. | 4 | 1 | 2 | 3 | 21 | Low (-) |
| | Safety risks to employees. | 4 | 1 | 4 | 2 | 18 | Low (-) |
| Dewatering of groundwater for mining purposes | Impact on groundwater levels of surrounding water users and contaminant migration away from the mining area. | 6 | 2 | 4 | 3 | 36 | Med (-) |
| | Potential decant from the mining area post closure can result in poor quality mine water discharging to the surface. | 4 | 1 | 4 | 2 | 18 | Low (-) |
| Transfer of ore via road | <ul style="list-style-type: none"> • Deterioration in pavement quality resulting in unsafe driving conditions. • Inadequate sight distance at intersections could cause accidents. • Safety risks to third parties and animals. | 4 | 3 | 3 | 3 | 30 | Med (-) |
| Closure and rehabilitation | Greenhouse Gas Emissions and Climate Change <ul style="list-style-type: none"> • The previously cleared areas that form part of the project will be rehabilitated resulting in a carbon sink gain. | 2 | 1 | 3 | 3 | 9 | Low (+) |
| | Downscaling and retrenchment of employees. | 6 | 2 | 3 | 4 | 36 | Med (-) |
| | Backfilling/rehabilitation of the currently disturbed area upon completion of mining may improve the visual and aesthetic features of the site while simultaneously transforming the area into a usable landform. | 6 | 1 | 5 | 5 | 60 | High (+) |

vi. Methodology used in determining the significance of environmental impacts

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

The Prime Resources Impact Assessment Methodology and rationale was used to assess the significance of the potential impacts of the initial layouts on the surrounding biophysical and socio-economic environments.

The objective of the Impact Assessment is to rate the significance of potential impacts of the project prior to and after the implementation of mitigation measures. The methodology encompasses an assessment of the nature, consequence (magnitude, extent, duration) and probability (likelihood) of the identified potential environmental and social impacts of the project. The reversibility of the impact as well as the cumulative impact are also considered. The impact is assessed prior to and after implementation of potential mitigation measures.

The following risk assessment model has been used for determination of the significance of impacts.

Significance = (magnitude + duration + scale) x probability

The maximum potential value for significance of an impact is 100 points. Environmental impacts can therefore be rated as high, medium or low significance on the following basis:

| | |
|-----------------------------------|----------|
| High environmental significance | 60 – 100 |
| Medium environmental significance | 30 – 59 |
| Low environmental significance | 0 – 29 |

| Magnitude (M) | |
|----------------------------|--|
| Minor (2) | Change not measurable; or threshold never exceeded There is no need for people to adapt and will not notice changes to livelihoods and lifestyles |
| Low (4) | Low disturbance of degraded areas, which have little conservation value. Minor change in species occurrence or variety Minor deterioration (nuisance or minor deterioration) or harm to receptors; Change to receiving environment not measurable; or identified threshold never exceeded People are able to adapt and maintain pre-impact livelihoods and lifestyles |
| Moderate (6) | Moderate/measurable deterioration or harm to receptors; Receiving environment moderately sensitive; Identified threshold occasionally exceeded People are able to adapt with difficulty (with no resettlement). Pre-impact livelihoods and lifestyles can be maintained with difficulty or with support or intervention. Disturbance of areas that have potential conservation value or are of use as resources Complete change in species occurrence or variety. |
| High (8) | High, measurable deterioration or harm to receptors; Receiving environment highly sensitive; Identified threshold often exceeded Pre-impact livelihoods and lifestyles cannot be maintained or resettlement is required |
| Very High/ Unknown (10) | Loss of ecosystem function Loss of an irreplaceable natural resource (including cultural and heritage resources) Disturbance of pristine areas that have important conservation value Human health and or safety is compromised Receptors of impact are of conservation importance; or identified threshold (such as SANS limits, Resource Quality Objectives, etc.) consistently exceeded Unknown |
| Scale (S) | |
| Footprint (0) | Occurs only within the footprint of the activity |
| Site (1) | Occurs only within the site of the project |
| Local (2) | Occurs within approximately 2.5 km of the activity |

| | |
|------------------------|--|
| Regional (3) | A regional scale as determined by administrative boundaries, habitat type/ecosystem or regional loss of a species population. |
| National (4) | Nationally important or macro-economic consequences |
| International (5) | Internationally important agreements and resources are affected such as areas protected by international conventions, international waters etc. Unknown |
| Duration (D) | |
| Immediate (1) | Completely reversible without management Impact is instantaneous and ceases imminently |
| Short (2) | Naturally reversible or reversible with minimal management Impact ceases when the activity ceases |
| Medium (3) | Impact can be reversed with sufficient management Impact ceases when project ends |
| Long (4) | Impact is potentially irreversible even with management |
| Permanent (5) | Impact remains after the life of the project The impact will continue indefinitely / ad infinitum Unknown |
| Probability (P) | |
| Improbable (1) | Improbable, almost impossible |
| Unlikely (2) | Low probability, unlikely to occur |
| Likely (3) | Medium probability, likely to occur |
| Expected (4) | High probability, expected to occur |
| Definite (5) | Definite (certain) or unknown |

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)

No project alternatives were considered and as such an assessment of alternatives to the project is not applicable. The initial layout showing the proposed surface infrastructure is reflected in Figure 3. The initial site layout will be further informed by the public participation process to accommodate any concerns raised by IAPs.

From Table 15 above the following potential **negative** and **positive** impacts have been identified and will be further investigated in the EIA phase:

Negative impacts

Surface preparation, clearing of land and construction of surface infrastructure including the construction of new on-site hauls roads and widening of the existing access roads may result in the following impacts:

- Air quality impacts due to dust and particulate matter / gaseous emissions.
- Further reduction in floral and faunal diversity, increased alien vegetation proliferation and encroachment and edge effects.
- Displacement of fauna due to habitat loss or transformation, disturbance to and mortality of fauna.
- Loss of subterranean / previously unidentified heritage and paleontological resources.
- Erosion from stormwater runoff.
- Contamination of soils or groundwater from machinery and spills.
- Greenhouse gas emissions and climate change impacts.
- Loss of a small portion of grazing land.

Mining activities including stockpiling of topsoil and subsoil, opencast mining and blasting, loading and hauling, processing and ore stockpiles may result in the following impacts:

- Air quality impacts due to dust and particulate matter / gaseous emissions .
- Nuisance noise.
- Blasting damage from ground vibration, air blast and fly rock.
- Contamination of soils and groundwater from machinery, spills, mining and dirty water handling and leaching from surface stockpiles / residue.
- Erosion from stormwater runoff.
- Impacts on the surface water quality due to contaminant migration away from the mining area.
- There are no water courses in close proximity to the proposed THM. The closest rivers are the Gamagara River (5 km west) and the Kuruman River (10 km north).
- Greenhouse gas emissions and climate change impacts .
- Backfilling/ rehabilitation will also commence immediately after the commencement of the mining operation and this may improve the current visual landscape to a degree.
- Possible in-migration of job seekers into the area resulting in the formation of new informal settlements as well as secondary impacts of in-migration including pressure on existing infrastructure, an increase in crime and social ills and a reduction in property value.

Handling, storage and disposal of residue material to in pit dumps may result in the following impacts :

- Contamination of soils and groundwater from mining and dirty water handling and leaching from surface stockpiles / residue.

Storage and handling of dangerous goods (bulk fuel storage and explosives handling) may result in the following impacts:

- Contamination of soils and groundwater from spills.
- Safety risks to employees.

Dewatering of groundwater for mining purposes may result in the following impacts:

- Impact on groundwater levels of surrounding water users and contaminant migration away from the mining area.
- Potential decant from the mining area post closure can result in poor quality mine water discharging to the surface.

Transfer of ore via road may result in the following impacts:

- Deterioration in pavement quality resulting in unsafe driving conditions.
- Inadequate sight distance at intersections could cause accidents.
- Safety risks to third parties and animals.

Closure and rehabilitation may result in the following impacts:

- Downscaling and retrenchment of employees.

Positive impacts

- Safety risks to third parties and animals on site will reduce as the mine will be fenced with access controls in place.
- Direct and indirect socio-economic benefits from the generation of employment (wages), taxes and profits and from the procurement of goods and services, and the increased spending power of employees.
- Direct and indirect socio-economic benefits from skills development and SLP initiatives.

- Greenhouse gas emissions and climate change impacts where the previously cleared areas that form part of the project will be rehabilitated resulting in a carbon sink gain.
- Backfilling/ rehabilitation of the currently disturbed area upon completion of mining may improve the visual and aesthetic features of the site while simultaneously transforming the area into a usable landform.

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)

An issues register will be compiled during the public participation process and relevant mitigation measures, controls, interventions or alternatives will be considered in the final Scoping Report to be submitted to the DMRE.

ix. The outcome of the site selection Matrix. Final Site Layout Plan

(Provide a final site layout plan as informed by the process of consultation with interested and affected parties)

The initial site layout plan showing the proposed surface infrastructure is reflected in Figure 3. The initial site layout will be further informed by the public participation process to accommodate any concerns raised IAPs.

Disadvantages of the initial site layout include:

- The proposed THM is located in close proximity to the town of Hotazel.
- The footprint and surface infrastructure is limited to the MR area.

If there is no need for the layout to be revised following public participation, the preferred initial layout will be considered as the final layout to be further assessed during the EIA phase.

x. Motivation where no alternative sites were considered

No alternative sites were assessed as the proposed location was selected based on the location of the MR area, surface access rights, as well as the location of the orezone within the property determined from the exploration results. Refer to Section 2.h.i.

xi. Statement motivating the preferred site

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

The THM is located in an area where there is limited natural vegetation due to the historical mining activities that were undertaken. The footprint of the THM is also limited to the footprint of the MR area and as far as possible the surface infrastructure must be placed on already disturbed areas and away from the orezone, so as not to sterilise the resource. Refer to Section 2.h.

The advantages of the preferred site include:

- The environmental sensitivity of the proposed THM is low as the site is largely disturbed and incorporates the historical HMM and the existing opencast void.
- The proposed THM layout has been selected based on the location of existing surface infrastructure.
- The proposed THM is well-located in terms of surrounding road infrastructure, being located adjacent to some of the major mobility north-south and east-west roads in the area, such as the R31 and R380.

i. Plan of Study for the Environmental Impact Assessment Process

i. Description of alternatives to be considered including the option of not going ahead with the activity

Alternatives to the proposed THM layout will be considered during the EIA process, and will be informed by the public participation process and specialist impact assessment studies. The option of not going ahead with the activity will also be considered. Further technological and operational alternatives may be recommended based on the outcome of the public participation process and the EIA.

ii. Description of the aspects to be assessed as part of the environmental impact assessment process

(The EAP must undertake to assess the aspects affected by each individual mining activity whether listed or not, including activities such as blasting, Loading, hauling and transport, and mining activities such as Excavations, stockpiles, discard dumps or dams, water supply dams and boreholes, accommodation, offices, ablution, stores, workshops, processing plant, storm water control, berms, roads, pipelines, power lines, conveyors, etc...etc...etc.)

The project activities to be assessed as part of the EIA process include:

- Surface preparation and clearing of land;
- Construction of surface infrastructure;
- Mining activities including stockpiling of topsoil and subsoil, opencast mining and blasting, loading and hauling, processing, ore stockpiles, bulk fuel storage and explosives handling;
- Dewatering of groundwater for mining purposes and management of surface water;
- Transfer of ore via road; and
- Backfilling/ rehabilitation.

The findings of the EIA process will provide a detailed overview of the potential impacts (including direct, indirect, cumulative and latent impacts) of the proposed project on the biophysical and social environments.

iii. Description of aspects to be assessed by specialists

From the ESR, the following list of specialist assessments were identified for inclusion in the assessment report. Specialist assessments that will not be undertaken are indicated with a strikethrough along with the reason for not including such. In addition to the specialist assessments listed below, a Blasting and Vibrations Impact Assessment and a Geochemistry Impact Assessment will also be undertaken.

Specialist assessments identified in the ESR for inclusion in the assessment reports

| Specialist study | Scope | Reason for not including |
|--|------------------------------------|---|
| Agricultural Impact Assessment | Compliance Statement | N/A |
| Landscape/Visual Impact Assessment | Baseline and Impact assessment | |
| Archaeological and Cultural Heritage Impact Assessment | Phase 1 Heritage Impact assessment | |
| Palaeontology Impact Assessment | Phase 1 PIA (desktop) | |
| Terrestrial Biodiversity Impact Assessment | Baseline and Impact assessment | |
| Aquatic Biodiversity Impact Assessment | Compliance Statement | |
| Hydrology Assessment | Baseline and Impact assessment | |
| Noise Impact Assessment | Baseline and Impact assessment | |
| Radioactivity Impact Assessment | Not included | A geochemistry impact assessment was undertaken and the sediments that were analysed indicated that abundances of |

| Specialist study | Scope | Reason for not including |
|---------------------------------------|--|---|
| | | uranium and thorium were below the detection limit. Comparison with the abundances of uranium, thorium and potassium with that of the average upper crust indicate that these elements are not considered enriched. |
| Traffic Impact Assessment | Baseline and Impact assessment | N/A |
| Geotechnical Assessment | Impact assessment | |
| Climate Impact Assessment | Baseline and Impact assessment | |
| Health Impact Assessment | Impact assessment | |
| Socio-Economic Assessment | Baseline (desktop) and Impact assessment | |
| Ambient Air Quality Impact Assessment | Baseline and Impact assessment | |
| Seismicity Assessment | Not included | The proposed THM is an opencast mine and all current plans for the project specifically exclude underground mining. A blasting and vibrations assessment will however be undertaken. |
| Plant Species Assessment | Baseline and Impact assessment | N/A |
| Animal Species Assessment | Baseline and Impact assessment | |

The following specialist studies have been completed during the Scoping phase and/ or will be undertaken during the EIA phase:

Specialist studies already completed

| Specialist study | Scope |
|---|-----------------------|
| Air quality | Baseline |
| Greenhouse Gas Emissions and Climate Change | Baseline |
| Agricultural Compliance Statement | Baseline |
| Archaeology and Cultural Heritage | Phase 1 HIA |
| Palaeontology | Phase 1 PIA (desktop) |
| Noise | Baseline |
| Hydrology | Baseline |
| Geohydrology | Baseline |
| Terrestrial Biodiversity | Baseline |
| Aquatic Biodiversity | Baseline |
| Socio-economic | Baseline (desktop) |
| Blasting and vibrations | Baseline |
| Traffic | Baseline |
| Visual Context / Landscape | Baseline (desktop) |

Specialist studies still to be undertaken during the EIA phase

| Specialist study | Scope |
|---|-------------------|
| Air quality | Impact assessment |
| Greenhouse Gas Emissions and Climate Change | Impact assessment |
| Noise | Impact assessment |
| Hydrology | Impact assessment |
| Geohydrology | Impact assessment |
| Geochemistry | Impact assessment |
| Geotechnical | Impact assessment |
| Terrestrial Biodiversity | Impact assessment |

| Specialist study | Scope |
|--|-------------------|
| Aquatic Biodiversity | Impact assessment |
| Socio-economic and Screening level health assessment | Impact assessment |
| Blasting and vibrations | Impact assessment |
| Traffic | Impact assessment |
| Visual Context / Landscape | Impact assessment |

iv. Proposed method of assessing the environmental aspects including the proposed method of assessing alternatives

The environmental aspects will be assessed in terms of the methodology described in Section h.vi.

v. The proposed method of assessing duration significance

The Prime Resources Impact Assessment Methodology and rationale as described in Section 2.h.vi above will be used to assess the significance of the potential impacts of the project on the surrounding biophysical and social environment.

As per the methodology duration will be assessed as follows:

| Duration (D) | |
|---------------|---|
| Immediate (1) | Completely reversible without management Impact is instantaneous and ceases imminently |
| Short (2) | Naturally reversible or reversible with minimal management Impact ceases when the activity ceases |
| Medium (3) | Impact can be reversed with sufficient management Impact ceases when project ends |
| Long (4) | Impact is potentially irreversible even with management. |
| Permanent (5) | Impact remains after the life of the project The impact will continue indefinitely / ad infinitum Unknown |

Duration will play a role in determining the significance of an impact as follows:

SIGNIFICANCE = (MAGNITUDE + **DURATION** + SCALE) X PROBABILITY

vi. The stages at which the competent authority will be consulted

The Competent Authority (DMRE) was formally notified of the project upon submission of the application for Environmental Authorisation on **11 June 2021**. The DMRE acknowledged receipt of the application for Environmental Authorisation on 25 June 2021 and the MR application was accepted on 29 July 2021.

Scoping phase public participation process

The Scoping phase public commenting period runs from **10 August 2021 to 9 September 2021**.

Written notification and consent

Written notice, as required by NEMA Regulations Section 41(2)(b), will be provided to the following recipients:

- Lawful occupant / landowner on the site over which the application has been submitted.
- Land owners, lawful occupiers and persons in control of land adjacent to the site.
- The municipality and municipal councillor of the ward in which the site is situated.
- Organs of state having jurisdiction in respect of any aspect of the activity.
- Any other parties identified by the DMRE as requiring notification.

Background Information Document (BID)

The BID was provided to Competent Authority, State Departments and IAPs via email on 10 August 2021.

Provision of reports and documents

The Scoping Report and any other relevant document (“information containing all relevant facts in respect of the application”) for review and comment by the DMRE, stakeholders and the relevant State Departments, will be provided digitally, where possible, directly via email or, via an email containing a link to a download platform (on the Prime Resources website: www.resources.co.za) during the 30-day commenting period.

EIA phase public participation process

The EIAR and EMPr will be made available to the DMRE during the 30-day commenting period for the EIA phase. The EIAR and EMPr will further be updated with any comments received and will be submitted to the DMRE at the end of the commenting period for consideration.

Comments and Responses Report

A Comments and Responses Report will be prepared, containing all comments received and responded to and any other representations made during the respective 30-day commenting periods, and will be provided to the DMRE with the final Scoping and EIA / EMPr reports. The Comments and Responses Report and IAP database may only be disclosed to the DMRE in accordance with the Protection of Personal Information Act, No. of 2013 (POPI Act).

Refer to the detailed Public Participation Plan attached as Appendix 6.1.

vii. Particulars of the public participation process with regard to the Impact Assessment process that will be conducted

1) Steps to be taken to notify interested and affected parties

(These steps must include the steps that will be taken to ensure consultation with the affected parties identified in (h) (ii) herein)

IAPs were notified about the project during the Scoping phase public participation process detailed under Section h.ii above, including:

- Written notice was provided to the following recipients:
 - Lawful occupant / landowner on the site over which the application has been submitted.
 - Landowner notification was provided to the current landowner, South 32 - HMM, who owns the farm portions subject to the EA Application;
 - Land owners, lawful occupiers and persons in control of land adjacent to the site.
 - The municipality and municipal councillor of the ward in which the site is situated.
 - Organs of state having jurisdiction in respect of any aspect of the activity.
 - Any other parties identified by the Competent Authority as requiring notification.
- A media notice was published in two newspapers circulating in the area;
- Site notices were posted on-site and at conspicuous locations within the surrounding areas;
- An IAP register has been compiled and representatives from all of the relevant State Departments, as well as any IAPs requesting to register, will be added to the database;
- BIDs were made available to State Departments (including the Competent Authority) via email and to adjacent landowners and occupiers by hand or email (based on the contact details available);
- The Scoping Report and any other relevant document (“information containing all relevant facts in respect of the application”) was provided digitally, where possible, directly via email or, via an email containing a link to a download platform (on the Prime Resources website) during the 30-day commenting period.
- Hard copies of reports will only be made available in accordance with Appendix 3 of GN650 and GN970 of 2020 which states that “reports may not be made available at any public places or premises closed to the public.” Therefore, hard copies of documents will only be placed at the Hotazel Public Library if the facility is open to the public (depending on the prevailing Covid-19 lockdown Alert Level and the Covid-19 protocols implemented at the proposed location).

IAPs will be further engaged during the EIA phase as per the process described below.

2) Details of the engagement process to be followed

(Describe the process to be 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 and records of such consultation will be required in the EIA at a later stage)

The EIA phase public participation process will comprise of the following:

- The EIAR and EMPr will be made available, for review and comment by IAPs, stakeholders and the relevant State Departments, during the 30-day commenting period for the EIA phase.
- An SMS will be sent out to all registered IAPs notifying them of the localities where the EIAR and EMPr can be viewed, and the commenting period.
- IAPs will be given the opportunity to raise issues and concerns.
- The IAP register and Comments and Responses Report will be updated throughout the EIA phase public participation process and submitted, together with the final EIAR and EMPr, to the Competent Authority for consideration after the 30-day commenting period has ended.

3) Description of the information to be provided to Interested and Affected Parties

(Information to be provided must include the initial site plan and sufficient detail of the intended operation and the typical impacts of each activity, to enable them to assess what impact the activities will have on them or on the use of their land)

Scoping phase

This Scoping Report and therefore all the information contained herein, including, *inter alia*, the description of affected and adjacent properties and prevailing land uses, baseline description of the receiving environment as understood at present, the details of the project, including the various activities proposed to be undertaken and the envisioned impacts resulting from such, is provided to IAPs.

EIA phase

The EIA and therefore all the information contained therein, including, *inter alia*, the description of affected and adjacent properties and prevailing land uses, baseline description of the receiving environment as understood at present, the details of the project, including the various activities proposed to be undertaken and the impacts resulting from such, as well as the measures to mitigate or reduce the significance thereof and monitoring protocols will be provided to IAPs.

The information provided in the EIA will also consist of any further details of the project which came to light based on the outcomes of IAP feedback during the Scoping phase, including the layout and description of project components; further outcomes of assessment phase specialist investigations along with the quantification of potential impacts (together with input from the EAP), concerns / issues raised during the Scoping phase and responses thereto which will have been incorporated into a Comments and Responses Report; the process to be followed for the EIA; opportunities to participate; and where to obtain further information.

viii. Description of the tasks that will be undertaken during the environmental impact assessment process

The tasks to be undertaken during the EIA phase are graphically represented in the following flow diagram:

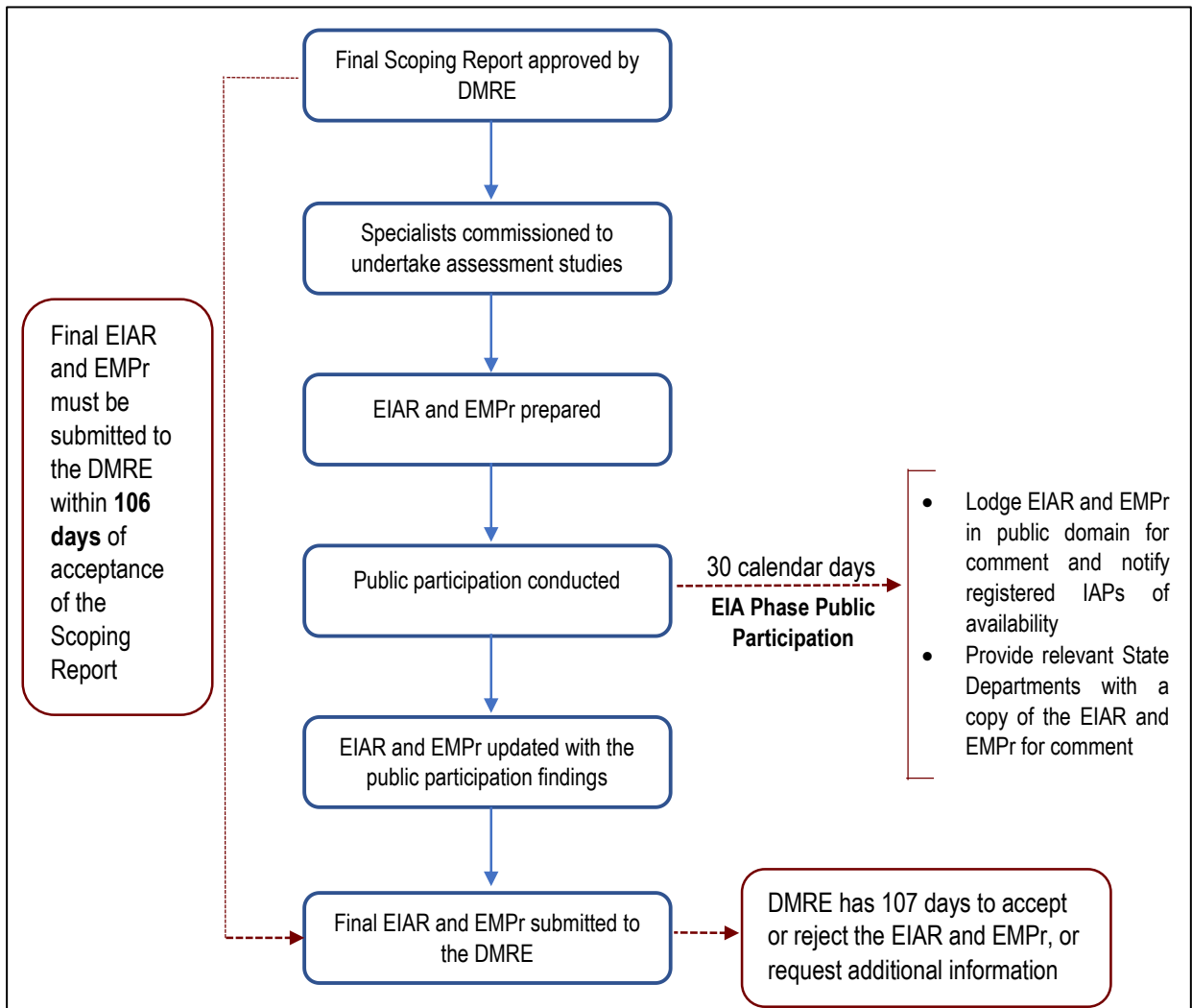


Figure 41: Tasks to be undertaken during the EIA phase


ix. Measures to avoid, reverse, mitigate, or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|---|--|--|
| Surface preparation, clearing of land and construction of surface infrastructure including the construction of new on-site hauls roads and widening of the existing access roads | Air quality impacts due to dust and particulate matter / gaseous emissions. | Avoid/stop or reduce impact at source: <ul style="list-style-type: none"> • Areas to be cleared will be limited to the minimum extent possible Control impact through management: <ul style="list-style-type: none"> • Implement dust suppression measures and monitor dust levels | Dust from wind erosion of bare areas may be ongoing should rehabilitation be inadequate |
| | Further reduction in floral and faunal diversity, increased alien vegetation proliferation and encroachment and edge effects. Displacement of fauna due to habitat loss or transformation, disturbance to and mortality of fauna, disturbance to the resident pair of Verreaux’s Eagle (<i>Aquila verreauxii</i>) and its progeny and likely displacement of the birds from the open-cast pit nesting platform | Avoid/stop or reduce impact at source: <ul style="list-style-type: none"> • Avoid demarcated sensitive areas • Minimise the extent of land / vegetation cleared Modify impact through design: <ul style="list-style-type: none"> • Avoid all indigenous species, protected trees and other plant SCC • Avoid clearing trees Control impact through management: <ul style="list-style-type: none"> • While suitable habitat and prey may be available in the broader area for the Verreaux’s Eagle, there may be opportunities to encourage the birds to remain resident with the provision of an artificial nesting platform, outside of the development zone. • The required permits must be obtained from the relevant Departments in order to destroy, remove or relocate SCC, protected, TOPS-listed and endemic species. • In the case of floral SCC, nationally protected tree species and TOPS-listed floral species, the licensing authority will be the DFFE, while the NC DENC will be the licensing authority in the case of provincially protected species. No permit requirements are applicable to GWC endemic species. • Implement an alien and invasive vegetation monitoring and eradication programme | Potential establishment of alien and invasive vegetation in the rehabilitated area and surrounds should eradication not be undertaken adequately Permanent loss |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|---|--|
| | Draining of pit lake and disturbance to/ removal of aquatic vegetation that has established within the pit lake, as well as fauna that has been artificially translocated to the pit lake such as <i>Tilapia sparrmanii</i> (provincially Protected fish species). | Repair or remedy impact through rehabilitation: <ul style="list-style-type: none"> Plant indigenous vegetation in disturbed areas should natural revegetation prove unsuccessful and/or as per landowner agreements Control impact through management: <ul style="list-style-type: none"> A detailed assessment of the fish species present within the lake must be conducted by an accredited aquatic specialist so as to advise on permit requirements. At present, it is known that at least one fish species identified within pit lake during the present study is listed as Protected under the NCNCA, and as such, a permit will be required to translocate the fish. Further permits may be required depending on any additional species present. When the pit lake is drained and depending on the number of fish species present (see previous comment), a suitably qualified and accredited aquatic specialist must be present so as to identify species for further actions (e.g. translocation, euthanasia, etc.). Under no circumstances are fish to be removed for the purpose of consumption due to potential metal accumulation within tissues of the fish and associated liabilities. | |
| | Erosion from stormwater runoff | Avoid/stop or reduce impact at source: <ul style="list-style-type: none"> Minimise the extent of land / vegetation cleared Modify impact through design and Control impact through management: <ul style="list-style-type: none"> Monitor erosion, implement prevention and maintenance measures | Erosion may be ongoing should rehabilitation be inadequate |
| | Contamination of soils or groundwater from machinery and spills. | Control impact through management: <ul style="list-style-type: none"> Ensure machinery is in good working order Implement a spill management plan and clean up measures Modify impact through design: <ul style="list-style-type: none"> Good housekeeping such as storage of potentially hazardous material and dangerous goods will be within properly constructed and lined or paved areas. | None foreseen as the pollution sources will cease at the end of operations |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|---|------------------------------------|
| | | <ul style="list-style-type: none"> Oil traps will be sized, operated and maintained to contain all discarded oil from working areas. | |
| | Loss of agricultural potential and grazing land | <ul style="list-style-type: none"> Minimise the extent of land / vegetation cleared and do not disturb/alter areas outside the development. Ensure that access roads are kept clear and that construction and operational activities do not interfere with agricultural activities. Maintain fencing to prevent animals entering the site. | None foreseen |
| | Loss of subterranean / previously unidentified heritage and paleontological resources. | <p>Control through management:</p> <ul style="list-style-type: none"> Due to archaeological sites being subterranean, it is possible that all cultural sites may not have been identified. Care should therefore be taken when development work commences that, if any more artifacts are uncovered, a qualified archaeologist be called in to investigate and the following Heritage Protocol and Chance Find Procedure be implemented: <ul style="list-style-type: none"> Loose stone tools found are usually of minor significance and should just be left as it is. Areas where a substantial number of stone tools are found together should be geo-referenced and left alone until such time as an archaeologist can visit the site to determine its significance. Although chances of finding Iron Age remains are slim, it should be treated similar to the above. Potshards found out of context should be left alone, but areas with stone walling or substantial pottery and other cultural remains should be geo-referenced and left alone until investigated by an archaeologist. All buildings and remains of buildings and other structures believed to be older than 60 years should be geo-referenced and left alone until and a heritage expert can be called in to determine the cultural significance thereof. | None foreseen |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|---|------------------------------------|
| | | <ul style="list-style-type: none"> ○ Graves should be left in situ, geo-referenced and left alone until investigated by an archaeologist. ● Fossil Chance Find Protocol (Only required if fossils are seen on the surface when drilling/excavations commence): <ul style="list-style-type: none"> ○ When excavations begin, the ECO or designated person must give the rocks a cursory inspection. ○ Put any fossiliferous material (plants, insects, bone, coal) aside in a suitably protected place and send photographs of the putative fossils to the palaeontologist for a preliminary assessment and to determine if a site inspection is required. ○ Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. ○ If there are fossils but no good fossil material is recovered then a site inspection by the palaeontologist will not be necessary but a final report must be compiled by the palaeontologist and sent to SAHRA once the project has been completed. ○ As part of the training and awareness plan, employees must be provided with the below photographs to assist them in recognizing the potential fossil plants that may exist in the proposed THM. <i>Examples of fossil bone fragments from a Quaternary pan</i> | |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|--|---|
| | |  <p><i>Examples of silicified wood fragments from a fluvial deposit</i></p> <ul style="list-style-type: none"> • If no fossils are found and the excavations have finished then no further monitoring is required. | |
| Mining activities including stockpiling of topsoil and subsoil, opencast mining and blasting, loading and hauling, processing, ore | Air quality impacts due to dust and particulate matter / gaseous emissions. | Control impact through management: <ul style="list-style-type: none"> • Implement dust suppression measures and monitor dust levels • Use rock and sand to create a berm upstream of the infrastructure area Modify impact through design: | Dust from wind erosion of bare areas may be ongoing should rehabilitation be inadequate |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|---|--|
| stockpiles and mechanical evaporation of pit water | | <ul style="list-style-type: none"> Minimise drop heights of materials to stockpiles to control the dispersion of materials | |
| | Erosion from stormwater runoff | Modify impact through design and Control impact through management: <ul style="list-style-type: none"> Monitor erosion, implement prevention and maintenance measures Establish vegetation and stormwater management infrastructure on and around slopes | Erosion may be a permanent problem should rehabilitation be inadequate |
| | Nuisance noise | Control impact through management: <ul style="list-style-type: none"> Monitoring of noise levels from the activities during the proposed project to determine level of mitigation required Implement systematic maintenance of all forms of equipment and vehicles to minimise noise Modify impact through design: <ul style="list-style-type: none"> Noise reduction measures (i.e. use on non-resonating materials, reduction in drop heights, screening of noise sources etc.) to be implemented if standards are exceeded at sensitive receptors | None foreseen as the noise sources will cease at the end of operations |
| | Contamination of soils and groundwater from machinery, spills, mining and surface stockpiles | Control impact through management: <ul style="list-style-type: none"> Ensure machinery is in good working order Implement a spill management plan and clean up measures Modify impact through design: <ul style="list-style-type: none"> Good housekeeping such as storage of potentially hazardous material, explosive storage and dangerous goods will be within properly constructed and lined or paved areas. Potentially contaminated water will be stored within the properly constructed and lined PCD. Oil traps will be sized, operated and maintained to contain all discarded oil from working areas. | None foreseen as the pollution sources will cease at the end of operations |
| | Impacts on the surface water quality due to contaminant migration away from the mining area | | |
| | Impacts on Greenhouse Gas Emissions and Climate Change | Avoid/stop or reduce impact at source: | Risk may exist post-closure should |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|---|--|---|
| | <ul style="list-style-type: none"> The project and the community are likely to be negatively impacted by climate change due to increased temperatures and possible water shortages (decreased rainfall and possible increased evaporation). The community are likely to be negatively impacted by climate change if extreme rainfall events increase due to flooding. | <ul style="list-style-type: none"> Limit the removal of vegetation and ensuring adequate re-vegetation or addition of vegetation surrounding the project. Control impact through management: <ul style="list-style-type: none"> Additional support infrastructure can reduce the climate change impact on the staff and project, for example ensuring adequate water supply for staff and reducing on-site water usage as much as possible. Investigating solar power for the operations and the community to minimise scope 2 emissions. Ensure the vehicles and equipment are maintained through an effective inspection and maintenance program. | rehabilitation be inadequate |
| | Blasting damage <ul style="list-style-type: none"> Ground Vibration Air Blast Fly rock | Modify impact through design: <ul style="list-style-type: none"> The blast designs (including timing and stemming requirements) must take the rock type descriptions, mining methods including planned bench height and hole diameter and the distribution of sensitive receptors surrounding the mine into account. The major control effort will be for limiting fly rock to within a maximum risk range of 300 m. Air blast will be controlled by the same measures that are applied for fly rock control. The following limits will be applied: <ul style="list-style-type: none"> Ground vibration: A maximum peak particle velocity (PPV) of 6 mm/s for the closest house. Air blast: A peak air blast level of 120 dBL. | None foreseen as blasting will cease at the end of operations |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|--|---|
| | | <ul style="list-style-type: none"> ○ Maximum fly rock range: Three fly-rock limits will apply using a factor of safety of two for the safety of people, these being 100 m maximum for all blasts, a 300 m alert or exceedance range for which a special internal investigation is needed of fly rock occurs in this range at distances more than 100 m, and a 500 m clearance zone. ● Electronic detonators must be applied, and blast timing designs must be undertaken by on-site planning engineers on a blast by blast basis to achieve the single hole initiation requirement. ● Vibration monitoring will be needed for each blast from the start of blasting. ● Ideally, the installation of permanent seismic stations at a few points within Hotazel will provide reliable and comparable data. | |
| | Possible in-migration of job seekers into the area resulting in the formation of new informal settlements as well as secondary impacts of in-migration including pressure on existing infrastructure, an increase in crime and social ills and mining may lead to a reduction in property value. | Control impact through management: <ul style="list-style-type: none"> ● Difficult to manage; collaboration between THM, the other surrounding mines and the municipality is required. | Risk may exist post-closure should management be inadequate |
| | <ul style="list-style-type: none"> ● Direct benefits from the generation of employment (wages), taxes and profits. ● Indirect benefits from the procurement of goods and services, and the increased | Positive impact which does not require mitigation; measures to enhance positive impacts will be investigated. | Positive impacts implemented as a result of the SLP are intended to be sustainable and therefore remain after closure |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|--|---|
| | spending power of employees. | | |
| Handling, storage and disposal of residue material to in pit dumps. | Contamination of soils and groundwater from mining and dirty water handling and leaching from surface stockpiles / residue. | Modify impact though design: <ul style="list-style-type: none"> Potentially contaminated water will be stored within the properly constructed and lined PCD. | There is the potential risk that the pollution potential will remain post-closure |
| Storage and handling of dangerous goods (bulk fuel storage and explosives handling) | <ul style="list-style-type: none"> Contamination of soils and groundwater from spills. Safety risks to employees. | Modify impact though design: <ul style="list-style-type: none"> Good housekeeping such as storage of potentially hazardous material, explosive storage and dangerous goods will be within properly constructed and lined or paved areas. Ensure explosives storage is within an access-controlled facility and with appropriate signage. Potentially contaminated water will be stored within the properly constructed and lined PCD. Oil traps will be sized, operated and maintained to contain all discarded oil from working areas. Control impact through management: <ul style="list-style-type: none"> Explosives should only be handled by those with the necessary training and qualifications. Implement a spill management plan and clean up measures | None foreseen as the pollution sources will cease at the end of operations |
| Dewatering of groundwater for mining purposes | <ul style="list-style-type: none"> Impact on groundwater levels of surrounding water users and contaminant | Control impact through management: <ul style="list-style-type: none"> Ongoing monitoring and updating of the groundwater model to determine the level of impact Provision of alternative water to affected users in zone of influence. | None foreseen as dewatering will cease at the end of operations and groundwater levels will return to pre-mining levels |

| 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.). | POTENTIAL IMPACT (e.g. dust, noise, drainage surface disturbance, fly rock, surface water contamination, groundwater contamination, air pollution etc....etc...) | 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 etc. etc) E.g. Modify through alternative method. Control through noise control Control through management and monitoring through rehabilitation. | POTENTIAL FOR RESIDUAL RISK |
|--|--|--|---|
| | migration away from the mining area. <ul style="list-style-type: none"> Potential decant from the mining area post closure can result in poor quality mine water discharging to the surface. | | There is the potential risk that decant will occur post-closure |
| Transfer of ore via road | <ul style="list-style-type: none"> Deterioration in pavement quality resulting in unsafe driving conditions. Inadequate sight distance at intersections could cause accidents. Safety risks to third parties and animals. | Modify impact through design: <ul style="list-style-type: none"> Engage with SANRAL to establish their current plans for the upgrading of the R31, as well as to assess the impact of additional HVs from the proposed THM. Control impact through management: <ul style="list-style-type: none"> Trucks should not be overloaded, and wheel/axle loading should be in accordance to legislation (TMH 3). Cut back overgrown grass and trees in the vicinity of the intersection. | None foreseen as transporting of ore will cease at the end of operations |
| Closure and rehabilitation | Downscaling and retrenchment of employees. | Control impact through management: <ul style="list-style-type: none"> Implement the SLP. | Risk may exist post-closure should employees not find employment |
| | Backfilling/ rehabilitation of the currently disturbed area upon completion of mining may improve the visual and aesthetic features of the site while simultaneously transforming the area into a usable landform. | Control impact through management: <ul style="list-style-type: none"> Implement concurrent rehabilitation whereby as much material as available will be used to re-fill the opencast void, which at closure will be revegetated and covered. Repair or remedy impact through rehabilitation: <ul style="list-style-type: none"> At closure a final void will remain open that will have engineered slopes and water-management measures in place. | Potential risk should rehabilitation be inadequate and engineered slopes and water-management measures are not in place |

J. 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 an Appendix and confirm that the applicable mitigation is reflected herein)

Directly affected persons include:

Landowners

The land is privately owned. At present, the landowner (South 32 - HMM) would therefore be the only directly affected party. It is required that a suitable agreement will be drawn up between Tawana Hotazel Mining (Pty) Ltd and the landowner for the activities proposed.

There are no communities within the project footprint.

Adjacent Landowners and Occupiers

Potential negative impacts on adjacent landowners and occupiers include:

- Air quality impacts due to dust and particulate matter / gaseous emissions.
- Further reduction in floral and faunal diversity, increased alien vegetation proliferation and encroachment and edge effects.
- Displacement of fauna due to habitat loss or transformation, disturbance to and mortality of fauna.
- Loss of subterranean / previously unidentified heritage and paleontological resources.
- Erosion from stormwater runoff.
- Greenhouse gas emissions and climate change impacts.
- Nuisance noise.
- Ground vibrations, air blast and fly rock due to blasting.
- Contamination of soils and groundwater from machinery, spills, mining and dirty water handling and leaching from surface stockpiles / residue.
- Impact on groundwater levels of surrounding water users and contaminant migration away from the mining area.
- Potential decant from the mining area post closure can result in poor quality mine water discharging to the surface.
- Backfilling/ rehabilitation will also commence immediately after the commencement of the mining operation and this may improve the current visual landscape to a degree.
- Possible in-migration of job seekers into the area resulting in the formation of new informal settlements as well as secondary impacts of in-migration including pressure on existing infrastructure, an increase in crime and social ills and mining may lead to a reduction in property value.
- Deterioration in pavement quality resulting in unsafe driving conditions.
- Inadequate sight distance at intersections could cause accidents.
- Safety risks to third parties and animals.

Potential positive impacts on adjacent landowners and occupiers include:

- Safety risks to third parties and animals on site will reduce as the mine will be fenced with access controls in place.

- Direct and indirect socio-economic benefits from the generation of employment (wages), taxes and profits and from the procurement of goods and services, and the increased spending power of employees.
- Direct and indirect socio-economic benefits from skills development and SLP initiatives.
- Greenhouse gas emissions and climate change impacts where the previously cleared areas that form part of the project will be rehabilitated resulting in a carbon sink gain.
- Backfilling/ rehabilitation of the currently disturbed area upon completion of mining may improve the visual and aesthetic features of the site while simultaneously transforming the area into a usable landform.

Land Claimants

According to the JTGDM Integrated Human Settlements Sector Plan, Final Report 2019/20, there are 10 Land Restitution cases within the borders of Joe Morolong Municipality which has been submitted to the Department of Land Reform and Rural Development for processing and have been resolved.

Correspondence from the Chief Director: Land Restitution Support – Northern Cape, dated 19 April 2021 indicates that a claim appears on the databases for claims up to 31 / 12 / 1998 and between 1 / 07 / 2014 and 27 / 07 / 2016 against the property Re Portion of RE of Farm Hotazel No. 280, but does not provide any further information in this regard (see Appendix 20).

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

(Provide the results of Investigation, assessment, and evaluation of the impact of the mining, bulk sampling or alluvial diamond prospecting on any national estate referred to in section 3(2) of the 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 an Appendix and confirm that the applicable mitigation is reflected herein)

Cultural heritage and palaeontology studies were undertaken to inform this scoping report. The potential impact to fossil heritage resources is extremely low. However, since there is a chance that fossils may occur on the land surface, it is recommended that a Fossil Chance Find Protocol be added to the EMP. Based on this information it is recommended that no palaeontological site visit is required.

From a cultural perspective, Stone Age people did utilize and settled in the area. However chances of finding Stone Age sites is reasonably high due to the lack of research in the area. However, the proposed mining area is almost entirely disturbed and thus it is expected that only finds out-of-context are likely to be identified. A few such sites are known toward the Gamagara River. No Early or Middle Iron Age sites have been identified in the area of study and chances of finding Iron Age sites and occurrences in the proposed THM are low. Sites associated with the first white farmers, early missionaries and mining companies, from the Historical Age may be expected in the proposed THM. These may include graves and buildings, including farm houses and outbuildings. Significance can only be determined on identification of such features, however the disturbance within the area, makes such finds unlikely. Graves are always of a high cultural significance due to the religious and social context thereof. If such sites are identified they will have to be dealt with in accordance with ethical guidelines and legislation in this regard. Due to the disturbed nature of the proposed THM, the existence of any graves within the proposed THM is very unlikely.

Sites of archaeological or paleontological significance are therefore unlikely to be present in the area (having been exposed, destroyed or otherwise removed during historical mining activities). However, there is always a chance that buried artefacts may be unearthed during vegetation clearing and earth moving activities. The potential impact can be mitigated by implementing a chance finds procedure to prevent damage to buried resources which may be of significance, in the unlikely event that they are unearthed. The significance of the potential impact on buried artefacts is low prior to and after the implementation of the recommended mitigation measure.

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

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

The most suitable sites for surface infrastructure development have been identified in Figure. The EIAR will address the following requirements in terms of sections 24(4)(a) and (b) of the Act:

| Section of NEMA | Contents | Description of how the aspect has been addressed thus far and will be further addressed during the EIA |
|-------------------------|---|---|
| Section 24(4)(a) | | |
| 24(4)(a) | Procedures for the investigation, assessment and communication of the potential consequences or impacts of activities on the environment – must ensure, with respect to every application for an environmental authorisation— | Refer to Section i for the plan of study for the EIA process. |
| 24(4)(a)(i) | Coordination and cooperation between organs of state in the consideration of assessments where an activity falls under the jurisdiction of more than one organ of state; | <p>The Scoping Report and EIAR will be made available to all the relevant organs of state: the relevant local and district municipality; DFFE and Northern Cape Province Department of Agriculture, Environmental Affairs, Land Reform and Rural Development as the authority regarding environmental matters, agriculture and land affairs, land reform and rural development; DWS for the activities requiring a WUL; Ngwao-Boswa Jwa Kapa Bokone (the Provincial Heritage Resources Authority of the Northern Cape Province) (via SAHRIS) as the authority regarding cultural heritage matters; Northern Cape Department of Roads and Public Works and SANRAL as the road authority; Transnet as the authority relating to rail infrastructure, Eskom as the authority relating to electricity infrastructure and South African Civil Aviation Authority relating to aviation- for comment during public participation processes. The DMRE remains the Competent Authority. Refer to Section 2.h.ii.</p> <p>Coordination is required between the DWS and DMRE regarding matters related to the design of impoundments for the storage and handling of residue. The DMRE are the CA for this element in terms of the NEMWA but the DWS chief engineer will be evaluating technical designs of the facility in terms of the NWA.</p> |
| 24(4)(a)(ii) | That the findings and recommendations flowing from an investigation, the general objectives of integrated environmental management laid down in this Act and the principles of environmental management set out in section 2 are taken into | The findings and recommendations of specialist investigations, and general objectives and the principles of environmental management, will be addressed in the EIAR and EMPr. |

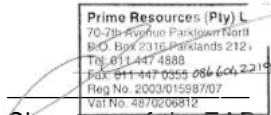
| Section of NEMA | Contents | Description of how the aspect has been addressed thus far and will be further addressed during the EIA |
|-------------------------|---|---|
| | account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan or project; | |
| 24(4)(a)(iii) | That a description of the environment likely to be significantly affected by the proposed activity is contained in such application; | Refer to Section 1(1)(a)1 for a detailed description of the baseline environment likely to be affected by the project. |
| 24(4)(a)(iv) | Investigation of the potential consequences for or impacts on the environment of the activity and assessment of the significance of those potential consequences or impacts; and | Refer to Section 2.h.v for an initial identification and assessment of the potential impacts. A detailed impact assessment will form part of the EIAR. |
| 24(4)(a)(v) | Public information and participation procedures which provide all interested and affected parties, including all organs of state in all spheres of government that may have jurisdiction over any aspect of the activity, with a reasonable opportunity to participate in those information and participation procedures; and | Refer to Section 2.h.ii which details the Scoping phase public participation process. Further public participation will be conducted during the EIA phase. Refer to Section i. |
| 24(4)(A) | Where environmental impact assessment has been identified as the environmental instrument to be utilised in informing an application for environmental authorisation, subsection (4)(b) is applicable | Environmental impact assessment has been identified as the environmental instrument therefore (4)(b) is applicable. |
| Section 24(4)(b) | | |
| 24(4)(b) | Must include, with respect to every application for an environmental authorisation and where applicable— | |
| 24(4)(b)(i) | Investigation of the potential consequences or impacts of the alternatives to the activity on the environment and assessment of the significance of those potential consequences or impacts, including the option of not implementing the activity; | Alternatives have been investigated and assessed for the project thus far, including the option of not implementing the activity. The final layouts will be assessed during the EIA phase and, based on the outcome, recommendations will be made in terms of layout alternatives or further technological and design alternatives which may be required. |
| 24(4)(b)(ii) | Investigation of mitigation measures to keep adverse consequences or impacts to a minimum; | Mitigation measures for potential impacts have been identified during the initial assessment. Refer to Section 2.h.viii. A detailed impact assessment will form part of the EIAR. Refer to Section i for the plan of study for the EIA process. Mitigation measures will also be recommended accordingly. |
| 24(4)(b)(iii) | Investigation, assessment and evaluation of the impact of any proposed listed or specified activity on any national estate referred to in section 3(2) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999), excluding the national estate contemplated in section 3(2)(i)(vi) and (vii) of that Act; | The NHRA has been taken into account, and a heritage assessment has been undertaken. Refer to Section 2.e. |

| Section of NEMA | Contents | Description of how the aspect has been addressed thus far and will be further addressed during the EIA |
|-----------------|---|--|
| 24(4)(b)(iv) | Reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information; | These have already been addressed to some extent in the specialist studies conducted (refer to various appendices). These will be further addressed and consolidated in the EIAR. |
| 24(4)(b)(v) | Investigation and formulation of arrangements for the monitoring and management of consequences for or impacts on the environment, and the assessment of the effectiveness of such arrangements after their implementation; | Management and monitoring measures will be specified in the EMP. Implementation and suitability of the EMP will be audited every second year as required by Regulation 55 of the MPRDA as well as per the frequency indicated in the Record of Decision (ROD) as per Regulation 34 of the NEMA EIA Regulations, 2014. |
| 24(4)(b)(vi) | Consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3); and | |
| 24(3) | The Minister, or an MEC with the concurrence of the Minister, may compile information and maps that specify the attributes of the environment in particular geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes which must be taken into account by every competent authority. | Refer to Section 1(1)(a)1 for maps indicating geographical areas, including the sensitivity, extent, interrelationship and significance of such attributes informed by maps compiled by relevant departments. |
| 24(4)(b)(vii) | Provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question. | Listed activities have been identified. Refer to Section 2.d.i. Environmental impact assessment has been identified as the environmental instrument in terms of NEMA. An AEL is not required as per NEMAQA. Permits may be required as per NEMBA in the unlikely event that species of conservation concern are identified. The area does not fall within a protected area as per NEMPAA. A WUL is required. |

I. Undertaking Regarding Correctness Of Information

I Jonathan van de Wouw herewith undertake that the information provided in the foregoing report is correct, ~~and that the comments and inputs from stakeholders and interested and Affected parties have been correctly recorded in the report.~~

Struck-through formatting of text to be removed after IAP consultation has been undertaken



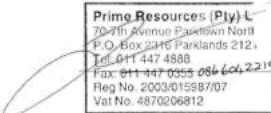
Signature of the EAP

DATE: 04 Aug 2021

m. Undertaking Regarding Level of Agreement

I Jonathan van de Wouw herewith undertake that the information provided in the foregoing report is correct, ~~and that the level of agreement with interested and Affected Parties and stakeholders has been correctly recorded and reported herein.~~

Struck-through formatting of text to be removed after IAP consultation has been undertaken

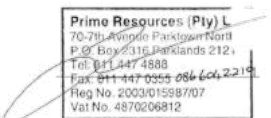


Signature of the EAP

DATE: 04 Aug 2021

n. Undertaking Under Oath/ Affirmation

I, Jonathan van de Wouw swear under oath / affirm that all the information submitted or to be submitted for the purposes of this Scoping Report is true and correct. Where information has been provided by external / independent specialists, the information received has been assumed as correct and has not been independently verified.



Signature of the EAP

DATE: 04 Aug 2021

-END-