



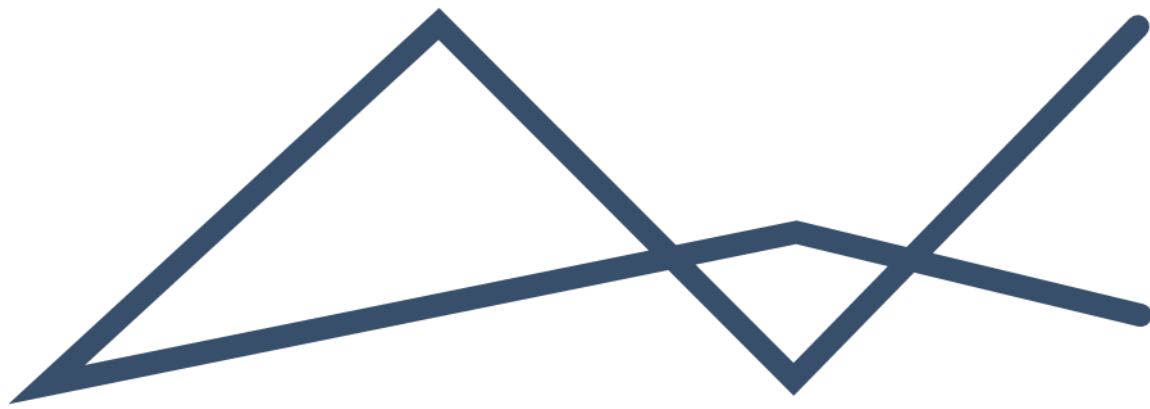
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T 011 789 7170 E info@eims.co.za W www.eims.co.za

## BASIC ASSESSMENT REPORT

MINE WASTE SOLUTIONS: MISPAH TSF RECLAMATION AND  
ASSOCIATED PIPELINES





### DOCUMENT DETAILS

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	<u>NAME</u>	<u>SIGNATURE</u>	<u>DATE</u>
COMPILED:	Ayabulela Manjezi	Sent Electronically	2023/02/20
CHECKED:	John von Mayer	Sent Electronically	2023/02/20
AUTHORIZED:	Liam Whitlow	Sent Electronically	2023/02/20

### REVISION AND AMENDMENTS

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## Abbreviations

AMSL	: Above Mean Sea Level
BAR	: Basic Assessment Report
CR	: Critically Endangered
DALRRD	: Department of Land Reform and Rural Development
DHSWS	: Department of Human Settlement, Water and Sanitation
DFFE	: Department of Forestry, Fisheries and the Environment
DMRE	: Department of Mineral Resources and Energy
EA	: Environmental Authorisation
EAP	: Environmental Assessment Practitioner
EAPASA	: Environmental Assessment Practitioners Association of South Africa
EIA	: Environmental Impact Assessment
EIMS	: Environmental Impact Management Services
EMPr	: Environmental Management Programme
EN	: Endangered
GA	: General Authorisation
GIS	: Geographic Information System
HDPE	: High Density Polyethylene
HGM	: Hydrogeomorphic
I&AP	: Interest and Affected Party
km	: kilometre
LC	: Least Concern
LOM	: Life of Mine
LT	:Least Threatened
mm	: millimetre
MPRDA	: Mineral and Petroleum Resources Development Act
MWS	: Mine Waste Solutions
NEMA	: National Environmental Management Act
NEMBA	: National Environmental Management: Biodiversity Act
NEMWA	: National Environmental Management Waste Act
NWA	: National Water Act
PPP	: Public Participation Process
SACNASP	: South African Council Natural and Scientific Professions
SANS	: South African National Standards
SCC	: Species of Conservation Concern
TSF	: Tailings Storage Facility
UVB	: Unchanneled Valley Bottom



VU : Vulnerable

WULA : Water Use License Application



# PART A: SCOPE OF ASSESSMENT AND BASIC ASSESSMENT REPORT

## 1 INTRODUCTION

Mine Waste Solutions (Pty) Ltd (MWS), hereafter referred to as the Applicant has appointed Environmental Impact Management Services (Pty) Ltd (EIMS) as the Environmental Assessment Practitioner (EAP) to assist with undertaking the required environmental authorisation processes (including the statutory public participation), and to compile and submit the required documentation in support of an application for:

- Environmental Authorisation (EA) in accordance with the NEMA- Listed activity/ies:
  - Listing Notice 1, Activity 27,
  - Listing Notice 1, Activity 10,
  - Listing Notice 3, Activity 12 and
  - Listing Notice 3, Activity 14.
- Water Use Licence (WUL) in accordance with the National Water Act – NWA (Act 36 of 1998) - Listed activity/ies:
  - Listed Water uses: Section 21 (c) and Section 21 (i).

The Applicant wishes to expand their reclamation activities through the construction of a reclamation pump station and the installation of associated pipeline infrastructure to meet the planned Life of Mine (LoM) production through increasing the volume of return water from the East Pump Station to the Mispah 1 Tailings Storage Facility (TSF) Reclamation Pump Station (Figure 1). The proposed new infrastructure is considered an upgrade and development of the existing pipeline infrastructure and is as follows:

- Construction of a Reclamation Pump Station west of the Mispah 1 TSF;
- Installation of a new 600mm slurry and 500m low-pressure process water pipeline of almost 9km from the East Pump Station to the Mispah 1 TSF Reclamation Pump Station. Both the slurry and process water pipelines will be crossing the Vaal River over the Nologwa Bridge; and
- The installation of a 100mm NB potable waterline and a 150mm NB sewage line at the reclamation pump station.

The proposed activities traverse both the North West (NW) and Free State (FS) Provinces within the Fezile Dabi District Municipality (FS) and Southern District Municipality (NW). In the North West the pipelines cross portion 4 of the Farm Modderfontein IP 440 within the Matlosana Local Municipality. In the Free State Province the proposed pipeline traverses the remaining extent of Farm Mispah IP 274, Farm Chrystalkop IP 69, Farm Hoekplats IP 598, Farm Viljoenskroon RD IP 446, remaining extent of Portion 4 of Farm Modderfontein IP 440, and portion 1 of Farm Zuiping IP 394 within the Moqhaka Local Municipality.

The proposed reclamation pump station (26°59'39.19"S; 26°46'7.08"E) is located on the north-western boundary of the Mispah 1 TSF (reclamation site). The sewage pipeline will be approximately 5km long starting at the reclamation site (26°59'39.19"S and 26°46'7.08"E), middle point 26°59'28.94"S; 26°47'20.33"E and ends at the Moab Khotsonq Sewage Works (26°59'4.33"S; 26°48'14.74"E). The slurry and process water pipelines are approximately 9km long and start from the East Pump Station (26°55'43.36"S; 26°46'22.56"E), passing next to the Nologwa Gold Plant (26°57'38.98"S; 26°46'35.40"E) and ending at the Mispah 1 TSF reclamation pump station (26°59'39.19"S; 26°46'7.08"E). A potable water pipeline will also be installed to the reclamation station. The potable waterline starts at Moab Khotsonq Sewage Works (26°58'42.08"S; 26°46'44.91"E) and ends at the Mispah 1 TSF Reclamation Station (26°59'39.19"S; 26°46'7.08"E).

The Public Participation Process (PPP) as required by Regulation 41(2) of the EIA Regulations, 2014 as amended has commenced. To date the following PPP has been conducted:





- Initial call to register:
  - Newspaper Advertisement: Placement of advertisement in English and SeTswana in the Klerksdorp Record and National Gazette;
  - Placement of site notices: Placement of 6 A1 Correx site notices in English and Setswana at locations along, within and surrounding the perimeter of the proposed project study area;
  - Notification of landowners, occupiers and other key I&APs: Notification letters, were distributed to pre-identified I&APs through either email, fax, and/or registered mail where contacts were available.

The draft BAR will be made available to Interested and Affected Parties (I&AP's) for comment for a minimum period of 30 days from the 7<sup>th</sup> of March 2023 until the 6<sup>th</sup> of April 2023. All comments received during this period will be included in the BAR for submission to the DFFE for their decision-making process.



## 1.1 REPORT STRUCTURE

This report has been compiled in accordance with the EIA Regulations, 2014 (Government Notice (GN) R982). A summary of the report structure, and the specific sections that correspond to the applicable regulations, is provided in Table 1 below.

Table 1: Report Structure

Environmental Regulation	Description	Section in Report
<b>NEMA EIA Regulations, 2014</b>		
<b>Appendix 1(3)(1)(a):</b>	Details of – <ul style="list-style-type: none"> <li>i) The EAP who prepared the report; and</li> <li>ii) The expertise of the EAP, including a curriculum vitae;</li> </ul>	Section 1.2 Section 1.3
<b>Appendix 1(3)(1)(b):</b>	The location of the activity, including: <ul style="list-style-type: none"> <li>i) The 21-digit Surveyor General code of each cadastral land parcel;</li> <li>ii) Where available, the physical address and farm name; and</li> <li>iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;</li> </ul>	Section 1.4
<b>Appendix 1(3)(1)(c):</b>	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale, or, if it is – <ul style="list-style-type: none"> <li>i) A linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken;</li> <li>ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;</li> </ul>	Section 1.4
<b>Appendix 1(3)(1)(d):</b>	A description of the scope of the proposed activity, including – <ul style="list-style-type: none"> <li>i) All listed and specified activities triggered and being applied for; and</li> <li>ii) A description of the activities to be undertaken including associated structures and infrastructure;</li> </ul>	Section 2



Environmental Regulation	Description	Section in Report
<b>NEMA EIA Regulations, 2014</b>		
<b>Appendix 1(3)(1)(e):</b>	A description of the policy and legislative context within which the development is proposed including – <ul style="list-style-type: none"> <li>i) An identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks, and instruments that are applicable to this activity and have been considered in the preparation of the report; and</li> <li>ii) How the proposed activity complies with and responds to the legislation and policy context plans, guidelines, tools frameworks, and instruments;</li> </ul>	Section 3
<b>Appendix 1(3)(1)(f):</b>	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred location;	Section 4
<b>Appendix 1(3)(1)(g):</b>	A motivation for the preferred site, activity, and technology alternative;	Section 5
<b>Appendix 1(3)(1)(h):</b>	A full description of the process followed to reach the proposed alternative within the site, including: <ul style="list-style-type: none"> <li>i) Details of all the alternatives considered;</li> <li>ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;</li> <li>iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;</li> <li>iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage, and cultural aspects;</li> <li>v) The impacts and risks identified for each alternative including the nature, significance, consequence, extent, duration, and probability of the impacts, including the degree to which these impacts –               <ul style="list-style-type: none"> <li>aa) Can be reversed;</li> <li>bb) May cause irreplaceable loss of resources; and</li> <li>cc) Can be avoided, managed, or mitigated;</li> </ul> </li> </ul>	Section 6 Section 6.1 Section 6.7 Section 6.8 Section 6.9 Section 6.10 Section 6.11



Environmental Regulation	Description	Section in Report
<b>NEMA EIA Regulations, 2014</b>	<p>The methodology used in determining and ranking the nature, significance, consequences, extent duration and probability of potential environmental impacts and risks associated with the alternatives;</p> <p>Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological social, economic, heritage and cultural aspects;</p> <p>The possible mitigation measures that could be applied and level of residual risk;</p> <p>The outcome of the site selection matrix;</p> <p>If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such; and</p> <p>A concluding statement indicating the preferred alternatives, including preferred location of the activity;</p>	<p>Section 7</p> <p>Section <b>Error! Reference source not found.</b></p>
<b>Appendix 1(3)(1)(i):</b>	<p>A full description of the process undertaken to identify, assess and rank the impacts the activity will impose on the preferred location through the life of the activity, including –</p> <ul style="list-style-type: none"> <li>i) A description of all environmental issues and risks that were identified during the environmental impact assessment process; and</li> <li>ii) An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures;</li> </ul>	<p>Section 6.5</p> <p>Section 6.6</p> <p>Section 6.7</p> <p>Section 6.8</p> <p>Section 8</p>
<b>Appendix 1(3)(1)(j):</b>	<p>An assessment of each identified potentially significant impact and risk, including –</p> <ul style="list-style-type: none"> <li>i) Cumulative impacts;</li> <li>ii) The nature, significance and consequence of the impact and risk;</li> <li>iii) The extent and duration of the impact and risk;</li> <li>iv) The probability of the impact and risk occurring;</li> <li>v) The degree to which the impact and risk can be reversed;</li> <li>vi) The degree to which the impact and risk may cause irreplaceable loss of resources; and</li> </ul>	<p>Section 8</p>



Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
	vii) The degree to which the impact and risk can be mitigated;	
<b>Appendix 1(3)(1)(k):</b>	Where applicable, a summary of the findings and impact management measures identified in any specialist report complying with Appendix 6 to these Regulations and an indication as to how these findings and recommendations have been included in the final report;	Section 9
<b>Appendix 1(3)(1)(l):</b>	An environmental impact statement which contains – <ul style="list-style-type: none"> <li>i) A summary of the key findings of the environmental impact assessment;</li> <li>ii) A map at an appropriate scale which superimposes the proposed activity and its associated structures and infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers; and</li> <li>iii) A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives;</li> </ul>	Section 10 Appendix G
<b>Appendix 1(3)(1)(m):</b>	Based on the assessment, and where applicable, impact management measures from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMPr;	Section 11
<b>Appendix 1(3)(1)(n):</b>	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorisation;	Section 12
<b>Appendix 1(3)(1)(o):</b>	A description of any assumptions, uncertainties and gaps in knowledge which relate to the assessment and mitigation measures proposed;	Section 13
<b>Appendix 1(3)(1)(p):</b>	A reasoned opinion as to whether the proposed activity should or should not be authorised, and if the opinion is that it should be authorised, any conditions that should be made in respect of that authorisation;	Section 14



Environmental Regulation NEMA EIA Regulations, 2014	Description	Section in Report
<b>Appendix 1(3)(1)(q):</b>	Where the proposed activity does not include operational aspects, the period for which the environmental authorisation is required, and the date on which the activity will be concluded, and the monitoring requirements finalised;	Section 15
<b>Appendix 1(3)(1)(r):</b>	An undertaking under oath or affirmation by the EAP in relation to: <ul style="list-style-type: none"> <li>i) The correctness of the information provided in the reports;</li> <li>ii) The inclusion of comments and inputs from stakeholders and I&amp;Ps;</li> <li>iii) The inclusion of inputs and recommendations from the specialist reports where relevant; and</li> <li>iv) Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties;</li> </ul>	Section 18
<b>Appendix 1(3)(1)(s):</b>	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing post decommissioning management of negative environmental impacts;	Section <b>Error! Reference source not found.</b>
<b>Appendix 1(3)(1)(t):</b>	Any specific information that may be required by the competent authority; and	Section 17
<b>Appendix 1(3)(1)(u):</b>	Any other matters required in terms of section 24(4)(a) and (b) of the Act.	Section 17
<b>Appendix 4(1)(1)(c):</b>	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers;	Section 6.9.2 Section 10.2
<b>Appendix 4(1)(1)(d):</b>	A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed, and mitigated as identified through the environmental impact assessment process for all phases of the development including – <ul style="list-style-type: none"> <li>i) Planning and design;</li> <li>ii) Construction activities;</li> </ul>	Section <b>Error! Reference source not found.</b> Section 8 Section 11



Environmental Regulation	Description	Section in Report
<b>NEMA EIA Regulations, 2014</b>		
	iii) Rehabilitation of the environment; and v) Where relevant, operation activities;	
<b>Appendix 4(1)(1)(f):</b>	A description of proposed impact management actions, identifying the manner in which the impact management contemplated in paragraphs (d) will be achieved, and must, where applicable, include actions to –  i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;  ii) Comply with any prescribed environmental management standards or practices;  iii) Comply with any applicable provisions of the ac regarding closure, where applicable; and  iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	Section 11,



## 1.2 DETAILS OF THE EAP

EIMS was appointed by the Applicant to fulfil the role of Environmental Assessment Practitioner (EAP) to compile this report. The contact details of the EAP's who compiled the report are as follows:

Table 2: EAP Details

Name of Practitioner	Mr John von Mayer (Project Manager/EAP)	Ms Ayabulela Manjezi (Report Compilation/EAP)
Tel No.:	011 789 7170	011 789 7170
Fax No.:	086 571 9047	063 443 1696
E-mail:	john@eims.co.za	aya@eims.co.za

## 1.3 EXPERTISE OF THE EAP

### 1.3.1 QUALIFICATIONS OF THE EAP

In terms of Regulation 13 of the EIA Regulations, 2014, an independent EAP, must be appointed by the applicant to manage the application. EIMS has been appointed by the Applicant as the EAP and is compliant with the definition of an EAP as defined in Regulations 1 and 13 of the EIA Regulations and Section 1 of the NEMA. This includes, inter alia, the requirement that EIMS is:

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

The declaration of independence of the EAP and the Curriculum Vitae (indicating the experience with environmental impact assessment and relevant application processes) of the consultants that were involved in the BAR process and the compilation of this report are attached as Appendix A.

### 1.3.2 SUMMARY OF EAP'S PAST EXPERIENCE

EIMS is a private and independent environmental management-consulting firm that was founded in 1993. EIMS has in excess of 29 years' experience in conducting EIAs, including many EIAs for mines and mining related projects.

Mr John von Mayer is a senior consultant at EIMS and has been involved in numerous significant projects the past 10 years. He has experience in Project Management, small to large scale Environmental Impact Assessments, Environmental Auditing, Water Use Licensing, and Public Participation. He is a Registered Professional Natural Scientist (400336/11) with the South African Council Natural and Scientific Professions (SACNASP) as well as a registered Environmental Assessment Practitioners Association of South Africa (EAPASA) Environmental Practitioner (2019/1247).

Ms Ayabulela Manjezi holds a BSc Honours degree in Environmental Management from the University of South African, BSc Honours in Applied Geology from the University of the Western Cape and is currently employed as an Environmental Consultant at EIMS. Ayabulela is a Registered Candidate Natural Scientist (142390) with the South African Council for Natural Scientific Professions (SACNASP) as well as a Candidate Environmental Assessment Practitioners Association of South Africa (EAPASA) Environmental Practitioner (2019/1279).



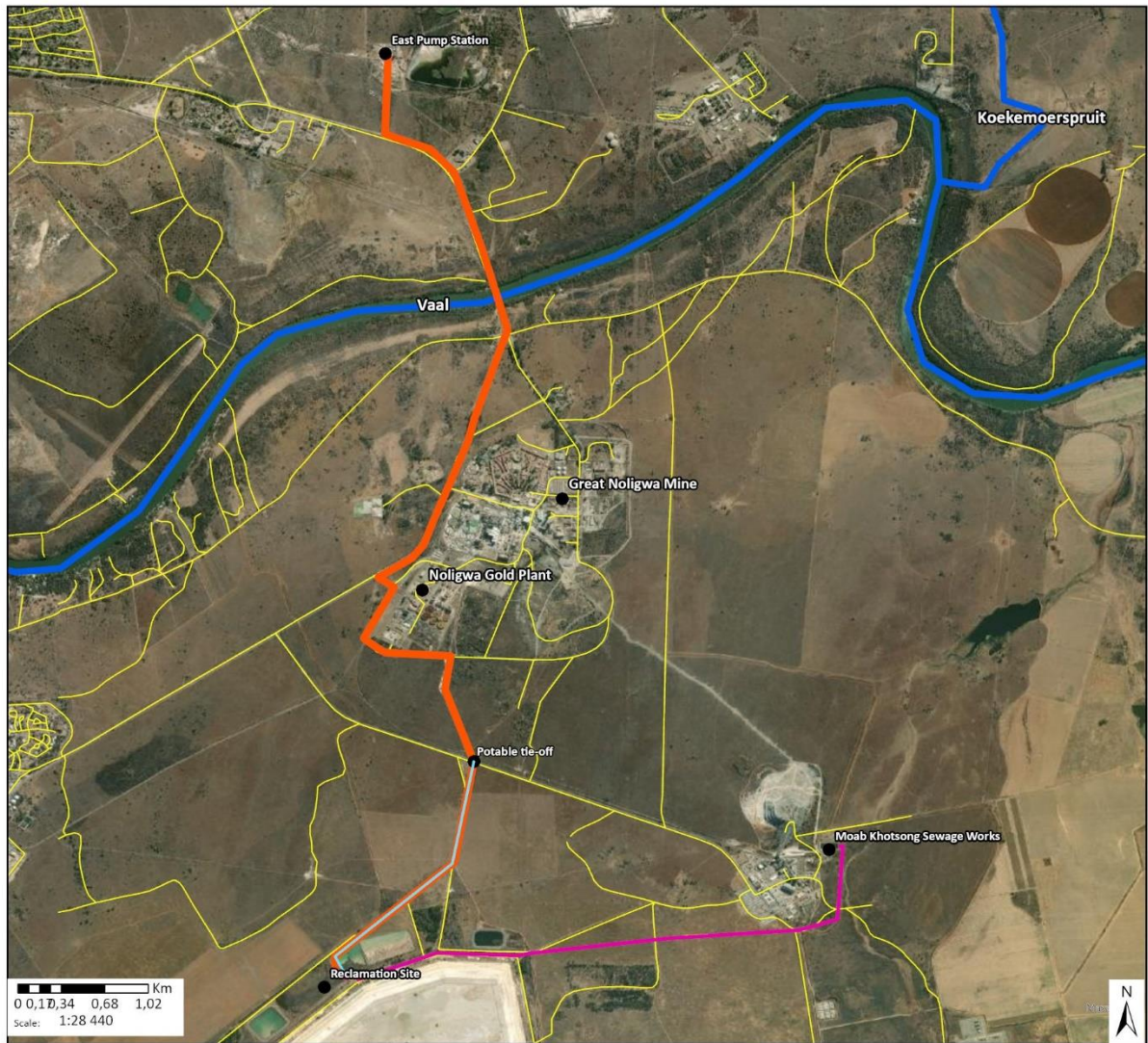


## 1.4 LOCATION OF THE OVERALL ACTIVITY

The table below provides details on the properties that fall within the EA Application Area. The proposed application area is located across several farm portions for which EA is required. The proposed project footprint for the installation of the proposed return water and slurry pipelines will only be a fraction of the properties on which the activity will take place. Refer to Figure 1 below for the locality map for the proposed activity.

Table 3: Locality Details

<b>Farm Name (s)</b>	The proposed activities traverse both the North West (NW) and Free State (FS) Provinces within the Fezile Dabi District Municipality (FS) and Southern District Municipality (NW). In the North West the pipelines cross portion 4 of farm Modderfontein IP 440 within the City of Matlosana Local Municipality. In the Free State Province the proposed pipeline traverses the remaining extent of Farm Mispah IP 274, Farm Chrystalkop IP 69, Farm Hoekplats IP 598, Farm Viljoenskroon RD IP 446, remaining extent of Portion 4 of Farm Modderfontein IP 440, and portion 1 of Farm Zuiping IP 394 within the Moqhaka Local Municipality.	
<b>Application Area (Ha)</b>	The pipelines are a linear development. The construction of the pump station will be limited to a small patch of land. Total area of all affected properties is 4 ha.	
<b>Magisterial District</b>	Fezile Dabi District Municipality (FS) and Southern District Municipality (NW)	
<b>Distance and direction from nearest town</b>	Orkney is located 4 km east of the closest point of the pipeline routes. Klerksdorp is located 15 km north east of the closest point of the pipeline routes.	
<b>21-digit Surveyor General Code for each Portion</b>	<u>Free State Province</u> F0360000000006900000 F03600000000044600000 F03600000000027400000 F03600000000059800000 F03600000000039400001	<u>North West Province</u> TOIP00000000044000004



### Locality Map

1542 Harmony Mispah TSF Reclam and Pipelines EIA WULA

- Places
- Roads
- Rivers
- Name
- Reclamation Pipelines
- Sewage Pipeline
- Potable Water Pipeline



Data Sources:  
CSG; ESRI  
Coord System: GCS WGS 1984  
Datum: WGS 1984  
Units: Degree  
Ref: 1542\_Locality Map\_Update

Date: 2022/11/10  
EIMS Ref: 1542  
Compiled: CM  
Reviewed: JP  
Approved: LW



Figure 1: Locality Map for the proposed Mispah TSF reclamation site and pipelines.



## 2 SCOPE OF THE PROPOSED ACTIVITY

The Applicant wishes to expand their reclamation activities to the Mispah 1 TSF through the construction of a reclamation pump station adjacent to the Mispah 1 TSF and installation of additional pipelines to meet the planned LoM for Mispah TSF to approximately 8 years and reclaiming around 75 Million tons at a rate of around 9.4 mT/annum. The existing return water and slurry pipeline infrastructure fails to meet the requirements of the planned LoM and has direct and indirect impacts on the long-term sustainability of the MWS operations. The planned infrastructure is a new 600mm slurry- and 500mm low-pressure process water pipelines of ~9km from the East Pump Station to the Mispah 1 TSF Reclamation Pump Station, as shown in Figure 1. Both the slurry and process water pipeline will cross the Vaal River at Nologwa Bridge. In addition to the slurry and process water pipelines, a sewage pipeline will be installed from the sewage change house and ablution will be pumped to the Moab Khotsong sewage works.

### 2.1 OVERVIEW OF PROPOSED ACTIVITIES

MWS plan to construct a new process water and slurry pipeline and reclamation pump station. The slurry pipeline will be a flanged 600mm NB steel pipeline with a concrete mortar or HDPE lining and flow rate of 472 l/s. The section across the Vaal River will be a continuous welded pipe with HDPE liner. While the low-pressure process water pipeline will be a flanged 500mm NB steel pipeline and flow rate of 337 l/s. Both pipes will be installed on surface on prefabricated concrete plinths.

A new slurry reclamation pump station will also be constructed west of the Mispah 1 TSF. The area cleared for the pump station will be ~ 4ha and consist of a series of slurry and high-pressure water pumps and associated infrastructure. The liquefied slurry from the TSF gravitate to the pump station where it is pumped to MWS processing plant, in Stilfontein, via the East pump station. From the East pump station, the slurry is pumped through the existing pipelines to MWS processing plant to extract gold before the tailings is disposed at Kareerand TSF. The pipelines will predominately follow existing pipeline corridors and vegetation clearance will be minimum.

Additionally, a 100mm Nominal Bore (NB) potable waterline and 150mm NB sewage line will also be installed to the reclamation pump station. The sewage from the change house and ablution will be pumped to the Moab Khotsong sewage Works. The sewage pipeline will be flanged steel pipeline and installed above-ground on pre-cast concrete plinths with a 3.5m wide access road adjacent to the pipelines which will be cleared/graded to provide access for construction, maintenance and inspections. All pipelines will be placed on concrete plinths and will be above-ground.

The specialist studies undertaken to inform this impact assessment includes an Aquatic and Wetland Study, Hydropedology Statement, Terrestrial Compliance Statement and Heritage Impact Assessment. The DFFE Screening Tool (Appendix E) has flagged the above managed aspects as having either a “Very high” or “High” sensitivity in the receiving environment in relation to the proposed project activities.

### 2.2 LISTED AND SPECIFIED ACTIVITIES

The planned infrastructure will require environmental authorisation prior to the commencement of the installation and operation. Table 4 below outlines the anticipated activities applied for in terms of the NEMA for the proposed installation of the return water and slurry pipelines and reclamation pump station.

Table 4: Listed and Specified Activities

Activity No(s):	Applicable listing notice	Project applicable to the listed activity
<b>Listing Notice 1,</b>	The development and related operation of infrastructure exceeding 1 000 metres in length for the bulk transportation	The 9km slurry pipeline will be a flanged 600mm steel pipeline with a flow rate of 472 l/s. The 9km low-pressure process



Activity No(s):	Applicable listing notice	Project applicable to the listed activity
<b>Activity 10</b>	<p>of sewage, effluent, process water, waste water, return water, industrial discharge or slimes-</p> <p>(i) with an internal diameter of 0,36 metres or more; or</p> <p>(ii) with a peak throughput of 120 litres per second or more;</p>	<p>water pipelines will be a flanged 500mm steel pipeline and flow rate of 337 l/s.</p>
<b>Listing Notice 1, Activity 27</b>	<p>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-</p> <p>(i) the undertaking of a linear activity; or</p> <p>(ii) maintenance purposes undertaken in accordance with a maintenance management plan.</p>	<p>Clearance of 4 ha of vegetation is required for reclamation pump station.</p>
<b>Listing Notice 3, Activity 12</b>	<p>The clearance of an area of 300 square meters or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan in:</p> <p>(b) Free State</p> <p>ii. Within critical biodiversity areas identified in bioregional plans;</p> <p>(h) North West</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority</p>	<p>Clearance of 4 ha of vegetation is required for the reclamation pump station and some limited clearance of vegetation will also be required along the pipeline routes. The reclamation project falls within areas identified as CBAs and ESAs in both the Free State and North West provinces.</p>
<b>Listing Notice 3, Activity 14</b>	<p>The development of—</p> <p>(ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs:</p> <p>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse in:</p> <p>(b) Free State</p> <p>(i) outside urban areas:</p> <p>(ff) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;</p> <p>(h) Northwest:</p> <p>iv. Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority.</p>	<p>Although the new pipeline will be installed on the existing bridge located outside of the 1:100 flood line, the pipeline across the river will have a footprint of more than 10m<sup>2</sup>. The reclamation project falls within areas identified as ESAs and CBAs in both the Free State and North West provinces.</p>



### 3 POLICY AND LEGISLATIVE CONTEXT

This section provides an overview of the governing legislation and policies identified which relates to the proposed project. Table 5 below describes the applicable policy and legislative context used to compile the BAR.

Table 5: Applicable Policy and Legislative Context

Applicable Legislation and Guidelines	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)	How does this Development Comply with and Respond to the Legislation and Policy Context
<b>National Environmental Management Act (Act No. 107 of 1998) (NEMA) and the EIA Regulations, 2014, as amended</b>	This Basic Assessment Report is prepared as in support of the Application for Environmental Authorisation under the NEMA.	In terms of the NEMA an Application for EA subject to a Basic Assessment Process has been applied for.  Activities applied for: <ul style="list-style-type: none"> <li>• GNR 983 Activity 10 &amp; 27.</li> <li>• GNR 324 Activity 12 &amp; 14</li> </ul>
<b>National Water Act (Act No. 36 of 1998) (NWA):</b>	Section 2.2 of this report provides detail on applicable water uses.	A WUL application has been submitted in terms of Section 21 of the NWA. The applicable listed water uses are:  Section 21 (c): Impeding or diverting the flow of water in a watercourse; and  Section 21 (i): Altering the bed, banks, courses or characteristics of a watercourse.
<b>The National Environmental Management: Biodiversity Act (Act No. 10 of 2004 – NEMBA)</b>	Regulations published under NEMBA provides a list of protected species (flora and fauna), according to the Act (GN R. 151 dated 23 February 2007, as amended in GN R. 1187 dated 14 December 2007) which require a permit in order to be disturbed or destroyed.	Three provincially protected plant species as classified by the Free State province were identified in the project area. These species must not be disturbed without first obtaining the requisite plant species permits under the NEMBA.
<b>National Environmental Management: Waste Act (No. 59 of 2008)</b>	As mentioned in Section 3, the project does not trigger any listed activities according to the Waste Management Act.	Waste from the installation of the pipeline will not trigger a listed activity in terms of GN 921, Category A, B or C, hence no Waste Management Licence will be applied for.
<b>National Heritage Resources Act (No. 25 of 1999) and Regulations</b>	Section 6.4 Description of the receiving environment including sensitive heritage and palaeontological features as identified by the specialist.	A Heritage and a Palaeontology specialist study were undertaken, and findings were recorded.  Notification of the proposed pipeline has been submitted to the





		South African Heritage Resource Agency (SAHRA).
<b>National Environmental Management: Air Quality Act (No. 39 of 2004)</b> <b>and</b> <b>National Dust Control Regulations (2013)</b>	Section 8 assesses the impact of the generation of dust during installation of the pipeline	Mitigation measures relating to the management of dust impacts are included Part B: EMPr of this report.
<b>SANS 10103 (Noise Regulations)</b>	Section 8 assesses the impact of noise impacts during installation of the pipeline.	Mitigation measures relating to the management of noise impacts are included Part B: EMPr of this report.
<b>Occupational Health and Safety Act (No. 85 of 1993)</b>	General duties of employers to their employees	Mitigation measures ensuring the health and safety of employees are included Part B: EMPr of this report.



## 4 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

The proposed project intends to expand the reclamation activities to the Mispah 1 TSF. The project includes the construction of a reclamation pump station and installation of additional pipelines to meet the planned LoM for Mispah TSF to approximately 8 years and reclaiming around 75 Million tons at a rate of around 9.4 mT/annum. The current return water and slurry pipeline infrastructure fail to meet the requirements of the planned LoM and has direct and indirect impacts on the long-term sustainability of the MWS operations. The infrastructure planned is a new 600mm slurry- and 500mm low-pressure process water pipelines of almost 9km from the East Pump Station to the Mispah 1 TSF Reclamation Pump Station. In addition to the slurry and process water pipelines, a sewage pipeline will be installed from the sewage change house and ablution will be pumped to the Moab Khotsong sewage works

There benefits associated with the additional pipeline infrastructure include but are not limited to increased production rates and tonnage at the MWS operations, this will lead to sustainable continuation of the associated mining activities and thereby indirectly benefit job security. The proposed project will lead to conservation of water as it entails the increase in re-use of water from the both Kareerand TSF and Mispah 1 TSF, hence reducing the need for abstraction of water from other sources, particularly groundwater. The continuation of operations at the MWS operations and related mining activities has long term benefits such as continued skills development, job creation and poverty alleviation for the surrounding communities and the general public as well continued contribution to the South African economy through the socio-economic development programmes. These benefits would be negatively impacted by any premature closure of MWS due to inability to meet the planned LoM.

## 5 MOTIVATION FOR THE OVERALL PREFERRED SITE, ACTIVITIES AND TECHNOLOGY ALTERNATIVE

The proposed project involves the expansion of existing infrastructure through the installation of a new process water and slurry pipeline, reclamation pump station and sewage pipeline. The pipelines will be predominately following existing pipeline servitudes with little environmental degradation. The activity alternatives as well as preferred site and technology are discussed in Section 6 below. The properties identified for the proposed development are owned by the Harmony Gold Mine (Pty) Ltd.

## 6 FULL DESCRIPTION OF THE PROCESS FOLLOWED TO REACH THE PROPOSED PREFERRED ALTERNATIVES WITHIN THE SITE

This section describes the specific site area and the preferred location of site features, having taken into consideration the comments raised by interested and affected parties, and the consideration of alternatives to the initially proposed site layout.

In terms of Section 24(4)(b)(i) of the NEMA, the Environmental Impact Assessment Regulations (2014, as amended), requires the application to identify alternatives for the proposed project in terms of:

- Location of the development;
- The type of activity to be undertaken;
- Design or layout of the development;
- The technology to be used;
- The operational aspects of the activity; and
- The option of not implementing the activity.



## 6.1 DETAILS OF DEVELOPMENT FOOTPRINT ALTERNATIVES

The pipeline footprints are anticipated to have minimal impact on the farm portions which they will traverse. The planned infrastructure includes a 600mm slurry and 500mm low pressure process water pipeline of almost 9km from the East Pump Station to the Mispah 1 TSF Reclamation Pump Station. Both the slurry and process water pipelines will cross the Vaal River at Nologwa Bridge. Additionally, a 100mm NB potable waterline and 150mm NB sewage line be installed to the reclamation pump station. The primary divers in determining the location of the proposed pipelines is due the limited environmental degradation as the pipelines will be following existing pipeline servitudes. All pipelines will be placed on concrete plinths and will be above-ground.

The slurry reclamation pump station will be constructed west of the Mispah1 TSF. The area that will be cleared of vegetation will be ~4ha. The preferred alignment of the reclamation pump station and associated pipeline infrastructure will have the liquefied slurry from the TSF gravitating to the pump station where it will then be pumped to the MWS processing plant, in Stilfontein, via the East Pump Station. From the East Pump Station, the slurry is pumped through existing pipelines to MWS processing plant to extract gold before the tailings are dispersed at Kareerand TSF. Additionally, the potable waterline and sewage line will be installed to the reclamation pump station where it was be following existing pipeline servitudes. The sewage from the change house and abluion will be pumped to the Moab Khotsong sewage works. Minimal vegetation will be cleared/graded for the construction, maintenance and inspection of the sewage line.

## 6.2 PROPERTY

The properties comprising the installation of the pipeline area as well as the adjacent properties are predominantly characterised by open areas, mining and industrial areas. The proposed pipeline, should it be approved, will be installed within a mine access road reserve and an existing pipeline servitude. The proposed alignment is located in a heavily disturbed and highly modified environment, as such no further assessment of alternative properties were undertaken. It is not anticipated that the proposed pipeline will affect the continuation of the long-term land uses.

## 6.3 TYPE OF ACTIVITY

The proposed project involves the expansion of Mispah 1 TSF activities to help meet the current LoM of MWS operations. Due to the nature and benefits of the proposed activity, no assessment of alternative activities was undertaken.

## 6.4 DESIGN OR LAYOUT

The current layout plan for the proposes project is considered as the preferred layout plan. The location of the reclamation pump station is dictated by the close proximity to the Mispah 1 TSF. The associated pipeline infrastructure is laid out to follow existing pipeline servitude routes. The proposed pipeline routes are within the mining area. The slurry and process water pipelines runs from the Mispah 1 TSF reclamation pump station toward the East Pump Station. The pipelines will be following existing pipeline routes however, there will be vegetation clearance towards the East Pump Station as there are no pipeline servitudes in the area. The potable waterline tie-ins and off will be made to the existing pipeline route of the slurry and process water pipeline, south of Nologwa Gold Plant towards the reclamation pump station site. The sewage line will move from the reclamation pump station towards the Khotsong Sewage Works. The pipeline will be installed above-ground on pre-cast plinths which will minimise groundwater contamination and disturbances. Due to the limited impacts and limited vegetation clearance of the preferred designs and layouts, no other layout alternatives were considered for the project.

## 6.5 TECHNOLOGY ALTERNATIVES

Process alternatives imply the investigation of alternative processes or technologies that can be used to achieve the same goal. The slurry pipeline will be a flanged 600mm steel pipeline with either a concrete mortar or HDPE lining and flow rate of 472 l/s. The section of the pipeline that will be cross the Vaal River at Nologwa Bridge will be a continuous welded pipe with HDPE liner to limit chances of leakage and contamination of the Vaal River.





The low-pressure process water pipeline will be flanged 500mm NB steel pipelines and flow rate of 337 l/s. Both the slurry and process water pipeline will be installed on above the surface on prefabricated concrete plinths. No alternative technologies were considered in this assessment as the proposed technology is considered the standard practice for a return and a slurry pipeline in the area, and the usage of other material for the construction of the pipeline would not change the level of significance of the identified impacts.

## 6.6 THE “NO-GO” OPTION

The no-go alternative would imply that the no new slurry transfer pipeline or raw water pipeline will be installed, and the status quo remains. The option of the project not proceeding would mean that the environmental impact and social status would remain the same as current. This implies that both negative and positive impacts would not take place. As such, negative impacts on biodiversity and water resources would not occur and also that the positive impacts such as availability of enough water to the reclamation pump stations, reduced need for additional top-up water, long term sustainability of the MWS operations, land rehabilitation, removal of alien invasive plants, skills development and poverty alleviation through employment would not occur. A negative social impact would also result from the closure of the MWS Plant operations plant as a result of failure to meet the planned LOM production rates.

## 6.7 DETAILS OF THE PUBLIC PARTICIPATION PROCESS TO BE FOLLOWED

The Public Participation Process (PPP) is a requirement of several pieces of South African Legislation and aims to ensure that all relevant I&AP's are consulted, involved and their opinions are taken into account and a record included in the reports submitted to Authorities. The process ensures that all stakeholders are provided this opportunity as part of a transparent process which allows for a robust and comprehensive environmental study.

The landowners and other pre-identified key I&AP's were sent an initial notification letter on the 23<sup>rd</sup> of November 2022, disseminated via email, fax, and registered mail. I&AP's were provided an initial registration period to register for the proposed project. All pre-identified and registered I&AP's will be notified of the availability of the BAR for review and comment. All comments received during this period will be included in this BAR and submitted to the Commenting Authority. A full description of the PPP will be included in the Comments and Responses Report, which will be attached as Appendix B to this report.

### 6.7.1 IDENTIFICATION OF I&AP'S

An initial I&AP list was compiled using existing databases, GIS analysis and WinDeed searches to determine the contact details of the registered landowners of the project affected properties and surrounding properties. The I&AP database includes amongst others: landowners, communities, regulatory authorities, and other specialist interest groups. Additional I&AP's have been registered during the initial notification and call to register period. The I&AP's database will continue to be updated throughout the duration of the BA process. A full list of I&AP's is attached in Appendix B.

### 6.7.2 LIST OF AUTHORITIES IDENTIFIED AND NOTIFIED

The following authorities have been identified and notified, but not limited to:

- City of Matlosana Local Municipality;
- Southern District Municipality;
- Fezile Dabi District Municipality;
- Moqhaka Local Municipality;
- Free State Department of Water and Sanitation;
- North West Department of Human Settlements;
- North West Economic Development, Environment, Conservation and Tourism;
- National Department of Water and Sanitation;
- North West Department of Community Safety and Management;
- National Department of Forestry, Fisheries and Environment;



- South African Resource Heritage Agency (SARHA).

### 6.7.3 LIST OF KEY STAKEHOLDERS IDENTIFIED AND NOTIFIED

The following key stakeholders have been identified and notified of the proposed MWS Pipelines Project:

- Birdlife South Africa;
- Endangered Wildlife Trust;
- Eskom Soc Ltd;
- Local Ward Councillor.
- North West Development Corporation Soc Ltd;
- North West Parks Board;
- North West Wetland Forum;
- South African National Roads Agency Ltd (SANRAL); and
- Wildlife and Environment Society of South Africa (WESSA).

Refer to Appendix B for the full list of I&AP's.

### 6.7.4 LIST OF SURROUNDING SURFACE RIGHTS HOLDERS/LANDOWNERS IDENTIFIED

The following surrounding surface rights holders/landowners of the area under application have been identified of the proposed MWS Pipelines EA application:

- Chemwes Pty Ltd;
- Harmony Moab Khotsong Operations (Pty) LTD; and
- Anglogold Ashanti.

### 6.7.5 NOTIFICATION OF I&AP'S

All I&APs were notified of the EA Application via the following one or more of the following methods:

- Initial call to register:
  - Newspaper Advertisement: Placement of advertisement in English and SeTswana in the Klerksdorp Record and National Gazette;
  - Placement of site notices: Placement of 6 A1 Correx site notices in English and Setswana at locations along, within and surrounding the perimeter of the proposed project study area;
  - Notification of landowners, occupiers and other key I&APs: Notification letters, were distributed to pre-identified I&APs through either email, fax, and/or registered mail where contacts were available.

Refer to Appendix B for proof of notification sent to I&AP's and for proof of correspondence with I&AP's. The following will still be conducted:

Table 6: PPP still to be conducted

<b>Notification of I&amp;APs of Draft Reports</b>	<b>Notification of pre-identified I&amp;APs via either email, fax, SMS and registered mail where contacts are available.</b> <b>Contact details are included in the notification if I&amp;APs require assistance accessing the information or require copies of reports.</b>
<b>Availability of Draft Reports (Basic Assessment Report)</b>	One (1) hard copy of report will be submitted to the local public library where members of the public can access the report.



<b>Notification of I&amp;APs of Draft Reports</b>	<b>Notification of pre-identified I&amp;APs via either email, fax, SMS and registered mail where contacts are available.</b>  <b>Contact details are included in the notification if I&amp;APs require assistance accessing the information or require copies of reports.</b>
<b>The draft BAR will be made available for public review and comment for a period of 30-days.</b>	Copy of the report to be placed on the EIMS website. A data free service will be made available to anyone who has limitations with respect to data downloads  The project team will make themselves available should an I&AP request a meeting to discuss the project. Virtual Microsoft Teams meetings will be recommended where possible.
<b>Notification of Decision</b>	Notification of registered I&APs via either email, fax, SMS and registered mail where contacts are available.  Contact details are included in the notification if I&APs require assistance accessing the decision.

I&AP's were provided an opportunity to register for the proposed project from the 15 November 2022. I&AP's will be notified of the availability of the BAR which will be made available for 30 days from the 7<sup>th</sup> of March 2023 until the 6<sup>th</sup> of April 2023, for review and comment. Comments obtained during the BAR public review and comment period and the responses will be included in the final submission to the DFFE.

## 6.8 SUMMARY OF ISSUES RAISED BY I&AP'S

Any comments received during the PPP to date will be included in Appendix B. Refer to the I&AP database in Appendix B for a full list of pre-identified and registered interested and affected parties.

## 6.9 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

### 6.9.1 SOCIO-ECONOMIC CONTEXT

The proposed reclamation pump station and associated pipelines situated on several farm portions between the North-West and Free-State Province as identified in Figure 1. The application area falls within the City of Matlosana Local Municipality, Dr Kenneth Kaunda District in the North West Province and Moqhaka Local Municipality, Fezile Dabi District Municipality in the Free State Province.

According to the approved updated IDP 2022-2027 for the Moqhaka Local Municipality, the population is 154 732 according to a community survey conducted in 2016. The statistics indicated that the population decreased by 3.61% when compared to the Census 2011 survey. The decrease can be attributed to lack of job opportunities in the area.

According to the approved Municipal Annual Report for the year 2019/2020, the City of Matlosana Local Municipality is a Category B (classified by the Municipal Demarcation Board, in terms of section 4 of the Local Government Municipal Structures Act, 1998) municipality situated within the Dr Kenneth Kaunda District in the North West Province. It is bordered by the Ngaka Modiri Molema District to the north, the Free State Province to the south, JB Marks Local Municipality to the east, and Maquassi Hills Local Municipality to the west. It is the smallest of the three municipalities that make up the district, accounting for a quarter of its geographical area. The municipality covers an area of approximately 3602 km<sup>2</sup> and the main economic services are mining, agriculture, manufacturing, construction and transport. The towns that make up the municipality include Klerksdorp, Jouberton, Alabama, Orkney, Kanana, Stilfontein, Khuma, Tigane and Hartbeesfontein.

According to the Census 2011, of the 158 896 economically active (employed and unemployed but looking for work) people in the municipality, 32,7% are unemployed. There are 11 311 discouraged work-seekers in the



municipality. The Census 2011 states that, of the people aged 15–34, 44 305 are employed, 33 500 are unemployed and there are 7 199 discouraged work-seekers among the youth.

## 6.9.2 TYPE OF ENVIRONMENT AFFECTED BY THE PROPOSED ACTIVITY

This section of the report has been compiled with input from various specialists that were appointed to undertake the specialist assessments for the application area. Refer to Appendix D for copies of the specialist reports undertaken. The following specialist studies were undertaken:

- Heritage Impact Assessment - PGS Heritage;
- Hydropedology Statement – The Biodiversity Company;
- Terrestrial Compliance Statement - The Biodiversity Company; and
- Wetland Baseline & Risk Assessment – The Biodiversity Company.

### 6.9.2.1 CLIMATE

According to Köppen-Geiger Climate classification, Orkney has a hot semi-arid climate (BSh). These climates tend to have hot, sometimes extremely hot, summers and warm to cool winters, with summer rainfall with the annual average of precipitation being approximately 530mm. High summer temperatures are common for this area with severe frost occurring throughout the winter (37 days per year on average). Refer to Figure 2.

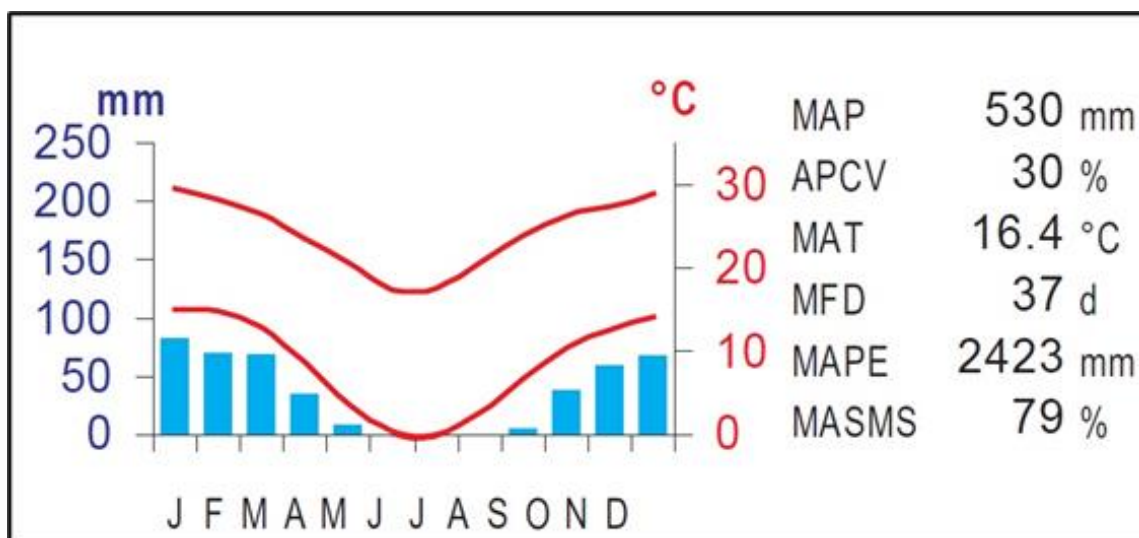


Figure 2: Graph showing average annual temperature for Vaal-Vet Sandy Grassland (Mucina & Rutherford, 2006)

### 6.9.2.2 GEOLOGY AND SOILS

The geology of the area is found within the Malmani Sub-Group of the Transvaal Basin (Refer to Figure 3). The geology is characterised by aeolian and colluvial sand which overlies mudstone, sandstone and shale of the Karoo Supergroup. Older Ventersdorp Supergroup basement gneiss and andesite is located to the north. Soil forms associated with the project area includes the Bd, Bc, Ae and Ba land types, which correlates with the findings from the land type database (Mucina and Rutherford, 2006).

According to the land type database (Land Type Survey Staff, 1972 - 2006), the project area is characterised by the Bc 24, the Fa 13 and the Bc 25 land type. The Bc land type is characterised by plinthic catena. Upland duplex and marginalitic soils are rare within this land type. Eutrophic red soils are widespread across this area. The Fa land type is characterised by Glenrosa and/or Mispah soil forms which are common in this area, however, other soils may occur. Lime is rare or absent throughout the entire landscape.



### 6.9.2.3 WETLANDS

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) wetland dataset is a recent outcome of the National Biodiversity Assessment (NBA, 2018) and, was a collaborative project by the South African National Biodiversity Institute (SANBI) and the Council for Scientific and Industrial Research (CSIR). The SAIIAE dataset provides further insight into wetland occurrences and extents building on the information from the NFEPA, as well as other datasets. Two wetland types were identified by means of this dataset which incorporate a single depression just north of the TSF and the Vaal River (Figure 5).

The National Freshwater Ecosystem Priority Areas (NFEPA) wetland dataset is a collaborative project between multiple stakeholders such as CSIR, the WRC and SANBI. The objective of the project was to identify priority areas to conserve and protect as well as to promote sustainable water use, thereby assisting in meeting the biodiversity goals for freshwater habitats set out in all levels of government (Nel et al. 2011). The NFEPA dataset represents four wetland types classified as wetland flats, floodplain wetland, unchannelled valley bottoms and valley head seeps (Figure 5).

The topographical inland and river line data for “2626” and “2726” quarter degree was used to identify potential wetland areas within the PAOI. This data set indicates multiple inland water areas classified as dams, large reservoirs, marsh vlei, non-perennial pans and, sewerage works. Furthermore, a single perennial river (Vaal River) and two non-perennial streams have been identified.

### 6.9.2.4 VEGETATION TYPE

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

- a) Seasonal precipitation; and
- b) The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

The project area is situated within the Vaal Reefs Dolomite Sinkhole Woodland and Vaal-Vet Sandy Grassland vegetation types of this biome (Figure 4).

#### 6.9.2.4.1 VAAL REEFS DOLOMITE SINKHOLE WOODLAND

This vegetation type is a slightly undulating landscape dissected by prominent rocky chert ridges and supporting grassland-woodland vegetation complex. It is a small area associated with dolomite sinkholes in and around Stilfontein and Orkney (Vaal Reefs). The characteristic vegetation feature is woodland, which naturally occurs in clumps around sinkholes, especially in places of dolomite outcrops.

This vegetation type is classified as Vulnerable according to Mucina and Rutherford (2006). The conservation target for this vegetation type is 24% with only a small portion statutorily conserved around the Sterkfontein Caves. The proposed ‘Highveld National Park’ is supposed to conserve a considerable area of this vegetation unit. Almost a quarter has already been transformed, predominantly by mining, cultivation, urban sprawl and roadbuilding.

#### 6.9.2.4.2 VAAL-VET SANDY GRASSLAND

This vegetation type is a plains-dominated landscape with some scattered, slightly undulating plains and hills. Mainly low-tussock grasslands with an abundant karroid element occurs here. Dominance of *Themeda triandra*



is an important feature of this vegetation unit. Locally low cover of *T. triandra* and the associated increase in *Elionurus muticus*, *Cymbopogon pospischilii* and *Aristida congesta* is attributed to heavy grazing and/or erratic rainfall (Mucina & Rutherford, 2006).

This vegetation type is classified as Endangered according to Mucina and Rutherford (2006). The conservation target for this vegetation type is 24% with only 0.3% statutorily conserved in the Bloemhof Dam, Schoonspruit, Sandveld, Faan Meintjies, Wolwespruit and Soetdoring Nature Reserves. More than 63% has been transformed for cultivation (ploughed for commercial crops) and the rest under strong grazing pressure from cattle and sheep.

#### 6.9.2.5 ECOSYSTEM PROTECTION LEVEL AND THREAT STATUS

The ecological state of the wetlands ranges from “C” -Moderately Modified to “E”- Largely Modified. These scores are due to the magnitude of anthropogenic impacts on the wetlands (Figure 6).

HGM 3 scored the lowest present ecological score with a “seriously modified” score. This is due to the fact that the wetland is subjected to a lot of anthropogenic water inputs into the system. The wetland also has a building and roads within the wetland area which alters the flow of water within the wetland. The wetlands are subjected to grazing and trampling through livestock.

HGM 1 and 2 scored “largely Modified” ecological scores due to the impacts on their vegetation through anthropogenic activities. HGM 1 underwent channelling in parts of the wetland to reduce the width of the wetland and historic agricultural activities reduced the volumes of hydrophytes within the wetland.

HGM 4 has the best present ecological state of all the wetlands, the wetland is located within the mines property where very few people are present. No agricultural activities take place within the wetlands or wetland buffer, the only impacts on the wetlands are from the TSF flowing down into the wetland.



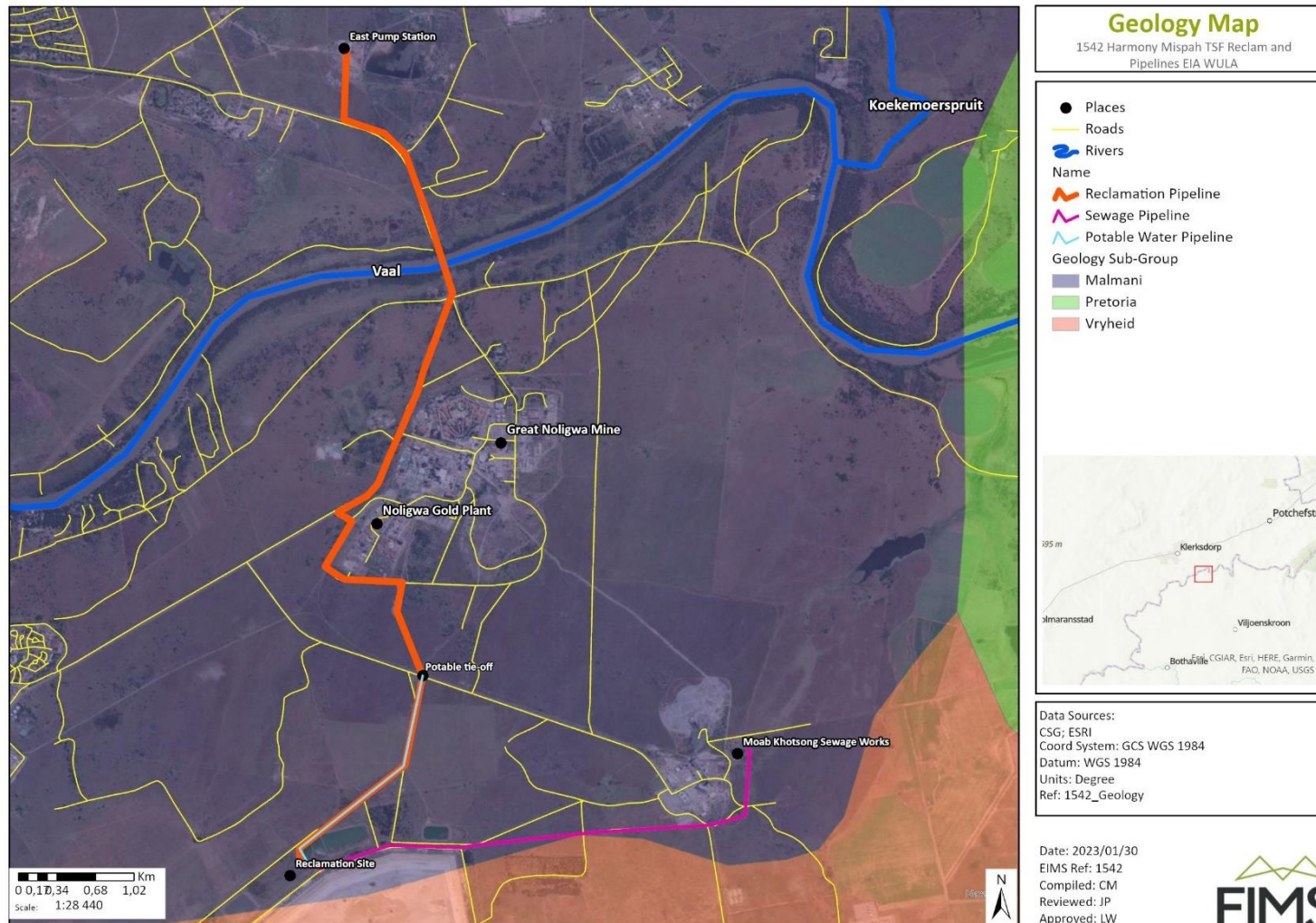


Figure 3: Geology Map

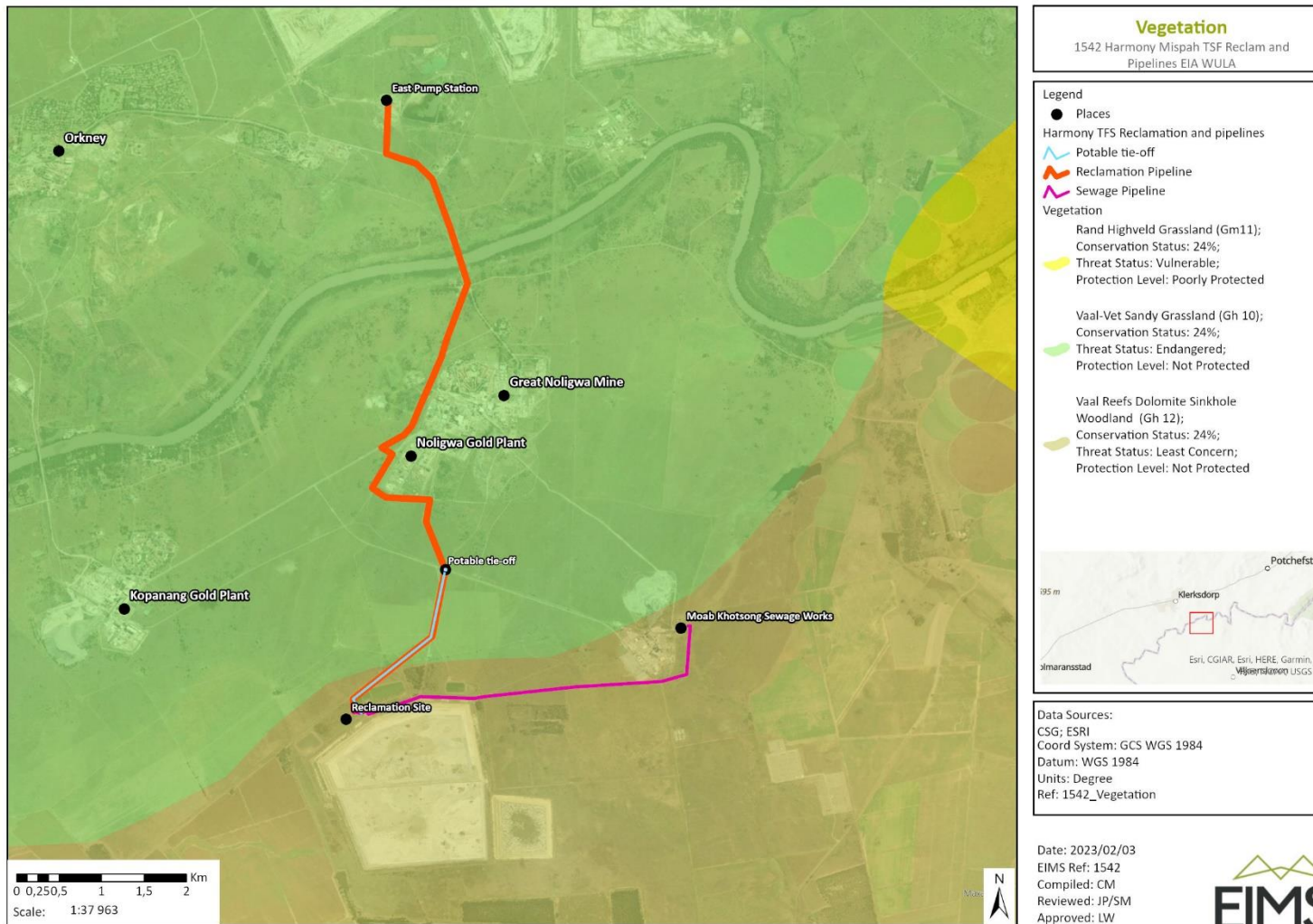


Figure 4: Map illustrating the vegetation types of the project area.



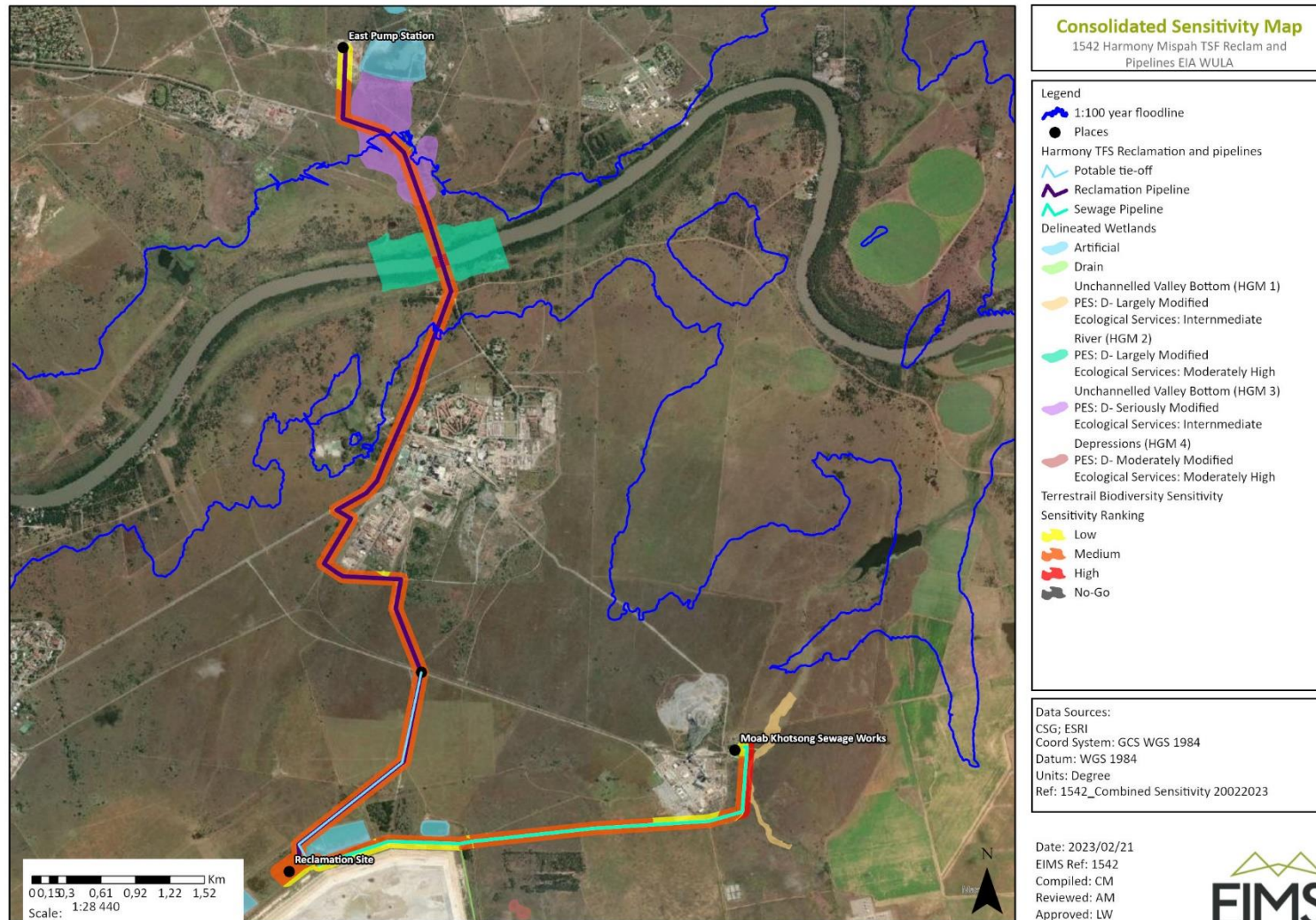


Figure 5: Map illustrating the Wetland characteristics within the project area.

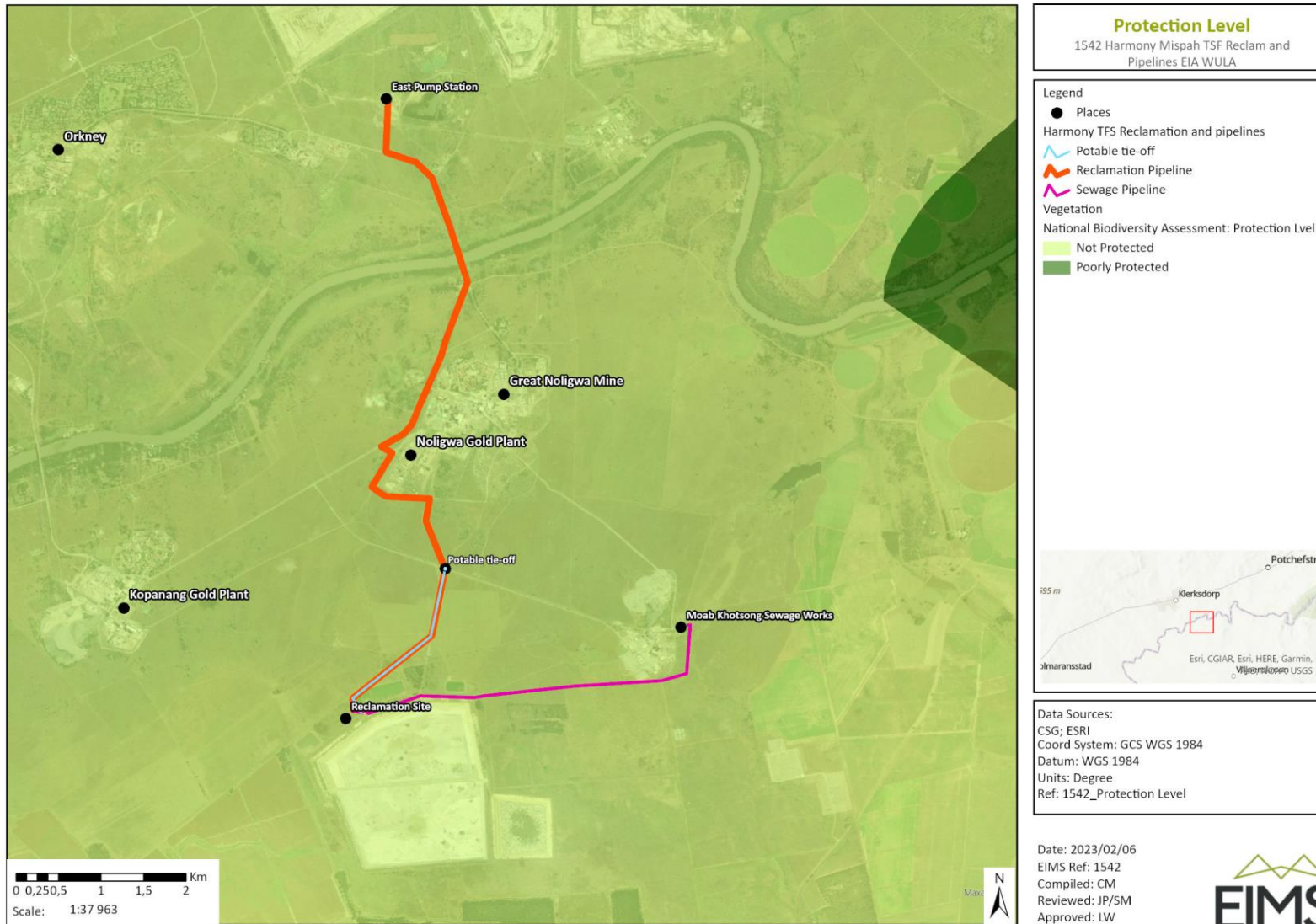


Figure 6: Map illustrating the Protection Level of the terrestrial ecosystem within the project area.



#### 6.9.2.6 RAMSAR SITES & WORLD HERITAGE SITES

No Ramsar sites or World heritage sites are located within the project area.

#### 6.9.2.7 VEGETATION ASSESSMENT

The project area is situated within the grassland biome. This biome is centrally located in southern Africa, and adjoins all except the desert, fynbos and succulent Karoo biomes (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the grassland biome include:

- Seasonal precipitation; and
- The minimum temperatures in winter (Mucina & Rutherford, 2006).

The grassland biome is found chiefly on the high central plateau of South Africa, and the inland areas of KwaZulu-Natal and the Eastern Cape. The topography is mainly flat and rolling but includes the escarpment itself. Altitude varies from near sea level to 2 850 m above sea level.

Grasslands are dominated by a single layer of grasses. The amount of cover depends on rainfall and the degree of grazing. The grassland biome experiences summer rainfall and dry winters with frost (and fire), which are unfavourable for tree growth. Thus, trees are typically absent, except in a few localized habitats. Geophytes (bulbs) are often abundant. Frosts, fire and grazing maintain the grass dominance and prevent the establishment of trees.

##### 6.9.2.7.1 ALIEN AND INVASIVE PLANTS

The National Environmental Management: Biodiversity Act, Act No. 10 of 2004, (NEM:BA) is the national legislation that incorporates the mandatory regulation of Invasive Alien Plant (IAP) species, and in September 2020 the most current lists of IAP Species were published in terms of NEM:BA (in Government Gazette No. 43726 of 18 September 2020).

A biodiversity field survey was undertaken by The Biodiversity Company on the 8<sup>th</sup> of December 2022. Eight listed IAP species were recorded in the project area namely *Gomphrena celosioides*, *Argemone mexicana*, *Xanthium strumarium*, *Flaveria bidentis*, *Eucalyptus grandis*, *Solanum elaeagnifolium*, *Tamarix ramosissima* and *Verbena bonariensis*.

The Alien and Invasive Species Regulations serve to define and regulate the various categories of Alien and Invasive Species and were recently updated and published in terms of NEM:BA in the Government Gazette No. 43735 of 25 September 2020.

The validity of the 2020 Alien and Invasive Species Regulations and Lists was recently extended as published in the Government Gazette No. 44182, 24th of February 2021.

The legislation calls for the removal and/or control of IAP species (Category 1 species). In addition, unless authorised thereto in terms of the National Water Act, no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse.

Below is a brief explanation of the three categories in terms of the NEM:BA:

- **Category 1a:** Invasive species requiring compulsory eradication. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.
- **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.





- **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones. Species existing outside of a regulated area shall be classified as category 1b.
- **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities: import, possess, grow, breed, move, sell, buy or accept as a gift - involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones as these will be classified as category 1b species.

Note that according to the regulations, any person who has under his or her control a category 1b listed invasive species must immediately:

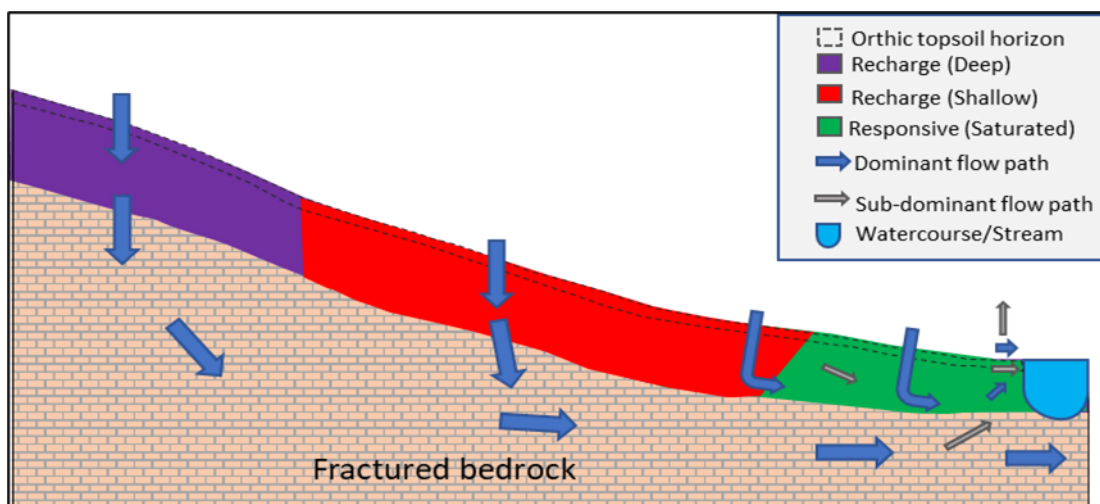
- Notify the competent authority in writing;
- Take steps to manage the listed invasive species in compliance with:
  - Section 75 of the NEM:BA;
  - The relevant local invasive species management programme developed in terms of regulation 4; and
  - Any directive issued in terms of section 73(3) of the NEM:BA.

#### 6.9.2.8 CULTURAL AND HERITAGE

PGS Heritage (Pty) Ltd (PGS) was appointed by EIMS to undertake a Heritage Impact Assessment (HIA) for the proposed return water and slurry pipelines. Intensive walkthroughs of the proposed pipeline footprint areas were undertaken by an archaeologist (Nicholas Fletcher) and a field assistant (Xander Fourier) from PGS. The fieldwork was conducted on the 5 December 2022. During the fieldwork no heritage resources were identified.

#### 6.9.2.9 HYDROPEDOLOGY

A hydrogeology statement was compiled by The Biodiversity Company for the Mispah 1 TSF reclamation and pipelines project. Several model exercises were undertaken to determine the catchment extent of the sub-basin for the wetlands associated with the project area as well as the Vaal River in proximity to the project boundary. These models indicate minimal to no impacts are expected. The site is in a land type commonly associated with deep recharge soils (i.e., Hutton, Ermelo, Nkonkoni and Vaalbos soil forms) and shallow recharge hydrogeological soil groups (i.e., Mispah) see Figure 7. The relevant land type also suggests high concentrations of shallow recharge soils (i.e., Glenrosa soil forms) and plinthic catena (i.e., Soft plinthic horizons) around the project area and the catchment. Some of the lower slope terrains are characterised with interflow A/B soils (i.e., Lamotte soil form). It is worth considering the source of water associated with the moisture content within the watercourse.



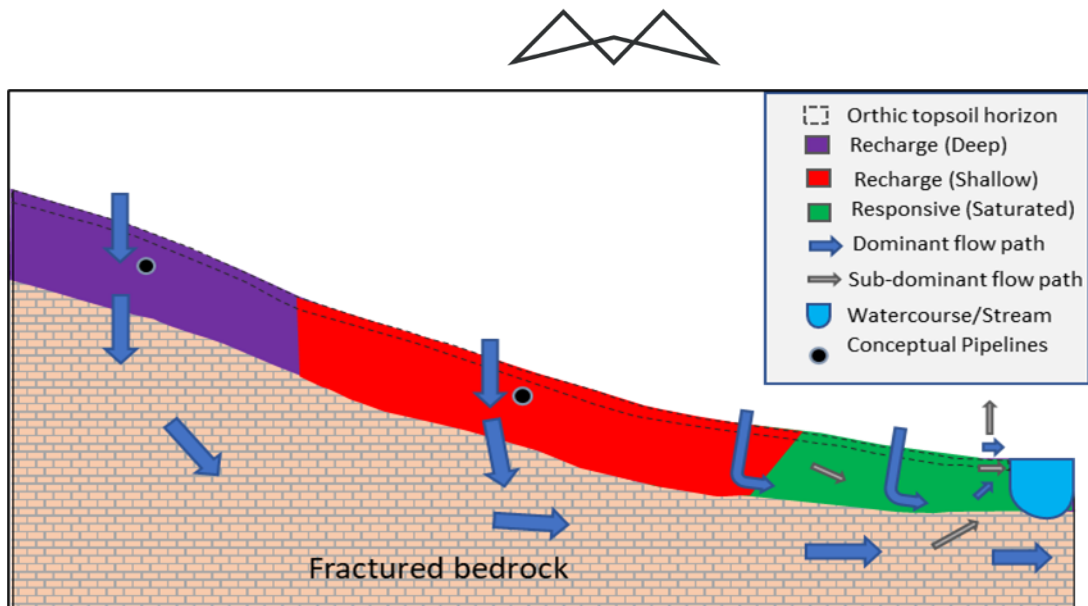


Figure 7: a) Hillslopes response before the proposed pipelines and; b) Hillslopes response after the construction of the proposed pipelines and associated infrastructure

### 6.9.3 DESCRIPTION OF CURRENT LAND USES

The project area is predominately mining development and industrial activities. Other dominant land uses in the project area include the local access roads which bisect certain points of the proposed pipelines, dirt roads, tar national road, existing pipeline and powerline servitudes. The proposed properties are expected to be generally flat, with a few steep TSFs in adjacent properties. The area is predominantly characterised by TSFs and other infrastructure related to the mining activities from the MWS Processing Plant as well as the Buffelsfontein Gold mine north of the return water pipeline.

### 6.9.4 DESCRIPTION OF SPECIFIC ENVIRONMENTAL FEATURES AND INFRASTRUCTURE ON SITE

The most notable infrastructure located within the application area includes the following:

- Mining developments (TSFs, processing plant and the Nologwa Gold Mine);
- Power Lines;
- Pipeline Servitudes; and
- Dirt Roads or Access Roads.

## 6.10 IMPACTS AND RISKS IDENTIFIED

In order to calculate the significance of an impact the nature, duration, extent, magnitude and reversibility will be assessed. The pre- and post-mitigation scores will provide an indication of the extent to which an impact can be successfully mitigated. The potential impacts that may occur as a result of the proposed installation of the pipeline are listed on Table 14 below.

## 6.11 THE IMPACT ASSESSMENT METHODOLOGY

The impact significance rating methodology, as provided by EIMS, is guided by the requirements of the NEMA EIA Regulations, 2014. The broad approach to the significance rating methodology is to determine the environmental risk (ER) by considering the consequence (C) of each impact (comprising Nature, Extent, Duration, Magnitude, and Reversibility) and relate this to the probability/ likelihood (P) of the impact occurring. This determines the environmental risk. In addition, other factors, including cumulative impacts, public concern, and potential for irreplaceable loss of resources, are used to determine a prioritisation factor (PF) which is applied to the ER to determine the overall significance (S).



The significance (S) of an impact is determined by applying a prioritisation factor (PF) to the environmental risk (ER). The environmental risk is dependent on the consequence (C) of the particular impact and the probability (P) of the impact occurring. Consequence is determined through the consideration of the Nature (N), Extent (E), Duration (D), Magnitude (M), and reversibility (R) applicable to the specific impact.

For the purpose of this methodology the consequence of the impact is represented by:

$$C = \frac{(E + D + M + R) * N}{4}$$

Each individual aspect in the determination of the consequence is represented by a rating scale as defined in Table 7.

Table 7: Criteria for determination of impact consequence

Aspect	Score	Definition
Nature	- 1	Likely to result in a negative/ detrimental impact
	+1	Likely to result in a positive/ beneficial impact
Extent	1	Activity (i.e., limited to the area applicable to the specific activity)
	2	Site (i.e., within the development property boundary)
	3	Local (i.e., the area within 5 km of the site)
	4	Regional (i.e., extends between 5 and 50 km from the site)
	5	Provincial / National (i.e., extends beyond 50 km from the site)
Duration	1	Immediate (<1 year)
	2	Short term (1-5 years)
	3	Medium term (6-15 years)
	4	Long term (15-65 years, the impact will cease after the operational life span of the project)
	5	Permanent (>65 years, no mitigation measure of natural process will reduce the impact after construction)
Magnitude/ Intensity	1	Minor (where the impact affects the environment in such a way that natural, cultural, and social functions and processes are not affected)
	2	Low (where the impact affects the environment in such a way that natural, cultural, and social functions and processes are slightly affected)
	3	Moderate (where the affected environment is altered but natural, cultural, and social functions and processes continue albeit in a modified way, moderate improvement for +ve impacts)



Aspect	Score	Definition
	4	High (where natural, cultural, or social functions or processes are altered to the extent that it will temporarily cease, high improvement for +ve impacts)
	5	Very high / do not know (where natural, cultural or social functions or processes are altered to the extent that it will permanently cease, substantial improvement for +ve impacts)
<b>Reversibility</b>	1	Impact is reversible without any time and cost.
	2	Impact is reversible without incurring significant time and cost.
	3	Impact is reversible only by incurring significant time and cost.
	4	Impact is reversible only by incurring prohibitively high time and cost.
	5	Irreversible Impact.

Once the C has been determined the ER is determined in accordance with the standard risk assessment relationship by multiplying the C and the P. Probability is rated/scored as per Table 8.

Table 8: Probability scoring

<b>Probability</b>	1	Improbable (the possibility of the impact materialising is very low as a result of design, historic experience, or implementation of adequate corrective actions; <25%),
	2	Low probability (there is a possibility that the impact will occur; >25% and <50%),
	3	Medium probability (the impact may occur; >50% and <75%),
	4	High probability (it is most likely that the impact will occur- > 75% probability), or
	5	Definite (the impact will occur),

The result is a qualitative representation of relative ER associated with the impact. ER is therefore calculated as follows:

$$ER = C \times P$$

Table 9: Determination of environmental risk

<b>Consequence</b>	5	5	10	15	20	25
	4	4	8	12	16	20
	3	3	6	9	12	15
	2	2	4	6	8	10
	1	1	2	3	4	5



		1	2	3	4	5
	<b>Probability</b>					

The outcome of the environmental risk assessment will result in a range of scores, ranging from 1 through to 25. These ER scores are then grouped into respective classes as described in Table 10.

Table 10: Significance classes

ER Score	Description
<9	Low (i.e., where this impact is unlikely to be a significant environmental risk/ reward).
≥9 ≤17	Medium (i.e., where the impact could have a significant environmental risk/ reward),
>17	High (i.e., where the impact will have a significant environmental risk/ reward).

The impact ER will be determined for each impact without relevant management and mitigation measures (pre-mitigation), as well as post implementation of relevant management and mitigation measures (post-mitigation). This allows for a prediction in the degree to which the impact can be managed/ mitigated.

In accordance with the requirements of Appendix 13. (1) of the EIA Regulations, 2014, and further to the assessment criteria presented above it is necessary to assess each potentially significant impact in terms of:

- Cumulative impacts; and
- The degree to which the impact may cause irreplaceable loss of resources.

To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 11: Criteria for Determining Prioritisation

Cumulative Impact (CI)	Low (1)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.
	Medium (2)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is probable that the impact will result in spatial and temporal cumulative change.
	High (3)	Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is highly probable/definite that the impact will result in spatial and temporal cumulative change.
Irreplaceable loss of resources (LR)	Low (1)	Where the impact is unlikely to result in irreplaceable loss of resources.
	Medium (2)	Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.





	High (3)	Where the impact may result in the irreplaceable loss of resources of high value (services and/or functions).
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The value for the final impact priority is represented as a single consolidated priority, determined as the sum of each individual criteria represented in To ensure that these factors are considered, an impact prioritisation factor (PF) will be applied to each impact ER (post-mitigation). This prioritisation factor does not aim to detract from the risk ratings but rather to focus the attention of the decision-making authority on the higher priority/significance issues and impacts. The PF will be applied to the ER score based on the assumption that relevant suggested management/mitigation impacts are implemented.

Table 11: Criteria for Determining Prioritisation

The impact priority is therefore determined as follows:

$$\text{Priority} = PR + CI + LR$$

The result is a priority score which ranges from 2 to 6 and a consequent PF ranging from 1 to 1.5 (refer to Table 12).

Table 12: Determination of prioritisation factor

Priority	Prioritisation Factor
2	1
3	1.125
4	1.25
5	1.375
6	1.5

In order to determine the final impact significance, the PF is multiplied by the ER of the post mitigation scoring. The ultimate aim of the PF is an attempt to increase the post mitigation environmental risk rating by a factor of 0.5, if all the priority attributes are high (i.e., if an impact comes out with a high medium environmental risk after the conventional impact rating, but there is significant cumulative impact potential and significant potential for irreplaceable loss of resources, then the net result would be to upscale the impact to a high significance).

Table 13: Environmental Significance Rating

Significance Rating	Description
<-17	High negative (i.e., where the impact must have an influence on the decision process to develop in the area).
≥-17, ≤-9	Medium negative (i.e., where the impact could influence the decision to develop in the area).
>-9, < 0	Low negative (i.e., where this impact would not have a direct influence on the decision to develop in the area).



Significance Rating	Description
0	No impact
>0, <9	Low positive (i.e., where this impact would not have a direct influence on the decision to develop in the area).
≥9, ≤17	Medium positive (i.e., where the impact could influence the decision to develop in the area).
>17	High positive (i.e., where the impact must have an influence on the decision process to develop in the area).

## 6.12 ANTICIPATED IMPACTS OF THE PROPOSED ACTIVITY

The proposed pipeline installation will transverse several properties which could result in a loss of vegetation, an increase in erosion and silt deposition, a loss of functionality of the direct wetland from the return water pipeline and could negatively impair the surface and groundwater quality. Furthermore, the proposed project could result in compaction soils; altering hydromorphic soils; drainage patterns change; altering surface hydrological characteristics; noise and deposition of dust.

A positive impact associated with the proposed activity is that the proposed new pipeline will allow for mine residue removal, land rehabilitation, alien invasive plant species removal, skills development and poverty alleviation through local employment. Other indirect positive impacts include improvement on biodiversity, water resource quality, air quality, land use etc.

It should be noted that this report has been made available to I&AP's for review and comment and their comments and concerns will be taken into account in the final BAR. Refer to Section 6.11 for the Methodology used in determining and ranking the nature, significance, consequence, extent, duration and probability of potential environmental impacts and risks.

The following section provides a description and assessment of the potential impacts identified in the impact assessment process. Refer to Appendix E for the full impact scoring calculations. A summary of the positive and negative impacts of the proposed activity are provided in Section 6.12 and Table 14.

Table 14: Positive and Negative Impacts of The Proposed Activity

Impact	Positive or Negative	Phase
Poor housekeeping will result in the deterioration of water quality, increase in E coli resulting in potential health effects	Negative	Construction
Local spillages of oils from construction vehicles and machinery leading to groundwater contamination.	Negative	Construction / Operation
Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the construction footprint area.	Negative	Construction



Impact	Positive or Negative	Phase
Disturbance of the area may release suspended solids into the river during the construction of the clearing of vegetation for the pipelines and pump station.	Negative	Construction / Operation
Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	Negative	Construction
Potential spreading of alien invasive species as indigenous vegetation is removed, and pioneer alien species are provided with a chance to flourish.	Negative	Construction
Possible increase in dust generation, PM10 and PM2.5 because of bulk earthworks, operation of heavy machinery, and material movement.	Negative	Construction / Operation
Loss of vegetation species including vegetation species of conservational concern due to site clearance.	Negative	Construction
The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	Negative	Construction
Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Negative	Construction / Operation
Poor waste management will result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Negative	Construction / Operation
Impacts on heritage resource	Negative	Construction
Potential leakage of sewage water may result in nuisance odor and flies which may result in conflict with communities around the project area.	Negative	Construction / Operation
Erosion of the riverbeds and banks may result in siltation of the Vaal River	Negative	Construction
Disturbances to or removal of vegetation whilst accessing infrastructure to carry out maintenance activities may result in potential loss to indigenous vegetation and further proliferation of alien floral species.	Negative	Construction / Operation
The use of vehicles and machinery during maintenance and/repair may generate noise in the immediate vicinity	Negative	Operation
Potential leakage of the proposed slurry pipeline and into the Vaal River and associated riparian zone because of maintenance activities;	Negative	Construction / Operation

## 6.13 METHODOLOGY FOR ASSESSING MITIGATION MEASURES

The following sections provide a description and assessment of the mitigation measures for each potential impact identified in the impact assessment process. The impact scores below are reflective of the impacts before the implementation of mitigation measures. A second score indicating the final significance of each potential impact is also reflected below. This score indicates the degree of potential loss of irreplaceable resources and



the cumulative nature of the impact. It should be noted that this report will be made available to I&AP's for review and comment and their comments and concerns will be addressed in the final report to be submitted to the DFFE for adjudication. Furthermore, it should be noted that the impact scores themselves will include the results of the aforementioned public response and comment. The results of the public consultation will be used to update the impact scores upon completion of the public review period, where after the finalised report will be submitted to the DFFE for adjudication. Please refer to Appendix E for the full impact scoring calculations. The mitigation hierarchy proposed by Macfarlane et al., (2016) was considered for this study (Figure 8).



Figure 8: Mitigation hierarchy (Research Gate, 2019)

Please refer to Section 8 for the detailed mitigation measures associated with each aspect and impact. The Pre-mitigation significance and final significance for each impact are identified in Table 15 below.

Table 15: Pre- Mitigation Significance and Final Significance

Impact	Positive or Negative	Pre-mitigation Significance	Final Significance
Poor housekeeping will result in the deterioration of water quality, increase in E coli resulting in potential health effects	Negative	-14	-4
Local spillages of oils from construction vehicles and machinery leading to groundwater contamination.	Negative	-6	-3,5
Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the construction footprint area.	Negative	-6	-2,8125
Disturbance of the area may release suspended solids into the river during the construction of the clearing of vegetation for the pipelines and pump station.	Negative	-13	-5,0625
Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	Negative	-3,5	-1,5



Impact	Positive or Negative	Pre-mitigation Significance	Final Significance
Potential spreading of alien invasive species as indigenous vegetation is removed, and pioneer alien species are provided with a chance to flourish.	Negative	-8,25	-5
Possible increase in dust generation, PM10 and PM2.5 because of bulk earthworks, operation of heavy machinery, and material movement.	Negative	-7	-2,5
Loss of vegetation species including vegetation species of conservational concern due to site clearance.	Negative	-13	-2,75
The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	Negative	-8	-4,5
Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Negative	-11	-6
Poor waste management will result in the contamination of surface runoff resulting in the deterioration of water quality of the watercourse.	Negative	-11	-3
Impacts on heritage resource	Negative	-3,5	-1,5
Potential leakage of sewage water may result in nuisance odor and flies which may result in conflict with communities around the project area.	Negative	-13	-3,5
Erosion of the riverbeds and banks may result in siltation of the Vaal River	Negative	-14	-5
Disturbances to or removal of vegetation whilst accessing infrastructure to carry out maintenance activities may result in potential loss to indigenous vegetation and further proliferation of alien floral species.	Negative	-7,5	-1,25
The use of vehicles and machinery during maintenance and/repair may generate noise in the immediate vicinity	Negative	-9	-2,5
Potential leakage of the proposed slurry pipeline and into the Vaal River and associated riparian zone because of maintenance activities;	Negative	-18	-4,5

## 7 ASSESSMENT METHODOLOGY OF IMPACTS

The impact assessment process is broken down as follows:

1. Identification of proposed activities including their nature and duration: Impacts were identified through various methods including a desktop analysis; specialist studies (Heritage and Palaeontological and Wetlands) and the public participation process;
2. Screening of activities likely to result in impacts or risks;



3. Utilisation of the above mentioned EIMS methodology to assess and score preliminary impacts and risks identified. Refer to section 6.11 above for the full methodology used;
4. Inclusion of I&AP comments received through the public participation process regarding impact identification and assessment;
5. Finalisation of impact identification and scoring; and
6. Identification of suitable mitigation measures and outcomes.



## 8 IMPACT ASSESSMENT OF EACH IDENTIFIED POTENTIALLY SIGNIFICANT IMPACT AND RISK

Several potential impacts were identified during the impact assessment process. Table 16 provides a breakdown of the identified potential impacts associated with the activity and provides the associated proposed mitigation measures to minimise the potential impact. Refer to Appendix E for the impact assessment.

Table 16: Potential impacts identified and associated mitigation measures.

Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
<ul style="list-style-type: none"> <li>• <b>Servitude clearing / preparation and</b></li> <li>• <b>Installation of pipelines.</b></li> <li>• <b>Site clearing</b></li> </ul>	Local spillages of oils from construction vehicles and machinery leading to groundwater contamination.	Site	Construction.	-6	<ul style="list-style-type: none"> <li>• Site access control, limit vehicle access to only essential machinery where possible.</li> <li>• Ensure vehicles are not left idling for longer than 5 minutes if not necessary.</li> <li>• No storage of vehicles or equipment will be allowed outside of the designated project areas. Make use of drip trays for all stationary construction vehicles on site.</li> <li>• All laydown, chemical toilets etc. should be restricted to least concern sensitivity areas. Materials may not be stored for extended periods and must be removed from the project areas once the construction phase has been concluded. No permanent structures should be permitted at laydown area.</li> <li>• Make sure all excess consumables and building materials / rubble is removed from site and deposited at an appropriate waste facility.</li> </ul>	-3.5





Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
					<ul style="list-style-type: none"> <li>• Appropriately contain any generator diesel storage tanks, machinery spills (e.g. accidental spills of hydrocarbons oils, diesel etc.) or construction materials on site (e.g. concrete) in such a way as to prevent them leaking and entering the north-western seep.</li> <li>• Regularly maintain stormwater infrastructure, pipes, pumps and machinery to minimise the potential for leaks. Check for oil leaks, keep a tidy operation, install bins and promptly clean up any spills or litter.</li> <li>• Provide appropriate sanitation facilities during construction and service them regularly.</li> </ul>	
	<p>Increase in silt load in runoff due to site clearing, grubbing and the removal of topsoil from the construction footprint area.</p>	<p>Site</p>	<p>Construction.</p>	<p>-6</p>	<ul style="list-style-type: none"> <li>• The construction and final development footprints should be demarcated, and all proposed activities should be restricted to the proposed development areas.</li> <li>• Ensure soil stockpiles and concrete / building sand are sufficiently safeguarded against rain wash.</li> <li>• Mixing of concrete must under no circumstances take place within the wetland.</li> </ul>	<p>-2.8125</p>



Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
					<ul style="list-style-type: none"> <li>Ensure areas where mixing and storage of sand and concrete are adequately cleaned once activity is completed.</li> </ul>	
	Disturbance of the area may release suspended solids into the river during the construction.	<ul style="list-style-type: none"> <li>Excavations</li> <li>Contamination of wetland</li> </ul>	Construction	-13.00	<ul style="list-style-type: none"> <li>Re-instate topsoil after each completed construction activity .</li> <li>Where workings are close to a water resource, make use of silt trapping on the downstream side of the footprint to trap sediment until the site has been constructed and vegetation has re-established.</li> </ul>	-5.0625
	Disturbances to vegetation and potential loss to indigenous vegetation and further proliferation of alien floral species.	Clearance and removal of vegetation	Construction.	-7.50	<ul style="list-style-type: none"> <li>Promptly remove all alien and invasive plant species that may emerge during construction (i.e. weedy annuals and other alien forbs) must be removed.</li> </ul> <p>The use of herbicides is not recommended in or near wetlands (opt for mechanical removal).</p>	-1.25
	Impact on heritage resources	Heritage resources	Construction	-3.50	<ul style="list-style-type: none"> <li>Implement chance find procedures in case where possible heritage finds are uncovered.</li> <li>If any heritage resources are discovered during any phase of construction, either on the surface or exposed by fresh excavations the</li> </ul>	-1.50



Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
					Chance Find Protocol must be implemented by the ECO.	
	Vegetation clearance may result in loss of faunal habitat ecological structure, species diversity and loss of species of conservation concern.	Excavation	Construction and Operation	-3.50	<ul style="list-style-type: none"> <li>Any holes/deep excavations must be dug in a progressive manner in order to allow burrowing animals time to move off and to prevent trapping. Should the holes remain open overnight they must be covered temporarily to ensure no fauna species fall in.</li> <li>The duration of the construction should be minimized to as short a term as possible, to reduce the period of disturbance on fauna.</li> <li>All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must be enforced to ensure that road killings and erosion is limited. Speed limit signage must be visible to traffic.</li> </ul>	-1.50
	Potential spreading of alien invasive species as indigenous vegetation is removed, and pioneer alien species are provided with a chance to flourish.	Alien Vegetation	Construction	-8.25	<ul style="list-style-type: none"> <li>The construction footprint area should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas. Road footprints must be kept to prescribed widths.</li> </ul>	-5.00



Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
					<ul style="list-style-type: none"> <li>A pest control plan for rodents (for example) must be put in place and implemented; it is imperative that poisons not be used.</li> </ul>	
	Loss of vegetation species including vegetation species of conservational concern due to site clearance.	Site	Construction	-13.00	<ul style="list-style-type: none"> <li>Ensure areas identified as conservational concern are demarcated as “no-go” areas.</li> <li>Any individual protected plant that may be observed needs a relocation or destruction permit for any individual that may be removed or destroyed as a result of the activities. Preferably, the plants should be relocated to an area that will not be impacted on by future activities.</li> <li>Restrict all laydown, material storage, cement mixing, earth deposition and storage etc. aspects and activities to ‘Low’ sensitivity areas.</li> </ul>	-2.75
	Impact on air quality from dust.	Dust generation	Construction	-7.00	<ul style="list-style-type: none"> <li>Dust-reducing mitigation measures must be put in place and must be strictly adhered to, for all roads and stockpiles. This may include wetting of exposed soft soil surfaces, adhering to speed limits and not conducting dust generating activities on windy days which will increase the likelihood of dust being generated.</li> </ul>	-2.50



Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
					<ul style="list-style-type: none"> <li>Clearing of construction footprints must be undertaken as close as possible to the commencement of actual construction to prevent the exposure of bare soils for unreasonable periods.</li> <li>The ambient air quality and dust standard thresholds should be maintained throughout the activity.</li> <li>On completion of the construction all exposed soil must be re-vegetated with indigenous vegetation.</li> <li>Dust suppression measures such as wetting of exposure soil must be undertaken as and when required.</li> </ul>	
	The use of vehicles and machinery during the construction phase may generate nuisance noise in the immediate vicinity	Noise generation	Construction.	-8.00	<ul style="list-style-type: none"> <li>Noise must be kept to an absolute minimum during the working hours to minimize all possible disturbances to amphibian species and nocturnal mammals. All construction work must be limited to normal working hours from 7:00 in the morning to 17:00 in the afternoon to avoid nuisance of any surrounding landowners.</li> </ul>	-4.50
	Waste management	<ul style="list-style-type: none"> <li>General, hazardous and construction waste</li> </ul>	Construction /Operational	-11.00	<ul style="list-style-type: none"> <li>Waste management must be a priority and all waste must be collected and adequately stored where relevant.</li> </ul>	-3.00



Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
		<ul style="list-style-type: none"> <li>• Storage of chemicals, and fuel</li> <li>• Maintenance of pipelines</li> <li>• Directly affected and adjacent properties</li> </ul>			<ul style="list-style-type: none"> <li>• A minimum of one toilet must be provided per 15 persons. Portable toilets must be serviced regularly and.</li> <li>• The Contractor should supply sealable and properly marked domestic waste collection bins and all solid waste collected shall be disposed of at a licensed disposal facility.</li> <li>• Refuse bins will be regularly emptied and secured where necessary. Temporary storage of domestic waste shall be in covered waste skips. Maximum domestic waste storage period will be 7 days.</li> <li>• All construction activities must be restricted to the development footprint area. This includes laydown and storage areas, ablutions, etc.</li> <li>• During construction activities, all rubble and waste generated must be removed from the site.</li> <li>• All contractors and employees should undergo induction which is to include a component of environmental awareness. The induction is to include aspects such as the need to avoid littering, the reporting and cleaning of</li> </ul>	



Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
					spills and leaks and general good "housekeeping;". <ul style="list-style-type: none"> <li>Adequate sanitary facilities and ablutions on the servitude must be provided for all personnel throughout the project area. Use of these facilities must be enforced (these facilities must be kept clean so that they are a desired alternative to the surrounding vegetation).</li> <li>No permanent disposal of construction material on site may take place.</li> <li>All waste generated on site during construction must be adequately managed. Separation and recycling of different waste materials should be supported.</li> </ul>	
	Localised clearing of vegetation and compaction of the construction footprint will result in the soils being particularly more vulnerable to soil erosion.	Clearing of vegetation to facilitate the pipeline installation	Construction	-11.00	<ul style="list-style-type: none"> <li>Where possible, existing access routes and walking paths must be made use of, and the development of new routes limited.</li> <li>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events.</li> </ul>	-6.00





Name of activity	Potential impact	Aspects affected	Phase in which impact is anticipated	Significance if not mitigated	Mitigation type	Significance if mitigated
	Erosion of the riverbeds and banks may result in siltation of the Vaal River	Clearing of vegetation to facilitate the pipeline installation	Construction	-14.00	<ul style="list-style-type: none"> <li>All construction activities must be restricted to the development footprint area. This includes laydown and storage areas, ablutions, etc.</li> <li>All construction should be limited outside the 1:100 year flood-line as much as possible.</li> </ul>	-5.00
	Potential leakage of the proposed slurry pipeline and into the Vaal River and associated riparian zone because of maintenance activities	Maintenance	Operational	-18.00	<ul style="list-style-type: none"> <li>Follow an approved spill procedure in the event of a slurry spillage incident. Monitoring of any leakages should be .</li> <li>Provision must be made to monitor any unforeseen impact that may arise as a result of the proposed project such as leakages in the pipeline. Leakages should be reported immediately to prevent pollution of the surrounding environment.</li> <li>15m post mitigation buffer zones should be considered as “no go” areas where possible along the delineated wetlands except for the wetland through which the pipelines traverses.</li> <li>All maintenance and spill containment structures of the slurry pipeline should be limited outside the 1:100 year flood-line of the Vaal.</li> </ul>	-4.5



## 9 SUMMARY OF SPECIALIST REPORTS

Various specialists that were appointed to undertake the specialist assessments for the application area. Table 17 presents a summary of the findings and recommendations as identified in the specialist studies undertaken to inform the BAR.

The following specialist studies were undertaken:

- Heritage Impact Assessment - PGS Heritage;
- Hydrogeology Statement – The Biodiversity Company;
- Terrestrial Compliance Statement - The Biodiversity Company; and
- Wetland Baseline & Risk Assessment – The Biodiversity Company.

Table 17: Summary of Specialist Findings

<b>Specialist undertaken</b>	<b>study Recommendations and Conclusion of Specialist Report</b>	<b>Reference to the applicable section of the Report where Specialist recommendations have been included.</b>
<b>Heritage Assessment</b>	<b>Impact</b> The HIA has shown that despite an intensive walkthrough of the footprint area, no heritage resources were identified and no evidence for any archaeological or heritage sites could be identified. As a result, no impact is expected from the proposed development on heritage. It is possible that cultural material will be exposed by excavation during construction and may be recoverable. As such, it is recommended that the following chance find procedure should be implemented. <ul style="list-style-type: none"> <li>• An appropriately qualified heritage practitioner/archaeologist must be identified to be called upon in the event that any possible heritage resources or artefacts are identified.</li> <li>• Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated, and construction activities halted.</li> <li>• The qualified heritage practitioner/archaeologist will then need to come out to the site and evaluate the Heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.</li> <li>• The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.</li> </ul>	Sections 8



Specialist undertaken	study Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	<ul style="list-style-type: none"> <li>Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner/archaeologist.</li> </ul>	
<b>Hydropedology Statement</b>	<p>Several model exercises were undertaken by the hydropedology specialist to determine the catchment extent of the sub-basin for the wetlands associated with the project area as well as the Vaal River in proximity to the project boundary. The models indicated minimal to no impacts to the wetlands associated with the project.</p> <p>The specialist concluded that the proposed project will not result in any significant loss of total streamflow and groundwater recharge and further recommendation that the proposed activities can proceed as planned.</p>	Section 8
<b>Terrestrial Statement</b> <b>Compliance</b>	<p>The proposed project activities are likely to present only minor negative residual impacts to the already degraded indigenous habitat as the laydown footprint for the pipeline is relatively small, with much of it running along existing pipelines and roads. However, it is imperative that proper maintenance be conducted on the existing pipeline, as well as the new pipeline in order to address leaks (some of which already occurring) that may further degrade the habitat.</p> <p>It is recommended that a site walkthrough be conducted for the project area prior to construction commencing. Ideally, the walkthrough must be conducted between October and March by a suitably qualified EO/ECO, specifically for the 'High' sensitivity areas. A walkthrough prior to construction being undertaken (irrespective of the season) is suitable for the 'Low' and 'Medium' sensitivity habitats. All species of regionally and nationally protected plants must be relocated prior (refer to Table 5-8 in the Terrestrial Compliance Statement) to commencement of construction activities, as outlined in the mitigation measures above. It should also be noted that this report must be considered in conjunction with the wetland assessment report and all recommendations put forward by the wetland specialist for wetlands that may be present in the project area be implemented appropriately.</p> <p>The western portion of the project area, near Harmony Moab, has been classified as a "High" sensitivity area due to its proximity to a CBA. This area has only experienced minor disturbance relative to the state of the surrounding habitat. It is the recommendation of</p>	Section 8



Specialist undertaken	study Recommendations and Conclusion of Specialist Report	Reference to the applicable section of the Report where Specialist recommendations have been included.
	<p>the specialist that the pipeline, which is known to have a small footprint, only be laid down along the existing road in a 'Medium' or 'Low' sensitivity habitat. It is also recommended that this 'High' sensitivity area be classified as a 'No-Go Area' in order to maintain some level of habitat integrity and laydown activities are not to take place in this area. It must also be noted that the Vaal River is an inherently a sensitive habitat due to the nature of rivers and must be treated accordingly.</p> <p>During construction of the pump station, the smallest footprint possible should be impacted upon and it is crucial that construction materials are cleared and the affected vegetation rehabilitated post construction phase. The project area is under threat from numerous populations of category 1b invasive alien plant species, which are significantly degrading the landscape and competing with indigenous trees, shrubs and herbs. According to the latest NEM:BA legislation, category 1b species must be controlled according to an Invasive Alien Plant Management Plan. It is recommended that this plan be developed and implemented on a priority basis in conjunction with the development activities, as the extensive invasion is likely to be aggravated by the project activities and further spread across the habitat.</p>	
<p><b>Wetland Baseline &amp; Risk Assessment</b></p>	<p>According to the freshwater ecology assessment the following recommendations made;</p> <ul style="list-style-type: none"> <li>• No fatal flaws are evident for the proposed project. It is the opinion of the specialist that the project may be favorably considered, on condition all prescribed mitigation measures and supporting recommendations are implemented.</li> <li>• In accordance with the GA in terms of section 39 of the NWA, for water uses as defined in section 21 (c) or section 21 (i) a GA does not apply "to any water use in terms of section 21 (c) or (i) of the Act associated with the construction, installation or maintenance of any sewer pipelines, pipelines carrying hazardous materials and to raw water and waste water treatment works". Owing to the fact that this project will include the installation of pipelines to accommodate the flow of hazardous materials, a water use license may be required.</li> </ul>	



## 10 ENVIRONMENTAL IMPACT STATEMENT

### 10.1 SUMMARY OF KEY FINDINGS

A summary of the key findings of the environmental impact assessment as undertaken in this BAR is outlined below:

- The majority of the impacts had a medium rating prior to mitigation, which were then decreased to low- negative in the post mitigation scenario.
- The proposed installation of the pipeline has the potential to impact negatively on the surrounding environment and properties it will transverse. However, the impact assessment conducted by the EAP and specialists concluded that the foreseeable impacts can be mitigated to acceptable levels through the implementation of the proposed mitigation measures.
- The HIA did not identify any heritage resources within the study area, however, heritage chance finds are possible during clearing and excavation. Impacts can be mitigated through the implementation of the proposed Heritage Chance Find Procedure as stipulated in the HIA report.
- The hydrogeology compliance statement indicated that surface and also subsurface recharge flows are predominantly responsible for the level of moisture in the watercourses. Construction of the new facilities will have a limited impact on the recharge soils in proximity to the site's catchment as vertical flows towards the water table recharge stores (deep and shallow recharge) will be minimally impeded. Limited impacts can also be expected where the upgrades of pipelines and pump stations foundation intercept hillslopes with interflow soils as the lateral flows will respond to vertical flow paths still recharging the catchment water stores sufficiently. When comparing the size of the project area with that of the combined sub-basins responsible for providing moisture content to the wetland systems and Vaal River, it is clear that the potential worst-case scenario loss of moisture to the wetland is < 3% of the total water regime on a catchment scale. Therefore, when considering a percentage loss of total streamflow and groundwater recharges, negligible losses are expected, predominantly due to the fact that the bulk of the river's moisture and waterflows already originates well upstream of the project area and around the catchment.
- The Terrestrial compliance statement indicated that there is no portion of the project area is represented by intact vegetation type. The areas that were listed as CBA's and protected areas exist in a modified state as they have experienced degrading due to grazing by livestock, the invasion of alien species and the additional related effects of nearby agricultural and mining activity. No SCC flora or fauna were recorded during the field survey, however, it is noted that certain SCC fauna may move through the area infrequently due to the abundance of wetland systems in the region and the presence of the Vaal River. Three provincially protected plant species as classified by the Free State province were recorded in the project area. These must be left undisturbed or relocated, as outlined in the mitigation measures, refer to Appendix D for a list of the identified protected plant species.
- The Wetland assessment identified four (4) wetland systems within the 500m regulated area of the proposed project area of influence. The systems scored an overall PES score ranging from C – "Moderately Modified" to E – "Seriously Modified", due to the modifications arising from anthropogenic influences and surrounding mining activities. The systems scored "Moderate" importance and sensitivity scores due to the Low threat status of the wetland vegetation and units in combination with them being minimally protected. The average ecosystem service score was determined to ranges between "Intermediate" and "Moderately High". A post-mitigation buffer of 15 m was assigned to the systems.

Key findings for the socio-economic environment

- The proposed installation of the pipeline activity has the potential to affect the current land use and disrupt services if not properly managed or mitigated.



- Consultation with the community and landowners will be conducted in order to capture any comments or concerns regarding the proposed activities and to ensure the community and landowners are kept informed and allowed to raise issues. The concerns raised will be included in the final BAR.

## 10.2 FINAL LAYOUT MAP

The wetland delineation map showing the location of the terrestrial and aquatic biodiversity sensitive areas is shown in Figure 9 below. No other sensitive areas were identified. The proposed return water and slurry pipelines are located in heavily disturbed and modified areas. The identified sensitivities are the four (4) delineated hydrogeomorphic (HGM) units within the 500 m regulated area. These comprise of two unchanneled valley bottoms, the Vaal River and associated riparian areas, and one depression wetland.



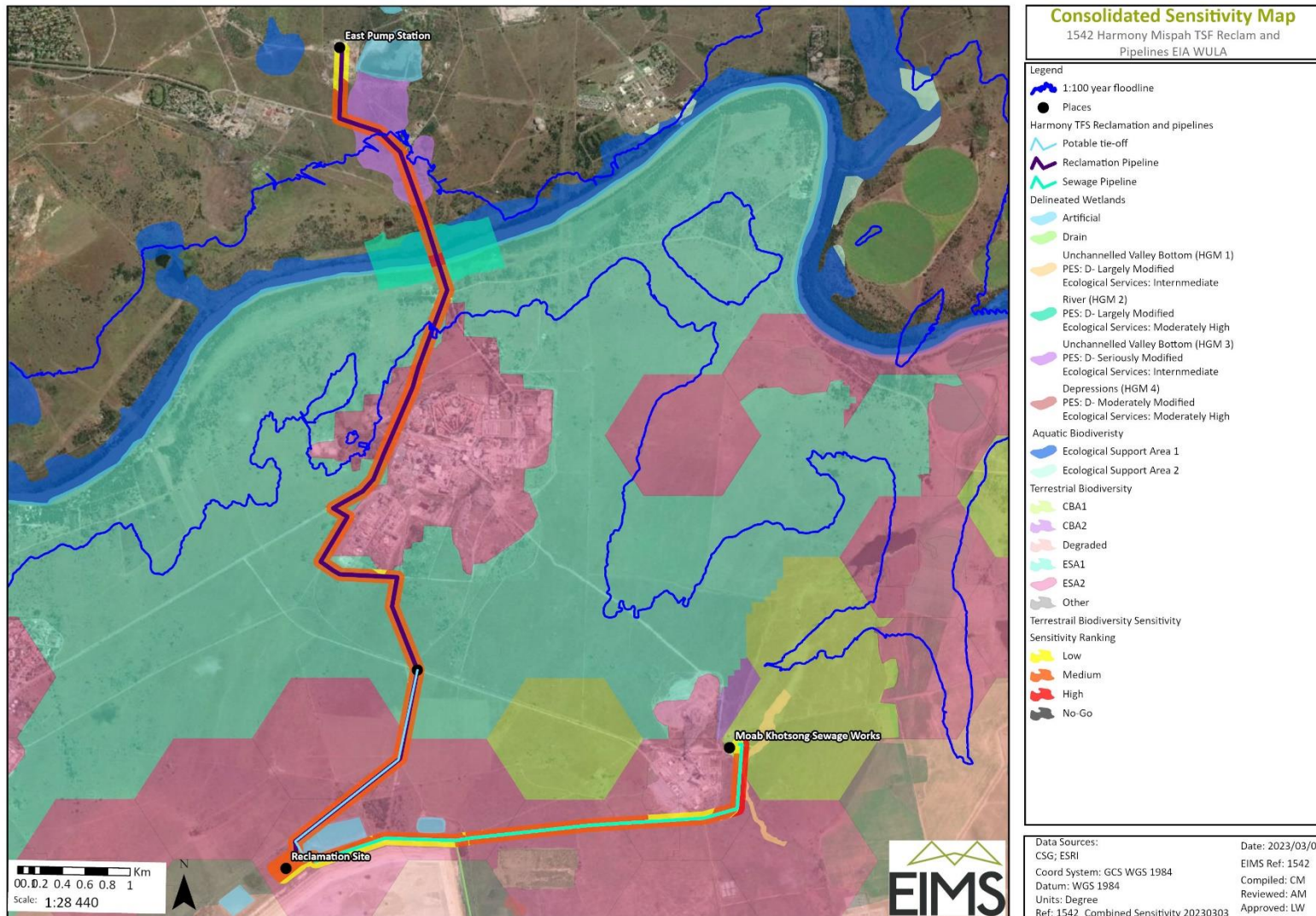


Figure 9: Consolidated sensitivity layout map





## 10.3 SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The proposed reclamation pump station and associated pipeline installation will transverse several properties which could result in direct and indirect environmental impacts. Furthermore, the proposed project could also result in erosion; compaction; introduction and spread of alien species; pollution of water resources; loss of vegetation; soil erosion and compaction; noise; dust; waste management challenges among others.

The aim of the proposed project is to meet the planned LoM for Mispah TSF to approximately 8 years and reclaiming around 75 Million tons at a rate of around 9.4 mT/annum. The current return water and slurry pipeline infrastructure fail to meet the requirements of the planned LoM and has direct and indirect impacts on the long-term sustainability of the MWS operations. Other direct positive impacts include land rehabilitation, removal of alien invasive plants, skills development and poverty alleviation through employment opportunities. Identified indirect positive impacts include improvement on biodiversity, water resource quality, air quality, land use etc.

The implementation of the proposed mitigation measure will ensure that the negative implications and risks of the project are reduced to a low level. Appropriate mechanisms for avoidance and mitigation of these negative impacts are included in the EMPr. The potential negative impacts are listed in Table 14.

## 11 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The management objectives are to minimise the socio-economic, cultural, heritage, biodiversity, and hydrogeological impacts of the proposed activity in terms of the perceptions and expectations of I&AP's. The outcome to be achieved is to lessen the impact through the following measures:

- Adhere to an open and transparent communication procedure with stakeholders at all times;
- Ensure that accurate information regarding the installation of pipeline to be undertaken and the resultant lack of requirements for site access and labour is communicated to I&AP's;
- Ensure that information is communicated in a manner which is understandable and accessible to I&AP's;
- Prevent the unnecessary destruction of, and fragmentation, of the vegetation community;
- Prevent the loss of the faunal community (including potentially occurring species of conservation concern) associated with the vegetation communities;
- Limiting the activity to the defined servitude area and only impacting those areas where it is unavoidable to do so otherwise;
- Enhance project benefits and minimise negative impacts through consultation with stakeholders;
- To limit interference with existing land uses as far as possible during installation of the pipeline;
- Ensure an approach that will provide the necessary confidence in terms of environmental compliance;
- Prevent the further loss and fragmentation of vegetation communities and the CBA areas in the vicinity of the project areas;
- Conserve sensitive receptors linked with wetland habitats to ensure that the functional integrity of all delineated systems is ensured;
- As far as possible, reduce the negative fragmentation effects of the linear development and enable safe movement of faunal species;
- To avoid damage to road infrastructure;



- To mitigate the impact on the wetlands;
- To prevent water quality contamination;
- To mitigate the impact on hydromorphic soils and compaction; and
- To maintain safety to communities.

## 12 ASPECTS FOR INCLUSION AS CONDITIONS OF AUTHORISATION

The following conditions are recommended for inclusion in the Environmental Authorisation:

- All mitigation measures included in the Basic Assessment Report, EMPr and associated specialist studies report must be adhered to;
- An Environmental Control Officer should be appointed for the proposed installation of the pipeline project to monitor compliance with the conditions of the Authorisation and EMPr.

## 13 DESCRIPTION OF ANY ASSUMPTIONS, UNCERTAINTIES AND GAPS IN KNOWLEDGE

Certain assumptions, limitations, and uncertainties are associated with the BAR. This report is based on information that is currently available and, as a result, the following limitations and assumptions are applicable:

- The project scope and descriptions are based on project information provided by the client;
- The information presented in this report is based on the information available at the time of compilation of the report;
- It is assumed that all data and information supplied by the Specialist, Applicant or any of their staff or consultants is complete, valid, and true; and
- The description of the baseline environment has been obtained from specialist studies.

Furthermore, certain assumptions, limitations, and uncertainties are associated with the BAR according to the appointed specialist studies and these are detailed for each aspect below.

- Wetland Impact Assessment:
  - The focus area was based on the spatial files provided by the client and any alterations to the area and/or missing GIS information would have affected the area surveyed;
  - Only the outline area of the proposed site was provided to the specialist;
  - The ecological integrity of the Vaal River and associated riparian area has been determined using the methodology presented in the specialist report; and
  - The GPS used for the survey has a 5 m accuracy and therefore any spatial features may be offset by 5 m.
- Heritage Impact Assessment
  - Not detracting in any way from the comprehensiveness of the fieldwork undertaken, it is necessary to realise that no heritage resources were identified during the fieldwork. However, that does not necessarily represent all the possible heritage resources present within the area.
  - Fieldwork was also focussed on areas that were not previously disturbed, thus focussing on areas with the highest potential to yield heritage resources.
- Terrestrial Compliance Statement



- It is assumed that all information received from the client and landowner is accurate;
- The specialist was not provided with any detailed engineering drawings with regards to the planned development activities and as such the potential impacts arising from these activities may only be assumed based on information received from the client and the landowner/developer;
- All datasets accessed and utilised for this assessment are considered to be representative of the most recent and suitable data for the intended purposes;
- The assessment area (project area) was based on the footprint areas as provided by the client, and any alterations to the area and/or missing GIS information pertaining to the assessment area would have affected the area surveyed and hence the results of this assessment;
- The area was only surveyed during a single site visit and therefore this assessment does not consider temporal trends (note that the data collected is considered sufficient to derive a meaningful baseline);
- Whilst every effort was made to cover as much of the project area as possible, representative sampling is completed, and by its nature it is possible that some plant and animal species that are present within the project area were not recorded during the field investigations; and
- The GPS used in the assessment has an accuracy of 5 m and consequently any spatial features may be offset by up to 5 m.

## **14 REASONED OPINION AS TO WHETHER THE PROPOSED ACTIVITY SHOULD OR SHOULD NOT BE AUTHORISED**

The section below gives a reasoned opinion on why the activity should be authorised as well as conditions that should be included in the authorisation.

### **14.1 REASONS WHY THE ACTIVITY SHOULD BE AUTHORISED OR NOT**

The impacts on the environment can be mitigated through open communication with the community, landowners, and implementation of the proposed EMPr mitigation measures. It is therefore the opinion of the EAP and appointed specialist that the proposed activity should be authorised.

### **14.2 CONDITIONS THAT MUST BE INCLUDED IN THE AUTHORISATION**

The following conditions should be included in the environmental authorisation:

- Stakeholder Engagement will continue throughout the construction and installation of the pipeline to ensure the community and landowners are kept informed and allowed to raise issues. These issues will then be addressed through a grievance mechanism;
- The applicant should adhere to the conditions of the EA, EMPr and the Specialist reports for this project; and
- An independent Environmental Control Officer should be appointed for the proposed pipeline project to ensure compliance with the EMPr.

## **15 PERIOD FOR WHICH THE ENVIRONMENTAL AUTHORISATION IS REQUIRED**

The Environmental Authorisation is required for a minimum of ten (10) years.



## 16 UNDERTAKINGS

It is confirmed that the undertaking required to meet the requirements of this section is provided at the end of the EMPr and is applicable to both the BAR and the EMPr. Refer to section 18 for the signed undertakings.

## 17 OTHER MATTERS REQUIRED IN TERMS OF SECTIONS 24(4)(A) AND (B) OF THE ACT

Section 24(4) (A) and (B) refer to the “procedures for investigation, assessment and communication of the potential consequences or impacts of activities on the environment”. The table below provides reference to where in the report section 24 (4) (A) and (B) is addressed.

Sub-Section Reference	Applicable legislation under section 24 (4)(A) and (B) of the NEMA	Reference Where Applied (i.e., where in this document has it been explained how the development complies section 24 (4))
<b>24 (a) must ensure, with respect to every application for an environmental authorisation-</b>		
<b>24 (a) (i)</b>	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	Refer to Section 6.7 and Appendix B.  Both the City of Matlosana Local Municipality and Moqaka Local Municipality were included on the I&AP database, notified, and provided with an opportunity to review and comment on the BAR and associated appendices.
<b>24 (a) (ii)</b>	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 account in any decision made by an organ of state in relation to any proposed policy, programme, process, plan, or project	Refer to Section 9 and Section 10  A summary of the specialist reports, including the recommendations is presented in Section 9. Section 10 presents a summary of the key findings.
<b>24 (a) (iii)</b>	that a description of the environment likely to be significantly affected by the proposed activity is contained in such application	Refer to Section 6.9.  Section 6.9 provides a summary of the environmental attributes for the proposed project area.
<b>24 (a) (iv)</b>	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	Refer to sections 6.10, 6.11, 6.12, <b>Error! Reference source not found.</b> and 8.  Sections 6.10, 6.11, 6.12 <b>Error! Reference source not found.</b> and 8 identifies potential impacts and risks, outlines the impact assessment methodology applied and presents the potential positive and negative impacts associated with the project, respectively. Section 8 presents the



Sub-Section Reference	Applicable legislation under section 24 (4)(A) and (B) of the NEMA	Reference Where Applied (i.e., where in this document has it been explained how the development complies section 24 (4))
		impact assessment for the identified impacts.
24 (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	Refer to Section 6.7 and Appendix B. Section 6.7 provides a summary of the public participation process to be followed. The Public Participation Report and associated appendices is attached in Appendix B
<b>24 (b) must include, with respect to every application for an environmental authorisation and where applicable—</b>		
24 (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	Refer to Section 6.1, 6.2, 6.3, 6.4, 6.5 and 6.6 and 6.10. Section 6.1, 6.2, 6.3, 6.4, 6.5 and 6.6 provide motivation as to why no alternative sites were considered and motivation for alternative site development, respectively. Section 6.10 investigates the potential impacts of the proposed activity.
24 (b) (ii)	investigation of mitigation measures to keep adverse consequences or impacts to a minimum	Refer to Section <b>Error! Reference source not found..</b> and Appendix D. Section <b>Error! Reference source not found..</b> provides possible mitigation measures for the potential impacts for each activity. Specialist Assessments are included in Appendix D. Mitigation measures are included in Appendix H.
24 (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	Refer to Appendix D and Section 8. Impacts in terms of the National Heritage Resources Act, 1999 are assessed in Section 8. The HIA is included in Appendix D.
24 (b) (iv)	reporting on gaps in knowledge, the adequacy of predictive methods and	Refer to Section 13.



Sub-Section Reference	Applicable legislation under section 24 (4)(A) and (B) of the NEMA	Reference Where Applied (i.e., where in this document has it been explained how the development complies section 24 (4))
	underlying assumptions, and uncertainties encountered in compiling the required information	Assumptions, Uncertainties and Gaps in Knowledge are included in Section 13.
<b>24 (b) (v)</b>	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	Refer to EMPr (Appendix H).
<b>24 (b) (vi)</b>	consideration of environmental attributes identified in the compilation of information and maps contemplated in subsection (3);	Refer to Section 6.9 environmental attributes and Appendix C for maps.
<b>24 (b) (vii)</b>	provision for the adherence to requirements that are prescribed in a specific environmental management Act relevant to the listed or specified activity in question	Refer to Section 3 for the policy and legislative context.



## 18 UNDERTAKING

I, **John von Mayer**, declare –

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&AP's;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and

That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:

Name of company:

Environmental Impact Management Services (Pty) Ltd

Date: 20/02/2023





I, **Ayabulela Manjezi**, declare –

- The correctness of the information provided in the reports;
- The inclusion of comments and inputs from stakeholders and I&AP's;
- The inclusion of inputs and recommendations from the specialist reports where relevant; and

That the information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested and affected parties are correctly reflected herein.

Signature of the environmental assessment practitioner:

Name of company:

Environmental Impact Management Services (Pty) Ltd

Date: 20/02/2023



## 19 REFERENCES

- BGIS (Biodiversity GIS). (2018). <http://bgis.sanbi.org/> (Accessed: November 2019).
- BirdLife International. 2018a. *Circus macrourus*. The IUCN Red List of Threatened Species.
- BirdLife International. 2018b. *Falco vespertinus*. The IUCN Red List of Threatened Species 2018: e.T22696432A131939286.
- <https://dx.doi.org/10.2305/IUCN.UK.20182.RLTS.T22696432A131939286.en>.
- BirdLife International. 2018c. *Phoeniconaias minor*. The IUCN Red List of Threatened Species
- BirdLife International. 2019. *Anthropoides paradiseus* (amended version of 2018 assessment).
- IUCN Red List of Threatened Species 2019: e.T22692109A155417800.
- Birdlife South Africa. (2015). Checklist of Birds - List of Threatened Species.
- BODATSA-POSA. (2019). Plants of South Africa - an online checklist. POSA ver. 3.0.
- City of Matlosana Annual Report 2011. <http://www.matlosana.gov.za/AnnualReportss> (Accessed: 18 February 2023).
- IUCN. (2017). The IUCN Red List of Threatened Species. [www.iucnredlist.org](http://www.iucnredlist.org) (Accessed: November 2011).
- Land Type Survey Staff. (1972 - 2006). Land Types of South Africa: Digital Map (1:250 000 Scale) and Soil Inventory Databases. Pretoria: ARC-Institute for Soil, Climate, and Water.
- Mucina, L. & Rutherford, M.C. (Eds.). (2006). The vegetation of South Africa, Lesotho, and Swaziland. Strelizia 19. South African National Biodiversity Institute, Pretoria South African.
- Moqhaka Local Municipality Integrated Development Plan (2022-2027). [chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/http://www.moqhaka.gov.za/wp-content/uploads/2022/07/Updated-IDP-2022-2027-Latest\\_01-07\\_2022.pdf](http://www.moqhaka.gov.za/wp-content/uploads/2022/07/Updated-IDP-2022-2027-Latest_01-07_2022.pdf) (Assessed: 19 February 2023).
- SANBI. 2009. Further Development of a Proposed National Wetland Classification System for South Africa. Primary Project Report. Prepared by the Freshwater Consulting Group (FCG) for the South African National Biodiversity Institute (SANBI).
- Strelizia 19. South African National Biodiversity Institute, Pretoria South African.
- Skowno, A.L., Raimondo, D.C., Poole, C.J., Fizzotti, B. & Slingsby, J.A. (eds.). (2019). South African National Biodiversity Assessment 2018 Technical Report Volume 1: Terrestrial Realm. South African National Biodiversity Institute, Pretoria.
- South African National Biodiversity Institute (SANBI). 2009. Further Development of a Proposed
- National Wetland Classification System for South Africa. Primary Project Report.