



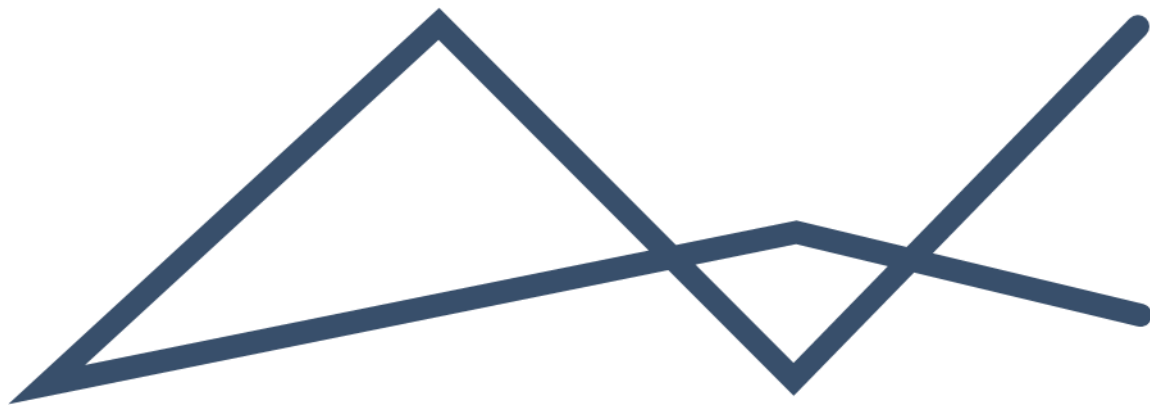
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## BASIC ASSESSMENT REPORT

MINE WASTE SOLUTIONS: RETURN WATER AND SLURRY PIPELINE  
PROJECT



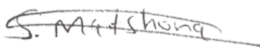



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| 2022/01/25            | ORIGINAL DOCUMENT | Basic Assessment Report for public review and comment. |



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## Abbreviations

|                   |  |
|-------------------|--|
| AMSL              | : Above Mean Sea Level   |
| BAR               | : Basic Assessment Report  |
| BID               | : Background Information Document                                    |
| BGL               | : Below Ground Level   |
| 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  |
| ktpd              | : average tons per day   |
| km                | : kilometre  |
| LC                | : Least Concern  |
| LOM               | : Life of Mine   |
| LT                | :Least Threatened  |
| mm                | : millimetre   |
| m <sup>3</sup> /h | : cubic metres per hour  |
| 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                        |
| NGA               | : National Groundwater Archive                                       |
| 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                          |
| SPD     | : Sulphur Pay Dam  |
| 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 46.
- Water Use Licence (WUL) or a General Authorisation Registration (GA) 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 is planning to install additional pipeline infrastructure to meet the planned Life of Mine (LOM) production rates and increase the volume of return water from Kareerand TSF to the reclamation pump stations. The current slurry and return water infrastructure fail to meet the requirements of the planned LOM and impacts on the long-term sustainability of the MWS operations. The proposed new infrastructure is considered an upgrade and expansion of the existing pipeline infrastructure and is as follows:

- An additional 6 km return water (750 mm diameter) pipeline along the existing pipeline route from Kareerand Tailings Storage Facility (TSF) to Midway Dam; and
- The installation of a new 6.2 km slurry pipeline (600 mm diameter) from Midway Dam towards the MWS Plant. The new pipeline will be installed alongside the existing pipelines and tie-in made upon commissioning whereafter the existing pipeline will be repurposed to a process water line.

The proposed pipelines traverse the following properties: portions 2, 6, 7 and 15 of the Farm Buffelsfontein 443 IP; portions 0, 2, 5, 12, 13, 24, 37, 57, 70, 8191 and 103 of the Farm Hartebeestfontein 422 IP; portions 30 and 33 of the Farm Stilfontein 408 IP; portion 0 of the Farm Stilfontein 534 IP and portion 0 of the Farm Wildebeestpan 442 IP within the City of Matlosana Local Municipality, North West Province. The proposed return water pipeline is located approximately 7 km south-east of the town Stilfontein. The pipeline has the following coordinate points: Start: 26°53'37.90"S and 26°52'30.26"E; Middle: 26°54'6.66"S and 26°50'43.59"E; and End: 26°54'9.07"S and 26°49'22.65"E. The proposed slurry pipeline is located within the town Stilfontein. The pipeline has the following coordinate points: Start: 26°53'16.65"S and 26°48'1.76"E; Middle 26°51'44.98"S and 26°48'17.89"E; and End: 26°50'15.40"S and 26°48'5.58"E.

A Public Participation Plan (PP Plan) has been prepared and submitted to the competent authority, the DMRE, with the application for EA in accordance with the requirements of the NEMA, and the Directions issued by the Department of Forestry, Fisheries and the Environment (GN 650 of 5 June 2020) in terms of the Disaster Management Act (Act 57 of 2002). The purpose of the PP Plan is to ensure that a successful public participation process is carried out for the duration of the project.

The BAR will be made available to Interested and Affected Parties (I&AP's) for comment from the 2<sup>nd</sup> of February 2022 until the 04<sup>th</sup> of March 2022. All comments received during this period will be included in the BAR for submission to the DMRE 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 –<br>i) The EAP who prepared the report; and<br>ii) The expertise of the EAP, including a curriculum vitae;  | Section 1.2<br>Section 1.3 |
| <b>Appendix 1(3)(1)(b):</b>       | The location of the activity, including:<br>i) The 21-digit Surveyor General code of each cadastral land parcel;<br>ii) Where available, the physical address and farm name; and<br>iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;  | 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 –<br>i) A linear activity, a description, and coordinates of the corridor in which the proposed activity or activities is to be undertaken;<br>ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken; | Section 1.4                |
| <b>Appendix 1(3)(1)(d):</b>       | A description of the scope of the proposed activity, including –<br>i) All listed and specified activities triggered and being applied for; and<br>ii) A description of the activities to be undertaken including associated structures and infrastructure;   | 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<br>Section 6.1<br>Section 6.7<br>Section 6.8<br>Section 6.9<br>Section 6.10<br>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 6.13</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          | Description  | Section in Report        |
|-----------------------------------|--|--------------------------|
| <b>NEMA EIA Regulations, 2014</b> |  |                          |
|                                   | 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<br>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          | Description  | Section in Report                       |
|-----------------------------------|--|---|
| <b>NEMA EIA Regulations, 2014</b> |  |   |
| <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 19                              |
| <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 17                              |
| <b>Appendix 1(3)(1)(t):</b>       | Any specific information that may be required by the competent authority; and  | Section 18                              |
| <b>Appendix 1(3)(1)(u):</b>       | Any other matters required in terms of section 24(4)(a) and (b) of the Act.  | Section 18                              |
| <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<br>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 6.13<br>Section 8<br>Section 11 |



| Environmental Regulation    | Description   | Section in Report |
|-----------------------------|---|-------------------|
| NEMA EIA Regulations, 2014  |   |                   |
|                             | iii) Rehabilitation of the environment; and<br>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 – <ul style="list-style-type: none"> <li>i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;</li> <li>ii) Comply with any prescribed environmental management standards or practices;</li> <li>iii) Comply with any applicable provisions of the ac regarding closure, where applicable; and</li> <li>iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;</li> </ul> | 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 Sinalo Matshona (Report Compilation/Public Participation) |
|----------------------|---|--|
| Tel No.:             | 011 789 7170                            | 011 789 7170   |
| Fax No.:             | 086 571 9047                            | 086 571 9047   |
| E-mail:              | john@eims.co.za                         | sinalo@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 27 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) His key experience includes:

- Experience with identification and assessment of environmental impacts.
- Experience in environmental compliance and monitoring.
- Knowledge of environmental legislation and policies, planning process and regulatory frameworks.
- Knowledge and experience of public participation process.



- Strong competencies in the assessment of renewable energy.
- Project management.

Ms Sinalo Matshona holds a BSc (Life and Environmental Science) degree from the University of the Johannesburg and is currently employed as an Environmental Consultant at EIMS. Sinalo is a Registered Candidate Natural Scientist (147072) with the South African Council for Natural Scientific Professions. Sinalo's range of experience includes onsite environmental compliance monitoring and undertaking the public participation process for various ongoing EIA related projects.

## 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 pipelines will be located on portions 2, 6, 7 and 15 of the Farm Buffelsfontein 443 IP; portions 0, 2, 5, 12, 13, 24, 37, 57, 70, 81, 91 and 103 of the Farm Hartebeestfontein 422 IP; portions 30 and 33 of the Farm Stilfontein 408 IP; portion 0 of the Farm OMV 534 IP and portion 0 of the Farm Wildebeestpan 442 IP |  |
| <b>Application Area (Ha)</b>                           | The pipelines are a linear development. Total area of all affected properties is 6091 ha.  |  |
| <b>Magisterial District</b>                            | Dr Kenneth Kaunda District Municipality  |  |
| <b>Distance and direction from nearest town</b>        | <p>The closest point of the pipeline routes is located within Stilfontein.</p> <p>Orkney is located 16 km south west of the closest point of the pipeline routes.</p> <p>Klerksdorp is located 15 km west of the closest point of the pipeline routes.</p>   |  |
| <b>21-digit Surveyor General Code for each Portion</b> | TOIP00000000044200000<br>TOIP00000000044300002<br>TOIP00000000044300006<br>TOIP00000000044300007<br>TOIP00000000044300015<br>TOIP00000000042200000<br>TOIP00000000042200002<br>TOIP00170000042200005<br>TOIP00000000042200012<br>TOIP00000000042200013   | TOIP00000000042200024<br>TOIP00000000042200037<br>TOIP00000000042200057<br>TOIP00000000042200070<br>TOIP00000000042200081<br>TOIP00000000042200091<br>TOIP00170000042200103<br>TOIP00000000053400000<br>TOIP00000000040800030<br>TOIP00000000040800033 |



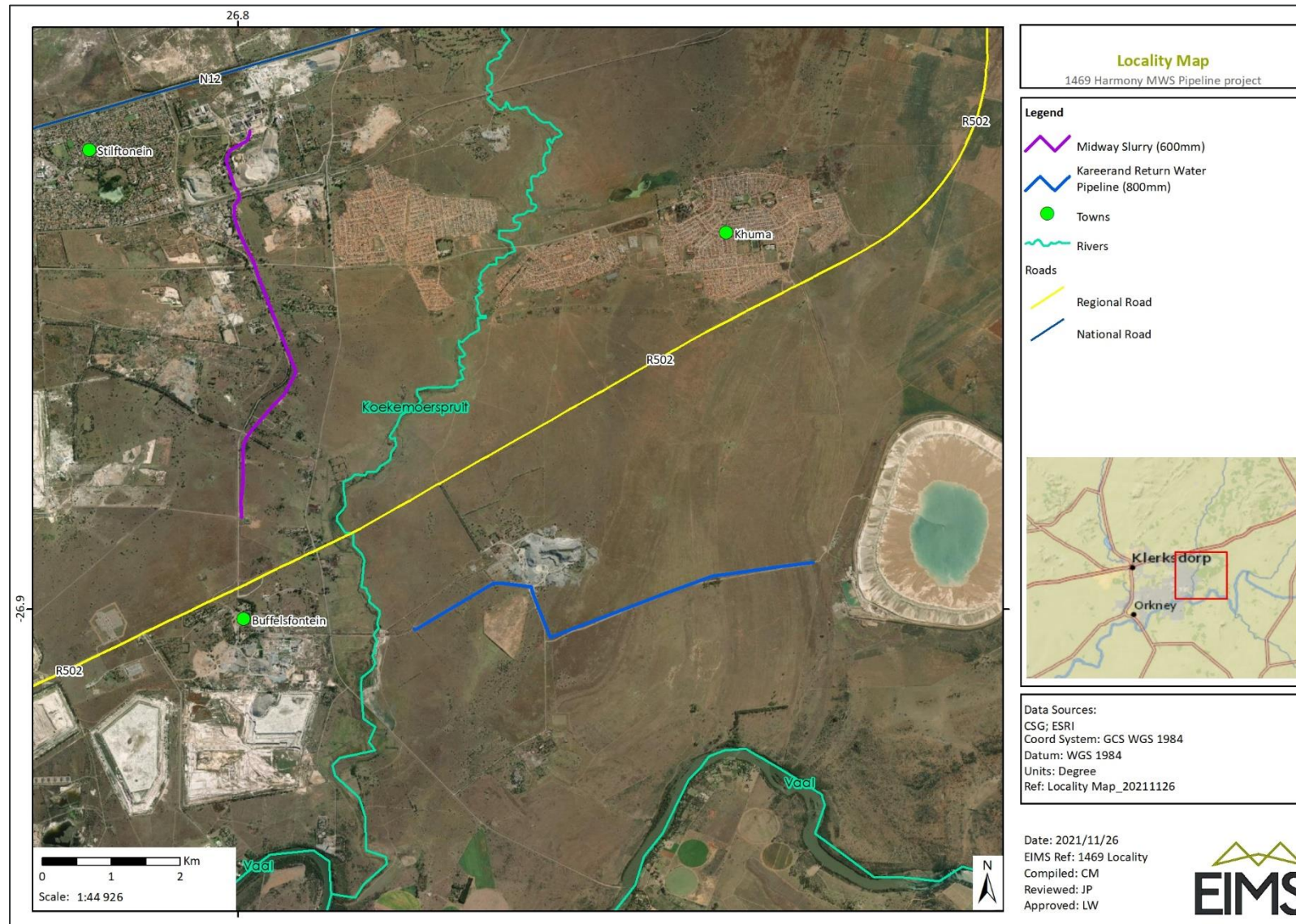


Figure 1: Locality Map for the proposed MWS Pipelines Project.



## 2 SCOPE OF THE PROPOSED ACTIVITY

The applicant wishes to install additional pipeline infrastructure to meet the planned LOM production rates and increase the volume of return water from Kareerand TSF to the reclamation pump stations. The current return water and slurry pipeline infrastructure fail to meet the requirements of the planned LOM and impacts on the long-term sustainability of the MWS operations. The infrastructure planned includes an additional 6 km return water pipeline (750 mm diameter) from Kareerand TSF to Midway Dam, along the existing return water pipeline and a new 6.2 km slurry pipeline (600 mm diameter) from Midway Dam to MWS Processing Plant.

### 2.1 OVERVIEW OF PROPOSED ACTIVITIES

MWS plan to construct an additional 6 km return water pipeline (750 mm diameter) along the existing pipelines from Kareerand TSF to Midway Dam to increase pumping rate of return water from Kareerand TSF to the reclamation pump stations. The new pipeline will tie-off the existing return water pipeline at Kareerand TSF and tie-in the existing pipeline before the Koekemoer Spruit. MWS water use hierarchy give priority to return (process) water and water from Kareerand are the main source of water for the reclamation operations and the proposed pipeline will increase rate and volume of return water available for reclamation and processing at MWS plant reducing the need for additional top-up water. The technical specifications of the proposed return water pipeline are:

- Transport material – Return/ Process Water
- Type – 6 mm Steel
- Construction – 10 bar rated flanged on plinths
- Flow Rate – 4000 m<sup>3</sup>/h
- Length – ± 6 km
- Diameter – 750 mm

Additionally, MWS plans to upgrade the Sulphur Pay Dam (SPD) Pump Station (Stream 1) slurry transfer system which requires the installation of a new 6.2 km slurry pipeline (600 mm diameter) from Midway Dam towards the MWS Plant. The new pipeline will be installed alongside the existing pipelines and tie-in made upon commissioning whereafter the existing pipeline will be repurposed to a process water line. The new portion of pipeline is required to increase Stream 1's daily production tonnage from 22.5ktpd to 30.5ktpd. The technical specifications of the proposed slurry pipeline are:

- Transport material – Slurry/ Tailings
- Type – 6 mm Steel (8 mm HDPE Liner)
- Construction – 16 bar rated flanged on plinths
- Flow Rate – 1851 m<sup>3</sup>/h
- Length – ± 6.2 km
- Diameter – 600 mm

A wetland specialist study was undertaken to delineate watercourses within 500 m of the proposed pipeline in accordance with the DWAF (2005) guidelines. This was done in an effort to assess if there was a need for a Water Use Licence Application (WULA) to be lodged with the Department of Human Settlement, Water and Sanitation (DHSWS). A heritage impact assessment study was also commissioned to assess the presence of and possible impacts of the proposed pipeline on heritage resources within the area.



## 2.2 LISTED AND SPECIFIED ACTIVITIES

The proposed return water and slurry pipelines require environmental authorisation prior to the commencement of the installation. 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.

Table 4: Listed and Specified Activities

| Name of activity  | Aerial extent of the activity   | Applicable listing notice   |
|---|---|---|
| <b>Construction of pipelines for the transport of return water and slurry/tailings.</b> | <p>The return water pipeline is approximately 6000 metres in length with a diameter of 0.75 metres and a flow rate of 1111 litres per second.</p> <p>The slurry pipeline is approximately 6200 metres in length with a diameter of 0.6 metres and a flow rate of 514 litres per second.</p> <p>The proposed project is considered an expansion to the existing pipeline infrastructure.</p> | <ul style="list-style-type: none"> <li>• <b>GNR 983 Activity 46:</b><br/> <i>"The expansion and related operation of infrastructure for the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes where the existing infrastructure-</i> <ul style="list-style-type: none"> <li>i) <i>has an internal diameter of 0,36 metres or more; or</i></li> <li>ii) <i>has a peak throughput of 120 litres per second or more; and</i> <ul style="list-style-type: none"> <li>a) <i>where the facility or infrastructure is expanded by more than 1 000 metres in length; or</i></li> <li>b) <i>where the throughput capacity of the facility or infrastructure will be increased by 10% or more;</i></li> </ul> </li> </ul> <i>excluding where such expansion-</i> <ul style="list-style-type: none"> <li><i>(aa) relates to the bulk transportation of sewage, effluent, process water, waste water, return water, industrial discharge or slimes within a road reserve or railway line reserve; or</i></li> <li><i>(bb) will occur within an urban area.</i></li> </ul> </li> </ul> |



### 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<br>(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.<br><br>Activities applied for: <ul style="list-style-type: none"> <li>• GNR 983 Activity 46.</li> </ul>   |
| <b>Minerals and Petroleum Resources Development Act (Act No. 28 of 2002) (MPRDA)</b>                                | The applicant is required to obtain an Environmental Authorisation in terms of Section 5A(b) of the MPRDA.   | An application for Environmental Authorisation has been submitted to the DMRE.   |
| <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 or GA application has been submitted in terms of Section 21 of the NWA. The applicable listed water uses are:<br><br>Section 21 (c): Impeding or diverting the flow of water in a watercourse; and<br><br>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. | <i>Vachellia erioloba</i> , a nationally protected tree species, occurs close to the proposed return water pipeline route and care must be taken not to remove or disturb these trees. There is no intention to remove any protected specimens and as such, no applications are required in terms of the National Environmental Management: Biodiversity Act. Mitigation measures relating to the management of protected species as well as alien and invasive species are included in Part B: EMPr of this report. |



| <b>Applicable Legislation and Guidelines</b>  | <b>Reference Where Applied<br/>(i.e., where in this document has it been explained how the development complies with and responds to the legislation and policy context)</b> | <b>How does this Development Comply with and Respond to the Legislation and Policy Context</b>  |
|---|--|---|
| <b>National Environmental Management: Waste Act (No. 59 of 2008)</b><br><b>National Environmental Management</b>                            | Waste generation   | 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 sensitive sites recorded on the sensitivity map.<br><br>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><br><b>and</b><br><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: EMP 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: EMP of this report.  |
| <b>National Forests Act (No. 84 of 1998) and Regulations</b>  | Section 6.4 Description of the receiving environment. Removal of protected trees during site clearance for installation of the pipeline.                                     | Vachellia erioloba, a nationally protected tree species, occurs close to the proposed return water pipeline however there is no intention to remove any protected specimens and as such no permits are required from the Department of Agriculture, Land Reform and Rural Development (DALRRD). |
| <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: EMP of this report.  |





## 4 NEED AND DESIRABILITY OF THE PROPOSED ACTIVITIES

The proposed additional pipeline infrastructure will be installed to meet the planned LOM production rates and increase the volume of return water from Kareerand TSF to the reclamation pump stations. The current slurry and return water infrastructure fail to meet the requirements of the planned LOM and impacts on the long-term sustainability of the MWS operations.

The proposed return water pipeline will increase rate and volume of return water available for reclamation and processing at MWS plant reducing the need for additional top-up water. Additionally, the Applicant plans to upgrade the SPD Pump Station (Stream 1) slurry transfer system which requires the installation of a new 6.2 km slurry pipeline (600 mm diameter) from Midway Dam towards the MWS Plant. The new portion of pipeline is required to increase Stream 1's daily production tonnage from 22.5ktpd to 30.5ktpd.

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. The proposed project will lead to conservation of water as it entails the increase in re-use of water from the Kareerand TSF, hence reducing the need for abstraction of water from other sources. 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 the 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 an additional return water pipeline from Kareerand TSF to Midway Dam and slurry pipeline from Midway Dam to MWS processing plant along existing pipeline servitudes. The activity alternatives included the proposed pipeline project as well as the no-go alternative.

Consultation with affected landowners and adjacent landowners has been in order to keep them informed about the proposed project activities as well as to capture any comments and concerns they may have regarding the installation of the pipeline.

## 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 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 expected to impact a fraction of the several farm portions of which they transverse. The proposed pipeline project includes a return water pipeline that is 6 km in length with a diameter of 750 mm, and a 6.2 km slurry pipeline that has a diameter of 600mm. The primary drivers in determining the location of the proposed pipeline includes servitude availability, environmental sensitivities and the existing pipeline & servitudes.

The preferred alignment for the return water pipeline starts approximately 0.4 km away from the Kareerand TSF and runs east along an existing pipelines and mine access road and towards the Vermaasdrift Rd located approximately 2 km from the pipeline. The pipeline turns and runs north towards the Buffelsfontein Gold Mine located north east of the pipeline where it turns east towards the Midway Dam. The preferred alignment for the slurry pipeline starts at the MWS Plant and runs south along the existing pipelines and JB Marks Rd until it reaches the Midway Dam located 1 km north of the R502. These two alignments are preferred as the project is an expansion of the existing reclamation pipeline system, located within existing pipeline servitudes which were identified during screening to have potentially low environmental sensitivities., therefore no alternative routes were applicable or assessed.

## 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 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 installation of an additional 6 km return water pipeline (750 mm) from the existing Kareerand TSF to Midway Dam, along the existing return water pipeline and a new 6.2 km slurry pipeline (600 mm diameter) from Midway Dam to MWS Processing Plant. 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 proposed project is considered as the preferred layout plan. The layout plan is dictated by the existing location of the Kareerand TSF, Midway Dam, the MWS Plant Operations as well as associated infrastructure such as pipelines. The proposed route is within a mining area and is characterised by mining related activities and a private hospital in close proximity to the Midway slurry pipeline. The preferred alignment layout for the return water pipeline starts approximately 0.4 km away from the Kareerand TSF and runs east along an existing pipelines and mine access road and towards the Vermaasdrift Rd located approximately 2 km from the pipeline. The pipeline turns and runs north towards the Buffelsfontein Gold Mine located north east of the pipeline where it turns east towards the Midway Dam. The slurry pipeline starts at the MWS Plant and runs south along existing pipelines and the JB Marks Rd towards the Duff Scott Private Hospital, the pipeline remains along the JB Marks Rd until it reaches the Midway Dam located 1 km north of the R502. The proposed pipelines are located within existing pipeline servitudes, tie-ins and tie-offs will be made to the existing pipelines upon completion, therefore no other layout alternatives were considered.

## 6.5 TECHNOLOGY ALTERNATIVES

Process alternatives imply the investigation of alternative processes or technologies that can be used to achieve the same goal. Should the project be granted authorisation, a 750 mm wide steel (6 mm thick) return water pipe and a 600 mm wide steel (6 mm thick with 8 mm HDPE liner) are to be installed above ground flanged on 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 03<sup>rd</sup> December 2021, 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, internet 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;
- Dr Kenneth Kaunda District Municipality;
- North West Department of Community Safety and Management;
- North West Department of Human Settlements;
- North West Economic Development, Environment, Conservation and Tourism;
- North West Department Public Works and Roads;
- National Department of Forestry, Fisheries and Environment;
- National Department of Water and Sanitation;
- National Department Of Rural Development And Land Reform; and
- SAHRA.

### 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:

- African Rainbow Minerals Ltd;
- Buffelsfontein Gold Mines Pty Ltd;
- Chemwes Pty Ltd;
- City Council of Klerksdorp;
- Corobrik Pty Ltd;
- Driade CC;
- Duff Scott Hospital Pty Ltd;
- Eagles Creek Golf Estate Pty Ltd;
- Earth Moving Equipment Services CC;
- Greenleaf Trust;
- HAB Procurements CC;
- Hartebeestfontein Gold Mining Co Ltd;
- Kopano Brickworks Ltd;
- Motswenyane Family Development Trust;
- MQM Property Pty Ltd;
- OMV Pty Ltd;
- Philou Motors;
- Pyramid Inv Three Pty Ltd;
- Relay Development CC;
- Stilfontein Gold Mining Co Ltd;
- Super Melk Beleggings Pty Ltd;
- Technicrete I S G Pty Ltd;
- Temotuo Rehabilitation Co;
- Tredkor Beleggings Pty Ltd; and
- Wildebeestpan (Portion 9 & 10) Communal Property Association.

#### 6.7.5 NOTIFICATION OF I&AP'S

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

- Registered letters, emails and/or faxes where available;
- Placement of English and Setswana A1 Correx Site Notices in various locations within and surrounding the proposed project area; and
- Placement of a newspaper advert in the Lentswe Newspaper.

Refer to Appendix B for proof of notification sent to I&AP's and for proof of correspondence with I&AP's. Notification documents sent to all pre-identified I&AP's included the following information:

- The proposed project area;



- List of activities to be authorised;
- Scale, nature, and extent of activities to be authorised;
- Sufficient detail of the intended operation to enable them to assess what impact the activities will have on them or on the use of their land;
- The purpose of the proposed project;
- Details of the affected properties (including parent farm and portion);
- Details of the NEMA Regulations that must be adhered to;
- Date by which comment, concerns and objections must be forwarded through to EIMS; and
- Contact details of the EAP.

I&AP's were provided an opportunity to register for the proposed project from the 03<sup>rd</sup> December 2021. I&AP's were also notified of the availability of the BAR which has been made available for 30 days from the 2<sup>nd</sup> of February 2022 until the 4<sup>th</sup> of March 2022, 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 DMRE.

## 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. This section will be updated post the review of the BAR and associated appendices for submission to the DMRE.

## 6.9 THE ENVIRONMENTAL ATTRIBUTES ASSOCIATED WITH THE ALTERNATIVES

### 6.9.1 SOCIO-ECONOMIC CONTEXT

The proposed return water and slurry pipelines will be situated on several farm portions as identified in Figure 1. The proposed return water pipeline is located approximately 7 km south-east of the town Stilfontein and the slurry pipeline is located within the town Stilfontein. The application area falls within the City of Matlosana Local Municipality, Dr Kenneth Kaunda District Municipality in the North West Province.

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 estimates based on the population growth rate of SA Statistics (1.04%) and the Matlosana Socio-Economic Report, the City of Matlosana has a total population of 438 486 people, of whom 103 407 (92%) are urbanised and 35 079 (8%) are rural. (mining villages form part of the urban areas). The largest population concentrations are in Jouberton (31%), Kanana, Khuma and Tigane, which represent 67% of the total urban population. The Municipal Integrated Development Plan (IDP) for 2017 to 2022 reported that, the City of Matlosana has a population density of 123 persons per km<sup>2</sup> people of which 92% are urbanised and 8% rural. The Census 2011 reported that, of the people aged 20 and above, 13,6% had some form of primary schooling, about 36,4% had some form of secondary schooling, 28,2% have completed matric and 9,0% have some form of higher education.



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.

There are 120 442 households in the municipality, with an average household size of 3,2 persons per household. Of those households, 50.1% have access to piped water in their dwellings and 46% have access to piped water inside the yard. Only 2% of the households do not have access to piped water. It is also reported that 90.3% of the household have access to electricity for lighting.

## 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 a copy of the specialist reports undertaken. The following specialist studies were undertaken:

- Terrestrial Ecology and Wetland Assessment - The Biodiversity Company;
- Heritage Impact Assessment - PGS Heritage; and
- Paleontological Impact Assessment - Banzai Environmental.

### 6.9.2.1 CLIMATE

According to Köppen-Geiger Climate classification, Stilfontein has a semi-arid climate, with warm to hot summers and cool, dry winters. The average annual precipitation in Stilfontein is 601 mm (Figure 2), with most of the precipitation occurring in January with an average of 104 mm. The average annual temperature in is 27 in Stilfontein°C. The warmest month of the year is January, with an average temperature: 31°C. Usually, June is the coldest month in Stilfontein, with an average temperature of 21 °C.

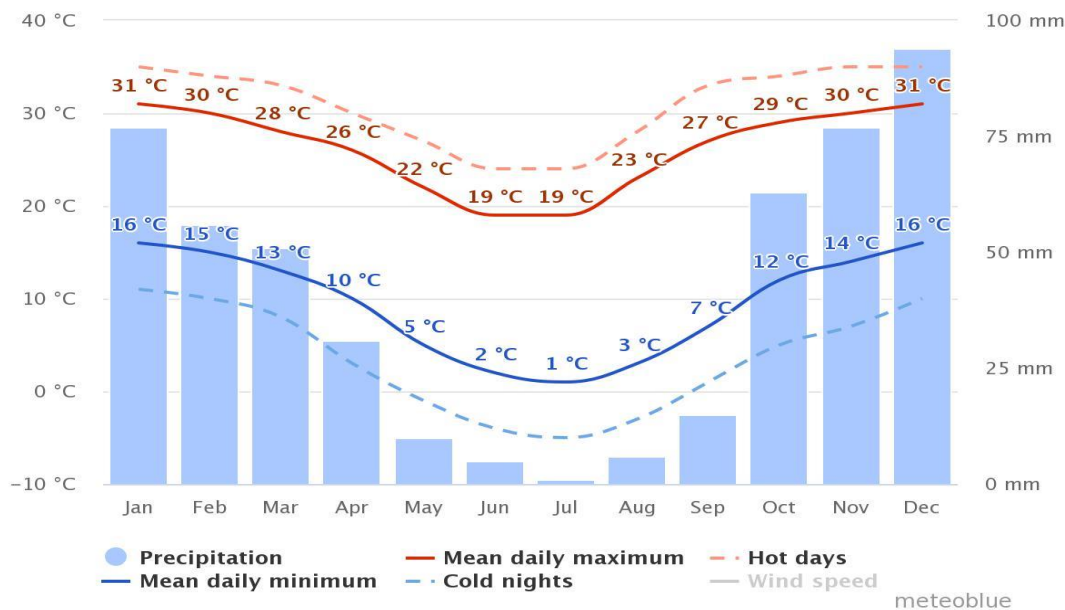


Figure 2: Graph showing average annual temperature for Stilfontein (Metoblue, 2021)

### 6.9.2.2 GEOLOGY AND SOILS

The geology of this area 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 marginal 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

This spatial dataset is part of the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) which was released as part of the National Biodiversity Assessment (NBA) 2018. National Wetland Map 5 includes inland wetlands and estuaries, associated with river line data and many other data sets within the South African Inventory of Inland Aquatic Ecosystems (SAIIAE) 2018. Two wetland types have been identified using this data set, namely channelled valley bottom wetlands and seeps. These wetland systems are “Critically Endangered” since less than 20% of these systems are in a natural or largely natural condition.

The National Freshwater Ecosystem Priority Areas (NFEPA) database forms part of a comprehensive approach for the sustainable and equitable development of South Africa’s scarce water resources. The NFEPA’s are intended to be conservation support tools and envisioned to guide the effective implementation of measures to achieve the National Environment Management Biodiversity Act’s biodiversity goals (Act No.10 of 2004) (NEM:BA), informing both the listing of threatened freshwater ecosystems and the process of bioregional planning provided for by this Act (Nel et al., 2011). According to Nel et al. (2011), three wetland types have been identified within the 500 m regulated area, namely unchanneled valley bottom wetlands, wetland flats and seeps. All the national wetlands surrounding located within 500 m of the regulated area have been shown in Figure 3.

#### 6.9.2.4 VEGETATION TYPE

The project areas are situated within three vegetation types as shown in Figure 4, these are the Rand Highveld Grassland, Vaal Vet Sandy Grassland and Vaal Reefs Dolomite Sinkhole Woodland according to Mucina & Rutherford (2006) (SANBI, 2018).

The Rand Highveld Grassland vegetation type occurs on highly variable landscapes with extensive sloping plains and a series of ridges slightly elevated over undulating surrounding plains. The vegetation is species-rich, wiry, sour grassland alternating with low, sour shrubland on rocky outcrops and steeper slopes. This vegetation type can be found in Gauteng, North-West, Free State and Mpumalanga Provinces, between rocky ridges from Pretoria to Witbank, extending onto ridges in the Stoffberg and Roossenekal regions as well as west of Krugersdorp centred in the vicinity of Derby and Potchefstroom, extending southwards and north-eastwards from there (Mucina & Rutherford, 2006). According to Mucina and Rutherford (2006), this vegetation type is classified as Endangered. The national target for conservation protection for this vegetation type is 24%, but only a few patches are protected in statutory reserves (Kwaggavoeetpad, Van Riebeeck Park, Bronkhorstspuit, Boskop Dam Nature Reserves) and in private conservation areas (e.g., Doornkop, Zemvelo, Rhenosterpoort and Mpopomeni).

Almost half of this vegetation type has been transformed mostly by cultivation, plantations, urbanisation or dam-building. Cultivation may also have had an impact on an additional portion of the surface area of the unit where old lands are currently classified as grasslands in land-cover classifications and poor land management has led to degradation of significant portions of the remainder of this unit.

The Vaal Vet Sandy Grassland (Gh10) 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.



The Vaal Reefs Dolomite Sinkhole Woodland (Gh 12) vegetation type is restricted to a small area of dolomite sinkholes near Stilfontein and Orkney with the Vaal River forming its southern boundary. It is associated with chert-rich dolomite rings, forming a prominent woodland-grassland mosaic, especially near sinkholes and dolomite outcrops. (Mucina & Rutherford, 2006). According to Mucina and Rutherford (2006), this vegetation type is classified as It is Vulnerable with a small section conserved within the Sterkfontein Caves conservation area (as part of the Cradle of Humankind World Heritage Site). This vegetation type is transformed by mining, cultivation and urban expansion, and contains the highest concentration of mines when compared to the other vegetation types.



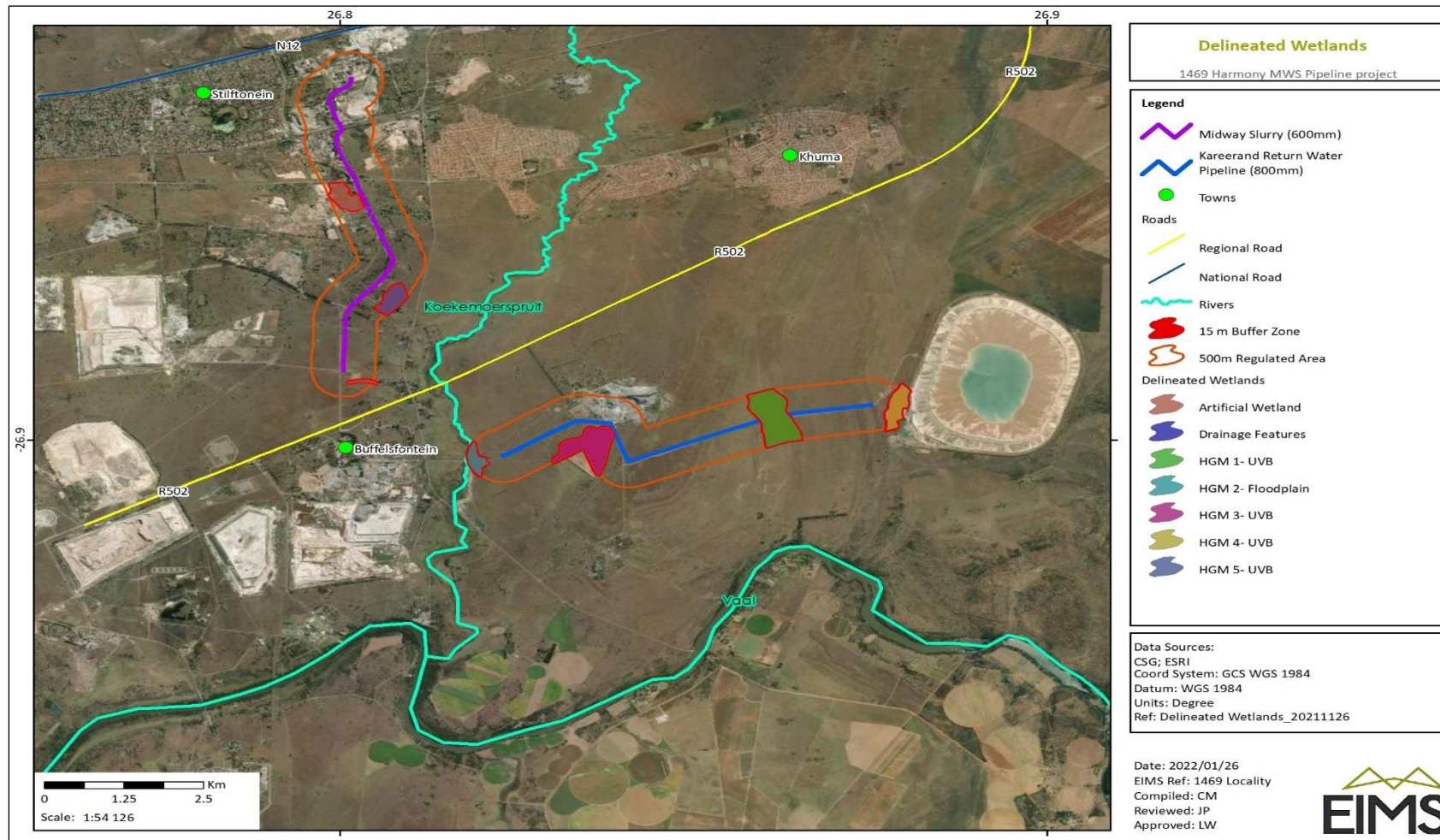


Figure 3: National wetlands located within 500 m of the regulated area.

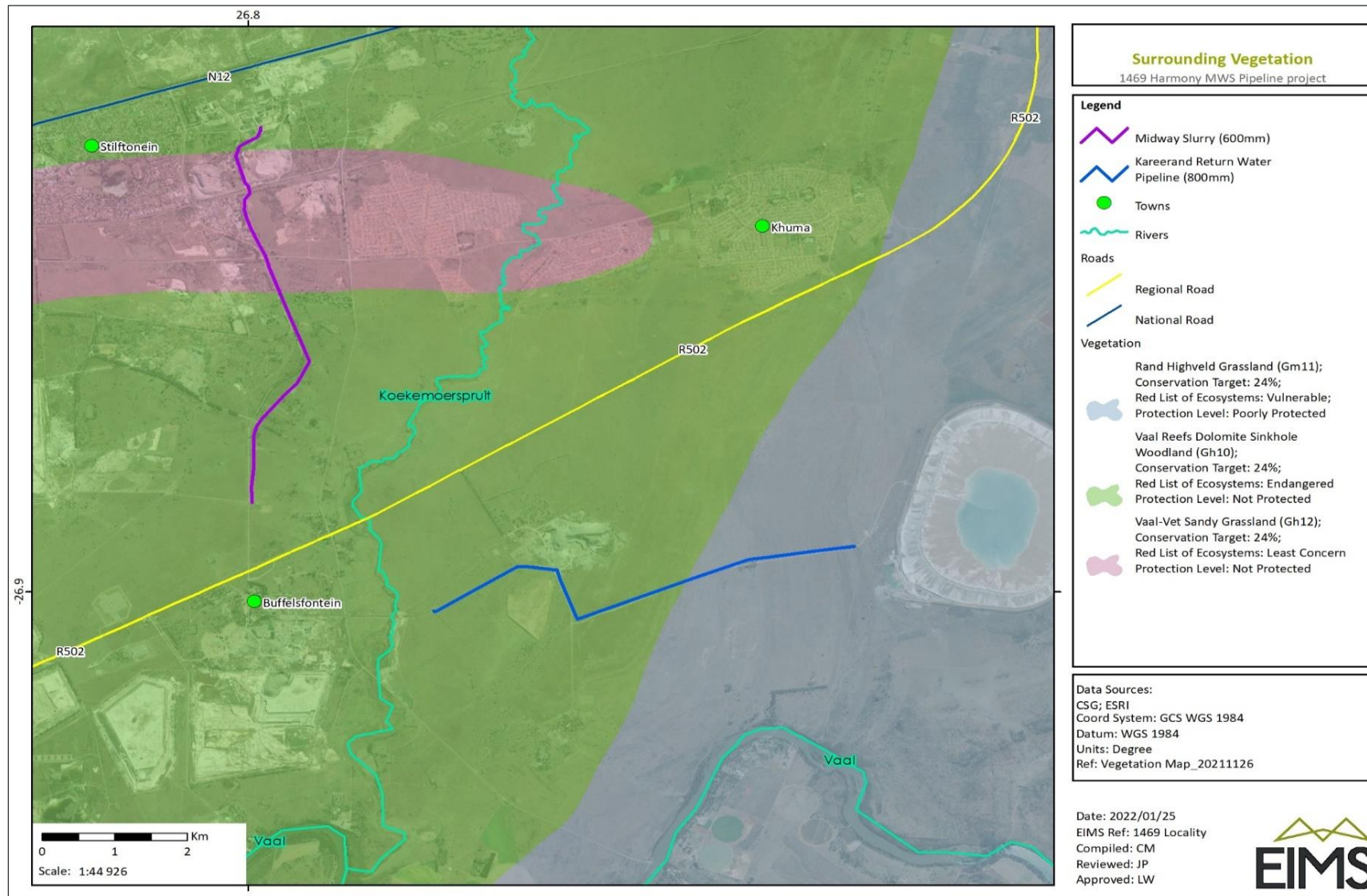


Figure 4: Map illustrating the vegetation types of the project area.



#### 6.9.2.5 ECOSYSTEM PROTECTION LEVEL AND THREAT STATUS

Ecosystem threat status outlines the degree to which ecosystems are still intact or alternatively losing vital aspects of their structure, function, and composition, on which their ability to provide ecosystem services ultimately depends (Skowno et al., 2019). Ecosystem types are categorised as Critically Endangered (CR), Endangered (EN), Vulnerable (VU) or Least Threatened (LT), based on the proportion of each ecosystem type that remains in good ecological condition (Skowno et al., 2019). The project areas were superimposed on the terrestrial ecosystem threat status as shown in Figure 5. The new slurry pipeline traverses LC and EN ecosystems, whereas the new return water pipeline traverse areas VU and LC ecosystems.

Ecosystem protection level tells us whether ecosystems are adequately protected or under protected. Ecosystem types are categorised as not protected, poorly protected, moderately protected, or well protected, based on the proportion of each ecosystem type that occurs within a protected area recognised in the Protected Areas Act (Skowno et al., 2019).

The project areas were superimposed on the ecosystem protection level map to assess the protection status of terrestrial ecosystems associated with the development (Figure 6). According to this figure, the Midway-MWS Plant slurry pipeline traverses a 'Not Protected' ecosystem, whereas the new return water pipeline traverses areas 'Not Protected and Poorly Protected' ecosystems.

According to the protected area spatial dataset from SAPAD (2021), SACAD (2021) and SAMPАЗ (2021), none of the options of the proposed development occurs within any protected area. The closest protected area, the Bushybend Private Nature Reserve is located more than 2 km south of the project area.



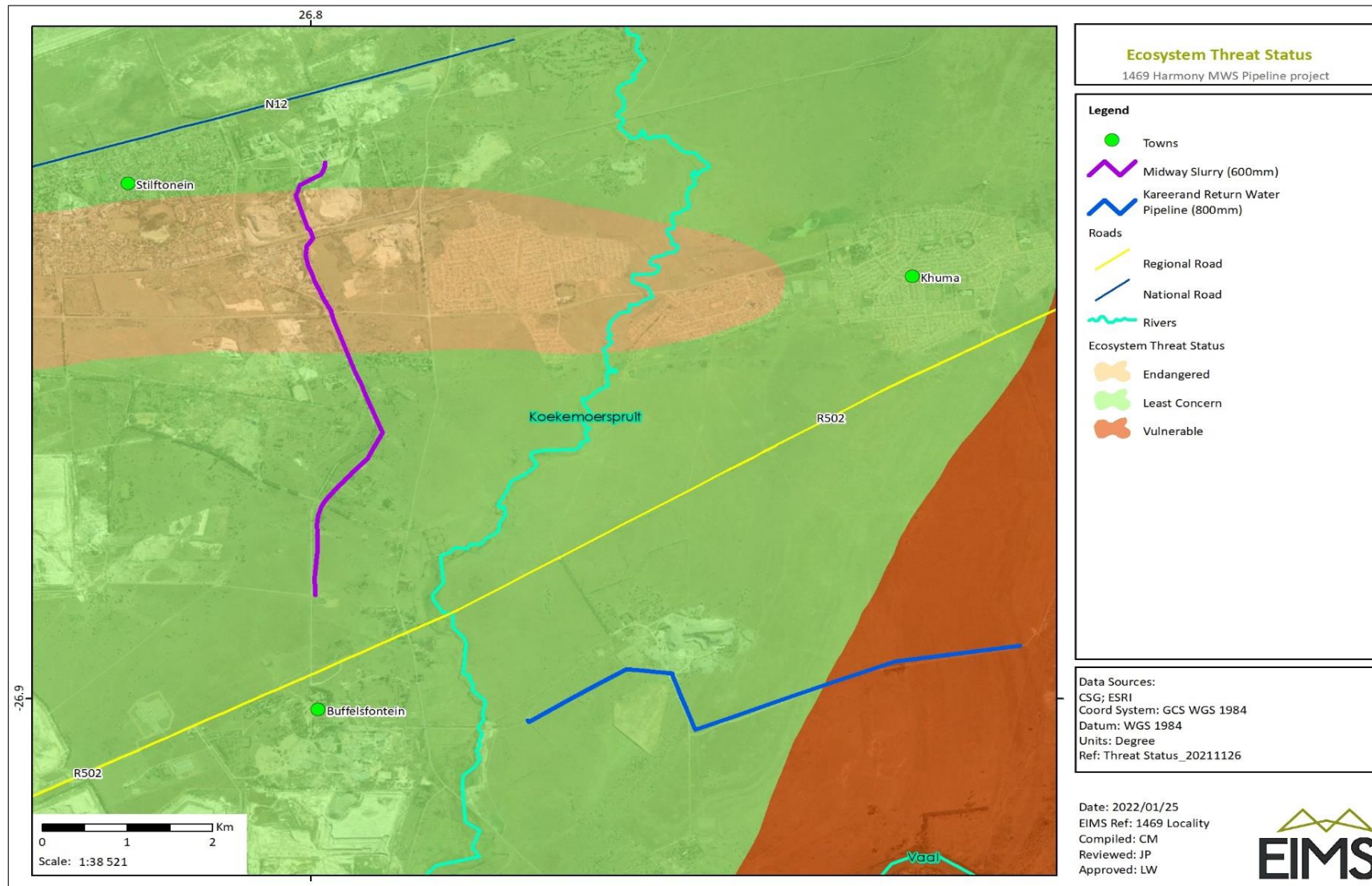


Figure 5: Map illustrating the Ecosystem Threat Status of the terrestrial ecosystem within the project area.

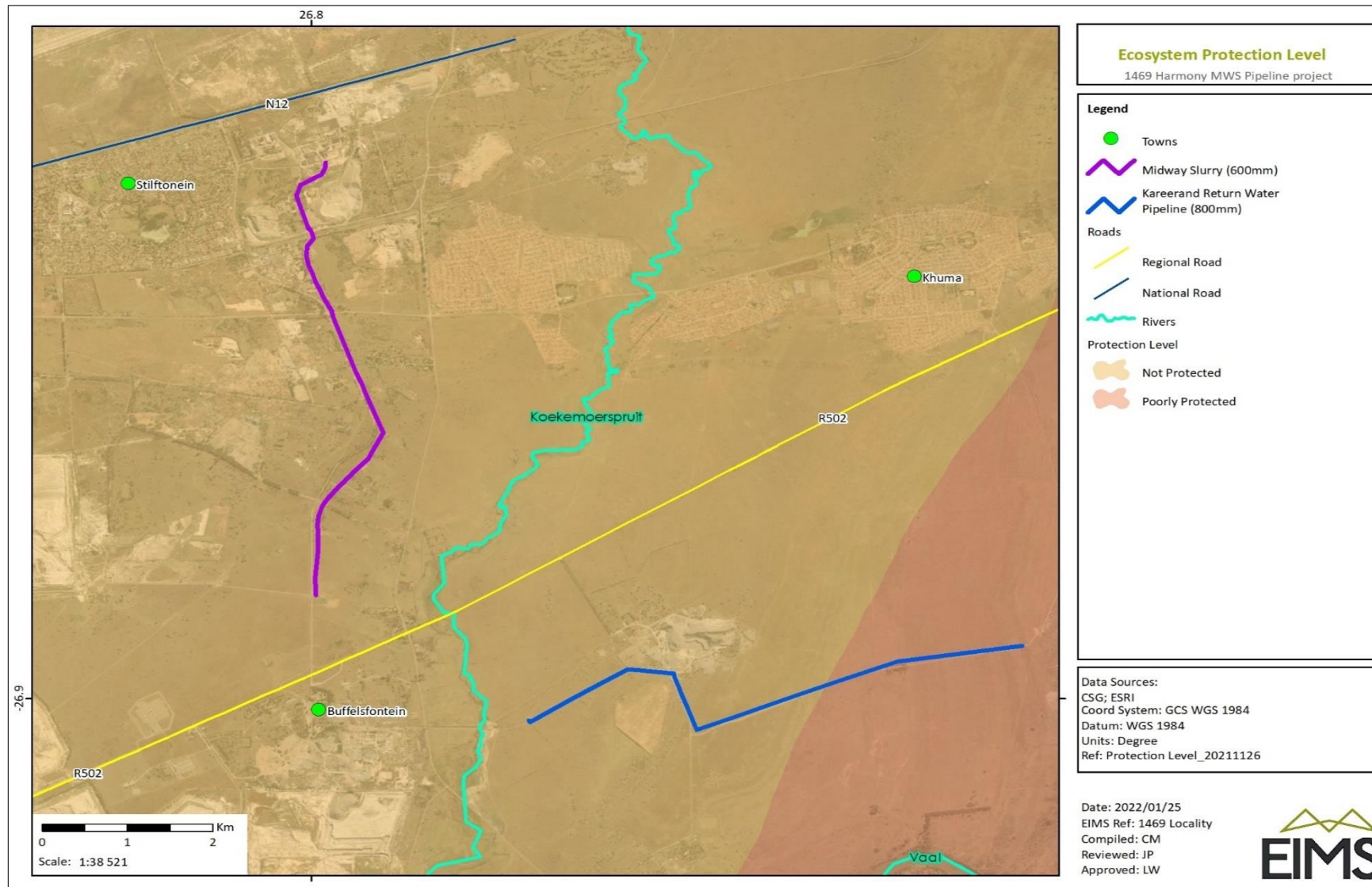


Figure 6: Map illustrating the Ecosystem Protection Level of the terrestrial ecosystem within the project area.



#### 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 areas are situated within the grassland biome. This biome is centrally located in southern Africa and adjoins all except the desert, fynbos and the 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. The 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

Invasive Alien Plants (IAPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, these plants must be controlled through an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

NEMBA is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the NEMBA. The Alien and Invasive Species Regulations were published in Government Gazette No. 43726, 18 September 2020. The legislation calls for the removal and/or control of IAP species (Category 1 species). In addition, unless authorised thereto in terms of the NWA, 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 NEMBA:

- Category 1a: Invasive species requiring compulsory control. 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.
- 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.
- Note that according to the Alien and Invasive Species Regulations, a 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 NEMBA;
  - The relevant invasive species management programme developed in terms of regulation 4; and
  - Any directive issued in terms of section 73(3) of the NEMBA.

Five invasive alien plant species were recorded within the study area. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b as well as Category 2. These IAP species must be controlled by implementing an IAP Management Programme, in compliance with section 75 of the NEMBA, as stated above.

#### 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 two archaeologists from PGS. The fieldwork was conducted on the 12<sup>th</sup> November 2021. The heritage impact assessment and desktop palaeontological impact assessment did not identify any heritage/palaeontological resources within the study area.

#### 6.9.2.9 PALAEOLOGY

The proposed project area is underlain by the Eccu Group of the Karoo Supergroup, diabase, and the following formations of the Pretoria Group (Transvaal Supergroup): Daspoort, Strubenkop, Hekpoort and Timeball Hill Formations; and the Malmani Subgroup of the Chuniespoort Group (Transvaal Supergroup). According to the Palaeontological Map of the South African Heritage Resources Information System (SAHRIS) database, the palaeontological sensitivity of the Malmani Subgroup is very high while the Eccu Group, Daspoort and Timeball Hill Formations has a high sensitivity. The Hekpoort Formation has a moderate palaeontological sensitivity while that of the Strubenkop Formation is low, and diabase has a zero palaeontological sensitivity.

During the field survey conducted on foot and by motor vehicle on the 11<sup>th</sup> of December 2021, fairly weathered stromatolite outcrops were identified on the proposed return water pipeline site. Due to preservation an overall low paleontological sensitivity is allocated to the development footprint

### 6.9.3 DESCRIPTION OF CURRENT LAND USES

The proposed return water pipeline is located approximately 7 km south-east from the town Stilfontein. The proposed slurry pipeline is located within the town Stilfontein. 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, existing pipeline and powerline servitudes as well as the Duff Scott Hospital near the slurry pipeline. 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 Buffelsfontein Gold Mine);
- Power Lines;
- Pipeline Servitudes;
- Dirt Roads or Access Roads; and the



- Duff Scott Hospital.

## 6.10 IMPACTS AND RISKS IDENTIFIED

In order to calculate the significance of an impact the probability, duration, extent, and magnitude 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 13 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 6.

Table 6: 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)   |



| Aspect                          | Score | Definition   |
|---------------------------------|-------|--|
| <b>Magnitude/<br/>Intensity</b> | 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)  |
|                                 | 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) |
| <b>Reversibility</b>            | 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)   |
|                                 | 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 7.

Table 7: 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 8: Determination of environmental risk

|             |   |   |    |    |    |    |
|-------------|---|---|----|----|----|----|
| Consequence | 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  |
| Probability |   |   |    |    |    |    |

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 9.

Table 9: 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 10: 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).   |

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 10: 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 11).

Table 11: 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 12: 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).    |
| $\geq -17, \leq -9$ | 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). |
| 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). |
| $\geq 9, \leq 17$   | 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 13.



Table 13: Positive and Negative Impacts of The Proposed Activity

| Impact  | Positive or Negative | Phase                    |
|---|----------------------|--------------------------|
| Loss and fragmentation of vegetation;                         | Negative             | Construction             |
| Erosion;  | Negative             | Construction             |
| Introduction of alien plant species;                          | Negative             | Construction             |
| Displacement of faunal community;                             | Negative             | Construction             |
| Impact on heritage resources;                                 | Negative             | Construction             |
| Impact on paleontological resources;                          | Negative             | Construction             |
| Compaction;   | Negative             | Construction             |
| Altering surface hydrology and loss of wetland functionality; | Negative             | Construction / Operation |
| Noise;  | Negative             | Construction             |
| Pollution of soils;   | Negative             | Construction / Operation |
| Pollution of surface and ground water;                        | Negative             | Construction / Operation |
| Air quality (dust);   | Negative             | Construction             |
| Interference with existing land uses;                         | Negative             | Construction / Operation |
| Waste management;   | Negative             | Construction             |
| Job Creation  | Positive             | Construction / Operation |

## 6.13 THE POSSIBLE MITIGATION MEASURES THAT COULD BE APPLIED AND THE LEVEL OF RISK

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 DMRE 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 DMRE 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 7).

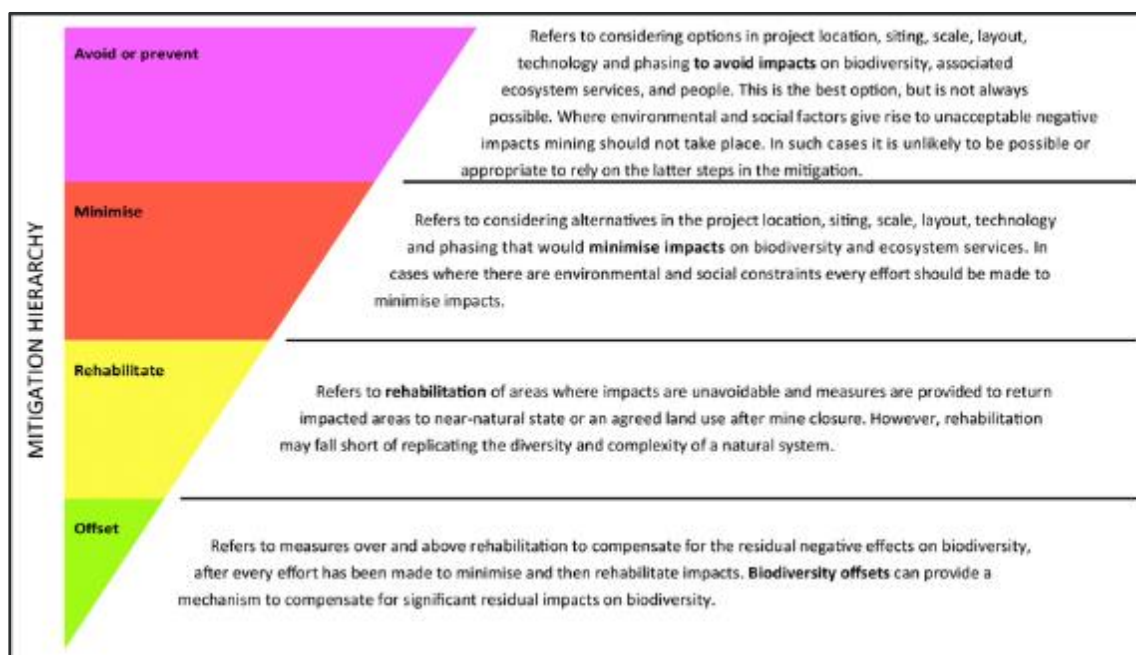


Figure 7: Mitigation hierarchy (Research Gate, 2019)

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 14 below.

Table 14: Pre- Mitigation Significance and Final Significance

| Impact  | Positive or Negative | Pre-mitigation Significance | Final Significance |
|---|----------------------|-----------------------------|--------------------|
| Loss and fragmentation of vegetation communities, habitats and ecosystems | Negative             | -12.00                      | -6.00              |
| Soil erosion and sedimentation  | Negative             | -10.00                      | -3.00              |
| Introduction and spread of alien plant species                            | Negative             | -15.00                      | -4.50              |
| Displacement of faunal community  | Negative             | -14.00                      | -5.06              |
| Impact on heritage resources  | Negative             | -3.50                       | -1.50              |
| Impact on paleontological resources                                       | Negative             | -4.50                       | -2.00              |
| Compaction  | Negative             | -12.00                      | -3.75              |
| Altering of surface hydrology/ wetland functionality                      | Negative             | -14.00                      | -8.25              |
| Noise   | Negative             | -9.00                       | -2.50              |
| Pollution of soils  | Negative             | -12.00                      | -3.50              |
| Pollution of surface and ground water                                     | Negative             | -13.00                      | -3.50              |
| Air quality (dust)  | Negative             | -10.00                      | -2.50              |



| Impact                               | Positive or Negative | Pre-mitigation Significance | Final Significance |
|--------------------------------------|----------------------|-----------------------------|--------------------|
| Interference with existing land uses | Negative             | -7.50                       | -1.25              |
| Waste management                     | Negative             | -11.00                      | -3.00              |
| Job Creation                         | Positive             | +3.00                       | +6.75              |

## 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; and
5. Finalisation of impact identification and scoring.



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

Several potential impacts were identified during the impact assessment process. Table 15 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 15: 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> </ul> | Interference with existing land uses. | <ul style="list-style-type: none"> <li>• Site Access.</li> </ul> | Construction.                        | -7.50                         | <ul style="list-style-type: none"> <li>• Site access control, limit vehicle access to only essential machinery where possible;</li> <li>• Consultation with landowners with regards to the ensuring that the necessary protective measures for people and vehicles are implemented such as road signs and any infrastructure in the area;</li> <li>• Temporary construction warning signs should be put in place to make other land and road users aware of the construction activities onsite; and</li> <li>• Interference of traffic on the local access roads by construction vehicles should be minimized.</li> </ul> | -1.25                     |



| Name of activity | Potential impact                     | Aspects affected  | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type   | Significance if mitigated |
|------------------|--------------------------------------|---|--------------------------------------|-------------------------------|---|---------------------------|
|                  | Loss and fragmentation of vegetation | <ul style="list-style-type: none"> <li>• Clearance and removal of vegetation;</li> <li>• Excavations</li> </ul> | Construction.                        | -12.00                        | <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>• Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further. Clearing of vegetation should be minimized (to plinths) and avoided where possible. Maintain small patches of natural vegetation within the construction site to accelerate restoration and succession of cleared patches. All activities must be restricted to the very low sensitivity areas. No further loss of medium sensitivity areas should be permitted. It is recommended that areas to be developed be specifically demarcated so that during the construction phase, only the demarcated areas be</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 |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|---|---------------------------|
|                  |                  |                  |                                      |                               | <p>impacted upon (Demarcation must be clearly visible and effective and the no-go area must remain demarcated throughout the construction phase);</p> <ul style="list-style-type: none"> <li>• All construction/operational and access must make use of the existing access and maintenance roads;</li> <li>• All laydown, chemical toilets etc. should be restricted to least concern sensitivity areas. Any materials may not be stored for extended periods and must be removed from the project areas once the construction/closure phase has been concluded. No permanent structures should be permitted at laydown area. No storage of vehicles or equipment will be allowed outside of the designated project areas;</li> <li>• Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood</li> </ul> |                           |



| Name of activity | Potential impact | Aspects affected | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type  | Significance if mitigated |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|--|---------------------------|
|                  |                  |                  |                                      |                               | <p>events. This will also reduce the likelihood of encroachment by alien invasive plant species;</p> <ul style="list-style-type: none"> <li>• All footprints are to be rehabilitated and landscaped after construction is complete. Rehabilitation of the disturbed areas existing in the project areas must be made a priority. Topsoil must also be utilised, and any disturbed area must be re-vegetated with plant and grass species that are endemic to this vegetation type;</li> <li>• A hydrocarbon spill management plan must be put in place to ensure that should there be any chemical spill out or over that, it does not run into the surrounding areas. The Contractor shall be in possession of an emergency spill kit that must always be complete and available on site. Drip trays or any form of oil absorbent material must be placed underneath</li> </ul> |                           |





| Name of activity | Potential impact | Aspects affected | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type  | Significance if mitigated |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|--|---------------------------|
|                  |                  |                  |                                      |                               | <p>vehicles/machinery and equipment when not in use. No servicing of equipment on-site unless necessary. All contaminated soil/yard stone shall be treated in situ or removed and be placed in containers;</p> <ul style="list-style-type: none"> <li>Leaking equipment and vehicles must be repaired immediately or be removed from the project areas to facilitate the repair.</li> <li>Storm Water discharge must be managed and restricted in such a manner that it does not cause erosion or flooding (flow paths, velocity and effects) and the water quality must be managed;</li> <li>It should be made an offence for any staff to /take bring any plant species into/out of any portion of the project areas. No plant species whether indigenous or exotic should be brought into/taken from the project areas, to prevent the spread of exotic or</li> </ul> |                           |



| Name of activity | Potential impact | Aspects affected | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type   | Significance if mitigated |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|---|---------------------------|
|                  |                  |                  |                                      |                               | <p>invasive species or the illegal collection of plants;</p> <ul style="list-style-type: none"> <li>• A fire action plan needs to be complied with and implemented to restrict the impact unplanned fires might have on the surrounding areas;</li> <li>• Limit vegetation clearance to plinths or where absolutely necessary;</li> <li>• Reduce the amount of unnecessary people and restrict vehicle access as much as possible on the property;</li> <li>• All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project areas to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and importance,</li> </ul> |                           |



| Name of activity | Potential impact                    | Aspects affected   | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type   | Significance if mitigated                                 |
|------------------|-------------------------------------|--|--------------------------------------|-------------------------------|---|---|
|                  |                                     |  |                                      |                               | biology, habitat requirements and management requirements the Environmental Authorisation and within the EMPr.  |   |
|                  | Introduction of alien plant species | <ul style="list-style-type: none"> <li>• Clearance and removal of vegetation.</li> </ul> | Construction.                        | -15.00                        | <ul style="list-style-type: none"> <li>• Implement the existing Harmony/MWS Alien Invasive Species management plan to remove existing and newly introduced alien invasive plant species;</li> <li>• The footprint area of the construction should be kept to a minimum. The footprint area must be clearly demarcated to avoid unnecessary disturbances to adjacent areas;</li> <li>• Reduce the amount of unnecessary people and restrict vehicle access as much as possible; and</li> <li>• Rehabilitate disturbed areas as soon as possible and control alien plants;</li> </ul> | -4.50   |
|                  | Displacement of faunal community    | <ul style="list-style-type: none"> <li>• Clearance and removal of vegetation</li> </ul>  | Construction.                        | -14.00                        | <ul style="list-style-type: none"> <li>• An Environmental Control Officer (ECO) that is qualified and competent within the</li> </ul>   | <ul style="list-style-type: none"> <li>• -5.06</li> </ul> |



| Name of activity | Potential impact | Aspects affected | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type  | Significance if mitigated |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|--|---------------------------|
|                  |                  |                  |                                      |                               | <p>field of environmental management must be on site when construction begins to identify faunal species that will be directly disturbed and to relocate fauna/flora that is found during the activities;</p> <ul style="list-style-type: none"> <li>• No trapping, killing, or poisoning of any wildlife is to be allowed;</li> <li>• Signs must be put up to enforce this;</li> <li>• The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna;</li> <li>• All construction and maintenance motor vehicle operators should undergo an environmental awareness training that includes instruction on the need to comply with speed limits, to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited;</li> </ul> |                           |



| 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>The areas to be developed must be specifically demarcated to prevent movement of staff or any individual into highly sensitive areas 'no go areas' outside of the project area (i.e., Nature Reserve) and the surrounding wetlands;</li> <li>Reduce the amount of unnecessary people and restrict vehicle access as much as possible on the property;</li> <li>The area must be walked through prior to construction to ensure no faunal species remain in the habitat that could potentially get killed. Should animals not move out of the area on their own relevant specialists must be contacted to advise on how the species can be relocated;</li> <li>Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian</li> </ul> |                           |



| Name of activity | Potential impact                     | Aspects affected  | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type  | Significance if mitigated |
|------------------|--------------------------------------|---|--------------------------------------|-------------------------------|--|---------------------------|
|                  |                                      |   |                                      |                               | species and nocturnal mammals; and <ul style="list-style-type: none"> <li>No trapping, killing, or poisoning of any wildlife is to be allowed.</li> </ul>  |                           |
|                  | Impact on heritage resources         | <ul style="list-style-type: none"> <li>Heritage resources</li> </ul>        | 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 Chance Find Protocol must be implemented by the ECO in charge of these developments.</li> </ul> | -1.50                     |
|                  | Impact on palaeontological resources | <ul style="list-style-type: none"> <li>Paleontological resources</li> </ul> | Construction                         | -4.50                         | <ul style="list-style-type: none"> <li>Implement chance find procedures in case where possible paleontological finds are uncovered.</li> <li>If fossil remains are discovered during any phase of construction, either on the surface or exposed by fresh excavations the Chance Find Protocol must be</li> </ul>  | -2.00                     |



| Name of activity | Potential impact   | Aspects affected   | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type  | Significance if mitigated |
|------------------|--|--|--------------------------------------|-------------------------------|--|---------------------------|
|                  |  |  |                                      |                               | implemented by the ECO in charge of these developments.  |                           |
|                  | Pollution of soils   | <ul style="list-style-type: none"> <li>Exposed and stockpiled soils</li> </ul> | Construction / Operation             | -12.00                        | <ul style="list-style-type: none"> <li>The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil, or hazardous substance spills are cleaned-up and discarded correctly;</li> <li>During construction activities, all rubble and waste generated must be removed from the site; and</li> <li>Any contaminated soils must be remediated or removed and discarded at an appropriately licensed facility.</li> </ul> | -3.50                     |
|                  | Pollution of surface water ( i.e. wetlands) and ground water | <ul style="list-style-type: none"> <li>Surface and ground water</li> </ul>     | Construction / Operation             | -13.00                        | <ul style="list-style-type: none"> <li>15 m post mitigation buffer zones should be implemented on the delineated wetlands except for the wetland through which the return water pipeline traverses (HGM 1) which cannot be avoided;</li> <li>The delineated wetlands should be demarcated and</li> </ul>   | -3.50                     |





| Name of activity | Potential impact | Aspects affected | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type   | Significance if mitigated |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|---|---------------------------|
|                  |                  |                  |                                      |                               | <p>marked as no-go areas for the duration of construction activities onsite except for HGM 1 through which the return water pipeline will traverse;</p> <ul style="list-style-type: none"> <li>• No laydown yards or parking areas are permitted within the wetland buffer zones;</li> <li>• An approved spill procedure to be followed in the event of a spillage incident must be made available onsite and all site personnel should be trained on the on proper spill clean-up measures.</li> <li>• The contractors used for the construction should have spill kits available prior to construction to ensure that any fuel, oil, or hazardous substance spills are cleaned-up and discarded correctly; and</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</li> </ul> |                           |



| Name of activity | Potential impact                 | Aspects affected  | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type   | Significance if mitigated |
|------------------|----------------------------------|---|--------------------------------------|-------------------------------|---|---------------------------|
|                  |                                  |   |                                      |                               | pipeline, leakages should be reported immediately to prevent pollution of the surrounding environment.  |                           |
|                  | Impact on air quality from dust. | <ul style="list-style-type: none"> <li>Clearance of vegetation</li> </ul> | Construction.                        | -10.00                        | <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 especially. This may include wetting of exposed soft soil surfaces, adhering to speed limits and not conducting activities on windy days which will increase the likelihood of dust being generated;</li> <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 standard of the National Environmental Management: Air Quality Act must be complied with (GNR 1210 of December 2009), specifically</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 |
|------------------|------------------|---|--------------------------------------|-------------------------------|--|---------------------------|
|                  |                  |   |                                      |                               | <p>pertaining to particulate matter (PM10);</p> <ul style="list-style-type: none"> <li>On completion of the construction all exposed soil must be re-vegetated preferably with indigenous vegetation; and</li> <li>Dust suppression measures such as wetting of exposure soil must be undertaken frequently.</li> </ul>  |                           |
|                  | Noise.           | <ul style="list-style-type: none"> <li>Removal of Vegetation</li> </ul>                     | Construction.                        | -9.00                         | <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> | -2.50                     |
|                  | 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 stored effectively;</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, mixes 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 pumped dry to ensure the system does not degrade over time and spill into the surrounding area;</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 emptied and secured 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, offices etc.;</li> <li>During construction activities, all rubble and waste</li> </ul> |                           |



| Name of activity | Potential impact | Aspects affected | Phase in which impact is anticipated | Significance if not mitigated | Mitigation type   | Significance if mitigated |
|------------------|------------------|------------------|--------------------------------------|-------------------------------|---|---------------------------|
|                  |                  |                  |                                      |                               | <p>generated must be removed from the site;</p> <ul style="list-style-type: none"> <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 spills and leaks and general good “housekeeping;”</li> <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 dumping of construction material on site may take place; and</li> <li>• All waste generated on site during construction must be adequately managed. Separation and recycling 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 |
|------------------|------------------|--|--------------------------------------|-------------------------------|---|---------------------------|
|                  |                  |  |                                      |                               | different waste materials should be supported.  |                           |
|                  | Erosion.         | <ul style="list-style-type: none"> <li>Clearing of vegetation to facilitate the pipeline installation</li> </ul> | Construction                         | -10.00                        | <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>   | -3.00                     |
|                  | Compaction.      | <ul style="list-style-type: none"> <li>Vehicle and machinery access to servitude</li> </ul>                      | Construction /Operational            | -12.00                        | <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, offices etc.;</li> <li>Construction vehicles and machinery must make use of existing access routes; and</li> <li>Where possible, compacted areas must be ripped and revegetated at the end of the construction phase.</li> </ul> | -3.75                     |







## 9 SUMMARY OF SPECIALIST REPORTS

Various specialists that were appointed to undertake the specialist assessments for the application area. Table 16 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:

- Terrestrial Ecology and Wetland Assessment – The Biodiversity Company;
- Heritage Impact Assessment – PGS Heritage; and
- Palaeontological Impact Assessment – Benzai Environmental.

Table 16: Summary of Specialist Findings

| Specialist study undertaken | Recommendations of Specialist Report  | Reference to the applicable section of the Report where Specialist recommendations have been included. |
|-----------------------------|---|--|
| Heritage Impact Assessment  | <p>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.</p> <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><li>• Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner/archaeologist.</li></ul> | Sections 8   |



| Specialist study undertaken              | Recommendations of Specialist Report   | Reference to the applicable section of the Report where Specialist recommendations have been included. |
|--|--|--|
| <b>Paleontological Impact Assessment</b> | <p>The Paleontological Desktop Assessment (PDA) undertaken indicated that the paleontological potential of the underlying geology is of low significance.</p> <p>During the field survey conducted on foot and by motor vehicle, fairly weathered stromatolite outcrops were identified on the proposed return water pipeline site. Due to preservation an overall low paleontological sensitivity is allocated to the development footprint. It is therefore considered that the proposed development is deemed appropriate and will not lead to detrimental impacts on the paleontological reserves of the area. It is recommended that no further paleontological heritage studies, ground truthing and/or specialist mitigation are required pending the discovery of newly discovered fossils.</p> <p>Should well preserved fossil remains be discovered during excavations, it is recommended that the chance find procedure must be implemented by the ECO/ site manager in charge of these developments. Such discoveries should be protected and reported to SAHRA so that appropriate mitigation can be conducted by a paleontologist. The paleontological specialist recommended the following chance find procedure:</p> <ul style="list-style-type: none"> <li>• If a chance find is made the person responsible for the find must immediately stop working and all work that could impact that finding must cease in the immediate vicinity of the find.</li> <li>• The person who made the find must immediately report the find to his/her direct supervisor which in turn must report the find to his/her manager and the ECO or site manager. The ECO or site manager must report the find to SAHRA. The information to the SAHRA must include photographs of the find, from various angles, as well as the GPS co-ordinates.</li> <li>• A preliminary report must be submitted to the SAHRA within 24 hours of the find and must include the date of the find, a description of the discovery and a description of the fossil and its context (depth and position of the fossil), GPS co-ordinates.</li> <li>• Photographs (the more the better) of the discovery must be of high quality, in focus, accompanied by a scale. It is also important to have photographs of the vertical section (side) where the fossil was found.</li> </ul> | <p>Section 8</p>   |



| Specialist study undertaken                       | Recommendations of Specialist Report  | Reference to the applicable section of the Report where Specialist recommendations have been included. |
|---|---|--|
| <b>Terrestrial Ecology and Wetland Assessment</b> | <p>The shapefiles received and the site visit along with the client interaction undertaken during the Terrestrial Assessment indicated that:</p> <ul style="list-style-type: none"> <li>Both the Kareerand return water pipeline and Midway slurry pipeline will be laid along the existing pipeline in the existing servitude which has been transformed already. Thus, both project areas can be considered transformed and significantly degraded due to alien invasive plant infestation of the existing pipeline and service roads as well as ongoing human disturbance.</li> <li>The vegetation and ecology within the proposed pipeline areas have been heavily disturbed for a long time, both currently and historically. No significant patches of intact natural vegetation remain within the project areas. Terrestrial botanical diversity within the project areas is very low.</li> <li>The temporary alteration of vegetation and soil structure in the affected areas of the proposed Kareerand return water pipeline as well as the Midway slurry pipeline may however still impact the fauna and flora directly within the proposed pipeline alignments/servitudes and potentially in the immediate surrounding area. It is recommended that minimal vegetation clearance and disturbances must occur along the proposed pipeline routes. Vegetation clearance should be restricted to the pipeline servitude especially within the existing access roads/maintenance roads and areas that are already denuded of vegetation within the pipeline servitude. Hence, both the pipelines are seen as acceptable from an ecological perspective. The proposed project would have an overall low negative impact.</li> <li>Although no Species of Conservation Concern (SCC) species were recorded within the project area, <i>Vachellia erioloba</i>, a nationally protected tree species, occurs close to the proposed Kareerand return water pipeline route and care must be taken not to remove or disturb these trees (National Forest Act, Act 84 of 1998). It must be also noted that the two project areas are highly infested with alien invasive plant species which could easily spread with more disturbance, thus the proponent is advised to address this before the developments to ensure no further spread.</li> </ul> <p>According to the wetland assessment undertaken Five wetland systems were identified within the 500 m regulated area, of which four have been classified as unchanneled</p> | <p>Sections 8</p>  |



| Specialist study undertaken | Recommendations of Specialist Report  | Reference to the applicable section of the Report where Specialist recommendations have been included. |
|-----------------------------|---|--|
|                             | <p>valley bottom wetlands and one being classified a floodplain. These systems have been determined to range from “Largely Modified” to “Seriously Modified” with the average ecosystem service scores being scored “Moderately Low” to “Moderately High.” The importance and sensitivity of these systems have been scored “Low” and “Moderate” with the calculated buffer determined to be 15 m. The associated risks posed to wetlands could be mitigated to an appreciable level, posing a “low” post-mitigation risk to the wetlands. Considering the “Low” post-mitigation significance ratings, a General Authorisation is permissible for the project.</p> <p>A hydropedological component was included in this assessment to ensure a holistic understanding of the hillslope hydrology and potential impacts towards the vadose zone properties. The entire hillslope is characterised by the interflow (between soil and bedrock) hydropedological type in the form of the Westleigh and Longlands soil form besides the main receptor (wetlands), which are characterised by a responsive hydropedological type (mainly Katspruit). However, that the proposed pipeline will not have any effect on the hillslope hydrology or vadose zone properties of the relevant hillslope. Therefore, zero percent loss of total moisture content to the depression is expected</p> |  |



## 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:

- Majority of the impacts had a medium rating prior to mitigations, which were then decreased to low-negative once mitigations are implemented.
- The proposed installation of the pipeline has the potential to impact negatively on the surrounding environment and properties it will transverse. However, impact assessments conducted by the EAP and specialists concluded that the foreseeable impacts can be mitigated 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.
- The PIA identified weathered stromatolite outcrops on the return water pipeline. However, due to preservation an overall low paleontological sensitivity has been allocated to the project area. Paleontological chance finds are possible during construction phase. Impacts on the finds can be mitigated through implementation of the proposed Paleontological Chance Find Procedure.
- The Terrestrial assessment indicated that both pipelines will be installed along areas that are transformed and significantly degraded by high alien invasive plant infestation and ongoing human disturbance. The vegetation and ecology of the pipeline areas has been disturbed for a long time and therefore, terrestrial biodiversity of the project areas is very low. It was concluded that the proposed project would have an overall all low negative impact and is seen as acceptable from an ecological perspective. No species of conservation concern were identified in the project area, however, *Vachellia erioloba*, a nationally protected tree species, occurs close to the proposed Kareerand return water pipeline route and care must be taken not to remove or disturb these trees.
- The Wetland assessment identified five (5) wetland systems within the 500m regulated area, it was determined that these systems range from largely to seriously modified with the average ecosystem service scores moderately low to moderately high. The importance and sensitivity of the systems is low and moderate. It has been concluded that the associated risks posed to wetlands could be mitigated to an appreciable level, posing a “low” post-mitigation risk to the wetlands. Considering the “low” post-mitigation significance ratings, a General Authorisation is permissible for the project. This explanation is also emphasised by the hydrogeological component which suggests that no impacts are foreseen and that a zero percent loss of moisture to the depression is expected.

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 sensitive areas is shown in Figure 8 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 five delineated hydrogeomorphic (HGM) units within the



500 m regulated area, which have all been classified as unchanneled valley bottom (UVB) wetlands except for HGM 2, which has been classified as a floodplain wetland. Of the delineated wetlands, only one wetland system is expected to be impeded on by the proposed return water pipeline.



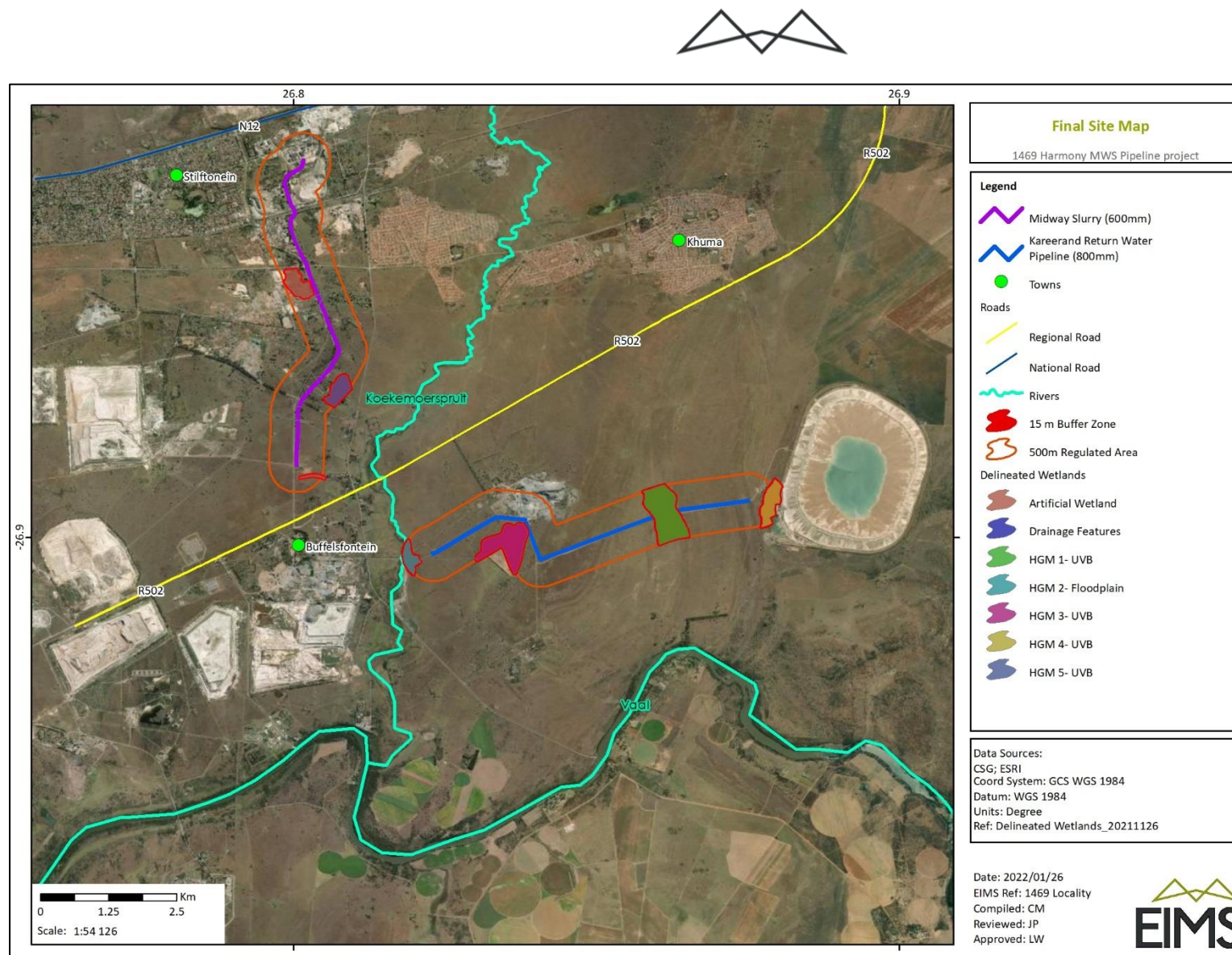


Figure 8: Delineation of natural wetlands (including buffers) within 500 m of the project area - final site layout map





### 10.3 SUMMARY OF POSITIVE AND NEGATIVE IMPLICATIONS AND RISKS

The proposed 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; altering surface hydrology; soil, surface and groundwater pollution; noise; dust; waste management challenges among others.

A positive impact of the proposed additional pipelines is the increase of pumping rates and volume of return water (main source of water) from Kareerand TSF to the reclamation pump stations, reduced need for additional top-up water, meeting and sustaining of the planned LOM production rates, 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 13.

## 11 PROPOSED IMPACT MANAGEMENT OBJECTIVES AND OUTCOMES

The management objective is to minimise the socio-economic, cultural, heritage, biodiversity, and palaeontological 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 these 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 impairment;
- 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;
- Landowners and occupiers should be consulted prior to and during the construction and installation of the pipeline; and
- 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 specialist studies and these are detailed for each aspect below.

- Wetland Impact Assessment:
  - Time constraints limited a wet season survey, but this was deemed enough for this level of assessment;
  - The exact design and specifications were not made available, as such assumptions were made by referring to standard features;
  - The wetlands within the project areas were the focus of the assessment, these systems were ground-truthed and further assessed. Wetland areas beyond the project areas but within the 500 m regulated area not considered to be at any appreciable level of risk were only considered at a desktop level; and
  - The GPS used for delineations is accurate to within five meters. Therefore, the wetland delineation plotted digitally may be offset by at least five meters to either side.
- Heritage Impact Assessment
  - Not detracting in any way from the comprehensiveness of the research undertaken, it is necessary to realise that the heritage resources located during the desktop research and fieldwork do not necessarily represent all the possible heritage resources present within the



area. Various factors account for this, including the subterranean nature of some archaeological sites, as well as the dense vegetation cover and disturbance found in some areas; and

- Such observed or located heritage features and/or objects may not be disturbed or removed in any way until such time that the heritage specialist has been able to make an assessment as to the significance of the site (or material) in question. This applies to graves and cemeteries as well.
- Palaeontological Impact Assessment
  - The accuracy of the Desktop Impact Assessment (DIA) is reduced by several factors which may include the following: the databases of institutions are not always up to date and relevant locality and geological information were not accurately documented in the past. Various remote areas of South Africa have not been assessed by palaeontologists and data is based on aerial photographs alone. Geological maps concentrate on the geology of an area and the sheet explanations were never intended to focus on palaeontological heritage; and
  - Similar Assemblage Zones, but in different areas is used to provide information on the presence of fossil heritage in an unmapped area. Desktop studies of similar geological formations and Assemblage Zones generally assume that exposed fossil heritage is present within the development area.

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

The section below gives a reasons on why the activity should be authorised as well as conditions which 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 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 UNDERTAKING

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 19 for the signed undertakings.

## 17 FINANCIAL PROVISION

Financial provision for the rehabilitation of the MWS pipeline project will be included in the Final Report to be submitted to DMRE.

## 18 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<br>(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.<br><br>Both the City of Matlosana Local Municipality and Dr Kenneth Kaunda District 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<br><br>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.<br><br>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, 6.13 and 8.<br><br>Sections 6.10, 6.11, 6.12 6.13 and 8 identifies potential impacts and risks,  |



| Sub-Section Reference  | Applicable legislation under section 24 (4)(A) and (B) of the NEMA   | Reference Where Applied<br>(i.e., where in this document has it been explained how the development complies section 24 (4))   |
|--|--|---|
|  |  | outlines the impact assessment methodology applied and presents the potential positive and negative impacts associated with the project, respectively. Section 8 presents the impact assessment for the identified impacts.   |
| <b>24 (a) (v)</b>  | 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.<br><br>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> |  |   |
| <b>24 (b) (i)</b>  | 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.<br><br>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.<br><br>Section 6.10 investigates the potential impacts of the proposed activity. |
| <b>24 (b) (ii)</b>   | investigation of mitigation measures to keep adverse consequences or impacts to a minimum  | Refer to Section 6.13. and Appendix D.<br><br>Section 6.13.provides possible mitigation measures for the potential impacts for each activity.<br><br>Specialist Assessments are included in Appendix D.<br><br>Mitigation measures are included in Appendix H.  |
| <b>24 (b) (iii)</b>  | 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.<br><br>Impacts in terms of the National Heritage Resources Act, 1999 are assessed in Section 8.<br><br>The HIA is included in Appendix D.  |



| Sub-Section Reference | Applicable legislation under section 24 (4)(A) and (B) of the NEMA   | Reference Where Applied<br>(i.e., where in this document has it been explained how the development complies section 24 (4)) |
|-----------------------|--|---|
| <b>24 (b) (iv)</b>    | reporting on gaps in knowledge, the adequacy of predictive methods and underlying assumptions, and uncertainties encountered in compiling the required information   | Refer to Section 13.<br><br>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 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.  |



## 19 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: 01/02/2022



I, **Sinalo Matshona**, 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: 01/02/2022





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