

## DRAFT ENVIRONMENTAL MANAGEMENT PROGRAMME INFORMATION

<b>PROJECT:</b>	<b>MARIEVALE PROJECT</b>
<b>Report Title:</b>	Draft Environmental Management Programme Report: Marievale Project in Johannesburg, Gauteng Province.
<b>Applicant:</b>	Ergo Mining (Pty) Limited
<b>Project No:</b>	DRDG#005
<b>Compilation Date:</b>	19 March 2020
<b>Status of Report:</b>	<b>Draft EIA and EMP reports for Public and Authority review</b>

VERIFICATION	CAPACITY	NAME	SIGNATURE	DATE
<b>By Author</b>	The EAP	Ashleigh Blackwell		19 March 2020
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## SECTION 1:

### EXTRACTED FROM THE ENVIRONMENTAL IMPACT ASSESSMENT

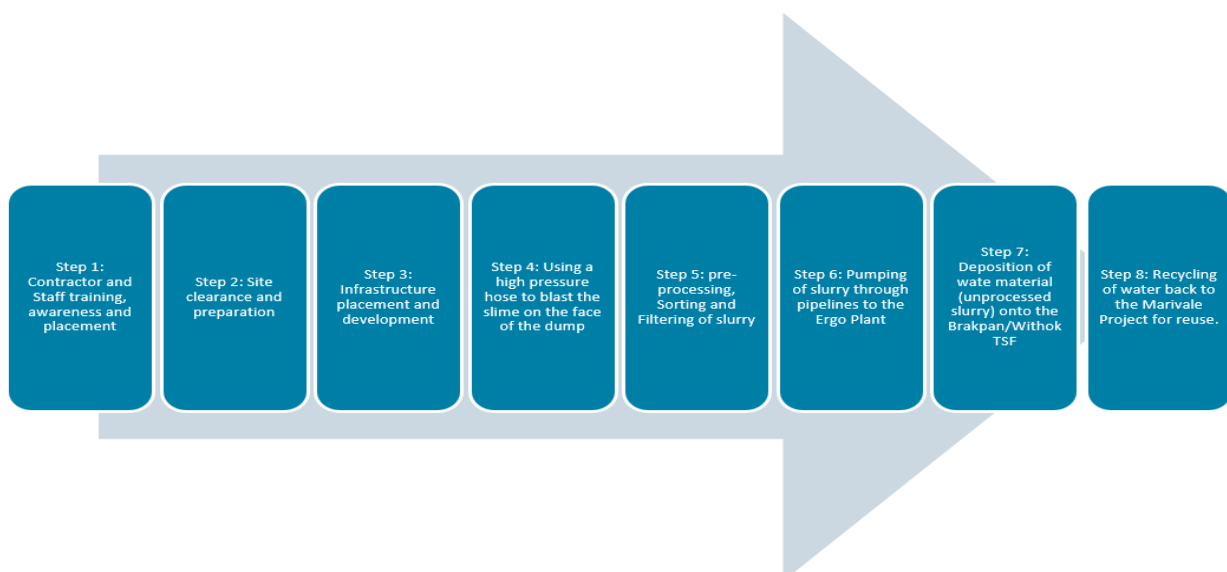
**Kongiwe Environmental (Pty) Ltd** ('Kongiwe') has been appointed as the Independent Environmental Service Provider, tasked with conducting the Scoping and Environmental Impact Assessment (S&EIA) process which is aimed at critically evaluating the potential environmental and social impacts of the proposed **Marievale Project** (hereafter the Proposed Project).

The Application for Environmental Authorisation was submitted to the Department of Mineral Resources and Energy (DMRE), the Competent Authority (CA), on Tuesday, 15 October 2019. The Draft Scoping Report (DSR) was made available for public review from 23 October 2019 to 21 November 2019. The Final Scoping Report (FSR) was submitted to the DMRE for its consideration and comment on the 28 November 2019.

The CA 43-day review and decision making period on the FSR ran until 31 January 2020. Acceptance of the Scoping Report was received by the DMRE on the 27 January 2020.

#### Project Intentions

Ergo Mining (Pty) Limited (hereafter Ergo) intends to reclaim and reprocess gold residues from the Marievale tailings storage facilities (TSFs) Nos. 7L5, 7L6 and 7L7. These TSFs are historical mineral deposits (slimes dams), situated approximately 6 km north-east of Nigel and 10 km south-east of Springs, in the Ekurhuleni Metropolitan Municipality (EMM). These TSFs were created prior to the promulgation of the Mineral and Petroleum Resources Development Act, 2002 (Act No 28 of 2002) (MPRDA) and are accordingly not regulated by the MPRDA. Ergo intends to conduct the project in accordance with the summary flow diagram below:



**Figure 1-1: A short summary of the Proposed Project Process**

Before reclamation can commence, the sites will be prepared to prevent unwanted material from being screened and blended with slurry. Suitable aggregate will be stockpiled and there is a possibility for cleared vegetation to be sold locally and where this is not possible, disposed of at a licenced facility.

A baseline radiological assessment will be undertaken by a registered professional once the site has been cleared of vegetation. Temporary and mobile (park homes) site infrastructure will be established either at the reclamation sites with existing connections to the power grid and potable water sources. As part of construction and site preparation activities, the existing Marievale paddocks and stormwater systems will be upgraded/reinstated for capturing and managing dirty water around site.

Once site preparation and construction is completed, hydraulic reclamation can begin. To excavate unconsolidated tailings material within the TSFs, a high pressure hose (or cannon) will be directed onto the face of the dump. Reclamation will take place in predetermined benches (or 'cuts') and will move unidirectionally until the entire dump has been reclaimed. Generally, 30 m – 40 m cuts are made as reclamation progresses. The water from the hose mixes with the tailings and forms a slurry with a high solids content. The slurry then flows under gravity, along the base of the TSF, to a collection sump which is positioned at the lowest elevation of the bench being mined. The collection sump is then able to filter and screen appropriately sized slurry, and direct this into pipelines which will pump the slurry to the Ergo Plant for gold recovery. Residual slurry will then be pumped to the licenced Brakpan/Withok TSF. The water which accumulates atop the Brakpan/Withok TSF will be pumped and reused for this project, as well as other Ergo operations.

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### **Project Rehabilitation and Future Land use**

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Once reclamation is completed, the project will be decommissioned. During this phase, all project infrastructure will be removed and a final radiological survey will be undertaken, after which rehabilitation can commence. The rehabilitation should invariably be evaluated in view of the future land use. If redevelopment is not proposed, it may still be necessary to carry out work on land to guard against future liability. Thus, it is the primary aim of rehabilitation, in the context of this document, to:

- ❖ Reduce the actual or potential environmental threat.
- ❖ Reduce the potential risks so that unacceptable risks identified in this EIA are reduced to acceptable levels.
- ❖ Protect the future liability of the land by re-establishing a sustainable land use as close to, or similar, to its pre-mining condition.

Kongiwe's preferred end land use is recommended as to be the extension of the Marievale Bird Sanctuary and the Blesbokspruit wetland, however, this would be at the discretion of the end landowner. To achieve this preferred end land use, the land will be levelled, and remnants of contaminated slime removed. Infiltration and dust generation will be minimised by planting of the soil with appropriate plant/grass species. Lastly, paddocks will remain as a short-term method of containing the surface migration of contaminants into the Blesbokspruit and will be removed once rehabilitation has proven to be successful. Since the TSFs lie within close proximity to the wetland system, it is expected that the flat lying areas directly adjacent to the

Blesbokspruit will fill with water once again, thereby extending the Marievale Bird Sanctuary and contributing to ecological success and sustainability.

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## Project Background and Motivation

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The following points below summarise the project motivations:

- ❖ Ergo makes use of sophisticated metallurgical processes which make it viable to retreat the historic Marivale TSFs and extract the residual gold, having retreated millions of tonnes of material since its inception in December 1977. With the upturn of the gold price, the grade in the Marivale TSFs has become economically viable to exploit. Although gold will be the main mineral prospected for, the concentrations of uranium, nickel and silver will also be investigated in conjunction with the availability of stone, gravel and waste rock.
- ❖ Although there is a strong economic case for the project, the removal of these dumps also forms part of DRDGOLD Limited's broader strategy to clean-up and remove the remaining dumps across Gauteng and contain them in two mega facilities known as the Brakpan/Withok TSF and the Regional TSF (RTSF – still to be constructed). It is envisioned that the Brakpan/Withok TSF will hold tailings retreated and removed on the East Rand, and the RTSF will hold tailings treated and removed on the West Rand.
- ❖ Ergo Mining will align to the National Environmental Management Act (Act 109, 1998) EIA Regulations, in accordance with the One-Environmental system for the reclamation of historic mine residue tailings.
- ❖ Ergo intends to remove a historic pollution point-source and rehabilitate the land to a state that is sustainable, functioning and represents a pre-mining landscape.

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## Project Alternatives

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The following sections below provide a short summary of the project alternatives that were assessed within this EIA.

### **The location of the proposed project:**

The Proposed Project is the reclamation of already existing TSFs (7L5, 7L6 and 7L7). Therefore, there can be **no alternative sites**

### **The type of activity to be undertaken:**

The only optional activity for Ergo is to reclaim and reprocess the existing Marievale TSFs. Therefore, there can be **no alternative activities undertaken by Ergo.**

### **The technology to be used:**

The reclamation of the Marievale TSFs is the “Preferred Activity” and there are no alternatives. The dumps will be reclaimed using **Hydraulic Mining**.

### **The Design and Layout of the Activity**

The current layout plan alternatives for the Proposed Project are considered as the preferred layout plan. The layout plan is dictated by independent specialist study recommendations, the existing location of the TSFs, their associated infrastructure and the routes of the proposed pipelines. The routes of these pipeline are limited to existing surface right permits (SRPs) that are held by Ergo. Where Ergo does not hold an SRP, a new servitude, right of way or wayleave will be sought.

### **Operational Alternatives:**

Two pipeline route alternatives are being considered for the transportation of slurry and return water:

- ❖ **Alternative 1:** Marievale TSFs are reclaimed, and slurry is transported through two new, 600 mm diameter, pipelines from the lowest point at 7L7 running north to the old Daggafontein Plant which is about 7 km north-west of the dumps. Thereafter, the slurry is transported a further 17 km to the Ergo Plant for reprocessing. Final residue deposition will take place at the Withok/Brakpan TSF.
- ❖ **Alternative 2:** Marievale TSFs are reclaimed and slurry is transported via two new 19 km, 600 mm diameter, pipelines from the lowest point at 7L6 running south to the Ergo Plant for reprocessing. Residue deposition will also take place at the Withok/Brakpan TSF.

Two locations for temporary site infrastructure will be assessed:

- ❖ **Alternative 1:** Temporary site administration, ablution and contractors’ yard to be located at the Marievale TSFs. Grid connection and portable water connection would need to be established.
- ❖ **Alternative 2:** Temporary site administration, ablution and contractors’ yard to be located at the Daggafontein TSF. Grid connection and portable water connection would not need to be established

In terms of water make-up and process water use, Ergo will make use of its Centralised water distribution system to recycle process water in a closed circuit. Where water makeup is required, this would be from TCTA, the Strubenvale Water Treatment Plant (WTP) or other sources.

### **The No-Go Alternative:**

The Option of the project not proceeding would mean that the environmental and social status would remain the same as current. This implies that both negative and positive impacts would not take place. As such, the short-term negative impacts on the environment would not transpire; equally so, the long term positive impacts such as environmental pollution source removal, economic development, skills development, and the availability of land for re-development would not occur.

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## **Environmental Impacts of the Marievale Project**

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The table overleaf represents a summary of the significance of impacts identified during the project lifetime for each environmental aspect. Impacts are expected to occur predominantly during the construction and operation phases, and to a lesser extent during decommissioning and post-decommissioning. Post decommissioning, the following positive benefits are expected:

- ❖ Job Security for staff and contractors currently contracted or employed by Ergo;
- ❖ Skills Development for those employed for the project;
- ❖ Economic growth and contribution to the economy;
- ❖ Improved surface water quality over time;
- ❖ Improved groundwater quality over time; and
- ❖ Improved ecosystem health and functioning over time

#### Risk Matrix of Assessed Project Impacts

IMPACT	RATING PRE-MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING	RATING POST MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING
Positive (+)	Major (high)				❖ Monitoring	Major (high)	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved aquifer yield</li> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Economic growth</li> <li>❖ Amelioration of flooding potentially</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved aquifer yield</li> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Economic growth</li> <li>❖ Amelioration of flooding potentially</li> </ul>
Positive (+)	Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ Job Security</li> <li>❖ Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>			Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Improved water quality and drinking water</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved water quality and drinking water</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved surface water quality</li> <li>❖ Improved groundwater quality</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved surface water quality</li> <li>❖ Improved groundwater quality</li> </ul>
Positive (+)	Minor (low)					Minor (low)			<ul style="list-style-type: none"> <li>❖ Improved ecosystem health and functioning</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improved ecosystem health and functioning</li> </ul>
No Impact	No Impact					No Impact				
Negative (-)	Minor (low)	<ul style="list-style-type: none"> <li>❖ Groundwater quality impacts</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Groundwater quality impacts</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>			Minor (low)	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Blesbokspruit</li> <li>❖ Water Quality impacts</li> <li>❖ Groundwater quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement patterns</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Blesbokspruit</li> <li>❖ Water Quality impacts</li> <li>❖ Groundwater quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement patterns</li> <li>❖ Traffic, congestion and impacts damage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Encroachment of alien species</li> <li>❖ Faunal mortalities</li> <li>❖ Safety impacts for community members and employees</li> </ul>	
Negative (-)	Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Blesbokspruit</li> <li>❖ Sedimentation</li> <li>❖ Water Quality impacts</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement</li> </ul>	<ul style="list-style-type: none"> <li>❖ Biodiversity Impacts</li> <li>❖ Flow Modification of the Blesbokspruit</li> <li>❖ Sedimentation</li> <li>❖ Water Quality impacts</li> <li>❖ Destruction of historical structures</li> <li>❖ Disruption of daily movement</li> </ul>	<ul style="list-style-type: none"> <li>❖ Encroachment of alien species</li> <li>❖ Faunal mortalities</li> <li>❖ Safety impacts for community members and employees</li> </ul>		Moderate (medium)	<ul style="list-style-type: none"> <li>❖ Direct Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Sedimentation</li> <li>❖ Air quality impacts</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>	<ul style="list-style-type: none"> <li>❖ Direct Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Sedimentation</li> <li>❖ Air quality impacts</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>		

IMPACT	RATING PRE-MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING	RATING POST MITIGATION	CONSTRUCTION	OPERATION	DECOMMISSIONING	POST DECOMMISSIONING
		patterns	patterns							
Negative (-)	Major (high)	<ul style="list-style-type: none"> <li>❖ Direct Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Air quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>	<ul style="list-style-type: none"> <li>❖ Direst Loss of Wetlands</li> <li>❖ Contamination of watercourse</li> <li>❖ Air quality impacts</li> <li>❖ Impact on cemetery</li> <li>❖ Impact on possible graves</li> <li>❖ Safety Impacts (including traffic safety impacts)</li> <li>❖ Increased Traffic</li> </ul>			Major (high)				



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## Conclusions

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An impact assessment has been undertaken using qualified specialists, which has incorporated extensive consultation with and participation of interested and affected parties. Applying the hierarchical approach to impact management, alternatives were firstly considered to avoid negative impacts, but where avoidance was not possible, to better mitigate and manage negative impacts. Where impacts were found to be potentially significant, various mitigation measures to manage and monitor the impacts of the project have been proposed. As a final option, offset strategies should be investigated, if feasible.

The findings of the impact assessment have shown that the Marievale Project would conclusively result in certain negative impacts during the operational phase to the environment, however, none of the specialist studies objected to the project. Impacts are largely Moderate (negative) in significance, being mitigated to Low (negative) Significance. During the decommissioning and post-decommissioning phases, the majority of the impact are expected to be Moderate – High (positive) in significance after mitigation.

Moreover, the scientific specialist mitigations measures have been included into this EIA and EMP report to reduce the significance of all the identified negative impacts. Most of the negative impacts from the proposed project can be reduced through the implementation of mitigation measures. Based on the information contained in this report, it is the opinion of the EAP that the negative environmental impacts resulting from the Marievale Project can be mitigated to within acceptable limits and that the project should be authorised. This opinion holds provided all the recommendations proposed in the specialist studies and the EIA and EMP report as well as legislative requirements are implemented and adhered to.

The water quality in the Blesbokspruit is already impacted, and there is a possibility of temporary contamination of downstream watercourses during operation of the Marievale project. If authorised, Ergo will need to minimise such contamination by following the prescribed mitigation stipulated in this EIA / EMP, the water use licence and all relevant best practice guidelines and legislation regarding the rehabilitation of contaminated land. It is anticipated that through carefully planned reclamation efforts the Blesbokspruit could expand to a state where it represents a viable and functioning pre-mining land use.

In conclusion, the EAP is of the reasoned opinion that the **project should be authorised to proceed** provided that the conditions of this EIA and the mitigation measures and objectives proposed by the EMP are implemented by Ergo Mining. Given that the RAMSAR site is directly adjacent to 7L5, 7L6 and 7L7, extra care and diligence is required by Ergo to minimise negative impacts and maintain the status quo of the Marievale Bird Sanctuary and Blesbokspruit through the construction and operation of the project. An improvement of the functioning of the wetland is expected following decommissioning and rehabilitation.

## CHAPTER 1: INTRODUCTION

**Konglwe Environmental (Pty) Ltd** ('Konglwe') has been appointed as the Independent Environmental Assessment Practitioner (EAP), tasked with conducting the Scoping and Environmental Impact Assessment (S&EIA) process which is aimed at critically evaluating the potential environmental and social impacts of the proposed **Marievale Project** (hereafter the Proposed Project).

### 1.1 Historical Project Background

Gold was first discovered in the project area (on the Farm Varkensfontein) in 1887 by a group of prospectors on their way to Johannesburg. The owner of the farm, Mr. Johannes Petrus Marais, subsequently started the Nigel Gold Mining Company (Davenport 2013; Erasmus 2014). Around the same time, low quality coal was being mined, and in 1891 the first railway line in the Transvaal (the 'Rand Tram') was built. The Rand Tram transported coal from the newly discovered coal fields on the East Rand to the gold mines on the Central Witwatersrand. It was the construction of this line that resulted in the rapid development of the coal mining industry in present-day Springs and surrounding areas (Erasmus, 2014). It was not until 1908 that gold mining expanded rapidly in Springs. A requirement for more residential land led to the proclamation of Nigel, as a township, in 1912.

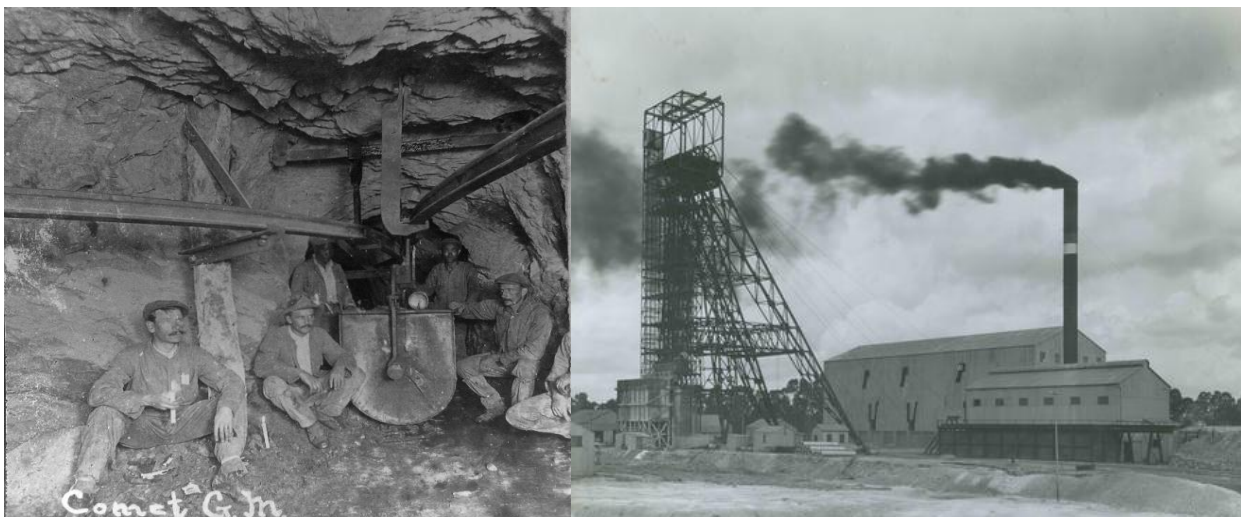


**Figure 1-2: Historic mining activities within the Johannesburg area.**

The Marievale Gold Mine & Estates Company and the Nigel East Gold Mining Company were the first two companies to commence gold prospecting and mining in 1896 on the three main affected farms of the Marievale Project: Vogelstruisbult 127 IR, Vlakfontein 281 IR and Marievale 282 IR. With news of successful prospects, gold mining thrived in Springs and Nigel and by 1933, there were several companies involved in extraction operations. These additional companies included the Marievale Nigel Gold Mine and Estates company, East Nigel and Consolidated Goldfields, Lydenburg Gold Farms, Vogelstruisbult Proprietary Limited, Vogelstruisbult Gold Mining Areas Limited and the Daggafontein Gold Mining Company.

The Marievale Nigel Gold Mines & Estate ceased mining on Farm Marievale 282 IR in 1911 but continued to derive a revenue from claim licences and mynpachts (Skinner 1911). A reduction plant was constructed on Vogelstruisbult 127 IR in 1936, and the associated mill-house was believed to be the first all-concrete mill building on a Reef mine. Rudd (1995) notes that Vogelstruisbult closed down its gold operations in 1968 and in August 1969, the headgear at No. 3 shaft was taken down. In 1967, the old uranium plant situated at No. 1 shaft area of Vogelstruisbult was used for the construction of an electrolytic zinc plant as part of the formation of a new company, the Zinc Corporation of SA, by Gold Fields SA, Iscor and Vogelstruisbult. It is believed that the Lydenburg Gold Farms Company operated on Vlakfontein 281 IR and was associated with the Johannesburg Consolidated Investment Company. This company abandoned operations in 1910.

By 1960, approximately 14 gold mines between Nigel and Springs existed. Although not operational today, the success of gold mining is represented by the numerous historic TSFs along the Witwatersrand Goldfields. From the above, it is assumed that the Marievale 7L5, 7L6 and 7L7 are approximately 47 to 63 years old and are landscape representations of mining infrastructure associated with the historical mining townscapes and settlements of the East Rand.



**Figure 1-3: Mine workers at Comet Gold Mine 1903 (left) and Simmer and Jack Mine Colliery 1939 (right)**

## 1.2 The Origin of Mine Dumps in Johannesburg

In laymen's terms the phrase '*mine dump*' refers to an area where excess material, containing forms of

mineral(s) that are either valuable or not, is left by the person who has won the minerals from the earth in accordance with his/her right or entitlement to mine. Prior to the enacting of legislative controls such as the Mines And Works Act, 1956 and its Regulations and later still the Minerals Act, 1991 and finally, the Mineral and Petroleum Resources Development Act, 2002 (No. 28 of 2002) (“the MPRDA”), which came into effect on 1 May 2004, mine dumps were placed in convenient positions adjacent to mining operations. This was often along fault lines, or within wetland areas. It is the legacy of these mine dumps within sensitive areas that has caused the environmental and health effects that are felt today.

As the mines in the project area began to close down during the 1970’s, technological advances enabled the extraction of valuable gold resources and other minerals from the dumps. In 1978 the East Rand Gold and Uranium Company (Ergo) began to reclaim some of these dumps to gain access to the residues of gold, uranium and pyrite. Over the last two decades there have been further advances in mining and metallurgical technologies and an evolution in the country’s environmental policy and legislation. This, as well as increasing gold prices has further incentivised the reclamation of TSFs.

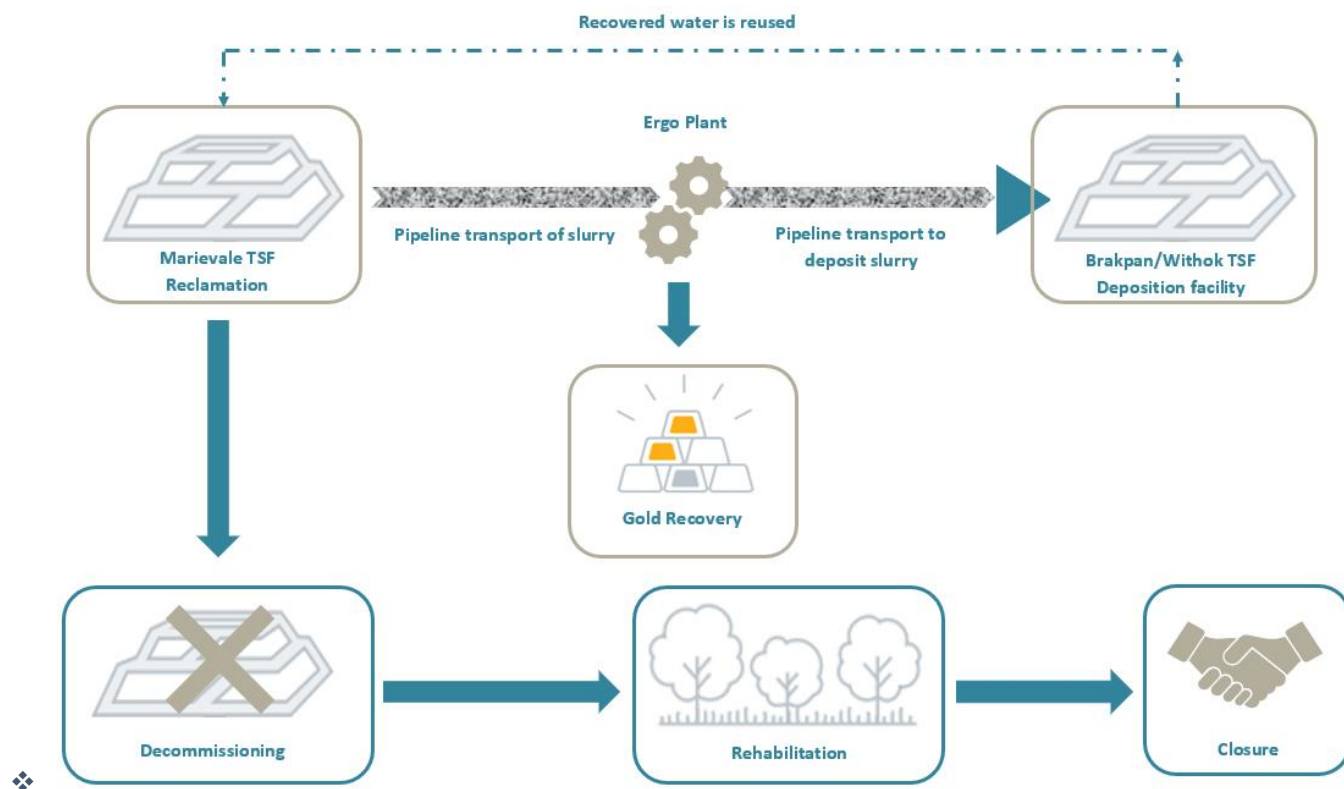
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Ergo will make use of its sophisticated metallurgical processes which make it viable to retreat the historic Marievale TSFs and extract the residual gold, having retreated millions of tonnes of material since its inception in December 1977. Prospecting in Marievale concluded that the dumps contain approximately 51.6Mt at an average grade of 0.289 g/t. With the upturn of the gold price, the grade and tonnage in the Marievale TSFs has become economically viable to exploit. Although gold will be the main mineral prospected for, the concentrations of uranium, nickel and silver will also be investigated in conjunction with the availability of stone, gravel and waste rock.

Although there is a strong economic case for the project, the removal of these dumps also forms part of DRDGOLD Limited’s broader strategy to align to the National Environmental Management Act (Act 109, 1998) EIA Regulations, in accordance with the One-Environmental system for the reclamation of historic mine residue tailings. Incorporated in this strategy is the need to clean-up and remove pollution point-sources across Gauteng and contain them in two mega facilities known as the Brakpan/Withok TSF and the Regional TSF (RTSF – *to still be constructed*). It is envisioned that the Brakpan/Withok TSF will hold tailings retreated and removed on the East Rand, and the RTSF will hold tailings treated and removed on the West Rand. Following the removal of the Marievale TSFs, Ergo intends to rehabilitate the land to a state that is sustainable, functioning and represents a pre-mining landscape.

Ergo intends to conduct the project in accordance with the summary flow diagram and description below:



**Figure 1-4: A short summary of the Proposed Project Process**

Before reclamation can commence, the sites will be prepared to prevent unwanted material from being screened and blended with slurry. Suitable aggregate will be stockpiled and there is a possibility for cleared vegetation to be sold locally and where this is not possible, disposed of.

A baseline radiological assessment will be undertaken by a registered professional once the site has been cleared of vegetation. Temporary and mobile (park homes) site infrastructure will be established either at the reclamation sites or at the Daggafontein plant with existing connections to the power grid and potable water sources. As part of construction and site preparation activities, the existing Marievale paddocks and stormwater systems will be upgraded/reinstated for capturing and managing dirty water around site.

Once site preparation and construction is completed, hydraulic reclamation can begin. To excavate unconsolidated tailings material within the TSFs, a high pressure hose (or cannon) will be directed onto the face of the dump. Reclamation will take place in predetermined benches (or 'cuts') and will move unidirectionally until the entire dump has been reclaimed. Generally, 30 m – 40 m cuts are made as reclamation progresses. The water from the hose mixes with the tailings and forms a slurry with a high solids content. The slurry then flows under gravity, along the base of the TSF, to a collection sump which is positioned at the lowest elevation of the bench being mined. The collection sump is then able to filter and screen appropriately sized slurry, and direct this into pipelines which will pump the slurry to the Ergo Plant for gold recovery. Residual slurry will then be pumped to the licenced Brakpan/Withok TSF. The water which accumulates atop the Brakpan/Withok TSF will be pumped and reused for this project, as well as other Ergo operations.



### 1.3.1 Project Rehabilitation and Future Land use

Once reclamation is completed the project will be decommissioned. During this phase, all project infrastructure will be removed and a final radiological survey will be undertaken, after which rehabilitation can commence. The rehabilitation should invariably be evaluated in view of the future land use. If redevelopment is not proposed, it may still be necessary to carry out work on land to guard against future liability. Thus, it is the primary aims of rehabilitation, in the context of this document, to:

- ❖ Reduce the actual or potential environmental threat.
- ❖ Reduce the potential risks so that unacceptable risks identified in this EIA are reduced to acceptable levels.
- ❖ Protect the future liability of the land by re-establishing a sustainable land use as close to, or similar, to its pre-mining condition.

Konglwe's preferred end land use is recommended to be the extension of the Marievale Bird Sanctuary and the Blesbokspuit wetland, however, this would be at the discretion of the end landowner. To achieve this preferred end land use, the land will be levelled, and remnants of contaminated slime removed. Infiltration and dust generation will be minimised by planting of the soil with appropriate plant/grass species. Lastly, paddocks will remain as a short-term method of containing the surface migration of contaminants into the Blesbokspuit and will be removed once rehabilitation has proven to be successful. Since the TSFs lie within close proximity to the wetland system, it is expected that the flat lying areas directly adjacent to the Blesbokspuit will fill with water once again, thereby extending the Marievale Bird Sanctuary and contributing to ecological success and sustainability.

#### 1.3.1.1 *The Blesbokspuit wetland system and the Marievale Bird Sanctuary*

The current land uses of the surrounding areas are typified by mining and agricultural activities, dispersed settlements, sensitive areas (i.e. the Marievale Bird Sanctuary Nature Reserve and Blesbokspuit Wetland System) and sections of TSFs.

The Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat is an international treaty for the conservation and sustainable use of wetlands (Ramsar, 2014). South Africa currently has 26 Ramsar sites with a combined surface area of 557 028 Ha. In the 1908s the Blesbokspuit wetland was used as a refuge for at least 20 000 waterbirds, which contributed to the declaration of this site as a Ramsar Wetland of International Importance in 1986. The Blesbokspuit Ramsar site is the only one found in Gauteng.

The Blesbokspuit wetland area comprises approximately 2000 ha privately and state owned land and is located to the East of Springs. This area covers approximately a 20 km section of the Blesbokspuit, which stretches from Grootvlei in the North to Marievale in the South. The wetland is one of the "Important Bird Areas of Gauteng" and includes both the Springs Bird Sanctuary and the Marievale Bird Sanctuary. This wetland system is home to 230 species, of which 65 waterbird species can be exclusively found in the Marievale

portion. Species of conservation concern in this area include African Grass Owl, Lesser- and Greater Flamingos, and White-bellied Korhaan. The Spotted-necked Otter has also been found in this habitat.

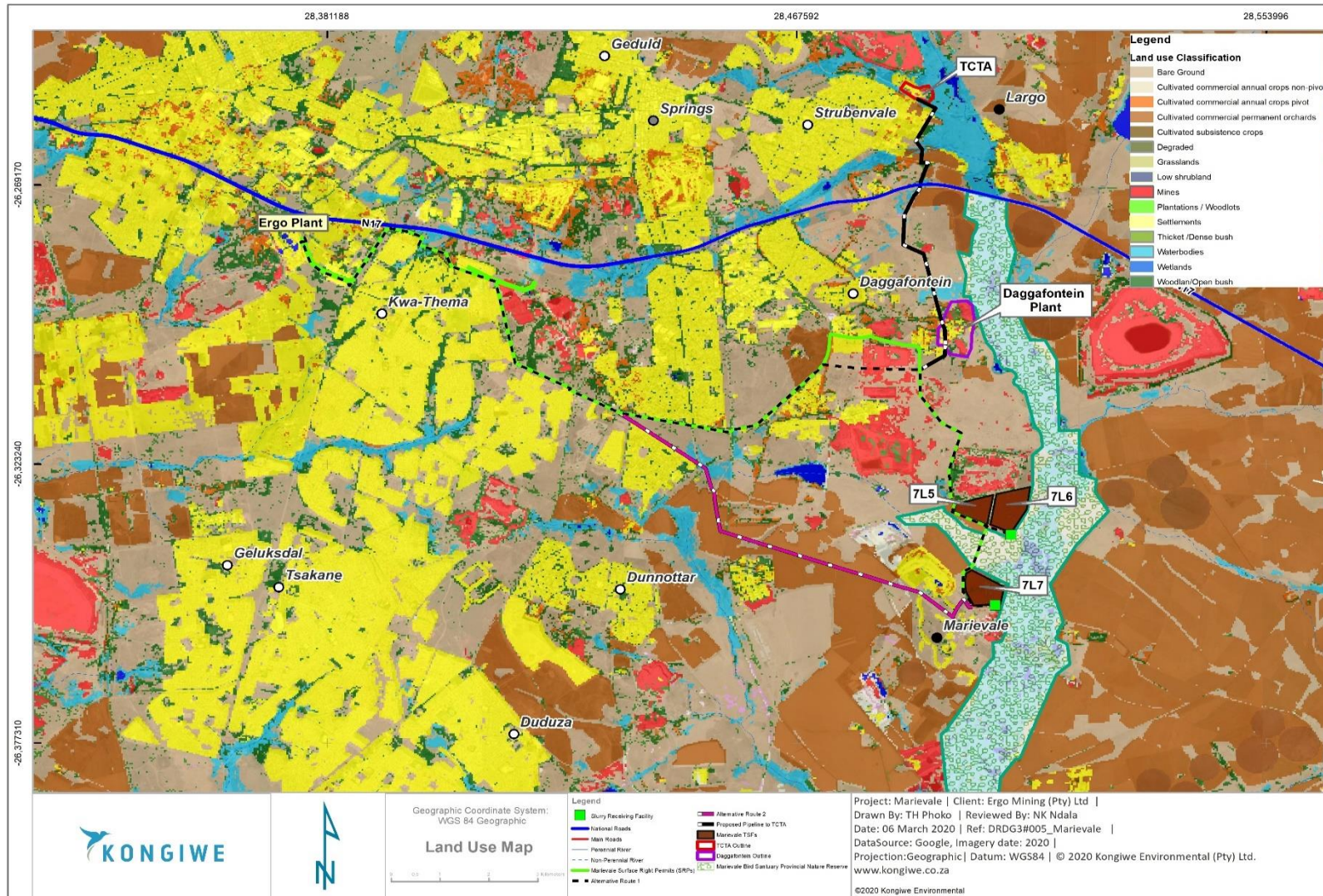


Figure 1-5: Marievale Land use Map



## 1.4 Description of the Project Location

The Marievale project will be confined to farms Vogelstruisbult 127 IR and Vlakfontein 281 IR, as well as all farms to be affected by the final pipeline route.

This is a "Brownfield Project" as it is the reclamation of historical tailings deposits with partly existing infrastructure. The potential negative and positive impacts of the Proposed Project on the environmental and social aspects will be objectively considered through studies undertaken by specialist professionals during the EIA phase.

Dumps 7L5 and 7L6 are both located on Portion 0 (RE) of the farm Vogelstruisbult 127 IR; while dump 7L7 is located on Portion 0 (RE) of Vlakfontein 281 IR farm. Other properties have been identified as directly and indirectly affected landowners due to the pipeline alternatives of the project. See Table 1-1 and Table 1-2 .

**Table 1-1: Description of the Directly Affected Properties**

Farm Names	Farm Name:	Farm ID	Portion	Landowner
	Vogelstruisbult	127 IR	0 (RE)	Ekurhuleni Metropolitan Municipality
	Vogelstruisbult	127 IR	3	Ekurhuleni Metropolitan Municipality
	Kwa Thema	210 IR	35	Kwa- Thema Ext3
	Kwa Thema	210 IR	4	Kwa Thema Township
	Kwa Thema	210 IR	33	Ekurhuleni Metropolitan Municipality
	Kwa Thema	210 IR	28	Ekurhuleni Metropolitan Municipality
	Daggafontein	125 IR	1 (RE)	STI Consulting Services (Pty) Ltd
	Daggafontein	125 IR	104	Struisbult Ext 1 Township
	Daggafontein	125 IR	108	WMG Estates (Pty) Ltd
	Daggafontein	125 IR	110	To be determined
	Daggafontein	125 IR	112	I&W Van Der Merwe Boerdery (Pty) Ltd
	Daggafontein	125 IR	114	Fondagtuin Landgoed CC
	Daggafontein	125 IR	117 (RE)	CLPF Prop Inv (Pty) Ltd
	Daggafontein	125 IR	122	Daggafontein Ext 2
	Daggafontein	125 IR	123	Struisbult Ext 1 Township
	Daggafontein	125 IR	126	STI Consulting Services (Pty) Ltd
	Daggafontein	125 IR	127 (RE)	Palmkuilen (Pty) Ltd
	Daggafontein	125 IR	128	EBM Project (Pty) Ltd
	Daggafontein	125 IR	137	Transnet Ltd
	Daggafontein	125 IR	146	Greater East Rand Metro
	Daggafontein	125 IR	151 (RE)	East Rand Water Care Company
	Daggafontein	125 IR	154 (RE)	EBM Project (Pty) Ltd
	Daggafontein	125 IR	159	Rappa Resources (Pty) Ltd

	Daggafontein	125 IR	180	C L P F PROP INV PTY LTD (T12648/1992)
	Daggafontein	125 IR	181	EAST RAND WATER CARE COMPANY
	Daggafontein	125 IR	184	South African National Roads Agency Ltd
	Daggafontein	125 IR	196	STI CONSULTING SERVICES PTY LTD
	Daggafontein	125 IR	197	STI CONSULTING SERVICES PTY LTD
	Daggafontein	125 IR	199	STI CONSULTING SERVICES PTY LTD
	Witklip (Vulcania)	279 IR	0 (RE)	IPROP (Pty) Ltd
	Grootvaly	124 IR	1 (RE)	GROOTVALY-AH
	Marievale	282 IR	282	Marievale Nature Reserve
	Vlakfontein	130 IR	10	Eskom
	Vlakfontein	130 IR	92	First Trade & Invest 4 (Pty) Ltd
	Vlakfontein	130 IR	96	Shell Downstream South Africa (Pty) Ltd
	Vlakfontein	130 IR	85	First Trade & Invest 4 (Pty) Ltd
	Vlakfontein	281 IR	0 (RE)	Scarlet Sun 33 (Pty) Ltd
	Vlakfontein	281 IR	9	Ilangabi
	Grootfontein	165 IR	0 (RE)	Gauteng Provincial Government
	Grootfontein	165 IR	10	Transnet Ltd
	Grootfontein	165 IR	29	Inyanga Trading 102 ((Pty)) Ltd
	Grootfontein	165 IR	82	Nigel Municipality
	Grootfontein	165 IR	85	Greater Nigel Transitional Local Council
	Grootfontein	165 IR	99	GAUTENG PROVINCIAL GOVERNMENT (T102481/2015)
	Rietfontein	128 IR	0 (RE)	MUN Springs
	Rietfontein	128 IR	81 (RE)	Vereeniging Properties & Investment (Pty) Ltd
	Rietfontein	128 IR	175	Ekurhuleni Metropolitan Municipality
	Witpoortje	117 IR	1 (RE)	Witpoort Estate
	Witpoortje	117 IR	183	Ergo Mining (Pty) Ltd)
	Witpoortje	117 IR	150	Vulcania Suid Ext 2

**Table 1-2: Property Details**

<b>Application Area (ha)</b>	The Proposed Project site covers a combined area of approximately <b>140 Ha</b> .
<b>Magisterial District</b>	Ward 88 of Ekurhuleni Metropolitan Municipality (EMM).
<b>Distance and Direction from Nearest Town</b>	The site is located approximately 6 km north-east from Nigel, 10 km south-east of Springs and falls within the Ekurhuleni Metropolitan Municipality district.

**Table 1-3: 21-digit Surveyor General Code for each Farm Portion (Directly Affected)**

Farm Names	Farm Name:	Farm ID	Portion	SG Code
	Vogelstruisbult	127 IR	0 (RE)	TOIR00000000012700000
	Vogelstruisbult	127 IR	3	TOIR00000000012700003
	Kwa Thema	210 IR	35	TOIR00000000021000035
	Kwa Thema	210 IR	4	TOIR00000000021000004
	Kwa Thema	210 IR	33	TOIR00000000021000033
	Kwa Thema	210 IR	28	TOIR00000000021000028
	Daggafontein	125 IR	1 (RE)	TOIR00000000012500001
	Daggafontein	125 IR	104	TOIR00000000012500104
	Daggafontein	125 IR	108	TOIR00000000012500108
	Daggafontein	125 IR	110	TOIR00000000012500110
	Daggafontein	125 IR	112	TOIR00000000012500112
	Daggafontein	125 IR	114	TOIR00000000012500114
	Daggafontein	125 IR	117 (RE)	TOIR00000000012500117
	Daggafontein	125 IR	122	None
	Daggafontein	125 IR	123	TOIR00000000012500123
	Daggafontein	125 IR	126	TOIR00000000012500126
	Daggafontein	125 IR	127 (RE)	TOIR00000000012500127
	Daggafontein	125 IR	128	TOIR00000000012500128
	Daggafontein	125 IR	137	TOIR00000000012500137
	Daggafontein	125 IR	146	TOIR00000000012500146
	Daggafontein	125 IR	151 (RE)	TOIR00000000012500151
	Daggafontein	125 IR	154 (RE)	TOIR00000000012500154
	Daggafontein	125 IR	159	TOIR00000000012500159
	Daggafontein	125 IR	180	None
	Daggafontein	125 IR	181	None
	Daggafontein	125 IR	184	TOIR00000000012500184
	Daggafontein	125 IR	196	None
	Daggafontein	125 IR	197	None
	Daggafontein	125 IR	199	None
	Witklip (Vulcania)	279 IR	0 (RE)	TOIR00000000027900000
	Grootvaly	124 IR	1 (RE)	TOIR00000000012400001
	Marievale	282 IR	282	TOIR00000000028200000
	Vlakfontein	130 IR	10	TOIR00000000013000010
	Vlakfontein	130 IR	92	TOIR00000000013000092

	Vlakfontein	130 IR	96	TOIR0000000001300096
	Vlakfontein	130 IR	85	TOIR0000000001300085
	Vlakfontein	281 IR	0 (RE)	TOIR000000000281000RE
	Vlakfontein	281 IR	9	TOIR0000000002810009
	Grootfontein	165 IR	0 (RE)	TOIR0000000001650000
	Grootfontein	165 IR	10	TOIR0000000001650010
	Grootfontein	165 IR	29	TOIR0000000001650029
	Grootfontein	165 IR	82	TOIR0000000001650082
	Grootfontein	165 IR	85	TOIR0000000001650085
	Grootfontein	165 IR	99	TOIR0000000001650099
	Rietfontein	128 IR	0 (RE)	TOIR0000000001280000
	Rietfontein	128 IR	81 (RE)	TOIR0000000001280081
	Rietfontein	128 IR	175	TOIR00000000012800175
	Witpoortje	117 IR	1 (RE)	TOIR0000000001170001
	Witpoortje	117 IR	183	TOIR00000000011700183
	Witpoortje	117 IR	150	TOIR00000000011700150

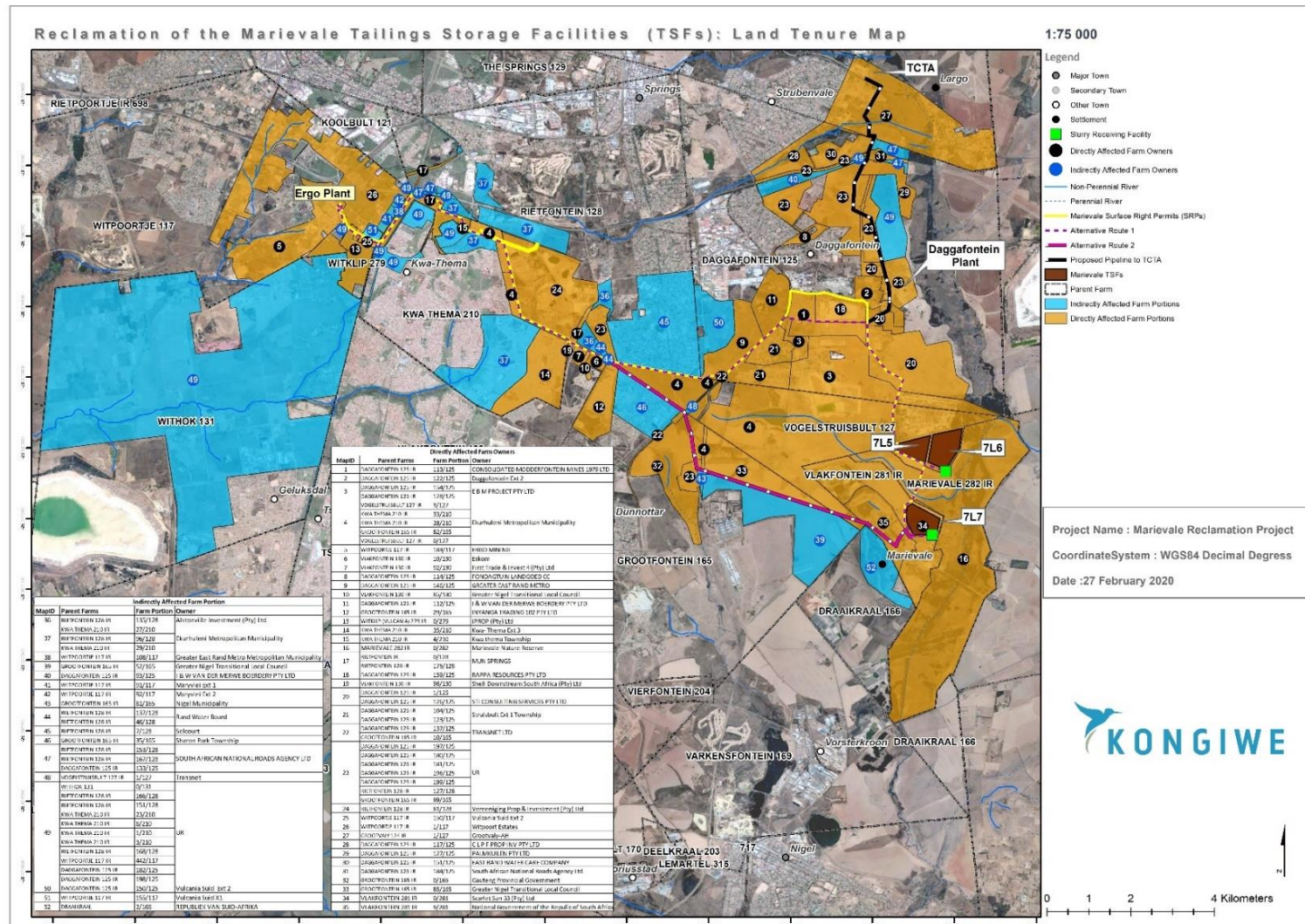


Figure 1-6: Marievale Land Tenure Map



All outstanding landowner information is being actively sourced through one-on-one consultations and the Deeds Office. This is an ongoing process and is updated continuously.

## 1.5 Known Mining Rights held in the Area

This EIA concluded that there are two proposed solar development projects within 30 km of the project site (Environmental Screening Tool, 2019). A solar photovoltaic (PV) and concentrated solar power (CSP) development, with approved EA applications, under consideration. The EIA reference numbers for the developments are 14/12/16/3/3/1/569 and 14/12/16/3/3/2/706 respectively. In addition to this, there are several authorisations proposed for the immediate areas surrounding the Marievale TSFs. These projects are indicated in Table 1-4:

**Table 1-4 : Proposed Environmental Authorisations (EAs) within the project vicinity**

COMMODITY	TYPE OF MINERAL RIGHT	APPLICANT	LOCATION	AUTHORISATION STATUS
Clay (General), Coal and Silica Sand (General)	Prospecting Right	Brikor Limited	On a portion of Portion 85 of the Farm Grootfontein 165 IR and a portion of the Remainder of the Farm Vogelstruisbult 12.	GP 30/5/1/1/2 (10064) PR  (GP 30/5/1/2/2 (10059) MR)
Stone, Coal and Clay	Mining Right	Ilangabi Investments 12 (Pty) Ltd	RE Vlakfontein 281 IR	GP 30/5/1/2/2 (219) MR  Approved
Stone Aggregate (from Waste Rock)	Mining Right	Ilangabi Investments 12 (Pty) Ltd	A portion of Portion 7 of the Farm Vlakfontein 281 IR	GP 30/5/1/2/2 (230) MR  Approved
Diamond	Prospecting Right	Ilangabi Investments 12 (Pty) Ltd	Portion 9 of The Farm Vlakfontein 281 IR	GP/30/5/1/1/2 (10613) PR
Coal	Mining Right	Anglo Operation (Pty) Ltd	Farm Palmietkuilen 241 IR,	Appealed
Coal	Mining Right	Totapix (Pty) Ltd	Portions 1, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14 and 16 of the Farm Bloemendal 283 IR, Portion 3 and the Remaining  Extent of the Farm Rietfontein 276 IR, Portions 4, 5, 9, 12, 22, 28 and the Remaining Extent of the Farm Nooitgedacht 286 IR,  Portions 1, 2 and the Remaining Extent of the Farm Potfontein 285 IR, and Portions 2 and 7 of the Farm Vlakfontein 281 IR,	GP30/5/1/2/2/10071MR

## CHAPTER 2: DETAILS OF THE EAP

Kongiwe Environmental (Pty) Ltd (Kongiwe) is a contemporary, problem-solving consultancy specialising in solving real-world environmental challenges. We pride ourselves in using the latest technology available to realise pragmatic solutions for our clients. The company was created with the essential intent: *‘To solve environmental challenges for a world driven towards a sustainable future’*.

Based in Johannesburg, South Africa, our team of professional Environmental Scientists are highly trained in various environmental disciplines and have significant, hands-on experience in an array of projects across various industries. The company has extensive environmental and project management experience in multiple sectors, with significant experience in South Africa, as well as internationally. Kongiwe focuses on the integration of environmental studies and processes into larger engineering and mining projects. Moreover, Kongiwe provides clients with strategic environmental assessments and compliance advice, the identification of environmental management solutions and mitigation / risk minimising measures throughout the project lifecycle.

### 2.1.1 Contact Person and Corresponding Address

Details of the Environmental Assessment Practitioner (EAP) who prepared the report are presented below

**Table 2-5: Details of the EAP**

<b>NAME OF PRACTITIONER</b>	
<b>TEL NO</b>	+27 (10) 140 6508
<b>FAX NO</b>	086 476 6438
<b>E-MAIL ADDRESS</b>	ablackwell@kongiwe.co.za

### 2.1.2 Expertise of the EAP

Ashleigh Blackwell has an B.Sc. (Hons) in Conservation Ecology from the University of Stellenbosch and is a registered Natural Scientist with the South African Council for Natural Science (SACNASP) (Environmental Scientist) (Registration No: 117167). She has 4 years’ work experience, predominantly in the renewable energy and mining industry. Her qualifications can be found in Appendix A.

### 2.1.3 Summary of the EAP’s Past Experience

Ashleigh Blackwell has 4 years’ work experience as an environmental consultant, predominantly in the renewable energy and mining industry. Her practical experience in the mining and construction industry has given her a depth of knowledge regarding project processes from pre-feasibility phase through to implementation. She is adept at working in different contexts, and problem-solving with her team to meet client needs. She has expertise in relation to Environmental Authorisation Processes in terms of the South

African legal framework. In addition, Ashleigh has attended various training courses in Environmental Law and is currently completing her M.Sc in Soil Science through the University of Pretoria.

#### 2.1.4 Additional Project Team Members

Team members that have been integral in the successful production of this Environmental Impact Assessment and Environmental Management Programme (EIA/EMPr) are represented below

**Table 2-6: Details of the Kongiwe Project Team**

TEAM MEMBER	POSITION IN THE COMPANY	ROLE AND RESPONSIBILITIES
Bradly Thornton	Chief Executive	High-Level project management and report review.
Gerlinde Wilreker	Technical Director (Pr.Sci.Nat)	Report review and Authorisation
Michael Hennessy	Legal Director	Legal review of report documentation
Sibongile Bambisa	Stakeholder Engagement and Social Consultant	Stakeholder Engagement and all other Public Participation requirements Social Impact Assessment
Vanessa Viljoen	Social Consultant	Assistance with Stakeholder Engagement and all other Public Participation requirements
Nokuthula Ndala	GIS Consultant	GIS Mapping
Foord Ceronio	Environmental Consultant	Scoping phase report compilation
Siphesihle Dambuza	Environmental Consultant	Compilation of the IWULA and Water Use Licence process.

#### 2.1.5 Independent Specialist Team Members

A number of independent specialist consultants have been appointed as part of the S&EIA team to adequately identify and assess potential impacts associated with the proposed project. The specialist consultants have provided input into this EIAR as well as EMPr (Refer to Appendix D).

**Table 2-7: Details of the Specialist Team**

SPECIALIST STUDY	SPECIALIST COMPANY	SPECIALIST NAME	PEER REVIEWER
Biodiversity (Fauna, Flora, Wetlands and Aquatics)	The Biodiversity Company	Ivan Baker (Pr.Sci.Nat)	Andrew Husted (Pr.Sci.Nat)
Surface Water	HydroSpatial	Andy Pirie (Pr.Sci.Nat)	Sivan Daher (Pr.Sci.Nat)
Groundwater	Groundwater Abstract	Lucas Smith (Pr.Sci.Nat)	Irene Lea (Pr.Sci.Nat)
Air Quality	Gondwana Environmental Solutions	Anja van Basten	Dr Martin van Nierop
Heritage	PGS Heritage	Wouter Fourie (APASA) (APHP)	Jaco van der Walt (ASAPA) (SAHRA) (AMAFSA)
Social	Kongiwe Environmental	Sibongile Bambisa	Gerlinde Wilreker (Pr.Sci.Nat)
Traffic	EDL Consulting Engineers	John v Rooyen	Eben D. Kotze (Pr.Tech.Eng)
Visual Statement	Kongiwe Environmental	Foord Ceronio	Gerlinde Wilreker (Pr.Sci.Nat)
Noise	EnviroAcoustic	Morne de Jager	Morne de Jager



## **CHAPTER 3: DESCRIPTION OF THE ASPECTS OF THE ACTIVITY**

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This document must be read in conjunction with the EIA. To minimise repetition throughout the documentation, the EAP refers the reader to Chapter 2 and Chapter 3 of the EIA.

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## CHAPTER 4: DESCRIPTION OF THE BASELINE ENVIRONMENT

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This document is kept as concise as possible. For an overview of the baseline environment of this project please refer to Chapter 7 of the EIAr.

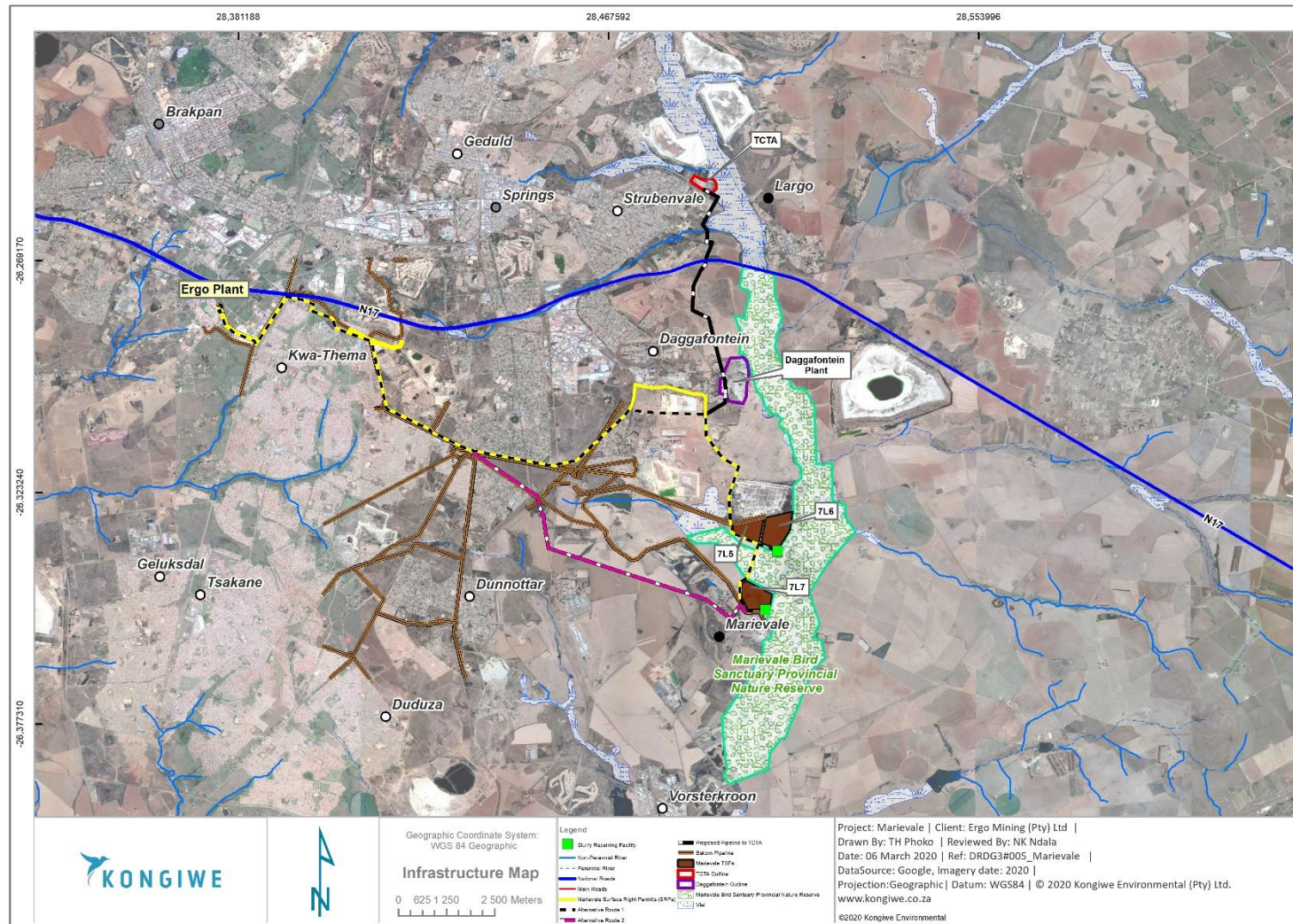
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## CHAPTER 5: COMPOSITE MAP

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The figures below illustrate the preferred Layouts for the Marievale Project:

- ❖ Figure 5-7: Marievale Project area and infrastructure



### Figure 5-7: Marievale Project

## CHAPTER 6: IMPACT MANAGEMENT OBJECTIVES

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The EMPr is compiled with the aim of achieving a required end state that, as far as possible, ensures that environmental quality is maintained. The impact management objectives and outcomes for the Marievale Project are as follows:

- ❖ To minimise the negative environmental impacts as far as feasible;
- ❖ To maximise the positive and minimise the negative socio-economic impacts;
- ❖ To capture, contain and recycle all contaminated water arising from the mining operations on site and to prevent the discharge of contaminated water to the environment; and
- ❖ To maintain cordial relationships with local residents, authorities and other stakeholders via sustained open communication.

The EMPr describes how activities that have, or could have, an adverse impact on the environment will be mitigated, controlled and monitored. Moreover, the EMPr will address the environmental impacts during the construction, operational, decommissioning (where applicable post-closure) phases of the Project. Due regard must be given to environmental protection during the entire Marievale Project, and a number of environmental recommendations are made in this regard. These recommendations are aimed at ensuring that the contractor maintains adequate control over the Project to:

- ❖ Minimise the extent of an impact during the life of the Marievale Project;
- ❖ Maintain a state of Environmental Quality following completion of the Marievale Project;
- ❖ Ensure appropriate restoration of areas affected by the Marievale Project; and
- ❖ Prevent long term environmental degradation.

The impacts identified in the EIA for the project are mostly medium to high in nature and occur during the construction and operational phases. With the proper implementation of the mitigation measures proposed, these impacts can be further reduced to avoid long term damage to the economical, ecological and social environment. Both positive and negative impacts have been identified.

The management and mitigation measures identified within the EIA process are systematically addressed in this EMPr and ensure the minimisation of adverse environmental impacts to an acceptable level.

Ergo must ensure that the implementation of the project complies with the requirements of all environmental authorisations, permits and obligations emanating from relevant environmental legislation.

Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation (EA) (once issued), the stipulations in the EA shall supersede those of this EMPr, unless otherwise agreed by the Competent Authority (CA) in writing. Similarly, any provisions in the legislation overrule any provisions or interpretations within this EMPr. Moreover, this EMPr shall be binding on all parties involved in the operational phase and shall be enforceable at all levels of operational management.

This document must be adhered to and updated as relevant throughout the project life cycle.

## 6.1 Aspects for Inclusions as Considerations of the Environmental Authorisation

Should the DMRE grant EA for this project, it should be subject to the following conditions:

- ❖ The project may not commence prior to the EA being issued;
- ❖ The project should remain in full compliance with the requirements of the EMPr and with all regulatory requirements;
- ❖ The EMPr should be implemented by qualified environmental personnel who have the competence and credibility to interpret the requirements of the EMPr. Such persons must be issued with a written mandate by Ergo management to provide guidance and instructions to employees and contractors;
- ❖ Ergo should conduct annual internal auditing of environmental performance and annual reporting to the DMRE;
- ❖ Ergo must undertake external auditing of the environmental performance as per the conditions of the Environmental Authorisation and provide the DMRE with a copy of the auditing report;
- ❖ The Applicant must report to the Department, with reason, if requirements of the EA have not been met.
- ❖ Stakeholder engagement must be maintained during the construction, operational and decommissioning/rehabilitation phases of the project, with the emphasis on the continuing provision of information;
- ❖ A community forum should be implemented by Ergo, with the aim of engaging Stakeholders and the public;
- ❖ All laydown, storage areas etc should be restricted to transformed areas close to the preferred option and existing roads should be used as far as possible;
- ❖ Keep storm water away from the working/mining areas;
- ❖ Prevent rainwater and the process water that has fallen on site from leaving the site in an uncontrolled and unregulated fashion;
- ❖ Prevent dust pollution during dry, windy conditions.
- ❖ All necessary authorisation must be in place prior to commencement of the project activities.
- ❖ All employees and contractors should receive induction that includes an environmental awareness component (noise). This is to allow employees and contractors to become aware of the potential noise risks that activities (especially night-time activities) pose to the surrounding environment.
- ❖ Ergo must adhere to the Rehabilitation Plan contained in the EMPr.
- ❖ The Applicant must maintain all financial responsibility throughout all phases of the project lifespan, including monitoring.
- ❖ Should the economic gold price diminish and not be seen as favourable to continue reclamation activities, Ergo must continue to implement monitoring and rehabilitation requirements as set out in this EMP.
- ❖ The Applicant must ensure that there are sufficient funds set aside to complete the project fully. Partial reclamation and partial rehabilitation should not be accepted.
- ❖ Exemption from GN R704 is obtained for mining activities and infrastructure proposed to be undertaken within the 1:100 year floodline or within 100 m of a watercourse.
- ❖ Management and Monitoring plans contained in the EMPr must be strictly adhered to.
- ❖ A Chance Find procedure for heritage resources and artefacts needs to be in place.



## 6.2 Determination of Rehabilitation Objectives

Once reclamation is completed the project will be decommissioned. During this phase, all project infrastructure will be removed and a final radiological survey will be undertaken, after which rehabilitation can commence. The rehabilitation should invariably be evaluated in view of the future land use. If redevelopment is not proposed, it may still be necessary to carry out work on land to guard against future liability. Thus, it is the primary aims of rehabilitation, in the context of this document, to:

- ❖ Reduce the actual or potential environmental threat.
- ❖ Reduce the potential risks so that unacceptable risks identified in this EIA are reduced to acceptable levels.
- ❖ Protect the future liability of the land by re-establishing a sustainable land use as close to, or similar, to its pre-mining condition.

Kongiwe's preferred end land use is recommended to be the extension of the Marievale Bird Sanctuary and the Blesbokspruit wetland, however, this would be at the discretion of the end landowner. To achieve this preferred end land use, the land will be levelled, and remnants of contaminated slime removed. Infiltration and dust generation will be minimised by planting of the soil with appropriate plant/grass species. Lastly, paddocks will remain as a short-term method of containing the surface migration of contaminants into the Blesbokspruit and will be removed once rehabilitation has proven to be successful. Since the TSFs lie within close proximity to the wetland system, it is expected that the flat lying areas directly adjacent to the Blesbokspruit will fill with water once again, thereby extending the Marievale Bird Sanctuary and contributing to ecological success and sustainability.

Ergo must maintain all financial responsibility throughout all phases of the project lifespan, including monitoring. Although this project is a NEMA Application and is not held under an approved Mining Right, Ergo must ensure that there are sufficient funds set aside to complete the project fully. Partial reclamation and partial rehabilitation must not be accepted. Should the economic gold price diminish and not be seen as favourable to continue reclamation activities, Ergo must continue to implement monitoring and rehabilitation requirements as set out in this EMPr.

This section **MUST** be read in conjunction with the EIA as well as follow the recommendations proposed by independent specialists.

### 6.2.1 Rehabilitation principles

Final rehabilitation will be carried out once the Marievale Project goes into its decommissioning phase. The principles for proper rehabilitation, which should be followed, are:

- ❖ Preparing a comprehensive rehabilitation plan prior to the commencement of any activities on site;
- ❖ Stormwater management must be in place at the site prior to commencing with any activities;
- ❖ Landform design (shaping, re-grassing);
- ❖ Maintenance management and eradication of invader species;
- ❖ A plan which negates how waste will be managed on site; and

- ❖ An Emergency Preparedness/Response plan .

The objective of the site rehabilitation (in accordance with the NEMA EIA Regulations of 2014) must be measurable, practical and is feasible to implement through:

- ❖ Providing the vision, objectives, targets and criteria for final rehabilitation of the project;
- ❖ Outlining the principles for rehabilitation;
- ❖ Explaining the risk assessment approach and outcomes and link decommissioning activities to risk rehabilitation;
- ❖ Detailing the decommissioning and rehabilitation actions that clearly indicate the measures that will be taken to mitigate and/ or manage identified risks and describes the nature of residual risks that will need to be monitored and managed post decommissioning;
- ❖ Identifying knowledge gaps and how these will be addressed and filled;
- ❖ Outlining monitoring, auditing and reporting requirements.

Mitigation / Management and Monitoring measures are proposed in the EMPr in Section 7.

#### 6.2.2 Decommissioning and Post-Decommissioning phase activities:

##### 6.2.2.1 *Decommissioning Phase Activities*

The slimes dam 7L7 will be the first dump to be reclaimed. Reclamation of 7L6 and 7L5 are likely to commence before 7L7 is fully reclaimed. Not all the infrastructure will be removed from 7L7 the pipelines installed may be used to service the operations of the other two dumps.

During typical decommissioning activities all project infrastructure will be removed and a final radiological survey will be undertaken, after which rehabilitation can commence. The rehabilitation should invariably be evaluated in view of the future land use. If redevelopment is not proposed, it may still be necessary to carry out work on land to guard against future liability. Thus, it is the primary aims of rehabilitation, in the context of this document, to:

- ❖ Reduce the actual or potential environmental threat.
- ❖ Reduce the potential risks so that unacceptable risks identified in this EIA are reduced to acceptable levels.
- ❖ Protect the future liability of the land by re-establishing a sustainable land use as close to, or similar, to its pre-mining condition.

##### 6.2.2.2 *Post-Decommissioning Activities*

Post-decommissioning activities will entail the assessment of rehabilitation and will address any further rehabilitation requirements. Monitoring must occur for at least five years after decommissioning and rehabilitation, or until satisfactory results are achieved.



#### 6.2.2.2.1 Maintenance and Aftercare

Maintenance will specifically need to focus on the rehabilitated areas. Furthermore, groundwater and surface water monitoring will have to take place in the Blesbokspruit. It has been recommended that the groundwater be monitored for at least a period of two years on a quarterly basis after decommissioning. The monitoring process will be used to assess whether the rehabilitation process has been successful or not and to indicate that no further deterioration on groundwater quality is foreseen.

Maintenance will specifically focus on the rehabilitated in accordance with the approved EMPr. Continuous erosion monitoring of rehabilitated areas and slopes should be undertaken and zones with excessive erosion should be identified. The cause of the erosion should be identified, and rectified. Zones with erosion will need to be repaired with topsoil. In addition, infiltration of contaminated water will be contained within paddocks.

#### 6.2.3 Health and Safety:

Regarding the safety of both the public and the employees, Ergo has completed a workers safety assessment as well as a public safety assessment. The public safety assessment for all of the proposed operations of Ergo are currently being updated. This is being done in relation to the requirements of the National Nuclear Regulator (NNR).

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## CHAPTER 7: ROLES AND RESPONSIBILITIES

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To ensure the success of the EMPr, it is important to assign definite roles and responsibilities. Compulsory adherence to the EMPr is required. The obligations of the EMPr create a legally binding document in terms of environmental legislation and civil law. It is important that Ergo, its contractors and sub-contractors ensure that all relevant aspects of the EMPr are communicated to all of their employees. It is the duty of Ergo, its contractors, sub-contractors and their employees to fulfil the project objectives with specific reference to the prevention and mitigation of impacts caused by the project development activities. It is the responsibility of the DMR to ensure that the development takes place in accordance with relevant legislation.

### 7.1 Government Departments

As the responsibility for the protection of our natural heritage lies with the government departments, they have the power to conduct site inspections to ensure that the development complies with all legislation, regulations and standards. They may enforce penalties where non-compliance occurs.

### 7.2 Site Manager

The Site Manager will oversee all the activities. He will be responsible for the activities on site and see to the implementation of the EMPr and will establish a communication network between the different components conducting the work. All incidents and reports will be made to the Site Manager. Ultimate responsibility in terms of compliance to the EMPr lies with the Site Manager.

### 7.3 Contractors

Where contractors are used during the life of the project, the on-site responsibility for environmental and social matters lies with the Contractor Engineer. He will be responsible for the day to day direction and management of the contractor's particular activities on the site throughout the life of the project.

### 7.4 Environmental Officer

An Environmental Officer (EO) or Health, Safety and Environmental (HSE) Officer will be appointed. It will be the responsibility of the EO/ SHEQ Officer to:

- ❖ Oversee that the day to day activities that will take place on site comply with the EMPr and the relevant legislation;
- ❖ To prepare a detailed communication strategy for liaison with I&APs, stakeholders and contractors;
- ❖ Manage and document forward and backward information flows between the Site Manager, the Contractors, the I&APs and Ergo. This includes information pertaining to monitoring and evaluation;
- ❖ Assist Ergo upon request, with project communication with I&APs;
- ❖ Ensure meaningful participation with the I&APs, including capacity building exercises where the need is identified;

- ❖ Give induction and environmental awareness training;
- ❖ Ensure that a record keeping system is maintained; and
- ❖ Promote co-regulation, shared responsibility and a sense of ownership amongst all parties involved.

## 7.5 Environmental Control Officer

To ensure full compliance to the EMPr and in effect the legislation, Ergo must appoint an Environmental Control Officer (ECO).

The responsibilities of the ECO will be:

- ❖ To monitor the activities through monthly site inspections to ensure compliance to the EMPr;
- ❖ To assess the EMPr as to its effectiveness in mitigating and preventing impacts;
- ❖ To assess compliance to the EA;
- ❖ To advise the Site Manager, Resident Engineer, Contractors and EO with respect to the activities and their associated impact on the environment;
- ❖ To identify any non-compliances and to advise to the immediate action and remediation;
- ❖ To write monthly compliance reports;
- ❖ To ensure monthly project meetings are undertaken with the contractors and the Site Manager to discuss the findings made during the site visits;
- ❖ To ensure that the best environmental options are followed throughout;
- ❖ To ensure that a proper training, awareness and competence training programme is implemented; and
- ❖ To update, where necessary, the EMPr as new issues may arise.

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## CHAPTER 8: IMPACT MITIGATION PER PHASE

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The management measures have been organised in the following project phases:

- ❖ Pre-Construction Phase;
- ❖ Construction Phase;
- ❖ Operational Phase;
- ❖ Decommissioning Phase; and
- ❖ Post-Decommissioning Rehabilitation Phase.

The tables in Section 6.2 provide the management measures (actions) recommended to manage the potential impacts rated during the different phases. In addition to the management measures provided the tables indicate the person responsible to ensure that these commitments are adhered to and implemented as well as specifying the priority of these commitments (either prior to a phase, during a phase and/ or ongoing), and the outcomes.

The construction, operation, decommissioning and where applicable post-decommissioning impacts associated with the Marievale Project are discussed for the following environmental aspects:

- ❖ Biodiversity;
- ❖ Wetlands;
- ❖ Surface water;
- ❖ Groundwater;
- ❖ Air quality;
- ❖ Heritage and palaeontology;
- ❖ Traffic;
- ❖ Social; and
- ❖ Noise.

The objectives and EMPr tables are required to be reviewed and possibly modified whenever changes, such as the following, occur:

- ❖ Planned activities change (i.e. in terms of the components and/or layout of the facility);
- ❖ Modification to or addition to environmental objectives and targets;
- ❖ Additional or unforeseen environmental impacts are identified, and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
- ❖ Relevant legal or other requirements are changed or introduced; and
- ❖ Significant progress has been made on achieving an objective or target such that it should be modified.

## 8.1 Pre-Construction Phase Mitigation Measures

Prior to initiating the Construction Phase, Ergo needs to ensure that the following is undertaken. Ergo will commence with the pre-construction and construction phase for its project related infrastructure in line with its approved environmental authorisations. During the construction phase the following activities will take place on site:

**Table 8-8: Summary table of the Activities associated with the construction phase of the project**

ACTIVITY	DESCRIPTION
<b>PRE-CONSTRUCTION:</b>	
1	Conduct a further pre-construct baseline Radiation walk-over survey
2	Removal of vegetation and site clearance
3	Preparation of access roads should this be required
4	Initiation of a community forum for engagement throughout the project life cycle

**Table 8-9: Pre-Construction Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.	<b>PRE-CONSTRUCTION: SITE PREPARATION AND DESIGN</b>							
1.1	❖ All	❖ Permitting	❖ Commencement of activities without relevant authorisations.	❖ Site	❖ Ensure all necessary permits have been obtained prior to commencement of activities.	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA)</li> <li>❖ National Water Act, 1998 (Act No. 36 of 1998) (NWA)</li> <li>❖ Heritage Resources Act, 1999 (Act No.25 of 1999) (HRA)</li> <li>❖ National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNR)</li> <li>❖ City of Johannesburg Municipality By-Laws</li> </ul>	<ul style="list-style-type: none"> <li>❖ When Prior to commencement of Activities</li> <li>❖ Responsibility: License holder</li> </ul>	❖ Prevention of undertaking of unauthorised activities.
1.2	❖ Radiation	<ul style="list-style-type: none"> <li>❖ A walk-over survey</li> <li>❖ A site safety Case</li> </ul>	❖ Baseline surface radiation	❖ Site and local	<ul style="list-style-type: none"> <li>❖ Undertake a radiation walk-over survey to determine the current surface radiation levels</li> <li>❖ Compile and submit a site safety case to the NNR</li> </ul>	❖ National Nuclear Regulator Act, 1999 (Act No. 47 of 1999) (NNR)	<ul style="list-style-type: none"> <li>❖ When Prior to commencement of Activities</li> <li>❖ Responsibility: License holder</li> </ul>	❖ Determine the surface radiation level prior to reclamation
1.2	<ul style="list-style-type: none"> <li>❖ Biodiversity</li> <li>❖ Wetlands</li> </ul>	❖ Project Design	❖ Project Design and infrastructure / vehicle placement could result in destruction of sensitive habitats of the Blesbokspruit.	❖ Site	<ul style="list-style-type: none"> <li>❖ The areas planned to be cleared must be kept to a minimum.</li> <li>❖ Work may not be undertaken outside of authorised project boundaries</li> <li>❖ Existing stormwater infrastructure to be maintained and desilted prior to activities commencing on site.</li> <li>❖ All dumping and storage must be within the existing infrastructure footprint and the low sensitivity areas;</li> </ul>	<ul style="list-style-type: none"> <li>❖ NEMA</li> <li>❖ NWA</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> <li>❖ Gauteng C-Plan</li> </ul>	<ul style="list-style-type: none"> <li>❖ When Prior to commencement of Activities</li> <li>❖ Responsibility: License holder</li> </ul>	<ul style="list-style-type: none"> <li>❖ Reduced size of footprint.</li> <li>❖ SWMP upgraded</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
					<ul style="list-style-type: none"> <li>❖ All laydown, storage areas etc should be restricted to transformed areas close to the preferred option and existing roads should be used as far as possible;</li> <li>❖ The number (and size) of laydown, storage and staff facilities must be kept to a minimum for the duration of the project. These areas must be designated in already disturbed/transformed areas;</li> <li>❖ Building material must be stored in areas that have previously been disturbed/ transformed and are classified as a low risk according to the sensitivity map in this report</li> </ul>			
1.3	❖ Contractors	❖ Contractor management	❖ Lack of knowledge of EMPr and procedure could result in environmental degradation.	❖ Site	<ul style="list-style-type: none"> <li>❖ Contractors must be trained and given a copy of the EMPr and of the detailed site layout plans to ensure compliance with the requirements.</li> <li>❖ Contractors must have a plan in place to implement the management measures set out in the EMPr.</li> <li>❖ The EO/ECO is to supervise the contractors to ensure that management measures are being adhered to.</li> </ul>	❖ None	<ul style="list-style-type: none"> <li>❖ When:</li> <li>❖ At the start of the project.</li> <li>❖ Annually for the LoM.</li> <li>❖ During induction (at the start of the project and annually).</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ EO/ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Raising staff and contractor environmental awareness.</li> <li>❖</li> <li>❖</li> <li>❖</li> <li>❖</li> </ul>
1.4	<ul style="list-style-type: none"> <li>❖ Biodiversity</li> <li>❖ Surface Water</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site planning</li> <li>❖ Site Preparation</li> </ul>	<ul style="list-style-type: none"> <li>❖ Vegetation removal as a result of site clearance.</li> <li>❖ Erosion and wash off of exposed soils leading to siltation in down gradient watercourses</li> </ul>	❖ Site	<ul style="list-style-type: none"> <li>❖ Ergo to keep the clearance of vegetation outside the dump footprint to a minimum.</li> <li>❖ Water quality sampling must be implemented upstream and downstream of construction sites. It is recommended that Total Suspended Solids (TSS) and turbidity are included in the current water quality monitoring programme.</li> <li>❖ Have a ready plan during pre-construction to implement the SWMP as a first step during the construction phase.</li> <li>❖ Compilation of a plant Search and Rescue Plan for Species of Conservation Concern.</li> <li>❖ Where encountered, permits for removal of protected plant species need to be obtained from the DEFF.</li> <li>❖ Compilation of an Alien and Invasive Species Plan to be implemented for the duration of the life of site.</li> </ul>	<ul style="list-style-type: none"> <li>❖ NEMA</li> <li>❖ Gauteng C-Plan</li> <li>❖ National Biodiversity Assessment (NBA)</li> <li>❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEM:BA) Alien and Invasive Species Regulations, 2013</li> <li>❖ NEM:BA Alien and Invasive Species Lists, 2016</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Prior to commencement of Activities</li> <li>❖ Responsibility:</li> <li>❖ The Applicant</li> <li>❖ The Contractor</li> <li>❖ All staff</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of destruction of biodiversity.</li> <li>❖ Reduced size of footprint.</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
					<ul style="list-style-type: none"> <li>❖ The temporary infrastructure needs to be placed in the low sensitivity areas.</li> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species;</li> <li>❖ Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site</li> </ul>			
1.5	<ul style="list-style-type: none"> <li>❖ Surface Water</li> <li>❖ Groundwater</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site planning</li> </ul>	<ul style="list-style-type: none"> <li>❖ Improper planning may lead to surface water and groundwater pollution during construction and operational phases.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ Design a Stormwater Management Plan taking surface water quality proposed designs into account.</li> <li>❖ Compilation of a Stormwater Management Plan aimed at reducing and/or eliminating adverse impacts on the receptors identified. These include existing private groundwater users, wetlands, rivers and streams. The Water Management Plan is to include the compilation of a Water Quality Monitoring Programme.</li> <li>❖ An Emergency Response Plan to contain spills is required to be in place prior to construction and operation.</li> <li>❖ Implement a groundwater monitoring programme before reclamation starts.</li> <li>❖ Ensure that sufficient information is available if private boreholes are identified around the Blesbokspruit (1 km radius), to quantify existing groundwater status and use. This information will form the basis for future assessments and pollution claims.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When Prior to commencement of Activities</li> <li>❖ Responsibility: License holder</li> </ul>	<ul style="list-style-type: none"> <li>❖ Reducing negative impacts on surface water resources in the event of spills.</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.6	❖ Air Quality	❖ Baseline dust fallout monitoring	❖ Air pollution and dustfall	❖ Site	❖ Initiate dust fallout monitoring at a minimum, 1 year, prior to commencement of activities to establish baseline against which to monitor.	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5 ❖ National Dust Control Regulations.	❖ When Prior to commencement of Activities ❖ Responsibility: License holder	❖ Establishing baseline air quality to measure baseline project life-span air quality.
1.7	❖ Heritage	❖ Site clearance	❖ Destruction of heritage sites	❖ Site	❖ A Chance Find Procedure for heritage resources and artefacts needs to be in place as per the EMPr. ❖ Demarcate No-Go areas. ❖ Implement 50 m buffer around all sensitive areas such as burial grounds, cemeteries and graves. If buffer zone cannot be maintained, then appropriate mitigation measures will need to be enacted with social consultation. ❖ Should the destruction of historical structures be deemed necessary, Ergo must acquire a Permit from PHRAG prior to construction/commencement of activities. ❖ A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts. ❖ Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.	❖ Recommendations from South African Heritage Resources Agency (SAHRA) under Section 36 and 38 of NHRA	❖ When Prior to commencement of Activities ❖ Responsibility: Applicant ❖ Heritage specialist	❖ Minimise risk of damaging heritage resources.
1.8	❖ Social ❖ Noise	❖ Recruitment ❖ Prior to activities	❖ Community complaints ❖ Community engagement ❖ Noise impacts	❖ Local ❖ Site	❖ Compilation of a Stakeholder Engagement Plan to be implemented for the life of the project. ❖ Instatement of a community liaison forum for community members to allow community member to participate in the project through engagement. ❖ All employees and contractors should receive induction that includes an environmental awareness component (noise). This is to allow employees and contractors to realize the potential noise risks that activities (especially night-time activities) pose to the surrounding environment;	❖ Ergo Social and Labour Plan ❖ Stakeholder engagement plan ❖ Emergency Preparedness and Response Plan	❖ When Prior to commencement of activities. ❖ Responsibility: Applicant. ❖ ECO ❖ HR	❖ Minimise negative impacts on local communities.



REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	MITIGATION MEASURES	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
					<ul style="list-style-type: none"> <li>❖ Ensure a good working relationship between Ergo and all potentially noise-sensitive receptors. Communication channels should be established to ensure prior notice to the sensitive receptor if work is to take place close to them (especially if work is to take place within 200 m from them at night);</li> <li>❖ Compilation of an Emergency Preparedness and Response Plan to be implemented for the life of the project.</li> <li>❖ Compilation of a Community Development Programme to be implemented through the life of the project.</li> <li>❖ Compilation of Employee Awareness Plans.</li> </ul>			
1.9	❖ Rehabilitation	❖ Decommissioning and Rehabilitation	❖ Align to end land use	❖ Site area	<ul style="list-style-type: none"> <li>❖ Compilation of a Rehabilitation Plan to be implemented for the duration of the life of the project.</li> <li>❖ This plan must make provision for continuous rehabilitation (where feasible) as well as the rehabilitation upon decommissioning.</li> <li>❖ The plan must be updated on a regular basis</li> <li>❖ Funds must be set aside in accordance with the Closure Plan for rehabilitation at the beginning of the project</li> </ul>	<ul style="list-style-type: none"> <li>❖ NEMA</li> <li>❖ Financial Provision Regulations</li> <li>❖</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Prior to commencement of activities.</li> <li>❖ End land use to be as and when required.</li> <li>❖ Responsibility:</li> <li>❖ License holder.</li> <li>❖ Contractors.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Ensure suitable end land use in line with the vision for future developments</li> </ul>

## 8.2 Construction Phase Mitigation Measures

Ergo will commence with the pre-construction and construction phase for its project related infrastructure in line with its approved environmental authorisations. During the construction phase the following activities will take place on site:

**Table 8-10: Summary table of the Activities associated with the construction phase of the project**

ACTIVITY	DESCRIPTION
Construction Phase	
1	Employment of workers (minimal)
2	Operation of construction machinery and vehicles
3	Temporary storage of construction materials and hazardous material such as contaminated soil
4	Instatement of waste management and dust control measures on site
5	Desilting of existing facilities
6	Instatement of traffic signage, access, parking bays

**Table 8-11: Construction Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
MAIN ACTIVITIES: SITE CLEARANCE AND PREPARATION; ACCESS ROADS; PLACEMENT OF TEMPORARY INFRASTRUCTURE								
Biodiversity and Wetlands								
1	❖ Biodiversity	❖ Construction of roads	❖ Loss of areas classified as CBA and ESA; Disturbance of habitat and species of ecological importance; Displacement of fauna; Loss of migration corridors; Direct loss of floral species/vegetation types and biodiversity; Alien vegetation encroachment; Erosion	<ul style="list-style-type: none"> <li>❖ Demarcate the project area and avoid surrounding areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Faunal species must be allowed to move out of the area unharmed;</li> <li>❖ Install culverts below the roads to assist with erosion control, leave green corridors for species to move along.</li> <li>❖ Demarcate the roads using tape, as far as possible restrict the movement into adjacent areas.</li> <li>❖ Install signs restricting the speeds of the vehicles.</li> <li>❖ Compile and implement a spill management plan.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ The National Environmental Management: Protected Areas Act (Act No. 57 of 2003)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ National Biodiversity Assessment (NBA)</li> <li>❖ Gauteng C-Plan National Spatial Biodiversity Assessment (NSBA) National Freshwater Ecosystem Priority Areas (NFEPA's)</li> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ Alien and Invasive Species Regulations, 2014</li> <li>❖ Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)</li> <li>❖ Mining and Biodiversity Guidelines</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility: Contractor</li> <li>❖ ECO</li> </ul>	❖ Minimise negative impacts on Biodiversity
2	❖ Biodiversity	❖ Placement of permanent (if any) and Temporary infrastructure	❖ Clearance of vegetation, dust, encroachment by alien vegetation, displacement of fauna and endemic plant	<ul style="list-style-type: none"> <li>❖ The temporary infrastructure needs to be placed in the low sensitivity areas.</li> <li>❖ Implementation of alien invasive plant management plan needs to be continued during</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ Mining and Biodiversity Guidelines</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility:</li> </ul>	❖ Minimise negative impacts on Biodiversity

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			species and Drying of Slimes	<ul style="list-style-type: none"> <li>operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species;</li> <li>❖ Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site.</li> </ul>			<ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	
3	❖ Biodiversity	❖ Slurry receiving facility, screening facility at pump station	<ul style="list-style-type: none"> <li>❖ Clearance of vegetation, dust, encroachment by alien vegetation, displacement and destruction of fauna and endemic plant species, habitat loss for species, loss of migratory corridors, mortalities of faunal species</li> </ul>	<ul style="list-style-type: none"> <li>❖ All dumping and storage must be within the existing infrastructure footprint and the low sensitivity areas;</li> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species;</li> <li>❖ Demarcate the area to be utilised and restrict any activities into surrounding habitats</li> <li>❖ Adhere to and implement the SWMP prior to any activities occurring on site.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>		<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility: Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Biodiversity</li> </ul>
4	❖ Avifauna	❖ Powerlines and transformers	<ul style="list-style-type: none"> <li>❖ Loss of avifauna species due to electrocutions, bird strikes, disturbance of fauna and flora species due to construction of lines, loss of habitat</li> </ul>	<ul style="list-style-type: none"> <li>❖ If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ Alien and Invasive Species Regulations, 2014</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility: Applicant</li> <li>❖ Contractor</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Flora</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"> <li>area that will not be directly disturbed by the project;</li> <li>❖ Bird flappers must be installed on the powerlines;</li> <li>❖ Spikes must be installed on the poles to prevent bird electrocutions;</li> <li>❖ An erosion control plan must be compiled and implemented.</li> <li>❖ An alien invasive species control plan must also be compiled and implemented for the footprint of the project area.</li> </ul>			❖ ECO	
5	<ul style="list-style-type: none"> <li>❖ Fauna</li> <li>❖ Flora</li> </ul>	<ul style="list-style-type: none"> <li>❖ Slurry Pipeline Option A</li> </ul>	<ul style="list-style-type: none"> <li>❖ Clearance of vegetation, dust, encroachment by alien vegetation, displacement of fauna and endemic plant species, habitat loss for species, loss of migratory corridors, mortalities of faunal species, Destruction, further loss and fragmentation of the remaining natural vegetation community, including CBA: Important and ESA.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Have a site specific spill management plan in place to handle pipeline spills/seepage</li> <li>❖ If a spill is detected, it must be rectified immediately and indicated as a incidence occurrence on a incidence register</li> <li>❖ An Environmental complaint register and incidence register must be kept on-site, and any significant incidences must be reported to the relevant Regional or Departmental Head (DHSWS and DMRE).</li> <li>❖ If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project;</li> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Demarcate the area to be utilised and restrict any activities into surrounding habitats</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ South Africa's National Biodiversity Strategy and Action Plan (NBSAP)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ HR</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Fauna</li> </ul>
6	<ul style="list-style-type: none"> <li>❖ Fauna</li> <li>❖ Flora</li> </ul>	<ul style="list-style-type: none"> <li>❖ Slurry Pipeline Option B</li> </ul>	<ul style="list-style-type: none"> <li>❖ Clearance of vegetation, dust, encroachment by alien vegetation,</li> </ul>	<ul style="list-style-type: none"> <li>❖ Have a site specific spill management plan in place to handle pipeline spills/seepage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Fauna</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			displacement of fauna and endemic plant species, habitat loss for species, loss of migratory corridors, mortalities of faunal species, Destruction, further loss and fragmentation of the remaining natural vegetation community, including CBA: Important and ESA, protected areas (IBA, Ramsar, Nature reserve);	<ul style="list-style-type: none"> <li>❖ If a spill is detected, it must be rectified immediately and indicated as a incidence occurrence on a incidence register</li> <li>❖ An Environmental complaints register and incidence register must be kept on-site, and any significant incidences must be reported to the relevant Regional or Departmental Head (DHSWS and DMRE).</li> <li>❖ If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project;</li> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Demarcate the area to be utilised and restrict any activities into surrounding habitats</li> </ul>		<ul style="list-style-type: none"> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ South Africa's National Biodiversity Strategy and Action Plan (NBSAP)</li> </ul>	<ul style="list-style-type: none"> <li>❖ construction</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ HR</li> </ul>	
6	<ul style="list-style-type: none"> <li>❖ Fauna</li> <li>❖ Flora</li> </ul>	<ul style="list-style-type: none"> <li>❖ Protected Species Management</li> </ul>	<ul style="list-style-type: none"> <li>❖ Loss of habitat for protected species, mortalities of protected species</li> </ul>	<ul style="list-style-type: none"> <li>❖ A qualified zoologist must accompany the construction team (before any work commence) to ensure that none of the species of conservation concern are present during construction.</li> <li>❖ Should Bullfrogs be found in the project area, all activities should cease, and a relocation of these species needs to be performed after obtaining permits from GDARD and a relocation plan can be compiled and implemented.</li> <li>❖ A 200-meter buffer has been added to the wetland delineations due to the sensitivity of these areas as well as the SCC that rely on these habitats.</li> <li>❖ All staff must complete induction, where species of conservation concern are highlighted. Should</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ South Africa's National Biodiversity Strategy and Action Plan (NBSAP)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Zoologist</li> <li>❖ All staff</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise negative impacts on Fauna</li> </ul>

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				these species be observed during the operational phase this must be reported to the EAP and necessary actions must be followed.				
7	❖ Wetlands	<ul style="list-style-type: none"> <li>❖ Construction of pipelines</li> <li>❖ Reclamation site establishment</li> </ul>	<ul style="list-style-type: none"> <li>❖ Loss of aquatic/wetland habitat;</li> <li>❖ Erosion of watercourses;</li> <li>❖ Loss of indigenous vegetation;</li> <li>❖ Exotic vegetation proliferation;</li> <li>❖ Sedimentation of the watercourses;</li> <li>❖ Flow sediment equilibrium change;</li> <li>❖ Water quality impairment;</li> <li>❖ Flow modifications;</li> <li>❖ Loss of biodiversity;</li> <li>❖ Loss of ecosystem services; and</li> <li>❖ Loss of hydromorphic soils</li> </ul>	<ul style="list-style-type: none"> <li>❖ Lighter vehicles (small trucks and other vehicles) required for the proposed activities should only be allowed to use existing roads (including dirt roads); and</li> <li>❖ No heavy machinery must be allowed within the delineated sensitive areas (especially the northern grassland areas). All excavations must be carried out via manual labour instead of heavy machinery/vehicles, if feasible.</li> <li>❖ Erosion prevention and sediment control measures are imperative and need to be implemented throughout the entire project footprint area of the proposed pipeline, access roads and temporary laydown / storage sites;</li> <li>❖ Contamination of the wetland systems with unset cement or cement powder should be negated as it is detrimental to aquatic biota. It is preferable that on-site mixing is avoided and that only prefabricated materials are used;</li> <li>❖ As far as possible, the proposed pipelines should be placed in areas that have already been disturbed/transformed, and no further loss of secondary vegetation should be permitted. Areas to be developed must be specifically demarcated so that during the construction phase, only the demarcated areas be impacted upon;</li> <li>❖ The areas rated as sensitive in the project area as defined in this report should be treated as such and the movement of construction vehicles and construction workers within these areas should be prohibited, unless required for the project (controlled access); and</li> <li>❖ Where possible, existing access routes and walking paths must be made use of, and new routes limited.</li> <li>❖ Have a site specific spill management plan in place to handle pipeline spills/seepage</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ South Africa's National Biodiversity Strategy and Action Plan (NBSAP)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility:</li> <li>❖ Applicant</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating slimes on the wetland system</li> </ul>



REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"> <li>❖ If a spill is detected, it must be rectified immediately and indicated as a incidence occurrence on a incidence register</li> <li>❖ An Environmental complaint register and incidence register must be kept on-site, and any significant incidences must be reported to the relevant Regional or Departmental Head (DHSWS and DMRE)</li> </ul>				
7	❖ Wetlands	❖ Reclamation site establishment	<ul style="list-style-type: none"> <li>❖ Loss of aquatic/wetland habitat;</li> <li>❖ Erosion of watercourses;</li> <li>❖ Loss of indigenous vegetation;</li> <li>❖ Exotic vegetation proliferation;</li> <li>❖ Sedimentation of the watercourses;</li> <li>❖ Flow sediment equilibrium change;</li> <li>❖ Water quality impairment;</li> <li>❖ Flow modifications;</li> <li>❖ Loss of biodiversity;</li> <li>❖ Loss of ecosystem services; and</li> <li>❖ Loss of hydromorphic soils</li> </ul>	<ul style="list-style-type: none"> <li>❖ Rehabilitation of the above-mentioned wetlands must be conduct concurrent to the project phases, and be initiated from the onset of the project where possible;</li> <li>❖ It is imperative that a budget be allocated for the planned rehabilitation efforts and likewise that it be approved by the relevant authorities;</li> <li>❖ Given the nature of the project mitigations limited and contamination of downstream watercourses is highly probable. However, as above this is likely to be a temporary impact which, following effective implementation of planned rehabilitation, should ultimately result in the removal / reduction of an existing source of wetland contamination;</li> <li>❖ Excavate a temporary cut-off trench around the active reclamation area to help contain contaminants that are mobilised during the reclamation process from ending up in the downstream watercourses;</li> <li>❖ Stay within the proposed reclamation areas and avoid extending earthmoving activities outside of these areas;</li> <li>❖ Work systematically targeting one area at a time while rehabilitating the recently completed area as the operation progresses. Rehabilitating in this manner will allow for problems or inadequacies to be identified and rectified in the successive rehabilitation phases;</li> <li>❖ Monitor water quality upstream and downstream of the site along the Blesbokspruit. Begin several months prior to construction commences to establish the pre-construction baseline;</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ The Environment Conservation Act (Act No. 73 of 1989)</li> <li>❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998)</li> <li>❖ South Africa's National Biodiversity Strategy and Action Plan (NBSAP)</li> <li>❖ DHSWS Risk Assessment Protocol</li> <li>❖ SANBI Guidelines</li> <li>❖ National Wetland Classification Systems (NWCS)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ construction</li> <li>❖ Responsibility: Applicant</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise the impact of excavating slimes on the wetland system</li> </ul>

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				<ul style="list-style-type: none"> <li>❖ Within the reclamation areas identify areas of higher soil saturation and the preferential flow paths. Take measures to effectively steer clear of these areas or divert these flows around the reclamation area.</li> <li>❖ Water leaving the site should do so via appropriately engineered stormwater structures that serve to spread and dissipate flows to prevent the erosion of downstream watercourses</li> </ul>				
<b>Surface Water and Groundwater</b>								
13	❖ Surface Water	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ The removal of vegetation will expose soils to water erosion that may lead to a deterioration in water quality of the Blesbokspruit</li> <li>❖ Erosion and wash off of exposed soils leading to siltation in down gradient watercourses.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Clearance of vegetation must be limited as far as possible;</li> <li>❖ The SWMP must be implemented as a first step during the construction phase; and</li> <li>❖ Water quality sampling must be implemented upstream and downstream of construction sites. It is recommended that Total Suspended Solids (TSS) and turbidity are included in the current water quality monitoring programme.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project – specifically construction</li> <li>❖ Responsibility: Contractor</li> <li>❖ ECO</li> </ul>	❖
14	❖ Groundwater	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ Any activity on the mine dump and opening of ground may allow water and air to enter the tailings material; likely after rainfall.</li> <li>❖ Deterioration in groundwater quality due to the increased suspended solids seeping in from exposed surfaces, plus pyrite starting to react.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Implement a groundwater monitoring programme at dumps 7L5, 7L6 and 7L7 before reclamation starts.</li> <li>❖ Additional groundwater monitoring boreholes are required between Sites 1 and 2, downstream from Site 2 and in the alluvial aquifer to the east to effectively measure the current groundwater status, impacts of the reclamation activities on the groundwater environment and changes in groundwater qualities and levels post closure.</li> <li>❖ Develop sound surface runoff management plans to ensure that all dirty runoff is contained and diverted to the paddocks. No pooling of water on surface allowed. The groundwater table is near surface and contaminated seepage will quickly enter the underlying aquifers if not managed effectively.</li> <li>❖ No pooling of water on surface allowed other than in designated stormwater management facilities.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Local</li> <li>❖ Regional</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project – specifically construction</li> <li>❖ Responsibility: Contractor</li> <li>❖ ECO</li> </ul>	❖ Minimise soil erosion and prevent deterioration of water quality as a result

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				❖ Ensure that paddocks are designed to contain all dirty water generated during the reclamation process, to prevent overflows and spillages.				
<b>Air Quality</b>								
15	❖ Air Quality	❖ PM2.5 and PM10 ❖ Clearance of vegetation	❖ Hauling of slime, turning of slime in the drying process and loading of dried slime onto haul trucks causes the emission of particulate matter into the air, thus increasing existing ambient air concentrations of criteria pollutants (both PM10 and PM2.5) at receptors.	❖ Restriction of the stripped band to a width of 40 metres; ❖ restriction of the use of storage piles; ❖ removing all tailings material down to 'red earth' as the area of work progresses and not leaving remnants of tailings material behind which could be exposed to wind erosion.	❖ Local	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5 ❖ National Dust Control Regulations.	❖ When ❖ Duration of the construction phase of the project ❖ Responsibility: ❖ Contractor ❖ ECO	❖ Minimise generation of PM.
16	❖ Air Quality	❖ Vehicle traffic	❖ PM2.5 and PM10 generation	❖ Implement dust suppression (water or chemical) on dirt roads ❖ The current Speed limit will be maintained. ❖ In the event of slow-moving vehicles (abnormal sized trucks or loaded trucks) exiting the proposed access, a Flag man will need to warn the traffic of the approaching danger and control the traffic approaching the proposed access to provide a safe and acceptable gap for the truck to enter the traffic. ❖ U-turn space will need to be provided on all sites to avoid dangerous movements within the traffic.	❖ Site ❖ Local ❖ Regional	❖ National Standards for Ambient Air Quality for PM10 and for PM2.5 ❖ National Dust Control Regulations.	❖ When ❖ Duration of the project ❖ Responsibility: ❖ Contractor ❖ ECO	❖ Minimise dust generation
<b>Heritage</b>								
17	❖ Heritage	❖ Main Activities	❖ Destruction of heritage sites VS1, VS2, Possible Burials	❖ A Chance Find Procedure for heritage resources and artefacts needs to be in place as per the EMPr. ❖ Demarcate No-Go areas. ❖ Implement 50 m buffer around site. If buffer zone cannot be maintained, then appropriate mitigation measures will need to be enacted with social consultation. ❖ Should the destruction of historical structures be deemed necessary, Ergo must acquire a Permit from PHRAG prior to construction/commencement of activities.	❖ Site	❖ Recommendations from South African Heritage Resources Agency (SAHRA) under Section 36 and 38 of NHRA	❖ When ❖ Prior to commencement of Activities ❖ Duration of the construction phase of the project ❖ Duration of the operation phase of the project ❖ Responsibility: ❖ License holder	❖ Minimise risk of damaging heritage resources.

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				❖ A heritage practitioner should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.			❖ Heritage specialist	
<b>Traffic</b>								
18	❖ Biodiversity ❖ Traffic	❖ Increased traffic on access roads	❖ Loss of species of conservation concern	❖ Vehicles to adhere to the speed limit on access roads. ❖ Maintain access and site roads, and site access intersections. ❖ Implement speed control measures on all roads to prevent road kill.	❖ Site	❖ National Road Traffic Act, 1996 (Act No. 93 Of 1996) (NTA), and Regulations	❖ When ❖ Duration of the project ❖ Responsibility: ❖ Contractor ❖ Applicant	❖ Reduce risk of animal deaths on access roads.
19	❖ Traffic	❖ Hauling of slimes	❖ Vehicle impact and damage	❖ Speed Limit Signs (R201_B 60km/h) at least 200m from the proposed access road on the Marievale Sanctuary Road to the west of the proposed access road position. ❖ Heavy Vehicles Turning signs (W344) at least 100m from the proposed access road on the Marievale Sanctuary Road to the west of the proposed access road position. ❖ Sight distances of at least 180m in both directions are available on the Marievale Sanctuary Road. This is more than the minimum sight distances required by COTO TMH16. ❖ A Flag Man is proposed in the event of slow-moving vehicles exiting the proposed access road, a Flag Man will need to regulate traffic and ensure a safe traffic environment with enough space to allow the vehicle(s) to exit. ❖ An internal U-Turn space needs to be provided to avoid dangerous movements on the road or within the traffic on the Marievale Sanctuary Road and near the Zincor Plant. ❖ A minimum stacking distance of 24m are required between any gate or boom and the existing mining access at the proposed access road. ❖ Place all road signage ❖ Sufficient sight distance at access position	❖ Site ❖ Local	❖ National Road Traffic Act, 1996 (Act No. 93 Of 1996) (NTA), and Regulations	❖ Responsibility: ❖ Contractor ❖ ECO	❖ Reduce traffic risks and accidents
<b>Social</b>								
20	❖ Social	❖ Main Activities	❖ Job Security and Skills Development	❖ As part of the Ergo's approved SLP programme and the Ergo Business Development Academy	❖ Local	❖ National Environmental Management Act, 1998 (Act 107 of 1998)	❖ When ❖ Duration of the construction	❖ Minimise, as far as possible, Negative social impacts

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			❖ Stimulation of economic growth	<ul style="list-style-type: none"> <li>(EBDA), targets for employment and training are established and realised</li> <li>❖ It is recommended that as part of the CSI programme, preference should be given to capable subcontractors and suppliers, HDSAs and SMMEs who based within the local municipal area;</li> <li>❖ Communication with locals regarding job opportunities and skills requirements to manage expectations</li> <li>❖ Equip employees with the required skills and competencies to effectively implement their employment responsibilities and progress to higher levels of employment within the company.</li> <li>❖ Effective implementation of training and skills development initiatives through EBDA.</li> <li>❖ Appoint competent safety personnel to ensure construction site personnel to comply with their responsibilities for health and safety and to achieve progressive improvement in safety performance.</li> <li>❖ The applicant should keep the residents informed on a continual basis regarding construction progress and when to expect the site to be blocked</li> <li>❖ To ensure effective consultation with community members during construction and operation of the proposed Project, it is advised that the applicant establishes a Community Consultation Forum that will comprise elected community representatives and aims to disseminate project information to community members.</li> <li>❖ Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders</li> </ul>		<ul style="list-style-type: none"> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<ul style="list-style-type: none"> <li>phase of the project</li> <li>❖ Responsibility: Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	❖ Maximise, as far as possible, positive social impacts
21	❖ Social	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ Safety Impacts for employees and communities</li> <li>❖ Dust level and health impacts</li> </ul>	<ul style="list-style-type: none"> <li>❖ Security patrols should monitor the perimeters of the project site thereby providing an increased security presence.</li> </ul>	❖ Local	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the construction phase of the project</li> </ul>	❖ Minimise, as far as possible, Negative social impacts

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			❖ Impacts on spatial development	<ul style="list-style-type: none"> <li>❖ All project infrastructure should be contained in a secured area to prevent unauthorized access and therefore potential health and safety risks.</li> <li>❖ Ergo to collaborate with local authorities (City of Ekurhuleni Metropolitan Municipality, the local South Africa Police Services, the relevant landowner and the Community Policing Forum to establish standard operating procedures for the control and/or removal of unauthorised individuals.</li> <li>❖ Community members, including illegal miners, should be made aware of the hazards of accessing mine dumps through safety signs at the reclamation and deposition sites.</li> <li>❖ Develop a comprehensive safety management plan protect the health and safety of all personnel and the property on or near the site</li> <li>❖ As far as possible avoid encroachment of pipelines on other development opportunities.</li> <li>❖ Pipelines to be constructed far away from homesteads, buildings and railway lines.</li> <li>❖ Applicant to undertake communicative planning with the relevant stakeholders (i.e.) Ilangabi Coal Mine, Proposed Bloemendal Mine, proposed Brikor's mining of clay, sand and coal, Vereeniging Properties, private landowners and the Marievale Military personnel. Communicative planning entails the flow of information or a direct contact between all the stakeholders, the planner and the beneficiaries. In so doing, there are high chances of keeping all the stakeholders informed with the decisions being taken and the progress made.</li> <li>❖ Applicant to consider engaging regularly with EMM, and actively contribute to a variety of planning documents</li> <li>❖ Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders.</li> <li>❖ Liaise openly and frequently with affected stakeholders to ensure they have information</li> </ul>		<ul style="list-style-type: none"> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<ul style="list-style-type: none"> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>



REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				about activities that will generate nuisance factors				
2	INFRASTRUCTURE (OFFICES & WORKSHOPS)							
1	❖ Surface water	<ul style="list-style-type: none"> <li>❖ Workshop and office activities.</li> <li>❖ Chemical storage facilities.</li> </ul>	<ul style="list-style-type: none"> <li>❖ The potential incorrect disposal of hazardous wastes and workshop effluent (if any), as well as spills and leaks at the temporary infrastructure.</li> <li>❖ The potential incorrect disposal of domestic waste at the offices and ablutions.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Implement the SWMP to separate clean and dirty water and to capture dirty water and prevent dirty water from leaving the site.</li> <li>❖ Spill kits must be present on site.</li> <li>❖ Drip trays must be placed under vehicles and equipment parked overnight.</li> <li>❖ Use biodegradable hydraulic fluids where possible.</li> <li>❖ No waste may be disposed at the site. Waste should be segregated and recycled, and non-recyclable waste and hazardous waste is to be disposed of at a registered landfill site.</li> <li>❖ Hazardous chemicals and waste must be stored in an impermeable, fit-for purpose, bunded area.</li> <li>❖ Hazardous chemical spills must be cleaned up immediately.</li> </ul>	❖ Site	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project.</li> <li>❖ Responsibility: Site/ Site manager</li> <li>❖ ECO</li> <li>❖ Contractor</li> </ul>	❖ Prevention of the deterioration of water quality

### 8.3 Operational Phase Mitigation Measures

The following activities are planned by the Applicant for the operation phase of the project.

**Table 8-12: Summary table of the Activities associated with the operational phase of the project**

ACTIVITY	DESCRIPTION
Operational Phase	
1	Reclamation Activities (including concurrent rehabilitation)
2	Operation of pipes
3	Operation of Pump Station
4	Community Engagement

**Table 8-13: Operational Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.	MAIN ACTIVITIES: RECLAMATION, PUMPING SLURRY, MONITORING, ENGAGEMENT, GOLD RECOVERY, WASTE DISPOSAL, RESIDUAL SLURRY DEPOSITION, RETURN WATER.							
Biodiversity and Wetlands								

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1	❖ Biodiversity	❖ Use of roads	❖ Disturbance of habitat and species of ecological importance; ❖ Displacement of fauna; Loss of migration corridors; ❖ Direct loss of floral species/vegetation types and biodiversity; Alien vegetation encroachment; ❖ Erosion	❖ Demarcate the project area and avoid surrounding areas; ❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces; ❖ An erosion control plan must be compiled and implemented; ❖ Faunal species must be allowed to move out of the area unharmed; ❖ Install signs restricting the speeds of the vehicles; ❖ Install culverts below the roads to assist with erosion control, leave green corridors for species to move along	❖ Site ❖ Local		❖ When ❖ Duration of the project ❖ Operation ❖ Responsibility: ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
2	❖ Biodiversity	❖ Temporary infrastructure	❖ Clearance of vegetation, dust, encroachment by alien vegetation, displacement of fauna and endemic plant species, increase in pest species and associated diseases	❖ The temporary infrastructure needs to be placed in the low sensitivity areas. ❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas; ❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces; ❖ An erosion control plan must be compiled and implemented; ❖ Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species; ❖ Waste management must be a priority and all waste must be collected and stored adequately. It is recommended that all waste be removed from site on a weekly basis to prevent rodents and pests entering the site	❖ Site ❖ Local	❖ The National Environmental Management Protected Areas Act (Act No. 57 of 2003) ❖ The National Environmental Management Act (NEMA) (Act No. 107 of 1998) ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan National Spatial Biodiversity Assessment (NSBA) National Freshwater Ecosystem Priority Areas (NFEPA's) ❖ The Environment Conservation Act (Act No. 73 of 1989) ❖ Alien and Invasive Species Regulations, 2014 ❖ Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983) ❖ Mining and Biodiversity Guidelines	❖ When ❖ Duration of the project ❖ Operation ❖ Responsibility: ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
3	❖ Biodiversity	❖ Slurry receiving facility	❖ screening facility at pump station: dust, encroachment by alien vegetation, displacement of fauna and endemic plant species, habitat loss for species, loss of migratory corridors,	❖ All dumping and storage must be within the existing infrastructure footprint and the low sensitivity areas; ❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas; ❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces; ❖ An erosion control plan must be compiled and implemented;	❖ Site ❖ Local		❖ When ❖ Duration of the project ❖ Operation ❖ Responsibility: ❖ Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			mortalities of faunal species.	<ul style="list-style-type: none"> <li>❖ Allow species to move out of the area safely, if they do not move on their own get a qualified person to assist with the relocation of the species;</li> <li>❖ Demarcate the area to be utilised and restrict any activities into surrounding habitats;</li> <li>❖ Polluted water runoff must be limited by installing a lined base below the silt that will be piled and drainage system must accompany this to restrict the spreading to the now concentrated polluted water;</li> <li>❖ A stormwater management plan needs to be compiled and implemented</li> </ul>				
4	❖ Biodiversity	❖ Powerlines and transformers	❖ Loss of avifauna species due to electrocutions, bird strikes, disturbance of fauna and flora species due to construction of linens, loss of habitat	<ul style="list-style-type: none"> <li>❖ Bird flappers must be installed on the powerlines;</li> <li>❖ Spikes must be installed on the poles to prevent bird electrocutions;</li> <li>❖ An erosion control plan must be compiled and implemented.</li> <li>❖ An alien invasive species control plan must also be compiled and implemented for the footprint of the project area</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>		<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ Operation</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	❖ Minimise negative impacts on Biodiversity
5	❖ Biodiversity	<ul style="list-style-type: none"> <li>❖ Slurry Pipeline A</li> <li>❖ Slurry Pipeline B</li> </ul>	❖ Clearance of vegetation, dust, encroachment by alien vegetation, displacement of fauna and endemic plant species, habitat loss for species, loss of migratory corridors, mortalities of faunal species, Destruction, further loss and fragmentation of the remaining natural vegetation community, including CBA: Important and ESA	<ul style="list-style-type: none"> <li>❖ A spill management plan must be put in place</li> <li>❖ If any faunal are recorded during construction, activities should temporarily cease, and time permitted for the species to move away. In the event the species does not move away (voluntarily), the species must be removed safely from the area and relocated to a suitable area that will not be directly disturbed by the project;</li> <li>❖ Implementation of alien invasive plant management plan needs to be continued during operation to prevent the growth of invasive on cleared areas;</li> <li>❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces;</li> <li>❖ An erosion control plan must be compiled and implemented;</li> <li>❖ Demarcate the area to be utilised and restrict any activities into surrounding habitats.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> <li>❖ Local</li> </ul>		<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the project</li> <li>❖ Operation</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> </ul>	❖ Minimise negative impacts on Biodiversity
6	❖ Wetlands	❖ As read for construction measure above						

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
<b>Surface Water and Groundwater</b>								
7	❖ Surface Water	❖ Main Activities	❖ Uncontained runoff from the operational areas at the TSFs running off into the downslope watercourses impacting on water quality	<ul style="list-style-type: none"> <li>❖ Implementation of the proposed SWMP. It must be ensured that stormwater measures are designed, constructed and operated, to ensure that stormwater does not spill more than once in 50 years, to be compliant with GN R704 regulations; and</li> <li>❖ Water quality sampling must be implemented upstream and downstream of the mining and stockpiling areas. It is recommended that Total Suspended Solids (TSS) and turbidity are included in the current water quality monitoring programme</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ During operations</li> <li>❖ Responsibility: Site/Site manager</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quality</li> </ul>
8	❖ Surface Water	❖ Main Activities	❖ Poor maintenance of stormwater infrastructure resulting in silted paddocks and channels as well as eroded berms, leading to spills into the downslope Russell Stream impacting on water quality and sedimentation	<ul style="list-style-type: none"> <li>❖ As mining progresses, paddocks should be established to contain and evaporate water within the reclamation area</li> <li>❖ Implementation of the stormwater monitoring detailed in the EMPr</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ During operations</li> <li>❖ Responsibility: Site/Site manager</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quality</li> </ul>
9	❖ Surface Water	❖ Main Activities	❖ Flooding of the operation as a result of being located within close proximity to the Blesbokspruit and consequent downstream water quality issues	<ul style="list-style-type: none"> <li>❖ Suitably sized paddocks must be implemented downslope of the stockpiling area to capture, contain and evaporate runoff and seepage from the stockpiles; and</li> <li>❖ Once the operational phase is complete, any remnants of the stockpiles must be removed</li> <li>❖ Implementation of flood protection measures around the eastern and southern sides of TSF 7L6, as well as along the northern and eastern sides of TSF 7L7</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ During operations</li> <li>❖ Responsibility: Site/Site manager</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quality</li> </ul>
10	❖ Surface Water	❖ Main Activities	❖ Abstraction of water from the Blesbokspruit within Ergo's authorization of 5 ML/day for hydraulic mining resulting in a reduction in water	<ul style="list-style-type: none"> <li>❖ Water quality sampling must be implemented upstream and downstream of the mining and stockpiling areas. It is recommended that Total Suspended Solids (TSS) and turbidity are included in the current water quality monitoring programme.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Regional</li> <li>❖ Local</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ During operations</li> <li>❖ Responsibility: Site/Site manager</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of the deterioration of water quality and quality</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			quantity for downstream users					
11	❖ Groundwater Quality	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ Impact on local groundwater quality</li> <li>❖ Reduction of the aquifer yield</li> </ul>	<ul style="list-style-type: none"> <li>❖ Develop sound surface runoff management plans to ensure that all dirty runoff is contained and diverted to the paddocks.</li> <li>❖ No pooling of water on surface allowed.</li> <li>❖ Commit to remove all tailings material and to monitor the quality of soils in the footprint areas. If soil monitoring suggests unacceptably high salt and metal concentrations, soil amelioration should be considered.</li> <li>❖ The alluvial aquifer is at greatest risk and as a result the Blesbokspruit.</li> <li>❖ Monitor boreholes, specifically in the alluvium, is required, with the condition that intercept trenches and later, contamination capture wells will have to be installed in the alluvial if the monitoring shows deterioration during operations.</li> <li>❖ Monitor groundwater quality in all boreholes installed. The groundwater monitoring network efficiency must be assessed and new monitoring boreholes drilled, if required. Additional mitigation measures need to be implemented if pollution is found migrating off site.</li> <li>❖ Ensure that paddocks can contain all dirty water generated during the reclamation process to prevent overflows and spillages.</li> </ul>	❖ Local	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ During operations</li> <li>❖ Responsibility: Site manager</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Prevention of additional AMD generation.</li> </ul>
<b>Social</b>								
12	❖ Social	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ Job Security and Skills Development</li> <li>❖ Stimulation of economic growth</li> </ul>	<ul style="list-style-type: none"> <li>❖ As part of the Ergo's approved SLP programme and the Ergo Business Development Academy (EBDA), targets for employment and training are established and realised</li> <li>❖ It is recommended that as part of the CSI programme, preference should be given to capable subcontractors and suppliers, HDSAs and SMMEs who based within the local municipal area;</li> <li>❖ Aim to absorb the youth (as the area has a high dependency ratio).</li> <li>❖ Communication with locals regarding job opportunities and skills requirements to manage expectations</li> <li>❖ Effective implementation of training and skills development initiatives through EBDA.</li> </ul>	❖ Local	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the operation phase of the project</li> <li>❖ Responsibility: Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impacts</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"> <li>❖ It is recommended that as part of the CSI programme, the contractor makes use of local labour as and when required; and</li> <li>❖ Communication with locals regarding job opportunities and skills requirements to manage expectations</li> <li>❖ Equip employees with the required skills and competencies to effectively implement their employment responsibilities and progress to higher levels of employment within the company.</li> <li>❖ Effective implementation of training and skills development initiatives through EBDA.</li> <li>❖ Appoint competent safety personnel to ensure construction site personnel to comply with their responsibilities for health and safety and to achieve progressive improvement in safety performance.</li> <li>❖ The applicant should keep the residents informed on a continual basis regarding construction progress and when to expect the site to be blocked</li> <li>❖ To ensure effective consultation with community members during construction and operation of the proposed Project, it is advised that the applicant establishes a Community Consultation Forum that will comprise elected community representatives and aims to disseminate project information to community members.</li> <li>❖ Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders</li> </ul>				
13	❖ Social	❖ Main Activities	<ul style="list-style-type: none"> <li>❖ Safety Impacts for employees and communities</li> <li>❖ Dust level and health impacts</li> <li>❖ Impacts on spatial development</li> </ul>	<ul style="list-style-type: none"> <li>❖ Security patrols should monitor the perimeters of the project site thereby providing an increased security presence.</li> <li>❖ All project infrastructure should be contained in a secured area to prevent unauthorized access and therefore potential health and safety risks.</li> <li>❖ Ergo to collaborate with local authorities (City of Ekurhuleni Metropolitan Municipality, the local South Africa Police Services, the relevant landowner and the Community Policing Forum to establish standard operating procedures for the control and/or removal of unauthorised individuals.</li> </ul>	❖ Local	<ul style="list-style-type: none"> <li>❖ National Environmental Management Act, 1998 (Act 107 of 1998)</li> <li>❖ Occupational Health and Safety (Act No. 85 of 1993)</li> <li>❖ National Spatial Development Framework;</li> <li>❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005)</li> <li>❖ National Dust Control Regulations (Government Notice No. R827, 2013)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Duration of the operation phase of the project</li> <li>❖ Responsibility:</li> <li>❖ Contractor</li> <li>❖ ECO</li> <li>❖ Ergo</li> </ul>	<ul style="list-style-type: none"> <li>❖ Minimise, as far as possible, Negative social impacts</li> <li>❖ Maximise, as far as possible, positive social impacts</li> </ul>



REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
				<ul style="list-style-type: none"><li>❖ Community members, including illegal miners, should be made aware of the hazards of accessing mine dumps through safety signs at the reclamation and deposition sites.</li><li>❖ Develop a comprehensive safety management plan protect the health and safety of all personnel and the property on or near the site</li><li>❖ As far as possible avoid encroachment of pipelines on other development opportunities.</li><li>❖ Pipelines to be constructed far away from homesteads, buildings and railway lines.</li><li>❖ Applicant to undertake communicative planning with the relevant stakeholders (ie) Ilangabi Coal Mine, Proposed Bloemendal Mine, proposed Brikor’s mining of clay, sand and coal, Vereeniging Properties, private landowners and the Marievale Military personnel. Communicative planning entails the flow of information or a direct contact between all the stakeholders, the planner and the beneficiaries. In so doing, there are high chances of keeping all the stakeholders informed with the decisions being taken and the progress made.</li><li>❖ Applicant to consider engaging regularly with EMM, and actively contribute to a variety of planning documents</li><li>❖ Make available, maintain and effectively implement a grievance/complaint register that is easily accessible to all neighbours and affected stakeholders.</li><li>❖ Liaise openly and frequently with affected stakeholders to ensure they have information about activities that will generate nuisance factors</li></ul>				
Noise								
14	<ul style="list-style-type: none"><li>❖ Noise impacts</li></ul>	<ul style="list-style-type: none"><li>❖ Operations at night</li></ul>	<ul style="list-style-type: none"><li>❖ Increased total noise levels in the area, changing existing ambient sound levels at receptors</li></ul>	<ul style="list-style-type: none"><li>❖ No night-time activities should be planned closer than 400m from any NSD</li></ul>	<ul style="list-style-type: none"><li>❖ Site</li><li>❖ Regional</li></ul>	<ul style="list-style-type: none"><li>❖ Noise Control Regulations (GN R154 of 1992)</li><li>❖ Noise Control Regulations: Gauteng Province (GN 5479 of 20 August 1999)</li><li>❖ Noise Standards</li></ul>	<ul style="list-style-type: none"><li>❖ When</li><li>❖ Duration of night time operation phase of the project</li><li>❖ Responsibility:</li><li>❖ Contractor</li></ul>	<ul style="list-style-type: none"><li>❖ To minimise the impact of night time noise generation on sensitive receptors</li></ul>
Air Quality								
15	Air Quality	<ul style="list-style-type: none"><li>❖ Refer to construction mitigation measures as these are applicable to operation as well.</li></ul>						
Heritage								

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
16	❖ Heritage	❖ Refer to construction mitigation measures as these are applicable to operation as well.						
Radiation								
17	❖ Radiation	❖ Air emissions pathways ❖ Groundwater pathways ❖ Surface Water Pathways	❖ Potential for radiological impacts on human health	❖ Ensure that radiation exposure is below the regulatory compliance criteria (i.e., the dose constraint) ❖ Optimise the radiation protection by applying the ALARA principle ❖ Implement the radiological monitoring programme ❖ Implement dust fallout monitoring for the project, ❖ Ensuring that unused areas remain covered with available vegetation as far as possible, ❖ Implement the stormwater management plant proposed in the surface water hydrology impact assessment, to ensure that the surface water in the area is contained and that the volume of water leaving the project area is kept to the minimum.	❖ Local	❖ National Nuclear Regulator Act (NNRA) (Act 47 of 1999) ❖ Nuclear Energy Act (NEA) (Act No. 46 of 1999). ❖ Safety Standards (Regulation No. 388 dated 28 April 2006)	❖ When ❖ Duration of the operation phase of the project ❖ Responsibility: Contractor ❖ Ergo ❖ NNR	❖ Prevent radiological impacts emanating from air, groundwater or surface water pathways
2	INFRASTRUCTURE							
1	❖ Surface Water	❖ Main Activities	❖ Poor maintenance of stormwater infrastructure and activities within the 1:100 year floodline.	❖ Implementation of the proposed SWMP. It must be ensured that stormwater measures are designed, constructed and operated, to ensure that they can convey/contain the 50 year runoff, to be compliant with GN R704 regulations; and ❖ It is recommended that a flood protection berm is constructed at the mining and stockpiling areas	❖ Regional ❖ Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	❖ When ❖ During operations ❖ Responsibility: Site/Site manager	❖ Prevention of the deterioration of water quality and quantity
2	❖ Surface Water	❖ Main Activities	❖ Leaks from the proposed pipelines impacting on down gradient water quality	❖ Implementation of the proposed SWMP. It must be ensured that stormwater measures are designed, constructed and operated, to ensure that they can convey/contain the 50 year runoff, to be compliant with GN R704 regulations; and ❖ It is recommended that the exiting paddocks and berms are constructed to a height above the floodline ❖ Regular inspections of the pipelines; and ❖ Immediate fixing of the pipeline and clean ups should spills occur	❖ Regional ❖ Local	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	❖ When ❖ During operations ❖ Responsibility: Site manager ❖ Contractor ❖ ECO	❖ Prevention of the deterioration of water quality and quantity
3	ACCESS ROADS AND HAULING ROADS							
1	❖ Traffic	❖ Refer to construction mitigation measures as these are applicable to operation as well.						

## 8.4 Decommissioning Mitigation Measures

The following activities are planned by the Applicant for the decommissioning phase of the project.

**Table 8-14: Summary table of the Activities associated with this decommissioning phase of the project**

ACTIVITY	DESCRIPTION
Decommissioning Phase	
1	Demolition of temporary infrastructure and Rehabilitation of the project area. Ergo aims to rehabilitate the Marievale area by shaping the areas where silt was removed and make the area free draining. Thereafter, appropriate species will be planted to stabilise the soil.
2	Decommissioning forum to be established with key stakeholders.

**Table 8-15: Closure and Decommissioning Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.	CESSION OF ACTIVITIES REMOVAL OF SITE TEMPORARY INFRASTRUCTURE AND REHABILITATION ACTIVITIES							
Biodiversity								
1	❖ Biodiversity	❖ cession of activities removal of site temporary infrastructure and rehabilitation activities	❖ Encroachment of alien invasive plant species.	❖ Implementation of alien invasive plant management plan needs to be continued during decommissioning to prevent the growth of invasive on rehabilitated areas; ❖ Rehabilitation of site with indigenous vegetation that occurs in the vicinity of project area ❖	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	❖ When ❖ Duration of the project ❖ rehabilitation ❖ Responsibility: Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
2	❖ Biodiversity	❖ cession of activities removal of site temporary infrastructure and rehabilitation activities	❖ Continued displacement, direct mortalities and disturbance of faunal community (including multiple threatened species) due to habitat loss and disturbances (such as dust).	❖ All infrastructure that could have a negative impact on faunal species (silt drying area sheeting etc) needs to be decommissioned and removed	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	❖ When ❖ Duration of the project ❖ rehabilitation ❖ Responsibility: Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
3	❖ Biodiversity	❖ cessation of activities removal of site temporary infrastructure and rehabilitation activities	❖ If rehabilitation is not done correctly erosion and dust dispersal is a major impact as it can result in habitat loss as well as impact the growth and health of both fauna and flora.	❖ Dust-reducing mitigation measures must be put in place and must be strictly adhered to. This includes wetting of exposed soft soil surfaces	❖ Site ❖ Local ❖ Regional	❖ NEMA ❖ National Biodiversity Assessment (NBA) ❖ Gauteng C-Plan ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Regulations, 2013 ❖ National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2016	❖ When ❖ Duration of the project ❖ rehabilitation ❖ Responsibility: Contractor ❖ ECO	❖ Minimise negative impacts on Biodiversity
Wetlands								
4	❖ Wetlands	❖ As read in the construction phase.						
Surface Water and Groundwater								
5	❖ Surface Water	❖ Rehabilitation activities	❖ Erosion and wash off of potential exposed contaminated soils resulting in water quality issues in the surrounding watercourses	❖ Runoff must be contained onsite through the implementation of paddocks until contaminated soils are removed; ❖ Once contaminated soils are removed, the area must be backfilled with uncontaminated soils, and levelled to its original functioning topography and revegetated; and ❖ Water quality monitoring must continue upstream and downstream until the site has been fully rehabilitatedslimes dams.	❖ Local ❖ Regional	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	❖ When ❖ During rehabilitation operations ❖ Responsibility: Site manager ❖ Contractor ❖ ECO	❖ Prevention of the deterioration of water quality
6	❖ Groundwater	❖ Rehabilitation activities	❖ Water quality impacts when the slimes have been removed	❖ Monitor groundwater quality in all boreholes, with the condition that intercept trenches and later, contamination capture wells will have to be installed in the alluvial if the monitoring shows deterioration during operations or post closure. ❖ Maintain sound surface runoff management to ensure that all dirty runoff is contained and diverted to the paddocks	❖ Site	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)	❖ When ❖ During rehabilitation operations ❖ Responsibility: Site manager ❖ Contractor ❖ ECO	❖ Prevention of the formation of AMD.
7	❖ Groundwater	❖ Groundwater Quantity	❖ Reduction in Aquifer Yield	❖ Monitor groundwater levels in all boreholes	❖ Site	❖ DWAF Best Practice Guidelines ❖ Guideline Document for the Implementation of Regulations ❖ Regulations on Use of Water for Mining and Related Activities aimedat the Protection of Water Resources (GN R704 of 12 February 2010)	❖ When ❖ During rehabilitation operations ❖ Responsibility: Site manager ❖ Contractor ❖ ECO	❖ Prevention of the formation of AMD.
Air Quality								

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
9	❖ Air Quality	❖ As read in the construction phase.						
<b>Social and Health</b>								
10	❖ Social	❖ Job Security and Skills Development ❖ Economic Growth	❖ Employment opportunities ❖ Stimulation of economic growth	❖ Offer a post retrenchment programme designed to equip those that have been retrenched with knowledge and skills; ❖ Post retrenchment programme can include computer courses, soft skills, construction and moving machinery	❖ Local ❖ Regional	❖ National Environmental Management Act, 1998 (Act 107 of 1998) ❖ Occupational Health and Safety (Act No. 85 of 1993) ❖ National Spatial Development Framework; ❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005) ❖ National Dust Control Regulations (Government Notice No. R827, 2013)	❖ When ❖ Duration of the construction phase of the project ❖ Responsibility: ❖ Contractor ❖ ECO ❖ Ergo	❖ Minimise, as far as possible, Negative social impacts ❖ Maximise, as far as possible, positive social impacts
11	❖ Social	❖ Safety concerns	❖ Safety impacts for employees and communities ❖ Spatial development and land use	❖ Maintain relationships with the relevant stakeholders and continue informing stakeholders about the progress of the project and prospects once the reclamation process is completed. ❖ Adhere to all measures implementable in the EIA and EMP reports.	❖ Local ❖ Regional	❖ National Environmental Management Act, 1998 (Act 107 of 1998) ❖ Occupational Health and Safety (Act No. 85 of 1993) ❖ National Spatial Development Framework; ❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005) ❖ National Dust Control Regulations (Government Notice No. R827, 2013)	❖ When ❖ Duration of the construction phase of the project ❖ Responsibility: ❖ Contractor ❖ ECO ❖ Ergo	❖ Minimise, as far as possible, Negative social impacts ❖ Maximise, as far as possible, positive social impacts
12	❖ Social	❖ Rehabilitation	❖ Alternative land uses ❖ Ecosystem Services	❖ Once the reclamation process has been completed, the area must be rehabilitated and should be made available for alternative sustainable land uses. ❖ Affected parties should be consulted in terms of the agreed end land use as per the MPRDA. ❖ The applicant to apply for a land clearance certificate from the NNR-upon approval of the clearance certificate, the applicant should comply with the conditions stipulated in the clearance certificate ❖ Adhere to all measures implementable in the EIA and EMP reports.	❖ Local ❖ Regional	❖ National Environmental Management Act, 1998 (Act 107 of 1998) ❖ Occupational Health and Safety (Act No. 85 of 1993) ❖ National Spatial Development Framework; ❖ National Environmental Management: Air Quality Act, Act 39 of 2004 (NEM:AQA) (Act No. 39, 2005) ❖ National Dust Control Regulations (Government Notice No. R827, 2013)	❖ When ❖ Duration of the construction phase of the project ❖ Responsibility: ❖ Contractor ❖ ECO ❖ Ergo	❖ Minimise, as far as possible, Negative social impacts ❖ Maximise, as far as possible, positive social impacts
<b>Radiation</b>								
13	❖ Radiation	❖ Implementation of the NNR approved decommissioning plan for the project	❖ To ensure that radiation exposure is below the regulatory compliance criteria (i.e., the dose constraint), and to optimise the radiation	❖ Adhere to the SWMP ❖ Adhere to the Groundwater monitoring programme ❖ Adhere to the dust fallout monitoring programme ❖ Submit any reportable incidents to the Relevant Department head	❖ Local	❖ National Nuclear Regulator Act (NNRA) (Act 47 of 1999) ❖ Nuclear Energy Act (NEA) (Act No. 46 of 1999). ❖ Safety Standards (Regulation No. 388 dated 28 April 2006)	❖ When ❖ Duration of the decommissioning phase of the project ❖ Responsibility:	❖ A plan which is in line with what is required by NNR ❖ Ensure the site is does not pose a

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
			protection by applying the ALARA principle.	<ul style="list-style-type: none"> <li>❖ Undertake a decommissioning radiation walk-over study</li> <li>❖ Abide by the Public Safety Assessment guidelines and recommendations to ensure that the site are cleared of radiation</li> <li>❖ Remove all contaminated soils and replace these with uncontaminated soils for land to be rehabilitated.</li> </ul>			<ul style="list-style-type: none"> <li>❖ Contractor</li> <li>❖ Ergo</li> <li>❖ NNR</li> </ul>	human health threat.

## 8.5 Post-Decommissioning Mitigation Measures

The following activities are expected to occur during the post-closure phase of the project.

**Table 8-16: Summary table of the Activities associated with this post-closure phase of the project**

ACTIVITY	DESCRIPTION
Post-Closure	
1	Rehabilitation and Monitoring.

**Table 8-17: Post-Closure Phase Mitigation Measures**

REFERENCE NO.	ASPECT	ACTIVITIES	IMPACT	MITIGATION MEASURES	SIZE AND SCALE OF DISTURBANCE POST-MITIGATION	COMPLIANCE WITH STANDARDS	TIME PERIOD FOR IMPLEMENTATION & RESPONSIBLE PERSON	OUTCOMES
1.	MONITORING							
1	<ul style="list-style-type: none"> <li>❖ Surface water</li> <li>❖ Groundwater</li> </ul>	<ul style="list-style-type: none"> <li>❖ Water quality monitoring</li> </ul>	<ul style="list-style-type: none"> <li>❖ Water pollution</li> </ul>	<ul style="list-style-type: none"> <li>❖ Monitor and maintain surface water management structures.</li> <li>❖ Monitor surface water and groundwater quality.</li> <li>❖ No pooling of water on surface allowed.</li> </ul>	<ul style="list-style-type: none"> <li>❖ Site</li> </ul>	<ul style="list-style-type: none"> <li>❖ DWAF Best Practice Guidelines</li> <li>❖ Guideline Document for the Implementation of Regulations</li> <li>❖ Regulations on Use of Water for Mining and Related Activities aimed at the Protection of Water Resources (GN R704 of 12 February 2010)</li> </ul>	<ul style="list-style-type: none"> <li>❖ When</li> <li>❖ Post closure timeframe</li> <li>❖ Responsibility:</li> <li>❖ Site manager</li> <li>❖ ECO</li> </ul>	<ul style="list-style-type: none"> <li>❖ Water quality improvement</li> </ul>



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## CHAPTER 9: SPECIFIC IMPACT MANAGEMENT PLANS

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The impact management actions per are detailed in Section 6 of this report. The impact management outcomes for the project are as follows:

- ❖ Maintain the footprint of the activities and do not extend the project infrastructure footprint more than 0,5 ha within the project boundary;
- ❖ Protect sensitive areas as far as practicable;
- ❖ Minimise dust fallout during reclamation;
- ❖ Reduce groundwater pollution and seepage;
- ❖ Reduce surface water pollution;
- ❖ Prevent further land and stream contamination;
- ❖ Maintain transparent engagement and communication; and
- ❖ Ensure the full rehabilitation of a site by removing sources of pollution and aligning rehabilitation of the land for its intended future use.

The following compliance mechanisms are required by Ergo on an annual basis:

- ❖ An environmental audit of the EMPr should be undertaken on an annual basis by an independent auditor.
- ❖ An internal audit should be undertaken annually.

### 9.1 Environmental Awareness Plan

#### 9.1.1 Communication Chain

The communication of the environmental risks for each phase of the project will take place for the management, administrative and site worker sectors of the site, as well as contractors and sub-contractors.

#### 9.1.2 Management Sector

A workshop will be conducted to inform all management of the risks associated with the project. The risks for all aspects will be explained and the appropriate management options discussed. The workshop will also elaborate on the monitoring programmes that will be implemented to identify and monitor the level of impact on the environment and discuss various remediation actions, should there be deterioration.

The evaluation process is integral in the assurance that the site reduces any possible environmental risks associated with the project. The workshop will be conducted prior to the construction phase to ensure that all risks are discussed before there is any chance of the impacts occurring.

The workshop may be repeated at certain stages during the construction phase, in the case of new employees.

This workshop will seek to explain the following necessary actions:

- ❖ Risks associated with each aspect will be discussed to ensure that there is an understanding of how each action of the project may impact on the environment.
- ❖ The mitigation of the environmental risk will be elaborated on.
- ❖ It is important that each person understand these management strategies as it ensures that the impact on the environment is kept to a minimum.
- ❖ Data collection regarding each aspect will also be explained to ensure that each aspect is monitored according to those protocols specified by the authorisations and licence. Along with data collection, the reporting of findings will be discussed.
- ❖ This workshop will take place before the construction phase begins, thus ensuring a full understanding of the project and its associated environmental risks before any construction activity is undertaken.
- ❖ The workshop will be repeated at the beginning of the operational phase as part of a handover to the next responsible party.
- ❖ The following communication channels and media will/ can be used to communicate environmental and social issues with Ergo employees during construction:
  - Head of Department (HOD) Meetings: The Site Manager communicates information to senior management on environmental issues and the information is minuted.
  - HSEC Meetings: 'Environmental issues' should be an agenda item on monthly safety, health & environmental meeting agendas.
  - Publications: Leaflets, posters etc. are produced by the relevant department or other designated persons, for use on notice boards, and distribution.
  - EMS Database: Feedback from line management on objectives, targets and actions.
  - Daily/ Weekly Safety Meeting: All meetings are scheduled to commence with a discussion on safety, health & environmental topics.

#### 9.1.3 Construction Workers Sector

The workers associated with the activities on site will attend an induction course to ensure that each person is aware of the environmental risks associated with the project. This induction will form part of the health and safety induction. The environmental risks of each aspect as well as the mitigation will be elaborated on.

A debriefing should take place when the project moves from one phase to the next. A Job Hazard Analysis (JHA) or Issue Base Risk Assessment could also be conducted to identify potential risks associated with the project.

Furthermore, weekly toolbox talks / green meetings must cover topics raising awareness on environmental and social issues relating to the project.

#### 9.1.4 Contractors

A Risk Conversancy Training (RCT) is conducted and is applicable to all contractors. Here focus will be on activities that carry an environmental risk, actions to be taken to reduce these risks, and procedures to be followed in the event of an incident.

Furthermore, weekly toolbox talks / meetings must cover topics raising awareness on environmental and social issues relating to the project.

#### 9.1.5 Environmental Control Officer

The ECO will oversee environmental awareness induction training to all contractor staff. The ECO will ensure that the necessary environmental induction training takes place and that records of attendance are maintained and up to date.

## 9.2 Strategic Communication Plan

### 9.2.1 Environmental Communication Strategies

Ergo Management are required to establish procedures for the internal communication between the various levels and functions of the organisation, and receiving, documenting and responding to environmental risks for each phase of the project will take place for the management, administrative and worker sectors of the site, as well as contractors. The organisation shall conduct processes for external communication on its significant environmental aspects and record its decision in line with Ergo communication policy as well as conditions stated in any EA or License.

#### 9.2.1.1 Stakeholder Engagement Plan

A Stakeholder Engagement Plan (SEP) and Grievance Mechanism (GM) must be compiled for a project. The SEP needs to provide guidance for engagement with Stakeholders.

#### 9.2.1.2 Internal Communication

Internal communication is done within the Administrative Sector.

#### 9.2.1.3 External Communication Strategies

The following communication channels and media can be used to communicate environmental issues to individuals who are not employed by Ergo or its subcontractors:

- ❖ **Environmental Stakeholder engagement forum:** An Environmental Stakeholder engagement forum must be established and used to keep interested and affected parties informed of the significant environmental aspects identified through the Environmental Impact Assessments and Management Plans. This forum should preferably be initiated prior to commencing with any activities on site. This is also the forum where interested and affected parties get the opportunity to raise environmental concerns. Records must be kept of all decisions and concerns. The Environmental Stakeholder engagement meetings must be chaired by the personal of Ergo, or another appropriately appointed competent individual.
- ❖ **Publications:** Selected publications should be produced and used to communicate environmental issues to outside parties. Examples include newsletters and Annual Reports.

- ❖ **Communication from External Parties and Employees:** A clear communication point is established within the company through the Ergo communication procedure that determines who is responsible for liaison with the media in respect of any crisis that may arise. A complete procedure for media liaison is available to all employees. Communication from external interested and affected parties may be received by email, fax, telephonically or by mail. Where required, a written response will be sent, on receiving such communication, by the appropriately appointed individual under signature of the Site Manager, to the respective interested and / or affected party. All telephonic or facsimile correspondence received on the site must be forwarded to the relevant department for action. All events or concerns will be captured and actioned on an existing and / or future database.
- ❖ **E-mail:** E-mail communication received must be stored, with replies, in an appropriate folder on a server. E-mail messages, relevant to environmental management, should be kept for a minimum of two years before deletion.
- ❖ **Mail:** Correspondence received by mail must be filed, along with the response (where relevant), within the relevant department's filing system for a minimum period of two years. Paper correspondence will be archived in this department.
- ❖ **Storage of Correspondence:** All original correspondence must be retained by the Site Manager for a minimum period of two years.
- ❖ **Environmental Reports:** Copies of relevant specialist study reports and Environmental Impact Assessments will be available on request from an external party by the Site Manager.
- ❖ **Queries from Interested and Affected Parties:** Response to queries about environmental impacts and aspects will be addressed by the relevant department and approved by the Site Manager.
- ❖ **Queries and Requests from the Media:** Requests for articles from the media on environmental issues regarding the road construction will be co-ordinated by the Corporate Communication manager according to the public communication strategy, with input from the relevant department, as approved by the General Manager, in line with the Ergo Public and Community Communication and Liaison Strategy. Due to the environmental awareness generated by induction, on the job training etc., employees are able to identify environmental problems, issues, concerns and pollution timeously.

#### 9.2.1.4 *Evaluation of the Environmental Awareness Plan*

The evaluation of the environmental awareness and training plan will be conducted by Ergo management. This evaluation will entail the auditing of the operation in both the construction and operation phase once activity has commenced. The environmental awareness and training plan described above is sufficient to make all those involved in the project aware of those risks that may occur as well as the necessary mitigation required to minimize these risks.

The environmental awareness and training plan indicates that Ergo is serious about the environments well-being and empowerment of the local people. Environmental issue will be highlighted at monthly meetings scheduled at the site.

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#### 9.2.1.5 *Emergency Incident Reporting*

Environmental incident reporting is a vital part of communication at the Marievale Project. Employees are required to report any and all environmentally related problems, incidents and pollution, so that the appropriate litigator action can be implemented timeously. In the event of an Environmental Incident, the incident must be reported according to the Incident Reporting Procedure.

An Emergency Incident Preparedness and Response Plan needs to be developed.

#### 9.2.1.6 *Induction*

All full-time staff and contractors are required to attend an induction session. Employees are inducted when they start on the project. Any contractor, who works on the project is required to undergo Ergo's prescribed induction training. This induction will form part of the health and safety induction.

Environmental issues and aspects related to the project will be addressed in the induction sessions. All environmental impacts and aspects and their mitigatory measures will be discussed, explained and communicated to employees. The induction sessions will be modified according to the level of employee attending the induction session so that all employees gain a suitable understanding of environmental issues and pollution.

The records of all individuals attending induction sessions to be kept; the records to be kept include names, ID, contact details, designation and signature.

#### 9.2.1.7 *On the Job Training*

On the job training is an essential tool in environmental awareness. Employees will be given details of the expected environmental issues and concerns specifically related to their occupation. Employees will be trained on how to respond if an environmental problem or source of environmental pollution arises. The training will be on-going, and all new employees will be provided with the same standard of training as existing employees. In addition, contractors working on the project will be subjected to a Risk Conversancy Training (RCT).

The records of all individuals receiving on the job training to be kept; the records to be kept include names, employee number, contact details, designation and signature.

#### 9.2.1.8 *Hazardous Substances*

Individuals dealing with potential hazardous situations and risks that could lead to hazardous spills, pollution incidents, excessive dust or other forms of environmental damage should receive appropriate job specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. All these actions will be done in accordance to the Ergo procedures on management of hazardous substances

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#### *9.2.1.9 Dust mitigation*

Individuals dealing with potential situations and risks that could lead to excessive dust should receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation

#### *9.2.1.10 Fire Incidents*

Individuals dealing with potential hazardous situations and risks that could lead to fire incidents or emergencies should receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *9.2.1.11 Pollution Incidents or Forms of Environmental Damage*

Any incident or form of environmental damage must be dealt with in accordance with the Incident management procedure. This document is held with Ergo.

Individuals dealing with potential situations and risks that could lead pollution incidents or other forms of environmental damage to receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.

#### *9.2.1.12 Waste Management*

Site personnel and contractors responsible for the operation and safe handling of the various waste streams will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation. Ergo must ensure that training and awareness programmes cover the safe transportation, handling, storage, transfer, handling, use and disposal of all waste streams, and the location of waste receptacles for each waste stream. All waste management activities must be done in accordance to the Ergo procedures and in terms of registers dealing with storage of waste in specific areas.

Staff awareness training programme will accommodate training, on which bin to use for organic waste and on sealing the lid on the bin once organic waste has been discarded.

#### *9.2.1.13 Water Management*

All persons responsible for active water management will receive appropriate job-specific training on the risks and potential consequences of their appointment and work situation, how to avoid environmental impacts and how to respond during an environmental incident or emergency situation.



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#### 9.2.1.14 Water Consumption and Use

All staff will receive training on minimising water consumption and how to use water sparingly.

### 9.3 Emergency Response Plan

An Environmental Emergency Response Plan defines the process to follow to respond rapidly and effectively to and manage emergency situations that may arise as a result of the Marievale Project. This plan must be initiated when an emergency:

- ❖ Cannot be immediately brought under control;
- ❖ Has the potential to extend beyond site boundaries;
- ❖ Has the potential to significantly impact on the environment and/or community; and
- ❖ Requires assistance from External Emergency Services.

Ergo will develop an Emergency Response Plan for the Marievale Project.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will ensure that Contractors comply with all procedures described in this document.

#### 9.3.1 Intent

A Work Method Statement should be prepared prior to the commencement of any activities, detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation. The method statement must also reflect conditions of the IFC Performance Standard 1 and include the following:

- ❖ Areas where accidents and emergency situations may occur;
- ❖ Communities and individuals that may be impacted, as read in the specialist studies;
- ❖ Response procedure;
- ❖ Provisions of equipment and resources;
- ❖ Designation of responsibilities; and
- ❖ Communication, both internally and externally.

The purpose of this plan is to define the emergency response structure and process of the Marievale Project. The objectives of the plan are:

- ❖ To ensure communication of all vital information as soon as possible;
- ❖ To provide clear guidance in the management of emergencies that have the potential to impact on life, property, environment and community;
- ❖ Clearly define roles and responsibilities;
- ❖ To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed;

- 
- ❖ For employees to be able to take prompt effective action to reduce the risk of injury, minimise environmental impact and property damage likely to result from possible emergencies;
  - ❖ To specify the emergency communication process necessary to establish links with key site personnel.

The Emergency Preparedness and Response Code of Practice will be compiled in accordance with the Occupational Health and Safety OHSAS 18001, and the Site Health and Safety Act, 1996 (Act No. 29 of 1996).

#### 9.3.2 Planning

There are three levels of emergency, these are delineated as follows:

- ❖ Local Emergency: An alert confined to a specific locality.
- ❖ Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- ❖ Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation, and every effort must be made to reduce or stop the cause of any emergency provided it is safe to do so. Factors effecting the success of the emergency response strategy include:

- ❖ The type and scale of incident/accident will govern the type of response.
- ❖ The scale of the incident, accident or emergency will govern the resources required to bring under control.
- ❖ Communications after which an incident or emergency is first reported governs scale, type and resources required to maintain effective control and bring to resolution.

To facilitate the effective implementation of the procedures, copies of the Environmental Emergency Response Plan must be placed in accessible and visible locations around the site.

**Table 9-18: Emergency Scenario Contingency Planning**

INCIDENT	PREVENTION MEASURES	PROCEDURES	DESIGNATION
Spill which would result in the contamination of land, surface or groundwater.	<ul style="list-style-type: none"> <li>❖ All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.</li> <li>❖ No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.</li> <li>❖ Any fluids drained from the machinery during servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.</li> <li>❖ A spill must be given the highest priority, and clean-up turn-around time must be as fast as possible,</li> <li>❖ Ensure all paddocks and stormwater systems are desilted prior to commencing with construction.</li> <li>❖ Ensure all paddocks and stormwater systems have sufficient capacity to hold dirty water – especially during rainfall events.</li> <li>❖ Adhere to the stormwater management plan for this EMPr.</li> <li>❖ Signage to be placed around the dams to ensure no persons use the paddocks for recreational purposes.</li> <li>❖ If these activities result in damage or accumulation of contaminated slimes on the bare soil, the contaminated soil must be stripped and disposed of as hazardous waste.</li> <li>❖ Chemical toilets used during construction must be regularly cleaned. Care and due diligence should be taken at all times.</li> <li>❖ Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.</li> </ul>	<ol style="list-style-type: none"> <li>1. Spill or release identified.</li> <li>2. Assess person safety, safety of others and environment.</li> <li>3. Stop the spill if safely possible.</li> <li>4. Contain the spill to limit entering surrounding areas.</li> <li>5. Identify the substance spilled.</li> <li>6. Quantify the spill {under or over guideline/threshold levels).</li> <li>7. Notify the Site Manager and emergency response crew and authorities {in the event of major spill}.</li> <li>8. Inform users {and downstream users} of the potential risk.</li> <li>9. Clean up of the spill as fast as possible.</li> <li>10. Record of the spill incident on company database.</li> </ol>	Contractor and ECO

Ergo's Safety, Health and Environment (SHE) Representative, who is responsible for managing the day-to-day on-site implementation of this Plan, must act as liaison and advisor on all environmental and related issues.

It is necessary to prevent land from becoming sterilised due to a spill. Criteria that may be considered for restoring the affected area include natural biodegradation of oil, replacement of soil and revegetation. Further, a radiation walk-over should be undertaken for spills of a reportable size and affecting large expanses of land which is intended for future use as residential housing or commercial property. Results from the survey must be reported back to the Competent Authority and National Nuclear Regulator.

Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

## 9.4 Conceptual Stormwater Management Plan

**Please refer to Section 7.6.6 of the EIA for a detailed description of the Stormwater Management Plan.**

### 9.4.1 Conceptual Stormwater Management Plan

The purpose of the conceptual SWMP is to ensure that clean and dirty water are adequately separated, by diverting clean water away from dirty areas, and ensuring that dirty water from the operation is captured, contained and managed appropriately in accordance with GN R704 Regulations and DHSWS best practice guidelines.

The following design philosophy was adopted to guide the development of the SWMP, and is based on GN R704 and the DWS Best Practice Guideline (BPG) G1: Storm Water Management:

- ❖ Confine or divert any unpolluted water to a clean water system, away from a dirty area;
- ❖ Runoff from dirty areas must be captured, contained and managed appropriately;
- ❖ Clean and dirty water systems must be designed and constructed to prevent cross contamination;
- ❖ Dirty water must, as far as possible, be recycled and reused or treated and discharged;
- ❖ Clean and dirty water systems must convey/contain runoff from the 50 year storm event, and should not lie within the 100 year floodline or within a horizontal distance of 100 m from any watercourse, whichever is the greater of the two; and
- ❖ Appropriate maintenance and management of stormwater related infrastructure should be ensured at all times.

The following are assumptions and limitations for the conceptual SWMP:

- ❖ The SWMP is based on the project description provided. Should the project description or infrastructure layout change, then the SWMP will need to be revised; and
- ❖ The SWMP is conceptual. A detailed SWMP should be designed based on the concept design prior to construction.

#### 9.4.1.1 Clean and Dirty areas

Dirty areas include the following areas:

- ❖ TSF footprint area;
- ❖ Reclamation pump station; and
- ❖ Coarse material stockpile.

Clean areas include all areas surrounding the above-mentioned dirty areas.

#### 9.4.1.2 Proposed stormwater measures

The proposed SWMP for Dumps 7L5 and 7L6 is indicated on Figure 9-9, whilst Figure 9-10 indicates the proposed SWMP for Dump 7L7. The SWMPs have been designed as closed systems (i.e. no discharge of dirty water runoff to the surrounding environment). Stormwater measures proposed to separate clean and dirty water areas are discussed below. The SWMPs have been designed as closed systems (i.e. no discharge of dirty water runoff to the surrounding environment). Stormwater measures proposed to separate clean and dirty water areas are discussed below.

#### 9.4.1.3 Clean Cut-Off Trenches

Upslope runoff will be diverted away from the dumps via cut-off trenches. An existing trench was noted to be running along the northern side of Dumps 7L5 and 7L6. The trench was noted to be silted and overgrown and will need to be repaired and upgraded. No trenches or channels to divert upslope runoff away from Dump 7L7 were noted, and it is therefore proposed that a trench is dug around the dump, as indicated on Figure 9-10. The soil removed during the construction of the trench, should be placed on the dump side of the channel, to create a berm that will provide a separation barrier between clean and dirty areas. In order to prevent erosion and siltation, the trenches and the berms must be vegetated with indigenous grass. It is proposed that the trenches are constructed to be trapezoidal in shape, with side slopes of 1V:2H (Figure 9-8). This will allow for easy access when maintenance is required, such as when the trenches become silted or overgrown.

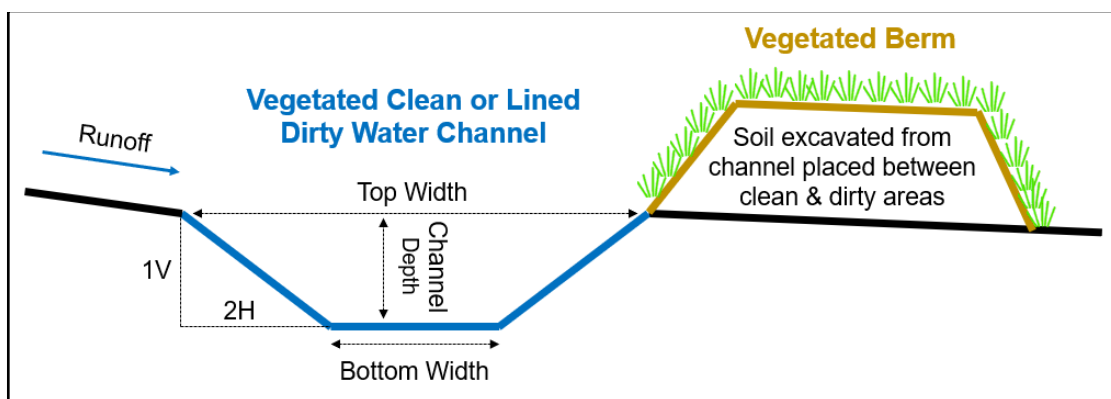


Figure 9-8: Proposed channel and berm design



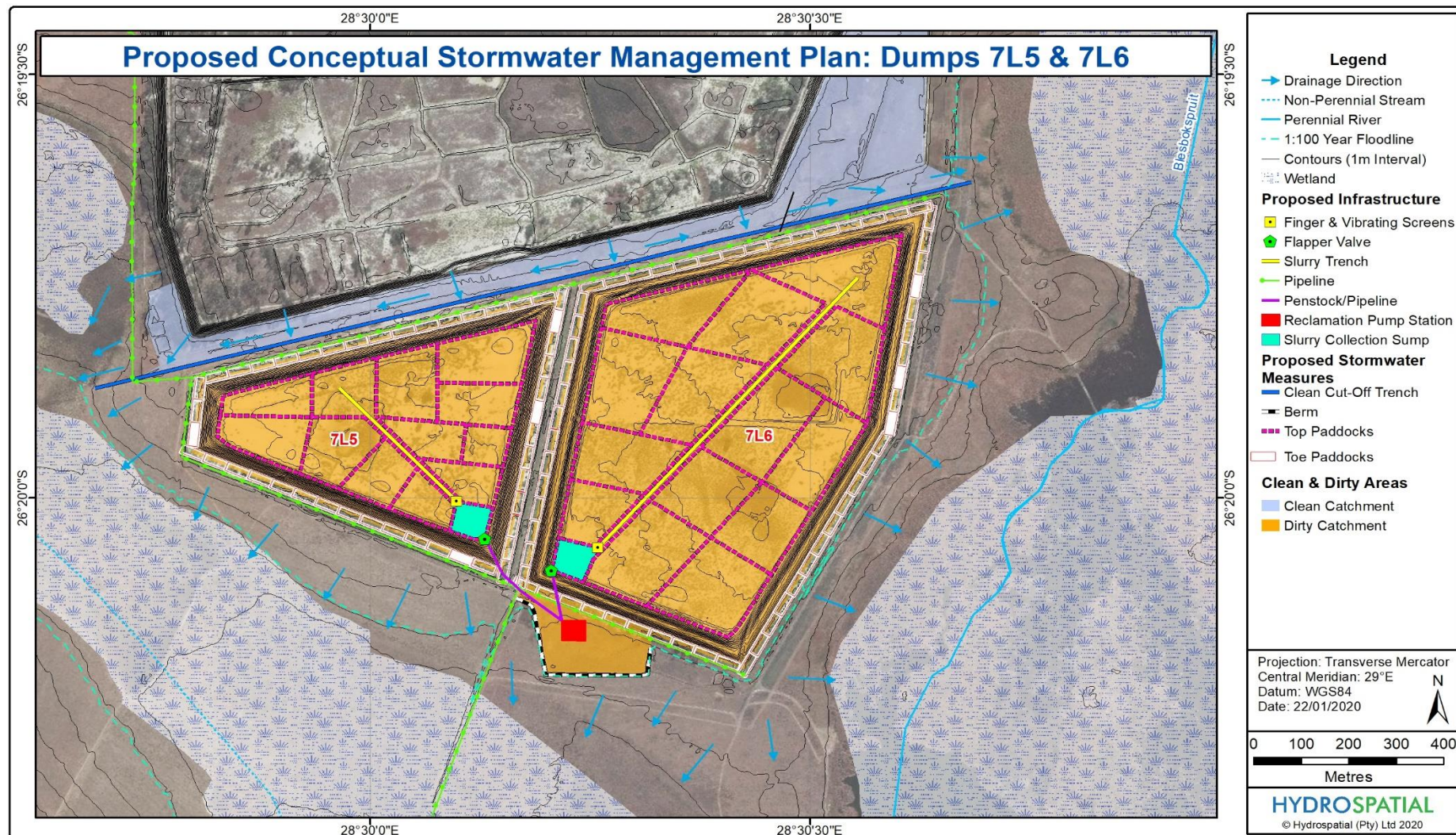


Figure 9-9: Proposed conceptual stormwater management plan for Dumps 7L5 and 7L6



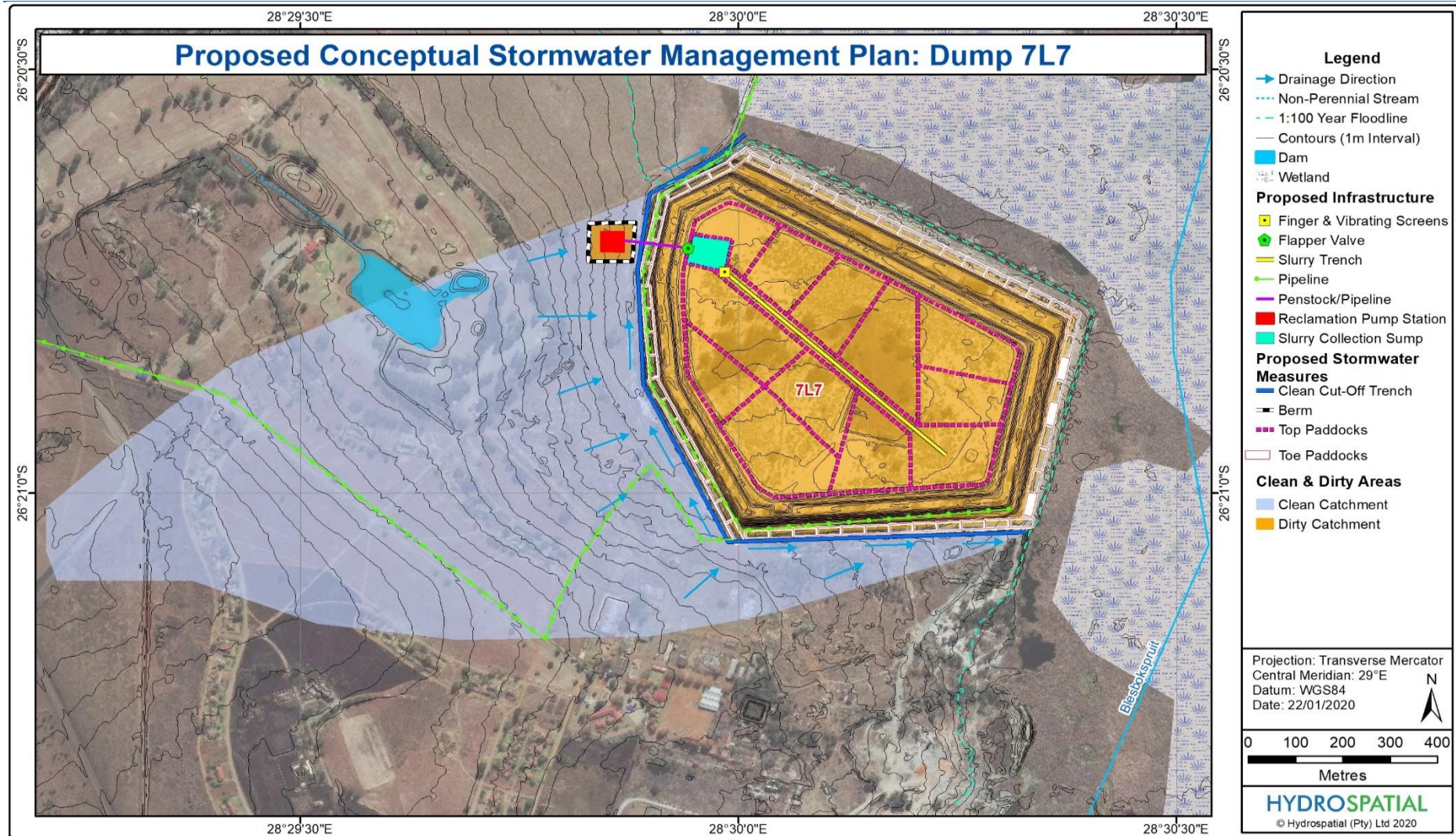


Figure 9-10: Proposed conceptual stormwater management plan for Dump 7L7



#### 9.4.1.4 Top Paddocks

It is proposed that the top of the dumps be sectioned off into a series of paddocks. The purpose of the paddocks is to ensure that runoff from storm events is contained on top of the dump, as well as to prevent flooding and potential spills at the slurry collection sump. The paddock walls should be constructed at a height of 1.5 m, which is higher than the 1:50 year storm event including an average year of rainfall, with side slopes not steeper than 1V:3H. The only area that will contribute runoff to the slurry collection sump, is the paddock where hydraulic reclamation takes place (this area is referred to as the working area in this report, which has been assumed to be 5 % of the dump area at any time).

#### 9.4.1.5 Toe Paddocks

The purpose of the toe paddocks is to capture, contain and evaporate runoff from the side slopes of the dumps. The existing toe paddocks at the dumps were noted to be silted and will require desilting. Figure 9-11 indicates silted paddocks at Dump 7L5.



**Figure 9-11: Silted toe paddocks at Dump 7L5**

#### 9.4.1.6 Berms

Berms are proposed around the reclamation pump stations. The purpose of the berms is to ensure that potential spills from the pump stations are contained. An existing berm at Dumps 7L5 and 7L6 can be made use of, which will need to be repaired and upgraded. At Dump 7L7, soil taken from the clean cut-off trench can be used to construct a berm. The berms must be vegetated to prevent erosion.

## 9.5 Groundwater Monitoring and Seepage Prevention

### 9.5.1 Groundwater Management Measures

During the reclamation process adequate quality control measures are needed to ensure that the methodology conforms to specification and that management targets have been achieved. This requires environmental monitoring while reclamation is in progress. In addition, upon completion of the reclamation, additional monitoring and management activities may be necessary, in particular, if contamination remains in any form on the site.

The following objectives and targets are proposed for groundwater management during and after completion of the Marievale reclamation project:

- ❖ Install dedicated groundwater monitoring points in-between dumps 7L5/ 7L6 and 7L7 and downstream from dump 7L7 . The current lack of boreholes / groundwater monitoring sites in these areas makes it difficult to assess, monitor and manage the groundwater environment.
- ❖ Implement a water management plan aimed at reducing and/or eliminating adverse impacts on the Blesbokspruit, from adjacent mining, industrial and residential activities.
- ❖ Assess implementation of additional mitigation/management measures.
- ❖ Implement sufficient monitoring procedures to measure the effectiveness of groundwater management measures at Ergo and private boreholes.
- ❖ Track and record the progress of implementation of all groundwater management measures.
- ❖ Analyse the information obtained from all monitoring programmes against compliance targets, to establish trends and make adjustment if required.
- ❖ Should the trends indicate adverse impacts on groundwater levels and/or quality, implement suitable measures within the shortest possible time to remediate and/or eliminate such adverse impacts identified.

#### 9.5.1.1 Principal Groundwater Management Measures

Several broad, over-arching groundwater management measures should be implemented for the Marievale project to minimise impacts on the groundwater environment, during all phases.

**Table 9-19: General groundwater management measures**

CONSTRUCTION PHASE
A dedicated groundwater monitoring network will first have to be established
Make provision for sufficient groundwater level and quality monitoring budget to implement the groundwater monitoring programme, before the excavation starts.
Ensure that sufficient information is available if private boreholes are identified around the Blesbokspruit (1 km radius), to quantify existing groundwater status and use. This information will form the basis for future assessments and pollution claims.
Develop effective surface runoff management plans to ensure that all dirty runoff is removed of site as soon as possible. Avoid pooling of water.
Ensure that cut-off trenches with sumps are designed to contain all dirty water generated during the reclamation to prevent overflows and spillages.

Implement sound house-keeping measures to prevent and clean spills, address leaks and undertake regular inspections. Ensure that the record-keeping procedure is in place and that instructions given are carried out.
Measure rainfall on site.
<b>OPERATIONAL PHASE</b>
Complete regular inspections of trenches and sumps, specifically noting incidences of overflow and leakage. If the latter is identified, measures must be taken to rectify immediately.
Maintain sound house-keeping measures to prevent spills and leaks.
Maintain the groundwater monitoring programme in mine and private boreholes (if identified).
Measure rainfall on site.
Record all groundwater-related complaints and deal with each complaint within the agreed upon timeframe.
<b>DECOMMISSIONING AND CLOSURE PHASE</b>
Complete all rehabilitation to a satisfactory level, focussing specifically on the water drainage and collection system.
Continue with the groundwater monitoring period for a minimum of two years after completion of the rehabilitation.
The continued need for groundwater monitoring will depend on the outcome of the final closure assessment.

The following specific groundwater management measures are recommended, based on the outcome of this assessment. The measures are related to two broad impacts, namely the availability of groundwater and the quality of groundwater.

#### 9.5.1.2 Measures to Address Impacts on Groundwater Availability

The following specific measures are recommended to minimise and/or eliminate the impacts on groundwater levels and availability:

- ❖ All boreholes listed in Section 7.7 of the EIA must be included in the groundwater monitoring programme.
- ❖ Feedback must be provided to owners of boreholes within the affected zones regarding progress made with the reclamation activities and the outcome of monitoring programmes, on a quarterly basis when groundwater monitoring will take place, to ensure that they are informed of aspects that may be of significance. At this stage groundwater users were not identified, apart from the agricultural activities to the east of the Blesbokspuit.
- ❖ Ensure that an effective surface water collection and retention system is in place to ensure that all flow and collected water is directed towards the cut-off trenches with sumps and not allowed to freely drain away from the various slime holding areas.

#### 9.5.1.3 Measures to Address Impacts on Groundwater Quality

The following specific measures are recommended to minimise and/or eliminate the impacts on groundwater quality:

- ❖ In order to minimise negative long-term impacts associated with the project, it is important that tailings reclamation must be completed to soil level at these sites. All tailings must be removed.
- ❖ A dedicated groundwater monitoring network will first have to be established.
- ❖ It is recommended that clusters of shallow and deep monitoring boreholes are drilled at each proposed monitoring position. The shallow boreholes must be used to target the alluvial aquifer

specifically, as this aquifer was identified as a preferential flow path to potential groundwater contamination associated with the project. The depth of the alluvial aquifer will be confirmed during the drilling of the deep borehole at each proposed monitoring site. If the alluvial aquifer is less than 5m thick, the shallow borehole must be drilled to the depth of weathering. A proposed maximum depth of 15m is recommended for the shallow monitoring boreholes. The shallow monitoring boreholes must be fitted with screens from top to bottom to ensure that all potential contamination is detected in the boreholes.

- ❖ The proposed new monitoring boreholes should be drilled in sets of shallow and deep boreholes to target the weathered Karoo aquifer, as well as the underlying dolomitic aquifer. Aquifer testing must be completed on the boreholes in order to obtain aquifer characteristics. This information must be used to update the existing conceptual model for the project area. If significant changes are recorded, the numerical modelling presented in this report must be updated.
- ❖ It is important that sound house-keeping measures are implemented at the operations to minimise the threat to groundwater contamination. This includes oil and fuel spill management as well as the containment of process water.
- ❖ Ensure that clean and dirty water is separated at the excavation and drying areas, and that dirty water is contained. Contain dirty water in adequately sized and lined sumps.
- ❖ It is important that all dirty water containment dams and paddocks as part of the project are constructed with sufficient size according to the requirements of GN704, to prevent overflow or spills. These dams and paddocks must further not be constructed on alluvial material, but on outcrops of Karoo sediments away from the wetland areas.
- ❖ All dirty water being pumped from the excavated areas should be taken off site to prevent unnecessary discharge into the natural environment or allow for seepage into the aquifers.
- ❖ A monitoring programme must be implemented to establish leachate quality during the life of operations.
- ❖ The following monitoring trigger actions are recommended for the project:
  - **An increase of >10%, <20% in any element monitored over one season:** Investigate the possibility of leakage and/or spills in process water containment dams and paddocks. If such leaks or spills are detected, they must be remediated immediately. Revise the operating procedure for the site to minimise spills and leaks.
  - **An increase of >20%, <50% in any element monitored over one season:** This is expected to happen if process water is not effectively contained and managed on site. In this event, the water balance for the site must be re-assessed and the sizing of process water containment dams and paddocks re-evaluated to ensure that all contaminated water is contained and effectively re-used in the water circuit.
  - **An increase of >50% in any element monitored over one season:** Develop an action plan to implement scavenger boreholes down gradient of the affected area to remove, contain on surface, reuse and possibly treat contaminated groundwater.
- ❖ It is recommended that representative tailings samples are taken from each of the TSFs that form part of the project to complete leach tests and a geochemical assessment. This will provide information on leachate/seepage quality as well as the risk of acidification during operations and in the long-term.
- ❖ Implement the necessary cut-off trenches and berms to prevent wash-in of additional silt and slimes from nearby historical TSF.

- ❖ A re-run of the contaminant transport simulations must be undertaken once additional information is available, to improve the confidence levels in long-term predictions. These simulations must be completed at least five years prior to site closure to ensure that effective measures are developed to manage long-term impacts

#### 9.5.2 Groundwater Monitoring

To monitor and prevent the spread of groundwater contamination, groundwater management procedures and practices have to be implemented that are in line with accepted practices and in accordance with the requirements of the Environmental Management Plan (EMPr). It is recommended to implement the groundwater monitoring programme presented in this report. The key objectives of the groundwater monitoring programme are to:

- ❖ Detect short and long-term trends;
- ❖ Recognise changes in groundwater quality and levels;
- ❖ Measure impacts and define mitigation measures; and
- ❖ Develop improved monitoring systems.

Groundwater monitoring will be undertaken to establish the extent of contamination in the shallow weathered and deeper fractured aquifers, during and after reclamation.

##### 9.5.2.1 Monitoring Locations

A preliminary groundwater monitoring network is presented in Table 9-3. If additional private boreholes are identified within a 1 km radius, they must be included in the monitoring programme.

Dedicated monitoring boreholes must be drilled and tested prior to the commencement of the reclamation project – at least 1 year before reclamation commences. At the new monitoring targets (MON1 to MON3), a cluster of one shallow and one deep monitoring borehole must be drilled to assess impacts on the shallow weathered and deeper fractured aquifers. The depth of the deeper boreholes must be at least 50 m. The deep monitoring boreholes must be fitted with a seal to the base of the weathered zone to ensure that it measures only the fractured rock aquifer. The depth of the paired shallow borehole, at each monitoring target must be drilled to the depth of weathering, approximately 20 m below surface. It is recommended that the additional monitoring positions are drilled based on the expected shape and movement of the simulated sulphate plumes.

The locations of the proposed boreholes are indicated on Figure 9-12. These locations are based on the outcome of the impact prediction completed as part of this assessment. In order to function as an effective early warning system, it is important that these boreholes are drilled as close as possible to the TSFs.

**Table 9-20: Proposed groundwater monitoring positions**

Borehole	X Coordinate (WGS84)	Y Coordinate	Depth (m)
MON1	-49202	-2914234	15 and 50



MON2	-50021	-2913893	15 and 50
MON3	-49450	-2915741	15 and 50

In addition to the monitoring of the new boreholes discussed above, it is important to include some of the hydrocensus boreholes in the Ergo monitoring programme. In this regard, it is strongly recommended that at least Mari1, Mari2, Mari3 and Mar4 are included in the monitoring programme. Their monitoring requirements would be the same as those described for the new monitoring boreholes

#### 9.5.2.2 Monitoring Requirements

The monitoring requirements are presented in Table 9-4.

**Table 9-21: Groundwater monitoring requirements**

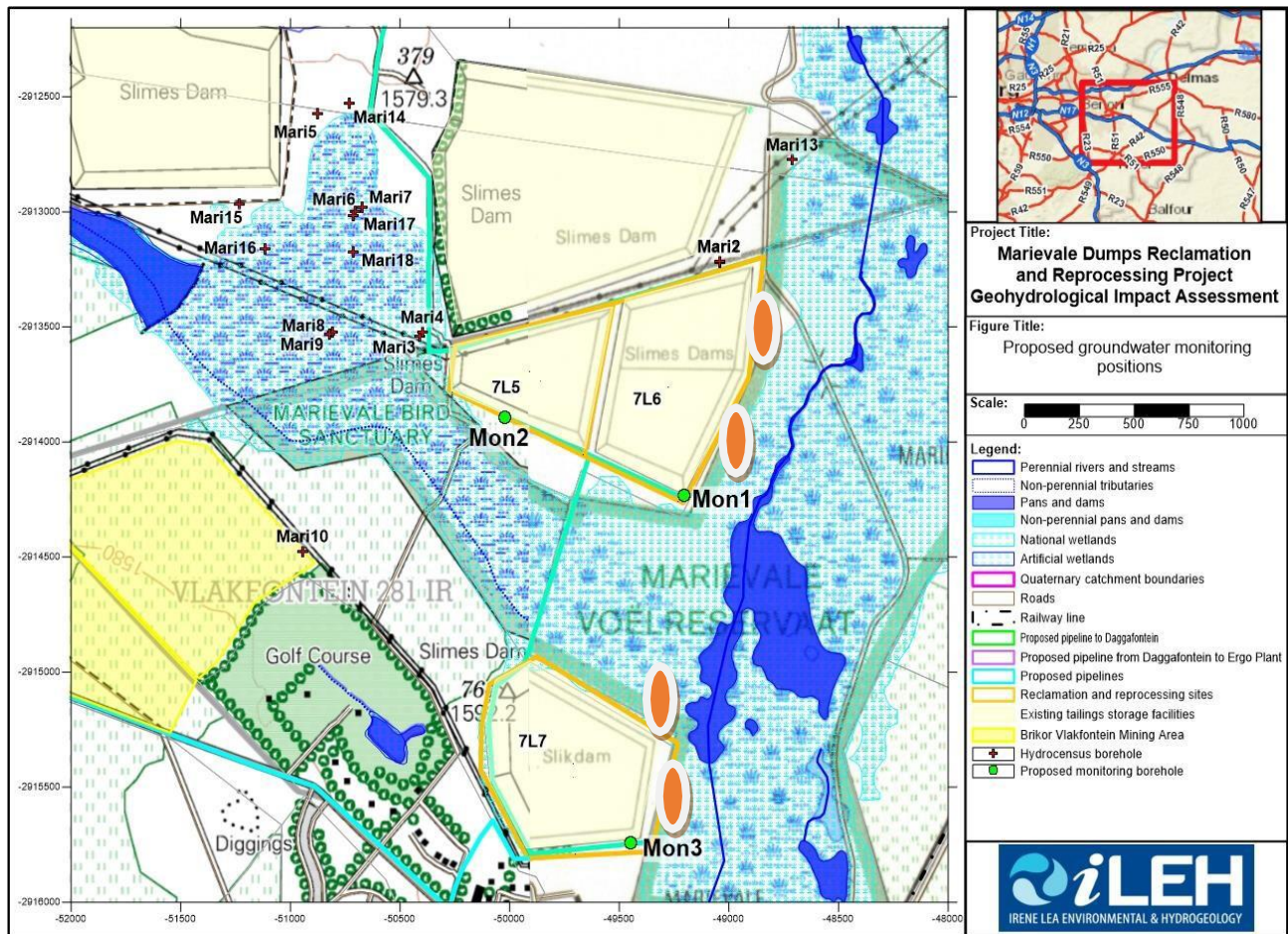
Monitoring parameter	Element for analysis	Monitoring frequency
Depth to groundwater level	Groundwater level	Monthly
Water quality	A full spectrum of heavy metals and salts	Quarterly

All monitoring information must be entered into a spreadsheet for record keeping and analysis. Copies of the certificates of analyses must be kept on file for inspection. If a significant exceedance is recorded during the monitoring programme, the following actions should be taken:

- ❖ Log the exceedances in the incident reporting system within 24-hours of it occurring.
- ❖ Report the exceedances to the Environmental and General Managers, as well as to the regulatory authority.
- ❖ Undertake an investigation to identify causes of the exceedances.
- ❖ Consult with any landowner or affected party that may be impacted by the exceedances to determine their concerns and to negotiate remedial actions.
- ❖ Implement the necessary remedial actions according to the outcome of the investigation and consultation with the affected parties.
- ❖ Track the incident until completion.

Regular monitoring reports must be prepared for internal use, as well as for submission to the authorities.

The length of post-closure monitoring must be negotiated with Government during the decommissioning phase. It is recommended that the monitoring programme be implemented for a minimum period of 2 years post closure to establish trends.



**Figure 9-12 Proposed new monitoring borehole locations**

#### 9.5.2.3 Groundwater Monitoring Reports

Monitoring reports must contain the following information:

- ❖ Monitoring borehole location map;
- ❖ Geology map;
- ❖ All coordinates of the groundwater sampling sites;
- ❖ Certificates of analysis must be included for quality assurance. Monitoring results will be compared to South African National Standards (SANS241) and the Klip River catchment guideline limits;
- ❖ Time-series graphs for key indicator elements (e.g. pH, EC, TDS, Fe, Mn, Al, SO<sub>4</sub> and E. coli);
- ❖ Trilinear or other analytical groundwater plots;
- ❖ A discussion regarding observed trends and potential groundwater contamination; and
- ❖ Recommendations regarding possible amendments or additions to the groundwater monitoring programme, based on trends and other information observed.

#### 9.5.2.4 Quality Assessment and Quality Control

Quality assurance means:

- ❖ Developing a system of activities to ensure that measurements meet defined standards of quality with a stated level of confidence;
- ❖ Defining monitoring objectives, quality control procedures to be followed and quality assessment;
- ❖ To define data quality objectives, including accuracy, precision, completeness, representativeness and comparability; and
- ❖ Designing a network, selecting sampling sites, selecting instruments and designing the sampling system, as discussed above.

All monitoring equipment must be maintained as required, and calibration must be undertaken on a regular basis.

To ensure that the Groundwater Monitoring Strategy complies with the above, it is important that analytical laboratories used should be accredited for each type of analysis required, to ensure that accurate analytical methods are used.

While only one or two of the common major ions found in waters may be specified as key indicators, it is necessary to analyse for the full suite of common ions for quality control purposes and to detect discrete events and long-term trends in anion composition.

Special attention must be paid to sampling methods and to preservation and handling of samples prior to analysis. pH and conductivity must be measured in the field.

Close attention must be given to siting, logging and construction of monitoring boreholes and assessment of their condition must be made quarterly. The following sampling protocol is proposed:

- ❖ Sterilised plastic bottles, with a plastic cap and no liner within the cap are required for the sampling. Sample bottles should be marked clearly with the borehole name, date of sampling, water level depth and the sampler's name;
- ❖ Water levels should be measured prior to taking the sample, using a dip meter (m bgl);
- ❖ Each borehole to be sampled should be purged (to ensure sampling of the aquifer and not stagnant water in the casing) using a submersible pump or a clean disposable polyethylene bailer. At least three borehole volumes of water should be removed through purging; or through continuous water quality monitoring, until the electrical conductivity value stabilizes;
- ❖ The following field measurements should be recorded on a field form for each sampling point: pH, EC and temperature;
- ❖ Samples should be kept cool in a cooler box in the field and kept cool prior to being submitted to the laboratory; and
- ❖ The pH and EC meter used for field measurements should be calibrated daily using standard solutions obtained from the instrument supplier.

## 9.6 Dust Fallout Monitoring Plan

In order to assess the air quality impacts of particulate emissions from the reclamation of the Marievale Project, ongoing dust fallout monitoring must be undertaken. This monitoring should be implemented as far prior to the start of the project as possible, but at least one year before the start of the project, in order to establish a baseline against which the impacts of the reclamation activities can be assessed.

The dustfall monitoring should be used as an indicator as to whether the mitigation measures are being strictly implemented and are sufficiently effective. The samplers must be operated in accordance with the National Dust Control Regulations (Government Notice No. R827, 2013) and the proposed revised regulations once these are promulgated. As part of this monitoring programme, monthly reports must be produced. If the measured dustfall shows a marked increase from pre-operational phase levels, and the new dustfall rates exceed the regulated dustfall rate (Table 9-22) urgent measures must be undertaken to further mitigate emissions until dustfall rates are brought back into compliance with the National Dust Control Regulations.

This emphasises the importance of monitoring (both in summer and in winter) prior to commencement of reclamation activities, as the development of a baseline will make it possible to more accurately evaluate the project's actual contribution to dustfall levels and by inference to ambient concentrations of PM.

**Table 9-22: National Dust Control Regulations (Government Notice No. R827, 2013).**

LEVEL	DUSTFALL RATE (D) (MG/M <sup>2</sup> /DAY)  (30-DAYS AVERAGE)	PERMITTED FREQUENCY OF EXCEEDING DUSTFALL RATE
Residential area	D < 600	Two within a year, not sequential months.
Non-residential area	600 < D < 1 200	Two within a year, not sequential months.

\*The method to be used for measuring dustfall rate and the guideline for locating sampling points shall be ASTM D1739: 1970, or equivalent method approved by any internationally recognised body.

## 9.7 Heritage Management Plans

The project will encompass a range of activities during the construction phase, including ground clearance, establishment of construction camp areas and small-scale infrastructure development associated with the project.

It is possible that cultural material will be exposed during construction and may be recoverable, keeping in mind delays can be costly during construction and as such must be minimised. Development surrounding infrastructure and construction of facilities results in significant disturbance, however foundation holes do offer a window into the past and it thus may be possible to rescue some of the data and materials. It is also possible that substantial alterations will be implemented during this phase of the project and these must be catered for. Temporary infrastructure developments, such as construction camps and laydown areas, are often

changed or added to the project as required. In general, these are low impact developments as they are superficial, resulting in little alteration of the land surface, but still need to be catered for.

During the construction phase, it is important to recognize any significant material being unearthed, making the correct judgment on which actions should be taken. It is recommended that the following chance find procedure should be implemented.

#### 9.7.1 Chance find procedure

- ❖ A heritage practitioner / archaeologist should be appointed to develop a heritage induction program and conduct training for the ECO as well as team leaders in the identification of heritage resources and artefacts.
- ❖ 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.
- ❖ Should an archaeological site or cultural material be discovered during construction (or operation), the area should be demarcated and construction activities halted.
- ❖ The qualified heritage practitioner / archaeologist will then need to come out to the site and evaluate the extent and importance of the heritage resources and make the necessary recommendations for mitigating the find and the impact on the heritage resource.
- ❖ The contractor therefore should have some sort of contingency plan so that operations could move elsewhere temporarily while the materials and data are recovered.
- ❖ Construction can commence as soon as the site has been cleared and signed off by the heritage practitioner / archaeologist.

#### 9.7.2 Possible finds during construction and operation (reclamation activities)

The study area occurs within a greater historical and archaeological site as identified during the desktop and fieldwork phase. Soil clearance for infrastructure as well as the proposed reclamation activities, could uncover the following:

- ❖ Stone foundations;
- ❖ Ash middens associated with the historical structures that can contain bone, glass and clay ceramics, ash, metal objects such as spoons, forks, and knives; and
- ❖ Unmarked graves

#### 9.7.3 Timeframes

It must be kept in mind that mitigation and monitoring of heritage resources discovered during construction activity will require permitting for collection or excavation of heritage resources and lead times must be worked into the construction time frames. Table 9-23 gives guidelines for lead times on permitting.

**Table 9-23: Lead times for permitting and mobilisation**

ACTION	RESPONSIBILITY	TIMEFRAME
Preparation for field monitoring and finalisation of contracts	The contractor and service provider	+1 month
Application for permits to do necessary mitigation work	Service provider – Archaeologist and SAHRA	+2 months
Documentation, excavation and archaeological report on the relevant site	Service provider – Archaeologist	+3 months
Handling of chance finds – Graves/Human Remains	Service provider – Archaeologist and SAHRA	+2 weeks
Relocation of burial grounds or graves in the way of construction	Service provider – Archaeologist, SAHRA, local government and provincial government	+6 months



**Table 9-24 Lead times for permitting and mobilisation**

AREA AND SITE NO.	MITIGATION MEASURES	PHASE	TIMEFRAME	RESPONSIBLE PARTY FOR IMPLEMENTATION	MONITORING PARTY (FREQUENCY)	TARGET	PERFORMANCE INDICATORS (MONITORING TOOL)
<b>General Marievale project area</b>	Implement chance find procedures in cases where possible heritage finds are uncovered	Construction and operation	During construction and operation	Applicant ECO Heritage Specialist	ECO (monthly / as or when required)	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Three informal burial grounds</b>	Demarcate sites with a 50 meter buffer and avoid.  Implement stakeholder engagement as required by the NHRA in developing practical management measures to avoid further damage to the burial grounds and allow community access	Construction through to Operational	Prior to and during construction	Applicant ECO Heritage specialist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Historical mine compound remains</b>	Avoid where feasible and apply a buffer zone of least 30 m.  If this is not possible, a detailed mitigation process must be implemented as required under the NHRA. This includes documenting the site and obtaining a destruction permit from the provincial heritage resource authority	Construction through to operation	Prior to and during construction	Applicant ECO	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA	ECO Monthly Checklist/Report

	<p>(Gauteng). This could include the possibility of compulsory destruction monitoring.</p> <p>Basic archival research may be required before destruction</p>						
<b>Historical Mine structure remains</b>	Depending on the state and age of the structure remains, a destruction permit may be required	Construction	Prior to and during construction	Applicant ECO Heritage specialist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34 and 38 of NHRA	ECO Monthly Checklist/Report
<b>Historical houses or structures and Residential areas</b>	<p>Avoid these sites where feasible and apply a buffer zone of least 30 m.</p> <p>If this is not possible, a detailed mitigation process must be implemented as required under the NHRA. This includes documenting the sites and obtaining a destruction permit from the provincial heritage resource authority (Gauteng). This could include the possibility of compulsory destruction monitoring.</p> <p>Basic archival research may be required before destruction</p>	Construction through to Operational	Prior to and during construction	Applicant ECO Heritage specialist	Applicant ECO	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 34 and 38 of NHRA	ECO Monthly Checklist/Report

## 9.8 Social Management Plans

The following chapter sets out the framework for the Social Management Plan which is established to assure that the proposed mitigation measures as included in the SIA are effectively implemented during the life of the project and are continually refined and modified as necessary on the basis of actual field conditions and circumstances which may not have been anticipated at the time of the SIA preparation.

### 9.8.1 Stakeholder Engagement Plan

Social impacts already start in the planning phase of a project and as such it is imperative to start with stakeholder engagement as early in the process as possible. A Stakeholder Engagement Plan (SEP) will assist in outlining the approach on how to effectively communicate with community members. It is recommended that the SEP is updated annually ensure that it stays relevant and that it addresses relevant concerns/comments raised by stakeholders. The following section provides key objectives to be included in the SEP.

The purpose of a SEP:

- ❖ To identify and assess the processes and/or mechanisms that will improve the communication between local communities, the wider community and Ergo Mining;
- ❖ Provide a guideline on how to effectively share information with community members-information must be communicated to stakeholders early in ways that are meaningful and accessible. Communication should be continued throughout the life of the project;
- ❖ Serves as a tool to facilitate grievance management – accessible and responsive means for stakeholders to raise concerns and grievances about the project must be established throughout the life of the project.

### 9.8.2 Grievance Mechanism

A grievance mechanism is a formal, legal or non-legal complaint process that can be used by individuals, workers, communities and/or civil society organisations that are being negatively affected by certain business activities and operations. A grievance mechanism plan aims to prevent, defuse and resolve community complaints and disputes.

The World Bank Group (2005:72) states that a company's grievance procedures should be communicated to all stakeholders, community members should be made aware of the procedures to follow (ie) people should know where to go and whom to talk to if they have a complaint and understand what the process will be for handling the complaint. Communication with stakeholders should be provided in a format and language that will be understood by stakeholders. It is recommended information is communicated orally in areas where literacy levels are low.

A grievance mechanism provides stakeholders with an opportunity to raise their concerns and provides them with confidence that their issues will be addressed- this encourages better community relations and good reputation for the company.

To ensure effective consultation with community members during construction and operation of the proposed Project, it is advised that Ergo Mining establishes a Community Consultation Forum that will comprise elected community representatives and aims to disseminate project information to community members.

Ergo Mining will request communities to democratically elect representatives to voluntarily sit on the Forum, which meets quarterly. Representatives would be responsible for disseminating project information to community members.

It is recommended that the composition of the community forum members represent a good geographic, racial and gender balance, have local standing. The forum could comprise of the following members :

- ❖ Community members from the communities within the Project area;
- ❖ Representatives from the local authority (ie) City of Johannesburg Metropolitan Municipality, Johannesburg Roads Agency etc ;
- ❖ Ergo Community Liaison.

Committee members would be required to hold meetings with their communities and provide Ergo Mining with copies of the attendance registers and minutes of these meetings.

#### 9.8.3 Human Rights

The applicant should establish human rights policy and aim to have zero human rights infringements in the workplace and community throughout the life of the project.

## 9.9 Socio Economic Monitoring Programme

The proposed socio-economic monitoring programme below should be implemented during the construction phase, continue into operations, and throughout the life of the project.

**Table 9-25: Proposed Socio-Economic Programme**

Item	Parameters	Frequency	Responsible person
Procurement Management Plan	Procurement awards	Ongoing- throughout the life of the project	Ergo Mining: Human Resources Manager/ Finance Manager and the Procurement officer.
Recruitment/retraining plan	Number of recruited candidates (sourced locally)  Retraining-linked with training programme and continued Professional Development of staff	Ongoing- throughout the life of the project	Ergo Mining: Human Resources Manager/ Finance Manager.
Training programmes/Learnerships/Internships	Number of training programmes offered and the effectiveness	Ongoing- results to be included in the SLP	Ergo Mining: Human Resources Manager/ Finance Manager.
Health and Safety Plan	Number of reported health and safety incidents	Ongoing-Monthly	Ergo Mining: Human Resources Manager/ Finance Manager, Safety, Health, Environment and Quality Officer
Commitments Register	Fulfilling commitments made in EIA, SIA as well as those made throughout the stakeholder engagement process	Ongoing-annual reviews	Ergo Mining: Human Resources Manager/ Finance Manager/Environmental Manager/Stakeholder

## 9.10 Radiological Monitoring Plan

### 9.10.1 General

The NNR regulatory process requires CoR holders to submit a public Radiation Protection Programme (RPP) for approval by the NNR. The basis for the definition of the public RPP is the outcome of the comprehensive radiological public safety assessment and includes a monitoring programme, a surveillance programme and a control programme.

The purpose of this section is to define a radiological monitoring plan for the project. The basis for the definition of the monitoring plan is the outcome of the radiological public impact assessment presented in this report, taken into consideration the radiological information available at present.

### 9.10.2 Baseline Characterisation

Some efforts went into characterising the radiological baseline conditions at the project area. The most significant of these is the gamma radiation and dose rate surveys that were performed over the extraction area.

The radiological impact assessment resulted in a medium impact rating based on the assessment results. These results suggest a low consequence and, therefore, the additional baseline characterisation proposed below should be implemented taking into consideration the graded approach to safety (IAEA, 2009b).

The following proposed characterisation activities will increase the radiological knowledge of the project, resulting in a higher degree of confidence in radiation safety of the associated activities:

- ❖ Collect a representative sample of the material in the extraction area and perform a full spectrum radioanalysis on the sample;
- ❖ Identify appropriate surface water and groundwater monitoring points upstream and downstream of the project area, samples these locations, and perform full spectrum radioanalysis on the collected samples; and
- ❖ Monitor the environmental radon concentration at selected points around the project area and in the nearby communities.

These activities will help to build confidence that the project does not increase the radiation exposure conditions in the area.

### 9.10.3 Monitoring Programme

Table 9-26 summarises the proposed monitoring programme for the project aimed at public radiation protection. The responsibility for the implementation and execution of the monitoring programme lies with the Radiation Protection Function (RP Function) that include legally appointed persons consisting of a Radiation Protection Monitor(s) (RPM), a Radiation Protection Officer (RPO), and a Radiation Protection Specialist (RPS).



**Table 9-26: Summary of the environmental monitoring programme proposed for the project aimed at public radiation protection.**

MONITORING ELEMENT	COMMENT	FREQUENCY
Surface water	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Annually
	Total Uranium and Thorium	Quarterly
Sediments	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Once every two years
	Total Uranium and Thorium	Biannually
Groundwater	Full-spectrum analysis (U-238, U-235, Th-232 and progeny)	Once every two years
	Total Uranium and Thorium	Biannually
Radon gas	Environmental radon using Radon Gas Monitors (RGMs)	Quarterly for a period of 2 to 3 month

A full-spectrum analysis is suitable for detailed dose analysis but is an expensive procedure with long lead times to perform the analysis, which is why less frequent intervals are proposed. The total uranium and thorium analysis are relatively inexpensive with fast turnaround times. These results will monitor variations in activity concentration over the monitoring period.

Large variations in the activity concentration over a short period are not expected in groundwater, oppose to surface water, for example. Therefore, a less frequent sampling schedule is proposed for groundwater. The same principle applies to the sediment samples at the same locations as the surface water sample.

The RGMs to monitor the variation in radon gas works in monitoring periods of 2 to 3 month, after which the RGMs is replaced with new RGMs for the next monitoring period.

#### 9.10.4 Proposed Monitoring Points

Most of the monitoring points proposed to be part of the monitoring programme coincide with the monitoring programme for the environmental pathways. The following can be noted:

- ❖ The surface water monitoring locations should coincide with the existing surface water monitoring points. The principle to be applied is that the monitoring locations should be upstream and downstream of the project area in potentially affected surface water streams, as well as upstream and downstream of specific discharge points.
- ❖ The sediment monitoring locations should coincide with the surface water monitoring points, applying the same principles.
- ❖ The groundwater monitoring points should coincide with the existing groundwater monitoring points. The principle to be applied is that the monitoring locations should be upstream and downstream of the project area. The exact location will be determined by the availability of water-bearing boreholes in the specific area.
- ❖ The environmental radon monitoring locations do not have to coincide with specific locations. The principle to apply is that it should be around the extraction area and in the dominant wind direction where receptors are located, complemented with monitoring locations in what can be considered as background. The exact location is often influenced by whether a secured location is available to improve the recovery rate of the RGMs.

## 9.11 Waste Management Plan

Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the project activities on site.

This management plan was formulated based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated throughout the life-cycle of the project, as required in order to ensure that appropriate measures are in place to manage and control waste and to ensure compliance with relevant legislation.

Prior to the commencement of construction, a detailed Waste Management Method Statement for the site should be compiled by the Contractor.

### 9.11.1 Waste Management Principles

An integrated approach to waste management is needed on site. It is important to ensure that waste is managed with the following objectives in mind during all phases of the project:

- ❖ Reducing volumes of waste is the greatest priority;
- ❖ If reduction is not feasible, the maximum amount of waste is to be recycled; and
- ❖ Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner

### 9.11.2 Project Phase Waste Management

A plan for the management of waste during all phases of the project is detailed below.

#### 9.11.2.1 Waste Inventory

- ❖ The Environmental Control Officer (ECO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during the project life-cycle for both general and hazardous waste streams.
- ❖ Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- ❖ Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- ❖ The ECO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

#### 9.11.2.2 Waste Collection, handling and storage

- ❖ Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- ❖ Septic tanks and portable toilets must be monitored by the ECO or responsible subcontractor and maintained regularly.
- ❖ Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- ❖ A dedicated waste area must be established on site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEMWA, GN 921 of November 2013.
- ❖ Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- ❖ The SHE Manager must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
- ❖ Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
- ❖ Recyclable waste must be removed from the waste stream and stored separately.
- ❖ All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
- ❖ Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
- ❖ Waste generated on site must be removed on a regular basis throughout the operation phase.
- ❖ Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

#### 9.11.2.3 Record Keeping

The success of waste management practices is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

- ❖ Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
- ❖ Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

#### *9.11.2.4 Monitoring of Waste Management Activities*

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- ❖ Monthly volumes/ mass of the different waste streams collected;
- ❖ Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- ❖ Monthly volumes/ mass of the waste that is recycled;
- ❖ Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. This report must form part of the ECO's reports on a monthly basis.

## CHAPTER 10: COMPLIANCE MONITORING MECHANISM

Table 10-27 depicts the monitoring and management plan for the management measures and actions identified in the impact assessment. Where specific monitoring and management plans are required, these are detailed in Section 9.

**Table 10-27: Monitoring and Management Plan**

IMPACT MANAGEMENT ACTION	MONITORING / MANAGEMENT ACTION	MONITORING FREQUENCY	ROLES AND RESPONSIBILITIES	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
<b>GROUNDWATER</b>					
Groundwater level	Depth to groundwater level	Quarterly (Jan, Apr, Jul, Oct)	Project ECO	-	Monthly
Water quality monitoring	<ul style="list-style-type: none"> <li>❖ All existing private boreholes;</li> <li>❖ Monitoring boreholes; and</li> <li>❖ Proposed new boreholes.</li> </ul>	Quarterly (Jan, Apr, Jul, Oct)	Project ECO	SANS: Drinking Water Standards (Recommended EAL)	Quarterly
<b>SURFACE WATER</b>					
Surface water quality monitoring	Surface water sampling and laboratory analysis from 10cm below the water surface at locations identified in the Surface Water Impact Assessment	Quarterly prior to the commencement of construction	Project ECO	<ul style="list-style-type: none"> <li>❖ DWS best practice guidelines G3: Water Monitoring Systems.</li> <li>❖ South African National Accreditation System (SANAS) accredited laboratory for analysis.</li> <li>❖ Compare against baseline quality.</li> </ul>	Quarterly
		Monthly basis during the life of the project	Project ECO		Monthly
		2 years post decommissioning	Project ECO		Monthly
Stormwater infrastructure	Water infrastructure (channels, berms and paddocks)	Monthly Basis during the dry season. Weekly basis during the wet season	Project ECO/Maintenance Manager		Monthly

IMPACT MANAGEMENT ACTION	MONITORING / MANAGEMENT ACTION	MONITORING FREQUENCY	ROLES AND RESPONSIBILITIES	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
		Monitored immediately after a stormwater event	Project ECO/Maintenance Manager		Immediately
Reporting	monitoring reports to include trend analyses. Sampling of water quality from upstream monitoring points must be compared to downstream monitoring points.	Monitoring reports submitted to DHSWS.	Project ECO		Quarterly (or as recommended by the DHSWS)
AIR QUALITY					
Dust: /Wet suppression/ Chemical stabilization of unpaved roads	Visually	Daily	❖ Project Site manager ❖ Contractor ECO ❖ Contractor EO	Internal audit by Ergo in house specialists	Monthly
	Dust Fallout Monitoring	Monthly during construction, operational and decommissioning phases	Project ECO	❖ Internal audit by Ergo in house specialists ❖ National Dust Control Regulations.	❖ Prior to the commencement of reclamation. ❖ Monthly during the life of the project
HERITAGE					
Possible finds	Chance find procedure	Prior to site clearance During construction and operation	❖ Ergo ❖ Project EO ❖ Heritage Specialist	Ensure compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA	Monthly Checklist/Report
RADIATION					



IMPACT MANAGEMENT ACTION	MONITORING / MANAGEMENT ACTION	MONITORING FREQUENCY	ROLES AND RESPONSIBILITIES	COMPLIANCE MECHANISM	COMPLIANCE REPORTING FREQUENCY
Refer to Section 9.10.3 for the radiological monitoring programme					
Other management measures included in Section 9.9					

## CHAPTER 11: OATH UNDERTAKING

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The EAP hereby confirms:

- ❖ The correctness, to the best of their knowledge, of the information provided in the specialist reports and on information provided by Ergo. The information was accepted as being as reliable as information generated during an EIA and a feasibility study, and provided in good faith, can be;
- ❖ The inclusion of comments and inputs from stakeholders and I&APs;
- ❖ The inclusion of inputs and recommendations from the specialist reports where relevant; and
- ❖ The acceptability of the project in relation to the finding of the assessment and level of mitigation proposed.

KONGIWE ENVIRONMENTAL (PTY) LTD

**Company Name**

ASHLEIGH BLACKWELL

**Name of the Environmental Assessment Practitioner**



**Signature**

19 March 2020

**Date**