PROPOSED MINING ON A PORTION OF THE REMAINING EXTENT OF THE FARM ELANDS SPRUIT NO 5523, ALFRED DUMA MUNICIPAL AREA, KWAZULU-NATAL PROVINCE

STORM WATER MANAGEMENT PLAN

DEPARTMENTAL REFERENCE NUMBER:

KZN 30/5/1/3/2/10979MP

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

The Applicant, Raubex Construction (Pty) Ltd, is applying for environmental authorisation (EA) and a mining permit (MP) over 4.91 ha of a portion of the Remaining Extent of the farm Elands Spruit No 5523, uThukela Magisterial District, KwaZulu-Natal Province.

The proposed mining footprint will extend across 4.91 ha of the above-mentioned property. The earmarked mining area directly borders an existing quarry, the Applicant therefore wishes to secure the resource and proposes to mine the quarry through the open-cast mining method.

The mining method will make use of blasting to loosen the hard rock; the material will then be loaded and hauled out of the excavation to the mobile crushing plant where it will be screened to various sized stockpiles. The stone aggregate, gravel will be stockpiled until it is transported from site using tipper trucks. The permit holder will be responsible for the rehabilitation of the entire area upon closure. The infrastructure will be of temporary nature as a mining permit can only be valid for a maximum of 5 years. The farm track will be improved to allow movement of the project related vehicles. No water will be abstracted from the site, and the plant will be powered with generators. Chemical toilets will be used, and the project will appoint ±8 local employees.

The proposed project requires an EA & MP from the Department of Mineral Resources and Energy (DMRE). This report, the Stormwater Management Report, forms part of the departmental requirements.

2. OBJECTIVE OF STORM-WATER MANAGEMENT

The objective to proper storm water management is to:

- Prevent the contamination of clean runoff,
- Contain dirty water, dispose, or treat it in an environmental responsible manner,
- Prevent soil erosion because of increased runoff from the mining area, and
- Prevent the loss of stockpiled topsoil to be used during the rehabilitation phase.

This Storm Water Management Plan must be seen as a dynamic document that must biennially be reviewed and adjusted to the site specific conditions experienced at the proposed mine.

3. PROJECT DESCRIPTION

As mentioned earlier, an application for a mining permit to mine stone aggregate , gravel from the above mentioned property was lodged with the DMRE.

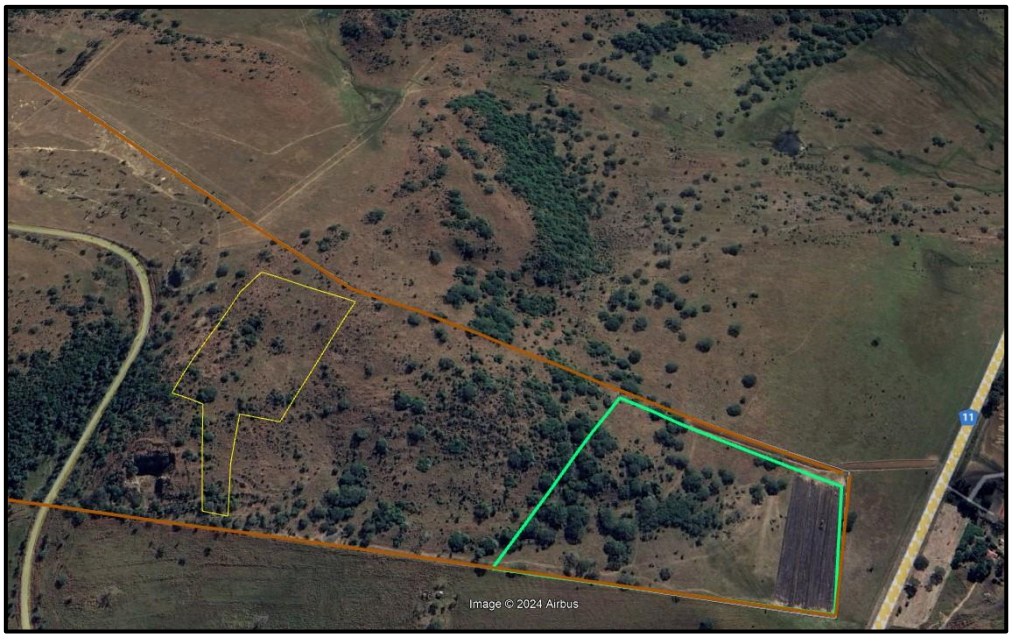

Figure 1: Satellite view showing the location of the proposed mining area (yellow polygon) indicates the mining permit area and the (brown polygon) is in relation to the farm boundary the (green polygon) indicates the approved stockpile area (Image obtained from Google Earth).

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The proposed MP project will therefore entail the:

» site establishment and infrastructure development;
» stripping and stockpiling of topsoil from the proposed mining footprint area;
» blasting and excavation of the mining area;

» crushing and screening of the loosened material at the processing plant; and
» stockpiling the product until needed and transported from site.

The Applicant proposes to upgrade the farm road to allow comfortable movement of mining related equipment and vehicles. Haul roads into the excavation will be extended as mining progresses. The surface of the road will be improved, re-gravelled where needed, and the width increased to ±10 m.

The proposed quarry will appoint ±11 employees (including management), and due to the small scale of the operation no permanent infrastructure will be built at the mining area. The Applicant plans to establish the following mobile/temporary infrastructure within the mining footprint:

» Chemical ablution facilities to be serviced by a registered contractor;
» Crushing and screening plant (mobile); and
» Weighbridge with associated control room.

4. SITE CHARACTERISTICS

Climate:

The following chart shows the maximum, minimum and average temperatures (21°C daytime, 15°C night-time) of the Ladysmith region. Ladysmith experiences its highest temperatures during the summer months from November – March with peaks of up to 32°C; thereafter the mercury drops to lows of 7°C during June/July.

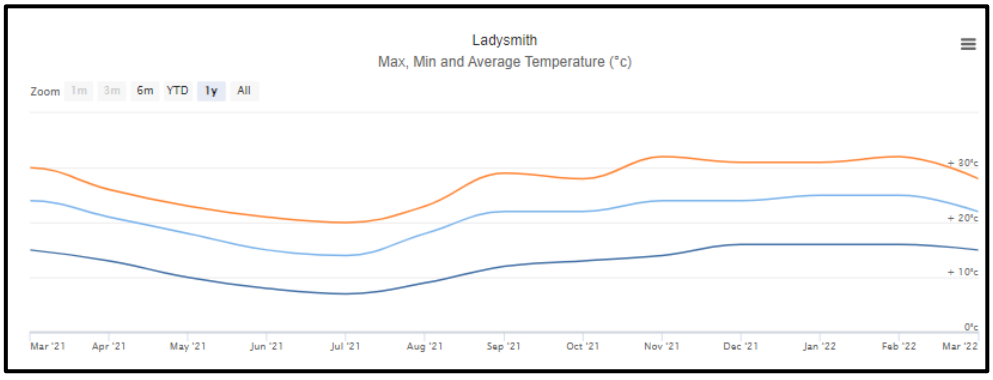

Figure 2: Maximum, minimum, and average temperature of the Ladysmith region where the orange line indicates the maximum temperature, the light blue line shows the averages, and the dark blue line shows the minimum temperatures (chart obtained from http://www.worldweatheronline.com)

The following chart obtained from World Weather Online shows that the measured rainfall average for 2021 was ±824 mm, while the area received the lowest rainfall during the winter months (May – August) and the highest in the summer (January - March).

Topography:

The site-specific topography has a gradual to moderate sloping landscape, slanting mainly in a southerly direction, in which three terrain types can be distinguished namely, a Midslope region of a low hill along the northern boundary, transgressing into a relative narrow footslope region which finally terminates into a relative extensive valley bottom landscape containing lower lying watercourse channels (Botha, 2017).

The proposed quarry will be situated mostly within the midslope region of the low hill, slightly encroaching into the upper parts of the footslope. To the west of the focus area the hill forms a slight notch or saddle within which the Collings Road passes over the hill. The average elevation of the study area is 1187 meters with the highest point recorded close to the top portion of the proposed quarry area (1 205 m) and the lowest point recorded within the wetland body (outside the proposed mining area) located within the valley bottom portion. The average loss of elevation from the highest to the lowest point is ~1156m with an average slope (southerly) of 11.8% (Max. Slope: 34.0%).

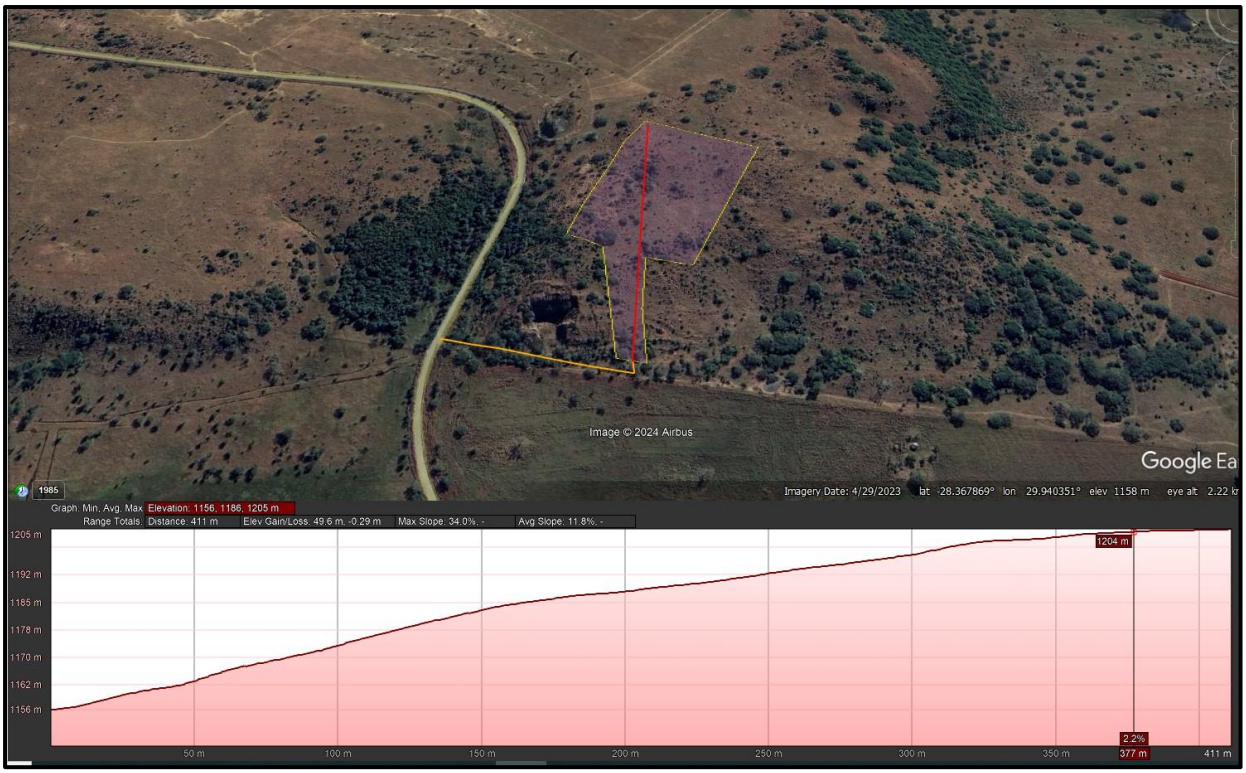

Figure 3: Elevation profile of the proposed mining area (image obtained from Google Earth).

Hydrology:

The site is located within quaternary catchment V60C which is part of the uThukela Water Management Area. Quaternary catchment V60C covers an area of 361 km^2, has a mean annual precipitation (MAP) of 726 mm, a mean annual evaporation (Symon's Pan) of 1500 mm and a mean annual runoff of 21.31 million m^3.

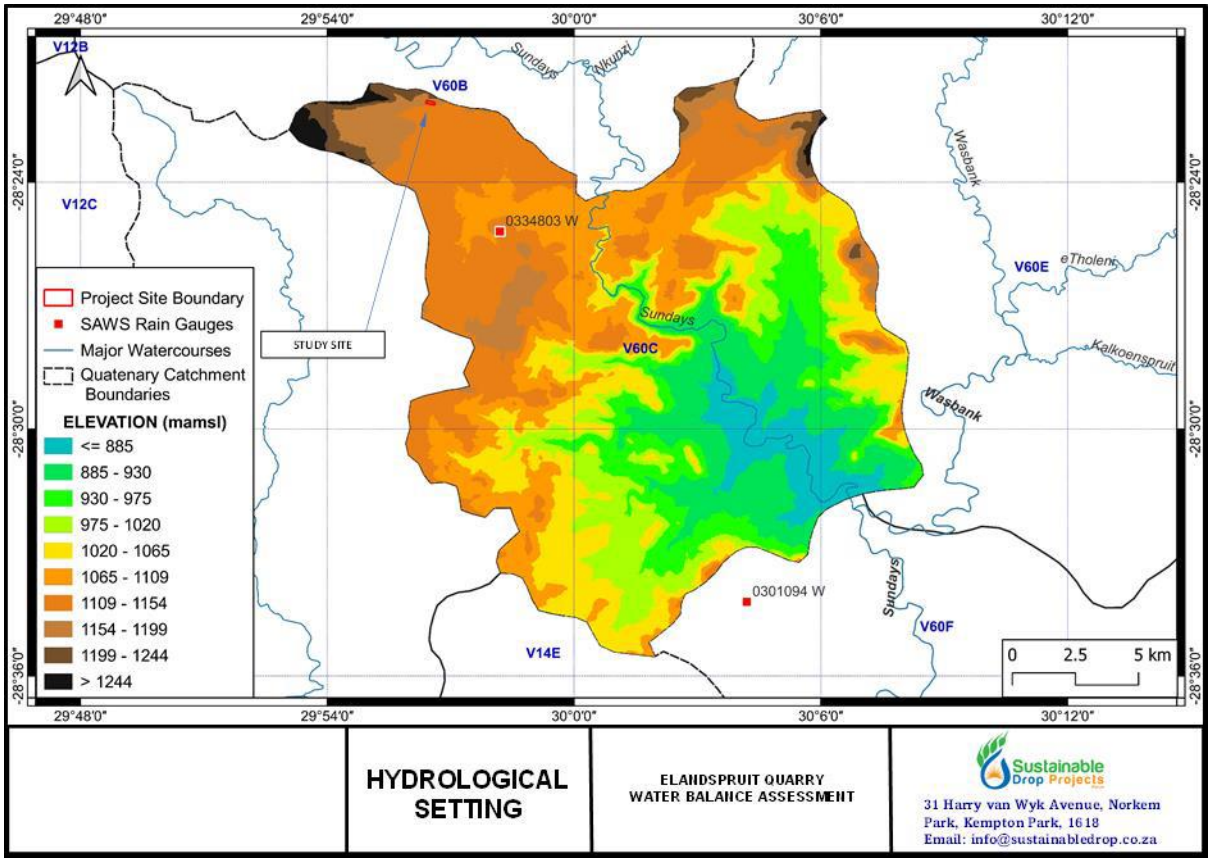

Figure 4: Hydrological setting of project site (image obtained from sustainable drop Projects).

Hydrological and meteorological variables were obtained for the quaternary catchment V60C and these are presented in Table 1

Table 2: Mean monthly rainfall and evaporation distribution.

Month	Rainfall (mm/month)	Symons Pan Evaporation (mm/month)
Jan	161.00	128.44
Feb	140.00	108.98
Mar	135.00	83.55
Apr	108.00	36.07
May	90.00	15.93
Jun	75.00	9.60
Jul	83.00	10.07
Aug	107.00	17.08
Sep	126.00	33.67
Oct	148.00	68.50
Nov	155.00	98.88
Dec	166.00	113.44

It is apparent from Table 1 that the catchment lies within a summer rainfall part of the country since the months of November to March are when most rainfall is received. The period April to September.

Regional Temperatures:

The regional temperature data (Table 2) was obtained from Climate-Data.Org. For this study, the temperature data for Ladysmith was used.

Table 2: Project Site Monthly Temperatures (https://en.climate-data.org/africa/south-africa/kwazulu-natal/ladysmith

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Temperature °C	21.6	21.5	20.2	17.3	14.2	11.1	10.8	13.8	17	18.6	19.8	21.2
Min. Temperature °C	16.3	16.4	14.8	11.5	7.3	3.9	3.3	6.2	9.4	11.9	13.7	15.4
Max. Temperature °C	27.7	27.5	26.4	23.7	21.7	19.2	19.1	22.2	25.3	26.2	27	27.9

A plot of the regional monthly temperatures, evaporation and rainfall data was prepared and is shown in Figure 5. It is clear from the plot that on average evaporation exceeds rainfall throughout the year.

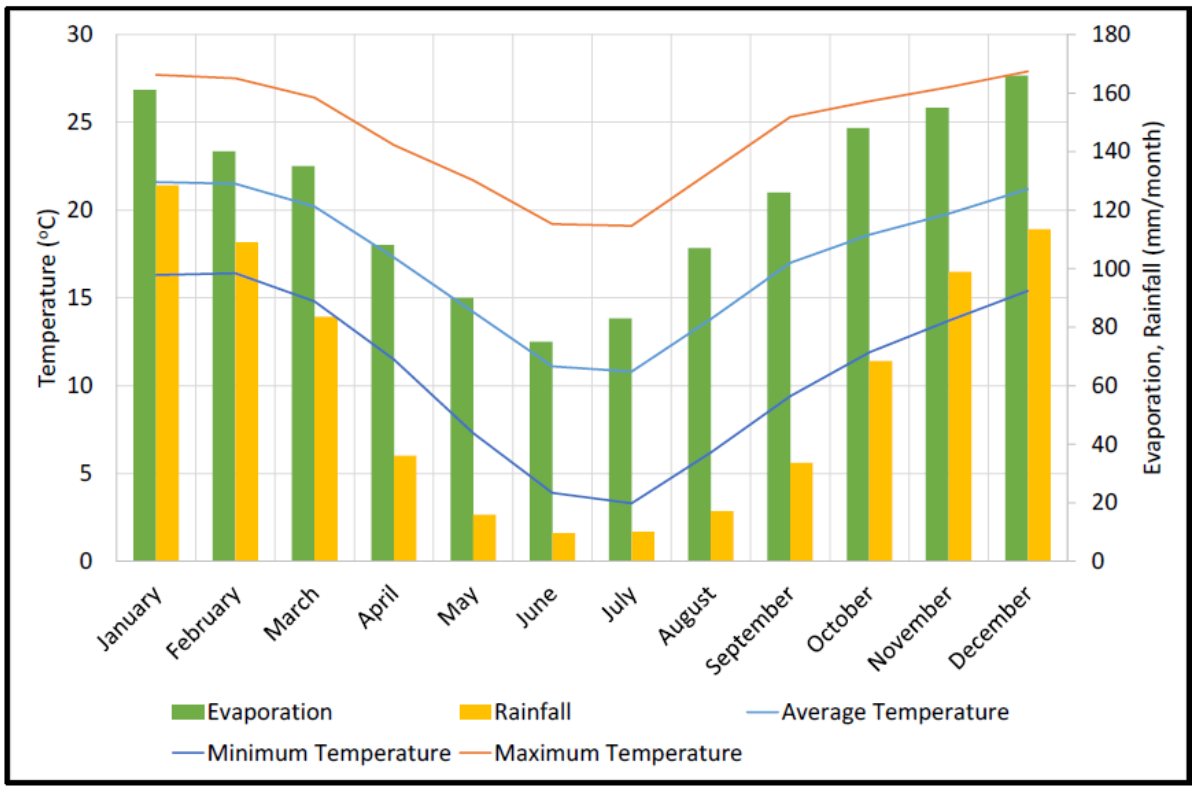

Figure 5: Plot of monthly Evaporation vs Rainfall and regional temperatures for the Project Site

The plot clearly indicates that the seasonal pattern of evaporation and temperatures is nearly identical to the seasonal rainfall pattern. It is also apparent that the Mean Annual Evaporation (MAE) exceeds the Mean Annual Rainfall (MAP) on account of the mean monthly values of evaporation for all months being greater than the corresponding monthly rainfall values.

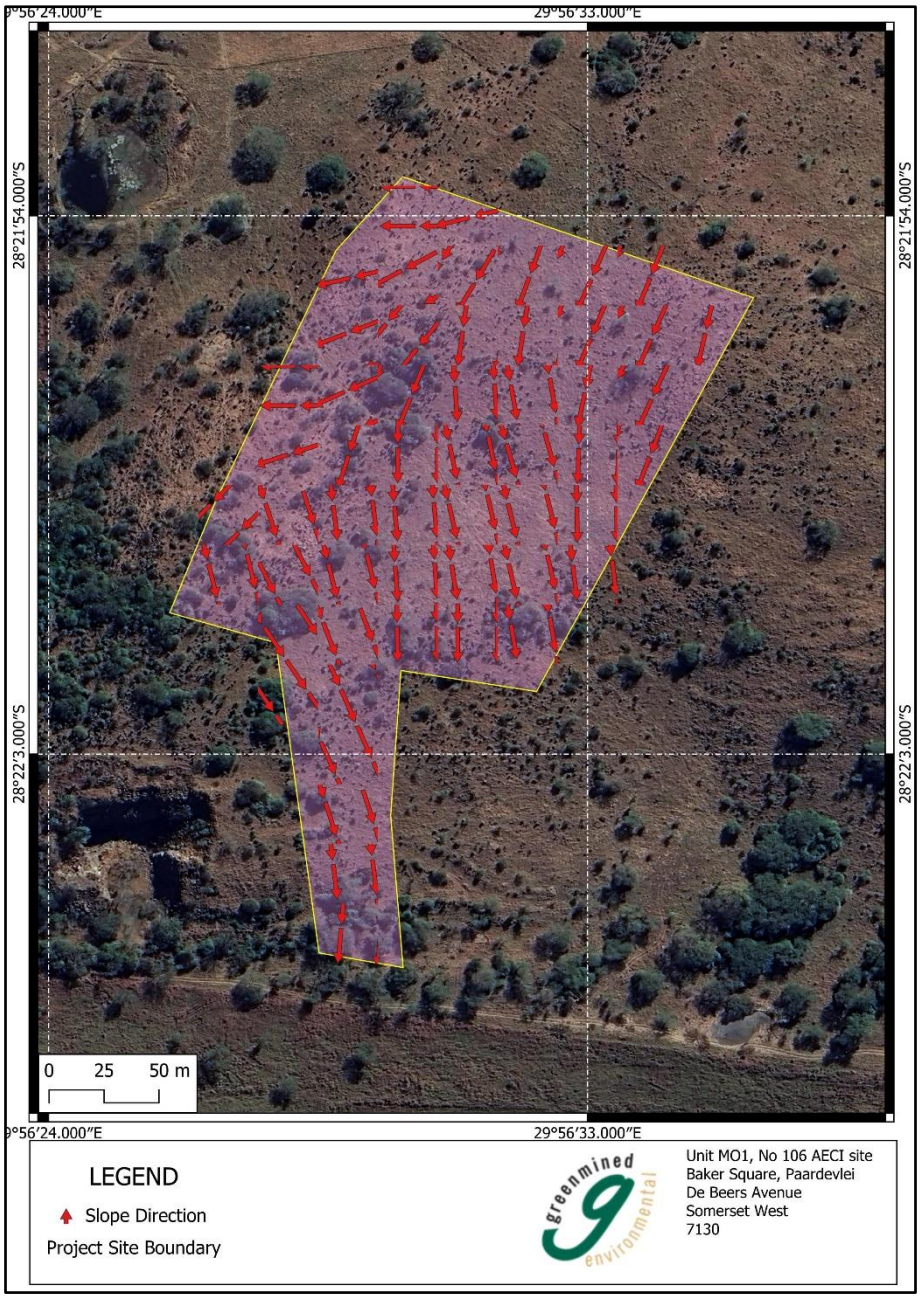

Figure 6: The arrows in this image indicate the direction of the slopes of the site's terrain and thus provide an indication of the directions that any storm runoff would follow. It is apparent that the site's terrain is such that most of the runoff would flow in a southerly direction except for parts of the site towards it's western edge where flow would south-westerly direction. image obtained from Google Earth).

5. EROSION RISK

The majority of the site is characterized by gentle slopes where soil erosion and instability are unlikely to be of great concern. The western parts of the study area are characterised by steeper slopes where soil erosion risk is likely to be of concern, however terrestrial habitat degraded in degraded areas because of human settlement and overgrazing.

6. STORM WATER MANAGEMENT

In order to adequately manage the storm water at the mining area, the following mitigation measures must be implemented for the duration of the site establishment-, operational- and decommissioning phases:

» Mining must be conducted only in accordance with the Best Practice Guideline for small scale mining that relates to storm water management, erosion and sediment control and waste management, developed by the Department of Water and Sanitation (DWS), and any other conditions which that Department may impose:
  - Clean water (e.g. rainwater) must be kept clean and be routed to a natural watercourse by a system separate from the dirty water system. Prevent clean water from running or spilling into dirty water systems.
  - Dirty water must be collected and contained in a system separate from the clean water system.
  - Dirty water must be prevented from spilling or seeping into clean water systems.
  - The storm water management plan must apply for the entire life cycle of the mine and over different hydrological cycles (rainfall patterns).

» The applicant must ensure that land clearing is minimised in areas with a bigger slope to limit the amount of runoff from the site to prevent erosion. It is recommended that the land clearing be done during dry seasons to avoid water runoff into the watercourse thus affecting the water quality.

» Areas cleared of vegetation must weekly be monitored, after larger rainfall events, to determine where erosion may initiate. These areas must be reinstated by modifying the soil micro-topography and revegetation or implementing soil erosion control efforts accordingly.

» Drainage must be controlled to ensure that runoff from the mining area does not culminate in off-site pollution, flooding or result in any damage to properties downstream or any storm water discharge points.

» Erosion control measures must be put in place to minimise erosion along the proposed mining areas. Extra precautions must be taken in areas where the soils are deemed highly erodible. These measures could include the use of sandbags, hessian sheets, bidim, retention or replacement of vegetation.

- Necessary precautions must be taken to ensure that floodwaters are diverted around the processing/stockpile- and excavation areas by means of berms.

- Stockpiling of soil or any other materials during the operational phase must not be allowed on or near steep slopes, near a watercourse or water body. This is to prevent pollution or the impediment of surface run-off. The Applicant must control and establish suitable mitigation measures to prevent the erosion of stockpiles.

- Where possible, storm water (and road-surface run-off) must be redirected towards the surrounding vegetated areas to increase groundwater infiltration, thereby providing sufficient soil moisture to support the vegetation cover (ensure that this water is slowed down, not channelized and spread out across the surface in order to prevent this water flow from causing erosion – where erosion signs are present prompt actions and measures should be taken to rehabilitate these areas and prevent erosion from occurring in these areas in the future).

- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering the river and other sensitive areas.

- If and where possible, rehabilitation of disturbed areas should be done concurrently with the mining activities to avoid erosion of bare soil. To reduce runoff, reinstated soil must be vegetated as soon as possible to restore soil properties. If erosion occurs on the slopes, it should be curbed by infill material obtained from the active mining area.

- No activities may take place, without the necessary authorisation from the DWS, within a horizontal distance of 100 m from any watercourse or estuary or within a 500 m radius from a delineated boundary of any wetland or pan. The 100 m between the river and the mine must be treated as a no-go area and all employees must be educated accordingly.

- Roads and other disturbed areas within the project area must be regularly monitored for erosion and problem areas must receive follow-up monitoring to assess the success of the remediation.

- Any erosion problems within the mining area because of the mining activities observed must be rectified immediately (within 48 hours) and monitored thereafter to ensure that it does not re-occur.

- » If there is any channelled run-off from active or un-rehabilitated mine areas it must be slowed down by installing temporary sediment traps, such as small sandbag impoundments. These impounding structures must still allow all water to return to the natural river channels and may not be used to capture additional water for agricultural purposed.

- » Mining activities must be reduced after large rainfall events when the soils are wet. No driving off of designated hardened roads may occur immediately following large rainfall events until soils have dried out and the risk of bogging down has decreased.

- » All bare areas, due to mining, must be revegetated as soon as possible with a cover crop to bind the soil and limit erosion potential.

- » Site management must implement good housekeeping practices and prevent leakage of hydrocarbons or other chemicals, and strictly prohibit littering of any kind.

- » The storm water management plan must be reviewed biennially and adjusted to reflect the specific site conditions relating to storm water control.

7. REHABILITATION

Rehabiliation of the mining area must be in accordance with the closure objectives and actions listed in the EMPR and Closure Plan of the mine. In the medium term, rehabilitation will entail the continuous reinstatement of mined areas, and the management of weeds and invasive plant species. In the long term, rehabilitation will involve the reinstatement of the stockpiling/processing area by removing the stockpiled material and site infrastructure/equipment and landscaping the disturbed footprints. The MR holder will further be responsible for the seeding of all rehabilitated areas. The right holder will also comply with the minimum closure objectives as prescribed by DMRE and listed in the Closure Plan (attached as Appendix L to the Environmental Impact Assessment Report).

8. SIGNATURE OF AUTHOR

NAME	SIGNATURE	DATE
Murchellin Saal		10 May 2024