

**OPERATIONAL PHASE: THE MINING ACTIVITIES ON MINING CLAIMS NO.
68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION**



**ENVIRONMENTAL MANAGEMENT PLAN (EMP): ENVIRONMENTAL
CLEARANCE CERTIFICATE (ECC) RENEWAL REPORT**

MARCH 2020

APP- 001212



T: +264 (0) 65 220 599 F: +264 (0) 65 221 157
MAIN ROAD OSHAKATI



DOCUMENT DATA SHEET

DOCUMENT VERSION

001

PROJECT NAME	OPERATIONAL PHASE: THE MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION
REPORT TITLE	ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE RENEWAL OF ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
PROPONENT	SLS CRUSHERS CC CONTACT PERSON: MR. L. L. NAIKAKU PHONE NO: +264 65 220 599 EMAIL ADDRESS: slstraders@hotmail.com
ENVIRONMENTAL CONSULTANT	MAFUTA ENVIRONMENTAL CONSULTANTS POSTAL BOX: 98049, Pelican Square, Windhoek-Namibia PHONE NO: +264 (0) 81 220 0816 EMAIL ADDRESS: mafuta20@gmail.com
MET PROJECT NO.	APP- 001212
AUTHORS	MARTHA L. HANGULA FREDRIKA N. SHAGAMA LINDA T. UULENGA
APPROVAL	NAME: SIGNATURE:
DATE OF SUBMISSION	16 March 2020

Contents

CONTENTS	II
LIST OF FIGURES	III
LIST OF TABLES	III
APPENDICES	III
ACRONYMS	IV
DEFINITION OF TERMS	IV
EXECUTIVE SUMMARY	V
1. CHAPTER ONE: INTRODUCTION AND BACKGROUND	1
1.1. PROJECT BACKGROUND AND LOCATION.....	2
1.2. THE AIM OF THE ECC RENEWAL	3
1.3. PROJECT PHASES COVERED IN THE EMP.....	5
1.4. ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP).....	5
2. CHAPTER TWO: DESCRIPTION OF EXISTING PROJECT (MINING) ACTIVITIES.....	6
2.1. OPERATIONAL AND MAINTENANCE PHASE	6
2.1.1. THE MINING PROCESS.....	6
2.1.2. OPERATION (SITE) RESOURCES	9
2.1.3. SERVICES INFRASTRUCTURE	9
2.1.4. WASTE MANAGEMENT.....	11
2.2. DECOMMISSIONING PHASE.....	11
3. CHAPTER THREE: ENVIRONMENTAL LEGAL REQUIREMENT (INCLUDING REQUIRED PERMITS AND LICENSES)	12
4. CHAPTER FOUR: BASELINE BIOPHYSICAL AND SOCIAL ENVIRONMENT.....	23
4.1. CLIMATE AND TOPOGRAPHY	23
4.2. GEOLOGY AND SOILS.....	24
4.3. WATER RESOURCES.....	25
4.4. FAUNA AND FLORA.....	27
4.5. POPULATION DENSITY.....	28
4.6. SURROUNDING LAND USES.....	28
4.7. ECONOMY AND SERVICES INFRASTRUCTURE.....	28
5. CHAPTER FIVE: EMP ROLES AND RESPONSIBILITIES	30
5.1. PROPONENT (SLS CRUSHERS).....	30
5.1. ENVIRONMENTAL CONTROL OFFICER (ECO) OR SAFETY, HEALTH & ENVIRONMENTAL (SHE) OFFICER 31	
5.2. SPECIALISTS	32
6. CHAPTER SIX: ENVIRONMENTAL MANAGEMENT ACTION PLANS.....	33
6.1. PREVIOUSLY IDENTIFIED ENVIRONMENTAL IMPACTS.....	33

6.2. CURRENT STATUS: IMPLEMENTATION OF PREVIOUS ENVIRONMENTAL MANAGEMENT AND SOCIAL MANAGEMENT MEASURES	33
6.3. UPDATED ENVIRONMENTAL AND SOCIAL MANAGEMENT ACTIONS (MEASURES)	41
7. CHAPTER SEVEN: MINE SITE REHABILITATION	56
8. CHAPTER EIGHT: ENVIRONMENTAL MONITORING ACTION	57
8.1. MONITORING OF SELECTED ENVIRONMENTAL COMPONENTS.....	57
8.2. ENVIRONMENTAL AWARENESS.....	57
9. CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS	59
10. REFERENCE LIST	60

LIST OF FIGURES

Figure 1: Location of SLS Crushers mining site near Ruacana in the Omusati Region	4
Figure 2: Site mining pit filled with rainwater during the site visit in February 2020	7
Figure 3: Some of the mining and crushing machinery and equipment on site	8
Figure 4: Site workshop (white and grey structure with an overhead power line pole) and workers' accommodation (light orange/pink building)	9
Figure 5: Fuel (diesel) tank on site	10
Figure 6: Topography around the SLS Crushers site	24
Figure 7: Site rock units of dolomite	25
Figure 8: Mine pit filled with rainwater in February 2020	26
Figure 9: Some mixed site vegetation (Commiphora and Camelthorn Mopane trees)	27

LIST OF TABLES

Table 1: Approximate coordinates of the site boundaries and significant features	3
Table 2: List of applicable legislations and where required, permits or licenses for the SLS Crushers mining activities	12
Table 3: Environmental and Social Management Compliance from 2017 to 2020 (updated after Mafuta Environmental Consultants, 2017)	34
Table 4: Operation and Maintenance Phase Management Action Plans (Updated)	42
Table 5: Decommissioning Phase Management Action Plans	55

APPENDICES

APPENDIX A: Environmental Compliance Audit Checklist

ACRONYMS

TERMS	DEFINITION
DWA	Department of Water Affairs and Forestry
EAP	Environmental Assessment Practitioners
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EA	Environmental Assessment
EMP	Environmental Management Plan
I&APs	Interested and Affected Parties
MAWF	Ministry of Agriculture Water and Forestry
MC	Mining Claim
MEC	Mafuta Environmental Consultants
MET: DEA	Ministry of Environment and Tourism's Directorate of Environmental Affairs
MME	Ministry of Mines and Energy
WAUP	Water Abstraction and Use Permit

DEFINITION OF TERMS

The '**Consultant**' – this refers to the team that is conducting the Environmental Clearance Certificate (ECC) renewal process and the preparation of the updated EMP report for the project.

The '**Proponent**' – this refers to the organization that is directly involved in the implementation of the project, i.e. SLS Crushers.

The '**Stakeholders**' – this refers to the people, organisations, NGOs that are directly or indirectly affected and interested by the project.

The '**Environment**' – this refers to the ecology, economy, society and politics.

The '**Mining Claim**' - A mining claim is a parcel of land for which the claimant has asserted a right of possession and the right to develop and extract a discovered, valuable, mineral deposit. In Namibia, the mining claim is only available to Namibian citizens for the development of small-scale mining. Mining claims are valid for 3 years and 2-year extension periods are possible provided that the claim is being developed or worked. Up to a maximum of ten claims can be held at any one time (Ministry of Mines and Energy, 2020).

EXECUTIVE SUMMARY

SLS Crushers CC (SLS Crushers or hereinafter referred to as The Proponent) intends to continue with their aggregate mining operations on the currently active part of one of the ten mining claims near Ruacana in the Omusati Region. The mining claims are reported to be covering parts of the Omusati and Kunene Regions with the current mining site/activities located in the Omusati Region part only. The extent of the mining claims and name of the active mining claim on which mining activities are currently carried cannot be determined. SLS Crushers mines aggregates from their quarry and supply materials and contracting services to the building, construction, road building, railroad and the mining sectors. The quarry is situated in the Ruacana area, southwest of 30 km from the town of Ruacana on the Kamanjab-Omakange C35 road, northern Namibia. The Proponent has applied to the Ministry of Mines and Energy (MME), as the mining activities regulator to renew their mining activities on the said mining claim in line with MME requirements.

Aggregates are classified as an 'industrial mineral' along other minerals in the Minerals (Prospecting and Mining) Act 33 of 1992 under Part 3 of Schedule 1. Mining forms part of the listed activities that that may not be undertaken without an Environmental Clearance Certificate (ECC). SLS Crushers have a valid ECC (issued 18 October 2017, due to expire on 25 October 2020), but MME has requested them to renew the ECC as it is expiring in the same year in which they have made their application to MME. Therefore, in order for MME to permit the Proponent's request to renew their operations on the mining claim, a new ECC should be applied for, obtained and submitted to MME. Thus, the renewal of the mining activities is subjected to an ECC to be issued by the Ministry of Environment and Tourism (MET) upon submission of an updated draft Environmental Management Plan (EMP) Report.

It should be noted that the current ECC has been issued for ten (10) mining claims; 68463, 68464, 68465, 68466, 68467, 68468, 68469, 68470, 68471 and 68472. However, the current mining activities by SLS Crushers are only undertaken on certain parts of one of these claims, which as indicated above cannot be determined, due to the lack of information on the national mining portal.

The 2017 potential impacts and Updated EMP in 2020

The potential (key) negative impacts were identified during the preceding environmental assessment done for the site which led to the issuance of the ECC in 2017. The impacts that had been identified and managed on site are as follows:

- Potential of land/soil disturbances;
- Soil and water resources contamination;
- Biodiversity (fauna and flora);
- Air quality/dust;
- Noise;
- Health and safety;
- Vehicular traffic safety; and
- Visual (aesthetic) and archaeological impact.

The mitigation measures or management action plans were also made for these impacts in 2017 and updated as deemed necessary in February 2020.

The implementation of the EMP and compliance during the validity period of the current environmental clearance certificate (ECC) is provided in this report under Section 6.2. The evaluated and updated compliance status in Table 3 has been done based on the 2017 environmental audit/EMP compliance report compiled by Mafuta Environmental Consultants. The status presents the progress that has been made on site between 2017 and early 2020 to improve and ensure environmental management and sustainability. The 2017 compliance status have been updated with the 2020 observations done during the site visit on 18 February 2020

The implementation of the EMP and compliance during the validity period of the current environmental clearance certificate (ECC) is given in Table 2. The evaluated and updated compliance status in Table 2 has been done based on the 2017 environmental audit/EMP compliance report compiled by Mafuta Environmental Consultants. The status presents the progress that has been made on site between 2017 and early 2020 to improve and ensure environmental management and sustainability. The 2017 compliance status have been updated with the 2020 observations done during the site visit on 18 February 2020.

Conclusions and Recommendations

Mafuta Environmental Consultants are confident that the potential negative impacts associated with the mining activities on site can continue to be mitigated by effectively implementing the recommended management action measures and their monitoring. Therefore, it is recommended that the aggregate mining and associated operations on the project site be granted an Environmental Clearance Certificate, provided that:

- All mitigations provided in this EMP should be implemented as stipulated and **where required and emphasized, improvement should be effectively put in place;**
- **SLS Crushers should improve the non-compliant and partially compliant components in Table 3 by effectively implementing the respective management measures in Table 4 and Table 5, followed by monitoring. This needs to be done in order to satisfy the requirements of and compliance with the EMA No. 7 of 2007, its 2012 EIA Regulations and the environmental clearance certificate conditions.**
- All required permits, licenses and approvals for the operations are obtained as required (please refer to the Permitting and Licensing in **Table 2** of this document);
- The Proponent and all their workers comply with the legal requirements governing this type of project and its associated activities;
- Environmental monitoring requirements recommended are adhered to; and
- All the necessary environmental and social (occupational health and safety) precautions provided are adhered to.
- Improvements should be done on the storage and measures implemented to manage dust emission from the crushing site (crushing waste heap).

1. CHAPTER ONE: INTRODUCTION AND BACKGROUND

Mining is the backbone of the Namibian economy constituting about 9.3% contribution to Gross Domestic Product (GDP). About 52.7% of export-earnings from mining were recorded in the Chamber of Mines' 2013 Annual Report. Other sectors contributing to the GDP include: fisheries, agriculture and tourism (Mweemba, 2014). Minerals extracted in Namibia range from diamonds, uranium, base metals (copper, lead, zinc, etc.), gold, dimension stones (marble), industrial minerals (sand, limestone and graphite) and semi-precious stones/gemstones. Some listed minerals and stones are either mined at a small, medium or large scale level, depending on the ore material, specimen size sought after, available resources and geological extent, etc. Extraction of most gemstones & mineral specimen and industrial minerals like aggregate falls under small-scale mining classification.

The term aggregate is used for any particulate material, which includes gravel, crushed stone, sand, slag, recycled concrete and geosynthetic aggregates. Aggregate may be natural, manufactured or recycled. Aggregates make up some 60 - 80% of the concrete mix. They provide compressive strength and bulk to concrete. They are divided into coarse or fine. Coarse aggregates are greater than 4.75 mm and the usual range employed is between 9.5 mm and 3.75 mm in diameter. Fine aggregates are usually sand or crushed stone that are less than 9.55 mm in diameter (Green Spec, 2020).

Aggregates are extracted from natural sand and gravel pits, hard rock quarries, dredging submerged deposits or mining underground sediments (Green Spec, 2020). Commonly in Namibia, aggregate mining is usually a surface type of mining; through open cast (quarry or pits.) as the mined deposits are found or can be extracted on the ground surface or in some instances, very few meters just below the ground surface. The mining methods would dependent on the magnitude of the operations and production. This would also determine the kind of required resources such as time, workforce, equipment and knowledge, etc.

Like any other type of mining activity, aggregate mining usually comes with some positive impacts such as income generation, employment creation, contribution to local and regional socio-economic development as well as the country's revenue through taxes and royalties. However, mining activities are also associated with some negative environmental issues. These impacts are largely dependent on the methods used and the geological context that

governs how easily the minerals/stones can be separated from the hosting environment rocks.

The current challenge worldwide is the management of small-scale mining in an environmentally acceptable manner, by developing appropriate implementation and environmental management strategies. These strategies must be relevant, understandable, affordable, be aimed at maintaining a balance between encouraging economic developments and preserving high standards of environmental management (Heath, 2006).

Given the constant need to develop the country, in both rural and urban areas, the mining of industrial minerals, specifically aggregate and other construction materials has been practiced in Namibia to meet construction demands. This document focuses on the existing mining operations of aggregates mined at a small-scale level near Ruacana, their impacts on the environment and appropriate management action measures thereof.

1.1. Project Background and Location

SLS Crushers CC (SLS Crushers or hereinafter referred to as The Proponent) intends to continue with their aggregate mining operations on the **currently active part of one of the ten mining claims** near Ruacana in the Omusati Region. The mining claims are reported to be covering parts of the Omusati and Kunene Regions with the current mining site/activities located in the Omusati Region part only. However, due to the unavailability of information of these mining claims' actual positioning on the Mining portal where mining information is usually uploaded and accessible to the public - <http://portals.flexicadastre.com/Namibia/>, the extent of the mining claims and name of the active mining claim on which mining activities are currently carried cannot be determined. The locality map of the mining site is shown in **Figure 1** and the approximate site coordinates, including significant site areas/features are presented in **Table 1**. SLS Crushers mines aggregates from their quarry and supply materials and contracting services to the building, construction, road building, railroad and the mining sectors. The quarry is situated in the Ruacana area, southwest of 30 km from the town of Ruacana on the Kamanjab-Omakange C35 road, northern Namibia. The Proponent has applied to the Ministry of Mines and Energy (MME), as the mining activities regulator to renew their mining activities on the said mining claim in line with MME requirements.

Table 1: Approximate coordinates of the site boundaries and significant features

Site Feature	Latitude	Longitude
Site Point A	17°29'5.83"S	14°20'51.73"E
Site Point B	17°29'21.97"S	14°20'47.92"E
Site Point C	17°29'20.79"S	14°21'1.57"E
Site Point D	17°29'6.46"S	14°20'59.68"E
Site House/Accommodation	17°29'11.13"S	14°20'55.53"E
Site Workshop	17°29'11.61"S	14°20'54.74"E
Work Area (Crushing area)	17°29'11.92"S	14°20'53.16"E
Mining Area (Quarry)	17°29'17.29"S	14°20'56.17"E

1.2. The Aim of the ECC Renewal

Aggregates are classified as an 'industrial mineral' along other minerals in the Minerals (Prospecting and Mining) Act 33 of 1992 under Part 3 of Schedule 1. Mining forms part of the listed activities that that may not be undertaken without an Environmental Clearance Certificate (ECC). SLS Crushers have a valid ECC (issued 18 October 2017, due to expire on 25 October 2020), but MME has requested them to renew the ECC as it is expiring in the same year in which they have made their application to MME. Therefore, in order for MME to permit the Proponent's request to renew their operations on the mining claim, a new ECC should be applied for, obtained and submitted to MME. Thus, the renewal of the mining activities is subjected to an ECC to be issued by the Ministry of Environment and Tourism (MET) upon submission of an updated draft Environmental Management Plan (EMP) Report.

It should be noted that the current ECC has been issued for ten (10) mining claims; 68463, 68464, 68465, 68466, 68467, 68468, 68469, 68470, 68471 and 68472. However, the current mining activities by SLS Crushers are only undertaken on certain parts of one of these claims, which as indicated above cannot be determined, due to the lack of information on the national mining portal.

This document has been developed to satisfy the requirements of both MET (as an environmental regulatory authority/custodian) and MME (the mining regulatory authority) for the issuance of the SLS Crushers' mining operations.

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC) RENEWAL

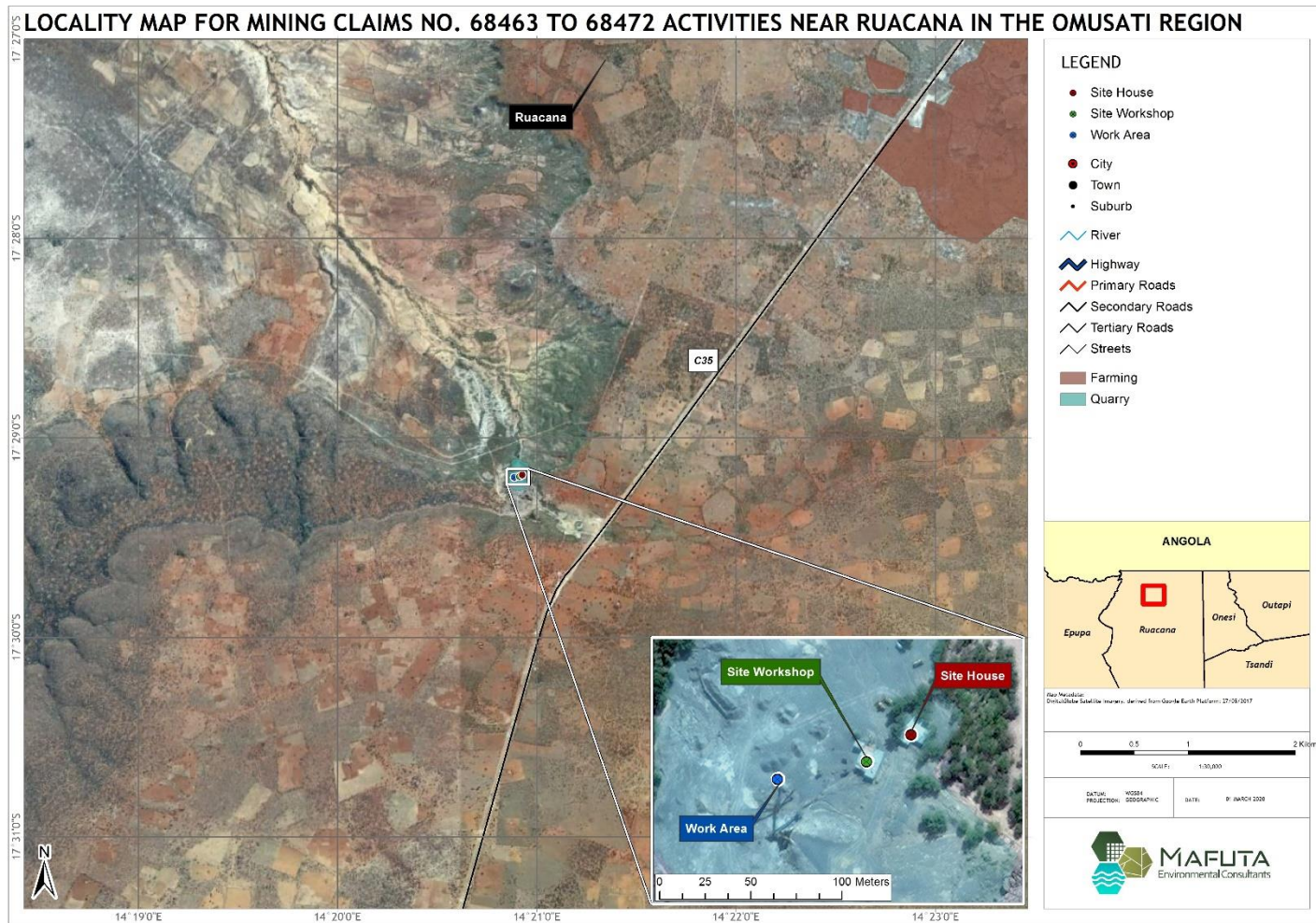


Figure 1: Location of SLS Crushers mining site near Ruacana in the Omusati Region

1.3. Project Phases Covered in the EMP

The following phases are addressed in this EMP:

- **Operational and maintenance phase:** the current phase during which the mining site activities are carried out and maintenance of the site, related infrastructure, equipment and machinery is done SLS Crushers. **The decommissioning phase** is the time during which the targeted aggregate material will eventually run out at the mining sites, leading to the cessation of the mining activities. During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place.

1.4. Environmental Assessment Practitioner (EAP)

Under the Environmental Impact Assessment (EIA) Regulations (2012) of the Environmental Management Act (7 of 2007), under the following Sections the mining is a listed activity that may not be undertaken without an Environmental Clearance Certificate (ECC):

- *"Regulation 3.1 The construction of facilities for any process or activities which requires a license, right or other forms of authorization, and the renewal of a license, right or other form of authorization, in terms of the Minerals (Prospecting and Mining Acts), 1992.*
- *Regulation 3.2 Other forms of mining or extraction of any natural resources whether regulated by law or not.*
- *Regulation 3.3 Resources extraction, manipulation, conservation and related activities.*
- *Regulation 9.2 Any process or activity which requires a permit, licence or other form of authorisation, or the modification of or changes to existing facilities for any process or activity which requires an amendment of an existing permit, licence or authorisation or which requires a new permit, licence or authorisation in terms of a law governing the generation or release of emissions, pollution, effluent or waste."*

In order to comply with the EMA and its 2012 EIA Regulations and MME requirements of a new ECC, SLS Crushers appointed Mafuta Environmental Consultants (MEC) (hereinafter referred to as the *Environmental Consultant*) to undertake the necessary tasks for their ECC renewal. The required tasks include; conducting a site visit, compiling an updated Environmental Management Plan (EMP) Report and submitting the renewal application for their ECC application to the Competent Authority (MET)'S Department of Environmental Affairs (DEA) on their behalf. The description of the mining operations (project activities) on site is presented under Chapter 2.

2. CHAPTER TWO: DESCRIPTION OF EXISTING PROJECT (MINING) ACTIVITIES

The description of the mining activities undertaken by SLS Crushers to extract aggregates is presented under the following subsections of this chapter. The description of the project chapter focuses on the current mining (operations) activities, project requirements in terms of inputs and resources, process and outputs.

It is important to take note that this project description is based on the current and actual mining operations on site (on one of the mining claims areas), and hence no new construction activities or upgrades are anticipated. Therefore, the description and subsequent environmental management measures will only be on the operational and maintenance and decommissioning phases.

2.1. Operational and Maintenance Phase

The general aggregate mining process from rock quarries usually involves explosives to shift the rock from the working face. The rock is crushed and passed through a series of screens. The output is a range of sizes of rock produced to specified sizes. The crushed rock is transported from quarries by road or rail (edited after Green Spec, 2020).

In the case of SLS Crushers site, their operational processes and activities are presented below.

2.1.1. The Mining Process

The mining activities on the SLS Crushers' site involve the use of heavy equipment such as excavator, compressors, explosives (emulsion/BS: S200 ECO) and loader to mine the aggregate in its raw form (dolomites) from the site pit. Due to heavy rainfalls at the beginning of the year 2020 and at the time this document was compiled, the mine pit was filled with rainwater (**Figure 2**). This had forced the mining operations to be put on hold until the water has evaporated from the pit or infiltrated into the ground as it is not pumped out by SLS Crushers.



Figure 2: Site mining pit filled with rainwater during the site visit in February 2020

Once mined, the mobile crushing plant is used to crush hard stones like the site dolomite rock into different particle sizes for industrial use (customers). The raw material stone (< 500mm) is sent into the Jaw Crusher stable by Feeder - **Primary Crushing Stage**. The raw material is then crushed into medium sized stone of 0-150mm diameter. The medium stones is further sent to the Cone and crushed into smaller stones (around 0-28 mm). This is referred to as the **Secondary Crushing Stage**.

Furthermore, the smaller stones are separated into 2 types: 0-5 mm, 5-10 mm, 10 mm-13 mm and 13-19 mm and >19 mm (also written as 0-5-10-13-19 mm) and >19 mm. The final aggregate which comprises of 0-5-10-13-19 mm and >19 mm stones is then crushed by a Cone crusher again into the final product with particle size of 0-5-10-13-19 mm. The 19mm and smaller particle sizes are sent to the Cone crusher for further crushing and re-shaping. This is done to round off the stones and get rid of the very sharp edges into the final product shape and sent to the screen to be separated into the final product sizes.

Particle sizes that are bigger than 19mm are sent back and re-crushed until they are 19mm and smaller and then sent to the Cone crusher again. The mining and crushing machinery are shown in **Figure 3** below.



Figure 3: Some of the mining and crushing machinery and equipment on site

Working days: Proponent indicated that site works are carried done on working days only, on a 6 hours shift per day and depending on the aggregate customers' demand.

Production: The average annual production of the mined aggregate is 28 800 tonnes.

After the aggregate is ready for the market and upon request from customers, two trucks are used to deliver the products (aggregate) to the intended users (customers).

An overburden of the material of no market value extracted from the crushing process is stored on site in a form of a waste heap and according to the information provided by the Proponent, some of this material is also sold for construction. This heap may also be kept aside so that it could be used s backfilling as part of site rehabilitation.

There are no anticipated construction activities to be done on the mining claim as mining operations have been ongoing for some time. Maintenance of the mining equipment and site are done by the Proponent. The site is equipped with an office/workshop that is located about 100 m and 200 m from the crushing site and mine pit, respectively. There is also a house for the workers on site to ensure that they are readily available for work. The site workshop and house are shown in **Figure 4** below.



Figure 4: Site workshop (white and grey structure with an overhead power line pole) and workers' accommodation (light orange/pink building)

2.1.2. Operation (Site) Resources

The site operations currently employ eight workers and there is no information on the anticipated expansion in the workforce. These employees are housed in the accommodation provided on site. The employees are provided with personal protective equipment (PPE) while carrying out the mining and crushing activities on site. It should be noted that the blasting work done on the site is very limited.

2.1.3. Services Infrastructure

The project area has access to basic infrastructure such as surfaced road links (C35), health centres, schools, shops, service stations in Ruacana and other services.

A. Power Supply

The Proponent uses diesel as a source of power supply for the mining equipment and equipment, thus no electricity is required for actual mining operations. The diesel is sourced from an above-ground 10 000 liter fuel storage tank installed on site – **Figure 5**. The fuel is delivered to site by TOTAL Namibia.



Figure 5: Fuel (diesel) tank on site

The site is connected to the nearest power grid belonging to the northern regional electricity distributor (NORED), but this electricity is used for other purposes like in the site office/workshop and workers accommodation (house).

B. Water Supply

Although the site has a borehole, this borehole is not in operational (not equipped). Water for drinking and washing is sourced from the nearby prepaid water source located about 2 km away from site. The water is pumped from this source and stored in an onsite water tank. The actual mining and crushing works do not require nor use water.

C. Roads (Site Accessibility)

The site area is connected to the rest of the country by the main road (C35) from which the site can be accessed by the local/access gravel road (turn off of about 100 m from the main road). The C35 and local roads then connect the mining site to Ruacana, Omakange and surrounding areas such as villages, respectively. Other road network links in the area include C46 (Oshakati/Outapi to Ruacana) and C41 (Okahao to Oshakati).

2.1.4. Waste Management

There are waste bins on site for each waste type. Depending on the amount generated, waste is sorted, stored at a small dumpsite on site. The dumpsite is cleared once in a while and the waste transported to the Okonjota dumpsite which belongs to the Ruacana Town Council. The mining workers are supplied with pit latrines and some eco-friendly portable toilets on site.

Apart from the diesel used for the machinery and equipment, there are no other chemicals used for mining. The waste material from the crushing process, which is the unwanted aggregate size particles of no market value is piled on site and sold at times for some other construction purposes. This waste is also kept and be used later for backfilling, once rehabilitation of the mined area starts.

2.2. Decommissioning Phase

Like all kinds of mining activities, the target material will eventually run out at the site leading to the cessation of mining works. Construction is an ongoing activity in every part of the world, and that includes Namibia, therefore the construction aggregates will always be in demand. Decommissioning may only be considered due to the decline in the targeted dolomite mined on site. During the operational phase and before decommissioning, the Proponent will need to put site rehabilitation measures in place.

The different components of the project (mining) activities on site are subject to different legal requirements. The list of the applicable legal requirements, in terms of general legislation and permitting and licensing are presented under the following chapter.

3. CHAPTER THREE: ENVIRONMENTAL LEGAL REQUIREMENT (INCLUDING REQUIRED PERMITS AND LICENSES)

This chapter presents the detailed information on the legal obligations (legislations, policies and guidelines) that governs certain project activities. The chapter also provide information on certain legislation where permitting and/or licensing that may be required from different applicable regulatory authorities - Please refer to **Table 2** below.

Table 2: List of applicable legislations and where required, permits or licenses for the SLS Crushers mining activities

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
The Constitution of the Republic of Namibia (1990)	<p>The articles 91(c) and 95 (i) commits the state to actively promote and sustain environmental welfare of the nation by formulating and institutionalising policies to accomplish the Sustainable objectives which include:</p> <ul style="list-style-type: none"> • Guarding against overutilization of biological natural resources, • Limiting over-exploitation of non-renewable resources, • Ensuring ecosystem functionality, • Maintain biological diversity. 	<p>The operation of the SLS Crushers mining site and associated activities can interfere with the ecosystem and overutilization of natural resources like water. Attention should be given to the state of water and other natural resources to avoid over exploitation.</p> <p>By developing and implementing the Environment Management Plan, The Proponent is ensuring sustainable development.</p> <p>Ecological sustainability should guide site operations.</p>

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
<p>Environmental Management Act No. 7 of 2007</p> <p>EIA Regulations GN 57/2007 (GG 3812)</p>	<p>Requires that activities with significant environmental impact are subject to an environmental assessment process (Section 27).</p>	<p>The nature of certain site activities potentially causes environmental impacts to the surrounding environment. Mining operations can potentially causes significant environmental impacts with some impacts revisable and avoided. Therefore, proper implementation of the EMP should lead and advise the project throughout its life cycle implementation.</p> <p>ECC Renewal: An ECC should be renewed every 3 years. Contact details at the Department of Environmental Affairs (DEA):</p> <p>Tel.: 061 284 2701 OR Environmental Assessment Unit Mr. Damian Nchindo, Tel: 061 284 2717, Email: damian.nchindo@met.gov.na</p>
	<p>Details requirements for public consultation within a given environmental assessment process (GN No 30 S21).</p> <p>The details the requirements for what should be included in an Environmental Scoping Report (GN No 30 S8) and an EIA report</p>	<p>The project is already in its operational phase. However, if necessary and required, constant consultations and engagements with the interested and affected parties (stakeholders) should be continued. In case of grievances raised by the neighbouring community to the Proponent,</p>

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
	(GN No 30 S15) were already incorporated in the initial reports submitted for the existing ECC.	this should be addressed and resolved amicably.
Minerals (Prospecting and Mining) Act (No. 33 of 1992)	<p>Section 48 (3): In order to enable the Minister to consider any application referred to in section 47 the Minister may (b) require the person concerned by notice in writing to (i) carry out or cause to be carried out such environmental impact studies as may be specified in the notice.</p> <p>Section 54(2): details provisions pertaining to the decommissioning or abandonment of a mine</p>	<p>The Proponent should ensure compliance with the Act and its Regulations with regards to their mining operations. Furthermore, the Proponent needs to plan rehabilitation actions for future mine decommissioning.</p> <p>The Proponent should ensure that all the necessary permits/authorisation for small/ medium-scale mining such as mining claim renewals are obtained from the Ministry of Mines & Energy (MME)'s Mine Directorate.</p> <p>Contact: Mr. Erasmus Shivolo (Mining Commissioner) Tel: 061 284 8167, Email: Erasmus.Shivolo@mme.gov.na</p>
Mine Health & Safety Regulations, 10th Draft	Makes provision for the health and safety of persons employed or otherwise present in mineral license areas. These deal with among other matters; clothing and devices; design, use, operation, supervision and control of machinery; fencing and guards; and	<p>The Proponent should comply with all these regulations with respect to their employees.</p> <p>No permit or license required</p>

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
	safety measures during repairs and maintenance.	
Petroleum Products and Energy Act (No. 13 of 1990) Regulations (2001)	Regulation 3(2)(b) states that “No person shall possess [sic] or store any fuel except under authority of a licence or a certificate, excluding a person who possesses or stores such fuel in a quantity of 600 litres or less in any container kept at a place outside a local authority area”	<p>If there is fuel stored or is intended to be stored on site, the relevant petroleum products storage licenses/permits should be applied for from the Petroleum Affairs at the Ministry of Mines and Energy</p> <p>Contact: Ms. Maggy Shino (Petroleum Commissioner) Tel: +264 61 284 8209 Email: Maggy.Shino@mme.gov.na</p>
Communal Land Reform Act 5 of 2002	To provide for the allocation of rights in respect of communal land; to establish Communal Land Boards; to provide for the powers of Chiefs and Traditional Authorities and boards in relation to communal land; and to make provision for incidental matters	<p>The mine site is situated in a communal area, therefore future changes on working/mining sites within the mining claims (that may overlie communal or even private lands), the Proponent should ensure proper consultations with the relevant authorities and that the that the project activities comply with the regulations provided in the Act.</p> <p>If required, the relevant authorisation should be obtained.</p>
The Water Act 54 of	The Act was formulated to consolidate and amend the laws	Projects of this type are usually associated with activities

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
1956	relating to the control, conservation and use of water for domestic, agricultural, urban and industrial purposes; to make provision for the control, in certain respects, of the use of sea water for certain purposes; for the control of certain activities on or in water in certain areas.	that may directly affect water conservation, management and use therefore, requires the implementation of water conservation techniques. The actual project activities does not use, except for human needs. Should the status quo change in future, the
The Water Resources Management Act No. 11 of 2013	Equitable improvement of water and sanitation services should be achieved by the combined efforts of the government and the beneficiaries, based on community involvement and participation, the acceptance of a mutual responsibility and by outsourcing services where necessary and appropriate, under the control and supervision of government.	PropONENT should notify the Department of Water and Forestry at the Ministry of Agriculture, Water and Forestry for a water abstraction and use permit. In case that PropONENT may in future consider abstracting water from their onsite borehole for their activities on site, a water abstraction and use permit (WAUP) should be applied for and obtained from the Department of Water Affairs & Forestry (DWA): Directorate of Water Resources Management: Water Policy and Water Law Administration. If issued or already in possession of the PropONENT, the WAUP should be renewed as required as stipulated in therein. Contact: Mr. F. Witbooi (Deputy Director)

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
		Tel: 061 208 7158, Email: Franciskus.Witbooi@mawf.gov.na
Pollution Control and Waste Management Bill	<p>The bill aims to “prevent and regulate the discharge of pollutants to the air, water and land” Of particular reference to the Project is: Section 21 “(1) Subject to sub-section (4) and section 22, no person shall cause or permit the discharge of pollutants or waste into any water or watercourse.”</p> <p>Section 55 “(1) No person may produce, collect, transport, sort, recover, treat, store, dispose of or otherwise manage waste in a manner that results in or creates a significant risk of harm to human health or the environment.”</p>	<p>The Project should make it mandatory that all their site waste produced as a result of their activities, directly or indirectly is managed in a manner that do not cause environmental threat and risk both to the surroundings and the local communities.</p> <p>No permit or license required</p>
Atmospheric Pollution Prevention Ordinance 11 of 1976	The law act to provide for the prevention of the pollution of the atmosphere, and for matters incidental thereto. The law regulates and prohibit pollution from industries particularly	Potential dust emanating from the pile of material produced from onsite crushing and access roads should be managed and suppressed so that it does not affect the surrounding air quality. Efforts to suppress dust should be adopted as

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
	smoke and dust from various activities.	recommended in the EMP. No permit or license required.
National Solid Waste Management Strategy	The Strategy ensures that the future directions, regulations, funding and action plans to improve solid waste management are properly co-ordinated and consistent with national policy, and to facilitate co-operation between stakeholders	The operational activities can potentially generate solid waste (stockpiles, soil remains, human waste and hydrocarbons) that might need proper management by the Proponent to avoid pollution. Waste management plans should be generated and implemented during operations. Proper handling of site waste is required as advised in the EMP. No permit or license required.
Soil Conservation Act 76 of 1969	The Act established to consolidate and amend the law relating to the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources in the Republic of Namibia.	Certain site activities may lead to soil disturbance, and soil erosion. Some materials handling such as hydrocarbons (fuels) may spill on the ground resulting in soil pollution. Therefore, mitigation measures proposed in the EMP to conserve and prevent or minimized erosion and pollution during operations should be implemented.

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
		No permit or license required.
Road Traffic and Transport Act, No. 22 of 1999	The Act provides for the establishment of the Transportation Commission of Namibia; for the control of traffic on public roads, the licensing of drivers, the registration and licensing of vehicles, the control and regulation of road transport across Namibia's borders; and for matters incidental thereto.	<p>Mitigation measures should be provided for, if the roads and traffic impact cannot be avoided.</p> <p>Should the Proponent wish to undertake activities involving road transportation or access onto existing roads, the relevant permits (access road) will be required from the Ministry of Works and Transport's Roads Authority.</p> <p>Contact: Mr. Eugene de Paauw (Specialist Road Legislation, Advice & Compliance)</p> <p>Tel: 061 284 7027, Email: dePaauwe@ra.org.na</p>
Forest Act 12 of 2001	Section 10 (1) set out the aim of the forest management as to: The purpose for which forest resources are managed and developed, including the planting of trees where necessary in Namibia is to conserve soil and water resources, maintain biological diversity and to use forest produce in a way which is	There site is covered by vegetation on certain areas and around the site itself. Should it be deemed necessary in future that certain project activities may trigger the removal of forests/vegetation in future, necessary measures should be taken to ensure minimum vegetation removal.

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
	<p>compatible with the forest’s primary role as the protector and enhancer of the natural environment.</p> <hr/> <p>Section 22. (1) (Protection of Natural vegetation) Unless otherwise authorised by this Act, or by a licence issued under subsection (3), no person shall cut, destroy or remove - Republic of Namibia 20 Annotated Statutes Forest Act 12 of 2001.</p> <hr/> <p>(a) vegetation which is on a sand dune or drifting sand or on a gully unless the cutting, destruction or removal is done for the purpose of stabilising the sand or gully; or</p> <p>(b) any living tree, bush or shrub growing within 100 metres of a river, stream or watercourse.</p>	<p>In order to remove protected plant species such as Camelthorn trees, which are known to occur within the project sites, a permit should be obtained from the nearest Forestry office (Ministry of Agriculture, Water & Forestry) prior to removing them.</p> <p>Contact: Mr. Joseph Hailwa (Director: Forestry) Tel: 061 208 7663, Email: Joseph.Hailwa@mawf.gov.na</p>

MINING ACTIVITIES ON MINING CLAIMS NO. 68463 - 68472 NEAR RUACANA IN THE OMUSATI REGION: ENVIRONMENTAL MANAGEMENT PLAN (EMP) FOR THE ENVIRONMENTAL CLEARANCE CERTIFICATE (ECC)
RENEWAL

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
	(2) A person who wishes to obtain a licence to cut and remove the vegetation referred to in subsection (1) shall, in the prescribed form and manner, apply for the licence to a licensing officer who has been designated or appointed for the area where the protected area is situated.	
Labour Act 11 of 2007.	Empowers the minister responsible for labour to publish regulations pertaining to health and safety of labourers (S135). Details requirements regarding minimum wage and working conditions (S39-47).	The Proponent should ensure that the workers welfare; safety and health are protected and that they are from the local community especially unskilled labour. No permit or license required.
Health and Safety Regulations GN 156/1997 (GG 1617)	Details various requirements regarding health and safety of labourers to be involved in operation of the mine.	The Proponent and their work should ensure compliance with this Act and its regulations. No permit or license required.
Public Health Act 36 of 1919	Section 119 states that “no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health.”	The safety of the site employees is crucial particularly women, who may not have the knowledge of handling dangerous, risk and strenuous jobs. No permit or license required.

LEGISLATION/POLICY	PROVISION/SUMMARY	PROJECT APPLICABILITY & REQUIRED PEMIT(S)
Public and Environmental Health Act 1 of 2015.	To provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters.	The Proponent should ensure that the public health as well as the environmental health is preserved and remain uncompromised. No permit or license required.
National Heritage Act 27 of 2004	Section 48(1) states that “A person may apply to the (Heritage) Council for a permit to carry out works or activities in relation to a protected place or protected object” Protects and conserves cultural heritage and cultural resources with special emphasis on places and sources of National heritage including graves, artefacts and any objects older than 50 years.	If heritage resources (e.g. human remains, etc.) are discovered at some point on and or around the site, these should be reported to the National Heritage Council of Namibia for relocation. Contact: Dr A. M. Nankela (Chief Archaeologist & Rock Art Specialist) Tel: 061 301 903, Email: archeology@nhc-nam.org

The legal requirements above have been listed and explained as per their relevance to the project. The project is being carried in an environment that is sensitive in terms of its biophysical and social features. The potential and known impacts that have been assessed in the initial environmental report of the project were identified based on these environmental components/features in terms of their sensitivities to the project activities. The environmental baseline of the project area is briefly explained under Chapter 4.

4. CHAPTER FOUR: BASELINE BIOPHYSICAL AND SOCIAL ENVIRONMENT

The biophysical and social environmental baseline of the project site area and immediate surrounding is given under the following sections. The information has been sourced from existing literature; reports of studies done in the project area as well as site observations made by Mafuta Environmental Consultants during the site visit conducted on the 18th of February 2020.

4.1. Climate and Topography

Project area is characterized by aridity and receives an average rainfall of 50mm in the west and 300mm in the east, with a variation averaging between 10-30% per year. Highest rainfall months range between October and April. Wind direction in the area is predominantly south-easterly, southerly and easterly. Annual temperatures are estimated around 19-35 °C during summer and 4-10 °C during winter (Mafuta, 2017; Vigne, 2001).

The topography of Omusati Region is mostly flat (with the exemption of Ruacana area towards the Angolan border that is punctuated by mountains and rolling hills). According to Omusati Regional Council (2016), the landscape of the Region is made up of a successive series of sand dunes of varying depths, separated by waterways. The project area is relatively flat and is overlain by relatively flat soils.

The site surrounded by some hilly mountains as seen in **Figure 6** below



Figure 6: Topography around the SLS Crushers site

4.2. Geology and Soils

The study area is mountainous and covered by sandy plains. These sediments are underlain by extrusive rocks of the Karoo age (Vigne, 2001). Geological analysis of the region revealed that the region is floored by mid-Proterozoic crustal rocks of the Congo Craton and contains possibly as much as 8 000 m of sedimentary rocks of the Nosib, Otavi and Mulden Groups of the late-Proterozoic Damara Sequence, 360 m of Karoo rocks and a blanket of semi-consolidated to unconsolidated Cretaceous to Recent Kalahari Sequence sediments up to 600 m thick (Mafuta, 2017).

The site is overlain by sediments; sands and gravels that seem to be influenced by site activities. The typical geology underlying these sediments are the dolomites; main target and source of the mined aggregate, making the site the perfect mining spot for SLS Crushers activities. The typical rock units (dolomites) on site are shown in **Figure 7** below.

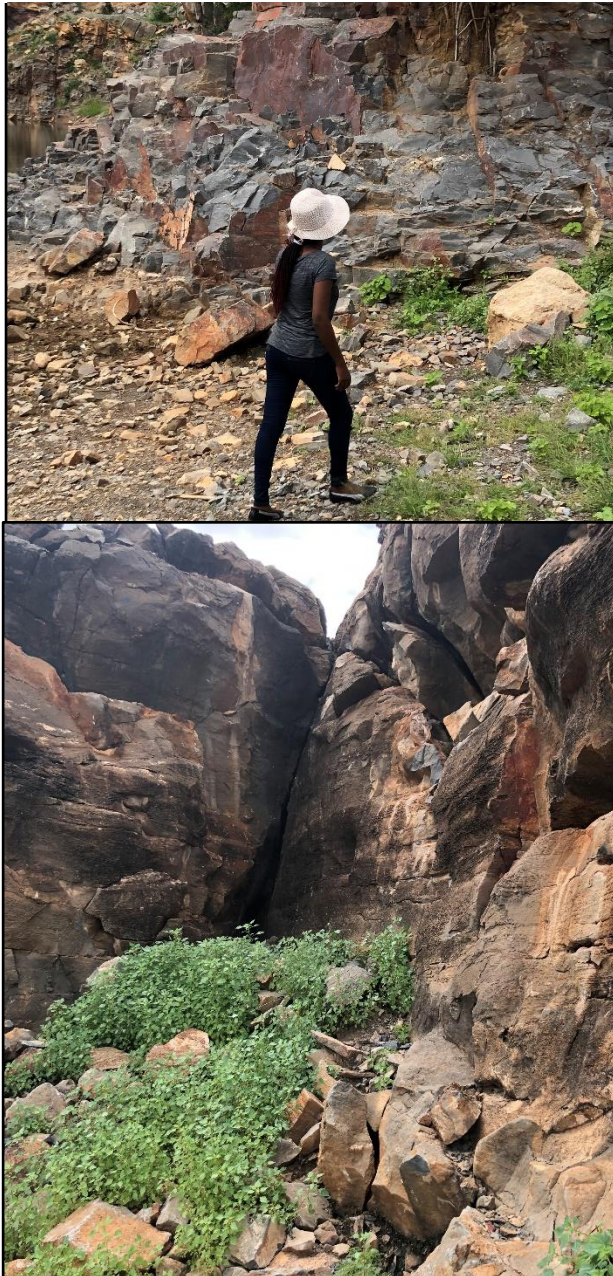


Figure 7: Site rock units of dolomite

4.3. Water Resources

A. Surface water

The Cuvelai Basin which hosts the project area consists of thousands of drainage channels or oshanas which flow during the rainy season. These oshanas are shallow, often vegetated and poorly defined, interconnected flood channels and pans through which surface water flows slowly or may form pools depending on the intensity of the floods (“*efundja*”) (GCS Water and Environmental Consultants, 2019).

There are no natural surface water bodies on site. The only surface water bodies identified are man-made; small site earth dam and the pit created from the mining activities (**Figure 8**).



Figure 8: Mine pit filled with rainwater in February 2020

B. Groundwater

According to the hydrogeological map of Namibia (Christelis and Struckmeier, 2011), the regional groundwater potential is moderate. Groundwater within the wider area of the Regions is hosted in the Kalahari sediments. The Kalahari aquifers are subdivided into five major units and named after the region or locality where they occur or where they were first described. The Discontinuous Perched Aquifer (KDP) represents a series of shallow, only locally occurring aquifers of limited extent. This aquifer type is present mainly in the Niipele Sub-Basin where recent dune sand covers the underlying sediments of the Kalahari Sequence. The KDP is recharged by direct infiltration of rainwater and exploited by means of traditional funnel-shaped hand dug wells called *omifima* (perched aquifer). Although the yield is generally limited by the size of the aquifers, they provide easily accessible and good quality drinking water to the scattered villages in the northern regions and possibly (Bittner Water Consultants, 2006).

4.4. Fauna and Flora

Livestock: Omusati Region is a home to 332 584 cattle and 295 780 goats (Namibian Sun Newspaper, 2018) and different species of domestic animals. Further domestic animals kept by the locals in the area include donkeys, sheep and pigs.

Wildlife: There is not much of wildlife occurring within the area as most wildlife is located within the Etosha National Park.

The project area and surrounding are characterized by mopane savannah and mixed woodlands (species of Acacia, Commiphora and Terminalia). The Ruacana area has good seasonal grazing and moderate browse capacity. Deforestation and degradation of grass species composition are visible in many places (Mafuta, 2017; Vigne, 2001).

The typical vegetation found on site is shown in **Figure 9** below.



Figure 9: Some mixed site vegetation (Commiphora and Camelthorn Mopane trees)

4.5. Population Density

As previously mentioned in the introduction chapter of this document regarding the exact location of all the ten mining claims being in both the Kunene and Omusati Region, the population census information provided in this section is for the Omusati (Ruacana Rural) and general Kunene Region. The active project site is found to be more in the Ruacana area of the Omusati Region than in the Kunene.

As per the Namibia Inter-censal Demographic survey 2016 report (Namibia Statistics Agency, 2017) the Kunene region is sparsely populated with a regional population of 97 856, at 0.8 people per sq. km population density.

According to National Housing and Population Census (2011a), the population Omusati Region was 243 166 (133 521 females and 109 545 males) with the Ruacana (rural) constituency population recorded at 28 081. The population density for the Region was 9.2 persons per km².

4.6. Surrounding Land Uses

Project site is surrounded by rural communities that practice subsistence farming with local small business and sales of produce from agricultural activities (these crops include tomatoes, cabbages, maize, water melons, etc.).

4.7. Economy and Services Infrastructure

Ruacana has no formal invocations of heritage in the form of museums, memorials or monuments. However, it does have a claim to natural heritage through the waterfalls, and a heritage of an ethnicity from groupings known as Zemba, Ndonguena and Himba. Ruacana remains known largely as a tourist destination or is used as a signpost to other popular tourist destinations.

The road, electricity and water infrastructure services are active in the town and nearby villages (such as the project area). These ethnicity groups affiliate themselves with livestock trading (Kapuka, 2014; Vigne, 2001).

Given the baseline of the environment components on which the project impacts were identified at the time of the environmental clearance renewal assessment was done for the site in 2017 and environmental management measures were provided for implementation, it is crucial that the implementation responsibilities of these measures are clearly indicated. Therefore, in order to

ensure continued effective implementation of the EMP and subsequent environmental protection and management, the EMP implementation responsibilities need to be assigned to all vital parties that are involved in the project on site so that they are aware of what is required of them throughout the project operational phase and/or after. These roles and responsibilities are presented under Chapter 5.

5. CHAPTER FIVE: EMP ROLES AND RESPONSIBILITIES

The chapter gives a presentation of the roles of different parties involved in the project cycle (from planning to operations and their respective responsibilities towards the implementation of the EMP.

This EMP informs all relevant parties listed below and other staff employed at the site as to their duties in the fulfilment of the legal requirements for the operation of the quarry. This is done with particular reference to the prevention and mitigation of anticipated potential negative environmental impacts. All parties should note that obligations imposed by the EMP are legally binding in terms of the Environmental Clearance granted by the relevant environmental permitting authority, in order to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Verify environmental performance through information on impacts as they occur;
- Provide feedback for continual improvement in environmental performance
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Create management structures that addresses the concerns and complaints of interested and affected parties (I&APs) with regards to the development/project;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity.

5.1. Proponent (SLS Crushers)

The Proponent is ultimately responsible for the implementation of this EMP during operation and maintenance phase (activities referred to in this EMP). In the case that the Proponent may not be able to undertake this responsibility themselves, they should assign this responsibility to a suitably qualified individual to act as their Representative or an Environmental Control Officer (ECO). The delegated responsibility for the effective implementation of this EMP will rest on the following key

individual who may be fulfilled by the same person referred to as the Proponent Representative (PR) or the ECO. The Proponent's responsibilities include:

- Managing the implementation of this EMP and updating and maintaining it when necessary.
- Management and monitoring of individuals and/or equipment on-site in terms of compliance with this EMP.
- The implementation of and compliance with the environmental management measures proposed in this document.
- Ensuring compliance with relevant environmental and related authorisations and license conditions.
- Identifying and appointing of appropriately qualified specialists (were necessary) to undertake the programmes in a timeous manner and to acceptable standards.

Alternatively, the Proponent may delegate an Environmental Officer (ECO) or they may appoint an external ECO to ensure EMP compliance throughout the project life cycle.

5.1. Environmental Control Officer (ECO) or Safety, Health & Environmental (SHE) Officer

The Proponent should assign the responsibility of overseeing the implementation of the whole EMP on the ground for the operations to a designated member of staff or external qualified and experienced person, referred to in this EMP as the Environmental Control Officer (ECO)/ Safety, Health and Environmental (SHE) Officer. The ECO will have the following responsibilities:

- Make sure that the provisions of the EMP as well as the environmental authorization are complied with during the construction and operational phases. The ECO must be fully conversant with the Environmental Impact Assessment, Environmental Management Plan/Programme and environmental legislations, specifically the Environmental Management Act No. 7 of 2007 and its Regulations.
- Issue instructions to the Proponent where environmental considerations call for action to be taken.
- Submit regular written reports, ensuring that activities on site comply with all relevant environmental legislation, monitoring and verifying that adverse environmental impacts are kept to a minimum.

- Management and facilitation of communication between the Proponent and Interested and Affected Parties (I&APs).
- Conducting bi-annually site inspections for the operation and maintenance of all areas with respect to the implementation of this EMP (monitor and audit the implementation of the EMP).
- Advising the Proponent on the removal of person(s) and/or equipment not complying with the provisions of this EMP.
- Making recommendations to the Proponent with respect to the issuing of fines for contraventions of the EMP.
- Undertaking an annual review of the EMP and recommending additions and/or changes to this document.
- Maintain records of all relevant environmental documentation.

5.2. Specialists

Specialized skills that may be required on an ad-hoc basis or in terms of environmental support services and independent compliance monitoring and auditing or maintenance, the Proponent will need to contract or appoint suitable/relevant professionals, as and when required.

The above-listed environmental management parties on site will be required to implement the respective management (action plans) measures given under the next chapter.

6. CHAPTER SIX: ENVIRONMENTAL MANAGEMENT ACTION PLANS

This chapter presents the potential impacts that were identified at the time when the current environmental clearance was issued, the environmental management actions (measures) recommended and the implementation checklist (current status of EMP implementation). It is under this chapter that the new EMP implementation roles and responsibilities and updated and additional environmental management measures going forward are also covered.

6.1. Previously Identified Environmental Impacts

The potential negative impacts were identified during the preceding environmental assessment done for the site which led to the issuance of the ECC in 2017. Mitigation measures or management action plans were also made for these impacts covered. The impacts that had been identified and managed on site are as follows:

- Potential of land/soil disturbances;
- Soil and water resources contamination;
- Biodiversity (fauna and flora);
- Air quality/dust;
- Noise;
- Health and safety;
- Vehicular traffic safety; and
- Visual (aesthetic) and archaeological impact.

6.2. Current Status: Implementation of previous Environmental Management and Social Management Measures

The implementation of the EMP and compliance during the validity period of the current environmental clearance certificate (ECC) is given in the table (**Table 3**) below. The evaluated and updated compliance status in **Table 3** has been done based on the 2017 environmental audit/EMP compliance report compiled by Mafuta Environmental Consultants. The status presents the progress that has been made on site between 2017 and early 2020 to improve and ensure environmental management and sustainability. The 2017 compliance status have been updated with the 2020 observations done during the site visit on 18 February 2020.

Table 3: Environmental and Social Management Compliance from 2017 to 2020 (updated after Mafuta Environmental Consultants, 2017)

**C - Compliant, PC - Partially Compliant, NC - Non-Compliant*

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
EMP and training Implementation	Lack of EMP awareness	-Employees have been trained on their responsibilities with regards with the EMP and their respective work on site.	C	Same as in 2017	C
Socio-economy	Employment of outsiders only	-The 7 site employees; 6 from the local surrounding communities and 1 from outside.	C	The number of employees increased to 8 (7 are locals).	C
	Social responsibility	-Access roads are not being maintained.	NC	-Access roads are cleared/brushed and sprinkled with gravel stones to create grip for vehicles.	C
		-SLS Crushers sponsor local sports and activities	C	Continued sponsorships for local sports and activities	C
Waste Management	Environmental pollution	-The aggregate crushing site did not have a waste management system in place and no provision for bins or waste disposal site.	NC	-Waste are disposed of in assigned site containers. -Improvement is needed to manage the crushing waste material.	PC

RENEWAL

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
Biodiversity	Flora (vegetation) conservation	<p>-There is minimal trees removal on site, and other mining claims are still in their pristine state.</p> <p>-There are no reforestation activities on areas where vegetation has been removed.</p> <p>-Employees have been trained against indiscriminate tree harvesting, hunting and gathering of forest produce.</p> <p>-Through following the EMA, SLS Crushers is abiding to the guidelines of the International and Regional Conventions: Convention on Biological Diversity (CBD)/Agenda 21.</p> <p>-The project Proponent is not taking full environmental conservation responsibility especially in terms of forest conservation.</p>	PC	<p>-The area mostly covered by Mopane trees as well as camelthorn trees. The project is being operated on an already cleared area, hence clearing/ destruction of vegetation is very minimal. However, should it come to light later that some vegetation will need to be removed, a permit will need to be obtained for the camelthorn trees.</p> <p>-Operations are limited to the existing site area.</p>	C
	Fauna (local wild and domestic animals)	<p>-The project area is already affected by the local communities such that there are few wild animals in the area.</p> <p>-Employees have been trained on the importance of animals and the non-hunting policy of the company.</p>	C	Same as in 2017	C

RENEWAL

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
Soils	Soil disturbance	-Erosion visible on site and stockpiled materials can result in siltation of nearby streams if no further action is taken.	NC	-The crushing waste material is not preserved in accordance to the EMP.	NC
	Soil pollution	-There are no soil conservation activities on site -Stationary trucks do not have drip trays to prevent potential pollution from oil spills. -The Workshop is not bunded. -There is visible pollution of soil on site from vehicle repairs, stationery equipment and trucks.	NC	-There is visible pollution of soil (hydrocarbon stains) on site from vehicle repairs, stationery equipment and trucks	NC
Water Resources	Over-abstraction of water resources	-Water supply to the site is sufficient and water supply ratio vs availability is balanced. A Water abstraction and use licence/permit for commercial use has been obtained from MAWF.	C	-The mining and crushing process does not require nor use water. -The permit has not been renewed because the Proponent no longer uses the site borehole as it is damaged. The required site water for human needs is obtained from a nearby prepaid water supply.	PC

RENEWAL

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
	Water pollution	-Polluted site soils can result in hydrocarbons deposition in nearby streams during the rainy season.	NC	Same as in 2017	PC
Health and safety	Injuries to site workers due to lack of safety gears and training	<ul style="list-style-type: none"> -Employees' PPE is not sufficient -Employees' accommodation facilities need to be upgraded. -Employees are not trained o health and safety -There are no Safety, Health and Environmental (SHE) Representative(s) on site. 	C	<ul style="list-style-type: none"> -All site employees are equipped with appropriate personal protective equipment for their respective works on site. -Safety and health training has been provided on site by a permanent qualified health and safety officer who recently got another job at another mine at the coast. SLS Crushers will now be outsourcing this task and get health and safety company to do training once every 12 months. 	C
	General site safety	-The site does not have Site markings and or Signs, for dangerous sites or hazardous materials	NC	-The site does not have Site markings and or Signs, for	NC

RENEWAL

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
				dangerous sites or hazardous materials	
	Safety risks to local community (people and animals)	No comment was made on this regard.	-	The site is fully fenced off to avoid intruders, animals, children and for the safety of the community members. The equipment at site is considered dangerous for those that do not have knowledge on how it is operated and to avoid injury the site gates are always kept closed.	C
	Workers housing and sanitation	-Site health and sanitation needs to be improved with an effective sewer handling system.	NC	Site is fully equipped for human settlement with a fully equipped house.	C
Culture and heritage	Archaeology - Destruction of heritage sites/objects	-Employees have been trained and informed of the course of action if they come across artefacts, graves or seeming culturally important objects and sites.	C	Same comment as in 2017	C

RENEWAL

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
	Proliferation of local cultures	<p>-SLS Crushers employed local people to ensure that the operations blend with the local cultural values - Employees from other areas of different cultural values have been given guidelines on conduct with the public.</p> <p>-SLS Crushers works hand in hand with the Village Headman.</p>	C	Same comment as in 2017	C
Mineral sustainability	Lack of regulated mining permits	-All relevant renewals with the Ministry of Mines and Energy have been conducted and obtained	C	Same as in 2017 with the new renewals and permits to be issued upon the issuance of the ECC.	PC
Land use	Land use change and resource depletion	<p>-There are no appropriate signs in place to notify the on-going activities on site.</p> <p>-In terms of local area carrying capacity, the Proponent has ensured that the project fits into the area and uses as minimal resources as possible.</p> <p>-Obsolete quarry pits are not secured or rehabilitated, posing risk to domestic and wild animals falling in the pits.</p>	PC	Same as in 2017	PC

RENEWAL

Environmental Feature	Impact	Compliance Comments in 2017	*Compliance Status	Compliance Comments in 2020	*Compliance Status
Noise	Noise	-Operations are only done during the day. -Pre-blasting notifications are given out to nearby communities.	C	There were no activities done during the time of the site visit due to the rain.	C
Visual	Aesthetic/sense of place	-Buildings and infrastructure on site is not slightly attractive and does not blend with the natural environment	NC	Same as in 2017. Moreover, during rainy season, the site infrastructure and buildings are covered by the green vegetation, which limits or minimise the visual impact on the neighbours.	PC
Roads	Vehicular traffic safety	No comment made on this.	-	-No access road permit from the Roads Authority. -No traffic signs on site.	NC
Air quality	dust	No comment made on this.	-	-Potential dust emanating from piled up mountain or heap of aggregate crushing waste material. There are no dust suppression measures on site.	NC

6.3. Updated Environmental and Social Management Actions (Measures)

The aim of the management actions in this EMP is to avoid potential operational negative impacts where possible. Where impacts cannot be avoided, measures are provided to reduce the significance of these impacts.

The management action measures for the two phases; operational & maintenance and decommissioning are clearly set out with the responsible implementation parties assigned to these and where necessary, timeframe is also indicated. **This is done to ensure that the EMP implementation responsibilities are clearly given and each implementation party involved in the project is aware of their respective responsibilities from the beginning and remain accountable.**

It should be noted that the mitigation measures or management action plans presented in **Table 4** are a re-presentation of measures provided in the 2017 EMP and where necessary, new or updated measures deemed were added for effective implementation from 2020 onwards. The aim is to enforce full compliance of the site activities to the governing legislations and ensure environmental sustainability by avoiding or minimizing the negative impacts while maximizing the project's positive impacts.

Table 4 and **Table 5** contain the management action measures recommended to improve environmental management on site during the operational and maintenance phase and for the decommissioning (closure) phase, respectively.

Table 4: Operation and Maintenance Phase Management Action Plans (Updated)

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
EMP training and Implementation	Lack of EMP awareness and the implications thereof	<ul style="list-style-type: none"> • All site personnel should be aware of necessary health, safety and environmental considerations applicable to their respective work. • EMP trainings should be provided to all new workers on site and also to old workers (as a refresher) every 6 months. • The implementation of this EMP should be monitored. • The site should be inspected and a compliance audit done throughout the operations on a bi-annual basis (twice a year). • An EMP non-compliance penalty system should be implemented on site. 	Proponent: ECO	Ongoing
Socio-economy	Labour recruitment (Local employment)	<ul style="list-style-type: none"> • Priority for casual work and any other work that can be done by people from the surrounding areas should be given to them, i.e. preference for site work should be given to the locals, provided they have the skills for specific work type. • Employment of out-of-area people should only be 	Proponent	As and when required

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
		<p>considered if the local community does not have the required skills or they are less in number to take up the work.</p> <ul style="list-style-type: none"> • Employment of women, marginalised people and people with disability in the area should be encouraged. • Equal opportunities should be provided for both men and women. 		
	Social responsibility	<ul style="list-style-type: none"> • The sponsorship of local sports and any other activities that can be done by SLS Crushers should be promoted. 		
Soils	Physical disturbance	<ul style="list-style-type: none"> • Appropriate storm water routing and attenuation must be implemented to avoid onsite erosion and downstream sedimentation during rainy seasons. • Re-vegetation of disturbed surfaces should be done in order to prevent erosion of site soils. 	Proponent	Ongoing
	Pollution	<ul style="list-style-type: none"> • Spill control preventative measures should be put in place to manage soil contamination, no matter how small the amount of pollution (spill) is. • Spill control preventative measures should be put in place to manage soil contamination. 	Proponent: ECO	

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
		<ul style="list-style-type: none"> • Potential contaminants such as hydrocarbons, and wastewater should be contained on site and disposed of in accordance to municipal wastewater discharge standards so that they do not contaminate surrounding soils. • Where hydrocarbons and other chemicals are used during the project’s phases on site, impermeable liners should be laid on such sites to capture possible spills, and prevent these substances from reaching the site soils. • Drip trays should be made available for project vehicles, especially heavy trucks to contain possible fuel leaks and spills while parked on site. • In an event that any of the substances mentioned above, spill on the soil, the contaminated soil should be cleaned up immediately and dispose of in a designated hazardous waste bin and transported to the nearest approved landfill site. The contaminated and removed soil should be replaced with clean soil. 		
Water	Water Use	<ul style="list-style-type: none"> • Once the pumping equipment of the site borehole is repaired and the Proponent may need to abstract water 	Proponent: ECO	As required

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<p>from the borehole, the existing Water abstraction and use permit should be renewed at the DWA (MAWF).</p> <ul style="list-style-type: none"> • Water reuse/recycling methods should be implemented as far as practicable on site. • All water pipes and tanks must be managed and maintained so that they do not leak and waste water in such manner. • Water management awareness should be raised on site in order to ensure conservation and protection. 		
	Pollution	<ul style="list-style-type: none"> • Polluted site soils must be cleaned up immediately in order to avoid hydrocarbons deposition in nearby streams during the rainy season or infiltration of polluted water into groundwater systems. • Potential contaminants such as hydrocarbons (diesel) should be contained on site and disposed of in accordance to the nearest municipal wastewater discharge standards so that they do not contaminate surrounding soils and eventually groundwater. 		

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<ul style="list-style-type: none"> Site workers must not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any project related activities. Avoid the discharge of any type of waste into the general environment or private properties or into the surface water bodies or ground (and eventual infiltration into groundwater). 		
Biodiversity (Flora and Fauna)	Vegetation disturbance or removal	<ul style="list-style-type: none"> Should the Proponent need to remove certain protected tree species such as camelthorn trees on and/or around the site, a relevant permit should be applied for and obtained from the nearest Directorate of Forestry office. Even if certain vegetation is found within actual site footprint, this does not mean that it should be removed. Therefore, care should be taken when conducting site activities without destroying the vegetation, unnecessarily and preserve biodiversity on the site. 	Proponent: ECO	Pre-removal of such trees
	Fauna (local domestic and	<ul style="list-style-type: none"> Site workers should be informed to refrain from killing 	Proponent: ECO	Ongoing

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
	wild animals)	<p>animal species that may be found on and around the site.</p> <ul style="list-style-type: none"> • Workers should refrain from disturbing or intentionally killing animals found on or around the project site. • Environmental awareness on the importance of biodiversity preservation should be provided to the site workers. 		
Roads	Vehicular traffic safety	<ul style="list-style-type: none"> • A Road access road permit connecting the site to C35 should be applied for and obtained from the nearest Roads Authority office. • The site should be equipped with road/traffic signs at the designated areas and this include truck offloading and loading zones. These signs should be maintained. • Drivers of the construction and operational vehicles should be in possession of valid and appropriate driving licenses. • Vehicle drivers should adhere to the road safety rules. • The Proponent should ensure that the site access road is well upgraded and in a good condition to cater for 	Proponent	Once off during this phase

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
		<p>vehicles travelling to and from site.</p> <ul style="list-style-type: none"> • Project vehicles should be in a road worthy condition and serviced regularly in order to avoid accidents as a result of mechanical faults of vehicles. • Vehicle drivers should only make use of designated site access roads provided. • Vehicles drivers should not be allowed to operate vehicles while under the influence of alcohol. • Sufficient parking bays for all project vehicles and safe offloading and loading zones should be provided on site and maintained. • No heavy trucks or project related vehicles should be parked outside the project site boundary. • Truck movements to and from site should be during weekdays and between the hours of 08h00 and 17h00. 		
Air Quality	Dust generation	<ul style="list-style-type: none"> • Dust control measures should be implemented specifically for the crushing waste material piling on site to avoid drifting of fine sand material and dust into neighbouring 	Proponent: ECO	As and when required

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<p>areas.</p> <ul style="list-style-type: none"> • Operations to be kept on current schedule (working days only) in order to keep the vehicle-related dust level minimal in the area, especially when it is windy. • In extremely windy days, a reasonable amount of water should be used to suppress the dust that may be emanating from certain site areas such as the crushing site and also some certain parts of the local utilized gravel roads that may be generating a significant amount of dust. • Excavations and other clearing activities must only be conducted during agreed working times and permitting weather conditions • Project vehicles and heavy machines should not be left idling when not in use, such that they emit air polluting gases. 		
Health and safety	Health and safety of the workers	<ul style="list-style-type: none"> • As part of their induction, the workers should be provided with awareness training on how to use site equipment as well as the risks of mishandling equipment and materials. 	Proponent: ECO	Ongoing

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<ul style="list-style-type: none"> • When working on site, employees should be properly equipped with appropriate personal protective equipment (PPE) such as coveralls, gloves, safety boots, earplugs, safety glasses, etc. depending on the type of work conducted done. • At the Proponent’s cost and as their responsibility, site workers should be sent for annual medical check-up to monitor their health in relation to site exposure. • No employee should be allowed to drink alcohol prior to and during working hours as this may lead to mishandling of equipment which results into injuries and other health and safety risks. • The Proponent should ensure that site is equipped with "danger" or "cautionary" signs for any potential danger or risk area identified on site. • The site workshop and working areas such as the quarry and crushing should be equipped with as sufficient number of fire extinguish, in case of fires. 		

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
		<ul style="list-style-type: none"> The workers should be engaged in health talks and training about the dangers of engaging in unprotected sexual relations which results in contracting HIV/AIDS and other sexual related infections. 		
	Health and safety of the locals (children and animals)	<ul style="list-style-type: none"> All necessary safety and security measures should be put in place around the site. This includes maintenance of the site fence and boundary walls or structures around the site as well as machinery and equipment. 	Proponent	
Waste	Environmental Pollution (General waste)	<ul style="list-style-type: none"> Site workers should be sensitized to dispose of waste in a responsible manner and not to litter. No waste may be buried or burned or left scattered on site on site or anywhere else throughout the project lifecycle. All domestic and general waste produced on a daily basis should be contained on site until such that time it will be transported to designated waste sites as necessary. The sites should be equipped with separate waste bins for each waste type, i.e. hazardous and general waste/domestic. 		

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe / when?
		<ul style="list-style-type: none"> A penalty system for irresponsible disposal of waste on site and anywhere in the area should be implemented. No waste should be improperly disposed of on site or in the surroundings, i.e. unapproved waste sites. 		
	Human Health (sanitation)	<ul style="list-style-type: none"> Since the site is not connected to municipal sewage system, sufficient portable toilets system has been established on site for workers and therefore, these toilets should be appropriately maintained and emptied according to their manufacturer's operational standards recommendations. Operational ablution facilities including toilets and washrooms should be provided on site. 	Proponent	As required
	Hazardous waste (fuels)	<ul style="list-style-type: none"> All hazardous substances such as paints and diesel should be stored in a bunded area with an impermeable surface beneath them to prevent spills on soils and eventually water resources. Hazardous waste and other chemicals should be safely stored on site and later (as required) transported to the nearby approved hazardous waste sites for safe disposal. 	Proponent	As required

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
		<ul style="list-style-type: none"> Empty hazardous substance containers should not be disposed of anywhere on the project site or surroundings, but should be stored on site and safely taken to the nearest approved hazardous waste sites. 		
Noise	Nuisance	<ul style="list-style-type: none"> Operating hours should strictly restrict remain between 08h00 and 17h00 on weekdays to avoid noise generated by equipment and the movement of vehicles before or after working hours. When operating the blasting and excavation machinery onsite, workers should be equipped with personal protective equipment (PPE) such as earplugs to reduce noise exposure. 	Proponent	Ongoing
Aesthetics	Visual	<ul style="list-style-type: none"> The site building such as the house and the workshop should be painted with a more area appealing colour in order to minimize visual impacts of these structures. 	Proponent	Once off
Archaeological	Impact on unknown cultural heritage or	<ul style="list-style-type: none"> Identification of any archaeological significant objects on the site should not be disturbed, but are to be reported to the project ECO who will then inform/notify the National Heritage Council offices for further instructions and 	Proponent: ECO	As required, upon encounter

RENEWAL

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe when? /
	sites/objects	actions. <ul style="list-style-type: none"> Workers should be educated to not destroy or throw away but report (to the ECO) of any unknown object found/discovered on site during excavation or upon encountering such archaeological objects or sites on the site areas. 		

Table 5: Decommissioning Phase Management Action Plans

Environmental Feature	Impact	Management Actions	Responsible person(s) / Implementation responsibility	Timeframe (When?)
Employment	Loss of employment	<ul style="list-style-type: none"> The Proponent should inform the employees on time, of its intentions to cease works and the expected date of such closure to allow them time to look for new jobs. 	Proponent	Pre-decommissioning
Rehabilitation	Environmental degradation due to poor or no proper site rehabilitation	<ul style="list-style-type: none"> The competent regulatory authority (Ministry of Mines and Energy should be consulted as often and as needed in order to seek advice on mine rehabilitation process. This includes trainings on post-mining rehabilitation. The waste rock placed aside during dolomite extraction (at the quarry) and waste material produced from aggregate crushing should be used to backfill the quarry. All equipment, infrastructure/structures and other items used during the mining period should be safely demolished and removed from site after mining operations. 	Proponent	Pre-decommissioning Ongoing site monitoring from complete closure

7. CHAPTER SEVEN: MINE SITE REHABILITATION

According to Ansaah (2008), rehabilitation of mined out areas provides ecological, economic and social benefits to the community, and non-rehabilitated disturbed areas deprive communities from benefiting from their land after mining. In order for communities to benefit from their land post-mining, it is necessary for small scale miners to rehabilitate the mined out areas to at least bring them close to their pre-mining states (by backfilling). However, this remains a challenge to many small-scale miners due to lack of rehabilitation knowledge, money and necessary equipment to undertake the required rehabilitation of sites. It is believed that rehabilitation has not been done on many, if not all small-scale mined out areas in Namibia. This will lead to cumulative environmental impacts that may take long or may not be able to be reversed. To avoid this, it is vital that new rational mitigation measures need to be taken into consideration and effectively implemented by the small-scale miners. This would only be achieved through providing awareness training to small-scale miners on the environment and progressive rehabilitation of their mined out areas.

It can be concluded that, at the moment rehabilitation of mined out areas at most project sites in Namibia, is difficult to achieve due to various reasons which is mainly based on rehabilitation resources; finances, machinery, rehabilitation knowledge/awareness, etc. The impact of mined out areas on the environment can be minimized by implementing the following measures are recommended.

- Miners and their workers are provided with sufficient awareness training (environmental education) on the environmental impacts stemming from mining activities and how to minimize these impacts, while maximizing small-scale miners benefits;
- Provision of rehabilitation trainings and assistance to miners by relevant government institutions; and
- All equipment and other items used during the mining period should be removed from the site after mining operations.

These above-listed recommendations are primarily not aimed at the miners alone, but also the competent and responsible government departments, as this cannot be successfully implemented by the miners on their own. However, this does not mean that miners should not do what they can do at the moment to help in the rehabilitation of their mined out sites.

8. CHAPTER EIGHT: ENVIRONMENTAL MONITORING ACTION

In order to ensure compliance with the legal requirements, minimize potential adverse impacts and improve environmental sustainability, some monitoring activities are recommended for the site. These recommended monitoring exercises are to be implemented as follows:

8.1. Monitoring of Selected Environmental Components

- **Environmental (during the validity period of the ECC):** bi-annual EMP implementation and compliance monitoring should be undertaken throughout the project cycle. The bi-annual monitoring exercise should be done every six months throughout the operations. Environmental monitoring reports are to be compiled and submitted to the Department of Environmental Affairs (DEA) for archiving. This practice will make the ECC renewal easy when it is about to expire in future. Therefore, the Proponent should effectively monitor and submit the reports to the DEA. The submission is not only done for record keeping purposes, but also in compliance with the environmental legislation.
- **Environmental (Checklist):** In order to make impact monitoring and EMP compliance easy, the Proponent should keep an Impact-Indicator Checklist that can be used by the ECO and updated every 6 months. The Environmental Checklist Template is attached under **Appendix A.**

8.2. Environmental awareness

SLS Crushers should ensure that its employees and any third party who carries out all or part of their obligations are adequately trained with regard to the implementation of the EMP, as well as regarding environmental legal requirements and obligations. Training may be conducted by the ECO, where necessary.

Environment and health awareness training programmes should be targeted at three distinct levels of employment, i.e. the executive, middle management and labour. Environmental awareness training programmes shall contain the following information:

- The names, positions and responsibilities of personnel to be trained.
- The framework for appropriate training plans.
- The summarized content of each training course.
- A schedule for the presentation of the training courses.

- The ECO shall ensure that records of all training interventions are kept in accordance with record keeping and documentation control requirements as set out in this EMP. The training records shall verify each of the targeted personnel's training experience.

9. CHAPTER NINE: CONCLUSIONS AND RECOMMENDATIONS

Mafuta Environmental Consultants are confident that the potential negative impacts associated with the mining activities on site can continue to be mitigated by effectively implementing the recommended management action measures and their monitoring. Therefore, it is recommended that the aggregate mining and associated operations on the project site be granted an Environmental Clearance Certificate, provided that:

- All mitigations provided in this EMP should be implemented as stipulated and **where required and emphasized, improvement should be effectively put in place;**
- **SLS Crushers should improve the non-compliant and partially compliant components in Table 3 by effectively implementing the respective management measures in Table 4 and Table 5, followed by monitoring. This needs to be done in order to satisfy the requirements of and compliance with the EMA No. 7 of 2007, its 2012 EIA Regulations and the environmental clearance certificate conditions.**
- All required permits, licenses and approvals for the operations are obtained as required (please refer to the Permitting and Licensing in **Table 2** of this document);
- The Proponent and all their workers comply with the legal requirements governing this type of project and its associated activities;
- Environmental monitoring requirements recommended are adhered to; and
- All the necessary environmental and social (occupational health and safety) precautions provided are adhered to.
- Improvements should be done on the storage and measures implemented to manage dust emission from the crushing site (crushing waste heap).

10. REFERENCE LIST

Ansaah, L. H. (2008). Retrieved from Kwame Nkrumah University of Science & Technology: Rehabilitation of Small Scale Mined Out Areas: <http://ir.knust.edu.gh/xmlui/handle/123456789/1520>

GCS Water and Environmental Consultants. (2019). *Environmental Assessment for the Preservation or Rehabilitation of Main Road 92 (MR92) [Oshakati-Outapi-Ruacana Road] in the Oshana and Omusati Regions*. Windhoek: Ministry of Environment and Tourism.

Green Spec. (2020). *Green Spec: Green Building Design - Concrete Production, Impact and Design (Aggregates)*. Retrieved February 26, 2020, from Green Spec: <http://www.greenspec.co.uk/building-design/aggregates-for-concrete/>

Heath, R. G. M. (2006). *Small-Scale Mines, Their Cumulative Environmental Impacts and Developing Countries Best Practice Guidelines for Water Management*. Auckland Park: Pulles Howard & de Lange.

Christelis, G and Struckmeier, W (eds). (2011). *Explanation to the Hydrogeological Map: Groundwater in Namibia*. Windhoek: Ministry of Agriculture, Water and Forestry.

Kapuka, H. N. (2014). *The making of Ruacana as a place and its Construction as Future Heritage*. Cape Town: University of the Western Cape.

Mafuta Environmental Consultants. (2017). *Environmental Audit and Management Plan for the Application of the Renewal of Environmental Clearance Certificate for Mining Claims 68463-68472 situated at Otjolute, Ruacana and Opuwo in the Kunene and Omusati Regions*.

Ministry of Mines and Energy. (2020). *Mineral Rights & Resources Development: Mining License Applications*. Retrieved from Ministry of Mines and Energy: <http://www.mme.gov.na/mines/mrrd/>

Mweemba, M. S. (2014). *Small-Scale Mining in Namibia: Theme: "Earth Sciences and Climate Change: Challenges to Development in Africa": 7th conference of the African Association of Women in Geosciences...* Windhoek.

Namibia Statistics Agency (NSA) . (2017). *Namibia Inter-censal Demographic Survey 2016 Report*. Windhoek: Namibia Statistics Agency.

Omusati Regional Council. (2016). *Omusati Regional Council: Regional Profile*. Retrieved from Omusati Regional Council: <http://www.omusatirc.gov.na/omusatirc/about-us>.

Vigne, P. (2001). *Cattle Marketing in the Epupa, Ruacana and Onesi Constituencies of the Kunene and Omsati Regions*. Windhoek.

Environmental Audit (checklist) for SLS Crushers Mining (Quarry) Site near Ruacana in the Omusati Region

Report No.	Monitoring Date:	Next Monitoring Date:	
Issue	Observation	Remedial Action	Compliance
Operations - Training			
1. Have all employees undergone EMP training?			
2. Have all employees undergone 6- monthly refresher EMP training?			
Operations – Waste Management			
3. Is there fuel storage tank on site? If so, is the appointed waste hydrocarbons management company have a valid Used Mineral Oil Permit?			
4. Is waste disposed of in designated containers on site and transported to nearby approved landfill sites?			
5. Has a wash bay/workshop area been constructed?			
6. Is the wash bay/workshop lined with an impermeable surface sloping towards an oil-water separator?			
7. Is the wash bay/workshop bunded and leak-proof?			
8. All maintenance of plant and equipment takes place in workshop?			
9. All plant equipment and vehicles are well maintained (no leaks)?			
10. All plant and machinery have drip trays, which are checked and emptied daily?			
11. All repairs on machinery using fuels or lubricants done over a drip tray?			
12. Contaminated soil removed to an appropriate depth and stored as hazardous waste?			
13. Have all waste hydrocarbons been removed from the site (annual requirement)?			

Issue	Observation	Remedial Action	Compliance
14. Workforce aware of procedures in the event of spills/leaks?			
Operations – Traffic			
15. No trucks parked in the road reserve?			
16. All drivers have appropriate licenses?			
Operations – Fuel Depot and Fire Safety			
17. Has SLS Crusher compiled a fire safety plan as described in the EMP?			
18. Have the workforce undergone fire safety training? Are the workforce aware of procedures in the event of a fire?			
19. Safety signage provided at fuel storage areas?			
20. Fire extinguishing equipment available on-site and compliant with the applicable SANS?			
21. Operation of fuel depot assigned to appropriately trained members of workforce?			
22. No smoking in hazardous areas?			
Operations – General Health and Safety			
23. Are all hazardous materials (used and unused hydrocarbons, corrosive materials etc.) contained within designated containers?			
24. Sufficient stock of personal protective equipment (ear muffs, dust masks, safety boots, gloves, hard hats etc.)?			
25. Have unsafe work areas/surfaces been marked as such?			
Operations – Air Quality			
26. Are dust suppressant measures (use of water) utilised around active work areas including the crushing waste material heap?			
27. Have mine workers gone for their annual health check-up?			

Issue	Observation	Remedial Action	Compliance
Operations – Rehabilitation and Aesthetics			
28. Has a rehabilitation plan been compiled in accordance with the EMP?			
29. Have the site buildings and structures been improved to minimize the visual impact?			
30. Topsoil stripped and stockpiled at a suitable site prior to mine operations?			
31. Are exhausted excavated areas that may be visible from the road (C35) being camouflaged progressively / systematically?			
32. Is the waste rock being reused - utilised for construction of access roads?			
33. Have the contours of abandoned/exhausted mine areas been blended with the surrounding landscape?			
34. Have abandoned/exhausted mine areas which are heavily compacted been ripped?			
35. Have the seeds of protected and/or endemic and/or near-endemic plant species removed been collected?			
36. Do any protected plant species need to be removed? If so, have permits for their removal been obtained? Furthermore, if so, can these be practicably transplanted and offered to the National Botanic Garden?			
37. Do any endemic, or near-endemic plant species need to be removed? If so, can these be practicably transplanted and offered to the National Botanic Garden?			