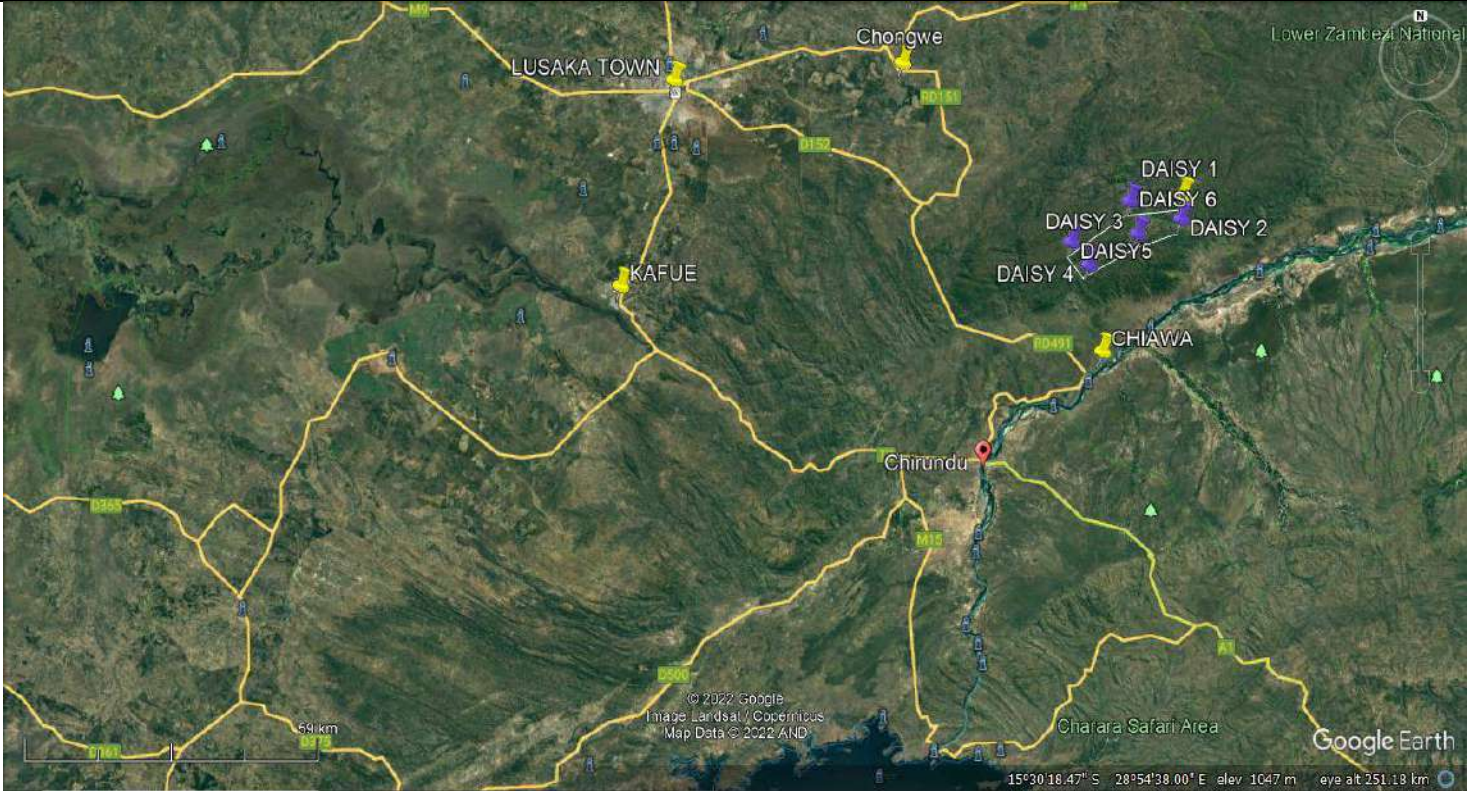


**ENVIRONMENTAL IMPACT STATEMENT (EIS)  
FOR  
DECO LUCK INVESTMENT'S  
UNDERGROUND COPPER MINING PROJECT  
IN CHIEF CHIAWA AREA,  
KAFUE DISTRICT**

**LICENSE # 26434-HQ-LEL**



**JUNE 2024**

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## **EXECUTIVE SUMMARY**

Sinomine Geological Engineering Resources Limited and Deco Luck Investments Limited have partnered to develop a medium-grade Copper deposit in eastern Chongwe near Chieftainess Chiawa's area license #26434-HQ-LEL. The developer wants to exploit the resources by opening an underground mine right in the Foot Hills of Muchinga Escarpment. This will be a challenging undertaking considering the mountainous terrain.

Deco Luck intends to exploit the mineral resources by Underground mining method. The method is being proposed due to the near vertical dip of the mineralized veins. The terrain also has dictated the use of underground mining. Being in the hills of Muchinga escarpment, the geomorphology provides a very challenging scenario, which though being shallow, open pit mining would prove very tricky, hence the mining method being proposed.

The proposed project will involve the following activities:

- Opening an Adit from the southern side of the foot hill
- Tunnels will be developed across into the hill and along following the veins
- Blind shafts will be developed to access ore below the Adit level and raises will be developed to access the ore above the Adit level.
- Ore will be blasted in sections and brought to surface at a Roaming pad
- Primary crushing will be done on surface to transportable particle sizes.
- The ore will then be tracked to a processing plant in Chiawa
- Waste rock will be deposited at site on a designated area to be identified

Deco Luck Investments Limited commissioned MOKA Environmental and Geotechnical Consultants to conduct the ESIA.

## **Legal framework**

Laws and regulations pertinent to the various aspects and activities of the proposed project were reviewed and considered. Among the Laws and regulations reviewed included the Environmental Management Act (EMA) No. 12 of 2011, the Environmental Management (Licensing) Regulations (EMR) No. 112 of 2013, the Mines and Minerals Development Act, 2015 [No. 11 of 2015] and various national and international pieces of legislations and international environmental conventions relevant to the proposed.

## **Objectives**

The objective is to Mine 2000 Metric Tonnes (MT) of ore per day by Adit mining and transport it to a floatation plant to be located in Chiawa.

## **Location**

The Mine will be located in Lusaka Province in Chiawa area of Kafue District of Zambia between latitude 12°47' and 12°48' south and between longitude 28°30' and 28°31' east about 102 Km to the east of Kafue CBD.

## **Shareholders**

Deco Luck Investments Limited is owned by Sun Hao 37%, Cao Tingjia 33%, Zhang Fengguo 15% and Liang Xuecheng 15% all Chinese nationals.

## **Investment Cost**

The company has projected to invest about US\$5.0 Million over the years towards the project.

## **Project Description**

The project is about mining the copper ore by Adit, Primary crushing on surface to transportable particle sizes and Trucking ore to a processing plant in Chiawa. The ore then will be processed by floatation method in a concentrator plant to be located in Chiawa.

## **Project lifespan**

It is projected that the project will run for 15 years.

## **Project alternatives**

The alternatives considered included: the no project option (to maintain status quo or not); project location alternatives (based on copper availability); raw material alternatives, Mining methods.

## **Summary findings of baseline studies**

The baseline studies involved collection and assessment of data from a variety of biophysical parameters (climate, geology, topography, air, water, noise, soils, and flora and fauna) and social- economic parameters (health, education, culture, demography, and economic activities).

### **Climate**

The project area has climatic conditions prevalent in the Lower Zambezi. The proposed site is located in a low rainfall area, where the mean annual rainfall is 335 mm. The area receives most of its rainfall in the months of November to March, with the months of May to September being effectively dry. The average temperature is about 20°C and the warmest month on average is October with an average temperature of 31.5°C. The mean relative humidity is about 60.4 %

### **Topography, Geology and Soils**

The general topography of the license area is hilly and undulating. This area is part of the mountain ranges of southern Zambia commonly known as Muchinga Escarpment. The area's topographic general profile slopes south towards the Zambezi River (40km away to the south). This gives a general drainage southward. Being a hilly place, there are no deposited soils.

The geology of the area as correlated from exploration drilling and surface mapping indicate that the area is largely metamorphic area with metatiferous Muscovite - Quart Schists rocks. These rocks belong to the Basement complex and are non-calcareous, hence do not bear any water and are generally aquitards. This indicates that there are no possibilities of intersecting aquifers

## **Noise and Vibration**

Noise measurements show that the general noise quality for the project area is within the acceptable limits. The main sources of noise in the immediate vicinity of the site were observed to be human activities typical of rural areas. Vibration levels in the area are also extremely low due to the absence of activities that

might cause vibrations such as Industrial activities and traffic. However, during the mine operation; both noise and vibration levels will increase and continuous monitoring is recommended to keep the levels within acceptable limits.

### **Flora and Fauna**

The Lower Zambezi has strong populations of big game. Buffalo and elephant are common, and move freely between Zimbabwe and Zambia, often grazing on the islands in the middle of the river. The Lower Zambezi's antelope species are dominated by large herds of impala, but there are also good populations of kudu, eland, zebra, wildebeest, waterbuck, bushbuck and the odd duiker or grysbok. Giraffe are completely absent (there is no record of them ever having lived here) as are cheetah and black rhino – the latter due to poaching.

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Zambia lies in the Zambesian Region, which is the summer-rainfall belt of southern tropical Africa with natural vegetation mainly determined by altitude, rainfall and soils. A total of 7 eco-regions can be identified in Zambia namely North-western Zambesian Miombo Woodland covering about Half of the country, Southern Miombo Woodlands, Zambezi Mopane Woodlands, Zambezi Baikiaea Woodlands, Cryptosepalum Dry Forests

### **Built Environment**

There are no settlements in the area.

### **Archaeological and Cultural Environment**

The proximity of the project to the LZNP, is a sensitive environmental issue. Therefore, the Company will implement a series of Standard Operating Procedures (SOP's) as part of its EMP, to ensure a consistent high standard is applied to minimize potential impacts on any downstream areas.

## **Socio-Economic and Cultural Setup**

The proposed project area falls under Kafue Municipal Council in Kafue District.

The key economic activities of Kafue district are industrial processing, trading (consumer services) and Tourism. Others are mining and agriculture.

Crops grown in small scale farming include maize, cassava, sweet potatoes, sorghum, beans, Soya beans and groundnuts. Livestock reared in the district include cattle, poultry, sheep and goats, ducks, guinea fowls, turkeys and geese. Logging, charcoal production, harvesting of wild fruit, vegetables, medicinal plants and edible insects are some of the uses of the forests.

## **Identified Impacts**

Impacts on the Socio-Economic and Cultural Environment

### **Positive impacts**

The following positive impacts and enhancement measures were identified:

- Increased employment opportunities – This impact will certainly occur it will be of local and regional extent, high magnitude and have a positive effect. The company will give priority to the local people when employing
- Increased government/ public revenue - This impact will certainly occur, it will be of local and regional extent, high magnitude and have a positive effect The company will ensure that all the forms of tax due to government and the local authorities is remitted
- Improved Local Capacity/Economy – This impact will certainly occur, it will be of local and regional extent, high magnitude and have a positive effect. The Company will continue identifying mine expansion opportunities so that the benefits of the project are felt by the local communities.

The EIS has identified **negative Impacts** on the Social-Economic and Cultural Environment and proposes mitigation measures as summarized below:

## **Dust and other emissions**

Impacts of Dust and other emissions will arise as a result of using equipment and vehicular movement as well as a result of blasting and haulage activities during site preparation and operation phase. Other emissions may result from use of

faulty equipment and vehicles. The impact is significant, irreversible and lowly sensitive. To mitigate the impacts, the company will employ appropriate measures to reduce dust such regular water spraying, keeping disturbed areas to a minimum, and revegetating bare area.

### **Occupational health and safety**

Impacts of occupational health and safety may arise during site preparation and operations. If they occurred the impacts are considered direct, local, long term, and permanent and highly sensitive. To mitigate the impacts, the company will employ appropriate measures to reduce the impacts such as provision of training, provision of Personal Protective Equipment (PPE) and erection of warning signs.

### **Increased noise**

Impacts of increased noise may arise during site preparation as well as operations. The impacts are considered direct, local, short term, and temporal. The impacts are considered significant and lowly sensitive. To mitigate the impact the company will employ appropriate measures to reduce the impacts such as operation of equipment with potential to generate high levels of noise will be limited to day time, provision of Personal Protective Equipment (PPE) to workers assigned to jobs with high prolonged exposure to highly pitched noise, servicing of equipment, improve efficiency and reduce friction of moving parts which may generate noise to limit noise levels to less than 85 dB and erection of warning signs etc.

### **Public health and safety**

Impacts on public health and safety may arise during site preparation as well as operations. The impacts are considered direct, local, short term, and temporal but highly sensitive. To mitigate the impacts, the company will employ appropriate measures to reduce the impacts such as allowing only authorized workers to be allowed to enter mine working areas, use of secure septic tanks or portable toilets, education and sensitization on the dangers of HIV and AIDS together with the promotion of self-protection, to reduce the incidence of

malaria, any standing water will not be allowed to accumulate in ponds or pits training, and erection of warning signs.

### **In migrations**

Impacts of in migrations may arise as a result of commencement of the Deco Luck Investments Limited project. The impacts are direct and indirect, of a local nature, short term, temporal and highly sensitive. To mitigate the impact, the company will employ appropriate measures to reduce the impacts such as adoption of selective employment opportunities targeting locals, and ensuring adequate facilities are provided for staff such as sanitation facilities.

### **Increased traffic**

The operation of Deco Luck Investments Limited project will result in a significant impact on traffic on the Chirundu Kafue road and other from the mine site to Smelters around the country as the number of vehicles moving to and from the site will increase. The impacts are considered direct, local, short term, and temporal but lowly sensitive. To mitigate this impact, the Company employees will be instructed to obey traffic rules and will be provided with appropriate training.

### **Loss of livelihoods, access routes, land use, access to common resources and customary rights and ethnicity**

The operation of Deco Luck Investments Limited project may result in loss of livelihoods, loss of land use, loss of access routes, loss of access to common resources, loss of customary rights and loss of ethnicity. The impacts are considered indirect, of a local nature, long term and highly sensitive. To mitigate these impacts, the company will employ appropriate measures to reduce the impacts such a Resettlement Action Plan that will be prepared by conducting a census to determine the affected people and compensation packages will be worked out by:

- a) Ministry of Agriculture will be engaged to generate a valuation report for compensation of affected farmers
- b) Sign a compensation agreement with each affected person/entity



### **Loss of amenity values**

The operation of Deco Luck Investments Limited project may result in loss of amenity values. The impacts are considered direct, of a local nature, long term and highly sensitive. To mitigate this impact, the company will employ appropriate measures to reduce the impacts such as preferring less well vegetated areas for work installations and ensuring that only the sites where construction will take place will be cleared and Landscaping and planting of flowers will be practiced to improve the appearance of the surrounding.

### **Impacts on the Bio-Physical Environment**

No positive impacts on the biophysical environment were identified

### **Negative impacts on the Bio-Physical Environment**

Loss of indigenous vegetation on site

The operation of Deco Luck Investments Limited project will not result in loss of indigenous vegetation as the project site is a less forested area. The impact is considered indirect, of a local nature, long term and highly sensitive. To mitigate this impact, the company will employ appropriate measures to reduce the impacts such as preferring less well vegetated areas for work installations and ensuring that only the sites where construction will take place will be cleared and Landscaping and planting of flowers will be practiced to improve the appearance of the surrounding.

### **Destruction of faunal habitat**

The operation of Deco Luck Investments Limited project may result in destruction of faunal habitat. The impact is considered indirect, of a local nature, long term and highly sensitive. Just like the impact above the company will mitigate by confining clearing of vegetation to only areas where construction will be done. All site clearing activities shall be approved by the Site Manager.

Loss of soil through erosion on exposed surfaces

The operation of Deco Luck Investments Limited project may result in loss of soil through erosion on exposed surfaces. The impact is considered direct, of a local nature, long term and highly sensitive. To mitigate this impact, the company will employ appropriate measures to reduce the impacts such as carrying out progressive rehabilitation on disturbed areas, limiting cutting of trees so as to provide a break against soil erosion, revegetating bare land etc.

#### Land degradation/soil contamination

The operation of Deco Luck Investments Limited project may result in land degradation/soil contamination. The impact is considered direct, of a local nature, long term and highly sensitive. To mitigate this impact, the company will employ appropriate measures to reduce the impacts such as contain, and manage spillages, dispensing points having drip pans while fuel tanks/drums being contained in a bund of sufficient capacity and standing on an impervious surface, maintenance of vehicles and equipment etc.

#### Air pollution (Dust and other emissions)

The operation of Deco Luck Investments Limited project may result in air pollution. The impact is considered direct, of a local nature, short term and lowly sensitive. To mitigate the impact, the company will employ appropriate measures to reduce dust and other air pollution activities such as regular water spraying, keeping disturbed areas to a minimum, and revegetating bare area and regular maintenance of vehicles and equipment etc.

#### Ground and surface water contamination

The operation of Deco Luck Investments Limited project may result in ground and surface water contamination. The impact is considered direct, of a local nature, long term and highly sensitive. To mitigate the impact, the company will employ appropriate measures to reduce the impacts such as providing secure septic tanks or portable toilets and placing them at least 100 meters from the nearest body of water, placing sumps or pits a minimum of 100 metres back from the high water mark of any water body or watercourse. Placing wash-water from the kitchen and washing facilities discharge to the sumps at least 100 metres from any body of water, manage spillages, providing bunds and impervious surfaces etc.

## **Noise and vibration Impacts**

This impact will be infrequent and unlikely to occur but in case it occurs it will be of local extent, low magnitude and have a negative effect. The developer will ensure compliance with all legislation (such as ZEMA and international standards) for the noise and vibration emitted from all mine activities.

## **Waste Generation and Management**

This impact will be infrequent but likely to occur it will be of local extent, low magnitude and have a negative effect. The developer will establish an effective waste management system that protects the environment from pollution by all mine waste.

## **Climate Change Impacts**

The operation of Deco Luck Investments Limited project may result in increased electrical energy consumption and climate change related impacts. The impacts are considered indirect, of regional nature, short term and lowly sensitive. To mitigate these impacts company will employ appropriate measures to reduce the impacts such as

- a) Employees' education on the importance of energy conservation and practical steps to take to achieve this.
- b) Regular repairs and service of electrical equipment and fossil fuel consuming equipment to be done to increase their efficiency and consequently minimize consumption
- c) Consumption or wastage of resources whose production directly contribute to GHG emissions or have direct bearing on Climate Change will be discouraged.
- d) Awareness campaigns on causes, consequences and mitigation of Climate Change will be done to employees and community members

## **Environmental Management and Monitoring**

In order to ensure successful implementation of mitigation measures, parameter monitoring and subsequent audits, Environmental Management Plans, Environmental Monitoring Plans and Social Management Plans have been proposed.

## **Closure and Decommissioning**

The study also looked at what will be done to restore the disturbed land. Consequent to land restoration exercise, the land should be handed back to government after the decommissioning process. The estimated cost of closure is approximately US\$2.0 Million.

## **Conclusion and recommendations**


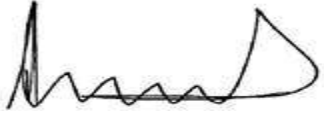


After considering the positive impacts associated with the proposed project in comparison with the negative ones, together with appropriate enhancement and mitigation measures respectively, it was concluded that the proposed project can be managed to ensure that all benefits are realised and that the environment and local communities is not impacted on adversely.

Based on the ESIA process carried out for this project, the consultant has made the following recommendations:

- The proposed project should be implemented in compliance with the regulatory framework and corporate requirements as highlighted in the report.
- The developer should consider all identified potential positive and negative impacts and implement all the proposed enhancement and mitigation measures respectively.
- The developer should implement the ESMP and the EMP provided in all the phases of the proposed project.
- The Zambia Environmental Management Agency should consider and grant approval to the proposed project.

## CONSULTANTS

Principal Members of the Environmental Impact Assessment Team Comprised of the following:

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We submit the EIA findings report for your approval

Signed;  
Director  
**DECO LUCK INVESTMENTS LTD**

## **NON EXECUTIVE SUMMARY**

Sinomine Geological Engineering resources limited and Deco Luck Investments Limited have partnered to develop a medium-grade Copper deposit in eastern Chongwe near Chieftainess Chiawa's area license #26434-HQ-LEL.

The developer wants to exploit the resources by opening an underground mine right in the Foot Hills of Muchinga Escarpment.

The Mine will be located in Lusaka Province in Chiawa area of Kafue District of Zambia between latitude 12°47' and 12°48' south and between longitude 28°30' and 28°31' east about 102 Km to the east of Kafue CBD.

The company has projected to invest about US\$5.0 Million over the years towards the project.

It is projected that the project will run for 15 years.

Deco Luck Investments Limited commissioned MOKA Environmental and Geotechnical Consultants to conduct the ESIA.

### **The Positive impacts identified include**

- Increased employment opportunities –
- Increased government/ public revenue
- Improved Local Capacity/Economy
- Established road access
- Increased business opportunities for Chiawa community

### **The negative Impacts identified include**

- Dust and other emissions
- Occupational health and safety
- Increased noise
- Public health and safety
- In migrations
- Increased traffic
- Loss of livelihoods, land use, access to common resources and customary rights and ethnicity
- Destruction of faunal habitat (specifically where mining will take place)

## CONCLUSIONS

The developer has proposed enhancement and mitigation measures respectively to address the positive and negative measures identified.

After considering the positive impacts associated with the proposed project in comparison with the negative ones, together with appropriate enhancement and mitigation measures respectively, it was concluded that the proposed project can be managed to ensure that all benefits are realised and that the environment and local communities is not impacted on adversely.

## NYANJA TRANSLATION - NON EXECUTIVE SUMMARY

### NDEMANGA (NON-EXECUTIVE SUMMARY IN NYANJA)

Akampani ya Sinomine Geotechnical Engineering Resources Limited ndi Deco Luck Investments Limited avomekezana kuti agwilizane panchito yokumba mwala wa kopala omwe upezeka chaku mmawa kwa boma la Chongwe, mudziko la mfumu Chiyawa (Licence No. 26434-HQ-LEL).

Makampani awiliwa ali ndilingo loimba mgodi wakopala umeneu kuyambila pansi pace pa phiri lalitali lomwe muchingelezi lishedwa Muchinga Escarpment. Mgodid umeneu udzaimbidwa mudela la Lusaka Province, pamtunda wokwanila 102Km chaku mmawa kwa boma la Kafue (12<sup>0</sup> 47'-12<sup>0</sup> 48' South Latitude and 28<sup>0</sup> 30'-28<sup>0</sup> 31' East Longitude).

Pofuna kutengako mbali muchitukuko cha migodi, eni ace amakampani aya ali okonzeka kuikamo ndalama zochulukira muchitoyi zofika ku 5.0 Million Dollar. Chiyembekezo ndichakuti nchitoyi idzatenga zaka khumi ndi zisanu kufika kumapeto.

Ndiye potsatila lamilo loimba migodi, akampani ya Deco Luck Investments Limited anasankha kampani ya MOKA Environmental & Geotechnical Consultants kuwaimililako ngati akatswili pankhani ya chitetezo cha zolengedwa zomwe zingakonongedwe chifukwa cha migodi.

Ubwino wotsegula mugodi kumalo aya uli motele:

- . Anthu ambili adzapezako mpata wolowa nchito.
- . Thumba la landalama za boma lidzakulilako.
- . Chuma cha malo yozungulila Chiyawa chidzapita patsogolo.
- . Misewo idzapangidwa komweko.
- . Nchito zamalonda zidzamasuka.

Komanso kuli mbali yoipa yotsegula mugodi kumeneko monga tele:

- . Fumbi, utsi ndi zina zotele zidzachulukilako.
- . Nchito ya mugodi idzabweletsa matenda yosiana siana.

- . Kuonjezela kwa chongo mudela la Chiyawa.
- . Anthu adzachelukilako mu malo amanewa.
- . Matenda pakati pa anthu yadzachelukilako ndiponso chitetezo chidzachepeleko.
- . Anthu adzachelotsewa pa malo yawo yokhala ndiponso miyambo yawo idzataika.
- . Nyama zamuthengo, zomela ndi zolengedwa zina zonse zidzaonongeka.

## **MAPETO**

Pomaliza, chokondweletsa ndichakuti eni ace a nchitoyi ndiokonzeka kuchita chilichonse chotheka kuona kuti zonse zalembedwa muchipangano ichi, ngakhale zitabvuta bwanji, zidzachitika.

Atafufuza fufuza pa zonse zalembedwa muchipangano chimenechi, akatswili pa nchito ya chitetezo cha zolengedwa (MOKA Environmental & Geotechnical Consultants), ndiokhutula kuti pakuimba mugodi umeneu eni ace akampani adzatsatila malamulo yosunga zolengedwa. Motelo nchito ya mugodi umeneu ingapitilize popeza kuti palibe chiopsezo cheni cheni ku anthu akumaloko ndiponso ku zolengedwa zonse.



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## **1.0 INTRODUCTION**

Sinomine Geological Engineering resources limited and Deco Luck Investments Limited have partnered to develop a medium-grade Copper deposit in eastern Chongwe near Chieftainess Chiawa's area.

The developer wants to exploit the resources by opening an underground mine right in the Foot Hills of Muchinga Escarpment. This will be a challenging undertaking considering the mountainous terrain.

Deco Luck intends to exploit the mineral resources by Underground mining method. The method is being proposed due to the near vertical dip of the mineralized veins. The terrain also has dictated the use of underground mining. Being in the hills of Muchinga escarpment, the geomorphology provides a very challenging scenario, which though being shallow, open pit mining would prove very tricky, hence the mining method being proposed.

### **1.1 History of the Project**

The area was first explored by Mwembeshi Resources from 2002 to 2007.

Mwembeshi Resources limited identified a resource of approximately 28million tonnes of Copper grading ranging from 0.5%TCu. to 2.5%TCu. over a three sectors over a strike length of 15km and width of 1.8km

area:

1. Cheowa west
2. Cheowa as depicted and
3. Neningombe

These locations are depicted in the map in Figure 1.

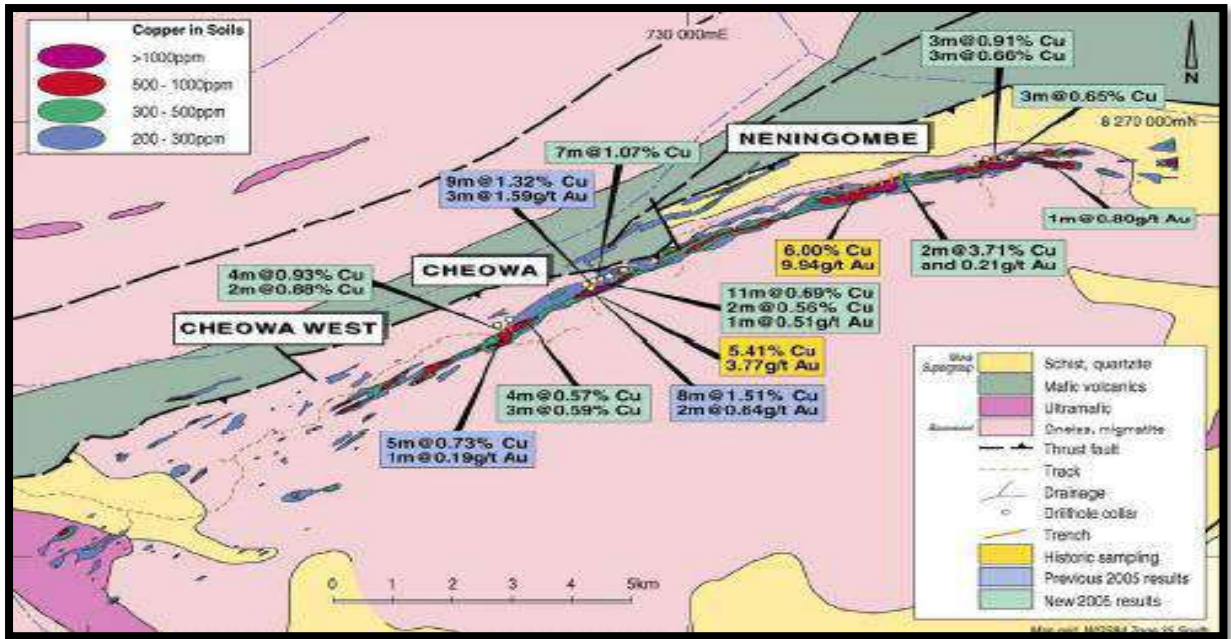


Figure 3: Intersected Copper and Gold mineralization

- GOLD was also intersected on most of the drill holes ranging from 0.24g/t to 3.5g/t (an added incentive for the planned mining project)

The intersected anomalous mineralization appeared as a continuous vein over a strike distance of 15km (Figure4 below).

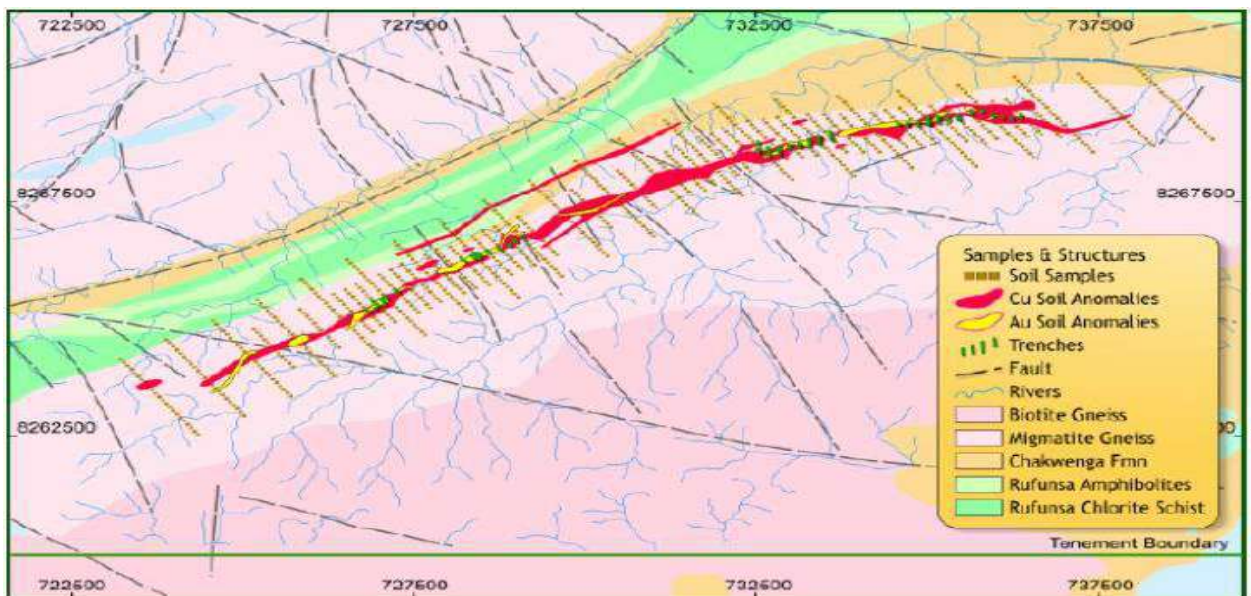


Figure 4: Delineated mineralization vein



## **1.2 Summary description of the project including project rationale**

The underground mining will involve opening an ADIT.

The mining method will involve:

1. Opening an Adit from the southern side of the foot hill
2. Tunnels will be developed across into the hill and along following the veins
3. Blind raises will be developed to access ore below the Adit level and raises will be developed to access the ore above the Adit level.
4. Ore will be blasted in sections and brought to surface at a Roaming pad
5. Primary crushing will be done on surface to transportable particle sizes.
6. Waste rock will be deposited at site on a designated area to be identified

An environmental Impact Assessment (EIA) is being done by MOKA Environmental and Geotechnical Consultants, an independent consulting company, to evaluate the potential environmental and social impacts of the proposed project.

## **1.3 Objectives of the project**

The main objective of the project is to mine the Copper in the Deco Luck Investments Licence area and transport it to the concentrator to be established in Chiawa area.

## **1.4 Brief description of the Location**

### **A description of the project area**

Exploration License 26434-HQ- is in Kafue District in Lusaka Province of Zambia. The licence is located approximately 150km southeast of Lusaka Central Business District (CBD) or 100km southeast of Chongwe, or about 100km east of Kafue Town.

Figure 3 below shows the location of the exploration licence. The central administrative districts in the area are Lusaka and Kafue Districts. The Chongwe River runs from the northwest to the southeast and drains into the Zambezi River, forming the dominant fluvial system for License 26434-HQ-LEL

Table 1 gives the site coordinates. These points are marked Daisy 1 – 6 on google map in Figure 3.

The licence can be accessed through either Chongwe or Chirundu. Most of the roads leading to the license area are only passable by a 4X4 vehicle during the dry season. Most of the roads are impassable during the rainy season.

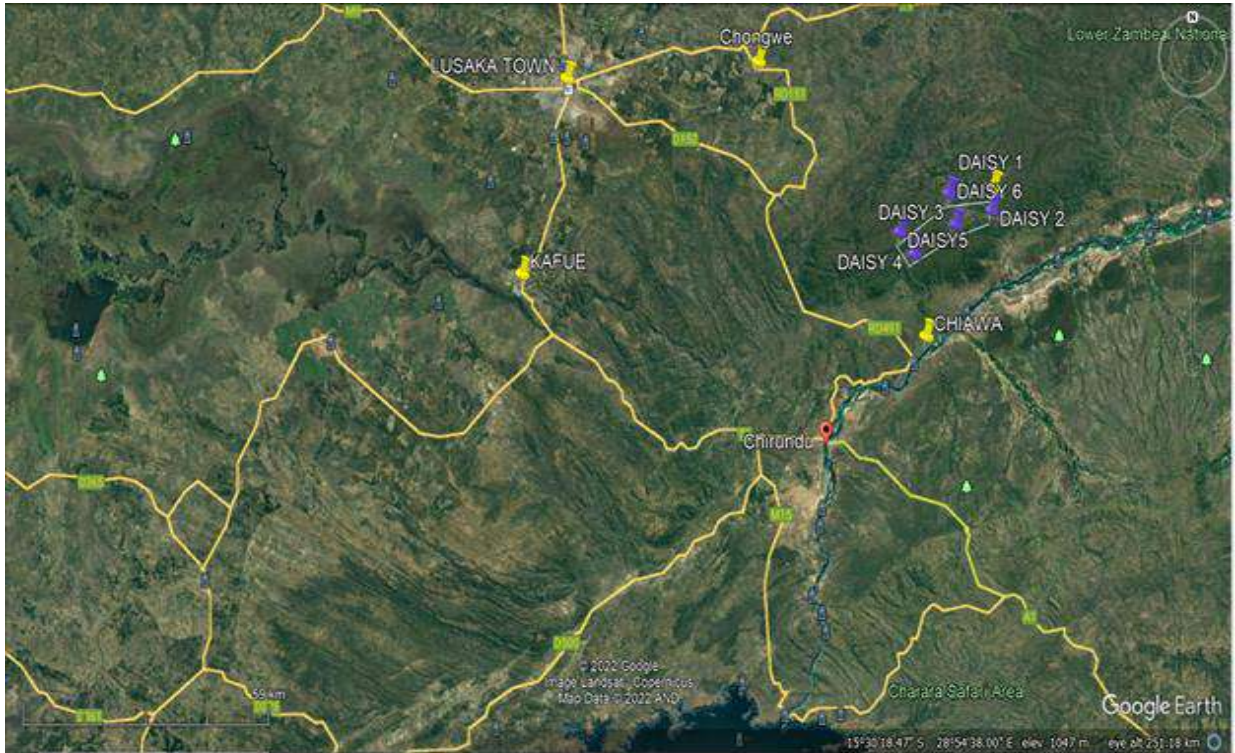


Figure 3: Location of proposed project (with google scale).

Table 1: Project Site Coordinates

	<b>LATITUDE</b>	<b>LONGITUDE</b>
A	15°39'12"	29°12'36"
B	15°39'18"	29°12'36"
C	15°39'18"	29°12'12"
D	15°39'30"	29°12'12"
E	15°39'30"	29°11'24"
F	15°39'42"	29°11'24"
G	15°39'48"	29°10'30"
H	15°42'48"	29°5'36"
I	15°42'48"	29°5'18"

J	15°41'30"	29°4'24"
K	15°41'12"	29°4'24"
L	15°37'24"	29°9'18"
M	15°37'24"	29°14'6"
N	15°38'54"	29°14'6"

### 1.5 Particulars of Directors and Percentage of shareholding by each shareholder

The particulars of the Directors are summarized in Table 2.

Table 2. Directors and Shareholders

Name	Address	Nationality	ID # (type)	# of Share	% shares
Sun Hao	24 Kalungwishi, Nkana East, Kitwe	Chinese	EJ5418618 (passport)	5550	37
Cao Tingjia	24 Kalungwishi, Nkana East, Kitwe	Chinese	EJ5863375 (passport)	4950	33
Zhang Fengguo	24 Kalungwishi, Nkana East, Kitwe	Chinese	EI5593980 (passport)	2250	15
Liang Xuecheng	24 Kalungwishi, Nkana East, Kitwe	Chinese	EG8789223 (passport)	2250	15

### 1.7 The developer's physical address and the contact person.

The particulars of the Developer are summarized in Table 3.

Table 3: Particulars of Developer/operators

Name of developer:	Deco Luck Investments Limited
Address:	24 Kalungwishi, Nkana East, Kitwe
Telephone number:	0963458196
Fax number:	1062286186@qq.com
Contact person	HUONG XIONG HUI (Daisy)

### 1.8 Track Record/Previous Experience of Enterprise Elsewhere

Deco Luck Investments Limited is a newly established company with no track record in Mineral Processing. However, the Directors have been involved in

Mineral processing before. The company was incorporated on 13<sup>th</sup> September 2022.

### **1.9 Total Project Cost/Investment**

Deco Luck Interments Limited intends to invest a total of about US\$ 50 million as capital investment.

### **1.10 Proposed Project Implementation Date**

Implementation is expected to commence as soon as the EIA and other approvals have been completed.

## **2.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK**

The operations of the project proposed by Deco Luck will be governed in accordance with the following relevant pieces of legislation:

### **2.1.1 Administrative Framework**

The core pieces of legislation and associated regulations governing environmental management in the mining sector and environmental protection are the Environmental Management Act (EMA) of 2011 and Mines and Minerals Development Act (MMDA) No. 7 of 2008. The enforcing institution of the MMDA is the Mines Safety Department (MSD). The EMA renames the established Environmental Council of Zambia (ECZ) to Zambia Environmental Management Agency (ZEMA). It is responsible for enforcing environmental regulations and coordinating of government agencies involved in environmental management in their sectors.

The EMA through Statutory Instruments (SIs) also sets environmental quality standards and makes the developer responsible for meeting them. Thus, under the EMA, all effluents and emissions from mining operations are regulated through a system of permits, licenses and fines

## **2.2 Legislative Framework**

### **2.2.1 The Constitution of Zambia (amendment) No.2 2016.**

The Constitution of Zambia (amendment) No.2 of 2016 provides for matters of environmental management and natural resources conservation in section 256. There are regulatory requirements and guidelines enshrined in a number of Acts of Parliament related to environmental management and protection as well as protection of the public that are relevant to the implementation of the project.

#### **Relevance to the Project**

The local community will be compensated accordingly to satisfy the provisions of the constitution and international guidelines. Article 23 protects against all forms of discrimination. Furthermore, with regard to women and vulnerable groups, who

may not have any title to land (and therefore not entitled to any compensation) in a traditional male dominated society; the constitution provides for compensation of such

### **2.2.2 The Environmental Management Act No 12 of 2011**

This is the principal Act which relates to all environmental issues in Zambia. The Act repealed and replaced the EPPCA of 1990. Its functions include; protection of the environment and control of pollution in particular so as to provide for the health and welfare of people, animals, plants and the environment in general. It also demands that an Environmental Impact Assessment (EIA) be conducted to assess all impacts resulting from implementation of new projects or existing project modification and decides the scope and nature of the environmental planning needed. A statutory instrument (No. 28 of 1997) also demands that an Environmental assessment or Environmental Project Brief (EPB) requirements be fulfilled before development can commence.

#### **Relevance:**

Deco Luck Investment Limited will ensure compliance by not implementing the project before it is approved with stipulated decision letter conditions by ZEMA. The authority concerned with Environmental Assessments in Zambia is the Zambia Environmental Management Agency (ZEMA), which also undertakes the coordination, enforcement and supervisory roles with cooperation from other government agencies and departments such as Mine Safety Department (MSD). Below are the subsidiary Statutory Instruments of the Environmental Management Act that are relevant to the proposed project:

### **2.2.3 The Environmental Impact Assessment Regulations, SI 28 of 1997**

The Environmental Impact Assessment (EIA) Regulations, S.I. 28 of 1997 read together with the Environmental Management Act (EMA) No. 12 of 2011 states as follows;

“A developer shall not implement a project for which a project brief or an environmental impact statement is required under these Regulations, unless the

project brief or environmental impact statement has been concluded in accordance with these Regulations and the Agency has issued a decision letter.” It is for this reason that Deco Luck Investments intends to develop this Terms of Reference for submission and consideration by the ZEMA.

In addition to the above, the project entails obtaining relevant licenses as required under the following Environmental Regulations:

#### **2.2.4 The Environmental Management (Licensing) Regulations No. 112 of 2013**

In addition to the above- mentioned environmental regulations, the project entails obtaining relevant licenses as required under the newly established Environmental Management (Licensing) Regulations;

- **Specific Applicable Section:** Part III-Waste Management

This section applies to the transportation of waste (non-hazardous) and operation of waste (non-hazardous) disposal sites. The proposed project, especially during the construction phase will produce waste in the form of construction waste, paper, and plastic and food stuffs. This waste will require disposal in line with these regulations.

*Compliance:* Apply for Waste Management License and adhere to its conditions.

- **Specific Applicable Section:** Part IV-Hazardous Waste

This section governs the generation, storage, and transportation of hazardous waste. The proposed project will generate certain types of hazardous waste during the construction and operational phases, the handling and disposal of which will be subject to these regulations. This waste will include spent fluorescent tubes, lighting bulbs, and batteries. Another source of hazardous waste will be used oil from servicing of vehicles and various machinery/equipment.

*Compliance:* Deco Luck Investment will obtain a Hazardous Waste License and adhere to its conditions.

### **2.2.5 Statutory Instrument No.112 of 2013 Part II**

Water Pollution (Effluent and Waste Water) Regulations- provides for licensing of air emissions and liquid waste discharge to the environment. It further stipulates statutory discharge limits for respective parameters as guided in the “**Second**” and “**Third**” Schedule.

Deco Luck Investment will obtain licenses as required.

### **2.2.6 The Mines and Minerals Development Act No. 11 of 2015**

Besides the Environmental Management Act No. 12 of 2011, mining activities in Zambia are also regulated by the Mines and Minerals Development Act (MMDA) No.11 of 2015. An Act to regulate mining and processing of, minerals; provide for safety, health and environmental protection in mining operations; provide for the establishment of the Mining Appeals Tribunal; repeal and replace the Mines and Minerals Development Act, 2008; and provide for matters connected with, or incidental to, the foregoing.

#### **Relevance to the Project: -**

The Act provides key safety requirements in the mining industry, environmental management requirements and mine development and mineral processing requirements. The proposed project shall be a typical mineral processing project and provisions of this Act are applicable. Subsidiary Regulations under the MMDA, which are relevant to the proposed project, are described below:

### **2.2.7 Local Government Act, 2019**

The Act repealed and replaced the Local Government Act, 1991 in 2019. The Act provides for an integrated local government system; give effect to the decentralisation of functions, responsibilities and services at all levels of local government; ensure democratic participation in, and control of, decision making by the people at the local level; revise the functions of local authorities; provide for the review of tariffs, charges and fees within the area of local authority; provide for the proceedings of the council and committees; provide for the role of traditional leadership in democratic governance; and provide for matters connected with, or incidental to, the foregoing.



Some of these functions relate to;

- Providing an oversight on strategic planning and developments within respective council areas, as well as enforcement of various statutory requirements. Councils like Kafue Township Council, are mandated to participate in the EIA process and take part in planned project disclosures.
- Pollution control and the protection of the environment in general. This regulation is applicable to areas controlled by local councils but it is equally applicable here as the project area lies in the Kafue municipality and as such a decision letter to approve this project shall also be availed to the Council for updating footprints for Land rates.

### **2.2.8 The Investment Act of 1993**

Passed in 1993, the Act provides a legal framework for investment in Zambia. The Act relates to environment indirectly by providing incentives for tree planting, soil and water conservation activities. The Act further recognises the role of other agencies including those responsible for environmental protection in authorising specific projects. This act is applicable to this project too.

"Investment" means contribution of capital, in cash or in kind, by an investor, to a new business enterprise, to the expansion or rehabilitation of an existing business enterprise or to the purchase of an existing business enterprise from the State/Financial institution;

Deco Luck Investment intends to spend a sum of **US\$ 5,000,000.00** during mining.

### **2.2.9 The Lands Acquisition Act of 1995**

The Act provides for the alienation, transfer, disposition and charge of land. The Act also provides for compulsory acquisition of land by the President whenever he is of the opinion that it is desirable or expedient to do so in the interest of the Republic.

#### **Specific sections:**

#### **Part II section 3 (a-g): Land administration**

All land in Zambia is vested in the President, the President can alienate land to a non-Zambian is a Permanent resident, an investor, has obtained

the President's consent, is a company registered under the company's act, is a statutory corporation created by an act of parliament, is a cooperative registered under the cooperatives act or is a commercial bank.

**Part II Section 5 (1):** Transfer of land

A person shall not sell, transfer or assign any land without the consent of the President and shall accordingly apply for that consent before doing so.

***Relevance to the project:***

The regulation is relevant in that the Developer acquired the land for the project.

***Compliance:*** All necessary approvals from relevant authorities will be obtained to prevent contravening the requirements of this regulation.

**2.2.10 The Lands and Deeds Registry (Amendment) No 39. Of 2021**

Provides for the registration of documents; for the issue of Provisional Certificates of Title and Certificates of Title; for the transfer and transmission of registered land; and to provide for matters incidental to or connected with the foregoing.

***Relevance to the project:***

The regulation is relevant in that the Land on the site will transfer from state land administered by Kafue Township council to Mining activities and deco Luck Limited will obtain authority for use.

***Compliance:*** All necessary approvals from relevant authorities will be obtained to prevent contravening the requirements of this regulation.

**2.2.11 Public Health Act, No 22 1995**

This Act provides for the prevention and suppression of diseases and general regulation of all matters connected with public health in the country such as drainage, disposal and treatment of sewage.

**Specific sections:**

**Part VII:** Prevention of introduction of disease

**Part IX:** Sanitation and housing

**PART XIV:** General

## **Section 102: Control of crops and irrigation**

### **Their Relevance to the project:**

The regulation is relevant in that the Developer will need planning approvals for the project so as to prevent diseases that can arise as a result of waste generated from project operation.

**Compliance:** Approval from the relevant authority will be obtained to prevent contravening the requirements of this regulation.

### **2.2.12 Workers Compensation Act No. 10 of 1999**

This is a social security Act which has provisions for employee compensation in case of injury or death of an employee whilst at work. It is a requirement under this Act that all employers register their employees with the Workers Compensation Fund and make periodic subscriptions for compensation of their employees.

#### **Relevance to the project:**

Because job opportunities shall be provided by the proposed project, a detailed understanding and adherence with requirements of the Workers Compensation Act is relevant.

**Compliance:** All necessary measures will be put in place to prevent contravening the requirements of this regulation.

### **2.2.13 National Heritage Conservation Commission Act, 1986**

The Act provides for the conservation of ancient, cultural and natural heritage, relics and other objects of aesthetic, historical, pre-historical, archaeological or scientific interest.

#### **Relevance to the project:**

The regulation is relevant in that the Developer will need to be on the lookout in case they find objects of historical or archaeological interest.

**Compliance:** All necessary measures will be put in place to prevent contravening the requirements of this regulation

#### **2.2.14 The Petroleum Act Cap 435**

The Petroleum Act provides for control of conveyance and storage of petroleum products such as diesel and petrol. The Act further provides for control measures regarding production, transportation, handling, distribution, re-sale and use of energy.

**Relevance to the project:**

The regulation is relevant in that the Construction and operation equipment shall require fuel in large quantities.

**Compliance:** All necessary measures will be put in place to prevent contravening the requirements of this regulation.

#### **2.2.15 The Energy Regulation Act Cap No 12 of 2019**

An Act to provide for the licensing of enterprises in the energy sector; continue the existence of the Energy Regulation Board and re-define its functions; re-constitute and revise the functions of the Board; repeal and replace the Energy Regulation Act, 1995; and provide for matters connected with, or incidental to, the foregoing.

**Relevance to the project:**

The uses of energy resources are regulated by this Act captioned above hence the relationship and relevance to the proposed project.

**Compliance:** All necessary measures will be put in place to prevent contravening the requirements of this regulation.

#### **2.2.16 The Local Administration (Trade Effluent) Regulations, SI 161 Of 1985**

The regulation provides for the control of medical, trade and industrial effluent disposal.

**Relevance to the project:**

The regulation is relevant in that the Developer will need Local Authority License approvals for the project.

**Compliance:** All approvals from the Local Authority will be obtained to prevent contravening the requirements of this regulation.

### **2.2.17 The Road Traffic Act No. 11 of 2022**

An Act to establish the Road Transport and Safety Agency and to define its functions; to provide for a system of road safety and for traffic management; to provide for the licensing of drivers and motor vehicles; to provide for the registration of motor vehicles and trailers; to provide for compulsory third party insurance of motor vehicles; to provide for the licensing and control of public service vehicles; to provide for the promotion of road safety; to provide for the regulation of road transport between Zambia and other countries with which Zambia has concluded cross-border road transport agreements; to provide for the implementation of the SADC Protocol on Transport, Communications and Meteorology, the Protocol on Third Party Motor Vehicle Insurance Scheme adopted by the Member States of COMESA and Protocols on transit trade and transit facilities; to repeal the National Road Safety Council Act, 1995 and to provide for matters connected with or incidental to the foregoing.

#### **Relevance to the project:**

The equipment to be used shall be transported by road to site. Traffic issues have safety issues that require adherence and the fact that road traffic activities shall be involved describes the relevance of the Act to the project.

- Part I:** Road Transport and Safety Agency
- Part II:** Registration of Vehicles
- Part III:** Registration of Motor Vehicles and Trailers
- Part IV:** Vehicle licensing
- Part V:** Licensing of Drivers of Motor Vehicles and Driving Schools
- Part VI:** Endorsement, Suspension and Cancellation of driving Licenses
- Part VII:** Compulsory Third Party Insurance
- Part VIII:** Licensing of Public Service Vehicles
- Part IX:** Examination for Certificate of fitness for certain classes of vehicles
- Part X:** Exclusive concessions
- Part XI:** Road Safety Provisions and Driving Offences

**Compliance:** All necessary measures will be put in place to prevent contravening the requirements of this regulation.

### **2.2.18 Employment Code Act No.3 2019**

An Act to regulate the employment of persons; prohibit discrimination at an undertaking; constitute the Skills and Labour Advisory Committees and provide for their functions; provide for the engagement of persons on contracts of employment and provide for the form and enforcement of the contracts of employment; provide for employment entitlements and other benefits; provide for the protection of wages of employees; provide for the registration of employment agencies; regulate the employment of children and young persons; provide for the welfare of employees at an undertaking; provide for employment policies, procedures and codes in an undertaking; repeal and replace the Employment Act, 1965, the Employment (Special Provisions) Act, 1966, the Employment of Young Persons and Children Act, 1933 and the Minimum Wages and Conditions of Employment Act, 1982; and provide for matters connected with, or incidental to, the foregoing.

**specific sections:**

<b>PART III:</b>	Employment Relationship:
<b>Division 3.1:</b>	Contract employment
<b>Division 3.2:</b>	Minimum Employee Benefits
<b>Division 3.3:</b>	Suspension and Termination of contract of employment
<b>Division 3.4:</b>	Employment of expatriates
<b>Division 3.5:</b>	The skills advisory committee
<b>PART IV:</b>	Protection of wages
<b>PART V:</b>	Employment of young children and young persons
<b>PART VI:</b>	Special provisions
<b>PART VII:</b>	Employee welfare
<b>PART VIII:</b>	Employment agencies
<b>PART IX:</b>	Disputes and breach of contract
<b>PART X:</b>	Inspectorate

**PART Xi:** General provisions

**Relevance to the project:**

One of the significant positive impacts of the proposed project shall be creation of job opportunities. Whenever labour issues are involved, provisions of the Employment Code Act are critical hence the relevance of the Act to the proposed project.

**Compliance:** All necessary measures will be put in place to prevent contravening the requirements of this act.

**2.2.19 The Water Resources Management Act No.21 2011**

An Act to establish the Water Resources Management Authority and define its functions and powers; provide for the management, development, conservation, protection and preservation of the water resource and its ecosystems; provide for the equitable, reasonable and sustainable utilization of the water resource; ensure the right to draw or take water for domestic and non-commercial purposes, and that the poor and vulnerable members of the society have an adequate and sustainable source of water free from any charges; create an enabling environment for adaptation to climate change; provide for the constitution, functions and composition of catchment councils, sub-catchment councils and water users associations; provide for international and regional cooperation in, and equitable and sustainable utilization of, shared water resources; provide for the domestication and implementation of the basic principles and rules of international law relating to the environment and shared water resources as specified in the treaties, conventions and agreements to which Zambia is a State Party; repeal and replace the Water Act, 1949; and provide for matters connected with, or incidental to, the foregoing

**Relevance to the project:**

The Deco Luck project is located near the Chongwe stream.

**Compliance:** Developer will abide by the stipulations in this act

The following are the specific sections of the Act

**Section 31:** Consistency of water resources management with environmental and national heritage protection.

**Part VI, section 53:** sinking, deepening or altering boreholes in water shortage areas restricted

**Part VI section 54:** Maximum volume and rate of abstraction in water shortage areas

**Section 9, 54 and 71:** requires that anyone who want to use water other than for domestic use or that specified under section sixty should obtain permits.

***Relevance to the project:***

The Project is crossed by the Chongwe River on the eastern side and Nyampungwa stream that runs through the central area. These are both tributaries to the Zambezi River to the south.

***Compliance:*** Developer will abide by the stipulations in this act

### **2.2.20 The urban and Regional Planning Act No. 3, 2015**

This piece of legislation provides for the appointment of planning authorities whose main responsibilities are the preparation, approval and revocation of development plans. It also provides for the control of development and subdivision of land.

***Relevance to the project:***

The Act is relevant to the proposed project in that the proposed project is a developmental undertaking which will require endorsement by the relevant planning authority and project activities need to comply with and be guided by provisions of the Act.

***Compliance:*** Management will consult with the local authority for guidance on compliance requirements and other guidelines to be followed.

**PART V:** The Planning Process

**PART VI:** Planning Applications and Permission

**PART XI:** General Provisions

**Section 71.** Offences and penalties

**Section 72.** Notices

**Section 73.** Right of entry

**Section 74.** Regulations



**Compliance:** Management will consult with the local authority for guidance on compliance requirements and other guidelines to be followed.

### **2.2.21 The Ionizing Radiation Protection Act No. 16, 2005**

The Act provides for the protection of the public, workers and the environment from hazards arising from the use of devices or materials capable of producing ionising radiation.

#### **Relevance to the project:**

The developer will ensure all hazardous pollutants arising from the project are well handled to the safety of its workers and the public.

**Compliance:** the developer will safeguard its workers and locals not to be exposed to any form of radiation.

### **2.2.22 The Solid Waste Management Act No.20 of 2018**

Provides for the sustainable regulation and management of solid waste; general and self-service solid waste services; the incorporation of solid waste management in companies and define their statutory functions; the licensing and functions of solid waste service providers, operators and self-service solid waste providers and provide for their functions; the regulation, operation, maintenance and construction of landfills and other disposal facilities; the setting and approval of tariffs for management of solid waste and provision of solid waste services; and matters connected with, or incidental to, the foregoing.

#### **Specific sections:**

<b>Part II</b>	Management of Solid waste
<b>Part III</b>	Regulation of Solid waste
<b>Part IV</b>	Licenses, Permits and Registration
<b>Part VI</b>	Solid waste tariffs

**Relevance to the project:**

The Deco Luck Investments Limited proposed project will generate a substantial amount of solid waste throughout the project cycle.

**Compliance:** the developer will comply with the regulations of this Act by engaging a Licenced Solid Waste Service Provider to collect, transport and dispose the Solid Waste at licensed Solid Waste Disposal facility.

**2.2.23 The Lands Act, No 20 of 2015**

An Act to provide for the continuation of Leaseholds and leasehold tenure; to provide for the continued vesting of land in the President and alienation of land by the President; to provide for the statutory recognition and continuation of customary tenure; to provide for the conversion of customary tenure into leasehold tenure; to establish a Land Development Fund and a Lands Tribunal; to repeal the Land (Conversion of Titles) Act; to repeal the Zambia (State Lands and Reserves) Orders, 1928 to 1964, the Zambia (Trust Land) Orders, 1947 to 1964, the Zambia (Gwembe District) Orders, 1959 to 1964, and the Western Province (Land and Miscellaneous Provisions) Act, 1970; and to provide for matters connected with or incidental to the foregoing.

**Specific sections:**

- Part II Administration of Land
- Part V General

**Relevance to the project:**

The Proposed Deco Luck Limited Mining project will occupy a 15 hectares of land.

**Compliance:** the developer will comply with the regulations of this Act obtaining a lease agreement with Kafue Township Council who is the owner of the land.

**2.2.24 The Lands Survey (Amendment Act) No 40 of 2021**

An Act to make further and more comprehensive provisions for the registration and licensing of land surveyors; to provide for the manner in which land surveys shall be carried out and diagrams and plans connected therewith shall be prepared; to provide for the protection of survey beacons and other survey marks; to provide for the establishment and powers of a Survey Control Board which will be responsible for the registration and licensing of land surveyors and for the exercise of disciplinary control over such surveyors; and to provide for matters incidental to and connected with the foregoing.

**Specific sections:**

- Part II Administration
- Part III Original Surveys and Re-surveys
- Part IV Sub-Divisional Surveys
- Part V Beacons and Boundaries
- Part VI General Plans and Diagrams

- Part VII      Miscellaneous

**Relevance to the project:**

The Proposed Deco Luck Limited project in Kafue area will be surveyed accordingly.

**Compliance:** the developer will comply with all the provisions of this Act by obtaining the necessary approvals

**2.2.25 The Pneumoconiosis Act (Amendment) No.15 of 1955**

An Act to make new provision for the assessment and payment of compensation in connection with pneumoconiosis; to provide for the medical examination and standards of physical fitness to be required of persons exposed or likely to be exposed to the risk of pneumoconiosis; and to provide for matters incidental to or connected with the foregoing.

**Specific sections:**

<b>Part II</b>	Administration
<b>Part III</b>	Medical Examinations, Certificates of Fitness and Reports
<b>Part IV</b>	Benefits, and other forms of assistance
<b>Part V</b>	Provisions governing the payments and receipt of benefits
<b>Part VI</b>	Compensation funds, levies and outstanding liabilities
<b>Part VII</b>	General

**Relevance to the project:**

The Proposed Deco Luck Limited project will be a Mining project whose workers will be Miners and subject to the provisions of the Act.

**Compliance:** the developer will comply with the provisions of this Act by ensuring that all the provisions are followed.

**2.2.26 Statutory Instrument No 022 of 2020 The Public Health (Infected Areas) (Coronavirus Disease 2019) Regulations**

These regulations empower the Ministry of Health to convert any building as a hospital or an isolation center and empowers officer of the Ministry of Health to enter premises to enquire for case or cases of Covid-19 and regulate matters of public gathering. It also empowers officers of the ministry to inspect premises to ensure sufficient sanitation and hygiene.

**Relevance to the project:**

The Proposed Deco Luck Investment Limited Mining project will have workers who are prone to Covid-19 quarantined and will have monitoring and treatment and sanitation facilities on site.

**Compliance:** the developer will comply with the provisions of this Regulations by ensuring that all the provisions are followed.

#### **2.2.27 Chiefs Act No. 67 1965**

An to make provision for the recognition, appointment and functions of Chiefs and Deputy Chiefs; for the exclusion of former Chiefs and Deputy Chiefs from specified areas in the interests of public order; for the appointment and functions of kapasus; and for matters incidental to or connected with the foregoing.

**Specific sections:**

Section 10: - Functions of Chiefs

Section 11: - Preservation of public peace

**Relevance to the project:**

The Proposed Deco Luck Investment Limited Mining project will be in Chieftainess Chiawa's area

**Compliance:** the developer will comply with the provisions of this act by ensuring that all the provisions are followed.

#### **2.2.28 Explosives Act (No 10 of 1974)**

Provides for the handling, storage and general management of explosives used for blasting in the mining industry.

**Relevance**

Explosives will be managed in line with the provisions of the Act at this project.

**Compliance.**

The company will ensure that explosives are kept in a manner that complies with this regulation

#### **2.2.29 International agreements and conventions**

Deco Luck Investments is also committed to complying with international conventions which Zambia has ratified. The list below presents environmental

management conventions that are relevant to the activities associated with Deco Luck Investment proposed project.

#### **2.2.29.1 The Convention on Biological Diversity (CBD).**

The convention is an international treaty adopted at the Earth Summit in Rio de Janeiro in 1992 with three main objectives:

- Conservation of Biodiversity
- Sustainable use of its components
- Fair and equitable sharing of benefits arising from genetic resources

#### **2.2.29.2 The Convention on Wetlands of International Importance Especially as Waterfowl Habitat (Ramsar Convention).**

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, is an intergovernmental treaty which provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources.

There are presently 155 Contracting Parties to the Convention, with 1675 wetland sites, totalling 150 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance.

Zambia is a signatory of the convention with the Convention having come into force in 1991.

#### **2.2.29.3 The United Nations Framework Convention on Climate Change (UNFCCC).**

The objective of this Convention, as stated in Article 2, is "to stabilize, in accordance with the relevant provisions of the Convention, concentrations of greenhouse gases in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner".

Zambia ratified the UNFCCC and as part of the Convention is required to record their emissions of greenhouse gases (GHG). To facilitate the Government's

responsibility under the Convention it is necessary to estimate and record the GHG emissions generated from the process plant and mining activities on the basis of the chemical composition or through direct measurements.

#### **2.2.29.4 The United Nations Convention to Combat Desertification (CCD).**

The convention is an agreement to combat desertification and combat the effects of drought, especially in countries experiencing serious drought and/or desertification. The convention focuses specifically on Africa and aims to achieve its objectives through national action programs and long term strategies that are supported through international cooperation and partnerships.

#### **2.2.29.5 The International Plant Protection Convention**

The International Plant Protection Convention (IPPC) is an international treaty organization that works to prevent the international spread of plant diseases. Among its functions is the maintenance of lists of plant pests, tracking of pest outbreaks, and coordination of technical assistance between member nations. The IPPC was created in 1952 by the Food and Agriculture Organization of the United Nations. As of 2007, 163 governments have adopted the IPPC.

#### **2.2.29.6 The Convention on the Protection of World Cultural and National Heritage.**

This convention was ratified by Zambia on 4 June 1984. The Convention is the first official international instrument stipulating the urgent need to identify and protect cultural and natural heritage of outstanding universal value, which is immovable and irreplaceable.

The Convention strongly affirms the shared moral and financial responsibility to protect common cultural and natural heritage, through international co-operation and action.

Deco Luck Investment limited will be required to observe the provisions of the Convention and ensure that the mining project does not affect any cultural and natural heritage sites.

### **2.2.29.7 Montreal Protocol on Substances That Deplete the Ozone Layer**

In re-affirming its commitment, the Zambia Government, ratified the Vienna Convention and its Montreal Protocol in January, 1990. Later in 1994 Zambia as Party to the Montreal Protocol also ratified the London Amendments to the Protocol.

Zambia is classified as a Developing country operating under Article 5.1 of the Protocol. As a developing country Zambia is provided with a ten year moratorium on the phase out schedules of developed countries. Zambia has nevertheless undertaken to phase out the use of ozone depleting substances and has established the National Ozone Unit to coordinate and monitor the implementation of the country programme to phase-out ozone depleting substances.

It is therefore important that in all applications in which ODS could be utilised such as refrigeration, air conditioners, degreasers, solvents and cleaning agents, aerosols spray cans, fumigants, and fire extinguishers for example do not contain ODS which are covered by the Montreal Protocol. Suitable alternative should be sourced.

### **2.2.29.8 The Convention on the Conservation of Migratory Species of Wild Animals.**

The Convention on the Conservation of Migratory Species of Wild Animals (also known as CMS or the Bonn Convention) aims to conserve terrestrial, marine and avian migratory species throughout their range. It is an intergovernmental treaty, concluded under the aegis of the United Nations Environment Programme, concerned with the conservation of wildlife and habitats on a global scale. Since the Convention's entry into force, its membership has grown steadily to include over 100 Parties from Africa, Central and South America, Asia, Europe and Oceania. The Convention was signed in 1979 in Bonn (hence the name) and entered into force in 1983

### **2.2.29.9 The Basel Convention on the Control of Trans-Boundary Movement of Hazardous Waste.**

The Basel Convention was developed under the auspices of the United Nations Environmental Programme (UNEP), in response to the growing worldwide awareness of the problem of international traffic in hazardous waste. The

Convention was adopted in 1989 and entered into force on May 1992. The Basel Convention is said to be the first and foremost global environmental treaty that strictly regulates the trans-boundary movement of hazardous wastes and other wastes, and obligates parties to ensure their environmentally sound management, especially during the disposal process.

The objectives of the convention are:

- To ensure that waste is disposed of as near as possible to the place or source of its generation;
- To reduce trans-boundary waste and where it cannot be avoided, to be disposed of in an environmentally sound and efficient manner;
- To provide assistance to developing countries in the management of hazardous waste and the generation thereof.

Zambia joined the Basel Convention and is mandated in line with the Basel Convention and the EMA to ensure that hazardous waste movements in and out of the country and the disposal thereof are effectively controlled to ensure protection of human health and the environment.

Disposal of any hazardous waste from decommissioning and closure of Deco Luck Investment Limited project will be in compliance with ZEMA requirements.

### 2.2.3 Stakeholder and Institutional Framework

The stakeholder and institutions of interest for this project may not be conclusively the one below herein:

**Table 4: Stakeholders identified**

No.	Institution	Agency	Anticipated Role
2	Ministry of Finance and National Planning	Zambia Revenue Authority	Revenue collection
3	Ministry of Local Government and Housing	Kafue Township Council	Waste management, Revenue collection and approval of plans
4	Ministry of Energy and Water Development	NWASCO and Water Utility Companies	Regulation of water/sanitation, water quality
5	Ministry of Health	Health Centers	Prevention of diseases, cure, etc.



6	Ministry of Home Affairs	Police Service	Security, policing and law Enforcement.
7	Ministry of Green Environment	ZEMA	Environmental Management
8	Ministry of Tourism	Tourism Council, ZTB	Development and tourism regulation
9	Ministry of Commerce and Trade and Industry	Investment Centre, PACRA, CEEC	Regulation, etc.
10	Ministry of Labour and Social Security	Factories Inspectorate	Regulation
11	Industry Bodies	ZACCI, ZAM, etc.	Wide Participation
12	NGO's	CBOs	Wide Participation
13	Public	Citizens	Wide Participation
14	Learning + Research	University, Colleges	Knowledge Centre

### 3.0 PROJECT DESCRIPTION

#### 3.1 Location

The proposed project area is located in Kafue District of Lusaka province of Zambia. Kafue district shares borders with Chirundu, Chikankata, Chilanga, Lusaka and Shibuyunji. The licence area is area is 73.36.5 km<sup>2</sup> and the latitude/longitude coordinates for this area are given in Table 2 below: However, only 5.63km<sup>2</sup> will be used for mining activities (Appendices No. 5)

**Table 5: Project Site Coordinates**

	<b>LATITUDE</b>	<b>LONGITUDE</b>
A	15°39'12"	29°12'36"
B	15°39'18"	29°12'36"
C	15°39'18"	29°12'12"
D	15°39'30"	29°12'12"
E	15°39'30"	29°11'24"
F	15°39'42"	29°11'24"
G	15°39'48"	29°10'30"
H	15°42'48"	29°5'36"
I	15°42'48"	29°5'18"
J	15°41'30"	29°4'24"
K	15°41'12"	29°4'24"
L	15°37'24"	29°9'18"
M	15°37'24"	29°14'6"
N	15°38'54"	29°14'6"

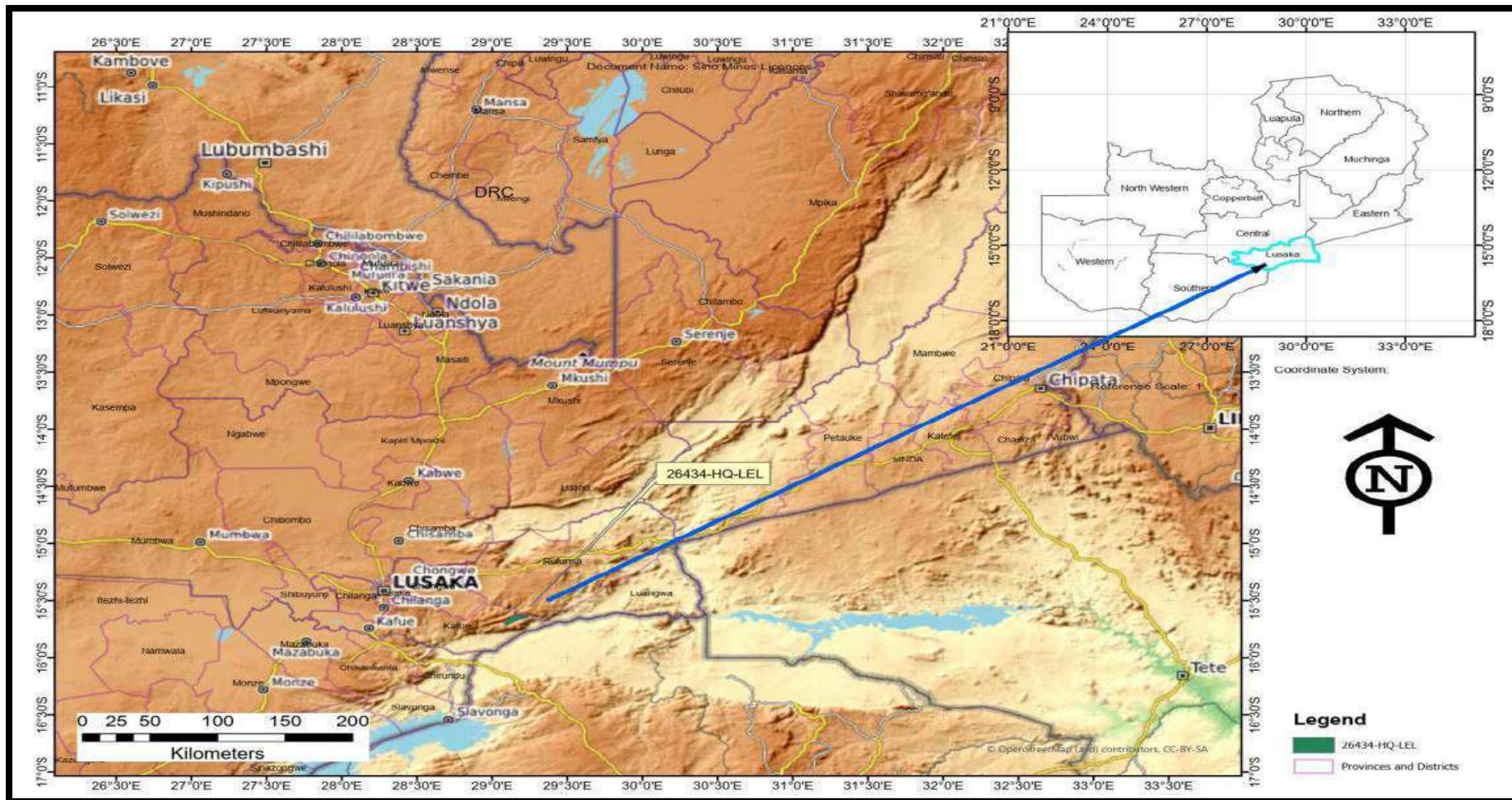


Figure 4: Location of the Proposed Chiawa Copper Project

For identification of the project site as well as the surrounding developments, a Google imagery of the project site has been provided in Figure 2 below. The project area is generally located in Game Management area. However, there are no settlements and farming fields around.

Other notable features within the project site include the Chongwe river.



**Figure 5: Satellite image of license area**

### **3.2 Nature of the Project**

#### **3.2.1 Raw Materials**

The area was first explored by Mwembeshi resources from 2002 to 2007.

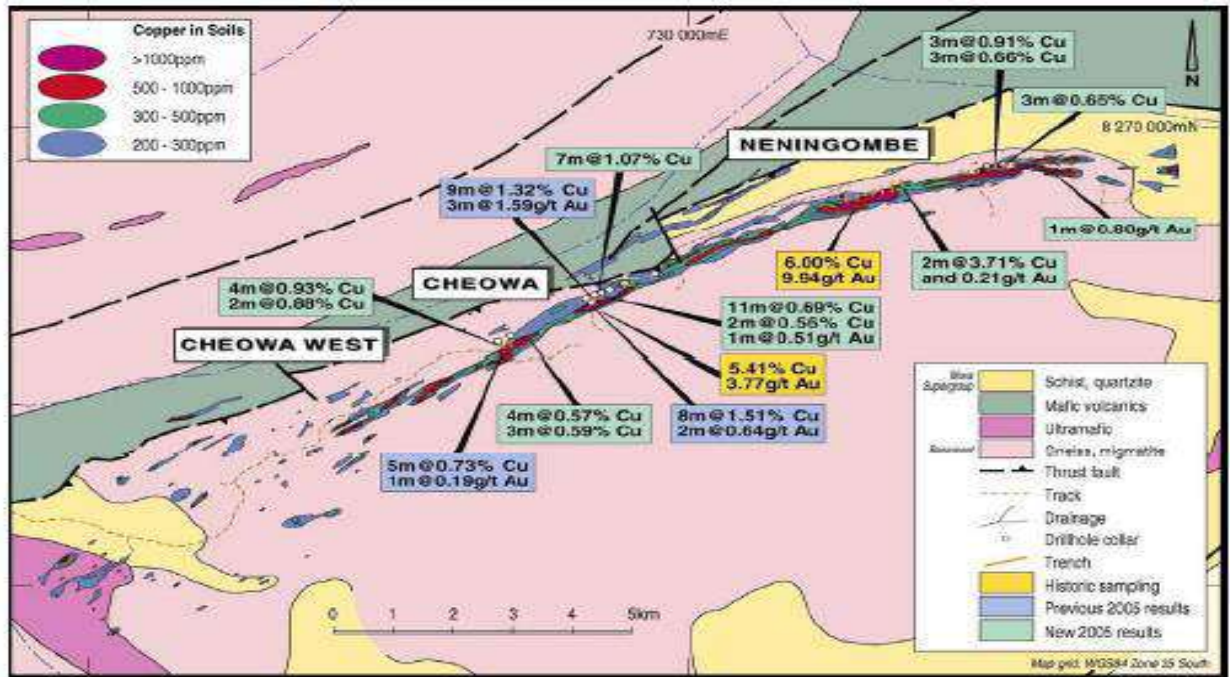
Mwembeshi resources limited identified a resource of approximately:

- 28million tonnes of Copper grading at an average of 0.5%TCu to 2.5%Tcu

over a three sectors area:

4. Cheowa west
5. Cheowa as depicted and
6. Neningombe

These locations are depicted in the map in Figure 6.



**Figure 6: Intersected copper and gold mineralization**

- GOLD was also intersected on most of the drill holes ranging from 0.24g/t to 3.5g/t (an added incentive for the planned mining project)

The intersected anomalous mineralization appeared as a continuous vein over a strike distance of 15km (Figure4 below).

### 3.3 Process and Technology

#### 3.3.1 Mining Method

The mining operations will involve:

1. Opening an Adit from the northern side of the hill. The adits will measure 3.5m width and 3.6m height. The coordinates for the Adits locations are:
  - Adit 1: 26° 17' 57.1914" E, 13° 57' 55.278" S
  - Adit 2: 26° 18' 14.6982" E, 13° 57' 55.278: S
2. Tunnels will be developed in the hill following the veins. The tunnels will measure 3.0m width by 3.6 height to accommodate pipes and electrical wiring and ventilation fans.
3. Ore will be blasted in sections and brought to surface at a Roaming pad for temporal storage by dump trucks
4. The ore will then be tracked to a processing plant – A new concentrator will be built on the lower Zambezi, near the bottom road entry area

5. Waste rock will be deposited at site on a designated area to be identified – Rock dump

### **Main equipment for mining**

The mining equipment to be used will include:

- Underground ventilation fans
- Rock breaking drilling machines
- Underground Jaw crusher
- LHDs, converted transport vans, ore transporting trucks
- Power generators
- Diamond drilling equipment/ machines
- And others that will be required over the period of mining operations.

**Table 6: Key Project Information/ Project costing**

<b>Activity</b>		<b>Total</b>
Total Ore to be delivered to mill		28 million tonnes
Average annual mining rate		1.2 million tonnes
Average grade		1.2% TCu
Bulk density of ore		1.8
Project capital investment		US\$ 5.0 million
Total waste to be mined (to waste rock dump)		1.8million tonnes
Employment		450
<b>Project costing</b>		
Item description	Quantity	Total cost US\$
Access roads	40km	1.5 million
Adits and Ramps	4km total	2.0 million
Surface structures	Buildings, Pads, fuel tanks, etc.	0.24 million
Machinery/others	Dump trucks, granders, front end loaders etc.	1.26 million
Grand total	+ -	5.0 million

### 3.3. 2 Waste Rock Dump

There will be waste generated during the development stage and subsequent mining operations. The creation of tunnels underground will result in generation of waste rock.

Deco Luck Investments Limited will establish a rock dump on the northern end of the mine about 50m away from the Adit (No. 2). The dump will be designed in line with requirement set by MSD

The waste rock from underground will be hoisted by dump trucks to surface rock dump. The quantities will vary depending on the stage of operation. However, it is estimated that the waste rock generated will average 35tonnes per day.

The stability of the dump will be monitored regularly as requirement in the mining regulations.

The Waste Rock Dump will have five (5) hectares in area, located at the west side of the main Adit.

Current features of the proposed Waste Rock Dump, is that it is located in an area that is flat and covered by soil. There will be no need to profile the surface.

### **3.3.4 Ore Transportation**

The run-of-mine ore from underground will be transported by dump trucks to the crushing plant from underground through the main adit. Ore will be crushed underground to ¾ inch size. The ore will be stored at a ROM pad before being transported by larger dump trucks to the concentrator some 40km to the chosen area near the junction with the bottom road project (Defunct project).

### **3.3.5 Power Supply**

The area is remote from national power grid. A diesel generator will be used to provide power for the operations. The generator will just be adequate to light up the area and power ventilation fans and other small operating machines in workshops and kitchens.

### **3.3.6 Support Services and Infrastructure**

Support Services and infrastructure will include those services and assets that will be provided to the various departments and their operating units. Deco luck will initially set up a camp like site. The campsite will be developed to a permanent mine site with all the services provided for. A simplified site sketch map is given Figure 7 below:

The main structures will consist of the following facilities:

- Office blocks
- Residential blocks
- Engineering workshops
- Generators and fuel tanks
- Ore storage pad
- Canteen facilities

Actual dimensions will be given on granting of licence. The sketch provides specific locations – Figure 7

Others will include:



- Development of a connecting road to where the concentrator will be located
- Mine entry Adits
- Ramps, tunnels and raises
- Rock dump,
- Boreholes and water tank and others

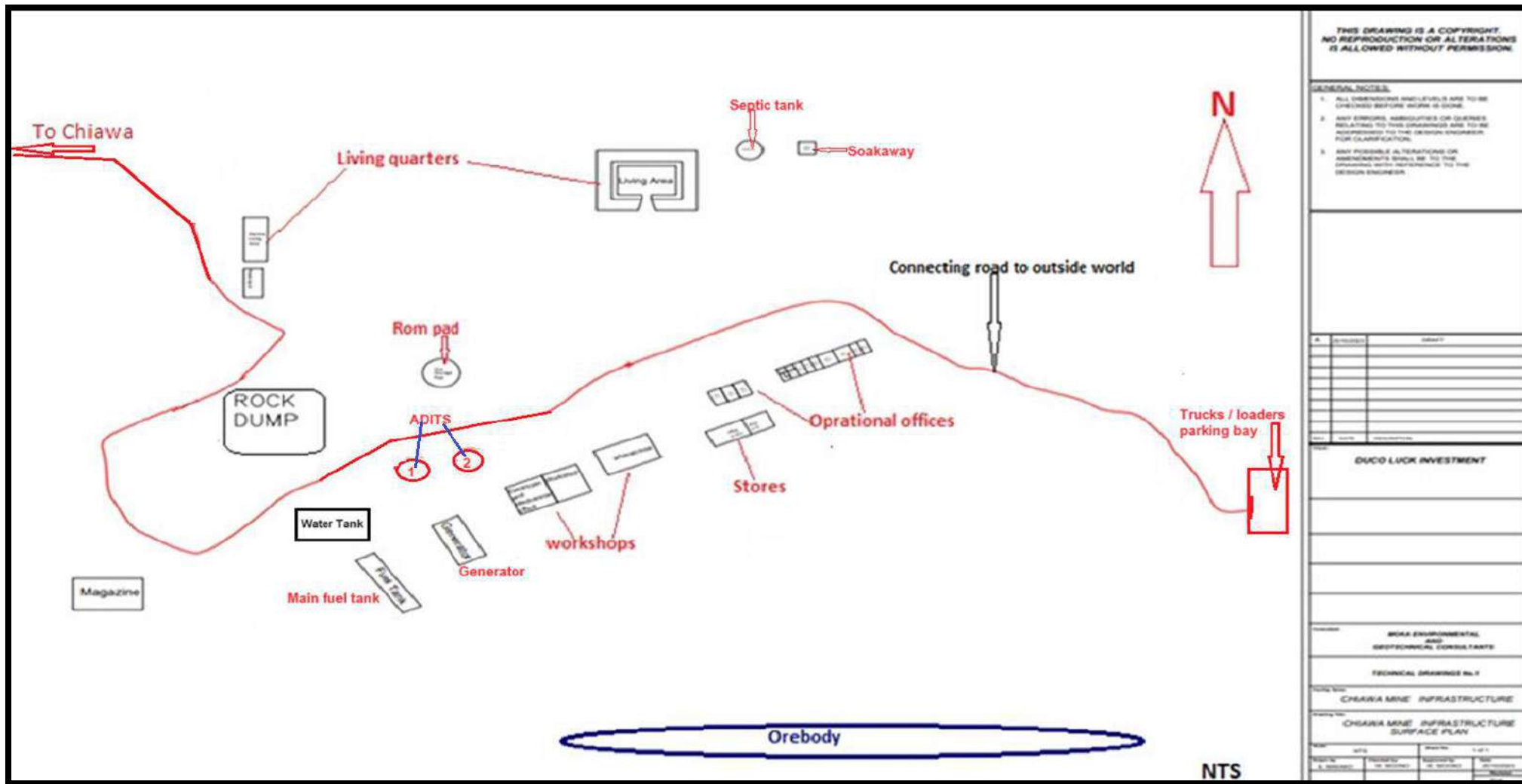


Figure 7: Proposed site plan sketch

### 3.3.7 General Offices and other facilities

An Office block to accommodate administration, human resources, industrial relations and accounting department will be located on the south west corner of the mine license area (operational offices Figure 7).

A potable water processing plant will be installed for the supply of potable water to the office block and other departments. The plant will supply an equivalent of 1000m<sup>3</sup> of water per day to the mine.

### 3.3.8 Sewerage Treatment

The mine offices, houses and all departmental offices will be serviced by septic tank – soakaway arrangements (Figure 7).

### 3.3.9 Workshops, Fuel Tanks and Raw Water Tanks

Workshops, fuel tanks and raw process water tanks will be located closer to the processing plant on the northern side of the mine license area (Figure 7).

There will be a fuel storage tank holding 20,000 litres of fuel which will be erected on site. Fuel from delivery trucks will be received and held in the tank and dispensed into trucks and other equipment for use in operations at Chiawa Mine project

The technical drawings of the fuel storage tank are depicted in figure 8 below

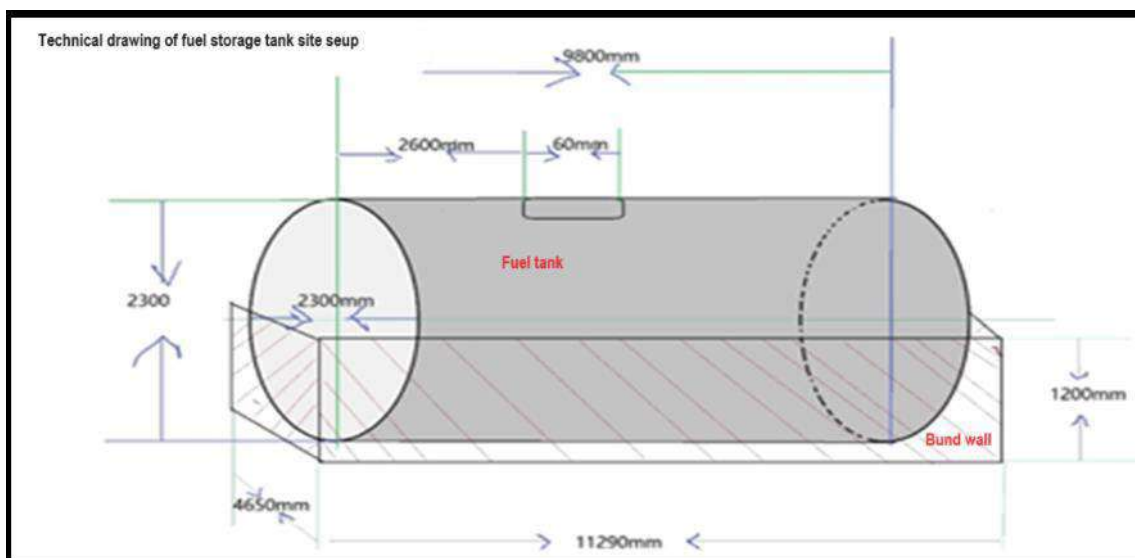


Figure 8. Technical drawing of the Tank

The construction of the fuel tank site shall involve grading, digging foundations, putting concrete and erecting the bund wall to accommodate tanks. The bunding wall shall be constructed with a design capacity of 110% the capacity of the fuel tank.

There shall be a general store/ warehouse for storage of raw materials and spares brought on site and a chemical storage area for the storage of chemicals and lubricants. The Stores will be constructed with an impermeable floor and roof. It will be well ventilated and equipped with firefighting equipment.

### **3.3.10 Training School**

A training school for the purpose of equipping employees with necessary skills in safety, health, environment and specific work skills will be built near the General Offices.

### **3.3.11. Plant Site Clinic**

A plant site clinic will be constructed to provide medical facilities to all employees at the mine. Very serious cases will be referred to UTH in Lusaka or other hospitals in Kafue.

### **3.3.12 Stores**

Stores will be constructed with an impermeable floor and roof. It will be well ventilated and equipped with firefighting equipment. There will be three types of stores depending on the needs, general stores, mobile equipment stores, reagents and domestic supply stores (Figure 7).

### **3.3.13 Fire Fighting and Emergency Response**

There will be a firefighting engine and a team to attend to any fire that might occur at the mine site. The team will also be trained in emergency response and preparedness. Phone numbers for all departments and sections at the mine, Zambia Police, Hospitals, health centres and relevant regulatory agencies will be provided and readily made available.

### **3.3.14 Mine Rescue**

A well trained and experienced mine rescue team will be constituted and always on standby just in case of any accident at the mine.

## **3.4 Mine Waste and by Products**

Non-hazardous waste resulting from industrial activities and domestic will be deposited accordingly in a designated waste disposal site. The mine will apply for a license from the ZEMA to operate a waste disposal site.

Hazardous waste generated mostly in the workshops will be stored and disposed as per instructions from the ZEMA. Deco Luck Investments Limited will identify suitable sites within the license area.

### **3.4.1 Waste from the preparation/construction phase**

The following waste is expected to be generated during the preparation and construction phases:

- Biomass (tree logs, branches, leaves etc.) from site clearing activities.
- Rubble and dust resulting from site clearing operations (blasting, trenching, excavations, lying of foundations, movement of machinery/vehicles and cut and fill activities) for site preparation
- Domestic and Sanitary waste generated by the construction workforce
- Construction waste resulting from rejected concrete, broken blocks and tiles, ceiling boards, roofs, scrap timber, steel rod and wires, etc.
- Solid waste resulting from discarded packaging materials (e.g. empty cement bags, carton boxes, plastic packs, and empty paint containers), leftover food stuff and food waste from worker's canteen, etc.
- Waste hydrocarbons (fuels, oils etc.) from operation and maintenance of mine equipment and machinery
- Waste material (rocks, dust, soils) generated during the initial year of site preparation works, that is, pre-strip of the open pits and generation ore. The waste is planned to be stockpiled for the construction of the ROM pad.

### **3.4.2 Waste from the operation phase**

The following waste is expected to be generated during the operation phase:

- Overburden from mining activities. The overburden will be by far the largest solid waste during the operations of the mine.
- Waste rock that will be generated during the extraction of ore.
- Waste hydrocarbons (fuels, oils etc.) from operation and maintenance of mine equipment and machinery
- Hygiene and biological waste (Sewage effluent and grey water).
- Domestic waste (e.g. food waste) to be generated from the housing area )
- Storm water runoff from roofed or built areas and contaminated runoff from agriculture crop fields

The developer will establish a waste management system that will be aimed at identifying the preferred options for waste management and/or disposal methods based on environmental principles, including necessary infrastructure.

### **3.5 Main Activities**

The main Project Activities will include the following

- Conducting and completion of the Environmental Impact Assessment Study
- Submission Environmental Impact Statement to ZEMA
- Approval of the relevant authorities e.g. ZEMA and MSD
- Finalization of project designs
- Construction of access roads
- Construction phase
- Commissioning of mine and process plant
- Mine production activities
- Mine closure and decommissioning
- Post closure monitoring

### **3.5.1 Mine Development Phases**

- Development of construction camp – clearing and levelling of site
- Site clearance and preparation – siting of particular buildings etc.
- Construction Phase – Commencement of mining development starting with adits and ramps
- Operational Phase – ore resource development, drilling and blasting, tracking and storage on surface. Then trunking to concentrator at Chiawa.
- Decommissioning and Closure Phase – Phased process of mining decommissioning and closure
- Post-closure Environmental and Social Monitoring Phase – to be done in conjunction with stakeholders.

#### **3.5.1.1 Power supply construction phase**

The area is remotely located from nearest power line grid (40km). Power supply will be by diesel generator. Experience from Jifumpa mine in Kasempa will apply here to ensure 24/7 power supply to operational areas especially for ventilation and water pumping activities.

### **3.5.2 Site clearance and preparation**

Clearance and preparation activities will occur in all areas where mine infrastructure will be constructed (Adits, waste rock dump, tailings dam, workshops, office block, a few management houses, construction camp and the processing plant). This will cover a total area of approximately 20 hectares.

Clearance and preparation will involve the following activities:

- Felling of big trees in the affected footprints
- Bulldozing and scrapping smaller trees and vegetation
- Removal and stockpiling of top soil for future rehabilitation works
- Profiling of each infrastructure footprint
- Laying of base for each infrastructure footprint
- Foundation requirements for each infrastructure footprint

### **3.5.3 Development of construction and operations camp**

The Operations Camp will house the temporary and permanent accommodation for the project activities. All temporary construction personnel will be housed in temporary prefabricated structures.

Permanent accommodation will include 6 blocks of buildings with forty (40) rooms of thirty (30m<sup>2</sup>) metre squared will be constructed at a cost of US\$300,000.00. These housing units will be located to the south western corner of the Mine License area. Plate 1 (Location of Chiawa and the Planned Development) shows the exact location.

#### **3.5.4 Construction Phase**

The construction phase will involve:

- Development of mine access roads
- Development of mine drains, runoff channels, sediment traps, sedimentation ponds and soakaways
- Preparation of the Waste Rock Dump
- Sinking of Main shaft, Auxiliary Shaft and air shaft
- Construction of the Mine Offices, Workshops, General Stores, Reagent Stores, Mobile Equipment Stores, Security Fencing and Offices
- Construction of the Raw Water Ponds

#### **3.5.5 Commissioning Phase**

Commissioning of the mine will involve testing of the ventilation system, underground mining operations and any installed equipment that requires certification from authorizing agencies. Authorizing agencies will give certificates of approval, e.g. ZEMA and MSD

#### **3.5.6 Mining Phase**

For purposes of ventilation and to provide means of egress, the mine will have two horizontal Adits. When at full throttle a total of 1,200 ore tonnes per day will be mined and delivered to the ROM pad awaiting transportation to the processing plant. Looking at the orebody parameters, it is most likely that two mining methods will be used interchangeably depending on which one is most applicable at any



particular location. Cut-fill and any of the caving methods (sublevel caving and block caving) are the two methods best suited for this orebody. This will be clearly spelt out on completion of ongoing twin drilling.

### **3.5.7 Decommissioning and Closure Phase**

After the mineable mineral reserves have been depleted (approximately after 25 years), the mine and its associated infrastructure will be decommissioned and closed, unless further mineable reserves are discovered during the continued exploration program.

The mine infrastructure (i.e. Living quarters, mine offices, workshops etc.) will be demolished and land rehabilitated. All scrap and re-usable materials will also be removed and sold or disposed-off once declared safe. A detailed Decommissioning and Closure Plan has been included in this EIS, which will be updated annually during the Project life.

### **3.5.8 Post-closure Environmental and Social Monitoring Phase**

A post closure environmental and social monitoring program has been included as part of this EIS document. Post closure environmental monitoring includes rehabilitation and re-vegetation of the area where the demolished infrastructure was built. It also includes soil, air and water samples monitoring for a given duration.

## **3.6 Schedule and life time of the project**

Two years of construction, one year of commissioning of production, 28 million tons of ore mined out, 1 200 000 tons per year, totalling (Figure 9)

Figure 9 Schedule chart of Mine life time

ITEM/ TIME	Yr1	Yr2	Yr3	Yr1	Yr2	Yr3	Yr7	Yr8	Yr9	Yr10	Yr11	Yr12	Yr13	Yr14	Yr25	Yr26
<b>Completion of EIA</b>	*															
<b>Construction phase</b>	*	*	*													
<b>Commissioning of mine</b>				*												
<b>Mine production activities</b>					*	*	*	*	*	*	*	*	*	*	*	
<b>Mine closure and decommissioning</b>																*
<b>Post closure monitoring</b>																*

## **4.0. PROJECT ALTERNATIVES**

### **4.1 Mining Alternatives**

The two mining alternatives considered are the Adit mining method or the open pit mining method. The best alternative considered is the Adit mining method because of the location of the ore body and local terrain. An open pit would not work well in this environment. It would create a lot of mine waste (overburden material) which would present storage and maintenance issues given the hilly terrain

### **4.2 The No Project Option**

The no project option will result in:

- No construction of the mine and leach plant
- No expenditure on construction of the plant
- No employment to the surrounding community during the construction and operation of the plant
- No disturbance to the land except what has already been cleared for the administration offices and the pilot plant
- Loss of investment worth millions of dollars
- Loss of Tax revenue by Government
- Loss of Tax Revenue by Kafue municipal Council
- Continued poverty to the people around the area

### **4.3 Project alternative location**

Relocating the Chiawa Copper project to another place was not an option. Projects of mining in nature are difficult to relocate as this specific “ore resource” is only found in Chiawa, permanently fixed and nowhere else.

For the above stated reason there is no any other project alternative in terms of relocating this project elsewhere as the reserve only occurs at Chiawa

## 5.0 DESCRIPTION OF METHODS USED IN DATA COLLECTION

The methods used to collect data were:

- Use of questionnaires in socio-economical assessment
- Samples of surface water were collected from the Chongwe Stream which were later tested for different water quality parameters.
- Site investigations through physical site visits
- Review of literature relating to the proposed project
- Collection of data generated over a long period of time from other sources relating to the proposed project site and relating to Kafue District

The EIA study consisted of the following phases:

- A scoping meeting at which all stakeholders and interested parties were invited (the scoping meeting minutes have been attached as appendix1)
- A review of documents and literature related to the project in particular Deco Luck Investments Limited proposed operations
- Socio-economic analysis of the neighbouring settlements
- Baseline study and data collection
- Impact assessment of bio-physical and socio-economic environments and
- Compilation of Social and Environmental Management Plans

## 6.0 Environmental Baseline Study

### 6.1 Climate

Three climatic seasons can be distinguished in the Cheowa tenement area. These are the hot rainy season from late November to March, the cool dry season from May to August, and the hot dry season from September to early November (Figure 10 and 11)

- i. Rainfall:** Seasonal mean = 785.2 mm
- ii. Temperature:** Seasonal mean maximum = 28.0 °C  
Seasonal mean minimum = 14.5 °C
- iii. Wind speed:** Seasonal mean = 5.1 knots

**& direction:** Dry seasons generally from the east  
Rainy seasons usually from the west

- iv. Evaporation:** Seasonal mean = 5.4 mm per day
- v. Extreme weather conditions;** occur during the rainy season. Flash floods in the many tributaries of the perennial Chongwe River and Nyampungwa stream and other seasonal streams can make movement, from December to March inclusive, at times difficult and sometimes impassable.

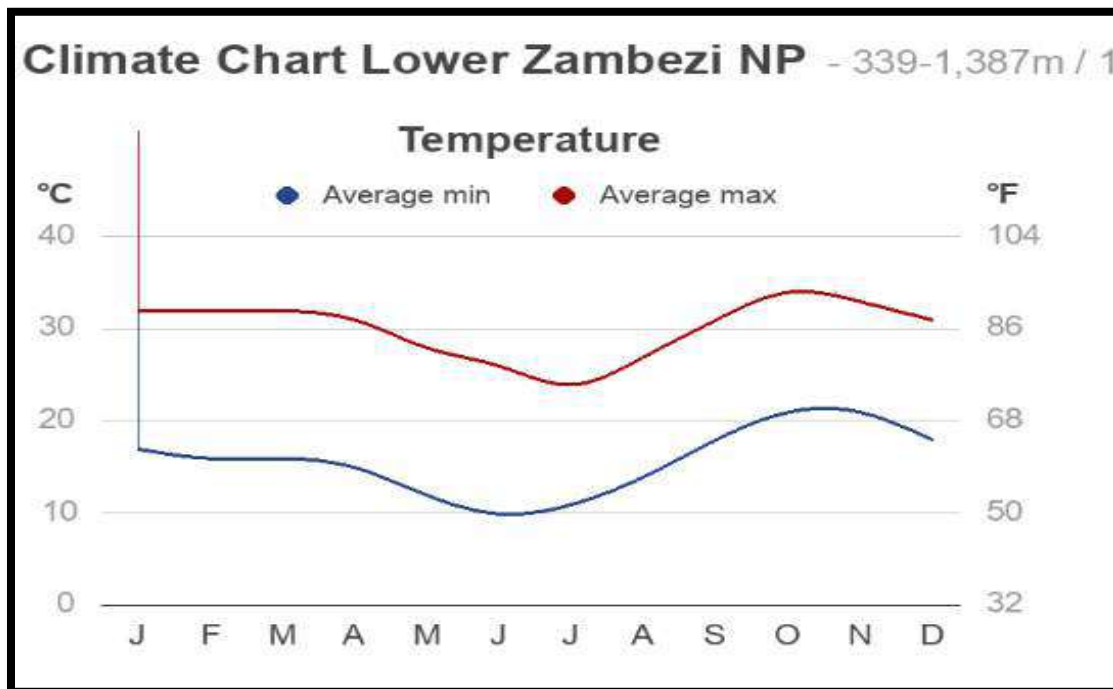


Figure 10: Seasonal Temperatures

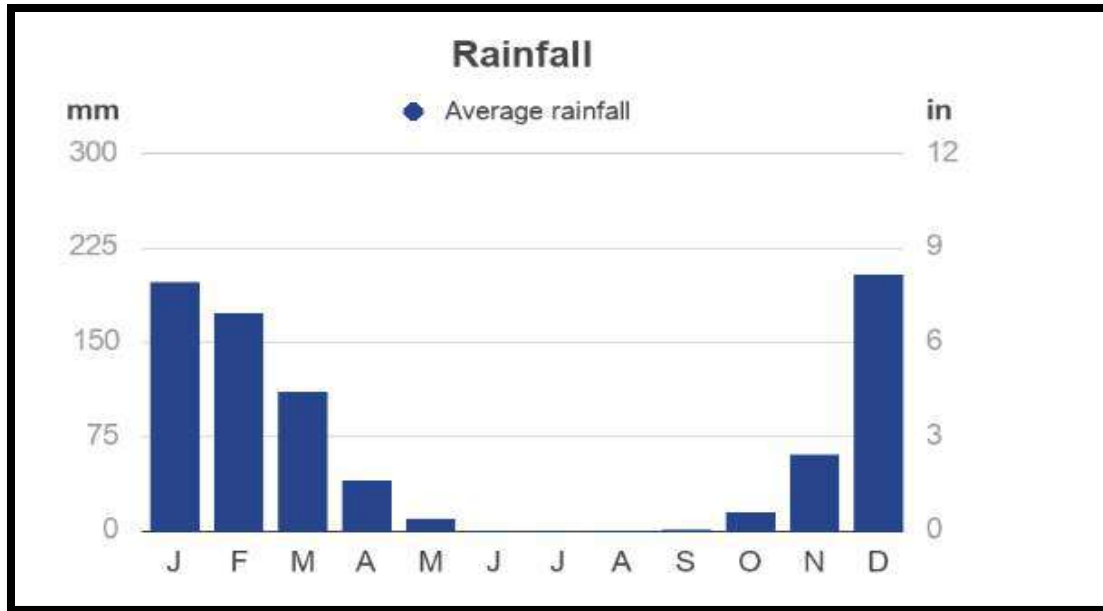


Figure 11: Rainfall

## 6.2 Air quality

The proposed Deco Luck Investments Limited Copper Project is located in LZNP. In view of having baseline data and a primary requirement for assessing the impacts on the air, the EIA team conducted Air and Dust sampling around the project site area. The instrumentation used for the Air sampling was a Dien-Mern air quality detector owned by the consultant. Triangulation method was done to capture representative data, reduce the degree of error and increase precision.

The dust levels averaged  $0.001\mu\text{g}$ , dust concentration averaged  $0.0001\mu\text{g}/\text{m}^3$  and the respirable dust (24 hrs)  $0.014\mu\text{g}/\text{m}^3$  (Using DM106A dust detector)

## 6.3 Geology

The dominant regional geological structure is a near east-west shear zone with an extent of at least 200 kilometres. The area comprises mainly tightly folded interlayer Proterozoic Muva Super group rocks, where both the Muva and the Basement Complex rocks are bisected by numerous localized faults and shears (Figure 12). In the Zambezi tenement the Muva Super group uncomfortably overlays the tightly folded Basement Complex

migmatite gneiss rocks of the Kafue Formation. From oldest to youngest the following Formations are present:

- ***Kuarashishi Formation***; massive white Quartzite rocks with minor interbedded Mica-rich Schist.
- ***Chakwenga Formation***; Laminated pelitic and psammitic Schist, various Quartz-Mica Schist, Quartzite and banded iron formation.
- ***Rufunsa Formation***; comprising mainly amphibolites schist, i.e., Biotite Chlorite Epidote Quartz Schist.
- ***Kangaluwe Formation***; Quartz-Muscovite Epidote Carbonate Kyanite Schist with minor interlayer marble.

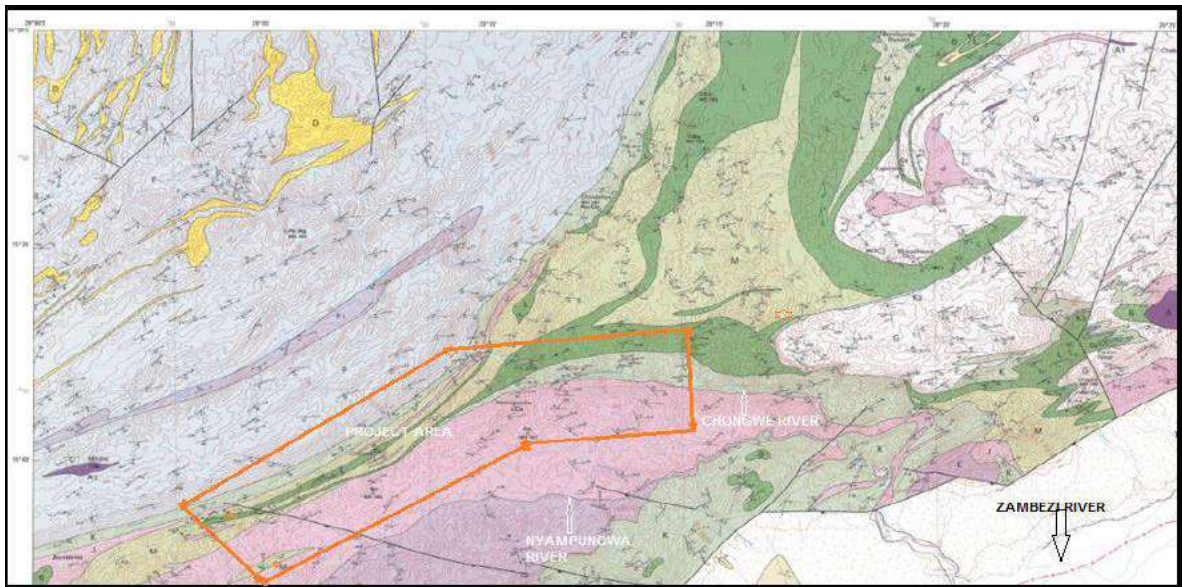


Figure 12: General Geology of the area

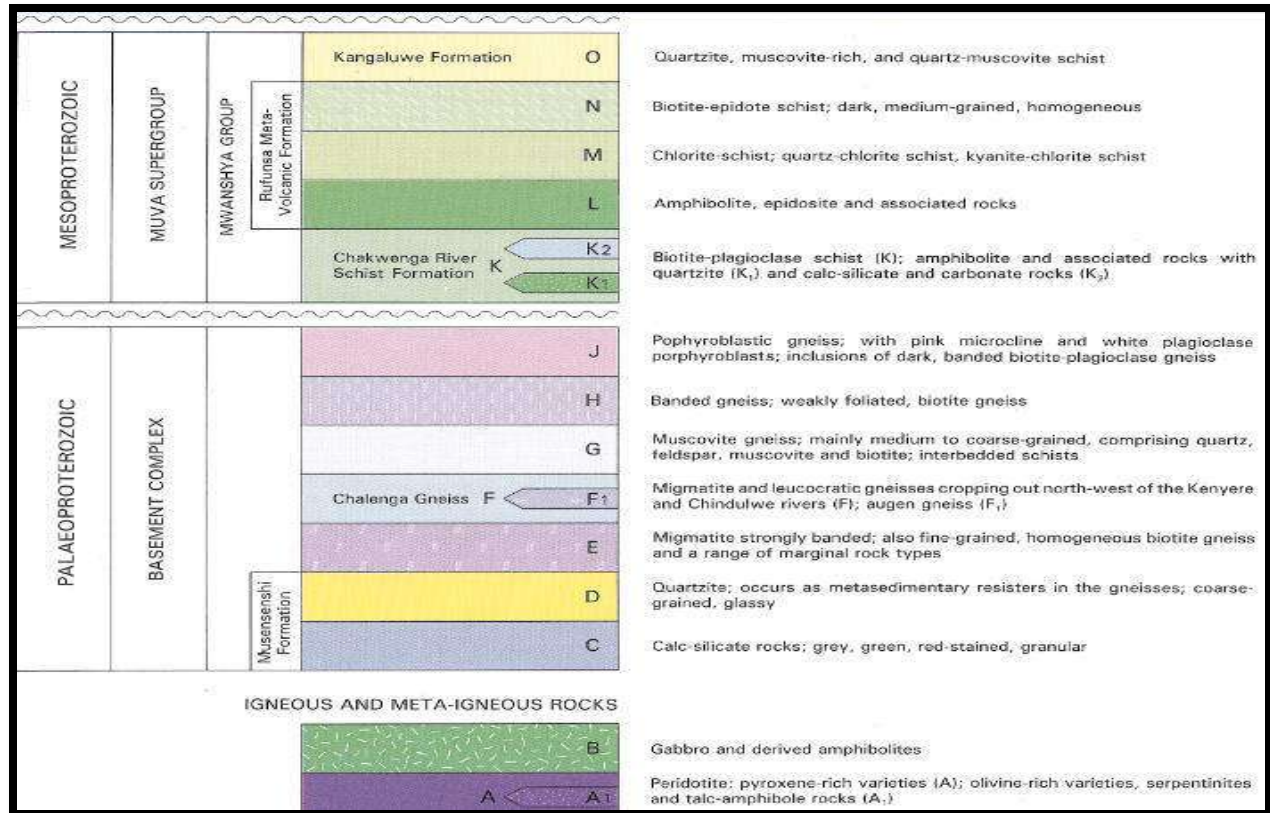


Figure 13: Key to Geology of Figure 12

### 6.4 Hydrology

The main river that drains the Cheowa tenement area is the Chongwe River, which flows all year round in high rainfall years and has many tributaries. The tributaries of the Chongwe River amount to a considerable drainage area of approximately 3000sq.kms in total. The Chongwe River drainage basins for the Chiawa GMA and the LZNP are 600sq.km and 130sq.kms, respectively; the much larger drainage basin coming from the upstream escarpment and plateau areas.

The Chongwe River joins the Zambezi River, which is the main drainage of the region together with its two largest tributaries, the Kafue and Luangwa Rivers (Figure 14).

#### i. Water table, boreholes, and springs

The depth of the water table in the escarpment begins at about 18metres however it is variable to 40metres where the water is potable.



There are no known site-specific locations for boreholes. Other sources of water in the area, apart from the permanent Chongwe River and seasonal tributaries, include unrecorded natural pans and springs.

***ii. Ground and surface water quality***

Ground water quality has never been properly analysed in this area. Samples were collected and analysed, as part of the environmental baseline study.

Surface water quality was also analysed.

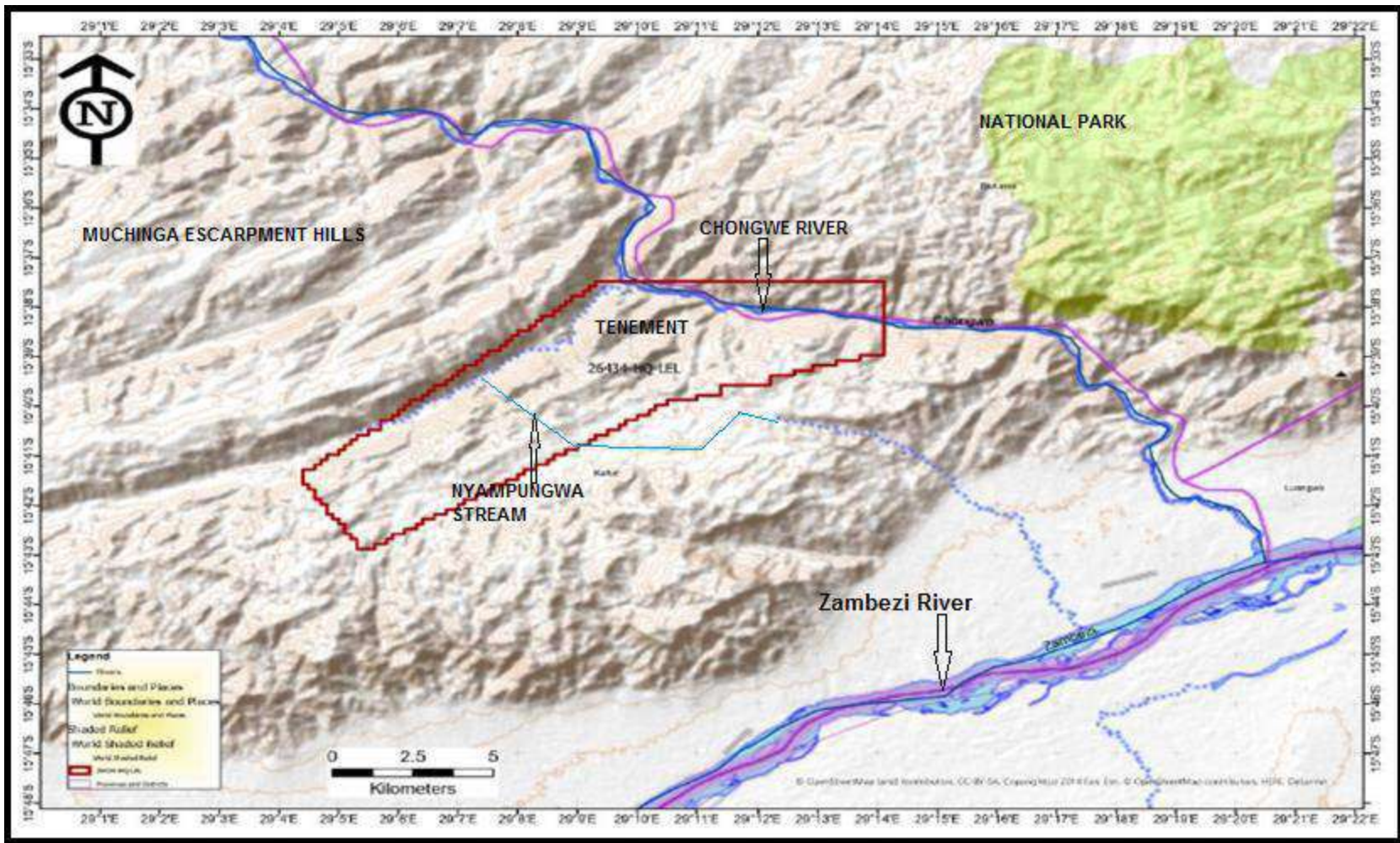


Figure 14: Surface drainage of the project area.

Water quality in a well in the area and Chongwe river are shown in tables 7 and 8

**Table 7: Ground water quality in project area**

Parameter	Unit	Value
pH		7.13
Turbidity	NTU	6.16
Conductivity	$\mu\text{S}/\text{cm}$	213
TSS	Mg/l	Nil
TDS	mg/l	102.1
SO <sub>4</sub>	mg/l	4
Fe	mg/l	<0.01
Cu	mg/l	0.01
Co	mg/l	<0.01
Mn	mg/l	<0.01
Pb	mg/l	<0.01

**Table 8: Water quality in Chongwe river**

Parameter	Unit	value
pH		7.24
Turbidity	NTU	3.7
Conductivity	$\mu\text{S}/\text{cm}$	242
TSS	Mg/l	Nil
TDS	mg/l	116.2
SO <sub>4</sub>	mg/l	9
Fe	mg/l	0.17
Cu	mg/l	0.02
Co	mg/l	<0.01
Mn	mg/l	<0.01
Pb	mg/l	<0.01

## 6.5 Hydrogeology

The geology of the area as correlated from exploration drilling and surface mapping indicate that the area is largely metamorphic area with metalliferous Muscovite - Quartz Schists rocks. These rocks belong to the Basement complex and are non-calcareous, hence do not bear any water and are generally aquitards (Figure 15). This indicates that there are no possibilities of intersecting aquifers. However, some water may be present by seepage through fissures such as joints, schistosity and bedding planes.

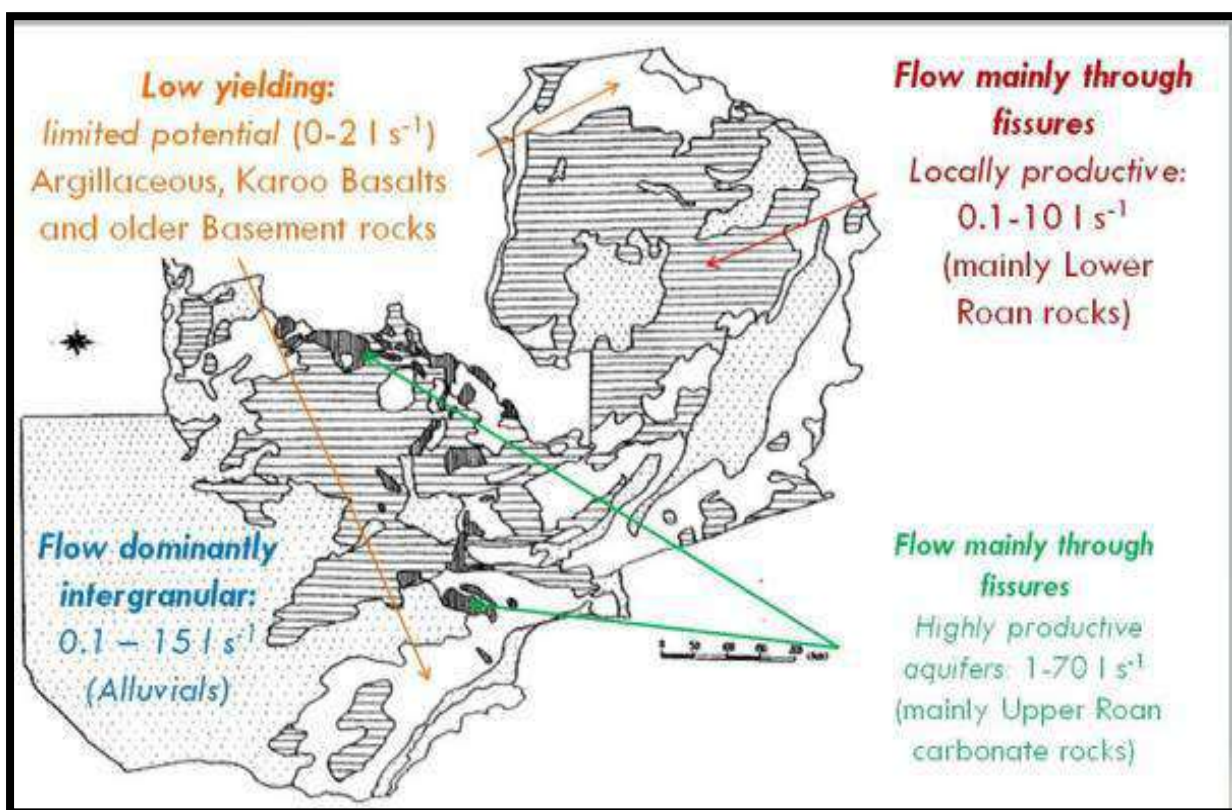


Figure 15: Hydrogeological characteristics in Zambia and the project area

## 6.6 Topography and Soils

The general topography of the license area is hilly and undulating. This area is part of the mountain ranges of southern Zambia commonly known as Muchinga Escarpment. The area's topographic general profile slopes south towards the Zambezi River (40km away to the south) (figure 16). This gives a general drainage southwards. Being a hilly place, there are no deposited soils.



Figure 16: Muchinga Escarpment hills in the project area

The soils in the project area is composed of generally undifferentiated admix of micaceous quartz rubble and top humus soils. The humus soil is very thin (less than 10cm) and is yellowish to greyish brown fine silt sand. The quartz rubble is coarse grained, a product of weathering of the insitu rocks. Most of the fines have been transported away by running rainy water. The rubble soil is yellowish to light brown in colour (Figure 12). The depth pf the soil cover is from 0.0m to 3.0m as deduced from drill hole logs.

## 6.8 Land use and land tenure

In general, all land in Zambia is vested in the hands of the President, who holds it on behalf of the citizens. The Commissioner of Lands administers land and the natural resources there in, on behalf of the President of the Republic of Zambia. There are basically two types of land management systems in the district:

- **Reserve Land** – comprising land that has been gazetted and is mainly forest areas.
- **State or Leasehold Land** – land that can be leased to individuals for a period of ninety-nine (99) years, with title deeds issued.

## 6.9 Built Environment

There are no permanent structures located along in the area

## 6.10 Noise and vibration

The proposed Project site is partly located in a GMA and the site has a pristine environment and there is no noise coming from industrial activities.

## 6.11 Fauna

The Lower Zambezi has strong populations of big game. Buffalo and elephant are common, and move freely between Zimbabwe and Zambia, often grazing on the islands in the middle of the river. The Lower Zambezi's antelope species are dominated by large herds of impala, but there are also good populations of kudu, eland, zebra, wildebeest, waterbuck, bushbuck and the odd duiker or grysbok. Giraffe are completely absent (there is no record of them ever having lived here) as are cheetah and black rhino – the latter due to poaching.

In the river, crocodile and hippo are always present, but also the large water monitor lizard occurs frequently here.

The major predators in the Lower Zambezi are lion, leopard and spotted. The varied terrain (with many large trees) seems to suit leopards, whilst the large herds of buffalo attract large prides of lion. Wild dogs occur, and generally also den in or near the park, although sightings tend to be sporadic.

Table 9: Avifauna in and around the project area

No.	Name	
	Common	Scientific
1.	Turtle Dove	<i>Streptopelia turtur</i>
2.	Owl – Grass Owl	<i>Tyto capensis</i>
3.	Black-eyed Bulbul	<i>Pycnonotus barbatus</i>
4.	Wax bill	<i>Serinus striolatus</i>
5.	White Stork	<i>Ciconia ciconia</i>
6.	Pied Crow	<i>Corvus albus</i>
7.	Barn Swallow	<i>Hirundo rustica</i>
8	Brown falcon	<i>Falco berigora</i>
9	White-necked Raven	<i>Corvus albicollis</i>
10	African Pied Wagtail	<i>Motacilla aguim</i>

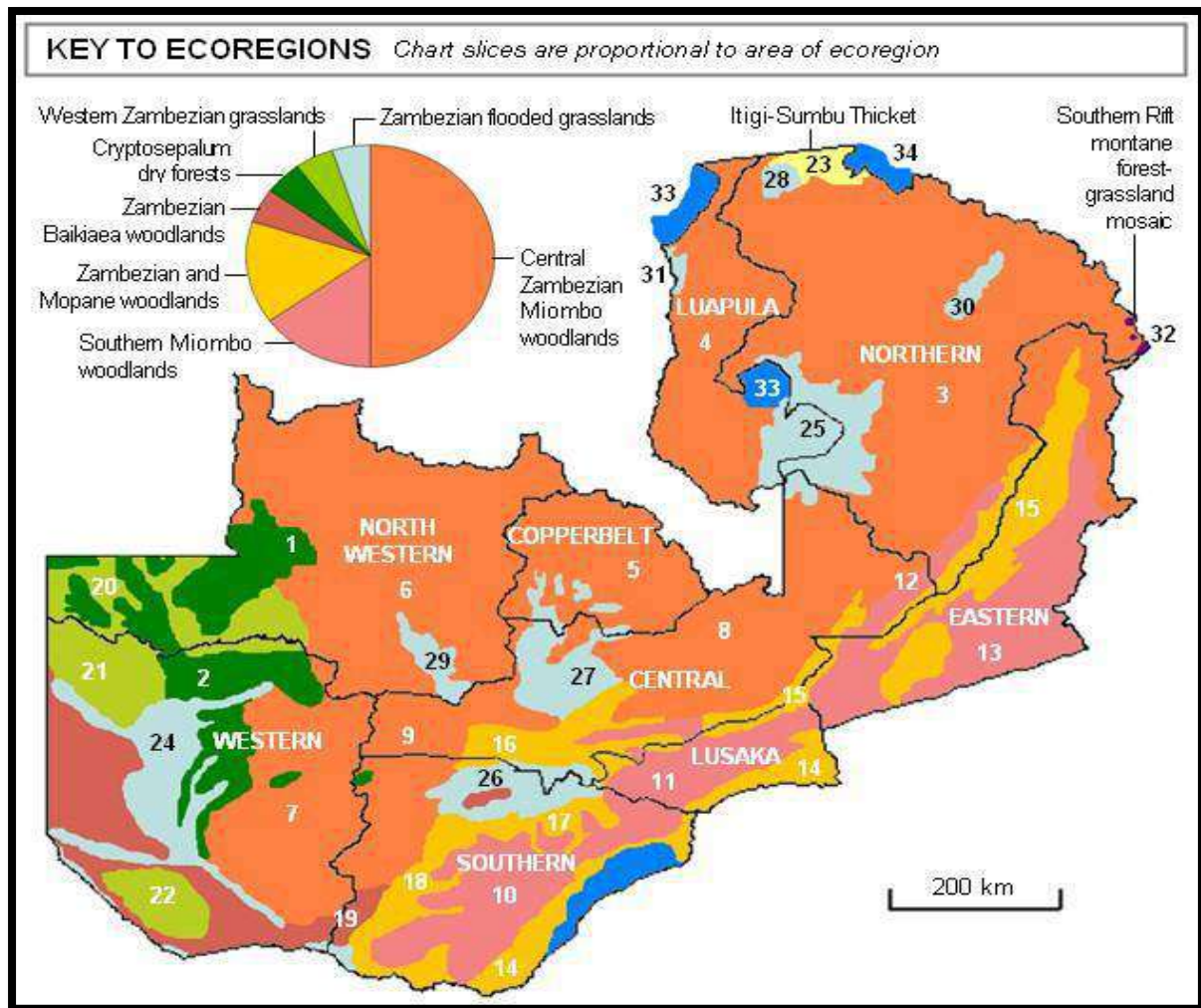
## 6.12 Flora

Zambia lies in the Zambesian Region, which is the summer-rainfall belt of southern tropical Africa with natural vegetation mainly determined by altitude, rainfall and soils. A total of 7 eco-regions can be identified in Zambia namely North-western Zambebian Miombo Woodland covering about Half of the country, Southern Miombo Woodlands, Zambebian Mopane Woodlands, Zambebian Baikiaea Woodlands, Cryptosepalum Dry Forests, Western Zambebian Grasslands and Zambebian Flooded Grasslands. Figure 2 below present the distribution of the afore-named ecoregions of which the North-western Zambebian Miombo Woodlands covers about half of the country (Figure 17).

Munga woodlands interspaced with Miombo woodlands characterize the vegetation on the project site. Vegetation is a mix of Miombo and Munga Woodlands, with Riparian Forest along the Chongwe River and its tributaries. Within the Miombo Woodland are patches of dambos that are situated along the main drainage system. These features are covered by tall coarse grasses with marshy channels in the centres, and they are an important dry season forage resource for wildlife. Also, bamboo grows in a number of places.

**Grasses** in this region have not been classified in detail, particularly in regard for their essential role in woodland ecology and as a guide to maintain slope stability. This survey will be carried out once access to the site is established as soon as practicable after the current rains. In the valley the poorly developed grass cover is made up of *Aristida* spp., *Sporobolus* spp., and *Enteropogon* spp.

A survey was conducted at the project site with the view of obtaining quantitative data of the flora existing on the proposed project area and the possible level of forest destruction (deforestation) i.e. that will be affected should the project proceed.



**Figure 17: Ecoregions of Zambia**

### 6.13 Archeological and Cultural Heritage Sites

This is a sensitive landscape, forming part of a major ecological boundary between the more tropical wetter woodlands north of the Zambezi River and the drier vegetation to the south. These seasonal changes dictate that the larger mammals extend their range from the Zambezi valley floor up into the escarpment during the wet season, whilst others concentrate around the remaining dry season water sources. The protection given to wildlife in particular and the environment in general by the LZNP and the Lower Zambezi Game Management Area (LZGMA), makes this project sensitive to those interested and affected parties.

The LZNP enters the Cheowa tenement on the north bank of the Chongwe River and this demands a high level of environmental awareness. The proximity of the project to the LZNP, is a sensitive environmental issue. Therefore, the Company will implement a series of Standard Operating Procedures (SOP's) as part of its



EMP, to ensure a consistent high standard is applied to minimize potential impacts on any downstream areas.

## **6.14 Social-Economic Set Up**

### **6.14.1 Population and Settlement**

The development of Kafue Township as an Urban Centre started with the extension of the railway line, starting in 1905 from Livingstone to Kalomo and beyond to the Copperbelt. In 1906 railway line reached Kafue and in the following years extended north to Kabwe and Copperbelt.

Most of the earlier settlers of Kafue were Pastorals and fishermen. Many were drawn in the emerging economy as railway workers. With the development of the railway large tracts of land along the line were opened up for settlement by British soldiers from the First World War. National Agricultural shows were often held at Kafue (The Kafue Urban Study (1998)).

In addition to Agricultural development, the establishment of a major railway station near Kafue River became an important stopover to re-furbish the steam engines with water on the journey up or down the line. As a result the train crews, firemen, drivers and other railway employees settled in Kafue as the process of urbanization began.

In 1930's it was granted Township Management Board status. In 1936, the first Asian trader established at Chipapa. Over the next 20 years business was booming. In 1956 – 1959 the main highway, Great North Road was built and shops started to be built to service the needs of farmers, travelers and railway employees. In 1965, Kafue's administrative status was up graded to that of a Town Council and due to the significance of the railway facilities, its proximity to Lusaka, the capital of Zambia, The Central Government decided to make Kafue the industrial capital of Zambia.

In 1970 NCZ was established to produce Ammonium Nitrate for making explosives for the mines. A Sulphuric acid plant was added in 1983, fertilizer production was also increased in order to diversify NCZ's activities following a low demand of explosives following a decline in the mining activities.

In 1991, under the new district based system of Local Government Administration (one council per district) Kafue was amalgamated with Chongwe District in what was called Lusaka Rural District. Under this arrangement, the more industrialized Kafue was merely subsidizing Chongwe.

In 2012, Chongwe was separated from Kafue making it a standalone District. This meant that Kafue had to give away some of the old and upcoming industries reducing on its revenue.

Today Kafue stands among some of the most glamorous towns in Zambia and offers a tranquil getaway to revelers escaping the concrete and asphalt tingle of Lusaka City.

It provides a serene environment for trails, fishing, lake viewing and a myriad of boat activities among others. It boasts of some of the major aquatic investments and a robust and emerging administrative center creating great synergies with like minded cities within and beyond.

On the verge of being conferred municipal status, Kafue provides the preferred destination for major investments because of its gently undulating topography giving rise to unmatched scenic beauty.

According to 2010 census results, the population of Kafue district stands at 160,853 at a growth rate of 4.2% with 24,271 households, in 11 wards, which make up Kafue Constituency.

**Table 10: Population of Kafue as per the Past Census conducted**

Area	Name	Population
Kafue west	Chikupi	1036
	Mungu	15474
	Shabusale	30527
	Kasenje	21838
	Matanda	10923
Kafue East	Kafue	8285
	Lukolongo	3140
	Malundu	9716
	Chisankane	8547
Chiawa	Kambale	5047
	Chiyaba	5882

### 6.14.2 Administration

Kafue Township appears to be the supreme authority at district level. Within this framework, a number of government departments are involved in natural resource allocation as follows. Each department has detailed specific, mandated functions.

- Lands Department - allocates land and issues title deeds.
- Forestry Department - has jurisdiction over forests.
- Fisheries Department - has jurisdiction over fisheries.
- Ministry of Mines - has jurisdiction over minerals.
- Water Affairs Department - controls water abstraction.
- National Heritage Conservation Commission – has jurisdiction over cultural and historical sites

### 6.14.3 Social services and amenities

Kafue Township appears to be the supreme authority at district level. Within this framework, a number of government departments are involved in natural resource allocation as follows. Each department has detailed specific, mandated functions.

- Lands Department - allocates land and issues title deeds.
- Forestry Department - has jurisdiction over forests.
- Fisheries Department - has jurisdiction over fisheries.
- Ministry of Mines - has jurisdiction over minerals.
- Water Affairs Department - controls water abstraction.
- National Heritage Conservation Commission – has jurisdiction over cultural and historical sites

### Health

Kafue District consists of 11 health Centres, 11 Health posts and 1 district hospital. Many illnesses such as Malaria, Tuberculosis, the Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS), diarrheal diseases and acute respiratory infections (ARI) continue to pose a challenge to the health status of the people of Kafue district.

### Health Thrusts and Interventions

The health thrusts and priority areas include 7 public health interventions and 5 systemic interventions. The systemic interventions represent support services

that facilitate the efficient and effective management of the health without which implementation of the public health priorities would not be possible.

Malaria continues to rank among the top three causes of morbidity in all age groups. The target for malaria was to reduce the incidence rate from 35/1000 to 10/1000 by the end of 2019. The result was 41/1000 as of 2016 despite interventions implemented such as prompt case management, distribution of ITNs, Indoor Residual Spraying (IRS) in particular did not cover the high incidence areas hence the increase,. The target is to reduce malaria incidence rate from 41/1000 to 25/1000 by the end of 2020.

Diarrheal diseases in under-5s have reduced from 18/1000 to 2/1000, the target is to reduce it to 0/1000 by 2020 and maintain fatality at 0/1000. These improvements have been as a result of sensitization on safe water and sanitation

The underweight prevalence rate in Kafue District is low however, disaggregated data show relatively high figures in some drought prone areas of Chiawa and Kambale. The target is to maintain the proportion of under-weights in under-5s at 0% by implementing interventions in areas with high prevalence rate of underweight.

The proportion of pregnant women attending Antenatal and those being delivered by trained personnel is below the national target, the objective is to increase 1<sup>st</sup> ANC attendance from 68% to 80% by 2020. We also intend to increase proportion of women starting ANC and testing for HIV from 88% to 98% by the end of 2020, fully implement option B+ to all HIV ANC attendees and increase number of women screened for cervical cancer from 730 to 3000 by the end of 2020 as well as increasing the number of delivery Centres from 8 to 14 by providing equipment and ensuring each health post has a midwife.

The HIV/AIDS pandemic has accelerated infections of Tuberculosis, it has continued to be the major opportunistic infection in patients with HIV/AIDS and we intend to increase early TB detection as well as to increase TB cure rate from 92% to 98% by 2020.

The prevalence rate of HIV/AIDS in Kafue District is at 14%, the major contributing factors to a high prevalence are the high poverty levels and the fact that Kafue is a transit town. It also has fishing camps in Chanyanya and lower Zambezi (Chiawa) whose population is highly migratory and we intend to reduce the prevalence rate of HIV from 14% to 10% by end of 2020. We also intend to increase the number of people accessing ARVs from 99% to 100% by the end of 2020 through the test and start initiative.

Environmental health has continued to be a challenge to the district. Lusaka Water and Sewerage has taken over the running of water and sanitation in the District which has led to improved water quality in Kafue urban. However, unplanned settlement have continued to pose a challenge in terms of water and sanitation in Kafue rural and peri-urban settlements. The district intends to engage LWSC, D-WASHE, District Council and communities in Kafue in provision of safe drinking water, the target of safe drinking water is to increase from 73% to 83% and increase access to safe disposal facilities from 65% to 80% by the end of 2020.

The facilities which fall under Kafue district include: 11 Health Centres namely; Chanyanya, Chikupi, Chiawa, Chipapa, Chisankane, Kafue Estates, Kafue Mission, Kambale, Nangongwe, Railway health Centre, Shikoswe, ZNS camp and 11 Health Posts; Shimambala, Kabweza, Mugurameno, Chikoka, Chisakila, Mungu, Mutendere, Kafue East, Old Kabweza-Malundu, Lukolongo. The District currently has no District Hospital since KDH has been upgraded to a General Hospital status, this therefore creates a need to have a 1<sup>st</sup> level referral facility.

### **Education**

There 138 schools in Kafue with about 46,592 pupils enrolled from grades 1 to 12.

### **Water and Sanitation**

There is no tap water in the project in the area. The locals use a shallow wells and the boreholes as the source of water. The locals use pit-latrines for sanitation facilities.

### **Telecommunication**

Landline telephones are provided by Zambia Telecommunication Company (ZAMTEL), other companies providing telecommunication services are Cell-Z, Airtel and MTN mobiles.

#### *Postal Services*

Ndola has a post office which offers services such as:

- Ordinary mail service
- Registered mail service
- Express Mail Service (EMS)
- Swift Cash Money Transfer
- Western Union Money Transfer
- Philatelic service
- Telefax

#### *Security*

The nearest police station is located in at Chiawa

### **6.14.5 Market availability on various commodities**

There are no stores/shops in the site area though Chiawa has a few shops and a market. Kafue CBD has adequate availability of various commodities.

### **6.15 Vulnerability and Need for Relocation**

The findings of the EIA study indicate that the entire project site is in Forest. Zambian resettlement laws and IFC performance standards will be applied to minimize social disruption and to ensure that the relocation is carried out as humanely and as sensitively as possible.

## **7.0 IDENTIFICATION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS**

In the study of environment, it is essential to identify each possible environmental aspect and impact of it on our surroundings. The various environmental aspects each have a number of different impacts on the environment. Potential impacts must also be identified.

According to the ISO 14000 standard, an environmental aspect consists of those parts of an organization's activities, products or services that can affect the environment.

An environmental impact is defined as any change to the environment whether adverse or beneficial (wholly or partially) resulting from an organization's activities, products or services.

This section makes an assessment of the impacts on the environment that may potentially arise from the environmental issues identified during the study.

Impacts that occur or could occur are grouped and discussed below under the headings of the various environmental components or receptors (e.g. air quality, water flow, ecosystem etc.).

An assessment of these impacts is made on the basis of information gathered during the environmental baseline study of the proposed concentrator site which included several field visits to the site and its surroundings, as well as a desk study of relevant existing documents and information pertaining to a concentrator

Potential positive and negative impacts are discussed below in separate sections. Mitigating measures being incorporated and or to be incorporated so as to minimize, compensate for or avoid the occurrence of these impacts are discussed in the Environmental Management Plan (EMP) in section 9.

### **7.1 Impact Assessment Criteria**

Significant environmental impacts were identified and evaluated considering the nature of the impacts, spatial extent, duration, frequency, magnitude, severity and sensitivity. Both direct and indirect impacts will be identified and evaluated.

#### **Nature of impact**

The nature of the impact is the type of effect that a proposed activity has on the environment. This should include the specific activity being performed, what is

being affected and how it is being affected. Broadly they can be categorized as positive and negative impacts. The question whether the impact is direct or indirect could also define its nature. Is the impact residual? Is the impact cumulative (only applicable to negative impacts) and is the effect of the impact reversible (only applicable to negative impacts)?

### **Direct Impacts**

These are impacts that appear immediately as a result of an activity of the project. The direct impacts would be experienced mainly during the construction and operational phases. These include effects on the physical environment, health and safety of the residents where the proposed activities are being implemented. Direct impacts could be positive or negative. Positive impacts are those that affect the physical environment, health and safety of the people in a positive manner. On the other hand negative impacts are those which affect the environment and the people within and in the vicinity of the proposed project site negatively.

### **Indirect Impacts**

These are impacts that are related to the project but that arises from activities of the project at a secondary level. The indirect impacts are primarily socio-economic and extend beyond the project implementation. The indirect impacts include changes in economic activities and long-term changes, such as increased land degradation due to increased settlement and development in the area. Unlike the direct impacts, which occur in the immediate environment, the indirect impacts would be felt in the adjacent regions. Like direct impacts, indirect impacts could be both positive and negative.

### **Spatial extent**

The geographical distribution or how far the impact has gone is indicated by spatial extent or distribution. Under spatial distribution the impact could be site specific, local (a few kilometres away from proposed project site), regional (within tens of kilometres from proposed project site) and national. The physical and spatial size of the impact is a description of whether the impact would occur on a scale described as follows:

- Site, the impact could affect the whole or measurable portion of the site.



- Whether it is limited to the immediate area of the proposed project (local), the impact could affect the extended area adjacent to the site perhaps a neighborhood or small town. Whether it would affect environments up to 15km outside the immediate environment;
- Regional, that impact could affect the area including the outlying areas of the city, the transport routes and adjoining towns.
- National, the impact could be as far reaching as to international boundaries.

### Duration

This is the time frame within which the impact could be experienced. It defines the impact lifetime and could be classified as temporary, short term, medium term, long term and permanent.

### Frequency

How many times does the impact occur per given time period? This could be daily, weekly, monthly and yearly.

### Likelihood

The probability of the impact occurring is given or measured by its likelihood. Under likelihood the impact could be possible, certain, unlikely and definite.

### Magnitude

Refers to the strength with which an impact will have on the receptor.

Table 11 indicates the impact factor definitions

Table 11: Impact factor definition

<b>Impact Factor</b>	<b>Meaning</b>
Magnitude	Refers to the strength with which an impact will have on the receptor.
Likelihood	The probability of the impact taking place.
Extent	The scope in space or geographical cover of the impact.
Frequency	The number of times or how often the impact shall occur.
Duration	The extent in terms of time.

Table 12: Impact factor significant scale

	<b>Characterization</b>
--	-------------------------

Scale	1	2	3	4	5
<b>Likelihood</b>	Impossible	Highly unlikely	Unlikely	Likely	Certain
<b>Extent</b>	Site specific	Local	Regional	National	International
<b>Frequency</b>	Annually	Bi-annually	Monthly	Weekly	Daily
<b>Duration</b>	Temporary	Short term	Medium term	Long term	Permanent
<b>Magnitude</b>	Negligible	Minor	Marginal	Significant	Catastrophic

Table 13: Significant analysis matrix table

		(Magnitude) + (Extent) +(Duration)														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
(Likelihood) + (Frequency)	1	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	2	4	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	3	6	9	12	16	20	24	28	32	36	40	44	48	52	56	60
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64
	5	10	15	20	24	28	32	36	40	44	48	52	56	60	64	68
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96
	7	14	21	28	36	44	52	60	68	76	84	92	100	108	116	124
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120	128
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135	144
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150	160

Table 14: Impact significance rating

Significance	Matrix Value	Negative Impact Measure	Positive Impact Enhancement Measure
Very Low	1 - 30	Propose mitigation measure	Enhance
Low	31 - 60	Propose mitigation measure	Enhance
Medium	61 - 90	Propose mitigation measure	Maintain
High	91 - 120	Propose mitigation measure and pay more attention	Maintain
Very High	121 - 150	High risk area, propose mitigation measures and	Maintain

		have high monitoring frequency	
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A scale of 1 – 5 was used to calculate the environmental risk in terms of magnitude, extent, duration, likelihood and frequency. The results were multiplied and then added as shown in the formulae and Table 9 below.

$$\text{Impact Significance} = (M+D+E) \times (F+L)$$

Where:

M	=	Magnitude
D	=	Duration
E	=	Extent
F	=	Frequency
L	=	Likelihood

## 7.2 Impact Assessment Reporting

The significance of the predicted environmental and social impacts has been defined as Low, Medium or High. Mitigation measures have been proposed especially for impacts predicted as being of medium to high significance. Table 15 shows the analysis/evaluation of the predicted impacts.

**Table 15: Evaluation of impacts**

Environmental & Socio-Economic Impacts	Positive/Negative	Direct/Indirect	Duration	Major/Minor	Occurrence			Sensitivity	Spatial Extent
			Temporal/Permanent		Construction	Operation	Decommissioning		
Loss of faunal and floral habitat	Negative	Direct	Temporal	major	Yes	Yes	Yes	high	Local
Increase soil erosion	Negative	Direct	Temporal	Minor	Yes	No	Yes	Low	Local
Loss of soil resource due to compaction	Negative	Direct	Temporal	Minor	Yes	No	Yes	Low	Local
Employment	Positive	Direct and Indirect	Temporal	Major	Yes	Yes	Yes	High	Local
Local Economy	Positive	Direct	Permanent	Major	Yes	Yes	No	High	Local
Capacity building	Positive	Direct	Permanent	Major	Yes	Yes	No	High	Local
Improved national power supply	Positive	Direct	Permanent	Major	No	Yes	No	High	Local
Visual Impact	Negative	Direct	Permanent	Minor	Yes	Yes	No	Low	Local

Soil contamination	Negative	Direct	Permanent	Moderate	Yes	Yes	Yes	Medium	Local
Loss of agricultural land	Negative	Direct	Permanent	Moderate	Yes	Yes	Yes	Medium	Local
Health & Safety Risk	Negative	Direct/Indirect	Permanent/Temporal	Moderate	Yes	Yes	Yes	Medium	Local/Regional
In migration	Negative	Direct/Indirect	Permanent/Temporal	Moderate	Yes	Yes	Yes	Medium	Local/Regional
Increased generation of Traffic on existing road network	Negative	Direct	Permanent	Moderate	Yes	Yes	Yes	Medium	Local
General rise in ambient noise	Negative	Direct/in direct	Permanent/temporal	Major	Yes	Yes	No	High	Local
Heritage	Negative	Direct/in direct	Permanent/temporal	Major	Yes	Yes	Yes	High	Local
Animal Human Conflict	Negative	Direct/in direct	Permanent/temporal	Major	Yes	Yes	Yes	High	Local

### 7.3 Positive Impacts

The project will result in the following positive socio-economic environmental impacts;

- Provision of employment and poverty alleviation
- Boost to the Mining sector
- Increased National Copper production
- Increased Public Revenue

#### 7.3.1 Impacts on the Local and National Economy

##### **Provision of employment and Poverty alleviation**

The Mine will provide employment to .... people during construction and ...people during operations. Furthermore, indirect opportunities for employment will be stimulated in other sectors such as manufacturers and suppliers of local raw materials and finished products and providers of services.

##### **Boost to the Mining sector**

The Mining project for Deco Luck Investments Limited will give boost to local suppliers to the activities of the project around the Kafue area and the Lusaka Province in general.

##### **Increased public revenue**

Operation of the Mine will provide increased revenue in terms of foreign exchange earnings and rates payable to Kafue Municipal Council. Increased employment and other multiplier effect downstream in the economy will provide opportunities for increased revenue for Zambia Revenue Authority (ZRA) due to increased payments in the form of PAYE, VAT and corporate income tax from the operator and suppliers. NAPSA will also receive contributions for employed persons. Utility providers such as ZESCO and Zamtel also will also receive revenue.

##### **Increased National Copper production**

Operation of the Mine will result in increased national output of copper and this will result in positive outlook of the national economy

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	5	5	4	5
Combination rating	14			9	
significance	126 High positive impact				

### 7.3.2 Positive Impacts on the Physical Environment

No positive impacts on the physical environment were identified

### 7.3.3 Positive Impacts on the Biological Environment

No positive impacts on the Biological environment were identified

## 7.4 Negative Impacts

The negative impacts identified during the study include:

- Soil degradation/Contamination
- Air Pollution
- Surface Water Pollution
- Ground water Pollution
- Impacts on health and safety
- Impacts on Public Health and Safety
- Impacts on Land use and Ecosystem
- Impacts on Public infrastructure
- Loss of indigenous vegetation on site
- Destruction of faunal habitat

### 7.4.1 Impacts on Soil and Land

The impacts on Land and Soil identified include soil erosion and land degradation due to mining activities.

## Soil Erosion

Activities during site preparation and construction involve considerable earthworks which may result in clearing the site of vegetation and removing topsoil. This may result in an increase in surface water runoff during periods of rainfall. At the same time, the grounds ability to resist erosion may be reduced especially where sub-soils have been destabilized by construction activities.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	2	2	3	5
Combination rating	8			6	
significance	64 Medium negative impact				

## Land degradation due to use of Hazardous substances

A potential area of concern is the use of hazardous material such as disinfectants, fuels, oils, etc. contaminating the land.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	2	2	3	5
Combination rating	8			8	
significance	64 Medium negative impact				

### 7.4.2 Impacts on Air Quality

The impacts on air quality identified during the study are mainly dust release, exhaust pollution and odour from solid waste.

The dust will be raised from exposed surface areas with loosened topsoil such as the Waste Rock Dump and the ROM pad and operation machinery such as bulldozers, crusher and trucks as well as by haulage vehicles. The dust can reduce visibility, cause respiratory problems and facilitate transport of odours and diseases.

The dust can pose a significant nuisance to workers and to neighbouring areas especially under dry and windy conditions.

Offensive odour can result if garbage and other solid waste generated by the complex is allowed to accumulate.



Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	3	2	4	4
Combination rating	9			8	
significance	72 Medium negative impact				

### 7.4.3 Impacts on surface water

The impacts on surface water identified include increased surface water contamination by effluents and storm water as a result of runoff.

#### Increased run off

The buildings on site will be roofed making the area impervious to water infiltration. This increases the amount of surface run-off emanating from the site. The drainage around the project area will properly maintained to ensure that that storm water flows freely to the natural stream.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	3	2	4	4
Combination rating	9			8	
significance	72 medium negative impact				

### 7.4.4 Impacts on ground water

The impacts on ground water identified include the is the possibility of contamination of ground water by Seepage from Waste Rock Dumps and ROM pad.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	4	2	4	4
Combination rating	10			8	
significance	80 medium negative impact				

### 7.4.5 Impacts on Noise Environment

The impacts on noise may arise from increased traffic and use of equipment.

The increased volume of traffic to the area will result in an increased background noise level especially, the operation of concentrator equipment may also result in an increased background noise levels.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	3	2	4	4
Combination rating	9			8	
significance	72 Medium negative impact				

### 7.4.6 Impacts on Occupational health and safety

The general and specific impacts to occupational health and safety identified at the concentrator will include:

- Physical hazards
- Chemical hazards
- Particulate matter
- Ionizing Radiation
- Risk of fires
- Hazardous situations arising from inadequate, design and/or maintenance of equipment and facilities
- Hazardous situation arising from substandard housekeeping unhealthy environment, slippery floors etc.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	3	2	5	4
Combination rating	9			9	
significance	81 Medium negative impact				

### 7.4.7 Impacts on Public Health and Safety

The impacts on public health and safety that may arise from the concentrator operations identified include:

- Risk of fire accidents
- Risk of water borne diseases
- Increased risk of transmission of HIV and communicable diseases
- Transmission of malaria
- Hazardous situation arising from substandard housekeeping unhealthy environment, slippery floors etc.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	4	3	2	5	4
Combination rating	9			9	
significance	81 Medium negative impact				

### 7.4.8 Impacts on Public infrastructure

The impacts on public infrastructure identified include:

- Increased traffic/road congestion
- Reduced road safety

The proposed development will have a significant impact on traffic on the main haulage road.

The increased levels of traffic present an inherent risk of accidents involving vehicles and other road users.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	2	3	2	5	4
Combination rating	7			8	
significance	56 low negative impact				

### 7.4.9 Loss of indigenous vegetation on site and destruction of Faunal Habitat

Construction of the Mine may result in loss of indigenous vegetation

The construction team will strive to cause minimal damage to the ecosystem. Only flora standing on infrastructure footprints will be cleared.

Another potential impact on biological environment is loss of fauna during operations. Management will encourage the rescue of important species that will be found on site.

Criteria	Magnitude	Duration	Extent	Frequency	Likelihood
Rating	2	5	1	1	5
Combination rating	8			6	
significance	48 low negative impact				

## 8.0 PROPOSED ENHANCEMENT/ MITIGATION MEASURES

### 8.1 Positive Impacts

#### 8.1.1 Employment and Poverty Reduction

The Deco Luck Investments limited project will provide employment to about 450 people during operations. The company will give priority to the local people when employing. Only skills that will not be available within the local community will be sourced from other areas. All recruitments shall be advertised in the local community and a database shall be developed for available local people with special skills. The Company will offer competitive salaries, wages and contracts.

#### 8.1.2 Increased Support to the Local and National Economy

The Deco Luck Investments limited project will give boost to local suppliers of goods and services and boost the Manufacturing sector around the Lusaka Province. The

company will give priority to sourcing of goods and services locally, only those goods and services that are not locally available will be sourced abroad.

Operation of the Deco Luck Investments limited project will provide increased revenue in terms of rates payable to Kafue Municipal Council. Increased employment and other multiplier effect downstream in the economy will provide opportunities for increased revenue for Zambia Revenue Authority (ZRA) due to increased payments in the form of PAYE, VAT and corporate income tax from the operator and suppliers. NAPSA will also receive contributions for employed persons. Utility providers such as ZAMTEL also will also receive revenue. The company will ensure that all the forms of tax due to government and the local authorities is remitted.

### **8.1.3 Impacts on the Local Capacity**

The setting up of the Deco Luck Investments limited project will increase the availability of minable mineral resources for the country. The Company will continue identifying mine expansion opportunities so that the benefits of the project are felt by the local communities. The company will perform rigorous Corporate Social Responsibility (CSR) towards construction of structures such as roads in the area. Skills base for the area will be increased by training the locals especially in those skills that can be mastered within a short time such as Bricklaying and plumbing. Job on training activities will be promoted

## **8.2 Negative Impacts**

### **8.2.1 Soil degradation/Contamination**

The setting up of the Deco Luck Investments limited project may increase the loss of soil through erosion on exposed surfaces. The mitigation measures proposed include:

- a) The company will carry out progressive as well as end of mining rehabilitation on disturbed areas.
- b) Topsoil stripping will be practised and this will be stockpiled for use when rehabilitating the site. When rehabilitating, the topsoil shall be re-spread and,

where appropriate, the area re-vegetated with species consistent with the surrounding vegetation.

- c) Cutting of trees will be limited so as to provide a break against soil erosion.
- d) Slash material is to be stockpiled at the edge of the clearing and utilized for reclamation of the site.
- e) Storm water cut-off drains will be constructed around the perimeter of the mines.
- f) Silt traps will be constructed across all channels draining mine areas, to settle suspended solids from surface runoff prior to release to the environment.
- g) Storm drains will be constructed to intercept runoff from the ROM pad area. The drains will discharge into sedimentation ponds where solids will settle.

Mitigation measures for land degradation/soil contamination include:

#### **Land degradation due to generation of Hazardous Waste**

- a) To limit, contain, and manage the impact of spillages, dispensing points shall have drip pans while fuel tanks/drums will be contained in a bund of sufficient capacity and will stand on an impervious surface.
- b) To limit the amount of spills during transfer from drums to vehicles, hand pumps will be used.
- c) Sturdy, non-leaking containers will be used for storage of fuel and oils.
- d) Hazardous waste such as waste oil and sludge will be handled differently; waste oil will be stored for sale to recyclers or those using the oil as a source of energy.
- e) Except for minor or emergency cases, all repair and maintenance works shall be carried out in the workshop.
- f) The engineering workshops will have heavy equipment wash-bays equipped with impervious surfaces and containment to enable capture of all effluent from washing operations. Oil traps will be installed in the workshop drainage system to treat all effluent prior to release.

## Land degradation due to generation of non - Hazardous waste

- a) All solid wastes shall be removed from the site to an approved waste disposal site.
- b) No burying or burning of wastes shall be permitted.
- c) Waste shall be stored in such a manner that it does not generate nuisances of odour and unsightly visual impact. For storage, solid waste will be located in covered, leak proof containers.
- d) All waste materials and redundant equipment shall be removed from work sites soon after mining operations.
- e) The Mine Manager shall ensure that no littering occurs at work sites and all waste shall be removed at the completion of an operation shift.
- f) All materials with use value such as scrap metal, wood paper, and plastic will be recycled or reused for other purposes or sold to other users.
- g) The camp shall at all times be kept in a safe, neat, and sanitary condition.
- h) Hazardous waste such as waste oil and sludge will be handled differently; waste oil will be stored for sale to recyclers or those using the oil as a source of energy.

### 8.2.2 Air pollution (Dust and other emissions)

Mitigation measures for air pollution include:

- a) Access tracks and cleared areas will be regularly watered down to reduce emissions of dust.
- b) Haulage trucks will be regularly cleaned and maintained to reduce exhaust emissions.
- c) In the event of excess dust being generated, personal protective equipment (dust masks) will be used.
- d) Employ appropriate measures to reduce dust by:
  - Keeping disturbed areas to a minimum, and revegetating bare areas, as soon as possible;
  - Minimising vehicle movements and speed.

- e) Water sprinkler systems will be installed in the crushing plant and at bulk ore transfer locations to suppress dust.
- f) Air quality control equipment will be installed in critical areas to assess the performance of the dust suppression systems.

### 8.2.3 Ground and Surface water contamination

Mitigation measures for ground and surface water contamination include:

- a) To limit, contain, and manage the impact of spillages, fuel tanks/drums will be contained in a bund of sufficient capacity and will stand on an impervious surface.
- b) To limit the amount of spills during transfer from drums to vehicles, hand pumps will be used.
- c) Fuel stores will be located on flat stable terrain at least 30 metres from the high-water mark of the nearest body of water whenever possible.
- d) Banded areas shall be drained to a sump.
- e) The Mine Manager shall ensure that fuel containers are in good condition and shall be inspected for leaks, holes, dents and overall integrity.
- f) Waste fuel, oil and lubricants, soil contaminated by spills, used absorbent material, impervious linings and any waste contaminated by hydrocarbons (such as rags) shall be treated as hazardous waste and disposed of at appropriately licensed facilities.
- g) Storm water cut-off drains will be constructed around the perimeter of the mines.
- h) Silt traps will be constructed across all channels draining mine areas, to settle suspended solids from surface runoff prior to release to the environment.
- i) Storm drains will be constructed to intercept runoff from the ROM pad area. The drains will discharge into sedimentation ponds where solids will settle.



## 8.2.4 Occupational health and safety

All workers will be trained in occupational health and safety and applicable protocols will be firmly enforced. All workers will be provided with personal protective equipment. An emergency response plan will be put in place to guide response and minimise effect in case of an emergency situation.

- a) Field crew shall be trained in firefighting techniques and the use of firefighting equipment.
- b) Firefighting equipment shall be visible and the location easily accessible.
- c) Firebreaks shall be constructed around the camps. The firebreak shall be at least 10 metres wide.
- d) Fire drills shall be held regularly.
- e) Flammable materials shall be stored away from ignition sources.
- f) All heavy equipment and fuelling sites shall have approved and fully charged fire extinguishers installed.
- g) All fuelling sites shall be designated and no smoking allowed near fuelling sites or while operating equipment.
- h) All pits shall be cordoned off with reflective material.
- i) The mine site will be fenced off to prevent unauthorised access.
- j) All containers and equipment where water can collect and provide breeding places will be removed.
- k) Warning signs will be erected around the mining site.
- l) To reduce the incidence of malaria, any standing water will not be allowed to accumulate in ponds or pits. All containers and equipment where water can collect and provide breeding places will be removed.

## 8.2.5 Impacts on Public Health and Safety

### Risk of water borne diseases

Impacts on health could also arise from lowering water quality as a result of contamination of ground or surface water resources.

- a) Secure Septic tanks or portable toilets shall be located at least 100m from the nearest body of water, topographically lower and downwind from the camp, and at least 30 to 40 metres away from the kitchen area. Any sump or pit used for storing liquid waste shall be located a minimum of 100 metres back from the high water mark of any water body or watercourse; and 15 metres away from drilled wells. There shall be a minimum of 2 meters of isolated distance between the bottom of the pit and the water table where the separation material is clay and 5 meters where it is sand.
- b) Wash-water from the kitchen and washing facilities shall be discharged to the sumps located at least 100 metres from any body of water. The bottom of the pit shall be filled with coarse gravel and the sides shored up with stones to prevent erosion and collapse of the pit.

### **Increased risk of transmission of HIV and communicable diseases**

Education and sensitization on the dangers of HIV and AIDS together with the promotion of self-protection e.g. by use of condoms will be the key intervention against the HIV and AIDS problem. The key message to be promoted will be that of abstinence from casual sex followed by use of condoms where abstinence has failed. To that effect free condoms will be placed in toilets. Talk about HIV and AIDS at the work place will be promoted too.

### **Transmission of malaria**

To reduce the incidence of malaria, any standing water will not be allowed to accumulate in ponds or pits. All containers and equipment where water can collect and provide breeding places will be removed.

## **8.2.6 Impacts on Loss of Land Use and Ecosystem**

To mitigate loss of land use:

- a) When clearing sites, trimming of overhanging trees will be kept to a minimum and will be limited to sites for construction.
- b) Installations will be located on areas where other land use possibilities are low.
- c) The company will uphold best practice environmental management aimed at protecting the areas biodiversity.

- d) Collaborate with the community and local authorities in the conservation of natural resources in the project area.
- e) Provide employment opportunities to locals that have been engaged in the plantation

### **8.2.7 Impacts on Public infrastructure**

The impacts on public infrastructure identified include:

- Increased traffic on roads

#### **Increased traffic**

The setting of the Deco Luck Investments Limited project will result in a significant impact on traffic on the roads from the mine site to Smelters around the country as the number of vehicles moving to and from the site will increase. However, this will not be very significant compared to the vehicular traffic already on the Road. The impact is direct, of a local nature and of long term. If it occurs, it is permanent and of medium sensitive.

### **8.2.8 Loss of indigenous vegetation on site**

The loss of indigenous vegetation will definitely affect the natural or physical qualities and characteristics of the project area that contribute to people's appreciation of its pleasantness, aesthetics and cultural attributes. The company will therefore:

- a) Prefer less well vegetated areas for work installations and the company will ensure that only the sites where construction will take place will be cleared.
- b) Landscaping and planting of flowers will be practiced to improve the appearance of the surrounding.

### **8.2.9 Destruction of faunal habitat**

The Clearing of vegetation will definitely destroy faunal habitat. The mitigation measure will include confining clearing of vegetation only to areas where construction will be done All site clearing activities shall be approved by the Site Manager.

### 8.2.9 Climate change and related Impacts

Mitigation measures for climate change and related impacts include:

- a) Vehicles and equipment that use fossil fuels will be regularly serviced to ensure optimal fuel conversion and minimal exhaust emissions
- b) Consumption or wastage of resources whose production directly contribute to GHG emissions or have direct bearing on Climate Change will be discouraged.
- c) Awareness campaigns on causes, consequences and mitigation of Climate Change will be done to employees and community members

## 9.0 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN

This Environmental and Social Management Plan (ESMP) covers the construction, operation and closure Phases of the Project. It is expected that all contractors and sub-contractors will be required to adhere to all of the environmental guidelines and standards as well as Zambia's legislation during the lifespan of the project.

### 9.1 Objectives of the ESMP

The objectives of this ESMP are to:

1. Ensure the project is compliant with applicable national environmental and social legal requirements
2. Identify the required mitigation measures that are needed in order to reduce negative impacts and enhance positive ones
3. Address human resource requirements to ensure implementation of the ESMP is possible.

In order to achieve the above objectives, the ESMP ensures that:

1. **During project planning and design**, all mitigation measures identified in the EIA that can be incorporated into the planning and design of the project are considered during the detailed planning and design phase.
2. **During construction** all constraints, restrictions and actions required to minimize construction related impacts are implemented.

### **3. During commissioning and operation**

A detailed operating procedures will be developed so that all constraints, restrictions and actions required to minimize impacts caused by commissioning and operation are developed, implemented and monitored for all aspects of the project

In this ESMP, some aspects and impacts are common for the construction and operational phase. In some cases, cross referencing for these aspects has been done and in other cases, these aspects have been treated separately in the phases of the project.

**Table 16: Environmental and Social Management Plan (ESMP)**

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
<b>1.0. Positive Socio-economic impacts during construction</b>									
1.1	Employment creation	Increased number of employed people in the area	To increase employment opportunities for the local people in the area	Priority will be given to the local people. Only skills that will not be available within the local community will be sourced from other areas.	Number of locals employed	On-going	Throughout construction period	Site Manager	200,000
				All recruitments shall be advertised in the local community and a database shall be developed for available local people with special skills.			Throughout construction period		
				Offer competitive salaries, wages and contract terms (to contractors and suppliers of goods and services).			Throughout construction period		
1.2	Participation in Local and National Economy	Increased support to the local and national economy	To facilitate local participation in business opportunities created by the project	Wherever possible construction materials will need to be sourced from the locality or from local contractors	Number of local contractors engaged	On-going	Throughout construction period	Site Manager	2,000,000
				Local business especially relating to daily consumables required on site shall be promoted. Priority shall be given to local suppliers			Throughout construction period		
			To guarantee that all tax due to the government	Ensure that all contractors on site including employees pay the necessary/applicable taxes	Amount of money paid to government in form of tax	On-going	Throughout construction period	Project Accountant	100,000
1.3	Infrastructure development	Improved infrastructure development and related externalities	to contribute to the development of infrastructure in the project area	Perform rigorous Corporate Social Responsibility (CSR) towards construction of structures such clinic and housing in the area	Amount of money/resources committed to CSR	Annually	Throughout construction period	Project Manager	100,000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
1.4	Capacity Building	Enhanced skill sets for the employed locals (capacity building and skills development)	To build capacity among local employees	Skills base for the area will be increased by training the locals especially in those skills that can be mastered within a short time such as Bricklaying and plumbing. Job on training activities will be promoted	Number of employees with upgraded skill/positions since joining the project	Annually	Throughout construction period	Site Manager	100,000
<b>2.0. Negative Socio-economic impacts during construction</b>									
2.1	Occupational and Public Health	Dust nuisance to workers on site and communities near the project site	To minimize dust generation	Dust suppression on haul roads and over exposed working areas will be done using water bowsers/hoses or they will be surfaced with molasses	Dust fall out	Monthly	Throughout construction period	Site Manager	8000
			To safeguard the health of employees on site	All workers will be provided with suitable PPE including respirators for those working in areas with high dust levels	Number of employees provided with full suitable PPE	Monthly	Throughout construction period	Site Manager	10,000
2.2	Noise generation	Increased ambient noise levels	To reduce the generation of noise to within regulatory prescribed limits	Noisy equipment or machinery on construction site will be restricted to work areas unless their movement is really necessary	Number of noisy equipment working outside prescribed areas	Daily	Throughout construction period	Site Manager	10,000
				Equipment on site will be regularly serviced to ensure their efficiency	Number of equipment serviced	Monthly	Throughout construction period	Site Manager	10,000
			To safeguard the health of employees on site	All workers will be provided with suitable PPE including ear muffers for those working in areas with high noise levels	Number of employees provided with full suitable PPE	Monthly	Throughout construction period	Site Manager	Captured in 2.1 above

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
2.3	In-migration	Threat to public security as a result of increase in crime	To improve the security in the area	The influx of the people into the area will undermine the security. The developer will support the construction of a police station in the area to curb crime.	Number of crimes/theft recorded	Annually	Throughout construction period	Security Manager	10,000
2.4	HIV/AIDS and STIs	Increased threat/risk of HIV/AIDS and other STIs transmission	To reduce the incidences of HIV/AIDS and other STIs	Professional HIV/AIDS Counsellors shall be subcontracted once every six months to offer awareness, voluntary counselling and testing services to employees	Number of employees tested, counselled and educated in HIV/AIDS matters	Annually	Throughout construction period	CSR Manager	8000
		Stigmatization and discrimination	To reduce or completely eliminate Stigmatization and discrimination	Workers who may voluntarily come out with the aim of creating awareness and stopping stigmatization shall be encouraged	Number of employees who open up	Annually	Throughout construction period	CSR Manager	10,000
				To give an equal opportunity to all the employees including those living with HIV/AIDS	Number of people living with HIV engaged	Annually	Throughout construction period	CSR Manager	10,000
2.5	Road safety	Increased road and traffic risk for motorists and pedestrians due to increased traffic flow	To ensure traffic and road safety	Awareness campaigns on road safety and rules will be carried out regularly	Number of awareness campaigns and number of traffic or road accidents	Annually	Throughout construction period	Site Manager	10,000
				Only drivers with valid licenses will be engaged by the project	Number of drivers with valid licenses	Annually	Throughout construction period	Safety Officer	5,000
2.6	Loss of land use	Threat to increased poverty	To ensure adequate compensation	To compile Resettlement Action Plan and Valuation Report and Sign Compensation agreement	Number of people compensated	On going	At commence	CSR Manager	100,000



No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
							ment of project		
2.7	Loss of land livelihood	Threat to increased poverty	To ensure adequate compensation	To compile Resettlement Action Plan and Valuation Report and Sign Compensation agreement	Number of people compensated	On going	At commencement of project	CSR Manager	Captured under 2.5
2.8	Loss of access to common routes	Threat to increased poverty	To ensure adequate compensation	To compile Resettlement Action Plan and Valuation Report and Sign Compensation agreement	Number of people compensated	On going	At commencement of project	CSR Manager	Captured under 2.5
2.9	Loss of customary rights	Social deprivation	To ensure adequate compensation	To compile Resettlement Action Plan and Valuation Report and Sign Compensation agreement	Number of people compensated	On going	At commencement of project	CSR Manager	Captured under 2.5
2.10	Loss of amenity values	Social deprivation	To ensure adequate compensation	To compile Resettlement Action Plan and Valuation Report and Sign Compensation agreement	Number of people compensated	On going	At commencement of project	CSR Manager	Captured under 2.5
2.11	Loss of ethnicity	Social deprivation	To ensure adequate compensation	To compile Resettlement Action Plan and Valuation Report and Sign Compensation agreement	Number of people compensated	On going	At commencement of project	CSR Manager	Captured under 2.5

**3.0. Negative impacts on the Biophysical environment during site preparation and construction**

3.1	Vegetation/fau na /forests	Destruction and disturbance of indigenous vegetation/forest during site clearing	To ensure minimal loss of vegetation	Clearing of vegetation will only be confined to areas where construction will be done	Construction footprint	At the end of construction activities	Throughout construction period	Site Manager	12000
				All site clearing activities shall be approved by the Site Manager	Number of site clearing approvals	Annually			

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
3.2	Fauna habitat	Loss of natural habitat for small mammals, birds and insects.	To ensure minimal loss of vegetation	As above (3.1)	Cleared area	Annually	Throughout construction period	Site Manager	Captured under 3.1
3.3	Soil	Loss of soil through erosion on exposed surfaces	To minimize soil erosion and loss of productive top soil as a result of site activities	Vegetation clearing will be kept to a minimum, that is only areas where construction is likely to be done will be fully cleared. This will lessen surface area exposed to agents of erosion	Construction footprint	At the end of construction activities	Throughout construction period	Site Manager	20000
		Soil contamination /land degradation	To preserve as much as is possible the integrity of the soils/land on the project area	To minimize leakages and/or spills of fuel, and other potential contaminants, regular servicing or maintenance of equipment/heavy vehicles on site will be done	Number of equipment serviced	Monthly	Throughout construction period	Site Manager	5000
				Repairing, servicing and maintenance of equipment will be done in dedicated fitted with impervious surface	Number of equipment serviced in dedicated areas/Workshop	Monthly	Throughout construction period	Site Manager	5,000
				Used and new batteries on site will be stored in secure locations fitted with impervious surfaces	Number of new and used batteries stored in secured locations on site	Monthly	Throughout construction period	Site Manager	5,000
				To prevent soil contamination by sewerage, portable toilets or secure septic tanks will be provided on site during construction	Number of toilets on site	Bi-annually	Throughout construction period	Site Manager	5000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
				All forms of waste will be temporarily held in designated, well contained waste receptors/holding areas prior to final disposal following regulatory framework	Volume of waste generated on site	Weekly	Throughout construction period	Site Manager	10000
3.4	Air Pollution	Increased levels of air pollution (dust)	To minimize dust generation	Dust suppression on haul roads and over exposed working areas will be done using water bowsers/hoses or they will be surfaced with molasses	Dust fall out	Monthly (in case of molasses)	Throughout construction period	Site Manager	Captured under 2.1
		Air emissions from equipment/machinery on site during construction	To reduce gaseous emissions from equipment/machinery	Equipment on site will be regularly serviced to ensure their efficiency and minimal exhaust emissions	Number of equipment serviced	Monthly	Throughout construction period	Site Manager	20000
3.5	Water contamination	Increased chances of Ground and Surface water contamination	To minimize water pollution as a result of sanitary waste water during construction	To prevent ground and surface water contamination by waste water/sewerage, portable toilets or secure septic tanks will be provided on site	Number of toilets on site	On-going from Start of clearing activities	Throughout construction period	Site Manager	Captured under 3.3
			To prevent the contamination of water as a result of spills and leakages from machines.	Equipment e.g. trucks will be washed in dedicated wash-bays equipped with impervious surfaces and containment to capture wash offs.	Number of wash bays on site	On-going from Start of clearing activities	Throughout construction period	Site Manager	10000
				Ensure that all employees are trained in handling chemicals/fuels so that spills are minimized despite the nature of the project not involving the use of many chemicals	Number of employees trained	Bi-annually	Throughout construction period	Site Manager	20000
3.6	Waste generation	General/ domestic	To prevent water and soil pollution by	Waste bins shall be provided for the kitchen, offices and areas where generation is likely to be high. Littering	Volume/quantity of waste	Weekly	Throughout construction period	Site Manager	10000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
		waste generation	safe disposal of domestic waste	shall not be acceptable and reminder signs shall be installed to inform workers and visitors that all domestic waste must be thrown in designated waste bins. The waste shall be ultimately disposed of at a ZEMA licensed landfill. Records of the waste disposed of per month shall be maintained.	disposed of per week				
		Industrial /hazardous waste generation	To prevent water and soil pollution by safe disposal of industrial/hazardous waste	Waste generated from the repair, maintenance or service of equipment will be handled, stored and disposed of according to Waste and hazardous Waste Management regulations as provided for in the Environmental Management (Licensing) Regulations of 2013.	Volume/quantity of waste disposed of per week	Weekly	Throughout construction period	Site Manager	Captured above under domestic waste
			To prevent water and soil pollution through safe disposal of sewerage and other forms of waste water	Portable toilets or secure pit latrines will be constructed on site	Number of toilets on site	Bi-annually	Throughout construction period	Site Manager	Captured above under 3.3
<b>4.0. Positive Socio-economic impacts during Operational Phase</b>									
4.1	Employment Creation	Increased number of people in employment in the project area (Employment	To increase employment opportunities for the local people in the area	Priority will be given to the local people. Only skills that will not be available within the local community will be sourced from other areas. All recruitments shall be advertised in the local community and a database shall be	Number of locals employed/contracted	On-going	Throughout operation period Throughout operation period	Human Resource Manager	50000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
		creation and contribution to poverty reduction)		developed for available local people with special skills. Offer competitive salaries, wages and contract terms to employees, contractors and suppliers of goods and services.			Throughout operation period		
4.2	Local and National Economy	Increased Support to the local and national economy	To facilitate local participation in business opportunities created by the project (university) To guarantee that all tax due to the government	Wherever possible, goods/raw materials required by the project, will need to be sourced from the locality or from local suppliers. The same will apply to services Local business especially relating to daily consumables required on site shall be promoted. Ensure that all employees working in the facility pay the necessary/applicable taxes	Number of local contractors engaged Amount of money paid to government in form of tax	On-going On-going	Throughout operation period Throughout operation period Throughout operation period	Stock controller/Purchasing Officer Accountant	50000 50000
4.3	Capacity Building	Improved ability of the employed individuals (capacity building and skills development)	To build capacity among local employees	Extra skills acquisition while in employment at the facility will be encouraged. Whenever possible, employees with limited skills will be taught on how to operate simple machinery on site, and other skills that can be useful even after the life of the project.	Number of employees with upgraded skill/positions since joining the project	Annually	Throughout operation period	Human Resource Manager	10000
<b>5.0. Negative Socio-economic impacts during Operational Phase</b>									
5.1	Noise pollution	Increased levels of noise due to trucks transporting	To reduce the noise levels to acceptable standards	Equipment on site will be regularly serviced to ensure optimal efficiency hence reducing noise generation from operations	Number of equipment serviced	Monthly	Throughout operation period	Chief Engineer on site	10000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
		materials increased area population and activities		Drivers will be instructed to refrain from unnecessary gunning of engines and use of pressure horns	Noise levels	Monthly	Throughout operation period	SHE officer	10,000
				Workers on site in noise areas will be given full PPE including ear mufflers	Number of employees given full PPE	Bi-annually	Throughout operation period	SHE officer	10000
5.2	In-migration	Increase in the local population	To reduce pressure on local resources and safeguard the livelihoods of the locals	Mitigating measures will include: i) adoption of selective employment opportunities targeting locals, ii) Ensure adequate facilities are provided for staff such as sanitation facilities.	Number of locals employed	Annually	Throughout operation period	Human Resource Manager	10000
		Increased threat to public security as a result of increase in crime	To improve the security in the area	The influx of the people into the area will undermine the security. The developer will support the construction of a police station in the area to curb crime.	Number of thefts recorded	Annually	Throughout operation period	Security Manager and local Zambia Police	50000
5.3	HIV/AIDS transmission	Increased risk of HIV/AIDS transmission as well as risk of stigmatization and discrimination against	To reduce the incidences of HIV/AIDS transmission	In-migration will expose the community to the non-local people which may lead to the spread of HIV/AIDS and other STIs. Measures to minimize this will include; i) sensitizing staff and communities on the dangers of HIV/AIDS and STIs ii) support local programs by Ministry of Health regarding HIV/AIDS	Number of people sensitized/number of programmes supported	Annually	Throughout operation period	Human Resource Manager and local health workers	20000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
		infected persons		Provision of protection in form of condoms in during awareness campaigns and in suitable places such as ablution blocks	Number of condoms distributed	Annually	Throughout operation period		10000
			To prevent stigmatization and discrimination	Equal opportunities shall be given to all employees and community members regardless of their HIV/AIDS status unless in cases were the condition will not legally, morally and clinically allow	Number of complaints regarding stigmatization and discrimination	Annually	Throughout operation period	Human Resource Manager	10000
				<ul style="list-style-type: none"> <li>Professional counsellors shall be engaged to offer counselling and voluntary testing service</li> <li>Stigmatization and discrimination will not be tolerated</li> </ul>			Throughout operation period		
5.4	Materials receiving and product transportation	Deteriorating traffic conditions leading to increased traffic congestion and accidents	To enhance smooth traffic flow and reduce the number of accidents	Awareness or educational programmes on road safety and courtesy will be conducted to employees and community members in the vicinity of the project area	Number of awareness programmes conducted	Annually	Throughout operation period	Human Resources Manager	50000
				Allocate sufficient parking space for trucks delivering materials to the facility	Area of parking lot	On-going	Throughout operation period	SHE officer	20000
<b>6.0. Negative impacts on the Biophysical environment during operation phase</b>									
6.1	Materials (fuel and other	Increased risk of soil contamination	To prevent soil contamination	Parking lot for transportation vehicles/trucks will be paved	Area of parking lot paved	Annually	Throughout operation period	SHE officer	20000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
	inputs) receiving	by oil, fuel and other hydraulic leaks/spillages from parked trucks on site	by leaks from trucks	Management will ensure that all trucks doing deliveries to and from the facility are well maintained to reduce the risk of leaks or spillages	Number of vehicles serviced in the facility workshop	Monthly	Throughout operation period	Engineering Manager	10,000
				Oil, grease and fuels spill kits will be provided and conveniently placed/located in locations near parking lots	Number of spill kits on site	Annually	Throughout operation period	SHE officer	10,000
		Increased risk of air contamination by exhaust fumes from trucks/delivery vehicles	To minimize air contamination by exhaust fumes from trucks/delivery vehicles	Drivers will be instructed to refrain from unnecessary gunning of engines	Air quality and noise levels from trucks	Monthly	Throughout operation period	SHE officer	10,000
6.2	Storage of oils, fuels and chemicals	Soil and water contamination by oils, fuels and chemicals' leaks spillages	To minimize the risk of soil and water contamination	Storage of oils, fuels and chemicals in the plant will be in banded areas equipped with impervious surfaces	Number of storage bays on site	Annually	Throughout operation period	SHE Officer	50,000
				Employees handling oils, fuels and chemicals will be trained to ensure minimal spillages on site	Reported spills incidents	Monthly	Throughout operation period	SHE Officer	50,000
				Appropriate spill kits will be provided in strategic areas of the plant especially storage and handling areas	Number of spill kits on site	Annually	Throughout operation period	SHE Officer	10,000
6.3	Waste generation	Increased levels of waste generation in	To reduce generation of general waste	Training or awareness programmes on efficient use of resources to reduce waste	Number of employees trained	annually	Throughout operation period	SHE Officer	20,000



No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
		the project area		generation will be conducted to employees					
			To ensure proper disposal of waste	All facilities in the facility will be provided with waste receptacles. These receptacles will be colour coded or labelled to indicate the type waste it is supposed to receive. A licensed waste collector/transporter will be engaged for final disposal	Number of waste receptacles distributed in the plant	Annually	Throughout operation period	SHE Officer	10,000
				Used oil and batteries in the plant will be stored in secured areas awaiting collection by licensed contractors for environmentally friendly final disposal	Volume of used oil and number of used batteries collected from site by contractor	Annually	Throughout operation period	SHE Officer	10,000
			To prevent water and soil pollution through safe disposal of industrial/hazardous waste	Waste generated from the repair, maintenance or service of equipment will be handled, stored and disposed of according to Hazardous Waste Management regulations as provided for in the Environmental Management (Licensing) Regulations of 2013.	Volume/quantity of waste disposed of per week	Weekly	Throughout operation period	SHE Officer	10,000
			To prevent water and soil pollution by waste water and sewerage	Washrooms (Bathrooms and toilets) and kitchen waste water will be channelled in the pipelines connected to the septic tank on site	Number of leaks in the piping system on site	On-going	Throughout operation period	Maintenance and SHE Officer	10,000
6.7	Energy Consumption	Increased energy consumption/stress on energy resources	To manage the consumption of electric and fuel energy consumption to acceptable levels	Employees will be education on the importance of energy conservation and practical steps to take to achieve this	Electric bills/amount of energy consumed	Monthly	Throughout operation period	Electrician on site	30,000
				Regular repairs of electrical equipment and fuel consuming equipment will be	Serviced or repaired equipment	Monthly	Throughout operation period	Electrician and maintenance	30,000

No.	Aspect/ Issue	Impact	Management and Monitoring objective	Mitigation/Enhancement Measures	Performance/ Monitoring indicators	Monitoring Frequency	Time Frame	Responsible person	Annual Monitoring Cost (ZMW)
				done to increase their efficiency and consequently minimize consumption				Site manager on site	
				Records of fuel consumption and stock reconciliation will be kept	Volume of diesel and petrol consumed	Monthly		Stock controller	5,000
6.4	Climate Change	Contribution to greenhouse gases emissions and Climate Change	To reduce Greenhouse gases footprint	Vehicles and equipment that use fossil fuels will be regularly serviced to ensure optimal fuel conversion and minimal exhaust emissions	Number of vehicles/equipment serviced	Monthly	Throughout operation period	Mechanic on site	30,000
				Consumption or wastage of resources whose production directly contribute to GHG emissions or have direct bearing on Climate Change will be discouraged.	Use of respective consumption trends	Monthly	Throughout operation period	Various	20,000
				Awareness campaigns on causes, consequences and mitigation of Climate Change will be done to employees and community members	Number of people educated/sensitized	Annually	Throughout operation period	Various	50,000

**Table 17: Social Management Plan**

<b>ASPECT</b>	<b>Objective to address impact</b>	<b>Mitigation</b>	<b>Responsibility</b>
Good stakeholder Engagement	Compile Stakeholder Identification and analysis	Carry out a stakeholder Identification and analysis	DCEO
	Information disclosure	Communicate information to stakeholders early in the decision making process in ways that are meaningful and accessible	DCEO
	Stakeholder consultation	Plan consultation process	DCEO
	Grievance management	Establish accessible and responsive means for stakeholders to raise concerns and grievances	DCEO
Socio-economic trends	Socio economic impacts	Conduct a baseline study to identify socio-economic trends	DCEO
		Develop plans to mitigate any negative trends	
Social action Plan	Social monitoring programme	develop a social monitoring programme to support effective implementation of the social action plans	Environmental Manager
Retrenchment Plan	Retrenchment Plan	develop a retrenchment Plan to mitigate against the adverse effects of closure of Deco Luck Investments Limited Project operations	CEO
Health care Plan	Public health factors	compile information relating to public health factors that could be impacted by Deco Luck Investments Limited Project operations	Environmental Manager
		Develop plans to mitigate any negative impacts related to Deco Luck Investments Limited Project operations	Environmental Manager
		Construct a clinic for the residents	DCEO
Dust Suppression	Health Factors	Identify areas likely to generate dust	DCEO



## 10.0 ENVIRONMENTAL MONITORING PLANS

Deco Luck Investments Limited will implement an environmental monitoring plan in and around the project site in accordance with the requirements of the Zambian Mining Environmental Regulations. The environmental monitoring will include the following:

- Noise and Vibration
- Air Emissions (Fugitive dust)
- Surface and Ground water;
- Soil conservation
- Wastes handling and disposal
- Hazardous material storage and handling
- Occupational Health Monitoring

The environmental monitoring program will enable the quantification of impacts from project operations and the evaluation of environmental performance. In the event of non-compliance with the statutory limits on effluent discharge and/or air emissions, Deco Luck Investments Limited **will** immediately notify the Zambia Environmental Management Agency (ZEMA). Spills or accidental releases to the environment will be reported as and when they occur. The spill incidents will be reported to ZEMA as they occur. After verification by ZEMA, the spillage will be cleaned up. Annual reports concerning environmental monitoring and performance will be submitted to ZEMA, detailing any modifications made to the environmental monitoring plan.

To mitigate risks and hazards that could occur to operational employees, the following measures will be implemented:

- Provision of adequate and appropriate protective clothing, boots, helmets, gloves, masks, ear plugs and goggles, etc.
- Ensure the employees are dressed adequately for the specified tasks and activities

- Restriction of access to certain areas during mine machinery works.
- Erection of warning signs in dangerous places
- Train the employees on safety measures that include first aid;
- Inform the employees, any contractor and the public of the dangers of entering into areas of operations.

Deco Luck Investments Limited will ensure that the contractors and workforce are made aware of the company's environmental policy and their responsibilities towards achieving the goals of the policy. Deco Luck Investments Limited will ensure that the workers are educated on various safety rules and practices.

Deco Luck Investments Limited will ensure that local people are given priority of employment, subject to availability of the required skills. The company is an 'equal opportunity' employer and in practice, the best applicant for the position will be offered employment. All in all, the local people will be given priority in employment subject to

The Environmental Monitoring Plans contained in this document have been undertaken with a view to minimizing or avoiding adverse environmental impacts and maximizing benefits. It is unlikely that the Deco Luck Investments Limited Project operations will cause significant adverse environmental effects, provided that recommendations, including implementation measures are incorporated. The Environmental monitoring Plan will be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during normal operations and upset conditions. The Environmental Monitoring activities will be based on direct or indirect indicators of the impacts. Monitoring frequency will be sufficient to provide representative data for the parameter being monitored.

Monitoring will be conducted by trained staff that will follow monitoring and record-keeping procedures using properly calibrated and maintained equipment.

Monitoring data will be analysed and reviewed at regular intervals and compared to operating standards so that any necessary corrective actions can be taken.

**Table 18: Environmental Monitoring Plans**

Ref no	What needs to be managed	Objective to address impact	Measures to be taken	Responsibility	Frequency
1	General	To ensure the operations adherence to the EMP and compliance to ZEMA licenses and regulations	Routine inspections and testing, routine environmental records, annual audits and incident reporting will be done	Environmental Manager	quarterly
2	Air quality	To minimize the risk of dust causing air pollution	Air quality measurement to monitor dust levels will be conducted	Environmental Manager	quarterly
3	Ground water quality	To avoid or minimize contamination ground water from point or diffused sources	Ground water quality analysis from all wells and boreholes on site will be monitored routinely to assess potential impacts on the aquifer	Environmental Manager	monthly



4	Surface water quality	To assess potential effects on Chongwe River	Water quality in the Chongwe river will be tested routinely	Environmental Manager	monthly
		To avoid or minimize contamination of surface water from solid waste	The storm drainage systems will be inspected regularly and cleared of waste / blockages	Environmental Manager	Weekly
5	Occupational health and safety	To minimize risks to occupational health	All work areas will be inspected frequently and safety inspection tours will be conducted to ensure that all aspects of health and safety are being observed	Environmental Manager	Weekly
		To minimize risks to occupational health	Risk assessment reports will be produced for appropriate action to be taken	Environmental Manager	Monthly
		To minimize risks to occupational health	A health and safety audit will be undertaken in order	Environmental Manager	Monthly

			to assess the effectiveness of the health and safety policy and Emergency Response Plan, and also to enable continual improvement in the management of health and safety at Deco Luck Investments Limited Project. The Emergency Response Plan will be developed at Commencement		
		To minimize risks to occupational health	Maintenance records for all firefighting equipment will be kept	Environmental Manager	Monthly
6	Public health	To minimize risks of water borne diseases	Waste management facilities will be inspected regularly	Environmental Manager	Weekly

		To minimize risks of water borne diseases	Well and borehole water will be tested routinely	Environmental Manager	Weekly
		To minimize risk of water borne diseases	Storm water drains will be inspected	Environmental Manager	Weekly
7	Hazardous substances	To minimize the risk of hazardous material polluting the environment	Records of Chemical use and effectiveness will be maintained	Environmental Manager	Monthly

## 11.0 AUDITING AND REPORTING PLAN

This section covers the auditing requirements and reporting procedures that will be developed and undertaken in implementing the EMPs.

The purpose of the environmental auditing is to:

- ensure that the EMP is being implemented;
- identify corrective actions where necessary; and
- Assess the effectiveness of previous corrective measures.

The results of the audit will be documented and appropriate actions taken.

### 11.1 Overview of Environmental Auditing Process

The environmental auditing process at Deco Luck Investments Limited Project will be in accordance with accepted practice as set out in ISO 14011 and 14012 standards on environmental auditing and the Mines and Minerals Act Environmental Regulations.

Hence the auditing process will comprise:

1. Determine the scope and objectives of the audit. The scope of the audit refers to the extent and boundaries of the audit. The objectives of the audit relates to the focus or subject of the audit e.g. environmental auditing aimed at establishing compliance with legislation, determining against environmental targets or identifying opportunities for savings
2. Selection of the audit team. The team must possess the overall expertise and experience required to carry out the audit in terms of the scope and objectives. The roles and responsibilities of the members the team must be clarified and agreed on.
3. Planning the audit. This should include the following:
  - Identifying the elements of the organization to be audited
  - Identifying key staff to be interviewed during the course of the audit;

- Identifying information sources and documents that are relevant to the scope and objectives of the audit which need to be reviewed (e.g. operating procedures, incident reports, emergency response plan, environmental permits, environmental expenditure);
- Determining the expected time and duration of the audit and the scheduling of audit activities;
- Determining the schedule of meetings to be held with management (normally an opening meeting at which the audit plan is discussed and closing meeting where preliminary findings are reported); and
- Deciding the completion date for the audit report.

4. Undertaking the audit. This includes the following activities:

- An opening meeting where the scope, objectives and audit plan are reviewed, the timetable is agreed, communication channels are agreed and the timing of the closing meeting is agreed.
- Collection of evidence through interviews, review of documents and observation (site inspection).
- Review of findings by the audit team to determine whether there are cases of non-conformance.
- A closing meeting where preliminary findings are presented to management

5. Preparation of the audit report. The audit report should cover the following:

- The identification of the organization audited;
- The agreed objectives, scope and plan of the audit;
- A list of reference documents reviewed during the course of the audit and or against which the audit is conducted;

- The period covered by the audit and dates when the audit was conducted;
  - The audit team and the role and responsibility of each member;
  - The summary of the audit process including any obstacles encountered;
  - The audit findings and conclusions; and
  - The recommendations for dealing with non-conformance
6. Management review. The audit findings must be reviewed by the management team and where there are cases of non-conformance; corrective action must be implemented in accordance with the audit recommendations.
7. Frequency of auditing. Auditing of compliance with the EMP should be undertaken on a regular basis. Internal audits should be conducted at least bi-annually and an external audit annually. The frequency of auditing should be reviewed by management and altered if warranted. The need for specific audits such as waste audit should be determined on an “as and when required” basis by management.

## 11.2 Auditing and Reporting Requirements

The systematic and documented assessment of the performance of the EMP will be undertaken. The performance assessment will evaluate how the management measures are performing in safeguarding the environment in the manner intended by Deco Luck Investments Limited Project. In order to do this, audits will be undertaken and results reported.

The audits and reports will provide an objective verification to:

- Determine whether there is conformance with the EMP objectives and targets; and
- Establish the effectiveness of the management actions taken in meeting the commitments described in the EMP

The results of these audits will be used to:

- Assess effectiveness of environmental management procedures and to implement corrective action required;
- Evaluate the extent to which objectives and targets are being met and to revise these on the basis of the principle of continuous improvement. Hence once it is demonstrated that targets are consistently being achieved, these will be revised to improve the level of environmental performance; and
- Report on environmental performance formally and informally to ZEMA

## **12.0 EMERGENCY AND PREPAREDNESS RESPONSE PLANNING**

### **12.1 Introduction**

Deco Luck Investments Limited will develop an Emergency and Preparedness Response Plan at commencement of operations. The Emergency preparedness and response plan will aim at maximizing the effectiveness and efficiency of reaction and management of unforeseen events, and therefore minimize the potential magnitude and extent of resulting effects. This will be achieved by ensuring that;

- Emergency research procedures are put in place;
- Personnel are trained in emergency response procedures;
- Emergency resources (i.e., equipment, personnel, vehicles, medical facilities) are readily available; and
- An effective communications and reporting system is in place

### **12.2 Objectives**

The objective of the emergency preparedness and response plan will be to minimize the potential impact of unforeseen events on the environment.

### **12.3 Description**

Emergency preparedness and response is an important component of the ISO 14001 Environmental Management System. These requirements will be incorporated into the emergency response requirements for Deco Luck Investments Limited Project operations. The emergency response plan will be designed as described below.

- Procedure will be established, maintained and implemented for;
  - Identifying potential accidents, environmental incidents and emergency situations;
  - Responding to accidents and emergency situations;
  - Preventing and mitigating environmental impacts that may be associated with accidents and incidents;



- Reporting accidents and emergency situations to the relevant regulatory authorities; and
  - Reporting accidents and emergency situations to the appropriate Deco Luck Investments Limited Project personnel
- The emergency response procedure will be reviewed and revised on a regular basis. An in-depth investigation into the effectiveness of emergency response procedures will be undertaken after the occurrence of accidents or emergency situations.
- Emergency response plans will address:
  - Liaison and interaction with emergency services and regulatory authorities; and
  - Liaison with and assistance to the local community in emergency situations.
- Documented administrative and operational procedures will be prepared to cover all situations where their absence could lead to deviation from the SHE policy
- The emergency response procedures will take into account incidents arising, or likely to arise as consequences of:
  - Abnormal operating conditions; and
  - Accidents or emergency situations
- Formal procedures will be put into place to ensure that a complete and current inventory of all hazardous substances present in the workplace is established.
- All operating procedures will include written instructions to ensure:
  - Safe handling, use and disposal of hazardous substances; and
  - Safe and environmentally sound use of machinery and equipment.
- It will be ensured that up to date Material Data Safety Sheets (MSDS) are available for all hazardous materials that are stored and used on site. Cognisance will be taken of the MSDS information in compiling emergency response procedures for materials handling and storage. Furthermore, it will be ensured that MSDS information is complete and that these documents include details required in terms of the ISO 11014. This means that the following should be provided:
  - Information on the character of the material;

- Information that is critical to know immediately in an emergency (e.g., health treatment requirements, including what to do and more importantly what not to do);
  - Information on action to be taken when a hazardous situation occurs; and
  - Information on the prevention of a hazardous situation.
- A procedure will be put in place to ensure that modifications to the mine infrastructure and its related equipment do not pose further potential negative impact on the environment. This will include written instructions on the hazard studies that need to be conducted. Any design considerations that are made as a result of the hazard studies will be recorded.
- Emergency response procedures will be rehearsed on a regular basis (e.g., through practice exercises -"dry runs"). The results of these rehearsals will be recorded and any shortcomings that are found in the emergency response procedure will be rectified.

## 13.0 CLOSURE AND DECOMMISSIONING

Deco Luck Investments Limited is committed to adhering to the statutory regulation applicable in Zambia. At the end of the operations of the mine, projected after 25 years, all efforts will be made to try and restore the land so that it goes back to status economic viability in terms of agriculture and any other land usage.

### 13.1 Closure Plan

At mine closure, Deco Luck Investments Limited will Endeavour to take measure to restore the disturbed areas. The disturbed areas will include;

- Mine area – shaft, portal tunnel and caving area
- General offices and other administrative facilities
- Stores and warehouses
- Housing units
- OB Dump
- Other facilities that will be added in the forerunning years

The closure plans are to demolish the infrastructures that will be of no use in future. Those structures like houses, offices that can be used can be donated to the local council or needy sectors of the society.

The Adit will have to be capped with concrete caps to a specified depth (10m) and barricade signs posted.

The demolished building concrete pads will be broken re-vegetation done. The broken concrete will dumped at designated dump site.

For Rock dumps re-vegetation will be encouraged.

The project cost will be around US\$2.0 million (estimate only). The values will be given after the infrastructures have been erected.

### **13.2 Decommissioning**

It is a requirement that the developer hands back the land to the Government after carrying out the land restoration. Deco Luck Investments Limited will carry out restoration as elaborated in the in the closure plan. The site will be monitored for an additional 5years and then will be handed over to the Government.

## **14.0 CONCLUSION AND RECOMMENDATIONS**

The development will have little effect on the natural biodiversity as most of the area to be developed is already under exotic species cultivation and most other areas are already heavily influenced by human activities.

The animal life in the areas to be developed is also found in the areas which won't be affected.

The project will have positive impact on the social aspect as a lot of Zambians will be employed and the Government and Local council will earn considerable revenue over the period the project will run hence it will go a long way in alleviating poverty levels in the country and improving lives of the local population and Zambia at large.

Based on the ESIA process carried out for this project, the consultant has made the following recommendations:

- The proposed project should be implemented in compliance with the regulatory framework and corporate requirements as highlighted in the report.
- The developer should consider all identified potential positive and negative impacts and implement all the proposed enhancement and mitigation measures respectively.

- The developer should implement the ESMP and the EMP provided in all the phases of the proposed project.
- The Zambia Environmental Management Agency should consider and grant approval to the proposed project.

**15.0 DECLARATION OF AUTHENTICITY**

I..... on behalf of Deco Luck Investments Limited confirm that this completed Environmental Impact Assessment for the Proposed Mining Project in Chiawa Area of Kafue District by Deco Luck Investments Limited through its consultants, and that the information provided herein is correct and true to the best of my knowledge.

**Signed:**

---

**Name:**

---

**Title:**

---

**Date:**

---

## 16.0 REFERENCES

- 1 The Geology of the Northern Rhodesian Copperbelt, F. Mendelson, 1961, P340
- 2 Kafue Electoral polling district map
- 3 Google Earth, Zambia maps- Internet
- 4 Data KKIA weather station
- 5 Internet website for National assembly of the Republic of Zambia

## APPENDICES

### 1. License ownership transfer:

#### AGREEMENT OF MINING LICENSE TRANSFER

This Agreement (the "Agreement") is entered into on this date of 8/06/2022 by and between:

**Party A:** DECO LUCK INVESTMENTS LIMITED

**Party B:** SINOMINE RESOURCE GEOLOGICAL ENGINEERING COMPANY LTD

#### The Scope of “The Contract”

Whereas Party B agrees to transfer the ownership of its large scale exploration license with [LICENCE NO. 26434-HQ-LEL] to Party A (or any company designated by Party A during the term of the contract). The following key points are hereby agreed upon:

#### Terms and Conditions:

- (1) Party A shall pay a deposit of K50,000 Kwacha (Fifty Thousand Kwacha Only) to Party B upon signing the agreement. Party B allows Party A to commence exploration activities. During the exploration period, Party B shall not interfere with Party A's activities and shall provide all necessary coordination with relevant government departments.
- (2) If Party A determines that the mining area has purchasing value after exploration, Party A shall inform Party B, and Party B shall transfer the mining rights to Party A (or the designated company of Party A) as agreed. The total amount of purchasing the same license is k2,000,000.00 (Two Million Kwacha Only), so the previously paid deposit of 50,000 Kwacha shall be considered as a prepayment, and Party A shall pay the remaining balance of 1,950,000 Kwacha to Party B after the completion of the ownership according to the agreement.
- (3) If Party A determines that the mining area does not have purchasing value after exploration, this agreement shall terminate automatically. Party B shall not refund the deposit or any expenses incurred during the exploration, and Party A shall no longer pay the remaining amount as stipulated in the contract.
- (4) ) Within twenty days after obtaining the necessary quantity of samples and obtaining assay results during Party A's exploration, Party A shall notify Party B whether the mining rights have purchasing value or not. Party A undertakes that the exploration period shall not exceed 180 days from the date of signing the contract.

#### Obligations of Party A:

- (1) On the day of contract signing, Party A shall pay Party B a cash deposit of 50,000 Kwacha.
- (2) Party A must commence exploration work within one year from the date of contract signing.

- (3) Party A shall bear the expenses incurred during the exploration work.
- (4) Upon completion of the transfer of mining rights, Party A must fully pay the remaining amount as agreed in the contract to Party B.

### Obligations of Party B:

- (1) During the term of the contract, Party B shall not interfere with Party A's exploration work and shall provide necessary assistance such as but not limited to providing all necessary document of license 26434-HQ-LEL, PACRA and so on.
- (2) During the term of the contract, Party B shall ensure that the owner of the mining rights remains unchanged and shall not transfer the mining rights stated in the contract for a second time or use them as collateral or do a finance guarantee and financial leasing .
- (3) Upon Party A's confirmation of the purchase intention, Party B must immediately start the transfer procedures for the mining rights, changing the ownership of the mining rights to Party A (or the designated company of Party A), without deliberate delays. Party A shall fully pay the remaining amount as agreed in the contract to Party B after the completion of changing the ownership.

### Breach:

- (1) In the event of Party A's breach, Party B has the right to evict Party A from the mining area and terminate the contract.
- (2) In the event of Party B's breach, Party B must refund the deposit paid by Party A and compensate Party A for three times the amount of expenses incurred during Party A's exploration activities as a loss.

### Additional Clause:

Upon completion of the mining rights transfer and full payment of the remaining amount, if Party B Assists Party A (or the newly designated mining license holding company of Party A) in processing the mining license, Party A undertakes to pay an additional 500,000 Kwacha to Party B as remuneration once the mining license processing is completed.

This agreement is drafted in duplicate, with each party holding one copy.

### Party A: DEOLUCK INVESTMENTS LTD

Signature: 张凤国 Date: 2022/06/08

### Party B: SINOMINE RESOURCE GEOLOGICAL ENGINEERING COMPANY LIMITED

Signature: 王朝磊 Date: 2022/06/08



2. Receipt of payment for licence:

26434 - HQ - LFL 2

**REPUBLIC OF ZAMBIA - GENERAL RECEIPT N° C 3661.366**

**N** TRIPLICATE  
Accounts Form 40

Original: To payer  
Duplicate: To support Cash Account  
Triplicate: File Copy  
Quadruplicate: To be retained for Audit

**STATION** KUSAKA

**Date** 06 04 2020

**RECEIVED from** SWOONINE RESOURCE & GEOLOGICAL ENGINEERING LTD

**The sum of: Kwacha** THREE THOUSAND ONLY

**ngwee** K3000 -00

**For the credit of** 122 -00

**Details and references** PAYMENT FOR APPLICATION FOR A MINING PERMITS LARGE SCALE EXPLOITATION LICENSE

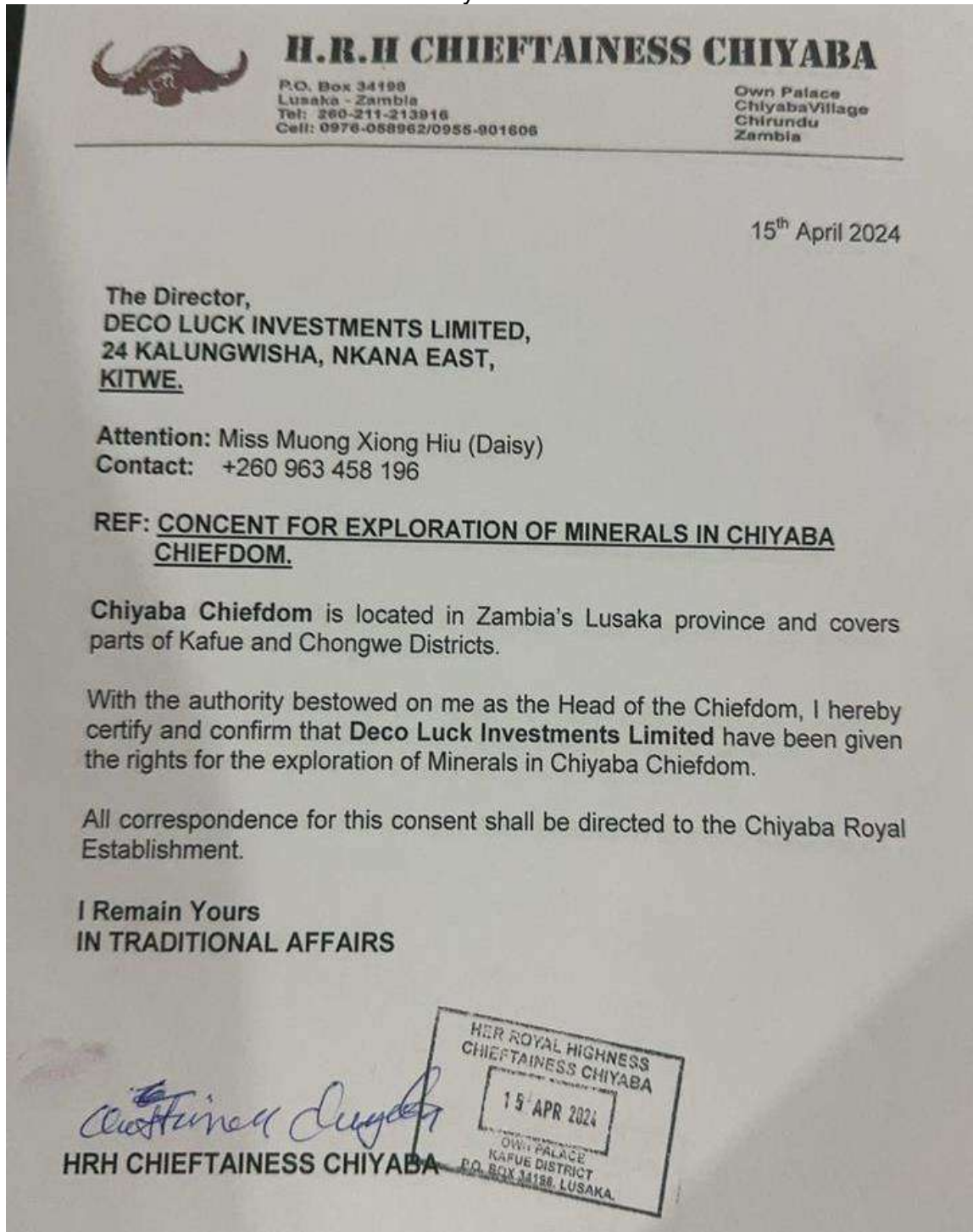
REPUBLIC OF ZAMBIA  
MINES AND MINERALS DEVELOPMENT  
CASHIER'S OFFICE  
**08 APR 2020**  
HO. BOX 31409  
LUSAKA

**Signature** *[Handwritten Signature]*

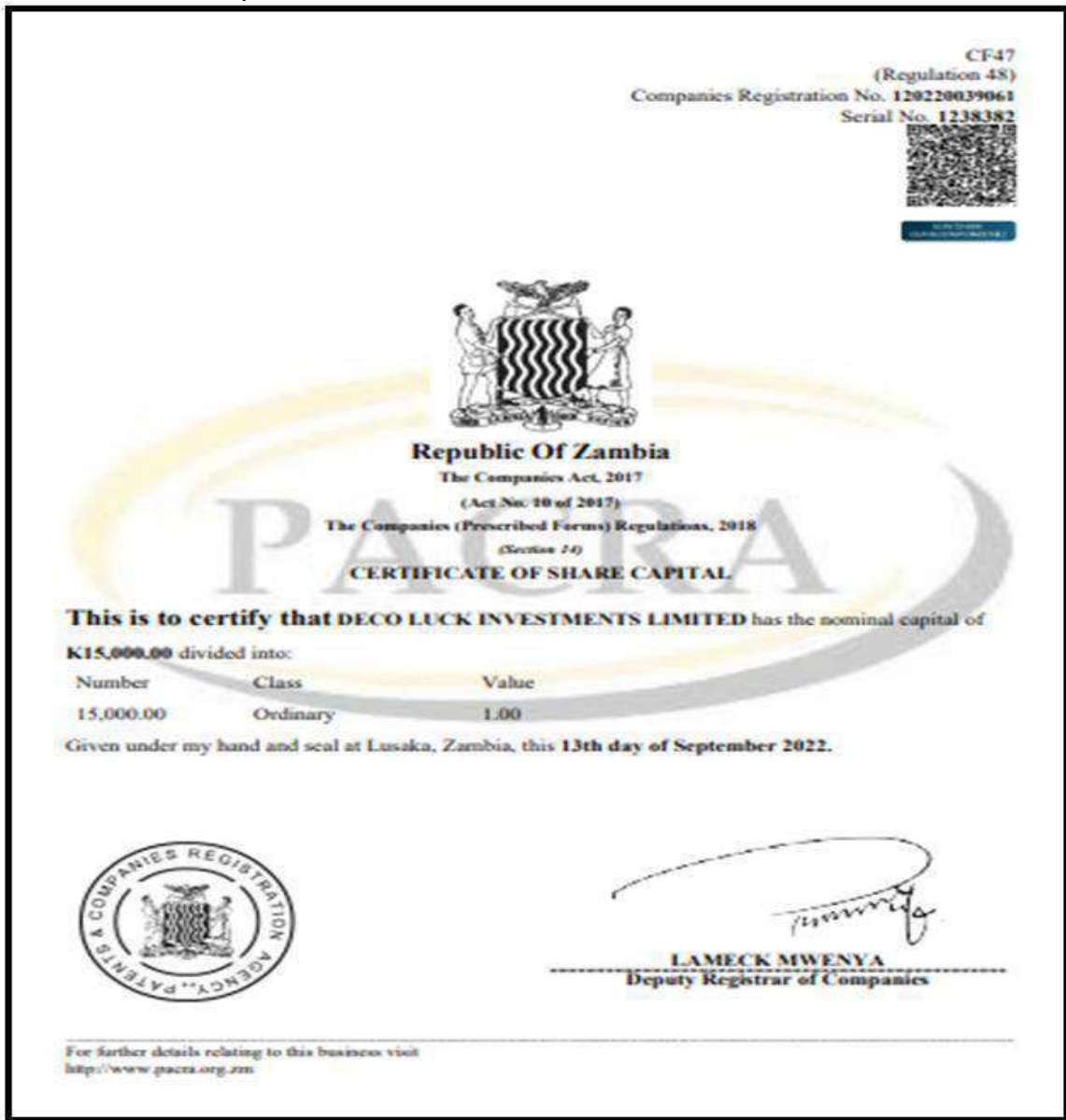
**Designation** A/A

Use ink only. No erasures allowed.

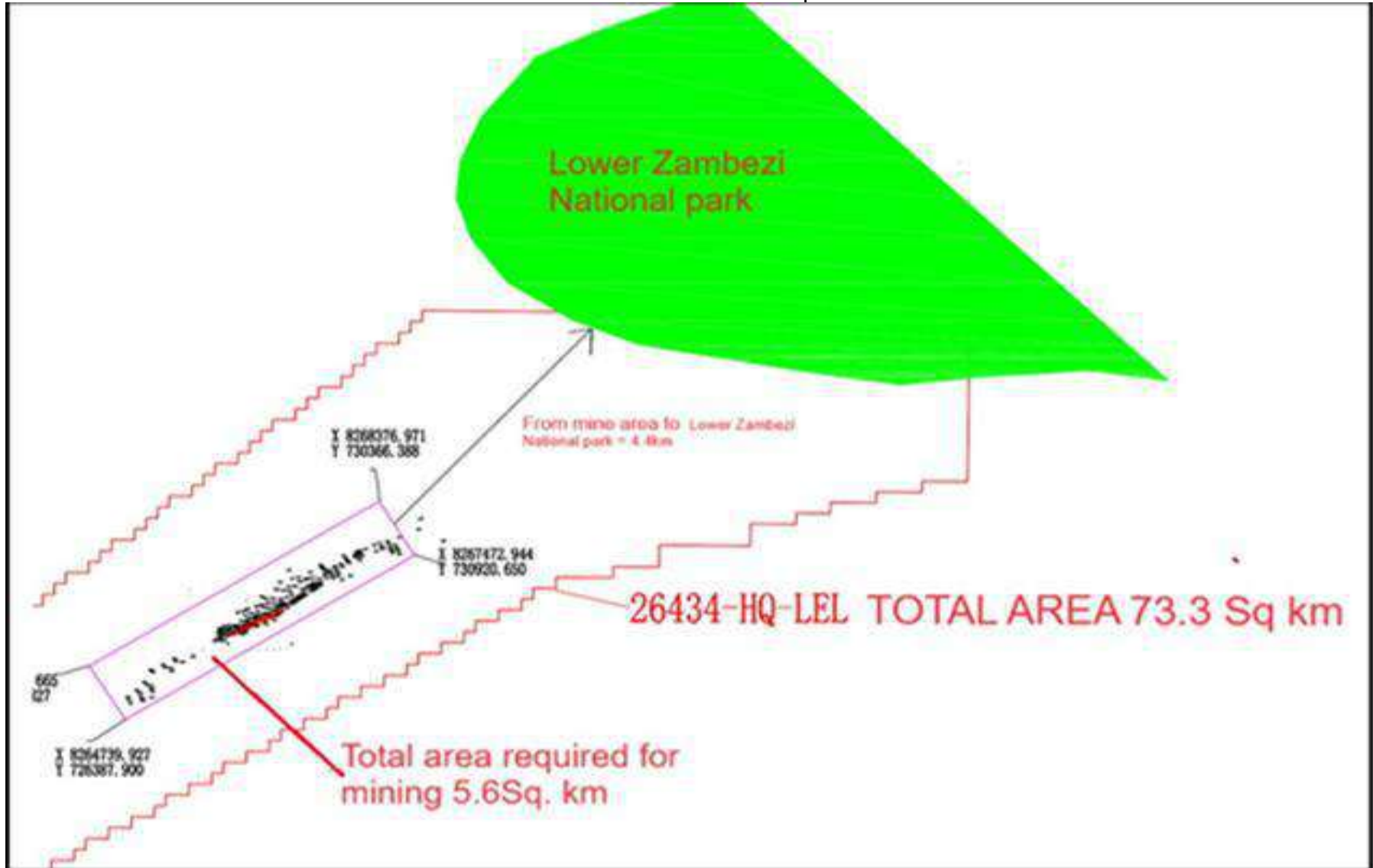
3. Consent letter from Chieftainess Chiyaba:



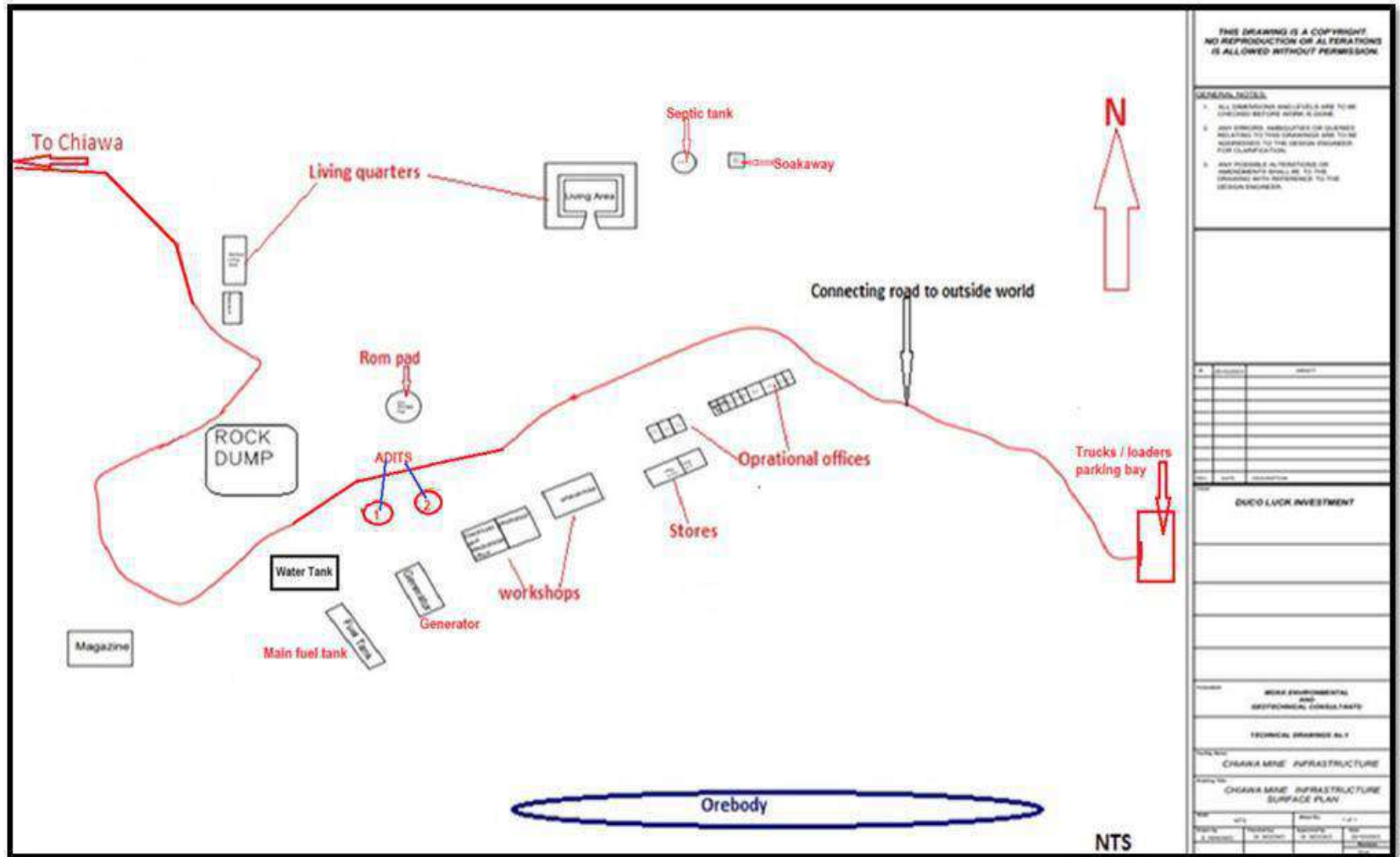
4. Certificate of incorporation for DECO LUCK:




5. Actual area to be mined and its relation to Lower Zambezi national park:



6. Site sketch plan:



7. No objection from ZEMA:



## ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY

**Head Office**  
 Corner of Church & Suez Roads  
 P.O Box 35131  
 Lusaka, Zambia  
 Tel: +260-211-254023/254059

All Correspondence to be addressed to  
**The Director General**

✉ [info@zema.org.zm](mailto:info@zema.org.zm) 🌐 [www.zema.org.zm](http://www.zema.org.zm)

*In reply please quote*  
**ZEMA/INS/101/04/1**  
*No:*

May 28, 2024

The Director  
 Deco Luck Investments Limited  
 24 Kalungwisha, Nkana East,  
**KITWE.**

**Attn:** Miss Huang Xiong Hui (Daisy)  
**Contact +260 963 458 196**  
**Email: [1062286@gg.com](mailto:1062286@gg.com)**

Dear Sir/Madam,


**REF: ENVIRONMENTAL IMPACT STATEMENT FOR THE THE PROPOSED COPPER MINING PROJECT ON LICENSE NO.26434-HQ-LEL IN CHIAWA AREA OF KAFUE DISTRICT BY DECO LUCK INVESTMENTS LIMITED.**

The Zambia Environmental Management Agency ("ZEMA") is in receipt of your draft Environmental Impact Statement ("EIS") report for the above captioned project submitted in accordance with the provisions of the Environmental Management Act No.12 of 2011 as read together with the Environmental Protection and Pollution Control (Environmental Impact Assessment) Regulations Statutory Instrument No. 78 of 1997.

ZEMA has **no objection** with you proceeding to submit final copies of the report (12 hard copies and a soft copy) **on condition** that you collect the fees assessment form and pay the required statutory fee.

Do not hesitate to contact the undersigned should there be any issue needing our attention.

Yours faithfully,



**Christopher Kanema**  
 Acting Director Operations  
**For/Director General**  
**ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY**

**Northern Regional Office**  
 P.O Box 71302  
 Tel: +260-212-621043/610407


**Solwezi**  
 P.O Box 110134  
 Tel: +260-218-821297

**Livinstone**  
 P.O Box 60195  
 Tel: +260-213-321279

**Chipata**  
 P.O Box 510527  
 Tel: +260 216-221234

**Chirundu**  
 P.O Box CRU 31 Chirundu  
 Tel: +260-211-515261

8. Review fee assessment:



**ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY**  
**THE ENVIRONMENTAL MANAGEMENT ACT NO.12 OF 2011 OF THE LAWS OF ZAMBIA**  
**STATUTORY FEES ASSESSMENT FORM**  
 Valid for 30 days from date of issue  
 Corner Suez / Church Road-Box 35131-Lusaka **Nº 15839**  
 E-mail: info@zema.org.zm  
 Tel: +260 211 254130, +260 211 254023, +260 211 254059  
 Fax: +260 21126858 / 254 164

**FACILITY'S DETAILS:** Deco Luck Investment Coils Limited  
 Dist: Kafue  
 DISTRICT: Kafue ZONE: TEL: 0963458196

NO.	Description/Type of Licence	Class	Unit Fee	Amount (ZMK)
	Being an Review fees for the proposed underground copper mines placed in Chief Chiswaa Area, Kafue District under Licence No. 26434-Hq-151 by Deco Luck Investment Limited		1,083,329	433,329.60
<b>TOTAL</b>				<b>433,329.60</b>

NOTE: 1 Fee unit=K0.30 Subject to prevailing statutory Instrument by GRZ


**PREPARED BY:** *[Signature]*  
**DESIGNATION:** Inspector  
**SIGNATURE:** *[Signature]*  
**DATE:** 20/05/2022

**REVIEWED BY:** *[Signature]*  
**DESIGNATION:** *[Signature]*  
**SIGNATURE:** *[Signature]*  
**DATE:** 22/05/2022


**APPROVED BY:** *[Signature]*  
**DESIGNATION:** *[Signature]*  
**SIGNATURE:** *[Signature]*  
**DATE:** 29/05/2022

**RECEIVED BY:** \_\_\_\_\_ **DATE:** \_\_\_\_\_ **SIGNATURE:** \_\_\_\_\_

Account name : MOF Appropriation in Aid Reverse Transit Account  
 Bank name : ZANACO  
 Account No. : 5888372300103  
 Branch name : Lusaka Business Centre  
 Swift Code : FNCOZMLU  
 Sort code : 018005  
 Narration : 053 001051 122071 (Indicate Company Name)



9. Review fee invoice:



**ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY**


Corner Suez/Church Roads P.O. Box 35131 Lusaka, Zambia  
 Telephone Numbers: Head Office: +260 211 254130, +260 211 254023 / 59, +260 211 254164, +260 211 256658  
 Regional Office, Jacaranda Road P.O. Box 7, 302 Ndola, Zambia  
 Telephone: +260 212 621048  
 Livingstone Office Plot No. 555, Junction of Obote / Nehru Roads P.O. Box 60195, Livingstone  
 Telephone: +260 32 521 297

**INVOICE NO 33632**

To: Deco Luck Investments Limited  
Plot 24 Kaly  
Kitwe.

Date: 30.05.2024

Quantity	Description	Unit Price	ZMW	Value
	Being EA Review fee for the proposed underground Copper mining project in Chief Chisasa area, Kafue District under license No. 26434-HQ - set by Deco Luck Investment Ltd.	108324		4933329.60
<b>TOTAL ZMW</b>				<b>4933329.60</b>



Prepared by: [Signature] Date: 30/05/2024

1. White: Client 2. Yellow: Accounts 3. Blue: Inspection 4. Pink: Book

Printed By: Pric-Print Ltd.



10. Review fee payment:

**REPUBLIC OF ZAMBIA - GENERAL RECEIPT N° G 1098308**

**STATION** Lema Chirundu **N ORIGINAL**  
Accounts Form 40

**Date** 30/05/2024  
Original: To payer  
Duplicate: To support Cash Account  
Triplicate: File Copy  
Quadruplicate: To be retained for audit

**RECEIVED from** Deco Luck Investments Ltd

**The sum of Kwacha** Four Hundred thirty three thousand  
three hundred and twenty  
nine **K 433 329.60**  
more 60/100 only

**For the credit of** Site office fees

**Details and references** FA Review fees - Invoice  
no 133622  
Cash dep 30/05/24

**Signature** [Signature]  
**Designation** A/Accountant

**PAID**  
OFFICIAL STAMP  
30 MAY 2024  
ACCO  
PO BOX 511

Use ink only. No erasures allowed.