

31/03/25

**DRAFT ENVIRONMENTAL  
IMPACT STATEMENT FOR THE  
PROPOSED WATER  
ABSTRACTION & PIPELINE  
PROJECT FOR THE THERMAL  
POWER PLANT IN SIAMEJA  
AZILUNDU AREA OF SENIOR  
CHIEF MWEEMBA'S  
CHIEFDOM OF SINAZONGWE  
DISTRICT BY EVER GREAT**

**PREPARED BY:**



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## **EXECUTIVE SUMMARY**

Ever Great Energy Company Limited is a Zambian owned private Company incorporated in January 2024. However, the directors of the company have vast experience in business and the mining sector.

Zambia's main hydroelectric power facilities are the Kariba North Bank Power Station (1,080 MW), Kafue Gorge Power Station (980MW), Kafue Gorge Lower Power Station (750 MW), Victoria Falls Power Station (108 MW), Lunsemfwa Hydro Power Station (56 MW), and the Itezhi Tezhi Hydro Power Station (120 MW). Maamba Collieries Limited operates Zambia's largest IPP, a coal-fired thermal power plant commissioned in 2016, which generates up to 300 MW. From the information given above, it can be noted that the country heavily relies on hydroelectric power which accounts for about 83% of installed generation capacity, and the changes in the climate (drought) has often greatly reduced water levels in reservoir dams, leading to a severe decrease in electricity generation. The installed generation capacity in Zambia is **3356.6 MW**.

The installed capacity comprises of 83 percent of hydro, 9 percent of coal, 5 percent of heavy fuel oil and 3 percent solar PV. However, the country is currently facing a power deficit due to the poor rainfall in the 2023-2024 rain season. Therefore, to mitigate this, other alternatives have been engaged by different stakeholders such as use of solar, thermal power plants and generators. The country has been endowed with mineral resources such as coal which has been underutilised. Therefore, in trying to help meet the power demand in the country, Ever Great Energy Company Limited is proposing to set up a Water Abstraction Pipe Line from lake Kariba in Dengeza area to be used in power generation at the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Senior Chief Mweemba's Chiefdom, Siameja Azilundu Area of Sinazongwe district. The project is at a total cost of **US\$30,000,000**.

In line with the provisions of the Environmental Management (Amendment) Act No. 8 of 2023 and the Environmental Impact Assessment Regulations SI No. 28 of 1997, an Environmental and Social Impact Assessment (ESIA) for the proposed thermal power plant project by Ever Great Energy Company Limited has been prepared and the company has engaged Tsalach Global Limited to undertake the ESIA study on their behalf. The ESIA of the project will involve incorporating views, concerns and contributions from interested and affected parties (stakeholders). Site location suitability studies for the project within the project area and ecological surveys of the project area will be conducted to determine the feasible design of the proposed project.

### Project Location

The proposed project area falls under Sinazongwe District where the proposed Thermal Power Plant will be constructed. The project site is located in Siameja azilundu village and Dengeza village in Senior Chief Mweemba's Chiefdom in Sinazongwe District about 124km South of Sinazongwe CBD. Access to the site is via the D775 (Batoka-Maamba) road which branches off from Batoka Junction onto a gravel road (bottom road) just after the check point going into Maamba town. The starting point where the abstraction will be conducted is at the Lake Kariba in Dengeza Area and the end point being the Thermal Power Plant location. Below are the project site coordinates of the pipe line route;

No.	Latitudes	Longitudes
<b>Starting Point</b>		
	17°41'22.39"S	27°10'10.73"E
<b>Ending Point</b>		
1.	17°37'24.25"S	27°7'0.08"E
2.	17°37'45.61"S	27°5'2.01"E
3.	17°37'47.20"S	27°0'43.31"E

### Project Description

Ever Great Energy Company Limited is proposing abstract water and to set up a Water abstraction Pipeline that will channell water from lake Kariba in Dengeza area to the 600MW thermal power plant in Siameja Azilundu area within Senior Chief Mweemba's Chiefdom of Sinazongwe District.

The main objective of the project is to abstract water from the Kariba dam in Dengenza area which will be used to generate electricity at the thermal power plant, later transmitted to Muzuma substation and then supplied to consumers by the Zambia Electricity Supply Corporation Limited (ZESCO). The company is proposing to set up a Water abstraction Pipe line covering a distance of approximately 24km from Lake Kariba in Dengeza village to the thermal plant in Azilundu Siameja area. The pipe will be made of metal with a diameter of 30cm which will be pumping 2500 m<sup>3</sup>/h and 3 pumps from source to the water storage area at the thermal plant. The pumps will have the pumping power of 2500 torque.

The proposed Water Abstraction Pipe Line will comprise of the following components:

- Shore water intake pumping station at Lake Kariba (22m x 8.5m excluding the intake head);
- Security house;
- Pipes;
- Valves; and

- Power backup Solar and generator.

Below is a summary description of the Water abstraction process:

Water pumping from Lake Kariba will involve a pump using mechanisms like impellers to create a pressure difference, drawing water in through a suction phase and pushing it out through a discharge phase, ultimately moving the water to its destination which is the power plant through the pipeline. The pump features which are often utilized within the power generation industry include;

- i. Variable Speed Drive – to accommodate multiple duty points and variations in demand.
- ii. Magnetic Drive – to eliminate the need for process seals which may leak
- iii. Relief Valves – to prevent damage to pumps but also excess system pressures
- iv. Wide viscosity range handling particularly if Crude Oil is handled which can vary significantly with temperature.

Long service intervals ensuring pumps experience little downtime and maintenance can be scheduled for during plant shutdown

### **Project Objectives and Benefits**

The sole objective of the proposed project is to abstract water and set up a pipeline from lake Kariba in Dengeza area to the Thermal Power Plant in Siameja Azilundu which will be generating 600MW. The project will improve the country's economy owing to the fact that most companies and industries in the country rely wholly on electricity to fully operate to their maximum. The specific objectives of the project are as follows:

- To build a reliable water supply system to support the power plant electricity generation process;
- To abstract raw water from lake kariba and convey it to the thermal power plant;
- To provide an adequate and consistent water supply to meet the demands of a power plant operation;
- To increase the capacity and maintain the reliability of the power generation system to contribute toward meeting the electricity demand within the country;
- To contribute to the alleviation of power shortage challenges in the country;
- Contributing to the diversification of the developers wealthy creation;

- Contribute to enhancing the nation's economy through paying of taxes;
- Contributing to infrastructural development such as road rehabilitation and construction of new roads to inaccessible areas;
- Contributing to the Local Community Development;
- Improved quality of life for local people due to a steady income that will come in form of wages; and
- Improved competencies in construction for local people employed during the construction of various activities at the project area.

### **Shareholders**

Ever Great Energy Company Limited shareholders are United Capital Fertilizer Zambia Company Limited with 50% stake in the company and Wonderful Group of Companies Limited with 50 % stake.

### **Project Implementation Date and Cost of the Project**

The project is scheduled to be implemented in the first quarter of 2026 with its Lifespan being estimated to last as long as it is economically viable. The total cost of the project is **US\$ 30,000,000**.

### **Regulatory framework and corporate requirements**

A number of local and international environmental management and protection Acts and relevant to the implementation of the Water abstraction pipeline project will be reviewed before project implementation. Some of these legislations include:

- i. The Environmental Management (Amendment) Act No. 8 of 2023 as read together with the EMA No. 12 of 2011;
- ii. The Environmental Impact Assessment (EIA) Regulations, SI 28 of 1997;
- iii. Environmental Management (Licensing) Regulations, SI No. 112 of 2013;
- iv. The Water Resources Management Act, No. 21 of 2011;
- v. The Fisheries Act No. 22 of 2011;
- vi. The Forest Act No. 4 of 2015;
- vii. The Pneumoconiosis Act No. 13 Of 1994;
- viii. The Zambia Wildlife Act No.14 of 2015;
- ix. The National Heritage Conservation Act (CAP 173);
- x. Local Government Act, No. 2 of 2019;
- xi. The Land and Land Acquisition Act of 1995;
- xii. Zambia Development Agency Act No. 11 Of 2006;

- xiii. The Chief's Act No. 13 of 1994;
- xiv. The Solid Waste Regulation and Management Act No. 20 of 2018;
- xv. The Explosives Act (CAP 115); and
- xvi. The Public Health (infected Areas) Coronavirus Disease) Regulations, 2020, Statutory Instruments 21 and 22.

Zambia is a signatory and a ratified party to a number of international conventions. Though most of these agreements are non-committal, they are very vital in ensuring that individual countries operate while conscious of the locally but think globally. The following are some of the conventions that relate to the proposed project:

- i. United Nations Framework Convention on Climate Change Ratified 1997 UN-FCCC;
- ii. Convention on International Trade in Endangered Species of Wild Fauna and Flora Ratified: 1975;
- iii. UN Convention on Biological Diversity (1992);
- iv. Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment Due to Air Pollution; and
- v. Convention on Control of Trans boundary Movements of Hazardous Wastes and their Disposal (1992).

## **Analysis of Project Alternatives**

### **Pipeline route Alternative**

#### ***Dengeza route or Kafwambila route***

The two options considered included laying of water abstraction pipes through Dengeza route from Lake Kariba through Dengeza to the power plant or laying of water abstraction pipes through Kafwambila route from Lake Kariba through Kafwambila to the power plant.

Developing the project through Kafwambila route from Lake Kariba through Kafwambila to the power plant will be a longer route and has a lot of settlements therefore, the most preferred route is through Dengeza.

### **Pipe types Alternatives**

Plastic pipes or Metal Pipes

When considering piping for water abstraction in thermal power plants, the choice between plastic and metal involves several factors.

The Developer preferred using metallic pipes as this is only a Water abstraction Pipe line project not a distribution project and it is a cost effective for this type of Project.

### **Pipe Laying Method alternatives**

Underground or Surface (both will be used were possible)

The Developer preferred laying the pipes both Underground and Surface because of the terrain.

### **Water Supply Alternatives**

Three alternatives were considered for water supply as follows:

Groundwater abstraction or Surface water abstraction

1. Ground water abstraction – the major source in the area is ground water. Project area has high ground water potential. This option would involve the developer drilling boreholes and managing them. And this was the preferred option for the site preparation and construction activities.
2. Water and Sewerage Company - This meant connecting to the nearest utility company. There is however, no Water and Sewerage Company line within the project area. Therefore, this option was not opted by the developer.
3. Water abstraction from the nearest stream or river – The nearest water body is the lake Kariba which will be used during the operation stage for all the power plant processes.

Therefore, the developer will use both groundwater and surface water abstraction at different phases of the project.

### **Waste Management alternative**

Creating a dumpsite or using bins to be emptied regularly by a licenced company or incineration of the waste. This option is not preferred because incineration is not environmentally friendly.

Hence, the option of engaging waste management company to disposal of its waste was preferred by the company to incineration.

### **Sewer Management Alternatives**

Using mobile toilets or using local community toilets nearby/pit latrines

Two sanitation alternatives were considered and these were using mobile toilets or nearby local community toilets. The workforce along the pipeline will use mobile toilets for convenience purposes. These will be regularly emptied and cleaned by a licenced company that will be engaged. Using nearby local community toilets was not preferred because it would be inconveniencing the locals and the number of people using the toilets would increase thereby, creating a health hazard.

### **Do nothing option**

This option was not chosen given the increasing demand for power in the country. The option would not have been commensurate to the scale of current demand and the need for Ever Great Energy Company Limited to contribute to employment creation in the area and the economy of the country.

### **No Project Alternative**

The “No project Option” would negatively affect the development of the project in the country thereby depriving the country of the much-needed benefits that the project will bring about.

### **Baseline Environmental Study**

- **Climate:** The project site lies on 495m above sea level and the climate is considered to be a local steppe climate. The average annual temperature in the project area is 25.5 °C and Precipitation is about 712 mm per year. The winds are generally easterly although there is a northerly at the onset of the rains. The easterly breeze can deteriorate into a storm, locally known as Sanyati and a south-westerly known as Sinazongwe.
- **Geology:** The geological structure of the project area is dominated by northeast-southwest trending rift faulting. The boundary of the rift is formed by a prominent fault escarpment, the junction between the Gwembe Highlands and the Zambezi rift. The Southern boundary is a smaller fault scarp of parallel trend that occurs along the northern side of the Sinazongwe hill area. A variety of rocks, such as biotite schists, quartzite, meta-quartzite, granite was observed in the project area.
- **Topography:** The project site has an altitude of 500 to 600 meters but further decreases in the southeast towards Lake Kariba to 400 to 500 meters. Ecologically the district is divided into three zones: The escarpment area lying at about 1000 to 1200 meters above sea level runs from the Southwest to the Northeast of the district and is characterized by hilly terrain and a sparse population.
- **Vegetation:** The project area has the following tree species; *Brachystegia spiciformis*, *Baikiaea plurijuga*, *Pterocarpus angolensis*, *Burkea africana*, *Erythrophleum africanum*, some *Guibourtia coleosperma* and other Kalahari woodland associated tree species. A total of 19 different tree species were observed in the project area sample plots created. An average total of 111 stems per hectare of trees above 5cm Diameter at Breast Height (Dbh) were measured and assessed in the main plots.

- **Fauna:** Only small mammals were observed during the field survey. The following mammals were sighted within the License area.
  - Rabbits
  - *Paraxereus cepapi* (Bush Squirrel)
  - *Rattus rattus* (**Black Rat**)
  - *Thryonomys swinderianus* (**Cane Rat**)

Interviews and interactions with the local people in license area stated that they have sighted other mammals such as duiker (*Sylvicaapra grimmia*) and Vervet monkey (*Cercoopithecus aethops*) in the area and around the proposed License area.

- **Hydrology:** The project area has a no water bodies except for seasonal streams that were dry by site visit time. Lake Kariba which is more correctly a dam, is the nearest water body to the site located about 20km from site. The Lake Kariba has water held back by a huge dam wall (128m high and spanning 617m across the Kariba Gorge). It is the largest man-made reservoir in the world. The volume of Lake Kariba at full capacity is 177 million tonnes. About 80% of the water entering the Lake is from inflowing Zambezi River and 14% is from small rivers flowing into the Lake and the balance being from rainfall.
- **Soils:** Generally, the soils in project area and Sinazongwe District have disadvantages of having a low water holding capacity, being highly susceptible to erosion and shallow top soil depth. The soils of the plant communities of the project site are dark to grey, heavy, clay- textured, strongly-cracking, the pH of which is between 5.1 and 6.5, well above the critical value of 4.5.
- **Noise Quality:** The highest average noise level reading obtained was 78.8dB (A) near the gravel road passing through the village while the lowest was 43.7dB (A). The highest noise level recorded are below the disruptive (85 dB) noise level standard of the International Finance Corporation (IFC) which was the benchmark used in the study.
- **Air Quality:** The air within the proposed area is clean and the ambient air in the project area is good in terms of quality since the area is neither in an environment that would compromise its quality. Dust from unpaved roads and some uncontrolled fires at times cause occasional smoke but it is insignificant to create pollution.
- **Population:** Sinazongwe District is in the Southern Province of Zambia, bounded on the northeast by Gwembe District; on the northwest by Choma District; on the Southwest by Kalomo District; and on the east by Zimbabwe – Zambia boarder along the Lake Kariba. The total

population for Sinazongwe District, as recorded by the 2022 Census, was at 159,055 people. This total population can be divided as 78,251 males and 80,804 for females, representing 49.2 percent and 50.8 percent respectively. The population of Sinazongwe continues to grow, not only in terms of natural growth but by the influx of “outsiders”, attracted to the town for seemingly economic and employments opportunities.

A large proportion of the population comprises valley Tonga people who have settled on the higher ground away from the flooded area of Lake Kariba, formed by construction of the Kariba Dam in the late 1950s. Sinazongwe district has a population density of 33.0 persons per square kilometer and an annual growth rate of 3.8%, 3.9% for males and 3.7% for females.

- **Economic Activities:** Due to poor, sandy soils, the region has limited production potential for agriculture. The growing season is short, annual rainfall is less than 800 mm per annum, and temperatures tend to be higher than elsewhere in the country. These conditions are most suitable for subsistence farming of drought-tolerant, short-season crops such as pearl millet, sorghum, sesame, and cotton. Maize production potential is low, but households grow it as it is the most preferred staple food. Landholdings are low, but conditions are favorable for keeping of small ruminants, mainly goats. The valleys are a habitat for Tsetse flies, especially in areas with national parks, which limits the keeping of cattle.
- Livelihoods in the region emphasize cereal production, fishing along main rivers, and tourism in parks and lakes located within the region. Bream caught is normally dried and sold to travelling marketeers. Marketeers travel from Lusaka and the Copperbelt to gather the dry fish.
- The area is prone to droughts and flooding, resulting in significant variation in agricultural production. The quantity and quality of market infrastructure and general physical access within the zone are generally less well developed than in other parts of the country. Agriculture and livestock production, though important, are complementary activities in the area. The main crops include sorghum, pearl millet, maize, and sweet potatoes. The environment is not suitable for maize, whose production is limited. The area has a relatively shorter growing period of 80 to 100 days between the rainy months of November and March.
- **Social Services and Amenities:** The proposed site has no social amenities within its boundaries. The project area is a peninsula with the

surrounding communities, similarly not being serviced by any social amenities. Schools in such areas are generally distant.

### **Project Potential Impacts**

The proposed water abstraction pipeline project has potential positive and negative environmental and social impacts.

### **Positive Social-Economic Impacts**

The development of this area and construction activities described in this report will lead to numerous positive social impacts during the various phases of the project such as;

- Increase in employment for people in Sinazongwe district and locals will be prioritized;
- The pipeline offers a resilient and dependable water source for the power generation process;
- The pipeline will help save time as it will eliminate the need for the developer to spend significant time collecting and transporting water from the lake.
- The project will help provide a steady water supply is essential for energy generation thereby, supporting job creation and local economic growth.
- A closed water pipeline system helps reduce water losses during water transmission from the source thereby, ensuring efficient management of the water resource.
- Increased revenue for the central government through co-operates taxes and license fees.
- The project will improve the livelihood standards of the local people through multiplier effects. Major activities will include supply of foodstuffs and services to workers and the company. To hence this the developer will buy foodstuffs and services from local suppliers unless those that cannot be found in the area.

### **Enhancement Of Positive Impacts**

Enhancement measures for these impacts will include:

- Sustained plant and business operation together with payment of all applicable taxes and levies;
- Improve salaries and conditions of service for all staff;
- Prioritizing offering jobs opportunities and contracts to surrounding villages residents and Zambian companies respectively;
- Employing cost effective production systems without compromising quality.

The proposed project for the thermal power plant has potential environmental and social impacts. The following are some of the potential negative impacts that were identified during the ESIA study:

### **Negative Impacts**

- **Air Quality Impacts:** Site clearing operations for land preparation is characteristic of dust emission. It also involves trenching, excavations, movement of vehicles and cut and fill activities, which all lead to dust emissions with the potential to disturb the local air quality. The vehicles and machines used on the site during the construction stage will have an impact on air quality.
- **Impacts on Water Resources:** Lowering of water levels due to potential excessive water abstraction, thereby causing harm to flora and fauna. Risk of Groundwater and surface water contamination due to construction debris, oil leakages and accidental Spillages which have the potential to pollute groundwater as well as surface water. The process of water abstraction itself may increase water salinity.
- **Impacts on Biodiversity and Vegetation:** Vegetation and Habitat Loss due to the clearing of land for the pipeline which will disrupt the ecosystem.
- **Impact on Land and Soil:** Increased soil erosion, compaction and sedimentation induced by site preparation and construction activities (vegetation clearance, earth works, etc.). Contamination of soil, due to Hydrocarbons (Accidental fuel/oil spills) and compaction from Heavy equipment movements. Induced water or wind erosion due to vehicle movements. Soil Destruction and sterilization due to topsoil stripping and pipeline construction activities.
- **Waste Generation and Management:** Different kinds of Waste is expected to be generated by workers onsite and from the construction activities which if not properly managed, may affect fauna and the environment at large.
- **Impact of Noise Level:** Construction activities such as excavation activities and the movement of machinery as well as other vehicle movements may lead to a change in the noise levels of the project area. Faulty operation equipment may also contribute to increased noise levels.
- **Impacts on Community Health and Safety:** Changes in the air quality as a result of the dust to be generated, changes in noise levels due to construction activities and an influx of people in the area, may pose a threat to the community safety and health. Impacts on physical health due to influx of people putting pressure on infrastructure and resources, increased disease, accidents and injuries. Impacts on the

social wellbeing due to an Influx of people in the project area creating a platform for opportunistic and other criminal vices such as Crime, increased theft, social ills etc.

- **Impacts on Occupational Health and Safety:** Workers may be exposed to health and safety risks due to the use of heavy machinery, tools, and equipment. Injuries may occur if proper safety measures are not followed.
- **Impacts on Traffic and Road Safety:** Project activities will increase traffic to and from the site, which may disrupt normal road use and increase the risk of accidents.
- **Impacts on Public Utility Infrastructure:** Construction activities may interfere with existing underground services such as electricity cables, water pipes, and communication lines. This may temporarily disrupt services to surrounding communities.
- **Impacts on Land Use, Property and Settlements:** Project construction will restrict land use and affect farming activities and livelihoods.
- **Archaeological, Traditional, Religious or Cultural Sites:** There is the potential for loss of access or disturbance to cultural heritage within the proposed pipeline route. This could include loss of trees, graves etc. According to the survey carried out by the EIA team and the consultation with NHCC, the proposed project area does not have any features which have been confirmed and classified as one with cultural or heritage value.

### **Mitigation Measures to the Identified Impacts**

The potential negative impacts mentioned above can be mitigated by thoroughly implementing and monitoring the measures outlined in the Environmental and Social Management Plan (ESMP), with no or only minor negative impacts remaining. The following are some of the proposed mitigation measures;

- **Impact on Air Quality:** Impacts on air quality will be mitigated through periodic air quality monitoring throughout the project period. Dust generation will be controlled by regular spraying of water using bowsers on access roads, open areas, and active construction zones. Earth materials and raw materials transported to site will be properly covered with tarpaulins, and construction vehicles will be routinely maintained to reduce exhaust emissions. Dust levels will be monitored to ensure compliance with the allowable limit of 50 mg/Nm<sup>3</sup>, while workers exposed to dusty environments will be

provided with dust masks. Waste will also be carefully managed to prevent the generation of unpleasant odours.

- **Impact on Water Resource:** Surface and groundwater pollution will be controlled through rigorous and continuous monitoring of key water quality parameters such as pH, temperature, and dissolved oxygen. Measures will be implemented to prevent contamination of water bodies during construction, including the use of bunded fuel and oil storage, proper management of work sites and access roads, and installation of silt fences and sediment traps to limit sediment runoff. Construction activities will be prioritized during the dry season where feasible, and efficient use of water resources will be promoted. Solid waste will be stored in designated bins and collected regularly by an approved waste management company for disposal at a ZEMA-approved landfill. The water body and community wells in the area will be regularly monitored by the developer to verify any impact on water levels.
- **Impact on Biodiversity and Vegetation:** Restricting clearing of vegetation only to areas where the Pipeline will pass. Vegetation will only be stripped immediately prior to the commencement of operations. Strengthening the awareness of the workforce for the environment (protected areas, plants and wildlife): to avoid logging, hunting, etc. at project site and in the surroundings, to prevent the extraction of plant products (wood, non-timber forest products) and the introduction of invasive species by operation staff and the population of the new settlement, to prevent or minimise pollution of sites. Consultations with relevant authorities such as the fisheries and livestock department will be done to ensure aquatic species are not affected.
- **Impact on Land and Soil:** No machinery and vehicles will be serviced on site, Fuels will be stored in a tank to be installed. Storage of fuel and lubricants has to be in tight containers placed on sealed surfaces underneath a roof. Solid waste generated during construction and at will be properly treated and safely disposed of only in demarcated waste disposal sites to prevent contamination of soils. All activities which could contaminate the soil have to be carried out on sealed surfaces. If accidental spillage occurs, the contaminated soil has to be excavated and disposed of properly (final treatment or disposal shall be done by a suitably qualified company).
- **Waste Generation and Management:** Waste impacts will be mitigated through the development and implementation of a comprehensive Waste Management Plan under the ESMP. Adequate waste storage facilities, including covered and designated areas, will

be provided on site, with bins placed throughout the project area to maintain cleanliness. Opportunities for recycling and reuse of construction spoil will be explored, while unrecyclable and hazardous waste will be collected by approved contractors and disposed of at authorized facilities, with no hazardous waste disposed of on site. Illegal dumping, either at the construction site, along the roads or in the surrounding areas, or into the lake shall not be allowed.


- **Impact of Noise:** Noise impacts will be minimized by limiting construction activities to daytime hours and maintaining all construction equipment and vehicles in good working condition. Periodic noise monitoring will be carried out to ensure that sound levels remain within the acceptable range of 70–85 dB and are largely confined to the project area. Noise-generating equipment will be located away from sensitive receptors, and workers operating in high-noise areas will be provided with appropriate hearing protection. Construction activities, will be managed carefully to avoid unnecessary disturbance to aquatic organisms.
- **Community Health and Safety:** Community health and safety risks will be managed through the implementation of a Community Health and Safety Management Plan and a Grievance Redress Mechanism. HIV/AIDS awareness activities will be extended to local communities, and construction waste will be properly managed to avoid public health hazards. Hazardous areas will be clearly marked, equipment idling will be minimized, and communities will be informed of hazardous activities at the start of each project phase. Workers will be trained on appropriate conduct and interaction with surrounding communities. Employing of local residents to minimise the spread of communicable diseases will be prioritised.
- **Impacts on Occupational Health and Safety:** Occupational health and safety will be ensured through the preparation and implementation of a Health and Safety Plan and an Emergency Response Plan. Regular safety inductions, meetings, and training sessions will be conducted, including HIV/AIDS awareness programs for workers. Appropriate personal protective equipment will be provided, and all equipment and vehicles will be regularly maintained. Work activities will be closely monitored through incident, accident, and near-miss reporting systems, supported by proper site management and waste handling practices.
- **Impacts on Traffic and Road Safety:** Traffic and road safety impacts will be addressed through the preparation of a Traffic Management Plan prior to project implementation. Measures will include construction of a new site entrance, installation of warning signs

along access roads, enforcement of speed limits, and establishment of security checkpoints to control unauthorized access. Restricted areas will be clearly demarcated, and alternative access routes for communities will be developed through consultation with local leaders.

- **Impacts on Public Utility Infrastructure:** Impacts on public utility infrastructure will be managed through consultations and ongoing engagement with relevant authorities, including the Road Development Agency, ZESCO and the Sinazongwe Town Council, to ensure that existing services are protected and maintained throughout the project.
- **Impacts on Land Use, Property and Settlements:** Impacts on land use and settlements will be managed by actively involving local communities in project planning and implementation. The project has been designed to avoid critical agricultural land, sensitive ecosystems, and culturally important areas where possible. Affected persons (though minimal disturbances are expected) will be identified and fair compensations will be done in collaboration with government valuation authorities.
- **Archaeological, Traditional, Religious or Cultural Sites:** Cultural and archaeological heritage will be safeguarded through the conduct of a Heritage Impact Assessment and the implementation of a project-specific Chance Find Procedure. Cultural heritage management measures will be incorporated into the ESMP to ensure that any discoveries are properly documented and protected.

### **Management Statement**

The proposed project by Ever Great Energy Company Limited is without a doubt in line with Zambian Government effort to contribute to the energy diversification in the country in the face of the power deficit challenge posed by the changes in the climate globally. Hence, Ever Great Energy Company Limited is submitted this report as a commitment to ensure Environmental management is incorporated in the development of this project.

  
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**Director**

**Ever Great Energy Company Limited**

## **NON-TECHNICAL SUMMARY**

Ever Great Energy Company Limited is a Zambian owned private Company incorporated in January 2024. However, the directors of the company have vast experience in business and the mining sector.

Ever Great Energy Company Limited is proposing to abstract water and to set up a Water Abstraction Pipe Line from lake Kariba in Dengeza area to be used in power generation at the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Senior Chief Mweemba's Chieftdom, Siameja Azilundu Area of Sinazongwe district. The project is at a total cost of **US\$30,000,000**.

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### **Project Location**

The proposed project area falls under Sinazongwe District where the proposed Thermal Power Plant will be constructed. The project site is located in Siameja azilundu village and Dengeza village in Senior Chief Mweemba's Chieftdom in Sinazongwe District about 124km South of Sinazongwe CBD. Access to the site is via the D775 (Batoka-Maamba) road which branches off from Batoka Junction onto a gravel road (bottom road) just after the check point going into Maamba town. The starting point where the abstraction will be conducted is at the Lake Kariba in Dengeza Area and the end point being the Thermal Power Plant location.

### **Project Description**

Ever Great Energy Company Limited is proposing to abstract water and set up a Pipeline that will channell water from lake Kariba in Dengeza area to the 600MW thermal power plant in Siameja Azilundu area within Senior Chief Mweemba's Chieftdom of Sinazongwe District.

The main objective of the project is to abstract water from the Kariba dam in Dengeza area which will be used to generate electricity at the thermal power plant, later transmitted to Muzuma substation and then supplied to consumers by the Zambia Electricity Supply Corporation Limited (ZESCO). The company is proposing to set up a Water abstraction Pipe line covering a distance of approximately 24km from Lake Kariba in Dengeza village to the thermal plant in Azilundu Siameja area.

The proposed Water Abstraction Pipe Line will comprise of the following components:

- Shore water intake pumping station at Lake Kariba (22m x 8.5m excluding the intake head);
- Security house;
- Pipes;
- Valves; and
- Power backup Solar and generator.

Below is a summary description of the Water abstraction process:

Water pumping from Lake Kariba will involve a pump using mechanisms like impellers to create a pressure difference, drawing water in through a suction phase and pushing it out through a discharge phase, ultimately moving the water to its destination which is the power plant through the pipeline.

### **Project Objectives and Benefits**

The sole objective of the proposed project is to abstract water and to set up a water abstraction pipeline from lake Kariba in Dengeza area to the Thermal Power Plant in Siameja Azilundu which will be generating 600MW. The project will improve the country's economy owing to the fact that most companies and industries in the country rely wholly on electricity to fully operate to their maximum. The specific objectives of the project are as follows:

- To build a reliable water supply system to support the power plant electricity generation process;
- To abstract raw water from lake kariba and convey it to the thermal power plant;
- To provide an adequate and consistent water supply to meet the demands of a power plant operation;
- To increase the capacity and maintain the reliability of the power generation system to contribute toward meeting the electricity demand within the country;
- To contribute to the alleviation of power shortage challenges in the country;
- Contributing to the diversification of the developers wealthy creation;
- Contribute to enhancing the nation's economy through paying of taxes;
- Contributing to infrastructural development such as road rehabilitation and construction of new roads to inaccessible areas;
- Contributing to the Local Community Development;

- Improved quality of life for local people due to a steady income that will come in form of wages; and
- Improved competencies in construction for local people employed during the construction of various activities at the project area.

### **Project Implementation Date and Cost of the Project**

The project is scheduled to be implemented in the first quarter of 2026 with its Lifespan being estimated to last as long as it is economically viable. The total cost of the project is **US\$ 30,000,000**.

### **Project Potential Impacts**

The proposed water abstraction pipeline project has potential positive and negative environmental and social impacts.

### **Positive Social-Economic Impacts**

The development of this area and construction activities described in this report will lead to numerous positive social impacts during the various phases of the project such as;

- Increase in employment for people in Sinazongwe district and locals will be prioritized;
- The pipeline offers a resilient and dependable water source for the power generation process;
- The pipeline will help save time as it will eliminate the need for the developer to spend significant time collecting and transporting water from the lake.
- The project will help provide a steady water supply is essential for energy generation thereby, supporting job creation and local economic growth.
- A closed water pipeline system helps reduce water losses during water transmission from the source thereby, ensuring efficient management of the water resource.
- Increased revenue for the central government through co-operates taxes and license fees.
- The project will improve the livelihood standards of the local people through multiplier effects. Major activities will include supply of foodstuffs and services to workers and the company. To hence this the developer will buy foodstuffs and services from local suppliers unless those that cannot be found in the area.

### **Negative Impacts**

The proposed project for the thermal power plant has potential environmental and social impacts. The following are some of the potential negative impacts that were identified during the ESIA study:

- **Air Quality Impacts:** Site clearing operations for land preparation is characteristic of dust emission. It also involves trenching, excavations, movement of vehicles and cut and fill activities, which all lead to dust emissions with the potential to disturb the local air quality. The vehicles and machines used on the site during the construction stage will have an impact on air quality.
- **Impacts on Water Resources:** Lowering of water levels due to potential excessive water abstraction, thereby causing harm to flora and fauna. Risk of Groundwater and surface water contamination due to construction debris, oil leakages and accidental Spillages which have the potential to pollute groundwater as well as surface water. The process of water abstraction itself may increase water salinity.
- **Impacts on Biodiversity and Vegetation:** Vegetation and Habitat Loss due to the clearing of land for the pipeline which will disrupt the ecosystem.
- **Impact on Land and Soil:** Increased soil erosion, compaction and sedimentation induced by site preparation and construction activities (vegetation clearance, earth works, etc.). Contamination of soil, due to Hydrocarbons (Accidental fuel/oil spills) and compaction from Heavy equipment movements. Induced water or wind erosion due to vehicle movements. Soil Destruction and sterilization due to topsoil stripping and plant construction.
- **Waste Generation and Management:** Different kinds of Waste is expected to be generated by workers onsite and from the construction activities which if not properly managed, may affect fauna and the environment at large.
- **Impact of Noise Level:** Construction activities such as excavation activities and the movement of machinery as well as other vehicle movements may lead to a change in the noise levels of the project area. Faulty operation equipment may also contribute to increased noise levels.
- **Impacts on Community Health and Safety:** Changes in the air quality as a result of the dust to be generated, changes in noise levels due to construction activities and an influx of people in the area, may pose a threat to the community safety and health. Impacts on physical health due to influx of people putting pressure on infrastructure and resources, increased disease, accidents and injuries. Impacts on the social wellbeing due to an Influx of people in the project area creating a

platform for opportunistic and other criminal vices such as Crime, increased theft, social ills etc.

- **Impacts on Occupational Health and Safety:** Workers may be exposed to health and safety risks due to the use of heavy machinery, tools, and equipment. Injuries may occur if proper safety measures are not followed.
- **Impacts on Traffic and Road Safety:** Project activities will increase traffic to and from the site, which may disrupt normal road use and increase the risk of accidents.
- **Impacts on Public Utility Infrastructure:** Construction activities may interfere with existing underground services such as electricity cables, water pipes, and communication lines. This may temporarily disrupt services to surrounding communities.
- **Impacts on Land Use, Property and Settlements:** Project construction will restrict land use and affect farming activities and livelihoods.
- **Archaeological, Traditional, Religious or Cultural Sites:** There is the potential for loss of access or disturbance to cultural heritage within the proposed pipeline route. This could include loss of trees, graves etc. According to the survey carried out by the EIA team and the consultation with NHCC, the proposed project area does not have any features which have been confirmed and classified as one with cultural or heritage value.

### **Mitigation Measures to the Identified Impacts**

The potential negative impacts mentioned above can be mitigated by thoroughly implementing and monitoring the measures outlined in the Environmental and Social Management Plan (ESMP), with no or only minor negative impacts remaining. The following are some of the proposed mitigation measures;

- **Impact on Air Quality:** Impacts on air quality will be mitigated through periodic air quality monitoring throughout the project period. Dust generation will be controlled by regular spraying of water using bowsers on access roads, open areas, and active construction zones. Earth materials and raw materials transported to site will be properly covered with tarpaulins, and construction vehicles will be routinely maintained to reduce exhaust emissions. Dust levels will be monitored to ensure compliance with the allowable limit of 50 mg/Nm<sup>3</sup>, while workers exposed to dusty environments will be provided with dust masks. Waste will also be carefully managed to prevent the generation of unpleasant odours.

- **Impact on Water Resource:** Surface and groundwater pollution will be controlled through rigorous and continuous monitoring of key water quality parameters such as pH, temperature, and dissolved oxygen. Measures will be implemented to prevent contamination of water bodies during construction, including the use of bunded fuel and oil storage, proper management of work sites and access roads, and installation of silt fences and sediment traps to limit sediment runoff. Construction activities will be prioritized during the dry season where feasible, and efficient use of water resources will be promoted. Solid waste will be stored in designated bins and collected regularly by an approved waste management company for disposal at a ZEMA-approved landfill. The water body and community wells in the area will be regularly monitored by the developer to verify any impact on water levels.
- **Impact on Biodiversity and Vegetation:** Restricting clearing of vegetation only to areas where the Pipeline will pass. Vegetation will only be stripped immediately prior to the commencement of operations. Strengthening the awareness of the workforce for the environment (protected areas, plants and wildlife): to avoid logging, hunting, etc. at project site and in the surroundings, to prevent the extraction of plant products (wood, non-timber forest products) and the introduction of invasive species by operation staff and the population of the new settlement, to prevent or minimise pollution of sites. Consultations with relevant authorities such as the fisheries and livestock department will be done to ensure aquatic species are not affected.
- **Impact on Land and Soil:** No machinery and vehicles will be serviced on site, Fuels will be stored in a tank to be installed. Storage of fuel and lubricants has to be in tight containers placed on sealed surfaces underneath a roof. Solid waste generated during construction and at will be properly treated and safely disposed of only in demarcated waste disposal sites to prevent contamination of soils. All activities which could contaminate the soil have to be carried out on sealed surfaces. If accidental spillage occurs, the contaminated soil has to be excavated and disposed of properly (final treatment or disposal shall be done by a suitably qualified company).
- **Waste Generation and Management:** Waste impacts will be mitigated through the development and implementation of a comprehensive Waste Management Plan under the ESMP. Adequate waste storage facilities, including covered and designated areas, will be provided on site, with bins placed throughout the project area to maintain cleanliness. Opportunities for recycling and reuse of

construction spoil will be explored, while unrecyclable and hazardous waste will be collected by approved contractors and disposed of at authorized facilities, with no hazardous waste disposed of on site. Illegal dumping, either at the construction site, along the roads or in the surrounding areas, or into the lake shall not be allowed.

- **Impact of Noise:** Noise impacts will be minimized by limiting construction activities to daytime hours and maintaining all construction equipment and vehicles in good working condition. Periodic noise monitoring will be carried out to ensure that sound levels remain within the acceptable range of 70–85 dB and are largely confined to the project area. Noise-generating equipment will be located away from sensitive receptors, and workers operating in high-noise areas will be provided with appropriate hearing protection. Construction activities, will be managed carefully to avoid unnecessary disturbance to aquatic organisms.
- **Community Health and Safety:** Community health and safety risks will be managed through the implementation of a Community Health and Safety Management Plan and a Grievance Redress Mechanism. HIV/AIDS awareness activities will be extended to local communities, and construction waste will be properly managed to avoid public health hazards. Hazardous areas will be clearly marked, equipment idling will be minimized, and communities will be informed of hazardous activities at the start of each project phase. Workers will be trained on appropriate conduct and interaction with surrounding communities. Employing of local residents to minimise the spread of communicable diseases will be prioritised.
- **Impacts on Occupational Health and Safety:** Occupational health and safety will be ensured through the preparation and implementation of a Health and Safety Plan and an Emergency Response Plan. Regular safety inductions, meetings, and training sessions will be conducted, including HIV/AIDS awareness programs for workers. Appropriate personal protective equipment will be provided, and all equipment and vehicles will be regularly maintained. Work activities will be closely monitored through incident, accident, and near-miss reporting systems, supported by proper site management and waste handling practices.
- **Impacts on Traffic and Road Safety:** Traffic and road safety impacts will be addressed through the preparation of a Traffic Management Plan prior to project implementation. Measures will include construction of a new site entrance, installation of warning signs along access roads, enforcement of speed limits, and establishment of security checkpoints to control unauthorized access. Restricted

areas will be clearly demarcated, and alternative access routes for communities will be developed through consultation with local leaders.

- **Impacts on Public Utility Infrastructure:** Impacts on public utility infrastructure will be managed through consultations and ongoing engagement with relevant authorities, including the Road Development Agency, ZESCO and the Sinazongwe Town Council, to ensure that existing services are protected and maintained throughout the project.
- **Impacts on Land Use, Property and Settlements:** Impacts on land use and settlements will be managed by actively involving local communities in project planning and implementation. The project has been designed to avoid critical agricultural land, sensitive ecosystems, and culturally important areas where possible. Affected persons (though minimal disturbances are expected) will be identified and fair compensations will be done in collaboration with government valuation authorities.
- **Archaeological, Traditional, Religious or Cultural Sites:** Cultural and archaeological heritage will be safeguarded through the conduct of a Heritage Impact Assessment and the implementation of a project-specific Chance Find Procedure. Cultural heritage management measures will be incorporated into the ESMP to ensure that any discoveries are properly documented and protected.

### **Management Statement**

The proposed project by Ever Great Energy Company Limited is without a doubt in line with Zambian Government effort to contribute to the energy diversification in the country in the face of the power deficit challenge posed by the changes in the climate globally. Hence, Ever Great Energy Company Limited is submitted this report as a commitment to ensure Environmental management is incorporated in the development of this project.

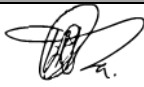
  
.....




**Director**


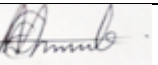
**Ever Great Energy Company Limited**


## EIA TEAM

The EIA studies will be undertaken by the Environmental Consultants' Team and other professional consultants to be involved in project implementation. The table below presents names of the ESIA team and their responsibilities.

Name	Qualifications	Responsibility	Roles	Signatures	Phone No.
Peter M. Mwanza	<ul style="list-style-type: none"> <li>• Bachelor of Science in Wood Science and Technology</li> <li>• Certificate Environmental and Social Risk Management Training, World Bank Group, Zambia.</li> <li>• Certificate Environmental and Social Impact Assessment in Mines.</li> <li>• Masters of Science in Project Management.</li> <li>• IEMA Approved Environmental management Systems 14001: Lead.</li> <li>• Certificate Environmental</li> </ul>	Environmentalism/Team Leader	ESIA Coordinator and provider of environmental management information		+260977614401

	Management Systems (EMS) ISO 14001				
Nephas Mapiki	<ul style="list-style-type: none"> <li>• Master of Science in Project Management.</li> <li>• Bachelor of Science in Urban and Regional Planning.</li> </ul>	GIS and Land use Expert	GIS information and conduct a land use assessment on the project area		+260977431448
Fidelis Silungwe	<ul style="list-style-type: none"> <li>• BEng Metallurgy</li> <li>• Diploma in Environmental Management.</li> <li>• Certificate in Environmental Management and Ethics.</li> <li>• Certificate in Sustainability and Climate Change.</li> </ul>	Metallurgist	The expert will specialize in air and noise studies and will hand in hand with Environmental engineer		+260977603021
Valerie Kalinso	<ul style="list-style-type: none"> <li>• Master of Mass Communication</li> <li>• Bachelor's Degree in Mass Communication.</li> </ul>	Social Economic Expert	Social Experts to specialize in gathering information on the Population, distribution. Conduct a Gender assessment, social and economic gender patterns in the project area.		+260976757926

Esther Banda	<ul style="list-style-type: none"> <li>• Bachelor of Engineering in Environmental Engineering</li> </ul>	Assistant in the Air & Noise study	The assistant in Air and Noise sampling will assist the expert in conducting Air Quality and Noise assessment in the project area		+260968853036
Dickson Kabwe	<ul style="list-style-type: none"> <li>• Bachelor Degree of Science (Ecology).</li> <li>• Certificate in Environmental Management.</li> <li>• Certificate in Compliance and Enforcement of Environmental Law</li> </ul>	Senior Ecologist	The Ecologist will focus on the assessment of the Flora, Fauna, Aquafora and Identify areas of high biodiversity on the site.		+260979969837
Christopher Mutale	<ul style="list-style-type: none"> <li>• Bachelors of Wildlife management</li> </ul>	Ecologist	The Ecologist who will focus on the assessment of the Flora, Fauna, Aquafora and Identify areas of high biodiversity on the site		+260961589164
Rodgers Lungu	<ul style="list-style-type: none"> <li>• Bachelors of wood Science and Technology's Degree</li> </ul>	Assistant Ecologist	The assistant Ecologist will assist the Ecologist who will focus on the assessment of the Flora, Fauna, Aqua-		+260979707595

			flora and Identify areas of high biodiversity on the site.		
Chisanga Siwale	<p><b>Hydrologist Expert</b></p> <ul style="list-style-type: none"> <li>• MSc (Integrated Water Resources Management), BSc (Natural Resources and Environmental Management)</li> </ul>	Hydrologist Expert	The Hydrologist will identify significant impacts from existing uses and interference with the water resource, surface water flow that may result either directly or indirectly from the proposed project and identify and comment on the risks and consequences of polluting surface water from proposed project activities		+260955275467

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## **LIST OF ACRONYMS AND ABBREVIATIONS**

<b>AIDS</b> -	Acquired Immune Deficiency Syndrome
<b>CBD</b> -	Convention on Biological Diversity
<b>EPB</b> -	Environmental Project Brief
<b>ESIA</b> -	Environmental and Social Impact Assessment
<b>ECZ</b> -	Environmental Council of Zambia
<b>EMA</b> -	Environmental Management Act
<b>EIS</b> -	Environmental Impact Statement
<b>EMP</b> -	Environmental Management Plan
<b>EPPCA</b> -	Environmental Protection and Pollution Control Act
<b>GRZ</b> -	Government of the Republic of Zambia
<b>Ha</b> -	Hectares
<b>HIV</b> -	Human Immune Virus
<b>IAP</b> -	Interested and affected parties
<b>NEAP</b> -	National Environmental Action Plan
<b>NCS</b> -	National Conservation Strategy
<b>RHC</b> -	Rural Health Centre
<b>SI</b> -	Statutory Instrument
<b>TORs</b> -	Terms of Reference
<b>EGECL</b> -	Ever Great Energy Company Limited
<b>WARMA</b> -	Water Resources Management Authority
<b>ZEMA</b> -	Zambia Environmental Management Agency

## 1. INTRODUCTION

Ever Great Energy Company Limited is a Zambian owned private Company incorporated in January 2024. However, the directors of the company have vast experience in business and the mining sector.

Zambia's main hydroelectric power facilities are the Kariba North Bank Power Station (1,080 MW), Kafue Gorge Power Station (980MW), Kafue Gorge Lower Power Station (750 MW), Victoria Falls Power Station (108 MW), Lunsemfwa Hydro Power Station (56 MW), and the Itezhi Tezhi Hydro Power Station (120 MW). Maamba Collieries Limited operates Zambia's largest IPP, a coal-fired thermal power plant commissioned in 2016, which generates up to 300 MW. From the information given above, it can be noted that the country heavily relies on hydroelectric power which accounts for about 83% of installed generation capacity, and the changes in the climate (drought) has often greatly reduced water levels in reservoir dams, leading to a severe decrease in electricity generation. The installed generation capacity in Zambia is **3356.6 MW**.

The installed capacity comprises of 83 percent of hydro, 9 percent of coal, 5 percent of heavy fuel oil and 3 percent solar PV. However, the country is currently facing a power deficit due to the poor rainfall in the 2023-2024 rain season. Therefore, to mitigate this, other alternatives have been engaged by different stakeholders such as use of solar, thermal power plants and generators. The country has been endowed with mineral resources such as coal which has been underutilised. Therefore, in trying to help meet the power demand in the country, Ever Great Energy Company Limited is proposing to set up a Water Abstraction Pipe Line from lake Kariba in Dengeza area to be used in power generation at the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Senior Chief Mweemba's Chiefdom, Siameja Azilundu Area of Sinazongwe district. The project is at a total cost of **US\$30,000,000**.

In line with the provisions of the Environmental Management (Amendment) Act No. 8 of 2023 and the Environmental Impact Assessment Regulations SI No. 28 of 1997, an Environmental and Social Impact Assessment (ESIA) for the proposed thermal power plant project by Ever Great Energy Company Limited has been prepared and the company has engaged Tsalach Global Limited to undertake the ESIA study on their behalf. The ESIA of the project will involve incorporating views, concerns and contributions from interested and affected parties (stakeholders). Site location suitability studies for the project within the project area and ecological surveys of the project area will be conducted to determine the feasible design of the proposed project.

### **1.1 Background of the project**

The energy sector in Zambia has been one of the sectors that has for a long time faced challenges with the changes in the climate conditions. Zambia has since inception been relying heavily on hydropower as a source of energy which mainly relies on rainfall. However, with the changes in the climatic conditions recently, the country has been facing an energy crisis with a deficit in power leading to huge energy demand.

It is for this reason that Ever Great Energy Company Limited decided to invest in the energy sector of Zambia by putting up a 600MW thermal power plant in Siameja Aziludu village. However, the plant required water as one of the major raw materials in the generation of power. Hence, the initiation of the water abstraction pipeline project to supply the needed water to the thermal power plant.

Therefore, Ever Great Energy Company Limited is proposing to put up a Water abstraction Pipeline to cover a distance of 24 km from Lake Kariba in Dengeza village to the thermal plant in Azilundu Siameja in Chief Mweemba's area of Sinazongwe District.

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

Ever Great Energy Company Limited (EGECL) is proposing to abstract water and put up a Water abstraction Pipe Line from lake Kariba Dengeza area to the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Senior Chief Mweemba's Chiefdom in Siameja Azilundu Area of Sinazongwe district. The main objective of the project is to increase the capacity and maintain the reliability of the power generation system to contribute toward meeting the electricity demand within the country. Therefore, the project activities will involve the design, construction and commissioning of a Water abstraction Pipeline to cover a distance of 24km from Lake Kariba in Dengeza village to the thermal plant in Azilundu Siameja in Chief Mweemba's area of Sinazongwe District.

The proposed Water abstraction Line will comprise of the following components:

- **Shore Water Intake Pump Station:** Contains the sealed chamber where the impeller rotates;
- **Motor:** Provides the rotational energy to the impeller;
- **Impeller:** The rotating component that moves the water;
- **Valves:** Control the flow of water and prevent backflow;
- **Pipes:** Transporting the water to its destination;
- Water storage and treatment facility at the power plant; and
- Power backup Solar and generator.

Below is a summary description of the Water abstraction process:

Water pumping from Lake Kariba will involve a pump using mechanisms like impellers to create a pressure difference, drawing water in through a suction phase and pushing it out through a discharge phase, ultimately moving the water to its destination which is the power plant through the pipeline. Below is a step-by-step flow of the process:

#### **i. Suction Phase**

There are basically 3 activities that occur under the suction phase which include;

- **Creation of a Low-Pressure Area:** This involves the pump's motor driving a rotating impeller (a fan-like component) inside a sealed chamber.
- **Formation of a Vacuum:** As the impeller spins, it creates a low-pressure area (a vacuum) at the pump's inlet (suction side).
- **Water Intake:** This low-pressure area draws water from the water source (lake) into the pump.

#### **ii. Discharge Phase**

- **Impeller Action:** The rotating impeller forces the water to move outwards, increasing its velocity and pressure.
- **Water Ejection:** The water is then pushed out of the pump through the outlet (discharge side) with high pressure.
- **Flow Establishment:** This forceful ejection creates a continuous flow of water, allowing it to be moved through pipes or hoses to its intended destination.

Types of Pumps to be used

- **Centrifugal Pumps:** These use a rotating impeller to create a pressure difference and move water.
- **Submersible Pumps:** These are designed to be submerged in the water source and draw water directly from below.
- **Positive Displacement Pumps:** These pumps use a mechanism to displace a fixed volume of water with each stroke.
- **Jet Pumps:** These use a jet of water to create a vacuum and draw water from a well.

The pump features which are often utilized within the power generation industry include;

- i. Variable Speed Drive – to accommodate multiple duty points and variations in demand.
- ii. Magnetic Drive – to eliminate the need for process seals which may leak

- iii. Relief Valves – to prevent damage to pumps but also excess system pressures
- iv. Wide viscosity range handling particularly if Crude Oil is handled which can vary significantly with temperature.
- v. Long service intervals ensuring pumps experience little downtime and maintenance will be scheduled for during plant shutdown

The pipe will be made of metal with a diameter of 30cm which will be pumping 2500m<sup>3</sup> per hour and 3 pumps from source to the water storage area at the thermal plant. The pumps will have the pumping power of 2500 torque.

### **1.3 Objectives of the project**

The sole objective of the proposed project is to abstract water and to set up a water abstraction pipeline from lake Kariba in Dengeza area to the Thermal Power Plant in Siameja Azilundu which will be generating 600MW. The project will improve the country's economy owing to the fact that most companies and industries in the country rely wholly on electricity to fully operate to their maximum. The specific objectives of the project are as follows:

- To build a reliable water supply system to support the power plant electricity generation process;
- To abstract raw water from lake kariba and convey it to the thermal power plant;
- To provide an adequate and consistent water supply to meet the demands of a power plant operation;
- To increase the capacity and maintain the reliability of the power generation system to contribute toward meeting the electricity demand within the country;
- To contribute to the alleviation of power shortage challenges in the country;
- Contributing to the diversification of the developers wealthy creation;
- Contribute to enhancing the nation's economy through paying of taxes;
- Contributing to infrastructural development such as road rehabilitation and construction of new roads to inaccessible areas;
- Contributing to the Local Community Development;

- Improved quality of life for local people due to a steady income that will come in form of wages; and
- Improved competencies in construction for local people employed during the construction of various activities at the project area.

#### 1.4 Brief description of the location

The proposed project area falls under Sinazongwe District where the proposed Thermal Power Plant will be constructed. The project site is located in Siameja azilundu village and Dengeza village in Senior Chief Mweemba's Chieftdom in Sinazongwe District about 124km South of Sinazongwe CBD. Access to the site is via the D775 (Batoka-Maamba) road which branches off from Batoka Junction onto a gravel road (bottom road) just after the check point going into Maamba town. The starting point where the abstraction will be conducted is at the Lake Kariba in Dengeza Area and the end point being the Thermal Power Plant location. Below are the project site coordinates of the pipe line route;

No.	Latitudes	Longitudes
<b>Starting Point</b>		
	17°41'22.39"S	27°10'10.73"E
<b>Ending Point</b>		
1.	17°37'24.25"S	27°7'0.08"E
2.	17°37'45.61"S	27°5'2.01"E
3.	17°37'47.20"S	27°0'43.31"E

#### 1.5 Particulars of Shareholders

The following are the shareholding details for the company:

Table 1: Shareholding

Shareholder	Business No.	Shares held	As %
United Capital Fertilizer Zambia Company Limited	120210019589	50,000.00	50%
Wonderful Group of Companies Limited	120150132394	50,000.00	50%
<b>Total</b>			<b>100</b>

## **1.6 The developer's physical address and the contact person**

Ever Great Energy Company Limited  
Plot 5493 Great East Road  
P.O Box 31211  
**Lusaka**

### **Contact Person**

Name: Roopesh Nekkanti  
Position: Company Representative  
Mobile: +260963287999  
Email: roopesh@wonderfulgroup2010.com.

## **1.7 Track Record/Previous Experience of Enterprise Elsewhere**

Ever Great Energy Company Limited is a Zambian owned private Company incorporated in January 2024. This is the first Water abstraction Pipeline project the company will be embarking on. However, the directors of the company have vast experience in business mining projects.

## **1.8 Project Cost Investment and Proposed Project Implementation Date**

The project is scheduled to be implemented in the first quarter of 2026. The total cost of the project is **US\$ 30,000,000**.

## **1.9 Scope of Study**

The Environmental and Social Impact study adheres to the requirements of the Environmental Impact Assessment (EIA) regulations of 1997. The EIA regulations demand that socio-economic and environmental impacts consequential to the operation of the project are assessed well in advance. Ever Great Energy Company Limited commissioned the development of an Environmental and Social Impact Assessment (ESIA) to assess the baseline, environmental trends and socio-economic data of the project area, identify significant environmental and socio-economic impacts of the project and propose possible mitigation measures. This study addresses positive as well as negative impacts and recommends measures for mitigating negative environmental effects.

### **1.9.1 Scope of Work**

The full scope of work and core issues considered when conducting the EIA are as stated in the TORs for this assignment attached as Appendix.

## **1.9.2 Study Methods**

### **a. Desk Study**

The desk study was conducted to collect available data including project briefs, satellite imagery, relevant site reports, records and materials. A preliminary review of these datasets was done in order to set foundation for pre-planning phase.

### **b. Reconnaissance site visit**

A reconnaissance site visit was undertaken to the project site to provide an idea on the local bio-physical and socio-economic conditions. Consultations were made with the stakeholders in the project area in Siameja Azilundu village of Sinazongwe District.

### **c. Fieldwork Planning**

The study team used the scoping data and additional information collected to plan a more detailed field assessment of the biophysical and socio-economic aspects, the project design and to facilitate a basis for elaboration of impacts and determine mitigation.

### **d. Stakeholder Consultation**

Visits were conducted to relevant government and other institutions to collect information and undertake interviews. Public consultation and information disclosure activities were also conducted in the project area.

### **e. Field Data Collection**

Necessary field studies were conducted, as supplements to previous studies and to fulfil special requirements of the TORs. The field studies, baseline descriptions and impact assessments were also conducted.

### **f. Data Analysis and Interpretation**

Information on the ecological conditions of the site and surroundings was also obtained from published information and records. Records and information compiled from previous studies on soils, vegetation and terrain were accessed and existing maps were obtained. This valuable information was used to identify and map the bio-physical sensitivities and determine the mitigation measures on expected impacts. Findings and recommendations in reports of consultations previously held with local stakeholder communities and earlier surveys, have also given important input to this EIA study. Baseline and field data were analysed using standard methods as follows:

- A review of the current policy and regulatory framework was done. Relevant environmental legislation and regulations that would apply to this project were collected from relevant stakeholders and considered;
- A temporal analysis of baseline and field data on climate was applied to determine rainfall patterns, temperature regimes, humidity and sunshine levels;
- Due to non-availability of detailed studies on air quality, the portable Pylon air sampler was used to sample the air within the project area in order to determine the baseline status of the project site;
- Similarly, available national level geological and hydro geological studies and maps were assessed and correlated to the project site. The baseline data were supplemented with field survey data analysis on hydrology & hydrogeology with specific consideration to quality of surface and ground water;
- Topographic, land use, land cover and landscape data were assessed;
- Available baseline data on land tenure was considered and correlated with underlying poverty conditions;
- Due to non-availability of detailed studies on noise and vibration, a sound level meter was used to obtain the baseline noise levels of the project site;
- Field survey for archaeological and cultural environment, fauna and flora were also conducted; and
- Available baseline data on socio-cultural and economic setup was supplemented with field data collection.

#### **g. Environmental Impact Statement Preparation**

The EIA Team used the ZEMA guidelines in preparing the EIS report. The Environmental Impact Assessment process is an open process that involves interested and affected parties. The EIA itself is defined as a systematic investigation of conditions within the environment of the proposed development or project followed by an assessment of the impacts that the development or project will have on the environment in its totality i.e. physical, biological and socio economic aspects. The following are the stages that comprise the process:

Stage 1: Preliminary Actions

Stage 2: Scoping (or Identification of Potential Impacts)

Stage 3: Baseline Study

Stage 4: Impact Evaluation

Stage 5: Public participation in Environmental Impact Study

Stage 6: Identification of Mitigation Measures

Stage 7: Assessment (or Comparison of Alternatives)

Stage 8: Decision making by the Developer

Stage 9: Submission of the report to ZEMA

Stage 10: Decision Making by ZEMA

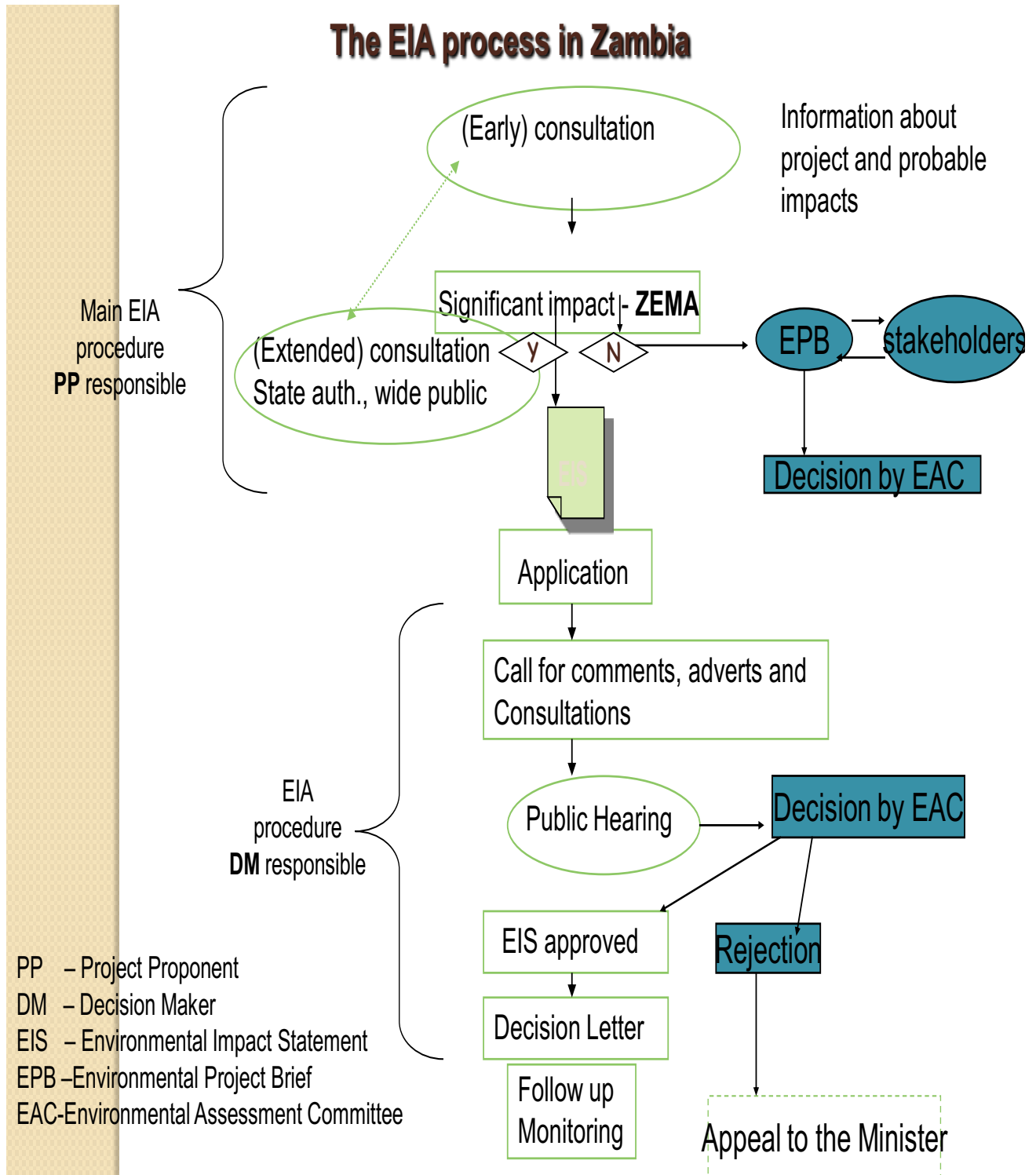


Figure 1: Shows the EIA process in Zambia

## **2. POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK**

This section will cite all policy, legal and institutional framework relevant to the project.

A number of local and international environmental management and protection Acts and relevant to the implementation of the Water abstraction Pipeline project will be reviewed before project implementation. The preliminary work done thus far indicates that the following Acts and Regulations are relevant to the project:

The core pieces of legislation and associated regulations governing environmental management of mining activities and environmental protection are the Environmental Management (Amendment) Act No. 8 of 2023 as read together with the Environmental Management Act No. 12 of 2011 and the Electricity Act No. 11 of 2019.

The EMA renamed 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.

### **2.1 Environmental Policy Framework**

Zambia launched its National Policy on Environment in 2007. The environmental policy document identifies deforestation, land degradation, wildlife depletion, soil erosion, loss of land productivity, inadequate sanitation and air and water pollution as the main environmental challenges the country is facing.

According to the Ministry responsible for the Environment, the main purpose of the National Policy on Environment is to “create a comprehensive framework for effective natural resource utilization and environmental conservation which will be sensitive to the demands of sustainable development. The Policy calls upon all institutions, Non-Governmental Organizations (NGOs), and community based or people’s organizations whose activities affect the environment in any way to carry out their activities judiciously in order to maintain the productivity and integrity of the environment.

The Policy recognizes the need for ESIA studies in all development projects in order to eliminate or mitigate adverse environmental impacts and enhance the benefits of the projects. The National Policy on Environment states that “EIAs will be required as deemed necessary to ensure that public and private sector development options are environmentally sound and sustainable and that any environmental consequences are recognized early and taken into account during project design and implement.

### **2.1.1 Regulatory Framework**

The core pieces of legislation and associated regulations governing environmental management of the Water abstraction Pipeline activities and environmental protection are the Environmental Management (Amendment) Act No. 8 of 2023 as read together with the Environmental Management Act No. 12 of 2011 and the Electricity Act No. 11 of 2019. The EMA renamed the established Environmental Council of Zambia (ECZ) to Zambia Environmental Management Agency (ZEMA). It is responsible for enforcing environmental regulations and coordinating 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 plant operations are regulated through a system of permits, licences and fines.

### **2.1.2 The Environmental Management (Amendment) Act No. 8 of 2023 as read together with the Environmental Management Act No. 12 of 2011.**

The Environmental Management Act is currently the Principal Act on environmental governance and regulation in Zambia that was passed in April 2011 to replace and repeal the Environmental Protection and Pollution Control Act (EPPCA) of 1990. Section 29 of this Act provides that a developer shall not implement a project for which an ESIA is required. Since an ESIA is required for this project, the following ESIA Statutory Instruments (SIs) and Regulations (Table 1) of the EMA will govern this particular project.

*Table 2: shows the Acts and Regulations reviewed*

<b>ACTS/ REGULATIONS</b>	<b>DESCRIPTION OF THE ACT/REGULATIONS</b>	<b>RELEVANCE TO THE PROJECT</b>	<b>COMPLIANCE</b>
<b>The Environmental Management Act (EMA) No. 8 Of 2023 as read with the EMA No.12 of 2011</b>	The primary environmental legislation in Zambia is the "Environmental Management Act, 2011". The Environmental Management Act (EMA) No. 12 of 2011 repeals and replaces the Environmental Protection and Pollution Control Act (EPPCA) No. 12 of 1990 as well as renaming the Environmental Council of Zambia (ECZ) as the Zambia Environmental Management Agency (ZEMA).	In Part III, Section 29(1), the Environmental Management Act prohibits developers to implement projects that have an impact on the environment, without approval by ZEMA. In Section 29, the Act also requires a project developer to conduct an Environmental Impact Assessment and prepare and submit an Environmental Project Brief (EPB) report or an EIS to ZEMA prior to any development activities.	Ever Great Energy Company Limited will ensure that all activities are performed in accordance with all Zambian environmental regulations.  Ever Great Energy Company Limited has prepared and submitted this report to ZEMA for approval before the commencement of project activities.
<b>The Environmental Impact Assessment (EIA) Regulations, SI 28 of 1997</b>	The Environmental Impact Assessment (EIA) Regulations, Statutory Instrument (SI) 28 of 1997, demands that before a developer commences implementing a project, an EIA report must be prepared and submitted to the relevant regulatory authority for review and approval.	According to the EIA regulations, an Impact Statement is required for all projects listed in the Second Schedule to the Regulations, including mining of copper, Coal and emerald. Regulation 3 (1) of the EIA Regulations states that, "a developer shall not implement a project for which a project brief or environmental impact statement is required	Ever Great Energy Company Limited will ensure that all activities are performed in accordance with all Zambian environmental regulations.

		under these Regulations, unless the project brief of the environmental impact statement has been concluded in accordance with these regulations and the Environmental Management Agency has issued a decision letter”	Ever Great Energy Company Limited has prepared and submitted this report to ZEMA for approval before the commencement of project activities.
<b>Environmental Management (Licensing) Regulations, SI No. 112 of 2013</b>	There are several parts in this SI giving powers to ZEMA to control the discharge of water pollutants, air emissions, pesticides and other toxic substances, waste (both municipal and hazardous) and ozone depleting substances in order to safeguard the general health, safety or welfare of person, animal life and plant life. Parts II and III are relevant to this project.	<p>Part II of the Regulations: This part gives powers to ZEMA to regulate discharge of water pollutants and emission of air pollutants. The clearing of land for access roads, as well as Water abstraction during the implementation of this project may generate dust that will need to be managed in compliance with the above regulations.</p> <p><b>Part III</b> of the Regulations: This part of the SI regulates the reclamation, reuse, recovery, recycling, transportation, export, collection and disposal of waste from industrial, commercial, domestic or community activities. ZEMA regulates these activities through licensing of handlers of waste and operators of disposal sites.</p>	Ever Great Energy Company Limited will adhere to these provisions during its operation phase
<b>The Water</b>	Provides for the main functions and powers of managing and protecting	<b>Part VI, section 53:</b> sinking, deepening or altering boreholes in water shortage areas	Ever Great Energy Company Limited will

<p><b>Resources Management Act, No. 21 of 2011</b></p>	<p>water resources in line with environmental sustainability.</p>	<p>restricted. <b>Part VI section 54:</b> Maximum volume and rate of abstraction in water shortage areas <b>Section 9, 54 and 71:</b> requires that any who wants to use water other than for domestic use or that specified under section sixty should obtain permits.</p>	<p>adhere to these provisions during its operation phase when it will need water.</p>
<p><b>The Forest Act No. 4 of 2015</b></p>	<p>Provides for the establishment and management of National and Local forests, conservation and protection of forests and trees, and licensing and sale of forest products. Some of the trees that are protected under this Act include: <i>Parinari curatellifolia</i>, <i>Anisophyllea boehmii</i>, <i>Pterocarpus angolensis</i>, <i>Faurea saligna</i> and <i>Julbernardia paniculata</i>.</p>	<p>The construction of facilities, will entail the clearing of existing vegetation. This impact, however, is minimal, in view of the fact that the area has been used for grazing of animals and farming <b>Part II, section 4-12:</b> felling conditions of trees’ <b>Section 68:</b> export some of the valuable timber <b>Section 68 (4):</b> restrictions on the use of certain trees species</p>	<p>Ever Great Energy Company Limited will not allow unnecessary cutting down of trees for upholding sustainable environmental practices and in compliance with the provisions of this legislation. If rare flora specified in the Act is identified within the area, this will be conserved and protected.</p>
<p><b>The Zambia Wildlife Act No.14 of 2015</b></p>	<p>Provides for the establishment, control and management of National Parks (NP) and for the conservation and enhancement of wildlife ecosystems.</p>	<p><b>Section 3:</b> Ownership of Wildlife <b>Part VI, section 31:</b> Restriction on hunting game or protected animals <b>Part VI, Section 32:</b> detailed wildlife impact assessment</p>	<p>The project area is not located in a National Park or GMA; however Ever Great Energy Company Limited will comply with this Act.</p>

<p><b>The Energy Regulation Act No. 12 Of 2019</b></p>	<p>An Act that provides for the licensing of enterprises in the energy sector; continue the existence of the Energy Regulation Board (ERB) and re-define its functions; reconstitute and revise the functions of the board; repeal and replace the Energy Regulation Act of 1995.</p>	<p>The storage, sale and handling of the fuel at the facility will be regulated by the Energy Regulation Board and the license will be obtained as provided for in section 10. Ever Great Energy Company Limited will use energy for various purposes on the site and therefore this Act will be very relevant.</p>	<p>During project implementation, fuels such as petrol and diesel will be used. Ever Great Energy Company Limited will ensure that such fuels are stored and used in accordance with the provisions of these regulations so as to protect human health and the Environment</p>
<p><b>The Land and Land Acquisition Act of 1995</b></p>	<p>The Department of Lands administers the Lands Act for alienation of land under statutory Leaseholds. The Land Act of 1995 Divides Land into three categories namely; State, Local Authority and Traditional land. The Act provides for an efficient and effective land administration system that promotes security of tenure, equitable access and control of land for sustainable socio- economic</p>	<p>Section 3 (1) of the Lands Act stipulates that all land in the country is vested in the President and. However, Section 3 (2) in subjection to Section 3 (4) highlights the procedures to which the president may delineate land to a Zambian whereas Section 3 (3) highlights the procedures to which the president may delineate land to a non-Zambian. Section 4 of the Act provides the conditions on the alienation of land to which the president may delineate land. The regulations are relevant because the project proponent will eventually have to obtain Title</p>	<p>The proposed project site falls under Traditional land. The provisions of the Act shall be adhered to and followed in obtaining Title under the relevant tenure category.</p>

	development of the people of Zambia.	to the proposed site and ownership will be in private hands which is only possible under this regulation.	
<b>The National Heritage Conservation Act (CAP 173)</b>	The Act provides for the conservation of ancient, cultural and natural heritage, relics and objects of aesthetic, historical, pre – historical, archaeological or scientific interest.	In Part V Section 33, the Act requires that no person shall, without the written consent of the Commission “alter, remove, destroy, damage, excavate or export as the case may be, from Zambia, any ancient heritage or relic or part of it; or disfigure, destroy, remove, alter or damage any national monument, memorial tablet, plaque, seal or sign erected or affixed by the Commission	Ever Great Energy Company Limited will immediately inform the NHCC if any artefact were found during site preparation or construction.
<b>The Public Health Act 1996</b>	The Act was passed in 1930 with several amendments along the way, particularly in this case 1996. The Act empowers a Council to prevent unhealthy activities and for disease prevention in relation to drainages, pit latrines and disposal of sewerage.	Section 64 states that no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health. Nuisances prohibited. The proposed site, being stand- alone, shall have its own drain and sewer system	Ever Great Energy Company Limited shall comply with the provisions of the Act in order to safeguard human life by ensuring that measures to prevent diseases and pollution harmful to human health are taken into account.
<b>Local Government Act, No. 2 of 2019</b>	An Act to provide for an integrated local government system; give effect to the de Southernisation of functions, responsibilities and	The Second Schedule, Section 61 of the Act highlights the functions of the local councils, which include: conservation of natural	Ever Great Energy Company Limited will work with the local planning authorities in advancing

	<p>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 a local authority; provide for the proceedings of the council and committees; provide for the role of traditional leadership in democratic governance</p>	<p>resources, maintaining, protecting and control of local forests and - Woodside, and - establishing and maintaining environmental health services</p>	<p>development and will recognize and comply with environmental specifications with in so far as this project is concerned.</p>
<p><b>Zambia Development Agency Act No. 11 Of 2006</b></p>	<p>This is an Act to foster economic growth and development by promoting trade and investment in Zambia through an efficient effective and coordinated private sector led economic development strategy. The other purpose of this Act is to provide and facilitate support to micro and small businesses enterprises and provide measures for the same businesses to compete at the global environment.</p>	<p>Section 2 (1) states that the Act shall apply to an investor, who may invest in all regions of the Republic and in all sectors and industries other than the industries specified in the first schedule. The proposed project is an investment and directly adds to environmental equity, the Act is therefore very relevant.</p>	<p>Through obtaining the relevant Investment Licences, particularly the ZDA Investment license.</p>

	The Zambia Development Agency Act has replaced the Investment Act of 1993		
<b>The Chief's Act No. 13 of 1994</b>	Provides 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 Kapasos; and for matters incidental to or connected with the foregoing.	Chapter 283 of the Act provides for the control, use and change of land use, zones and reservations for various purposes e.g. sitting of work sites. It also provides for the compensation of those affected by planning decisions and regulated development subdivisions. The proposed project under different title holders.	The project proponent shall ensure that all procedures in terms of obtaining permission for subdivision of land and development permits is followed and adhered to.
<b>The Employment Act, No. 15 of 2015</b>	This Act provides legislation relating to the employment of persons; to make provision for the engagement of persons on contracts of service and to provide for the form of and enforcement of contracts of service; to make provision for the appointment of officers of the Labour Department and for the conferring of powers on such officers and upon medical officers; to make provision for the protection of wages of employees; and to provide for the control of employment agencies	One of the significant positive impacts of the project is creation of job opportunities to the local people. Like the act directs employers to follow the laid down law provided in section 14 and 66. Whenever labour issues are involved, provisions of the Employment Act are critical hence the relevance of the Act to Ever Great Energy Company Limited. The construction and operation phases of the project will involve the employment of skilled and unskilled manpower. These will include labourers, surveyors, engineers, drivers, office managers, etc	Ever Great Energy Company Limited will ensure that individuals employed at the project are of legal employment age, and are provided with conditions of service that meet or exceed the minimum conditions of service. Employees will not be subjected to exploitation and abuse of their rights through casualization.

<p><b>The Occupational Health and Safety Act, No. 36 of 2010</b></p>	<p>This Act is promulgated to provide for the health, safety and welfare of persons at work; provide for the duties of manufacturers, importers and suppliers of articles, devices, items and substances for use at work; provide for the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work.</p>	<p>Section 11 of Part III requires that an employer of ten or more persons at any workplace establishes a health and safety committee. The operation of the project might raise the risks of occupational health hazards as a result of the use and operation of machinery and tools. The generation of dust from clearing activities is another occupational health risk that will be generated by the project.</p>	<p>Ever Great Energy Company Limited will ensure that all the workers are provided with adequate and appropriate personal protective equipment. Ever Great Energy Company Limited will also provide information, instruction, training and supervision to ensure the health and safety of the employees at their workplace.</p>
<p><b>The Factories Act, 1999</b></p>	<p>The Act regulates the conditions of employment in factories and other places of work as regards the safety, health and welfare of persons employed therein. The Act also provides for the examination and inspection of certain plant and machinery in order to ensure safety.</p>	<p>Section 5 states that any workplace in which, with the permission of or undergarment with the owner or occupier, two or more persons carry on any work which would constitute such workplace a factory if the persons working therein were in the employment of the owner or occupier shall be deemed to be a factory for the purposes of this Act. All places of work as defined under this act will be deemed a 'factory' where safety, health and general welfare of employees will be required to be upheld</p>	<p>To ensure that the occupational health and safety of employees is upheld during the construction and operational periods, all employees will be trained in health and safety protocols.</p>

<p><b>The Public Health (infected Areas) Coronavirus Disease) Regulations, 2020, Statutory Instruments 21 and 22</b></p>	<p>Statutory Instrument 21 of 2020 designates COVID-19 as a notable disease and Statutory Instrument 22 provides additional management and control of COVID 19. These S.I provides for mandatory Screening and quarantine of travellers and international travellers, restriction of foreign travels, hygiene practices to be conducted at workplaces, public and schools, self-quarantine of travellers coming in the country, social distancing and mandatory wearing of facemasks</p>	<p>The Plant site being a public place its mandatory that all covid-19 prevention guidelines such as masking up and hand sanitizing are adhered to. And it shall be subjected to inspections by authorized officers as provided for in section 10 of the regulations. These two Statutory Instruments are important to the proposed project both at construction and operation phase due to the employees working on the project site and during the running of the Power Plant.</p>	<p>The developer will adhere to the two S.I and ensure all its employees and customers comply.</p>
<p><b>National Council for Construction Act No. 10 Of 2020</b></p>	<p>An Act to provide for the establishment of the National Council For Construction and to define its functions :to provide for the promotion and development of the construction Industry in Zambia; to provide for the registration of contractors; to provide for the affiliation to the Council of professional bodies or organizations whose members are engaged in activities related to the</p>	<p>Section 6(1) The Council shall, on the request of a public or private body, provide guidance or information to procuring entities on standards for construction works, construction materials, grades of contractors and categories under which registered contractors are classified.</p>	<p>The developer will ensure that all the contractors on site are registered by National Council for Construction.</p>

	<p>construction Industry; to provide for the establishment of the Construction school; to provide for the training of persons engaged in construction or in activities related to construction; and to provide for matters connected with or incidental to the fore-going</p>		
<p><b>The Zambezi River Authority Act No. 17 of 1987</b></p>	<p>Established the Zambezi River Authority (ZRA). The ZRA is a joint venture between the governments of Zambia and Zimbabwe</p>	<p>Article 18 of the Zambezi River Authority Act of 1987 covers water abstraction from Kariba Dam.</p> <ul style="list-style-type: none"> <li>• <b>Information sharing</b> Contracting states must inform each other of any proposals to abstract water from the Kariba Dam.</li> <li>• <b>Consultation</b> Contracting states must consult the Authority before approving proposals to abstract water from the Kariba Dam.</li> <li>• <b>Problem resolution</b> Contracting states must consult with each other and the Authority if there are problems with water abstraction from the Kariba Dam.</li> </ul>	<p>Ever Great Energy Company Limited will ensure that it obtains all necessary permits and adhere to the conditions attached to the permits.</p>
<p><b>Solid Waste Regulations &amp;</b></p>	<p>This Act provides for the regulation of solid waste and management. The</p>	<p>The proposed development will result in the generation of solid waste at all phases of the</p>	<p>Solid waste will be collected in bins at various locations</p>

<p><b>Management Act No. 20 of 2018</b></p>	<p>Act relevant provides for the management of solid waste; for the regulation of solid waste and for the provision of solid waste services by licensed solid waste service providers.</p>	<p>project which should be managed according to the provisions of this Act.</p>	<p>on site and then disposed of by an approved Local Council licensed transporter in possession of all the valid waste licenses from ZEMA. At all phases of the project there shall be no burning of waste and the bins to be used for waste will be leak proof and contained preventing scatter of waste.</p>
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## 2.2 Institutional Framework

This section shows the most important institutions in terms of Environmental Management of natural resources in the country and institutions which might interact with the project implementation.

Table 3: Institutions relevant in the Environmental Management of Natural Resources

<b>INSTITUTION</b>	<b>DESCRIPTION</b>
<b>Zambia Environmental Management Agency</b>	The Zambia Environmental Management Agency (ZEMA) is a statutory body created by an act of parliament and falls under the Ministry of Green Economy and Environmental. The ZEMA is responsible for the enforcement of the EMA on pollution control, natural resources management and solid waste management which includes establishment of the landfill sites.
<b>National Heritage Conservation Commission</b>	The national heritage conservation commission is responsible for the identification and conservation of sites of cultural and historical interest. The commission is also responsible for the enforcement of the national heritage conservation Act.
<b>Energy Regulation Board</b>	The Energy Regulation Board has the responsibility of issuing licences and monitoring the efficiency as well as the performance of energy companies to ensure they comply with the relevant standards.
<b>Zambia Electricity Supply Cooperation Limited (ZESCO)</b>	This is a public electricity utility company that generates, transmits, distributes and supplies electricity in the country.
<b>Ministry of Green Economy and Environment</b>	The Ministry is responsible for policy formulation which galvanises functions on the country's forests, climate change, meteorology biosafety and environmental protection in general. It is responsible for development of policy on environment covering issues such as solid waste management and landfill site. The ministry is also responsible for co-ordinating and monitoring the other ministries that play a role in the effective conservation and management of the environment.
<b>Water Resources Management Authority (WARMA)</b>	The Water Resources Management Authority (WARMA) was established by the Water Resources Management Act to ensure the management, development, conservation, protection and

	<p>preservation of the water resource and its ecosystems as well as equitable and sustainable utilisation of the water resource. Permits will thus need to be sought from WARMA and the company will abide by any condition, limitation, restriction or prohibition that WARMA may impose for the sustainable utilisation of the water in the rivers.</p>
<p><b>The Zambezi River Authority (ZRA)</b></p>	<p>Functions of the ZRA, as laid out in the acts that created the body, include:</p> <ul style="list-style-type: none"> <li>• Operate, monitor and maintain the Kariba Complex</li> <li>• Investigate the desirability of constructing new dams on the Zambezi River</li> <li>• Construct, operate, monitor and maintain any other dams on the Zambezi River</li> <li>• Collect, accumulate and process hydrological and environmental data of the Zambezi River</li> <li>• Make recommendations as will ensure the effective and efficient use of the waters and other resources of the Zambezi.</li> </ul> <p>The Zambezi River Authority also plays a role in managing the use of water from Lake Kariba for irrigation and for domestic, industrial and institutional use.</p> <p>As a water abstraction project, Zambezi River Authority (ZRA) will be cardinal in ensuring guidance is given with regards to the abstraction point.</p>
<p><b>Sinazongwe Town Council</b></p>	<p>Sinazongwe Town Council is recognised under the Urban and Regional Planning Act, in consultation with the Provincial Planning Authority as a planning authority whose main responsibilities are the preparation, approval and revocation of development plans.</p> <p>Ever Great Energy Company Limited recognises that the company operates in the jurisdiction of the local authority and will observe the by-laws and regulations set up by the local authorities. Planning and building permission will need to be sought from the local authority.</p>

### **2.3 International Environmental Conventions to which Zambia is a Signatory**

Zambia is a signatory and a ratified party to a number of international conventions. Though most of these agreements are non-committal, they are very vital in ensuring that individual countries operate while conscious of the locally but think globally. These agreements are meant to encourage countries to operate on agreed principles to enhance environmental, social and economic development.

Table 4: shows the international conventions

Convention	Description	Relevance to the Project
<b>United Nations Framework Convention on Climate Change Ratified 1997 UNFCCC</b>	Article 3 provides for aiming at stabilizing greenhouse gas (GHGs) concentration in the atmosphere at the level that would prevent ‘dangerous interference with climate’. It urges countries to take steps in reducing the GHGs.	There will be not much emission of GHGs from this project except CO <sub>2</sub> from fossil fuel consumption. Ever Great Energy Company Limited will endeavour to use best technology and practices to reduce emissions of GHGs.
<b>UN Convention on Biological Diversity (1992)</b>	Article 3 provides for the promotion and conservation of biological diversity and sustainable use of its components.	Ever Great Energy Company Limited will continue to implement measures that encourage the conservation and protection of biodiversity.
<b>Rio Declaration on Environment and development.</b>	Principle 2 states that with the charter of the United Nations and the principles of international law, the sovereign right to exploit their own resources pursuant to their own environment and developmental policies, and responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment. It established important principles for sustainable development	This declaration is important in that it involves the use of natural resources in a sustainable way to ensure that future generation also benefit. Ever Great Energy Company Limited will implement the project in line with this declaration. It will incorporate sustainability principles in all in all its operation.
<b>CITES Convention on International Trade in Endangered Species of Wild Fauna and Flora Ratified: 1975</b>	Article II aims at the protecting endangered species prominent in international trade through appropriate trade control measures and monitoring the status of such species.	Ever Great Energy Company Limited will continue to adhere to the provisions of this convention as the licence area has a number of fauna and flora species.

<p><b>UNCCD Convention on Desertification</b></p>	<p>Article 2 of the states that the convention is meant to combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective action at all levels, supported by international cooperation and partnership arrangements.</p>	<p>This Convention has a bearing on Ever Great Energy Company Limited as the project site is prone to serious drought/desertification.</p>
<p><b>Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat. Ratified: 1975</b></p>	<p>Article 2 of the convention aims at protecting wetlands through sustainable utilisation of them. It addresses one of the most important issues in Southern Africa, namely the conservation of the countries water supplies, for both the use of the natural resources.</p>	<p>The project will have impacts on Wetlands which provide a range of services, functions, and products that have direct social, economic and cultural value and are vital to the survival and well- being of communities. These systems have indispensable ecological value, being repositories of biodiversity and providing essential life support for a range of plant and animal species. The conservation and wise use of all wetlands is therefore in the national interest. Ever Great Energy Company Limited will take into account the provisions and principles of this instrument when implementing the project.</p>
<p><b>Montreal Protocol Protocol for the Protection of the Ozone Layer Ratified: 1990</b></p>	<p>Article 2 of the protocol is aimed at ensuring measures to protect the ozone layer</p>	<p>Ever Great Energy Company Limited needs to ensure its compliance by excluding all products and equipment making use of CFCs. Ever Great Energy Company Limited will not use anything that will contribute to ozone layer depletion</p>

<p><b>African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968), (Maputo, 2003)</b></p>	<p>Article III encourages individual and joint action for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.</p>	<p>Ever Great Energy Company Limited will ensure the conservation of important habitats as well as habitat corridors to promote biological diversity. The EMP deals with these aspects of ensuring habitat diversity and sustainable utilisation of natural resources.</p>
<p><b>Basel Convention Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal Ratified: 1994</b></p>	<p>Article 4 Aims at the reduction of the production of hazardous waste and the restriction of transboundary movement transboundary movement and disposal of hazardous waste.</p>	<p>No direct impact on Ever Great Energy Company Limited power plant project as the company will not be transporting any of its waste across any international boundaries.</p>

### 3. PROJECT DESCRIPTION

#### 3.1 Project Location

The proposed project area falls under Sinazongwe District where the proposed Thermal Power Plant will be constructed. The project site is located in Siameja azilundu village and Dengeza village in Senior Chief Mweemba's Chiefdom in Sinazongwe District about 124km South of Sinazongwe CBD. Access to the site is via the D775 (Batoka-Maamba) road which branches off from Batoka Junction onto a gravel road (bottom road) just after the check point going into Maamba town. The starting point where the abstraction will be conducted is at the Lake Kariba in Dengeza Area and the end point being the Thermal Power Plant location. Below are the project site coordinates of the pipe line route;

*Table 5: Water Abstraction Pipeline Route Coordinates*

<b>No.</b>	<b>Latitudes</b>	<b>Longitudes</b>
<b>Starting Point</b>		
	17°41'22.39"S	27°10'10.73"E
<b>Ending Point</b>		
1.	17°37'24.25"S	27°7'0.08"E
2.	17°37'45.61"S	27°5'2.01"E
3.	17°37'47.20"S	27°0'43.31"E



*Figure 2: Part of the Project Area at the Starting Point in Dengeza Area*



Figure 3: Water Pipeline Route from Dengeza Village to Siameja Azilundu Village

### 3.2 Nature of the Project

Ever Great Energy Company Limited (EGECL) is proposing to abstract water and set up a Water abstraction Pipeline from lake Kariba in Dengeza village to the Thermal plant in Siameja Azilundu Village area in Senior Chief Mweemba's of Sinazongwe District.

The main objective of the project is to abstract water and to set up a Water abstraction Pipe line to cover a distance of about 24km from Lake Kariba in Dengeza village to the thermal plant in Azilundu Siameja in Chief Mweemba's area of Sinazongwe District.

#### 3.2.1 Components of Water abstraction Pipe Line

The proposed Water abstraction Pipeline will comprise of the following components:

- **Pump House:** Contains the sealed chamber where the impeller rotates;
- **Motor:** Provides the rotational energy to the impeller;
- **Impeller:** The rotating component that moves the water;
- **Valves:** Control the flow of water and prevent backflow;
- **Pipes:** Transporting the water to its destination;
- Water storage and treatment facility at the power plant; and
- Power backup Solar and generator.

Below is a summary description of the Water abstraction process:

Water pumping from Lake Kariba will involve a pump using mechanisms like impellers to create a pressure difference, drawing water in through a suction phase and pushing it out through a discharge phase, ultimately moving the water to its destination which is the power plant through the pipeline. Below is a step-by-step flow of the process:

**i. Suction Phase**

There are basically 3 activities that occur under the suction phase which include;

- **Creation of a Low-Pressure Area:** This involves the pump's motor driving a rotating impeller (a fan-like component) inside a sealed chamber.
- **Formation of a Vacuum:** As the impeller spins, it creates a low-pressure area (a vacuum) at the pump's inlet (suction side).
- **Water Intake:** This low-pressure area draws water from the water source (lake) into the pump.

**ii. Discharge Phase**

- **Impeller Action:** The rotating impeller forces the water to move outwards, increasing its velocity and pressure.
- **Water Ejection:** The water is then pushed out of the pump through the outlet (discharge side) with high pressure.
- **Flow Establishment:** This forceful ejection creates a continuous flow of water, allowing it to be moved through pipes or hoses to its intended destination.

Types of Pumps to be used

- **Centrifugal Pumps:** These use a rotating impeller to create a pressure difference and move water.
- **Submersible Pumps:** These are designed to be submerged in the water source and draw water directly from below.
- **Positive Displacement Pumps:** These pumps use a mechanism to displace a fixed volume of water with each stroke.
- **Jet Pumps:** These use a jet of water to create a vacuum and draw water from a well.

The pump features which are often utilized within the power generation industry include;

- i. Variable Speed Drive – to accommodate multiple duty points and variations in demand.
- ii. Magnetic Drive – to eliminate the need for process seals which may leak

- iii. Relief Valves – to prevent damage to pumps but also excess system pressures
- iv. Wide viscosity range handling particularly if Crude Oil is handled which can vary significantly with temperature.

The pipe will be made of metal with a diameter of 30cm which will be pumping 2500m<sup>3</sup>/h and 3 pumps from source to the water storage area at the thermal plant. The pumps will have the pumping power of 2500 torque.

### **3.2.2 Camping area**

The project will also have a temporal camping area which will be along the pipe line. The makeshift houses will be for staff and contractors working on the Water abstraction Pipeline. The housing units will be fenced off and entry will be restricted to staff only.

### **3.2.3 Water Management System**

Ever Great Energy Company Limited will manage water across the plant site in order to efficiently manage the water resource and prevent excess drop in water levels. To achieve this, Ever Great Energy Company Limited will develop and implement a Site Water Management Plan. The Water Management Plan will focus on the following:

- Separation of clean and dirty water;
- Where practicable, reduce raw water consumption, maximize re-cycling of waste water and reduce the volume of effluent discharged to the environment;
- Regular inspection and maintenance of the pipes to prevent any leaks;
- Regular inspection and maintenance of the plant site drainage system and pollution control facilities;
- Regular monitoring of surface water, effluent streams and flow rates, and groundwater quality;
- Compliance with the Zambian drinking water quality standards and other relevant guidelines for effluent discharge to surface waters; and
- Preparation of formal emergency response procedures in the event of a spillage to prevent water contamination.

### **3.2.4 Pumping Capacity**

The proposed Water abstraction Pipeline is expected to pump approximately 2500m<sup>3</sup>/h.

### 3.2.5 Raw materials, Equipment and Machinery

The main machinery to be utilised in all the phases are but not limited to mechanised equipment such as excavators, dump trucks, compressors, jack hammers, water pumps, a rock drilling machine, generator, crushers, conveyors and bulldozers. Front-end loaders will supplement the fleet and be used for construction. Water bowsers, will be used to control dust emissions at and around the project site. Dust suppressing water will be taken from the lake. The majority of the materials, equipment and machinery will be procured locally.

*Table 6: Shows the raw materials to be used*

<b>S/n</b>	<b>Description</b>	<b>Source</b>	<b>Use</b>
1.	Steel for towers, concrete reinforcement, Insulators, ACSR Conductor, Timber of various sizes, Accessories such as bolts and nuts, Fencing wire	Locally	Construction
2.	Cement, steel beams, paint, roofing sheets, cladding sheets	Locally	Construction
3.	Bars, sand, laterite, other wooden materials, glasses, piping, electrical, paving	Locally	Construction
4.	Water	On Site & from lake Kariba	Dust Suppression, Domestic use and operational use.
5.	Crushed stones	Locally	Construction
6.	Fuel	Locally	Construction and Operations

### **3.2.6 Products and by-products**

The main product of the project is water for the thermal plant that will be pumped through the proposed pipe line.

The expected solid waste from the project among others will be empty oil tins and other packaging waste and domestic waste arising from the camp kitchen. All other solid waste will be stored in appropriate solid waste bins separated into Domestic Waste, Industrial Waste and Hazardous Waste. The waste will be managed in- accordance with Environmental Management (Amendment) Act No. 8 of 2023 and Solid Waste Regulation and Management Act, 2018 (Stored and once the quantities are sufficient, will be transported to the Licensed waste disposal site).

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

The project will involve preparation of the project site, construction and the operational of the thermal power plant. The project life span has been estimated to be 50years.

## **3.3 Main project activities**

The project will consist of three implementation phases; these will include the following;

### **3.2.8 Preparation phases**

The phase will involve obtaining of all relevant authorization from regulatory agencies including ZEMA and other regulatory authorities. All equipment, machinery, construction raw material and utensils will be procured and delivered to the proposed sites in readiness for the commissioning of the operation activities. Summary of activities to be undertaken in this phase will be as given below:

- Obtaining relevant approvals from regulatory authorities and other stakeholders.
- Mobilizing all equipment and machinery to site.
- Recruitment of local labour (skilled and semi-skilled) for the operation.
- Site clearing for the installation of unit operation machinery will be done with extreme care and precaution.

### **3.2.9 Construction phase**

The following activities will be undertaken during the construction phase of the project. The project will involve the clearing of the site in preparation for the construction activities to be conducted, construction of the water abstraction pipe line, Pump house and light vehicle repairs at the site, store rooms, guard house, change house, water supply facilities, sanitation facilities and fuel storage facility etc. A boundary security fence will also be constructed around the working areas. Some of the activities during this phase will include:

- Removal of vegetation;
- Digging and earthworks to prepare trenches for the laying of pipes;
- Laying of pipes in the trenches and backfilling;
- Construction of a pump house and a security guard house;
- Fabrications and installation of fuel storage tanks;(the used oil to be generated will be stored in separate drums, which will be stored in separate room which is well labelled and the used batteries will also be stored in a separate room and later disposed of by the licenced transporter to the ZEMA approved dump site;
- Setting and erection of block walls, partitioning, roofing, painting and Installation of fittings and piped water facilities; and
- A boundary security wall fence will also be constructed around the working areas.

### **3.2.10 Operation phase**

At operation phase, the company will be abstracting water from Lake Kariba in Dengeza Village to the Thermal plant in Azilundu Siameja village through pipelines, storing and treating of the raw abstracted water before use. Repair and maintenance of electrical equipment will most likely be done during the operation phase of the project.

### **3.2.11 Decommission and closure phase**

The activities that will be carried out during the decommissioning of the Water abstraction Pipeline will include the decommissioning and removal of the equipment from the pumping station, demolition of the pipe line and the re-vegetation of the entire project area, unless by request, pre-determined by the local population to have the facilities for alternative use.

*Table 7 shows the Decommissioning and Closure activities*

<b>No.</b>	<b>Project Component</b>	<b>Activity</b>
01	Pump house	To be demolished
02	Camp Site/housing units	<ul style="list-style-type: none"> <li>- Dismantling all the building and other structures.</li> <li>- Disinfect portable toilets</li> <li>-Re-vegetate</li> <li>- Close access roads to avoid further deforestation activities since some areas may become more accessible</li> <li>- Lime shall be used to disinfect toilet areas of the camp.</li> </ul>

		-Houses shall be demolished and the sight rehabilitated.
03	Water abstraction Pipeline	-All components to be dismantled -The pipeline route to be re-vegetated

## 4 PROJECT ALTERNATIVES

The proposed implementation of the project may be undertaken considering other viable options. The following are some of the alternatives that were considered for the project.

### 4.1 Pipeline route Alternative *Dengeza route or Kafwambila route*

The two options considered included laying of water abstraction pipes through Dengeza route from Lake Kariba through Dengeza to the power plant or laying of water abstraction pipes through Kafwambila route from Lake Kariba through Kafwambila to the power plant.

Developing the project through Kafwambila route from Lake Kariba through Kafwambila to the power plant will be a longer route and has a lot of settlements therefore, the most preferred route is through Dengeza.

Dengeza route was chosen due to the following advantages;

- It will be less costly to use that route.
- It has less settlements hence less disturbances.
- It is the shortest route to the power plant.

### 4.2 Pipe types Alternatives

Plastic pipes or Metal Pipes

When considering piping for water abstraction in thermal power plants, the choice between plastic and metal involves several factors.

#### **Option 1: Metal Piping;**

*Strength and durability:* Metal pipes, especially steel, can withstand high pressures and temperatures.

*Thermal conductivity:* Useful in certain applications where heat transfer is desired.

#### **Option 2: Plastic Piping;**

*Temperature limitations:* Some plastics have temperature limitations, which may be a concern in thermal power plants.

*Pressure limitations:* While some plastics can handle high pressures, others may not be suitable. potential for degradation from UV light.

The Developer preferred (option 1) as this is only a Water abstraction Pipe line project not a distribution project and it is a cost effective for this type of Project.

### 4.3 Pipe Laying Method alternatives

Underground or Surface (both will be used were possible)

When considering pipe laying method alternatives for a water abstraction project serving a thermal power plant, several factors come into play. These include;

**Water Volume and Pressure:** The required water flow rate and pressure will significantly influence the pipe diameter and material, which in turn affects the laying method.

**Terrain and Soil Conditions:** Rocky terrain, soft soils, or areas with high groundwater levels will necessitate different approaches.

**Environmental Impact:** Minimizing disruption to the surrounding environment is crucial.

**Cost and Time:** Balancing the budget and project timeline is essential.

**Thermal Considerations:** If the abstracted water has temperature variations, then thermal expansion of the pipe must be accounted for.

Here are some pipes laying method alternatives:

**Open Trenching:** This is the traditional method, involving excavating a trench, laying the pipes, and backfilling. It's suitable for relatively straightforward terrain but can be disruptive.

Considerations must be given to the depth of the trench, and the type of soil being excavated.

**Trenchless Technology:** These methods minimize surface disruption and are ideal for sensitive areas or where open trenching is impractical.

**Horizontal Directional Drilling (HDD):** This involves drilling a pilot hole, then enlarging it to accommodate the pipe. It's suitable for crossing obstacles like rivers, roads, or railways.

**Pipe Jacking/Micro tunneling:** These methods involve pushing pipes through the ground using hydraulic jacks. They're suitable for larger diameter pipes and challenging soil conditions.

**Aboveground Piping:** In certain situations, particularly in remote areas or where underground conditions are problematic, aboveground piping may be considered. This requires careful design to account for thermal expansion, support structures, and environmental factors. Considerations must be given to the visual impact of above ground piping.

When making a decision, a thorough site investigation, engineering analysis, and cost-benefit analysis are crucial. Therefore, the Developer preferred laying the pipes both Underground and Surface because of the terrain.

#### **4.4 Water Supply Alternatives**

Three alternatives were considered for water supply as follows:

Groundwater abstraction or Surface water abstraction

1. Ground water abstraction – the major source in the area is ground water. Project area has high ground water potential. This option would involve the developer drilling boreholes and managing them. And this was the preferred option for the site preparation and construction activities.
2. Water and Sewerage Company - This meant connecting to the nearest utility company. There is however, no Water and Sewerage Company line within the project area. Therefore, this option was not opted by the developer.
3. Water abstraction from the nearest stream or river – The nearest water body is the lake Kariba which will be used during the operation stage for all the power plant processes.

Therefore, the developer will use both groundwater and surface water abstraction at different phases of the project.

#### **4.5 Waste Management alternative**

Creating a dumpsite or using bins to be emptied regularly by a licenced company.

Solid waste to be generated at the site will mainly be packaging plastic material, kitchen waste and paper waste. Considerations will be made by the developer to manage solid waste by way of transporting it to a designated dumpsite within Sinazongwe town through existing waste management companies including the Sinazongwe Council Waste Management Unit.

Waste management alternative includes incineration of the unused raw materials. This option is not preferred because no incinerator will be installed on site.

Hence, the option of engaging waste management company to disposal of its waste was chosen by the company.

#### **4.6 Sewer Management Alternatives**

Using mobile toilets or using local community toilets nearby/pit latrines

Two sanitation alternatives were considered and these were using mobile toilets or nearby local community toilets. The workforce along the pipeline will use mobile toilets for convenience purposes. These will be regularly emptied and cleaned by a licenced company that will be engaged. Using nearby local community toilets was not preferred because it would be inconveniencing the locals and the number of people using the toilets would increase thereby, creating a health hazard.

#### **4.7 Do nothing option**

This option was not chosen given the increasing demand for power in the country. The option would not have been commensurate to the scale of current demand and the need for Ever Great Energy Company Limited to contribute to employment creation in the area and the economy of the country.

#### **4.8 No Project Alternative**

The “No project Option” would negatively affect the development of Mineral Resources in the country thereby depriving the country of the much-needed benefits that the project will bring about.

## 5.0 DESCRIPTION OF THE BASELINE ENVIRONMENT

The proposed project is for setting up of a Water Abstraction Pipeline from lake Kariba in Dengeza village to the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Siameja Azilundu village of Senior Chief Mweemba's Chiefdom in Sinazongwe district. The proposed project site is in its natural state with a few settlements around where the pipeline route will be.

### 5.1 Climate

The project area is characterized by a subtropical climate that consists mostly of three distinct seasons as follows;

- (i) Cold season: June to August
- (ii) Pre-rainy season: September to October
- (iii) Rainy season: November to March

The project area is in the Zambezi valley where temperature is relatively high, particularly during the dry season. Given the prevailing climate variations, the three seasons experience variations in terms of duration and onset. In recent years and because of the prevailing climate change phenomena, the variations in the seasons have been observed and this has had an impact on water availability in time and space. The specific climatic factors are described in the proceeding sub-sections.

### Agro-Economic Zone

The proposed project falls in Agro-Economic Zone I and IIa which has less than 800mm of rainfall. However, this is able to support the production of a variety of food and cash crops like maize, sunflower, groundnuts and tobacco.



Figure 4: Agro-ecological Zone Map

## Temperature

The mean annual temperature around Lake Kariba does not differ significantly. The temperature range in the project area is typical of what prevails in the valleys where the mean annual temperature is relatively higher than in the highland areas. Sinazongwe and surrounding areas lie in the Zambezi Valley and temperature in these areas is relatively high almost throughout the year except during the cold season. The monthly mean annual temperature ranges from 21°C in June to 35°C in October. Other climatic elements are presented in Table 4.

*Table 5: Maximum and minimum temperature and other climatic parameters for Kariba (Source: FAO).*

Month	Min Temp (°C)	Max Temp (°C)	Humidity (%)	Wind (km/day)	Sun (hours)	Rad (MJ/m <sup>2</sup> /day)	Eto (mm/day)
Jan	21.6	30.5	76	121	6.9	21.3	4.68
Feb	23.2	35.2	36	233	9.2	24.0	7.48
Mar	21.6	30.5	76	121	6.9	21.3	4.68
Apr	23.2	35.2	36	233	9.2	24.0	7.48
May	21.6	30.5	76	121	6.9	21.3	4.68
Jun	23.2	35.2	36	233	9.2	24.0	7.48
Jul	21.6	30.5	76	121	6.9	21.3	4.68
Aug	23.2	35.2	36	233	9.2	24.0	7.48
Sept	21.6	30.5	76	121	6.9	21.3	4.68
Oct	23.2	35.2	36	233	9.2	24.0	7.48
Nov	21.6	30.5	76	121	6.9	21.3	4.68
Dec	23.2	35.2	36	233	9.2	24.0	7.48
<b>Average</b>	<b>18.2</b>	<b>30.4</b>	<b>58</b>	<b>156</b>	<b>8.5</b>	<b>20.9</b>	<b>4.93</b>

## Evaporation and Evapotranspiration

In the project area, PET varies throughout the year. The monthly PET ranges from 150mm to 250mm with the highest being experienced between September and November. Spatially, PET in the area ranges from 1800mm to 1900mm. Around the project area, the annual PET is about 1800mm.

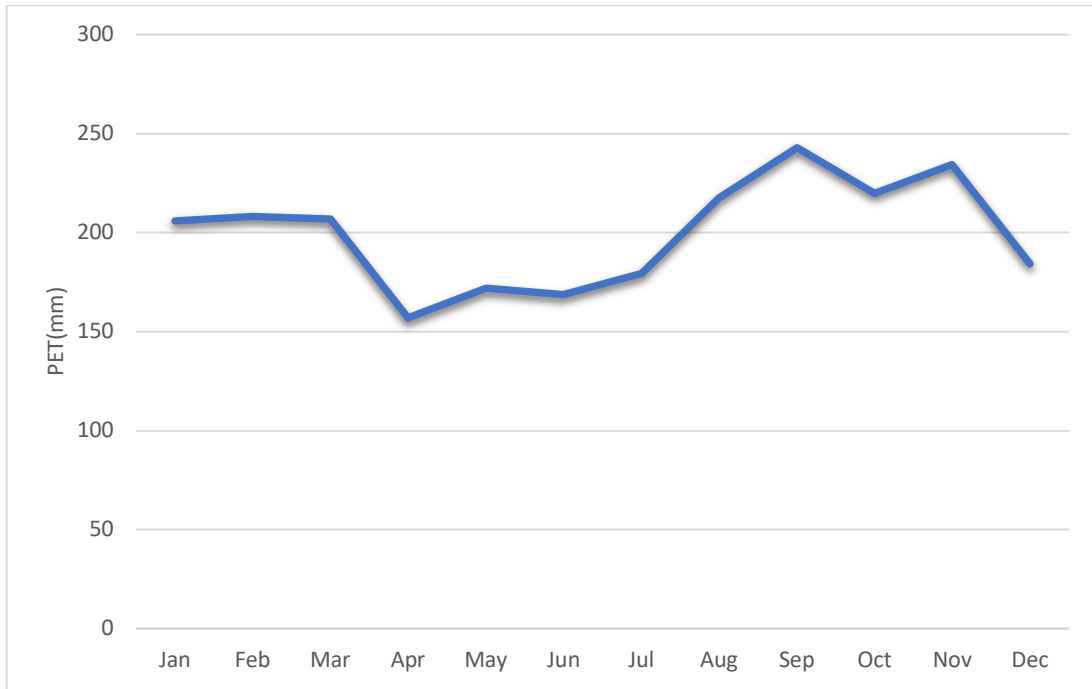


Figure 6: Shows the average monthly evapotranspiration

The evapotranspiration of Sinazongwe district through satellite imagery has been represented in the figure 6 below.

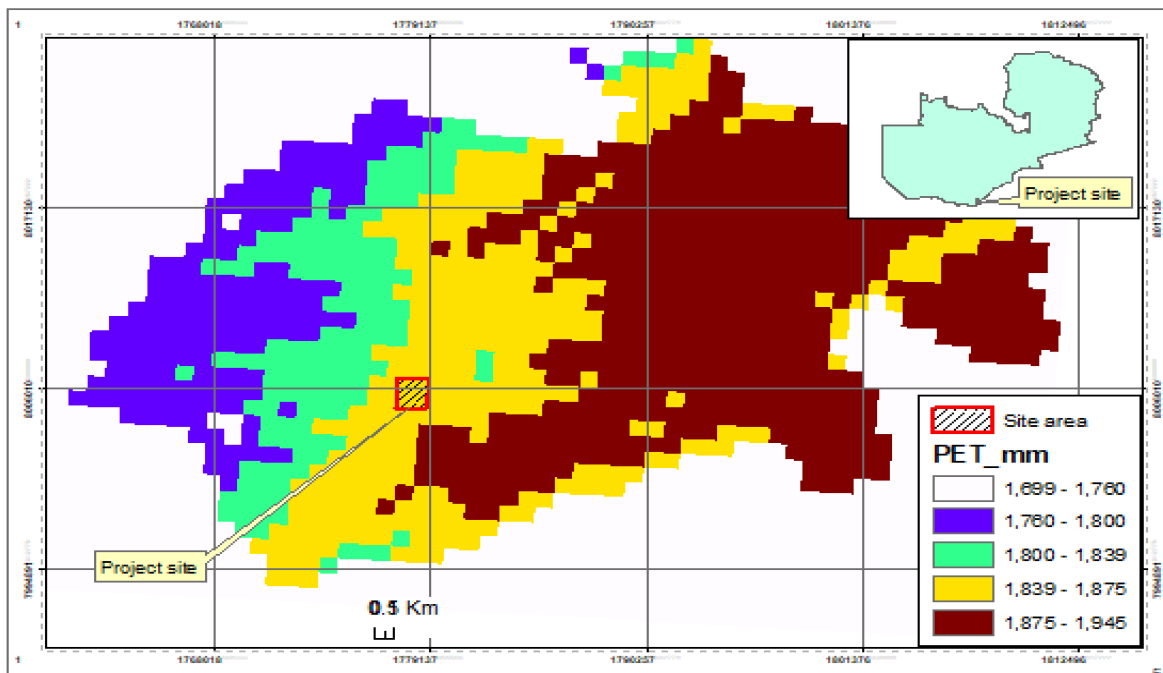


Figure 7: Shows evapotranspiration of the project area

### Mean Annual Rainfall

Rainfall records for the past 42 years (1983 to 2023) show that the area receives 717mm as mean annual rainfall (figure 7). This is typical and consistent with the long-term rainfall occurrence in agro-ecological region I where annual rainfall ranges from 600mm to 800mm. Like other parts of the country, rainfall

in Sinazongwe and the project area is mainly influenced by the movement of the Inter-Tropical Convergence Zone (ITCZ).

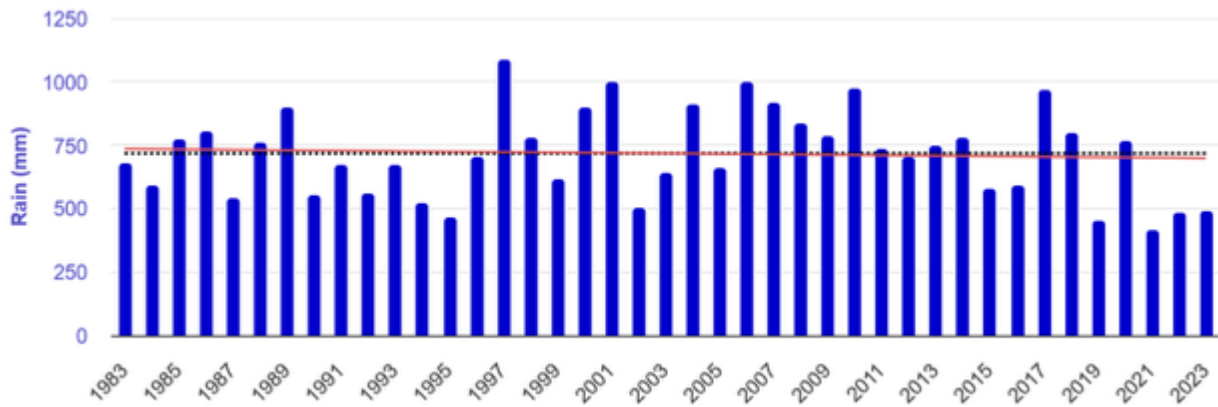


Figure 8: Shows Historical mean annual rainfall over the project area (Source: CHRS)

In terms of rainfall reliability, the analysis in Table 8 shows that an annual rainfall of 556 mm was found to have an 80% probability of exceedance (dry year), 707 mm had a 50% probability of exceedance (normal year) while the wet year had 904mm at a 20% exceedance probability. The corresponding return periods for the mean annual rainfall records are shown in Table 8 and Figure 8.

Table 8: Design Rainfall and return periods (Data source: CHRS, 2024)

Year	Rainfall	Exceedance	Return Period (Yrs)	Remarks
1997	1089.87	2.4	73.4	
2001	1003	4.9	26.4	
2006	1000.07	7.3	16.1	
2010	976.67	9.8	11.6	
2017	970.44	12.2	9.0	
2007	917.55	14.6	7.4	
2004	911.22	17.1	6.3	
2000	904.47	19.5	5.44	Wet year (20% probability)
1989	902.48	22.0	4.8	
2008	837.33	24.4	4.3	
1986	809.37	26.8	3.9	
2018	798.75	29.3	3.6	
2009	787.61	31.7	3.3	
1998	782.28	34.1	3.0	
2014	780.34	36.6	2.8	
1985	773.62	39.0	2.6	
2020	769.34	41.5	2.5	
1988	765.51	43.9	2.3	
2013	752.61	46.3	2.2	

2011	740.31	48.8	2.1	
2012	707.09	51.2	2	Normal year (50% probability)
1996	703.62	53.7	1.9	
1983	684.6	56.1	1.8	
1993	676.16	58.5	1.7	
1991	675.72	61.0	1.7	
2005	660.93	63.4	1.6	
2003	642.72	65.9	1.5	
1999	618.73	68.3	1.5	
1984	596.5	70.7	1.4	
2016	593.86	73.2	1.4	
2015	580.46	75.6	1.3	
1992	559.17	78.0	1.3	
1990	556	80.5	1.26	Dry Year (80% probability)
1987	546.01	82.9	1.2	
1994	525.76	85.4	1.2	
2002	502.7	87.8	1.2	
2023	490.11	90.2	1.1	
2022	483.77	92.7	1.1	
1995	470.3	95.1	1.1	
2019	454.32	97.6	1.0	
2021	414.72	100.0	1.0	

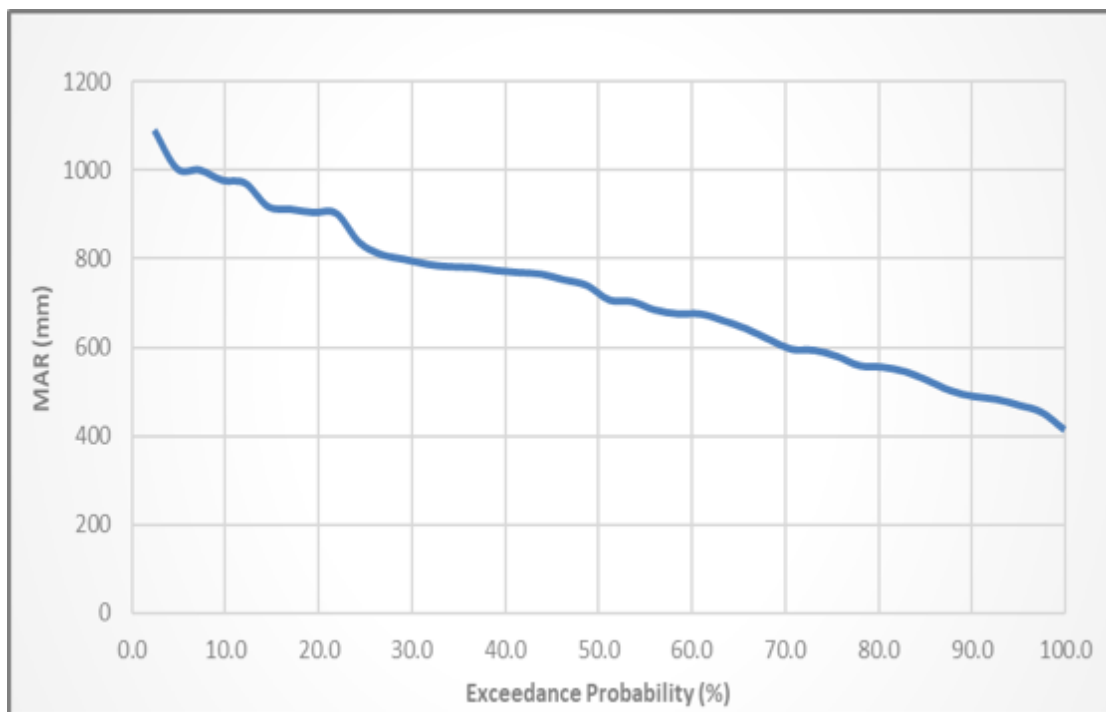


Figure 9: Probability exceedance of rainfall for the catchment area (Data source: CHRS, 2024)

## 5.2 Morphology and Drainage

The project area lies in an undulating terrain at an average altitude of about 592m above mean sea level (amsl) as shown in Figure 9. The terrain type is typical of the riparian places along the shores of Lake Kariba. The topography of the project area from the north to the south is shown in figure 9 and the summary of the terrain statistics. An overview of the morphology, as shown in Figure 10, indicates the undulating and dissected terrain of the project area and surrounding places.

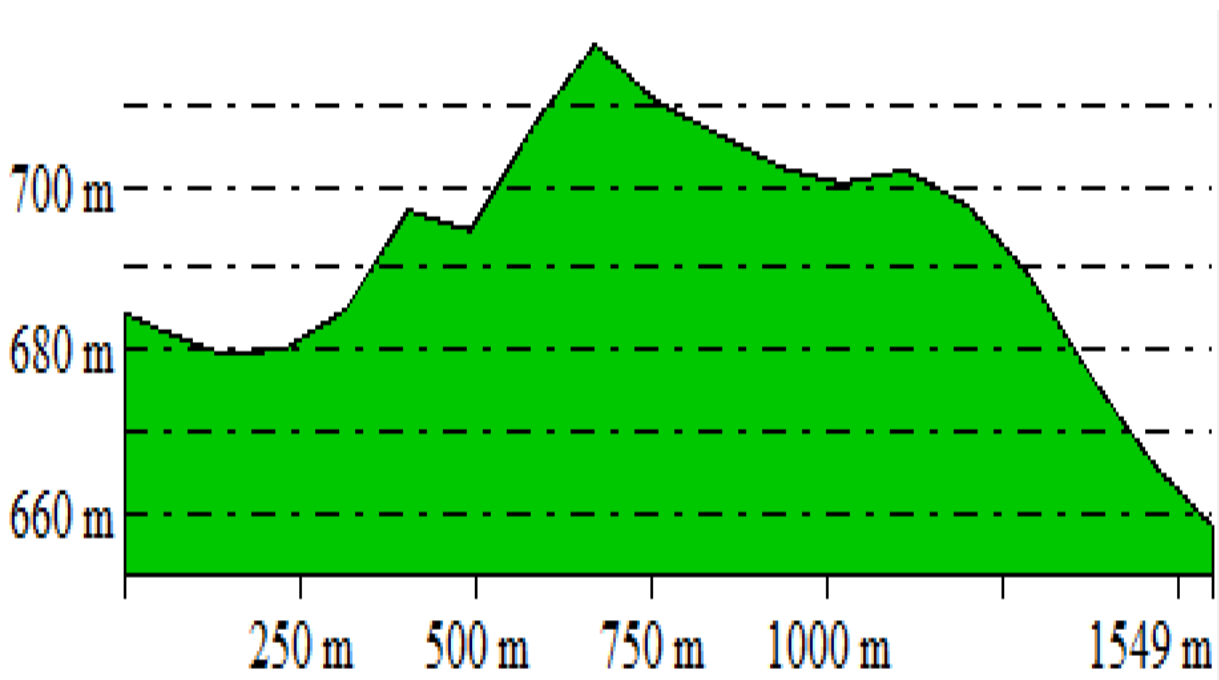
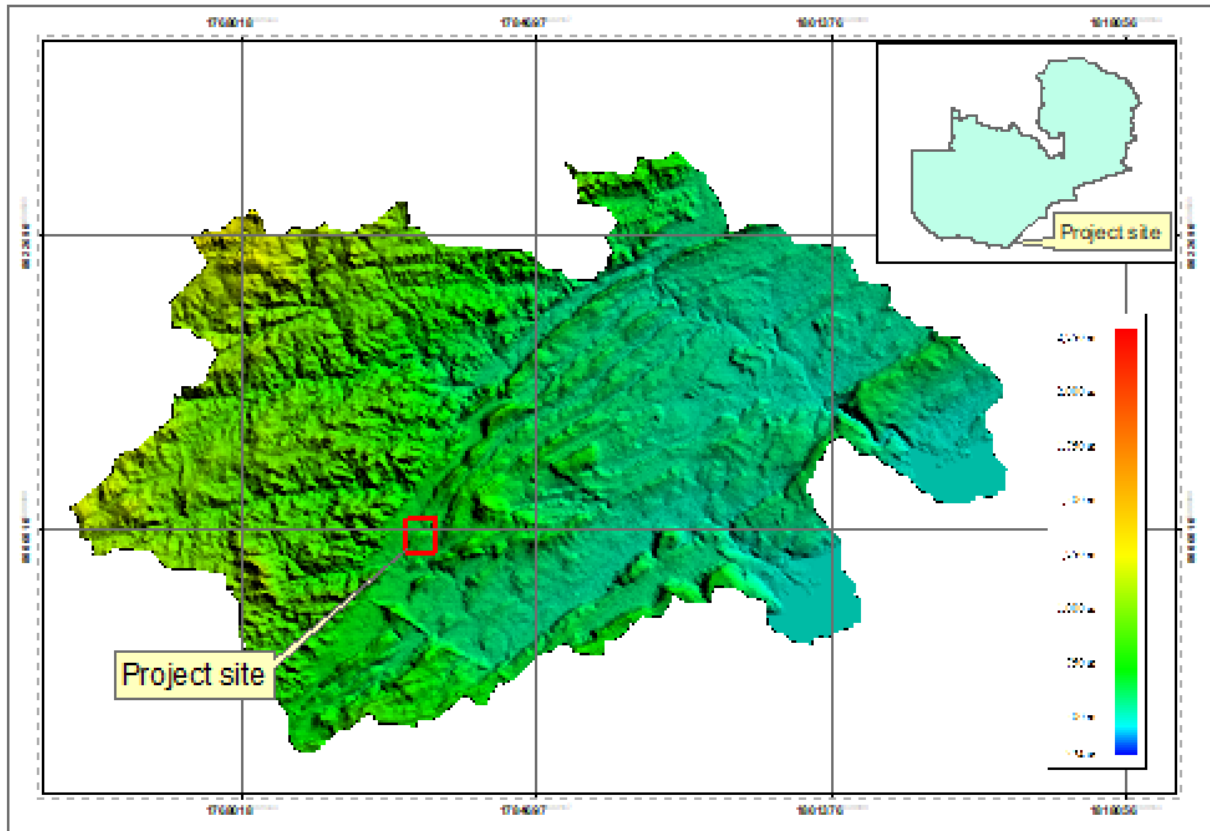


Figure 10: Undulating terrain from the east-west of the project site

Min Elevation (m asl)	Max Elevation (m asl)	Average Elevation (m asl)	Maximum slope (°)	Average slope(°)
592	859	700	27	7



*Figure 11: Morphology and drainage of the project area and surrounding places*

### **5.3 Geology**

The geology of Southern Province is of a complex nature. The basement rocks are overlaid by the Muva, Lower and Upper Roan, Mwashia Upper and Lower Kundelungu series. Large parts of these have been irregularly deposited and irregularly eroded over time. The Basement complex and the Muva system comprise a series of Schist, Quartzites, Gneisses and intrusion of Granite. On the Muva and Basement rocks are sedimentary rocks of the Katanga system which are considered to be of the late Pre - Cambrian age. The project site is characterised by hills

The geology of Sinazongwe District comprises a varied suite of rocks of various origins and ages. The youngest rocks are of colluvial materials found in the valley floor. Close to the valley floor are red sandstone, basalt and sandstone all belonging to the Karroo system. A variety of rocks, such as biotite schists, quartzite, meta-quartzite, granite.

The geological structure of the project area is dominated by northeast-southwest trending rift faulting. The boundary of the rift is formed by a prominent fault escarpment, the junction between the Gwembe Highlands and the Zambezi rift. The Southern boundary is a smaller fault scarp of parallel trend that occurs along the northern side of the Sinazongwe hill area. Within

the rift valley, northeast- southwest trending faulting has produced several ridges of Basement rocks. Rock exposure within the valley floor is generally poor except along river courses.

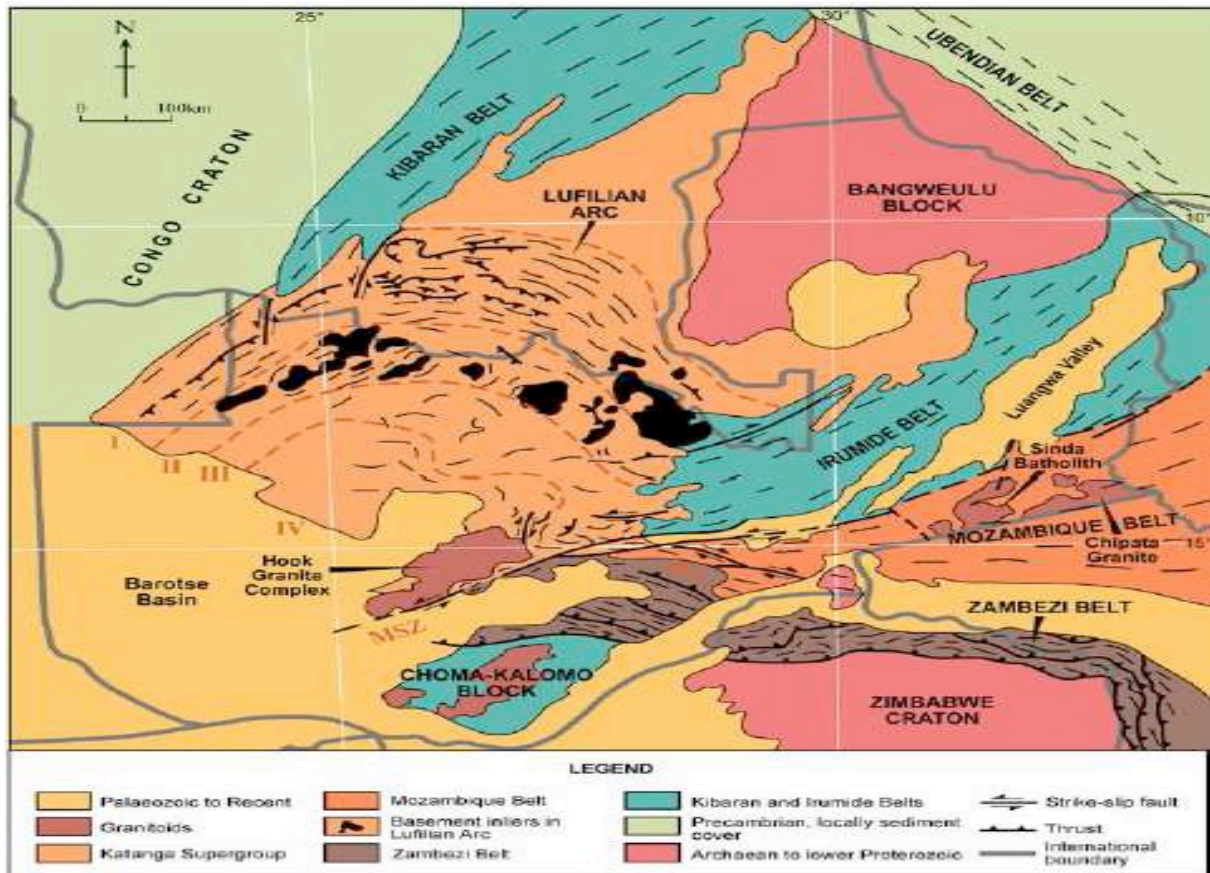


Figure 12: Shows the geology of the project area

#### 5.4 Hydrogeology

According to the Hydrogeological map of Zambia, the project area predominantly lies in an aquifer that has moderate groundwater potential. The map shows that the expected yields in this area may range from 0.1 – 15 litres per second (figure 12).

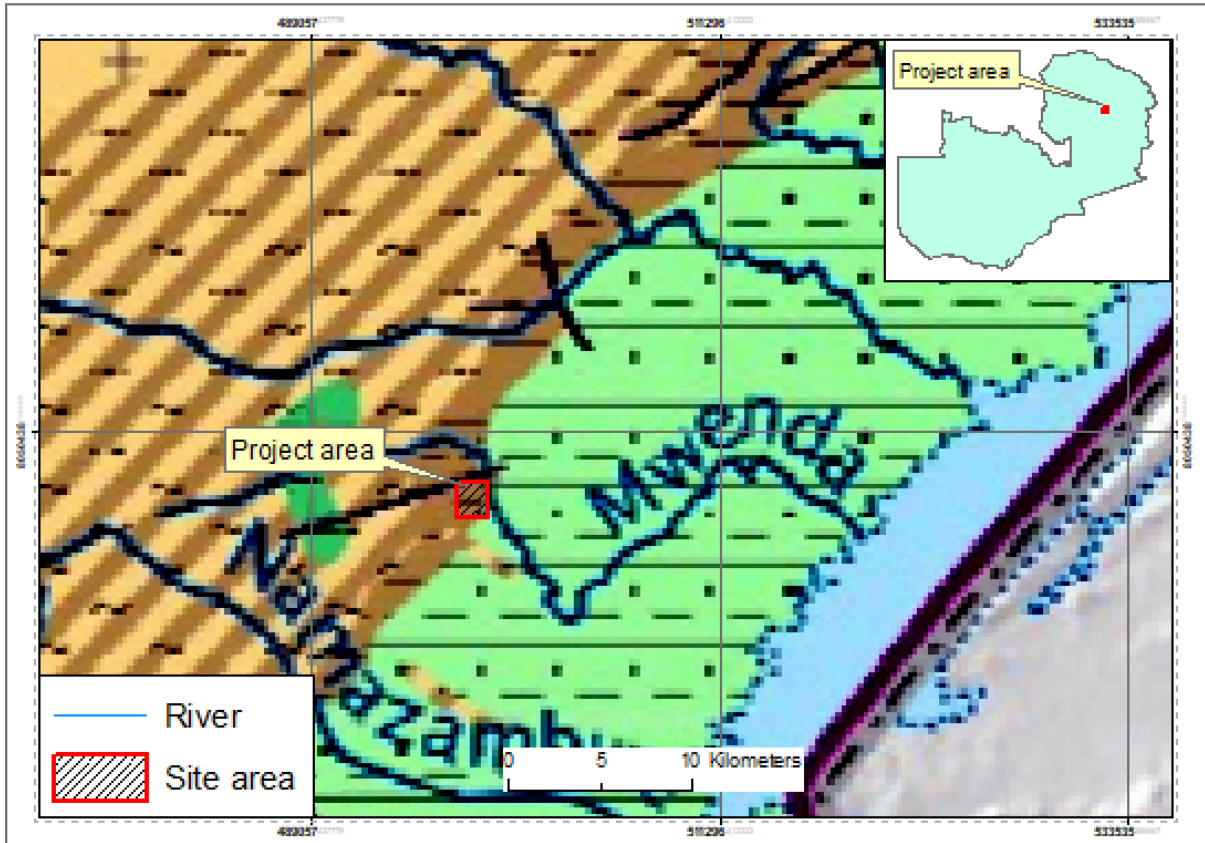


Figure 13: Hydrogeology of the project area

#### Groundwater Development Prospect

##### Aquifers in which intergranular flow is significant

**B** Moderately productive, intergranular, predominately unconsolidated aquifer (0,1 - 15 l/s) (mainly alluvial sands and gravels & Kalahari Group)

##### Aquifers in which flow is dominantly in fissures, channels or discontinuities

**C** Highly productive aquifer (0,1 - 70 l/s) (mainly Upper Roan dolomite and Kundelungu limestone)

**D** Moderately productive, fissured aquifer (0,1 - 15 l/s) (mainly Karoo sandstones)

**E** Locally productive, fissured aquifer (0,1 - 10 l/s) (mainly undifferentiated Kundelungu, Lower Roan quartzites, Muva sediment granites)

##### Aquifers of limited potential or regions without significant groundwater

**E - F** Stratum with intermediate characteristics (0 - 2 l/s) (mainly low yielding formations of Karoo basalts, Mine series shales and basement gneiss)

**F** Unproductive formations (mainly Karoo shales, metamorphic and igneous rocks)

### 5.5 Catchment yield and water availability

The project area is drained by several intermittent streams which drain into the Zambezi River, in the eastern direction. The drainage channels are Zhimu, Namazambwe and Mwenda. These three river channels are the main ones and all drain portions of the project from the north to the southern tip (figure 12).

Given the above scenario, significant runoff passes through the project area and contributes to the overall flow into the Zambezi River and eventually into Lake Kariba. Based on the rainfall analysis in section 5.1 and catchment extent, the yield across the project. Cumulative runoff based on seasonal variations and related climatic factors ranges from 74Mm<sup>3</sup> to 120Mm<sup>3</sup> per

annum. In terms of discharge, the southern drainages discharge about 0.4m<sup>3</sup>/s (Point X) and the northern end discharges about 0.9m<sup>3</sup>/s at point Y (Hydro Atlas). The discharge points are depicted in figure 13.

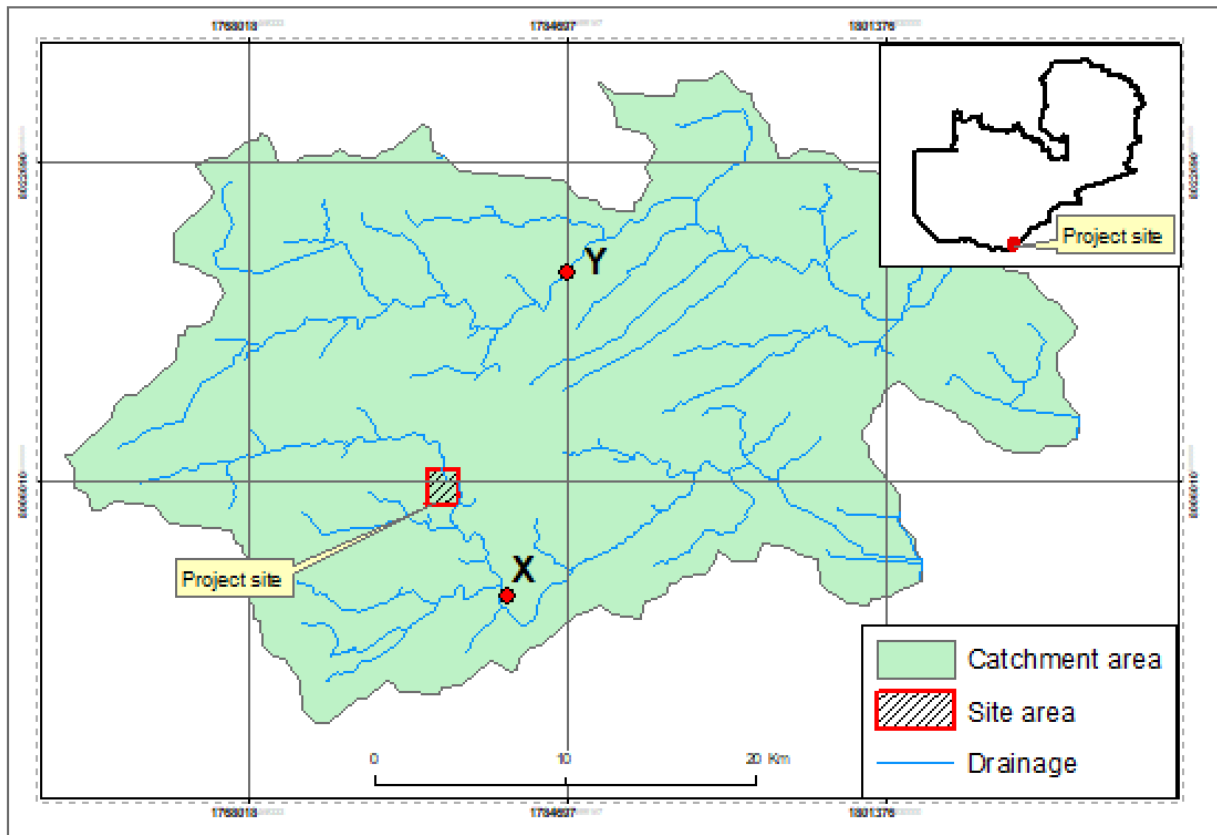


Figure 14: The catchment extent of the project area

Table 9: Catchment runoff through the project area

Mean Annual Rainfall (mm)	Seasonal Description	Catchment Area	Runoff
		(km <sup>2</sup> )	(Mm <sup>3</sup> )
904	Wet Year	1025	120.5
707	Normal Year	1025	94.2
556	Dry Year	1025	74.1

## 5.6 Topography

Sinazongwe District is characterized by an escarpment zone which drops sharply from the plateau in the north to the valley which is now partly covered by Lake Kariba. The Northeastern part of the valley is bordered by the Zambezi and Kafue Rivers. The project site has an altitude of 500 to 600 meters but further decreases in the Southeast direction towards Lake Kariba to 400 to 500 meters. Ecologically the district is divided into three zones: The escarpment area lying at about 1000 to 1200 meters above sea level runs from the

Southwest to the Northeast of the district and is characterized by hilly terrain and a sparse population. The project area is in the hilly part of the district.

### 5.7 Vegetation

A study of the vegetation of the project area was carried out. The proposed project area is dominated by Munga, Mopane woodlands. These trees species adapted to hot dry areas on sandy soils. The proposed license area vegetation showed some retrogression process occurring in the area. This means most of the trees were cut down for charcoal use and agriculture activities, as such the Chipya vegetation emerged to replace the miombo.

The project area has the following tree species; *Brachystegia spiciformis*, *Pterocarpus angolensis*, *Burkea africana*, *Erythrophleum africanum*, some *Guibourtia coleosperma* and other Kalahari woodland associated tree species. A total of 19 different tree species were observed in the project area sample plots created. An average total of 111 stems per hectare of trees above 5cm Diameter at Breast Height (Dbh) were measured and assessed in the main plots. The six (06) most common tree species observed in the sample plots were as follows:

- i. *Brachystegia spiciformis* spp. (Mutuya (T))
- ii. *Burkea africana* (Musheshe (L))
- iii. *Guibourtia coleosperma* (Muzauli (L))
- iv. *Pterocarpus angolensis* (Mukwa (B))
- v. *Erythrophleum africanum* (Mubako (T))

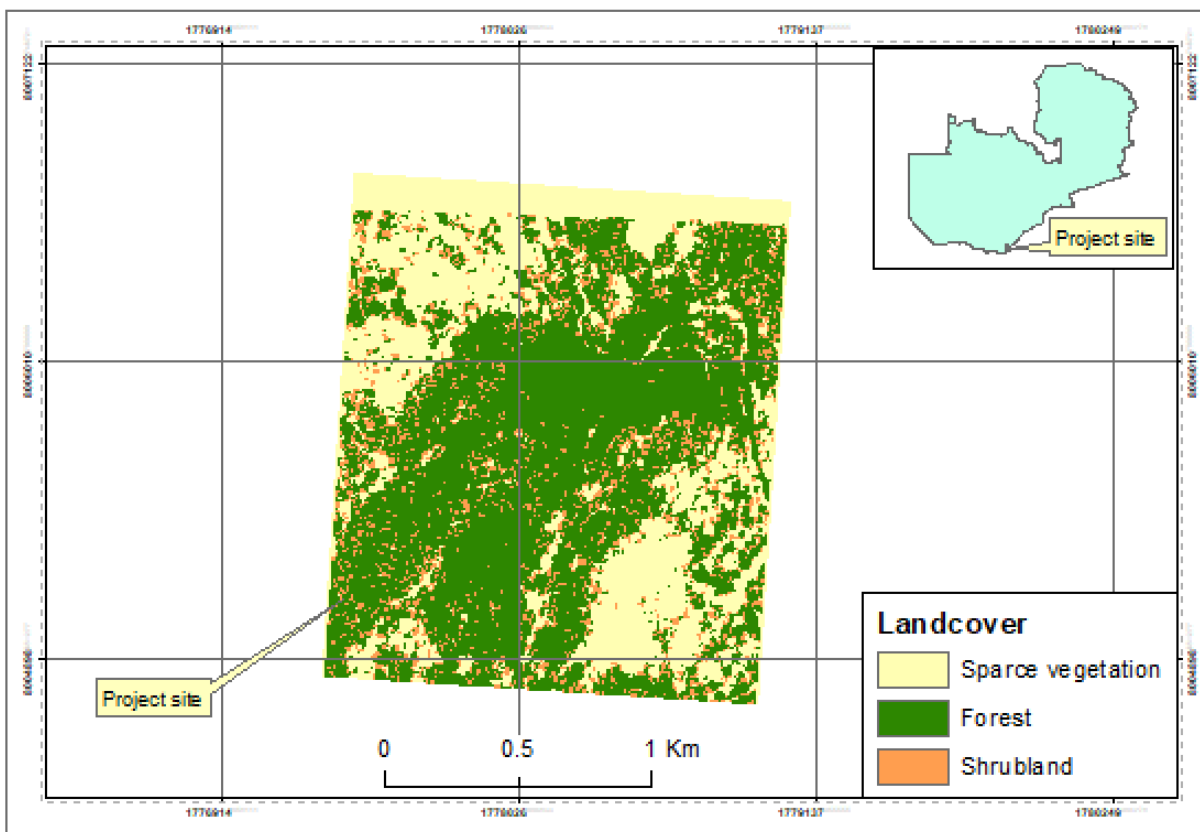
Table 10: Shows the trees species in the project area

<b>Local Name</b>	<b>Botanical Name</b>
Isunde	<i>Baphia massaiensis</i>
Mubako	<i>Erythrophleum africanum</i>
Mukenge	<i>Combretum molle</i>
Mukungu	<i>Pseudolachynostylis maprouneifolia</i>
Mukwe	<i>Cryptosepalum exfoliatum</i>
Mulya	<i>Diplorhynchus condylocarpon</i>
Musamba	<i>Lannea discolor</i>
Muzauli	<i>Guibortia coleospermum</i>
Mukwa	<i>Pterocarpus angolensis</i>
Mutuya	<i>Brachystegia spiciformis</i>
Musheshe	<i>Burkea africana</i>
Muombo	<i>Brachystegia longifolia</i>
Mwande	<i>Afzelia quanzensis</i>
Muhonono	<i>Terminalia sericea</i>
Munjongolo	<i>Diospyros chamaethamnus</i>
Mutondo	<i>Julbernardia paniculata</i>
Muzwili	<i>Combretum imberbe</i>

The predominant land cover of the Project area is the tree cover which covers about 40.7% of the proposed site area. Bare land and water are also a predominant landcover of the catchment covering 37% and 14% respectively. The rest of the area has isolated portions of shrubs and cultivated pieces (Table 12). The forest area is characterized by the Miombo woodland which is a typical landcover type in most parts of the country.

*Table 11: Land cover of project area*

No	Landcover	Area (km <sup>2</sup> )	% Coverage
1	Tree cover	0.04	47.7
2	Shrubs	0.01	6.2
3	Bareland	0.04	37.0
4	Cultivated	0.002	1.8
5	Water	0.016	7.3
<b>Total</b>		<b>0.11</b>	<b>100.0</b>



*Figure 15: shows the Vegetation Cover of the project area*

The volumetric distributions of species in the sample plots per hectare were as below:

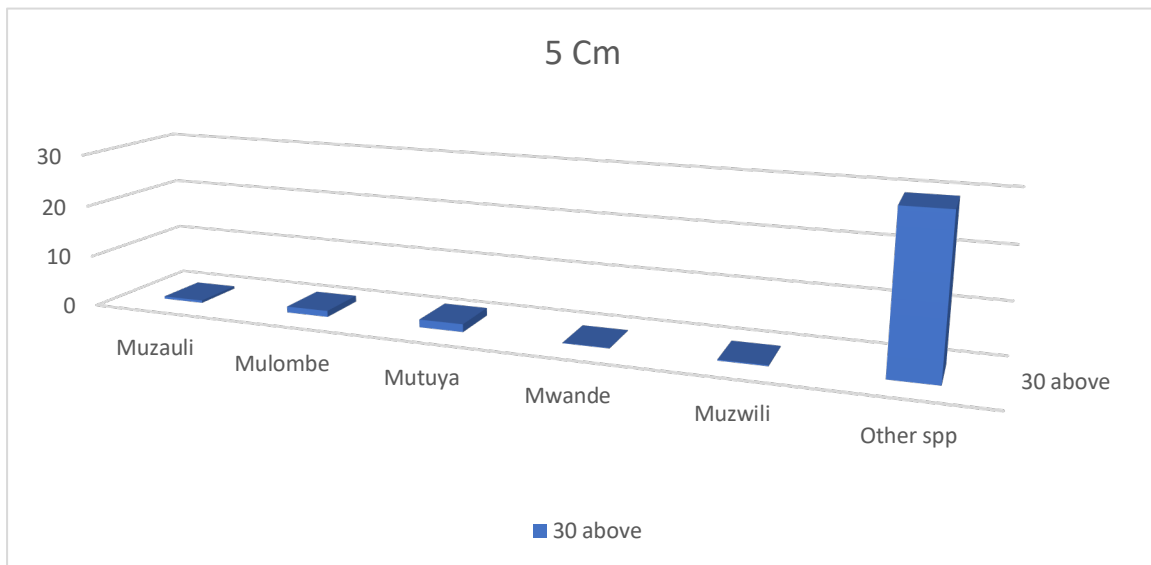


Figure 16: Shows the Species Distribution

*Pterocarpus angolensis* was the predominant commercial species in the sample plots assessed and can be visibly seen that the species dominates the project area. Second in dominance was *Brachystegia spiciformis* which was relatively stocked and was fairly present in the sample plots.



Figure 17: Shows some tree species within the project area

The Mean stocking (sph) was calculated to be 111 sph. The mean basal area was found to be 11.27m<sup>2</sup>/ha. The mean standing volume for all species above 5cm dbh was found to be 79.21m<sup>3</sup>/ha.

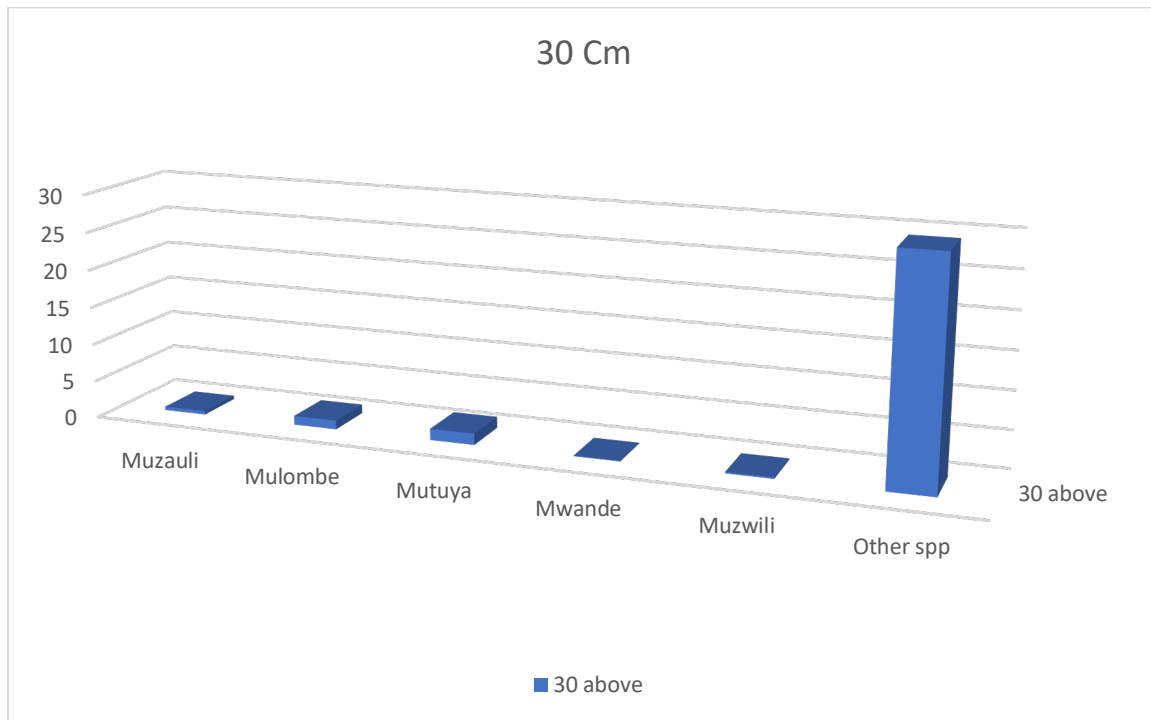


Figure 18: Shows the Mean stocking levels of the tree species

The mean wood volume found was 32.800m<sup>3</sup>, consisted of Mutuya 1.501453m<sup>3</sup>/Ha., Muzauli 0.47023m<sup>3</sup>/Ha., Mukusi 1.132m<sup>3</sup>/Ha., Mulombe 1.182147m<sup>3</sup>/Ha., Mwande 0.083747m<sup>3</sup>/Ha., Muzwili 0.181233m<sup>3</sup>/Ha., and other species 30.782m<sup>3</sup>/Ha. Therefore, the wood volume for tree species comprising Muzauli, Mulombe, Mukusi, Mwande, Muzwili and Mutuya for the 6794.8624Ha area size of the proposed mining area was estimated to be **3,786m<sup>3</sup>**.

Table 12: Shows the tree species wood volume

DBH Class (cm)	Muzauli (m <sup>3</sup> /ha)	Mulombe (m <sup>3</sup> /ha)	Mutuya (m <sup>3</sup> /ha)	Mwande (m <sup>3</sup> /ha)	Muzwili (m <sup>3</sup> /ha)	Others (m <sup>3</sup> /ha)	Total (m <sup>3</sup> /ha)
5-9	0.0018	0.007	0.01558	0	0	2.48966	2.51404
10-14	0.01543	0.0186	0.0089	0	0	8.75	8.79293
15-19	0.0596	0.088476	0.019867	0.04325	0.0206	17.3218	17.553593
20-29	0.23117	0.0879	0.077	0.016797	0.3010	17.2348	17.948667
30-39	0.4286	0.740561	0.8731	0.035647	0.181233	15.3446	17.603741
40+	0.04163	0.441586	0.628353	0.0481	0	14.0363	15.195969
Total	0.77823	1.384123	1.6228	0.143794	0.502833	75.17716	79.60894
Trees ≤ 29.9	0.308	0.201976	0.121347	0.060047	0.3216	45.79626	46.80923
Trees ≥ 30.0	0.47023	1.182147	1.501453	0.083747	0.181233	29.3809	32.79971

**Table 13: Summary Volume of Wood Produced to be cleared during Site Clearance**

<b>Average volume per hectare(m<sup>3</sup>)</b>	<b>Volume of wood to be removed /3,786m<sup>3</sup>. hectares (m<sup>3</sup>)</b>	<b>Average Trees per hectare</b>	<b>Total Numbers of trees to be removed /3,786m<sup>3</sup>. hectares</b>
79.61m <sup>3</sup> /ha.	676.68	85	57,756.67

The results in table 13 shows the volume of the trees in the various quadrants made was measured and it was estimated that the average volume of wood produced to be cleared per hectare is 79.61m<sup>3</sup>.

### **5.7.1 Flora**

The vegetation of the area has been historically collected, studied and documented. The various species, vegetation types and their relationships to the different soil types are also well known (Fanshawe, 1969). The major vegetation of the project area was largely made up of legumes, both nitrogen fixing – Mimosoideae, comprising various species of *Acacia*, white orchid-tree (*Bauhinia*), African oak (*Afzelia*), and non-nitrogen fixing Ceasalpinalceae such as Turpentine tree (*Colophospermum mopane*) and mnondo (*Julbernardia globiflora*).

The Flowering plant (*Burseraceae*) and white mangrove (*Combretaceae*) species mainly of Guggul (*Commiphora*) and Sea Almond (*Terminalia*) and Red bushwillow (*Combretum*) were highly frequent. The unique valley vegetation association species of baobab tree (*Adansonia digitata*), white seringa (*Kirkia acuminata*) and *Xerroderris stuhlmannii* (Wing bean) were highly definitive of the various vegetation types found in the project area. These different species assemblages are associated with different soil types, topographical formations and moisture regimes.

The vegetation of this area is a mixture of Wild syringa (*Burkea Africana*), *Julbernardia globiflora* (Kamponi), Purplepod clusterleaf (*Terminalia prunoides*), Duiker-berry (*Pseudolacnostylis maprouneifolia*), Rhodesian rubber tree (*Diplorynchus condylocarpon*), white seringa (*Kirkia acuminata*) and Ambila (*Pterocarpus angolensis*). Jackalberry (*Diospyros mespiliformis*) occurred on the anthills along the banks of the stream along with Turpentine tree (*colophospermum mopane*) and the occasional Rough-leaved shepherds' tree (*Boscia*). At the eastern edge of the project site the same vegetation existed with a settlement called Namafulo fish camp. The vegetation ranged between 4-14m in height and grew without any distinctive strata as the trees were scattered over a large area. Pod mahogany (*Afzelia quanzensis*), Wild syringa (*Burkea Africana*) and Ambila (*Pterocarpus angolensis*) were the tallest trees on the site, averaging between 12-14m.



*Figure 19: shows some of the vegetation within the project area*

This type of vegetation occurs on the relatively flat areas and is usually edged by rock outcrops and ravines. Regeneration was restricted to scattered species of *Combretum*, *Commiphora*, *Colophospermum* and Bastard marula (*Kirkia*). There was no visible regeneration of Mupapa (*Azelia quanzensis*) despite its prominence. The middle part of the site was covered by a number of vegetation types, ranging from thickets dominated by various Acacias, Northern dwaba berry (*Friesodielsia obovatum*) and Zambesi Coffee (*Bauhinia petersiana*) to almost pure regenerating stands of Mpasa (*Julbernardia globiflora*). Although not resistant to termites or wood borers, the poles of Mpasa (*Julbernardia globiflora*) are heavily utilized for construction purposes. The species therefore, on sites where there are no annual hot bush fires regenerates from seed, coppice and root suckers making it a rapid colonizer of abandoned agricultural sites.



*Figure 20: shows the different vegetation types within the area*

The common species of grass found in the project area include; *hyparrhenia spp.* (Thatching grass), *Olax obtusifolia* (Kulukumo (B)), *missanthiunia spp.*, *themedia triandria*, *setaria spp* *Biden pilosa*, *Lantana camara* (Likobezabalisana (L)), *Anisophea boehmii*, *Anonna stenophylla*, *Aloe* (Itembushya (B)), *Cassia singuena* (Mtawetawe (N)), *Diospyros kirkii* (Mukolofuma (B)), *Ochna* (Choni (B)), and *Loudetia simplex* (Nkololwe (B)). The dominant grass species was *hyparrhenia spp* (Thatching grass), this is very common with wet miombo vegetation.

### **Aquatic Flora**

The Macrophytes are few in the watercourse. However, aquatic plant growth was observed to be more along the sections where water had not dried. Most of the parts of these streams are dry with little or no vegetation. Macrophytes play an important role in the health of the aquatic ecosystem. The vegetation provides a food source for the aquatic fauna and also influences the chemical and physical nature of the aquatic environment. The riverine vegetation and aquatic plant species identified on the bank of the seasonal stream are *polygonium seneglense typha domingensis*, *Cyperus papyrus* and *Phragmites sp.*

### 5.7.2 Fauna

A terrestrial fauna study was conducted in the project area through a detailed literature review, a field survey, walking transects, trapping, scouting in vehicles and interviews with the local populations.

#### Major Animal Species

##### Mammals

Only small mammals were observed during the field survey. The following mammals were sighted within the License area.

- 1) Rabbits
- 2) *Paraxerus cepapi* (Bush Squirrel)
- 3) *Rattus rattus* (**Black Rat**)
- 4) *Thryonomys swinderianus* (**Cane Rat**)

Interviews and interactions with the local people in license area stated that they have sighted other mammals such as duiker (*Sylvicaapra grimmia*) and Vervet monkey (*Cercoopithecus aethops*) in the area and around the proposed License

##### Birds Species

The following birds were identified at the proposed site during the field surveys.

*Table 14: List of Birds observed within the Project area*

<b>NO.</b>	<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>
1.	<i>Indicator variegates</i>	Scaly-throated Honeyguide
2.	<i>Hirundo rustica</i>	Barn swallow
3.	<i>Pycnonotus barbatus</i>	Common Bulbul
4.	<i>Passer domesticus</i>	Gray headed Sparrow
5.	<i>Streptopelia lugens</i>	Dusky turtle dove
6.	<i>Urocolius indicus</i>	Red-faced Mousebird
7.	<i>Merops hirundineus</i>	Swallow-tailed Bee eater

##### Reptiles

Reptiles reportedly observed and seen by the local people at the project site were Nile Monitor (*Varanus niloticus*), *Bitis arietans arietans* (African Puff adder), *Naja nigricollis nigricollis* (Black-necked Spitting Cobra), Black mamba

(*Dendroaspis angusticeps*), *Mabuya mabuya* (Common African Lizard), *Dispholidus typus* (Boomslang), Geckos, Chameleons and skinks.

### **Insects**

Insect survey at the project site was done and a number of insects were observed in the area. Insect life included a variety of species of dragonfly, wasp, bees, crickets, grasshoppers, termites, mosquitoes, ants, red ants, lady bugs, butterflies and moths.

### **5.7.3 Aquatic Fauna**

The main watercourse in the project area is the Seasonal Streams. The collections of site aquatic data focused on the following variables:

- Fish species present in the watercourse
- Stream conditions
- Fishing activities including information on
- Aquatic vegetation and
- Aquatic animals

The collection of data was based on interviews from local people, literature review and Aquatic site survey.

The seasonal stream found near the project area has no aquatic life activities present. At the time of the field survey, much of the seasonal stream was dry and its mostly used for the livestock to drink the water when its flowing.

The following are the Fish species found in lake Kariba which is the main water body in the district: *Clarias ngamensis* and nkupe (*Distichodus mossambicus*). Fishing in seasonal stream is high during the raining season. During the dry season small children are normally found around the stream. Other Aquatic organisms found in seasonal stream are frogs and tadipoles. Species such as *Xenopus laevis* and *Regularis* were also found in the stream.

### **Endangered species**

No threatened, rare or endangered species either fauna or flora were observed within the project area. And there is no gazetted Game Management Area or Forest within the License area.

### **Termitaria Moulds**

Some termite moulds were sighted around the license area. The moulds normally coexist with trees. Termites are beneficial for the functioning of forest and savannah ecosystems. Traditionally children and women consume termite moulds soil for nutritional or other benefits. And some subsistence farmers use termites' moulds as indicators of soil fertility. (*Ecology and Society.2009*)

## **Presence of Invasive species**

No Invasive or exotic species for both Flora and Fauna were noted on the proposed project site.

## **5.8 Soils**

The land in the district is composed of the following soil types:

- Alluvial soils are mostly found along the lakeshore, the lower Zambezi and Kafue Rivers. These areas are most suitable for agriculture activities owing to the high fertility of the soils;
- The clayey soils are common in the valley areas that are susceptible to seasonal flooding. Some of these soils have vertic properties which make them relatively difficult to manage for agricultural purposes.
- Loamy sand soils dominate the escarpment area but are shallow and comprise of considerable amount of grit which is subject to erosion.

Generally, the soils in project area and Sinazongwe District have disadvantages of having a low water holding capacity, being highly susceptible to erosion and shallow top soil depth.

The soils of the plant communities of the project site are dark to grey, heavy, clay- textured, strongly-cracking, the pH of which is between 5.1 and 6.5, well above the critical value of 4.5. In the *Acacia polyantha* woodland and *Combretum-Albizia-Terminalia* woodland where litter covers are 55% and 33% respectively, the organic matter contents of the soils are above the critical value. In contrast, the soils covered by the flood plain grasslands and the open woodland have litter covers of between 12% and 20% with organic matter contents of between 0.30% and 0.33%, well below the critical values. It is noted that high coverage of litter corresponds with high content of organic matter in the woodlands, whereas low coverage of litter corresponds with low organic content in the flood plain grasslands and open woodland.

## **5.9 Noise Quality**

The Noise levels in the area are very low due to factor that no industries or markets are near the project site. The only potential sources of noise in the immediate vicinity of the site are animals grazing from the nearby bushes and trucks using the nearby roads. The source of noise is mainly from the above factors and the impact is insignificant. Therefore, the general noise quality for this area is much better than the urbanized areas of the district.

The noise levels in the area are consistent with the levels generally expected for rural Zambia especially where there are no major industrial or mining activities being undertaken.

The highest average noise level reading obtained was 78.8dB (A) near the gravel road passing through the village while the lowest was 43.7dB (A). The highest noise level recorded are below the disruptive (85 dB) noise level standard of the International Finance Corporation (IFC) which was the benchmark used in the study. From the figures recorded, it can be deduced that there is a slight increase in noise levels during midday compared to morning and evening times. This is attributed to increased socio-economic activities during the day.

The main source of noise in the project area is mainly from vehicles using the gravel access road and from the grazing animals.



Figure 21: Picture showing noise monitoring at the starting point in Dengeza Area

**Table 15: Noise monitoring results**

Sampling Location	Coordinates	Noise level-dB(A)		Duration (min)	IFC Standard	Remarks	Noise Source & Receptor	
		Min	Max				Source	Receptors
<b>SP1</b>		49.2	54.5	10	85dB	Normal	Neighboring farms and natural elements i.e., leaves rustling	Surrounding neighborhood
<b>SP2</b>		40.8	44.7	10	85dB	Normal	Neighboring farms and natural elements i.e., leaves rustling	Surrounding neighborhood
<b>SP3</b>		38.3	43.6	10	85dB	Normal	Neighboring farms and natural elements i.e., leaves rustling and tweeting of birds	Surrounding neighborhood
<b>SP4</b>		40.6	44	10	85dB	Normal	Neighboring farms and natural elements i.e., leaves rustling and tweeting of birds	Surrounding neighborhood
<b>SP5</b>		41.3	43.0	10	85dB	Normal	Neighboring farms and natural elements i.e., leaves rustling and tweeting of birds	Surrounding neighborhood

### 5.10 Air Quality

This section highlights the baseline information of the Air quality of the area. The air within the proposed area is clean and the ambient air in the project area is good in terms of quality since the area is neither in an environment that would compromise its quality. Dust from unpaved roads and some uncontrolled fires at times cause occasional smoke but it is insignificant to create pollution. Ever Great Energy Company Limited will not allow burning on its property. Dust particles due to construction activities will be minimized through sprinkling water on gravel roads.

It should be noted that no baseline data has been recorded in the project site. Hence the consultant, conducted air quality measurement on the project site.

*Figure 22: Shows air quality sampling being conducted onsite*



*Table 16: Shows the results of the ambient air sampling from the four sampling points*

<b>Location</b>	<b>Coordinates</b>	<b>Parameter</b>	<b>Results</b> (ug/m <sup>3</sup> )	<b>ZEMA Standards</b>	<b>Duration</b> (min)	<b>Remark</b>
<b>SP1</b>		PM <sub>2.5</sub>	38	50ug/m <sup>3</sup>	60	Acceptable Limit
		PM <sub>10</sub>	47.7	50ug/m <sup>3</sup>	60	Acceptable Limit
<b>SP2</b>		PM <sub>2.5</sub>	40.9	50ug/m <sup>3</sup>	60	Acceptable Limit
		PM <sub>10</sub>	47.8	50ug/m <sup>3</sup>	60	Acceptable Limit

<b>SP3</b>		PM <sub>2.5</sub>	29.2	50ug/m <sup>3</sup>	60	Acceptable Limit
		PM <sub>10</sub>	42.5	50ug/m <sup>3</sup>	60	Acceptable Limit
<b>SP 4</b>		PM <sub>2.5</sub>	13.8	50ug/m <sup>3</sup>	60	Acceptable Limit
		PM <sub>10</sub>	19.8	50ug/m <sup>3</sup>	60	Acceptable Limit
<b>SP5</b>		PM <sub>2.5</sub>	16.8	50ug/m <sup>3</sup>	60	Acceptable Limit
		PM <sub>10</sub>	24	50ug/m <sup>3</sup>	60	Acceptable Limit

The sampling revealed the levels of dust both PM<sub>2.5</sub> and PM<sub>10</sub> were within ZEMA Standards for the five sites sampled. Generally, the project site has no anthropogenic activities that can significantly impact the air quality of the area. On analysis of the area, it was concluded that the air quality is generally good within the project site and the surrounding areas.

## **5.11 Description of the Social Economic Environment**

### **5.11.1 Population**

Sinazongwe District is in the Southern Province of Zambia, bounded on the northeast by Gwembe District; on the northwest by Choma District; on the Southwest by Kalomo District; and on the east by Zimbabwe – Zambia boarder along the Lake Kariba. The total population for Sinazongwe District, as recorded by the 2022 Census, was at 159,055 people. This total population can be divided as 78,251 males and 80,804 for females, representing 49.2 percent and 50.8 percent respectively. The population of Sinazongwe continues to grow, not only in terms of natural growth but by the influx of “outsiders”, attracted to the town for seemingly economic and employments opportunities.

A large proportion of the population comprises valley Tonga people who have settled on the higher ground away from the flooded area of Lake Kariba, formed by construction of the Kariba Dam in the late 1950s. Sinazongwe district has a population density of 33.0 persons per square kilometer and an annual growth rate of 3.8%, 3.9% for males and 3.7% for females.

The below table summarizes some bassline demographic data as recorded by CSO in 2010.

*Table 17: Zamstats Sinazongwe Data*

<b>Sinazongwe District</b>	<b>Number of people</b>
Total population	159,055

Male population	78,251
Female population	80,804

### **Growth Rate, Population Density and Distribution**

Sinazongwe has a 3.8 percent growth rate and it holds a 6.6 percent representation of the total population in Southern Province.

#### **5.11.2 Social Services and Amenities**

The proposed project area does not have any social services and amenities. There are no big shops or recreation facilities in the area. Neither does the area have any modern services such as piped water, sewerage services or electricity. The people in the area get water either from shallow wells or from streams and boreholes. For social services and amenities many prefer to go to Maamba or Sinazongwe central business district as the small local shops are not sufficiently stocked. Due to the proposed project, the market is expected to expand to cater for the work force proposed to be employed. No amenities will be disturbed due to the proposed project.



*Figure 23: Picture showing the market near the project area*

#### **5.11.3 Literacy Levels and Health**

Education is a basic human right. It is also of central importance to the economic and social development of a nation. There are various benefits of education such as promoting economic growth, national productivity, innovations and social cohesion. There are quite a number of schools in the project area i.e., Siameja area. The schools include Siameja Primary, Matambo

Primary, Kanchindu Primary/Secondary School, Siameja Primary which happens to be the nearest to the project area. The schools currently face many problems, which include insufficient staff, lack of desks for the children to sit on as well as lack of proper infrastructures.



Figure 24: Pictures showing a clinic and health post near the project area

Sinazongwe has over 16 health facilities. One level one (1) hospital namely Sinazongwe District Hospital and Maamba Hospital which serves as a referral hospital for the district. The rest are rural health centres and health posts with the nearest health facility being Dengeza Health Post.



Figure 25: Picture showing Siameja Azilundu primary school

#### **5.11.4 Transport/Communication**

The project area is accessed via D775 which is a tarred road from Batoka junction onto Maamba road all through to the gravel road (bottom road) leading to Matambo village, Muka and Dengeza where the starting point is located before making a right turn onto another gravel road that passes through a Chinese coal mine called Seizic which is the nearest landmark to the project site in Siameja Azilundu village, the end point for the thermal power plant location.

#### **Communication Services**

Sinazongwe district has access to a variety of mass and telecommunication infrastructure which includes:

- ZNBC TV: The Zambia National Broadcasting Corporation (ZNBC). ZNBC is a state-owned broadcaster;
- Radio stations: ZNBC.
- The project districts are also well serviced with the three Mobile Service Providers. Namely: MTN, Airtel and Zamtel. However, the project area has intermittent mobile phone network.

#### **5.11.5 Water Supply/Sanitation** **Water Supply**

The importance of having access to safe water cannot be overemphasized. Households in the project area are dependent on unsafe water from hand dug wells as well as safe water for drinking from boreholes. These sources provide water both for drinking and bathing.

#### **5.11.6 Power Generation and Supply**

Coal powered and Hydro Electricity is the main source of power in the project district. This is provided for by the national grid run by ZESCO. However, the project area is not connected to the national ZESCO grid therefore, the locals currently depend on solar energy.

#### **5.11.7 HIV/AIDS in the Project Area**

According to the Zambia Population-Based HIV/AIDS Impact Assessment (Final Report 2019), the annual incidence of HIV among adults aged 15-59 in Zambia was 0.61 percent, that is, approximately 43,000 new cases of HIV annually in Zambia. Southern Province, in which Sinazongwe district lies, had the third highest HIV/AIDS prevalence in Zambia with the total percent of 15.7. The report further says that Zambia has one of the highest HIV burdens in Sub-

Saharan Africa. It is also reported that the annual incidence of HIV among adults aged 15-59 is higher in women (0.93 percent) compared to men (0.29 percent). This indicates that HIV incidence of new HIV infections was three times higher among women than men between the ages of 15-59, and the current HIV prevalence was four times higher among young women than men between the ages of 20-24. Efforts in place to address the problem include;

- Education and sensitization programs as well as, Voluntary Counselling and Testing.
- Radio and TV programs on HIV/AIDS,
- Posters and billboards encouraging safe acts to minimize the spread of HIV/AIDS,
- Voluntary counseling and testing made free and easily accessible,
- Free HIV/AIDS talk line and availability of condoms in most retail outlets at an affordable price.
- The developer will also include HIV/AIDS topic in the toolbox talks to promote safety practices on site.

#### **5.11.8 Administration**

The Zambian government approved a national decentralisation policy in November 2002, following two previous failed attempts in 1968 and 1980. The policy covers aspects such as empowering local people through setting up sub-district structures, and clearly defined roles and responsibilities for local authorities, the provinces and national government. Additionally, it states that the ultimate aim of the government is decentralisation through devolution, although the process will start with de-concentration of services while capacity is being developed in the local authorities. The objective of the policy is to enhance governance, by giving citizens more authority and power in decision-making at the local level.

Like the rest of the country, there are three administrative systems in the province and these are: Central Government, Local Government (Authority) and Traditional Systems. Central Government Administration is composed of all government departments and is headed by the District Commissioner (DC) appointed by the Republican President. The DC supervises and coordinates government activities in the district. He also harmonizes the activities of the Local Authority with those of Central Government in the districts.

Heads of Departments in respective government departments in the districts report directly to their provincial heads on technical matters and to the DC on administrative matters. Local Government Administration system is based on the political delineation of the district.

Politically, Sinazongwe district is a single constituency. The constituency is further disintegrated into 12 wards. The constituency in the affected area has a duly elected member of parliament who represents the residents in the National Assembly. The Member of Parliament has a mandate covering a period of five years.

The elected Member of Parliament representing the constituency, elected Councilors representing the wards that sit and together are known as the Council. While the councilors provide political direction of the district, the executive arm of the district is headed by a Council Chairperson who is assisted by directors covering various functions of the council. The Council Chairperson is directly responsible for the execution of Council development strategies and also provides technical and professional guidance to the Council on matters relating to district development. The Council however, endorses what is to be implemented based on resolutions from its full Council meetings.

The traditional leadership in the area is headed by Chief Mweemba. Through the traditional lineage and ascendancy guidelines, the chief is flanked by his traditional councils. These are appointed by the Chief and can be dissolved by the Chief as well. These councils head a grouping of villages., who in turn are headed by Village headmen. These headmen are also subordinated by village headman. The Village headmen and Council leaders are close advisers to the Chief.

### **5.11.9 Social-Economic Set up Economic Activities**

Due to poor, sandy soils, the region has limited production potential for agriculture. The growing season is short, annual rainfall is less than 800 mm per annum, and temperatures tend to be higher than elsewhere in the country. These conditions are most suitable for subsistence farming of drought-tolerant, short-season crops such as pearl millet, sorghum, sesame, and cotton. Maize production potential is low, but households grow it as it is the most preferred staple food. Landholdings are low, but conditions are favorable for keeping of small ruminants, mainly goats. The valleys are a habitat for Tsetse flies, especially in areas with national parks, which limits the keeping of cattle.

Livelihoods in the region emphasize cereal production, fishing along main rivers, and tourism in parks and lakes located within the region. Bream caught is normally dried and sold to travelling marketeers. Marketeers travel from Lusaka and the Copperbelt to gather the dry fish.

The area is prone to droughts and flooding, resulting in significant variation in agricultural production. The quantity and quality of market infrastructure and general physical access within the zone are generally less well developed than

in other parts of the country. Agriculture and livestock production, though important, are complementary activities in the area. The main crops include sorghum, pearl millet, maize, and sweet potatoes. The environment is not suitable for maize, whose production is limited. The area has a relatively shorter growing period of 80 to 100 days between the rainy months of November and March. During this period, dry spells are a common hazard with the potential to negatively affect crop production. This zone is within the tsetse control zone, making it less suitable for cattle, though some better off households may own a limited number for draft power and sale. Rather, goats are the most common livestock asset in the zone and they constitute an important income source for poor households.

Land ownership and utilization, livestock ownership of fishing equipment define the wealth of the area. The poor survive from crop production and the purchase of food on the market while the better-off are able to produce most of their food, only purchasing the food they do not produce. Both the poor and better-off obtain their income through the sale of fish, crops, and livestock. The poor additionally do casual work, sale of charcoal, beer brewing, and sale of wild fruits to supplement their incomes while the better-off engage in trade activities.

Poor infrastructure makes this area relatively remote. As a food deficit area, the zone depends on supply of staples from Food Reserve Agency and private traders from neighboring zones. On the other hand, this zone supplies most of Zambia with fresh and dry fish via middlemen and private traders who deliver to most towns and rural areas of Zambia.

The lack of investment and the growing population has resulted in the indigenous people of the district being amongst the poorest in Zambia, and apart from the relative few that do have jobs, most people resort to subsistence farming and artisanal fishing. Poor people need places to live and without jobs they resort to building huts and sub-standard dwellings in various compounds around the district. These compounds have grown without any measure of control by the Local Authorities and as a result they have become scars on the landscape of Sinazongwe. In most cases, the compounds do not have any source of clean water available, sanitation or internal road accesses.

### **Industry/Mining**

ZAMBEEF Zambia Limited has an abattoir and milling company near the Sinazongwe civic centre along the Sinazongwe-Sinazeze Road. The farm operates 25 irrigation pivots throughout the year and is able to produce over 10,000 metric tons of maize per annum, excluding other cash crops like wheat. The district also houses one of the Chinese owned paprika cultivating and processing company named Chenguang Biotech Limited. Sinazongwe also has vast potential in mining. There are several explorations currently going on with a view of mining. Maamba is the economic hub of Sinazongwe District and this is

mainly because of the coal mining industry which has attracted companies such as Maamba Collieries, Maamba Collum Coal Mine and Indongo Coal Mine in Mulungwa area south of Sinankumbi.

### **Hospitality**

Sinazongwe has a number of small hotels, lodges and Inns which were built to cater for the growing conference market.

### **Fishing and Livestock**

The business of Kapenta fishing is hugely important to the area. Kapenta (a type of sardine or sprat) is one of Zambia 's staple high protein foods and there are many commercial Kapenta fishing companies in Sinazongwe. The Latin names for kapenta are *Limnothrissa miodon* and *Stolothrissa tanganyicae*. Commercial bream fishing and crocodile farming is also carried out in the area. Kapenta fishing on the Lake began in the 1990's and a number of commercial fishing enterprises have been established at various centers of the lake including Siavonga, Chipepo and Sinazongwe. There are several commercial Kapenta fishing companies in the town producing one of Zambia's staple high protein foods. Commercial bream fishing and farming is also done on the Lake, most of which is grown in large floating pens from fingerlings bred locally.

Livestock is common in the licensed area and all around the district. Some households keep Cattle and goats but many households keep chicken and sell them for consumption. Livestock is a key household resource and safety net and used as security to cushion households against shocks and shortfalls in consumption. In addition, households rely on the sale of livestock to see them through the lean months of the year (October – March) periods of food shortage. Livestock is also sold to pay school fees or buy medicines when a family member is afflicted by illness. Additionally, the people of Sinazongwe are also into fishing, with the geographical location of Sinazongwe district near the biggest man-made lake Kariba. There are quite a number of residents who are into fishing and fish is preserved using a number of traditional methods such as smoking, salting and some fish is freshly sold to the readily available markets.

### **Crocodile farming**

Crocodiles are bred for the leather from their skins which are exported for fashion accessories such as shoes and handbags. The crocodile tail also provides an exotic culinary delicacy sold to hotels and exclusive restaurants. The Nile crocodile, a prolific species around the Lake and rivers, is bred from eggs either from the farm's own breeding stock or from the collection of 'wild' crocodile eggs.

### **Tourism**

The presence of wildlife in the lakeshore area and the scenic value of the area has led to the development and flourishing of the tourism industry. The district

is endowed with abundant natural resources like Lake Kariba and wildlife on Islands (Chete and Sekula) and other pleasure resorts such as Lodges on Chete Island run by Westlake investment Co, Chikanka Island (Lake Safaris Co), Crocodile farms e.g., Lunchinze Crocodile farm, and House Boat Company that attract tourists especially in Siansowa.

Lake Kariba offers a lot of activities for the adventurous visitors; boating, canoeing, sport fishing, water sports, birding and lake cruises. There are natural and man-made facilities and activities that promote tourism in the area.

#### **5.11.10 Traditional and Religious Practice Archaeological and Cultural Environment**

The project site has no known sites that have been confirmed as cultural or archaeological sites. However, it is worth noting that should such sites be discovered the Council and National Heritage Conservation Commission shall be notified at the earliest possible time. Close collaboration with traditional leaders is important. Chief Mweemba and his traditional network of leaders can play a key role in development. The institution of traditional leadership embodies the culture, traditions, customs and values of local people. While traditional leaders had been largely left out in the local government system, serve for their role of appointing a symbolic representative to the Local Council, a House of chiefs was re-established a few years ago.

#### **Religion**

Zambia was officially declared a Christian nation according to the 1996 constitution. Hence, Christianity is the dominant religion in the country and Sinazongwe district as well with the Seventh Day Adventists church in the majority in and around the project area. Other noted Denominations close to the project area include United Church of Zambia (UCZ), Catholic, Pentecostals, Lutheran Wesley Church, Jehovah's Witnesses, New Apostolic Church, Anglican Church and Baptist Church. It is also noted that Zambia has a very small Jewish community, composed mostly of white Ashkenazi. Muslim, Hindu and Baha'i citizens.

#### **Language**

English remains the official language of communication and instruction in Zambia. The major vernaculars are Tonga, Bemba, Kaonde, Lozi, Lenje, Lunda, Luvale, Nyanja and about 66 other indigenous languages. Observation indicates that Tonga is the main language spoken in Sinazongwe and particularly the project area.

## **Traditional**

Traditional Tonga culture is similar to others in Zambia. The primary source of power and reverence is the traditional spirit. This spirit is often interceded by a witch doctor. Here intervention for individual blessings and curses alike, are done. Initiation ceremonies are held for both girls and boys. Lobola, the bride price, is practiced as a token of appreciation to the parents of the girl, often placing a great financial burden upon the husband, who often has to pay off the lobola over many years. Funerals are also big occasions in the villages and grief is shown by wailing and singing and the beating of drums. The men sit outside during the funeral and the women crowd inside the house of the deceased. Family and friends pay respect and to show their condolences by contributing food or money towards the funeral ceremony. The spirit of the deceased must be appeased and the ceremony ensures that it is happy and at rest. If the husband who has died has a brother, he will often take on the widow and children as his family. Polygamy is still practiced although it is usually only the chiefs and headmen who are wealthy enough to support more than one wife. Commitment to a marriage partner is not considered a priority. This and the current tradition of migrant work has resulted in AIDS and other STDs being prevalent in Zambia.

The Lwiindi traditional ceremony is an annual ancient Tonga cultural ceremony to honour the spirits of the ancestors and celebrate the onset of a new rainy season. The ceremony takes place in the middle of the year around July.

## 6.0 ENVIRONMENTAL AND SOCIAL IMPACTS

The environmental and social impacts associated with the proposed Water abstraction Pipeline are likely to trigger both negative and positive impacts. This requires that the negative impacts be managed and the positive impacts be enhanced to minimise the potential impacts on the environment. The evaluation of impacts was based on the methodology described in the subsequent section below.

### 6.1 The Nature and Evaluation of Impacts

Studies undertaken on the proposed Water Pipeline considered direct, indirect, cumulative, and residual environmental impacts associated with the construction and operation activities. These were assessed in terms of the following criteria: description of what causes the effect, what will be affected, and how it will be affected. The extent, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. The following factors were considered in classifying each potential impact generated by the Project.

- **Frequency:** Occurrence of activity producing the impact, e.g., continuous, intermittent or a single event/less than once per year;
- **Likelihood:** Probability of impact occurrence (e.g., 100%, 50%, 0%);
- **Extent:** Spatial extent of the impact (e.g., within 2km of site boundary, outside the project site but within 10km, within 50km, within Zambia, outside Zambia.
- **Duration:** Extent in time of the impact. Short term impact (less than the life of the project), medium term impacts (equal to the lifetime of the Project) and long-term impacts (greater than the lifetime of the Project);
- **Magnitude:** Impact magnitude defined in relation to the limit criterion specified by ZEMA or international standards where available.
- **Type of impact:** Positive or negative effect; direct or indirect action.
- **Potential significance:** A combination of all the factors described in the preceding bullet points is used to determine the type and significance of potential impact prior to mitigation. This is defined as low, medium or high.

### 6.1.1 Evaluation of Potential Impacts

An attempt is made in this section to evaluate the overall significance of each identified impact by assigning values to a set of criteria as follows:

Table 18: Significance Ranking Matrix

CONSEQUENCE (Magnitude Geographic Extent Duration of impact)															
LIKELIHOOD (Frequency of activity Frequency of impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 19: Positive/Negative Mitigation Ratings

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very High	126-150	Propose mitigation measures	Improve current management
High	101-125	Propose mitigation measures	Improve current management
Medium-High	76-100	Propose mitigation measures	Improve current management
Low-Medium	51-75	Maintain current management	Propose mitigation measures
Low	26-50	Maintain current management	Propose mitigation measures
Very low	1-25	Maintain current management	Propose mitigation measures

- **Type of Impact** (Direct / Indirect)

- **Duration** (Intermittent / Temporary / Short Term / Medium Term (construction phase) / Long Term / Permanent)
- **Intensity / Severity** (Negligible / Low / Moderate / High)
- **Spatial Extent** (Site / Local (area surrounding the site) / Regional)
- **Likelihood** (Uncertain / Improbable / Probable / Highly Probable / Certain)
- **Sensitivity** [of the receptor; degree of change effected on natural processes or people's livelihoods] (Low / Moderate / High)
- **Overall Significance** (Insignificant / Low / Moderate / High)

## 6.2 Anticipated Project Impacts

The positive and adverse project impacts assessment was based on the following impact criteria during pre-construction, construction, operation phases and decommissioning phase as follows:

- **Direction of Impact:** Type of effect the activity would have on the affected environment,
- Positive or negative
- **Scale:** Physical scale / area over which the impact will be felt: Local, Regional, National or International
- **Duration:** The length of time the impact is likely to occur: Short, Medium or Long Term.
- **Reversibility:** Reversible; where it is avoidable or has potential to be restored; Irreversible; where it is unavoidable or has no potential to be restored.
- **Pathway:** Indirect; where it is no direct result of the project. Direct; where it is a direct result of the Project and associated activities; Cumulative; where it results from incremental changes caused by other past, present or reasonably foreseeable actions together with the Project.

### 6.2.1 Positive Social-Economic Impacts

The development of the Water abstraction Pipeline and its construction activities described in this report will lead to numerous positive social impacts during the various phases of the project;

- **Provision of employment:** The project is expected to generate direct and indirect jobs for both skilled and unskilled labor during all the various phases of the project. The categories of job opportunities are expected to attract employees both locally and beyond the project area. Aside from direct employment, there are other forms of employment that will be created such as those associated with provision of goods and services to the permanent and temporary employees.

- **Increased public revenue:** Revenue will be increased through statutory contributions such as Pay as You Earn (PAYE) and Corporate Tax.
- **Multiplier Effects:** There shall be a boost to local development activities especially in the area of food supply and raw materials. This will be a direct impact on the developmental activities due to the power plant activities.
- **Improved Livelihood of the Local People:** The project will directly improve the livelihood standards of the local people through multiplier effects. Major activities will include supply of foodstuffs and services to workers and the company.
- **Skills transfer to the locals:** Through recruitment of labour locally, the workers will have an opportunity to learn an array of skills that relate to the installation of a water pipeline to be used in power generation using a thermal power plant. This may be difficult to quantify, but is still regarded as an important positive impact. This impact will be indirect and direct to the local people surrounding the project area.
- Contributing to infrastructural development such as road rehabilitation and construction of new roads to inaccessible areas.
- The pipeline offers a resilient and dependable water source for the power generation process;
- The pipeline will help save time as it will eliminate the need for the developer to spend significant time collecting and transporting water from the lake.
- The project will help provide a steady water supply which is essential for energy generation thereby, supporting job creation and local economic growth.

### **Enhancement of Positive Impacts**

Enhancement measures for these impacts will include:

- Sustained plant and business operation together with payment of all applicable taxes and levies;
- Improve salaries and conditions of service for all staff;
- Prioritizing offering jobs opportunities and contracts to surrounding villages residents and Zambian companies respectively;
- Employing cost effective production systems without compromising quality.

## 6.2.2 Potential Negative Impacts

### 6.2.2.1 Impact on Air Quality

- **Dust emissions:** Site clearing operations for land preparation is characteristic of dust emission. It also involves trenching, excavations, movement of vehicles and cut and fill activities, which all lead to dust emissions with the potential to disturb the local air quality. The vehicles and machines used on the site during the construction and operation stage will have an impact on air quality.
- **Fuel combustion emissions** from equipment and vehicles: Exhaust gaseous emissions are likely to be emitted by the heavy flow of traffic and operation of machinery on site especially and will result to increased levels of air pollution due to exhaust emissions.

### 6.2.2.2 Impact on the Water Quality and Resource

- **Water Quality Impacts:** Sanitary wastewater from construction worker camps and canteens and Surface and ground water contamination from Spent oils, oil leakages and accidental Spillages.
- Lowering of water levels due to potential excessive water abstraction, thereby causing harm to flora and fauna.

### 6.2.2.3 Impact on Land and Soil

- **Soil Erosion and Quality Impacts:** Soil erosion – induced by site preparation and construction activities (vegetation clearance, earth works, etc.). Contamination of soil, due to Hydrocarbons (Accidental fuel/oil spills) and compaction from Heavy equipment movements. Induced water or wind erosion due to vehicle movements.
- **Soil Compaction** due to regular heavy vehicle movement, and laydown areas.
- **Soil Destruction and sterilization** due to topsoil stripping and construction of the Pipeline.

### 6.2.2.4 Waste Generation and Management

The project will have both solid and liquid wastes generated during the construction processes.

- **Pollution from Hazardous Waste:** Hazardous waste will be generated during the construction phase of the project. There will be wastes such as chemicals, battery acid, fuels, used oils and brake fluid though will be in very minimal amounts. Used chemical containers could present a problem when it comes for disposal of such.
- **Pollution from Non-Hazardous Waste:** Non-Hazardous waste will mainly come from discarded packaging materials such as cement bags, metal cuttings, carton boxes and plastic packs. Although the impact from this waste is expected to be minimal, poor disposal methods can

lead to environmental problems due to their non-biodegradable nature.

#### **6.2.2.5 Impact on Biodiversity and Vegetation**

- **Loss of Vegetation:** Preparation/construction activities may lead to loss of vegetation due to clearance of the Pipeline route as well as other project infrastructure.
- **Loss of wildlife habitats:** The area is well forested and this has promoted the survival of a few wildlife within the project area. Hence, clearing may cause loss of some wildlife habitats.

#### **6.2.2.6 Impact of Noise and vibration**

- Site preparation and Construction activities will be a source of noise due to moving machines such as mixers, tippers, excavators and bulldozers
- During operation movement of vehicles and machinery will contribute to the change in the noise levels during round inspections and maintenance works.

#### **6.2.2.7 Community Health and Safety**

The presence of the pipeline project activities will have the potential to affect community health and safety. Key concerns are:

- Increased transmission of communicable diseases – due to presence of non-local workers and in-migration of people.
- Increased transmission of STIs including HIV/AIDS associated with improved livelihoods, higher levels of disposable incomes and changes to the population.
- Impacts on Health and social wellbeing: Impacts on physical health due to influx of people putting pressure on infrastructure and resources, increased disease, accidents and injuries.
- Influx of people creating a platform for opportunistic and other criminal vices, increased theft, social ills etc.

#### **6.2.2.8 Impacts on Occupational and Public Health**

- There is potential of accidents resulting in injuries or death while using operating equipment, travelling on foot, by vehicle, manual handling of tools, slipping and falling or being beaten by a snake. Such events may result in injury or death of workers or damage to vehicles or equipment. Accident, injury or death could result in economic loss, its employees and their dependents due to cost of compensation/hospitalization, loss of trained personnel, loss of production and damage to equipment. Access by unauthorized people,

especially at night into the working area may result in injury, and accidents with the basic tools that the workers will be using may occur.

#### **6.2.2.9 Archaeological, Traditional, Religious/Cultural Sites**

- Damage to or destruction of undiscovered heritage or archaeological resources, during construction, operation and decommissioning of the pipeline and associated projects (roads, water supply etc.).

#### **6.2.2.10 Land use, Property and Settlements**

- Mostly projects of this nature, sites may lead to the temporary loss of shortest foot tracks to agricultural fields for the local community or loss of agricultural fields or disturb settlements as these sites are usually fenced off for public and wild life safety during construction. The loss of the current land use in the pipeline route will only be temporal.

#### **6.2.2.11 Impacts on Traffic and Road Safety**

- Project activities will increase traffic to and from the site, which may disrupt normal road use and increase the risk of accidents.

#### **6.2.2.12 Impacts on Public Utility Infrastructure**

- Construction activities may interfere with existing underground services such as electricity cables, water pipes, and communication lines. This may temporarily disrupt services to surrounding communities.

Table 20: shows the evaluation of the impacts during the construction phase

Aspect/ Issue	Potential Environmental Impact	Environmental Impact Characterization								Sensitivity	Severity of the impact
		Positive / Negative Impact	Intensity of Impact	Spatial Extent of Impact	Duration of Impact	Timing of Impact	Frequency of Impact	Likelihood of Impact Occurring	Significance of Impact		
<b>Biophysical Impacts</b>											
<b>Air Quality</b>	Site clearing operations for land preparation is characteristic of dust emission. Dust contamination during construction and maintenance works	Negative	Low	Localized Project Area	Long time	During preparation, construction and operation phases	Occasional	Possible	Moderate	Medium	Low
	Exhaust gaseous emissions are likely to be emitted by the heavy flow of traffic and operation of machinery on site	Negative	Low	Localized Project Area	Long time	During preparation, construction and operation phases	Occasional	Possible	Low	Medium	Low
<b>Water Quality and Resource</b>	Sanitary wastewater from construction worker camps and canteens and Surface and ground water contamination from Spent oils, oil leakages and accidental Spillages	Negative	Medium	Localized Project Area	Short	During preparation, construction and operation phases	Occasional	Possible	Moderate	High	High

<b>Land and Soil</b>	Contamination of soil, due to Hydrocarbons (Accidental fuel/oil spills) and compaction from Heavy equipment movements	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low
	Soil Destruction and sterilization due to topsoil stripping and plant construction	Negative	Low	Localized Project Area	Short	During preparation, construction and operation phases	Occasional	Probable	Moderate	Medium	Low
<b>Biodiversity and Vegetation</b>	Preparation/construction activities may lead to loss of vegetation due to clearance of Pipeline route and other project infrastructure.	Negative	Low	Localized Project Area	Short	During construction	Occasional	Probable	Low	Low	Low
	The area is well forested and this has promoted the survival of a few wildlife within the project area.	Negative	Low	Localized Project Area	Short	During preparation, construction and operation phases	Infrequent	Probable	Low	Low	Low
	Loss of agriculture land on the people conducting subsistence farming in the project area	Negative	High	Localized Project Area	Short	During preparation, construction and operation phases	Once	Probable	High	High	High
	Impacts on biodiversity may arise due to such activities as vegetation clearing for setting up of base camp, construction of access roads, pipeline facilities	Negative	medium	Localized Project Area	Short	During preparation, construction and operation phases	Occasional	Probable	Moderate	Medium	Medium
	Biodiversity loss may be due to habitat loss for									Medium	Medium

	flora and fauna because of project induced activities such as vegetation clearing for terrestrial habitats	Negative	medium	Localized Project Area	Short	During preparation, construction and operation phases	Occasional	Probable	Moderate		
	Other activities may result in increased noise and vibration which may disturb the range and breeding pattern of endemic species in the project area inducing migration of species	Negative	medium	Localized Project Area	Short	During preparation, construction and operation phases	Occasional	Probable	Moderate	Medium	Medium
<b>Waste Generation and Management</b>	There will be wastes such as chemicals, battery acid, fuels, used oils and brake fluid though will be in very minimal amounts.	Negative	medium	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	high	high
	Non-Hazardous waste will mainly come from discarded packaging materials such as cement bags, metal cuttings, carton boxes and plastic packs	Negative	Low	Localized Project Area	Short	During preparation, construction and operation phases	Occasional	Probable	Moderate	high	high
<b>Noise generation</b>	Construction activities will be a source of noise due to moving machines such as mixers, tippers, excavators and bulldozers	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low
	During operation phase, high noise levels will be expected from plant	Negative	Medium	Localized Project Area	Long term	During operation phase	Occasional	Probable	Moderate	Medium	Medium

	components such as the turbines, crushers and boilers affecting workers and nearby communities.										
<b>Disturbance of Land use</b>	Pipeline activities will impact mainly the land use of the area. Locals have agriculture fields within the project area	Negative	High	Localized Project Area	Short term	During preparation & construction phases	Once	Probable	Low	Medium	Medium
<b>Socio-economic Impacts</b>											
<b>Employment Opportunities</b>	The project will create employment opportunities for the communities within the project area	Positive	High	Widespread	Long term	Preparation and Construction Phase	Continuou s	Certain	High	High	High
<b>Enhanced Economic Activities</b>	Development of the project will open up business opportunities & enhance commercial activities	Positive	High	Widespread	Long term	Post Decommissioning	Continuou s	Certain	High	High	High
<b>Community Health and Safety</b>	Increased transmission of communicable diseases – due to presence of non-local workers and in-migration of people	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	high	high
	Increased transmission of STIs including HIV/AIDS associated with improved livelihoods, higher levels of disposable incomes	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	High	high

	and changes to the population											
<b>Archaeological, Traditional, Religious or Cultural Sites</b>	Damage to or destruction of undiscovered heritage or archaeological resources, during construction, operation and decommissioning of the Pipeline project and associated projects (roads, water supply etc.).	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low	Low
<b>Impacts on Occupational health and Safety</b>	Improper sanitation habits can lead to intestinal parasite infestations within humans and animals, endangering the overall health of the recipients.	Negative	Medium	Localized Project Area	Short term	During preparation, construction and operation phases	Occasional	Probable	Low	Medium	Low	Low
	This project is inherent with hazards such as electricity faults, compressed air, handling and storage of potentially hazardous substances, motor vehicle accident, accidental falling collapse that may result to injury or death of employees and exposure to fugitive dust that can contribute to respiratory and eye infections.	Negative	Medium	Localized Project Area	Short term	During preparation, construction and operation phases	Occasional	Probable	Low	High	High	High

<b>Impact on Agriculture Land for the Locals</b>	Project activities might affect the locals with agriculture land within the project area once the project is approved	Negative	High	Localized Project Area	Short term	During preparation, construction and operation phases	Once	Certain	High	High	High
<b>Impact on Loss of Livelihood</b>	Water abstraction Pipeline activities in the project area will impact on the livelihood of the locals	Negative	High	Localized Project Area	Short term	During preparation, construction and operation phases	Once	Certain	High	High	High
<b>Impact on Loss of Access routes</b>	The project area will have restricted areas within the project area hence some access routes will be closed off	Negative	medium	Localized Project Area	Short	During preparation, construction and operation phases	Once	Probable	Low	Medium	Medium
<b>Impact on Loss/restriction of access to common resources (e.g., water front, forest)</b>	The Water abstraction Pipeline activities might restrict access to common resources such as water front or forest	Negative	Low	Localized Project Area	Long term	During preparation & construction phases	Occasional	Probable	Low	Low	Low
<b>Impact on loss of customary rights</b>	The project might impact on the customary rights of the local people.	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low
<b>Impact on loss of amenity values</b>	The project might impact on the amenity values in the project area	Negative	Low	Localized Project Area	Short term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low
<b>Impact on Loss of ethnicity (culture/traditions)</b>	The project might impact on the ethnicity (culture/traditions) in the project area	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low

## **7.0 ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)**

This section discusses the proposed enhancement and mitigation measures for each respective positive and negative Impact identified in the previous section. The proposed mitigation measures designed to minimize or eliminate for impacts triggered by the project.

The ESMP will include all the measures that are required for environmental protection, which will include the mitigation measures and the monitoring plan. The aim of an environmental management plan is to avoid, minimize, or ameliorate effects or impacts resulting from project implementation and where possible, enhance beneficial effects.

### **7.1 Impact Mitigation Measures**

The impact mitigation plan allocates the responsibilities for implementation of the proposed mitigation measures to the various stakeholders and indicates at what stage in the project they should be performed. The key components of the proposed impact mitigation are as following:

#### **7.1.1 Impact on Air Quality**

- Periodic monitoring of air quality.
- Provision of dust masks to the workforce at points of high dust generation.
- Dust suppression using a water bowser will be done.
- Regular maintenance of construction vehicles to reduce exhaust emissions.
- The amount of dust generated will be monitored to ensure that it conforms to the set standards and does not go above 50mg/Nm<sup>3</sup>.
- All earth materials will be covered with appropriate material to suppress dust emission and during construction it shall be suppressed by spraying water.
- Waste should be carefully managed to prevent unpleasant odours.
- Vehicles ferrying the raw materials will be covered by tarpaulins to mitigate the impact.
- Water shall be sprayed along the access roads and open spaces using water bowsers. This will be done once in a day where necessary.

#### **7.1.2 Impact on Water Quality and Resource**

- Implementing vigorous monitoring programs to track water quality parameters like turbidity, temperature and later make necessary adjustments in operations;

- Impacts on Water Quality: all measures will be put in place to ensure the water body is not contaminated during construction to prevent water pollution.
- Bunded or contained oil/fuel storages.
- Management of working sites, access roads, yards and camps to minimise sediment runoff into the water course.
- Installation of physical barriers like silt fences and sediment traps, to capture the soil preventing it from entering nearby water sources.
- Prioritise installation activities during the dry season.
- Priorities efficient use of water resources.
- All solid waste will be put in bins and dumpsters on site and will be collected on a regular basis by a Solid Waste Collection Company approved by the Town Council Waste Management Unit and disposed of at a ZEMA approved landfill site.
- The water body and community wells in the area will be regularly monitored by the developer to verify any impact on water levels.

#### **7.1.3 Impact on Land and Soil**

- Remove and remediate any soils contaminated by accidental spills.
- Conduct training on proper handling of fuels and other hazardous substances.
- Additional measures to contain spillages such as oil-retention brooms be set up on the facility.
- Develop a spill prevention and control plan to counter and manage emergencies that may arise in the event of accidental spillages.
- Any disposal of hazardous waste shall be done using a licensed waste collection company for appropriate disposal.
- All activities which could contaminate the soil have to be carried out on sealed surfaces. If accidental spillage occurs, the contaminated soil has to be excavated and disposed of properly (final treatment or disposal shall be done by a suitably qualified company.
- Topsoil removed from the peripheral areas of the site along access roads will be stockpiled and used in future re-vegetation schemes on the project site.
- Stockpile the topsoil and replace it after construction works are completed.

#### **7.1.4 Waste Generation and Management**

- A waste management system will be developed and implemented onsite.
- Solid waste shall be sorted according to types. Garbage cans will be installed for temporary disposal of domestic waste. These have to be collected and disposed of according to the regulation of solid waste management and approved by the local authorities.

- No waste shall be disposed of or buried on site. Illegal dumping, either at the construction camp, along the roads or in the surrounding areas, or into the lake shall not be allowed.
- Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites.
- In general, waste should be reduced, re-used, recycled before being disposed where possible and the disposal should be controlled.
- All hazardous waste will be disposed of in accordance with the provisions of SI No. 112 of 2013.
- Hazardous waste (oil, chemicals, etc.) has to be stored in a designated closed tank and/or area until it is handed over to companies specialised in the proper disposal or recycling of those hazardous wastes.
- Containers have to be available at the workshops for the disposal of used filters, gaskets and other spare parts.

#### **7.1.5 Impact on Biodiversity and Vegetation**

- Restrict clearing of vegetation only to areas where the Water abstraction Pipeline and other associated structures will be put up.
- Vegetation will only be stripped immediately prior to the commencement of operations.
- In general, strengthening the awareness of the workforce for the environment (protected areas, plants and wildlife): to avoid logging, hunting, etc. at project site and in the surroundings, to prevent the extraction of plant products (wood, non-timber forest products) and the introduction of invasive species by operation staff and the population of the new settlement, to prevent or minimise pollution of sites, Construction site to be fenced off for preventing use of surrounding areas.
- Where possible, riparian and specialised habitats should be avoided when planning the location of temporary sites.
- Minimise impacts on flora and fauna through management of noise generation.

#### **7.1.6 Impact of Noise and vibration**

- Limit all project activities to during daytime hours.
- Regular maintenance of construction vehicles and equipment.
- Periodic noise monitoring will be done.
- Using adequate and well-maintained construction and transportation equipment including state-of-the-art built-in systems (muffle) to reduce the noise.

- The contractor has to develop a maintenance program to ensure to keep noise within legally permitted limits. Instructing the workforce to avoid unnecessary noise.
- Workers exposed to excessive noise have to be equipped with PPE (e.g., ear protectors) and the exposition time has to be limited.

#### **7.1.7 Community Health and Safety**

- Employing of local residents to minimise the influx of people in the area which may contribute to the spread of communicable diseases.
- The Construction Supervisor in collaboration with the Ministry of Health shall take measures to educate and sensitise the labour force on the risks of communicable diseases (malaria, TB, STDs, including HIV/AIDS etc.). How infections are transmitted, how to recognise symptoms, what should be done and on prevention measures. Male and female condoms shall be distributed to workers by the Contractor free of charge.
- Every worker will have to have the necessary vaccinations (Hepatitis A and B, Tetanus, etc.). Preventive medicine and mosquito nets shall be distributed to the workforce by the Contractor free of charge on a regular basis. Workers' camps should be sprayed for mosquitoes and other pests on a regular basis.
- Ensure adequate management of all construction waste.
- Ensure proper storage of waste and placing of barricades and warnings around all sensitive and dangerous areas.
- Avoid idling of equipment when not in use.
- Communicate all hazardous activities to the surrounding communities at the start of each new phase of the Project and whenever needed during each phase.
- Regular maintenance of all construction equipment.
- Training all workers on appropriate interactions with communities and include workers code of conduct in contracts.

#### **7.1.8 Occupational and Safety**

- Strict use and cleanliness of the modernized sanitary facilities will be enforced during the entire life of the project.
- Ever Great Energy Company Limited will develop a Safety Guidance Code whose objectives will be to assist in reducing accidents, injuries, incidents and occupational diseases during construction and operation activities.
- Speed limits will be put up and drivers will be instructed to follow they set up limits within the project area to minimize on risks of accidents

- All personnel involved in the project will be equipped with proper Personnel Protective Equipment (PPE) such as dust mask, eye goggles, protective clothing, gloves, hard hats, hearing protection and boots.
- All hazardous materials will be stored in an isolated place and will be well labelled.
- Adequate signages to be put up in all areas of the Water abstraction Pipeline.

#### **7.1.9 Impact on Archaeological, Traditional, Religious/Cultural Sites**

- The project might impact on the customary rights of the local people. However, the project site is on traditional land and traditional leadership will be consulted.

#### **7.1.10 Impact on Land use, Property and Settlements**

- Involving the local community in the planning and implementation process to understand their concerns and incorporate them and address them effectively.
- Planning of the proposed project in such a way as to avoid critical areas like productive agricultural land, sensitive ecosystems, or areas of significant cultural importance to locals.
- Identifying affected parties and providing fair compensation.

#### **7.1.11 Impact on Traffic and Road Safety**

- The company will prepare a Traffic Management report that will help to address all traffic related issues before the project is implemented
- Construct new entrance to site
- Warning signs along the access roads directed at pedestrians to be put up.
- Speed limits to be adhered to by all construction site drivers.
- Barrier/Security check point at entrance to regulate unauthorized traffic.
- Restricted zones will be clearly demarcated, alternative access routes for the community will be made through engagement of the locals and the leaders.

#### **7.1.12 Impact on Public Utility Infrastructure**

- Consultations and engagement will be done with relevant authorities such as RDA, ZESCO, ZRA and Sinazongwe Town Council etc.

## Summary of Environmental and Social Monitoring Plan

Table 21: Summary of Environmental and Social Monitoring Plan

Aspect	Impact	Mitigation Measures	Time frame	Performance Indicator	Frequency of Monitoring	Responsible person	Cost ZMW /year
<b>Waste generation</b>	Waste to be generated will include general solid waste (putrescible and non-putrescible), general office waste (paper, cardboard, glass), used oils, filters, oily rags, drill mud and batteries.	<p>Provide waste bags for storage of waste in all and dedicated receptacles for storage of waste at the campsite and all operational sites.</p> <p>Develop a waste management system</p> <p>No waste shall be disposed of or buried on site. Illegal dumping, either at the construction camp, along the roads or in the surrounding areas, or into the river shall not be allowed.</p>	All project phases	<p>Waste bags and waste receptacles available</p> <p>Waste management system developed</p> <p>No illegal dumping sites</p>	Random	SHE Manager & Contractors representative	45,000.00

		<p>Waste oil and lubricants will be stored in designated receptacles and areas until enough quantity is collected for disposal through ZEMA approved recyclers.</p> <p>Containers have to be available at the workshops for the disposal of used filters, gaskets and other spare parts.</p>	All project phases	<p>Records of waste oil disposed at ZEMA approved recycler</p> <p>Number of containers available</p>	Regularly	SHE Manager & Contractors representative	30,000.00
<b>Air quality</b>	<p>Uncontrolled disposal of putrescible waste could attract vermin including rodents and birds as well as the release of unpleasant odors which may be regarded as a nuisance to other adjacent land users, particularly those located down-wind.</p>	<p>Biodegradable waste will be placed in waste plastic bags, secured and disposed in pit at a depth of 1 m on a regular basis to avoid attracting animals and vermin.</p>	All project phases	No biodegradable waste stored at campsite	Regularly	SHE Manager & Site manager	

	<p>Site clearing operations for land preparation is characteristic of dust emission. Dust due to excavation activities.</p> <p>Exhaust gaseous emissions are likely to be emitted by the heavy flow of traffic and operation of machinery on site.</p> <p>Air emissions: Air emissions such as CO, NOx and Sox are common pollutants from such power plants during the operation stage.</p>	<p>Water bowsers will be employed on site to suppress dust on all site roads.</p> <p>Site workers will be issued with personal protective attire.</p> <p>All earth materials will be transported moist and/or covered with appropriate material suppress dust emission.</p>	<p>All project phases</p> <p>All project phases</p> <p>All project phases</p>	<p>Presence of water sprinklers within the project area</p> <p>Number of water bowsers and the watered roads</p> <p>Presence of PPE</p> <p>All equipment with appropriate material for suppressing dust.</p>	<p>Regularly</p> <p>Regularly</p> <p>Regularly</p> <p>Regularly</p>	<p>SHE Manager &amp; Site manager</p> <p>SHE Manager &amp; Site manager</p> <p>SHE Manager &amp; Site manager</p> <p>SHE Manager &amp; Site manager</p>	<p>50,000 per quarter</p> <p>30,000 per quarter</p>
<b>Waste management</b>	<p>Littering of non-degradable wastes such as plastics, glass, rubber and paper can visually degrade an area.</p>	<p>Waste generated while in the project area shall be placed in the waste bags to be placed in waste bins to be found in all appropriate project areas.</p>	<p>All project phases</p>	<p>Number of Waste bins provided onsite</p>	<p>Random</p>	<p>SHE Manager &amp; Site manager</p>	<p>28,000 per month</p>

		Dispose of non-hazardous waste at regular basis in dedicated receptacles provided with bunds to prevent escape waste at designated disposal site at campsite.  In general waste should be reduced, re-used, recycled and the disposal should be controlled.		Receptacles provided and bunded disposal site  Quantity of recycled materials	Monthly	SHE Manager & Site manager	
	Improper sanitation habits can lead to intestinal parasite infestations within humans and animals, endangering the overall health of the recipients.	Adequate number of portable toilets will be provided. These will be kept closed at all times to prevent flies finding their way to the excreta.	All project phases	Number of portable toilets provided	Random	SHE Manager & Site manager	25,000/annual
<b>Noise and Vibration from the equipment</b>	Increase in ambient noise level	Workers to wear ear plugs in noisy environs. contractor to avoid working at night, limit speed to 40-60 km/hr and tune-up vehicles.	During site preparation and	Speed Limits set	Continuous through project cycle	SHE Manager & Site manager	35,000/quarter

		<p>All land preparation and construction activities will take place during the day and any work during night- time will be communicated to the state authorities and local community.</p> <p>Using adequate and well-maintained construction and transportation equipment including state-of-the-art built-in systems (muffler) to reduce the noise.</p>	<p>constructi on phases</p> <p>During site operation phase</p> <p>During site operation phase</p>	<p>Works done during daytime</p> <p>Number of PPE provided</p> <p>state-of-the-art built-in systems (muffler) installed</p>	<p>Continuous through project cycle</p>		<p>150,000/annual</p>
<b>Wildlife disturbance</b>	Construction activities	<p>Strengthen the awareness of the workforce for the environment (protected areas, plants and wildlife): to avoid logging, hunting, etc. at project site and in the surroundings, to prevent the extraction of plant products (wood, non-timber forest products) and the introduction of invasive</p>	<p>The site is further away from the protected areas, and in cases where wildlife is encountered, stringent measures shall be</p>	<p>Number of awareness programs conducted</p>	<p>Throughout the project cycle</p>	<p>SHE Manager &amp; Site manager</p>	<p>25,000/annual</p>

		species by operation staff and the population of the new settlement, to prevent or minimise pollution of sites, Construction site to be fenced off for preventing use of surrounding areas	put in place.				
<b>Soil pollution</b>	Soil contamination	No machinery and vehicles will be serviced on site. Fuels will be stored in a tank to be installed onsite.	Weekly storage of fuels	Number of vehicles serviced at the workshop	Continuous through project cycle	SHE Manager & Site manager	20,000/ Month
		No waste shall be disposed of or buried on site. Illegal dumping, either at the construction camp, along the roads or in the surrounding areas, or into the lake shall not be allowed.	Weekly for solid waste and continuous for liquid waste	No piles of waste within the project site.	Continuous through project cycle	SHE Manager & Site manager	15,000/month
		Storage of fuel and lubricants has to be in tight containers placed		Number of tight		SHE Manager & Site manager	10,000/month

		<p>on sealed surfaces underneath a roof.</p> <p>Solid waste generated during construction and at campsites will be properly treated and safely disposed of only in demarcated waste disposal sites.</p> <p>All activities which could contaminate the soil have to be carried out on sealed surfaces. If accidental spillage occurs, the contaminated soil has to be excavated and disposed of properly (final treatment or disposal shall be done by a suitably qualified company.</p> <p>Hazardous waste has to be stored in designated closed tanks or areas</p>		<p>containers placed</p> <p>Quantity of solid waste treated and disposed off</p> <p>Number of sealed surfaces constructed</p> <p>Number of designated closed tanks installed</p>	<p>Continuous through project cycle</p> <p>Continuous through project cycle</p> <p>Continuous through project cycle</p> <p>Continuous through project cycle</p>	<p>SHE Manager &amp; Site manager</p> <p>SHE Manager &amp; Site manager</p>	<p>15,000/month</p> <p>N/A</p> <p>15,000/month</p>
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<p><b>Occupational safety</b></p>	<p>Loss of human life</p>	<p>Observance of good work ethics and sensitization of workers</p> <p>Drivers will be instructed to drive the vehicles at the set speed limits within the project area to minimize on risks of accidents.</p> <p>All personnel involved in the project will be equipped with proper Personnel Protective Equipment (PPE) such as dust mask, eye goggles, protective clothing, gloves, hard hats, hearing protection and boots.</p> <p>Strict use and cleanliness of the modernized sanitary facilities will be enforced during the entire life of the plant.</p> <p>All hazardous materials will be stored in an</p>	<p>During construction and operation phases</p> <p>During construction and operation phases</p>	<p>No occupational accidents are reported.</p> <p>Number of employees provided with PPE</p>	<p>Continuous through project cycle</p>	<p>SHE Manager &amp; Site manager</p>	<p>30,000/Quarterly</p>
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		<p>isolated place and will be well labelled.</p> <p>Adequate signages to be put up in all areas of a power plant.</p>					
<b>Health of workers</b>	Spread of HIV/AIDS and STIs	<p>Conduct a comprehensive health awareness campaign among the local community and project workers on the dangers of the HIV/AIDS pandemic. Screen and treat project workers for STIs. Provide treatment to project workers and their partners regarding non-HIV/AIDS cases and refer HIV/AIDS cases to National AIDS Program for treatment under the MOH.</p> <p>Provide condoms to all project workers at all times.</p> <p>Employing of local residents to minimise</p>	During site preparation and operation phases	Number of STDs, HIV/AIDS infected workers reduced	Continuous through project cycle	Project Manager	10,000/month

		the spread of communicable diseases					
<b>Creation of employment</b>	Improved incomes	Discriminate in favour of local unskilled workers  It is anticipated that the project will provide both temporal and permanent jobs going by the labor law requirement that any one working more than 6 months should be permanently employed	During preparation and operation phases	Standard of life of local improved	Continuous through project cycle	Project Manager	N/A
<b>Increased public revenue</b>	Revenue might be increased through statutory contribution	There will be opportunities to generate some revenue. There will also be economic benefits at the national level through revenue contribution from taxes	Project lifecycle	Revenue collected per annual	Quarterly	Site manager	N/A
<b>Multiplier Effects of the project in the area</b>	The project might bring multiplier effects to the local people	There shall be a boost to local development activities especially in the area of food supply and raw materials. This	Project Lifecycle	New developmental activities introduced in	Random	Site manager	N/A

		will be a direct impact on the developmental activities due to the project activities.		the project area			
<b>Clearing right of way</b>	Loss of vegetation	<p>Confine clearance to project areas only</p> <p>Vegetation will only be stripped immediately prior to the commencement of operations</p> <p>Where possible, riparian and specialised habitats should be avoided when planning the location of temporary sites</p>	Site preparation phase	Loss of vegetation is restricted to within the project area and trees are planted.	Continuous through project cycle	SHE Manager & Site manager	N/A
<b>Fire and explosions</b>	Loss of human life	<p>All fuel storage and handling facilities in Zambia must however comply with strict safety distances as prescribed by relevant pieces of legislation.</p> <p>Fire extinguishers will be available in all mobile equipment and</p>	Project lifecycle	No reports of fire and explosions	Continuous through project cycle	SHE Manager & Site manager	N/A

		will be maintained and serviced as required and employees trained in fire prevention and firefighting.					
<b>Water quality</b>	Grey and black water discharges have potential of contaminating surface and ground water and impact on quality.	No siting of pipeline facilities will be done within 150 to 250m of any water body to provide enough environmental buffer zone of natural vegetation to act as filter of suspended solids.	Daily	No facilities located within 100metres of any water body  Camp siting and site plan map	Continuous through project cycle	SHE Manager & Site manager	15,000/yearly
	Oil spillage from vehicles, machinery, storage containers and leachate from waste disposed on site can pollute surface and ground water in the area.  Lowering of water levels of nearby waterbodies as the power plant process requires a lot of water,	Provide roof cover, HDPE liner and bund wall for storage of fuel, oils and chemicals to prevent water to infiltrate such areas and generate contaminated runoff that can contaminate unprotected soil.	Quarterly	Roof cover, HDPE liners and erected bund wall in use.  Records of Water level	Continuous through project cycle.	SHE Manager & Site manager.	5000/per month

	<p>thereby causing water shortages for domestic uses for other water users.</p> <p>Groundwater and surface water contamination due to possible leaks from Coal washing processes.</p>	<p>Regular Monitoring of community wells and water levels</p> <p>Oil traps will be installed in the workshop drainage system to treat all effluents prior to release.</p>	Operation phase	No reports of contaminated ground water.	Continuous through project cycle.	SHE Manager & Site manager.	
<b>Generation of sewage</b>	During the project lifecycle sewer will be generated from the toilets and ablution blocks within the site	All sewer waste will be channelled to a septic tank.	Project lifecycle	Operational water treatment plant	Continuous through project cycle	SHE Manager & Site manager	30,000/Biannual

## 8.0 DECOMMISSIONING AND CLOSURE PLAN

Water abstraction Pipeline closure planning primarily considers the best way to manage environmental changes and socio-economic effects associated with closing the project. Successful closure generally varies from place to place due to several factors. However, it is important that physical, chemical and biological stability is achieved and the final land use is appropriate.

### 8.1 Objectives

The target closure outcomes of the decommissioning plan are to:

- Restore as much as possible of the project site to a condition consistent with the predetermined post-closure site use objective;
- Ensure that the project site is left in a condition which poses an acceptable level of risk to public health and safety;
- Rehabilitation of Water abstraction Pipeline area, offices, access routes and campsites;
- Removal of all the associated project infrastructure on site.
- Minimize or prevent environmental degradation by water, by ensuring the site is left in a condition that is chemically and physically stable; and
- Complying with national and environmental regulations.

Restoration steps to be taken before abandonment are:

- Clean up;
- Drainage and erosion control;
- Re-contouring;
- overburden replacement; and
- Revegetation if necessary.

The topsoil stored when the excavations were done, will be spread over the overburden and levelled off the ground so as to present a neat appearance (the level of the excavated area should be the same as that of the undisturbed surrounding ground one year after restoration is completed). The topsoil contains seeds and organic material that will help vegetation regrowth and return the area to conditions as close as possible to those that existed before operations commenced. Without any topsoil, natural revegetation is a much slower process.

Monitoring will take place to see if re-growth is taking place naturally. If re-vegetation does not take place naturally, seeding of the prospecting area with surrounding indigenous species will be considered.

The following is the procedure for decommissioning;

- a. Notify relevant authorities of the intention to cease activities: This will be done in order for the regulatory authorities that include ZEMA, Sinazongwe Town

Council and other relevant authorities. This will entail that Ever-Great Energy Company Limited will have completed the project in accordance with the project objectives.

- b.** Demobilize all equipment from the project sites and terminate contracts of all employees upon payment of their benefits accrued at the time of closure.
- c.** Conduct baseline study on air quality, water and soil to determine impacts of the project activities during the project life cycle.

The decommissioning exercise will take into account the implementation of the environmental management plan highlighted above. Summary of the decommissioning activities and associated costs are indicated in the table below.

Table 22: Summary decommissioning activities & costs.

Aspects	Impacts	Objective	Mitigation Measures	Responsible person	Indicator	Means of Verification	Frequency	Cost ZMK
Decommission and closure	Closure of the project	To ensure adherence to all regulations and requirements	A full decommissioning report will be elaborated by an independent consultant and submitted to ZEMA	Ever Great Energy Company Limited	Reports submitted	Decommissioning report	-	40,000
Dismantling of the operational components and removal from site	Dismantling of some infrastructure that cannot be used	Improved value of the land	Remove all structures that cannot be used for other purposes	Ever Great Energy Company Limited	Dismantled components	Monitoring Year after Final Year of operation	On-going	100,000
Removal of some infrastructure for alternative uses	infrastructure removed for alternative uses	Improved value of the land and Continued empowerment of the community	All infrastructure that can be used for other purposes will be rehabilitated so that they can be used for other purposes	Ever Great Energy Company Limited	Records of reusable infrastructure	Monitoring Year after Final Year of operation	On-going	50,000
Refilling of trenches, foundation, pits etc.	Improvement of human safety, community accessibility	Promote community safety, accessibility and restoration of project area	All trenches and foundations will be filled using dug out materials	Ever Great Energy Company Limited management	Refilled trenches and foundations	Monitoring Year after Final Year of operation	On-going	200,000

<b>Aspects</b>	<b>Impacts</b>	<b>Objective</b>	<b>Mitigation Measures</b>	<b>Responsible person</b>	<b>Indicator</b>	<b>Means of Verification</b>	<b>Frequency</b>	<b>Cost ZMK</b>
Vegetation loss due to project infrastructure and activities	Loss of vegetation	To minimize visual impact of rehabilitated areas	Re-vegetation will either be allowed to take place naturally or will be assisted by the mechanical seeding of grasses and trees that are indigenous to the area	Ever Great Energy Company Limited management	Re-vegetation of the cleared areas of the project site	Re-vegetation occurrence	On-going	20,000
Land degradation	Land degradation due to operational activities	Minimize land degradation of the project area	Earth materials resulting from the demolishing of the pipeline structures will be backfilled.	Ever Great Energy Company Limited management	Backfilled land	Restored degraded land	-	50,000

## 9.0 BIBLIOGRAPHY

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## **10.0 DECLARATION OF AUTHENTICITY OF REPORT CONTENTS**

We trust that the information described in this Environmental Impact Statement is adequate and satisfies the laws and regulations of Zambia regarding the construction and operation of a Water abstraction Pipeline from lake Kariba Dengeza area to the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Senior Chief Mweemba's Chieftom in Siameja Azilundu Area of Sinazongwe district. We also trust that the information meets the Zambia Environmental Management Agency's requirements for approval.

  
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Director

**Ever Great Energy Company Limited**

## 11.0 APPENDICES

### Appendix 1: Certificate of Incorporation

Digitally signed by: NDONANO MWANABEENE SIULUTA  
Issued by: issuer.users.pki.gsb.gov.zm  
Reason: E-20240125-368826  
Location: Patents and Companies Registration Agency  
Date: 2024-01-26 14:16:53 UTC+0

CF45  
(Regulation 46)  
Companies Registration No. 120241001245  
Serial No. 1318640



Scan to verify  
OUR REGISTRATION DETAILS



Republic Of Zambia

The Companies Act, 2017

(Act No. 10 of 2017)

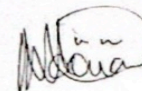
The Companies (Prescribed Forms) Regulations, 2018

(Section 14)

### CERTIFICATE OF INCORPORATION PRIVATE COMPANY LIMITED BY SHARES

**This is to certify that EVER GREAT ENERGY COMPANY LIMITED is on and from the 26th day of January 2024 incorporated as a PRIVATE COMPANY LIMITED BY SHARES.**

Given under my hand and seal at Lusaka, Zambia, this 26th day of January 2024.



NDONANO MWANABEENE SIULUTA  
Deputy Registrar of Companies

For further details relating to this business visit  
<http://www.pacra.org.zm>

## Appendix 2: TORs & Scoping Approval Letter



ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY  
RESPONSE LETTER

18 Mar, 2025

{serial\_no}

The Director  
Ever Great Energy Company Limited  
Plot 5493 Great East Road  
P.O Box 31211  
**Lusaka**

Dear Sir/Madam

RE: APPROVAL OF THE TERMS OF REFERENCES AND SCOPING REPORT FOR THE PROPOSED WATER ABSTRACTION AND PIPELINE PROJECT FOR THE THERMAL POWER PLANT IN SIAMEJA AZILUNDU AREA, SINAZONGWE DISTRICT BY EVER GREAT ENERGY COMPANY LIMITED

The above matter refers.

Zambia Environmental Management Agency (ZEMA) has reviewed the Terms of Reference (ToRs) and Scoping Report for the Proposed Water Abstraction and Pipeline Project for the Thermal Power Plant in Siameja Azilundu Area Sinazongwe District by Ever Great Energy Company Limited.

The "Agency" would like to inform you that the said ToRs and Scoping Report have been **approved**.

The approved ToRs and EIA team members are as follows:

### 1. Project Description

Ever Great Energy Company Limited is proposing to set up a Water Abstraction and Pipeline Project from Lake Kariba in Dengeza area to the 600MW Thermal Power Plant within Licence No. 33627-HQ-LEL in Senior Chief Mweemba's Chieftom in Siameja Azilundu Area of Sinazongwe District. The pipe will be made of metal with a diameter of 30cm which will be pumping 35000m<sup>3</sup> per day and 3 pumps from source to the water storage area at the thermal plant. The pumps will have a pumping power of 2500 torque.

#### 1.1 Key Project Components

The proposed Water Abstraction Pipeline will comprise of the following components:

- Pump House;
- Motor;
- Impeller;
- Valves;
- Pipes;
- Water storage and treatment facility at the power plant; and
- Power backup Solar and generator

## **Annex 2a: Approved Terms of Reference Report**

## **Annex 2b: Approved Scoping Report**

### Appendix 3: Disclosure Meeting Advert

ZAMBIA DAILY MAIL, Tuesday, December 23, 2025

## DISCLOSURE MEETING

**INVITATION TO A DISCLOSURE MEETING FOR THE PROPOSED WATER ABSTRACTION PROJECT IN SENIOR CHIEF MWEEMBA'S CHIEFDOM OF SINAZONGWE DISTRICT BY EVER GREAT ENERGY COMPANY LIMITED**

Ever Great Energy Company Limited (EGECL) is a Zambian owned private Company incorporated in January 2024. The company intends to abstract water from lake Kariba for use at the Thermal Power Plant in Simeja Azilundu village of Senior Chief Mweemba's Chiefdom in Sinazongwe district. The proposed project is located approximately 95km southwest of the Sinazongwe Central Business District.

Tsalach Global Limited a consulting firm has been contracted to undertake all environmental works on behalf of EGECL as part of the Environmental Impact Assessment (EIA) process and in compliance with section 29 of the Environmental Management (Amendment) Act No. 8 of 2023 and appropriate international best practices.

Therefore, EGECL is inviting all stakeholders from government ministries and agencies, local authorities, traditional and civic leadership, non-governmental organizations, community-based organizations and potentially affected communities to a Disclosure Meeting for the proposed project. The meeting will be held **Physically on 30<sup>th</sup> December, 2025** in Dengeza Village, at **10:00hrs** with the local community. In addition, another physical meeting will be held on **29<sup>th</sup> December, 2025** at **14:00hrs** with the venue being the Sinazongwe Town Council Hall with the local authorities as well as interested parties.

For further details and clarifications and registration of the meeting, please contact the following numbers:  
 +260979969837/0977603021,  
 email:  
 tsalachglobaltd@gmail.com.



**Tsalach Global Limited**  
Office #7 - A and B Building,  
 Plot No. 82/14/1906,  
 Chibambala Road,  
 New Chibanga, Lusaka.

Call/Whatsapp: +260 975 187 750  
 +260 977 603 021  
 Email: tsalachglobaltd@gmail.com

RSO400814/23.12

## **Appendix 3a: Disclosure Meeting Minutes**

### **MINUTES OF THE DISCLOSURE MEETING FOR THE PROPOSED WATER ABSTRACTION PROJECT IN SENIOR CHIEF MWEEMBA'S CHIEFDOM OF SINAZONGWE DISTRICT BY EVER GREAT ENERGY LIMITED**

**Date:** 30/12/2025

**Time:** 11:00hrs- 12:00hrs

**Venue:** Dengeza Primary School

#### **ATTENDEES**

Find attached to these minutes a list of all stakeholders in attendance. No apologies were sent forth.

#### **AGENDA**

1. Welcoming all stakeholders and Introductions
2. Presentation of the Proposed Project by Mr. Christopher Mutale
3. Discussion (Questions and Comments)
4. Closing remarks

#### **1. Welcoming all Stakeholders and Introductions**

The meeting was called to order at 11:00 hours by the Chairperson, Mr. Christopher Mutale. He introduced the team from Tsalach Global Limited (TGL), after which the various stakeholders were given an opportunity to introduce themselves. The Chairperson welcomed all stakeholders in attendance and briefly outlined the purpose of the meeting, which was to present and discuss the project.

The rationale for the water abstraction project was also explained, taking into account that projects of this magnitude require the preparation of an Environmental and Social Impact Assessment (ESIA).

#### **2. Presentation of the Proposed Project**

The presentation on the proposed project was given by the meeting chairperson Mr. Christopher Mutale who gave an overall verbal presentation of the Environmental and Social Impact Assessment (ESIA). The ESIA presentation included the following;

- Project Introduction
- Project Description and Location
- Objective of the disclosure meeting
- Potential project impacts both negative and positive impacts and;
- Proposed mitigation measures.

Mr. Mutale gave a detailed presentation on the proposed project. He gave a precise location of the project and the main components of the project.

Mr. Mutale concluded the presentation with an emphasis on the necessity and importance of conducting the ESIA process on such a project of such magnitude. In addition, Mr. Mutale encouraged the stakeholders to attend future meetings as they are vital for the thorough ESIA process.

## **Discussions**

### **Mr. Kipson Siantuwele – Senior Headman (Mandonda Village)**

Mr. Siantuwele thanked everyone for attending the meeting and welcomed the proposed development. He requested that the developer should prioritise employing people from the local community before sourcing labour from elsewhere, with particular emphasis on providing employment opportunities for local youths.

### **Mr. Mutale – Chairperson**

Mr. Mutale responded by stating that the concern raised was valid and assured the meeting that the developer would prioritise employing local youths before seeking labour from outside the community.

### **Mr. Ackson Siankope – Headman (Silika Village)**

Mr. Siankope requested the developer to renovate the community school and to construct a 1 x 3 classroom block for use by local pupils.

### **Mr. Mutale – Chairperson**

Mr. Mutale acknowledged the request and assured Mr. Siankope that the matter would be communicated to the developer for consideration.

### **Mr. Viston Sitima – Headman (Zyabunga Village)**

Mr. Sitima expressed deep concern over the work culture of the contractors who were engaged for road construction. He stated that many workers were dismissed during the final stages of the works without being paid. He further added that members of the supporting committee were also treated unfairly, receiving little to no compensation. Lastly, he requested that the company construct a dam for cattle use, as the existing community dam was destroyed during the rainy season.

### **Mr. Mutale – Chairperson**

Mr. Mutale began by apologising to the community for the poor work culture exhibited by the contractors, stating that such practices do not reflect Ever Great Energy Limited's values. He added that the company would engage the contractor to find an appropriate way to resolve the matter. In response to the request for a dam, the Chairperson assured the community that the company intends to construct the dam as part of its Corporate Social Responsibility (CSR). However,

he emphasised that the process of obtaining all necessary approvals for both the main project and the dam construction must be finalised first, as such works cannot proceed without consultation with the relevant regulatory bodies.

**Mr. Dennis Mwanapenzi – Vice Headman (Siachaaba Village)**

Mr. Mwanapenzi suggested that the company should prioritise rehabilitating the dam that was destroyed before constructing a new one.

**Mr. Godfrey Siabukwe – W.D.C Chairman (Chalyeeba Village)**

Mr. Siabukwe informed Mr. Mwanapenzi that contractors had already been assigned to work on the dam.

**Mr. Mitson Mboola – Headman (Syoka Village)**

Mr. Mboola sought clarification on when the installation of the pipeline would commence, emphasising that it should be done before the next farming season to avoid disturbing agricultural activities.

**Mr. Mutale – Chairperson**

Mr. Mutale responded that the works would be carried out during the dry season and that the pipeline would be installed underground, ensuring that no farmers would be affected during the process.

**Mr. Charles Nsovao – Headman (Dengeza Village)**

Mr. Nsovao requested that the developer should simultaneously construct the dam and install the pipeline before full operations begin.

**Mr. Mutale – Chairperson**

Mr. Mutale responded by stating that the developer has engaged a different contractor for the pipeline installation. He further explained that construction of the dam cannot commence before all approvals are obtained from the relevant stakeholders and a full assessment is conducted prior to the start of any works.

**Ms. Sheilla Sievu – Community Member (Dengeza Village)**

Ms. Sievu thanked everyone for attending the meeting and welcomed the project, stating that it would be beneficial to the youths and the community at large.

**Closing Remarks**

The closing remarks were given by **Mr. Vincent Mulunda – General Manager (Ever Great Energy Limited)** and **Mr. Haston Tumbe – Field Consultant (Ever Great Energy Limited)**. They thanked all participants for their attendance, valuable contributions, and active participation during the meeting. They acknowledged the concerns, requests, and recommendations raised by the community leaders and members, and assured the meeting that these issues

would be carefully considered and incorporated into the project planning and implementation process where feasible.

They further emphasised the importance of continued engagement, transparency, and collaboration between the developer, local leadership, and affected community members to ensure smooth project implementation and mutual benefits. The community was encouraged to maintain open communication with the project team and to use established leadership structures when raising concerns. The meeting was officially closed at **12:00 hrs.**



.....  
Mr. Christopher Mutale  
**Meeting Chairperson**



.....  
Mr. Chomba Kabnshi  
**Meeting Secretary**



# Tsalach Global Limited

## ATTENDANCE SHEET

NAME	COMPANY/ORGANISATION	POSITION	PHONE NO.	EMAIL ADDRESS	SIGNATURE
1. CHOMBA KUBANWIT	Tsalach Global limited	CEO	09779933613	kubanjchic@gmail.com	[Signature]
2. CHRISTOPHER MWALE	"	Field Officer	097742611	christophermwale@gmail.com	[Signature]
3. Heston Tumbwe	Ever great logistic	Field Consultant	0977618514	tumbweheston@gmail.com	[Signature]
4. Dathan Mwehwa	Dengeza	WDC MEMBER	0978455364	mwehwadathan05@gmail.com	[Signature]
5. Andrew Lende	Dengeza	Headman	0953199576		[Signature]
6. GODFREY SIABUKWE	CHACHAABA	WDC CHAIRPERSON	8119911741	siabukwegodfrey@gmail.com	[Signature]
7.			0976339825		[Signature]
8. Billy Munsaka	NJANGA	WDC SECRETARY	0979628278		[Signature]
9. MITSAL MBOKA	SUDKA	HEADMAN	0953589203		[Signature]
10. DENNIS MWANAPENZI	SIACHAABA	HEADMAN	0953308702		[Signature]
11. SIGN KYAMBWA	MUNENGO	HEADMAN	0973485001		[Signature]
12. ANDREW MWANAPENZI	DENGEZA	V. HEADMAN			[Signature]
13. CHARLES JSOLO	DENGEZA	S. HEADMAN	0973613298		[Signature]
14. KIPSON SIANTUWELE	SIANTUWELE	HEADMAN	0953596330		[Signature]
15. STI SIANKAPUA	SIACHAABA	V. HEADMAN	0750200635		[Signature]
16. MARGARET SWIFORD	DENGEZA	SECRETARY	0971283996	swifordmargaret1992@gmail.com	[Signature]
17. EDSON JAKOBANI	NYANGA	WDC MEMBER	0976290004		[Signature]
18. NISTAL SIIMA	KYABUNGA	HEADMAN	0998957324		[Signature]
19. DESCIRE SIAMBWA	MUNENGO	SECRETARY	0957639529		[Signature]
20. JAMES SIMANKWANA	KIAMBWA	CHAIRMAN	0952859140		[Signature]



# Tsalach Global Limited

## ATTENDANCE SHEET

	NAME	COMPANY/ORGANISATION	POSITION	PHONE NO.	EMAIL ADDRESS	SIGNATURE
1.	DAISON SAMUENBA	MANBOWA	HEADMAN	0953521619		<i>AS</i>
2.	ACKSON SIANKOPE	SILIKA	HEADMAN	0955098687		<i>AS</i>
3.	AFRICA KKOLOMONT	MWANAPENZI	HEADMAN	0953274602		<i>Akoma</i>
4.	GIFT MUKHABILA	CHINGO	WDC MEMBER	0976819231		<i>Gift</i>
5.	ABER SIACHIPANDA	NAMPONKWE	HEADMAN	0750219985		<i>AS</i>
6.	MILIS MUBENKWE	MUDZU	HEADMAN	0957436251		<i>M. M.</i>
7.	RESIAS MUKOMBWE	SIABENKWE	HEADMAN	0954956983		<i>K.M</i>
8.	MARTIN MUBENKWE	MAKULA	HEADMAN	0955098711		<i>M. M.</i>
9.	BELAND MUKONGA	MUKONGA	HEADMAN	0953663146		<i>B. M.</i>
10.	ETSON SIANTWELA	SIANTWELA	SECRETARY	0953343151		<i>Etson</i>
11.	MATHIAS SIOMALYA	SIOMALYA	HEADMAN	096382129		<i>M. S.</i>
12.	MACKSON SIACHIPANDA	NAMPONKWE	SECRETARY	0954734674		<i>Mackson</i>
13.	SHEILA SLENU	DENGERA	MEMBER	0773149851		<i>Sheila</i>
14.	DAVE MUBENKWE	MUBENKWE WARD	COUNCILLOR	0955579860	<i>vincentmuisda@gmail.com</i>	<i>Dave</i>
15.	Vincent Muisda	Ever Great Energy Co. Ltd	g/Manager	0999722289	<i>vincentmuisda@gmail.com</i>	<i>Vincent</i>
16.	EDMOND NAMUNDA	EVER GREAT ENERGY	HRM	0961721408	<i>edmondn@evergreatenergy.co.zw</i>	<i>Edmond</i>
17.	ELIAS NGUNA	EVER GREAT ENERGY	mechanic	0914583211		<i>Elias</i>
18.	ANDREW NAMUNDA	CHITANI	HEADMAN	0956905976		<i>Andrew</i>
19.	CHRISTINA ASAMBE	SYOKA	MEMBER	0953966933		<i>Christina</i>
20.						



## **MINUTES OF THE DISCLOSURE MEETING FOR THE PROPOSED WATER ABSTRACTION PROJECT IN SENIOR CHIEF MWEEMBA'S CHIEFDOM OF SINAZONGWE DISTRICT BY EVER GREAT ENERGY LIMITED**

**Date:** 29/12/2025

**Time:** 14:30hrs- 15:40hrs

**Venue:** Sinazongwe Town Council Hall

### **ATTENDEES**

Find attached to these minutes a list of all stakeholders in attendance. No apologies were sent forth.

### **AGENDA**

5. Welcoming all stakeholders and Introductions
6. Presentation of the Proposed Project by Mr. Christopher Mutale
7. Discussion (Questions and Comments)
8. Closing remarks

### **3. Welcoming all Stakeholders and Introductions**

The meeting was called to order at 14:30 hours by the Chairperson, Mr. Christopher Mutale. He introduced the team from Tsalach Global Limited (TGL), after which the various stakeholders were given an opportunity to introduce themselves. The Chairperson welcomed all stakeholders in attendance and briefly outlined the purpose of the meeting, which was to present and discuss the project.

The rationale for the water abstraction project was also explained, taking into account that projects of this magnitude require the preparation of an Environmental and Social Impact Assessment (ESIA).

### **4. Presentation of the Proposed Project**

The presentation on the proposed project was given by the meeting chairperson Mr. Christopher Mutale who gave an overall verbal presentation of the Environmental and Social Impact Assessment (ESIA). The ESIA presentation included the following;

- Project Introduction
- Project Description and Location
- Objective of the disclosure meeting
- Potential project impacts both negative and positive impacts and;
- Proposed mitigation measures.

Mr. Mutale gave a detailed presentation on the proposed project. He gave a precise location of the project and the main components of the project.

Mr. Mutale concluded the presentation with an emphasis on the necessity and importance of conducting the ESIA process on such a project of such magnitude. In addition, Mr. Mutale encouraged the stakeholders to attend future meetings as they are vital for the thorough ESIA process.

## **Discussions**

### **Mr. Isaac Kalunga – ADPH (Sinazongwe District Council)**

Mr. Changwe requested that the company consider constructing a small dam that can be used by the community as cattle drinking area. He further emphasized the importance of water in the community, noting that during the dry season cattle tend to graze too close to the ground, which increases the risk of contracting anthrax.

### **Mr. Mutale – Chairperson**

Mr. Mutale responded by highlighting that the same concern was raised during the scoping meeting with local community members, and the company representative agreed that a dam would be constructed within the community. He further stated that, in addition to the dam, the company plans to sink boreholes at different locations as part of its Corporate Social Responsibility (CSR) initiatives.

### **Mr. Isaac Kalunga – ADPH (Sinazongwe District Council)**

Mr. Changwe's second concern related to the proposed pipeline route. He inquired whether the pipeline would affect the normal routes used by local people.

### **Mr. Mutale – Chairperson**

Mr. Mutale responded by explaining the method of installation, stating that the pipeline would be installed underground. He further highlighted that the pipeline would only be visible at sensitive locations such as water bodies, natural drainages, and depressions where underground installation would not be feasible.

### **Mr. Isaac Kalunga – ADPH (Sinazongwe District Council)**

Mr. Changwe sought clarification on whether the stated 1,500 m<sup>3</sup> pump-out capacity was on a daily or hourly basis.

### **Mr. Mutale – Chairperson**

Mr. Mutale responded by stating that the indicated output capacity is on an hourly basis.

**Mr. Isaac Kalunga – ADPH (Sinazongwe District Council)**

Mr. Changwe expressed serious concern regarding the company's attitude towards CSR, stating that the company had not been supportive of any health-related programs within the community.

**Mr. Mutale – Chairperson**

Mr. Mutale noted the complaint raised and assured Mr. Kalunga that the company would be engaged on the matter. He stated that the company would become more active in community programs once it commenced full operations, further explaining that the company is currently limited in implementing active programs as operations have not fully started.

**Ms. Chibwili Njoolo – DACA (Sinazongwe District Council)**

Ms. Njoolo raised similar concerns to those expressed by Mr. Kalunga regarding CSR and the lack of the company's involvement in health-related programs. She further stated that a company's commitment to CSR should be demonstrated at the initial stages of development and not at a later stage.

**Mr. Mutale – Chairperson**

Mr. Mutale acknowledged the concern and stated that the company would be advised accordingly.

**Mr. Luyando Chibombya**

Mr. Chibombya expressed concern about the potential impacts of the project on aquatic life and the implications for local people who depend on fishing as a source of income.

**Mr. Mutale – Chairperson**

Mr. Mutale responded by stating that a comprehensive assessment had been conducted by experts, which indicated that while impacts on aquatic life are expected, they would be minimal. He further stated that additional assessments would be conducted by WARMA and ZRA, and that permits would be issued with specific conditions that the company must adhere to in order to minimize impacts on aquatic life and local communities.

**Mr. Ndonje Siyambango – Senior Technologist (Forestry Department)**

Mr. Siyambango inquired about the number of trees that would be affected by the project and whether a flora inventory had been conducted within the project area.

**Mr. Mutale – Chairperson**

Mr. Mutale responded by explaining that the proposed route has limited vegetation as it has been previously used by local people. He further stated that an ecological study had been conducted and that a flora inventory report was

being prepared. He noted that he could not state the exact number of species at that moment but assured the stakeholders that the report would be shared once finalized.

**Ms. Chibwili Njoolo – DACA (Sinazongwe District Council)**

Ms. Njoolo sought clarification on how overflow from the reservoir would be managed at the site.

**Mr. Mutale – Chairperson**

Mr. Mutale responded by stating that the company would employ state-of-the-art technology to detect potential overflows before they occur. In the event of an overflow, the water would be channeled into an overflow dam and later recycled back into the process.

**Mr. Brain Nsombo – Council Advocate (Sinazongwe District Council)**

Mr. Nsombo raised concerns regarding the company’s commitments, emphasizing that local communities take such matters seriously. He further stated that the company should engage through the Council to better address the actual needs of the community in relation to CSR.

**Mr. Mutale – Chairperson**

Mr. Mutale noted the concerns raised

**Closing Remarks**

**Mr. Mutale- Chairperson**

The closing remarks were given by the Chairperson who thanked everyone for their participation and attendance and he urged the developer to continue engaging the stakeholders and the affected community members. The meeting was closed at 16:30 hrs.



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Mr. Christopher Mutale

**Meeting Chairperson**



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Mr. Chomba Kabnshi












**Meeting Secretary**

### Attendance List



# Tsalach Global Limited

#### ATTENDANCE SHEET

NAME	COMPANY/ORGANISATION	POSITION	PHONE NO.	EMAIL ADDRESS	SIGNATURE
1. CHOMBA KARANISA	Tsalach Global Limited	CEO	0979923693	kabonisa@tsal.com	
2. Thomas Mankwede	Department of Agriculture	AgSAD	0977455258	mankwadedt@outlook.com	
3. NDOMSI SIYAMBAZI	FORESTRY DEPARTMENT	S. TECHNOLOGIST	0973175400	siyambazindomsi@gmail.com	
4. BRIAN SIWELWA	DISTRICT ADMINISTRATOR	D.A.D	0978365014	brian-siwelwa@frank.com	
5. KALHAGA ISAAC	SINAZONGWE TOWN COUNCIL	ADPH	0973319443	gongkong31@gmail.com	
6. BRIAN MUMBA	SINAZONGWE TOWN COUNCIL	COUNCIL ADVOCATE	0977811184	brianmumba@gmail.com	
7. MUMBA PUPWE	SINAZONGWE T. COUNCIL	ENV. PLANNER	0977392566	pupwemumba@gmail.com	
8. CHIBWILI NJIRO	SINAZONGWE T. COUNCIL	DACA	0976966289	chibwili1985@gmail.com	
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11. DAVY MUNTHALI	Department of Agriculture	DACO	0979199131	davmuntali@gmail.com	
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## **Appendix 4: Specialised Study Reports**

### **Appendix 4a: Hydrology Report**

## **Appendix 4b: Social and Economic Study Report**

## **Appendix 4c: Site Suitability Mapping Report**

## **Appendix 4d: Ecological Report**

## **Appendix 4e: Ambient Air Quality & Noise Measurement Report**

## **Appendix 5: Maps, Satellite Image and Drawings**

### **Appendix 5a: Location Map**

## **Appendix 5b: Contour Map**

## **Appendix 5c: Elevation Map**

## **Appendix 5d: Topographic Map**

## **Appendix 5e: Google Satellite Map**



*EIS For the Water Abstraction Pipe Line in Sinazongwe Districts by Ever Great Energy Company Ltd*