

# ENVIRONMENTAL IMPACT ASSESSMENT

**FOR THE  
CONSTRUCTION AND OPERATION OF A 10MW SOLAR PHOTOVOLTAIC (PV)  
POWER GENERATION PLANT ON A 20HA PORTION OF ONIPA TOWNLANDS,  
ONIPA CONSTITUENCY, OSHIKOTO REGION.**



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<b>Prepared by</b>	<b>Prepared for:</b>
<b>NGHIVELWA PLANNING CONSULTANTS</b>	<b>MAGUNUS GLOBAL INVESTMENTS</b>
<b>P.O. Box 40900</b>	<b>P. O. BOX 30979</b>
<b>AUSSPANNPLATZ</b>	<b>PIONEERS PARK, WIDHOEK</b>
<b>CEL: +264 85 323 2230</b>	<b>+264 811 469 014</b>
<b>E-MAIL: <a href="mailto:planning@nghivelwa.com.na">planning@nghivelwa.com.na</a></b>	<b>E-MAIL: <a href="mailto:hilda@magnusglobal.africa">hilda@magnusglobal.africa</a></b>

## Environmental Management Practitioners

Name of representative of the EAP	Education qualifications	Professional affiliations
Nghivelwashisho Natangwe Ndakunda	B-Tech Town and Regional Planning	Namibia Council of Town and Regional Planners
Ndati-Onawa N Ndakunda	Master of Science in Integrated Environmental Management and Sustainable Development	Geoscience Council of Namibia Geoscience Council of Namibia, Environmental Scientist (EAPAN Member)

## Client

Name	Position/ Role	Address
Magnus Global Investments CC	Magnus Global Investments CC (Proponent)	P O Box 30979 Pioneerspark

## LIST OF ABBREVIATIONS

TERMS	DEFINITION
<b>EIA</b>	Environmental Impact Assessment
<b>EMP</b>	Environmental Management Plan
<b>DEA</b>	Department of Environmental Affairs
<b>PPPPs</b>	Projects, Plans, Programmes and Policies
<b>ULP</b>	Unleaded Petrol
<b>SANS</b>	South African National Standards
<b>I&amp;APs</b>	Interested and Affected Parties

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## **INTRODUCTION**

### **Project Overview**

Magnus Global Investment cc has proposed to construct and operate a 10MW solar power generation facility on a 20ha portion located adjacent the Onamulunga substation in Oniipa Town, Oniipa Constituency, Oshikoto Region. The solar power plant will generate and feed power into the existing Nampower electricity grid with the support of Southern Africa Power Pool. The solar power plant project is expected to increase the power generation capacity of Namibia and move the country closer to energy self-sufficiency.

Nghivelwa Planning Consultants has been appointed to conduct an Environmental Impact Assessment and Environmental Management Plan (EMP) for the proposed solar power generation plant. The Environmental Impact Assessment was conducted to meet the requirements of Namibia's Environmental Management Act (No. 7 of 2007), the Electricity Act (Act No.4 of 2007).

An EIA may be defined as a study that completes an effective land use policy that anticipate the environmental consequences and enhance positive effects of a development before planning permission is granted. Thus, the development of a solar power plant is expected to have positive impacts in terms of social and economic impact and less negative impacts on the natural environment.

An EIA thus has some of the following main functions:

- To predict problems,
- Proposes modified designs to reduce environmental impacts
- Identifies possible and reasonable alternatives
- Predicts significant adverse impacts
- Identifies mitigation measures to reduce, offset, or eliminate major impacts
- Engages and informs potentially affected communities and individuals
- Influences decision-making and the development of terms and conditions

## **Terms of Reference**

The proposed construction and operation of solar power generation facility on the 20ha portion of Oniipa Townlands is a listed activity that cannot be undertaken without an Environmental Clearance Certificate. Therefore, as part of the commissioning process an Environmental Impact Assessment (EIA) is required.

Therefore, Magnus Global Investment cc appointed Nghivelwa Planning Consultant to provide consultancy services to undertake an environmental impact assessment in compliance with the Environmental Management Act (No. 7 of 2007).

The Terms of Reference (ToR) for the consultants are, but not limited to the following:

- The collection of all possible data on the environmental, social and natural resource components and parameters of necessity;
- A description of the location of the proposed project including the physical area that may be affected by the project activities;
- Description of the design of the proposed project;
- Description of the activities that will be undertaken during the project construction, operation and decommissioning phases;
- Listing of the materials to be used, products and by products, including waste to be generated by the project and the methods of disposal;
- Identification of the potential environmental impacts of the proposed project and
- The mitigation measures to be taken during and after implementation of the project;
- Accidents during the project cycle;
- Establishment of a plan to ensure the health and safety of the workers and neighbouring communities;
- Identification of the economic and socio-cultural impacts of the proposed project
- Economic and social analysis of the project including project risk and measures to mitigate them.
- Establishment of an action plan for the prevention and management of possible (EMP).
- The consultant will prepare recommendation on the project for its future use.

## **Acknowledgement**

Nghivelwa Planning Consultant has prepared this EIA Scoping Report on behalf of Magnus Global Investment cc. The proponent (Magnus Global Investment CC) has been extremely forthcoming in providing the necessary information and documents and in providing necessary guidance during undertaking of the study and preparation of the report.

Therefore, the Consultant (Nghivelwa Planning Consultant) hereby acknowledges the advice and information provided by the proponent (Magnus Global Investment cc), as well as the support and interest shown by all the identified stakeholders and public.

## **EIA METHODOLOGY**

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise from undertaking the activity and the findings used to inform the competent authority's decision whether the activity should be authorised subject to conditions that will reduce the impacts to acceptable levels, or should not be accepted. In this sense impacts are defined as the changes in an environmental or social parameter that result from undertaking the proposed activity.

The following general methodology was used in this EIA for the proposed construction and operation of a 10MW Solar PV Power Generation Plant on a 20 ha portion of Oniipa Townlands, Oniipa Town; to investigate the potential impacts on the social and natural environment due to the construction and operation of the solar power generation facility:

The key activities undertaken during the assessment included the following:

### **Establishment of the environmental baseline**

This involved study and description of the receiving environment on which the proposed project is to be implemented. Thus, it involved a site visit, physical inspection of the study area's soil, biology, topography, animal species, water resources, climate and the local socio-economic environment.

### **Impact analysis**

This involves the identification of impacts that are usually associated with the construction, operation or maintenance and decommissioning of the propose activity and are generally obvious and quantifiable. These impacts were analyzed and evaluated.

## **Impacts mitigation**

This involves the identification of the impacts and once impacts have been identified and predicted for a particular activity, then appropriate mitigation measures need to be established. Mitigation measures are the modification of certain activity in a way that will reduce the impacts on the physical and socio-economic environment. The objectives of mitigation are to:

- Find more environmentally sound ways of doing things;
- Enhance the environmental benefits of a proposed activity;
- Avoid, minimize or remedy negative impacts; and ensure that remaining negative impacts are within acceptable levels.

Furthermore, impacts associated with all the stages of the proposed project were identified and mitigated. An Environmental Management Plan has been prepared as framework for mitigation of impacts and environmental monitoring of the project.

## **Review of alternatives**

This entailed a review of the alternatives to the proposed project. This was aimed at determining better ways of avoiding or minimizing environmental impacts while still realizing the project goals. The review of alternatives provided opportunities for environmental enhancement. The alternatives reviewed were alternative sites, alternative implementation technology, alternative designs, alternative fuel sources and the no project alternative.

## **Public Participation Process (PPP)**

The public participation process was carried out by informing relevant stakeholders to the proposed project and by conducting a site meeting on the proposed project site. The public was invited to raise their concerns on the proposed project through newspaper advertisements that were placed in two (2) local newspapers the New Era and the Confidante of the 15<sup>th</sup> and 22<sup>nd</sup> July 2022. A site meeting was held on the 4<sup>th</sup> of August 2022. However, there were no participants present.

## **POLICY AND OTHER RELEVANT LEGISLATIONS**

The following are the legal instruments that govern the construction and operation of a Solar Power Generation Plan:

### **The Namibian Constitution**

The Constitution of Namibia encourages wise and sustainable use of its resources. According to Article 95 of Namibia's Constitution provides that "the State shall actively promote and maintain the welfare of the people by adopting policies aimed at the following:

(1) "maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future; in particular, the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste in Namibian".

This article recommends that a relatively high level of environmental protection is called for in respect of pollution control and waste management.

### **Environmental Assessment Policy (1994)**

The environmental assessment policy details the principles of achieving and maintaining sustainable development that underpin all policies, programmes and projects undertaken in Namibia. This is related in particular, to the wise utilization of the country's natural resources, together with the responsible management of the biophysical environment, which is intended to benefit both present and future generation. The policy also provides guidance on undertaking the assessment procedures.

It further provides a guideline list of all activities requiring an impact assessment. The proposed development is listed as a project requiring an impact assessment as per the following points in the policy:

- Power generation facility with an output of 10MW.

The policy provides a definition to the term "environment" - broadly interpreted to include biophysical, social, economic, cultural, historical and political components and provides reference to the inclusion of alternatives in all projects, policies, programmes and plans. Cumulative impacts associated with proposed developments must be included as well as public consultation. The policy further requires all major industries and mines to prepare waste management plans and present these to the local authorities for approval.

Apart from the requirements of the Draft Environmental Assessment Policy, the following sustainability principles need to be taken into consideration, particularly to achieve proper waste management and pollution control:

### **Cradle to Grave Responsibility**

This principle provides that those who manufacture potentially harmful products should be liable for their safe production, use and disposal and that those who initiate potentially polluting activities should be liable for their commissioning, operation and decommissioning.

### **Precautionary Principle**

There are numerous versions of the precautionary principle. At its simplest it provides that if there is any doubt about the effects of a potentially polluting activity, a cautious approach should be adopted.

### **The Polluter Pays Principle**

A person who generates waste or causes pollution should, in theory, pay the full costs of its treatment or of the harm, which it causes to the environment.

### **Public Participation and Access to Information**

In the context of environmental management, the public should have access to information and the right to participate in decisions making.

### **Environmental Management Act of Namibia (2007)**

The Environmental Management Act, No.7 of 2007 specifies the environmental assessment procedures to be followed and the activities that require an EIA. The Act provides a procedure for environmental assessments as indicated under Part VII and Part VIII, which is set out to:

- better inform decision makers and promote accountability in decisions taken;
- strive for public participation and involvement of all sectors of the Namibian community in the environmental assessment process;

- take into account the environmental costs and benefits of proposed policies, programmes and projects;
- take into account the secondary and cumulative environmental impacts of policies, programmes and projects; and
- Promote sustainable development in Namibia, and especially ensure that a reasonable attempt is made to minimize the anticipated negative impacts and maximize the benefits associated with the development.

### **Environmental Management Act Regulations (2012)**

The Environmental Management Act Regulations have been finalised (February 2012) and have been used as guidance in the compilation of this scoping report. Namibia's Environmental Assessment Policy was the first formal effort in the country to regulate the application of environmental impact assessment. The regulation set out the process to be followed during the compilation of EIA reports as well as the minimum requirements for such reports.

### **National Heritage Act No. 27 of 2004**

The Heritage Act of 2004 makes provision for the developer to identify and assess any archaeological and historical sites of significance. The existence of any such sites should be reported to the Monuments Council as soon as possible. The Council may serve notice that prohibits any activities as prescribed within a specified distance of an identified heritage/archaeology site.

### **Water Resource Management Act on Namibia (2013)**

The Water Resources Management Act, No.11 of 2013 provide for the management, protection, development, use and conservation of water resources; to provide for the regulation and monitoring of water services and to provide for incidental matters.

Section 35 imposes that "Without prejudice to the powers conferred on the Minister responsible for health under the laws relating to public health, the Minister, with the concurrence of the Minister responsible for health must, for the purpose of ensuring the supply of healthy and safe water under this Act".

### **Electricity Act 4 of 2007 (Act No. 4 of 20007)**

“To establish the Electricity Control Board and provide for its powers and functions; to provide for the requirements and conditions for obtaining licences for the provision of electricity; to provide for the powers and obligations of licensees; and to provide for incidental matters.”.

*Regulated by the Electricity Control Board*

### **Hazardous Substances Ordinance (No. 14 of 1974)**

The Ordinance applies to the manufacture, sale, use, disposal and dumping of hazardous substances, as well as their import and export and is administered by the Minister of Health and Social Welfare. Its primary purpose is to prevent hazardous substances from causing injury, ill-health or the death of human beings.

*Regulated by the Ministry of Health and Social Service*

### **Public Health Act (Act 36 of 1919)**

The act was enacted; “To provide a framework for a structured uniform public and environmental health system in Namibia; and to provide for incidental matters”.

Section 3 (2) governs the following in terms of the Act were “every local authority must take the necessary and reasonably practicable measures to”;

(a) Maintain its local authority area at all times in a hygienic and clean condition;

(b) Prevent the occurrence within its local authority area of:

(i) a health nuisance;

(ii) an unhygienic condition;

(iii) an offensive condition; or

(iv) other condition which could be harmful or dangerous to the health of a person within its local authority area or the local authority area of another local authority;

(c) if a health nuisance or condition referred to in paragraph (b)(i) to (iv) has so occurred, to abate or cause to abate the health nuisance or condition or to remedy or cause to be remedied, the health nuisance or condition;

(d) to prevent the pollution of water intended for human consumption, irrespective whether the water is obtained from sources within or outside its local authority area, or to purify the water which has become so polluted;

## **PROJECT RATIONALE**

The electricity generation in Namibia has largely been dominated by the state owned Nampower Corporation. This domination has exposed inefficiencies as the power generation giant relies on electricity that is imported from neighbouring Zimbabwe and South Africa. To curb the rising costs of imported electricity and increase the local electricity generation, the government of Namibia has introduced an indigenous solar power generation policy. This policy is driven by the public private partnership principle.

Magnus Global Investment has identified Oniipa Town to an ideal town to setup a solar power plant as it is located to the nearby Onamulunga power substation and can easily feed into the existing electricity transmission grid. The solar power will be sold to Nampower Corporation for distribution to NORED.

The Environmental Impact Assessment was conducted to meet the requirements of Namibia's Environmental Management Act (No. 7 of 2007) and Electricity Act (No 4 of 2007).

The proponent proposes a 10MW Solar Power Generation Plant with components that includes:

- Solar modules
- Electrical inverters
- String combiner boxes
- Electricity Transformers
- Switch gear
- Switch yard

The objective of EIA is to identify, predict and evaluate the economic, environmental and social impact of development activities, to provide information on the environmental consequences for decision making and to promote environmentally sound and sustainable development through the identification of appropriate alternatives and mitigation measures.

## SCOPE OF THE EIA

The objectives of the scope of the EIA were to ascertain key issues of the environmental impacts that are likely to be more important during all the phases of the Project. Relevant environmental data have been compiled by making use of primary data which is the site assessment done on the 4<sup>th</sup> August 2022 and secondary data. Potential environmental impacts and associated social impacts was identified and addressed in this report.

The construction and operation of the proposed 10MW solar power plant involves;

- Preparation of the site, including excavations.
- The installation of solar panels.
- Installation of electrical inverters
- Installation of string combiner boxes
- Installation of electrical transformers
- Construction of an electrical switch yard and installation of electrical switch gears.
- Construction of buildings (including a control center, security office and parking facilities).

The Environmental Impact Assessment study report includes an impact assessment and their mitigation measures of all the three phases of the proposed project following:

- The field investigations (site assessment),
- Identifying and involving all stakeholders in the Environmental Impact Assessment process by expressing their views and concerns on the proposed project;
- Identify all potential significant adverse environmental and social impacts of the project and recommend mitigation measures to be well described in the Environmental Monitoring Plan (EMP);
- Coordination with the proponent, regarding the requirements of Namibia's Environmental Management Act (No. 7 of 2007) and Electricity Act (No 4 of 2007);
- To define the Terms of Reference for the Environmental Impact Assessment study.
- A review of the policy, and relevant legislations
- To provide overall assessment information of the social and biophysical environments of the affected areas by the proposed solar power generation facility.

## DESCRIPTION OF THE PROPOSED ACTIVITY

### Proposed location and land ownership

The proposed activity involves the construction of a 10MW Solar Electricity Generation Power Plant on a 20Ha portion of Oniipa Townlands in Oniipa Constituency of Oshikoto Region. The proposed solar power plant will be owned by Magnus Global Investment cc that will sell the electricity generated to Nampower through the Southern Africa Power Pool. The solar power plant will be operated on a public private partnership basis between the owners and Nampower. The proposed site covers the area of 20 hectares and the GPS coordinates of the location of the proposed project site are (610415.00 E, 8016783.00S).

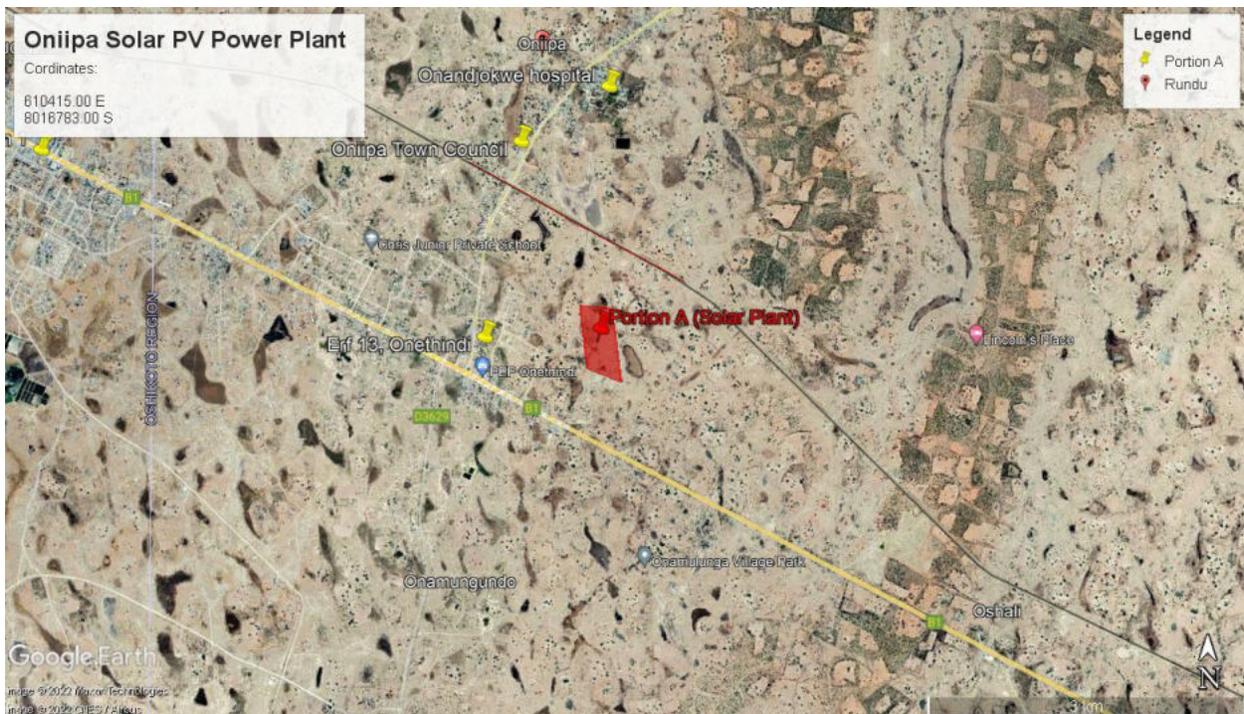


Figure 1: Locality Map



Figure 2: Site Photos

### **Description of the solar power plant**

A grid-connected PV system consists of solar panels, inverters, a power conditioning unit and grid connection equipment. It has effective utilization of power that is generated from solar energy as there are no energy storage losses. When conditions are right, the grid-connected PV system supplies the excess power, beyond consumption by the connected load to the utility grid. But, in standalone systems batteries are used to store energy or else energy has to be directly connected to load.

The total rating of the plant will be 10 MW occupying about 20ha of land. This plant area will be divided into eight different blocks with two equal blocks. Each individual block will have the generating capacity of about 625 kW thus total of sixteen blocks combined to form a 10 MW generation capacity. Each block of solar panels will consist of about 230 strings each and a total of 1852 strings. These large numbers of solar panels in single block will again be divided into two blocks of strings. Each string consists of 24 solar panels connected in series and about 120 of these strings are connected in parallel to a single inverter through a main string combined box.

Three phases double fed primary winding transformer will be used. Converted AC power from the two inverters will be fed to these two primaries of the transformer. Each string will consist of 24 modules in that way 16 strings are connected to one string combined box (SCB). Total 15 SCB'S are connected to one main string combined box (MSCB'S).

Each inverter will be connected with one main string combined box. Total 16 inverters will be connected to eight transformers with each two. The output of transformer will be connected directly to existing electrical grid. The plant will be installed in such a way that it is cost effective, more reliable, and has more energy output.



Figure 3: picture of solar power plant

### **Description of the Proposed Construction of the Project**

The project involves the construction of a 10MW solar power generation plant with:

- Solar modules
- Electrical inverters
- String combiner boxes
- Electricity Transformers
- Switch gear
- Switch yard

## **Proposed Project Activities**

The project will consist of three (3) phases, namely the construction, operational and possible decommissioning phase.

### **Activities during the Construction Phase**

**a) *Site Office***

The contractor shall construct a temporary site office to run and manage all activities of this phase.

**b) *Site clearance and fencing***

This will involve clearance of the little vegetation that is currently found at the proposed site. The site will then be isolated for public safety and for the security of construction material and equipment.

**c) *Excavation***

This will involve excavation of the ground for installation of the solar modules and other structures. This will use appropriate excavation equipment. This process will generate waste in form of spoil soil and rock particles.

**d) *Installation solar modules, transformers and backfilling***

The solar modules and transformers will then be installed as per the latest in the solar power plant design. The pits will then be backfilled with hard and compacted soil.

**e) *Construction of superstructures***

This will entail construction of superstructures including the control center, security check points and other buildings necessary for the successful operation of a solar power plant.

**f) *Plumbing***

Necessary plumbing for the temporary and permanent buildings on site.

**g) *Installation of fire protection equipment***

The appropriate firefighting equipment ( fire extinguishers that contain carbon dioxide, dry powder, foam) will then be installed.

**h) *Other fittings (builder's works)***

These will include reinforced concrete beams, fuel dispenser shed, site lighting and other necessary fittings.

## **Activities during the operation and maintenance phase**

Operation & Maintenance (O&M) is one of the most critical ways to ensure that the solar power system gives the best possible generation.

- Ensure roof drainage is adequate, roof drains are not clogged and confirm that there are no signs of water pooling near the arrays;
- Ensure roof penetrations (if any) are watertight;
- Check for ground erosion near the footings of a ground mount systems;
- Confirm electrical enclosures are only accessible to authorised personnel;
- Check for corrosion on the outside of enclosures and the racking systems;
- Check for cleanliness throughout the site to ensure that there is no debris in the inverters pad area or elsewhere on the plant;
- Check for loose hanging wires in the arrays;
- Check for signs of animal infestation under the arrays.

## **Activities at the decommissioning phase**

Decommissioning refers to removal of equipment and restoration of the site. Unlike some other forms of development, a decommissioned solar project site can be repurposed for other uses.

- Solar panels are to be removed and sold as second hand or recycled for other uses.
- During the decommissioning phase, aboveground wires and wires shallower than 3 centimeters underground will be removed, copper and/or aluminum wiring and associated electronic equipment will be sold as scrap or recycled to the extent practical use.
- Inverters and transformers will be dismantled, and various parts are refurbished, recycled, or landfilled as appropriate.
- Foundations will be broken up and removed to be recycled, sold as scrap, and/or landfilled. Once debris is removed, the area is backfilled with native or similar soils.
- Fencing will be removed from the site and reconditioned and reused, recycled, or landfilled as appropriate.
- As a final step of decommissioning, the site will be revegetated to help with erosion and dust control as required.

This development will create employment opportunities in all the three phases. Therefore, it is estimated that there will be 100 possible direct job opportunities associated with construction phase with 5-10 indirect jobs that could be generated during this phase of the development.

Furthermore, there will be the creation of between 1 and 5 permanent jobs associated directly with the operation of the solar power plant. A further 1 to 5 indirect job opportunities are likely to be generated in other sectors of Oniipa Town Council.

### **Need and Desirability of the Proposed Project**

The electricity generation in Namibia has largely been dominated by the state owned Nampower Corporation. This domination has exposed inefficiencies as the power generation giant relies on electricity that is imported from neighbouring Zimbabwe and South Africa. To curb the rising costs of imported electricity and increase the local electricity generation, the government of Namibia has introduced an indigenous solar power generation policy. This policy is driven by the public private partnership principle.

Thus, the government policy on electricity aim to diversify the power generation sources of the country by investing in renewable energy sources like solar. The policy also aims to empower local businesses by creating partnerships between parastatals and private companies to generate electricity that will satisfy the domestic consumption and in future be used for export purposes.

Therefore, Magnus Global Investment has identified Oniipa Town to an ideal town to setup a solar power plant as it is located to the nearby Onamulunga power substation and can easily feed into the existing electricity transmission grid. The solar power will be sold to Nampower Corporation for distribution to NORED.

Given the reasons above, there is a need and desirability for the proposed 10MW solar power generation plant to be constructed and operated from a 20ha portion situated in Oniipa Townlands, Oniipa Constituency of Oshikoto Region.

### **Timing of the activity**

The statutory approvals for the proposed project is likely to take about 6 months, while the construction of the solar power station is expected to take about 12 months.

tertiary, government office, hotels, banks, shops, malls and entertainment areas around the town of Helao Nafidi.

## **BASELINE DATA**

This section lists the most important environmental characteristics of the study area and provides a statement on the potential environmental impacts on each.

### **Locality and Surrounding Land Use**

The proposed development is spearheaded by the Magnus Global Investment CC and will take up an area of 20 hectares. It is situated on the property described 20-hectare portion in Oniipa Townlands, Oniipa Constituency, Oshikoto Region as shown in the attached locality plan. The site is currently vacant and is not in use. The proposed site is approximately 1 km north of the B1 main road in Oniipa town, opposite the Onamulunga electrical substation. There are 2 traditional homesteads situated approximately 200-500 meters from the site and they will not be affected by the proposed development (the neighbours have been consulted).

### **Climate and Temperature**

The climatic condition in Oniipa Town is considered to be a local steppe climate. During the year, Oniipa receives little rainfall. The Köpper-Geiger climate classified is BSh, the average annual temperature is 22.8°C. The average rainfall in Oniipa is 469mm. Oshikoto Region has a negative water balance due to the dry conditions and high evaporation rate. The climate of the region is described as a semi-arid with an average annual rainfall ranging between 400mm to 500mm per annum.

The summer season of the region is described as hot with a maximum temperature between 30°C and 35°C during the hottest months and coldest winter temperatures are around 2°C to 6°C. The mean evaporation figure for the region lies from 2600mm to 280mm per annum.

### **Geology, Topography and drainage**

According to NDS, the topography of the Oshikoto region is predominantly flat, gradually descending from north south towards the Etosha pan. In this region, there are no perennial rivers, but at least 3 seasonal rivers of which some forms part of the Cuvelai Drainage system from Angola in the North to Etosha Pan in the South of the region.

## **Hydrology**

The quality of the groundwater within the region is variable due to the fact that some boreholes provide a good yield at the depths of 10m and 50m. The water quality in the region is varying from drinkable to highly saline water. With Ephemeral River in the region, the water source in the ephemeral can be accessed even by hand-dug pit. The interconnected Ephemeral pans and shallow river courses known as Oshanas are the reminders of the proto-Kunene and Cuvelai systems which are emptied into the inland pan known as the Etosha pan. However, these water systems do not pass through Oniipa and the test boreholes that are situated in the area have revealed that the water is not fit for human consumption.

The potable water in the region is supplied in piped system from the Calueque Dam in Angola, on the Kunene River, to the major urban settlements within the region. This dam does not only provide water to the Oshikoto Region, it also provides water to the Oshana, Omusati and Oshana Regions. The dam also provides water to the citizens of Angola that are residing in the south western part of that country.

## **Vegetation**

The vegetation on site consists of short grass moderately scattered around the site, there is also a Marula tree that will be preserved during the construction phase of the project. The project site is currently undeveloped. Thus, the minimal disturbance on site is by animals and human activities such as vehicular tracks, sport fields and animal grazing.

## **Soils**

Oshikoto Region is covered by the Kalahari Sandveld which is mainly made up of an Aeolian sand mantle about 50m thick, covering calcretes and sediments. The high evaporation rate in the region makes the soils in the oshanas to be very saline with sodium and Gypsum found in these soils making the soils not suitable for agricultural projects.

## **Fauna**

The Kalahari woodland in the region is mainly dominated by species such as Rhodesian teak, kiaat, mangetti and silver leafed tennianalia. The Ekata and Cuvelai Systems are more ecologically sensitive and support a diverse but depressed fauna as well as fish which are introduced to the system during good rainy years. During rainy season, the bird life picks up in the western part of

the Region. However, other places get high numbers of individual species such as Abdim's stork and Flamingo rather than a wide variety of species.

During the site inspection, no animals were seen except for the community's cattle and avifauna. However, small burrowing species are expected to occur. The surrounding area is currently transformed agricultural land and used for grazing and other agricultural purposes (livestock enclosures) and vehicular movement and footpaths. The site visit has revealed that it is unnecessary to appoint a specialist to assess the ecology of the area.

## **Flora**

The proposed site was visited on the 9<sup>h</sup> of December 2022 and examined for any possible traces of red data or endangered species. It was observed that the proposed site is generally covered with grass and small shrubs with few scattered trees. However, no red data or endangered species were noted / recorded during the site visit, therefore it was decided that it is unnecessary to include an ecological specialist study in the report.

## **SOCIO-ECONOMIC ENVIRONMENT**

### **Demographics**

According to the Namibia 2011 Population and Housing Census the total population in Oshikoto Region was 181 173 (NPC, 2011). The population density is 4.7 persons per km<sup>2</sup> and the Human Poverty index (HPI) is 0.636 compared to National HPI of 20.35. Eighty-six (86 %) percent of the population lives in rural areas and fourteen (14%) percent live in urban areas. Life expectancy is 62 years for females and 52 years in males, resulting in most houses being head by females at 55% and the remainder by males at 45%. The population was divided into 20988, with an average size of 3.6 persons. Most (96%) of the households residing within the Oshikoto Region speaking Oshiwambo (NPC, 2011).

### **Economic activities**

There has been immense commercial and administrative growth in Oshikoto Region. Oshikoto is commonly an agricultural region, with both cropping and livestock farming, with the sector employing more than 50% of economic active population. The trade and service sectors in the urban areas provide employment outside the agricultural sector while manufacturing occurs only on a small scale. However, the main economic activities are centered on agriculture and retail trade,

public services such as cuca shops, open air butcheries, and mechanical land panel beating workshops, shoemakers, woodcarving and leather works and mining in the south.

There are popular Open Markets to be found in most towns and villages, while many traders find this an excellent facility to meet their clientele. Modern super markets, restaurants, general shopping facilities, pharmacies, private medical facilities schools and other support services are also available in the Region. The proclamation of settlements, which is a priority with the Regional Council, encourages private entrepreneurs to invest in the region. Therefore, the Oshikoto Regional Council assists small farmers in obtaining access to markets to sell agriculture produce on the open market. There are large salt pans in this region. These Salt pans are resources that can be developed into a major source of income to the Region. These pans consist of the large alkaline and saline content.

### **Education Profile**

The Oshikoto Region is well placed with regards to academic rates in Namibia. According to (EMIS, 2012) there are 140 Primary schools, 105 Combines school and 28 Secondary schools in total. The percentage literacy rates for persons older than 15 years in the Oshikoto Region is 88% compared with that of Namibia which is 81%. There are 274 schools altogether, where 257 are state owned and 17 privately owned and other schools there 1 owned by the state. From the 86,430 learners 84,555 are enrolled in public schools while the remaining 1,875 attend private schools. Only 94 of all 3,632 teachers in the Oshikoto Region are without training. The Oshikoto Region is known to yield exceptional results when it comes to academic ratings in the country, most schools offer quality education to the young ones as from primary to high schools. The Region has several tertiary institutions (UNAM and NUST) which provides knowledge and skills in terms of agriculture.

### **Employment Opportunities**

In the year 2011, 58% of the population older than 15 years were employed and 49% unemployed. The population outside the labour force comprised of students, homemakers and retired or old age persons.

### **Income**

According to the 2011 censuses, the subsistence farming and labour migration were considered the primary livelihood sources of many households. The majority of the employed population (59.7%) are employed in the formal sector making Wages and Salaries 25% the main source of income in

the region. Pensions 31%, Non-farming business 10%, Cash Remittance 5% and farming 22% is the means of survival for the rest of the population.

### **Health Profile**

Oshikoto region has 3 district hospitals, (Oniipa, Omuthiya and Tsumeb) six health centers and 40 clinics and 124 Outreach points. Namibia is one of the ten worst affected countries in terms of the HIV/AIDS epidemic. According to the 2013 Namibia Demographic and Health Survey (NDHS), in Namibia, it is estimated that 14% of adults aged 15-49 and 16.4 % of those ages 50-64 are infected with HIV. Furthermore, the 2014 National HIV Sentinel Survey (NHSS) estimated that amongst pregnant women attending Antenatal Clinics (ANC) in Namibia, the overall prevalence was 16.9% which shows a reduction from 18% in 2012 (NARPR. 2015). The HIV Prevalence rate among men in Namibia age 15-49 was 10.9%. According to the 2013 (NDHS.2013), the HIV/AIDS prevalence rate among adult pregnant women in the Oshikoto region is 17.4%. The 2013-2014 HIV Prevalence rate survey report shows that the HIV Prevalence rate among women age 15-49 in Oshikoto Region was estimated to be 21.9% (NARPR. 2015).

### **Immigration**

The sports facility will attract many immigrants from other settlements and especially from the surrounding villages. Employment and business opportunities will be the main reason thereof. This might cause discomfort to the local community currently residing in the area as food prices might increase, cuca-shops will have more customers leading to increased stress and conflict over time and leading to the lack of housing resulting in the increasing informal settlements.

### **Acquisition**

Jobs emanating from the construction and operation of the proposed development will be outsourced to small medium enterprises in the area.

### **Tourism**

The tourism industry is generally poor in the Oniipa Town and Oshikoto Region at large. Apart from the Oshikoto and Guinas lakes in the south of the Region and the Nakambale heritage site in Olukonda, there are no other noticeable tourist attraction sites. However, the development of tourist sites north of the Etosha National Park promises to open up the tourism potential of the region and guarantee access to the inhabitants and foreign tourists alike access to the National Park. There is

loyal house for Ondonga Traditional Authority which preserves the traditions and culture of people of the Ondonga Tribe.

Above all, the region through the town of Tsumeb is hosting the best and spectacular festival known as Copper Festival which is a combination of commercial advertisement and cultural fairs for both local and international entrepreneurs. This festival takes place in August annually. All the above-mentioned places hold the potential to become the region's most important industry subject to major investment and marketing initiatives from the private sector since they attract many tourists who may as well need some supportive services. Oshikoto Region is well connected by roads whereby all tourists can drive through. It can be easily reached from points such Ondangwa, Tsumeb, Eenhana and Okongo. Major roads such as B1 Main Road that that is the main arterial road in the Country passes through the region.

### **Amenities**

A number of amenities are offered to the residents of the Oshikoto Region. As mentioned in the health profile section, there are three district hospitals, (Onandjokwe, Omuthiya and Tsumeb) six health centers and 40 clinics and 124 Outreach points health care facilities in the region, plus schools, different denomination churches such as the ELCIN, Roman Catholic Church, Anglican Church and many more, modern banking and financial facilities such as; First National Bank, Standard Bank, Bank Windhoek and Nedbank and Nampost all available in Oniipa, Onyaanya, Omuthiya and Tsumeb as well ATM facilities also available in the region.

## **ANALYSIS OF ALTERNATIVES**

In terms of environmental impact assessment best practice, assessment of potential impacts from a proposed activity must include the assessment of alternatives. Assessment of alternatives is undertaken to identify the option that will minimise harm to the environment and may include site, technology and other alternatives, but must always include the option of not implementing the activity, known as the “no-go” alternative.

### **Alternative Site**

The proponent has the option of undertaking the proposed development in a different location other than the chosen site. This could also entail acquiring land elsewhere to carry out the development.

However, in the planning process of the proposed project, Nghivelwa Planning Consultant had several consultation meetings with Magnus Global Investment CC and the Oniipa Town Council in order to determine the best site for the proposed solar power plant. Due to land availability and

service connections, the proposed site, Alternative 1, is the best site that has been identified for solar power station because of its proximity to Onamulunga electrical substation. Therefore, no alternative site has been identified or considered during this study.

The following reasons justify the use of the proposed site for the development:

- The land is a property of the Oniipa Town Council and allocated to the Magnus Global Investment CC; the proponent of the project to construct a solar power facility and there was no red data recorded on the proposed site which might hinder the development on the proposed land.
- This solar power plant will, in terms of the Oniipa Town Council Implementation Plan, together with the Government's electrical generation policies empower the local electricity producers.
- It will create job opportunities for the local community in both construction and operational phases which will improve their skills.
- There is adequate space for the proposed development on the proposed land which is 20 hectares.
- There are no housing structures constructed on the property. Therefore, compensation will be minimal.
- The proposed site will be located at a suitable location that is far from the main roads and that will avoid traffic problems.

### **The “No Project” Alternative**

The No-Go Option is the option not to proceed with the activity, implying a continuation of the current situation/ status quo. Therefore, the No-go Alternative would mean that the proposed construction of the solar power plant will not go ahead on the proposed portion and the land would remain vacant. Should the proposed construction not take place, a serious shortfall in electricity generation is expected in northern Namibia. From the environmental and socio-economic point of view, the no project option is the least preferred option due to the following factors:

- Vacant land may result in informal settlement development.
- There will be a shortfall in the electricity generation in the region that might lead to slowed development and low economic growth.
- No employment opportunities will be created for the locals who would work on the project.
- Poverty will not be eradicated in terms of job creation and youth empowerment.
- The local skills would remain underutilized.

- Reduced technology advancement at the town and interaction both at local, national and international levels.
- Promotes vegetation clearing for firewood

This is therefore not a desirable alternative.

## **PUBLIC PARTICIPATION PROCESS (PPP)**

This section of the report provides details of Public Participation Process (PPP) undertaken in the compilation of the EIA final report. Therefore, in terms of Section 26(1)(h) of the Namibian Environmental Assessment Regulations (2012), it is a requirement to provide details of the public participation process conducted in accordance with Section 32 of the Environmental Assessment Regulations.

Furthermore, the Public Participation forms an important component of this EIA. It has been defined by the Ministry of Environment and Tourism that an Environmental Assessment Regulations (2012) of the Environmental Management Act (2007), as a process in which potential interested and affected parties such as neighbouring landowners, local authorities, environmental groups, village councils and communities, to comment on the potential environmental impacts associated with the proposed construction and operation of a solar power plant are given an opportunity to comment on, or raise issues relevant to the proposed project and its benefits to the nation and to Namibia's economy.

Apart from the legal requirements, Consultations were also done with the public and other relevant stakeholders to ensure that their views and comments are heard and taken into account during the decision-making process.

### **Aim for Public Participation Process (PPP)**

The reasons for the Public Participation Process are but not limited to; -

- Informing Interested and Affected Parties (I&APs) of the proposed project;
- Identifying issues, comments and concerns as raised by I&APs;
- Promoting transparency and an understanding of the project and its consequences;
- Serving as a structure for liaison and communication with I&APs; and
- Providing local knowledge and input in identifying potential environmental (biophysical and social) impacts and "hotspots" associated with the proposed development.

## **Compilation of stakeholder database**

The first step in the Public Participation Process (PPP) is to identify key stakeholders. A stakeholder database was compiled and the target groups for this project were invited to comment on the proposed development, A public meeting was held on the proposed site on the 4<sup>th</sup> of August 2022. However, no members of the public or the invited affected parties showed up for the meeting. The following were invited to the meeting and to provide comments:

- Oniipa Town Council,
- Oshikoto Regional Council,
- Traditional leaders;
- Business stakeholders, such as NamPower, Nored and
- General public

## **Background Information Document**

This document provides a short summary of the project and the EIA process. Therefore, a background information document (BID) was prepared and was ready to be distributed to Interested & Affected Parties. However, no body requested for it. See a copy of the BID attached.

## **Notification of I&Aps**

The requirements for the notification of potentially interested and affected parties of this application are set out in detail in section 32(2)(b) of the EA regulation. These requirements have been addressed and include;

- Forwarding letters to government authorities and other identified relevant stakeholders;
- Fixing a notice board at a place conspicuous to the public in Oshiwambo & English;
- Placing advertisements twice in at least two local newspapers.

## **Advertisement**

The advertisement of the public participation and submission of comments for the proposed project were placed in the national newspaper, the New Era and Confidante Newspapers dated: 15<sup>th</sup> and 22<sup>nd</sup> July 2022. Proof of advertisements are attached.

## Public Meeting

In compliance with the EIA Regulations (2012), public (I&AP) and all stakeholders were notified as a requirement for EIA process. Therefore, to incorporate the varying needs of stakeholders and I&APs, as well as to ensure the relevant interactions between stakeholders and the EIA specialist team; A public meeting held on the 4<sup>th</sup> of August 2022 at the proposed site as invited and advertised. However, none of the invited members showed up for the meeting.

The public interest on this project is minimal. Letters for comments were sent to the identified key stakeholders for comments see a copy of the letter for comments attached.

## Issues raised by interested and affected parties

No comments received on the project from interested and affected parties (stakeholders), although they were notified about the project.

## ENVIRONMENTAL ASSESSMENT METHODOLOGY

An appraisal of the type of effect of the construction of a solar power generation facility would have on the affected environment; rate as either positive (beneficial on the environment), neutral (no impact on the environment), or negative (adverse impact on at a cost to the environment).

Rating	Description
1	Negligible / non-harmful / minimal deterioration (0 – 20%)
2	Minor / potentially harmful / measurable deterioration (20 – 40%)
3	Moderate / harmful / moderate deterioration (40 – 60%)
4	Significant / very harmful / substantial deterioration (60 – 80%)
5	Irreversible / permanent / death (80 – 100%)

**Table 2: Assessment and Rating of Severity**

Rating	Description
1	Less than 1 month / quickly reversible
2	Less than 1 year / quickly reversible
3	More than 1 year / reversible over time
4	More than 10 years/ reversible over time/ life of project or facility
5	Beyond life of project or facility/ permanent

**Table 3: Assessment and Rating of Duration**

Rating	Description
1	Within immediate area of the activity
2	Surrounding area within project boundary
3	Beyond project boundary
4	Regional/ Provincial
5	National/ International

**Table 4: Assessment and Rating of Extent**

Consequence is calculated as the average of the sum of the ratings of severity, duration and extent of the environmental impact.

Determination of Consequence (C)	$(\text{Severity} + \text{Duration} + \text{Extent}) / 3$
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**Table 5: Determination of Consequence**

Rating	Description
1	Less than once a year
2	Once in a year
3	Quarterly
4	Weekly

5	Daily
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**Table 6: Assessment and Rating of Frequency**

Rating	Description
1	Almost impossible
2	Unlikely
3	Probable
4	Highly likely
5	Definite

**Table 7: Assessment and Rating of Probability**

### Likelihood

Likelihood considers the frequency of the activity together with the probability of the environmental impact associated with that activity occurring.\

Determination of Likelihood (L) =	$(\text{Frequency} + \text{Probability}) / 2$
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**Table 8: Determination of Likelihood**

## Environmental Significance

Environmental significance is the product of the consequence and likelihood values.

Rating	Description
L (1 - 4.9)	Low environmental significance
LM (5 - 9.9)	Low to medium environmental significance
M (10 - 14.99)	Medium environmental significance
MH (15 - 19.9)	Medium to high environmental significance
H (20 - 25)	High environmental significance. Likely to be a fatal flaw

**Table 9: Determination of Environmental Significance**

### Impacts Associated with Construction Phase

Potential effects on the environment and their mitigation measures during construction are:

**Air Quality Impacts-** These are expected to be site specific, short-termed and will most probably pose a negligible nuisance and health threat to those residing nearby. The construction of the proposed solar power plant will have impact on the surrounding air quality as construction vehicles will be frequenting the site and the surrounding area. The clearing of vegetation in preparation for construction exposes the soil, dust which increases the Particulate Matter concentration in the atmosphere. PM may contribute to respiratory tract infections to the people living around the proposed site.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	3	4.33	5	5	5	Negative	9.33(LM)
<p>Mitigation measures:</p> <p>Dust may be generated during the construction/decommissioning phase and might be aggravated when strong winds occur. Therefore, dust suppression during the construction process is advised if dust becomes an issue.</p> <p>Vehicles travelling to and from the construction site must adhere to the speed limits so as to avoid producing excessive dust. A speed limit of 40 km/hr should be set for all vehicles travelling over exposed areas.</p> <p>Loads could be covered to avoid loss of material in transport, especially if material is transported off site.</p>									
Mitigated	2	2	1	1.66	1	2	1.5	Negative	3.16 (L)

**Employment Creation** (Positive Impact) employment creation and economic development is expected to benefit the local community since construction activities associated with the installation of solar power infrastructure will require labour from the surrounding area.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	2	2	1.66	2	5	3.5	Positive	5.16 (LM)
<p>Mitigation measures:</p> <p>Various employment opportunities will be created during all phases of the development, ranging from highly skilled to semi-skilled. The development is expected to create more than 100 skilled and unskilled positions. Preference should be given to local residents and to Namibian citizens.</p> <p>When recruiting, the responsible contractor should ensure gender equity is taken into consideration and that both men and women are recruited equally.</p> <p>Equity, transparency, should be put into account when hiring and recruiting and that Public Participation i.e. Community Leaders or Community committees should also take part in the recruiting process.</p> <p>In terms of human resource development and capacity building, the contractor must enforce training programs that skilled workers should always train unskilled workers when necessary, in order for them to enhance their performances and to gain more knowledge that they might demonstrate at other levels in future.</p>									
Mitigated	1	2	5	2.66	3	5	4	Positive	6.66 (LM)

**Noise caused by construction activities-** Noise levels are expected to rise during the construction phase of the solar plant. Construction activities that can cause noise includes construction vehicles, electricity generators, pressure hammers, noise from construction workers, and earthmoving equipment. However, there are not houses that are constructed 150m closer to the proposed site. The project site is currently not adjacent to any residential or industrial area except few traditional houses occupying the proposed site therefore the construction of the solar plant will not disturb residents. The noise levels that are likely to occur during this phase are not assessed to be a nuisance to the residents and communities.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	4	5	2	3.66	5	5	5	Negative	8.66 (LM)
<p>Mitigation measures:</p> <p>Construction should be limited to normal working days and office hours from 08h00 to 17h00 and 7:30 – 13:00 on Saturdays.</p> <p>No construction activities may be undertaken on Sundays.</p> <p>Provide ear plugs and ear muffs to staff undertaking the noisy activity or working within close proximity thereof or alternatively, all construction workers should be equipped with ear protection equipment.</p> <p>Noise pollution should be addressed and mitigated at an early stage of construction phase.</p>									
Mitigated	1	1	1	1	1	1	1	Negative	2 (L)

**Soil Loss and Erosion-** Loss of topsoil during the construction period caused by the clearing and removal of vegetation, the digging of foundations and earthworks may expose soils to wind and rain and could result in localized erosion.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	4	3	3	3.33	5	5	5	Negative	8.33 (LM)
Mitigation measures: Removal of vegetation to take place only within demarcated construction site. No work is to be conducted within 30 meters of all drainage lines; Topsoil should only be exposed for minimal periods of time and adequately stockpiled to prevent the topsoil loss and run-off. Planting more indigenous trees around the site and on some areas of open space should be done. Reuse topsoil to rehabilitate disturbed areas.									
Mitigated	1	1	1	1	2	2	2	Negative	3 (L)

**Removal and use of local flora for firewood-** collection of local flora for firewood may lead to the removal of the protected flora due to the lack of knowledge of the types of protected flora.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	3	3	2.66	4	5	4.5	Negative	7.16 (LM)
Mitigation measures: No cutting down of trees for firewood.									

Utilize commercially sold wood or other sources of energy.									
Training of contractors on environmental awareness and the importance of flora.									
Mitigated	1	1	1	1	1	2	1.5	Negative	2.5 (L)

**Health and Safety-** Health and Safety Regulations pertaining to personal protective clothing, first aid kits being available on site, warning signs, etc. are important and should be adhered to. During construction phase, there is a possibility of injuries to occur if no measures are taken into consideration.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	4	4.66	5	5	5	Negative	9.66 (LM)
Mitigation measures:									
A health and safety plan is to be developed and implemented as soon as land clearing commences.									
During construction, earthmoving equipment will be used on site. This increases the possibility of injuries and the responsible contractor must ensure that all staff members are briefed about the potential risks of injuries on site.									
Ensure the appointment of a Safety Officer to continuously monitor the safety conditions during construction.									
The contractor is further advised to ensure that adequate emergency facilities are available on site.									
The construction staff handling chemicals or hazardous materials must be trained in the use of the substances and the environmental, health and safety consequences of incidents.									
All construction staff must have the appropriate PPE.									
Mitigated	2	1	2	1.66	1	2	1.5	Negative	3.16 (L)

**Traffic** - Potential impact due to increase in traffic because the construction vehicles that will be frequenting the area. Construction related activities are expected to have a minimal impact as the existing streets are located far away from the site and all main roads are at least one kilometer away. Accidents might occur unqualified drivers are employed to drive construction vehicles.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	3	4.33	5	3	4	Positive	8.33 (LM)
<p>Mitigation measures:</p> <p>No diversion of traffic or closure of the road is expected.</p> <p>Flag men and traffic controllers should be appointed to regulate traffic flow of construction vehicles.</p> <p>The responsible contractor must ensure that all drivers employed have valid driver's licenses of type of vehicles they will be operating.</p> <p>The contractor must ensure that there is always a supervisor on hand on site to ensure that no driver operates a vehicle while under the influence of alcohol or narcotics.</p> <p>The construction vehicles speed limit should be 40km/h and must consider other motorists.</p>									
Mitigated	2	1	1	1.33	1	2	1.5	Positive	2.83 (L)

**Waste Impacts-** The construction phase of the development is likely to generate waste from clearing of vegetation, builder's rubble, general construction refuse and minor hazardous waste including paint containers, cleaning acids, asphalt's and oils. The development could therefore negatively impact the environment by generating solid waste pollution.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	3	4.33	5	5	5	Negative	8 (M)
<p>Mitigation measures:</p> <p>Ensure that no excavated soil, refuse or building rubble generated on site are discarded on surrounding properties or land.</p> <p>Contaminated waste in the form of soil, litter, building rubble and other material must be disposed of at an appropriate disposal site.</p> <p>The contractor and developer should ensure that all the waste generated by the development is appropriately disposed of at the recommended waste disposal sites.</p> <p>Strictly, no burning of waste on the site or at the disposal site is allowed as it possess environmental and public health impacts;</p> <p>No construction waste should enter the surrounding environment and no cleared vegetation to be burnt on-site.</p> <p>To avoid contaminating the soil and underground ecosystem, no wastewater should be disposed on soil.</p>									
Mitigated	1	1	1	1	4	2	3	Negative	4 (L)

**Groundwater Contamination** – Oil leakage from equipment and machinery might occur during the construction phase or mixing of concrete and the use of ablution facilities will lead to the contamination of groundwater.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	5	5	5	4	5	Negative	9.5 (LM)
<p>Mitigation measures:</p> <p>Chemicals used during construction e.g. paint and paint remover are also posing a risk. Care must be taken to avoid contamination of soil and groundwater.</p> <p>Ensure no cement or cement containers should be left lying around.</p> <p>Mixing of concrete should be done at specifically selected areas on mortar boards or similar structures to contain surface run-off.</p> <p>Proper toilet facilities should be installed at the construction site and at the camping site or alternative arrangements made.</p> <p>The contractor shall ensure that there is no spillage when the ablution facilities are cleaned or during normal operation and that the contents are properly removed from site.</p> <p>Cleaning of concrete mixing equipment should be done on proper cleaning trays.</p> <p>Prevent spillage of contaminants or of water potentially contaminated by concrete, chemicals, sewage</p> <p>Fuel (diesel and petrol) and oil containers shall be in good condition and placed in a bunded area or on plastic sheeting covered with sand (temporary bunding).</p>									
Mitigated	3	1	1	1.66	5	3	4	Negative	5.66 (LM)

**Increased Spread of HIV/ AIDS and Covid - 19-** migrant workers with HIV/AIDS and Covid – 19 may affect local people leading to a high rate of HIV/AIDS in Oniipa Town.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	5	5	5	5	5	Negative	10(M)

Mitigation measures:

The spending power of locals and expatriates working for the developer and/or its contractors are likely to increase, and this might be a perfect opportunity for sex workers to explore. Migrant labourers from other regions and expatriates are normally vulnerable and may use the services rendered by the sex workers. A key initiative should be to educate workers. See section 9 (Socio-economic Environment) for details on region statistics.

External construction workers should be housed in secure camp and are to abide by rules of the EMP to prevent public disruption (i.e. Spread of HIV/AIDS, crime, public disturbance).

Contractors should be encouraged to source labour from surrounding areas to prevent the spread of HIV/AIDS from external workers who will be sourced from other areas out of Oniipa because sourcing labour from the surrounding area will prevent the spread of the HIV/AIDS as the residents will not be vulnerable to new workers in the area.

Condoms as a contraceptive should be distributed to construction employees.

Face masks should be distributed to workers to avoid the spread of Covid – 19.

Workers should practice social distancing, and should at least stand 1,5 meters away from each other to contain the spread of Covid – 19.

Workers that are exhibiting flu like symptoms and have high fever should not be allowed to enter the construction site for at least 3 days.

Covid – 19 test kits should be kept on site to allow for rapid testing and isolation of infected workers.

Mitigated	2	1	4	2.33	2	3	2.5	Negative	4.8(L)
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**Heritage Impacts** – There are no known heritage areas or artefacts were identified at the project site during the site visit. However, there is a potential damage or destruction to undiscovered heritage sites in the area.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	5	5	2	1	1.5	Negative	6.5 (LM)
<p>Mitigation measures:</p> <p>There were no sites or objects of archaeological finds, Graves, historical and cultural significance identified, however, during construction, if any possible finds occur, the construction must come to a halt until a qualified archaeologist makes an assessment of the findings. Work may only commence once approval is given from the heritage agency.</p> <p>No specific mitigation measures are required at the moment.</p>									
Mitigated	1	1	1	1	1	2	1.5	Negative	2.5 (L)

**Ecological Impacts** – The site is free of vegetation, except seasonal shrubs and grass that grows during the rainy season.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	1	1	1	1	1	Negative	1 (L)
Mitigation measures:  There is no vegetation that was observed on the proposed solar plant location. The site was strategically chosen because solar power plants generally require vegetation free areas to allow for maximum exposure to sunlight.									
Mitigated	1	1	1	1	1	1	1	Negative	1 (L)

**Impacts Associated with Operational Phase**

**Storm water-** Storm water drains away from the site and flow into water bodies without any kind of treatment. This can pollute the water bodies like creeks, lakes and rivers and have adverse effects on their chemical as well as biological nature. It is in this nature that plans for storm water collection has been proposed in such way so as to accommodate the entire amount of outflow that may occur after development.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	4	5	3	4	2	5	3.5	Negative	7.5 (LM)
Mitigation measures:  All along the roads storm water drains would be provided to collect water during rains.									

Storm water drains will be collected through network of storm drains from gardens, parking areas, paved and unpaved areas, and roadways.									
They would be adequately sized to prevent over flooding of the site.									
Mitigated	1	1	2	1.33	1	2	1.5	Negative	2.83 (L)

**Commercialization of the area** - The solar power generation plant will be uplift the community economically and socially.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	1	1	2	5	5	5	Positive	7 (LM)
<b>Mitigation measures:</b>									
This project will contribute to the improvement of the services and infrastructure for the surrounding communities, as it will provide more social services within the area.									
Will create job opportunities for the local community which will improve their skills and improve their livelihoods.									
Jobs emanating from the construction and operation of the proposed development will be outsourced to small medium enterprises in the area.									
Residents to be provided with all the basic amenities and utilities required by the community for them to live in a quality life style.									
Mitigated	1	2	1	1.33	5	3	4	Positive	5.33 (LM)

**Improved aesthetic look of the area-** The proposed solar power plant is essential to improve the aesthetics of the area while turning it into an environmentally friendly settlement with improved infrastructure services. This potential impact of the infrastructure on the economic structure is positive impact. The construction should be completed on time to prevent the delay of the good looking and improved site.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	2	2	2	1	1	1	Positive	3 (L)
<p>Mitigation measures:</p> <p>No mitigation required because it's a positive impact. However, the developer should create awareness among the residents about energy conservation and other resources as well as to implement measures to prevent or minimize any adverse effects on the environment.</p> <p>This project should provide a quality of life that can be expected in an urban area in relation to the utilities, convenience, amenities and security.</p> <p>This project will provide quality residential accommodation to the previously disadvantaged residents with low income.</p> <p>It should provide convenient transport system, accessibility to utilities and social centres to enhance the social quality of life.</p> <p>Public open space and park erven should be revegetated to look greener and to minimize soil exposure to erosion.</p>									
Mitigated	1	5	4	3.33	3	5	4	Positive	7.33 (LM)

**Increased employment opportunities-**

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	2	3	5	3.33	3	3	3	Positive	6.33 (LM)
<p>Mitigation measures:</p> <p>The principles of gender equality, maximizing local employment should be implemented in the provision and establishment of jobs.</p> <p>It is recommended that local people are considered first when employing workers, this will help in the skills transfer from the experienced workers to the local unskilled labourers. The skills transfer to local communities will empower them to participate in similar projects in the future.</p> <p>Opportunities for the maintenance of infrastructure and services will be created following the completion of the development. These opportunities might be made available to the existing labour force thus, creating long term employment for locals.</p> <p>Equity, transparency, should be taken into account when hiring and recruiting and that Public Participation i.e. Community Leaders or Community committees should be part in the recruiting process.</p>									
Mitigated	1	4	4	3	2	5	4	Positive	6.5 (LM)

**Traffic** - Potential impact due to increase in traffic because of the operation activities of the solar power generation plant.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	5	3	4.33	5	3	4	Positive	8.33 (LM)
Mitigation measures:  Sidewalks for pedestrians should be provided.  Appropriate road signs and markings should be provided throughout the layout.  Signs should be provided at intersections particularly at higher order intersections.									
Mitigated	2	1	1	1.33	1	2	1.5	Positive	2.83 (L)

**Waste management**- waste to be created due to the operation of the solar power generation plan is expected to be minimal.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	5	3	3	3.66	5	5	5	Negative	8.66 (LM)
Mitigation measures:  During the operations phase, the Oniipa Town Council waste management will carry out the waste management function at the solar power plant.  Oniipa Town Council to develop a formal waste collection strategy and that the waste is to be collected regularly by disposed of at authorized waste disposal site.									

Illegal dumping should be prohibited.									
Mitigated	1	1	1	1	1	2	1.5	Negative	2.5 (L)

**Land use** -The proposed development will result in a change in land use, with some loss of grazing taking place. However, it will impact positively on the economic development of Oniipa Town.

	Severity	Duration	Extent	Consequence	Frequency	Probability	Likelihood	Status	Confidence/ Significance
Unmitigated	1	5	4	3.33	1	5	3	Positive	6.33 (LM)
Mitigation measures:									
The land use will be changed from undetermined to light industrial use. However, the development will be compatible with the surrounding land use on completion of the construction phase.									
The solar power station will generate electricity for the northern regions of Namibia, generate revenues for the Oniipa Town Council in terms of rates and taxes and create jobs for the local people.									
Mitigated	1	2	1	1.33	5	3	4	Positive	5.32 (LM)

## **Impacts Associated with Decommissioning Phase**

It is not easy to assess the decommissioning phase at this point in time as the developers are still to make a decision whether the facility will be decommissioned, repurposed or retooled, although the procedures for decommissioning phase should be the same as for the construction phase however, there will be possible pollution in the decommissioning of the project. Furthermore, during the decommissioning phase, an Environmental Impact Assessment (EIA) will be required and the disposal of decommissioned equipment and hazardous contaminated materials should be disposed following the disposal of hazardous material legislation.

## **CONCLUSIONS**

Magnus Global Investment cc has proposed to construct and operate a 10MW solar power generation facility on a 20ha portion located adjacent the Onamulunga substation in Oniipa Town, Oniipa Constituency, Oshikoto Region. The solar power plant will generate and feed power into the existing Nampower electricity grid with the support of Southern Africa Power Pool. The solar power plant project is expected to increase the power generation capacity of Namibia and move the country closer to energy self-sufficiency.

Nghivelwa Planning Consultants has been appointed to conduct an Environmental Impact Assessment and Environmental Management Plan (EMP) for the proposed solar power generation plant. The Environmental Impact Assessment was conducted to meet the requirements of Namibia's Environmental Management Act (No. 7 of 2007), the Electricity Act (Act No.4 of 2007)

Therefore, potential environmental issues associated with the proposed activities have been identified. A number of potential impacts were assessed and mitigation measures are provided. The area is generally suitable for the proposed solar power generation plant. All environmental risks can be minimised and managed through implementing preventative measures and sound management systems.

It is concluded that the proponent can construct adequate water supply infrastructure, sewage disposal system, electricity, etc to serve the proposed development. The Oniipa area has good climatic conditions and thus, this development would not be affecting any of the locals in a negative way. It is also concluded that there will be no need for any rehabilitation as there are no human settlements in this area as all existing structures are situated a long distance from the proposed development.

It is further concluded that, there will be abundant opportunities for employment during the construction phase (both skilled and unskilled), although temporary and there will be permanent employment opportunities during the operational period of the project. The solar power plant will enhance the living conditions of the Oniipa residents.

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