ENVIRONMENTAL SCOPING ASSESSMENT

SCHONAU SOLAR ENERGY

ENVIRONMENTAL SCOPING REPORT

APRIL 2022

Town and Regional Planning Consultants
Environmental Management Consultants

PROJECT INFORMATION

Developer	**EMESCO ENERGY NAMIBIA (PTY) LTD**
Proponent:	**SCHONAU SOLAR ENERGY (PTY) LTD**
Project Title:	**SCHONAU SOLAR ENERGY (SSE)**
Type of Project:	**ENVIRONMENTAL SCOPING ASSESSMENT**
Project Location:	**KARASBURG – //KARAS REGION (NAMIBIA)**
Project Number:	**KAR/SCH/001**
Competent Authority:	**MINISTRY OF MINES AND ENERGY** **PRIVATE BAG 13297** **WINDHOEK**
Approving Authority:	**MINISTRY OF ENVIRONMENT, FORESTRY AND TOURISM** **DEPARTMENT OF ENVIRONMENTAL AFFAIRS** **PRIVATE BAG 13306** **WINDHOEK** **NAMIBIA**
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LIST OF ACRONYMS

BIPA	Business and Intellectual Property Authority of Namibia
BID	Background Information Document
BOO	Build Own Operate
˚C	degrees Celsius
CBD	Convention on Biological Diversity
COD	Commercial Operation Date
COP	Conference of the Parties
CSP	Concentrated Solar Power
CSR	Corporate Social Responsibility
DEA	Directorate of Environmental Affairs
DSR	Draft Scoping Report
EAP	Environmental Assessment Practitioner
ECB	Electricity Control Board
ECC	Environmental Clearance Certificate
ECO	Environmental Control Officer
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMA	Environmental Management Act
EMP	Environmental Management Plan
EPC	Engineering, Procurement and Construction
EPL	Exploration Licence
FAA	Federation Aviation Admiration
FSR	Final Scoping Report
GHG	Greenhouse Gases
GHI	Global Horizontal Irradiance
ha	Hectare
HPP	Harambee Prosperity Plan
I&AP	Interested and Affected Parties
INDC	Intended Nationally Determined Contributions
IPP	Independent Power Producer
kV	KiloVolt
kVA	Kilowatts Ampère
L	Litre
MAWLR	Ministry of Agriculture, Water and Land Reform

MET	Ministry of Environment and Tourism
MEFT	Ministry of Environment, Forestry and Tourism
ML	Mining Licence
MME	Ministry of Mines and Energy
MVA	Mega-volt-amperes
MW	MegaWatt
NDP5	Namibia's 5th National Development Plan
NIRP	National Integrated Resource Plan
NMD	Nominal Maximum Demand
No	Number
OHTL	Overhead Transmission Line
O&M	Operations and Maintenance
PPA	Power Purchase Agreement
PPP	Public Participation Process
PV	Photovoltaic
REFIT	Renewable Energy Feed-in Tariff
SSE	Schonau Solar Energy
SPV	Special Purpose Vehicle
SAPP	Southern African Power Pool
ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

GLOSSARY OF TERMS

Alternatives - A possible course of action, in place of another, that would meet the same purpose and need but which would avoid or minimize negative impacts or enhance project benefits. These can include alternative locations/sites, routes, layouts, processes, designs, schedules and/or inputs. The "no-go" alternative constitutes the 'without project' option and provides a benchmark against which to evaluate changes; development should result in net benefit to society and should avoid undesirable negative impacts.

Assessment - The process of collecting, organising, analysing, interpreting and communicating information relevant to decision making.

Bulk Supply - The wholesale supply of i.e. water on a business-orientated basis, in large quantities, whether in treated or untreated form, for any utilisation purpose to a customer for own use or for subsequent supply by the customer to consumers.

Competent Authority - Means a body or person empowered under the local authorities act or Environmental Management Act to enforce the rule of law.

Critically Endangered (IUCN) - A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V of the IUCN Red List Categories and Criteria[1]), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Cumulative Impacts - In relation to an activity, means the impact of an activity that in itself may not be significant but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Endangered (IUCN) - A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V of the IUCN Red List Categories and Criteria[2]), and it is therefore considered to be facing a very high risk of extinction in the wild.

Environment - As defined in the Environmental Assessment Policy and Environmental Management Act - "land, water and air; all organic and inorganic matter and living organisms as well as biological diversity; the interacting natural systems that include components referred to in sub-paragraphs, the human environment insofar as it represents archaeological, aesthetic, cultural, historic, economic, paleontological or social values".

Environmental Impact Assessment (EIA) - The process of examining the environmental effects of a development as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012) for activities listed as List of Activities which may not be undertaken without an Environmental Clearance Certificate from the Environmental Commissioner (GN. No. 29 of 2012).

Environmental Management Plan (EMP) - A working document on environmental and socioeconomic mitigation measures, which must be implemented by several responsible parties during all the phases of the proposed project.

Evaluation – the process of ascertaining the relative importance/significance of information, in light of people's values, preference and judgements in order to make a decision.

Hazard - Anything that has the potential to cause damage to life, property and/or the environment. The hazard of a particular material or installation is constant; that is, it would present the same hazard wherever it was present.

Interested and Affected Party (I&AP) - any person, group of persons or organisation interested in, or affected by an activity; and any organ of state that may have jurisdiction over any aspect of the activity.

Mitigate - The implementation of practical measures to reduce adverse impacts.

[1] Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf

[2] Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf

Protected - Protected under Namibian legislation.

Proponent - Any person who has submitted or intends to submit an application for an authorisation, as legislated by the Environmental Management Act no. 7 of 2007, to undertake an activity or activities identified as a listed activity or listed activities; or in any other notice published by the Minister or Ministry of Environment, Forestry & Tourism.

Public - Citizens who have diverse cultural, educational, political and socio-economic characteristics. The public is not a homogeneous and unified group of people with a set of agreed common interests and aims. There is no single public. There are a number of publics, some of whom may emerge at any time during the process depending on their particular concerns and the issues involved.

Public consultation - The process of engagement between stakeholders (the proponent, authorities and I&APs) during the planning, assessment, implementation and/or management of proposals or activities. The level of stakeholder engagement varies depending on the nature of the proposal or activity as well as the level of commitment by stakeholders to the process. Stakeholder engagement can therefore be described by a spectrum or continuum of increasing levels of engagement in the decision-making process. The term is considered to be more appropriate than the term “public participation”.

The term therefore includes the proponent, authorities (both the lead authority and other authorities) and all interested and affected parties (I&APs). The principle that environmental consultants and stakeholder engagement practitioners should be independent and unbiased excludes these groups from being considered stakeholders.

IUCN Red List - The IUCN Red List of Threatened Species™ is widely recognised as a comprehensive, objective global approach for evaluating the conservation status of plant and animal species.

Scoping Process - Process of identifying: issues that will be relevant for consideration of the application; the potential environmental impacts of the proposed activity; and alternatives to the proposed activity that are feasible and reasonable.

Significant Effect/Impact - Means an impact that by its magnitude, duration, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Sustainable Development – Development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs and aspirations.

Species of Special Concern - Those species listed in the Endangered, Threatened, Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally Near Threatened categories (Barnes, 1998).

Topsoil - The top 150 mm of soil (topsoil) and root material of cleared vegetation.

Vulnerable - A taxon is vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V of the IUCN Red List Categories and Criteria[3]), and it is therefore considered to be facing a high risk of extinction in the wild.

[3] Available at http://s3.amazonaws.com/iucnredlist-newcms/staging/public/attachments/3097/redlist_cats_crit_en.pdf

EXECUTIVE SUMMARY

EMESCO Energy (Namibia) (PTY) Ltd. (the Developer) is of the intention to develop, construct and operate a photovoltaic solar power plant with a maximum export capacity of 125 MWp near Karasburg on behalf of Schonau Solar Energy (Pty) Ltd (The Proponent).

The worldwide drive to stabilise greenhouse gas (GHG) concentrations in the atmosphere is increasing the importance of alternative energy sources such as solar, wind, wave and biomass. Climate Change also press Namibia to move towards a low-carbon and climate resilience development. This project is accordingly in line with Namibia's National Energy Policy to make use of renewable energy rather than fossil fuels, while ensuring security of supply to the local demand. This investment will allow southern Namibia to benefit from its natural resources without harm to this ecologically sensitive area.

In accordance with the Environmental Management Act, (Act No. 7 of 2007) and within the framework of the Environmental Impact Assessment Regulations (2012), Urban Green cc (EAP) has been appointed by the Developer to undertake an Environmental Scoping Assessment (ESA) and apply for an Environmental Clearance Certificate for Schonau Solar Energy (SSE). This ESA process was carried out in accordance with provisions for EA, as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), provided for by Section 56 of the Environmental Management Act (No. 7 of 2007).

Given the nature of the activities associated with the Project and the nature of the receiving environment, an Ecological Baseline Assessment (attached as Appendix D) and an Archaeological Baseline Assessment (Appendix E) was conducted. For purpose of assessing the loss of agricultural land, an Agricultural Impact Assessment (Appendix F) was also undertaken.

Emesco Energy Namibia (Pty) Ltd. currently owns 100% of Schonau Solar Energy (Pty) Ltd. and will be responsible for the development of the solar PV facility based on the Modified Single Buyer (MSB) framework. Schonau Solar Energy (SSE) will fulfil the role of Independent Power Producer (IPP) on a Build-Own-Operate (BOO) basis with Emesco arranging all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility.

The Project entails the construction and operation of a photovoltaic solar power plant to the extent of 200 ha and an estimated yield of 338 714 MWh (P50), which consists of the energy generation component (solar plant) and the transmission component (overhead transmission line), extending from the solar plant to the intake sub-station.

The Project Site is located in the //Karas Region, 60 km south-west of //Karasburg Town and 50 km north of the Orange River as indicated by Fig. 4.1 in this report. The site proposed for the solar park is envisaged on the commercial Farm Schönau No. 126. The 200 ha set aside for this Project is located on a portion within the south-western parts of the mentioned Farm next to the D208. The proposed solar park is situated directly to the west of the Harib Substation and the OHTL will stretch 300 m between the SSE substation and the NamPower Substation.

The layout consists of a variety of infrastructure, each having a particular purpose. This includes PV panels to harvest the sun's energy, a tracking system to ensure optimal exposure of the PV panels during daylight, inverters and field transformers to step-up the voltage and cables to transmit electricity to the site substation. The Project will feed into the 220/132 kV Harib Substation of NamPower via a 300m 132 kV overhead transmission line from the project site.

Alternative criteria were considered to identify Farm Schonau, because of its ideal locality considering optimal solar radiation and duration of sunlight exposure (i.e. maximum energy yield), and due to its locality next to the existing Harib Substation of NamPower.

The Project Site falls within in the semi-arid *Nama Karoo* and consist of a sparse layer of grass and low shrubs. Overall flora and fauna diversity and endemism is viewed to range between "average", "low" to "extremely low".

The proposed Project Site lies within a narrow strip of Permo-Carboniferous Dwyka tillite forming low eminences with complex braided drainage and little vegetation cover. The harsh climatic conditions of the Nama Karoo severely limited both historical and pre-colonial human settlement as highlighted in the Archaeological Baseline Assessment Report (Appendix E).

The general area surrounding the Project Site is predominant agriculture and tourism on freehold land. Farm Schonau No. 126 is zoned for agriculture and consent to use land for use other than agricultural purposes must be obtained from the Ministry of Agriculture, Water and Forestry. The Agricultural Impact Assessment concluded that the agricultural potential of the farm is low due to low and erratic rainfall, spares shrubland with low grazing capacity and limited water supply.

The //Karas Region has a well distributed electricity network and Karasburg is well situated within the southern Namibian road network. It has its own airport used mainly for light aircraft or as an emergency landing strip and has an active train station, which is the last significant stop before Upington Station across the border into South-Africa.

The visual aesthetics and as a result the sense of place, correlates with the land uses and related infrastructure. The visual aesthetics of the area is that of extensive arid farmlands covered in low shrubs and some grass, which gives it a unique desolate sense of place that might be disturbed by solar- and electricity transmission development. The proposed Project Site is directly next to the existing Harib Substation of NamPower where land use has been converted to infrastructure development and the area is already altered to an electricity transmission network. SSE will have a significant visual impact from the D208 and no mitigation measures exist on the flat topography with low vegetation. The D208, however, does not lead to any border posts or towns and visual receptors will only be travellers to a few farms south of Farm Schonau. The solar farm will thus be seen as part of the electricity development around Harib Substation by these passers-by.

The Project Site falls within the //Karas Region, the southernmost, largest and least densely populated of the 14 regions of Namibia. It falls within the Karasburg Constituency, and is, apart from the Keetmanshoop Urban Constituency, the 2nd highest populated within the //Karas Region. The Region has seen a slight increase in population numbers since 2001, with 63% of the total population being within the 15 – 59 year age group. This statistic predicted an increase in the demand for employment, food, housing, etc. within the Region for the years to come.

Public consultation for the purposes of this project was done as prescribed by Regulations 21 to 24 of the Environmental Impact Assessment Regulations (GN. 30 of 2012). Engagement with the public and authorities as part of the first round of public consultation commenced on the 11th of November 2021 and concluded on the 2nd of December 2021. During the first round of consultation, I&APs and authorities were given an opportunity to register and submit comments and/or concerns on the proposed project. No concerns were raised during this first round of consultations.

Following the Scoping Assessment, various positive impacts were identified:

- This project is in line with the mentioned strategies and policies (see section 4.1) to give energy access and promotion of economic development by increasing the availability of clean energy via the SAPP to southern Africa.
- Schonau Solar Energy will reduce the annual GHG's emitted in the production of utility supplied power in the region by 331 973 t CO^2 compared to conventional energy generation.
- The particular solar technology used and required cleaning method enables as reduction in the use of water for purpose of cleaning the PV panels (see section 4.3.3).
- The proposed Project holds various direct and indirect socio-economic benefits for both the local people of Karasburg/Warmbad area and the //Karas Region. (see section 4.5.1).
- //Karas Region is listed amongst Namibia's most vulnerable regions to Climate Change. A Solar Park will enhance economic development in an environment that is changing to become less suitable for livestock farming. (*MET, 2018*).

Construction impacts identified (section 7.4.1) were loss of biodiversity and habitat destruction; disturbance and removal to heritage and archaeological resources; ground and surface water pollution; littering; and socio-economic, of which the loss of biodiversity and habitat destruction was considered the most sensitive.

Permanent removal of some of the natural vegetation cover (see section 4.3.7.2), are inevitable to make way for the roads, steel poles, buildings, field transformers and substation. The extent to which actual vegetation disturbance will take place is considered small, i.e. 1.47% of the surface of the Project Site or 0.025% of the surface of the Farm Schonau No. 126.

The findings of the Ecological Baseline Assessment (Appendix D) are that the proposed Project is not expected to impact the *Nama Karroo* biome as a whole, and/or any unique spp. due to the location of the site and the small footprint.

It can be expected that single endemic and endangered flora species exist on the Project site, which should be identified and relocated before site clearance commence. It is accordingly recommended that a Search and Rescue Management Plan be drafted (with monitoring plan) and that this Plan include the necessary permit/s as per the Forest Act (No. 12 of 2001, as amended) and the Nature Conservation Ordinance (No. 4 of 1975, as amended). This Plan should be implemented by an ecologist to be present during site lay-out and demarcation, to identify protected and endangered species for removal and transplant. Site lay-out should be done within a carefully planned and responsible manner to avoid unnecessary removal of ground cover or any protected species.

Operational impacts identified (section 7.4.2) were loss of biodiversity and habitat destruction; visual impact; ground and surface water pollution; natural resource (water); and genera health & safety of which the visual impact was considered the most sensitive.

There is increasing concern that solar-energy facilities may be harmful to birds, expected as a result of concentrated solar power (CSP) from super-reflective panels. With very little structured research done, it is not clear to what extend and how many birds could be injured or killed at solar-energy facilities and if this is in actual fact the reason. There have only been a few scientific papers documenting the effects of solar energy on birds since 2012. It is thus not possible yet to get an accurate indication of the actual scale of the impacts. Considering Emesco's support towards sustainable practises within the solar industry, it is recommended that this solar farm and other in the region, be used as a case study for purpose of further research to study the mentioned effects on bird mortalities, with the aim of proposing mitigations.

Loss of avifauna through collision with power lines is a reality that accompanies power lines. The effect of aboveground transmission line infrastructure is expected to be detrimental to "pylon sensitive species". These are listed as pylon sensitive species in Section 5.3.2.4 and the impact of OHTLs on avifauna are assessed in Section 7.4.1.1 (c). Species at risk would be larger species flying at pylon height (e.g. kori and Ludwig's bustard, various large eagles and vultures); nocturnal travellers (e.g. flamingos and Palaearctic species) and species potentially visiting the area for roosting/foraging (e.g. bustards, eagles, vultures). None of the unique/important species are, however, exclusively associated with the proposed development area.

The Ecological Baseline Assessment study determined that the proposed Project is not expected to fall within a major bird flyway. It is recommended that a Bird Collision Monitoring programme be introduced to monitor and mitigate impacts to determine whether anti-collision mechanisms – e.g. bird flight diverters such as coils, flappers, etc are required. Although not the responsibility of this Project's Proponent, it is equally important that NamPower take similar action in mitigating and monitoring bird collisions along their OHTL within the area.

The ***decommissioning phase*** (section 7.4.3) will activate after 30 years (i.e. Project's life) where after a new agreement will be negotiated with the land owner whether the permanent buildings and fence should be removed (along with all other solar infrastructure) or whether it can be re-used for other purposes by the owner. In case a full rehabilitation is requested, it will be the responsibility of the Proponent to undertake the decommissioning. Given the nature of the activities associated with decommissioning (see section 4.3.9), the expected impacts are very similar to that of the construction phase (see section 7.4.1), as is the case with the required mitigations to be applied.

It is the conclusion of the Environmental Scoping Assessment that this project has the potential to contribute positively to the country's electricity supply in a manner that compliments the National Energy Strategy of Namibia (see Chapter 4.1.1 and 7.1.1.1). The project has the potential to assist NamPower in replacing some of its fossil fuel consumption with clean renewable energy at an affordable rate. It can provide socio-economic benefits to the //Karas Region and specifically Karasburg and Warmbad (see Chapter 4.5.1 and 7.1.1.4).

Based on the information presented in this scoping report, the Environmental Assessment Practitioner is of the opinion that the immediate and larger environment will not be significantly

impacted if the recommendations as proposed in this report are implemented and monitored, and responsible environmental practises are applied by the Developer, Proponent, appointed contractors and sub-consultants.

1 INTRODUCTION TO THE PROJECT AND THIS REPORT

This chapter of the report provides a background and motivation to the proposed Project; the study's terms of reference; study approach and methodology, purpose of this report; the assumptions and limitations of the study; and an outline of the remainder of the report.

1.1 PROPOSED PROJECT

EMESCO Energy (Namibia) (PTY) Ltd. (the Developer) is of the intention to develop, construct and operate a photovoltaic solar power plant with a maximum export capacity of 125 MWp near Karasburg on behalf of Schonau Solar Energy (Pty) Ltd (The Proponent).

The aim of the project is to supply renewable electricity into the Southern African Power Pool (SAPP) through the NamPower grid. The generated electricity will enter the NamPower grid at the existing nearby Harib Substation, which is situated directly to the north-eastern point of the proposed Schonau Solar Energy.

Infrastructure for the generation and supply of energy (and associated activities) require an Environmental Clearance Certificate (ECC) before being implemented [Section 27(3) of the Environmental Management Act, No. 7 of 2007].

In accordance with the Environmental Management Act, (Act No. 7 of 2007) and within the framework of the Environmental Impact Assessment Regulations (2012), Urban Green cc (EAP) has been appointed by the Developer to undertake an Environmental Scoping Assessment and apply for an Environmental Clearance Certificate for the solar park.

1.2 NEED FOR AND DESIRABILITY OF THE PROJECT

The worldwide drive to stabilise greenhouse gas (GHG) concentrations in the atmosphere is increasing the importance of alternative energy sources such as solar, wind, wave and biomass. Climate Change also press Namibia to move towards a low-carbon and climate resilience development. (*NDP5, 2017*)

Throughout the past decade, Namibia's total electricity consumption has increased by an average annual rate of approximately 4.1% (*NDP 5, 2017*). The country's demand for electrical energy is outgrowing the available supply and the Country's generation capacity is under pressure to meet the rising demand. Namibia has relied substantially on importing electricity shortfalls from its neighbours, but has proofed to be not a sustainable solution. Security in supply of electricity has become detrimental for Namibia when the Southern African Power Pool (SAPP) faced the prospect of power shortages, arising from South Africa's inability to meet its own domestic demand, and its diminished capacity to export power to the rest of the region (*Konrad-Adenauer-Stiftung, 2012*).

This project is in line with Namibia's National Energy Policy to make use of renewable energy rather than fossil fuels, while ensuring security of supply to the local demand. The

development of this project will contribute to energy access and the promotion of economic development of southern Africa by increasing the availability of clean energy via the Southern African Power Pool to southern African countries. This investment will allow southern Namibia to benefit from its natural resources without harm to this ecologically sensitive area.

SSE will reduce the annual GHG's emitted in the production of utility supplied power in the region by 331 973 tons of CO^2.

1.3 STUDY TERMS OF REFERENCE

No formal Terms of Reference (ToR) were provided, but rather were inferred from the requirements of the applicable legislation namely the Environmental Impact Assessment Regulations (Government Notice No. 30 of 2012), to enable an application for an ECC with the Environmental Commissioner, as required by Section 27(3) of the Environmental Management Act (No. 7 of 2007).

The purpose of this Study is to apply for an ECC only. All other permits and/or licenses (see section 3.4**Error! Reference source not found.**) required for the operation of the proposed project still needs to be applied for by the Developer/Proponent.

1.4 STUDY APPROACH AND METHODOLOGY

This EA process was carried out in accordance with provisions for EA, as prescribed by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), provided for by Section 56 of the Environmental Management Act (No. 7 of 2007).

The study's approach and methods were guided by the Terms of Reference (Section 1.3) and the relevant legislation (Chapter 3).

The EA process is a planning, design and decision-making tool used to inform the relevant authorities and Proponent on what the consequences of their decisions will be in biophysical and social terms. As such, it identifies potential impacts (negative and positive) that the Project may have on the natural and social environments; as well as identifying potential opportunities and constraints the natural and social environment may pose to the Project.

The steps followed as part of this EA process, are (i) registration of application for an ECC, and (ii) execution of a scoping assessment (content of this report). A flowchart indicating the process being followed is presented by Figure 1.4 below.

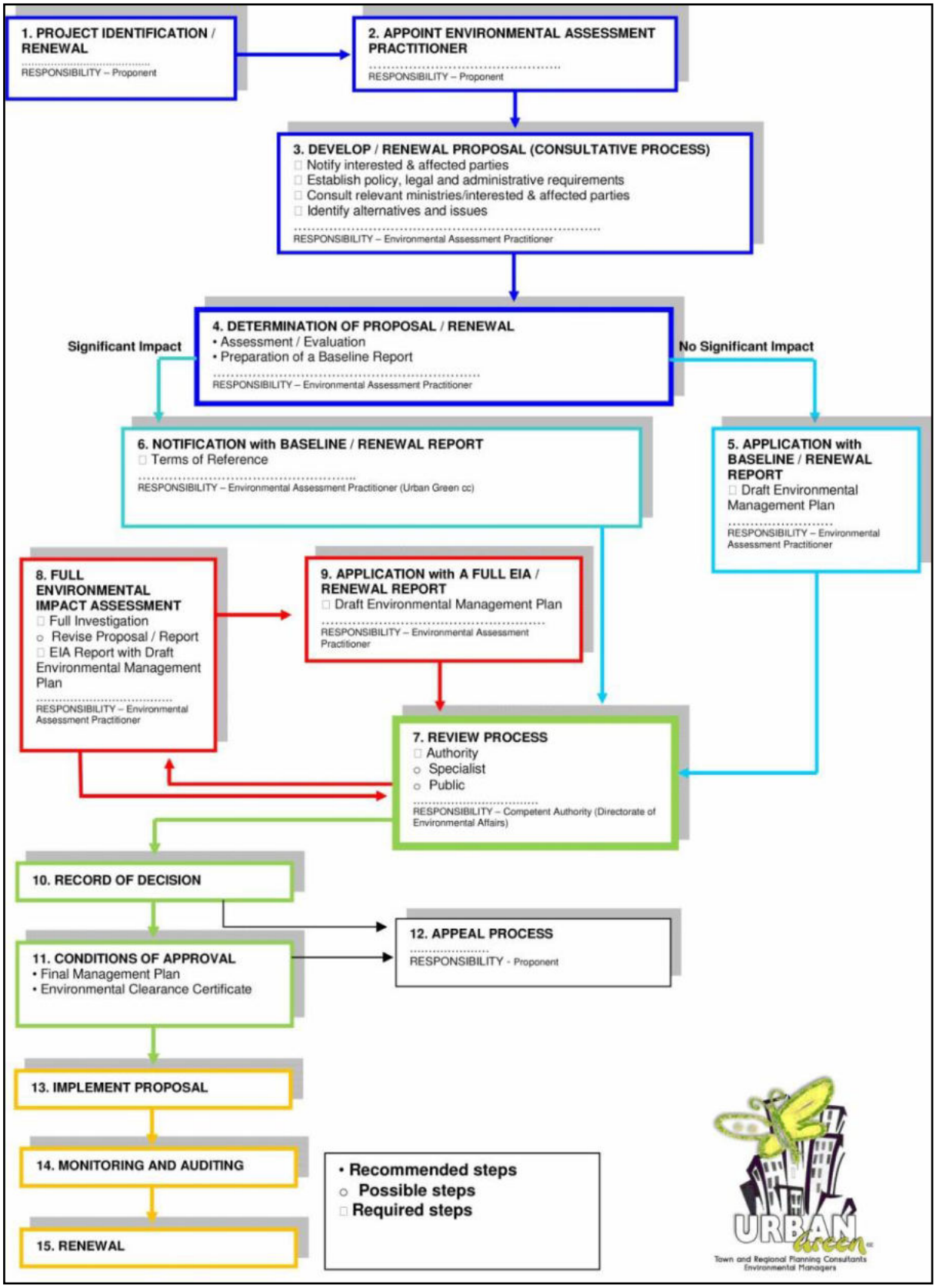

Fig. 1.4: *Diagrammatic representation of Namibia's Environmental Assessment process*

1.4.1 REGISTRATION OF APPLICATION FOR ECC

The first step followed as part of this EA process was to identify the listed activities potentially associated with the Project, as stipulated in the '*List of Activities that may not be undertaken without an Environmental Clearance Certificate'* (GN. No. 29 of 2012) and register the mentioned with the Office of the Environmental Commissioner.

The listed activities for which an ECC is was initially applied for are:

"ENERGY GENERATION, TRANSMISSION AND STORAGE ACTIVITIES

The construction of facilities for -

1. (a) the generation of electricity;

(b) the transmission and supply of electricity;"

"LAND USE AND DEVELOPMENT ACTIVITIES

5.1 The rezoning of land from –

(c) agricultural use to industrial use;" (Government Gazette, 2007)

In accordance with Section 32 of the EMA, applications for an ECC should be submitted with the relevant Competent Authority, which for this Project was identified to be the Ministry of Environment, Forestry and Tourism (decision making authority) and the Ministry of Mines and Energy – Electricity Control Board (Energy Generation and Transmission Competent Authority). Although no formal rezoning of land is intended or required, approval for the change in the use of the land has to be obtained from the Ministry of Agriculture, Water and Land Reform. The Ministry of Mines and Energy was informed in writing on 11 November 2021 of the proponent's intention to apply for an ECC with the Environmental Commissioner, with a copy of the application submitted with the office of the Environmental Commissioner with the Ministry of Environment, Forestry and Tourism (Appendix A).

1.4.2 SCOPING STAGE AIMS

The next step followed as part of this EA process was the scoping stage. The identification of impacts and their significance, as well as public consultation (as prescribed by Regulation 21 to 24 of the EIA Regulations (GN. No. 30 of 2012) are important elements of the scoping stage. Hence, during the scoping stage issues/impacts that are likely to be significant are identified and those that are less significant are evaluated and if warranted, eliminated.

1.4.3 SCOPING STAGE METHOD

The method followed during the scoping stage was as per the requirements set by the Environmental Impact Assessment Regulations (GN. No. 30 of 2012), which included –

- Giving notice to all potential interested and affected parties (I&APs) of the application (ECC application);
- Public consultation as per Regulation 21 which included the -

- Opening and maintaining a register of all I&APs;
- Receiving and recording of all comments and representations received from I&APs following the public consultation processes;

- Preparing a scoping report by subjecting the proposed application to scoping by -
  - Assessing the potential effects of the proposed listed activities on the environment (specialist studies also formed part of this stage);
  - Assessing whether and to what extent the potential effects identified can be mitigated and whether there are any significant issues and effects that require further investigation;
  - Identifying feasible alternatives related to the project;
  - Setting the Terms of Reference for further investigations (if required);
  - Informing I&APs of the way forward in the EA process;
  - Ensuring informed, transparent and accountable decision-making by the relevant authorities; and
  - Inviting all registered I&APs to comment on the scoping report.
- Informing all registered I&APs of the decision of the office of the Environmental Commissioner.

1.4.4 SPECIALIST STUDIES

Given the nature of the activities associated with the Project and the sensitivity of the receiving environments, an Ecological Baseline Assessment (attached as Appendix D), Archaeological Baseline Assessment (Appendix E) was conducted. For purpose of assessing the loss of agricultural land, an Agricultural Impact Assessment (Appendix F) was also undertaken.

1.4.5 ISSUES AND CONCERNS RAISED, IDENTIFIED AND ASSESSED

During the screening stage, the following issues for further investigation was identified –

- Loss of Biodiversity (fauna, flora and avifauna)
- Archaeology
- Visual

No concerns, objections or specific issues were raised during the 1st round of public consultation.

As a result, an ecological baseline assessment and an archaeological baseline assessment was carried out as part of the scoping assessment. The ecological baseline assessment and archaeological baseline assessment confirmed that damage or disturb sites or materials protected under the National Heritage Act (27 of 2004) is unlikely to occur and that none of

the fauna and flora species, that might be affected, are exclusively associated with the Farm Schonau development site.

Other issues identified as part of the scoping assessment were –

- Impact of PV modules on avifauna;
- Positive impact on National Energy Supply Strategy;
- Reduction in greenhouse gas emissions;
- Introduction of new solar technology;
- Security of electricity supply;
- Development in an arid region with limited other prospects;
- Socio-economic benefits to Karasburg and Warmbad area.

These issues are discussed in detail in Chapter 6.1.2 in this Report. Mitigation measures and recommendations are provided in Section 7.4.

1.5 PURPOSE OF THIS DRAFT SCOPING REPORT

This Final Scoping Report (FSR) has been compiled as part of an assessment that has been undertaken for the development of the solar farm and related amenities. The FSR summarises the process followed to date, provides a description of the project and addresses the issues raised by Interested and Affected Parties (I&APs) during both consultation opportunities. It further provides an assessment of the impacts of the proposed Project along with mitigation measures and recommendations.

The Draft version of this Report was made available for public review and comment from 5 - 12 April 2022, as required by section 23 of the Environmental Impact Assessment Regulations (GN. No. 30 of 2012). Comments received were included into this Final Scoping Report (FSR) submitted with the Ministry of Mines and Energy and (i.e. Competent Authorities) and the Directorate of Environmental Affairs (i.e. Approving Authority) with the Ministry of Environment, Forestry and Tourism for decision-making.

After the DEA has reached a decision, all registered I&APs on the project database will be notified of the decision and the requirements of the statutory Appeal Period.

1.6 STUDY ASSUMPTIONS AND LIMITATIONS

In undertaking the EA and compiling the scoping report, the following assumptions and limitations apply:

- It is assumed that all the information provided by the developer, proponent, appointed consultants and authorities consulted, is accurate and that those aforementioned have disclosed all necessary information available;
- It is assumed that all permit or licence requirements, other than the ECC, associated with the Project will be addressed as separate investigations and are not included in this EA process;
- It is assumed that there will be no significant changes to the project (see Chapter 4) or the affected environment (see Chapter 5) between the compilation of this report and implementation of the project that could substantially influence findings, recommendations with respect to mitigation and management, etc.;
- The EA process involved the assessment of impacts on the current conservation value of affected land and not on either the historic or potential future conservation value; and
- The assessment is based on the prevailing environmental (social and biophysical) and legislative context at the time of writing this report.

1.7 STRUCTURE OF THE REPORT

This report consists of nine chapters as outlined below.

Table 1.7 – *Structure of the Report*

SECTION	CONTENTS
Executive Summary	**Executive Summary** Provides an overview of the main findings of the Study.
Chapter 1	**Introduction** Provides a background and motivation to the proposed development; Terms of Reference; Study approach and methods; the study assumptions and limitations; outlines the purpose, goals and structure of the Report. It also describes the procedure for submitting comment on the Study.
Chapter 2	**Project Team and Expertise** Provides an overview of the role-players participating in the project as well as their experiences.
Chapter 3	**Legislations Applicable to the EA & Project** Provides an overview of the key legislation having relevance to the environmental assessment and activities associated with the proposed project.
Chapter 4	**Description of the Proposed Project** Provides a description of the physical appearance of the proposed project, the technology intended to be used, land use, service infrastructure, construction and operation activities.

Chapter 5	**The Affected Environment** Describes the details pertaining to the site, the existing physical, biophysical and socio-economic environment of the study area.
Chapter 6	**Details of the Public Participation Process** Explains in detail the entire public consultation process followed as part of this study. Feedback received from registered Interested and Affected Parties and Stakeholders are listed as well.
Chapter 7	**Assessment of Potential Impacts** Describes and assesses the potential impacts of the proposed project. Mitigation measures relevant to the planning; design, construction and operational phases of the proposed solar park as appropriate and recommended.
Chapter 8	**Conclusions and Recommendations** Provides conclusions to the impact assessment and evaluates the overall suitability of the proposed solar park. Recommendations for implementation during the further planning, design, construction and operation of the proposed solar park are also provided, as appropriate.
Chapter 9	**References** Provides details on the information referenced in the document.

2 PROJECT TEAM

This chapter of the report provides an introduction and overview of the various role players on this Project and environmental assessment study, as well as the expertise and qualifications of the environmental consultants and specialists.

2.1 ROLE PLAYERS

The role players in this project are set out in Table 2.1.

Table 2.1 - *The role players*

ORGANISATION	PROJECT ROLE
Ministry of Mines and Energy – Electricity Control Board	Competent Authority
Ministry of Environment, Forestry and Tourism	Competent Authority
Directorate of Environmental Affairs	Decision-making authority for environmental authorization
EMESCO Energy Namibia (Pty) Ltd	Developer / Client
Schonau Solar Energy (Pty) Ltd.	Proponent
Urban Green cc – Christina Tromp	Independent Environmental Consultant (EAP)
Urban Green cc – Brand van Zyl	Independent Environmental Consultant (EAP)
Peter Cunningham	Ecologist
John Kinahan	Archaeologist
Francois Knight	Soil Scientist / Land Capability Specialist

2.1.1 DEVELOPER

EMESCO Energy (Namibia) (PTY) Ltd operates in renewable energy markets across Namibia and southern Africa. Emesco provides solar and wind solutions to utility, commercial and industrial customers by delivering reliable, cost-effective, clean energy.

Emesco currently owns 100% of Schonau Solar Energy (Pty) Ltd. and will be responsible for the development of the solar PV facility in its entirety. It will arrange all the necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility. During the execution of the scope of works, Emesco and its contractors is accordingly compelled to adhere at all times to, and strictly comply with, all applicable health and safety legislation, codes of practice regulations, industry codes and the specification provided in this document.

2.1.2 PROPONENT

Schonau Solar Energy (Pty) Ltd. has been registered with the Business and Intellectual Property Authority of Namibia (BIPA) as the project's Special Purpose Vehicle (SPV) for the construction and operation of Schonau Solar Energy (SSE). The required agreements will be signed in the name of Schonau Solar Energy (Pty) Ltd., which will fulfil the role of Independent Power Producer (IPP) on a Build-Own-Operate basis.

2.1.3 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Urban Green Consultants cc is a multi-disciplinary consultancy, which has been offering innovative and environmentally sound solutions for over 17 years to private-, public- and NGO clients in Namibia. They offer professional services in Environmental Management, and Town and Regional Planning, as well as advise and products in the water and wastewater treatment industry. Urban Green compiled the project team for the EIA as set out in Section 2.2.

2.2 EXPERTISE OF THE EAP AND EIA SPECIALISTS

The qualifications and expertise of the environmental consultants and specialists are set out in Table 2.2 below.

Table 2.2 – *Qualifications and expertise of the environmental consultants*

NAME	**Christina Tromp**
RESPONSIBILITY ON THE PROJECT	EAP Impact assessment and mitigation formulation, reporting and application for Environmental Clearance
QUALIFICATIONS	M. Phil Degree in Environmental Management and Bachelor of Science Degree in Agriculture, majoring in Nature Conservation
PROFESSIONAL REGISTRATION	Environmental Assessment Professional Association of Namibia (EAPAN)
EXPERIENCE IN YEARS	13
EXPERIENCE	Christina Tromp is an educated environmentalist with work experience in the Namibian environment in Rural Development, Agricultural and Environmental sectors. She is a registered Environmental Assessment Practitioner. Her work experience was gathered in most regions of Namibia.
NAME	**Mr Brand van Zyl**
RESPONSIBILITY ON THE PROJECT	EAP Public consultation, impact assessment and mitigation formulation, reporting and application for Environmental Clearance
QUALIFICATIONS	M. Degree in Environmental Management; M. Degree Town and

	Regional Planning; Bachelor of Arts Urban Geography
PROFESSIONAL REGISTRATION	Namibian Council for Town and Regional Planners Member of the Green Building Council of South Africa
EXPERIENCE IN YEARS	18
EXPERIENCE	Brand van Zyl has been involved in various Environmental Impact Assessment studies throughout Namibia and of different kind.
NAME	**Mr Pieter Cunningham**
RESPONSIBILITY ON THE PROJECT	Ecologist
QUALIFICATIONS	M.Sc; B.Sc Honours; B.Sc (Conservation Ecology)
PROFESSIONAL REGISTRATION	N/A
EXPERIENCE IN YEARS	24
EXPERIENCE	Peter Cunningham has been involved as ecologist in various Environmental Impact Assessment studies throughout Namibia (including Angola, South Africa, Swaziland, Tanzania, United Arab Emirates and Saudi Arabia)
NAME	**Mr John Kinahan**
RESPONSIBILITY ON THE PROJECT	Archaeologist
QUALIFICATIONS	PhD University of the Witwatersrand, 1989
PROFESSIONAL REGISTRATION	N/A
EXPERIENCE IN YEARS	41
EXPERIENCE	John Kinahan is a research archaeologist who has worked wisely in Africa and is attached to several universities in southern Africa, the United Kingdom and North America. He has published more than 70 research articles which have been cited 1381 times and has a Google Scholar ranking of H18.
NAME	**Mr Francois Knight**
RESPONSIBILITY ON THE PROJECT	Soil Scientist / Land Capability Specialist
QUALIFICATIONS	B.Sc.Agric.Hons degree in Soil Science from the Free State University, a post graduate diploma in terrain evaluation from Potchefstroom University and a M.Sc.Agric. cum laude degree in Soil Science from the University of Stellenbosch.
PROFESSIONAL REGISTRATION	N/A

EXPERIENCE IN YEARS	34
EXPERIENCE	Experience in natural agricultural resource assessments, which stems from his work as a senior researcher at the Department of Agriculture and, for the past 19 years, as an independent consultant

3 LEGISLATION APPLICABLE TO THIS STUDY AND PROPOSED PROJECT

For environmental protection and sustainable renewable resource management to the benefit of all, legislation from different spheres under control of different ministries have been adopted and enacted by Parliament. In support to the goal of sustainable renewable resource management, various international treaties and conventions have also been agreed to by Namibia.

There are several sectoral laws that fall under the general rubric of environmental laws. Sectoral laws are generally specific and apply to sectors such as forestry, water, mining and so forth. Any development, such as this, is expected to have certain impacts and would therefore have to comply with some or other legislative requirement/s before commencement.

This chapter provides an overview to the legislation that is applicable to both the assessment process and the various activities making up the solar park development. It is accordingly divided into: (i) the legal framework for environmental management in Namibia; (ii) national sectoral legislative requirements applicable to the activities of the Project; and (iii) other relevant legislation and approvals required for the commencement of the Project.

3.1 NAMIBIAN LEGAL FRAMEWORK FOR EIA

Several Namibian legislation and policies have environmental considerations with respect to the proposed Project.

The instruments accounting for the legal framework for conducting an environmental assessment is listed in Table 3.1 below.

Table 3.1 – Namibian legislation applicable to the EA process

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
The Namibian Constitution (1990)	Article 95 (1) states that "*the State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at… maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis"* Article 100 stipulates that all natural resources are vested in the state, unless otherwise legally owned. The use of such resources is only allowed within reasonable limits and beyond such limits, permission	The Project should support the provisions of the Namibian Constitution

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	should be obtained from a competent authority responsible for the use and governance of the concerned natural resources.	
Environmental Management Act (No 7 of 2007)	Section 3(2) of the EMA provides a set of principles that give effect to the provisions of the Namibian Constitution for integrated environmental management. Section 27(3) stipulates that no party, whether private or governmental, can conduct a listed activity without an ECC obtained from the Environmental Commissioner. Section 40(1) stipulates that an ECC remains valid for a period not exceeding three years, subject to cancellation or suspension.	The Project should adhere to the principles provided in the EMA. An ECC should be obtained for the Project. The Proponent should renew the ECC (if granted) every three years.
EIA Regulations 2012 (GG No. 4878 GN No. 29 and 30)	Provides for the process to be followed in undertaking an environmental assessment, stipulating particular requirements with regards to public consultation, the identification of impacts and establishing the significance thereof, as well as the content of an environmental scoping report. Of particular interest is the transfer of an ECC, which is regulated by section 20 of the EIA Regulations.	The EA process should be undertaken as prescribed in the EIA Regulations. Transfer of the ECC should be done as per the requirements, at the time when so required.

3.2 NAMIBIAN SECTORAL LEGISLATIVE REQUIREMENTS

A number of Namibian legislation and policies have environmental considerations in respect of the proposed Project, as listed in Table 3.2 below.

Table 3.2 - Cross-sectoral legislation applicable to the project

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
Electricity Act of 2007	The regulation of electricity generating activities falls within the jurisdiction of the Ministry of Mines and Energy (MME),	The Proponent will have to plan and operate in consultation with this

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	specifically the Electricity Control Board. The act provides the requirements and conditions involved in obtaining licenses for the generation and provision of electricity. It also addresses the powers and obligation of the licensees and provides for incidental matters.	regulatory board.
Subdivision of the Agricultural Land Act No. 70 of 1970 ("Subdivision Act")	To control the subdivision and, in connection therewith, the use of agricultural land.	The long-term lease is subject to the provisions of this Act, which requires the Proponent to obtain consent from the Ministry of Agriculture, Water and Land Reform to register a long-term lease against the title deed of the agricultural land within which the project site resides.
Forest Act No. 12 of 2001, as amended	Provision for the protection of various plant species and of the environment. Prohibits the removal of and transport of various protected plant species.	The project site may harbour endemic, endangered and/or protected species Permits are required for the removal of these trees, bushes or shrubs, or any indigenous plants.
Nature Conservation Ordinance No. 4 of 1975, as amended	Protects wild animals and indigenous plants. Prohibits disturbance or destruction of the eggs of huntable game birds or protected birds without a permit. Requires a permit for picking (the definition of "picking" includes damage or destroy) protected plants without a permit. Prohibits the removal of and transport of various protected plant species.	The project site may harbour some of the endemic, endangered and/or protected species as listed in Schedule 9 of the Ordinance. Permits are required for the removal of the listed species.

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
Soil Conservation Act No. 76 of 1969, as amended	Prevention and combating of soil erosion; conservation, improvement and manner of use of soil and vegetation, and protection of water sources.	The proposed Project's activities should adhere to the requirements as set in the Act.
Water Act No. 54 of 1956, as amended	Makes provision for a number of functions pertaining to the management, control and use of water resources, water supply and the protection of water resources. Of importance is that the Act - • Prohibits the pollution of underground and surface water bodies. • Liability of clean-up costs after closure / abandonment of an activity.	The Proponent should ensure that water use during the construction and operational phases are as sustainable as possible and that no pollution of any above and/or below ground water resource takes place.
National Heritage Act (Act 27 of 2004), as amended	Protects the archaeology remains in Namibia. Requires the identification, registration and protection of cultural and archaeological sites within the study area. Heritage sites or remains are defined in Part 1, as "any remains of human habitation or occupation that are 50 or more years old found on or beneath the surface". Part V Section 46 of the Act prohibits removal, damage, alteration or excavation of heritage sites or remains. Part VI Section 55 Paragraphs 3 and 4 require that any person who discovers an archaeological site should notify the National Heritage Council.	All possible cultural or heritage resources (e.g. human remains etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.
Hazardous Substances Ordinance No. 14 of 1974, as amended	This ordinance provides for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in	During the construction and operation phases, any hazardous waste needs to be handled, stored, and disposed of in a responsible manner and at appropriate

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	certain circumstances. It is administered by the Ministry of Health and Social Services.	waste sites.
Atmospheric Pollution Prevention Ordinance No 11 of 1976, as amended	Provides for the prevention of the pollution of the atmosphere. Part IV of this ordinance deals with dust control and provides for the proclamation of dust control areas.	Excessive dust emissions caused during the construction and operational phases should be avoided or mitigated as it could be categorised as causing a public nuisance under common law.
Public Health Act No. 36 of 1919, as amended Health and Safety Regulations GN 156/1997 (GG 1617)	Section 119 states that "no person shall cause a nuisance or shall suffer to exist on any land or premises owned or occupied by him or of which he is in charge any nuisance or other condition liable to be injurious or dangerous to health."	The Project should both during the construction and operational phases consider and ensure proper human health and safety conditions.
Labour Act No. 11 of 2007, as amended	The Labour Act (No. 6 of 1992), the New Labour Act (no. 11 of 2007) and Government Notice 156 of 1997: Labour Act, 1992: Regulations Relating to the Health and Safety of Employees at Work, governs working conditions of employees. These regulations are prescribed for among others safety relating to hazardous substances, exposure limits and physical hazards. Special consideration must be given to: • Chapter 3: Welfare and Facilities at Work-Places • Chapter 4: Safety of Machinery • Chapter 5: Hazardous Substances • Chapter 6: Physical Hazards	The Proponent (including their appointed contractors) needs to comply with health and safety regulations pertaining to the health and safety of employees during construction. Operational activities should not result in any potential negative health implications to the residents and/or larger community.
Road Traffic and Transport Act 52 of 1999 and its 2001	Provides for the control of traffic on public roads and the regulations pertaining to road transport, including the licensing of	All personnel and vehicles active during the construction and the

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
Regulations, as amended	vehicles and drivers. Part 5 of the 2001 Regulations lays out detailed provisions pertaining to vehicle loads – i.e. types of loads and the appropriate manner in which loads for different vehicle classes should be carried.	operational phase should be appropriately licensed. Construction materials transported/delivered to the construction site should adhere to the requirements of the 2001 Regulations – i.e. should not exceed limits stipulated and should be transported in a safe manner.

While it has been set out to list all those laws and regulations, which regulate the healthy functioning of the environment, it is not necessarily complete and the proponent has the responsibility to make themselves aware of all applicable legislation and permit requirements applicable to the Project.

3.3 INTERNATIONAL TREATIES AND CONVENTIONS

In support to the goal of sustainable renewable resource management, various international treaties and conventions have been agreed to by Namibia. The international treaties and conventions applicable to the Project and affected environment worth taking note of are listed below in Table 3.3 below.

Table 3.3 - International Treaties and Conventions applicable

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
The 1992 United Nations Framework Convention on Climate Change	The UNFCCC was adopted to regulate levels of greenhouse gas concentration in the atmosphere so as to avoid the occurrence of climate change on a level that would impede sustainable economic development.	Energy production adaptation should strive toward long-term energy security and energy efficient production technologies and decrease the dependence on non-renewable, volatile and environmentally unsound resources.
The 1985 Vienna Convention for the Protection of the Ozone	Aims to protect human health and the environment against the adverse effects resulting from modifications of	Parties commit themselves to cooperate in formulation and implementation of

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
Layer	the ozone layer.	measures to control activities that cause adverse modifications of the ozone layer.
Convention on Biological Diversity 1992	Aims at the conservation of biological diversity and promoting sustainable use of its components. Regulate or manage biological resources important for the conservation of biological diversity whether within or outside protected areas, with a view to ensure their conservation and sustainable use. Promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings.	Removal of vegetation cover and destruction of natural habitats should be avoided and where not possible, minimised.
The United Nations Convention to Combat Desertification 1994	Focuses on land degradation in the dry lands where some of the most vulnerable ecosystems and people in the world exist.	The Project should adhere to responsible land management and rehabilitation, which contributes to the conservation and sustainable use of biodiversity and the mitigation of climate change.
The 1972 Convention Concerning the Protection of the World's Cultural and Natural Heritage	This convention intends to establish an effective system of collective protection of the cultural and natural heritage of outstanding universal value, organised on a permanent basis and in accordance with modern scientific methods.	Possible cultural heritage resources (e.g. human remains, fossils, etc.) discovered, need to be reported immediately to the National Heritage Council (NHC) and require a permit from the NHC before they may be relocated.
Stockholm Declaration on the Human Environment 1972	Recognises the need for: *"a common outlook and common principles to inspire and guide the people of the world in the preservation and enhancement of the human*	The proponent should strive to protection of natural resources and prevention of any form of pollution.

STATUTE	PROVISIONS	DEVELOPMENT IMPLICATIONS
	environment".	
National Policy on Climate Change for Namibia 2011	Seeks to promote the primary government objectives, which include job creation, provision of basic services and infrastructure development, alleviation of poverty and provision of housing. These priorities are generally compatible with the principles of sustainable development as defined in the Rio Declaration of 1992.	Energy production adaptation works toward long-term energy security through the use of renewable and energy efficient production technologies and decreases the dependence on non-renewable, volatile and environmentally unsound resources.

3.4 AGREEMENTS, PERMITS, LICENCES AND/OR APPROVALS REQUIRED

The following agreements/permits and/or licenses (Table 3.4) should be concluded/obtained prior to construction.

Table 3.4 – *Permits, licences, approvals and/or agreements that may also be required.*

Type of Permit / Licence	Activity	Relevant Parties
Equity Finance Agreements		Emesco Energy Namibia (Pty) Ltd and Schonau Solar Energy (Pty) Ltd
Debt Finance Agreements	Limited Suretyship Bank Account Pledge	Emesco Energy Namibia and Potential Lenders
Shareholders Agreement	Agreement, including provision of equity contributions, has to be signed prior to Financial Close	SPV's shareholders
Agreement between all and each participants and Market Operator	Letter of support received	Schonau Solar Energy (Pty) Ltd and SAPP Members
Land Lease Agreement	Land option agreement for 35 year lease in place	Schonau Solar Energy (Pty) Ltd and Private Land Owner
Development Agreement	An agreement outlining the development responsibilities of	Schonau Solar Energy (Pty) Ltd and Emesco Energy (Namibia)

	Emesco and compensation for its development activities.	(Pty.) Ltd
Consent to use land for use other than agricultural purposes	Approved	Ministry of Agriculture, Forestry and Land Reform.
Generation and Export Licence	Submitted	ECB (Regulatory Authority)
Market Participant Agreement	Submitted	NamPower
EPC Agreement:	Full turnkey EPC contract based on FIDIC silver book will be signed	Emesco Energy (Namibia) (Pty.) Ltd
O&M Contract:	A contract for the long-term operations and maintenance of the plant to be signed.	Schonau Solar Energy (Pty) Ltd and Emesco Energy Namibia (Pty) Ltd
Power Purchase Agreement	A Power Purchase Agreement has to be signed	Schonau Solar Energy (Pty) Ltd and NamPower.
Asset Management Agreement		Schonau Solar Energy (Pty) Ltd and Emesco Energy Namibia (Pty) Ltd
Consent for the registration of a servitude for an overhead powerline	Approval required	Roads Authority.
Environmental Clearance certificate	Environmental Impact Assessment in progress	Ministry of Environment, Forestry and Tourism
Water use	Approval and agreement required	Landowner
Access road from existing gravel road linking up with the D208 road.	Approval required	Roads Authority
Removal of protected and indigenous species	Permit if required	Ministry of Environment, Forestry and Tourism

4 DESCRIPTION OF THE PROPOSED PROJECT

Emesco Namibia (Pty) Ltd is of the intention to develop a 125 MWp utility-scale Solar PV Plant that will link to the national grid of NamPower for electricity supply to the Southern African Power Pool (SAPP) and/or individual consumers within the Modified Single Buyer Framework.

The proposed Project entails the construction and operation of a 125 MWp photovoltaic solar power plant to the extent of 200ha and an estimated yield of 338 714 MWh (P50), which consists of the energy generation component (solar plant) and the transmission component (overhead transmission line), extending from the solar plant to the Harib sub-station, as explained below.

This chapter provides first of all a brief overview of the national strategies and policies relevant to the energy supply sector, followed by a description of the project development, implementation and shareholding. The remainder of this chapter provides a detailed description of the proposed Project.

4.1 NATIONAL STRATEGIES & POLICIES

4.1.1 NAMIBIA'S NATIONAL ENERGY SUPPLY STRATEGY

Like many other countries, Namibia aspires to use more renewable energy, to achieve reductions in its greenhouse gas (GHG) emissions, as well as to avail the Country of the numerous other benefits associated with their use. Namibia's submission to the UNFCCC's COP 21 meeting in Paris, France, titled "*Intended Nationally Determined Contributions*" (INDC) shows that the energy sector is expected to contribute to the national level INDC by increasing the share of renewables in electricity production from 33% in 2010, to 70% by 2030. This objective is indicative of the importance of increased consideration of renewable energy in the Country's energy mix, but it is conditional on Namibia receiving foreign financial support. A significant number of the generation options of the country under consideration would be based on renewable energy.

4.1.2 NATIONAL ENERGY POLICY AND (DRAFT) NATIONAL RENEWABLE ENERGY POLICY

The National Energy Policy aims to "*ensure the development of Namibia's natural capital and its sustainable use for the benefit of the country's social, economic and environmental wellbeing*". The Policy's main goals are to ensure the security of all relevant energy supplies to the country; to create cost-effective, affordable, reliable and equitable access to energy for all Namibians; to promote the efficient use of all forms of energy; and to incentivise the discovery, development and productive use of the country's diverse energy resources. The policy supports sustainable energy and exploration of low carbon developments.

To this effect the National Renewable Energy Policy, still with draft, states that renewable energy holds the solution to Namibia's energy challenges, if developed strategically and with foresight. This Policy responds to the energy problem statement, and will better equip Namibia to prevail over these difficulties.

4.1.3 NATIONAL INTEGRATED RESOURCE PLAN (NIRP)

The National Integrated Resource Plan (NIRP) is a 20-year development plan for Namibia's Electricity Supply Industry, spanning the period between 2016 and 2035. It provides a projection of Namibia's expected future electricity demand, and identifies the mix of resources required to meet the country's electricity needs in an efficient and reliable manner at the lowest reasonable cost.

Namibia has numerous power supply options that could potentially be developed to meet its future electricity requirements. However, the relatively small size of the Country's power sector, as well as the low load densities and long distances between major load centres and some potential generation connection points make it challenging to expand the power system, while ensuring the security of supply, maintaining reliability levels and keeping costs to reasonable levels.

With one of the highest solar radiation levels in the world, Namibia stands to benefit as the world-wide boom in the solar power market results in reduced costs and improved efficiency of solar photovoltaic (PV) panels and related equipment. Small solar PV installations can assist NIRP for the Electricity Supply Industry (ESI) in Namibia and SAPP. Distributed generation can potentially reduce the technical and financial challenges associated with delivering small amounts of power across a large area.

The NIRP Implementation Plan stipulates the path forward for the Namibian ESI should include three key activities as follows:

1. Secure access to short-term rental generation by 2018, or, if available, guaranteed access to power markets for electricity imports;
2. Install fossil-fuel base load generation by 2021; and
3. Continue programs to install solar PV and wind generation and further investigate the use of other renewable power technologies.

4.1.4 NDP 5 AND HARAMBEE PROSPERIT PLAN

Energy remains the number one key input for development and thus Government recognizes it in both the Harambee Prosperity Plan (HPP) and the 5th National Development Plan (NDP5) as a priority infrastructure area needed for the nation's socio-economic growth and development. In order to meet the growing demand for energy, the NDP 5 promotes the entrance of Independent Power Producers (IPP). The mining, water pumping, construction sector and urban growth are expected to be major drivers of energy demand. The promotion of IPPs in the electricity supply industry is required to meet this demand.

4.1.5 NAMPOWER'S CORPORATE STRATEGY AND BUSINESS PLAN

NamPower's Corporate Strategy & Business Plan for 2019 - 2023 has been compiled to guide and provide strategic direction for electricity provision for five years. This plan is in line with the National Energy Policy to prioritise generation projects from renewable, non-polluting, indigenous, diverse and decentralised resources in a manner which optimises long-term cost of electricity supply. Technology listed in the plan are:

- **Solar PV**
- Wind
- Energy Storage
- Smart grids
- Thermal
- Behind the meter solutions

NamPower intends to procure Independent Power Produces (IPP) to develop 20 MW Solar PV Plants. It is envisaged that Schonau Solar Energy will feed into this grid.

4.1.6 GOVERNMENT INITIATIVES

In an attempt to increase production of electricity from renewable resources the Government of Namibia undertook the Interim Renewable Energy Feed-in Tariff (REFIT) Programme. This programme undertook 14 Renewable Energy Projects. These projects were created with the intention to reduced electricity imports and attract private investment in the development of renewable energy resources in Namibia.

4.2 PROJECT DEVELOPMENT, IMPLEMENTATION AND SHAREHOLDING

4.2.1 PROJECT DEVELOPMENT

Emesco Namibia (Pty) Ltd, on behalf of the Schonau Solar Energy (Pty) Ltd, will be responsible for the development of the solar PV facility in its entirety. The activities involved in the development of SSE include, but are not limited, to the following:

a) Entering into a Market Participant Agreement with NamPower and SAPP;

b) Obtaining all necessary licenses and permits as set out in Chapter 3.4 required to construct, operate and maintain the power plant for the duration of the Market Participant Agreement;

c) Concluding a long-term Land Lease Agreement with the owner of the land;

d) Design, engineering, procurement, transportation to site, erection, construction, installation, quality assurance, testing (on and off-site), commissioning and

acceptance testing of the solar plant for all auxiliary and ancillary plant, services, and works and rehabilitation of associated sites;

e) Design and construction of all infrastructure required for the connection of the solar PV plant to the Harib NamPower Substation;

f) Appointment of international EPC contractor via competitive bidding process; and

g) Appointment of international O&M contractor with local presence via competitive bidding process.

4.2.2 PROJECT IMPLEMENTATION

With respect to the implementation strategy, Emesco will –

a) arrange all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility;

b) provide overall project management as required to develop and construct the plant until the end of plant design life;

c) will be responsible for selecting the equipment technology, dictating the design of the facility, and carrying out the plant design, construction, and commissioning; and

d) study and implement mitigation measures for the project to comply with the Government environmental regulations and guidelines, which may include a corporate social responsibility (CSR) initiative to foster social and economic improvements in communities located near the site.

4.2.3 SHAREHOLDING

Emesco Energy Namibia (Pty) Ltd. currently owns 100% of Schonau Solar Energy (Pty) Ltd. and will be responsible for the development of the solar PV facility based on the Modified Single Buyer (MSB) framework.

Schonau Solar Energy (SSE) will fulfil the role of Independent Power Producer (IPP) on a Build-Own-Operate (BOO) basis with Emesco arranging all necessary financing, insurance, authorizations, engineering, procurement and construction requirements for the solar PV facility.

An organogram presenting more detailed information regarding the shareholding, management and contractual parties of Schönau Solar Energy is presented in Appendix C.

4.2.4 PROJECT IMPACT

The development of this project will contribute to energy access and the promotion of economic development of southern Africa by increasing the availability of clean energy via the Southern African Power Pool to Southern African countries.

This investment will allow southern Namibia to benefit from its natural resources without harm to this ecologically sensitive area.

Schonau Solar Energy will reduce the annual Green House Gas (GHG) emitted in the production of utility supplied power in the region by 331 973 over 30 years of project life.

The project will increase skills levels in the region, creating temporary job opportunities during construction and permanent as well as seasonal jobs during the 30 years of operations.

It will also promote industry innovation and infrastructure development in the Karasburg area.

4.3 PROJECT'S TECHNICAL DETAILS

4.3.1 PROJECT OVERVIEW

The Project entails the construction and operation of a photovoltaic solar power plant to the extent of 200 ha and an estimated yield of 338 714 MWp (P50), which consists of the energy generation component (solar plant) and the transmission component (overhead transmission line), extending from the solar plant to the intake sub-station, as explained below. Refer to Appendix C for Schonau Solar Energy Project Information.

In accordance with the PPA and the Modified Single Buyer market rules, the solar plant will be developed by Emesco Energy Namibia (Pty) Ltd. according to the following milestones presented in Table 4.3 below.

Table 4.3 – *Project development planning*

Milestone	Milestone Date
Generation and Export Licence	1 Apr 2022
SAPP Membership	1 Jul 2022
Start of Construction	1 Jun 2023
Scheduled Connection Date	10 Dec 2024
Commercial Operation/Grid Compliance Date	24 Dec 2024
Target First Supply Date	31 Dec 2024

The Project is expected to reach Commercial Operation Date on 24 December 2024 and First Supply Date 31 December 2024.

4.3.2 SITE LOCALITY & OHTL ALIGNMENT

The Project Site is located in the southern parts of Namibia, in the //Karas Region, 60 km south-west of //Karasburg Town and 50 km north of the Orange River (refer to Fig. 4.1 for the locality within the //Karas Region). The site proposed for the solar park is envisaged on a portion of the commercial Farm Schönau No. 126. The 200 ha set aside for this Project is located on a portion within the south-western parts of the mentioned Farm, between the D208 and the existing 132 kV powerline that runs between NamPower's Harib and Khurub sub-stations (refer to Fig. 4.2). The proposed solar park is situated directly to the west of the Harib Substation and the OHTL will run for 300 m between SSE substation and the

NamPower substation. Figures 4.1 and 4. 2 shows the locality of Farm Shonau No. 126 and the locality of Schonau Solar Energy on the farm.

4.3.3 SOLAR FARM

The solar farm is envisaged to be constructed and developed with the solar panels in configuration as indicated in Fig. 4.3 below.

The layout consists of a variety of infrastructure, each having a particular purpose. This includes PV panels to harvest the sun's energy, a tracking system to ensure optimal exposure of the PV panels during daylight, inverters and field transformers to step-up the voltage and cables to transmit electricity to the site substation. The Project will feed into the 220/132 kV Harib Substation of NamPower via a 300m 132 kV overhead transmission line from the project site. This process is visualised by Figure 4.4 below.

Fig. 4.1 – *Locality of Farm Schonau No. 126 within Namibia*

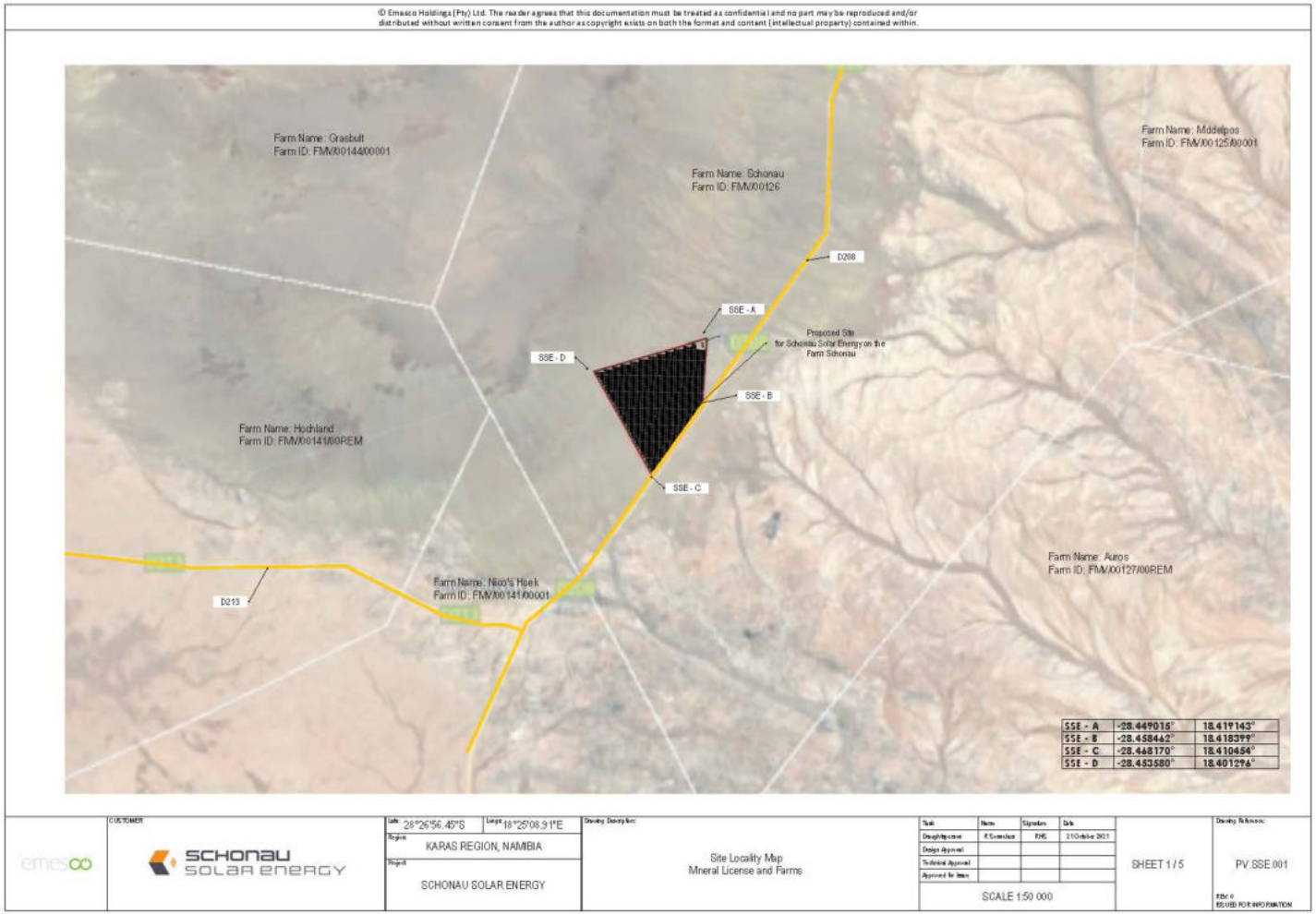

Fig. 4.2 – *Locality of Schonau Solar Energy on Farm Schonau No. 126*

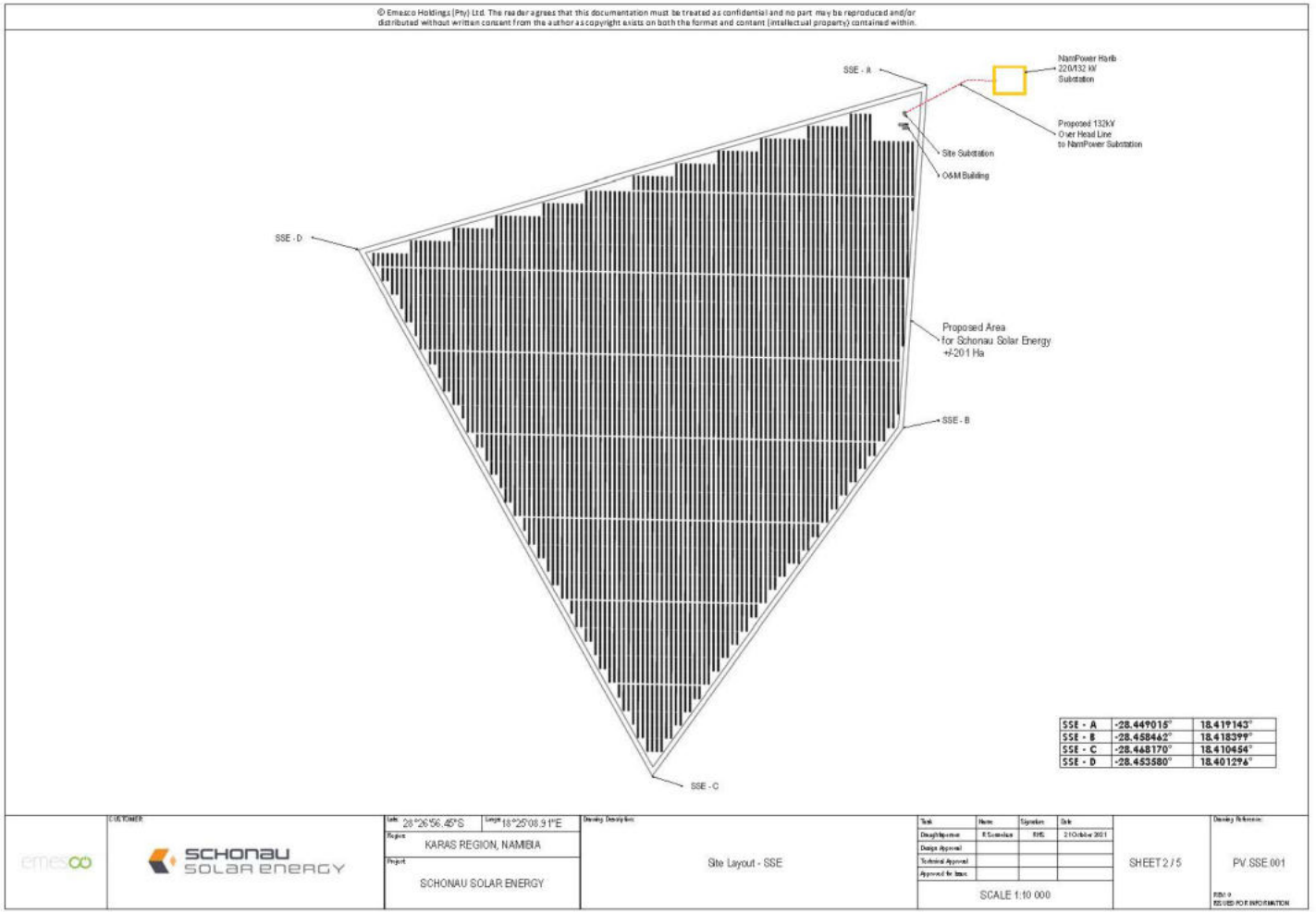

Fig. 4.3 – *Configuration of Solar Panels on the Project Site*

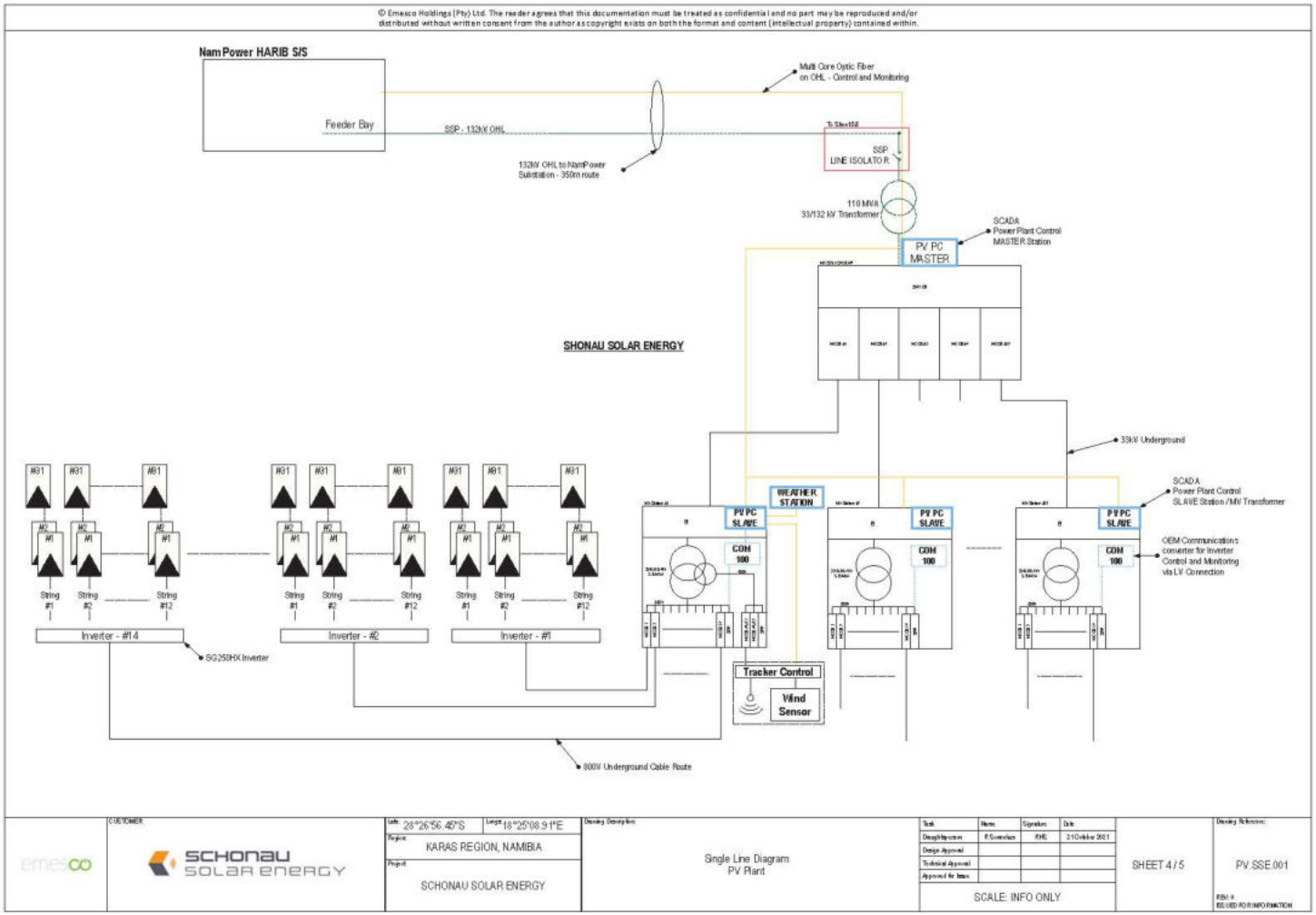

Fig. 4.4 – *Schematic illustration of solar harvesting and transmission process*

(i) Solar PV modules (panels)

The solar panels to be installed is a high quality solar product from Canadian Solar (or similar) with a 12 year guarantee on material and workmanship, and 30-year performance warranty, which reduce operational requirements and maintenance cost. The life span of these PV modules minimise the carbon footprint of the Project.

The PV modules can harvest up to 30% more electricity from the back, in addition to the electricity generated from the front (maximum system voltage – 1500V).

A single panel has a dimension of 2,384 x 1,303 x 35mm, weighing 39.5 kg.

More details on the Canadian Solar PV modules are attached in Appendix H.

The real-world life expectancy of these panels is more than 25 to 30-year performance guarantee and regular replacement of modules is not anticipated. Panels that are damaged will be replaced as part of the routine maintenance. Redundant panels still producing electricity, can be reused for rural electrification purpose, while those panels not functional anymore be recycled (i.e. glass, aluminium, copper, silica and plastic) and reused in the manufacturing of new panels.

(ii) Trackers on planted steel poles

The modules (solar panels) will be mounted on a single axis tracking system requiring 2m high steel posts (above ground), as indicated by Photo 4.1 below.

Photo 4.1 – *Example of single axis tracking system*

The solar tracking system both works as a support structure for the PV panels and provide maximum potential sun light by tracking the Sun. The table row (PV panels) is 4 800 mm wide and 10 200 mm apart to allow for optimal sun exposure and maintenance access.

The single-axis solar trackers track the sun east to west, rotating on a single point, moving either in unison, by panel row or by section, ensuring optimal exposure to the sun for a longer time during the day.

The particular technology to be installed is the IDEEMATEC Horizon L:TEC PV tracker, which offers most advanced zero loss bifacial, two-in-portrait tracker solution. The system provides the highest additional gains, optimizes overall yields and improves lifetime cost performance of a solar system. It offers unprecedented safety against wind induced instabilities.

More details on the IDEEMATEC Horizon L:TEC PV tracker are attached in Appendix I.

The life expectancy of these structures are on average more than 25 years, where after the structures will be replaced with new steel poles. Redundant poles are recycled and reuse as part of the steel and aluminium chain.

(iii) Inverters

Inverters are installed below the module rows (PV panels) on the tracker posts, which reduce the required structures.

The inverters used are the Multi-MPPT String Inverter for 15000 Vdc systems, which is a small device of 916 x 690 x 340mm. Inverters convert direct current electricity to alternating current either for stand-alone systems or to supply power to an electricity grid.

More details on the SG125HX Multi-MPPT String Inverter are attached in Appendix J.

(iv) Field transformers

A total of 35 transformers will be installed for the 200 ha development. The field transformers (see Photo 4.2) will be located in between the PV panel sections, placed on a plinth of 12m² per transformer.

These transformers have the purpose to step-up the voltage to deliver the renewable energy to the utility grid, with the added benefit that it provides galvanic isolation between the solar facility and the utility grid.

The real-world life expectancy of these transformers is more than 30 years, where after the transformers will be replaced with new transformers. The transformers will be re-furbished at the end of plant life and re-introduced into the energy market. Technical details of the transformers appear in Appendix K.

Photo 4.2 – *Example of a field transformer*

(v) Cables & trenching

For purpose of transmitting the electricity from the field transformers to the site substation, direct buried cables will be provided. Raised cable trays will feed electricity generated down each tracker row. At the end of the tracker rows a trenched system would be used to link the rows to field transformer stations. The field transformer stations would be linked to the site substation via a trenched system.

(vi) Site Substation

A single site substation will be provided on-site, expected to take-up about 2 500 m². Photo 4.3. gives a visual representation of such a site substation.

Photo 4.3 – *View of a similar site substation & buildings*

(vii) Internal Road

For purpose of providing access during the construction phase and the operational phase, a 4m wide compacted gravel road will be constructed to accommodate large trucks that need to access the site during emergencies and repairs.

For access in between the PV panel sections and routine daily maintenance no formal constructed roads are provided for. Routine inspections will be done with small quad bikes. Any crossings of water drainage lines will be engineered to allow water thoroughfare.

(viii) Security Fence with Controlled Access

A 2.5 m high electrified security fence (see Photo 4.4) will be installed along the perimeter of the solar farm. The length for the entire 200 ha site will be approximately 6036 m.

Access to the solar farm will be controlled by means of a gate at the entrance, manned by a guard on duty 24/7.

Photo 4.4 – *View of a similar electrified security fence*

4.3.4 OVERHEAD TRANSMISSION LINE

The transmission line will be a 132 kV overhead power line extending from the solar park's substation to the intake of the Harib substation, which is approximately 300m away.

The transmission lines will be mounted on single steel pole structures of approximately 12m high and 80 to 120m span in between, of which only 3-4 pole structures need to be constructed. Photo 4.5 below gives a visual representation of a similar pole structure.

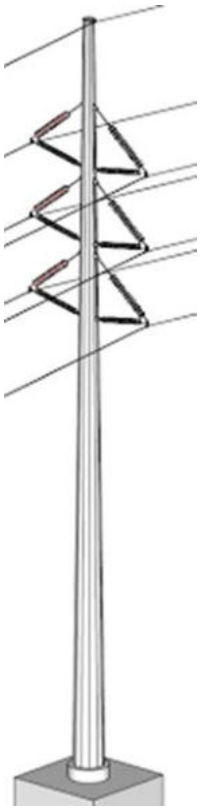

Photo 4.5 – *View of a similar steel pole structure*

4.3.5 HARIB SUBSTATION

The OHTL will connect to the existing intake of Harib Substation (see Photo 4.6 and 4.7), located about 300 m to the north-west of the solar farm. Fig. 4.5 indicate the available feeders of the Harib Substation where the 132 kV OHTL from SSE will feed into.

Photo 4.6 – *View of Harib Substation*

Photo 4.7 – *Arial View of Harib Substation*

Fig. 4.5 – *Harib Substation*

4.3.6 SUPPORTING INFRASTRUCTURE

(i) Access & Roads

Access to the solar farm will preferably be obtained directly from the D208 district road as indicated in Photo 4.8 top left. A permit from Roads Authority must be obtained for the access road. From here a 4m gravel road will be constructed into the Project Site to give access to the Solar Farm. The Harib Substation is visible on Photo 4.8 (bottom central) with its access road to the left thereof.

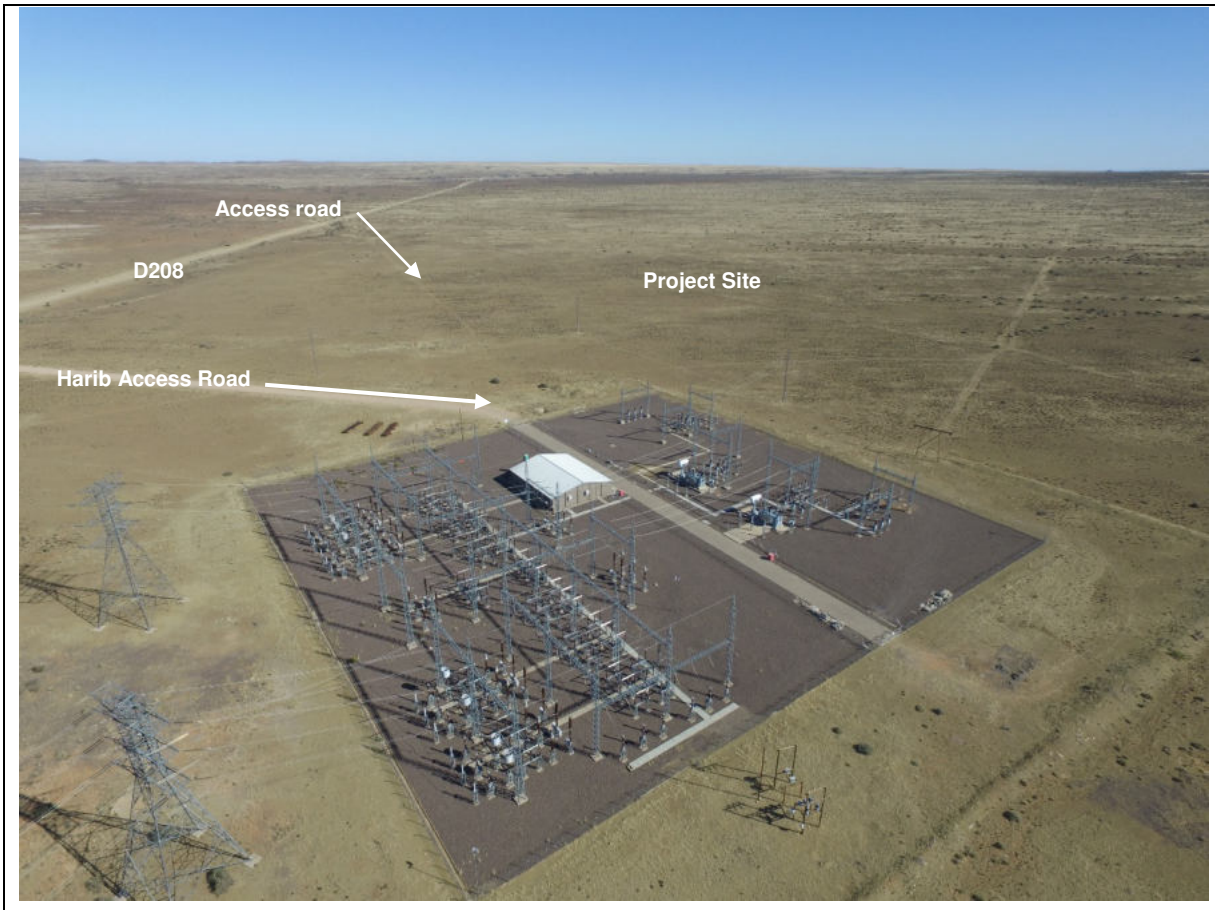

Photo 4.8 – *Arial view of Project Site indicating Access Road and Harib Substation*.

(ii) Operations and Maintenance Building

A building for operations and maintenance will be erected which will consist of a storeroom, office and ablution with sewage system. An example of such a building can be seen on Photo 4.3 next to the site substation.

(iii) Lightning Protection System

A lightning protection system will be installed to protect equipment on site.

(iv) Electricity

The solar farm will by its nature be self-sufficient for electricity.

(v) Potable Water

Water required for the construction phase will be limited to on-site concrete works (i.e. construction of buildings and concrete platforms).

During the operational phase, potable water will be used at the kitchen within the administrative building, flushing of toilets and when so required cleaning of panels. A robotic cleaner will use approximately 200 litre of water per 1 MWp per year. Thus the 100 MWp solar park will use 55 liter per day (*Knight, 2021*).

Water for daily use will be sourced from the existing borehole located to the south-west of the Project Site (see Photo 4.9) from which a connection will be made to the maintenance building. For the construction period tanks will have to be erected to gather and store sufficient quantities of water required.

Photo 4.9 – *Borehole and Dam that will provide potable water to the Project Site*

(vi) Sewage

No sewer infrastructure exists at the proposed site. During the construction phase a total of ± 200 people are expected for which temporary mobile toilets will be provided on-site.

Sewage to be generated during the operational phase is from the administrative office, having 15 permanent staff on a daily basis with 60 temporary staff during emergency or routine maintenance and cleaning of panels. For the operational phase it is envisaged that a French drain system will be constructed.

(vii) Domestic Waste

Domestic waste generated on a daily basis during the construction and operational phase will be handled similar to the standard waste management system of Karasburg Town.

General waste will be stored on site within municipal bins, which will be removed on a weekly basis to Karasburg landfill.

Domestic waste to be generated during the operational phase is from the administrative office, having 15 permanent staff on a daily basis with 60 temporary staff during emergency or routine maintenance.

(viii) Hazardous Waste

Construction waste generated will be stored on-site and disposed of at the Karasburg dumpsite.

Waste of a semi-hazardous nature, which require special disposal, are the PV panels, inverters, transformers and related equipment that is either not functional or need to be replaced as part of the routine maintenance programme during the operational phase.

All these wastes are to be recycled and reintroduced into the respective streams.

4.3.7 CONSTRUCTION ACTIVITIES & METHODOLOGY

The activities associated with the construction phase are presented below.

4.3.7.1 Site Surveillance and Demarcation:

The first step within the construction phase entails -

- setting out the project site borders;
- setting out the existing roads & tracks that can be used;
- identification and setting out the site office, ablutions, smoking and eating areas and parking;
- identification and setting out the construction yard, storage area and stockpile area;
- identification and setting out the waste storage area for the handling of all different waste types, wash bays, bulk storage and dispensing of fuel;
- drafting of construction and operational site layout; and
- ecological survey and rescue of species to be relocated.

This step of the construction phase will be done in consultation with the EAP to identify areas suitable for the various uses and to identify and rescue species to be affected. Following the approved construction and operational site plan, the search and rescue of species will commence and done by the ecologist in line with the ecologist's Search & Rescue Plan, which should include approval from the Ministry of Agriculture, Water and Land Reform.

4.3.7.2 Site Clearance

Once the survey and demarcation, as well as search and rescue, has been completed, clearance of vegetation within pre-identified areas will commence. This will be done as per the requirements of the EMP (Appendix L).

The vegetation of the area allows that the proposed Project Site surface does not have to be cleared entirely as with other solar farms. For purpose of preventing erosion and conserving the local vegetation and habitat, it will be left intact for most of the area.

Areas to be cleared of vegetation are as indicated in Table 4.4, below.

Table 4.4 – *Footprint of area to be developed*

Activity	m²	%	Nature of Disturbance (Temporary / Permanent)
Project Site	2002121.46m²		
Fencing	6036 m²	0.3%	Permanent
Roads	20000 m²	1%	Permanent
Buildings x 3	400 m²	0.02%	Permanent
PV Modules (5880 x 30 176400)	552166 m²	27.58%	Shading only
Tracking system foundations (20580)	13093 m²	0.65%	Temporary
Trenching	49000 m²	2.4%	Temporary
Inverters (490)			Installed on tracker posts
Field transformer stations x 35	420 m²	0.02%	Permanent
Substation	2500 m²	0.12%	Permanent
Steel pole transmission lines x 4			
	Total	**Total**	
	29 356 m²	1.47%	**Permanent**
	62 093 m²	3.1%	**Temporary**
	91 449 m²	4.57%	**Total**

The total area to be disturbed calculates to 91 449 m² of which 29 356 m² is of a permanent nature, which calculates to 1.47 % of the Project Site or 0.025% of the surface of the Farm Schonau No. 126.

Areas other than the mentioned, for example areas in between PV panel sections, will not be cleared of vegetation. Temporary storage and disposal of the removed vegetation will be done as per the requirements of the EMP (Appendix L), as is the case with topsoil removal, temporary storage and replacement.

4.3.7.3 Construction

(i) Vegetation Clearance

As indicated above, the proposed project site's surface will not be cleared entirely as with other solar farms, because of the vegetation type that exists on site.

Clearance for purpose of the roads is done by means of a grader, while manual labour will be used to clear those areas earmarked for the buildings, field transformers, tracking foundations, fencing and substation.

(ii) Drilling/digging & Casting of Collar (Tracking Foundations)

The steel posts on which the tracking system will be mounted will be drilled into the ground to a depth of 1,500mm to 2,200mm below ground making use of a small augur.

Each post would have a concrete collar at its base extending 150 to 200 mm above ground and 300 to 400 mm below ground (typical dimension of the collars would be Ø800 mm x 600 mm deep), as indicated by Figure 4.6 below.

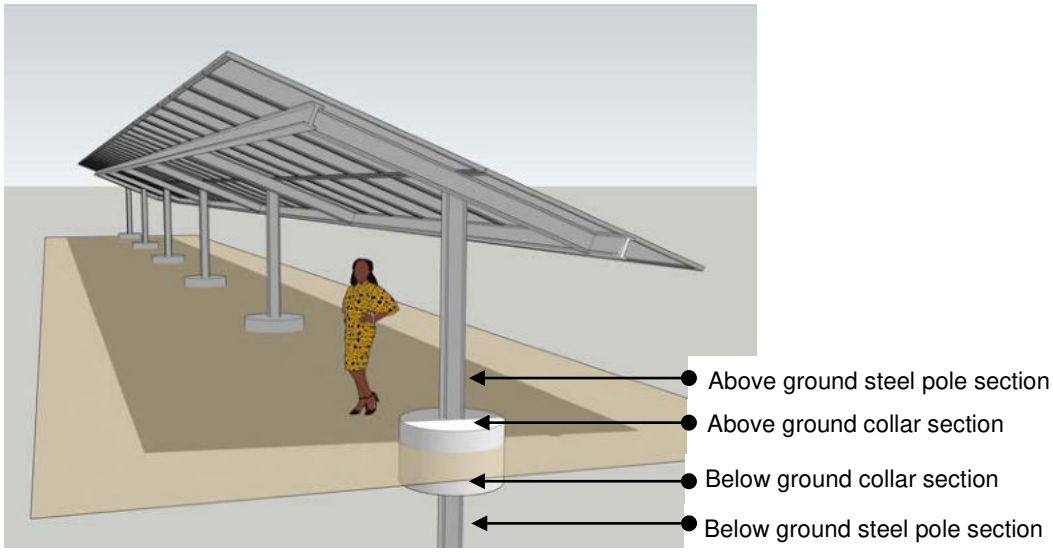

Figure 4.6 – *Tracking Poles & Foundations*

The selected mounting system will be installed along the existing site levels as far as possible with minimal levelling required, typically limited to module ground clearances only, but may also be required at some post locations to stay within the trackers slope tolerance, as indicated by Figure 4.7 below.

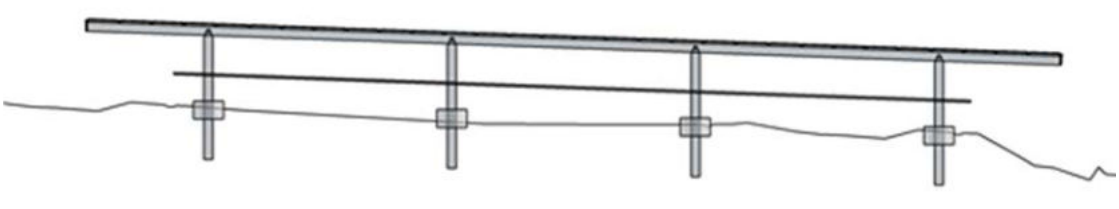

Figure 4.7 – Installing of system along site gradient

Each tracker row can be installed on a different elevation height and the row itself can accommodate a slope of up to 3% thus reducing disruption of the ground surface, as indicated by Photo 4.10 below.

Photo 4.10 – *Installing of system along site gradient*

The works for this installation will be done by both semi-skilled and skilled labour.

(iii) Field Transformers

For purpose of the field transformers, concrete plinth of 12 m² will be cased, which will be done by manual labour (i.e. semi-skilled labour).

The installation and connection of the field transformer will be done by skilled labour.

(iv) Cables & Trenching

The trenching to host the cables, linking the PV panels with the field transformer stations and the mentioned again with the site substation, would be at a depth of between 400 and 1,000 mm and width of 500mm.

Trenching will be done by semi-skilled labour while connections will be done by skilled labour. Excavated material will be re-used for backfill of the trenches though some imported soil material may be required depending on the soil's thermal capacity of the soil on site.

(v) Site Substation

An area of 25 x 50 m (1,250 m²) would be raised to create a level platform with the required earthing. This area will be covered with stone-chip and a concrete plinth for the large transformer and switchgear, +/-250 m² concrete and the balance of 1,000 m² would be stone-chip. (see Photo 4.3)

Construction of the mentioned and installation of the substation will be done by manual labour (i.e. semi-skilled and skilled).

(vi) Internal Roads

The construction of these roads will involve grading of surface, in-situ gravel compacting, imported surface soil grading and compacting. Any crossings of water drainage lines will be engineered to allow water thoroughfare.

For this purpose, a grader will be used, as well as tipper trucks and roller compactor.

(vii) Security Fence

The security fence will be a 2.5m high fence of galvanised poles and wire mesh (see Photo 4.4), electrified for security purpose.

For purpose of securing the galvanised poles, a hole of Ø300 mm x 600 mm deep will be dug and filled with concrete, making use of manual labour. The fence will be installed along the existing site levels.

(viii) Buildings

Three buildings will be constructed on-site, i.e. guard house, operations and maintenance building and switchgear station (see Photo 4.3).

Standard building methods will be used to construct these buildings, i.e. digging of trenches for foundations, casting of foundations, brick works for building, etc.

(ix) Other

The following activities are also associated with the construction phase:

- Temporary accommodation for labour force from Karasburg;
- Access to and from the project site by construction & delivery vehicles;
- Handling and removal of sewage;
- Handling, storage and removal of construction waste; and
- Usage of water for daily construction activities and generation of waste water.

The impacts expected to occur during the construction phase, the assessment therefore and the mitigations recommended are discussed in more detail in Section 7.4.1, while the environmental requirements are listed in much detail within the Environmental Management Plan (EMP), attached in Appendix L.

4.3.8 OPERATIONAL ACTIVITIES & METHODOLOGY

Once operational very little is required on-site and most is controlled from the Control Room, while specific operational and maintenance checks are performed as per the particular Solar Farm's Site Operation Manual.

These activities are only to be performed by authorized operators, maintenance teams and site personnel. The operation instruction manual of the specific equipment must be followed

to complete the procedures discussed below. Strict safety measures (personal and site safety measures) as outlined in the Solar Farm's Site Operation Manual should be followed at all times to ensure health & safety of all personnel and others.

Typical dangers that exist during operations are high voltage due to lighting, danger of electrocution, and/or crush hazard from moving parts of a motor. Several sources of combustion exist on a solar farm, the most common being electrical fire others including combustible materials, flammable liquids, and grass fires.

The activities associated with the operational phase are presented below.

- Day-to-day site checks, which includes –
    - General checks
        - Ensure that appropriate safety signs are in place at each access point of the site.
        - All areas are cleaned and free from obstacles or dangerous materials.
        - All waste materials have been dealt with according to the waste site management plan.
        - Ensure all equipment and Site O&M Manual are safely kept and easily accessible.
        - Conduct a health and safety checks as per Site O&M Manual.
        - Ensure there is enough water to drink and for daily usage and sun protection (HAT and sun block).
        - Ensure that everything, e.g. tools, documents, brooms etc., are in the correct areas.
    - Security and surveillance
        - Check perimeter fencing and entrance gate for damages or signs of attempted entry.
        - Inspect CCTV monitors to ensure all are operational.
        - Ensure that the fire detection system is armed and operational.
- Operation and Maintenance, which would involve:
    - Daily rounds on the project site along existing tracks;
    - Plant start-up and shut down;
    - Diagnostic testing;
    - Fuse checks;
    - Vegetation management, which entail;
        - ⊡ Clearing of vegetation that attached to the tracking system;

- ⊡ Clearing of vegetation that grew into array wiring;
- ⊡ Clearing of vegetation if shading onto PV panels appear; and
- ⊡ Clearing of vegetation around skids and other electrical equipment (i.e. field transformers; substation);

- Maintenance to roads;
- Cleaning of PV panels, which entails:
  - ⊡ Removal of noticeable dirt by rubbing away by gentle cleaning-implement (soft cloth, sponge or brush with soft bristles);
  - ⊡ Cleaning of soft dirt (like dust) on modules to be done weekly with compressed air. This technique can be applied as long as the method is efficient enough considering the existing conditions;
  - ⊡ If excessive soiling is present on the module surface, water will be used (2l/panel). This will be seldom necessary, expected once a year; and
  - ⊡ If grease is present, an environmentally friendly cleaning agent may be used with caution.

The vegetation control method currently applied with great success is grazing of the site by farm animals, such as sheep (see Photo 4.11).

Photo 4.11 – *View of sheep grazing the site and controlling vegetation growth*

Common repairs on a PV site include the following:

- Broken module replacements.
- Inverter shutdowns require inverter swops.
- Burnt connections.

- Communication fault finding and system repairs (smaller electronic equipment).
- Tracker gearbox and motor replacements.
- Wind damaged steel structure replacements.

4.3.9 DECOMMISSIONING

The project life is envisaged to be 30 years where after a new agreement will be negotiated with the land owner whether the permanent buildings and fence should be removed (along with all other solar infrastructure) or whether it can be re-used for other purposes after project life by the owner.

In case a full rehabilitation is requested, it will be the responsibility of the Proponent to undertake the decommissioning, which will be done as per the Proponent's Decommissioning & Rehabilitation Plan. It is recommended that a Botanist / Ecologist be involved to advise on how to go about restoring the area to a pristine condition.

A complete decommissioning exercise, which should be covered by the Decommissioning & Rehabilitation Plan should involve as a minimum:

- Demolishing and removal of all temporary and permanent structures;
- Disposing of building rubble;
- Preparation of disturbed areas and recovery of topsoil;
- Search and relocate of local indigenous vegetation onto the site;
- Rehabilitated Desert and Succulent Steppe vegetation patch; and
- Rehabilitation monitoring.

4.4 ALTERNATIVES

The criteria applied by Emesco during the initial Project investigation was:

- sufficient solar radiation;
- available infrastructure (i.e. NamPower grid, access, etc.);
- private owned land;
- available land for lease;
- land use & potential;
- underutilised or unutilised land; and
- site topography and size.

The larger area of the //Karas Region was considered and evaluated due to its high values of solar radiation and hours of sunshine. This resulted in identifying Farm Schonau No. 126 and in specific the flat portion west of the Harib Sub-station, as indicated by Figure 4.2. This Farm was chosen, because of its ideal locality considering optimal exposure and duration of sunlight (i.e. maximum energy yield), and due to its locality next to the existing Harib

Substation of NamPower. The Schonau Solar Energy will feed into the existing substation along a OHTL that will follow the servitude of the existing 132 kV OHTL that runs between Aurus and Rock Sub-stations.

4.5 PROJECT BENEFITS

4.5.1 SOCIO-ECONOMIC BENEFITS

Considering the socio-economic standing of the Region, a serious need for employment opportunities and improved living conditions exists, which would contribute to achieve Vision 2030. The project will support local development and contribute to local (Karasburg and Warmbad) and regional (//Karas Region) economic development.

4.5.1.1 Employment & Skills Development

During construction large numbers of unskilled labour, as well as skilled labour although to a lesser extent, will be required. It is envisaged that employment opportunity for approximately 200 people (i.e. unskilled & semi-skilled) will be created. This will contribute to income generation and better livelihoods and also contribute to skills transfer and training. During the operation phase approximately 15 people residing in Karasburg will have to be employed and approximately 60 people on an ad hoc basis for maintenance and cleaning of the PV Modules when required. The project life is envisaged to be 30 years, which is as long as the equipment is warranted. It is important that local people be employed and that the necessary opportunities exist for unskilled labour to undergo on the job training and skills enhancement.

The project will thus have a direct impact on creating much needed employment, again contributing to alleviating poverty and socio-economic upliftment within the Karas Region, which is in line with Vision 2030.

Apart from the direct employment opportunities, a variety of skills development exists within the solar technology, electricity supply and maintenance of the proposed Project. Skills development is expected as part of the on-the-job training that will be done, which is an added benefit to socio-economic upliftment.

4.5.1.2 Economic Spin-offs & Opportunities

The construction phase is expected to create opportunities to various small scale contractors and/or entrepreneurs within the town of Karasburg and Warmbad, as well as //Karas Region. Local businesses will be supported and in so doing poverty in the region can be alleviated to some extent.

4.5.1.3 The project will provide a means for Climate Change Adaptation

//Karas Region is listed amongst Namibia's most vulnerable regions to Climate Change. Climate Change Adaptation is recommended for arid areas that are predicted to become more prone to draught and flood conditions. Acknowledging that change towards a more

resilient lifestyle is required will help vulnerable regions to better cope with changing environmental conditions. A Solar Park will enhance economic development in an environment that is changing to become less suitable for livestock, especially cattle farming. (*MET, 2018*)

4.5.1.4 New Solar Technology

Please refer to Appendix H, I, J and K for the technical details of the equipment that will be installed in SSE. The aim is to make maximum use of the abundant sunlight available, whilst reducing the use of limited water available in Namibia.

4.5.2 CARBON EMISSIONS

The Solar Farm will replace fossil fuel consumption with clean renewable energy at an affordable rate. Over the project life span this amounts to 331 973 tons of reduction in CO^2 emissions (*Rossouw, 2022*). This is in line with Namibia's Energy Policy (See Chapter 4.1) to reduce GHG and cost of electricity supply over vast distances to rural areas.

4.5.3 SECURITY IN SUPPLY OF ELECTRICITY

Please refer to Section 4.1.1 where the National Energy Supply Strategy of Namibia is examined. This project is in line with the strategy to diversify and decentralise electricity supply of low energy levels required across long distances. The use of renewable energy resources such as solar and wind is encouraged. The project will also contribute to the security of electricity supply of Namibia and the SAPP.

4.5.4 OPTIMAL USE OF UNDERUTILISED LAND

Considering the low agricultural potential of this arid area, the proposed Project will result in the optimal utilisation of previously underutilised land that hold little benefit to the current owner.

Through the 35-year lease and development that will take place, the value of this portion of the Farm Schonau No. 126 will be increased.

5 THE AFFECTED ENVIRONMENT

This chapter describes the details pertaining to the larger study area's existing biophysical and socio-economic environments, which defines the sensitivities to be considered during the planning, construction and operation of the Project.

It provides base line information according to which the likely negative and positive impacts of the solar park will be assessed, as well as the significance thereof, which in turn will inform the applicable mitigating measures and need for any further detailed assessments.

A great deal of this chapter is derived from specialist input from the Ecological-, Archaeology- and Agricultural Baseline Assessment, attached as Appendix D, E, and F.

5.1 LOCALITY

The proposed Project Site is located in the southern parts of Namibia, within the //Karas Region, 60 km south-west of //Karasburg Town and 50 km north of the Orange River (refer to Fig. 4.1, Chapter 4).

Schonau Solar Energy (SSE) is envisaged on a portion of the commercial farm, Farm Schönau No. 126. The 200 ha set aside on the farm for this Project is located on a portion within the south-western parts of the mentioned Farm, between the D208 and the existing 132 kV powerline that runs between NamPower's Harib and Khurub sub-stations. The proposed solar park is situated directly to the west of the Harib Substation. (refer to Fig. 5.1)

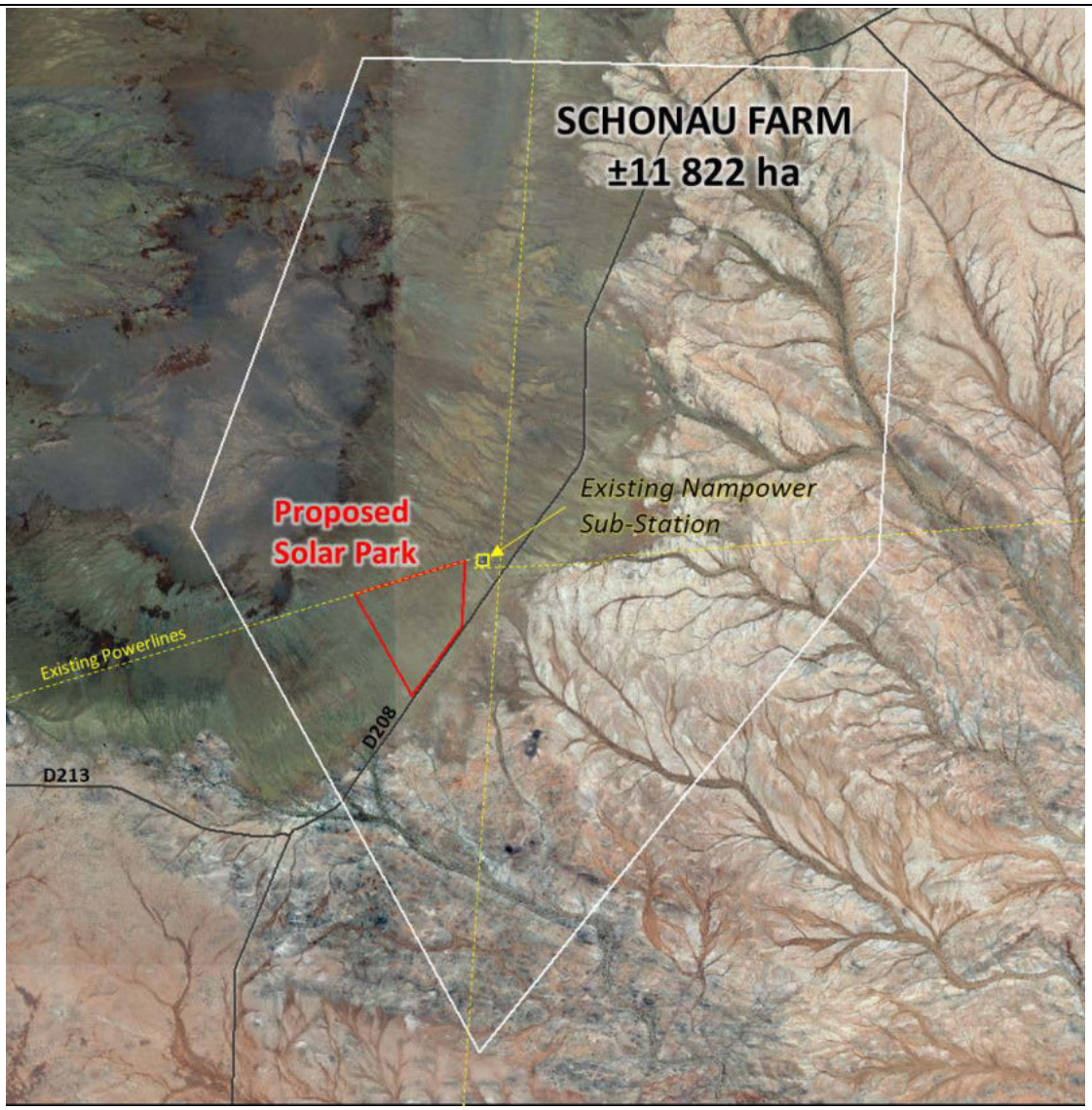

Fig. 5.1 *– Locality of Schonau Solar Energy on Farm Schonau No. 126 (Source: Knight, 2021)*

5.2 PHYSICAL ENVIRONMENT

The project area falls within the *Nama Karoo* Biome, which directly determines the particular bio-physical nature presented in this chapter.

The proposed Project will by its nature impact on the project site's physical character and vice-versa, which again will affect the bio-physical environment.

5.2.1 CLIMATE

5.2.1.1 Temperature

The *Nama Karoo* experience extreme temperature fluctuations with mean lowest 4˚C in June and mean highest 34 ˚C recorded in January. Average winter minimum temperatures are cool to cold and mid-winter temperatures can fall significantly below 0 ˚C. Average summer

temperatures rise extremely and maximum temperatures above 40 ˚C frequently occurs from November to February (*Mendelson et al., 2002*).

Refer to Appendix F - Agricultural Impact Assessment Report Table 1 for recorded climate data of the Project area.

5.2.1.2 Rainfall

Mostly summer rain is experienced in this area, but due to its proximity to the Succulent Karoo Biome it can also experience winter rainfall. The long-term average annual rainfall for the area measured at Karasburg is a mere 128 mm with an annual evaporation rate of 1960 – 2100 mm/year. (*Mendelson et al*., *2002*) The inter-annual variability of rainfall is high, with some years far exceeding annual average and other years, extreme drought may follow. Flash floods do occur, as have been recorded in the past. (*Knight, 2021*)

Refer to Appendix F - Agricultural Impact Assessment Report Figure 9 and 10 for the rainfall map and – graph of the area.

5.2.1.3 Fog

Fog is not common this far inland of the cold Atlantic Ocean and the area experiences approximately between 1 – 5 days with fog during the year (*Mendelson et al*., *2002*).

5.2.1.4 Sunshine and Solar Radiation

Solar radiation is valued at 5,8 – 6 kWh/m^2/day and the average hours of sunshine in the Project area is approximately 9-10 hours per day (*Mendelson et al., 2002*). A Solar Resource Assessment that was conducted by Emesco in 2020 in the //Karas Region determined that the project site is ideal for maximum energy yield (*Rossouw, P. 2021*).

5.2.2 TOPOGRAPHY

The landscape is dominated by large, open valleys of gently sloping ground. Farm Schonau is situated on a relatively flat plain at an altitude of 950 m above sea level, with the Orange River to the south and Karasburg to the north-east. The Farm slopes from an elevation of 952m AMSL in the north-eastern corner of the Project Site towards 912m AMSL near the south-eastern corner (refer to Appendix F – Agricultural Impact Assessment Figure 7 and 8 for topography and slope map).

Surface drainage through the Project site is in a generally north-south direction (refer to Appendix F – Agricultural Impact Assessment Figure 6 for slope directions) (*Knight, 2021*).

5.2.3 HYDROLOGY AND GEOHYDROLOGY

The Project area falls within the Gamchab Basin. This large basin was formed by rivers eroding away the terrain to the north of the Orange River. The perennial Orange River lies approximately 50km to the south of Farm Schonau. The Project area and larger

surroundings thus forms part of the Orange River catchment that drains south-west towards the Atlantic Ocean.

The ephemeral rivers and drainage lines flow and erode the landscape only sporadically after heavy rain falls. The main ephemeral rivers that drain towards the south, southwest and southeast are the Haib, Hom and Ham Rivers and their tributaries (*Cunningham, 2022*).

Conspicuous drainage lines occur on the section of the farm east of the D 208, but prominent drainage lines or erosion gullies are not present on the Project Site itself. (These are visible in Appendix F – Agricultural Impact Assessment Figure 3) The latter is the result of the low rainfall, gentle slope and relatively high infiltration rate of the soil, thus inducing little to no runoff during most rainfall events (*Knight, 2021*). Flooding and erosion on the Project Site itself is thus not envisaged.

Limited volumes of groundwater are available in the basement rocks of the southern Karas Region, since there are no productive aquifers. Elevated salt levels occur in the groundwater and the electrical conductivity is 199 S/m, which limits the suitability of the groundwater for irrigation purposes. Lack of recharge and poor groundwater quality in most areas further aggravates the situation (*Knight, 2021*). The groundwater potential is thus very low and limited.

5.2.4 SOIL

The project site incorporate geology from the Namaqua Metamorphic Complex. The dominant soil type is Eutric Leptosols. These are shallow soils and contain much gravel, with hard rock or cemented calcrete within 30 cm from the surface. (*Mendelsohn et al. 2002*)

General observations made by the Agriculturalist during the site visit suggest that the soils are sandy to sandy loam with a high stone content. (*Knight, 2021*) The water holding capacity is thus low.

5.2.5 ARCHAEOLOGY AND HERITAGE

Archaeological assessment forms the basis of recommended management actions to avoid or reduce negative impacts, as part of the environmental assessment. The study is intended to satisfy the requirements of the relevant legislation and regulations, in which the process of review and clearance may require further, or different mitigation measures to be adopted if required by the National Heritage Council.

The proposed Project Site lies within a narrow strip of Permo-Carboniferous Dwyka tillite forming low eminences with complex braided drainage and little vegetation cover. The harsh climatic conditions of the Nama Karoo severely limited both historical and pre-colonial human settlement.

The general distribution of archaeological records indicates highly dispersed, ephemeral, and low density hunter-gatherer occupation during the last 10 000 years. Pastoral

occupation during the last 2000 years was equally mobile, is range limited by the water and pasture requirements of livestock, and generally characterized by the use of portable huts.

Evidence of human settlement is strongly associated with outcropping bedrock features. Most settlement was concentrated along the course of the perennial Orange River and along drainage lines connecting it with the interior of the country. Evidence further indicate that the vicinity of the proposed Project Site was regularly traversed by wagon traffic from the Orange River northward during the 19th and early 20th centuries. Historical wagon routes are often associated with the isolated graves of those who travelled along them.

No known archaeological sites appear on the proposed Project Site or in the immediate vicinity of it (refer to Appendix E Figure 2, p.8 for the archaeological distribution map).

However, the area may contain some scattered evidence of human occupation and site work might reveal buried and previously unknown archaeological remains. Refer to Appendix E for the Archaeological Study Report.

5.3 BIO-PHYSICAL ENVIRONMENT

The bio-physical environment was studied through a comprehensive literature review (i.e. desktop study) by the Ecologist, as presented in the Ecological Baseline Assessment Report (Appendix D).

The Project Site is located in the semi-arid *Nama Karoo* of southern Namibia and consist of a sparse layer of grass and low shrubs. Overall flora and fauna diversity and endemism is viewed range between “average”, “low” to “extremely low”. (*Mendelsohn et. al., 2002*).

Photo 5.1 shows a view of the environment on the Project Site.

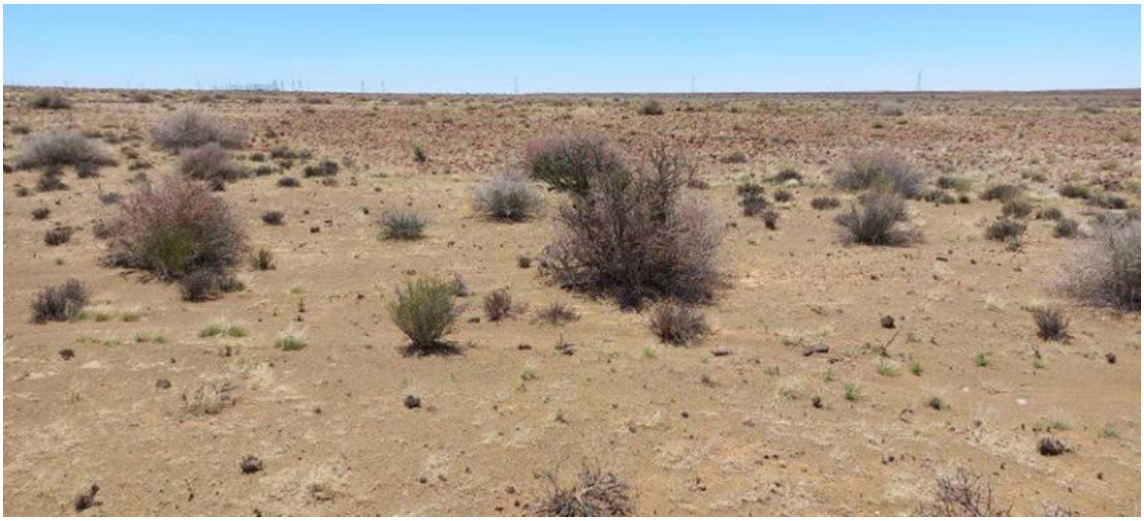

Photo 5.1 – *View of the environment on the Project Site*

5.3.1 FLORA

The vegetation of the area can be described as *Dwarf Shrub Savannah* (*Giess 1971*) or *Karas Dwarf Shrubland* (*Mendelsohn et al. 2002*). The vegetation structure is classified as grasslands and low shrubs (*Cunningham, 2021*).

This vegetation type is underrepresented in the state protected area network of Namibia, with 0-2% coverage in the Naute Recreational Resort and the /Ai-/Ais-Richtersveld Transfrontier Park. (*Barnard 1998*).

The overall plant diversity in the general area is “low” with an estimated 50-149 species. Plant endemism is very low with only 2-5 species expected from the general area. (*Cunningham, 2021*).

5.3.1.1 Trees and Shrubs

At least 61 species of larger trees and shrubs (>1m in height) are known and/or expected to occur in the general area of which 1 species is classified as rare (1.6%), 2 species are classified as endemic (3.3%), 18 species classified as near endemic (29.5%), 17 species are protected by the Forest Act No. 12 of 2001 (27.9%) and 3 species are classified as CITES Appendix 2 species (4.9%) – i.e. 30 species (including endemic and near endemic) have some form of conservation status (49.2%) These species are listed and discussed in the Ecological Baseline Assessment Report Appendix D Chapter 3.5 and Table 5 and 6.

On the Project Site itself, trees are limited due to the absence of drainage lines here. Photo 5.2, 5.3 and 5.4 are some examples of tree and shrub species that occur.

Photo 5.2 – *Parkinsonia africana*

Photo 5.3 – *Boscia albitrunca* – Protected under Forest Act No. 12 of 2001

Photo 5.4 – *Salsola sp.*

5.3.1.2 Grass

Up to 49 grasses are expected in the general area, none of which are viewed as endemic or particularly unique. *Stipagrostis* (8 species) and *Eragrostis* (11 species) species are the dominant grasses expected to occur in the general area.

The grasses known and/or expected to occur in the Project Site area are discussed and listed in the Ecological Baseline Assessment Report in Appendix D Chapter 3.6 and Table 7. None of the grass species is expected to be exclusively associated with the Farm Schönau development site. Photo 5.5 shows grass species that grow on site.

Photo 5.5 – *Stipagrostis sp. growing on the Project Site*

5.3.1.3 Other Species

Aloes

Aloes are protected throughout Namibia and 4 aloe species were identified that may potentially occur in the Project area. These are *Aloe claviflora*, *A. gariepensis*, *A. striata* sp. *karasbergensis* and *A. variegata* (*Cunningham, 2021*).

Photo 5.6 shows an *Aloe claviflora* that occur in the Project area. These may not be damaged or removed without relevant consent (Forest Act No. 12 of 2001, as amended).

Photo 5.6 – *Aloe claviflora*

Commiphoras

Commiphora pyracanthoides may potentially occur in the general area. (*Cunningham, 2021*)

Ferns

Ferns in the general area include at least 5 endemic species (*Cheilanthes capensis, C. deltoidea*, *C. hastate*, *C. kunzei*, *C. robusta*) and 4 indigenous species (*Adiantum capillus-veneris*, *Asplenium cordatum*, *Equisetum ramosissimum*, *Ophioglossum polyphyllum*). (*Cunningham, 2021*)

Lithops

Lithops species – all protected (See Nature Conservation Ordinance No. 4 of 1975) – are also known to occur in the general area and often difficult to observe, especially during the dry season when their aboveground structures wither. At least 4 species of Lithops are expected to occur in the general Warmbad area of which 2 species are expected to occur on the Farm Schonau – *Lithops julii* subsp. *julii* and *Lithops dinteri* subsp. *dinteri* var. *dinteri* – and are all viewed as important. (*Cunningham, 2021*)

Lichens

Lichen diversity is related to air humidity and generally decreases inland form the Namibian coast. There is a possibility that Lichens might occur on the Project Site, mostly on rocky outcrops. (*Cunningham, 2021*) Disturbance in these areas should be kept to a minimum.

Fygies

Aizoaceae (succulents or commonly referred to as “vygies”) are common in southern Namibia, especially south-western Namibia, with many species being protected (see Nature Conservation Ordinance No. 4 of 1975) Fygies are viewed as important from the general area, but they often only emerge after winter rains in the area; have specific habitat requirements and vary in distribution. (*Cunningham, 2021*)

Other

Other species with commercial potential that could occur in the general area include *Citrullus lanatus* (Tsamma melon) which potentially has a huge economic benefit (*Mendelsohn et al. 2002*).

Photo 5.2.7 – *Citrullus ecirrhosus occur on the Project Site*

5.3.2 FAUNA

The general Warmbad area is regarded as “low” in overall diversity (all terrestrial species), while the overall terrestrial endemism is “average” (*Mendelsohn et al. 2002*).

It is estimated that at least 50 reptile, 4 amphibian, 59 mammal, 146 bird species (breeding residents) are known or expected to occur in the general Farm Schönau/Warmbad area of which a high proportion are endemics. (*Cunningham, 2021*)

5.3.2.1 Reptiles

At least 50 species of reptiles are expected to occur in the general Farm Schönau/Warmbad area with 26 species being endemic – i.e. 52% endemic. The 50 species include at least 1 tortoise (100% vulnerable and protected game), 18 snakes (1 blind snake, 1 thread snake and 16 typical snakes) of which 8 species (44.4%) are endemic, 13 lizards of which 7 species classified as endemic (53.8% endemic), 1 plated lizard (endemic), 1 girdled lizard (endemic), 3 agamas (1 endemic), 1 chameleon and 12 geckos of which 8 species (66.7%) are classified as endemic.

All the endemics are, however, classified as “secure” accept for the Bushmanland Tortoise (*Psammobates tentorius veroxii*), which is classified as “vulnerable and protected game” (*Cunningham, 2021*).

Refer to the Ecological Baseline Assessment Report in Appendix D Chapter 3.1 and Table 1 for Reptile species lists.

Snakes and lizards are the most important groups of reptiles expected from the general Farm Schönau/Warmbad area followed by geckos. Geckos expected and/or known to occur here, have the highest occurrence of endemics (66.7%) of all the reptiles in this area. However, none of the reptiles are expected to be exclusively associated with the Farm Schonau development site.

5.3.2.2 Amphibians

At least 4 species of amphibians can occur in suitable habitat in the general Farm Schönau/Warmbad area, i.e. 1 rubber, 1 platanna, 1 caco and 1 sand frog (*Cunningham, 2021*). Of these, 1 species is endemic (*Phrynomantis annectens*), but it occurs widespread in Namibia and is not exclusively associated with the Warmbad area in particular.

The hot water spring situated in Warmbad forms pools and suitable amphibian habitat in the otherwise ephemeral Hom River. Other potential habitats in the area include farm reservoirs and earth dams although the latter are also dependant on localised showers and temporary of nature.

Refer to the Ecological Baseline Assessment Report in Appendix D Chapter 3.2 and Table 2 for Amphibian species lists.

5.3.2.3 Mammals

At least 58 species of mammals can occur in suitable habitat in the general Farm Schonau/Warmbad area of which 7 species (12.1%) are classified as endemic. The Namibian legislation classifies 2 species as rare (*Cistugo seabrae*, *Felis nigripes*), 1 species as indeterminate, 4 species as vulnerable, 1 species as specially protected game, 4 species as protected game, 4 species as insufficiently known, 3 species as huntable game, 4 species as problem animals, 3 species as peripheral, 1 species a migrant and 1 species as invasive alien. At least 37.9% (22 species) of the mammalian fauna that occur or are expected to occur in general Warmbad area are represented by rodents of which 4 species (18.2%) are endemic. This is followed by carnivores with 24.1% (14 species) of which 1 species (7.1%) is endemic and bats with 15.5% (9 species).

The House Mouse (*Mus musculus*) is viewed as an invasive alien species to the area and they are known carriers of “plague” that can cause economic losses.

The most important species expected to occur in the general area are viewed as those classified by the IUCN (2021) as vulnerable i.e. leopard (*Panthera pardus*, small spotted cat *Felis nigripes*) and near threatened i.e. straw-coloured fruit bat (*Eidolon helvum*) and the species classified as rare by the Namibian legislation i.e. Angolan hairy bat (*Cistugo seabrae*) and small spotted cat (*Felis nigripes*).

Please refer to the Ecological Baseline Assessment Report in Appendix D Chapter 3.3 and Table 3 for species list and conservation status.

5.3.2.4 Avifauna

At least 146 species of terrestrial (“breeding residents”) birds occur and/or could occur in the general Farm Schönau/Warmbad area at any time (*Cunningham, 2021*). Only 1 (Rosy-faced Lovebird) of the 14 Namibian endemics are expected to occur in the general area.

55 species (37.7% of all the birds expected) have a southern African conservation rating with 21 species classified as endemic (38.2% of southern African endemics or 14.4% of all the

birds expected) and 34 species classified as near endemic (61.8% of southern African endemics or 23.3% of all the birds expected) (*Cunningham, 2021*).

The most important species expected to occur in the Warmbad area is the one endemic species (Rosy-faced Lovebird) and those species classified as critically endangered (White-backed Vulture), endangered (Ludwig's bustard, Lappet-faced Vulture, Black Harrier, Martial Eagle, Secretary Bird, Booted Eagle, Black Stork), vulnerable (Tawny Eagle and Secretary Bird) and near threatened (Kori Bustard, Verreaux's Eagle, Peregrine Falcon and Marabou Stork). These can all be classified as pylon sensitive species.

Species known to cause nest induced faulting are Cape Crow, Sociable weaver, large Eagles and Vultures. (*Cunningham, 2021*)

Please refer to the Ecological Baseline Assessment Report in Appendix D Chapter 3.4 and Table 4 for species list and conservation status.

5.4 LAND USE AND INFRASTRUCTURE

The general area surrounding the Project Site is predominant agriculture and tourism on freehold land, with some smaller pockets of large-scale and small-scale agriculture on communal land, as well as government and other parastatal uses (*Mendelsohn et al. 2009*).

5.4.1 AGRICULTURAL (FARM SCHÖNAU NO. 126)

Farm Schönau No. 126, on which the Project site for the envisaged solar park is located, is zoned for agricultural use. The Farm is fenced with a standard livestock fence (±1200 mm) and used for cattle grazing. Springbok do occur while resident small game such as steenbok, common duiker and ostrich as well as migrating large game is also expected to occur on the farm (*Knight, 2021*).

Limited to no trees occur here and the grazing and browsing capacity is valued as "average" in the general area (*Mendelson et al., 2002*). A variety of shrubs and some drought-resistant grasses supply limited browse for livestock. Traditionally, sheep and goat were the dominant livestock, but more recently extensive cattle farming has become more prevalent, due to the collapse of the Karakul industry and high predation rates on small stock from leopard, caracal and jackal. The risk of farming is viewed as "average to high" with the carrying capacity calculated as 6 kg/ha or 9 ha /SSU. Livestock farming can only be conducted on a very extensive scale (*Knight, 2021*).

Cultivated agriculture is seen as not a feasible option, since irrigation water is very limited in the area with elevated salt levels (*Knight, 2021*).

The construction and operation of a solar park on agricultural land could potentially have an impact on the agricultural potential and farming activities. The consent of the Ministry of Agriculture, Water and Forestry is required prior to the start of any construction activity. To

this effect an Agricultural Impact Assessment was conducted in November/December 2021. Please see attached as Appendix F.

5.4.2 PROTECTED AREAS

The Karas Dwarf Shrubland vegetation type of the Nama Karoo Biome is underrepresented within the state protected area network, with a coverage of 0-2% (*Barnard 1998*). The Naute Recreational Resort, approximately 170 km north-west of Karasburg, and the /Ai-/Ais-Richtersveld Transfrontier Park, approximately 140 km west of Warmbad, are the only protected areas in the immediate vicinity.

The //Gamaseb communal conservancy is located directly to the north of Farm Schönau with the major wildlife resources viewed as steenbok, oryx and springbok (*NACSO 2022*). No, freehold (commercial) conservancies occur in the immediate area (*Mendelsohn et al. 2002*).

The tourism potential of this area is viewed as relatively low (Mendelsohn *et al. 2002*). The solar park will not interfere with any of the protected areas or any of the tourism routes towards these attractions or border posts. From Karasburg the B3 leads to the border post to South Africa at Ariamsvlei or the C10 to Vioolsdrift. The M21 connects Karasburg to Warmbad, which is known for its warm water springs.

5.4.3 URBAN AREAS

The nearest urban areas to the Project Site is Warmbad approximately 30 km to the east of Farm Schonau and Karasburg, approximately 50 km north of Farm Schonau.

Karasburg is a small town with around 4,000 inhabitants in the Karas Region in southern Namibia and the district capital of the Karasburg electoral constituency. It lies within the heart of the southern Namibian sheep farming industry, which is the main economic drive for the town's existence. It is also an important truck stop for transport vehicles entering Namibia from the South African border and has a number of 24 hour garages and bed and breakfast establishments.

Warmbad served as a missionary since 1805. It is located next to the Hom River and also belongs to the Karasburg electoral constituency. There is no industry in the area and residence survive from old-age pensions and subsistence sheep and goat farming. The majority of Warmbad's inhabitants thus live in abject poverty. The hot springs in Warmbad have been developed into a tourist attraction between 2004 and 2006 and the springs are community property. In 2009 Uranium deposits were discovered in the area. (*Dierks, 2003*)

5.4.4 INFRASTRUCTURE

5.4.4.1 Electricity

The electricity network of the //Karas Region is well distributed to provide in the electricity needs of the region. From the Harib Substation extends a 132 kV OHTL to Rock Substation

in the east and Aurus Substation to the west. A 220 kV OHTL connects Harib Substation to the Kokerboom Distribution Station to the north and connects with the SAPP to the south.

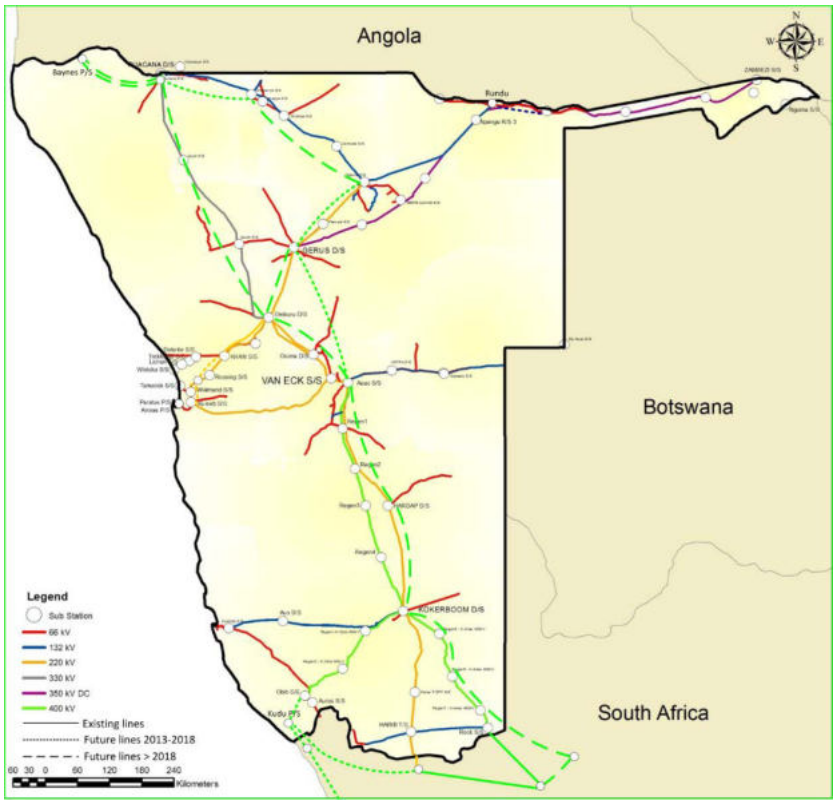

Figure 5.2 – *Electricity distribution map of Namibia (source NamPower)*

5.4.4.2 Roads

The B3 main route from Grunau to the South-African border at Ariamsvlei passes through Karasburg and the C10 connects Karasburg with the South-African border at Vioolsdrift towards Upington. The C11 connects Karasburg with Aroab and Koes. Karasburg is thus well located within in the southern Namibian road network.

A road network exists between Karasburg and Farm Schonau along the D208, Karasburg and Warmbad along the M21 and between Farm Schonau and Warmbad along the D210. Refer to Fig. 4.1 in Chapter 4.3.25.1.

5.4.4.3 Airport

Karasburg has its own airport, the Karasburg Airport: (IATA:KAS) which is used mainly for light aircraft or as an emergency landing strip for larger planes. It is approximately 60 km north-east from the Project Site. Namibia Civil Aviation Regulations (NAMCARs) and Namibia Civil Aviation Technical Standards – Aerodromes and Heliports (NAMCATS -AH) Part 139 and will thus not be applicable for this study.

5.4.4.4 Railway

Karasburg also has an active train station, which is the last significant stop before Upington Station across the border into South-Africa.

5.4.4.5 Reservoir

Approximately 7 km to the west of Karasburg is the Bondels Dam, built in 1959. It dams the Satco River and was built to enhance the recharge of the Bondels Dam aquifer. It has a capacity of 1.105 million cubic metres.

5.5 VISUAL AESTHETICS AND SENSE OF PLACE

The visual aesthetics and as a result the sense of place, correlates with the land uses and related infrastructure. In the Project area land use include extensive agriculture and tourism in large undeveloped open landscape.

The visual aesthetics of the area is that of extensive arid farmlands covered in low shrubs and some grass, which gives it a unique desolate sense of place that might be disturbed by solar- and electricity transmission development. (See Photo 5.8)

Photo 5.8 – *Sense of Place of Farm Schonau and area*

However, the Project Site identified for Schonau Solar Energy is directly next to the existing Harib Substation of NamPower where land use has been converted to infrastructure development. The Harib Substation accommodates a 220 kV Overhead Transmission Line (OHTL) running north-south and a 132 kV OHTL running east-west (Photo 5.9). The Substation and powerlines are visible from the D208.

Photo 5.9 – *Existing electricity development next to the Project Site*

The visual aesthetics and sense of place in the abutting area is thus already altered to an electricity transmission network. The envisaged solar farm will lie directly adjoining this area to the west (Photo 5.10 shows the envisaged area (central in photo) for SSE with Harib Substation visible bottom centre)

Photo 5.10 – *Area allocated for Schönau Solar Energy (centre of photo)*

The //Karas Region is the southern-most region of Namibia and is the largest region per square kilometre. It has a population of 77 421 with a population density of 0.5 persons per square kilometre, which makes it the least densely populated of the 14 regions of Namibia. The Project Site falls within the Karasburg Constituency, and is, apart from the

Keetmanshoop Urban Constituency, the 2nd highest populated within the //Karas Region (*Namibia Statistics Agency, 2014*).

The Region has seen a slight increase in population numbers since 2001, with 63% of the total population being within the 15 – 59 year age group. This statistic predicted an increase in the demand for employment, food, housing, etc. within the Region for the years to come. The literate adult population in the Region is 96.6 % and in the Karasburg Constituency it is 97.3%.

The majority (32.4%) of the work force are employed in the Agricultural sector (which also includes Fishing near the coast and Forestry), followed by 'Mining and Quarrying' (8.9%). Wholesale and Retail Trade, as well as construction companies each employed about 6 % of the workforce. Unemployment within the Region (32.2%), being slightly lower than the National average (36.9%), increased with 11% since 2001. The largest source of income remains wages and salaries, representing 72% of the population within the Region (*2011 Census*). Rural to urban migration increased since 2001, mainly due to young adults in search of job opportunities.

About 42 % of households in //Karas Region rely on electricity from the main grid as the main source of energy for cooking and 67.2 % for lighting.

6 PUBLIC CONSULTATION

Public consultation and participation are an important aspect of an EA process. During public consultation, potential impacts that the proposed project may have on the natural and/or socio-economic environments, were identified. Consultation with Interested and Affected Parties (I&APs) and relevant Authorities enables transparent decision-making.

This chapter describes in detail the full extent of the public consultation process that was followed and the I&APs and authorities that were notified of the study being undertaken. It also includes the main issues and concerns raised during the public consultation process and comments received on the Background Information Document (BID) distributed during the first round of public consultation.

Public consultation for the purposes of this project was done as prescribed by Regulations 21 to 24 of the Environmental Impact Assessment Regulations (GN. 30 of 2012).

6.1 PUBLIC ENGAGEMENT

6.1.1 FIRST ROUND OF CONSULTATION

Engagement with the public and authorities as part of the first round of public consultation commenced on the 11th of November 2021 and concluded on the 2nd of December 2021. During the first round of consultation, I&APs and authorities were given an opportunity to register and submit comments and/or concerns on the proposed project.

6.1.1.1 Activities of Public Engagement

Activities undertaken to date to ensure effective and adequate I&AP involvement, are as follows:

- A list of predetermined I&APs and authorities was compiled. A total of 51 I&APs were included on the database (Appendix G1).
- A notification email (Appendix G2) with Background Information Document (BID) (Appendix G3) was send to all pre-identified I&APs and authorities (Appendix G1) on 11 November 2021.
- Notification letters (Appendix G4) with BID (Appendix G3) was hand delivered on 11 November 2021 (Appendix G5) to line ministries (Appendix G1) and State Owned Enterprises situated in Windhoek.
- Notification letters with BID (Appendix G3) was sent via courier (Appendix G6) to the Regional and Local Authorities (Appendix G7) on 11th November 2021.
- Notification letters (Appendix G8) with BID (Appendix G3) was sent via registered post (Appendix G9) to the neighbouring farm/property owners on 11th of November 2021.

- Public notices announcing the commencement of the EA and an invitation to register as an I&AP were placed in 'Die Republikein' and 'Namibian' on 11 November 2021 and 18 November 2021 (Appendix G10).
- A notice board (with the dimensions 60cm x 42cm) was placed at the //Karas Regional Council (Appendix G11) and at the Karasburg East Constituency office notice board (Appendix G11). An On-site notice was placed at the Farm Schönau No. 126 gate entrance area (Appendix G12).

6.1.1.2 Comments Received and Responses Provided

All comments and feedback received from I&APs and Authorities are summarised in Table 6.1 below, while a copy of the original correspondence is attached as Appendix G13 and Appendix G14. A total of 2 I&AP were registered (Appendix G15).

Table 6.1: *Comments received during the first round of public consultation*

NO.	NAME	COMMENTS	NAME	RESPONSE
1.	//Karas Governor`s Office secretary – Adnaan Boois (11/11/2021)	Noted with thanks. Adnaan Boois	Urban Green cc	
2.	Ministry of Urban and Rural Development – Frieda Sindano (12/11/2021)	Dear Ms. Bashir We acknowledge, with thanks, receipt of your letter dated 11 November 2021 on the above-captioned subject matter. Your letter has been forwarded to Mr. Big Don Kondunda, Director: Habitat and Housing Development for his required attention and action. Mr. Kondunda can be reached at 061 297 5062/5017 and email dkondunda@murd.gov.na. Frieda Sindano Control Administrative Officer Tel: 061 – 297 5283 / Fax: 061 – 258131/ Email: fsindano@murd.gov.na	Urban Green cc	
3.	NamWater CEO Secretary – Debbie Benade (02/12/2021)	Dear Ms Bashir, Please receive attached letter. Thanks and regards, Debbie	Urban Green cc (02/12/2021)	Dear Debbie, Your email below refers. NamWater has been registered as an Interested and Affected Party and will be kept informed throughout the project.

NO.	NAME	COMMENTS	NAME	RESPONSE
				Kind regards Julia L. Bashir
	NamWater CEO – Mr Abraham Nehemia (26/11/2021)	Dear Ms Bashir RE: APPLICATION FOR AN ENVIRONMENTAL CLEARANCE CERTIFICATE FOR THE PROPOSED SCHÖNAU SOLAR ENERGY PARK ON FARM SCHÖNAU NO. 126, KARASBURG DISTRICT, //KARAS REGION 1. With reference to the latter dated 11 November 2021, NamWater has no comments on the above-mentioned project at the moment. 2. Thank you for the Background Information Document. Please register NamWater as an I&AP with the following contact details: NP du Plessis Plessisn@namwater.com.na 081 127 9040 Jolanda Kamburona KamburonaJ@namwater.com.na 081 144 1528 Please forward all the relevant documents to us. Yours sincerely, Abraham Nehemia (MR) Chief Executive Officer	Urban Green cc	

6.1.2 SECOND ROUND OF CONSULTATION

Engagement with the public and authorities as part of the second round of public consultation commenced on the 4th of April and concluded on the 11th of April 2022. During the second round of consultation, I&APs and authorities were given an opportunity to submit comments on the Draft Scoping Report.

6.1.2.1 Activities of Public Engagement

Activities undertaken during the 2nd round to ensure effective and adequate I&AP involvement, are as follows:

A notification email (Appendix G16) informing all affected authorities and registered I&APs of the availability of the Draft Scoping Report and request for comment was distributed on 4 April 2022. The proof of successful delivery of emails is attached as Appendix G 17.

6.1.2.2 Comments Received and Responses Provided

All comments and feedback received from I&APs and Authorities are summarised in Table 6.2 below, while a copy of the original correspondence is attached as Appendix G18.

Table 6.2: *Comments received during the second round of public consultation*

NO.	NAME	COMMENTS	NAME	RESPONSE
1.	Karasburg East Constituency – Control Admin Officer B. Waterboer (05/04/2022)	Good Day Thank you for informing us. Please submit an Electronic Copy of the ESA for our records. Regards	Urban Green cc (05/04/2022)	Dear Mr Waterboer, Your email below refers. Find attached the electronic copy of the draft ESA Report (without appendices) for the Schönau Solar Energy Park, //Karas Region. Please confirm receipt of the ESA Report. Thank you. Kind regards Julia L. Bashir Urban Green cc
2.	NamWater Ms Jolanda Kamburona (05/04/2022)	Dear Julia, Kindly send me the electronic copy of the ESR. Regards, Jolanda	Urban Green cc (05/04/2022)	Dear Jolanda, Your email below refers. Find attached the electronic copy of the draft ESA Report (without appendices) for the Schönau Solar Energy Park, //Karas Region. Please confirm receipt of the ESA Report. Thank you. Kind regards Julia L. Bashir Urban Green cc

NO.	NAME	COMMENTS	NAME	RESPONSE
	NamWater Ms Jolanda Kamburona (06/04/2022)	Dear Julia, Received, thank you. Regards, Jolanda		

7 ASSESSMENT OF ENVIRONMENTAL ISSUES, POTENTIAL IMPACTS AND MITIGATIONS

This chapter provides a description and assessment of the key issues of concern and potential impacts associated with the construction of the solar farm (i.e. the Project). Mitigation measures relevant to the planning, design, construction, operational and decommissioning phases of the Project as appropriate are recommended. These measures are aimed at avoiding, minimising, or rehabilitating negative impacts or enhancing potential benefits. The significance of potential impacts without and with mitigation is also provided.

The Environmental Assessment Process consisted of two phases, the first being the screening phase and the second the scoping phase, as explained below.

7.1 SCREENING PHASE METHODOLOGY

Each of the potential impacts identified during public consultation and the scoping assessment was screened according to a set of questions (Figure 7.1), which resulted in those impacts not requiring further assessment (see Section 7.1.1 and 7.1.2 below) and those impacts requiring further assessment (see Section 7.2.)

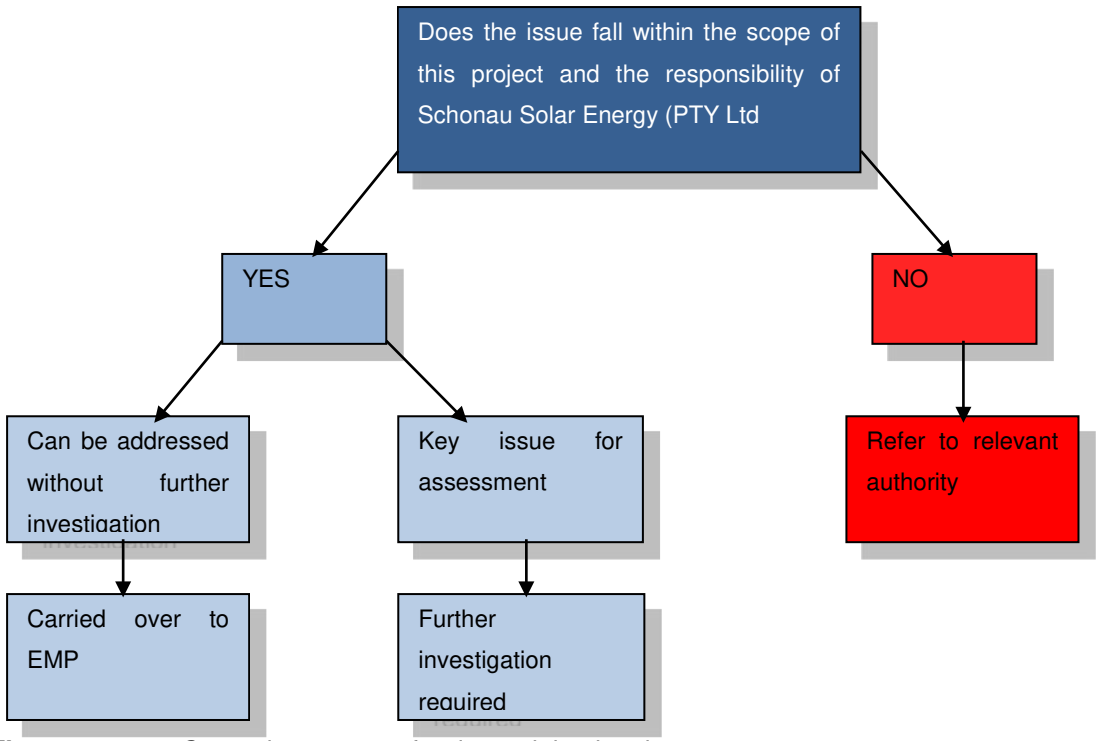

Fig. 7.1: *Screening process for determining key impacts*

7.1.1 IMPACTS NOT REQUIRING FURTHER ASSESSMENT

The following impacts where identified as to not have any negative impact (i.e. positive impacts) or minor impacts not of any significance not requiring further assessment.

7.1.1.1 National and International Strategies and Policies

This project is in line with the mentioned strategies and policies (see section 4.1) to give energy access and promotion of economic development by increasing the availability of clean energy via the SAPP to southern Africa.

7.1.1.2 Reduction in Green House Gas Emissions

Schonau Solar Energy will reduce the annual GHG's emitted in the production of utility supplied power in the region by 331 973 t CO^2 compared to conventional energy generation. The project will contribute positively to the positively to the increased use of green energy, whilst decreasing the GHG emissions in Namibia.

7.1.1.3 Reduced Dependency on Water

The particular solar technology used and required cleaning method enables as reduction in the use of water for purpose of cleaning the PV panels (see section 4.3.3)

7.1.1.4 Socio-economic Benefits

The proposed Project holds various direct and indirect socio-economic benefits for both the local people of Karasburg/Warmbad area and the //Karas Region. (see section 4.5.1)

7.1.1.5 Climate Change

//Karas Region is listed amongst Namibia's most vulnerable regions to Climate Change. Climate Change Adaptation is recommended for arid areas that are predicted to become more prone to draught and flood conditions. Acknowledging that change towards a more resilient lifestyle is required will help vulnerable regions to better cope with changing environmental conditions. A Solar Park will enhance economic development in an environment that is changing to become less suitable for livestock, especially cattle farming. (MET, 2018)

7.1.1.6 Loss of Agricultural Land

The Agricultural Impact Assessment concluded that that the portion of land (i.e. of the Farm Schonau No. 126) is insignificant with respect to the total size of the farm, and that impact on farming activities is negligible (see Appendix F and Section 5.4.1).

7.1.1.7 Loss of Protected Areas

None of the region's protected areas are affected by the activities or location of the proposed Project. (see section 5.4.2)

7.2 SCOPING ASSESSMENT METHODOLOGY

This list of impacts that were subjected to a scoping assessment is presented in Table 7.2 and 7.3, as per the evaluation criteria presented in Table 7.1 below.

The key impacts, identified after carrying out screening (see Section 7.1 above), were evaluated in terms of extent (spatial scale), duration (time scale), intensity (magnitude) and probability. The means of arriving at the different significance ratings is explained in Table 7.1 below.

These criteria are used to ascertain the significance of the impact, firstly in the case of no mitigation and then with the most effective mitigation measure(s) in place. The significance of an impact is derived by considering the temporal and spatial scales and magnitude. Such significance is also informed by the context of the impact, i.e. the character and identity of the receptor of the impact.

Table 7.1: *Criteria for impact evaluation*

CRITERIA	CATEGORY
Impact	This is a description of the expected impact
Nature	**Positive** – environment overall will benefit from the impact **Negative** – environment overall will be adversely affected by the impact **Neutral** – environment overall will not be affected
Extent	**Site Specific:** Expanding only as far as the activity itself *(onsite)* **Local:** Restricted to immediate environment within 5 km of the site **Regional:** Within the Karas region **National:** Within Namibia
Duration	Reviews the lifetime of the impact, as being - **Very short** – days, <3 days **Short** - days, <1 month) **Medium** - months, <1 year **Long** - years, 1 -10 years **Permanent** - >10 years
Intensity	Establishes whether the magnitude of the impact is destructive or innocuous and whether it exceeds set standards, and is described as –

CRITERIA	CATEGORY
	None (No environmental functions and processes are affected); **Low** (Environmental functions and processes are negligibly affected); **Medium** (Environment continues to function but in a noticeably modified manner); **High** (Environmental functions and processes are altered such that they temporarily or permanently cease and/or exceed legal standards/requirements).
Probability	Considers the likelihood of the impact occurring and is described as – **Improbable** (low likelihood), **Probable** (distinct possibility), **Highly probable** (most likely) or **Definite** (impact will occur regardless of prevention measures).
Significance (no mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design) **Moderate** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a "no go" implication for the project unless mitigation or re-design is practically achievable)
Mitigation	Description of possible mitigation measures
Significance (with mitigation)	**None** (A concern or potential impact that, upon evaluation, is found to have no significant impact at all) **Low** (Any magnitude, impacts will be localised and temporary. Accordingly, the impact is not expected to require amendment to the project design) **Moderate** (Impacts of moderate magnitude locally to regionally in the short term. Accordingly, the impact is expected to require modification of the project design or alternative mitigation) **High** (Impacts of high magnitude locally and in the long term and/or regionally and beyond. Accordingly, the impact could have a "no go" implication for the project unless mitigation or re-design is practically achievable)

CRITERIA	CATEGORY
Confidence level	The degree of confidence in the predictions, based on the availability of information and specialist knowledge. **Low** (based on the availability of specialist knowledge and other information) **Medium** (based on the availability of specialist knowledge and other information) **High** (based on the availability of specialist knowledge and other information)

The decision as to which combination of alternatives and mitigation measures to apply lies with the proponent, and their acceptance and approval ultimately with the relevant Competent Authority.

7.3 MITIGATION APPLICATION METHODOLOGY

There is a hierarchy of actions which can be undertaken to respond to any development or activity. These cover avoidance, minimisation and compensation. It is possible and considered sought after to enhance the environment by ensuring that positive gains are included in the development. If negative impacts occur then the hierarchy, as a guiding philosophy, recommends the following steps.

Impact avoidance: This step is most effective when applied at an early stage of project planning. It can be achieved by:

1. Not undertaking certain actions or elements that could result in adverse impacts;
2. Avoiding areas that are environmentally sensitive; and
3. Putting in place preventative measures to stop adverse impacts from occurring.

Impact minimisation: This step is usually taken during impact identification and prediction to limit or reduce the degree, extent, magnitude, or duration of adverse impacts. It can be achieved by:

4. scaling down or relocating the proposal;
5. redesigning elements of the project; and
6. implementing mitigation measures to manage the impacts.

Impact compensation: This step is usually applied to remedy unavoidable residual adverse impacts. It can be achieved by:

7. rehabilitation of the affected site or environment, for example, by habitat enhancement;
8. restoration of the affected site or environment to its previous state or better; and

9. replacement of the same resource values at another location (off-set), for example, by wetland engineering to provide an equivalent area to that lost to drainage or infill.

7.4 POTENTIAL IMPACTS IDENTIFIED AND ASSESSED

The information presented in this section has mainly been drawn from the Proponent's information regarding the proposed development, specialist studies and public engagement that was undertaken as part of this phase of the EIA process.

For this assessment's purpose the issues and impacts identified are grouped according to the main development phases – i.e. construction phase, operational phase and decommissioning phase.

7.4.1 POSSIBLE IMPACTS DURING CONSTRUCTION PHASE

Table 7.2 presents the potential impacts that might occur during the construction phase of the Project, while Table 7.2.1 to Table 7.2.11 presents each potential impact and outcome in detail.

All impacts can be viewed as negative, unless otherwise mentioned. Positive impacts have been listed in Section 7.1 above, during the screening exercise.

Table 7.2 *Potential impacts to consider during Construction phase:*

IMPACT	CAUSE	
Loss of Biodiversity and Habitat Destruction	Vegetation Clearing	Tracks and roads on site
		Construction of 3 Buildings
		Drilling of steel posts for solar module mounting
		Trenching to lay cables
		Erection of field transformers and substation
		Erection of power line
	Forced relocation	Noise and vibration
	Illegal removal of protected plants	
	Poaching	
	Interference with small animal movement & electrocution	Security fence
Archaeological and Heritage	Removal and/or	Tracks and roads on site

Resources	disturbance	Construction of 3 Buildings
		Drilling of steel posts for solar module mounting
		Trenching to lay cables
		Erection of field transformers and substation
		Erection of power line
Ground and Surface Water Pollution	Construction waste water (concrete batching) Temporary sewage Construction waste Hazardous material & liquid disposal	
Littering	Building rubble and general waste	
Natural Resource Usage (water & energy	Consumption for concrete works and roads	
Socio-economic	Health, Safety & Security	Dust and Emissions
		Noise and vibration
		Traffic & pedestrian safety
		Theft

7.4.1.1 Loss of Biodiversity and Habitat Destruction

As all developments have potential negative environmental consequences, identifying the most important faunal species including high risk habitats beforehand, coupled with environmentally acceptable mitigating factors, lessens the overall impact of such development.

(a) Flora

Removal of some of the natural vegetation cover are inevitable to make way for the roads, steel poles, buildings, field transformers, substation and cables. The permanent shadow under the PV solar panels might also have an influence on the vegetation beneath.

The impact during construction, are expected to be detrimental to larger trees/shrubs, especially if it damages protected species associated with the area. Various protected tree/shrub species occur in the general area (refer to Tables 5 and 6 of the Ecological Baseline Assessment Report in Appendix D) and these species, especially the larger specimens, should be avoided as they potentially serve as habitat to a variety of vertebrate

fauna. Also refer to the Forest Act for tree harvesting limitations – i.e.18cm diameter, 100m from streams, etc. (*Cunningham, 2021*)

These negative impacts would depend on the scale and intensity of the proposed development. In relation to the whole farm Schonau of 11 822 ha this would, however, affect a relatively small area (~200ha) over a short/limited period of time. Since Farm Schonau has already been impacted by current/past small stock farming activities, fencing, NamPower Substation and transmission lines, gravel roads, etc. it is not in a pristine condition. The 200 ha Project Site does not have any major unique habitats, due to the absence of rocky areas or ephemeral drainage lines here.

The findings of the Ecological study were that the proposed development area is not expected to impact the *Karas Dwarf shrubland* as a whole, and/or any unique spp. due to the location of the site.

Site lay-out should be done within a carefully planned and responsible manner to avoid unnecessary removal of ground cover or any protected species, as per the Forest Act (No. 12 of 2001, as amended).

Mitigation measures are suggested in Table 7.2.1

Table 7.2.1: *Impact assessment pertaining to loss of biodiversity and habitat destruction (flora)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction**
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Low
Probability	Highly probable
Significance (no mitigation)	Low
Mitigation	<u>Flora:</u> Draft a Search and Rescue Management Plan inclusive of a monitoring section. Obtain permit from Ministry as per Forest Act if protected plant species must be removed. Nobody may enter possible sensitive habitat areas (rocky areas/ephemeral drainage lines) outside of the project area; No collection, removal and/or damaging of unique plants or protected flora (e.g. various *Aloe* and *Lithop* species); Avoid introducing ornamental plants, especially potential invasive alien species, but rather use localised indigenous species, should landscaping be attempted, which would also require less

CRITERIA	DESCRIPTION
	maintenance (e.g. water); Remove all invasive alien species on site – e.g. *Prosopis* spp., etc. – should these occur. This would not only indicate environmental commitment, but actively contribute to a better landscape; Inform contractors/workers regarding the above mentioned issues prior to construction activities and monitor for compliance thereof throughout; Rehabilitate all areas disturbed by the construction activities – i.e. camp sites, etc.; Ensure that adequate fire-fighting equipment (e.g. fire beaters; extinguishers, etc.) is available; Make use of existing tracks/roads as much as possible on the project area; Do not drive randomly throughout the area (could cause damage to unique flora, accidental fires or erosion related problems, etc.); Implement and maintain off-road track discipline with maximum speed limits (e.g. 30km/h) as this would result in fewer faunal mortalities and limit dust pollution; Where new tracks have to be made off the main routes, the routes should be selected causing minimal damage to the environment – e.g. use the same tracks; cross drainage lines at right angles; avoid placing tracks within drainage lines; avoid collateral damage (i.e. select routes that do not require the unnecessary removal of trees/shrubs, especially protected species). Draft a Post Construction Rehabilitation and Management Plan, which should include monitoring; Implement erosion control measures where applicable.
Significance (with mitigation)	Low – Very low
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended

(b) Fauna

The impact during construction on reptiles and small mammals associated with the affected area/habitat are expected to be detrimental. Tortoises are viewed as the group of reptiles most under threat and *Psammobates tentorius veroxii* probably the most important reptile expected in the area followed by *Bitis xerophaga*. This would, however, affect a relatively small area (~200ha) over a short/limited period of time.

It is not expected that the impact on amphibians will be detrimental, since none of the amphibians are expected to be exclusively associated with the Farm Schonau development site.

During construction there will be an increased movement and damage by people and vehicles to the natural habitat of these species. Track discipline must be strictly adhered to as far as possible to act as mitigation measure for important slow moving, especially nocturnal, reptiles, amphibians and mammals.

Some mammals – e.g. small-spotted genet, mongoose – are attracted to the substations and on-pole-mounted switching gear probably for foraging and heat and may cause problems at these structures. This could be mitigated by electrostatic animal and/or squirrel guards on the bushings. Other mammals that could be affected by the electrical infrastructure are baboons, which often get electrocuted by various types of infrastructure. Pole mounted transformers and bushings can be insulated and/or substations could be equipped with electric fencing to prevent baboons entering such areas.

Table 7.2.2: *Impact assessment pertaining to loss of biodiversity and habitat destruction (fauna)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction**
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Low
Probability	Highly probable
Significance (no mitigation)	Low
Mitigation	Fauna: Draft a Search and Rescue Management Plan for slow moving vertebrate fauna (e.g. tortoises, chameleon, snakes, etc.) prior to construction. Select storage site for building material, temporary ablution, office building and/or camp sites and other temporary lay over sites with care to avoid important habitats; Select the same site for all of the above to make the footprint of damage as small as possible; Use portable toilets to avoid faecal pollution around camp sites; Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios – e.g. baboon, black-backed jackal, crows, etc.; Do not drive randomly throughout the area (could cause mortalities

CRITERIA	DESCRIPTION
	to vertebrate fauna); Avoid off-road driving at night as this increases mortalities of nocturnal species; Avoid and/or limit the use of lights during nocturnal exploration activities as this could influence and/or affect various nocturnal species – e.g. bats and owls, etc. Use focused lighting for least effect; Prevent the killing of species viewed as dangerous – e.g. various snakes – when on site; Prevent the setting of snares for ungulates (i.e. poaching), collection of veld foods (e.g. tortoises, chameleon, etc.) and or any form of illegal hunting activities; Avoid introducing dogs and cats as pets to office/camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs); Liaise with MET staff and Ecologist regarding ecology related problems/questions on the Project Site; Employ an environmental officer to ensure compliance, especially of the rehabilitation of all the affected areas. Introduce genet and baboon mitigation measures (e.g. cover bushings and/or electrify perimeter fence although not lower than 20cm from the ground so as to avoid tortoise mortalities, etc.); Initiate a mammal electrocution monitoring programme after construction to determine “high risk” areas so as to mitigate these areas as well once identified; Remove and relocate slow moving vertebrate fauna (e.g. tortoises, chameleon, snakes, etc.) to suitable habitat elsewhere in area; Do not electrify strands around the solar plant lower than 20cm from the ground as this could result in tortoise mortalities.
Significance (with mitigation)	Low - None
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended

(c) Avifauna

Bird species, especially *ground nesting species* associated with the affected area/habitat can be detrimentally affected during construction of the solar park.

Loss of avifauna through collision with power lines is a reality that accompanies power lines. The effect of aboveground transmission line infrastructure is expected to be detrimental to "pylon sensitive species" mentioned in Chapter 5.3.2.4 and also include:

- Birds flying at pylon height – e.g. bustards, swifts, sandgrouse, ravens and raptors species.
- Birds with nocturnal transients – e.g. Palaearctic migrants and wetland birds towards riverine area.
- Birds attracted to the area during rainfall events – e.g. bustards – and temporary water sources in ephemeral rivers/drainage lines – e.g. aquatic/marine species.
- Other potential transmission line issues related to birds would be species that typically nest on such structures.

The following factors influence the collision risk for birds:

- Voltage levels – i.e. correlation between physical size of bird and collision risk;
- Horizontally configured designs experience more problems with bird streamers than vertically configured designs probably due to birds perching/roosting closer to the conductors increasing the probability of flashovers;
- Body size and flight behaviour – i.e. birds with a heavy body size and small wing surface are more prone to collisions;
- Flight height and habitat use – i.e. short distance, low altitude, frequency of overhead structures;
- Age (i.e. young birds more prone to collisions);
- Resident versus migratory birds (i.e. movement into unfamiliar terrain increases collisions);
- Weather (i.e. inclement weather increases collisions);
- Time of day (i.e. nocturnal movement increases collisions);
- Land use (i.e. cultivated areas attract birds); and
- Topography (i.e. mountains/rivers/shorelines act as corridors).

The Ecology study determined that the proposed development site is not expected to fall within a major bird flyway. The internal powerline will run parallel to the existing 132 kV powerline to the Harib Substation. The alignment of the project power line along the existing line should make the obstacle more visible and reduce incidence.

The Ecology study concluded that none of the unique/important species are exclusively associated with the proposed development area.

Table 7.2.3 below presents the comprehensive assessment outcome.

Table 7.2.3: *Impact assessment pertaining to loss of biodiversity and habitat destruction (avifauna)*

CRITERIA	DESCRIPTION
Risk Event	**Loss of Biodiversity and Habitat Destruction (Avifauna)**
Nature of Impact	Negative
Extent	Local
Duration	Long
Intensity	Low
Probability	Highly probable
Significance (no mitigation)	Low
Mitigation	Avifauna: Introduce bird avoidance mechanisms – e.g. bird flight diverters such as flappers, coils, etc. – at bird collision risk areas and along movement corridors; Powerline design – e.g. vertical figured designs have less "flashover" problems from bird streamers (faeces) than horizontally figured designs; Initiate a bird collision monitoring programme after construction to determine "high collision" areas so as to mitigate these areas as well once identified.
Significance (with mitigation)	Low - None
Confidence level	Medium
Legal Implications	Nature Conservation Ordinance No. 4 of 1975, as amended Forest Act No. 12 of 2001, as amended

The actual development area (footprint) will be relatively small and therefore only have localised negative impacts to the environment and associated flora and fauna during a short period of time. The impact associated with habitat destruction and loss of biodiversity is expected to have a ***low*** significance rating prior to mitigation and ***low – none*** after mitigation.

7.4.1.2 Archaeological and Heritage Resources

While there are no known archaeological sites on the proposed solar plant site, it is possible that site work will reveal previously unknown archaeological remains. In the event that buried archaeological remains are detected, which are not visible to surface survey, it must be handled in accordance with the provisions of Part V Section 46 of the National Heritage Act (27 of 2004). The "chance finds" procedure covers the actions to be taken from the discovery of a heritage site or item, to its investigation and assessment by a trained archaeologist or other appropriately qualified person. This process involves the following:

Responsibility:

Operator To exercise due caution if archaeological remains are found

Foreman To secure site and advise management timeously

Superintendent To determine safe working boundary and request inspection

Archaeologist To inspect, identify, advise management, and recover remains

Procedure:

Action by person identifying archaeological or heritage material:

a) If operating machinery or equipment stop work;

b) Identify the site with flag tape;

c) Determine GPS position if possible;

d) Report findings to foreman.

Table 7.2.4 below presents the assessment and suggested mitigation.

Table 7.2.4: *Impact assessment pertaining to Archaeological and Heritage Resources*

CRITERIA	DESCRIPTION
Risk Event	Archaeological and Heritage Resources
Nature of Impact	Neutral
Extent	Site specific
Duration	Medium
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	Caution should be exercised during the construction phase if archaeological/heritage remains are discovered during the excavations. The Environmental Site Manager should receive training by a suitably qualified archaeologist with respect to the identification of archaeological/heritage remains and the procedures to follow should such remains be discovered during construction. Any archaeological materials found should be reported to the Environmental Site Manager and the National Monuments Council, and all on-site activities stopped immediately. Details with regards to the procedure to follow is defined in the EMP
Significance (with mitigation)	None
Confidence level	High
Legal Implications	National Heritage Act (Act 27 of 2004), as amended

The probability of locating important archaeological/heritage remains during the construction phase of the development is unlikely. The impact rating associated with such an event is therefore considered to be ***low*** before mitigation and ***low-none*** after mitigation.

7.4.1.3 Ground and Surface Water Pollution

Prominent drainage lines or erosion gullies are not present on the Project Site. The latter is the result of the low rainfall, gentle slope and relatively high infiltration rate of the soil, thus inducing little to no runoff during most rainfall events. (*Knight, 2021*)

Construction activities are, however, associated with a variety of potential pollution sources (i.e. cement, oils, diesel, chemicals, paints, etc.), either having a direct and immediate impact or indirect and longer-term impact. As a single incident, for the downstream ground water to be contaminated, exceptionally large quantities of pollutants will have to be released into the environment, of which the volumes are not associated with this type of development. Although, however small these potential sources of pollution might be, it still requires special attention (i.e. planning, control and management) to avoid any potential pollution of the immediate environment and contributing to the cumulative pollution impacts on downstream resources. Consideration should be given to controlling potentially harmful impacts on surface and groundwater while 'best' practice measures are applied to minimise the potential for discharges of pollutants to nearby receiving drainage channels to the south of the project site.

Table 7.2.5 below presents the comprehensive assessment outcome.

Table 7.2.5: *Impact assessment pertaining to Ground and Surface Water Pollution*

CRITERIA	DESCRIPTION
Risk Event	**Ground and Surface Water Pollution**
Nature of Impact	Negative
Extent	Local
Duration	Short
Intensity	Low
Probability	Improbable
Significance (no mitigation)	Low
Mitigation	Draft and implement a Construction Waste Management Plan to be maintained for the duration of the construction phase. Waste should be stored in appropriate containers in an appropriately constructed area protected against exposure to high intensity rainfall. Waste should be frequently disposed of. Storage and service areas must be sited in areas away from the alluvial sediments and / or drainage channels. Storage of any material or substance that may cause pollution to water sources should be safely handled and stored in accordance with appropriate legislation. Contractor should submit a Method Statement for the purpose of handling and storage of hazardous materials on-site.

CRITERIA	DESCRIPTION
	A Storm Water Management Plan should be drafted to be maintained for the duration of the construction time frame. Ensure proper maintenance of all construction vehicles and equipment and conduct continuous maintenance and check-ups. Draft and implement a Detailed Preparedness and Emergency Plan for all construction related spillages. Ensure that oil/ fuel spillages from construction vehicles and machinery are minimised and that where these occur, that they are appropriately dealt with. Polluted soil and building rubble must be transported away from the site to an approved and appropriately classified waste disposal site. Polluted soil must be remediated where possible. Drip trays must be placed underneath construction vehicles when not in use to contain all oil that might be leaking from these vehicles. All fuel tanks must be bunded to 120% of the capacity of the tank to contain any spillages that might take place. Washing of equipment should not be allowed on site. Should it be necessary to wash construction equipment these should be done at an area suited and prepared to receive and contain polluted waters. These polluted waters should be transported and disposed at a waste site for hazardous materials. Appointing qualified and reputable contractors is essential. Proper training of construction personnel would reduce the possibility of the impact occurring. 'Best' practice measures should be applied to minimise the potential discharge of pollutants onto open soil. Method Statements are compulsory for this aspect of the Construction Phase and should be closely monitored by the Environmental Control Officer (ECO). Various Method Statements (e.g. bunding; camp establishment and fencing; concrete batching; bulk earthworks; demolition; fuels and fuel spills; solid waste management; wash areas; storm water management) are required to combat any potential surf/ace and underground water pollution.
Significance (with mitigation)	None
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended /Soil Conservation Act 76 of 1969 / Hazardous Substances Ordinance No. 14 of 1974, as

CRITERIA	DESCRIPTION
	amended / Public Health Act No. 36 of 1919, as amended

Given the environment's natural characteristics and nature of the development, construction pollution is expected to have a ***low*** significance before mitigation and a ***none*** significance following proper mitigation measures and continues monitoring.

7.4.1.4 Waste

The kind of construction to be undertaken for the solar park, should not generate excessive waste. It is, however, important that a proper waste management system be introduced to accommodate general domestic waste (i.e. plastic, paper, etc) as well as some construction waste, including hazardous waste.

Given that no waste removal service is available in the rural area of the Project Site, it is required to develop an independent waste management system. Such a system will require a temporary on-site storage facility for domestic-, construction- and hazardous waste.

Because of the distance to the nearest land fill site, an innovative waste management system need to be developed by the Proponent/Contractor to ensure effective and efficient treatment of the different types of waste generated.

The existence of a temporary waste facility poses the potential of contributing to surface pollution, unpleasant smells and attracting vermin. It is thus important that the system be planned and managed in an effective manner by the Proponent/Contractor.

Table 7.2.6 below presents the assessment and suggests mitigation for the outcome.

Table 7.2.6: *Impact assessment pertaining to Waste*

CRITERIA	DESCRIPTION
Risk Event	**Waste**
Nature of Impact	Negative
Extent	Local
Duration	Short
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Draft and implement a Construction Waste Management Plan to be maintained for the duration of the construction phase. Waste bins with scavenger-proof lids to be distributed on the project site at strategic points. Waste bins to be emptied into a waste container that is removed on a scheduled basis to the nearest registered dump site. Hazardous waste containers must be made available for

CRITERIA	DESCRIPTION
	construction and hazardous waste. Hazardous waste containers must be removed on a scheduled basis to the nearest registered hazardous waste dump site. Method Statements are compulsory for this aspect of the Construction Phase and should be closely monitored by the Environmental Control Officer (ECO).
Significance (with mitigation)	None
Confidence level	Medium
Legal Implications	Public Health Act No. 36 of 1919, as amended Health and Safety Regulations GN 156/1997 (GG 1617)

Construction waste and littering is expected to have a ***low*** significance before mitigation and a ***none*** significance following proper mitigation measures and continues monitoring.

7.4.1.5 Natural Resources (water & energy)

The construction phase requires both water and energy of which water is currently the source under pressure.

Construction activities requiring water are for the cement and concrete mixing for the 3 buildings and plinths (for field transformers and substation), as well as road compaction. Water for the general construction purpose should make use of the available underground water source.

These potential impacts hold ***moderate*** significance and can with appropriate mitigations reduce its impact to ***low*** (see Table 7.2.7).

Table 7.2.7: *Impact assessment pertaining to Natural Resources (Water and Energy)*

CRITERIA	DESCRIPTION
Risk Event	**Natural Resources (Water and Energy)**
Nature of Impact	Negative
Extent	Large
Duration	Medium
Intensity	Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	There should be no tolerance towards water wastage. Water should be recycled where possible.
Significance (with mitigation)	Low
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended

7.4.1.6 Socio-Economic

Construction activities are associated with a variety of impacts that has either a direct or indirect implication on the surrounding residents' living conditions and/or socio-economic status, as covered below. Positive Socio-Economic impacts are also listed in Chapter 4.5.1 and 7.1.1.4. Other negative Socio-Economic impacts associated with construction are:

7.4.1.6.1 Dust & Emissions

The air quality in the rural area is considered very good. Dust and emissions are associated with construction activities (i.e. digging; drilling, clearing; transport of materials) of which the severity is related to the extent of the development and the nature of the receiving environment.

Limited dust emission is expected by the construction of the solar park due to the soil composition and nature of construction. Considering the absence of surrounding receptors and limited water available in the area, dust suppression using water is not recommended.

Table 7.2.8: *Impact assessment pertaining to dust and emissions*

CRITERIA	DESCRIPTION
Risk event	**Dust and emissions**
Nature of Impact	Negative.
Extent	Small
Duration	Very short
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Removal of vegetation should be restricted to the minimum and what is necessary. Construction activities during high winds should be limited to those activities not generating dust. Handling and transport of erodible materials should be avoided under high wind conditions. Where possible, topsoil stockpiles should be in sheltered areas and covered. Appropriate dust suppression measures should be used when dust generation is unavoidable particularly during prolonged dry periods in summer. Such measures shall also include the use of temporary

CRITERIA	DESCRIPTION
	stabilising measures. No fires should be allowed on-site for any what purpose and construction waste are not allowed to be burned on-site. It is imperative that all machinery and vehicles on site is road worthy and do not give rise to excessive smoke or emissions. The contractor's personnel are to be provided with access to dust masks.
Significance (with mitigation)	Low - none
Confidence level	High

Given the expected scale of dust generation activities and the distance to the nearest receiver, dust and emissions from construction activities, being temporary in nature, are expected to have a ***low*** pre-mitigation impact significance rating and ***none*** post-mitigation.

7.4.1.6.2 Construction Noise & Vibration

Noises and vibrations are synonymous with the construction phase, as heavy construction vehicles and machinery operates. The scale of the construction activities and type of construction activity, as well as the locality of the surrounding receptors determine the significance there of. Accept for the on-site workforce, there are no receptors close enough to the construction site to be affected by noise and vibration.

The nature of the construction activities for this Project is not associated with any large scale or high intensity noise activities. No blasting is intended as part of the construction phase. The noises expected from the construction phase are to be very similar to other existing noises.

Workers exposed to loud noises during construction should be issued with the necessary protective gear, as required by the Public Health Act (No. 36 of 1919) and Labour Act (No. 11 of 200).

Table 7.2.9: *Impact assessment pertaining to noise and vibration*

CRITERIA	DESCRIPTION
Risk event	**Noise and Vibration**
Nature of Impact	Negative.
Extent	Small
Duration	Medium
Intensity	Low
Probability	Probable

CRITERIA	DESCRIPTION
Significance (no mitigation)	Low
Mitigation	Appropriate directional and intensity settings are to be maintained on all hooters and sirens. No amplified music should be allowed on site. Inform immediate neighbours of construction activities to commence and provide for continuous communication between the neighbours and residents engineer. The contractor shall not use sound amplification equipment on site unless in emergency situations. Limit construction times to acceptable daylight hours. The World Health Organization (WHO) guideline on maximum noise levels (guidelines for Community Noise, 1999) to prevent hearing impairment can be followed during the construction phase. This limits noise levels to an average of 70db over a 24-hour period with maximum noise levels not exceeding 110db during the period. All construction vehicles and machinery should be kept in good working condition. If any noise-related complaints are registered the applicable construction vehicles and machinery should be fitted with noise reduction devices. Personnel working in noisy environments must be issued with hearing protectors.
Significance (with mitigation)	Low-none
Confidence level	High

Given the small scale of the development and resulting construction activities; the construction period being temporary and the existing sources of noise 'pollution', the potential impact is regarded as having ***none*** significance after mitigation.

7.4.1.6.3 Traffic & Safety

Construction activities are associated with an increase in vehicles of different kinds (i.e. delivery vehicles and construction vehicles) to and from the site, which inevitably increase risk and conflict.

The significance of this conflict on the D208 road is expected to be low, due to the limited number of vehicles needed to service the project site and low volume of traffic on this rural

road. However, all intersections and junctions should be considered dangerous and requires caution from both the construction vehicle drivers and other road users. Strict road safety measures will have to be applied during the construction phase.

Table 7.2.10: *Impact assessment pertaining to traffic and safety*

CRITERIA	DESCRIPTION
Risk event	**Traffic and Safety**
Nature of Impact	Negative.
Extent	Small
Duration	Medium
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Contractor's personnel should adhere to speed limits. Appropriate signs should be in place along the roads being used by construction vehicles notifying road users of the construction activity and roads used by construction vehicles. Drivers of construction vehicles should have valid driver's licenses with ample experience on proper road usage and manners on-site as well as when making use of public roads. Construction vehicles' need to be in a road worthy condition and maintained throughout the construction phase. Make use of predetermined roads to the site and refrain from creating new roads. Provide traffic signals and road markings where necessary to ensure safe traffic movement.
Significance (with mitigation)	None
Confidence level	High

The pre-mitigation impact is regarded as ***low***, which can be reduced to ***none*** after appropriate mitigation measures have been implemented.

7.4.1.6.4 Health, Safety & Security

Areas within which construction activities takes place is usually associated with criminal activity, posing a security risk to those residing in the area. It is not to say that these criminal activities are because of the construction staff but it is known to happen in the vicinity of construction sites.

Prostitution is also associated with construction activities, especially where construction labourers reside in temporary accommodation near or on site/s.

Open trenches and other constructions during the construction phase may also pose a safety and health implication and should be properly mitigated for the duration of the construction phase.

Construction of the development has the potential for accidental injury, either minor or major accidents to construction workers or visitors to the Project Site. On-site safety of all personnel is an important responsibility of the appointed contractor and should be adhered to in accordance with the requirements of the Labour Act (No 11 of 2007) and the Public Health Act (No. 36 of 1919). The contractor's site and construction site should be properly secured to prevent any injury or harm to the residents and/or any local fauna.

The significance is directly related to the duration of the construction period, nature of associated activities and general accessibility of the site, which in the case is considered small, while the site will be fenced-off and access control.

Table 7.2.11: *Impact assessment pertaining to health, safety, and security*

CRITERIA	DESCRIPTION
Risk event	**Health, Safety and Security**
Nature of Impact	Negative.
Extent	Small
Duration	Short
Intensity	Low
Probability	Probable
Significance (no mitigation)	Low
Mitigation	Ensure that all construction personnel are trained depending on the nature of their work. Provide for a first aid kit and trained person to apply first aid when necessary. A wellness program should be initiated to raise awareness on health issues, especially the impact of sexually transmitted diseases. Restrict unauthorised access to the site and implement access control measures.

CRITERIA	DESCRIPTION
	Clearly demarcate the construction site boundaries, dangerous and no-go areas on site along with signage of no unauthorised access. Staff and visitors to the site must be fully aware of all health safety measures and emergency procedures. The contractor must comply with all applicable occupational health and safety requirements. The workforce should be provided with all necessary Personal Protective Equipment including earplugs. All affected landowners should be notified at least one month in advance who the appointed contractor is and provided with details about the proposed construction activities and timeline.
Significance (with mitigation)	None
Confidence level	High

These potential impacts hold ***low*** significance and can with appropriate mitigations reduce its impact to ***none***.

7.4.2 POSSIBLE IMPACTS DURING OPERATIONAL PHASE

The operational phase of the proposed Project entails predominantly daily monitoring and management of the solar system. Replacement of a faulty component is done, if and when required. Daily operations include a set of activities to be performed by the staff on a daily basis, as presented in the Project's O&M Plan. The operational activities associated with the proposed Project are presented in section 4.3.8.

Details with regards to the potential impacts expected during the operational phase are listed in Table 7.3, below. These impacts are usually more permanent in nature or at least until decommissioning of the development. Mitigation measures and environmental requirements having direct relevance to the expected operational phase impacts are presented in Tables 7.3.1 to 7.3.4 below. Detailed mitigation measures and environmental requirements having direct relevance to the expected operational phase impacts are presented in the Environmental Management Plan (Appendix L).

Different from the construction related impacts, no Management Plan is provided for the operational phase, but rather recommendations are made to existing policies or plans to be applied.

Table 7.3 *Potential Impacts during Operational Phase:*

IMPACT	CAUSE
Loss of Biodiversity and Habitat Destruction	Shading
	Removal of flora & fauna as part of site maintenance
	Heat and glare from solar farm
	Avifauna collision to powerline
	Increase human activity
Visual Impact	Buildings and solar farm infrastruture
Ground and Surface Water Pollution	Usage of water for sporadic cleaning of panels and generation of waste water
	Waste disposal
	Sanitation
	Hazardous material & liquid disposal
Natural Resources (water & energy)	Water usage for cleaning of PV panels
	Wastage
Socio-Economic	Health and Safety around electricity
	Security
Change in land use	Loss of Agricultural Land

7.4.2.1 Loss of Biodiversity and Habitat Destruction

(a) Increased shading

Given that some areas will not be cleared of vegetation, i.e. areas underneath the PV panels and in between the sections of PV panels (see section 4.3.7.2), it can be expected that some species of high value will remain on-site. These species will be partially or entirely shaded from time to time or throughout the day, which might affect their survival.

It is recommended to have a monitoring plan in place according to which the well-being of these shaded species is monitored. Should any of the species show negative signs, these should be relocated in accordance with the Search and Rescue Management Plan.

(b) Removal of flora and fauna during management

Vegetation management applicable to the Project site basically entails keeping vegetation clear to interfere with the operation of equipment (see section 4.3.8).

Considering the vegetation type expected on the Project site, mostly low perennial shrubs (see section 5.3.1), very low interference is expected from the side of vegetation on equipment. As with Emesco's other solar farms, grazing should be applied to keep natural vegetation under control (see section 4.3.8). Vegetation management by means of chemical sprays are not allowed.

Day-to-day activities, i.e. inspections requiring access into and in between the equipment should preferable done by foot or small quad bike. It is important that a Vegetation and Habitat Management Plan be drafted, which should form part of the Project's O&M Plan, according to which external operational monitoring will be done.

Irresponsible behaviour (e.g. uncontrolled access to sensitive areas; collecting of plants or animals; killing of snakes, use of general poison, setting of fires, littering, pollution, destructive driving with quad and/or vehicles, etc.) should not be allowed and/or tolerated and included within the Vegetation and Habitat Management Plan.

(c) Heat and Glare from Solar Park

There is increasing evidence that solar-energy facilities may be harmful to birds. The solar panels cause concentrated solar power (CSP) from super-reflective panels. CSP uses the sun's rays as a heat source and has the ability to store heat energy, in some cases for as long as nine hours. It is expected (not confirmed) that as birds fly through areas of concentrated solar energy (solar flux), burn injuries occur (*Ralston, 2015*)

With very little structured research done, it is not clear to what extend and how many birds could be injured or killed at solar-energy facilities and if this is in actual fact the reason. There have only been a few scientific papers documenting the effects of solar energy on birds since 2012. It is thus not possible yet to get an accurate indication of the actual scale of the impacts.

It has been hypothesised that birds (and insects) are attracted to solar-power plants; mistaking the panels for water, birds collide with the reflective surfaces or become stranded and vulnerable to predation. Impact trauma and predation are the major causes of death.

Considering Emesco's support towards sustainable practises within the solar industry, it is recommended that this solar farm, together with Emesco's other, be used as a case study for purpose of further research to study the mentioned effects on bird mortalities, with the aim of proposing mitigations.

7.4.2.1.1 Avifauna collision to Powerline

Loss of avifauna through collision with power lines is a reality that accompanies power lines. The effect of aboveground transmission line infrastructure is expected to be detrimental to "pylon sensitive species". These are listed as pylon sensitive species in Section 5.3.2.4 and the impact of OHTLs on avifauna are assessed in Section 7.4.1.1 (c).

Species at risk would be larger species flying at pylon height (e.g. kori and Ludwig's bustard, various large eagles and vultures); nocturnal travellers (e.g. flamingos and Palaearctic species) and species potentially visiting the area for roosting/foraging (e.g. bustards, eagles, vultures). None of the unique/important species are, however, exclusively associated with the proposed development area.

The Ecological Baseline Assessment study determined that the proposed Project is not expected to fall within a major bird flyway. It is recommended that a Bird Collision Monitoring programme be introduced to monitor and mitigate impacts to determine whether anti-collision mechanisms – e.g. bird flight diverters such as coils, flappers, etc are required. Although not the responsibility of this Project's Proponent, it is equally important that NamPower take similar action in mitigating and monitoring bird collisions along their OHTL within the area.

Mitigation measures are suggested in Table 7.3.1 to show environmental sensitivity and commitment regarding the fauna.

7.4.2.1.2 Increase Human Activity

The introduction of human activities daily can place an increased strain on the fauna and flora species if not managed sensitively. Impacts during the operational phase are predominantly associated with the daily operations of humans and poor management practices (e.g. improper waste management, uncontrolled fires, etc.) and irresponsible behaviour (e.g. uncontrolled access to sensitive areas; collecting of plants or animals; killing of snakes, use of general poison, etc.).

Table 7.3.1: *Impact assessment pertaining to the loss of biodiversity and habitat destruction*

CRITERIA	DESCRIPTION
Risk event	**Loss of Biodiversity and Habitat Destruction**
Nature of Impact	Negative.
Extent	Local
Duration	Long Term
Intensity	Medium
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	Flora:

CRITERIA	DESCRIPTION
	No collection of unique plants (e.g. various *Aloe* and *Lithop* species); Avoid the removal and/or damaging of protected flora potentially occurring in the general area – e.g. various *Aloe*, *Lithop* spp., etc.; Avoid introducing ornamental plants, especially potential invasive alien species, but rather use localised indigenous species, should landscaping be attempted, which would also require less maintenance (e.g. water); Remove all invasive alien species on site – e.g. *Prosopis* spp., etc. – should these occur. This would not only indicate environmental commitment, but actively contribute to a better landscape; Ensure that adequate fire fighting equipment (e.g. fire beaters; extinguishers, etc.) is available; Make use of existing tracks/roads as much as possible on the project area; Do not drive randomly throughout the area (could cause damage to unique flora, accidental fires or erosion related problems, etc.); Implement and maintain off-road track discipline with maximum speed limits (e.g. 30km/h) as this would result in fewer faunal mortalities and limit dust pollution; Implement erosion control measures where applicable <u>Fauna</u>: Initiate a suitable and appropriate refuse removal policy as littering could result in certain animals becoming accustomed to humans and associated activity and result in typical problem animal scenarios – e.g. baboon, black-backed jackal, crows, etc.; Do not drive randomly throughout the area (could cause mortalities to vertebrate fauna) Avoid off-road driving at night as this increases mortalities of nocturnal species; Avoid and/or limit the use of lights during nocturnal exploration activities as this could influence and/or affect various nocturnal species – e.g. bats and owls, etc. Use focused lighting for least effect; Prevent the killing of species viewed as dangerous – e.g. various snakes – when on site; No setting of snares for ungulates (i.e. poaching), collection of veld

CRITERIA	DESCRIPTION
	foods (e.g. tortoises, chameleon, etc.) and or any form of illegal hunting activities; Avoid introducing dogs and cats as pets to office/camp sites as these can cause significant mortalities to local fauna (cats) and even stock losses (dogs); Maintain a mammal electrocution monitoring programme to determine "high risk" areas so as to mitigate these areas as well once identified. <u>Avifauna</u>: Maintain a bird collision monitoring programme after construction to determine "high collision" areas so as to mitigate these areas as well once identified. Mark PV panel so that birds can distinguish them as solid surfaces. Minimise the use of bright lights to reduce the number of insects (and therefore birds) attracted to the facility. Discouraging roosting and perching on nearby infrastructure, and managing habitat, could help prevent birds being attracted to an area
Significance (with mitigation)	Low
Confidence level	Medium

Given the limited information on heat and glare impact of solar farms on birds and the certainty of bird collisions in powerlines, the impacts and significance thereof are rated ***moderate*** before mitigations and ***low*** following mitigation measures and continuous monitoring. The practical efficacy of the suggested mitigations for CSP remains uncertain. Transparent, systematic monitoring and research are required to better understand the impacts and to test the value of these mitigation measures.

7.4.2.2 Visual Impact

The extent to which the proposed Project will have an effect on the visual aesthetics and/or sense of place is determined by the (i) developed/undeveloped status of the site and the area in between the site and the receptor; (ii) larger topography; (iii) density and type of vegetation on-site and in between the site and the receptor; (iv) distance between the site and the receptor; and (v) the nature and scale of the development.

The land use and visual aesthetics in the Project area include extensive undeveloped open landscape covered in low shrubs and some grass. The unique desolate sense of place has been disturbed by the Harib Substation and associated electricity transmission development. The Substation and powerlines are visible from the D208.

The solar farm will also be visible from the D208, which passes directly next to the south-eastern border thereof (refer to Photo 7.1 below). The distance between passing travellers (receptors) on this road and the solar farm will thus be minimal and the solar park will be visible directly adjacent to the road for approximately 5 km. The flat topography of the Project Site and low vegetation cover will not hide the solar park. This road is, however, not a major tourist road and does not lead to any of the border posts to South Africa. It is mostly used by local farmers to reach the farms directly south of Farm Schonau. The visual impact is thus very significant, but forms part of the electricity infrastructure already developed here and it will have few receptors that pass on this district road.

Photo 7.1 – *View on Project Site from D208* *(source Knight, 2021)*

Table 7.3.2: *Impact assessment pertaining to visual aesthetics and sense of place*

CRITERIA	DESCRIPTION
Risk event	**Visual aesthetics and sense of place**
Nature of Impact	Negative.
Extent	Local
Duration	Permanent
Intensity	High
Probability	Highly Probable
Significance (no mitigation)	Moderate
Mitigation	The only mitigation that exits is the limited number of people that pass on the D208 on a daily basis.

CRITERIA	DESCRIPTION
Significance (with mitigation)	Remains Moderate
Confidence level	High with assistance of photos

The significance of the pre-mitigation visual impact of the solar farm on the area during the construction phase is expected to be ***moderate*** and will remain ***moderate*** during project life. Mitigation measures for full rehabilitation exist to reduce the significance of the impact after project life to ***none.***

7.4.2.3 Ground and Surface Water Pollution

The larger area surrounding the Project site does not contain any surface water bodies, accept for a sink farm dam. Ground water potential in the area is rated as 'low and limited potential', resulting in poorly developed underground water resources (see section 5.2.3).

The daily operational activities of the proposed Project having a potential pollution risk is limited to sewage waters originating from the office (i.e. 15 people), which hold a very small risk and should be properly managed (i.e. timely pumping of septic tank to prevent overflow).

Other potential pollution sources are the transformers and other equipment holding oils. Routine inspections to ensure timely observation of leakage should form part of the day-to-day activities and included into the O&M Manual. Other sources of potential pollution, however small include but are not limited to hazardous liquids (i.e. diesel/petrol/cleaning liquids) stored at the Project site; improper storage of general waste and dumping of waste within open areas. Increased run-off during rainy seasons could enhance pollutant transportation. Storm water will follow the natural relief of the ephemeral line.

Care should be taken that no nutrients or pollutants be discharged or be able to enter the ground and the groundwater system from any operational activity.

Mitigation measures are suggested in Table 7.3.3 to show environmental sensitivity and commitment regarding the fauna.

Table 7.3.3: *Impact assessment pertaining to ground and surface water pollution*

CRITERIA	DESCRIPTION
Risk event	**Ground and Surface Water Pollution**
Nature of Impact	Negative.
Extent	Local
Duration	Medium
Intensity	Low
Probability	Improbable

CRITERIA	DESCRIPTION
Significance (no mitigation)	Low
Mitigation	Draft and implement an Operational Waste Management Plan to be maintained for the duration of the operational phase. Storage of any material or substance that may cause pollution to water sources should be safely handled and stored in accordance with appropriate legislation. Ensure proper maintenance of all vehicles and equipment and conduct continuous maintenance and check-ups. Draft and implement a Detailed Preparedness and Emergency Plan for all operational related spillages. Drip trays must be placed underneath vehicles when not in use to contain all oil that might be leaking from these vehicles. Continued 'policing' from the side of the Proponent. Continued awareness of harmful practises and storage of hazardous liquids should be undertaken by the proponent. No pesticides or herbicides to be stored or used on site.
Significance (with mitigation)	Low - None
Confidence level	Medium

Possible pollution and the significance rating by way of wastewater (and others) is initially considered to be ***low*** but has proven to increase in risk over the years as the infrastructure and equipment degrade. Should proper management, policing and/or monitoring be done from the side of the proponent, the risk factor can remain ***low - none***.

7.4.2.4 Natural Resources (water & energy)

The operation phase requires water to clean the PV solar panels and water is currently the source under pressure. SSE plans to use new technology robotic cleaners that do not use water. In case of excessive dirt, water will have to be used, but this is only envisaged during the rainy season from Feb. to April. Water can be sourced from the borehole on the Project Site and collected in tanks for these cleaning periods.

Table 7.3.4: *Impact assessment pertaining to Natural Resources (Water and Energy)*

CRITERIA	DESCRIPTION
Risk Event	**Natural Resources (Water and Energy)**
Nature of Impact	Negative
Extent	Regional
Duration	Medium

CRITERIA	DESCRIPTION
Intensity	Low
Probability	Probable
Significance (no mitigation)	Moderate
Mitigation	Use compressed air or robotic cleaners to clean panels. Ad hoc cleaning of panels should make use of the available underground water. Should water be required for cleaning of excessive dirt, there should be no tolerance towards water wastage.
Significance (with mitigation)	Low
Confidence level	High
Legal Implications	Water Act No. 54 of 1956, as amended

Potential impact on natural resources hold ***moderate*** significance, but can be reduced with appropriate mitigations to ***low***.

7.4.2.5 Socio-economic Implication

The operational phase of any type of development is associated with a variety of impacts that has either a direct or indirect implication to the surrounding residents. The positive impact regarding income generation and skills transfer is discussed in Chapter 4.5.1 and 7.1.1.4.

(a) Noise & Disturbance

Solar parks are not associated with activities generating unhealthy noise levels, such as other industrial activities or agricultural activities. The increase in vehicle movement to and from the solar park will have a slight increase in traffic noise compared to the current status but is expected to be of low significance.

Apart from a slight increase in vehicle movement, no other noises of significance are associated with the operational activities.

The significance of the predicted noise levels from the development's operations and that of the traffic to and from the development is considered ***low***.

(b) Traffic & Safety

Operational activities in this respect are associated with minor vehicle movement of staff to and from the solar farm, which will make use of the D208 district road and gravel access road to the project site. No real conflict points exist, and little additional traffic is expected on this road.

7.4.2.6 Change in Land use from Agriculture to Industrial

According to the Agricultural Impact Assessment the impact of the proposed solar farm on the agricultural potential or agricultural activities can be caused by:

(i) a reduction in the area available for farming,
(ii) the interference with farming activities,
(iii) the use of groundwater for cleaning of solar panels and
(iv) the impact on farm security.

Please refer to Section 5.4.1 for a description of the general land use of the area and the agricultural land use of Farm Schönau as well as Appendix F for the Agricultural Impact Assessment Report.

It was concluded that the impact potential of the proposed Schonau Solar Energy on the agricultural resources or agricultural activities of Farm Schonau No. 126 is regarded as negligible (See Appendix F). The proposed solar park will occupy an area of 1.7% of the total farm area and will cause a change in land use from agriculture to industrial.

It can be expected that land value will be increased because of the proposed solar farm and associated product. The ecotourism value of the general area might, however, be negatively affected, but the tourism potential of this area is viewed as relatively low (Mendelsohn *et al. 2002*)

The solar park will not interfere with any of the protected areas or any of the tourism routes towards these attractions or border posts.

The change in land use is expected to have a ***low*** impact, that stays ***low*** until project life has been completed and decommissioning has taken place.

7.4.3 DECOMMISSIONING AND CLOSURE

The Project's life is envisaged to be 30 years where after a new agreement will be negotiated with the land owner whether the permanent buildings and fence should be removed (along with other infrastructure) or whether it can be re-used for other purposes by the owner.

In case a full rehabilitation is requested, it will be the responsibility of the Proponent to undertake the decommissioning. Given the nature of the activities associated with decommissioning (see section 4.3.9), the expected impacts are very similar to that of the construction phase (see section 7.4.1), as is the case with the required mitigations to be applied.

The decommissioning phase should include a detailed Decommissioning & Rehabilitation Plan, which should include rehabilitation monitoring for a period of at least 5 years after date of decommissioning completion. This must be included into the rehabilitation budget and allocated to this particular component of the Project's financial liability.

7.5 CUMULATIVE IMPACTS

Any development introduced is expected to place an additional load on existing natural resources and infrastructure and have both positive and negative impacts on the immediate and surrounding environment (natural and social). Cumulative impacts are defined as *"those*

that result from the successive, incremental, and/or combined effects of an action, project, or activity (collectively referred to in this document as developments") when added to other existing, planned, and/or reasonably anticipated future ones".

The significance thereof is determined by the nature and the scale of the proposed development and the sensitivity of the receiving environment. From this scoping assessment conducted, seven potential cumulative impacts can be expected, as outlined below –

- Employment creation & skills transfer (P);
- Economic benefits to land owner, local contractors & Namibian shareholders (P);
- Security in supply of energy (P);
- Reduced carbon footprint in generation of electricity (P);
- Increased visual impact (N);
- Increased loss of habitat and vegetation (N); and
- Increased bird mortalities (collisions with powerlines) (N).

Considering the evaluation and assessment (i.e. nature and the scale of the proposed Project's activities and the sensitivity of the receiving environment) that was done for each of the negative (N) impacts (see section 7.4), as listed above in bullet format, the cumulative impacts are expected to be of a ***'low'*** significance, with appropriate mitigation and continues monitoring, as recommended.

The greatest cumulative impact of SSE is expected to be the visual impact of the solar park combined with the Harib Substation and related powerlines. Given the limited mitigation measures for visual impact on the flat topography and low vegetation, but also the limited receptors who will see it in this desolate area, the cumulative impact of the proposed development is expected to be **'low'** and remain **'low'** during project life.

8 CONCLUSIONS & RECOMMENDATIONS

This chapter of the report presents the assessment conclusion following the scoping phase, as well as the key recommendations and the environmental statement for consideration by the authorities. The conclusion and recommendations as presented in this chapter have been drawn from the assessment outcome, as presented in Chapter 6.1.2.

8.1 CONCLUSIONS

It is the conclusion of the Environmental Scoping Assessment that this project has the potential to contribute positively to the country's electricity supply in a manner that compliments the National Energy Strategy of Namibia (see Chapter 4.1.1 and 7.1.1.1). The project has the potential to assist NamPower in replacing some of its fossil fuel consumption with clean renewable energy at an affordable rate. It can provide socio-economic benefits to the //Karas Region and specifically Karasburg and Warmbad (see Chapter 4.5.1 and 7.1.1.4).

As all developments have potential negative environmental consequences, it is important to identify possible adverse impacts beforehand, coupled with environmentally acceptable mitigating factors to lessen the overall impact of such development. These are addressed in Chapter 7.4 and Appendix L.

The project site is selected next to the existing Harib Substation, which make it convenient to connect to the national electricity grid. It is situated in one of the lowest population density areas in Namibia. The vegetation is low and sparse, which allows the solar park to be developed with minimum vegetation removal. Singular protected species can be relocated with the assistance of an ecologist/botanist where necessary. Uncertainty exists around the impact that the solar farm will have on birds, but according to the Ecological study no major bird fly paths exist over the project area. The study determined that the project will not have a significant negative effect on the *Nama Karoo Biome* as a whole, neither on any of the endemic or endangered fauna or flora species in specific in the area. Other impacts identified have mitigation measures that can be put into place.

For the **visual impact**, no mitigation exists, since the solar farm will be located directly next to the D208 on a flat area with low vegetation. There are, however, limited receptors that use this district road. It is not a major tourist road and does not lead to any of the border posts to South Africa. It is mostly used by local farmers to reach the farms directly south of Farm Schonau. It will be seen as part of the electricity distribution development that already exists at Harib Substation.

It is the conclusion that the project may go ahead on the grounds that the nature of the project is subtle, the footprint of the project area is small and the receiving environment is not exceptionally sensitive.

Given this, it is not to say that there will be no further impact/s and potential threats as highlighted by the study. Construction, operations and decommissioning and closure

activities need to be strictly controlled by the Proponent and Contractor/s, and monitored by the appointed specialist and applicable Competent Authority to ensure that all potential impacts identified in this study and other impacts that might arise during implementation are properly identified in time and addressed in an effective manner.

8.2 RECOMMENDATIONS

Recommendations are provided in the tables in Chapter 7.4 and incorporated in the EMP in Appendix L. This must be undertaken by the Developer, Proponent and Contractor and monitored by the Ministry of Environment, Forestry and Tourism. All potential impacts identified in this study and other impacts that might arise during implementation must be properly identified in time and addressed in an effective manner.

Mitigation measures must be enforced and Monitoring Programmes on bird mortalities due to heat and glare from the solar park and collision in powerline must be undertaken to address the uncertainties around these impacts. Timeous management practices must be put in place if any detrimental impacts are detected.

It is the opinion of the EAP that further information is not required for a full EIA. This environmental scoping assessment concludes that the intended project should proceed under the following recommendations:

1. All required permits, licenses and approvals (see section 3.4) for the development be obtained.

2. All mitigations listed in Tables 7.2.1 to 7.2.11 and 7.3.1 to 7.3.4 and the Environmental Management Plan (Appendix L) be implemented prior and during construction.

3. A well-qualified and experienced (i.e. minimum 10 years) Environmental Control Officer should be appointed during the construction- and operational phase of the Project to make sure all the requirements within the Scoping Report and Environmental Management Plan (Appendix L) are adhered to.

4. A well-qualified and experienced (i.e. minimum 5 years) Environmental Site Manager should be appointed during the course of the construction phase to make sure that all the requirements as listed within this scoping report and the EMP (Appendix L) are adhered to. Furthermore, the Environmental Site Manager should receive training by a suitably qualified archaeologist with respect to the procedures to follow in the event that such remains are discovered during construction.

5. A well-qualified and experienced (i.e. minimum 15 years) Ecologist should be appointed to undertake the required investigations, site-layout and demarcation to ensure that all protected species are handled according to best practices.

6. The vegetation should not be cleared under PV panels for construction (like other solar farms), since the low vegetation that exist on site allows for this. It should be done as per the information provided by the Developer. (section 4.3.7.1)

7. Continued on-site monitoring and evaluation be conducted during the construction and operational phases to be authorised by the DEA.

8.3 ENVIRONMENTAL STATEMENT

Based on the information presented in this scoping report, the Environmental Assessment Practitioner is of the opinion that, accept for the visual impact, the immediate and larger environment will not be significantly impacted if the above recommendations as proposed in this report are implemented and monitored, and responsible environmental practises are applied by the proponent, appointed contractors and sub-consultants.

Urban Green cc, the independent environmental assessment practitioner, recommends to the relevant authorities that the application for the listed activities associated with Schonau Solar Energy be approved on condition that the above recommendations (Section 8.2) are met and that continuous monitoring be conducted in accordance with the Environmental Management Act (Act No. 7 of 2007), its EIA Regulations and this scoping report. It is important that proof of monitoring is submitted to the office of the Environmental Commissioner to be used as part of the review process pertaining to the 3-yearly ECC renewal.

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APPENDIX A

APPLICATION FOR ENVIRONMENTAL CLEARANCE CERTIFICATE

APPENDIX B

CURRICULUM VITAE ENVIRONMENTAL ASSESSMENT PRACTITIONER

APPENDIX C

SCHONAU SOLAR ENERGY PROJECT INFORMATION

APPENDIX D

ECOLOGICAL BASELINE ASSESSMENT REPORT

APPENDIX E

ARCHAEOLOGICAL BASELINE ASSESSMENT REPORT

APPENDIX F

AGRICULTURAL IMPACT ASSESSMENT REPORT

APPENDIX G

PUBLIC PARTICIPATION PROCESS

APPENDIX H

TECHNICAL DETAIL OF SOLAR PV MODULES

APPENDIX I

TECHNICAL DETAIL OF PV TRACKER

APPENDIX J

TECHNICAL DETAIL OF INVERTER

APPENDIX K

TECHNICAL DETAIL OF TRANSFORMER

APPENDIX L

SCHONAU SOLAR ENERGY

ENVIRONMENTAL MANAGEMENT PLAN