



# Environmental Impact Assessment Report

Prepared for

**SERTUM ENERGY PTY Ltd**

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For the

**Establishment of the Trekkopje Solar Park**

**December 2013**

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Project Location: Erongo Region

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## 1. List of Acronyms

DEA	Directorate of Environmental Affairs
DNP	Dorob National Park
EIA	Environmental Impact Assessment
EMA	Environmental Management Act
EMP	Environmental Management Plan
I&AP	Interested and Affected Parties
IBA	Important Bird Areas
MET	Ministry of Environment and Tourism
PV	Photovoltaic
SEA	Strategic Environmental Assessment
ToR	Terms of Reference

## 2. Executive Summary

An application for an Environmental Clearance for the construction of a Solar Park was submitted to the office of the Environmental Commissioner during July 2013 and October 2013. This revised report is submitted in response to the comments received from the Office of the Environmental Commissioner and it was indicated that the following should be addressed:

- Curriculum Vitae of the Environmental Assessment Practitioner (*Appendix B of the report*)
- Due reference to the applicable Strategic Environmental Assessment (SEA). (*Addressed in section 4.1 of this report*)
- Reference to the alternative location, Site B inside the Dorob National Park should be removed from the report.
- A detailed site survey to detect protected or threatened species is required

The above-mentioned measures are incorporated and addressed in this report.

### 2.1 Project Background

Sertum Energy Namibia Pty Ltd intends to develop a photovoltaic plant at Trekkopje in the Erongo region in Namibia. The objective of the project is to generate electricity and to feed the national grid by the installation of a solar plant. This will be aligned with the Namibian Government's request to make use of renewable energy sources in addition to the current electricity generation methods. The proposed solar plant will be a 22.80 MWac power plant.

During the construction phase of the Solar Park 30 people will be employed. Once the facility becomes operational 10 permanent employees will be required. It is envisaged that the construction period will be completed over 12 weeks.

The envisaged development will be known as the Trekkopje Solar Park and it will be first of its kind in Namibia. It is intended that the Solar Park will consist of a facility that will be located in the Trekkopje concession area, on the AREVA mine site next to the NAMPOWER AREVA substation.

## 2.2 Purpose of this Report

In terms of the Environmental Management Act (7 of 2007) and the 2012 Environmental Impact Assessment (EIA) Regulations, this proposal triggers the Environmental Impact Assessment process.

Sertum Energy Namibia Pty Ltd, the Proponent appointed EnviroSolutions to complete the EIA for this project. The completion of an EIA before this development is consistent with the Namibian environmental regulatory requirements. The objectives of the EIA are therefore as follows:

- To obtain approval from the Ministry of Environment and Tourism for the envisaged development.
- To assist the relevant authorities with a decision on the allocation of a preferred sites for the intended development.
- To identify all potential risks and environmental impacts associated with the intended development.
- To investigate any socio-economic impacts associated with this project, both positive and negative.
- To suggest the most suitable mitigatory measures so as to reduce the nature and extent of any negative impact on the environment associated with this project.
- To investigate the current and pending legal framework to which this project will need to comply, and finally,
- To identify and consult with all relevant Interested stakeholders so as to incorporate their concerns and suggestions into the planning phase of this project.

## 2.3 Terms of Reference

The Terms of Reference (ToR) provided by the client is described in this section. This is also aligned with the requirements of the Environmental Management Act 7 of 2007 and the 2012 Regulations. The following was therefore required as part of the scope of work:

**Environmental Impact Assessment:** It is expected that the EIA should be able to explain how to deal with the identified impacts to eliminate or minimize it during the construction and operational phases.

Impacts that might be considered include the following:

- **Air Quality**
- **Surface Water**
- **Fauna and Flora**
- **Land use plans**

Impacts should also be classified for Normal, Abnormal and Emergency situations using the criteria below:

The type

- **Permanent or**
- **Temporary**

The magnitude

- **Low**
- **Medium**
- **High**

## ***2.4 Alternatives (Including the No-Go Option)***

Alternatives sites were not considered for the development, since the infrastructure needs to be in close proximity to the existing NAMPOWER substation on the Areva Mine site.

## ***2.5 Assumptions and Limitations***

- All information received from sources contributing to this project is correct.
- That the applicant will implement the recommendations derived from this study.

## ***2.6 Summary of Key Findings***

Key findings of the Environmental Impact Assessment Study indicate that the project can be implemented, provided the recommended control measures are implemented.

- The site that has been select for the Solar Park needs to near existing substations in order to ensure that power that is generated can be supplied to the national grid with minimum additional infrastructure.
- The envisaged location on the AREVA Mine site is ideal since the area has already been cleared and levelled during the establishment of the infrastructure required for the mining operations.
  - There will be limited impacts or negative effects on the biodiversity of the site since there is limited vegetation on the project site and well developed access roads that will ensure easy vehicular access.

- There will be typical construction related impacts like noise and the generation of dust but this will be of a temporary nature. These impacts will be localized in an area that is currently used for mining and processing activities.
- The envisaged development will supplement power supply to the Erongo Region, and Namibia and will also ensure that long term Solar Power Generation infrastructure is put in place.
- The socio economic impacts associated with the Solar Park construction will have an insignificant effect on the towns of Arandis, Swakopmund and Walvis Bay, since it is not expected that jobseekers will “invade” these towns.

It is also imperative that the Proponent ensures the mitigatory measures are incorporated and adhered to. It is therefore recommended that these mitigatory measures form part of a legal agreement between the relevant parties.

## 3. Introduction

### 3.1 *The background and Context of this report*

Sertum Energy Namibia Pty Ltd intends to develop a photovoltaic plant at Trekkopje in the Erongo region in Namibia. The objective of the project is to generate electricity and to feed the national grid by the installation of a solar plant. This will be aligned with the Namibian Government's request to make use of renewable energy sources in addition to the current electricity generation methods. The proposed solar plant will be a 22.80 MWac power plant.

The envisaged development will be known as the Trekkopje Solar Park and it will be first of its kind in Namibia. The intention is to establish a Solar Park that will consist of a facility in the Trekkopje concession area, on the AREVA mine site next to the NAMPOWER AREVA substation.

For a development of this nature an EIA is required. The EIA needs to be reviewed by the relevant authorities before a final decision is taken on whether the project can proceed.

- The completion of an EIA before the project commences is consistent with the Namibia's Environmental Assessment Policy (1995) and the Environmental Management Act (GN27, 2007: GG3966). It is intended to identify potential environmental and social impacts associated with a project of this nature. This is essential to ensure that mitigatory measures, if required, are included into the initial stages of the project and the identification of possible impacts and issues associated with the proposed development.

EnviroSolutions was appointed to facilitate the completion of the Environmental Impact Assessment Report for this development. The objective is to identify the potential impacts associated with a development of this nature and to provide mitigation measures to ensure that potential impacts to the environment are managed effectively.

This report comprises an assessment of the likely impacts, and aspects relating to the proposed construction and operation of the Solar Park. These were identified through site visits, investigations, and review of existing information available for the area.

### **3.2 Approach Methodology**

The intention of the study is to ensure the envisaged activities by Sertum Energy are aligned with the Namibian legal requirements. Furthermore, proper mitigation measures should be implemented to ensure the success of the project. The following approach was used during the completion of the EIA:

1. Site visit and evaluation site sensitivity.
2. Investigation and assessment of potential effects associated with the envisaged power line.
3. Consultation with the Authorities.
4. Completion of a risk assessment, to predict the conditions likely to result from activities associated with this development.
5. Development of a management plan to mitigate potential negative impacts.

EnviroSolutions takes cognizance of the fact that the Environmental Assessment report will be independently reviewed by the Ministry of Environment and Tourism (MET). In this way, practical and realistic solutions to potential problems can be identified in a consultative manner where all stakeholders are involved. The intention of this report is to ensure the project achieves regulatory compliance, appropriate environmental evaluation is in place and proper mitigation measures are implemented.

## **4. Project Description**

### **4.1 The need for this project**

The aim of the project is to generate electricity, making use of renewable energy sources. The solar plant is aligned with the Namibian Government's vision to make use of renewable energy sources in addition to the current electricity generation methods. Sertum Energy intends to supplement the current electricity supply and will contribute towards ensuring long term sustainable power supply.

During 2007, a Strategic Environmental Assessment was conducted for the Erongo Region under the NAMCOMA project. The SEA stated the following with regard to energy:

## SEA; Erongo Region - 2007

“There is no policy directed toward the establishment of energy facilities in the Erongo coastal region *per se*. Proposals for nuclear energy production near Walvis Bay has been presented as an attempt to use some of the uranium produced in Namibia for the best of the Namibians. Nuclear power does not at present comprise a part the National Energy Policy.

Although the Government of Namibia has declared that the country will move towards the sustainable use of natural resources for energy production and consumption and although the environment of the regions may offer large potentials for both wind and solar power no governmental plans or feasibility studies have yet been made to boost the production of renewable energy.”

The objective of the Proponent is aligned with the Government’s vision to move towards the sustainable use of natural resources, and this is therefore the reason why this project was initiated.

### 4.2 Project Location

The Figures below show the location of the proposed site for the Solar Park. The intention is to have the facilities near existing NAMPOWER substation to ensure easy connection to the national grid. The project site location is best appreciated in the figures below.



Figure 1: Project Site Location



**Figure 2: Project Site with Access Routes**

There are two access routes to the site which are both restricted roads. Special permission is required from AREVA to make use of these roads. The site is located about 11km east of the Dorob Park boundary.



**Figure 3: Project Site Location (about 70ha)**



**Figure 4:** View on site towards the North East



**Figure 5:** View on site towards the North West  
*(AREVA Desalination Storage dam in the background)*



**Figure 6:** View on site (NAMPOWER Substation towards the west)



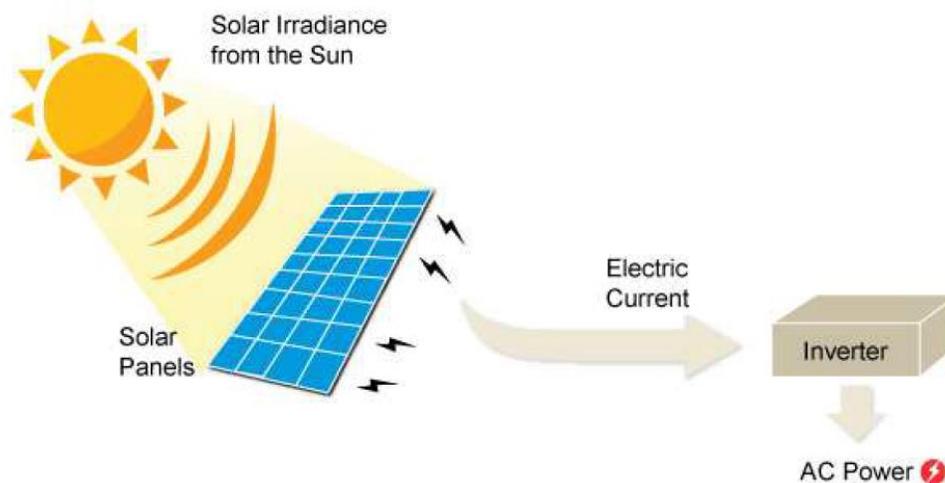
**Figure 7:** View on site towards the South West  
*(This is the only vegetated area on the project site)*

## 4.3 The Proposed Development

### 4.3.1 PV Panel operation

It is anticipated that Photovoltaic (PV) panel arrays with approximately 186,396 panels will be installed in an area of approximately 70 ha. The area required does not need to be cleared or graded since it is level already. There are no trees on site and the highest vegetation stands are about 0.7 meters high. These are mounted into metal frames which are usually aluminium. Concrete or screw pile foundations may be used to support the panel arrays.

The arrays are tilted at a fixed angle equivalent to the latitude at which the site is located in order to capture maximum sunlight. (Source: *Sintec Project Background document, March 2013*)

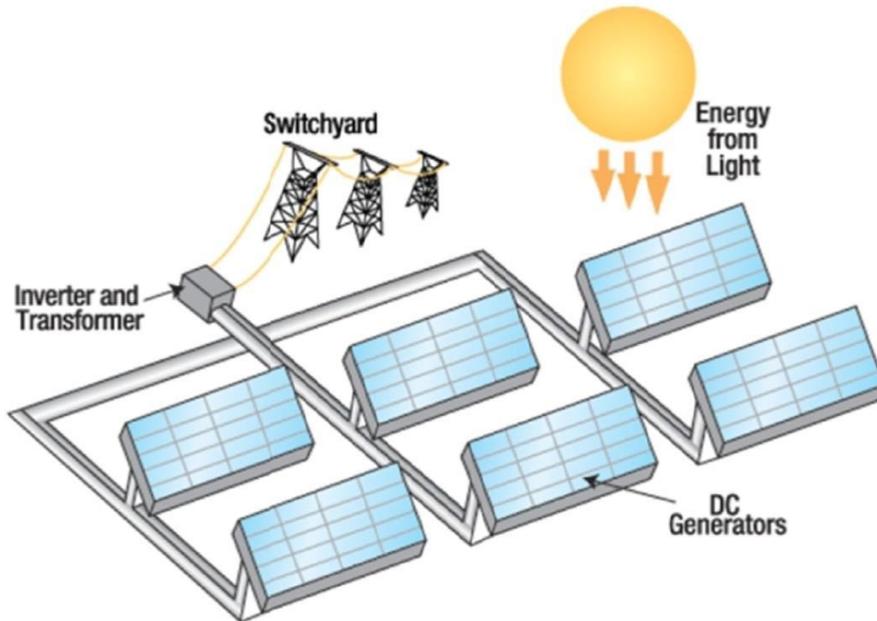


**Figure 8:** Illustration of PV panel operation

### 4.3.2 Electrical Infrastructure

The PV arrays are typically connected to each other in strings and strings are connected to DC to AC inverters (see figure below). The DC to AC inverters may be mounted on the back of the panel's support substructures / frames or alternatively in a central inverter station. (Source: *Sintec Project Background document, March 2013*)

The substation will be approximately 100m x 100m and should be located near an existing substation to prevent additional construction of overhead power lines, using either pole or pylon construction methods



**Figure 9:** PV process

### 4.3.3 Access to the project areas

The project site is located in the AREAV Mining Area. There are strict regulations in place prohibiting off road driving by vehicles in these areas. Vehicles leave very clear tracks on the barren landscape that takes years to disappear if they at all disappear. No new roads will be constructed and the existing roads will be sufficient for the Proponent. Access to the site will be primarily from the B2 national road.

### 4.3.4 Waste water and Effluent Treatment

It is highly unlikely that large quantities of water will be used during the construction and operational phases of the project. In the case where waste water is produced, the water will be collected and kept for disposal at the appropriate facilities within the municipal areas. Portable toilets should be provided to the construction workers at the project area. Under no circumstance is waste water or effluent to come into contact with the land.

### 4.3.5 Solid Waste Management

All solid waste produced during the constructing phase should be disposed of appropriately. Littering is not permitted and is also punishable by Law. All mechanical waste is to be collected and disposed of at an approved landfill site.

### 4.4 *Typical Construction Activities*

The site is level and ideal for the Solar Park. Limited ground work will be required. The area has been disturbed and is next to the AREVA NAMPOWER Substation. Construction Activities will be as follows:

- Installation of the DC generators
- Installation of electrical cables
- Connection of Solar Park to NAMPOWER Substation
- Vehicle traffic the existing roads

## 5. Regulatory Framework and other Requirements

### 5.1 Regulatory Agencies

The regulatory agencies guarding or implementing the relevant environmental regulations are listed as follows:

Table 1: **Government agencies regulating environmental protection in Namibia.**

REGULATING AGENCY	ROLE IN REGULATING ENVIRONMENTAL PROTECTION
Ministry of Environment and Tourism (MET)	MET is the lead government agency charged with Environmental Monitoring, Assessment and Management. The mission of MET is to maintain and rehabilitate essential ecological processes and life-supported life-support systems, to conserve biological diversity and to ensure that the utilization of natural resources is sustainable for the benefit of all Namibians, both present and future, as well as the international community, as provided for in the Constitution. MET lays a foundations to implementation and promulgation of regulations relevant to this project including; the Environmental Act no7. Of 2007, Park and Wildlife Management Bill, the Pollution Control and Waste Management Act , The MET plays role in approval of Environmental Impact Assessments (EIAs) which are prepared under Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1995). Provisions in other line ministries' legislation (strengthens MET's position.

### 5.2 Environmental Management Requirements

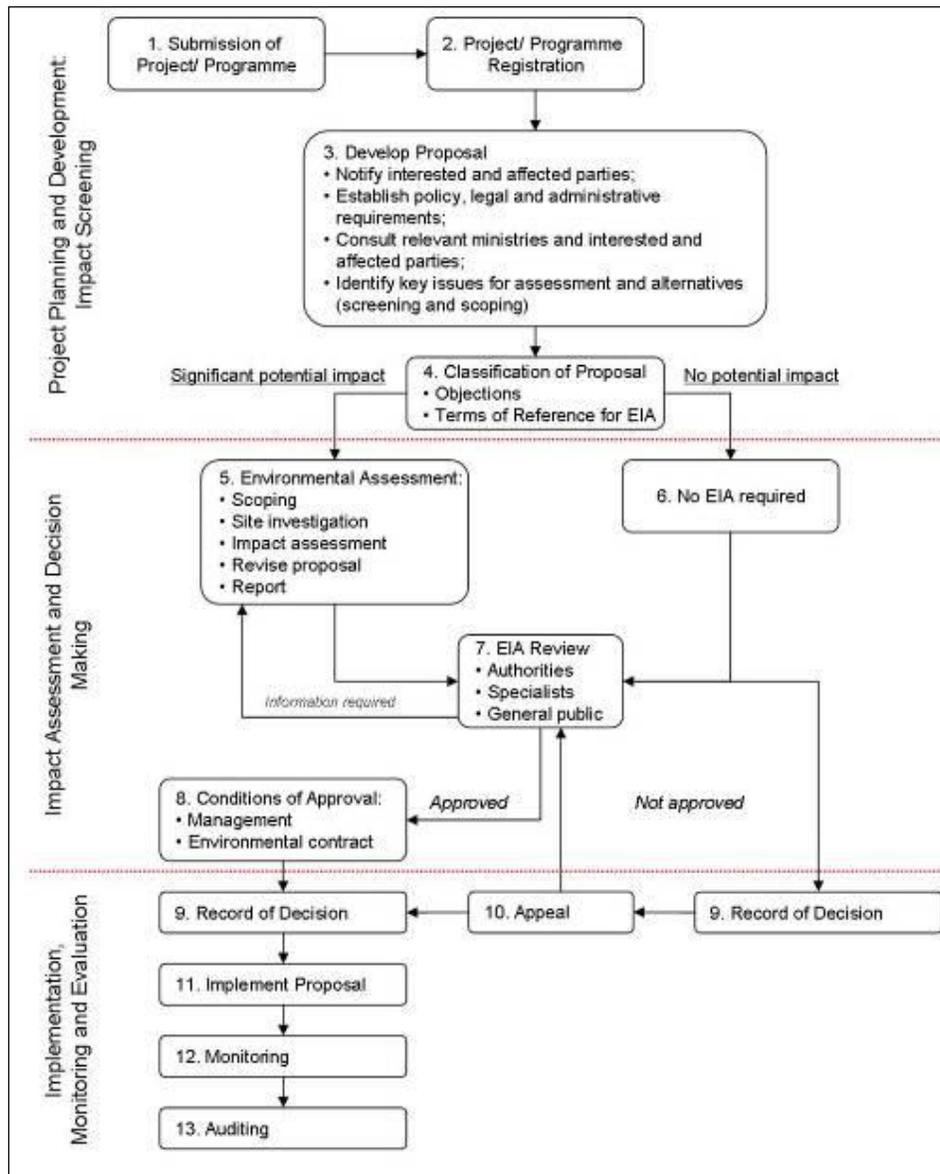
An important component of an Environmental Assessment process is the review of applicable and relevant legislation pertaining to this project. The legislative and regulatory foundation for protection and management of the environment and its natural resources is governed by the Namibian Constitution. Article 95(I) of the constitution clearly emphasizes the promotion of the welfare of the people, whereby *the maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future; in particular.*

In terms of the Environmental Management Act (7 of 2007) and the 2012 Environmental Impact Assessment (EIA) Regulations, this activity triggers the Environmental Impact Assessment process. The intended activity is a listed activity under Annexure 1(b) of the EIA Regulations and it that states that the “the transmission and supply of electricity” may not be undertaken without an Environmental Clearance Certificate.

The completion of an EIA before this development is consistent with the Namibian environmental regulatory requirements.

These instruments make it mandatory for any proposed development to be subjected to an Environmental Assessment procedure. Both promote sustainable development and

economic growth while safeguarding the environment in the long run. The figure below illustrates the Environmental Assessment process in Namibia.



**Figure 10:** Illustration of the EIA Process in Namibia

Currently the project is at Stage 5: Environmental Assessment. Once the Environmental Assessment Process has been completed the final document will be reviewed by the authorities, specialists and the public. Before the project can be implemented, a record of decision will be taken.

## **5.3 Legislation of international significance**

### **5.3.1 Convention on Wetlands and Biological Diversity**

The Convention on Wetlands of International Importance, especially as Waterfowl Habitat, 1971 (Ramsar) aims primarily to prevent the loss of wetlands, to promote the wise use of these, and to give special protection to listed wetlands. The Convention stresses a habitat-type approach rather than a species-specific approach.

The primary goal of the Convention on Biological Diversity, 1992, is the conservation of biodiversity. The causes of threats to biodiversity should be anticipated and prevented, and the precautionary principle should be applied. Parties to the convention are obliged to:

- Establish a network of protected areas;
- Create buffer areas adjacent to these protected areas using environmentally sound and sustainable development practices; and
- Rehabilitate degraded habitats and populations of species.

### **5.3.2 Convention on Combat Desertification (CBD)**

The convention recognized that the conservation of biological diversity is “a common concern of humankind” and is an integral part of the development process. The agreement covers all ecosystems, species, and genetic resources. It links traditional conservation efforts to the economic goal of using biological resources sustainably. It sets principles for the fair and equitable sharing of the benefits arising from the use of genetic resources, notably those destined for commercial use.

#### **The objectives of the CBD are:**

- The conservation of biological diversity,
- The sustainable use of its components and
- The fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including by appropriate access to genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.

The Proponent and the contractors should therefore prevent the unnecessary disturbance of any species during the construction and operational phases. Conservation of species and ecosystem to combat the increasing rate of loss of biological diversity is one of

Namibia's challenges due to a heavy reliance on natural resources and ecosystem goods and services.

In the interest of welfare of the people, the state has adopted policies aimed at maintaining ecosystems, ecological processes and biodiversity for the benefit of present and future generations. The National Biodiversity Strategy and Action Plan (NBSAP) and the Namibia Community-based Tourism Association (NACOBTA) can assist the Proponent in environmental management issues. Direct impact on biodiversity is minimal but a precautionary approach is necessary to ensure those disturbances are avoided.

#### **5.4 Legal Requirements of national significance**

National legislation exists to protect the environment and threats to public health. Included, among others, are issues related to the protection of public water supplies, nuisances and other public health issues. Nuisances are broadly defined as any condition which is considered to be offensive, injurious or dangerous to health. This definition is broad enough to cover a range of issues, and thus this law may be effective in any instance where public health might be compromised.

##### **5.4.1 Dorob National Park Requirements**

The preferred access route to the site will be via the existing Areva Mine access road. There is an alternative access road to the site via the Dorob National Park. It is possible that this road may be used during construction and routine maintenance work. Although it will not be the preferred access to the site, the Dorob National Park requirements, December 2011 states that the following that will be applicable:

##### **Applicable Specific conservation provisions:**

- Use water or electricity in excessive quantities or for any other purpose other than for reasonable domestic use;
- Pollute or degrade the environment;
- Kill, injure, hunt, capture, disturb or feed any wild animal or remove any part of any wild animal, whether alive or dead;
- Remove, destroy, damage or disturb any egg, nest or burrow;
- Pick, collect, mutilate, destroy, damage, tamper with, disturb or remove any tree, plant, shrub, herb, mineral or any other object of botanical, zoological, geological, archaeological, historical or any other scientific interest, or part thereof;
- Collect or gather firewood; or

- Remove, damage, destroy, soil, mutilate or interfere with any form of State property.

**Applicable provisions related to camping:**

- People may overnight or camp in the Dorob National Park but only with a permit and only at officially designated sites. ***(Along the access road to the project site there are no designated campsites)***
- Domestic animals may not be brought into a camping site unless the officer in charge grants permission indicating where the animal may stay overnight.

**Applicable general provisions related to Vehicles and Driving:**

- People may use a vehicle in the park with their permit at any time except between 21:00 and 05:00. This provision does not apply to proclaimed roads and people may use those roads at any time.
- Young people aged 16 years or younger may only drive or use a vehicle if an adult accompanies him/her.
- A valid driver's license will be required to use any motor vehicle in the park.
- No person shall drive or use any vehicle in the park whilst under the influence of alcohol or any other narcotic substance or in such a way that is dangerous to human life or that may cause damage to any property or the environment.

**5.4.2 Legislation related to Electricity Generation**

The Electricity Act 4 of 2007 requires that any generation and or distribution complies with laws relating to health, safety and environmental standards (s 18(4) (b)). In the event that exemption from acquiring a license is granted, the Minister may impose conditions relating to public health safety or the protection of the environment.

Off relevance is that fact that the Proponent and its contractors should ensure that compliance with the relevant Health, Safety and Environmental Management legislation is maintained.

**5.4.3 Legislation related to Public Health**

Section 119 of this Act prohibits the existence of a nuisance on any land owned or occupied by the Proponent. The term nuisance is important for the purpose of this EIA, as it is specified, where relevant in Section 122 as follows:

- a) any dwelling or premises which is or are of such construction as to be injurious or dangerous to health or which is or are liable to favour the spread of any infectious disease;
- b) any dung pit, sloptank, ash pit or manure heap so foul or in such a state or so constructed as to be offensive or to be injurious or dangerous to health;
- c) any area of land kept or permitted to remain in such a state as to be offensive, or liable to cause any infectious, communicable or preventable disease or injury or danger to health; or
- d) any other condition whatever which is offensive, injurious or dangerous to health.

#### **5.4.4 Legislation related to Construction and Demolition**

The following is relevant in terms of the Health and Safety Regulations under the Labour Act:

##### Noise

No employer shall require or permit an employee to work in an environment in which he or she is exposed to an equivalent noise level equal to or exceed 85 db (A).

If the equivalent noise level to which employees are exposed in any work-place is equal to, or exceeds, 85 db (A), the employer shall reduce the levels to below 85 db (A) or, if this is not practicable, he or she shall reduce the level to as low as is practicable and take all reasonable steps to the satisfaction of an inspector, isolate the source of the noise. Of relevance is the fact that holes will be drilled with noisy equipment for the planting of wooden poles.

#### **5.4.5 Legislation related to Air Quality**

Air pollution is controlled primarily by the Atmospheric Pollution Prevention Ordinance (11 of 1976). This Ordinance generally provides for the prevention of the pollution of the atmosphere.

Part IV of this ordinance deals with dust control. The Ordinance is clear in requiring that any person carrying out an industrial process which is liable to cause a nuisance to persons residing in the vicinity or to cause dust pollution to the atmosphere, shall take the prescribed steps or, where no steps have been prescribed, to adopt the best practicable means for preventing such dust from becoming dispersed and causing a nuisance.

Of applicability to the envisaged project, is dust generated by vehicles or equipment as well as dust generated during excavation of foundation and earth works. The risk of dust generation is however low.

#### **5.4.6 Legislation related to Soil Conservation**

The objectives of the Soil conservation Act 76, 1969 are to make provision for the combating and prevention of soil erosion, and for the conservation, protection and improvement of the soil, the vegetation and the sources and resources of the water supplies.

Part II, deals with soil conservation works and it further states that in section 4(1) The Minister may by means of a direction order the owner of land to construct the soil conservation works referred to in such direction either on land belonging to such owner or on land belonging to another person, in such manner and within such period as may be mentioned in such direction, if the Minister is of the opinion that the construction of such soil conservation works is necessary in order to achieve any object of this Act in respect of the land belonging to such owner.

Of relevance is the fact that adjacent areas to the project site should not be disturbed. The use of existing tracks is essential. The Proponent should however ensure that when areas outside the project site boundaries are disturbed, rehabilitation should be conducted immediately once the activity has been completed.

#### **5.4.7 Legislation related to petroleum products**

Regulations made under the Petroleum Products and Energy Act 13 of 1990 states that:

A license or certificate is required for purposes of storing or keeping fuel in a quantity of 200 liters or less in any container kept at a place within a local Authority area or fuel in a quantity of 600 liters or less in any container kept at a place outside a local authority area.

#### Containers used to store or convey petroleum products

Petroleum product containers must be completely leak-proof and spill-proof and otherwise safe and suitable for storage and conveyance. Such containers may not be used as water trough or for any purpose that may cause environmental harm, safety or health of any person or animal.

Of relevance is that fact that heavy equipment or vehicles may carry significant quantities of fuel and proper precaution should be taken to prevent spills.

### 5.4.8 Legislation related to Nature Conservation

The Nature Conservation Ordinance (1975) as amended through the Nature Conservation Amendment Act of 1996 states that permits are required for entering the Dorob National Park and for the removal of any indigenous plant or tree. It also stipulates that no damage may be done to any object of geological, ethnological, archaeological, historical or other scientific interest without the appropriate **permits**.

Off relevance is that the Proponent may only make use of the access road to the site and that no activities will be conducted in the Dorob National Park.

## 6. Description of the Local Environment

This section describes components of the existing environment that could be affected by the Proposed Action. The environmental components described include air, water, land use and socioeconomics.

### 6.1 Important Species

#### 6.1.1 Reptiles

The high percentage of endemic reptile species (51%) known and/or expected to occur in the general Central Coastal area underscores the importance of this area for reptiles. Reptile species of concern are the 2 thread snakes (*Leptotyphlops occidentalis* and *L. labialis*) as well as the sand burrowing/dwelling species such as *Bitis peringueyi* and the various *Meroles* species, especially *Meroles micropholidotus* classified as endemic and rare, as well as the high proportion (81%) of endemic gecko (e.g. *Pachydactylus* species) species of which very little is known about their ecological role and actual status in

Namibia. The most important species are viewed as all the endemics, especially little known species classified as “rare” – i.e. *Meroles micropholidotus* and *Afroedura africana africana*. However, none of the reptiles are exclusively associated with the proposed project area.

The barren plain areas in the project area may be host to a variety of reptile fauna and is not often expected and/or acknowledged. A large section of the project area has however already been disturbed by earthworks when it was levelled during the construction of the substation and the related mining activities and these species may have moved.

### 6.1.2 Amphibians

Amphibians are generally not viewed as extremely important in saline coastal areas which are marginal habitat for most amphibians. Although 43% of the amphibians expected to occur in the general project area are endemic to Namibia they are expected to occur near water courses – i.e. the Kuiseb and Swakop Rivers and rocky outcrops with temporary pools associated with these landforms, etc.

The endemic *Phrynomantis annectens* is probably the amphibian of greatest concern in the area although it occurs widespread throughout large parts of Namibia. However, none of the amphibians are exclusively associated with the proposed project area.

### 6.1.3 Mammals

Endemic mammals expected to occur in the general Central Coastal area make up a relatively large percentage (29%) of the mammals known and/or expected from the area. Endemic mammal species of concern include the bats *Laephotis namibensis* and *Cistugo seabrai* as well as the Hairy-footed Gerbils (*Gerbillurus* sp.). Both bats are very poorly known with only a few records from the general area making them particularly important. How bats are affected by the intended development is also not understood. The most important mammals known/expected to occur in the general area include the Round-eared Elephant-shrew (*Macroscelides proboscideus flavicaudatus*); Littledale’s Whistling Rat (*Parotomys littledalei namibensis*); Brown Hyena (*Hyaena brunnea*); African Wild Cat (*Felis silvestris*) and Suricate (*Suricata suricatta marjoriae*).

The most important predator known/expected to occur in the general area is *Hyaena brunnea* which is classified locally as Insufficiently Known, probably Vulnerable; with an international status of Near-threatened (SARDB 2004, IUCN 2012). However, none of the mammals are exclusively associated with the proposed area.

#### **6.1.4 Birds**

The high proportion of endemic birds of which 50% (7 of 14 species) are endemic to Namibia and which are known and/or expected to occur in the Central Coastal area is important and should be taken into consideration regarding development in the area. The most important species known/expected to occur (albeit occasionally or during migrations and/or local seasonal movements) in the project area and potentially affected by the proposed Solar Park and the power line developments are the Great White Pelican, Greater & Lesser Flamingos, Lappet-faced Vulture, Martial Eagle and Kori & Ludwig's Bustards. The Palaearctic migrants visiting the Walvis Bay lagoon area – mainly during the summer – are also of great importance. The larger birds which follow local migration patterns such as the 2 Flamingo species (Walvis Bay – Etosha NP – Botswana) and the Great White Pelican (Walvis Bay – Etosha NP – Hardap Dam) would also be of concern. Flamingos have shown a downward trend in southern Africa with the Namibian coast regularly supporting 84% (40,000 to 47,000) of the Greater Flamingos and 85% (34,000 to 40,000) of the Lesser Flamingos, respectively (Simmons 1998c). This indicates the importance of the coastal areas for these species.

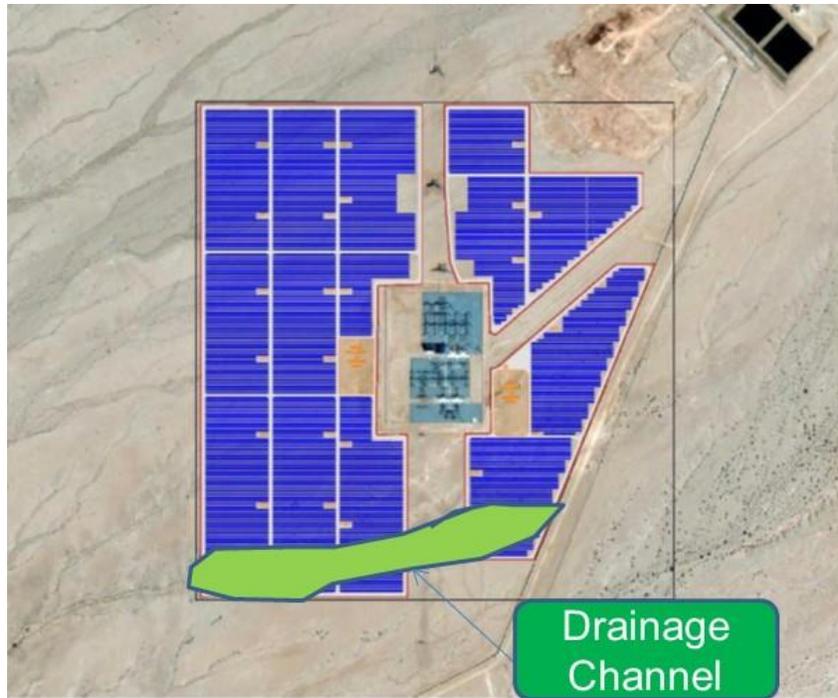
However, none of these birds are exclusively associated with the proposed development although the existing power lines potentially may impact on these species moving through the area, especially Bustards and Flamingos.

## **6.2 Important Areas**

An important ephemeral drainage line is found towards the southwest of the project area. This is also the only vegetated area on the project site:

### **6.2.1 Ephemeral Drainage lines**

A sparsely vegetated ephemeral drainage line is located towards the south west of the project area. These are virtual lifelines to a variety of species that forage along these barren areas. The most important species potentially affected would be Rüppel's Korhaan, Kori and Ludwig's Bustards known to frequent drainage lines for shelter and food.



**Figure 11:** Drainage Channel towards the south of the project area  
*(This is the only vegetated area on the project site)*

**Vegetation that occurs towards the south west of the project area**



***Zygophyllum stapfii***

This plant is endemic to the Namib Desert. It is especially common near Swakopmund and can be found on the beach where it leads to the formation of sand mounds. In sandy areas it collects wind-blown sand to such an extent that only the leaves are visible above a mound of sand. *Zygophyllum stapfii* together with *Arthroa leubnitziae*, often constitute the only shrubby vegetation of the coastal Namib, but unlike the latter, it cannot survive on dew-fall alone and requires ground water.



### **Arthroerua leubnitziae**

A. Leubnitziae is very common on gravel plains, it forms the only vegetation for many kilometres. These low dark green bush species is endemic to Namibia. It traps wind-blown sand to form hummocks. Also known as pencil bush, it one of the few plants in the amaranth family possessing a combination of cuticular waxes, hairs and sunken stomata, which help prevent water loss and damage from sand abrasion.



### **Zygophyllum simplex**

z. simplex is one of the most widely distributed herbs in the Namib desert. Growing close to the ground, its round, succulent leaves, small, white flowers and a yellow to green appearance characterise this plant. Zygophyllum simplex regulates its water uptake under saline conditions by accumulating inorganic solutes and thus able to tolerate a certain degree of salinity in soil.

## **6.2.2 Ecological Sensitivity**

There will be removal of vegetation when activities are conducted in the southern section of the project area. None of the species that occur are threatened or endangered. All new structures will be erected in such a manner as to preserve the original state of the area.

The envisaged impacts at the project sites, are thus not of such magnitude and/ or significance that it will have irreversible impacts on the biodiversity and endemism of the area.

### **6.3 Water**

Rainfall distribution throughout Namibia is extremely variable with evaporation in excess of precipitation. Water availability in general is also variable from one year to the next, making arid and semi-arid regions, such as Namibia, very vulnerable to a succession of dry years. These variations can be attributed to changing weather conditions and, to some extent, (increasing) water-use demands.

The study zone is described by extreme aridity with an average of less than 50 mm of rain per year. Most of the moisture received in this area comes from fog. Fog is also much more predictable than rain. Much of the animal and plant life depend on fog for survival by having developed techniques of harvesting fog droplets on their leaves or bodies.

## **7. Stakeholder Consultation**

The purpose of stakeholder consultation process is to increase awareness by involving people who are directly affected or concerned about this development. This is a vital factor during the planning and success of the development. Allowing stakeholder approval gives assurance and a sense of partnership with the developer and prevents unnecessary disputes and costs during the establishment of the project.

The Proponent has consulted with NAMPOWER, AREVA and the Electricity Control Board regarding the envisaged development. These parties seconded the project seeing that it is a positive development and it will contribute significantly towards alleviating the power shortages in the country.

## **8. Potential Social and Environmental Impacts**

In this chapter, potential environmental impacts associated with the envisaged project are examined. A summary of the potential impacts associated with the envisaged Solar Park construction and operational activities are presented, together with suggested mitigatory measures required to ensure impacts are managed effectively.

An Environmental Management Plan (EMP) is a legally binding document and will form the basis of the environmental contract between the Proponent and the Ministry of Environment and Tourism (MET). In this way, the EIA report and EMP report will assist both parties in ensuring impacts to the environment are minimized during this project.

The below table summarizes the key issues and potential impacts as identified using the information presented above on the descriptions of the planned operation and the existing environment.

Within the accepted broad definition of the term “environment” that applies to Environmental Impact Assessments, it is required to assess potential socio-economic impacts as part of this study. The significance of the impact and the resulting management priority arising from the occurrence of an aspect is considered to be a function of the two factors described below:

**1) Likelihood of the impact:**

An environmental aspect is considered to be the “trigger mechanism” that will result in the occurrence of the environmental impact or consequence. The potential significance of the impact is therefore a function of the likelihood that the impact will occur. (Note: The assessment of likelihood is specific to the occurrence of the aspect and not the activity). The likelihood of an impact is related to the level of control associated with the activity under normal and abnormal conditions and the potential for accidents to happen.

**2) Consequence of the impact:**

Assuming that the impact has taken place, the consequences of the impact is assessed. The effect of pollution to the environment and the business are considered when determining the consequences.

## **8.1 Potential Socio-Economic Impacts**

Within the accepted broad definition of the term “environment” that applies to Environmental Impact Assessments, it is required to assess potential socio-economic impacts as part of this study.

Potential socio-economic factors that are typically associated with an Environmental Impact Assessment are listed below, with a brief comment made in each case as to their relevance and significance to this particular project.

### **8.1.1 Changes in employment opportunities within the region**

It is envisaged that the planned activity will not create significant new employment opportunities.

The current estimations indicate that approximately 30 jobs will be created during construction and 10 permanent jobs will be created once the facility becomes operational. It is not possible to estimate the number of temporary jobs that will be created during the construction phase but it will be limited since existing contractor firms and suppliers will be considered.

### **8.1.2 Changes in the composition of the local community during construction**

Since there will be limited new employment opportunities it is not anticipated that potential jobseekers would “invade” the area.

## **8.2 Environmental Impacts**

Potential environmental impacts associated with the envisaged development are listed below, with a brief comment made in each case as to their relevance and significance to this particular project.

### **8.2.1 Impacts related to the Drainage Channels**

#### **Impact Description:**

There is 1 important drainage channels on the project site. This drainage channel is not regarded as sensitive since the area has already been disturbed due the activities that is associated with the operation of a mine. Ephemeral drainage lines throughout the area – albeit sparsely vegetated – are often habitat to important species.

These drainage lines and associated important vegetation could potentially be affected by poorly placed structures and vehicle routes. Poorly placed access and maintenance routes could also affect certain species if these habitats are disturbed. Future erosion problems can occur if the general relief is not taken into consideration. Off road driving also threatens these desert habitats.

#### **Mitigation:**

The proposed new structures are not expected to adversely affect the overall sparse vegetation at the project areas. Mitigation measures that should be implemented include the following:

- Avoid access routes through the drainage channel;
- Plan activities in drainage line crossing points with the least effect on the flora

### **8.2.2 Visual amenity impacts**

#### **Impact Description**

The area where the development will be located is in a restricted area and not frequented by tourist. The structures and associated power lines may therefore not be visible from the public roads / routes used by the average tourist.

#### **Mitigatory Measure**

The envisaged activity will be in an area where it will be least visible during construction and operation.

### **8.2.3 Impacts related to domestic sewage effluent disposal**

#### **Impact Description**

It is envisaged that employees will not reside within the project area. Domestic effluent or waste could be generated and could potentially pollute the area if not managed properly.

#### **Mitigatory Measure**

Portable ablution facilities should be made available for workers during operational hours.

### **8.2.4 Impacts related to solid waste disposal**

#### **Impact Description**

It is envisaged that solid waste will be generated. Solid waste will mainly be generated from the construction activities. Hazardous wastes e.g. hydraulic oils from heavy equipment may also be generated.

#### **Mitigatory Measures**

All waste that will be generated should be contained on vehicles and disposed at the landfill sites in Swakopmund or Walvis Bay. Recycling of solid waste is encouraged to minimise the amount of waste that goes to landfill.

### **8.2.5 Impacts related to Heritage and Archaeology**

#### **Impact Description:**

Potential impacts to artifacts may arise from excavation activities.

#### **Mitigation:**

There is no known heritage or artefacts that may occur at the project site. There will also be no significant excavations taking place. If such sites are discovered during the construction phase it is vital that they are reported for possible conservation.

## 9. Summary and Conclusions

This document highlights the potential impacts for the envisaged development. It can be concluded that if the necessary mitigatory measures are implemented the potential impacts associated with the development can be minimized. The intended development will be in close proximity to existing roads, power lines and a pipeline. There will be limited disturbance of new areas.

Key findings of the Environmental Impact Assessment Study indicate that the project can be implemented, provided the recommended control measures are implemented.

- The project site has already been disturbed, it is level and very limited earthworks will be required.
- According to Mendelsohn *et al.* (2002) the average plant production in the study area is extremely low, the overall plant diversity (all species) in the general central coastal area is estimated as <50 species but are limited to “higher” plants. Plant endemism is viewed as “medium” – with between 1-15 endemics expected from the general area. The construction activities will be limited to an area that is not regarded as sensitive.
- All development have potential negative environmental consequences, but identifying the most important flora species including high risk habitats beforehand, coupled with environmentally acceptable mitigating factors, lessens the overall impact of such development. Three vegetation species were identified on the project site and it is not endangered or threatened.
- The envisaged development will ensure that infrastructure is developed to cater for future power supply requirements in the Erongo Region.
- The socio economic impacts associated with the scale of this project will not negatively affect the central coastal towns.

It is also imperative that Proponent ensures the mitigatory measures are incorporated and adhered to. It is therefore recommended that these mitigatory measures form part of a legal agreement between the relevant parties.

# 10. Appendix A: Trekkopje Solar: Park Technical Report

## 11. Appendix B: CV of Environmental Assessment Practitioner

### Alan Jenneker - Resume



#### PERSONAL DETAILS

Date of Birth: 17 May 1969  
Birth Place: Windhoek  
Gender: Male  
Nationality: Namibian  
Marital Status: Married  
Home Language: Afrikaans  
Other Language: English (Speak, read, write)  
Drivers license: BE (Light vehicle) & A (Motorcycle)  
Residential Address: 53 Franke St, Vineta  
Swakopmund  
Namibia  
Telephone (Home) +264 64463461  
Office: +264 64404438  
Mobile: +264 811227891

#### KEY AREAS OF COMPETENCE

- Project Management – (Environmental Management, Safety and Software Implementation projects)
- Management Systems Implementations (ISO 14001 / OHSAS 18001, Namibian Legal Compliance)
- Environmental Assessment Process (Environmental Impact Assessment, Environmental Management Plans and Strategic Environmental Assessments)
- Safety and Environmental Auditing
- Risk Assessments (Safety & Environmental)
- Software & Database Development using MS SQL Server, MS Access & Visual Basic for Applications.

#### EDUCATION AND TRAINING

- 1990 National Diploma Chemical Engineering: (Cape Peninsula University of Technology- South Africa)
- 1992 Handling of Chlorine Gas (Department Of Water Affairs, Namibia)

- 1995 Environmental Management ISO 14001 Course – Johannesburg, South Africa
- 1996 Arthur D Little HSE Auditor's Course (USA Accredited course) - Swakopmund, Namibia
- 1997 MS SQL Server & MS Access Database developer Course – Windhoek, Namibia
- 2006 IEMA approved Health, Safety and Environmental Auditor (ISO14001 & OHSAS 18001) – Stellenbosch, South Africa

## PROFESSIONAL EXPERIENCE

### Technical Experience

November 1999 – Current      Business Owner, EnviroSolutions Swakopmund

#### Current Roles and Responsibilities

Business Management	<ul style="list-style-type: none"> <li>• Project Management</li> <li>• Human Resources Management</li> <li>• Sales and Customer Care</li> <li>• Financial Management and Preparation of financial information – (for financial auditors)</li> </ul>
Environmental Impact Assessments (EIA)	<ul style="list-style-type: none"> <li>• Managing the EIA processes and oversee the development of Environmental Management Plans (EMP's)</li> </ul>
Management Systems	<ul style="list-style-type: none"> <li>• Implementation of management systems using ISO 14001 and OHSAS 18001</li> </ul>
Software Development	<ul style="list-style-type: none"> <li>• Oversee the development of Ms Access, Web based and SQL Server Database projects</li> <li>• Development and maintain various Health, Safety and Environmental databases for a wide range of clients</li> </ul>
Weather Monitoring	<ul style="list-style-type: none"> <li>• Sales, Distribution, Maintenance of Davis weather stations in Namibia Interpretation of weather data and compilation of weather reports</li> </ul>

### Projects completed during the past 4 years

The projects listed below are some of the key projects that was completed recently.

Project Type	Short Description
Management Systems:	<ul style="list-style-type: none"> <li>• ERONGO RED: Implementation of ISO 14001 &amp; OHSAS 18001</li> <li>• INDONGO Toyota: Eco Audit and Implementation of ISO 14001</li> <li>• GRINROD Terminal – Walvis Bay Port: - ISO 14001 Implementation</li> <li>• AREVA Processing: Assist with the implementation of OHSAS 18001 management system</li> </ul>
Audit /Risk Assessment	<ul style="list-style-type: none"> <li>• Risk Assessment at Namibia Breweries Ltd processing facility</li> <li>• Risk Assessment for Commercial Cold Storage - – Walvis Bay Port</li> <li>• Audits Aquatic Marine Engineer, RJ Southey - Walvis Bay</li> </ul>
Environmental Impact Assessments	<ul style="list-style-type: none"> <li>• Water front Development: Misty Bay - Walvis Bay</li> <li>• Quarry Activities: Rössing Mountain and the Walvis Bay Municipal area</li> <li>• Tourist Lodges; Sadadi- Okombahe, Ozohere- Uis,</li> <li>• Namibia Poultry Industries: Hatchery, Broiler and Chicken Abattoir</li> </ul>
And	

Environmental Management Plans	<ul style="list-style-type: none"> <li>• Strategic Environmental Assessment for the coastline between Swakopmund and Walvis Bay</li> <li>• Residential Developments; Finkenstein, Sonnleiten, Henties Bay Extension 10</li> <li>• Exploration and Mining Project EIA's – Otjozondu, Aurum Namibia</li> <li>• Fuel Storage Facility EIA's at Ondangwa, Windhoek, Walvis Bay</li> <li>• Cell phone tower installations in Namibia for AGA Technical Services, MTC Namibia and PowerCom</li> <li>• Sand Mining activities in the Swakop River</li> </ul>
Weather Monitoring Instruments– Davis	<ul style="list-style-type: none"> <li>• Commissioning of various weather stations in Namibia.</li> <li>• Develop a weather database for the weather stations in the Naukluft Park. (The database is primarily used to compile wind roses and provision of the weather statistics)</li> <li>• Maintenance, sales and servicing of weather stations</li> </ul>

#### Other relevant completed in the last 4 years

Project Type	Short Description
EIA and EMP's	<ul style="list-style-type: none"> <li>• Establishment of a Super Dairy Farm near Mariental, Namibia (<i>Namibia Dairies Pty Ltd - O&amp;L</i>)</li> </ul>
	<ul style="list-style-type: none"> <li>• Floating Dry Docks  Walvis Bay, Namibia (Elgin Brown and Hamer)</li> </ul>
	<ul style="list-style-type: none"> <li>• Gypsum Mine Naukluft Park, Namibia (Elspe Minerals)</li> </ul>
Coastal Development Policy	<ul style="list-style-type: none"> <li>• Monitoring and Evaluation Specialist for the NACOMA Project - Swakopmund</li> </ul>
Software / Database Development	<ul style="list-style-type: none"> <li>▪ Development and installation of Radiation Control software for AREVA,</li> <li>▪ HSE database for Langer Heinrich Mine,</li> <li>▪ Develop and install HSE databases for Roads Contractor Company and Telecom Namibia</li> </ul>

During the last 12 years I have worked on a number of Health, Safety and Environmental projects, as a project manager. The key purpose of the above summary is to indicate my abilities and the level of experience.

### COMPUTER LITERACY

Applications	Experience Rating
Microsoft SQL Server	Good
Microsoft Access	Excellent
Visual Basic for Applications	Good
Microsoft Word, Excel, PowerPoint	Excellent
Lakes: Wind-Rose Software	Excellent
Web Site design: Dream Weaver, Page Breeze	Good

## PREVIOUS WORK EXPERIENCE

**1994 – 1999:**

**Rössing Uranium Mine, Swakopmund, Namibia: Senior Environmentalist**

- Part of the implementation team that was responsible for the implementation of the Environmental Management Systems (ISO 14001)
- Monitoring of environmental aspects e.g., air quality, noise, radiation, fumes and gases
- Safety and Environmental auditing
- Develop and maintain the Environmental, Medical Surveillance and Occupational hygiene databases.

**1990 – 1994:**

**Department of Water Affairs, Windhoek, Namibia: Chemical Technician**

- Carry out audits at Landfill sites, Mining operations, factories & wastewater disposals facilities in Namibia for water pollution control purposes,( Water Act)
- Provide guidelines to the Government water treatment facilities on effective water purification methods.

**1989 – 1990:**

**Consolidated Diamond Mines, Oranjemund, Namibia: Trainee Metallurgist**

- Metallurgical Plant operator in the diamond extraction process

## LANGUAGE PROFICIENCY

	Reading	Writing	Speaking
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

## REFERENCE

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