BUFFELSPOORT SOLAR PV ENERGY FACILITY AND ASSOCIATED INFRASTRUCTURE, NORTH WEST PROVINCE

ENVIRONMENTAL MANAGEMENT PROGRAMME

November 2022

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EMPR DETAILS

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DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process, or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Assessment: The process or collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Development area: The development area is that identified area (located within the project site) which has been assessed by specialists within this Scoping Report with the aim of identifying areas of sensitivity which should be avoided by the development footprint or facility layout. The development area is ~77ha in extent.

Development footprint: The development footprint is the defined area (located within the development area) where the Solar PV Energy Facility and other associated infrastructure for the Project is planned to be constructed. This is the actual footprint of the facility, and the area which would be disturbed.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows/occur in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that are made up of:
(i) The land, water and atmosphere of the earth;
(ii) Micro-organisms, plant and animal life;
(iii) Any part or combination of (i) and (ii) and the interrelationships among and between them; and
(iv) The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental assessment practitioner (EAP): An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its on-going maintenance after implementation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Incident: Section 30 of NEMA defines an 'incident' as "an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed."[1]

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Mitigation hierarchy: The mitigation hierarchy is a framework for managing risks and potential impacts related to biodiversity and ecosystem services. The mitigation hierarchy is used when planning and implementing development projects, to provide a logical and effective approach to protecting and conserving biodiversity and maintaining important ecosystem services. It is a tool to aid in the sustainable management of living, natural resources, which provides a mechanism for making explicit decisions that balance conservation needs with development priorities.

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted) from any activity, including the storage or treatment or waste or substances.

Project developer: The project developer, Buffelspoort Solar Project (Pty) Ltd will be the party responsible for the construction and day-to-day operation and maintenance of the proposed Solar PV Energy Facility.

Project site: The project site is the aerial extent of the affected properties (~223ha) within which the Buffelspoort Solar PV Energy Facility is proposed.

[1]http://ipwis.pgwc.gov.za/ipwisdoc/Public/Publications/ChemicalsMgt/A%20Procedure%20for%20Section%2030%20of%20NEMA.pdf

Proponent: Applicant/Project Developer, Buffelspoort Solar Project (Pty) Ltd will be the party responsible for the construction and day-to-day operation and maintenance of the proposed Solar PV Energy Facility.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red data species: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: An impact that by its magnitude, duration, intensity, or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to the Waste Amendment Act (as amended on June 2014); or any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister.

ABBREVIATIONS AND ACRONYMS

DFFE	National Department of Forestry, Fisheries and the Environment
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EMPr	Environmental Management Programme
EO	Environmental Officer
EPC	Engineering Procurement Contractor
GG	Government Gazette
GN	Government Notice
Ha	Hectare
HGM	Hydrogeomorphic
I&AP	Interested and Affected Party
km^2	Square kilometres
kV	Kilovolt
m^2	Square meters
m/s	Meters per second
MS	Method Statement
MW	Mega Watt
NEMA	National Environmental Management Act (Act No 107 of 1998)
NHRA	National Heritage Resources Act (Act No 25 of 1999)
NIRP	National Integrated Resource Planning
NWA	National Water Act (Act No 36 of 1998)
NWC	Not Conservation Worthy
NWDEDECT	North West Department of Economic Development, Environment, Conservation and Tourism
PM	Project Manager
PV	Photovoltaic
SHE	Safety, Health and Environment
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited

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CHAPTER 1: INTRODUCTION

This Environmental Management Programme (EMPr) has been compiled for the Buffelspoort Solar PV Energy Facility. . The Project Site is located approximately 6 km west of Mooinooi, within the jurisdiction of the Rustenburg Local Municipality (RLM) and the Bojanala Platinum District Municipality (BPDM) in the North West Province. The Buffelspoort Solar PV Energy Facility will have a contracted capacity of up to 40 MWp and is to be constructed over an area of approximately 57 ha in extent.

This EMPr has been developed on the basis of the findings of the Environmental Impact Assessment (EIA), and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts. This EMPr is applicable to all Buffelspoort Solar Project (Pty) Ltd employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Buffelspoort Solar PV Energy Facility. The document must be adhered to and updated as relevant throughout the project life cycle. This document fulfils the requirement of the EIA Regulations, 2014 (as amended) and forms part of the EIA report of the Project.

In terms of the Duty of Care provision in S28(1) of the NEMA the Project DeveloperDevelopermust ensure that reasonable measures are taken throughout the life cycle of this Project to ensure that any pollution or degradation of the environment associated with the Project is avoided, halted or minimised. In terms of NEMA, it has become the legal duty of a Project Developer to consider a project holistically, and to consider the cumulative effect of a variety of impacts.

CHAPTER 2: PROJECT DETAILS

The Project is to be developed on a site located approximately 6 km west of Mooinooi (refer to **Figure 2.1**). The Project Site is located in the Rustenburg Local Municipality and the Bojanala Platinum District Municipality in the North West Province. The full extent of the Project Site (i.e., 223 ha) was considered during the Scoping Phase of the EIA process, within which the Buffelspoort Solar PV Energy Facility will be appropriately located from a technical and environmental sensitivity perspective. The Project Site over which the Buffelspoort Solar PV Energy Facility and associated Grid Connection Corridor is proposed comprises the following farm portions:

The Development Footprint for the Solar PV comprises the following farm properties:

» Portion 75 of Farm Buffelspoort 343JQ
» Portion 134 of Farm Buffelspoort 343JQ

Grid Connection Corridor

» Portion 75 of Farm Buffelspoort 343JQ
» Portion 88 of Farm Buffelspoort 343JQ
» Portion 89 of Farm Buffelspoort 343JQ
» Portion 101 of Farm Buffelspoort 343JQ
» Portion 119 of Farm Buffelspoort 343JQ
» Portion 120 of Farm Buffelspoort 343JQ
» Portion 121 of Farm Buffelspoort 343JQ
» Portion 122 of Farm Buffelspoort 343JQ
» RE of Portion 101 of Farm Kafferskraal 342JQ
» RE of Portion 148 of Farm Kafferskraal 342JQ
» Portion 236 of Farm Kafferskraal 342JQ
» Portion 303 of Farm Kafferskraal 342JQ
» Portion 374 of Farm Kafferskraal 342JQ
» Portion 376 of Farm Kafferskraal 342JQ

A Development Footprint of ~57 ha has been identified within the Development Area (~77 ha) and assessed for the construction of the facility and its associated infrastructure. The optimal position for the PV facility and associated infrastructure was determined taking into consideration the environmental sensitivities identified through the Scoping and EIA Evaluation. The PV infrastructure have been appropriately placed to optimise the energy generating potential of the solar resource while also minimising impacts on environmental sensitivities.

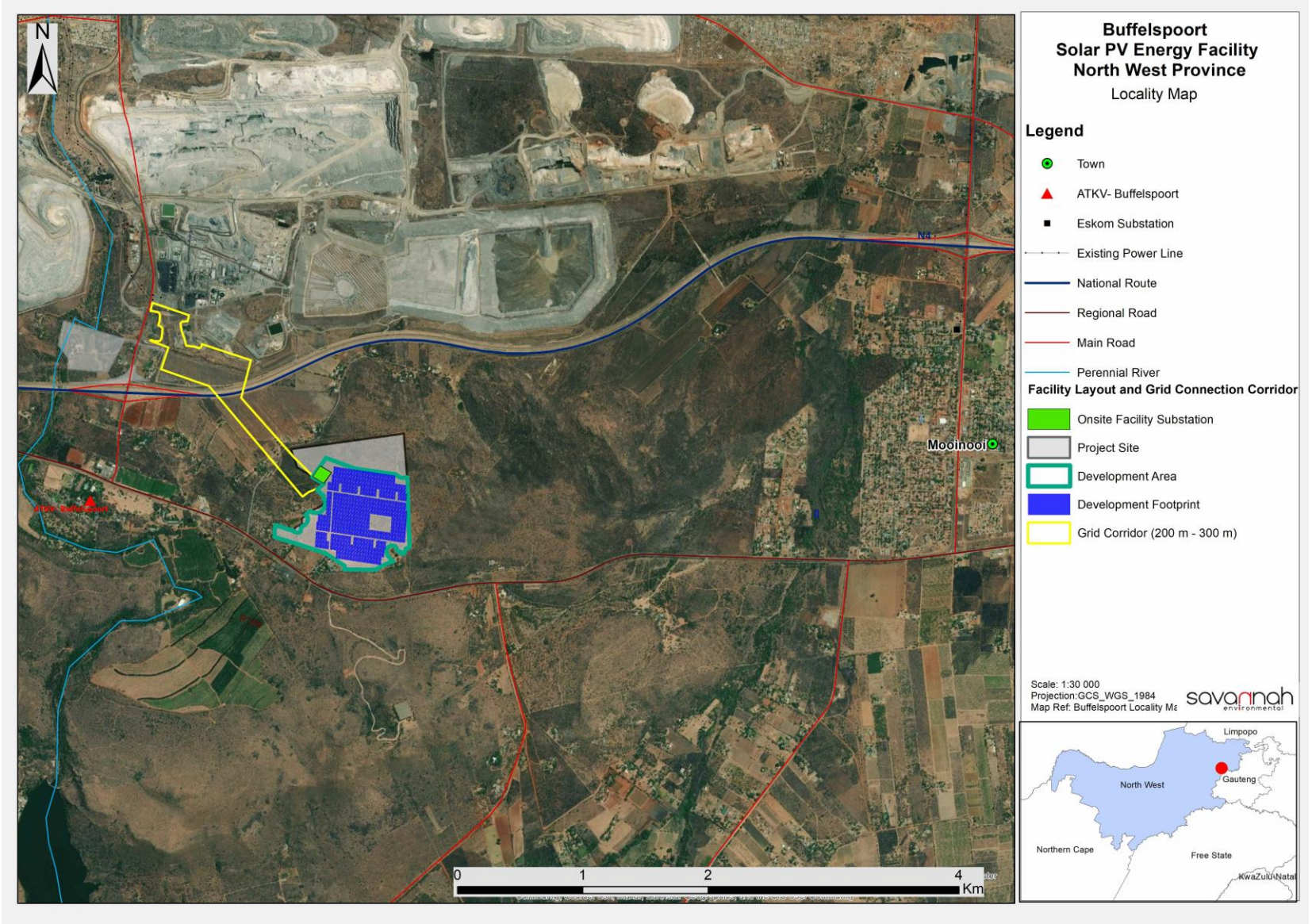

Figure 2.1: Locality map of the Project Site and the Development Area within which the Buffelspoort Solar PV Energy Facility is proposed to be developed.

2.1. Components of the Buffelspoort Solar PV Energy Facility

The Development Footprint is proposed to accommodate the PV panels and all associated infrastructure which is required for such a facility, and will include:

- Solar PV arrays comprising PV panels and mounting structures.
- Inverters and transformers.
- Cabling between the arrays.
- Onsite facility substation.
- 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed Project Site.
- Battery Energy Storage System (BESS[2]) – to be initiated at a later stage than the Solar PV Energy Facility.
- Temporary laydown area.
- Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop.
- Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads.
- Fencing around the site, including an access gate.

A summary of the details and dimensions of the planned infrastructure associated with the project is provided in **Table 2.3.**

Table 2.3: Details or infrastructures proposed as part of the Project.

Infrastructure	Footprint and dimensions
Number of Modules	Up to 75 000 modules (560 Wp modules for the generation of up to 40 MWp)
Contracted Capacity	Up to 40 MWp
Area occupied by the solar array	up to 20 ha
Panel Height	Up to 3 m
Technology	The Project will make use of fixed-tilt or single-axis tracking PV technology and bifacial panels
Inverters	» Up to 116 inverters

[2] The BESS is included as part of the ESIA process albeit that the facility will only be installed after the Solar PV Energy Facility has come into operation. The total electricity requirements for the offtaker are currently under review and an energy master plan is being developed, which will only be finalised post implementation of the Solar PV Energy Facility to address all the electricity needs of the offtaker. The BESS has been included in this ESIA in order to ensure that should the energy master plan require this component to be included sooner than expected that it has already been authorized.

Infrastructure	Footprint and dimensions
	» Height: 660mm
BESS	» Proposed technology: Lithium - Ion or Lithium-iron-phosphate or Redox Vanadium battery technology » Footprint: up to 2 ha » Height: Up to 3 m » Proposed capacity of battery storage: 30 MW / 4 hours of usable energy at Beginning of Life
Other infrastructures	» Fencing: 3 m high around 4 400m » O&M building (including site security office, warehouse, storage area and workshop): 500 m^2, 3 m high
Area occupied by temporary laydown area	2 x 2 500m^2
Area occupied by the onsite facility substation	1 ha
Capacity of onsite facility substation	88 kV
Access and internal roads associated with the facility	An existing access road, which may be upgraded with hard surface, will be used to access the facility (up to 6m wide). Newly proposed internal gravel roads will be established between the arrays (3.5 m wide) and around the boundary of the site (2.5 m wide).
Grid connection	A grid connection corridor, which is up to 200-30 0m wide and 2.5 km long to allow for avoidance of environmental sensitivities and technical constraints, and suitable placement of the overhead power line within the corridor has been assessed as part of the S&EIA process. The dimensions of newly proposed overhead power line are provided below: Capacity and circuit of the power line: 88kV (single circuit) Power line servitude width: 32m Height of the power line towers (pylons):16-24m During construction, a permanent access road along the length of the power line corridor between 4 – 8m wide will be established to allow for large crane movement. This track will then be utilised for maintenance during operation.

Infrastructure	Footprint and dimensions
Temporary infrastructure	Temporary infrastructure, including laydown areas, hardstand areas and a concrete batching plant, will be required during the construction phase. All areas affected by temporary infrastructure will be rehabilitated following the completion of the construction phase, where it is not required for the operational phase.

Table 2.4 provides details regarding the requirements and the activities to be undertaken during the Buffelspoort Solar PV Energy Facility development phases (i.e., construction phase, operation phase and decommissioning phase).

2.2. Activities and Components associated with the Buffelspoort Solar PV Energy Facility

Table 2.4: Details of the Buffelspoort Solar PV Energy Facility project development phases (i.e., construction, operation, and decommissioning)

Construction Phase	
Requirements	» Project receives Environmental Authorisation from NW DEDECT. » Construction period expected to be up to 12 months. » Create direct construction employment opportunities. The number of employment opportunities to be created during the construction phase will be derived as the Project modelling progresses during the EIA Phase but is estimated at approximately 200 jobs for the construction phase. The number estimation will be further fine tuned during the post -EIA phase as well. This will be dependent on the EPC and contracting discussions. » No on-site labour camps are planned to be established during the construction phase. Workers will be sourced from the neighbouring towns and will be transported to site daily. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a suitably qualified sub-contractor. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when construction activities are undertaken. » Electricity required for construction activities will be sourced from the off-taker. The off-taker is is in the process of upgrading the Eskom power supply to the Quarantine facility where a construction power point will be made available. The upgrade to the electricity supply is expected to be completed by end March 2023.. » Water required for the construction phase will be sourced from the onsite boreholes (x3) and stored in storage tanks. Should the required WUL not be obtained in time the project will source water from the WSA - RLM and trucked to site until the WUL is approved. » Sewage due to the presence of personnel on-site will be produced during the construction phase. Mobile chemical toilets will be used, and these will be emptied and maintained regularly.
Activities to be undertaken	
Conduct surveys prior to construction	» Including, but not limited to a geotechnical survey, topographical survey and hydrological survey; site survey and confirmation of the panel micro-siting footprint and micro-siting of the pylons of the power line; and survey of the onsite facility substation site to determine and confirm the locations of all associated infrastructure.

Undertake site preparation	» Including the clearance of vegetation at the footprint of PV panel foundation, onsite substation, power line tower positions, establishment of the laydown area, the establishment of internal access roads and excavations for foundations. » Vegetation clearance to be undertaken in a systematic manner to reduce the risk of exposed ground being subjected to erosion. » Stripping of topsoil to be stockpiled, for use during rehabilitation. » Include search and rescue of floral and faunal species of concern (where required) and the identification and excavation of any sites of cultural/heritage value (where required).
Establishment of access roads to the site and internal roads	» Internal gravel access roads between the arrays (3.5 m wide) and around the boundary of the site (2.5 m wide) will be established at the commencement of construction. » An existing access road, which might possibility be upgraded with hard surface, will be used to access the facility (up to 6 m wide). » During construction, a permanent access road along the length of the power line corridor between 4 – 8 m wide will be established to allow for large crane movement.
Establishment of laydown area and temporary concrete batching plant	» A laydown area for the storage of PV panels, Project components, cabling and other construction equipment. » The laydown will also accommodate building materials and equipment associated with the construction of buildings. » No borrow pits will be required. Infilling or depositing materials will be sourced from licenced borrow pits within the surrounding areas. » A temporary concrete batching plant of 25 m x 25 m in extent to facilitate the concrete requirements for foundations, if required.
Construct foundation	» Excavations to be undertaken mechanically. » For PV array installation vertical support posts will be driven into the ground. » Depending on geological conditions, the use of alternative foundations may be considered (e.g., screw pile, helical pile, micropile or drilled post/piles). » Ramming of the piles or predrilling with concrete filling will be considered if the ground is found to be hard.
Transport of components and equipment to and within the site	» The components for the Solar PV Energy Facility and onsite substation will be transported to site by road. Transportation will take place via appropriate National and Provincial roads, and the dedicated access/haul road to the Project Site. » Some of the components (i.e., substation transformer) may be defined as abnormal loads in terms of the Road Traffic Act (Act No. 29 of 1989) by virtue of the dimensional limitations. » Typical civil engineering construction equipment will need to be brought to the Project Site (e.g., excavators, trucks, graders, compaction equipment, cement trucks, etc.) as well as components required for the mounting of the PV support structures, construction of the substation and site preparation.
Erect PV Panels and Construct Substation, Invertors and BESS	» The construction phase involves installation of the solar PV panels and the structural and electrical infrastructure to make the plant operational. In addition, preparation of the soil and improvement of the access roads would continue for most of the construction phase. » For array installation, typically vertical support posts are driven into the ground. Depending on the results of the geotechnical study a different foundation method, such as screw pile, helical pile, micro-pile or drilled post/pile could be used. The posts will hold the support structures (tables) on which PV arrays would be mounted. Brackets attach the PV modules to the tables.

	» Trenches are dug for the underground Alternate Current (AC) and Direct Current (DC) cabling, and the foundations of the inverter enclosures and transformers are prepared. While cables are being laid and combiner boxes are being installed, the PV tables are erected. » Wire harnesses connect the PV modules to the electrical collection systems. » Underground cables and overhead circuits connect the Power Conversion Stations (PCS) to the onsite AC electrical infrastructure and ultimately the Project's onsite substation. This process also involves the installation of the BESS facility[3]. The following simplified sequence is conducted for the construction of the substation: » Step 1: Conduct geotechnical investigations to determine founding conditions; » Step 2: Conduct site survey; » Step 3: Vegetation clearance and construction of access road; » Step 4: Site grading and levelling; » Step 5: Construction of foundations; » Step 6: Import of collector substation components; » Step 7: Construction of collector substation; » Step 8: Rehabilitation of disturbed area and protection of erosion sensitive areas; and » Step 9: Testing (including quality control) and commissioning (in consultation with the switching specialist).
Connection of PV panels to the onsite substation	» PV arrays to be connected to the onsite substation via underground electrical cables. » Excavation of trenches is required for the installation of the cables. Trenches will be approximately 1.5 m deep. » Underground cables are planned to follow the internal access roads, as far as possible. » Onsite substation to be connected to the collector substation via underground cables.
Construction overhead power line to connect the onsite facility substation to the existing 88kV substation	An 88kV single circuit overhead power line will be constructed to connect the onsite facility substation to an existing 88kV substation. Overhead power lines are constructed in the following simplified sequence: » Step 1: Surveying of the development corridor and negotiating with affected landowner; » Step 2: Final design and micro-siting of the infrastructure based on geo-technical, topographical conditions and potential environmental sensitivities; obtain required environmental permits (such as biodiversity permits, heritage permits & WUL/GA); » Step 3: Vegetation clearance and construction of access roads/tracks (where required); » Step 4: Construction of pylon foundations; » Step 5: Assembly and erection of infrastructure within and along the corridor; » Step 6: Stringing of conductors; » Step 7: Rehabilitation of disturbed areas; and

[3] The BESS is included as part of the ESIA process albeit that the facility will only be installed after the Solar PV Energy Facility has come into operation. The total electricity requirements for the off-taker are currently under review and an energy master plan is being developed, which will only be finalised post implementation of the Solar PV Energy Facility to address all the electricity needs of the off-taker. The BESS has been included in this ESIA in order to ensure that should the energy master plan require this component to be included sooner than expected that it has already been authorized.

	» Step 8: Continued maintenance.
Establishment of ancillary infrastructure	» An O&M building, which will include a site security office, warehouse, storage area and workshop will be required. » Establishment of ancillary infrastructure will require the clearing of vegetation, levelling, and the excavation of foundations prior to construction.
Undertake site rehabilitation	» Commence with rehabilitation efforts once construction is completed in an area, and all construction equipment is removed. » On commissioning, access points to the site not required during the operation phase will be closed and prepared for rehabilitation.
Operation Phase	
Requirements	» Duration will be up to 15 years or as required by the off-taker (with the possibility to extend should it be required). » Requirements for security and maintenance of the Project. » Employment opportunities relating mainly to operation activities and maintenance. The number of employment opportunities to be created during the operation phase will be derived as the Project modelling progresses during the EIA Phase and is anticipated to be approximately 20 permanent jobs. The number estimation will be further fine tuned during the post -EIA phase as well. This will be dependent on the EPC and contracting discussions. » Overnight on-site worker presence would be limited to security staff. » Waste removal and sanitation will be undertaken by a suitably qualified sub-contractor. Waste containers, including containers for hazardous waste, will be located at easily accessible locations on site when operation activities are undertaken. » During the operational phase, water will mostly be required for the cleaning of panels and will be sourced from the onsite boreholes (x3) where it will be stored in storage tanks. » Sewage due to the presence of maintenance personnel on-site will be produced during the operation phase. Septic Tanks and French drains are installed to catch up all dirt and sewage water. These are emptied, when necessary, by the service provider – DEONAK. Therefore, during the operation phase, the toilets at the O&M Building will be used by maintenance personnel.
Activities to be undertaken	
Operation and Maintenance	» Full time security, maintenance, and control room staff. » All PV panels will be operational except under circumstances of mechanical breakdown, inclement weather conditions, or maintenance activities. » The Solar PV Energy Facility will be subject to periodic maintenance and inspection. » It is anticipated that the PV panels will be washed more than twice a year during operation using clean water with no cleaning products or using non-hazardous biodegradable cleaning products. The exact number of cleaning cycles will be confirmed once more knowledge on the soiling on the Project Site is obtained. » Areas which were disturbed during the construction phase to be utilised, should a laydown area be required during operation.
Decommissioning Phase	
Requirements	» Decommissioning of the Project at the end of its economic life. » Potential for repowering of the facility, depending on the condition of the facility at the time. » Expected lifespan of approximately 15 years (with maintenance) or as required by the off-taker before decommissioning is required.

	» A decommissioning Environmental Management Programme (EMPr) will be drafted and complied with at that decommissioning stage of the project lifecycle. » Decommissioning activities to comply with the legislation relevant at the time.
Activities to be undertaken	
Site preparation	» Confirming the integrity of access to the site to accommodate the required decommissioning equipment. » Preparation of the site (e.g., laydown areas and construction platform). » Mobilisation of equipment and machinery.
Disassemble and remove PV panels	» Components to be reused, recycled, or disposed of in accordance with regulatory requirements. » Much of the above ground wire, steel, and PV panels of which the system is comprised are recyclable materials and would be recycled to the extent feasible. » Concrete will be removed to a depth as defined by an agricultural specialist and the area rehabilitated. Cables will be excavated and removed, as may be required.

It is expected that the areas of the Development Area affected by the Solar PV Energy Facility infrastructure (Development Footprint) will revert back to the original land-use (i.e., agriculture and mining) once the Buffelspoort Solar PV Energy Facility has reached the end of its economic life and all infrastructure has been decommissioned.

2.3. Findings of the EIA Report

The EIA Report, together with the specialist studies provide a detailed assessment of the potential impacts that may result from the development of the Buffelspoort Solar PV Energy Facility. No environmental fatal flaws or unacceptable impacts were identified in the detailed specialist studies conducted, provided that the recommended mitigation measures are implemented. The Development Footprint has been defined to avoid any sensitive features.

The potential environmental impacts associated with the Buffelspoort Solar PV Energy Facility assessed through the EIA process include:

- Impacts on terrestrial ecology (flora and fauna).
- Impacts on Aquatic ecology.
- Impacts on avifauna.
- Impacts on soils and agricultural potential.
- Impacts on heritage resources, including archaeology, palaeontology, and the cultural landscape.
- Visual impacts on the area imposed by the components of the facility.
- Positive and negative social impacts.

The environmental sensitivities identified by the relevant specialists for the Development Area as discussed in the following sections are illustrated in **Figure 2.2**. The Development Footprint, as assessed, has been overlain with the relevant environmental sensitivities.

2.3.1. Impacts on Terrestrial Ecology (including flora and fauna)

The Project Site is situated within the Savanna Biome. The savanna vegetation of South Africa represents the southern-most extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna Biome include a seasonal precipitation and a sub-tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006).

The Savanna Biome is the largest biome in South Africa, extending throughout the east and north-eastern areas of the country. Savannas are characterised by a dominant grass layer, over topped by a discontinuous, but distinct woody plant layer (Mucina & Rutherford, 2006). At a structural level, Africa's savannas can be broadly categorised as either fine-leaved (*microphyllous*) savannas or broad-leaved savannas. Fine-leaved savannas typically occur on nutrient rich soils and are dominated by *microphyllous* woody plants of the Mimosaceae family (Common genera include *Vachellia* and *Albizia*) and a generally dense herbaceous layer (Scholes & Walker, 1993).

The present land use had a direct impact on both the fauna and the flora in the area, which is evident in the disturbed and transformed habitats. Historically, land clearing and the subsequent mismanagement has led to the deterioration of most of the area to a disturbed habitat that has not recovered since. However, the degraded Bushveld habitat in the wider project area can be regarded as important, not only within the local landscape, but also regionally; as they are used for habitat, foraging and movement corridors for fauna within a landscape fragmented by development.

The degraded Bushveld habitat in the Project Site has a **High ecological theme sensitivity**.

The habitat sensitivity of the degraded Bushveld and wetland/water resources is regarded as high and medium respectively, due to the species recorded and the role of this intact unique habitat to biodiversity within a very fragmented local landscape, not to mention the sensitivity according to various ecological datasets.

The high sensitivity terrestrial areas still:

» Support nearby CBA/ESAs as per the conservation plan (NWBSP);
» Viable constituent of and EN ecosystem, NPAES, IBA and Biosphere Reserve; and
» Support various organisms and may play an important role in the ecosystem, if left to recover from the superficial impacts.

The ecological integrity, importance and functioning of these terrestrial biodiversity areas provide a variety of ecological services considered beneficial, with one key service being the maintenance of biodiversity. The preservation of these systems is the most important aspect to consider for the proposed Project.

Development in high sensitivity areas must be avoided, which will occur with the selection of the Project Site. Development within the high sensitivity areas within the Project Site will lead the direct destruction and loss of functional habitats; and the faunal species that are expected to utilise this habitat. Thus, if these areas are not maintained in a natural or near natural state, destroyed or fragmented, then meeting targets for biodiversity features will not be achieved. The mitigation measures, management and associated monitoring regarding the expected impacts will be the most important factor of this Project.

The main expected impacts of the proposed Project will include:

» Habitat loss and fragmentation;
» Degradation of surrounding habitat;
» Disturbance and displacement caused during the construction and maintenance phases; and
» Direct mortality during the construction phase.

Mitigation measures as described in this report can be implemented to reduce the significance of the risk. Considering that this area that has been identified as being of significance for biodiversity maintenance and ecological processes, development may proceed but with caution and only with the implementation of mitigation measures.

Considering the above-mentioned information, no fatal flaws are evident for the proposed Project. It is the opinion of the specialists that the proposed Project, may be favourably considered, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

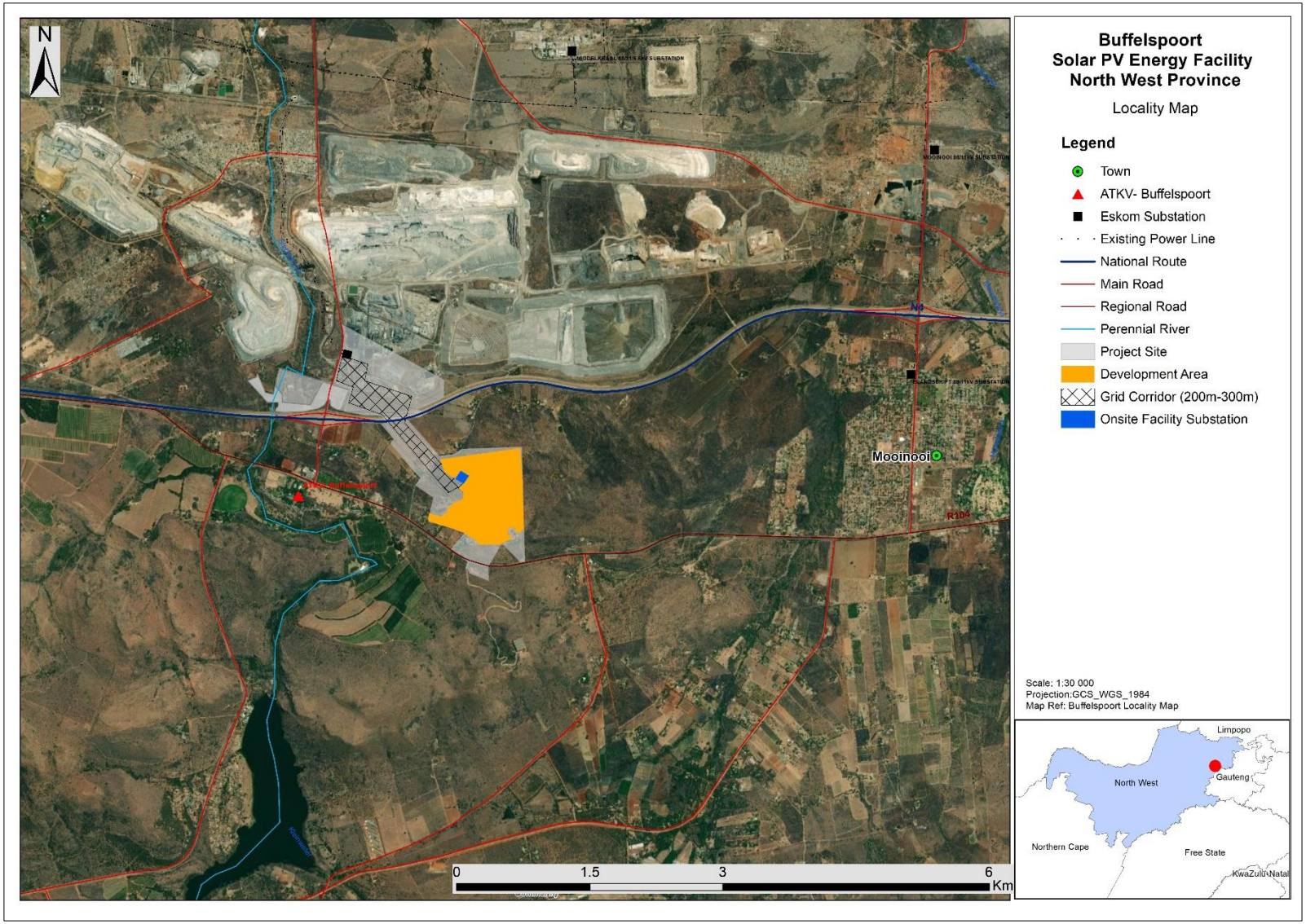

Figure 2.2: The Development Footprint of the Buffelspoort Solar PV Energy Facility, as assessed within the EIA Report

2.3.2. Impacts on Aquatic Ecology

During the site visit, four (4) HGM units were identified within the 500 m regulated area. The wetland areas were delineated in accordance with the DWAF (2005) guidelines. Two (2) HGM units have been identified as depression wetlands, one (1) has been identified as a hillslope seep wetland and one (1) as a unchannelled valley bottom wetland. Along with the wetlands multiple drainage features as well as artificial wetlands and a few dams were also delineated. Although these systems do not classify as a natural wetland system it is important to note where they are and to preserve them.

The depression and hillslope seep wetlands scored a "Low" importance and sensitivity score due to the low protection level in the ecosystem as it is location in the agricultural fields meaning that the wetland will be stripped from all hydrophyte vegetation which limits its ability to contribute to biodiversity maintenance and to provide habitat for species. The average ecosystem service score ranges between "Moderately Low" and "Moderately High".

A 15 m post mitigation buffer was assigned to the wetland systems.

Based on the results and conclusions presented in this section of the report, it is expected that the proposed activities will have low residual impacts on the wetlands and thus no fatal flaws were identified for the Project. A General Authorisation (GN 509 of 2016) is required for the water use authorisation.
The following Zones of Regulation (ZoR) are applicable to the drainage line identified within the assessment area:

- A 32 m Zone of Regulation in accordance with the National Environmental Management Act, 1998 (Act No. 107 of 1998) should be assigned to the drainage lines; and
- A 100 m ZoR in accordance with the National Water Act, 1998 (Act No. 36 of 1998) should be assigned to the drainage lines.

2.3.3. Impacts on Avifauna

During the field assessment fifty-seven (57) bird species were recorded in the point counts of the survey, while thirty-six (36) species were recorded during incidental observations. None of the species recorded were SCC. The species recorded were generalist species, this is somewhat of a concern for an area that is a nature reserve. It is likely that the low number of species could be attributed to the season of the survey. The low number of water birds recorded is likely attributed to poor water quality in both the man-made dams on site and in the nearby Sterkstroom river. Only three (3) types of water birds were observed at three (3) dams and along two points of the Sterkstroom.

The different habitat types within the Development Footprint were delineated and identified based on observations during the field assessment as well as available satellite imagery. These habitat types were assigned Ecological Importance (EI) categories based on their ecological integrity, conservation value, the presence of species of conservation concern and their ecosystem processes. The sensitivities were compiled for the avifauna study based on the one survey. All habitats within the Development Footprint were allocated a

sensitivity category. The water resources in the area are of high ecological importance not only as a source of water but also because of the unique habitat they offer in the area surrounding them. The Degraded Bushveld had a unique assemblage of bird species due to the rocky outcrops found in this area, but as no species of conservation concern (SCC) were recorded the site sensitivity was rated as Medium. The Disturbed Bushveld had a composition of bird species that are adapted to change and disturbance as such the site sensitivity was rated as Low.

The proposed Project will have a high or medium impact on the avifauna which, in most instances, could be reduced to a lower impact through appropriate mitigation. Based on the current types of bird species recorded in the Development Footprint the proposed Project will not have a high residual impact should all the mitigations and recommendations be implemented.

No fatal flaws are evident for the proposed Project. It is the opinion of the specialists that the proposed Project, may be favourably considered, on condition that all prescribed mitigation measures and supporting recommendations are implemented.

2.3.4. Impacts on Soils and Agricultural Potential

The most sensitive soil forms identified within the Project Site is the Hutton and Tukulu soil forms, with other associated soils also occurring. The Hutton soil form consists of an orthic topsoil horizon on top of a thick red apedal subsurface diagnostic horizon below. The Tukulu soil form consists of an orthic topsoil on top of a thick neocutanic horizon underlain with gleyic horizon.

The land capability of the above-mentioned soils has been determined to have land capability classes of "II" and "III" with a climate capability level 8 given the low Mean Annual Precipitation (MAP) and the high Mean Annual Potential Evapotranspiration (MAPE) rates. The combination between the determined land capabilities and climate capabilities results in land potentials "L5" and "L6". The "L5" land potential level is characterised by a restricted potential. Regular and/or moderate to severe limitations occur due to soil, slope, temperatures or rainfall. The "L6" land potential level is characterised by a very restricted potential. Regular and/or severe limitations occur due to soil, slope, temperatures or rainfall. These areas are non-arable. The "L5" and "L6" land potential are characterized with a "Low Sensitivity".

The land capability sensitivity (DAFF, 2017) indicates a range of sensitivities expected throughout the Project Site, which predominantly covers "Moderately Low" to "Moderate" sensitivities. Smaller patches are characterised by sensitivities up to "Moderately High". Furthermore, various crop field boundaries were identified by means of the DEA Screening Tool (2022), which indicated that the grid connection corridor is predominantly characterised by "High" sensitivity crop fields. It is mainly recommended that high sensitivity crop field be avoided. However, in the event that relocating of the Project Site is not feasible, stakeholders should undertake an evaluation of possible agreement with the landowners prior to any development in those areas.

The Project Site is associated with both arable and non-arable soils. However, the available climatic conditions of low annual rainfall and high evapotranspiration potential severely limits crop production significantly resulting

in land capabilities with "Low" and "Moderate high" sensitivities. The land capabilities associated with the Project Site are suitable for cropping and grazing, which corresponds with the current land use.

The final results indicate "Low" post-mitigation significance ratings for the proposed Project. It is therefore clear that the proposed Project is expected to have a low impact on land potential resources. It is the specialist's opinion that the proposed Project will have no impacts on the agricultural production ability of the land and therefore may be favourably considered.

2.3.5. Impacts on Heritage Resources (archaeology, palaeontology, and cultural landscape)

During the fieldwork, a total of seven (7) heritage features and resources where identified. These consist of one (1) burial ground with approximately 100 graves, three (3) localities with recent historic structures and one (1) kraal, as well as two (2) low to moderate significance archaeological sites.

Archaeological Resources

The two archaeological sites identified, are characterised by large areas of stonewalling (BFP-01 and BFP-03). Site BFP-01 consists of a long continuous stone wall running along a raised outcrop, although no other cultural material was identified within the proposed Development Footprint. The Project Developer has excluded this site employing buffers put in place for the layout of the solar energy facility. Site BFP-03 is a large stone wall site with numerous stone-walled enclosures. It appears the area was already disturbed as it now functions as a feeding ground for the game in the area. There is evidence of some of the stonewalling being destroyed whereas others still appear to be in their original state, no other cultural material was identified in the area. It is located just outside (at the north-eastern corner) of the proposed Development Footprint.

The sites BFP01 and BFP03 have a low and moderate heritage significance respectively and a heritage rating of IIIC and IIIB.

Burial Grounds and Graves

A single burial ground consisting of approximately 100 graves was identified at site BFP-02. The site was indicated to the fieldwork team by the owner of the property. The informal graveyard lies just outside (west) the proposed Development Footprint. Although the area is overgrown by vegetation, some of the graves are still identifiable and consist mainly of stone-packed or stone-lined grave dressings, except for a few concrete or marble grave dressing features. Due to the cultural and religious significance of burial grounds, the site is graded as Grade IIIA.

The site BFP-02 has a high heritage significance and heritage rating of IIIA. This site has high heritage sensitivity.

Historical Structures

The recent historic structures (BFP-04, BFP-06 and BFP-07) and the kraal (BFP-05) are all younger than 60 years and vary in preservation. They are all currently abandoned. The structures and remains of structures are not conservation worthy and contain no cultural or scientific value and are consequently graded as not conservation worthy (NCW).

BFP-04, BFP-05, BFP-06 and BFP-07 were rated as not conservation worthy and of no heritage significance.

Palaeontology

According to the PalaeoMap of SAHRIS, the Palaeontological Sensitivity of the proposed Development Footprint is zero or insignificant

Overall conclusion

Heritage resources are present within the Development Footprint of the Buffelspoort Solar PV Energy Facility. The initial projected impact is rated as LOW to HIGH on these heritage resources before mitigation measures. Through the combination of the various environmental, cultural, and socio-economic sensitivities, the client can develop a layout option that will reduce the impact on the heritage resources. The proposed layout reduces the impact on the heritage resource identified to LOW.

2.3.7. Visual Impacts

The findings of the Visual Impact Assessment undertaken for the proposed Buffelspoort PV Solar facility and its associated infrastructure is that the visual environment surrounding the site, especially within a 1km radius (and potentially up to a radius of 3km) of the proposed facility, may be visually impacted during the anticipated operational lifespan of the facility (i.e. a minimum of 15 years).

The following is a summary of impacts remaining, assuming mitigation as recommended, is exercised:

- During construction, there may be a noticeable increase in heavy vehicles utilising the roads to the development site that may cause, at the very least, a visual nuisance to other road users and residents in the area. Construction activities may potentially result in a high, temporary visual impact, that may be mitigated to moderate.
- The Solar PV Energy Facility is expected to have a high visual impact pre-mitigation and a moderate visual impact post mitigation on residents of homesteads and observers travelling along the R104 and N4 within a 1 km radius.
- The operational Solar PV Energy Facility could have a moderate visual impact on observers travelling along the R104 and residents at homesteads north south of the N4 including visitors to the AKTV resort within a 1 – 3km radius of the Solar PV Energy Facility structures. This impact may be mitigated to low.
- The anticipated impact of lighting at the Solar PV Energy Facility is likely to be of moderate significance and may be mitigated to low.
- The potential visual impact related to solar glint and glare as a road travel hazard is expected to be of moderate significance mitigated to low significance.
- There are a fair number of residences located within a 1km radius of the Solar PV Energy Facility. The potential visual impact related to solar glint and glare on static ground-based receptors (residents of homesteads) is therefore expected to be of low significance, both before and after mitigation.
- The anticipated visual impact resulting from the construction of on-site ancillary infrastructure is likely to be of moderate significance both before and after mitigation.
- The anticipated visual impact of the proposed Solar PV Energy Facility on the regional visual quality (i.e. beyond 6km of the proposed infrastructure), and by implication, on the sense of place, is difficult to quantify, but is generally expected to be of low significance.

The anticipated visual impacts listed above (i.e. post mitigation impacts) range from moderate to low significance. Anticipated visual impacts on sensitive visual receptors (if and where present) in close proximity to the proposed Solar PV Energy Facility are not considered to be fatal flaws for the proposed Project. Considering all factors, it is recommended that the development of the Solar PV Energy Facility as proposed be supported, subject to the implementation of the recommended mitigation measures and management programme.

2.3.8. Socio-Economic Impacts

Impacts are expected to occur with the development of Buffelspoort Solar PV Energy Facility during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Potential Social Impacts during the Construction Phase

The positive and negative social impacts identified and assessed for the construction phase includes:

- Creation of direct, indirect and induced employment opportunities
- Economic multiplier effect
- Industry stimulation
- Influx of jobseekers and change in population structure
- Safety and security impacts
- Impacts on daily living and movement patterns
- Nuisance impacts, including noise and dust

Potential Social Impacts during the Operation Phase

It is anticipated that the Project will operate for approximately 15years, or as long as required by the private off-taker.

The potential positive and negative social impacts that could arise because of the operation of the proposed Project include the following:

- Direct and indirect employment opportunities
- Development of renewable energy infrastructure
- Visual impact and sense of place impacts

2.3.8. Assessment of Cumulative Impacts

Impacts are expected to occur with the development of Buffelspoort Solar PV Energy Facility during the construction, operation and decommissioning phases. Both positive and negative impacts are identified and assessed.

Potential Social Impacts during the Construction Phase

The positive and negative social impacts identified and assessed for the construction phase includes:

» Creation of direct and indirect and induced employment opportunities
» Economic multiplier effects
» Industry stimulation
» Influx of jobseekers and change in population structure
» Safety and security impacts
» Impacts on daily living and movement patterns
» Nuisance impacts, including noise and dust

Potential Social Impacts during the Operation Phase

It is anticipated that the Project will operate for approximately 15 years, or as long as required by the private off-taker.

The potential positive and negative social impacts that could arise because of the operation of the proposed project include the following:

» Direct and indirect employment opportunities
» Development of renewable energy infrastructure
» Visual impact and sense of place impacts

The proposed Project will create a number of potential socio-economic opportunities and benefits and is unlikely to result in permanent damaging social impacts. From a social perspective it is concluded that the Project is acceptable subject to the implementation of the recommended mitigation and enhancement measures and management actions identified for the Project.

Based on the social assessment, the following recommendations are made:

» In terms of employment related impacts, it is important to consider that job opportunities for the unskilled and semi-skilled are scarce commodities in the study area and could create competition among the local unemployed. Introducing an outside workforce will therefore most likely worsen local endeavors to obtain jobs and provoke discontent as well as put pressure on the local services available. Local labour should be utilised to enhance the positive impact of employment creation in the area. Local businesses should be involved with the construction activities where possible. It is imperative that local labour be sourced to ensure that benefits accrue to the local communities. Preference should thus be given to the use of local labour during the construction and operational phases of the project as far as possible.
» Locals should also be allowed an opportunity to be included in a list of possible local suppliers and service providers, enhancing the multiplier effect. This aspect would serve to mitigate other subsequent negative impacts such as those associated with the inflow of outsiders to the area, the increased pressure on the infrastructure and services in the area, as well as the safety and security concerns.
» Nuisance Impacts associated with the construction period should be carefully mitigated to minimise any dust and noise pollution.

» Safety and security concerns should be considered during the planning and construction phases of the proposed Project.

Considering the findings of the report and potential for mitigation it is the reasoned opinion of the specialist that the Project can be authorised from a social perspective.

2.3.9. Assessment of No-go Alternative

Cumulative impacts and benefits on various environmental and social receptors will occur to varying degrees with the development of several renewable energy facilities in South Africa. The degree of significance of these cumulative impacts is difficult to predict without detailed studies based on more comprehensive data/information on each of the receptors and the site-specific developments. The alignment of renewable energy developments with South Africa's National Energy Response Plan and the global drive to move away from the use of non-renewable energy resources and to reduce greenhouse gas emissions is undoubtedly positive. The economic benefits of renewable energy developments at a local, regional and national level have the potential to be significant.

The are several authorised renewable energy projects within a 30km radius of the proposed site, namely:

» 7 MW PV Plant on the Farm Spruitfontein
  » Lonmin Western Plantinum Limited with Madibeng Local Municipality
  » Avelar Solar Panel project for International Ferro Metals
  » Rustmo3 PV plant North West
  » Rustmo4 PV plant North West
  » Expansion of the Co-generation plant
  » Construction of PV Solar Panels on the Rietpoort 395 IQ Mogale City local Municipality
  » Construction of the Rustmo2 PV plant on a site near Buffelspoort, Rustenburg local Municipality

All cumulative impacts associated with the Project are expected to be of a medium or low significance, with impacts of a high significance associated with the visual impacts.

2.3.10. Assessment of the Facility Layout

Taking into consideration the solar resource, proximity to the off-taker and point of interconnection, land availability and suitability, geographical and topographical location, access to road infrastructure and proximity to towns with a need for socio-economic upliftment, the development of the Project within the Development Footprint is considered to be desirable. The Development Footprint within which the facility is proposed is sufficient in extent for the installation of a solar PV facility, while allowing for the avoidance of environmental site sensitivities. Similarly, the power line corridor identified is sufficient for the placement of the power line while allowing for the avoidance of environmental sensitivities. To ensure avoidance of these sensitive environmental features, the facility layout has been optimised by the Project Developer. This approach ensures the application of the mitigation hierarchy (i.e., avoid, minimise, mitigate and offset) to the Buffelspoort Solar PV project, which ultimately ensures the avoidance, reduction and/or mitigation of all identified detrimental or adverse impacts on sensitive features as far as possible.

In summary the Environmental sensitivities identified include:

- Degraded bushveld
- Heritage features
- Wetland systems
- Rocky outcrop

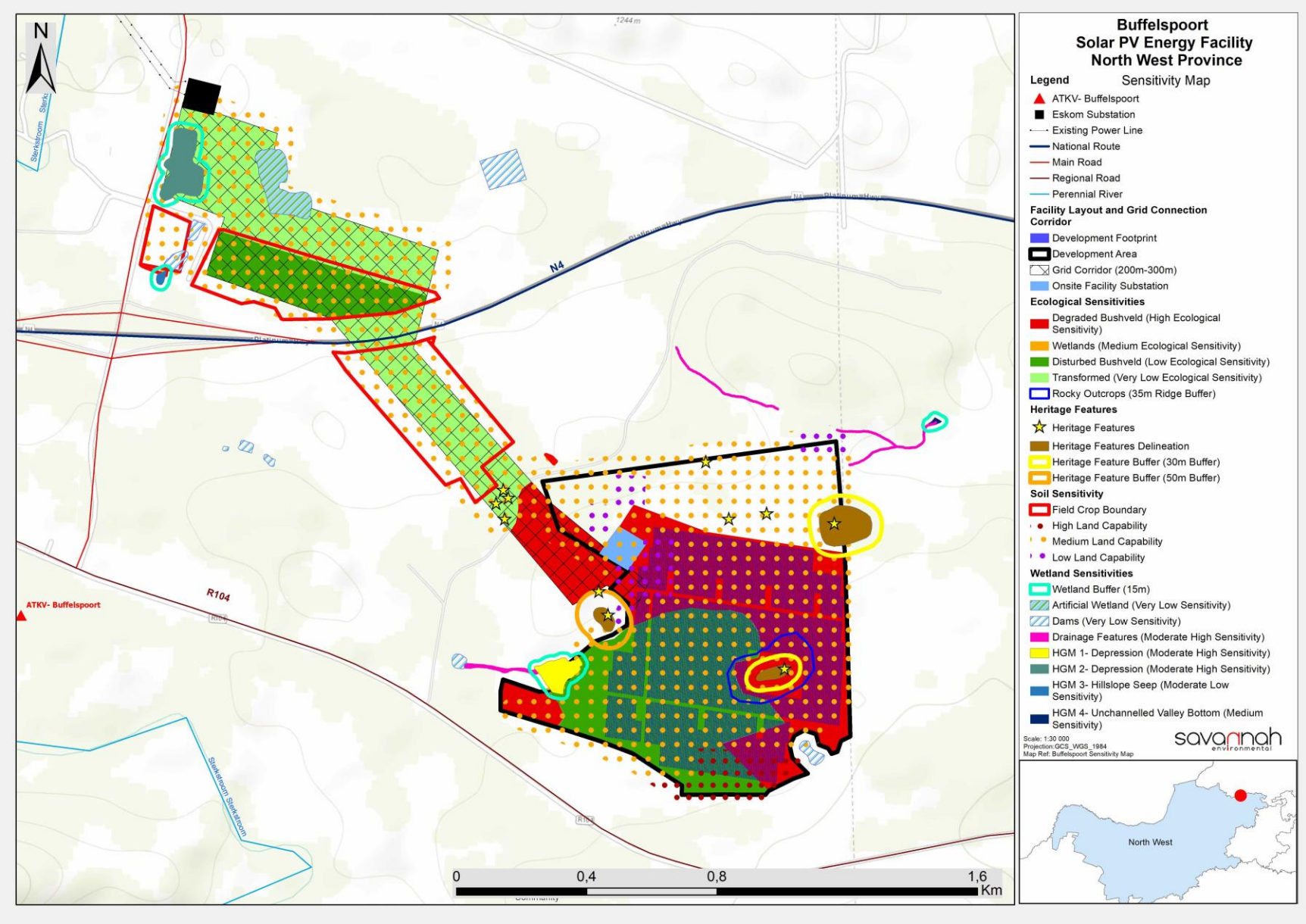
N
N4
R104
ATKV- Buffelspoort
Sterkstroom Sterkstroom
0
0,4
0,8
1,6
Km
Buffelspoort
Solar PV Energy Facility
North West Province
Legend
Sensitivity Map
ATKV- Buffelspoort
Eskom Substation
Existing Power Line
National Route
Main Road
Regional Road
Perennial River
Facility Layout and Grid Connection Corridor
Development Footprint
Development Area
Grid Corridor (200m-300m)
Onsite Facility Substation
Ecological Sensitivities
Degraded Bushveld (High Ecological Sensitivity)
Wetlands (Medium Ecological Sensitivity)
Disturbed Bushveld (Low Ecological Sensitivity)
Transformed (Very Low Ecological Sensitivity)
Rocky Outcrops (35m Ridge Buffer)
Heritage Features
Heritage Features
Heritage Features Delineation
Heritage Feature Buffer (30m Buffer)
Heritage Feature Buffer (50m Buffer)
Soil Sensitivity
Field Crop Boundary
High Land Capability
Medium Land Capability
Low Land Capability
Wetland Sensitivities
Wetland Buffer (15m)
Artificial Wetland (Very Low Sensitivity)
Dams (Very Low Sensitivity)
Drainage Features (Moderate High Sensitivity)
HGM 1- Depression (Moderate High Sensitivity)
HGM 2- Depression (Moderate High Sensitivity)
HGM 3- Hillslope Seep (Moderate Low Sensitivity)
HGM 4- Unchannelled Valley Bottom (Medium Sensitivity)
Scale: 1:30 000
Projection:GCS_WGS_1984
Map Ref: Buffelspoort Sensitivity Map
savannah environmental
North West

Figure 2.3: The Development Footprint of the Buffelspoort Solar PV Energy Facility, as assessed as part of the EIA, overlain on the identified sensitive environmental features

2.3.11. Environmental Costs versus Benefits of the Buffelspoort Renewable Energy Facility

Environmental costs (including those to the natural environment, economic and social environment) can be anticipated at a local and site-specific level and are considered acceptable provided the mitigation measures as outlined in the EIA Report and the EMPr are implemented and adhered to. No fatal flaws have been identified. These environmental costs could include:

- Loss of biodiversity, flora and fauna due to the clearing of land for the construction and utilisation of land for the Solar PV Energy Facility - The cost of loss of biodiversity has been minimised/avoided through the limited placement of project components and infrastructure within the ecological features, and sensitive areas considered to be of high sensitivity.
- Impact on avifauna - The current types of bird species recorded in the Development Footprint will not have a high residual impact should all the mitigations and recommendations be implemented.
- Impacts on aquatic resources – The Project will not result in any direct impacts on water resources and as a result has a low residual impact on aquatic ecology.
- Visual impacts associated with the Project - The Project will be visible and mainly of a high significance within 0 to 3km distance from the site. No mitigation of this impact is possible (i.e., the structures will be visible in the landscape), but general mitigation and management are required as best practise to minimise secondary visual impacts which may arise from mismanagement of the site.
- Loss of land for agriculture – The overhead power line is proposed to transect some high sensitivity crop fields, but it is expected that impacts can be reduced through appropriate placement of infrastructure. With mitigation, the proposed Project will have a low impact on the land potential resources.
- Negative impact to the Heritage resources – Various heritage resources are within the Development Area including archaeological resources and burial grounds and graves which are rated as having a high heritage significance and will require further mitigation work before the Project can continue. Implementation of the recommended management and mitigation measures can reduce the impact rating to Low.

Benefits of the Project include the following:

- The Project will result in important economic benefits at the local and regional scale through job creation, income and other associated downstream economic development. These will persist during the pre-construction, construction, operation and decommissioning phases of the Project.
- The Project contributes towards the Provincial and Local goals for the development of renewable energy as outlined in the respective IDPs.
- The Buffelspoort Solar PV Energy Facility is a climate friendly development. The uptake of renewable energy offers the opportunity to address energy needs in an environmentally responsible manner and thereby allows South Africa to contribute towards mitigating climate change through reducing greenhouse gas (GHG) emissions. South Africa is estimated to be responsible for ~1% of global GHG emissions and currently ranked 9th worldwide in terms of per capita CO2 emissions.

The private offtaker will contribute towards pollution reduction as it will not entail the release of by-products through the burning of fossil fuels for electricity generation, but will utilise a renewable energy resource, in this case solar radiation.

- The Project will improve the grid stability as the private offtake will be less depended on the Eskom Energy supply.

The benefits of the Project are expected to occur at a national, regional, and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure in the development area within medium and low sensitive areas, and through the avoidance of features and areas considered to be of high and very high sensitivity, the benefits of the Project are expected to partially offset the localised environmental costs of the Project.

2.3.12. Overall Conclusion (Impact Statement)

A technically viable Development Footprint for the Project was proposed by Buffelspoort Solar Project (Pty) Ltd and assessed as part of the EIA process. The environmental assessment of the Development Footprint was undertaken by independent specialists and their findings have informed the results of this EIA Report. Buffelspoort Solar Project (Pty) Ltd has proposed a technically viable layout for the Project and associated infrastructure, which has been assessed as part of the independent specialist studies.

From a review of the relevant policy and planning framework, it was concluded that the Project is well aligned with the policy framework, and a clear need for the Project is seen from a policy perspective at a local, provincial and National level.

The Specialists considered desktop data, results from field work, existing literature and the National Web-based Environmental Screening Tool to inform the identification of sensitivities. The specialist findings have concluded that there are no identified environmental fatal flaws associated with the implementation of the Project. The impacts that are expected to remain after the avoidance of the sensitive areas have been reduced through the recommendation of specific mitigation measures by the specialists. The minimisation of the significance of the impacts is in line with tier 2 of the mitigation hierarchy.

Therefore, it is concluded that impacts can be mitigated to acceptable levels or enhanced through the implementation of the recommended mitigation or enhancement measures. This is however not relevant for the visual impact of the Project as the PV modules and associated infrastructure will be visible within 0 to 3km of the site regardless of the mitigation applied. This high significance rating is, however, not considered as a fatal flaw by the specialist.

As detailed in the cost-benefit analysis, the benefits of the Project are expected to occur at a national, regional and local level. As the costs to the environment at a site-specific level have been largely limited through the appropriate placement of infrastructure within the Development Footprint within lower sensitive areas through the avoidance of features and areas considered to be sensitive, the benefits of the Project are expected to partially offset the localised environmental costs of the Buffelspoort Solar PV Energy Facility. From a social perspective, both positive and negative impacts are expected.

Through the assessment of the Development Footprint within the Project Site, it can be concluded that the development of the Project will not result in unacceptable environmental impacts (subject to the implementation of the recommended mitigation measures).

2.3.13. Overall Recommendation

Considering the findings of the independent specialist studies, the impacts identified, the Development Footprint proposed by the Project Developer, the avoidance of the sensitive environmental features within the Development Footprint, as well as the potential to further minimise the impacts to acceptable levels

through mitigation, it is the reasoned opinion of the EAP that the Project is acceptable within the landscape and can reasonably be authorised subject avoidance the sensitive areas identified through the EIA process and the implementation of recommended mitigation measures. The following Project details should be included within the EA for the Project:

» The Buffelspoort Solar PV Facility with a contracted capacity of up to 40MWp, to be located on Portions 75 and 134 of the Farm Buffelspoort 343 JQ and has an aerial extent of approximately 77ha. The grid connection infrastructure is to be located within an assessment corridor that varies in width from 200m to 300m and is up to 2.5km in length and traverses Portion 75, 88, 89, 101, 119, 120, 121, 122 of Farm Buffelspoort 343 JQ, the Remainder of Portion 101 Farm Kafferskraal 342 JQ, and Portion 148, 236, 303, 374, 376 of Farm Kafferskraal 342 JQ.

The following infrastructure is to be included within an authorisation issued for the project:

» Solar PV arrays comprising PV panels and mounting structures.
» Inverters and transformers.
» Cabling between the arrays.
» Onsite facility substation.
» 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site.
» Battery Energy Storage System (BESS)[4] – to be initiated at a later stage than the Solar PV Energy Facility.
» Temporary laydown area.
» Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop.
» Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads.
» Fencing around the site, including an access gate.

[4] The BESS is included as part of the ESIA process albeit that the facility will only be installed after the Solar PV Energy Facility has come into operation. The total electricity requirements for the offtaker are currently under review and an energy master plan is being developed, which will only be finalised post implementation of the Solar PV Energy Facility to address all the electricity needs of the offtaker. The BESS has been included in this ESIA in order to ensure that should the energy master plan require this component to be included sooner than expected that it has already been authorized.

CHAPTER 3: PURPOSE AND OBJECTIVES OF THE EMPR

An Environmental Management Programme (EMPr) is defined as "an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented or mitigated, and that the positive benefits of the projects are enhanced". The objective of this EMPr is to provide consistent information and guidance for implementing the management and monitoring measures established in the permitting process and help achieve environmental policy goals. The purpose of an EMPr is to help ensure continuous improvement of environmental performance, reducing negative impacts and enhancing positive effects during the construction and operation of the facility. An effective EMPr is concerned with both the immediate outcome as well as the long-term impacts of the Project.

The EMPr provides specific environmental guidance for the construction and operation phases of a project and is intended to manage and mitigate construction and operation activities so that unnecessary or preventable environmental impacts do not result. These impacts range from those incurred during start up (site clearing and site establishment) through to those incurred during the construction activities themselves (erosion, noise, dust) to those incurred during site rehabilitation (soil stabilisation, re-vegetation) and operation. The EMPr also defines monitoring requirements in order to ensure that the specified objectives are met.

This EMPr is applicable to all employees and contractors working on the pre-construction, construction, and operation and maintenance phases of the Buffelspoort Solar PV Energy Facility. The document must be adhered to and updated as relevant throughout the project life cycle.

This EMPr has been compiled in accordance with Appendix 4 of the EIA Regulations, 2014 (as amended). This is a dynamic document and will be further developed in terms of specific requirements listed in any authorisations issued for the Buffelspoort Solar PV Energy Facility and/or as the Project develops. The EMPr has been developed as a set of environmental specifications (i.e., principles of environmental management). The specifications have been developed on the basis of the findings of the EIA and must be implemented to protect sensitive on-site and off-site features through controlling construction, operation and decommissioning activities that could have a detrimental effect on the environment, and through avoiding or minimising potential impacts.

The EMPr has the following objectives:

- Outline mitigation measures and environmental specifications which are required to be implemented for the planning, construction, rehabilitation, and operation phases of the project in order to minimise the extent of environmental impacts, and to manage environmental impacts associated with the Buffelspoort Solar PV Energy Facility.
- Ensure that the construction and operation phases do not result in undue or reasonably avoidable adverse environmental impacts and ensure that any potential environmental benefits are enhanced.
- Identify entities who will be responsible for the implementation of the measures and outline functions and responsibilities.
- Propose mechanisms and frequency for monitoring compliance and prevent long-term or permanent environmental degradation.

» Facilitate appropriate and proactive responses to unforeseen events or changes in project implementation that were not considered in the EIA process.

The mitigation measures identified within the EIA process are systematically addressed in the EMPr, ensuring the minimisation of adverse environmental impacts to an acceptable level.

Buffelspoort Solar Project (Pty) Ltd must ensure that the implementation of the Project complies with the requirements of all environmental authorisations, permits, and obligations emanating from relevant environmental legislation. This obligation is partly met through the development and the implementation of this EMPr, and through its integration into the relevant contract documentation provided to parties responsible for construction and/or operation activities on the Project Site. The adequacy and efficacy of implementation is to be monitored by an independent Environmental Control Officer (ECO). Since this EMPr is part of the EIA process for the Buffelspoort Solar PV Energy Facility, it is important that this document be read in conjunction with the EIA Report compiled for this Project. This will contextualise the EMPr and enable a thorough understanding of its role and purpose in the integrated environmental management process. Should there be a conflict of interpretation between this EMPr and the Environmental Authorisation (EA), the stipulations in the EA shall prevail over that of the EMPr, unless otherwise agreed by the Competent Authority in writing. Similarly, any provisions in legislation overrule any provisions or interpretations within this EMPr.

This EMPr shall be binding on all the parties involved in the planning, construction and operational phases of the Project and shall be enforceable at all levels of contract and operational management within the Project. The document must be adhered to and updated as relevant throughout the project life cycle.

CHAPTER 4: STRUCTURE OF THIS EMPR

The first three (3) chapters provide background to the EMPr and the Buffelspoort Solar PV Energy Facility, while the chapters which follow consider the following:

» Planning and design activities;
» Construction activities;
» Operation activities; and
» Decommissioning activities.

These chapters set out the procedures necessary for Buffelspoort Solar Project (Pty) Ltd as the Project Developer, to minimise environmental impacts and achieve environmental compliance. For each of the phases of implementation, an over-arching environmental **goal** is stated. In order to meet this goal, a number of **objectives** are listed. The EMPr has been structured in table format in order to show the links between the goals for each phase and their associated objectives, activities/risk sources, mitigation actions, monitoring requirements and performance indicators. A specific EMPr table has been established for each environmental objective.

The information provided within the EMPr table for each objective is illustrated below:

OBJECTIVE: Description of the objective, which is necessary to meet the overall goals; which take into account the findings of the EIA specialist studies

Project component/s	List of project components affecting the objective, i.e.: » PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	Brief description of potential environmental impact if objective is not met.
Activity/risk source	Description of activities which could impact on achieving objective.
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion.

Mitigation: Action/control	**Responsibility**	**Timeframe**
List specific action(s) required to meet the mitigation target/objective described above.	Who is responsible for the measures	Time periods for implementation of measures

Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting.

The objectives and EMPr tables are required to be reviewed and possibly modified throughout the life of the Project whenever changes, such as the following, occur:

» Planned activities change (i.e. in terms of the components of the Project).
» Modification to or addition to environmental objectives and targets.
» Additional or unforeseen environmental impacts are identified and additional measures are required to be included in the EMPr to prevent deterioration or further deterioration of the environment.
» Relevant legal or other requirements are changed or introduced.
» Significant progress has been made in achieving an objective or target such that it should be re-examined to determine if it is still relevant or should be modified, etc.

4.1. Project Team

This EMPr was compiled by:

Debbie-Lee Janse van Rensburg, the principle author of this EMPr, holds a Bachelor of Arts in Psychology, Geography and Environmental Management and a BSc. Honors degree in Environmental Science from the North West University. Her key focus is on undertaking environmental authorisation applications, environmental permitting, public participation, environmental impact assessments, and GIS mapping.

» Nkhensani Masondo, the principle author of this report and EAP on this project is registered with the Environmental Assessment Practitioners Association of South Africa (EAPASA (2020/1385) and holds a BSocSci in Environmental Analysis and Management and is currently completing her MSc in Environmental Management. She has six (6) years of working experience in the environmental field and has gained extensive experience in conducting Environmental Impact Assessments, Stakeholder Engagements, Environmental Auditing and Environmental Management Plans Programmes for a wide range of projects. She is responsible for overall compilation of the report, this includes reviewing specialists reports and incorporating specialist studies into the Basic Assessment report and its associated Environmental Management.

» **Jo-Anne Thomas**, is a registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA - 2019/726) and a Professional Natural Scientist with the South African Council for Natural Scientific Professions (SACNASP). She provides technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Her key focus is on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures.

» **Bregardia Rabbie** is a Public Participation Consultant at Savannah Environmental. She has six (6) years working experience in project management and coordinating public participation processes in the Telecommunication industry. She has good communication skills and utilizes this skill to manage

interaction between National, Provincial, and local authorities and the community. Bregardia is skilled at organising, managing, and coordinating public participation and engagement projects effectively and timeously.

In order to adequately identify and assess potential environmental impacts associated with the proposed Buffelspoort Solar PV Energy Facility, the following specialist sub-consultants have provided input into this EMPr Report:

Specialist	Area of Expertise
Jan Jacobs, Rian Pienaa, Martinus Erasmusand Andrew Husted of The Biodiversity Company	Terrestrial Ecology (including flora, fauna and avifauna), Aquatic and soils
Nondumiso Bulunga andMolatela Ledwaba of Savannah Environmental (Pty) Ltd and peer reviewed by Tony Barbour of Tony Barbour Environmental Consulting	Social
Lourens du Plessis of LoGIS	Visual
Wouter Fourie and Michelle Sachse of PGS Heritage	Heritage (including archaeology and palaeontology)

The Savannah Environmental team have extensive knowledge and experience in EIA and environmental management, having been involved in EIA processes for more than sixteen (16) years. They have managed and drafted EMPrs for other power generation projects throughout South Africa, including numerous wind and solar energy facilities.

CHAPTER 5: ROLES AND RESPONSIBILITIES

OBJECTIVE 1: Establish clear reporting, communication, and responsibilities during construction in relation to the overall implementation of the EMPr

For the purposes of the EMPr, the generic roles that need to be defined are those of the:

» Project Developer;
» Project Manager/Site Manager;
» Environmental Control Officer (ECO);
» Contractors; and
» Contractor's Safety, Health and Environment Representative/Environmental Officer.
»

It is acknowledged that the specific titles for these functions may vary once the Project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during Project implementation.

i) The Project Developer

As the Project Developer, the Buffelspoort Solar Project (Pty) Ltd must ensure that the implementation of the Project complies with the requirements of all environmental authorisations and all other permits, and obligations emanating from other relevant environmental legislation.

ii) Project Manager/Site Manager

The Project Manager/Site Manager is responsible for overall management of Project and EMPr implementation. The following tasks will fall within his/her responsibilities:

» Be fully conversant with the EIA for the Project, the EMPr, the conditions of the EA, and all relevant environmental legislation.
» Be fully knowledgeable with the contents of all relevant environmental and development licences and permits.
» Be familiar with the recommendations and mitigation measures of this EMPr and implement these measures.
» Ensure all specifications and legal constraints specifically with regards to the environment are highlighted to the Contractor(s) so that they are aware of these.
» Monitor site activities on a daily basis for compliance.
» Ensure that the EMPr is correctly implemented throughout the Project's life cycle by means of site inspections and meetings. This must be documented as part of the site meeting minutes.
» Conduct internal audits of the construction site against the EMPr.
» Confine the construction site to the demarcated area.
» Rectify transgressions through the implementation of corrective action.

iii) Environmental Control Officer

A suitably qualified ECO[5] must be appointed by the Project Developer prior to the commencement of any authorised activities and will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specifications of the EMPr and the conditions of the EA. Accordingly, the ECO will:

- Be fully knowledgeable of the contents of the EIA Report.
- Be fully knowledgeable of the contents of the conditions of the EA for the Project.
- Be fully knowledgeable of the contents of the EMPr.
- Be fully knowledgeable of all the licences and permits issued for the Project Site.
- Be fully knowledgeable of the contents of all relevant environmental legislation.
- Ensure that the contents of the EMPr are communicated to the Contractors' site staff and that the Project Manager/Site Manager and Contractors are constantly made aware of the contents through ongoing discussion.
- Ensure that the compliance of the EMPr, EA and the legislation is monitored through regular and comprehensive inspection of the Project Site and surrounding areas.
- Ensure that the Project Manager/Site Manager has input into the review and acceptance of construction methods and method statements or site-specific plans.
- Ensure that if the EMPr, EA and/or the legislation conditions, regulations or specifications are not followed then appropriate measures are undertaken to address any non-compliances (for example an ECO may cease construction or an activity to prevent a non-compliance from continuing).
- Ensure that any non-compliance or remedial measures that need to be applied are reported.
- Keep records of all activities on the Project Site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO.
- Independently report to the NWDEDECT in terms of compliance with the specifications of the EMPr and conditions of the EA.
- Keep records of all reports submitted to NWDEDECT.

The ECO must be present full-time on site for the site preparation and initial clearing activities to ensure the correct demarcation of no-go areas, to facilitate environmental induction with construction staff and supervise any flora relocation and faunal rescue activities that may need to take place during the site clearing phase of Project implementation (i.e. during site establishment, and excavation of foundations). Thereafter, monthly compliance audits can be undertaken, provided that adequate compliance with the EA, environmental permits and EMPr is achieved. The developer should appoint a designated Environmental Officer (EO) to be present on-site to deal with any environmental issues as the arise. The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site handed over for operation.

iv) EPC Contractors

The Lead Engineering, Procurement and Construction (EPC) Contractor is responsible for the following:

- Ensure compliance with the EA, environmental permits and the EMPr at all times during construction.

[5] The ECO should have a relevant degree or technical diploma in environmental management and at least 2 years' experience in the field.

- Have the overall responsibility of the EMPr and its implementation.
- Ensure that all appointed contractors and sub-contractors are aware of the EMPr and their respective responsibilities.
- Provide all necessary supervision during the execution of the Project.
- Comply with any special conditions as stipulated by landowners.
- Inform and educate all employees about the environmental risks associated with the various activities to be undertaken, and highlight those activities which should be avoided during the construction process in order to minimise significant impacts to the environment.
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
  - Public involvement / complaints
  - Health and safety incidents
  - Hazardous materials stored on site
  - Non-compliance incidents
  - Ensure that no actions are taken which will harm or may indirectly cause harm to the environment and take steps to prevent pollution on the Project Site.
- Where construction activities are undertaken is close to any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants.
- ECO is to conduct audits to ensure compliance to the EMPr.
- Ensure there is communication with the Project Manager, the ECO, and relevant discipline engineers on matters concerning the environment.
- Should the Contractor require clarity on any aspect of the EMPr the Contractor must contact the ECO for advice.

Contractors and service providers must be aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts.

The Contractor's obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the Project Site and the surrounding environment.
- A copy of the EMPr must be easily accessible to all on-site staff members.
- Employees must be familiar with the requirements of this EMPr and the environmental specifications as they apply to the construction of the Project.
- Prior to commencing any site works, all employees and sub-contractors must have attended an environmental awareness training course which must provide staff with an appreciation of the Project's environmental requirements, and how they are to be implemented.
- Staff will be informed of environmental issues as deemed necessary by the ECO.

All Contractors (including sub-contractors and staff) and service providers are ultimately responsible for:

- Ensuring adherence to the environmental management specifications.
- Ensuring that Method Statements are submitted to the Project Manager/Site Manager (and ECO) for approval before any work is undertaken.

- Any lack of adherence to the above will be considered as non-compliance to the specifications of the EMPr.
- Ensuring that any instructions issued by the Project Manager/Site Manager on the advice of the ECO are adhered to.
- Ensuring that a report is tabled at each site meeting, which will document all incidents that have occurred during the period before the site meeting.
- Ensuring that a register is kept in the site office, which lists all transgressions issued by the ECO.
- Ensuring that a register of all public complaints is maintained.
- Ensuring that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the EMPr (i.e. ensure their staff are appropriately trained as to the environmental obligations)

v) Contractor's Safety, Health and Environment Representative/Environmental Officer

The Contractor's Safety, Health and Environment (SHE) Representative/Environmental Officer (EO), employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this EMPr, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the SHE/EO must act as liaison and advisor on all environmental and related issues and ensure that any complaints received from the public are duly recorded and forwarded to the Site Manager and Contractor.

The Contractor's SHE/EO should:

- Develop and Implement an Environmental and Social Management System (ESMS) for the Project's construction phase.
- Be well versed in environmental matters.
- Understand the relevant environmental legislation and processes.
- Development and enforcement of MS on behalf of the contractor.
- Understanding and implementation of the EMPR, EA and all other relevant permits.
- Understand the hierarchy of Environmental Compliance Reporting, and the implications of Non-Compliance.
- Know the background of the Project and understand the implementation programme.
- Be able to resolve conflicts and make recommendations on site.
- Keep accurate and detailed records of all EMPr-related activities on the Project Site.

OBJECTIVE 2: Establish clear reporting, communication, and responsibilities during operation in relation to overall implementation of the EMPr during operation

Formal responsibilities are necessary to ensure that key procedures are executed during operation. Several professionals will form part of the operation team. For the purposes of the EMPr, the generic roles that need to be defined are those of the:

- Operations Manager; and
- Environmental Manager

It is acknowledged that the specific titles for these functions may vary once the Project is implemented. The purpose of this section of the EMPr is to give a generic outline of what these roles typically entail. It is expected that this will be further defined during Project implementation.

i) Operations Manager

The Operations Manager will:

» Ensure that adequate resources (human, financial, technology) are made available and appropriately managed for the successful implementation of the operational EMPr.
» Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
» Take appropriate action as a result of findings and recommendations in management reviews and audits.
» Provide forums to communicate matters regarding environmental management.

ii) Environmental Manager

The Environmental Manager will:

» Develop and Implement an Environmental and Social Management System (EMS) for the operational phase of the Project.
» Compile environmental policies and procedures.
» Manage and report on the Solar PV Energy Facility's environmental performance.
» Maintain a register of all known environmental impacts and manage the monitoring thereof.
» Conduct internal environmental audits and co-ordinate external environmental audits.
» Liaise with statutory bodies (such as the National and Provincial Department of Environmental Affairs and conservation authorities) on environmental performance and other issues.
» Conduct environmental training and awareness for the employees who operate and maintain the Solar PV Energy Facility.
» Liaise with interested and affected parties (IAPs) on environmental issues of common concern.
» Conduct annual basis reviews of the EMPr to evaluate its effectiveness.
» Take appropriate action as a result of findings and recommendations in management reviews and audits.
» Provide forums to communicate matters regarding environmental management.

The Environmental Manager must provide fourteen (14) days written notification to the NWDEDECT that the Buffelspoort Solar PV Energy Facility operational phase will commence.

CHAPTER 6: MANAGEMENT PROGRAMME: PLANNING AND DESIGN

Overall Goal: undertake the pre-construction (planning and design) phase in a way that:

- Ensures that the design of the Project responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements.
- Ensures that adequate regard has been taken of identified environmental sensitivities, as well as any landowner and community concerns and that these are appropriately addressed through design and planning (where applicable).
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.
- Ensures that the best environmental options are selected for the Project.

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

6.1. Objectives

OBJECTIVE 1: To ensure that the design of the facility responds to the identified environmental constraints and optimise low sensitivity environmental areas

If accepted by the North West Department of Economic Development, Environment, Conservation and Tourism (NWDEDECT), the Development Footprint detailed in **Figure 2.2**, must be implemented. Cognisance of sensitive areas defined in **Figure 2.3** and detailed within the EIA Report should be considered when undertaking the final design of the Project.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Design fails to respond optimally to the identified environmental considerations.

Activities/risk sources	» Positioning of PV arrays and alignment of access roads, powerline and underground cabling where feasible. » Positioning of onsite substation. » Positioning of laydown areas. » Pre-construction activities, e.g. geotechnical investigations.
Mitigation: Target/Objective	» To ensure that the design of the Project responds to the identified environmental constraints and opportunities, including the constraints identified through the EIA process. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner by e.g. avoiding identified sensitive areas. » Optimal planning of visual infrastructure to minimise visual impact.

Mitigation: Action/control	Responsibility	Timeframe
Plan and conduct pre-construction activities in an environmentally responsible manner and in a manner that does not lead to unnecessary impacts and disturbance.	Project Developer EPC Contractor	Pre-construction
Consider design level mitigation measures recommended by the specialists, especially with respect to flora, fauna, aquatic ecology, avifauna, and heritage sites, as detailed within the EIA Report and relevant appendices.	Project Developer EPC Contractor	Design phase
Ensure that laydown areas, construction camps and other temporary use areas are located in areas of low and medium sensitivity.	Project Developer EPC Contractor	Design phase
Existing watercourse crossings should be utilised/upgraded as far as possible.	Project Developer EPC Contractor	Design phase
Should watercourses need to be crossed for the construction of the powerline or any of the proposed facility access roads, existing crossings need to be used and where necessary upgraded to avoid any additional impact on the watercourse.	Project Developer EPC Contractor	Design phase
Road infrastructure and cable alignments should coincide as far as possible to minimise the impact	Project Developer r EPC Contractor	Design phase
Under no circumstances must new channels be created for flow diversion and conveyance purposes unless approved as part of an EA or WUL.	Developer EPC Contractor	Design phase
The minimum footprint areas of infrastructure should be used wherever possible, including road widths and lengths.	Project Developer EPC Contractor	Design phase
Internal power lines should be buried wherever possible.	Project Developer EPC Contractor	Design phase
Avoid all high agricultural production land and other actively cultivated areas. Where avoidance is not feasible, stakeholder engagement should occur to compensate affected landowners	Project Developer EPC Contractor	Design phase
Undertake careful design of security and operational lighting to minimise impacts on surrounding areas. No high mast lighting should be used.	Project Developer EPC Contractor	Design phase

Performance Indicator	» Design meets the objectives and does not degrade the environment. » Design and layouts respond to the mitigation measures and recommendations in the EMPrreport.

Monitoring	» Ensure that the design implemented meets the objectives and mitigation measures in the EIA report through review of the facility design by the Project Manager/Site Manager and ECO prior to the commencement of construction.

OBJECTIVE 2: Ensure that relevant permits and site-specific plans are in place to manage impacts on the environment

Project Component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Impact on identified sensitive areas.
Activities/Risk Sources	» Positioning of all Project components. » Pre-construction activities, e.g., geotechnical investigations, site surveys of substation footprint, power line servitude and internal access roads and environmental walk-through surveys. » Positioning of temporary sites.
Mitigation: Target/Objective	» To ensure that the design of the Project responds to the identified environmental constraints and opportunities. » To ensure that the design of the power plant responds to the identified constraints identified through pre-construction surveys. » To ensure that pre-construction activities are undertaken in an environmentally friendly manner. »

Mitigation: Action/Control	Responsibility	Timeframe
Obtain any additional environmental permits required prior to the commencement of construction. Copies of permits/licenses must be submitted to the NWDEDECTand kept on site during the construction and operation phases of the Project.	Project Developer	Pre-construction
Obtain abnormal load permits for transportation of Project components to site (if required).	EPC Contractor(s)	Prior to construction
A detailed geotechnical investigation is required for the design phase for all infrastructure components.	Project Developer EPC Contractor	Design phase
Undertake ecological preconstruction walk-through of the final development footprint to identify and locate protected species that would be affected and that can be translocated. The necessary biodiversity permits must be obtained prior to removal of any species of concern.	Project Developer Specialist - Ecologist	Pre-construction

Mitigation: Action/Control	Responsibility	Timeframe
Search and rescue of species of conservation concern should be conducted prior to clearing activities.		
A stormwater management plan must be developed in the pre-construction phase, detailing the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems. The stormwater control systems must be inspected on an annual basis to ensure these are functional. Effective stormwater management must include effective stabilisation (gabions and Reno mattresses) of exposed soil and the re-vegetation of any disturbed riverbanks.	EPC Contractor(s)	Design phase
Develop an Alien Invasive and Vegetation Rehabilitation Management Plan.	Project Developer	Pre-construction
Develop a detailed method statement for the implementation of the Plant Rescue and Protection Plan for the Project Site (refer to **Appendix E**).	Project Developer	Pre-construction
Develop a detailed method statement for the implementation of the Re-vegetation and Habitat Rehabilitation Plan for the site (refer to **Appendix D**).	Project Developer	Pre-construction
Develop a detailed method statement for the implementation of the traffic and transportation management plan for the site (refer to **Appendix F**).	Project Developer	Pre-construction
Develop an effective monitoring system to detect any leakage or spillage of all hazardous substances during their transportation, handling, use and storage. This must include precautionary measures to limit the possibility of oil and other toxic liquids from entering the soil or storm water systems.	Project Developer	Pre-construction
Prepare a detailed Fire Management Plan in collaboration with surrounding landowners.	Project Developer	Pre-construction
A comprehensive rehabilitation / monitoring plan must be developed in consultation with a specialist, and must be implemented from the Project onset i.e. during the detailed design phase prior to construction, to ensure a net benefit to the environment within all areas that will remain undisturbed.	Project Developer EPC Contractor Specialist – ecologist & agriculturalist	Pre-construction

Performance Indicator	»	Permits are obtained and relevant conditions complied with.
	»	Relevant management plans and Method Statements prepared and implemented.
Monitoring	»	Monitor ongoing compliance with the EA, EMPr, management plans and MS.

OBJECTIVE 3: Ensure compliance of required mitigation measures and recommendations by contractors

Project Component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Impact on identified sensitive areas. » Planning fails to respond optimally to the environmental considerations.
Activities/Risk Sources	» Positioning of all Project components » Positioning of temporary sites that will be used during construction. » Employment and procurement procedures.
Mitigation: Target/Objective	» To ensure that appropriate planning is undertaken by the EPC Contractor to ensure compliance with the conditions of the EA and EMPr, management plans and MS. » To ensure that pre-construction and construction activities are undertaken in a controlled and monitored manner to reduce and avoid damage.

Mitigation: Action/Control	Responsibility	Timeframe
The terms of this EMPr and the EA must be included in all tender documentation and EPC Contractor contracts.	Project Developer EPC Contractor	Pre-construction
The Project Developer should encourage the EPC Contractor to increase the local procurement practices and promote the employment of people from local communities, as far as feasible, to maximise the benefits to the local economies.	EPC Contractor	Pre-construction

Performance Indicator	» Conditions of the EA and EMPr form part of all EPC Contractor contracts. » Local employment and procurement are encouraged.
Monitoring	» Monitor ongoing compliance with the EA, EMPr, management plans and MS.

OBJECTIVE 4: To ensure effective communication mechanisms

It is important to maintain on-going communication with the public (including affected and surrounding landowners) during the planning/design, construction and operation phases of the Buffelspoort Solar PV Energy Facility. Any issues and concerns raised should be addressed as far as possible in as short a timeframe as possible.

Project component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Impacts on affected and surrounding landowners and land uses.
Activity/risk source	» Activities associated with pre-construction phase. » Activities associated with construction of the solar facility. » Activities associated with operation.
Mitigation: Target/Objective	» Effective communication with affected and surrounding landowners. » Addressing any issues and concerns raised as far as possible in as short a timeframe as possible.

Mitigation: Action/control	Responsibility	Timeframe
Compile and implement an External Grievance Mechanism Procedure for the public (including the affected and surrounding landowners) (using **Appendix B**) to be implemented during both the construction and operation phases of the Project and if applicable during decommissioning. This procedure should include the details of the contact person who will be receiving issues raised by interested and affected parties, and the process that will be followed to address issues. The mechanism must also include procedures to lodge complaints in order for the local community to express any complaints or grievances with the construction process. A Public Complaints register must be maintained by the EPC Contractor to record all complaints and queries relating to the Project and the actions taken to resolve the issue. A Project Specific Grievance Mechanism must be developed and implemented prior to construction.	Project Developer EPC Contractor O&M Operator	Pre-construction (construction procedure) Pre-operation (operation procedure)
Develop and implement an Internal Grievance Mechanism Procedure for the construction, operation and closure phases of the Project for all employees, contractors, subcontractors and site personnel. This procedure should be in line with the South African Labour Law.	Project Developer EPC Contractor O&M Operator	Pre-construction (construction procedure) Pre-operation (operation procedure)
Have a detailed consultation and Stakeholder Engagement Plan (SEP) with neighbouring property owners to keep them	Project Developer	Pre-construction

Mitigation: Action/control	Responsibility	Timeframe
informed with regards to construction progress, issues and potential dangers		

Performance Indicator	» Effective internal and external Grievance Mechanism as well as SEP in place for all phases as required.
Monitoring	» An incident reporting system used to record non-conformances to the EA, EMPr, management plans or MS. » Internal and External Grievance Mechanism procedures implemented. » Public complaints register developed and maintained.

CHAPTER 7: MANAGEMENT PROGRAMME: CONSTRUCTION

Overall Goal: Undertake the construction phase in a way that:

- Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, farming practices, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, protected tree species, and habitats of ecological value.
- Minimises impacts on fauna using the Project Site.
- Minimises the impact on heritage sites should they be uncovered.
- Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

An environmental baseline must be established during the undertaking of construction activities, where possible.

7.1. Objectives

In order to meet the overall goal for construction, the following objectives, actions, and monitoring requirements have been identified.

OBJECTIVE 1: Site establishment and Security Measures

Project component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Hazards to landowners and the public. » Security of materials, equipment and machinery. » Substantially increased damage to natural vegetation. » Potential impact on flora, fauna and avifauna habitat.
Activities/risk sources	» Open excavations (foundations and cable trenches). » Movement of construction phase employees, vehicles and plant equipment in the area and on-site.
Mitigation: Target/Objective	» Implementation of security protocols for the Project Site against unauthorised entry. » To protect members of the public/landowners/residents.

Mitigation: Action/control	Responsibility	Timeframe
Implement adequate security and safety measures for the site, working areas and excavations.. Adequate protective measures must be implemented to prevent unauthorised access to the Project Site, working areas and the internal access/haul routes.	EPC Contractor EO	During site establishment Maintenance: for duration of Contract
The EPC Contractor must take all reasonable measures to ensure the safety of the public in the surrounding area. Where the public could be exposed to danger by any of the works or site activities, the EPC Contractor must, as appropriate, provide suitable flagmen, barriers and/or warning signs in English and any other relevant indigenous languages, all to the approval of the Site Manager/Project Manager. All unattended open excavations shall be adequately demarcated and/or fenced.	EPC Contractor	During site establishment Maintenance: for duration of Contract
Where necessary to control access (for specific working areas), fence and secure the area and implement access control procedures.	EPC Contractor	During site establishment Maintenance: for duration of Contract
Establish SABS 089: 1999 Part 1 approved bunded areas for the storage of hazardous materials and hazardous waste.	EPC Contractor	During site establishment and during construction
Supply adequate weather and vermin proof waste collection bins and skips (covered at minimum with secured netting or shadecloth) at sites where construction is being undertaken. Separate bins should be provided for general and hazardous waste. As far as possible, provision should be made for separation of waste for recycling.	EPC Contractor	Site establishment, and duration of construction
Establish the necessary ablution facilities with chemical toilets and provide adequate sanitation facilities and ablutions for construction workers (1 toilet per every 15 workers for both males and females) at appropriate locations on site.	EPC Contractor	During site establishment and during construction

Performance Indicator	» Ensure that the Project Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured as a result of construction activities. » Fauna and flora are protected as far as practically possible. » Appropriate and adequate waste management and sanitation facilities provided at construction site.
Monitoring	» Regular visual inspection of the fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EA, EMPr, management plans and MS. » Public complaints register must be developed and maintained for the Project Site. » ECO/ EO to monitor all active construction areas on a continuous basis until construction is complete; reporting back to the Site Manager/Project Manager. » ECO/ EO to address any infringements with responsible EPC contractor as soon as these are recorded.

OBJECTIVE 2: Appropriate management of the construction site and construction workers

Project Component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Damage to indigenous natural vegetation and sensitive areas. » Damage to and/or loss of topsoil (i.e. pollution, compaction etc.). » Impacts on the surrounding environment due to inadequate sanitation and waste removal facilities. » Pollution/contamination of the environment.
Activities/Risk Sources	» Vegetation clearing and levelling of equipment storage area/s. » Access to and from the equipment storage area/s. » Ablution facilities. » Contractors not aware of the requirements of the EA, EMPr, management plans and MS leading to unnecessary impacts on the surrounding environment. » Compaction from movement of machinery. » Leakages from Hydrocarbons.
Mitigation: Target/Objective	» Limit equipment storage areas/footprint within demarcated and designated areas. » Ensure adequate sanitation facilities and waste management practices. » Ensure appropriate management of actions by on-site personnel in order to minimise impacts to the surrounding environment.

Mitigation: Action/Control	Responsibility	Timeframe
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	EPC Contractor	Construction
All construction vehicles must adhere to clearly defined and demarcated roads. No driving outside of the Development Footprint will be permitted, unless authorised.	EPC Contractor	Construction
Ensure all construction equipment, machinery and vehicles are properly maintained at all times.	EPC Contractor	Construction
Ensure proper health and safety plans in place during the construction period to ensure safety on and around site during construction	HSE	Pre-construction
Ensure that construction workers are clearly identifiable. All workers must wear identifiable clothing.	EPC Contractor	Construction
Undertake pre-construction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. Induction training should cover the following principles: • Waste management activities and littering, • appropriate handling of pollution and chemical spills, • avoiding fire hazards,	EPC Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
• minimising wildlife interactions (not harming or collecting species such as tortoises and snakes which are often persecuted out of fear or superstition(• remaining within demarcated construction areas .,		
Regular toolbox talks should be undertaken to ensure appropriate levels of environmental awareness.	EPC Contractor	Construction
Contact details of emergency services must be prominently displayed at the construction site camp notice board.	EPC Contractor	Construction
Contractor must provide adequate firefighting equipment on site and provide firefighting training to selected construction staff.	EPC Contractor	Construction
Road borders must be regularly maintained to ensure that vegetation remains short to serve as an effective firebreak. An emergency fire plan must be developed with emergency procedures in the event of a fire.	Contractor	Duration of construction
Personnel trained in first aid must be on site to deal with smaller incidents that require medical attention.	EPC Contractor	Construction
All work in the vicinity of any watercourses will be done in accordance with the approved MS (which will provide guidance on what activities can be done and not done within the watercourse area). Any deviation from the MS, unless authorised by the ECO will be recorded as a non-conformance.	EPC Contractor	Construction
Ensure that rubble, litter, and disused construction materials are appropriately stored at the designated waste management yard and then disposed regularly at licensed waste facilities. The waste management yard needs to be maintained and managed in accordance with the approved MS.	EPC Contractor	Duration of Contract
All litter/waste must be deposited in a clearly marked, closed, animal-proof disposal bin in the construction area. Particular attention needs to be paid to food waste.	EPC Contractor and sub-contractor/s	Duration of contract
All sewage disposal (from mobile toilets) to take place at a registered and operational wastewater treatment works. Proof of disposal to be retained as proof of responsible disposal.	EPC Contractor	Duration of construction
All contaminated water must be contained by means of careful run-off management on site.	EPC Contractor	Construction
Ensure compliance with all national, regional and local legislation with regard to the storage, handling and disposal of hydrocarbons, chemicals, solvents and any other harmful and hazardous substances and materials.	EPC Contractor	During construction.

Mitigation: Action/Control	Responsibility	Timeframe
Keep a record of all hazardous substances stored on site. Clearly label all the containers storing hazardous waste.	EPC Contractor	Duration of contract
Ensure ablution facilities are appropriately maintained. Ablutions must be cleaned regularly and the associated waste products disposed of at a registered/permitted disposal facility. Mobile Toilets must be removed from site when construction is completed.	EPC Contractor and sub-contractor/s	Duration of contract
Cooking and eating of meals must take place in a designated area. No fires are allowed on site. No firewood or kindling may be gathered from the Project Site or surrounds.	EPC Contractor and sub-contractor/s	Duration of contract
A MS must be compiled for the management of pests and vermin within the site, specifically relating to the canteen area if applicable.	EPC Contractor	Construction
Ensure proper health and safety plans in place during the construction period to ensure safety on and around the Project Site during construction, including fencing of the property and site access restriction.	EPC Contractor and sub-contractor/s	Pre-construction
All disturbed areas that are not used such as excess road widths, should be rehabilitated with locally occurring shrubs and grasses after construction to reduce the overall footprint of the development.	EPC Contractor and sub-contractor/s	Construction
On completion of the construction phase, all construction workers must leave the Project Site within one week of their contract ending.	EPC Contractor and sub-contractor/s	Construction

Performance Indicator	» Appropriate training of all staff is undertaken prior to them commencing work on the Project Site. » Ablution and waste removal facilities are in a good working order and managed in accordance with the relevant MS as to not pollute the environment due to mismanagement. » All areas are rehabilitated promptly after construction in an area is complete. » Excess vegetation clearing and levelling is not undertaken. » No complaints regarding contractor behaviour or habits have been received.
Monitoring	» Regular audits of the construction camps and areas of active construction on the Project Site by the EO. » Proof of disposal of sewage at an appropriate licensed wastewater treatment works. » Proof of disposal of waste at an appropriate licensed waste disposal facility. » An incident reporting system must be used to record non-conformances to the EA, EMPr, management plans and MS. » Observation and supervision of Contractor practices throughout the construction phase by the EO. » Complaints will be investigated and, if appropriate, acted upon.

OBJECTIVE 3: Maximise benefits and opportunities associated with the construction phase

It is acknowledged that some skilled personnel will be required during the construction phase of the Project. However, where semi-skilled and unskilled labour is required, opportunities for local employment should be maximised as far as possible. Employment of locals and the involvement of local Small, Micro and Medium Enterprises (SMMEs) would enhance the social benefits associated with the Project, even if the opportunities are only temporary. The procurement of local goods could furthermore result in positive economic spin-offs.

Project component/s	» Construction activities associated with tfhe establishment of the Project, including associated infrastructure.
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised.
Activities/risk sources	» The employment of outside contractors to undertake the work and who make use of their own labour will reduce the employment and business opportunities for locals. Employment of local labour will maximise local employment opportunities.
Mitigation: Target/Objective	» The EPC Contractor , in discussions with the local municipality, should aim to employ as many workers (skilled, semi-skilled / low-skilled) from the local areas/ towns, as possible. » The Project Developer should also develop a database of local BBBEE service providers.

Mitigation: Action/control	Responsibility	Timeframe
Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	EPC Contractor	Construction
Where feasible, effort must be made to employ local labour in order to create maximum benefit for the communities and limit in-migration.	EPC Contractor	Construction

Performance Indicator	» Maximise the number of semi-skilled and unskilled labour sourced locally where possible. » Maximise the use of local suppliers and SMMEs where possible. » Skills transfer facilitated where possible.
Monitoring and Reporting	» Contractors and appointed ECO must monitor indicators listed above to ensure that they have been met for the construction phase.

OBJECTIVE 4: Control of noise pollution stemming from construction activities

Various construction activities would be taking place during the development of the Project and may pose a noise risk to the sensitive receptors located around the Project Site. The impact of such activities, in general, is very low. Impacts may however occur where activities are undertaken at night.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area.

	» Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate. »
Potential Impact	» Increased noise levels at potentially sensitive receptors.
Activity/risk source	» Site preparation and earthworks. » Construction-related transport. » Foundations or plant equipment installation. » Building activities.
Mitigation: Target/Objective	» Ensure compliance with the National Noise Control Regulations. » Ensure that maximum noise levels at potentially sensitive receptors are less than 65dBA. » Ensure night-time noise levels less than 45 dBA. » Reduce and restrict, where possible the generation of disturbing or nuisance noises.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Communicate the External Grievance Mechanism to all stakeholders.	Project Developer	Construction
Construction activities need to be done between 07:00 and 18:00 unless otherwise permitted and authorised by the relevant municipal authorities per the approved MS and as communicated to the affected stakeholders.	Project Developer	Construction
Ensure that all equipment is maintained and fitted with the required noise abatement equipment.	EPC Contractor	Weekly inspection
The construction crew must abide by the local by-laws regarding noise.	EPC Contractor	Construction phase

Performance Indicator	» Construction activities do not change the existing ambient sound levels with more than 7dB. » Ensure that maximum noise levels at potentially sensitive receptors are less than 65 dBA. » No noise complaints are registered.
Monitoring and Reporting	» Monitoring of noise levels associated with construction activities, especially near to sensitive receptors.

OBJECTIVE 5: Management of dust and emissions and damage to roads

During the construction phase, limited gaseous or particulate emissions (and dust) and dust is anticipated from construction vehicles, machinery and equipment on-site.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site.

	» Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Dust impacts can occur from cleared areas and from vehicle movement along internal roads. » Release of minor amounts of air pollutants (for example NO_2, CO and SO_2) from vehicles and construction equipment and machinery.
Activities/risk sources	» The movement of construction vehicles and their activities on the site. » Clearing of vegetation and topsoil. » Excavation, grading and scraping. » Transport of materials, equipment and components. » Re-entrainment of deposited dust by vehicle movements. » Wind erosion from topsoil and spoil stockpiles and unsealed roads and surfaces. » Fuel burning from construction vehicles with combustion engines.
Mitigation: Target/Objective	» To avoid and or minimise the potential dust impacts associated with heavy vehicles, and also minimise damage to roads. » To ensure emissions from all vehicles are minimised, where possible, for the duration of the construction phase. » To minimise nuisance to the community and adjacent landowners from dust emissions and to comply with workplace health and safety requirements for the duration of the construction phase.

Mitigation: Action/control	Responsibility	Timeframe
Reduce and control dust emissions by using approved dust suppression techniques as and when required.	EPC Contractor	Construction phase
Vehicles used to transport sand and building materials must be fitted with tarpaulins or covers when travelling on roads.	EPC Contractor	Construction phase
Ensure vehicles adhere to the speed limit of 40km/h on public roads and speed limits set within the Project Site by the Site Manager.	EPC Contractor Transportation contractor	Duration of contract
Ensure that damage to gravel public roads and access roads attributable to construction vehicles is repaired before completion of the construction phase.	EPC Contractor	Before completion of construction phase
Disturbed areas must be re-vegetated as soon as practicable after construction is complete in an area.	EPC Contractor	At completion of the construction phase

Performance Indicator	» Appropriate dust suppression measures implemented on the Project Site during the construction phase. » Drivers made aware of the potential safety issues and enforcement of strict speed limits when they are employed or before entering the Project site.
Monitoring and Reporting	» The Developer and appointed EO must monitor indicators listed above to ensure that they have been met for the construction phase. » Immediate reporting by personnel of any potential or actual issues with nuisance dust or emissions to the Site Manager/Project Manager.

	» An incident reporting system must be used to record non-conformances to the EA, EMPr, management plans and MS. » Public complaints register must be developed and maintained on the Project Site.

OBJECTIVE 6: Conservation of the existing soil resource within the site and in the adjacent areas

The natural soil on the Project Site needs to be preserved as far as possible to minimise impacts on the environment. Soil degradation including erosion (by wind and water) and subsequent deposition elsewhere is of a concern. Uncontrolled run-off relating to construction activities (excessive wetting, etc.) will also lead to accelerated erosion. Degradation of the natural soil profile due to excavation, stockpiling, compaction, pollution and other construction activities will affect soil forming processes and associated ecosystems.

A set of strictly adhered to mitigation measures are required to be implemented in order to effectively limit the impact on the environment. The disturbed areas where human impact is likely are the focus of the mitigation measures laid out below.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate. »
Potential Impact	» Erosion and soil loss. » Increased runoff. » Downstream sedimentation.
Activities/risk sources	» Rainfall and wind erosion of disturbed areas. » Excavation, stockpiling and compaction of soil. » Concentrated discharge of water from construction activity. » Stormwater run-off from sealed surfaces. » Mobile construction equipment movement on site. » Roadside drainage ditches. » Project related infrastructure, such as buildings, solar panels and fences.
Mitigation: Target/Objective	» To minimise erosion of soil from site during construction. » To minimise damage to vegetation by erosion or deposition. » To retain all topsoil .

Mitigation: Action/control	Responsibility	Timeframe
Any erosion problems observed along access roads or any hardened/engineered surface should be rectified immediately and monitored thereafter to ensure that they do not re-occur.	EPC Contractor	Construction
All denuded areas , affected by the development, should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.	EPC Contractor EO ECO	Construction
Practical phased development and vegetation clearing must be practiced so that cleared areas are not left un-vegetated and vulnerable to erosion for extended periods of time.	EPC Contractor EO	Construction
Roads and other disturbed areas should be regularly monitored for signs of erosion. These areas should be monitoring by the EO to assess the success of the remediation.	EPC Contractor EO	Construction
Topsoil must be removed and stored separately from subsoil. Topsoil must be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation on cleared areas.	EPC Contractor ECO EO	Construction
Stockpile topsoil for re-use in rehabilitation phase. Maintain stockpile shape and protect from erosion.	EPC Contractor	Construction
Salvaging topsoil: » Topsoil must always be salvaged and stored separately from subsoil and lower-lying parent rock or other spoil material. ∗ Topsoil stripping removes up to 30 cm or less of the upper soils. ∗ In cultivated areas, depth of topsoil may increase and needs to be confirmed with the land owner. » Prior to salvaging topsoil the depth, quality and characteristics of topsoil should be known for every management area. o This will give an indication of total volumes of topsoil that need to be stored to enable the proper planning and placement of topsoil storage. o Different types of topsoil – rocky soils and sands or loams must be stored separately. Topsoil should be removed (and stored) under dry conditions to avoid excessive compaction whenever topsoil will have to be stored for longer than one year.	EPC Contractor	Construction
Excavated soils should be stockpiled on the upslope side of the excavated trench so that eroded sediments off the stockpile are washed back into the trench.	EPC Contractor	Construction
Storing topsoil: » Viability of stored topsoil depends on moisture, temperature, oxygen, nutrients and time stored. » Rapid decomposition of organic material in warm, moist topsoil rapidly decreases microbial activity necessary for nutrient cycling, and reduces the amount of beneficial micro-organisms in the soil. » Stockpile location should ideally be in a disturbed but weed-free area.	EPC Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
» Storage of all topsoil that is disturbed should be of a maximum height of 2 m and the maximum length of time before re-use is 18 months. » Topsoil handling should be reduced to stripping, piling (once), and re-application. Between the stockpiling and reapplication, stored topsoil should not undergo any further handling except control of erosion and (alien) invasive vegetation. » Where topsoil can be reapplied within six months to one year after excavation, it will be useful to store the topsoil as close as possible to the area of excavation and re-application, e.g. next to cabling trenches. » Do not mix overburden with topsoil stockpiles, as this will dilute the proportion of fertile soil (with less fertile subsoil or rock material). » Employ wind nets made from Hessian or similarly fibrous and biodegradable material, where required, to stabilise newly placed topsoil stockpiles and to reduce wind erosion. » In cases where topsoil has to be stored longer than 6 months or during the rainy season, soils should be kept as dry as possible and protected from erosion and degradation by: ∗ Preventing ponding on or between heaps of topsoil ∗ Covering topsoil berms ∗ Preventing all forms of contamination or pollution ∗ Preventing any form of compaction ∗ Monitoring the establishment of all invasive vegetation and removing such if it appears ∗ Keeping slopes of topsoil at a maximal 2:1 ratio ∗ Monitoring and mitigating erosion where it appears Where topsoil needs to be stored in excess of one year, it is recommended to either cover the topsoil or allow an indigenous grass cover to grow on it – if this does not happen spontaneously, seeding should be considered.		
Excavated soils will need to be replaced in the same order as excavated from the trench, i.e. sub-soil must be replaced first and topsoil must be replaced last (this will maximise opportunity for re-vegetation of disturbed areas).	EPC Contractor	Construction
Re-applied topsoil needs to be re-vegetated as soon as possible.	EPC Contractor	Construction
Only the proposed access roads as per the Development Footprint are to be used to reduce any unnecessary compaction.	EPC Contractor	Construction
Silt traps should be used where there is a danger of topsoil eroding and entering streams and other sensitive areas. These silt traps must be regularly monitored and maintained and replaced / repaired immediately as and when required. These measures should be regularly checked, maintained and repaired when required to ensure that they are effective.	EPC Contractor	Construction
Spillages of cement to be cleaned up immediately and disposed or re-used in the construction process.	EPC Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Spill kits to be kept on active parts of the construction site and at site offices.	EPC Contractor	Construction
In instances where mobile cement batching is not available on site, cement batching to take place in designated areas only, as approved on site layout plan (if applicable).	EPC Contractor	Construction

Performance Indicator	» Minimal level of soil erosion around the Project Site. » No construction activity outside demarcated working areas. » Progressive return of disturbed and rehabilitated areas to the desired end state. » No indications of visible topsoil loss.
Monitoring and Reporting	» Continual inspections of the site by the EO. » Reporting of ineffective sediment control systems and rectification as soon as possible. » If soil loss is suspected, acceleration of soil conservation and rehabilitation measures must be implemented.

OBJECTIVE 7: Minimise impacts on sensitive areas and plant species

The Plants of Southern Africa (POSA) database indicates that 508 species of indigenous plants are expected to occur within the Development Footprint and grid connection corridor. Three (3) flora species of conservation concern (SCC), based on their conservation status, could be expected to occur within the Development Footprint and grid connection corridor.

The Ecosystem Threat Status is an indicator of an ecosystem's wellbeing, based on the level of change in structure, function or composition. The proposed Project overlaps mainly with an Endangered (EN) ecosystem, and marginally with an ecosystem of Least Concern (LC).

The Ecosystem Protection Level is an indicator of the extent to which ecosystems are adequately protected or under-protected. The proposed Project overlaps with a Poorly Protected (PP) ecosystem.

According to the protected area spatial datasets from the South African Protected Areas Database SAPAD (2021) and SACAD (2021), the proposed Project overlaps with the Magaliesberg Biosphere Reserve, with the Development Footprint encroaching into the Buffer Zone and the grid connection corridor extending into a Transition Area. The development area (at the closest point) is located approximately 12km from the core of the Biosphere.

The South African Inventory of Inland Aquatic Ecosystems (SAIIAE) was released with the National Biodiversity Assessment (NBA) 2018. Ecosystem threat status (ETS) of river and wetland ecosystem types are based on the extent to which each river ecosystem type had been altered from its natural condition.. The 500 m regulated area around the grid corridor overlaps with the Critically Endangered (CR) Sterkstroom river.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers.

	» Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate. »
Potential Impact	» Loss of plant cover leading to loss of faunal habitat and loss of specimens of protected plants. » Soil erosion. » Increased water use.
Activity/risk source	» Site preparation and clearing. » Soil disturbance. » Introduction of plant propagules with people and vehicles. » Activities outside of designated construction areas. » Driving off designated routes.
Mitigation: Target/Objective	» To limit construction activities to designated areas. » Implement invasive plant clearing prior to construction, but after site demarcation.

Mitigation: Action/control	**Responsibility**	**Timeframe**
Communicate clearly to all contractors that no disturbance outside the demarcated areas will be tolerated.	EPC Contractor	Construction
Demarcate all areas to be cleared with construction tape or other appropriate and effective means. However, caution should be exercised to avoid using material that might entangle fauna.	EPC Contractor	Construction
Before construction commences individuals of listed species within the Development Footprint that would be affected, should be counted and marked and translocated where deemed necessary by the ecologist conducting the pre-construction walk-through survey, and according to the ratios that will be recommended by specialists.	EPC Contractor Specialist – Ecologist EO ECO	Pre-construction Construction
Any individuals of protected species affected by and observed within the Development Footprint during construction should be translocated under the supervision of the ECO and/or Contractor's Environmental Officer (EO).	EPC Contractor ECO EO	Construction
No plants may be translocated or otherwise uprooted or disturbed for rehabilitation without express permission from the ECO and or Contractor's EO.	EPC Contractor ECO EO	Construction
No fires are allowed within the Development Footprintboundary as there is a risk of runaway veld fires.	EPC Contractor	Construction
No firewood collection is allowed within the Development Footprint.	EPC Contractor	Construction

Mitigation: Action/control	Responsibility	Timeframe
Regular monitoring for alien plants within the Development Footprint as well as adjacent areas which receive runoff from the facility must be undertaken as these are also likely to be prone to invasion problems.	EPC Contractor	Construction
Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible.	EPC Contractor	Construction
ECO and/or Contractor's EO to provide supervision and oversight of vegetation clearing activities and other activities which may cause damage to the environment, especially at the initiation of the Project, when the majority of vegetation clearing is taking place.	Contractor EO ECO	Construction
Unnecessary impacts on surrounding natural vegetation must be avoided. The construction impacts must be contained to the Development Footprint of the Project.	EPC Contractor	Construction
Where new roads need to be constructed, the existing road infrastructure should be rationalised and any unnecessary roads decommissioned and rehabilitated to reduce the disturbance of the area.	EPC Contractor	Construction
All vehicles to remain on demarcated roads and no unnecessary driving in the veld outside these areas should be allowed.	EPC Contractor	Construction
Avoid creating conditions in which alien plants may become established: » Keep disturbance of indigenous vegetation to a minimum. » Rehabilitate disturbed areas as quickly as possible once construction is complete in an area. » Do not import soil from areas with alien plants.	EPC Contractor ECO EO	Construction
Establish an on-going monitoring programme to detect, quantify and remove any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Act 43 of 1983 and NEM: Biodiversity Act).	EPC Contractor ECO EO	Construction
Immediately control any alien plants that become established using registered control methods appropriate for the particular species in question. Where necessary, obtain an opinion from a registered Pest Control Officer.	EPC Contractor ECO EO	Construction
All alien plant re-growth must be monitored and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.	EPC Contractor ECO EO	Construction
The use of herbicides and pesticides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides (a registered Pest Control Officer). It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored or used on site along with any other nationally or internationally similarly restricted/banned products.	EPC Contractor ECO EO	Construction

Mitigation: Action/control	Responsibility	Timeframe
A registered Pest Control Officer must be appointed to implement the invasive alien plants and weeds management plan. The Pest Control Officer must supervise the clearing team to ensure compliance with the invasive alien plants and weeds management plan.	EPC Contractor ECO EO	Construction
All cleared areas should be revegetated with indigenous perennial species from the local area.	EPC Contractor ECO EO	Construction

Performance Indicator	» No disturbance outside of designated work areas. » Limited alien infestation within the Project's Development Footprint. » Construction activities need to be restricted to the Development Footprint.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout the construction phase. » Monitoring of alien plant establishment within the Development Footprint on an on-going basis.

OBJECTIVE 8: Protection of terrestrial fauna

The International Union for Conservation of Nature (IUCN) Red List Spatial Data lists 86 mammal species that could be expected to occur within the Development Footprint. This list excludes large mammal species that are normally restricted to protected areas. Thirteen (13) of these expected species are regarded as threatened. Of these 13 SCCs, nine (9) have a low likelihood of occurrence based on the lack of suitable habitat in the development area. Twenty-two (22) amphibian species are expected to occur within the Development Footprint, according to the International Union for Conservation of Nature (IUCN) Red List Spatial Data and FrogMap. There are no amphibian SCCs expected in the Development Footprint. According to the IUCN Red List Spatial Data and the ReptileMAP database, 66 reptile species are expected to occur within the Development Footprint. One (1) species (the Lobatse Hinged Tortoise) is considered threatened.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Vegetation clearance and associated impacts on faunal habitats. » Traffic to and from the Project Site.

Activity/risk source	» Site preparation and earthworks. » Installation of foundations or plant equipment. » Movement of mobile construction equipment on site. » Access road construction activities. » Substation construction activities.
Mitigation: Target/Objective	» To minimise footprints of habitat destruction. » To minimise disturbance to resident and visitor faunal species.

Mitigation: Action/control	Responsibility	Timeframe
The extent of clearing and disturbance to the vegetation must be kept to a minimum so that impact on fauna and their habitats is restricted.	EPC Contractor	Construction
During construction any fauna directly threatened by the construction activities should be removed to a safe location by a suitably qualified person.	EPC Contractor Specialist – ecologist/ trained person	Construction
The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden.	EPC Contractor	Construction
Employees should be trained (e.g. during toolbox talks) that poisonous animals should not be killed and if encountered the ECO/ EO should be informed.	Project Developer EPC Contractor ECO EO	Duration of contract
Make use of Low Pressure Sodium lighting or other types of low impact lighting.	EPC Contractor	Construction
All construction vehicles on site should adhere to a low speed limit (40km/h) to avoid collisions with susceptible species such as snakes and tortoises.	EPC Contractor	Construction
Construction vehicles limited to the Development Footprint on the Project Site (no movement outside of the demarcated footprint).	EPC Contractor	Construction
If any parts of the facility are to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises are susceptible to electrocution from electric fences as they do not move away when electrocuted but rather adopt defensive behaviour and are killed by repeated shocks.	EPC Contractor	Duration of contract

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for fauna. » Limited impacts on faunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout construction phase. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 9: Protection of avifauna

Project component/s	» Solar PV arrays comprising PV panels and mounting structures.

	» Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Disturbance of avifaunal species (e.g. destruction of habitat). » Displacement of avifaunal species » Collision with Project components. » Electrocution by means of powerline collision
Activity/risk source	» Site preparation and earthworks. » Installation of foundations or plant equipment. » Movement of mobile construction equipment on site. » Access road construction activities. » Substation construction facilities. » Powerline construction activities.
Mitigation: Target/Objective	» To minimise habitat destruction. » To minimise disturbance to resident and visitor avifaunal species.

Mitigation: Action/control	Responsibility	Timeframe
The extent of clearing and disturbance to the vegetation must be kept to a minimum so that impact on avifauna and their habitats is restricted.	EPC Contractor	Construction
Outside lighting should be designed and limited to minimize impacts on fauna. All outside lighting should be directed away from highly sensitive areas. Fluorescent and mercury vapor lighting should be avoided and sodium vapor (red/green) lights should be used wherever possible.	Project manager/Site Manager EO Design Engineer	Construction/Operational Phase
The movement of construction personnel should be restricted to the construction areas on the Project Site.	EPC Contractor	Construction
The appointed EO must be trained to identify the potential Red Data species as well as the signs that indicate possible breeding by these species.	EPC Contractor EO	Construction
The EO must, during audits/site visits, make a concerted effort to look out for such breeding activities of SCCs.	EPC Contractor EO	Construction
All areas to be developed must be walked through once prior to any activity to ensure no nests or avifauna species are found in the area. Should any SCC be found and not move out of the area, or their nest be found in the area a suitably qualified specialist must be consulted to advise on the correct actions to be taken.	Project manager/Site manager EO Specialist – avifaunal	Planning, Construction and Decommissioning

Mitigation: Action/control	Responsibility	Timeframe
If any avifaunal SCCs are confirmed to be breeding (e.g. if a nest site is found), construction activities an avifaunal specialist is to be contacted immediately for further assessment of the situation and instruction on how to proceed.	EPC Contractor EO ECO Specialist - avifaunal	Construction
Any excavations should not be left open for extended periods of time to prevent entrapment by ground dwelling avifauna or their young and only be dug when required and filled in soon thereafter.	EPC Contractor	Construction
Temporary fencing must be suitably constructed, e.g. if double layers of fencing are required for security purposes they should be positioned at least 2 m apart to reduce the probability of entrapment by larger bodied species that may find themselves between the two fences.	EPC Contractor	Construction
All personnel should undergo environmental induction with regards to avifauna and in particular awareness about not harming, collecting, or hunting terrestrial species and owls, which are often persecuted out of superstition. Signs must be put up to enforce this.	EO	Life of operation
The EO should provide training of construction staff (e.g. in Toolbox talks) to identify Red Data species, followed by regular questioning of staff as to the regular whereabouts on site of these species.	EPC Contractor EO	Construction
All construction and maintenance motor vehicle operators should undergo an environmental induction that includes instruction on the need to comply with speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Health and Safety Officer	Life of operation
No faunal species may be harmed, collected or hunted on the Project Site	EPC Contractor ECO EO	Life of operation
The duration of the construction should be kept to a minimum to avoid disturbing avifauna.	Project manager/Site Manager EO Design Engineer	Construction/Operational Phase
All traffic on the Project Site will adhere to the set speed limit (40km/h), to respect all forms of wildlife. Speed limits must still be enforced to ensure that road killings and erosion is limited.	Health and Safety Officer	Life of operation
All Project activities must be undertaken with appropriate noise mitigation measures to avoid disturbance to avifauna population in the region	Project manager/Site manager EO	Construction/Operational Phase
The design of the proposed PV and grid lines must be of a type or similar structure as endorsed by the Eskom-EWT Strategic Partnership on Birds and Energy,	EPC Contractor EO Engineer	Planning and construction

Mitigation: Action/control	Responsibility	Timeframe
considering the mitigation guidelines recommended by Birdlife South Africa (Jenkins *et al.,* 2015).		
All the parts of the infrastructure must be nest proofed and anti-perch devices placed on areas that can lead to electrocution	EPC Contractor EO Engineer	Planning and construction
Fencing mitigations: • Top 2 strands must be smooth wire • Routinely retention loose wires • Minimum 30 cm between wires • Place markers on fences	EPC Contractor EO Engineer	Planning, construction, and operation
As far as possible power cables within the Development Footprint should be thoroughly insulated and preferably buried.	EPC Contractor EO Engineer	Planning and construction
Overhead powerlines over the ridge must be fitted with bird diverters throughout the alignment and not just the portions adjacent to the pylons.	EPC Contractor EO Engineer	Planning and construction
Any exposed parts must be covered (insulated) to reduce electrocution risk	EPC Contractor EO Engineer	Planning and construction

Performance Indicator	» No disturbance outside of designated work areas. » Minimised clearing of existing/natural vegetation and habitats for avifauna. » Limited impacts on avifaunal species (i.e. noted/recorded fatalities), especially those of conservation concern.
Monitoring and Reporting	» Observation of vegetation clearing activities by the EO throughout construction phase. » Supervision of all clearing and earthworks by the EO.

OBJECTIVE 11: Minimise impacts on heritage sites during the construction of the Project.

Project component/s	» Excavations of solar panel mounting structure foundations. » Excavations of trenches for the installation of cabling and infrastructure. » Excavation of substation foundations.
Potential Impact	» Loss of archaeological artefacts. » Loss of fossil resources. » Destruction of on heritage sites. » Destruction of graves or burial sites. » Loss of resources going unnoticed. » Destruction of resources
Activity/risk source	» All earthworks.
Mitigation: Target/Objective	» To facilitate the likelihood of identifying heritage resources and ensure appropriate actions in terms of the relevant legislation

Mitigation: Action/control	Responsibility	Timeframe
» A Chance Fossil Find Procedure must be implemented for the duration of construction activities: » One person in the staff must be identified and appointed as responsible for the implementation of the protocol in instances of accidental fossil discovery and must report to the ECO or site agent. If the ECO or site agent is not present on site, then the responsible person on site should follow the protocol correctly in order to not jeopardize the conservation and well-being of the fossil material. » Once a workman notices possible fossil material, he/she should report this to the ECO or site agent. Procedure to follow if it is likely that the material identified is a fossil: » The ECO must ensure that all work ceases immediately in the vicinity of the area where the fossil or fossils have been found. » The ECO must inform SAHRA of the find immediately. This information must include photographs of the findings and GPS co-ordinates. » The ECO must compile a Preliminary Report and fill in the attached Fossil Discoveries: Preliminary Record Form within 24 hours without removing the fossil from its original position. The Preliminary Report records basic information about the find including: • The date. • A description of the discovery. • A description of the fossil and its extent (e.g., position and depth of find). • Where and how the find has been stored. • Photographs to accompany the preliminary report: (• A scale must be used. • Photos of location from several angles. • Photos of vertical section should be provided. • Digital images of hole showing vertical section (side). • Digital images of fossil or fossils. » Upon receipt of this Preliminary Report, SAHRA will inform the ECO whether or not a rescue excavation or rescue collection by a palaeontologist is necessary. » Exposed finds must be stabilised where they are unstable and the site capped, e.g. with a plastic sheet or sand bags. This protection should allow for the later excavation of the finds with due scientific care and diligence. SAHRA can advise on the most appropriate method for stabilisation. » If the find cannot be stabilised, the fossil may be collect with extreme care by the ECO or the site agent and put	EPC Contractor Project Developer ECO Heritage Specialist	Construction

Mitigation: Action/control	Responsibility	Timeframe
aside and protected until SAHRA advises on further action. Finds collected in this way must be safely and securely stored in tissue paper and an appropriate box. Care must be taken to remove the all fossil material and any breakage of fossil material must be avoided at all costs. » No work may continue in the vicinity of the find (the buffer will be determined by the type of heritage that is identified) until SAHRA has indicated, in writing, that it is appropriate to proceed. » A detailed "walk down" of the final approved Solar PV Energy Facility Development Footprint and the grid connection corridor will be required before construction commences. » Any heritage features of significance identified during this walk down will require formal mitigation (i.e., permitting where required) or where possible a slight change in design could accommodate such resources. » A Heritage management plan (HMP) for the heritage resources needs to be compiled and approved for implementation during construction and operations where heritage features of significance are identified.		
» Training: » Workmen and foremen need to be trained in the procedure to follow in instances of accidental discovery of fossil material, in a similar way to the Health and Safety protocol. A brief introduction to the process to follow in the event of possible accidental discovery of fossils should be conducted by the designated Environmental Control Officer (ECO) for the project, or the foreman or site agent in the absence of the ECO It is recommended that copies of the attached poster and procedure are printed out and displayed at the site office so that workmen may familiarise themselves with them and are thereby prepared in the event that accidental discovery of fossil material takes place.	EPC Contractor Project Developer ECO Heritage Specialist	Construction
» Historical Structures that were rated as NCW (BFP-04, BFP-05, BFP-06 and BFP-07) • No mitigation is required	Project Developer ECO	Construction
» Archaeological Resources rated as MODERATE (BFP-01 and BFP-03) - - large areas of stonewalling. • If the preservation of the site is not possible mitigation before destruction will be required. • A Phase 2 archaeological mitigation process must be implemented. This will include, surface collections, test excavations and analysis of recovered material. A permit issued under s35 of the NHRA will be required to conduct such work.	Project Developer ECO	Prior to Construction

Mitigation: Action/control	Responsibility	Timeframe
• On completion of the mitigation work the Project Developer can apply for a destruction permit with the backing of the mitigation report.		
» Burial Grounds and Graves (BFP-02) • Demarcate sites with a 50-meter buffer as per SAHRA guidelines and avoid the graveyard. • Development a Grave Management Plan • Submission of the Grave Management Plan to SAHRA BGGfor approval prior to implementation.	Project Developer ECO	Prior to Construction
» Burial Grounds and Graves (BFP-02) • Should demarcation not be possible a detailed grave relocation process will be implemented as required under the NHRA and National Health Act regulations. Whereby the remains will be exhumed, a public particition will be undertaken if next of kin cannot not be sourced and remains will be buried in a local cemetery.	Project Developer ECO	Prior to Construction

Performance Indicator	» Reporting on possible heritage resource finds. » Heritage resources identified and protected or permitted. » Dealing with all heritage finds as per the legislative requirements. » Ensure compliance with relevant legislation and recommendations from SAHRA under Section 36 and 38 of NHRA
Monitoring and Reporting	» Ensure staff are aware of heritage resources and the procedure to follow when found. » EO to conduct inspections of open excavations.

OBJECTIVE 12: Minimisation of visual impacts associated with construction

During construction heavy vehicles, components, cranes, equipment and construction crews will frequent the Project Site and may cause, at the very least, a visual nuisance to landowners and residents in the area as well as road users.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.

Potential Impact	» Visual impact of general construction activities, and the potential scarring of the landscape due to vegetation clearing and resulting erosion.
Activity/risk source	» The viewing of the above mentioned by observers on or near the site.
Mitigation: Target/Objective	» Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate construction work areas.

Mitigation: Action/control	Responsibility	Timeframe
Ensure that vegetation cover adjacent to the Development Footprint (if present) is not unnecessarily removed during the construction phase, where possible.	EPC Contractor	Construction
Reduce the construction phase timeframes through careful logistical planning and productive implementation of resources wherever possible.	EPC Contractor	Construction
Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.	EPC Contractor	Construction
Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.	EPC Contractor	Construction
Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).	EPC Contractor	Construction
Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting, where possible.	EPC Contractor	Construction
Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works.	EPC Contractor	Construction

Performance Indicator	Vegetation cover on and in the vicinity of the Project Site is intact (i.e. full cover as per natural vegetation present within the environment) with no evidence of degradation or erosion.
Monitoring	Monitoring of vegetation clearing during construction (by contractor as part of construction contract). Monitoring of rehabilitated areas quarterly for at least a year following the end of construction (by contractor as part of construction contract).

OBJECTIVE 13: Appropriate handling and management of waste

The construction of the Project will involve the generation of various waste streams. In order to manage the waste effectively, guidelines for the assessment, classification, and management of waste, along with industry principles for minimising construction waste must be implemented. The main waste expected to be generated by the construction activities include:

» general solid waste
» organic waste
» hazardous waste
» inert waste (rock and soil) / construction waste

» liquid waste (including grey water and sewage)

Project Component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Excessive waste generation due to the inefficient use of resources » Un-neat and visibly unappealing Project Site due to mismanagement of waste i.e. Litter » Contamination of the soil or water resource through poor waste management practices. » Rodent infestation » Odor
Activity/Risk Source	» Packaging materials for modules etc. » Hydrocarbon use and storage. » Spoil material from excavation, earthworks and site preparation. » Improper management of the waste management yard » Improper and irregular cleaning of chemical toilet and disposal of wastewater
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate waste storage and disposal. » To avoid environmental harm from waste disposal.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an integrated waste management approach that is based on waste minimisation and incorporates reduction, recycling, re-use and disposal where appropriate. Where solid waste is disposed of, such disposal shall only occur at an appropriately licensed landfill.	EPC Contractor EO ECO	Construction
Construction method and materials must be carefully considered in view of waste reduction, re-use, and recycling opportunities. The waste management provided in **Appendix I** must be utilised.	EPC Contractor	Construction
Construction contractors must provide specific detailed waste management plans to deal with all waste streams.	EPC Contractor	Construction
Ensure that no waste stream generated by the Project is placed, dumped or deposited on adjacent/surrounding properties.	EPC Contractor EO ECO	Construction
A waste management yard will be designated on-site for the temporary management of various waste streams generated on the Project Site. The location of the waste management yard will seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control. This location of the waste management yard will be included on the construction site layout plan.	EPC Contractor Waste Management Contractor	Construction
Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.).	EPC Contractor EO ECO Waste Management Contractor	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Storage and disposal of waste must be done in accordance with relevant legislative requirements, including the use of licensed contractors.	EPC Contractor EO ECO Waste Management Contractor	Construction
Uncontaminated waste must be removed at least weekly for disposal, if feasible; other wastes must be removed for recycling/ disposal at an appropriate frequency.	EPC Contractor EO ECO	Construction
Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area and clearly labelled. This must be regularly removed and recycled (where possible) or disposed of at an appropriately licensed landfill site.	EPC Contractor EO ECO Waste Management Contractor	Construction
Mobile chemical toilets will be used, and these will be emptied and maintained regularly.	EPC Contractor EO ECO	Construction
All liquid wastes must be contained in appropriately sealed container within the Development Footprint of the Project and be disposed of at a designated waste management facility.	EPC Contractor EO ECO Waste Management Contractor	Construction
Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	EPC Contractor EO ECO Waste Management Contractor	Construction
Regularly serviced chemical toilet facilities and/or septic tank must be used to ensure appropriate control of sewage.	EPC Contractor EO ECO	Construction
Daily inspection of all chemical toilets and septic tanks must be performed by environmental representatives on site.	EPC Contractor EO ECO	Construction
In the event where sewage is discharged into the environment, all contaminated vegetation/ rock and soil must be removed immediately and treated as hazardous waste.	EPC Contractor EO ECO	Construction
Under no circumstances may waste be burnt or buried on site.	EPC Contractor EO ECO	Construction
Litter generated by the construction crew must be collected in rubbish bins and disposed of at an appropriate frequency, at registered waste disposal sites.	EPC Contractor EO ECO	Construction
Upon the completion of construction, the area must be cleared of potentially polluting materials (including chemical toilets). Spoil stockpiles must also be removed and appropriately disposed of, or the materials re-used for an appropriate purpose.	EPC Contractor EO ECO	Construction

Performance Indicator	» No complaints received regarding waste on site or indiscriminate dumping.

	» Internal site audits ensuring that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests for all waste streams.
Monitoring	» Observation and supervision of waste management practices throughout construction phase. » Waste collection will be monitored on a regular basis. » Waste documentation completed. » Proof of disposal of sewage at an appropriate wastewater treatment works. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EA, EMPr, management plans and MS.

OBJECTIVE 14: Appropriate handling and storage of chemicals, hazardous substances

The construction phase may involve the storage and handling of a variety of chemicals including adhesives, abrasives, oils and lubricants, paints and solvents.

Project Component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads.
Potential Impact	» Water Pollution » Contaminated soil/ soil pollution » Contaminated waste productsHuman health » Faunal health »
Activity/Risk Source	» Vehicles associated with site preparation and earthworks. » Construction activities of the Project . » Hydrocarbon spills by vehicles and machinery during levelling, vegetation clearance and transport of workers, materials and equipment and fuel storage tanks. » Accidental spills of hazardous chemicals. » Washing of vehicles at the wash bays » Cleaning or spraying down of workshop and laydown areas » Concrete mixing/bathing.
Mitigation: Target/Objective	» To ensure that the storage and handling of chemicals and hydrocarbons on-site does not cause pollution to the environment or harm to persons.

	» To ensure that the storage and maintenance of machinery on-site does not cause pollution of the environment or harm to persons. » Prevent and contain hydrocarbon leaks. » Undertake proper waste management. » Store hazardous chemicals safely in a bunded area.

Mitigation: Action/Control	Responsibility	Timeframe
Implement an emergency preparedness plan during the construction phase.	EPC Contractor EO ECO	Construction
Any liquids stored on site, including fuels and lubricants, must be stored in accordance with applicable legislation.	EPC Contractor	Construction
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants. These must be maintained regularly.	EPC Contractor EO ECO	Construction
Vehicles and equipment must be parked on an impermeable surface when not in use or overnight. If this is not possible all vehicles, machinery and equipment needs to be fitted with a drip tray and plastic sheeting filled with absorbent material.	EPC Contractor EO ECO	Construction
Establish an appropriate Hazardous Stores and fuel storage area which is in accordance with the Hazardous Substance Amendment Act, No. 53 of 1992. This must include but not be limited to: » Designated area; » All applicable safety signage; » Firefighting equipment; » Enclosed by an impermeable bund as per the requirements of the relevant standards and any relevant by-laws; » Protected from the elements, » Lockable; » Ventilated; and » Has adequate capacity to contain 110% of the largest container contents.	EPC Contractor EO ECO	Construction
The storage of flammable and combustible liquids such as oils must be stored in compliance with Material Safety Data Sheets (MSDS) files.	EPC Contractor EO ECO	Construction
Corrective action must be undertaken immediately if a complaint is made, or potential/actual leak or spill of polluting substance identified. This includes stopping the contaminant from further escaping, cleaning up the affected environment as much as practically possible and implementing preventive measures. Where required, a NEMA Section 30 report must be submitted to NWDEDECT within 14 days of the incident.	EPC Contractor EO ECO	Construction
In the event of a major spill or leak of contaminants, the relevant administering authority must be immediately notified as per the notification of emergencies/incidents.	EPC Contractor EO ECO	Construction
Spilled concrete must be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site.	EPC Contractor EO ECO	Construction

Mitigation: Action/Control	Responsibility	Timeframe
Accidental spillage of potentially contaminating liquids and solids must be cleaned up immediately in line with procedures by trained staff with the appropriate equipment.	EPC Contractor EO ECO	Construction
Any contaminated/polluted soil removed from the site must be disposed of at a licensed hazardous waste disposal facility.	EPC Contractor EO ECO	Construction
All machinery and equipment must be inspected regularly for faults and possible leaks,	EPC Contractor EO ECO	Construction
Routine servicing and maintenance of vehicles must not to take place on-site (except for emergencies). If repairs of vehicles must take place, an appropriate drip tray must be used to contain any fuel or oils.	EPC Contractor EO ECO	Construction
Construction machinery must be stored in an appropriately sealed area or drip trays musts be placed underneath stationary vehicles.	EPC Contractor EO ECO	Construction
Any storage and disposal permits/approvals which may be required must be obtained, and the conditions attached to such permits and approvals will be compiled with.	Project Developer EPC Contractor ECO	Pre Construction and Construction
Transport of all hazardous substances must be in accordance with the relevant legislation and regulations.	Waste Management Contractor ECO EO EPC Contractor	Construction
Precautions must be in place to limit the possibility of oil and other toxic liquids from entering the soil or clean stormwater system.	ECO EO EPC Contractor Engineer	Design Construction
As much material must be prefabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site.	EPC Contractor	Construction
Minimise fuels and chemicals stored on site.	Contractor	Construction
Implement a contingency plan to handle spills, so that environmental damage is avoided.	Contractor	Construction
Drip trays must be used during all fuel/chemical dispensing and beneath standing machinery/plant.	Contractor	Construction
In the case of petrochemical spillages, the spill must be collected immediately and stored in a designated area until it can be disposed of in accordance with the Hazardous Chemical Substances Regulations, 1995 (Regulation 15).	Contractor	Construction

Performance Indicator	» No hazardous material spills outside of designated storage areas. » No water or soil contamination by spills. » Safe storage of hazardous chemicals. » Proper waste management.
Monitoring	» Observation and supervision of chemical storage and handling practices and vehicle maintenance throughout construction phase.

	» A complaints register must be maintained, in which any complaints from the community will be logged. » An incident reporting system must be used to record non-conformances to the EA, EMPr, management plans and MS. » On-going visual assessment to detect polluted areas and the application of clean-up and preventative procedures. » Monitor hydrocarbon spills from vehicles and machinery during construction continuously and record volume and nature of spill, location and clean-up actions. » Monitor maintenance of drains and intercept drains weekly. » Analyse soil samples for pollution in areas of known spills or where a breach of containment is evident when it occurs. » Records of accidental spills and clean-up procedures and the results thereof must be audited on an annual basis by the ECO. » Records of all incidents that caused chemical pollution must be kept and a summary of the results must be reported to management annually.

OBJECTIVE 15: Traffic management and transportation of equipment and materials to site

The construction and decommissioning phases of the Project will be the most significant in terms of traffic impacts resulting from the transport of equipment (including solar components) and materials and construction crews to the Project Site and the return of the vehicles after delivery of materials. Potential impacts associated with transportation and access relate mostly to works within the site boundary (i.e. the solar facility and ancillary infrastructure) and the external road network. This section should be read in conjunction with the Traffic and Transportation Plan attached as **Appendix F**.

Project component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Traffic congestion, particularly on narrow roads or on road passes where overtaking is not permitted. » Road accidents. » Deterioration of road conditions
Activity/risk source	» Construction vehicle movement. » Mobile construction equipment movement on-site. » Speeding on local roads.
Mitigation: Target/Objective	» Minimise the impact of traffic associated with the construction of the Project on the local traffic volume, existing infrastructure, property owners, animals, and road users. » To minimise the potential for negative interaction between pedestrians or sensitive users and traffic associated with the construction of the Project. » To ensure all vehicles are roadworthy and all materials/equipment are transported appropriately and within any imposed permit/licence conditions.

Mitigation: Action/control	Responsibility	Timeframe
Develop and implement a detailed MS for the implementation of the traffic and transportation management plan (refer to **Appendix F**).	Contractor(s), (Transportation sub-contractor) EO ECO	Construction
Heavy vehicles travelling on secondary roads should adhere to low-speed limits to minimise noise and dust pollution.	Contractor(s), (Transportation sub-contractor)	Construction
Where possible provide public transportation service for workers in order to reduce congestion on roads.	Contractor	Construction
Transportation contractors must adhere to the road rules and regulations.	Contractor	Construction
A designated access (or accesses) to the proposed Project Site must be created to ensure safe entry and exit.	Contractor	Construction
Utilise only designated access routes & entrance/exits from the site.	Contractor	Construction
Implement appropriate signage & road safety measures at entrance/exit to the site and on site.	Contractor	Construction
The delivery of solar components to the site must be staggered and trips must be scheduled to occur outside of peak traffic periods, where possible.	Contractor	Construction
The use of mobile batching plants and quarries in close proximity to the site must be considered as this would decrease the impact on the surrounding road network.	Contractor	Construction
Regular maintenance of gravel roads by the EPC Contractor during the construction and decommissioning phases.	Contractor	Construction
Dust suppression of gravel roads during the construction and decommissioning phases, as required.	Contractor	Construction
Any low hanging overhead lines (lower than 5.1 m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.	Contractor	Construction

Performance Indicator	» No traffic incidents involving Project personnel or appointed contractors. » Appropriate signage in place. » No complaints resulting from traffic congestion, delays or driver negligence associated with construction of the Project.
Monitoring	» Visual monitoring of traffic control measures to ensure they are effective. » A complaints register will be maintained, in which any complaints from the community will be logged. Complaints will be investigated and, if appropriate, acted upon. » An incident reporting system will be used to record non-conformances to the EA, EMPr, management plans and MS.

OBJECTIVE 16: Ensure appropriate rehabilitation of disturbed areas such that residual environmental impacts are remediated or curtailed

Areas requiring rehabilitation will include all areas disturbed during the construction phase and that are not required for regular operation and maintenance operations. Rehabilitation should be undertaken in an area as soon as possible after the completion of construction activities within that area.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Undermining of the Environmental integrity of the Project Site resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activity/risk source	» Site preparation and earthworks. » Excavation of foundations and trenches. » Construction of laydown areas. » Construction of access roads/tracks. » Other disturbed areas/footprints.
Mitigation: Target/Objective	» To ensure and encourage site rehabilitation of disturbed areas. » To ensure that the Project Site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts (including erosion) are remediated or curtailed.

Mitigation: Action/control	Responsibility	Timeframe
A site rehabilitation programme should be compiled and implemented (refer to **Appendix D**).	EPC Contractor Specialist – ecologist & agriculturalist EO ECO	Construction
Following construction, rehabilitation of all disturbed areas that will not be utilised during the operations of the Facility will be undertaken.	Contractor EO ECO	Rehabilitation
Rehabilitate of disturbed areas should be undertaken as soon as reasonably practicable after construction works have been closed out.	Contractor EO ECO	Rehabilitation

Mitigation: Action/control	Responsibility	Timeframe
Where required, artificial rehabilitation (e.g. re-seeding with collected or commercial indigenous seed mixes) may be applied in order to speed up the rehabilitation process if deemed necessary by the ECO.	Contractor EO ECO	
If natural re-vegetation is unsuccessful, seeding and planting of the area will need to be implemented	Contractor EO ECO	Rehabilitation
All temporary facilities, equipment and waste materials must be removed from the Project Site and appropriately disposed of.	Contractor	Rehabilitation
Re-vegetated areas may have to be protected from wind erosion and maintained until an acceptable plant cover has been achieved.	Contractor	Rehabilitation
On-going alien plant monitoring and removal should be undertaken on all areas of natural vegetation on an annual basis.	Contractor	Life of Project

Performance Indicator	» All facilities that have been constructed or erected for only construction phase purposes including but not limited to the construction camp and working areas, must be cleared of equipment » Topsoil replaced on all areas and stabilised. » Disturbed areas must be rehabilitated and acceptable plant cover achieved on rehabilitated sites.
Monitoring and Reporting	» On-going inspection of rehabilitated areas need to take place during the operational lifespan of the Project in order to determine the effectiveness of the rehabilitation measures implemented. » On-going monitoring of alien invasive plant species on site and annual removal where needed. . » An incident reporting system must be used to record non-conformances to the EA, EMPr, management plans and MS.

7.2. Detailing Method Statements

OBJECTIVE 17: Ensure all construction activities are undertaken with the appropriate level of environmental awareness to minimise environmental risk

The environmental specifications are required to be underpinned by a series of Method Statements, within which the Contractors and service providers are required to outline how any identified environmental risks will be mitigated and managed for the duration of the contract, and how specifications within this EA, EMPr and management plans will be met. The Contractor will be required to describe how specific requirements will be achieved through the submission of written Method Statements (MS) to the Site Manager/Project Manager and ECO.

A MS is defined as "a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes to use to undertake the activity. The MS needs to be drafted in such a manner as to allow the Site Manager to assess whether the Contractor's proposal is in accordance with the specifications and/or will produce results in accordance with the specifications". The MS must cover applicable details with regard to:

- Details of the responsible person/s
- Construction procedures
- Materials and equipment to be used
- Getting the equipment to and from site
- How the equipment/material will be moved while on-site
- How and where material will be stored
- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur
- Timing and location of activities
- Compliance/non-compliance with the Specifications
- Any other information deemed necessary by the Site Manager

MS must be compiled for all activities which affect any aspect of the environment and should be applied consistently to all activities. Specific areas to be addressed in the MS; pre, during and post construction include:

- Site establishment (which explains all activities from induction training to offloading, construction sequence for site establishment and the different amenities and to be established etc., including a construction site camp layout plan indicating all of these).
- Preparation of the construction site (i.e. clearing vegetation, compacting soils and removing existing infrastructure and waste).
- Soil management/stockpiling and erosion control.
- Excavations and backfilling procedure.
- Stipulate norms and standards for water supply and usage (i.e. comply strictly to licence and legislation requirements and restrictions).
- Stipulate the stormwater management.
- Ablution facilities (placement, maintenance, management and servicing).
- Solid Waste Management:
  - Description of the waste storage facilities (on site and accumulative).
  - Placement of waste stored (on site and accumulative).
  - Management and collection of the waste process.
  - Recycle, re-use and removal process and procedure.
- Liquid waste management:
  - Design, establish, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.
  - Should grey water (i.e. water from basins, showers, baths, kitchen sinks etc.) need to be disposed of, link into existing facilities or sewerage systems where possible. Where no facilities are available, grey water runoff must be controlled to ensure there is no unacceptable seepage occurs.
- Dust and noise pollution:

- Describe the necessary measures to ensure that noise from construction activities is maintained within lawfully acceptable levels.
- Procedure to control dust at all times on the site, access roads, borrow pits and spoil sites (dust control shall be sufficient so as not to have significant impacts in terms of the biophysical and social environments). These impacts include visual pollution, decreased safety due to reduced visibility, negative effects on human health and the ecology due to dust particle accumulation.

» Hazardous substance storage (ensure compliance with all national, regional and local legislation with regard to the storage of oils, fuels, lubricants, solvents, wood treatments, bitumen, cement, pesticides and any other harmful and hazardous substances and materials. South African National Standards apply):
  - Lists of all potentially hazardous substances to be used.
  - Appropriate handling, storage and disposal procedures.
  - Prevention protocol of accidental contamination of soil at the storage and handling areas.
  - All storage areas, (i.e. for harmful substances appropriately bunded with a suitable collection point for accidental spills must be implemented and drip trays underneath dispensing mechanisms including leaking engines/machinery).
» Fire prevention and management measures on site.
» Fauna and flora protection process on and off site (i.e. removal to reintroduction or replanting, if necessary):
  - Rehabilitation, re-vegetation process and bush clearing.
» Incident and accident reporting protocol.
» General administration.
» Access roads and the protocol for when roads are in use.
» Site Access.

The Contractor may not commence with the activity covered by the MS until it has been reviewed by the Site Manager, except in the case of emergency activities and then only with the consent of the Site Manager. Approval of the MS will not absolve the Contractor from their obligations or responsibilities in terms of their contract.

Failure to submit a MS may result in suspension of the activity concerned until such time as a MS has been submitted and approved.

7.3. Awareness and Competence: Construction Phase of the Buffelspoort Solar PV Energy Facility

OBJECTIVE 18: To ensure all construction personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm

To achieve effective environmental management, it is important that Contractors are aware of the responsibilities in terms of the relevant environmental legislation and the contents of the EA, EMPr and management plans. The Contractor is responsible for informing employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- All employees must have a basic understanding of the key environmental features of the construction site and the surrounding environment. This includes the discussion/explanation of site environmental matters during toolbox talks.
- The content and requirements of MS are to be clearly explained to all plant operators and general workers. All staff acting in a supervisory capacity is to have copies of the relevant MS and be aware of the content thereof.
- Ensuring that a copy of the EMPr is readily available on-site, and that all senior site staff is aware of the location and have access to the document. Senior site staff will be familiar with the requirements of the EMPr and the environmental specifications as they apply to the construction of the Project.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training session. The training session must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
  - Records must be kept of those that have completed the relevant training.
  - Training should be done either in a written or verbal format but must be appropriate for the receiving audience.
  - Refresher sessions must be held to ensure the contractor staff are aware of their environmental obligations as practically possible.
- All sub-contractors must have a copy of the EMPr, EA and Development Permits and sign a declaration/ acknowledgement that they are aware and familiar with the contents and requirements of the EMPr and that they will conduct work in such a manner as to ensure compliance with the requirements of the EMPr.
- Contractors and main sub-contractors should have basic training in the identification of archaeological sites/objects, and protected flora and fauna that may be encountered on the Project Site.
- Awareness of any other environmental matters, which are deemed to be necessary by the ECO.
- Ensuring that employee information posters, outlining the environmental "do's" and "don'ts" (as per the environmental awareness training course) are erected at prominent locations throughout the site.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present on-site, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

7.3.1 Environmental Awareness Training

Environmental Awareness Training must be undertaken by the EPC Contractor and must take the form of an on-site talk and demonstration by the EO before the commencement of site establishment and construction on site. The education/awareness programme should be aimed at all levels of management and construction workers within the contractor team. A record of attendance of this training must be maintained by the EO on site.

7.3.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations; Contractor's or Engineer's staff; administrative or site staff; sub-contractors or visitors to site.

This induction training should be undertaken by the Contractor's EO and should include discussing the developer's environmental policy and values, the function of the EA, EMPr, management plans and Contract Specifications and the importance and reasons for compliance to these. The induction training must highlight the overall "do's" and "don'ts" on site and clarify the repercussions of not complying with these. The non-conformance reporting system must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the EO on site.

7.3.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least once a week) where foremen, environmental and safety representatives of different components of the works and sub-consultants hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of the reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

7.4. Monitoring Programme: Construction Phase of the Buffelspoort Solar PV Energy Facility

OBJECTIVE 19: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are, or could result in significant environmental impacts for which corrective action is required. Monitoring during construction must be continuous for the duration of this period. The Project Manager must ensure that the monitoring is conducted and reported.

The aim of the monitoring and auditing process will be to monitor the implementation of the environmental specifications, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
- Ensure adequate and appropriate interventions to address non-compliance.
- Ensure adequate and appropriate interventions to address environmental degradation.
- Provide a mechanism for the lodging and resolution of public complaints.
- Ensure appropriate and adequate record keeping related to environmental compliance.
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site.
- Aid in communication and feedback to authorities and stakeholders.

All documentation e.g., audit/monitoring/compliance reports and notifications, required to be submitted in terms of the Environmental Authorisation, must be submitted to the NWDEDECT.

Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of this development.

7.4.1. Non-Conformance Reports

All supervisory staff including foremen, resident engineers, and the ECO must be provided with the means to be able to submit non-conformance reports to the Site Manager. Non-conformance reports will describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractort.

The non-conformance report will be updated on completion of the corrective measures indicated on the finding sheet. The report must indicate that the remediation measures have been implemented timeously and that the non-conformance can be closed-out to the satisfaction of the Site Manager and ECO.

7.4.2. Incident Reports

According to Section 30 of National Environmental Management Act (NEMA), an "Incident" is defined as an unexpected sudden occurrence, including a major emission, fire or explosion leading to serious danger to the public or potentially serious pollution of or detriment to the environment, whether immediate or delayed.

In terms of the requirements of NEMA, the responsible person must, within 14 days of the incident, report to the Director General, provincial head of department and municipality such information as is available to enable an initial evaluation of the incident, including:

(a) the nature of the incident;
(b) the substances involved and an estimation of the quantity released and their possible acute effect on persons and the environment and data needed to assess these effects;
(c) initial measures taken to minimise impacts;
(d) causes of the incident, whether direct or indirect, including equipment, technology, system, or management failure; and
(e) measures taken and to be taken to avoid a recurrence of such incident.

7.4.3. Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis (or as dictated by the conditions of the EA) and must be submitted to the NWDEDCT for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded, corrective action required, and details of those non-conformances or incidents which have been closed out, or any other aspect as per the Appendix 7 of the EIA Regulations (2014, as amended 2017). The EPC contractor must ensure that all waste manifests are provided to the ECO on a monthly basis in order to inform and update the NWDEDECT regarding waste related activities. I

7.4.4. Audit Report

The Project Developer must ensure that compliance with the conditions of the EA is audited by an independent auditor, and that the audit reports are submitted to the Director: Compliance Monitoring at the NWDEDECT at intervals as dictated by the conditions of the EA. Such audits must be undertaken during

both the construction and operation phases of the solar facility. The effectiveness of the mitigation measures and recommendations for amongst others the following: grievance incidents; waste management, alien and open space management, re-vegetation and rehabilitation, plant rescue and protection and traffic and transportation should be audited. The results must form part of the project monitoring and audit reports.

7.4.5. Final Audit Report

A final environmental audit report must be compiled by an independent external auditor and be submitted to NWDEDECT upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the EA conditions and the requirements of the EMPr.

CHAPTER 8: MANAGEMENT PROGRAMME: OPERATION

Overall Goal: To ensure that the operation of the Project does not have unforeseen impacts on the environment and to ensure that all impacts are monitored, and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the Buffelspoort Solar PV Energy Facility in a way that:

- Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- Enables the Project's operational activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to farming practices, traffic and road use, and effects on local residents.
- Minimises impacts on fauna using the site.

An environmental manager (EM) must be appointed during operation whose duty will be to ensure the implementation of the operational EMPr.

8.1. Objectives

In order to meet this goal, the following objectives have been identified, together with necessary actions and monitoring requirements.

OBJECTIVE 1: Securing the site and general maintenance during operation

Safety issues may arise with public access to Project Site (e.g., unauthorised entry to the site). Prevention and control measures to manage public access are therefore important.

General maintenance at the Buffelspoort Solar PV Energy Facility will be required during the operation of the Project. The maintenance required may also include the replacement of PV modules, if required during the operation lifetime of the Project.

Project component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Security threat to neighbouring land owners.
Activities/risk sources	» Uncontrolled access to the solar facility and associated infrastructure. » Insufficient maintenance of the fence » Insufficient security service personnel present on site
Mitigation: Target/Objective	» To secure the site against unauthorised entry. » To protect members of the public/landowners/residents.

Mitigation: Action/control	Responsibility	Timeframe
General onsite maintenance of the Project during the operational phase must in no way impact or negatively affect the environment, and contractors or other service providers providing onsite maintenance must be made aware of the EA, EMPr, management plans and the content thereof.	O&M Operator	Operation phase
Secure access to the Project Site.	O&M Operator	Operation phase
Post information boards about public safety hazards an d emergency contact information.	O&M Operator	Operation phase
Should there be a need for equipment/components to be replaced, during operations the following will apply: » Site access must be confirmed for the transportation of the required equipment/ components to the site. » Materials and solar structures are to be stored within the previously disturbed construction laydown area. No disturbance of areas outside of these areas should occur. » Full clean-up of all materials must be undertaken after the removal and replacement of the equipment/components, and disturbed areas appropriately rehabilitated. » Waste generated by the maintenance work must be treated in accordance with the Operational Waste Management MS. Waste materials will be sorted and stored on site until disposal is required. Recyclable materials must be transported off-site by truck and managed at appropriate facilities in accordance with relevant waste management regulations. No waste materials may be left on-site following the replacement. » Waste material which cannot be recycled shall be disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.	O&M Operator	Operation phase

Performance Indicator	» Site is secure and there is no unauthorised entry. » No members of the public/ landowners injured. » No complaints from landowners/ public.
Monitoring and Reporting	» Regular visual inspection of fence for signs of deterioration/forced access. » An incident reporting system must be used to record non-conformances to the EMPr. » A public complaints register must be developed and maintained on site. » Landowners should be consulted regularly.

OBJECTIVE 2: Protection of indigenous natural vegetation, fauna, and maintenance of rehabilitation

Indirect impacts on vegetation and terrestrial fauna during operation could result from maintenance activities and the movement of people and vehicles on site. In order to ensure the long-term environmental integrity of the site following the construction, maintenance of the areas rehabilitated post-construction must be undertaken until these areas have successfully re-established.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures.

	» Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Disturbance to or loss of vegetation and/or habitat. » Alien plant invasion. » Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention.
Activity/Risk Source	» Movement of employee vehicles within and around site.
Mitigation: Target/Objective	» Maintain minimised footprints of disturbance of vegetation/ habitats on-site. » Ensure and encourage plant regrowth in non-operational areas of post-construction rehabilitation.

Mitigation: Action/Control	Responsibility	Timeframe
Any potentially dangerous fauna such as snakes or fauna threatened by the maintenance and operational activities should be removed to a safe location.	O&M Operator	Operation phase
The collection, hunting or harvesting of any plants or animals at the Project Site should be strictly forbidden by anyone without the appropriate permits and permissions..	O&M Operator	Operation phase
Implement an animal removal plan to ensure safety of workers and fauna.	O&M Operator	Operation phase
Make use of Low Pressure Sodium lighting or other types of low impact lighting.	O&M Operator	Operation phase
All vehicles accessing the site should adhere to a low-speed limit (40km/h max) to avoid collisions with susceptible species such as snakes and tortoises.	O&M Operator	Operation phase
All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk.	O&M Operator	Operation phase
Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance must be undertaken, as per the Erosion Management and Rehabilitation Plans for the Project.	O&M Operator	Operation phase
Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	O&M Operator	Operation phase
Vehicle movements must be restricted to designated roadways.	O&M Operator	Operation phase

Mitigation: Action/Control	Responsibility	Timeframe
All erosion problems observed must be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques.	O&M Operator	Operation phase
Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and a long-term control plan will need to be implemented.	O&M Operator	Operation phase
Annual site inspection for erosion with follow up remedial action where problems are identified.	Specialist	Annual monitoring until successful re-establishment of vegetation in an area
Regular monitoring for alien plants within the Development Footprint.	O&M Operator	Operation phase
When alien plants are detected, these must be controlled and cleared using the recommended control measures for each species to ensure that the problem is not exacerbated or does not re-occur and increase to problematic levels. Clearing methods must aim to keep disturbance to a minimum. The use of herbicides should be avoided as far as possible.	O&M Operator	Operation phase
No planting or importing any listed invasive alien plant species (all Category 1a, 1b and 2 invasive species) to the site for landscaping, rehabilitation or any other purpose must be undertaken.	O&M Operator	Operation phase
All alien plant re-growth must be monitored, and should these alien plants reoccur these plants should be re-eradicated. The scale of the development does however not warrant the use of a Landscape Architect and / or Landscape Contractor.	O&M Operator	Operation phase
In order to increase general faunal protection, the use of any pesticide in the Development Footprint should be prohibited.	O&M Operator	Operation phase
Vegetation control within the Development Footprint should be by manual clearing and herbicides should not be used except to control alien plants in the prescribed manner if necessary.	O&M Operator Specialist	Operation phase
The use of herbicides and other related horticultural chemicals should be carefully controlled and only applied by personnel adequately certified to apply pesticides and herbicides. It must be ensured that WHO Recommended Classification of Pesticides by Hazard Class 1a (extremely hazardous) or 1b (highly hazardous) are not purchased, stored, or used on site along with any other nationally or internationally similarly restricted/banned products.	O&M Operator	Operation phase
Fire breaks should be maintained, where appropriate and as discussed with the landowners. Access roads could also act as fire breaks.	O&M Operator Specialist	Duration of contract
There should be follow-up rehabilitation and revegetation of any remaining bare areas with indigenous vegetation types to the local area.	O&M Operator	Operation phase
Noise and disturbance on the site should be kept to a minimum during operation and maintenance activities.	O&M Operator	Operation phase

Performance Indicator	» No further disturbance to vegetation or terrestrial faunal habitats. » No erosion problems resulting from operational activities . » Low abundance of alien plants within Development Footprint. » Maintenance of a ground cover that resist erosion. » Continued improvement of rehabilitation efforts.
Monitoring	» Observation of vegetation on-site by EM. » Regular inspections to monitor plant regrowth/performance of rehabilitation efforts and weed infestation compared to natural/undisturbed areas. » Annual monitoring with records of alien species presence and clearing actions. » Annual monitoring with records of erosion problems and mitigation actions taken with photographs.

OBJECTIVE 3: Protection of avifauna

Project component/s	» PV arrays; » Substation; » BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Disturbance to or loss of avifaunal species as a result of collision with Project components. » Destruction of habitat. » Displacement of avifaunal species. » Electrocution.
Activity/risk source	» Operations of the Project » Maintenance activities.
Mitigation: Target/Objective	» More accurately determine the impact of the operating Project on collision-prone Red Data species.

Performance Indicator	» Minimal additional disturbance to avifaunal populations on the Project Site. » Continued improvement of avifaunal protection devices, as informed by the operational monitoring.
Monitoring and Reporting	» Observation of avifaunal populations and incidence of injuries/death from collisions from Project infrastructure. » Monitoring of Project infrastructure and reporting where fatalities do occur.

OBJECTIVE 5: Minimisation of visual impact

The mitigation of secondary visual impacts, such as security and functional lighting, , etc. may be possible and should be implemented and maintained on an on-going basis.

Project component/s	» PV arrays; » Substation;

	» BESS; » Access roads; and » Associated infrastructure.
Potential Impact	» Enhanced visual intrusion. » Visual impact of the Project degradation and vegetation rehabilitation failure.
Activity/risk source	» Lighting of the Project Site for safety and security purpose.
Mitigation: Target/Objective	» To minimise the potential for visual impact. » Well maintained and neat facility.

Mitigation: Action/control	Responsibility	Timeframe
Maintain the general appearance of the facility..	Project Developer / operator	Throughout the operation phase.
Maintain roads and servitudes to forego erosion and to suppress dust.	Project Developer / operator	Throughout the operation phase.
Monitor rehabilitated areas and implement remedial action as and when required.	Project Developer / operator	Throughout the operation phase.
Investigate and implement (should it be required) the potential to screen visual impacts at affected receptor sites.	Project Developer / operator	Throughout the operation phase.

Performance Indicator	» Well maintained and neat facility with intact vegetation in areas rehabilitated.
Monitoring and Reporting	» Monitoring of the Project Site on an ongoing basis by the operator.

OBJECTIVE 6: Ensure appropriate operation and maintenance of the battery energy storage system

Project Component/s	» Battery Energy Storage System.
Potential Impact	» Fire and safety risks » Soils pollution » Water resources pollution
Activities/Risk Sources	» Inappropriate operation and maintenance of BESS.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of associated with the operation and maintenance of the BESS.

Mitigation: Action/Control	Responsibility	Timeframe
Compile (and adhere to) a procedure for the safe handling of battery cells	O&M Contractor	Operation
Ensure that battery supplier user guides, safety specifications and MSDS are filed on site at all times.	O&M Contractor	Operation
Operate, maintain and monitor the BESS as per supplier specifications.	O&M Contractor	Operation

Mitigation: Action/Control	Responsibility	Timeframe
Compile method statements for approval by the Technical/SHEQ Manager for battery cell, electrolyte and battery cell/ container replacement. Maintain MS on site.	O&M Contractor	Operation
Develop, implement and maintain the emergency response plan for implementation in the event of a spill or leakage.	O&M Contractor	Operation
Batteries must be strictly maintained by the supplier or suitably qualified persons for the duration of the project life cycle. No unauthorised personnel should be allowed to maintain the BESS.	O&M Contractor	Operation
Ensure that all maintenance contractors/ staff are familiar with the supplier's specifications.	O&M Contractor	Operation
Provide signage on site specifying the types of batteries in use and the risk of exposure to hazardous material and electric shock.	O&M Contractor	Operation
Provide signage on site specifying how electrical and chemical fires must be dealt with by first responders, and the potential risks to first responders (e.g. toxic fumes). Provide suitable firefighting equipment on site.	O&M Contractor	Operation
Lithium-ion batteries must have battery management systems (containment, automatic alarms and shut-off systems) to monitor and protect cells from overcharging or damaging conditions.	O&M Contractor	Operation
Maintain strict access control to the battery storage area.	O&M Contractor	Operation
Undertake regular visual checks on BESS equipment to identify signs of damage or leaks.	O&M Contractor	Operation
Spill kits must be made available to address any incidents associated with the flow of chemicals from the batteries into the surrounding environment.	O&M Contractor	Operation
Any spills must be cleaned up immediately and contaminated absorbents and materials or soil disposed of at a licensed hazardous waste disposal facility.	O&M Contractor	Operation

Performance Indicator	» BESS operated and maintained in accordance with supplier specifications. » Appropriate signage on site. » Employees appropriately trained. » Required documentation available on site. » Firefighting equipment and training provided before the operation phase commences.
Monitoring	» The O&M contractor must monitor indicators listed above to ensure that they have been met.

OBJECTIVE 7: Appropriate management of stormwater and erosion control

Project component/s	»
Potential Impact	» Erosion and soil loss. » Increased runoff.

	» Downstream sedimentation.
Activities/risk sources	» Disturbed areas that were not appropriately rehabiliatated » Rainfall and wind erosion of disturbed areas. » Concentrated discharge of water from Project Site. » Stormwater run-off from sealed surfaces. »
Mitigation: Target/Objective	» To minimise the erosion of soil from site during operation. » To minimise damage to vegetation by erosion or deposition. » To retain all topsoil with a stable soil surface

Mitigation: Action/control	**Responsibility**	**Timeframe**
Any erosion problems observed along access roads, or any hardened/engineered surface should be rectified immediately and monitored thereafter to ensure that they do not re-occur	O&M Operator	Operation phase
All denuded areas, affected by the development, that have not been rehabilitated should be re-vegetated with locally occurring species, to bind the soil and limit erosion potential where applicable.	O&M Operator	Operation phase
Any stormwater within the site must be handled in a suitable manner as per the management measures in stormwater management plan.	O&M Operator	Operation phase
Stormwater from hardstand areas, buildings and the substation must be managed using appropriate channels and swales when located within steep areas.	O&M Operator	Operation phase
No stormwater runoff must be allowed to discharge directly into the watercourses. The runoff should rather be dissipated over a broad area covered by natural vegetation or managed using appropriate channels and swales when located within steep embankments.	O&M Operator	Operation phase
Stormwater run-off infrastructure must be maintained to mitigate both the flow and water quality impacts of any stormwater leaving the Solar PV Energy Facility site.	O&M Operator	Operation phase

Performance Indicator	» Minimal level of soil erosion around site. » Minimal level of soil degradation. » No activity outside demarcated areas. » Progressive return of disturbed and rehabilitated areas to the desired end state. » No indications of visible topsoil loss.
Monitoring and Reporting	» Continual inspections of the site by the Environmental Manager. » Reporting of ineffective sediment control systems and rectification as soon as possible. » If soil loss is suspected, acceleration of soil conservation and rehabilitation measures must be implemented.

OBJECTIVE 8: Appropriate handling and management of hazardous substances and waste

The operation of the Project will involve the generation of limited waste products. The main waste streams/products expected to be generated by the operational activities includes general solid waste and hazardous waste.

Project component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Inefficient use of resources resulting in excessive waste generation. » soil contamination » Water pollution » Vermin infestation » odor.
Activity/risk source	» Transformers and switchgear – substation. » Fuel and oil storage. » Improper waste management activities – including storage and disposal
Mitigation: Target/Objective	» To comply with waste management legislation. » To minimise production of waste. » To ensure appropriate storage and disposal of waste. » To avoid environmental harm from waste disposal.

Mitigation: Action/control	Responsibility	Timeframe
Hazardous substances must be stored in sealed containers within a clearly demarcated and designated area.	O&M Operator	Operation phase
All structures and/or components replaced during maintenance activities must be appropriately disposed of at an appropriately licensed waste disposal site or sold to a recycling merchant for recycling.	O&M Operator	Operation phase
Care must be taken to ensure that spillage of oils and other hazardous substances are limited during maintenance and operational work. Handling of these materials should take place within an appropriately sealed and bunded area. Should any accidental spillage take place, it must be cleaned up according to specified standards regarding bioremediation.	O&M Operator	Operation and maintenance
Waste handling, collection and disposal operations must be managed and controlled by a waste management contractor.	O&M Operator / waste management contractor	Operation phase

Mitigation: Action/control	Responsibility	Timeframe
Used oils and chemicals: » Where these cannot be recycled, appropriate disposal must be arranged with a licensed facility in consultation with the administering authority. » Waste must be stored and handled according to the relevant legislation and regulations.	O&M Operator	Operation phase
General waste must be recycled where possible or disposed of at an appropriately licensed landfill.	O&M Operator	Operation phase
Spill kits must be made available on-site for the clean-up of spills and leaks of contaminants.	O&M Operator	Operation and maintenance
Hazardous waste (including hydrocarbons) and general waste must be stored and disposed of separately.	O&M Operator	Operation phase
No waste may be burned or buried on site.	O&M Operator	Operation phase

Performance Indicator	» No complaints received regarding waste on site or illegal dumping. » Internal site audits identifying that waste segregation, recycling and reuse is occurring appropriately. » Provision of all appropriate waste manifests. » No contamination of soil. » No pollution of water resources.
Monitoring and Reporting	» Waste collection must be monitored internally on a regular basis. » Waste documentation must be completed and made available for inspection on request. » An incidents/complaints register must be maintained, in which any complaints from the community must be logged. Complaints must be investigated and, if appropriate, acted upon. » Regular reports on exact quantities of all waste streams exiting the site must be compiled by the waste management contractor and monitored by the environmental manager. All appropriate waste disposal certificates must accompany the monthly reports.

OBJECTIVE 9: Maximise benefits and opportunities for local communities associated with the operation of the solar facility

Project component/s	» Solar facility. »
Potential Impact	» The opportunities and benefits associated with the creation of local employment and business should be maximised as far as possible.
Activity/risk source	» During the operation phase of the Project permanent employment opportunities will created. »
Mitigation: Target/Objective	» Create medium- to long-term full time employment opportunities for locals.

Mitigation: Action/control	Responsibility	Timeframe
The Project Developer should make effort to use locally sourced inputs where feasible in order to maximize the benefit to the local economy.	O&M Operator	Operation phase
Local Small and Medium Enterprises are to be approached to investigate the opportunities for supplying inputs required for the maintenance and operation of the facility, as far as feasible.	O&M Operator	Operation phase
Where feasible, effort must be made to employ locally in order to create maximum benefit for the communities.	O&M Operator	Operation phase

Performance Indicator	» Maximum amount of semi and unskilled labour locally sourced where possible. » Local suppliers and SMMEs contracted where possible.
Monitoring and Reporting	» Indicators listed above must be met for the operation phase.

OBJECTIVE 10: Implement an appropriate fire management plan during the operation phase

The vegetation on the site may be at risk of fire, especially during drought conditions experienced in the area. The increased presence of people on the Project Site could increase the risk of veld fires, particularly in the dry season.

Project Component/s	» Solar PV arrays comprising PV panels and mounting structures. » Inverters and transformers. » Cabling between the arrays. » Onsite facility substation. » 88kV single circuit overhead power line for the distribution of the generated power, which will be connected to an existing 88kV Substation just north of the proposed project site. » Battery Energy Storage System (BESS) – to be initiated at a later stage than the Solar PV Energy Facility. » Temporary laydown area. » Operations and Maintenance (O&M) building, which will include a site security office, warehouse, storage area and workshop. » Main access road (existing – to be upgraded with hard surface) and internal (new) gravel roads. » Fencing around the site, including an access gate.
Potential Impact	» Personal safety risk to local farmers and communities, and their homes, crops, livestock and farm infrastructure, such as gates and fences. » Risk to the integrity of the Project infrastructure and personnel working on site.
Activities/Risk Sources	» Making of fires on site » Smoking outside of designated areas » The presence of operation and maintenance personnel and their activities on the site can increase the risk of veld fires.
Mitigation: Target/Objective	» To avoid and or minimise the potential risk of veld fires on local communities and their livelihoods.

Mitigation: Action/Control	Responsibility	Timeframe
Provide adequate firefighting equipment on site. Apply for membership to the local Fire Protection Association, should there be one.	O&M Operator	Operation phase
Provide fire-fighting training to selected operation and maintenance staff.	O&M Operator	Operation phase
Ensure that appropriate communication channels are established to be implemented in the event of a fire.	O&M Operator	Operation phase
Fire breaks should be maintained where and when required. Cognisance must be taken of the relevant legislation when planning and burning firebreaks (in terms of timing, etc.). Access roads may also act as fire breaks.	O&M Operator	Operation phase
Upon completion of the construction phase, an emergency evacuation plan must be drawn up to ensure the safety of the staff and surrounding land users in the case of an emergency.	O&M Operator	Operation phase
Contact details of emergency services should be prominently displayed on site.	O&M Operator	Operation phase

Performance Indicator	» Firefighting equipment and training provided during the operational phase of the Project. » Appropriate fire breaks in place.
Monitoring and Reporting	» The Project Developer must monitor indicators listed above to ensure that they have been met.

8.2. Monitoring Programme: Operation Phase of the Buffelspoort Solar PV Energy Facility

OBJECTIVE 11: To monitor the performance of the control strategies employed against environmental objectives and standards

A monitoring programme must be in place not only to ensure conformance with the EMPr, but also to monitor any environmental issues and impacts which have not been accounted for in the EMPr that are/could result in significant environmental impacts for which corrective action is required. An internal environmental audit must be conducted every 6 months and an external audit must be conducted once a year in order to confirm compliance with the requirements of all environmental permits for the Project, this EMPr, and all relevant legislation. The results of the audit reports must be made available to the NWDEDECT and the relevant authorities on request and must be part of monitoring and audit reports. An annual audit report must be compiled and submitted to NWDEDECT. The aim of the auditing process would be to routinely monitor the implementation of the specified environmental specifications, in order to:

» Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications.
» Ensure adequate and appropriate interventions to address non-compliance.
» Ensure adequate and appropriate interventions to address environmental degradation.
» Provide a mechanism for the lodging and resolution of public complaints.
» Ensure appropriate and adequate record keeping related to environmental compliance.

- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site.
- Aid in the communication and feedback to authorities and stakeholders.

CHAPTER 9: MANAGEMENT PROGRAMME: DECOMMISSIONING

The solar infrastructure which will be utilised for the Buffelspoort Solar PV Energy Facility with Associated Infrastructure is expected to have a lifespan of 15 years (with the option to extend the facility life) . Equipment associated with this Project would only be decommissioned once it has reached the end of its economic life. It must be noted that decommissioning activities will need to be undertaken in accordance with the legislation applicable at that time, which may require this section of the EMPr to be revisited and amended.

The relevant mitigation measures contained under the construction section should be applied during decommissioning and therefore are not repeated in this section.

» ***Site Preparation***
Site preparation activities will include confirming the integrity of the access to the Project Site to accommodate the required equipment, preparation of the Project Site (e.g. laydown areas, construction platform) and the mobilisation of construction equipment to be used during decommissioning.

» ***Dismantle and Remove Infrastructure***
The infrastructure such as the modules and mounting structures will be dismantled.. Once dismantled, the components will be reused, recycled, or disposed of in accordance with regulatory requirements (NEMA / NEM:WA).

9.1. Objectives

In decommissioning the Buffelspoort Solar PV Energy Facility, Buffelspoort Solar Project (Pty) Ltd must ensure that:

» All structures not required for the post-decommissioning use of the site (may include the modules and mounting structures, substation, inverters and transformers, BESS, laydown areas, and O&M facilities) are dismantled and/or demolished, removed and waste material disposed of at an appropriately licensed waste disposal site or as required by the relevant legislation.
» Access/service roads and servitudes not required for the post-decommissioning use of the site is rehabilitated. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.
» All disturbed areas are compacted, sloped, and contoured to ensure drainage and runoff and to minimise the risk of erosion.
» Rehabilitated areas are monitored on a quarterly basis for at least a year following decommissioning and implement remedial action as and when required.
» Any fauna encountered during decommissioning activities should be removed to safety by a suitably qualified person.
» All vehicles to adhere to low-speed limits (i.e. 40km/h max) on the site, to reduce risk of faunal collisions as well as to reduce dust.
» Retrenchments should comply with South African Labour legislation, relevant at the time of the site closure and decommissioning.

The general specifications of Chapter 7 (Construction) and Chapter 9 (Decommissioning) are also relevant to the decommissioning of the Buffelspoort Solar PV Energy Facility and must be adhered to.

APPENDIX A:
FACILITY LAYOUT AND SENSITIVITY MAPS

Buffelspoort
Solar PV Energy Facility
North West Province

Locality Map

Legend

- Town
- ATKV- Buffelspoort
- Eskom Substation
- Existing Power Line
- National Route
- Regional Road
- Main Road
- Perennial River

Facility Layout and Grid Connection Corridor

- Onsite Facility Substation
- Project Site
- Development Area
- Grid Corridor (200 m - 300 m)

Scale: 1:30 000
Projection:GCS_WGS_1984
Map Ref: Buffelspoort Locality Ma

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Buffelspoort
Solar PV Energy Facility
North West Province

Locality Map

Legend

- Town
- ATKV- Buffelspoort
- Eskom Substation
- Existing Power Line
- National Route
- Regional Road
- Main Road
- Perennial River

Facility Layout and Grid Connection Corridor

- Onsite Facility Substation
- Project Site
- Development Area
- Development Footprint
- Grid Corridor (200 m - 300 m)

N

N4

Mooinooi

ATKV- Buffelspoort

R104

0 1 2 4 Km

Scale: 1:30 000
Projection:GCS_WGS_1984
Map Ref: Buffelspoort Locality Ma

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Buffelspoort
Solar PV Energy Facility
North West Province

Layout Map

Legend

- Eskom Substation
- Existing Power Line
- National Route
- Regional Road
- Main Road
- Perennial River

Facility Layout and Grid Connection Corridor

- Project Site
- Development Area
- Development Footprint
- Internal Access Roads (3.5 m)
- Access Road
- Water tank
- Warehouse
- Parking Lots
- Compound and Storage Area
- Production Substation
- Onsite Facility Substation
- Grid Corridor (200 m - 300 m)

Scale: 1:30 000
Projection:GCS_WGS_1984
Map Ref: Buffelspoort Locality Ma

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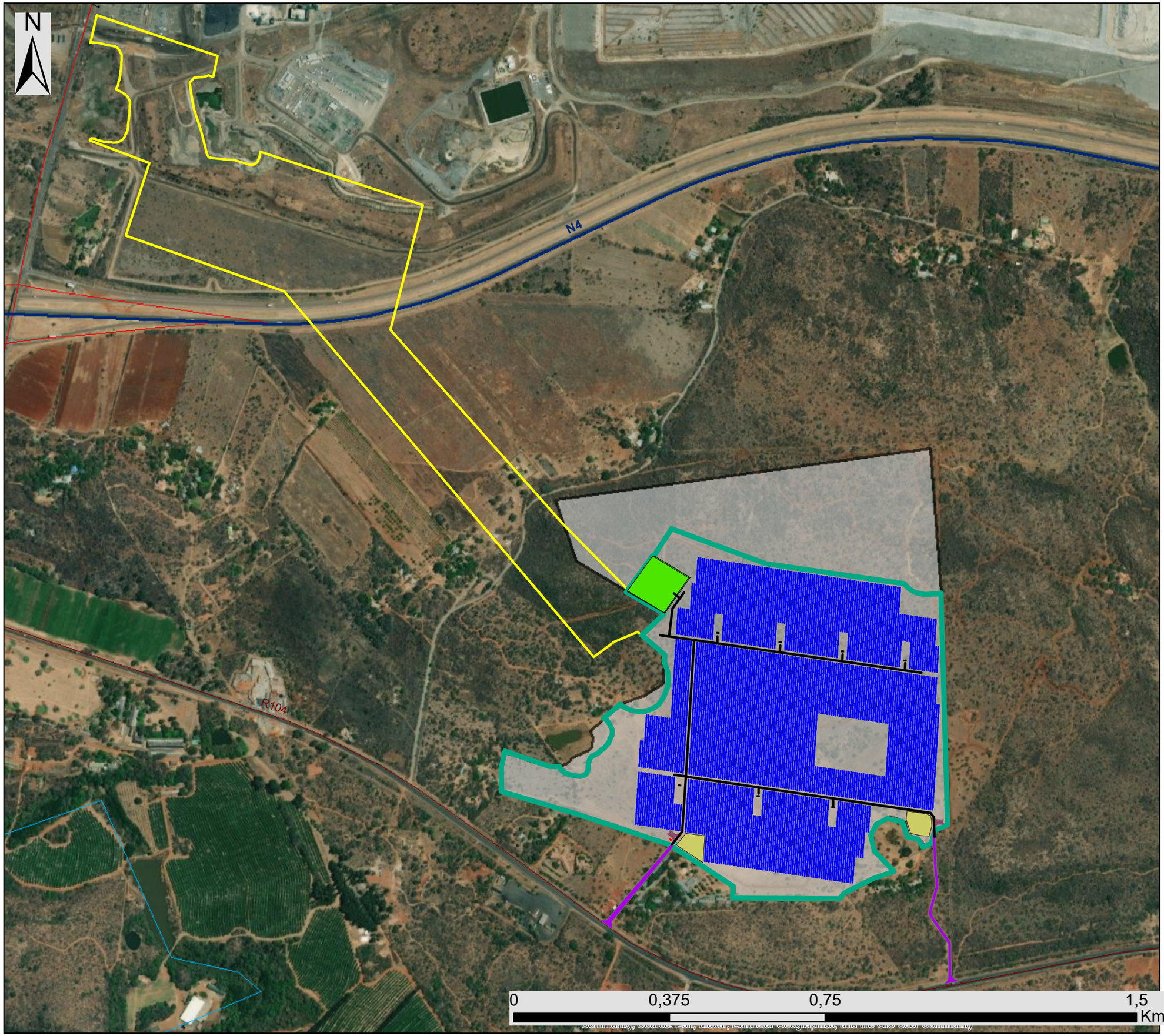


Buffelspoort
Solar PV Energy Facility
North West Province

Legend — Sensitivity Map

- ATKV- Buffelspoort
- Eskom Substation
- Existing Power Line
- National Route
- Main Road
- Regional Road
- Perennial River

Facility Layout and Grid Connection Corridor

- Development Footprint
- Development Area
- Grid Corridor (200m-300m)
- Onsite Facility Substation

Ecological Sensitivities

- Degraded Bushveld (High Ecological Sensitivity)
- Wetlands (Medium Ecological Sensitivity)
- Disturbed Bushveld (Low Ecological Sensitivity)
- Transformed (Very Low Ecological Sensitivity)
- Rocky Outcrops (35m Ridge Buffer)

Heritage Features

- Heritage Features
- Heritage Features Delineation
- Heritage Feature Buffer (30m Buffer)
- Heritage Feature Buffer (50m Buffer)

Soil Sensitivity

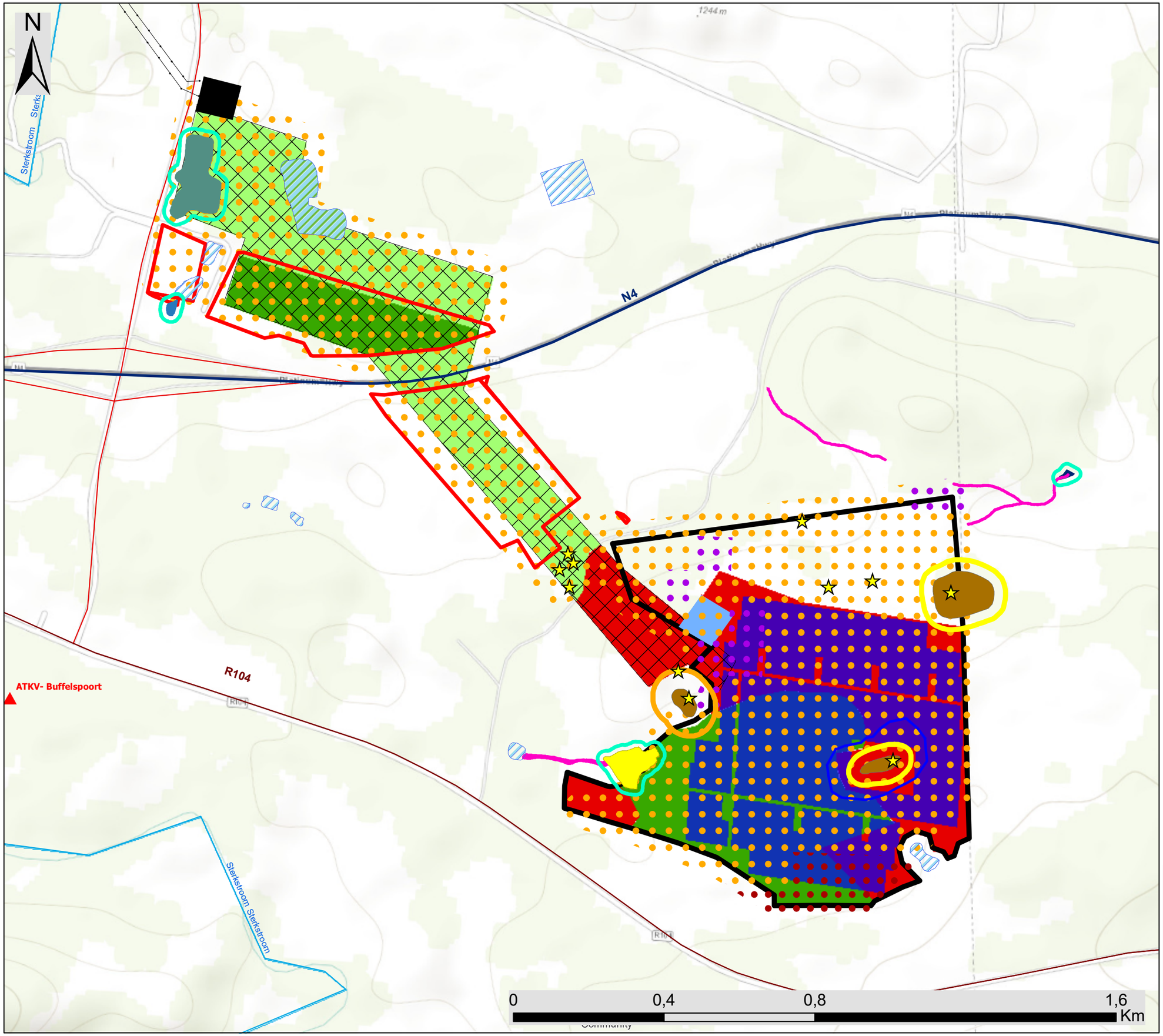
- Field Crop Boundary
- High Land Capability
- Medium Land Capability
- Low Land Capability

Wetland Sensitivities

- Wetland Buffer (15m)
- Artificial Wetland (Very Low Sensitivity)
- Dams (Very Low Sensitivity)
- Drainage Features (Moderate High Sensitivity)
- HGM 1- Depression (Moderate High Sensitivity)
- HGM 2- Depression (Moderate High Sensitivity)
- HGM 3- Hillslope Seep (Moderate Low Sensitivity)
- HGM 4- Unchannelled Valley Bottom (Medium Sensitivity)

Scale: 1:30 000
Projection:GCS_WGS_1984
Map Ref: Buffelspoort Sensitivity Map

savannah environmental



APPENDIX B:
GRIEVANCE MECHANISM FOR COMPLAINTS AND ISSUES

GRIEVANCE MECHANISM / PROCESS

1. PURPOSE

This Grievance Mechanism has been developed to receive and facilitate the resolution of concerns and grievances regarding the Project's environmental and social performance. The aim of the Grievance Mechanism is to ensure that grievances or concerns raised by stakeholders are addressed in a manner that:

- Provides a predictable, accessible, transparent, and credible process to all parties, resulting in outcomes that are fair and equitable, accountable and efficient.
- Promotes trust as an integral component of broader community relations activities.
- Enables more systematic identification of emerging issues and trends, facilitating corrective action and pre-emptive engagement.

The aim of this Grievance Mechanism is to provide a process to address grievances in a manner that does not require a potentially costly and time-consuming legal process.

2. PROCEDURE FOR RECEIVING AND RESOLVING GRIEVANCES

The following proposed grievance procedures are to be complied with throughout the construction, operation and decommissioning phases of the Project. These procedures should be updated as and when required to ensure that the Grievance Mechanism is relevant for the Project and effective in providing the required processes.

- Local landowners, communities and authorities must be informed in writing by the Project Developer of the grievance mechanism and the process by which grievances can be brought to the attention of the Project Developer through its designated representative. This must be undertaken with the commencement of the construction phase.
- The Project Developer needs to appoint a representative as the contact person to which grievances can be directed. The name and contact details of the contact person must be provided to local landowners, communities and authorities when requested.
- Project related grievances relating to the construction, operation and or decommissioning phases must be addressed in writing to the contact person. The contact person should assist local landowners and/ or communities who may lack resources to submit/prepare written grievances or are illiterate, by recording grievances and completing written grievance notices where applicable, translating requests or concerns or by facilitating contact with relevant parties who can address the raised concerns. The following information should be obtained, as far as possible, regarding each written grievance, which may act as both acknowledgement of receipt as well as record of grievance received:
    a. The name and contact details of the complainant;
    b. The nature of the grievance;
    c. Date raised, received, and for which the meeting was arranged;
    d. Persons elected to attend the meeting (which will depend on the grievance); and
    e. A clear statement that the grievance procedure is, in itself, not a legal process. Should such avenues be desired, they must be conducted in a separate process and do not form part of this grievance mechanism.

- The grievance must be registered with the contact person who, within two (2) working days of receipt of the grievance, must contact the Complainant to discuss the grievance and, if required, agree on a suitable date and venue for a meeting in order to discuss the grievances raised. Unless otherwise agreed, the meeting should be held within 2 weeks of receipt of the grievance.
- The contact person must draft a letter or send a voice recording (in cases whereby the Complainant is illiterate)to be sent to the Complainant acknowledging receipt of the grievance, the name and contact details of Complainant, the nature of the grievance, the date that the grievance was raised, and the date and venue for the meeting (once agreed and only if required).
- A grievance register must be kept on site (in electronic format, so as to facilitate editing and updating), and shall be made available to all parties wishing to gain access thereto.
- Prior to the meeting being held the contact person must contact the Complainant to discuss and agree on the parties who should attend the meeting, as well as a suitable venue. The people who will be required to attend the meeting will depend on the nature of the grievance. While the Complainant and or Project Developer are entitled to invite their legal representatives to attend the meeting/s, it should be made clear to all the parties involved in the process that the grievance mechanism process is not a legal process, and that if the Complainant invites legal representatives, the cost will be their responsibility. It is therefore recommended that the involvement of legal representatives be limited as far as possible, as a matter of last resort, and that this process be primarily aimed at stakeholder relationship management as opposed to an arbitration or litigation mechanism.
- The meeting should be chaired by the Developer's representative appointed to address grievances. The Developer must supply and nominate a representative to capture minutes and record the meeting/s.
- Draft copies of the minutes must be made available to the Complainant and the Project Developer within five (5) working days of the meeting being held. Unless otherwise agreed, comments on the Draft Minutes must be forwarded to the company representative appointed to manage the grievance mechanism within five (5) working days of receipt of the draft minutes.
- The meeting agenda must be primarily the discussion of the grievance, avoidance and mitigation measures available and proposed by all parties, as well as a clear indication of the future actions and responsibilities, in order to put into effect the proposed measures and interventions to successfully resolve the grievance.
- In the event of the grievance being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties. The record should provide details of the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of a dispute between the Complainant and the Project Developer regarding the grievance, the option of appointing an independent mediator to assist with resolving the issue should be discussed. The record of the meeting/s must note that a dispute has arisen, and that the grievance has not been resolved to the satisfaction of all the parties concerned.
- In the event that the parties agree to appoint a mediator, the Project Developer will be required to identify three (3) mediators and forward the names and CVs to the Complainant within two (2) weeks of the dispute being declared. The Complainant, in consultation with the Project Developer, must identify the preferred mediator and agree on a date for the next meeting. The cost of the mediator must be borne by the Project Developer. The Project Developer must supply and nominate a representative to capture minutes and record the meeting/s.

- In the event of the grievance, with the assistance of the mediator, being resolved to the satisfaction of all the parties concerned, the outcome must be recorded and signed off by the relevant parties, including the mediator. The record should provide details on the date of the meeting/s, the names of the people that attended the meeting/s, the outcome of the meeting/s, and where relevant, the measures identified to address the grievance, the party responsible for implementing the required measures, and the agreed upon timeframes for the measures to be implemented.
- In the event of the dispute not being resolved, the mediator must prepare a draft report that summaries the nature of the grievance and the dispute. The report should include a recommendation by the mediator on the proposed way forward with regard to the addressing the grievance.
- The draft report must be made available to the Complainant and the Project Developer for comment before being finalised and signed by all parties, which signature may not be unreasonably withheld by either party. Unless otherwise agreed, comments on the draft report must be forwarded to the company representative appointed to manage the grievance mechanism within five (5) working days. The way forward will be informed by the recommendations of the mediator and the nature of the grievance.

A Complaint is closed out when no further action is required, or indeed possible. Closure status must be classified and captured following mediation or successful resolution in the Complaints Register as follows:

- Resolved. Complaints where a resolution has been agreed and implemented and the Complainant has signed the Confirmation Form.
- Unresolved. Complaints where it has not been possible to reach an agreed resolution despite mediation.
- Abandoned. Complaints where the Complainant is not contactable after one month following receipt of a Complaint and efforts to trace his or her whereabouts have been unsuccessful.

The grievance mechanism does not replace the right of an individual, community, group or organization to take legal action should they so wish. In the event of the grievance not being resolved to the satisfaction of Complainant and or the Project Developer, either party may be entitled to legal action if an appropriate option, however, these grievance mechanisms aim to avoid such interactions by addressing the grievances within a short timeframe, and to mutual satisfaction, where possible.

APPENDIX C:
OPEN SPACE MANAGEMENT PLAN

ALIEN PLANT AND OPEN SPACE MANAGEMENT PLAN

1. PURPOSE

Invasive alien plant species pose the second largest threat to biodiversity after direct habitat destruction. The purpose of this Alien Plant and Open Space Management Plan is to provide a framework for the management of alien and invasive plant species during the construction and operation of the Buffelspoort Solar PV Energy Facility. The broad objectives of the plan include the following:

- Ensure alien plants do not become dominant in parts of the site, or the whole site, through the control and management of alien and invasive species presence, dispersal and encroachment.
- Develop and implement a monitoring and eradication programme for alien and invasive plant species.
- Promote the natural re-establishment and planting of indigenous species in order to retard erosion and alien plant invasion.

This plan should be updated throughout the life cycle of the Project, as required in order to ensure that appropriate measures are in place to manage and control the establishment of alien and invasive plant species and to ensure compliance with relevant legislation. This plan should be implemented with specific focus on sensitive areas.

2. LEGISLATIVE CONTEXT

Conservation of Agricultural Resources Act (Act No. 43 of 1983)

In terms of the amendments to the regulations under the Conservation of Agricultural Resources Act (Act No. 43 of 1983), all declared alien plant species must be effectively controlled. Landowners are legally responsible for the control of invasive alien plants on their properties. In terms of this Act alien invasive plant species are ascribed to one of the following categories:

- Category 1: Prohibited and must be controlled.
- Category 2 (commercially used plants): May be grown in demarcated areas provided that there is a permit and that steps are taken to prevent their spread.
- Category 3 (ornamentally used plants): May no longer be planted. Existing plants may be retained as long as all reasonable steps are taken to prevent the spreading thereof, except within the flood line of watercourses and wetlands.

National Environmental Management: Biodiversity Act, 2004 (Act No.10 of 2004)

The National Environmental Management: Biodiversity Act (NEM:BA) regulates all invasive organisms in South Africa, including a wide range of fauna and flora. Regulations have been published in Government Notices R.506, R.507, R.508 and R.509 of 2013 under NEM:BA. According to this Act and the regulations, any species designated under Section 70 cannot be propagated, grown, bought or sold without a permit. Below is an explanation of the three categories:

- **Category 1a:** Invasive species requiring compulsory control. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

- **Category 1b:** Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
- **Category 2:** Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
- **Category 3:** Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Plants listed under the categories above are detailed within the Alien and Invasive Species published in GNR1003 of 18 September 2020. The following guide is a useful starting point for the identification of alien species: Bromilow, C. 2010. Problem Plants and Alien Weeds of South Africa. Briza, Pretoria.

It is important to note that alien plant species that are regulated in terms of the Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) as weeds and invader plants are exempted from NEM:BA. This implies that the provisions of the CARA in respect of listed weed and invader plants supersede those of NEM: BA.

3. ALIEN PLANT MANAGEMENT PRINCIPLES

3.1. Prevention and early eradication

A prevention strategy should be considered and established, including regular surveys and monitoring for invasive alien plants, effective rehabilitation of disturbed areas and prevention of unnecessary disturbance of natural areas.

Monitoring plans should be developed which are designed to identify Invasive Alien Plant Species already on site, as well as those that are introduced to the site by the construction activities. Keeping up to date on which weeds are an immediate threat to the site is important, but efforts should be planned to update this information on a regular basis. When additional Invasive Alien Plant Species are recorded on site, an immediate response of locating the site for future monitoring and either hand-pulling the weeds or an application of a suitable herbicide (where permissible only) should be planned. It is, however, better to monitor regularly and act swiftly than to allow invasive alien plants to become established on the Project Site.

3.2. Containment and control

If any alien invasive plants are found to become established on the Project Site, action plans for their control should be developed, depending on the size of the infestations, budgets, manpower considerations and time. Separate plans of control actions should be developed for each location and/or each species. Appropriate registered chemicals and other possible control agents should be considered in the action plans for each site/species. The uses of chemicals are not recommended for any wetland areas. Herbicides should be applied directly to the plant and not to the soil. The key is to ensure that no invasions get out of control. Effective containment and control will ensure that the least amount of energy and resources are required to maintain this status over the long-term. This will also be an indicator that natural systems are impacted to the smallest degree possible.

3.3. General Clearing and Guiding Principles

Alien species control programmes are long-term management projects and should consist of a clearing plan which includes follow up actions for rehabilitation of the cleared area. The lighter infested areas should be cleared first to prevent the build-up of seed banks. Pre-existing dense mature stands ideally should be left for last, as they probably won't increase in density or pose a greater threat than they are currently. Collective management and planning with neighbours may be required in the case of large woody invaders as seeds of alien species are easily dispersed across boundaries by wind or watercourses. All clearing actions should be monitored and documented to keep records of which areas are due for follow-up clearing.

i. Clearing Methods

Different species require different clearing methods such as manual, chemical or biological methods or a combination of both. Care should however be taken that the clearing methods used do not encourage further invasion and that they are appropriate to the specific species of concern. As such, regardless of the methods used, disturbance to the soil should be kept to a minimum.

Fire should not be used for alien species control or vegetation management at the Project Site. The best-practice clearing method for each species identified should be used.

» **Mechanical control**
This entails damaging or removing the plant by physical action. Different techniques could be used, e.g., uprooting, felling, slashing, mowing, ringbarking or bark stripping. This control option is only really feasible in sparse infestations or on a small scale, and for controlling species that do not coppice after cutting. Species that tend to coppice, need to have the cut stumps or coppice growth treated with herbicides following the mechanical treatment. Mechanical control is labour intensive and therefore expensive and could cause severe soil disturbance and erosion.

» **Chemical Control**
Although it is usually preferable to use manual clearing methods where possible, such methods may create additional disturbance which stimulates alien plant invasion and may also be ineffective for many woody species which re-sprout. Where herbicides are to be used, the impact of the operation on the natural environment should be minimised by observing the following:

- Area contamination must be minimised by careful, accurate application with a minimum amount of herbicide to achieve good control.
- All care must be taken to prevent contamination of any water bodies. This includes due care in storage, application, cleaning equipment and disposal of containers, product and spray mixtures.
- Equipment should be washed where there is no danger of contaminating water sources and washings carefully disposed of at a suitable site.
- To avoid damage to indigenous or other desirable vegetation, products should be selected that will have the least effect on non-target vegetation.
- Coarse droplet nozzles should be fitted to avoid drift onto neighbouring vegetation.
- The appropriate health and safety procedures should also be followed regarding the storage, handling and disposal of herbicides.
- The use of chemicals is not recommended for wetland areas.

For all herbicide applications, the following Regulations and guidelines should be followed:

- Working for Water: Policy on the Use of Herbicides for the Control of Alien Vegetation.
- Pesticide Management Policy for South Africa published in terms of the Fertilizers, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) – GNR 1120 of 2010.
- South African Bureau of Standards, Standard SANS 10206 (2010).

According to Government Notice No. 13424 dated 26 July 1992, it is an offence to "*acquire, dispose, sell or use an agricultural or stock remedy for a purpose or in a manner other than that specified on the label on a container thereof or on such a container*".

Contractors using herbicides need to have a valid Pest Control Operators License (limited weeds controller) according to the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act (Act No. 36 of 1947). This is regulated by the Department of Agriculture, Forestry and Fisheries.

» **Biological control**

Biological weed control consists of the use of natural enemies to reduce the vigour or reproductive potential of an invasive alien plant. Biological control agents include insects, mites, and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant, either the reproductive organs directly (flower buds, flowers or fruit) or the seeds after they have dropped. The stress caused by the biological control agent may kill a plant outright or it might impact on the plant's reproductive capacity. In certain instances, the reproductive capacity is reduced to zero and the population is effectively sterilised. All of these outcomes will help to reduce the spread of the species.

To obtain biocontrol agents, provincial representatives of the Working for Water Programme or the Directorate: Land Use and Soil Management (LUSM), Department of Forestry, Fisheries and Environment (DFFE) can be contacted.

3.4. General management practices

The following general management practices should be encouraged or strived for:

- Establish an on-going monitoring programme for the construction phase to detect and quantify any alien species that may become established.
- Alien vegetation regrowth on areas disturbed by construction must be immediately controlled.
- Care must be taken to avoid the introduction of alien invasive plant species to the site. Particular attention must be paid to imported material such as building sand or dirty earth-moving equipment. Stockpiles should be checked regularly and any weeds emerging from material stockpiles should be removed.
- Cleared areas that have become invaded by alien species can be sprayed with appropriate herbicides provided that these herbicides break down on contact with the soil. Residual herbicides should not be used.
- The effectiveness of vegetation control varies seasonally, and this is also likely to impact alien species. Control early in the wet season will allow species to re-grow, and follow-up control is likely to be required. It is tempting to leave control until late in the wet season to avoid follow-up control. However, this may allow alien species to set seed before control, and hence will not contribute

towards reducing alien species abundance. Therefore, vegetation control should be aimed at the middle of the wet season, with a follow-up event towards the end of the wet season. There are no exact dates that can be specified here as each season is unique and management must therefore respond according to the state and progression of the vegetation.

- » Alien plant management is an iterative process, and it may require repeated control efforts to significantly reduce the abundance of a species. This is often due to the presence of large and persistent seed banks. However, repeated control usually results in rapid decline once seed banks become depleted.
- » Some alien species are best individually pulled by hand. Regular vegetation control to reduce plant biomass within the site should be conducted. This should be timed so as to coincide with the critical growth phases of the most important alien species on site. This will significantly reduce the cost of alien plant management as this should contribute towards the control of the dominant alien species and additional targeted control will be required only for a limited number of species.
- » No alien species should be cultivated on-site. If vegetation is required for aesthetic purposes, then non-invasive, water-wise locally occurring species should be used.
- » During operation, surveys for alien species should be conducted regularly. It is recommended that this be undertaken every six (6_ months for the first two (2) years after construction and annually thereafter. All alien plants identified should be cleared using appropriate means.

3.5. Monitoring

In order to assess the impact of clearing activities, rehabilitation efforts, follow-ups and monitoring must be undertaken. This section provides a description of a possible monitoring programme that will provide an assessment of the magnitude of alien plant invasion on site, as well as an assessment of the efficacy of the management programme.

In general, the following principles apply for monitoring:

- » Photographic records must be kept of areas to be cleared prior to work starting and at regular intervals during initial clearing activities. Similarly, photographic records should be kept of the area from immediately before and after follow-up clearing activities. Rehabilitation processes must also be recorded.
- » Simple records must be kept of daily operations, e.g., area/location cleared, labour units and, if ever used, the amount of herbicide used.
- » It is important that, if monitoring results in detection of invasive alien plants, that this leads to immediate action.

The following monitoring should be implemented to ensure management of alien invasive plant species.

Construction Phase

Monitoring Action	Indicator	Timeframe
Document alien species present at the site	List of alien plant species	Preconstruction Monthly during Summer and Autumn (Middle November to end of March) 3 Monthly during Winter and Spring
Document alien plant distribution	Alien plant distribution map within priority areas	Quarterly

Document & record alien plant control measures implemented	Record of clearing activities	Quarterly

Operation Phase

Monitoring Action	Indicator	Timeframe
Document alien plant species distribution and abundance over time at the site	Alien plant distribution map	Biannually
Document alien plant control measures implemented & success rate achieved	Records of control measures and their success rate. A decline in alien distribution and cover over time at the site	Biannually
Document rehabilitation measures implemented, and success achieved in problem areas	Decline in vulnerable bare areas over time	Biannually

APPENDIX D:
RE-VEGETATION AND HABITAT REHABILITATION PLAN

REVEGETATION AND REHABILITATION PLAN

1. PURPOSE

The purpose of the Rehabilitation Plan is to ensure that areas cleared or impacted during construction activities within the Project Site for the Buffelspoort Solar PV Energy Facility, and that are not required for operation, are rehabilitated to their original state before the operation phase commences, and that the risk of erosion from these areas is reduced. The purpose of the Rehabilitation Plan for the site can be summarised as follows:

- Achieve long-term stabilisation of all disturbed areas.
- Re-vegetate all disturbed areas with suitable local plant species.
- Minimise visual impact of disturbed areas.
- Ensure that disturbed areas are rehabilitated to a condition similar to that found prior to disturbance.

This Rehabilitation Plan should be read in conjunction with other site-specific plans, including the Erosion Management Plan, Soil Management Plan, Alien Invasive Management Plan and Plant Rescue and Protection Plan. Prior to the commencement of construction, a detailed Rehabilitation Plan and Method Statement for the Project Site should be compiled with the aid of a suitably qualified, professionally registered specialist (with a botanical or equivalent qualification).

2. REHABILITATION METHODS AND PRACTISES

The following general management practices should be encouraged or strived for:

- The footprint should be limited much as possible through reducing the excess footprint around roads, PV panel footings etc as much as possible.
- Topsoil should be reserved wherever possible on site, to be utilised during rehabilitation.
- Clearing of invaded areas should be conducted as per the Alien Plant and Open Spaces Management Plan, included in the EMPr.
- No harvesting of vegetation may be undertaken outside the area to be disturbed by construction activities.
- It is important to select the correct species to use for rehabilitation.
- Indigenous plant material must be kept separate from alien material.
- Re-seeding with collected or commercial indigenous seed mixes is recommended. Indigenous seeds may be harvested for purposes of revegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites.
- Sods used for revegetation should be obtained directly from the Project Site, but not from the sensitive areas. Sods should contain at least a 50 mm topsoil layer and be minimally disturbed, in particular to existing root systems. Sods must ideally be obtained from areas as close as possible to the region that is to be rehabilitated.
- Water used for the irrigation of re-vegetated areas should be free of chlorine and other pollutants that might have a detrimental effect on the plants.
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals.

- On steep slopes and areas where seed and organic matter retention is low, it is recommended that soil savers are used to stabilise the soil surface. Soil savers are man-made materials, usually constructed of organic material such as hemp or jute and are usually applied in areas where traditional rehabilitation techniques are not likely to succeed.
- In areas where soil saver is used, it should be pegged down to ensure that it captures soil and organic matter flowing over the surface.
- The final rehabilitated area should resemble the current composition and structure of the soil as far as practicably possible.
- Progressive rehabilitation is an important element of the rehabilitation strategy and should be implemented where feasible.
- No construction equipment, vehicles or unauthorised personnel should be allowed onto areas that have been rehabilitated.
- Where rehabilitation sites are located within actively grazed areas, they should be fenced off, this must be undertaken in consultation with the landowner.
- Any runnels, erosion channels or wash-aways developing after revegetation should be backfilled and consolidated and the areas restored to a proper stable condition.
- Re-vegetated areas should be monitored frequently and prepared and revegetation from scratch should inadequate signs of surface coverage or grown be evident after two growth seasons. Adequate recovery must be assessed by a qualified botanist or rehabilitation specialist.
- The stockpiled vegetation from the clearing operations should be reduced to mulch where possible, and retained along with topsoil to encourage seedbank regrowth and soil fertility.
- Mulches must be collected in such a manner as to restrict the loss of seed.
- Mulch must be stored for as short a period as possible.
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants.
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited, and only the correct herbicide type should be applied.
- Once rehabilitated, areas should be protected to prevent trampling and erosion.
- Fencing should be removed once a sound vegetative cover has been achieved.

3. MONITORING AND FOLLOW-UP ACTION

Throughout the lifecycle of the development, regular monitoring and adaptive management must be in place to detect any new degradation of rehabilitated areas. During the construction phase, the Environmental Officer (EO) and EPC Contractor will be responsible for initiating and maintaining a suitable monitoring system. Once the development is operational, the Project Developer will need to identify a suitable entity that will be able to take over and maintain the monitoring cycle and initiate adaptive management as soon as it is required. Monitoring personnel must be adequately trained.

The following are the minimum criteria that should be monitored:

- Associated nature and stability of surface soils.
- Re-emergence of alien and invasive plant species. If noted, remedial action must be taken immediately, as per the alien management plan and mitigation measures contained within the EMPr.

Rehabilitation success, monitoring and follow-up actions are important to achieve the desired cover and soil protection. The following monitoring protocol is recommended:

- Rehabilitation areas should be monitored every 4 months for the first 12 months following construction, or as per the recommendations of specialist.
- Ensure that steep slopes are not de-vegetated unnecessarily and subsequently become hydrophobic (i.e. have increased runoff and a decreased infiltration rate) increasing the erosion potential.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the timeframe between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control and rehabilitation strategy.
- Any areas showing erosion, should be adaptively managed with particular erosion control measures, depending on the situation.

If the current state of the environment prior to construction (which will be disturbed during the construction phase) is not achieved post impact, within the specified rehabilitation period, maintenance of these areas must continue until an acceptable state is achieved (excluding alien plant species or weeds). Additional rehabilitation methods may be necessary to achieve the current state before construction commenced.

Monitoring of the rehabilitation success, as well as follow-up adaptive management, combined with the clearing of emerging alien plant species should all continue for as long as is considered necessary, depending on regrowth rates.

APPENDIX E:
PLANT RESCUE AND PROTECTION PLAN

SEARCH AND RESCUE AND PROTECTION PLAN

1. PURPOSE

The purpose of the Search and Rescue and Protection Plan is to implement avoidance and mitigation measures, in addition to the mitigations included in the EMPr to reduce the impact of the Buffelspoort Solar PV Energy Facility's establishment on listed and protected plant species and their habitats during construction and operation. This subplan is required in order to ensure compliance with national and provincial legislation for vegetation clearing and any required destruction or translocation of provincially and nationally protected species within the Development Footprint.

2. IDENTIFICATION OF SPECIES OF CONSERVATION CONCERN

Plant species are protected at a national level as well as the provincial level and different permits may be required for different species depending on their protection level. At the national level, protected trees are listed by the Department of Forestry, Fisheries and Environment (DFFE) under the National List of Protected Trees, which is updated on a regular basis. Any clearing of nationally protected trees requires a permit from DFFE. At the provincial level, all species red-listed under the Red List of South African plants (http://redlist.sanbi.org/) as well as species listed under the the National Environmental Management Biodiversity Act, No. 10 of 2004 protected and require provincial permits.

Protected fauna species red-listed under the Red List of South African plants (http://redlist.sanbi.org/) as well as species listed under the National Environmental Management Biodiversity Act, No. 10 of 2004 are protected and require provincial permits.

3. IDENTIFICATION OF LISTED SPECIES

The vegetation assessment was conducted throughout the extent of the Project Site. A total of 88 tree, shrub and herbaceous plant species were recorded in the Project Site during the field assessment (Table 1). Plants listed as Category 1 alien or invasive species under the NEM:BA appear in green text. Plants listed in Category 2 or as 'not indigenous' or 'naturalised' according to NEM:BA, appear in blue text.

Family	*Scientific Name*	Threat Status (SANBI, 2021)	SA Endemic	Alien Category
Agavaceae	*Chlorophytum cooperi*	LC	Not Endemic	
Amaranthaceae	*Achyranthes aspera*			Not indigenous; Naturalised
Amaranthaceae	*Alternanthera pungens*			Not indigenous; Naturalised
Amaranthaceae	*Gomphrena celosioides*			Not indigenous; Naturalised
Amaryllidaceae	*Haemanthus humilis*	LC	Not Endemic	
Anacardiaceae	*Searsia lancea*	LC	Not Endemic	
Anacardiaceae	*Ozoroa paniculosa*	LC	Not Endemic	
Anacardiaceae	*Searsia zeyheri*	LC	Endemic	

Anacardiaceae	*Sclerocarya birrea subsp. caffra*	LC-Protected Tree	Not Endemic	
Apocynaceae	*Gomphocarpus fruticosus*	LC	Not Endemic	
Araliaceae	*Cussonia spicata*	LC	Not Endemic	
Asparagaceae	*Asparagus cooperi*	LC	Not Endemic	
Asphodelaceae	*Aloe davyana*	LC	Not Endemic	
Asteraceae	*Bidens pilosa*			Not indigenous; Naturalised
Asteraceae	*Conyza bonariensis*			Not indigenous; Naturalised
Asteraceae	*Flaveria bidentis*			NEMBA Category 1b.
Asteraceae	*Nidorella anomala*	LC	Not Endemic	
Asteraceae	*Schkuhria pinnata*			Not indigenous; Naturalised
Asteraceae	*Tagetes minuta*			Not indigenous; Naturalised
Asteraceae	*Zinnia peruviana*			Not indigenous; Naturalised
Asteraceae	*Kleinia longiflora*	LC	Not Endemic	
Asteraceae	*Geigeria burkei*	LC	Not Endemic	
Asteraceae	*Felicia muricata*	LC	Not Endemic	
Asteraceae	*Dicoma anomala*	LC	Not Endemic	
Asteraceae	*Helichrysum rugulosum*	LC	Not Endemic	
Asteraceae	*Tithonia rotundifolia*			NEMBA Category 1b.
Bignoniaceae	*Tecoma stans*			NEMBA Category 1b.
Boraginaceae	*Ehretia rigida*	LC	Endemic	
Cactaceae	*Opuntia ficus-indica*			NEMBA Category 1b.
Cannabaceae	*Celtis africana*	LC	Not Endemic	
Celastraceae	*Maytenus albata*	LC	Endemic	
Combretaceae	*Combretum hereroense*	LC	Not Endemic	
Combretaceae	*Combretum molle*	LC	Not Endemic	
Combretaceae	*Combretum zeyheri*	LC	Not Endemic	
Ebenaceae	*Diospyros lycioides subsp. lycioides*	LC	Not Endemic	
Ebenaceae	*Euclea crispa subsp. crispa*	LC	Not Endemic	
Euphorbiaceae	*Euphorbia cooperi*	LC	Not Endemic	
Euphorbiaceae	*Croton gratissimus*	LC	Not Endemic	
Fabaceae	*Dichrostachys cinerea*	LC	Not Endemic	
Fabaceae	*Senegalia caffra*	LC	Not Endemic	

Fabaceae	*Senegalia mellifera*	LC	Not Endemic	
Fabaceae	*Vachellia karoo*	LC	Not Endemic	
Fabaceae	*Vachellia nilotica*	LC	Not Endemic	
Fabaceae	*Vachellia robusta*	LC	Not Endemic	
Fabaceae	*Vachellia tortilis*	LC	Not Endemic	
Fabaceae	*Peltophorum africanum*	LC	Not Endemic	
Iridaceae	*Gladiolus dalenii*	LC	Not Endemic	
Lamiaceae	*Vitex zeyheri*	LC	Not Endemic	
Malvaceae	*Dombeya rotundifolia var. rotundifolia*	LC	Not Endemic	
Malvaceae	*Hermannia depressa*	LC	Not Endemic	
Meliaceae	*Melia azedarach*			NEMBA Category 1b.
Moraceae	*Ficus ingens*	LC	Not Endemic	
Oxalidaceae	*Oxalis depressa*	LC	Not Endemic	
Poaceae	*Aristida congesta subsp. barbicollis*	LC	Not Endemic	
Poaceae	*Aristida stipitata subsp. graciliflora*	LC	Not Endemic	
Poaceae	*Bothriochloa insculpta*	LC	Not Endemic	
Poaceae	*Brachiaria xantholeuca*	LC	Not Endemic	
Poaceae	*Cymbopogon caesius*	LC	Not Endemic	
Poaceae	*Cynodon dactylon*	LC	Not Endemic	
Poaceae	*Eragrostis chloromelas*	LC	Not Endemic	
Poaceae	*Eragrostis curvula*	LC	Not Endemic	
Poaceae	*Eragrostis racemosa*	LC	Not Endemic	
Poaceae	*Eragrostis superba*	LC	Not Endemic	
Poaceae	*Heteropogon contortus*	LC	Not Endemic	
Poaceae	*Hyparrhenia hirta*	LC	Not Endemic	
Poaceae	*Melinis repens*	LC	Not Endemic	
Poaceae	*Panicum maximum*	LC	Not Endemic	
Poaceae	*Pennisetum clandestinum*			NEMBA Category 1b in protected areas and wetlands.
Poaceae	*Pennisetum setaceum*			NEMBA Category 1b.
Poaceae	*Sporobolus africanus*	LC	Not Endemic	

Poaceae	*Themeda triandra*	LC	Not Endemic	
Poaceae	*Aristida bipartita*	LC	Not Endemic	
Poaceae	*Digitaria eriantha*	LC	Not Endemic	
Poaceae	*Pogonarthria squarrosa*	LC	Not Endemic	
Poaceae	*Cenchrus ciliaris*	LC	Not Endemic	
Poaceae	*Eragrostis rigidior*	LC	Not Endemic	
Poaceae	*Sorghum versicolor*	LC	Not Endemic	
Pteridaceae	*Pellaea calomelanos var. calomelanos*	LC	Not Endemic	
Rhamnaceae	*Berchemia zeyheri*	LC-Protected Tree	Not Endemic	
Rhamnaceae	*Ziziphus mucronata subsp. mucronata*	LC	Not Endemic	
Ruscaceae	*Sansevieria aethiopica*	LC	Not Endemic	
Sapindaceae	*Pappea capensis*	LC	Not Endemic	
Sapindaceae	*Dodonaea viscosa var. angustifolia*	LC	Not Endemic	
Scrophulariaceae	*Aptosimum procumbens*	LC	Not Endemic	
Thymelaeaceae	*Lasiosiphon capitatus*	LC	Endemic	
Verbenaceae	*Lantana camara*			NEMBA Category 1b.
Verbenaceae	*Lippia javanica*	LC	Not Endemic	
Vitaceae	*Rhoicissus tridentata*	LC	Not Endemic	

Table1: Trees, shrub and herbaceous plant species recorded on the Project Site.

Invasive Alien Plants (IAPs) tend to dominate or replace indigenous flora, thereby transforming the structure, composition and functioning of ecosystems. Therefore, it is important that these plants are controlled by means of an eradication and monitoring programme. Some invader plants may also degrade ecosystems through superior competitive capabilities to exclude native plant species.

NEMBA is the most recent legislation pertaining to alien invasive plant species. In August 2014, the list of Alien Invasive Species was published in terms of the NEMBA. The Alien and Invasive Species Regulations were published in the Government Gazette No. 43726, 18 September 2020. The legislation calls for the removal and / or control of IAP species (Category 1 species). In addition, unless authorised thereto in terms of the NWA, no land user shall allow Category 2 plants to occur within 30 meters of the 1:50 year flood line of a river, stream, spring, natural channel in which water flows regularly or intermittently, lake, dam or wetland. Category 3 plants are also prohibited from occurring within proximity to a watercourse. Below is a brief explanation of the three (3) categories in terms of the NEMBA:

Category 1a: Invasive species requiring compulsory control. Remove and destroy. Any specimens of Category 1a listed species need, by law, to be eradicated from the environment. No permits will be issued.

Category 1b: Invasive species requiring compulsory control as part of an invasive species control programme. Remove and destroy. These plants are deemed to have such a high invasive potential that infestations can qualify to be placed under a government sponsored invasive species management programme. No permits will be issued.
Category 2: Invasive species regulated by area. A demarcation permit is required to import, possess, grow, breed, move, sell, buy or accept as a gift any plants listed as Category 2 plants. No permits will be issued for Category 2 plants to exist in riparian zones.
Category 3: Invasive species regulated by activity. An individual plant permit is required to undertake any of the following restricted activities (import, possess, grow, breed, move, sell, buy or accept as a gift) involving a Category 3 species. No permits will be issued for Category 3 plants to exist in riparian zones.

Note that according to the Alien and Invasive Species Regulations, a person who has under his or her control a Category 1b listed invasive species must immediately:

- Notify the competent authority in writing
- Take steps to manage the listed invasive species in compliance with:
- Section 75 of the NEMBA.
- The relevant invasive species management programme developed in terms of regulation 4; and
- Any directive issued in terms of section 73(3) of the NEMBA.

Eight (8) IAP species were recorded on the Project Site. These species are listed under the Alien and Invasive Species List 2020, Government Gazette No. GN1003 as Category 1b. These IAP species must be controlled by implementing an IAP Management Programme, in compliance of Section 75 of the NEM:BA, as stated above.

During the field assessment **two (2) species of protected trees were observed: *Berchemia zeyheri* (Pink-Ivory) and *Sclerocarya birrea* subsp *caffra* (Marula)**. The protected trees observed are protected by the List of Protected Tree Species under the National Forests Act, 1998 (Act No. 84 of 1998) (NFA). In terms of the NFA, no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate, or in any other manner acquire or dispose of any protected tree or any product derived from a protected tree, except under a licence or exemption granted by the Minister to an applicant and subject to such period and conditions as may be stipulated. Contravention of this declaration is regarded as a first category offence.

4. MITIGATION & AVOIDANCE OPTIONS

The primary mitigation and avoidance measure that must be implemented at the pre-construction phase is the Pre-construction Walk-Through of the Development Footprint. This defines which and how many individuals of listed and protected species are found within the Development Footprint. This information is required for the DFFE and The National Environmental Management Biodiversity Act 10 of 2004 permits which must be obtained before construction can commence.

Where listed species fall within the Development Footprint and avoidance is not possible, then it may be possible to translocate the affected individuals outside of the Development Footprint. However, not all species are suitable for translocation as only certain types of plants are able to survive the disturbance. Suitable candidates for translocation include most geophytes and succulents. Although there are exceptions, the majority of woody species do not survive translocation well and it is generally not recommended to try and attempt to translocate such species. Recommendations in this regard would be

made following the walk-through of the facility footprint before construction, where all listed and protected species within the Development Footprint will be identified and located.

5. RESCUE AND PROTECTION PLAN

5.1. Pre-construction

» Identification of all listed species which may occur within the Project Site, based on the SANBI POSA database as well as the specialist studies for the Project Site and any other relevant literature.
» Before construction commences at the site, the following actions should be taken:
- A walk-through of the final Development Footprint by a suitably qualified botanist/ecologist to locate and identify all listed and protected species which fall within the Development Footprint. This should happen during the flowering season at the Project Site which, depending on rainfall, is likely to be during spring to early summer (August-October).
- A walk-through report following the walk-through which identifies areas where minor deviations to roads and other infrastructure can be made to avoid sensitive areas and important populations of listed species must be compiled. The report should also contain a full list of localities where listed species occur within the development footprint and the number of affected individuals in each instance, so that this information can be used to comply with the permit conditions required by the relevant legislation. Those species suitable for search as rescue should be identified in the walk-through report.
- A permit to clear the Project Site and relocate species of concern is required from the North-West provincial conservation authority before construction commences.
- A tree clearing permit is also required from DFFE to clear protected trees from the Project Site (if recorded).
- Once the permits have been issued, there should be a search and rescue operation of all listed species that cannot be avoided, which have been identified in the walk-through report as being suitable for search and rescue within the Development Footprint. Affected individuals should be translocated to a similar habitat outside of the Development Footprint and marked for monitoring purposes.

5.2. Construction

» Vegetation clearing should take place in a phased manner, so that large cleared areas are not left standing with no activity for long periods of time and pose a wind and water erosion risk. This will require coordination between the contractor and EO, to ensure that the EO is able to monitor activities appropriately.
» All cleared material should be handled according to the Revegetation and Rehabilitation Plan and used to encourage the recovery of disturbed areas.
» The EO should monitor vegetation clearing at the Project sSite. Any deviations from the plans that may be required should first be checked for listed species by the EO and any listed species present which are able to survive translocation should be translocated to a safe site.
» All areas to be cleared should be demarcated with construction tape, survey markers or similar. All construction vehicles should work only within the designated area.
» Plants suitable for translocation or for use in rehabilitation of already cleared areas should be identified and relocated before general clearing takes place.

- Any listed species observed within the Development Footprint that were missed during the pre-construction plant sweeps should be translocated to a safe site before clearing commences.
- Many listed species are also sought after for traditional medicine or by collectors and so the EO and ECO should ensure that all staff attend environmental induction training in which the legal and conservation aspects of harvesting plants from the wild are discussed.

5.3. Operation

- Access to the Project Site should be strictly controlled and all personnel entering or leaving should be required to sign in and out with the security officers.
- The collecting of plants or their parts should be strictly forbidden and signs stating so should be placed at the entrance gates to the Project Site.

6. MONITORING & REPORTING REQUIREMENTS

The following reporting and monitoring requirements are recommended as part of the Plant Rescue and Protection plan:

- Pre-construction walk-through report detailing the location and distribution of all listed and protected species must be compiled. This should include a walk-through of all infrastructure including all new access roads, cables, buildings and substations. The report should include recommendations of route adjustments where necessary, as well as provide a full account of how many individuals of each listed species will be impacted by the development. Details of plants suitable for search and rescue must also be included.
- Permit applications to NW DEDECT and DFFE. This requires the walk-through report as well as the identification and quantification of all listed and protected species within the Development Footprint. The permit is required before any search and rescue or vegetation clearance can take place. Where large numbers of listed species are affected, a site inspection and additional requirements may be imposed by NW DEDECT and DFFE as part of the permit conditions. All documentation associated with this process needs to be retained and the final clearing permit should be kept at the Project Site.
- Active daily monitoring of clearing during construction by the EO must be undertaken to ensure that listed species and sensitive habitats are avoided. All incidents should be recorded along with the remedial measures implemented.
- Post construction monitoring of plants translocated during search and rescue to evaluate the success of the intervention. Monitoring for a year post-transplant should be sufficient to gauge success.

APPENDIX F:
TRAFFIC AND TRANSPORTATION MANAGEMENT PLAN

PRINCIPLES FOR TRAFFIC MANAGEMENT

1. PURPOSE

The purpose of this Traffic Management Plan (TMP) is to address regulatory compliance, traffic management practices, and protection measures to help reduce impacts related to transportation and the construction of temporary and long-term access within the vicinity of the Buffelspoort Solar PV Facility Project Site. The objectives of this plan include the following:

- To ensure compliance with all legislation regulating traffic and transportation within South Africa (National, Provincial, Local & associated guidelines).
- To avoid incidents and accidents while vehicles are being driven and while transporting personnel, materials, and equipment to and from the project site.
- To raise greater safety awareness in each driver and to ensure the compliance of all safe driving provisions for all the vehicles.
- To raise awareness to ensure drivers respect and follow traffic regulations.
- To avoid the deterioration of access roads and the pollution that can be created due to noise and emissions produced by equipment, machinery, and vehicles.

2. TRAFFIC AND TRANSPORTATION MANAGEMENT PRINCIPLES

- Prior to the commencement of construction, the contractor must develop their own detailed Transport Management Plan (TMP) based on traffic volumes and road carry capacity outlines in this plan
- The transport contractor must ensure that all required permits for the transportation of abnormal loads are in place prior to the transportation of equipment and Project components to the Project Site. Specific abnormal load routes must be developed with environmental factors taken into consideration.
- Before construction commences, authorised access routes must be clearly marked in the field with signs or flagging. The Construction Contractor must review the location of designated access and will be responsible for ensuring construction travel is limited to designated routes. The entrance of the main access road must not be constructed before a blind rise or on a bend of the public road.
- All employees must attend an environmental training program (e.g., toolbox talks) by the Environmental Officer (EO). Through this program, employees will be instructed to use only approved access roads, drive within the delineated road limits, and obey jurisdictional and posted speed limits to minimise potential impacts to the environment and other road users.
- The Construction Contractor will be responsible for making sure that their suppliers, vendors, and subcontractors strictly comply with the principles of this TMP and the contractor's TMP.
- Adjacent landowners must be notified of the construction schedule.
- Access roads and entrances to the site should be carefully planned to limit any intrusion on the neighbouring property owners and road users.
- Signs must be posted in the project area to notify landowners and others of the construction activity.
- Flagging must be provided at access points to the site and must be maintained until construction is completed on the Project Site.
- Speed limits must be established prior to commencement of construction and enforced over all construction traffic.
- Speed controls and implementation of appropriate dust suppression measures must be enforced to minimise dust pollution.

- Throughout construction the Contractor will be responsible for monitoring the condition of roads used by project traffic and for ensuring that roads are maintained in a condition that is comparable to the condition they were in before the construction began.
- Drivers must have an appropriate valid driver's license and other operation licences required by applicable legislation.
- All vehicles must be maintained in good mechanical, electrical, and electronic condition, including but not limited to the brake systems, steering, tires, windshield wipers, side mirrors and rear-view mirror, safety belts, signal indicators, and lenses.
- Any traffic delays attributable to construction traffic must be co-ordinated with the appropriate authorities.
- No deviation from approved transportation routes must be allowed, unless roads are closed for reasons outside the control of the contractor.
- Impacts on local communities must be minimised. Consideration should be given to limiting construction vehicles travelling on public roadways during the morning and late afternoon commute time.

3. MONITORING

- The Construction Contractor must ensure that all vehicles adhere to the speed limits.
- A speeding register must be kept with details of the offending driver.
- Repeat offenders must be penalised.
- Where traffic signs are not being adhered to, engineering structures must be used to ensure speeds are reduced.

APPENDIX G:
STORMWATER AND EROSION MANAGEMENT PLAN

STORMWATER AND EROSION MANAGEMENT PLAN

1. PURPOSE

By taking greater cognisance of natural hydrological patterns and processes it is possible to develop stormwater management systems in a manner that reduces potentially negative impacts and mimics nature. The main risks associated with inappropriate stormwater management are increased erosion risk and risks associated with flooding. Therefore, this Stormwater Management Plan and the Erosion Management Plan are closely linked to one another and should be managed together.

This Stormwater Management Plan addresses the management of stormwater runoff from the Project Site and significant impacts relating to resultant impacts such as soil erosion and downstream sedimentation. The main factors influencing the planning of stormwater management measures and infrastructure are:

» Topography and slope gradients.
» Placing of infrastructure and infrastructure design.
» Annual average rainfall; and
» Rainfall intensities.

The objective of the plan is therefore to provide measures to address runoff from disturbed portions of the site, such that they:

» Do not result in concentrated flows into natural watercourses i.e., provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.
» Do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development if not necessary.
» Do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

This Stormwater Management Plan must be updated and refined once the construction/ civil engineering plans have been finalised following detailed design.

2. RELEVANT ASPECTS OF THE PROJECT SITE

The Project Site is situated in the Savanna biome. The savanna vegetation of South Africa represents the southernmost extension of the most widespread biome in Africa (Mucina & Rutherford, 2006). Major macroclimatic traits that characterise the Savanna biome include a seasonal precipitation and a sub-tropical thermal regime with no or usually low incidence of frost (Mucina & Rutherford, 2006). On a fine-scale vegetation type, the project area overlaps with the Marikana Thornveld and Moot Plains Bushveld vegetation types.

In an attempt to better conserve aquatic ecosystems, South Africa has categorised its river systems according to set ecological criteria (i.e., ecosystem representation, water yield, connectivity, unique features, and threatened taxa) to identify Freshwater Ecosystem Priority Areas (FEPAs) (Driver *et al.*, 2011). The FEPAs are intended to be conservation support tools and envisioned to guide the effective

implementation of measures to achieve the National Environment Management Biodiversity Act's (NEM:BA) biodiversity goals (Nel *et al.,* 2011).

The Development Footprint does not overlap with a FEPA river or wetland. There are however five areas marked as NFEPA's located within the 500 m regulated area around the Project Site. These were classified as artificial unchanneled valley bottoms. The topographical inland and river line data for "2527" quarter degree was used. This data set indicates multiple inland water areas classified as dams as well as a perennial and various non-perennial river lines located within the 500 m regulated area. These areas indicate potential wetland areas.

The terrain of the 500 m regulated area has been analysed to determine potential areas where wetlands are more likely to accumulate (due to convex topographical features, preferential pathways, or more gentle slopes).

Four (4) HGM units were identified within the 500 m regulated area. The wetland areas were delineated in accordance with the DWAF (2005) guidelines. Two HGM units have been identified as depression wetlands, one has been identified as a hillslope seep wetland and one as a unchanneled valley bottom wetland. Along with the wetlands multiple drainage features as well as artificial wetlands and a few dams were also delineated. Although these systems do not classify as a natural wetland system it is important to note where they are and to preserve them.

3. STORMWATER MANAGEMENT PRINCIPLES

In the design phase, various stormwater management principles should be considered including:

- Prevent concentration of stormwater flow at any point where the ground is susceptible to erosion.
- Reduce stormwater flows as far as possible by the effective use of attenuating devices (such as swales, berms, and silt fences). As construction progresses, the stormwater control measures are to be monitored and adjusted to ensure complete erosion and pollution control at all times.
- Silt traps must be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Construction of gabions and other stabilisation features on steep slopes may be undertaken to prevent erosion, if deemed necessary.
- Minimise the area of exposure of bare soils to minimise the erosive forces of wind, water and all forms of traffic.
- Ensure that development does not increase the rate of stormwater flow above that which the natural ground can safely accommodate at any point in the sub-catchments.
- Ensure that all stormwater control works are constructed in a safe and aesthetic manner in keeping with the overall development.
- Plan and construct stormwater management systems to remove contaminants before they pollute surface waters or groundwater resources.
- Contain soil erosion, whether induced by wind or water forces, by constructing protective works to trap sediment at appropriate locations. This applies particularly during construction.
- Avoid situations where natural or artificial slopes may become saturated and unstable, both during and after the construction process.
- Design and construct roads to avoid concentration of flow along and off the road. Where flow concentration is unavoidable, measures to incorporate the road into the pre-development stormwater

flow should not exceed the capacity of the culvert. To assist with the stormwater run-off, gravel roads should typically be graded and shaped with a 2-3% cross fall back into the slope, allowing stormwater to be channelled in a controlled manner towards the, natural drainage lines and to assist with any sheet flow on the site.

» Design culvert inlet structures to ensure that the capacity of the culvert does not exceed the pre-development stormwater flow at that point. Provide detention storage on the road and/or upstream of the stormwater culvert.
» Design outlet culvert structures to dissipate flow energy. Any unlined downstream channel must be adequately protected against soil erosion.
» Where the construction of a building causes a change in the vegetative cover of the site that might result in soil erosion, the risk of soil erosion by stormwater must be minimised by the provision of appropriate artificial soil stabilisation mechanisms or re-vegetation of the area. Any inlet to a piped system should be fitted with a screen or grating to prevent debris and refuse from entering the stormwater system.
» Preferably all drainage channels on Project Site and contained within the larger area of the property (i.e. including buffer zone) should remain in the natural state so that the existing hydrology is not disturbed.

3.1. Engineering Specifications

Detailed engineering specifications for a Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared by the Civil Engineers during the detailed design phase and should be based on the underlying principles of this Stormwater Management Plan. This should include erosion control measures. Requirements for project design include:

» Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction) must be indicated within the Final/Updated Stormwater Management Plan.
» All temporary and permanent water management structures or stabilisation methods must be indicated within the Final/Updated Stormwater Management Plan.
» The drainage system for the site should be designed to specifications that can adequately deal with a 1:50 year intensity rainfall event or more to ensure sufficient capacity for carrying stormwater around and away from infrastructure.
» Procedures for stormwater flow through a Project Site need to take into consideration both normal operating practice and special circumstances. Special circumstances in this case typically include severe rainfall events.
» The Resident Engineer and EO is to be responsible for ensuring implementation of the erosion control measures on site during the construction period.
» The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved stormwater plan is not correctly or appropriately implemented and damage to the environment is caused.

During the construction phase, the Contractor must prepare a Stormwater Control Method Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of the Stormwater Management Plan are met before, during and after construction. The designated responsible person on site, must be indicated in the

Stormwater Control Method Statement and shall ensure that no construction work takes place before the relevant stormwater control measures are in place.

4. EROSION MANAGEMENT PRINCIPLES

The goals of erosion control during and after construction at the site should be to:

- Protect the land surface from erosion;
- Intercept and safely direct run-off water from undisturbed upslope areas through the Project Site without allowing it to cause erosion within the site or become contaminated with sediment; and
- Progressively revegetate or stabilise disturbed areas.

These goals can be achieved by applying the management practices outlined in the following sections.

4.1. On-Site Erosion Management

Soil erosion is a frequent risk associated with the development of a Solar PV Energy Facility on account of the vegetation clearing and disturbance associated with the construction phase of the development and may continue occurring throughout the operation phase. Service roads and installed infrastructure will generate increased direct runoff during intense rainfall events and may exacerbate the loss of topsoil and the effects of erosion. These eroded materials may enter the nearby watercourses and may potentially impact these systems through siltation and change in chemistry and turbidity of the water. General factors to consider regarding erosion risk at the Project Site includes the following:

- Reduction of a stable vegetation cover and associated below-ground biomass that currently increases soil surface porosity, water infiltration rates and thus improves the soil moisture availability. Without the vegetation, the soil will be prone to extensive surface capping, leading to accelerated erosion and further loss of organic material and soil seed reserves from the local environment.
- Soil loss is related to the length of time that soils are exposed prior to rehabilitation or stabilisation. Therefore, the gap between construction activities and rehabilitation should be minimised. Phased construction and progressive rehabilitation, where practically possible, are therefore important elements of the erosion control strategy.
- The extent of disturbance will influence the risk and consequences of erosion. Therefore, site clearing should be restricted to areas required for construction purposes only, as far as possible. Additionally it is recommended where possible that large areas should not be cleared all at once, especially in areas where the risk of erosion is higher.
- Roads should be planned and constructed in a manner which minimises their erosion potential. Roads should therefore follow the natural contour as far as possible. Roads parallel to the slope direction should be avoided as far as possible.
- Where necessary, new roads constructed should include water diversion structures with energy dissipation features present to slow and disperse the water into the receiving area.
- Roads used for project-related activities and other disturbed areas should be regularly monitored for erosion. Any erosion problems recorded should be rectified as soon as possible and monitored thereafter to ensure that they do not re-occur.
- Runoff may have to be specifically channelled or stormwater adequately controlled to prevent localised rill and gully erosion.

- Compacted areas should have adequate drainage systems to avoid pooling and surface flow. Heavy machinery should not compact those areas which are not intended to be compacted as this will result in compacted hydrophobic, water repellent soils which increase the erosion potential of the area. Where compaction does occur, the areas should be ripped.
- All de-nuded areas should be revegetated with appropriate locally occurring species, to bind the soil and limit erosion potential.
- Silt fences should be used where there is a danger of topsoil or material stockpiles eroding and entering streams and other sensitive areas.
- Gabions and other stabilisation features must be used on steep slopes and other areas vulnerable to erosion to minimise erosion risk as far as possible.
- Activity at the Project Site after large rainfall events when the soils are wet and erosion risk is increased should be reduced. No driving off of hardened roads should occur at any time, and particularly immediately following large rainfall events.
- Topsoil should be removed and stored in a designated area separately from subsoil and away from construction activities (as per the recommendations in the EMPr). Topsoil should be reapplied where appropriate as soon as possible in order to encourage and facilitate rapid regeneration of the natural vegetation in cleared areas.
- Regular monitoring of the Project Site for erosion problems during construction (on-going) and operation (at least twice annually) is recommended, particularly after large summer thunderstorms have been experienced. The ECO will determine the frequency of monitoring based on the severity of the impacts in the erosion prone areas.

4.1.1 Erosion control mechanisms

The contractor may use the following mechanisms (whichever proves more appropriate/ effective) to combat erosion when necessary:

- Reno mattresses;
- Slope attenuation;
- Hessian material;
- Shade catch nets;
- Gabion baskets;
- Silt fences;
- Stormwater channels and catch pits;
- Soil bindings;
- Geofabrics;
- Hydro-seeding and/or re-vegetating;
- Mulching over cleared areas;
- Boulders and size varied rocks; and
- Tilling.

4.2. Engineering Specifications

A detailed engineering specifications Stormwater Management Plan describing and illustrating the proposed stormwater control measures must be prepared during the detailed design phase and should be based on the underlying principles of the Stormwater Management Plan and this should include erosion control measures. Requirements for Project design include:

- Erosion control measures to be implemented before and during the construction period, including the final stormwater control measures (post construction).
- All temporary and permanent water management structures or stabilisation methods must be indicated within the Stormwater Management Plan.
- The Resident Engineer and EO to be responsible for ensuring implementation of the erosion control measures on site during the construction period. The ECO should monitor the effectiveness of these measures on the interval agreed upon with the Site Manager and EO.
- The EPC Contractor holds ultimate responsibility for remedial action in the event that the approved Stormwater Management Plan is not correctly or appropriately implemented and damage to the environment is caused.

4.3 Monitoring

The site must be monitored continuously during construction and operation in order to determine any indications of erosion. If any erosion features are recorded as a result of the activities on-site the EO (during construction) or Environmental Manager (during operation) must:

- Assess the significance of the situation.
- Take photographs of the soil degradation.
- Determine the cause of the soil erosion.
- Inform the contractor/operator that rehabilitation must take place and that the contractor/operator is to implement a rehabilitation method statement and management plan to be approved by the Site/Environmental Manager in conjunction with the ECO.
- Monitor that the contractor/operator is taking action to stop the erosion and assist them where needed.
- Report and monitor the progress of rehabilitation weekly and record all the findings in a site register (during construction).
- All actions with regards to the incidents must be reported on a monthly compliance report which should be kept on file for if/when the Competent Authority requests to see it (during construction) and kept on file for consideration during the annual audits (during construction and operation).

The Contractor (in consultation with an appropriate specialist, e.g. an engineer) must:

- Select a system/mechanism to treat the erosion.
- Design and implement the appropriate system/mechanism.
- Monitor the area to ensure that the system functions like it should. If the system fails, the method must be adapted or adjusted to ensure the accelerated erosion is controlled.
- Continue monitoring until the area has been stabilised.

5. CONCLUSION

The Erosion Management Plan is a document to assist the Project Developer/ EPC Contractor with guidelines on how to manage erosion during all phases of the Project. The implementation of management measures is not only good practice to ensure minimisation of degradation, but also necessary to ensure compliance with legislative requirements. This document forms part of the EMPr, and is required to be considered and adhered to during the design, construction, operation and decommissioning phases of the project (if and where applicable). During the construction phase, the Contractor must prepare an Erosion Control Method

Statement to ensure that all construction methods adopted on site do not cause, or precipitate soil erosion and shall take adequate steps to ensure that the requirements of this plan are met before, during and after construction. The designated responsible person on site, must be indicated in the Method Statement and shall ensure that relevant erosion control measures are in place throughout the construction phase.

An operation phase Erosion Management Plan should be designed and implemented if not already addressed by the mitigations implemented as part of construction, with a view to preventing the passage of concentrated flows off hardened surfaces and onto natural areas.

APPENDIX H:
WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN

1. PURPOSE

A Waste Management Plan (WMP) plays a key role in achieving sustainable waste management throughout all phases of the Project. The plan prescribes measures for the collection, temporary storage and safe disposal of the various waste streams associated with the project and includes provisions for the recovery, re-use and recycling of waste. The purpose of this plan is therefore to ensure that effective procedures are implemented for the handling, storage, transportation and disposal of waste generated from the Project activities on the Project Site.

This WMP has been compiled as part of the EMPr and is based on waste stream information available at the time of compilation. Construction and operation activities must be assessed on an ongoing basis in order to determine the efficacy of the plan and whether further revision of the plan is required. This plan should be updated should further detail regarding waste quantities and categorisation become available, during the construction and/or operation stages.

2. RELEVANT ASPECTS OF THE SITE

It is expected that the development of the Buffeslpoort Solar PV Energy Facility will generate construction solid waste, general waste and hazardous waste during the lifetime of the Project.

Waste generated on site, originates from various sources, including but not limited to:

- Concrete waste generated from spoil and excess concrete.
- Contaminated water, soil, rocks and vegetation due to hydrocarbon spills.
- Hazardous waste from vehicle, equipment and machinery parts and servicing, fluorescent tubes, used hydrocarbon containers, and waste ink cartridges.
- Recyclable waste in the form of paper, glass, steel, aluminium, wood/ wood pallets, plastic (PET bottles, PVC, LDPE) and cardboard.
- Organic waste from food waste as well as alien and endemic vegetation removal.
- Sewage from portable toilets and septic tanks.
- Inert waste from spoil material from site clearance and trenching works.

3. LEGISLATIVE REQUIREMENTS

Waste in South Africa is currently governed by several regulations, including:

- National Environmental Management: Waste Act (NEM:WA), 2008 (Act 59 of 2008);
- National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014);
- The South African Constitution (Act 108 of 1996);
- Hazardous Substances Act (Act 5 of 1973);
- Health Act (Act 63 of 1977);
- Environment Conservation Act (Act 73 of 1989);
- Occupational Health and Safety Act (Act 85 of 1993);
- National Water Act (Act 36 of 1998);
- The National Environmental Management Act (Act 107 of 1998) (as amended);

- Municipal Structures Act (Act 117 of 1998);
- Municipal Systems Act (Act 32 of 2000);
- Mineral and Petroleum Resources Development Act (Act 28 of 2002); and
- Air Quality Act (Act 39 of 2004).

Storage of waste must be conducted in accordance with the National Norms and Standards for the Storage of Waste, published in GNR 926.

4. WASTE MANAGEMENT PRINCIPLES

An integrated approach to waste management is needed on the Project Site. Such an approach is illustrated in **Figure 1**.

It is important to ensure that waste is managed with the following objectives in mind during all phases of the Project:

- Reducing volumes of waste is the greatest priority;
- If reduction is not feasible, the maximum amount of waste is to be recycled; and
- Waste that cannot be recycled is to be disposed of in the most environmentally responsible manner.

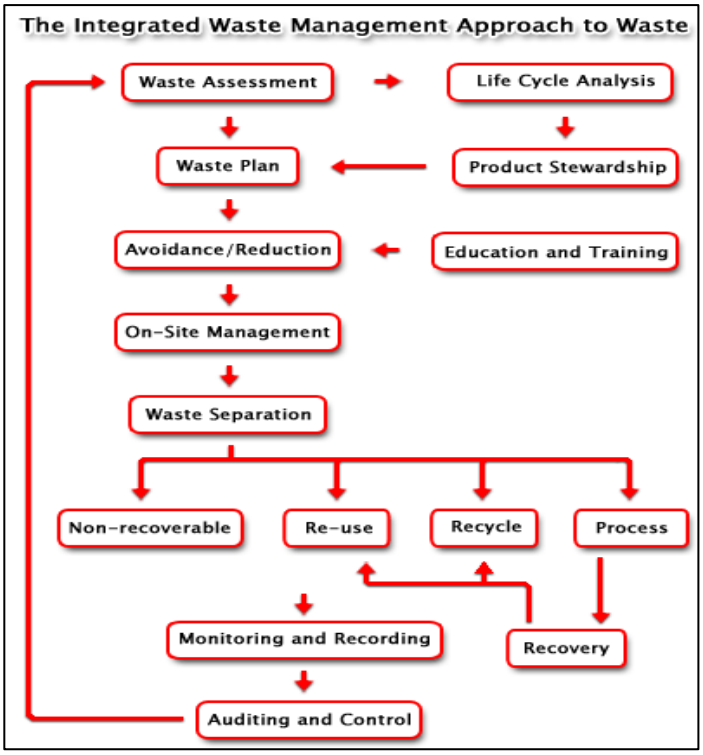


Figure 1: Integrated Waste Management Flow Diagram
(Source: http://www.enviroserv.co.za/pages/content.asp?SectionId=496)

4.1. Construction phase

A plan for the management of waste during the construction phase is detailed below. A Method Statement detailing specific waste management practices during construction should be prepared by the Contractor prior to the commencement of construction, for approval by the Resident Engineer, Project/Site Manager and/or ECO.

4.1.1. Waste Assessment / Inventory

- The Environmental Officer (EO), or designated staff member, must develop, implement and maintain a waste inventory reflecting all waste generated during construction for both general and hazardous waste streams.
- Construction methods and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities, to be pro-actively implemented.
- Once a waste inventory has been established, targets for the recovery of waste (minimisation, re-use, recycling) should be set.
- The EO must conduct waste classification and rating in terms of SANS 10288 and Government Notice 634 published under the NEM: WA.

4.1.2. Waste collection, handling and storage

- It is the responsibility of the EO to ensure that each subcontractor implements their own waste recycling system, i.e. separate bins for food waste, plastics, paper, wood, glass cardboard, metals, etc. Such practises must be made contractually binding upon appointment of the subcontractors.
- Waste manifests and waste acceptance approvals (i.e. receipts) from designated waste facilities must be kept on file at the site office, in order to record and prove continual compliance for future auditing.
- Septic tanks and portable toilets must be monitored by the EO or responsible subcontractor and maintained regularly. Below ground storage of septic tanks must withstand the external forces of the surrounding environment. The area above the tank must be demarcated to prevent any vehicles or heavy machinery from moving around in the surrounding area.
- Waste collection bins and hazardous waste containers must be provided by the principal contractor and subcontractors and placed at strategic locations around the site for the storage of organic, recyclable and hazardous waste.
- A dedicated waste area must be established on Project Site for the storage of all waste streams before removal from site. The storage period must not trigger listed waste activities as per the NEM:WA, GN 921 of November 2013.
- Signage/ colour coding must be used to differentiate disposal areas for the various waste streams (i.e. paper, cardboard, metals, food waste, glass etc.).
- Hazardous waste must be stored within a bunded area constructed according to SABS requirements, and must ensure complete containment of the spilled material in the event of a breach. As such, appropriate bunding material, design, capacity and type must be utilised to ensure that no contamination of the surrounding environment will occur despite a containment breach. The net capacity of a bunded compound in a storage facility should be at least 110% of the net capacity of the largest tank.
- Take into consideration the capacity displaced by other tanks within the same bunded area and any foundations.

- Treat interconnected tanks as a single tank of equivalent total volume for the purposes of the bund design criteria
- The location of all temporary waste storage areas must aim to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control, while being reasonably placed in terms of centrality and accessibility on site. Where required, an additional temporary waste storage area may be designated, provided identical controls are exercised for these locations.
- Waste storage shall be in accordance with all Regulations and best-practice guidelines and under no circumstances may waste be burnt on site.
- A dedicated waste management team must be appointed by the principal contractors' EOOfficer, who will be responsible for ensuring the continuous sorting of waste and maintenance of the area. The waste management team must be trained in all areas of waste management and monitored by the EO Officer.
- All waste removed from site must be done by a registered/ licensed subcontractor, who must supply information regarding how waste recycling/ disposal will be achieved. The registered subcontractor must provide waste manifests for all removals at least once a month or for every disposal made, records of which must be kept on file at the site camp for the duration of the construction period.

4.1.3. Management of waste storage areas

- The position of all waste storage areas must be located so as to ensure minimal degradation to the environment. The main waste storage area must have a suitable stormwater system separating clean and contaminated stormwater.
- Collection bins placed around the Project Site and at subcontractors' camps (if at a different location than the main site camp) must be maintained and emptied on a regular basis by the principal contractor to avoid overflowing receptacles.
- Inspections and maintenance of the main waste storage area must be undertaken daily. Skips and storage containers must be clearly marked or colour coded and well-maintained. Monitor for rodents and take corrective action if they become a problem.
- Waste must be stored in designated containers and not on the ground.
- Inspections and maintenance of bunds must be undertaken regularly. Bunds must be inspected for leaks or cracks in the foundation and walls.
- It is assumed that any rainwater collected inside the bund is contaminated and must be treated by oil/water separation (or similar method) prior to dewatering, or removed and stored as hazardous waste, and not released into the environment.
- If any leaks occur in the bund, these must be removed immediately.
- Bund systems must be designed to avoid dewatering of contaminated water, but to rather separate oil and hydrocarbons from water prior to dewatering.
- Following rainfall event bunds must always be dewatered in order to maintain a sufficient storage capacity in the event of a breach.
- No mixing of hazardous and general waste is allowed.

4.1.4. Disposal

- Waste generated on site must be removed on a regular basis. This frequency may change during construction depending on waste volumes generated at different stages of the construction process,

however removal must occur prior to the storage capacity being reached to avoid overflow of containers and poor waste storage.
» Waste must be removed by a suitably qualified contractor and disposed of at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor to the EO and ECO.

4.1.5. Record keeping

The success of the Waste Management Plan is determined by measuring criteria such as waste volumes, cost recovery from recycling and cost of disposal. Recorded data can indicate the effect of training and education, or the need for education. It will provide trends and benchmarks for setting goals and standards. It will provide clear evidence of the success or otherwise of the plan.

» Documentation (waste manifest, certificate of issue or safe disposal) must be kept detailing the quantity, nature, and fate of any regulated waste for audit purposes.
» Waste management must form part of the monthly reporting requirements in terms of volumes generated, types, storage and final disposal.

4.1.6. Training

Training and awareness regarding waste management shall be provided to all employees and contractors as part of the toolbox talks or on-site awareness sessions with the EO and at the frequency as set out by the ECO.

4.2. Operation phase

It is expected that the operation phase will result in the production of limited amounts of general waste consisting mostly of cardboard, paper, plastic, tins, metals and a variety of synthetic compounds. Hazardous wastes (including grease, oils) will also be generated. All waste generated will be required to be temporarily stored at the facility in appropriate sealed containers prior to disposal at a permitted landfill site or other facilities.

The following waste management principles apply during the operation phase:

» The EO must develop, implement and maintain a waste inventory reflecting all waste generated during operation for both general and hazardous waste streams.
» Adequate waste collection bins at site must be supplied. Separate bins should be provided for general and hazardous waste.
» Recyclable waste must be removed from the waste stream and stored separately.
» All waste must be stored in appropriate temporary storage containers (separated between different operation wastes, and contaminated or wet waste).
» Waste storage shall be in accordance with all best-practice guidelines and under no circumstances may waste be burnt on site.
» Waste generated on site must be removed on a regular basis throughout the operation phase.
» Waste must be removed by a suitably qualified contractor and disposed at an appropriately licensed landfill site. Proof of appropriate disposal must be provided by the contractor and kept on site.

5. Monitoring of Waste Management Activities

Records must be kept of the volumes/ mass of the different waste streams that are collected from the site throughout the life of the project. The appointed waste contractor is to provide monthly reports to the operator containing the following information:

- Monthly volumes/ mass of the different waste streams collected;
- Monthly volumes/ mass of the waste that is disposed of at a landfill site;
- Monthly volumes/ mass of the waste that is recycled;
- Data illustrating progress compared to previous months.

This report will aid in monitoring the progress and relevance of the waste management procedures that are in place. If it is found that the implemented procedures are not as effective as required, this WMP is to be reviewed and amended accordingly. This report must from part of the EO's reports to the ECO on a monthly basis.

APPENDIX I:
EMERGENCY PREPARDENESS, RESPONSE AND FIRE MANAGEMENT PLAN

EMERGENCY PREPAREDNESS, RESPONSE AND FIRE MANAGEMENT PLAN

1. PURPOSE

The purpose of the Emergency Preparedness and Response Plan is:

- To assist contractor personnel to prepare for and respond quickly and safely to emergency incidents, and to establish a state of readiness which will enable prompt and effective responses to possible events.
- To control or limit any effect that an emergency or potential emergency may have on site or on neighbouring areas.
- To facilitate emergency responses and to provide such assistance on the site as is appropriate to the occasion.
- To ensure communication of all vital information as soon as possible.
- To facilitate the reorganisation and reconstruction activities so that normal operations can be resumed.
- To provide for training so that a high level of preparedness can be continually maintained.

This plan outlines response actions for potential incidents of any size. It details response procedures that will minimise potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to an emergency event. The plan will enable an effective, comprehensive response to prevent injury or damage to the construction personnel, public, and environment during the Project. Contractors are expected to comply with all procedures described in this document. A Method Statement should be prepared at the commencement of the construction phase detailing how this plan is to be implemented as well as details of relevant responsible parties for the implementation.

- Identification of areas where accidents and emergency situations may occur;
- Communities and individuals that may be impacted;
- Response procedure;
- Provisions of equipment and resources;
- Designation of responsibilities;
- Communication; and
- Periodic training to ensure effective response to potentially affected communities.

2. PROJECT-SPECIFIC DETAILS

The Project Site has been identified by the applicant as a technically feasible site which has the potential for the development of 40 MWp Solar PV Energy Facility, Battery Energy Storage System (BESS) and associated infrastructure located in the Rustenburg Local Municipality (RLM)and the Bojanala Platinum District Municipality (BPDM), North West Province of South Africa.

The Project Site has been identified as a technically feasible site which has the potential for the development of the Solar PV Energy Facility, through the consideration of a number of technical factors. A Project Site of approximately ~223ha has been identified by the Project Developer.

Due to the scale and nature of this Project, it is anticipated that the following risks could potentially arises during the construction and operation phases:

- Fires;
- Leakage of hazardous substances;
- Storage of flammable materials and substances;
- Accidents; and
- Natural disasters.

3. EMERGENCY RESPONSE PLAN

There are three (3) levels of emergency as follows:

- Local Emergency: An alert confined to a specific locality.
- Site Emergency: An alert that cannot be localised and which presents danger to other areas within the site boundary or outside the site boundary.
- Evacuation: An alert when all personnel are required to leave the affected area and assemble in a safe location.

If there is any doubt as to whether any hazardous situation constitutes an emergency, then it must be treated as an Evacuation.

Every effort must be made to control, reduce or stop the cause of any emergency provided it is safe to do so. For example, in the event of a fire, isolate the fuel supply and limit the propagation of the fire by cooling the adjacent areas. Then confine and extinguish the fire (where appropriate) making sure that re-ignition cannot occur.

3.1. Emergency Scenario Contingency Planning

3.1.1. Scenario: Spill which would result in the contamination of land, surface or groundwater

i. Spill Prevention Measures

Preventing spills must be the top priority at all operations which have the potential of endangering the environment. The responsibility to effectively prevent and mitigate any scenario lies with the Contractor and the ECO. In order to reduce the risk of spills and associated contamination, the following principles should be considered during construction and operation activities:

- All equipment refuelling, servicing and maintenance activities should only be undertaken within appropriately sealed/contained or bunded designated areas.
- All maintenance materials, oils, grease, lubricants, etc. should be stored in a designated area in an appropriate storage container.
- No refuelling, storage, servicing, or maintenance of equipment should take place within sensitive environmental resources in order to reduce the risk of contamination by spills.
- No refuelling or servicing should be undertaken without absorbent material or drip pans properly placed to contain spilled fuel.
- Any fluids drained from the machinery during emergency servicing should be collected in leak-proof containers and taken to an appropriate disposal or recycling facility.

- If these activities result in damage or accumulation of product on the soil, the contaminated soil must be disposed of as hazardous waste. Under no circumstances shall contaminated soil be added to a spoils pile and transported to a regular disposal site.
- Chemical toilets used during construction must be regularly cleaned. Chemicals used in toilets are also hazardous to the environment and must be controlled. Portable chemical toilets could overflow if not pumped regularly or they could spill if dropped or overturned during moving. Care and due diligence should be taken at all times.
- Contact details of emergency services and HazMat Response Contractors are to be clearly displayed on the site. All staff are to be made aware of these details and must be familiar with the procedures for notification in the event of an emergency.

ii. Procedures

The following action plan is proposed in the event of a spill:

1. Spill or release identified.
2. Assess person safety, safety of others and environment.
3. Stop the spill if safely possible.
4. Contain the spill to limit entering surrounding areas.
5. Identify the substance spilled.
6. Quantify the spill (under or over guideline/threshold levels).
7. Notify the Site Manager and emergency response crew and authorities (in the event of major spill).
8. Inform users (and downstream users) of the potential risk.
9. Clean up of the spill using spill kit or by HazMat team.
10. Record of the spill incident on company database.

a) Procedures for containing and controlling the spill (i.e. on land or in water)

Measures can be taken to prepare for quick and effective containment of any potential spills. Each contractor must keep sufficient supplies of spill containment equipment at the construction sites, at all times during and after the construction phase. These should include specialised spill kits or spill containment equipment. Other spill containment measures include using drip pans underneath vehicles and equipment every time refuelling, servicing, or maintenance activities are undertaken.

Specific spill containment methods for land and water contamination are outlined below.

Containment of Spills on Land

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, and therefore spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. It is important that all measures be undertaken to avoid spills reaching open water bodies located outside of the Project Site. The following methods could be used:

- *Dykes* - Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled substance. A dyke needs to be built up to a size that will ensure containment of the maximum quantity of contaminant that may reach it. A plastic tarp can be placed on and at the base of the dyke such that the contaminant can pool up and subsequently be

removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly, a dyke may not be necessary and sorbents can be used to soak up contaminants before they migrate away from the source of the spill.

» *Trenches* - Trenches can be dug out to contain spills. Spades, pick axes or a front-end loader can be used depending on the size of the trench required. Spilled substances can then be recovered using a pump or sorbent materials.

b) Procedures for transferring, storing, and managing spill related wastes

Used sorbent materials are to be placed in plastic bags for future disposal. All materials mentioned in this section are to be available in the spill kits. Following clean up, any tools or equipment used must be properly washed and decontaminated or replaced if this is not possible.

Spilled substances and materials used for containment must be placed into empty waste oil containers and sealed for proper disposal at an licensed disposal facility.

c) Procedures for restoring affected areas

Criteria that may be considered include natural biodegradation of oil, replacement of soil and revegetation. Once a spill of reportable size has been contained, the ECO and the relevant Authority must be consulted to confirm that the appropriate clean up levels are met.

3.1.2. Scenario: Fire (and fire water handling)

i. Action Plan

The following action plan is proposed in the event of a fire:

1. Quantify risk.
2. Assess person safety, safety of others and environment.
3. If safe – attempt to extinguish the fire using appropriate equipment.
4. If not safe to extinguish, contain fire.
5. Notify the Site Manager and emergency response crew and authorities.
6. Inform users of the potential risk of fire.
7. Record the incident on the company database or filing register.

ii. Procedures

Because large scale fires may spread very fast it is most advisable that the employee/contractor not put his/her life in danger in the case of an uncontrolled fire.

Portable firefighting equipment must be provided at strategic locations throughout the site, in line with the Building Code of South Africa and the relevant provincial building code. All emergency equipment including portable fire extinguishers, hose reels and hydrants must be maintained and inspected by a qualified contractor in accordance with the relevant legislation and national standards.

Current evacuation signs and diagrams for the building or site that are compliant to relevant state legislation must be provided in a conspicuous position, on each evacuation route. Contact details for the relevant emergency services should be clearly displayed on site and all employees should be aware of procedures to follow in the case of an emergency.

a) Procedures for initial actions

Persons should not fight the fire if any of the following conditions exist:

» They have not been trained or instructed in the use of a fire extinguisher.
» They do not know what is burning.
» The fire is spreading rapidly.
» They do not have the proper equipment.
» They cannot do so without a means of escape.
» They may inhale toxic smoke.

b) Reporting procedures

In terms of the requirements of NEMA, the responsible person must, within fourteen (14) days of the incident, report to the Director General, provincial head of department and municipality.

- Report fire immediately to the Site Manager, who will determine if it is to be reported to the relevant emergency services and authorities.
- The Site Manager must have copies of the Report form to be completed.

» **SUMMARY: RESPONSE PROCEDURE**

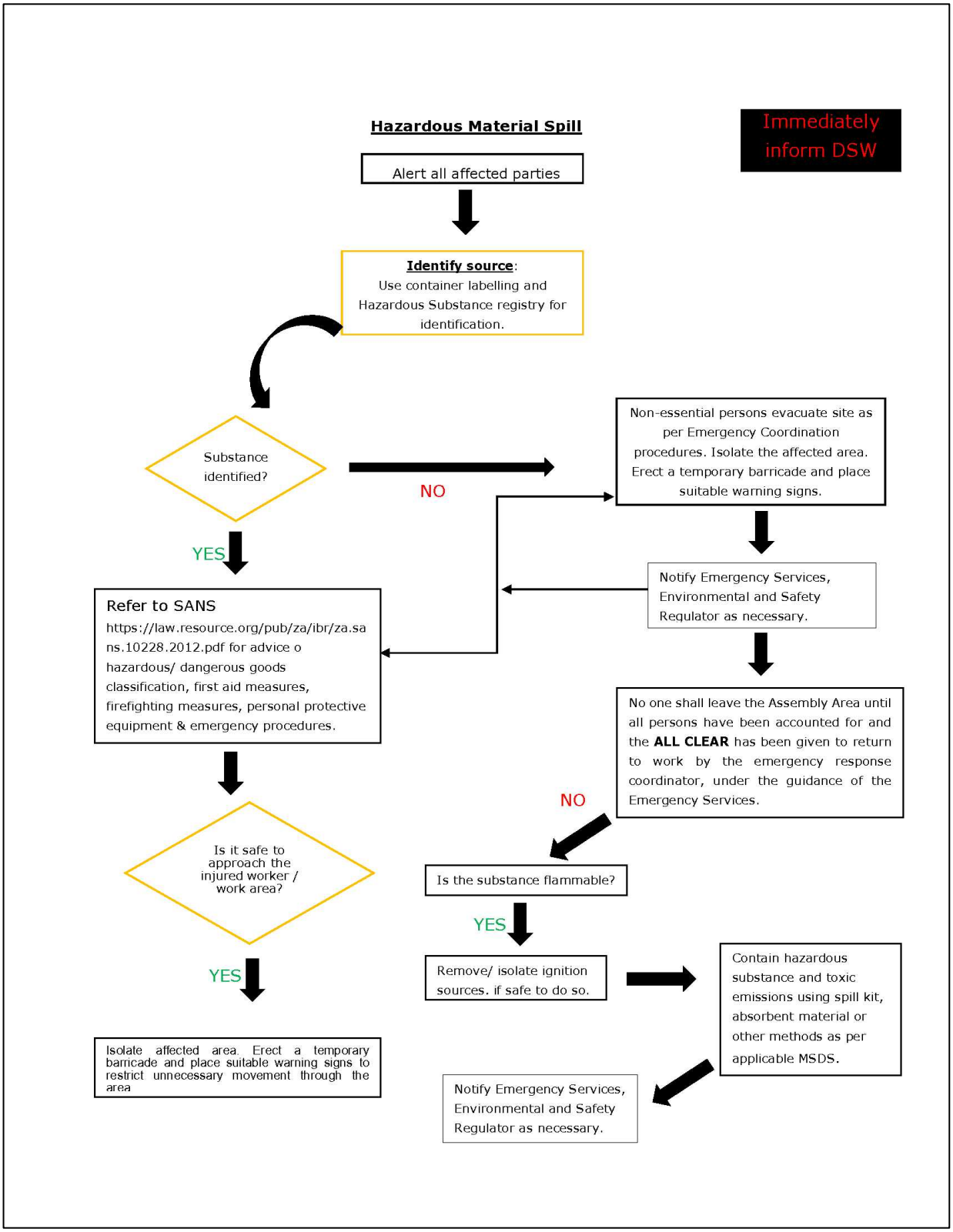


Figure 1: Hazardous Material Spill

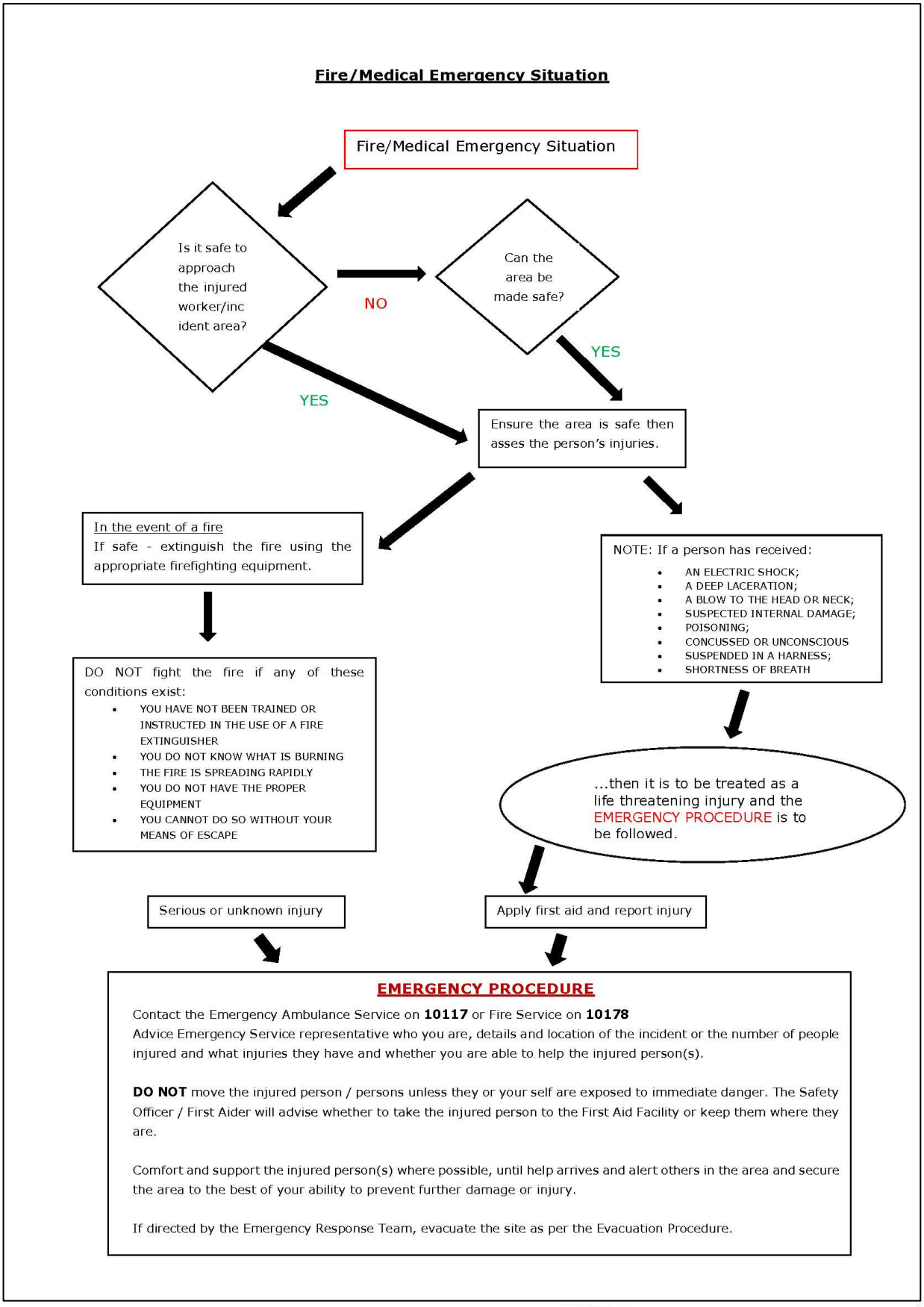


Figure 2: Emergency Fire/Medical

4. PROCEDURE RESPONSIBILITY

The Contractor's Environmental and Safety and Healthofficers, employed by the Contractor, is responsible for managing the day-to-day on-site implementation of this Plan, and for the compilation of regular (usually weekly) Monitoring Reports. In addition, the EO must act as liaison and advisor on all environmental and related issues.

The local authorities will provide their assistance when deemed necessary, or when it has been requested and/or indicated in Section 30 (8) of NEMA. The provincial authority will provide assistance and guidance where required and conduct awareness programmes.

APPENDIX J:
CURRICULCUM VITAE OF THE PROJECT TEAM

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Johannesburg, South Africa

Email: karen@savannahsa.com
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CURRICULUM VITAE OF DEBBIE-LEE JANSE VAN RENSBURGXXXX

Comprehensive CV

Profession :	Junior Environnemental Consultant
Specialisation:	Environmental Management; Environmental Impact Assessments; Basic Assessments; Water licencing; Project related GIS mapping; Public Participation Administration and Compliance Auditing
Work Experience:	Eight (8) Months in the GIS and Environmental Field

VOCATIONAL EXPERIENCE

Debbie-Lee is a highly dedicated, hardworking, goal orientated individual who does everything to the best of her ability. She studied BA Psychology with Geography, and Environmental Management for 3 years, she also completed her BSc. Honours degree in Environmental Science with Geography and Environmental Management at the North West University, Potchefstroom Campus.

After Debbie-Lee completed her 4 years of studies. She started her career at a GIS company where she worked as a Geospatial Technician. Her role as Geospatial Technician 1 taught her a lot about GIS and ArcMap. Typical tasks for which she was responsible in her role include the following: Review and analyse GIS data; maps and graphs; create data reports and digital 3D models of terrain; gather and convert data for GIS mapping; and plot maps for projects.

She has a special interest in environmental management with a specific focus on

- Renewable energy,
- Mining,
- Water management,
- GIS,
- Environmental auditing,
- Public participation,
- Environmental authorisation processes (EIA, BA, etc.)

With the aim of learning as much as possible, Debbie-Lee believes that she can learn from fellow colleagues as well as clients on a daily basis so that she can apply the knowledge she gains in her day-to-day tasks as an environmental consultant.

SKILLS BASE AND CORE COMPETENCIES

- Planning and Organising
- Compilation of Basic Assessment Reports in compliance with environmental legislation
- Self-discipline
- Aiding with public participation processes
- Passionate about the environment
- Goal orientated
- Good analytical and organisational skills
- Project management for environmental-related events and projects
- Working under pressure
- Experience with South African environmental legislation
- Eager to learn new skills
- Result orientated
- Water use licenses
- Environmental Authorisations and amendments
- Analysis and manipulation of geographical information and technical experience with the use of ArcGIS
- Teamwork
- Communication

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- BSc. Hons. in Environmental Science with Geography and Environmental Management, North-West University Potchefstroom (2021)
- BA in Psychology, Geography and Environmental Management, North-West University Potchefstroom (2020)

Short Courses:

- 3D Visualization Techniques Using ArcGIS (2021)
- 3D analysis of Surfaces and Features Using ArcGIS (2021)
- Deriving Raster for Terrain Analysis Using ArcGIS (2021)
- Distance Analysis Using ArcGIS (2021)
- Training and Resources in Research Ethics and Evaluation (THRREE) (2021)

EMPLOYMENT

Date	Company	Roles and Responsibilities
July 2022 - Current:	Savannah Environmental (Pty) Ltd	*Junior Environmental Consultant* Tasks include: *Environmental Assessment Practitioner (EAP); Specialising in project-related GIS mapping. Performing Basic Assessment Reports and Environmental Impact Assessments, Assisting on administrative public participation documents*
March 2022 – July 2022	Southern Mapping Company – Woolpert	*Geospatial Technician 1* Tasks included: *Review and analyse GIS data, maps and graphs; create data reports and digital 3D models of terrain. Gather and convert data for GIS mapping, plot maps for projects.*

PROJECT EXPERIENCE

Project experience includes Photovoltaic Solar Panels and associated grid connection infrastructure.

GRID INFRASTRUCTURE PROJECTS

Basic Assessments

Project Name & Location	***Client Name***	***Role***
Picley Park EGI	*Mulilo*	*Junior Environmental Consultant & GIS*

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CURRICULUM VITAE OF NKHENSANI MASONDO

Profession : Senior Environmental Consultant

Specialisation: Environmental Management, Environmental Impact Assessments, Report Writing, Project Management, Stakeholder Engagement, Environmental Auditing

Work Experience: 6 years in the Environmental Management Consulting Field

VOCATIONAL EXPERIENCE

Nkhensani is an EAPASA Registered Environmental Assessment Practitioner with over 6 years of experience in the environmental field. She holds a BSocSCi (Hons) in Environmental Management and Analysis and a BA (Own Choice) specialising in Geography and Archaeology, both from the University of Pretoria (UP). She is currently pursuing her MSc in Environmental Management at the University of South Africa (UNISA).

She has been involved in residential, commercial, institutional, industrial, and mixed-use development within South Africa. She has been involved in mine closure strategies and implementation plans on behalf of Mining partners. Her main responsibilities include compilation of environmental reports, stakeholder engagement, and project management.

SKILLS BASE AND CORE COMPETENCIES

- Environmental Planning
- Compilation of Environmental Impact Assessments, Basic Assessments, Water Use Licenses, NEMA Queries, GPEMF Applications, General Authorisations, Schedule 1 and Existing Lawful Use Applications
- Compilation and Implementation of Environmental Programmes
- Undertaking Environmental Audits for residential, commercial, and industrial developments
- Project Management of various projects
- Review of Specialists reports
- Undertaking Stakeholder Engagements for a variety of projects

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- Master of Science in Environmental Management (current), University of South Africa
- BSocSci (Hons) Environmental Analysis and Management (2014), University of Pretoria
- BA (Own Choice) Specialising in Geography and Archaeology (2013), University of Pretoria

Short Courses:

- Geographical Information Systems Training (ESRI) 2016
- ISO 14001: 2004 Lead Environmental Auditor Training: Environmental Management Systems (SGS) 2015

Professional Society Affiliations:

- Environmental Assessment Practitioners Association of South Africa – Environmental Assessment Practitioner

EMPLOYMENT		
Date	**Company**	**Roles and Responsibilities**
01 June 2022 - Current:	Savannah Environmental (Pty) Ltd	Senior Environmental Consultant <u>Tasks include</u>: • Play a lead role in environmental permitting, environmental authorisation applications, and compliance and advice and assurance. • Project management, execute draft, review and/or further develop and manage the delivery of environmental impact assessments (EIA) reports and EMPrs in line with the requirements of NEMA and the EIA regulations. • Environmental Permitting (including WULA), environmental authorisation applications and associated stakeholder engagement and public participation. • Manage the delivery of specialist environmental consultants and their reporting, as may be required. Manage any third parties or sub-consultants to which functions have been outsourced. • Project-related GIS mapping. • New business development and the preparation of proposals.
August 2017 – May 2022	LEAP: Landscape Architects and Environmental Planners (Imbrillinx CC)	Environmental Assessment Practitioner <u>Task included:</u> • Compiling Scoping Reports, Integrated Wastewater • Management Plans, Water Use License Applications, General • Authorisations, Schedule 1 Borehole Registrations, Basic • Assessment Reports, Environmental Management Programmes, • Section 24G Applications and Appeals, conducting site inspections. • Compiling Water Quality Monitoring, compiling wetland rehabilitation • and management reports. • • Stakeholder Engagement. • • Project Management • • Act as a liaison officer for the company with State Departments.
May 2015 – December 2016	LEAP: Landscape Architects and Environmental Planners (Imbrillinx CC)	*Environmental Control Officer* <u>Tasks Included</u> • Formulated and implemented long-range plans for environmental programs.

		• Performed inspections, groundwater sampling and soil sampling. • Performed environmental site assessments and provided remediation recommendations. • Inspected sites to ensure adherence to environmental regulations. • Training of contractors of appropriate environmental practices. • Attending site meetings with contractors. • Liaison with state departments. • Act as a public participation assistant as and when required.

PROJECT EXPERIENCE

INFRASTRUCTURE DEVELOPMENT PROJECTS (PIPELINES, WATER RESOURCES AND INDUSTRIAL

Basic Assessment and Environmental Programmes

Project	Client Name	Role
Lombardy East Stream Flow Reduction Activities	Johannesburg Road Agency	Project Manager & EAP
The Whisken K54 Road development	Balwin Properties Limited on behalf of Gautrans	Public Participation Assistant

Part 1 Amendment

Project	Client Name	Role
Malibongwe Pipeline	Codevco	Project Manager & EAP

Water Use License Applications and Environmental Programmes

Project	Client Name	Role
Crowthorne Leogem Sewer Pipeline	Leogem Property Projects (Pty) Ltd on behalf of	Project Manager & EAP
Diepsloot Klevebank Sewer pipeline	Eris Property Group (Pty) Limited	Project Manager & EAP
Kyalami Heights X4 Sewer Pipeline	Church of Scientology	Project Manager & EAP
Lombardy East Stream Flow Reduction Activities	Johannesburg Road Agency	Project Manager & EAP

General Authorisation

Project	Client Name	Role
Alinta Extension 4 Stormwater Infrastructure	Balwin Properties	Project Manager & EAP
Celtisdal Stormwater Infrastructure	Cosmopolitan Projects (Tshwane) Pty Ltd	Project Manager and EAP
Erasmus Estate – Road Crossing	Erasmus Estate Trust	EAP
Olivedale Retirement Village Stormwater Infrastructure	Olivedale Retirement Village NPO	EAP
Gem Valley Mixed Use Development Stormwater Culvert	Central Developments (Pty) Ltd	Project Manager & EAP

Environmental Compliance

Project	Client Name	Role
Diepsloot Porcupine Park Avenue	Valumax Northern Farms (Pty) Ltd	ECO

HOUSING AND URBAN PROJECTS

Environmental Impact Assessments and Environmental Management Programmes (EMPr)

Project	Client Name	Role
Dersley Springs Mixed Used Development	Royal Albatross (Pty) Ltd	EAP
Green Valley Residential Development	Balwin Properties Limited	Project Manager & EAP
Irene Ridge Mixed Use Development	M&T Developments	EAP
Onderstepoort Extension 42 Mixed Use Development	Power Developments (Pty) Ltd	EAP
Reigerpark X10 Mixed Use Development	Living Africa (Pty) Ltd	EAP
Sammy Marks Mixed Use Development	Abland	EAP
Swaziland		

Basic Assessments and Environmental Management Programmes

Project	Client Name	Role
Atteridgeville X47 Light Industrial Development	JT Group (Pty) Ltd	Project Manager
Erasmus Estate Mixed Use Development	Erasmus Estate Trust	EAP
Germiston Cemetery	Living Africa (Pty) Ltd	Project Manager & EAP
Homes Haven X24	Central Developments (Pty) Ltd	EAP
Leeuwfontein Shopping Centre	McCormick Property Group	Project Manager & EAP
Lewende Woord Bronkhorstspruit Church and Rehabilitation Centre	Lewende Woord Church and Rehabilitation Centre	EAP
Spes Magte	South African Special Forces	EAP
Waterfall Polofields	Balwin Properties	EAP
Willaway Residential Development	3V Projects	EAP
Waterkloof Marina Retirement Village	Central Development Projects	EAP

Part 2 Amendments

Gem Valley Hauptfleish	Gem Valley Hauptfleisch (Pty) Ltd	Project Manager & EAP
Greenlee Residential Develop	Balwin Properties Limited	EAP
Heidelberg X25 Mixed Use Development	Mantracare (Pty) Ltd	Project Manager & EAP
The Reid Montesorri School	Balwin Properties	EAP

Part 1 Amendments

Apex X10 Industrial Development	Moolman Group	EAP
Amberfield X47	Central Developments (Pty) Ltd	Project Manager
Clayville X50 and X71 Mixed Use Development	Valumax Midrand (Pty) Ltd	Project Manager & EAP
Klerksoord Mixed Use Development	SafDev (Pty) Ltd	Project Manager & EAP
Mooikloof Mega City	Balwin Properties Limited	EAP
Riverside View X30 – X35	Valumax Northern Farms (Pty) Ltd	Project Manager & EAP

GPEMF

Project	Client Name	Role
Krugerus X9 Residential Development	Moolman Group	Project Manager & EAP
Linbro Park Klulee Residential Development	Balwin Properties Limited	Project Manager &EAP
Theresa Park X66 & X67	Social Housing Regulatory Authority	Project Manager & EAP

NEMA Query

Project	Client Name	Role
Kwa-Mhlanga Crossing	Top Spot (Pty) Ltd	Project Manager & EAP
Waterfall Polofields Show block	Balwin Properties Limited	EAP

24G Rectification Application

Project	Client Name	Role
Dekenah Street	Alrode CC	EAP
Mopane Grootvlei	RuaCon	Project Manager

Water Use License Applications

Project Name	Client Name	Role
Botesdal X15 Light Industrial Development	Open Energy (Pty) Ltd	Project Manager & EAP
Clayville X45 Mixed Use Development	Valumax Midrand (Pty) Ltd	Project Manager & EAP
Ermelo Shopping Centre	Moolman Group	Project Manager & EAP
Gem Valley Hauptfleisch Mixed Use Development	Gem Valley Hauptfliesch (Pty) Ltd	Project Manager & EAP
Lewende Woord Bronkhorstspruit Church and Rehabilitation	Lewende Woord Bronkhorstspruit	Project Manager & EAP
Matsamo Mall Shopping Centre	Moolman Group	Project Manager & EAP
Miracle Meadow Water Bottling Facility	Mr Pieter du Randt Pretorius	Project Manager & EAP
Reigerpark Extension 10 and Comet X18 Mixed Use Development	Living Africa 2 (Pty) Ltd	Project Manager & EAP
Norton Park X8 Residential Development	SSI Group	Project Manager & EAP
Onderstepoort X42 Mixed Use Development	Power Developments (Pty) Ltd	Project Manager & EAP
The Whisken	Balwin Properties Limited	Project Manager & EAP
Zwartkop 187 Mixed Use Development	Moolman Group	Project Manager & EAP
Zuurfontein Ptn 221 Residential Development	M&T Developments	Project Manager & EAP

General Authorisations

Project	Client Name	Role
Thokoza Park Recreational Park	City of Ekurhuleni	Project Manager & EAP

Schedule 1 Authorisations

Project	Client Name	Role
Builders Warehouse Midrand	Massmart (Pty) Ltd	Project Manager
Greenlee Borehole Registration	Balwin Properties Limited	Project Manager & EAP
Willway Residential Development	3V projects (Pty) Ltd	Project Manager & EAP

Environmental Auditing

Project	Client Name	Role
Amberfield Estate	Central Developments (Pty) Ltd	Environmental Control Officer
Blue Hills Equestrian Estate	Century Property Development	Environmental Control Officer
Chuma Mall	Eris Property Group	Environmental Control Officer
Diepsloot Ptn 1 Mixed Use Development	Valumax Northern Farms (Pty) Ltd	Environmental Control Officer
Kyalami Hills	Balwin Properties Limited	Environmental Control Officer
Kyalami Ridge Mall	Kyalami Retail Africa	Environmental Control Officer
South Hills Mixed Use Estate	Calgro M3	Environmental Control Officer
Waterfall Estate	Century Property Developments	Environmental Control Officer

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CURRICULUM VITAE OF JO-ANNE THOMAS

Profession:	Environmental Management and Compliance Consultant; Environmental Assessment Practitioner
Specialisation:	Environmental Management; Strategic environmental advice; Environmental compliance advice & monitoring; Environmental Impact Assessments; Policy, strategy & guideline formulation; Project Management; General Ecology
Work experience:	Twenty four (24) years in the environmental field

VOCATIONAL EXPERIENCE

Provide technical input for projects in the environmental management field, specialising in Strategic Environmental Advice, Environmental Impact Assessment studies, environmental auditing and monitoring, environmental permitting, public participation, Environmental Management Plans and Programmes, environmental policy, strategy and guideline formulation, and integrated environmental management. Key focus on integration of the specialist environmental studies and findings into larger engineering-based projects, strategic assessment, and providing practical and achievable environmental management solutions and mitigation measures. Responsibilities for environmental studies include project management (including client and authority liaison and management of specialist teams); review and manipulation of data; identification and assessment of potential negative environmental impacts and benefits; review of specialist studies; and the identification of mitigation measures. Compilation of the reports for environmental studies is in accordance with all relevant environmental legislation.

Undertaking of numerous environmental management studies has resulted in a good working knowledge of environmental legislation and policy requirements. Recent projects have been undertaken for both the public- and private-sector, including compliance advice and monitoring, electricity generation and transmission projects, various types of linear developments (such as National Road, local roads and power lines), waste management projects (landfills), mining rights and permits, policy, strategy and guideline development, as well as general environmental planning, development and management.

SKILLS BASE AND CORE COMPETENCIES

- Project management for a range of projects
- Identification and assessment of potential negative environmental impacts and benefits through the review and manipulation of data and specialist studies
- Identification of practical and achievable mitigation and management measures and the development of appropriate management plans
- Compilation of environmental reports in accordance with relevant environmental legislative requirements
- External and peer review of environmental reports & compliance advice and monitoring
- Formulation of environmental policies, strategies and guidelines
- Strategic and regional assessments; pre-feasibility & site selection
- Public participation processes for a variety of projects
- Strategic environmental advice to a wide variety of clients both in the public and private sectors
- Working knowledge of environmental planning processes, policies, regulatory frameworks and legislation

EDUCATION AND PROFESSIONAL STATUS

Degrees:

- B.Sc Earth Sciences, University of the Witwatersrand, Johannesburg (1993)
- B.Sc Honours in Botany, University of the Witwatersrand, Johannesburg (1994)
- M.Sc in Botany, University of the Witwatersrand, Johannesburg (1996)

Short Courses:

- Environmental Impact Assessment, Potchefstroom University (1998)
- Environmental Law, Morgan University (2001)
- Environmental Legislation, IMBEWU (2017)
- Mining Legislation, Cameron Cross & Associates (2013)
- Environmental and Social Risk Management (ESRM), International Finance Corporation (2018)

Professional Society Affiliations:

- Registered EAP with the Environmental Assessment Practitioners Association of South Africa (EAPASA) (2019/726)
- Registered with the South African Council for Natural Scientific Professions as a Professional Natural Scientist: Environmental Scientist (400024/00)
- Registered with the International Associated for Impact Assessment South Africa (IAIAsa): 5601
- Member of the South African Wind Energy Association (SAWEA)

EMPLOYMENT

Date	Company	Roles and Responsibilities
January 2006 - Current:	Savannah Environmental (Pty) Ltd	Director Project manager Independent specialist environmental consultant, Environmental Assessment Practitioner (EAP) and advisor.
1997 – 2005:	Bohlweki Environmental (Pty) Ltd	Senior Environmental Scientist at. Environmental Management and Project Management
January – July 1997:	Sutherland High School, Pretoria	Junior Science Teacher

PROJECT EXPERIENCE

Project experience includes large infrastructure projects, including electricity generation and transmission, wastewater treatment facilities, mining and prospecting activities, property development, and national roads, as well as strategy and guidelines development.

RENEWABLE POWER GENERATION PROJECTS: PHOTOVOLTAIC SOLAR ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Christiana PV 2 SEF, North West	Solar Reserve South Africa	Project Manager & EAP
De Aar PV facility, Northern Cape	iNca Energy	Project Manager & EAP
Everest SEF near Hennenman, Free State	FRV Energy South Africa	Project Manager & EAP
Graafwater PV SEF, Western Cape	iNca Energy	Project Manager & EAP
Grootkop SEF near Allanridge, Free State	FRV Energy South Africa	Project Manager & EAP
Hertzogville PV 2 SEF with 2 phases, Free State	SunCorp / Solar Reserve	Project Manager & EAP

Project Name & Location	Client Name	Role
Karoshoek CPV facility on site 2 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Kgabalatsane SEF North-East for Brits, North West	Built Environment African Energy Services	Project Manager & EAP
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy Global	Project Manager & EAP
Lethabo Power Station PV Installation, Free State	Eskom Holdings SoC Limited	Project Manager & EAP
Majuba Power Station PV Installation, Mpumalanga	Eskom Holdings SoC Limited	Project Manager & EAP
Merapi PV SEF Phase 1 – 4 South-East of Excelsior, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Sannaspos Solar Park, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Ofir-Zx PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV Energy South Africa	Project Manager & EAP
Project Blue SEF North of Kleinsee, Northern Cape	WWK Development	Project Manager & EAP
S-Kol PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Sonnenberg PV Plant near Keimoes, Northern Cape	S28 Degrees Energy	Project Manager & EAP
Tutuka Power Station PV Installation, Mpumalanga	Eskom Transmission	Project Manager & EAP
Two PV sites within the Northern Cape	MedEnergy Global	Project Manager & EAP
Two PV sites within the Western & Northern Cape	iNca Energy	Project Manager & EAP
Upington PV SEF, Northern Cape	MedEnergy Global	Project Manager & EAP
Vredendal PV facility, Western Cape	iNca Energy	Project Manager & EAP
Waterberg PV plant, Limpopo	Thupela Energy	Project Manager & EAP
Watershed Phase I & II SEF near Litchtenburg, North West	FRV Energy South Africa	Project Manager & EAP
Alldays PV & CPV SEF Phase 1, Limpopo	BioTherm Energy	Project Manager & EAP
Hyperion PV Solar Development 1, 2, 3, 4, 5 & 6, Northern Cape	Building Energy	Project Manager & EAP
Vrede & Rondavel PV, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Aberdeen PV SEF, Eastern Cape	BioTherm Energy	Project Manager & EAP
Christiana PV 1 SEF on Hartebeestpan Farm, North-West	Solar Reserve South Africa	Project Manager & EAP
Heuningspruit PV1 & PV 2 facilities near Koppies, Free State	Sun Mechanics	Project Manager & EAP
Kakamas PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Kakamas II PV Facility, Northern Cape	iNca Energy	Project Manager & EAP
Machadodorp 1 PV SEF, Mpumalanga	Solar To Benefit Africa	Project Manager & EAP
PV site within the Northern Cape	iNca Energy	Project Manager & EAP
PV sites within 4 ACSA airports within South Africa, National	Airports Company South Africa (ACSA)	Project Manager & EAP
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo3 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
RustMo4 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Sannaspos PV SEF Phase 2 near Bloemfontein, Free State	SolaireDirect Southern Africa	Project Manager & EAP
Solar Park Expansion within the Rooiwal Power Station, Gauteng	AFRKO Energy	Project Manager & EAP
Steynsrus SEF, Free State	SunCorp	Project Manager & EAP
Sirius Solar PV Project Three and Sirius Solar PV Project Four (BA in terms of REDZ regulations), Northern Cape	SOLA Future Energy	Project Manager & EAP
Northam PV, Limpopo Province	Northam Platinum	Project Manager & EAP
Kolkies PV Suite (x 6 projects) and Sadawa PV Suite (x 4 projects), Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Allemans Fontein SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Amandel SEF near Thabazimbi, Limpopo	iNca Energy	Project Manager & EAP
Arola/Doornplaat SEF near Ventersdorp, North West	FRV & iNca Energy	Project Manager & EAP
Bloemfontein Airport PV Installation, Free State	The Power Company	Project Manager & EAP
Brakspruit SEF near Klerksorp, North West	FRV & iNca Energy	Project Manager & EAP
Carolus Poort SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Damfontein SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Everest SEF near Welkom, Free State	FRV & iNca Energy	Project Manager & EAP
Gillmer SEF near Noupoort, Northern Cape	Fusion Energy	Project Manager & EAP
Grootkop SEF near Allansridge, Free State	FRV & iNca Energy	Project Manager & EAP
Heuningspruit PV1 & PV 2 near Koppies, Free State	Cronimat	Project Manager & EAP
Kimberley Airport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Kolonnade Mall Rooftop PV Installation in Tshwane, Gauteng	Momentous Energy	Project Manager & EAP
Loskop SEF near Groblersdal, Limpopo	S&P Power Unit	Project Manager & EAP
Marble SEF near Marble Hall, Limpopo	S&P Power Unit	Project Manager & EAP
Morgenson PV1 SEF South-West of Windsorton, Northern Cape	Solar Reserve South Africa	Project Manager & EAP
OR Tambo Airport PV Installation, Gauteng	The Power Company	Project Manager & EAP
Oryx SEF near Virginia, Free State	FRV & iNca Energy	Project Manager & EAP
Rhino SEF near Vaalwater, Limpopo	S&P Power Unit	Project Manager & EAP
Rustmo2 PV Plant near Buffelspoort, North West	Momentous Energy	Project Manager & EAP
Spitskop SEF near Northam, Limpopo	FRV & iNca Energy	Project Manager & EAP
Steynsrus PV, Free State	Suncorp	Project Manager & EAP
Tabor SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
UpingtonAirport PV Installation, Northern Cape	The Power Company	Project Manager & EAP
Valeria SEF near Hartebeestpoort Dam, North West	Solar to Benefit Africa	Project Manager & EAP
Watershed SEF near Lichtenburg, North West	FRV & iNca Energy	Project Manager & EAP
Witkop SEF near Polokwane, Limpopo	FRV & iNca Energy	Project Manager & EAP
Woodmead Retail Park Rooftop PV Installation, Gauteng	Momentous Energy	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Adams Solar PV Project Two South of Hotazel,	Enel Green Power	Project Manager

Project Name & Location	Client Name	Role
Northern Cape		
ECO for the construction of the Kathu PV Facility, Northern Cape	REISA	Project Manager
ECO and bi-monthly auditing for the construction of the Pulida PV Facility, Free State	Enel Green Power	Project Manager
ECO for the construction of the RustMo1 SEF, North West	Momentous Energy	Project Manager
ECO for the construction of the Sishen SEF, Northern Cape	Windfall 59 Properties	Project Manager
ECO for the construction of the Upington Airport PV Facility, Northern Cape	Sublanary Trading	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Kathu PV facility, Northern Cape	REISA	Project Manager
ECO for the construction of the Konkoonsies II PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
ECO for the construction of the Aggeneys PV SEF and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager

Compliance Advice and ESAP Reporting

Project Name & Location	Client Name	Role
Aggeneys Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Airies II PV Facility SW of Kenhardt, Northern Cape	BioTherm Energy	Environmental Advisor
Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Environmental Advisor
Kathu PV Facility, Northern Cape	Building Energy	Environmental Advisor
Kenhardt PV Facility, Northern Cape	BioTherm Energy	Environmental Advisor
Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Environmental Advisor
Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Environmental Advisor
Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Environmental Advisor
Lephalale SEF, Limpopo	Exxaro	Environmental Advisor
Pixley ka Seme PV Park, South-East of De Aar, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
RustMo1 PV Plant near Buffelspoort, North West	Momentous Energy	Environmental Advisor
Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Environmental Advisor
Sirius PV Plants, Northern Cape	Aurora Power Solutions	Environmental Advisor
Upington Airport PV Power Project, Northern Cape	Sublunary Trading	Environmental Advisor
Upington SEF, Northern Cape	Abengoa Solar	Environmental Advisor
Ofir-ZX PV SEF near Keimoes, Northern Cape	Networx S28 Energy	Environmental Advisor
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Environmental Advisor
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
5 PV SEF projects in Lephalale, Limpopo	iNca Energy	Environmental Advisor
Prieska PV Plant, Northern Cape	SunEdison Energy India	Environmental Advisor
Sirius Phase One PV Facility near Upington, Northern Cape	Aurora Power Solutions	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permit & WULA for the Aggeneys SEF near Aggeneys, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permit for the Konkoonises II SEF near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Biodiversity Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Kleinbegin PV SEF West of Groblershoop, Northern Cape	MedEnergy	Project Manager & EAP
Environmental Permitting for the Upington SEF, Northern Cape	Abengoa Solar	Project Manager & EAP
Environmental Permitting for the Kathu PV Facility, Northern Cape	Building Energy	Project Manager & EAP
Environmental Permitting for the Konkoonsies Solar Farm, Northern Cape	BioTherm Energy	Project Manager & EAP
Environmental Permitting for the Lephalale SEF, Limpopo	Exxaro Resources	Project Manager & EAP
Environmental Permitting for the Scuitdrift 1 SEF & Scuitdrift 2 SEF, Limpopo	Building Energy	Project Manager & EAP
Environmental Permitting for the Sirius PV Plant, Northern Cape	Aurora Power Solutions	Project Manager & EAP
Environmental Permitting for the Steynsrus PV1 & PV2 SEF's, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Environmental Permitting for the Heuningspruit PV SEF, Northern Cape	Cronimet Power Solutions	Project Manager & EAP
Permits for the Kleinbegin and UAP PV Plants, Northern Cape	MedEnergy Global	Project Manager & EAP
S53 Application for Arriesfontein Solar Park Phase 1 – 3 near Danielskuil, Northern Cape	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for Hertzogville PV1 & PV 2 SEFs, Free State	Solar Reserve / SunCorp	Project Manager & EAP
S53 Application for the Bloemfontein Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
S53 Application for the Kimberley Airport PV Facility, Northern Cape	Sublunary Trading	Project Manager & EAP
S53 Application for the Project Blue SEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 Application for the Upington Airport PV Facility, Free State	Sublunary Trading	Project Manager & EAP
WULA for the Kalahari SEF Phase II in Kathu, Northern Cape	Engie	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: CONCENTRATED SOLAR FACILITIES (CSP)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ilanga CSP 2, 3, 4, 5, 7 & 9 Facilities near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Ilanga CSP near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Ilanga Tower 1 Facility near Upington, Northern Cape	Emvelo Holdings	Project Manager & EAP
Karoshoek CPVPD 1-4 facilities on site 2 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshoek CSP facilities on sites 1.4; 4 & 5 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Karoshoek Linear Fresnel 1 Facility on site 1.1 as part of the larger Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the !Khi CSP Facility, Northern Cape	Abengoa Solar	Project Manager
ECO for the construction of the Ilanga CSP 1 Facility near Upington, Northern Cape	Karoshoek Solar One	Project Manager
ECO for the construction of the folar Park, Northern Cape	Kathu Solar	Project Manager
ECO for the construction of the KaXu! CSP Facility, Northern Cape	Abengoa Solar	Project Manager
Internal audit of compliance with the conditions of the IWUL issued to the Karoshoek Solar One CSP Facility, Northern Cape	Karoshoek Solar One	Project Manager

Screening Studies

Project Name & Location	Client Name	Role
Upington CSP (Tower) Plant near Kanoneiland, Northern Cape	iNca Energy and FRV	Project Manager & EAP

Compliance Advice and ESAP reporting

Project Name & Location	Client Name	Role
Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Environmental Advisor
Ilangalethu CSP 2, Northern Cape	FG Emvelo	Environmental Advisor
Kathu CSP Facility, Northern Cape	GDF Suez	Environmental Advisor
Lephalale SEF, Limpopo	Cennergi	Environmental Advisor
Solis I CSP Facility, Northern Cape	Brightsource	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting for the Ilanga CSP Facility near Upington, Northern Cape	Ilangethu Energy	Project Manager & EAP
Environmental Permitting for the Kathu CSP, Northern Cape	GDF Suez	Project Manager & EAP
WULA for the Solis I CSP Facility, Northern Cape	Brightsource	Project Manager & EAP

RENEWABLE POWER GENERATION PROJECTS: WIND ENERGY FACILITIES

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Sere WEF, Western Cape	Eskom Holdings SoC Limited	EAP
Aberdeen WEF, Eastern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Amakhala Emoyeni WEF, Eastern Cape	Windlab Developments	Project Manager & EAP
EXXARO West Coast WEF, Western Cape	EXXARO Resources	Project Manager & EAP
Goereesoe Wind Farm near Swellendam, Western Cape	iNca Energy	Project Manager & EAP
Hartneest WEF, Western Cape	Juwi Renewable Energies	Project Manager & EAP
Hopefield WEF, Western Cape	Umoya Energy	EAP
Kleinsee WEF, Northern Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Klipheuwel/Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Moorreesburg WEF, Western Cape	iNca Energy	Project Manager & EAP
Oyster Bay WEF, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Project Blue WEF, Northern Cape	Windy World	Project Manager & EAP
Rheboksfontein WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Spitskop East WEF near Riebeeck East, Eastern Cape	Renewable Energy Resources Southern Africa	Project Manager & EAP
Suurplaat WEF, Western Cape	Moyeng Energy	Project Manager & EAP
Swellendam WEF, Western Cape	IE Swellendam	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro	Project Manager & EAP
West Coast One WEF, Western Cape	Moyeng Energy	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Amakhala Emoyeni Wind Monitoring Masts, Eastern Cape	Windlab Developments	Project Manager & EAP
Beaufort West Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
Koekenaap Wind Monitoring Masts, Western Cape	EXXARO Resources	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Palm Tree Power	Project Manager & EAP
Laingsburg Area Wind Monitoring Masts, Western Cape	Umoya Energy	Project Manager & EAP
Overberg Area Wind Monitoring Masts, Western Cape	BioTherm Energy	Project Manager & EAP
Oyster Bay Wind Monitoring Masts, Eastern Cape	Renewable Energy Systems Southern Africa (RES)	Project Manager & EAP
Wind Garden & Fronteer WEFs, Eastern Cape	Wind Relc	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Albertinia WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Koingnaas WEF, Northern Cape	Just Pal Tree Power	Project Manager & EAP
Napier Region WEF Developments, Western Cape	BioTherm Energy	Project Manager & EAP
Tsitsikamma WEF, Eastern Cape	Exxarro Resources	Project Manager & EAP

Project Name & Location	Client Name	Role
Various WEFs within an identified area in the Overberg area, Western Cape	BioTherm Energy	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Investec Bank Limited	Project Manager & EAP
Various WEFs within an identified area on the West Coast, Western Cape	Eskom Holdings Limited	Project Manager & EAP
Various WEFs within the Western Cape	Western Cape Department of Environmental Affairs and Development Planning	Project Manager & EAP
Velddrift WEF, Western Cape	VentuSA Energy	Project Manager & EAP
Wind 1000 Project	Thabo Consulting on behalf of Eskom Holdings	Project Manager & EAP
Wittekleibosch, Snylip & Doriskraal WEFs, Eastern Cape	Exxarro Resources	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager
ECO for the construction of the Gouda WEF, Western Cape	Blue Falcon	Project Manager
EO for the Dassiesklip Wind Energy Facility, Western Cape	Group 5	Project Manager
Quarterly compliance monitoring of compliance with all environmental licenses for the operation activities at the Gouda Wind Energy facility near Gouda, Western Cape	Blue Falcon	Project Manager
Annual auditing of compliance with all environmental licenses for the operation activities at the West Coast One Wind Energy facility near Vredenburg, Western Cape	Aurora Wind Power	Project Manager
External environmental and social audit for the Amakhala Wind Farm, Eastern Cape	Cennergi	Project Manager
External environmental and social audit for the Tsitsikamma Wind Farm, Eastern Cape	Cennergi	Project Manager
ECO for the construction of the Excelsior Wind Farm and associated infrastructure, Northern Cape	BioTherm Energy	Project Manager
External compliance audit of the Dassiesklip Wind Energy Facility, Western Cape	BioTherm Energy	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Amakhala Phase 1 WEF, Eastern Cape	Cennergi	Environmental Advisor
Dassiesfontein WEF within the Overberg area, Western Cape	BioTherm Energy	Environmental Advisor
Excelsior Wind Farm, Western Cape	BioTherm Energy	Environmental Advisor
Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Environmental Advisor
Hopefield Community WEF, Western Cape	African Clean Energy Developments (ACED)	Environmental Advisor

Rheboksfontein WEF, Western Cape	Moyeng Energy	Environmental Advisor
Tiqua WEF, Western Cape	Cennergi	Environmental Advisor
Tsitsikamma WEF, Eastern Cape	Cennergi	Environmental Advisor
West Coast One WEF, Western Cape	Moyeng Energy	Environmental Advisor

Due Diligence Reporting

Project Name & Location	Client Name	Role
Witteberg WEF, Western Cape	EDPR Renewables	Environmental Advisor
IPD Vredenburg WEF within the Saldanha Bay area, Western Cape	IL&FS Energy Development Company	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Biodiversity Permitting for the Power Line between the Tsitikamma Community WEF & the Diep River Substation, Eastern Cape	Cennergi	Project Manager & EAP
Biodiversity Permitting for the West Coast One WEF, Western Cape	Aurora Wind Power	Project Manager & EAP
Environmental Permitting for the Excelsior WEF, Western Cape	BioTherm Energy	Project Manager & EAP
Plant Permits & WULA for the Tsitsikamma Community WEF, Eastern Cape	Cennergi	Project Manager & EAP
S24G and WULA for the Rectification for the commencement of unlawful activities on Ruimsig AH in Honeydew, Gauteng	Hossam Soror	Project Manager & EAP
S24G Application for the Rheboksfontein WEF, Western Cape	Ormonde - Theo Basson	Project Manager & EAP
S53 Application & WULA for Suurplaat and Gemini WEFs, Northern Cape	Engie	Project Manager & EAP
S53 Application for the Hopefield Community Wind Farm near Hopefield, Western Cape	Umoya Energy	Project Manager & EAP
S53 Application for the Project Blue WEF, Northern Cape	WWK Developments	Project Manager & EAP
S53 for the Oyster Bay WEF, Eastern Cape	RES	Project Manager & EAP
WULA for the Great Karoo Wind Farm, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (COAL)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Mutsho Power Station near Makhado, Limpopo	Mutsho Consortium	Project Manager & EAP
Coal-fired Power Station near Ogies, Mpumalanga	Ruukki SA	Project Manager & EAP
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Project Manager & EAP
Transalloys Coal-fired Power Station, Mpumalanga	Transalloys	Project Manager & EAP
Tshivasho IPP Coal-fired Power Station (with WML), near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Umbani Coal-fired Power Station, near Kriel, Mpumalanga	ISS Global Mining	Project Manager & EAP

Project Name & Location	Client Name	Role
Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Coal Stockyard on Medupi Ash Dump Site, Limpopo	Eskom Holdings	Project Manager & EAP
Biomass Co-Firing Demonstration Facility at Arnot Power Station East of Middleburg, Mpumlanaga	Eskom Holdings	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Baseload Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP
Coal-Fired Power Plant near Delmas, Mpumalanga	Exxaro Resources	Project Manager & EAP
Makhado Power Station, Limpopo	Mutsho Consortium, Limpopo	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the Camden Power Station, Mpumalanga	Eskom Holdings	Project Manager

Compliance Advice

Project Name & Location	Client Name	Role
Thabametsi IPP Coal-fired Power Station, near Lephalale, Limpopo	Axia	Environmental Advisor

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Permit application for the Thabametsi Bulk Water Pipeline, near Lephalale, Limpopo	Axia	Project Manager & EAP
S53 & WULA for the Waterberg IPP Coal-Fired Power Station near Lephalale, Limpopo	Exxaro Resources	Project Manager & EAP
S53 Application for the Tshivasho Coal-fired Power Station near Lephalale, Limpopo	Cennergi	Project Manager & EAP

CONVENTIONAL POWER GENERATION PROJECTS (GAS)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Ankerlig OCGT to CCGT Conversion project &400 kV transmission power line between Ankerlig and the Omega Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Gourikwa OCGT to CCGT Conversion project & 400kV transmission power line between Gourikwa & Proteus Substation, Western Cape	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP
Richards Bay Gas to Power Plant, KwaZulu-Natal	Richards Bay Gas Power 2	Project Manager & EAP
Decommissioning & Recommissioning of 3 Gas Turbine Units at Acacia Power Station & 1 Gas Turbine Unit at Port Rex Power Station to the existing	Eskom Holdings	Project Manager & EAP

Project Name & Location	Client Name	Role
Ankerlig Power Station in Atlantis Industria, Western Cape		
320MW gas-to-power station in Richards Bay, KwaZulu-Natal	Phinda Power Projects	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Fatal Flaw Analysis for 3 area identified for the establishment of a 500MW CCGT Power Station	Globeleq Advisors Limited	Project Manager & EAP
Richards Bay Gas to Power Combined Cycle Power Station, KwaZulu-Natal	Eskom Holdings SoC Limited	Project Manager & EAP

GRID INFRASTRUCTURE PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Aggeneis-Oranjemond Transmission Line & Substation Upgrade, Northern Cape	Eskom Transmission	Project Manager & EAP
Ankerlig-Omega Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Karoshoek Grid Integration project as part of the Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP
Koeberg-Omega Transmission Power Lines,, Western Cape	Eskom Transmission	Project Manager & EAP
Koeberg-Stikland Transmission Power Lines, Western Cape	Eskom Transmission	Project Manager & EAP
Kyalami Strengthening Project, Gauteng	Eskom Transmission	Project Manager & EAP
Mokopane Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Saldanha Bay Strengthening Project, Western Cape	Eskom Transmission	Project Manager & EAP
Steelpoort Integration Project, Limpopo	Eskom Transmission	Project Manager & EAP
Transmission Lines from the Koeberg-2 Nuclear Power Station site, Western Cape	Eskom Transmission	Project Manager & EAP
Tshwane Strengthening Project, Phase 1, Gauteng	Eskom Transmission	Project Manager & EAP
Main Transmission Substation (MTS) associated with the Choje Wind Farm cluster, Eastern Cape	Wind Relic	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Dassenberg-Koeberg Power Line Deviation from the Koeberg to the Ankerlig Power Station, Western Cape	Eskom Holdings	Project Manager & EAP
Golden Valley II WEF Power Line & Substation near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Golden Valley WEF Power Line near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Karoshoek Grid Integration project as part of the Karoshoek Solar Valley Development East of Upington, Northern Cape	FG Emvelo	Project Manager & EAP

Project Name & Location	Client Name	Role
Konkoonsies II PV SEF Power Line to the Paulputs Substation near Pofadder, Northern Cape	BioTherm Energy	Project Manager & EAP
Perdekraal West WEF Powerline to the Eskom Kappa Substation, Westnern Cape	BioTherm Energy	Project Manager & EAP
Rheboksfontein WEF Powerline to the Aurora Substation, Western Cape	Moyeng Energy	Project Manager & EAP
Soetwater Switching Station near Sutherland, Northern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Solis Power I Power Line & Switchyard Station near Upington, Northern Cape	Brightsource	Project Manager & EAP
Stormwater Canal System for the Ilanga CSP near Upington, Northern Cape	Karoshoek Solar One	Project Manager & EAP
Tsitsikamma Community WEF Powerline to the Diep River Substation, Eastern Cape	Eskom Holdings	Project Manager & EAP
Two 132kV Chickadee Lines to the new Zonnebloem Switching Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Electrical Grid Infrastructure for the Kolkies and Sadawa PV clusters, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Sadawa Collector substation, Western Cape	Mainstream Renewable Energy Developments	Project Manager & EAP
Electrical Grid Infrastructure for the Vrede and Rondavel PV facilities, Free State	Mainstream Renewable Energy Developments	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Ferrum-Mookodi Transmission Line, Northern Cape and North West	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section A Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Gamma-Kappa Section B Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Hydra IPP Integration project, Northern Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Kappa-Sterrekus Section C Transmission Line, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
EO for the construction of the Namaqualand Strengthening project in Port Nolloth, Western Cape	Trans-Africa Projects on behalf of Eskom	Project Manager
ECO for the construction of the Neptune Substation Soil Erosion Mitigation Project, Eastern Cape	Eskom	Project Manager
ECO for the construction of the Ilanga-Gordonia 132kV power line, Northern Cape	Karoshoek Solar One	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Environmental Permitting and WULA for the Rockdale B Substation & Loop in Power Lines,	Eskom Holdings	Project Manager & EAP
Environmental Permitting and WULA for the Steelpoort Integration project, Limpopo	Eskom Holdings	Project Manager & EAP
Environmental Permitting for Solis CSP near Upington, Northern Cape	Brightsource	Project Manager & EAP

MINING SECTOR PROJECTS

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Elitheni Coal Mine near Indwe, Eastern Cape	Elitheni Coal	Project Manager & EAP
Groot Letaba River Development Project Borrow Pits	liso	Project Manager & EAP
Grootegeluk Coal Mine for coal transportation infrastructure between the mine and Medupi Power Station (EMPr amendment) , Limpopo	Eskom Holdings	Project Manager & EAP
Waterberg Coal Mine (EMPr amendment), Limpopo	Seskoko Resources	Project Manager & EAP
Aluminium Plant WML & AEL, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP
Decommissioning and Demolition of Kilns 5 & 6 at the Slurry Plant, Kwa-Zulu Natal	PPC	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO for the construction of the Duhva Mine Water Recovery Project, Mpumalanga	Eskom Holdings SoC Limited	Project Manager
External compliance audit of Palesa Coal Mine's Integrated Water Use License (IWUL), near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Palesa Coal Mine's Waste Management License (WML) and EMP, near KwaMhlanga, Mpumalanga	HCI Coal	Project Manager
External compliance audit of Mbali Coal Mine's Integrated Water Use License (IWUL), near Ogies, Mpumalanga	HCI Coal	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mining Operations (Brand se Baai), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Mineral Separation Plant (MSP), Western Cape	Tronox Namakwa Sands	Project Manager
Independent External Compliance Audit of Water Use License (WUL) for the Tronox Namakwa Sands (TNS) Smelter Operations (Saldanha), Western Cape	Tronox Namakwa Sands	Project Manager
Compliance Auditing of the Waste Management Licence for the PetroSA Landfill Site at the GTL Refinery, Western Cape	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
Waste Licence Application for the Rare Earth Separation Plant in Vredendal, Western Cape	Rareco	Project Manager & EAP

WULA for the Expansion of the Landfill site at Exxaro's Namakwa Sands Mineral Separation Plant, Western Cape	Exxaro Resources	Project Manager & EAP
S24G & WML for an Aluminium Plant, Gauteng	GfE-MIR Alloys & Minerals	Project Manager & EAP

INFRASTRUCTURE DEVELOPMENT PROJECTS (BRIDGES, PIPELINES, ROADS, WATER RESOURCES, STORAGE, ETC)

Environmental Impact Assessments and Environmental Management Programmes

Project Name & Location	Client Name	Role
Bridge across the Ngotwane River, on the border of South Africa and Botswana	Eskom Holdings	Project Manager & EAP
Chemical Storage Tanks, Metallurgical Plant Upgrade & Backfill Plant upgrade at South Deep Gold Mine, near Westornaria, Gauteng	Goldfields	Project Manager & EAP
Expansion of the existing Welgedacht Water Care Works, Gauteng	ERWAT	Project Manager & EAP
Golden Valley WEF Access Road near Cookhouse, Eastern Cape	BioTherm Energy	Project Manager & EAP
Great Fish River Wind Farm Access Roads and Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Ilanga CSP Facility Watercourse Crossings near Upington, Northern Cape	Karoshoek Solar one	Project Manager & EAP
Modification of the existing Hartebeestfontein Water Care Works, Gautng	ERWAT	Project Manager & EAP
N10 Road Realignment for the Ilanga CSP Facility, East of Upington, Northern Cape	SANRAL	Project Manager & EAP
Nxuba (Bedford) Wind Farm Watercourse Crossings near Cookhouse, Eastern Cape	African Clean Energy Developments (ACED)	Project Manager & EAP
Pollution Control Dams at the Medupi Power Station Ash Dump & Coal Stockyard, Limpopo	Eskom	Project Manager & EAP
Qoboshane borrow pits (EMPr only), Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Tsitsikamma Community WEF Watercourse Crossings, Eastern Cape	Cennergi	Project Manager & EAP
Clayville Central Steam Plant, Gauteng	Bellmall Energy	Project Manager & EAP
Msenge Emoyeni Wind Farm Watercourse Crossings and Roads, Eastern Cape	Windlab	Project Manager & EAP

Basic Assessments

Project Name & Location	Client Name	Role
Harmony Gold WWTW at Doornkop Mine, Gauteng	Harmony Doornkop Plant	Project Manager & EAP
Ofir-ZX Watercourse Crossing for the Solar PV Facility, near Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Qoboshane bridge & access roads, Eastern Cape	Emalahleni Local Municipality	Project Manager & EAP
Relocation of the Assay Laboratory near Carletonville, Gauteng	Sibanye Gold	Project Manager & EAP
Richards Bay Harbour Staging Area, KwaZulu-Natal	Eskom Holdings	Project Manager & EAP
S-Kol Watercourse Crossing for the Solar PV Facility, East of Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP
Sonnenberg Watercourse Crossing for the Solar PV Facility, West Keimoes, Northern Cape	Networx S28 Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP
Masetjaba Water Reservoir, Pump Station and Bulk Supply Pipeline near Nigel, Gauteng	Naidu Consulting Engineers	Project Manager & EAP
Access Road for the Dwarsug Wind Farm, Northern Cape Province	South Africa Mainsteam Renewable Power	Project Manager & EAP

Screening Studies

Project Name & Location	Client Name	Role
Roodepoort Open Space Optimisation Programme (OSOP) Precinct, Gauteng	TIMAC Engineering Projects	Project Manager & EAP
Vegetable Oil Plant and Associated Pipeline, Kwa-Zulu Natal	Wilmar Oils and Fats Africa	Project Manager & EAP

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
ECO and bi-monthly auditing for the construction of the Olifants River Water Resources Development Project (ORWRDP) Phase 2A: De Hoop Dam, R555 realignment and housing infrastructure	Department of Water and Sanitation	Project Manager Auditor
ECO for the Rehabilitation of the Blaaupan & Storm Water Channel, Gauteng	Airports Company of South Africa (ACSA)	Project Manager
Due Diligence reporting for the Better Fuel Pyrolysis Facility, Gauteng	Better Fuels	Project Manager
ECO for the Construction of the Water Pipeline from Kendal Power Station to Kendal Pump Station, Mpumalanga	Transnet	Project Manager
ECO for the Replacement of Low-Level Bridge, Demolition and Removal of Artificial Pong, and Reinforcement the Banks of the Crocodile River at the Construction at Walter Sisulu National Botanical Gardens, Gauteng Province	South African National Biodiversity Institute (SANBI)	Project Manager
External Compliance Audit of the Air Emission Licence (AEL) for a depot in Bloemfontein, Free State Province and in Tzaneen, Mpumalanga Province	PetroSA	Project Manager

Environmental Permitting, S53, Water Use Licence (WUL), Waste Management Licence (WML) & Other Applications

Project Name & Location	Client Name	Role
WULA for the Izubulo Private Nature Reserve, Limpopo	Kjell Bismeyer, Jann Bader, Laurence Saad	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Environmental Advisor
WULA for the Ezulwini Private Nature Reserve, Limpopo	Ezulwini Investments	Project Manager & EAP
WULA for the Masodini Private Game Lode, Limpopo	Masodini Private Game Lodge	Project Manager & EAP
WULA for the N10 Realignment at the Ilanga SEF, Northern Cape	Karoshoek Solar One	Project Manager & EAP
WULA for the Kruisvallei Hydroelectric Power Generation Scheme, Free State	Building Energy	Project Manager & EAP

Project Name & Location	Client Name	Role
S24G and WULA for the Ilegal construction of structures within a watercourse on EFF 24 Ruimsig Agricultural Holdings, Gauteng	Sorror Language Services	Project Manager & EAP

HOUSING AND URBAN PROJECTS

Basic Assessments

Project Name & Location	Client Name	Role
Postmasburg Housing Development, Northern Cape	Transnet	Project Manager & EAP

Compliance Advice and reporting

Project Name & Location	Client Name	Role
Kampi ya Thude at the Olifants West Game Reserve, Limpopo	Nick Elliot	Environmental Advisor
External Compliance Audit of WUL for the Johannesburg Country Club, Gauteng	Johannesburg Country Club	Project Manager

Environmental Compliance, Auditing and ECO

Project Name & Location	Client Name	Role
Due Diligence Audit for the Due Diligence Audit Report, Gauteng	Delta BEC (on behalf of Johannesburg Development Agency (JDA))	Project Manager

ENVIRONMENTAL MANAGEMENT TOOLS

Project Name & Location	Client Name	Role
Development of the 3rd Edition Environmental Implementation Plan (EIP)	Gauteng Department of Agriculture and Rural Development (GDARD)	Project Manager & EAP
Development of Provincial Guidelines on 4x4 routes, Western Cape	Western Cape Department of Environmental Affairs and Development Planning	EAP
Compilation of Construction and Operation EMP for the Braamhoek Transmission Integration Project, Kwazulu-Natal	Eskom Holdings	Project Manager & EAP
Compilation of EMP for the Wholesale Trade of Petroleum Products, Gauteng	Munaca Technologies	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for Medupi Power Station, Limpopo	Eskom Holdings	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Dube TradePort Site Wide Precinct	Dube TradePort Corporation	Project Manager & EAP
Operational Environmental Management Programme (OEMP) for the Kusile Power Station, Mpumalanga	Eskom Holdings	Project Manager & EAP
Review of Basic Assessment Process for the Wittekleibosch Wind Monitoring Mast, Eastern Cape	Exxaro Resources	Project Manager & EAP
Revision of the EMPr for the Sirius Solar PV	Aurora Power Solutions	Project Manager & EAP

Project Name & Location	Client Name	Role
State of the Environment (SoE) for Emalahleni Local Municipality, Mpumalanga	Simo Consulting on behalf of Emalahleni Local Municipality	Project Manager & EAP
Aspects and Impacts Register for Salberg Concrete Products operations	Salberg Concrete Products	EAP
First State of Waste Report for South Africa	Golder on behalf of the Department of Environmental Affairs	Project Manager & EAP
Responsibilities Matrix and Gap Analysis for the Kruisvallei Hydroelectric Power Generation Scheme, Free State Province	Building Energy	Project Manager
Responsibilities Matrix and Gap Analysis for the Roggeveld Wind Farm, Northern & Western Cape Provinces	Building Energy	Project Manager

PROJECTS OUTSIDE OF SOUTH AFRICA

Project Name & Location	Client Name	Role
Advisory Services for the Zizabona Transmission Project, Zambia, Zimbabwe, Botswana & Namibia	PHD Capital	Advisor
EIA for the Semonkong WEF, Lesotho	MOSCET	Project Manager & EAP
EMP for the Kuvaninga Energia Gas Fired Power Project, Mozambique	ADC (Pty) Ltd	Project Manager & EAP
Environmental Screening Report for the SEF near Thabana Morena, Lesotho	Building Energy	EAP
EPBs for the Kawambwa, Mansa, Mwense and Nchelenge SEFs in Luapula Province, Zambia	Building Energy	Project Manager & EAP
ESG Due Diligence for the Hilton Garden Inn Development in Windhoek, Namibia	Vatange Capital	Project Manager
Mandahill Mall Rooftop PV SEF EPB, Lusaka, Zambia	Building Energy	Project Manager & EAP
Monthly ECO for the PV Power Plant for the Mocuba Power Station	Scatec	Project Manager