

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

PROPOSED KATHU SOLAR PV AUGMENTATION FACILITY ON THE FARM KATHU NO. 465 WITHIN GAMAGARA LOCAL MUNICIPALITY, NORTHERN CAPE PROVINCE

Kathu Solar Park (RF) Pty Ltd

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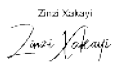
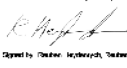
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Appendix 4 of the National Environmental Management Act, No. 107 of 1998 (NEMA) Environmental Impact Assessment (EIA) Regulations of 2014 specifies the requirements of an Environmental Management Programme (EMPr). The table below serves as a map of how the requirements detailed in Appendix 4 have been adhered to.

Requirement	Reference
Details of the EAP who prepared the EMPr and the expertise of the EAP, including a CV.	Section 1.5 and Appendix A
A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.	Section 1 and Section 2
A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.	Figure 2-1, Figure 2-4 and Appendix B
A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed, and mitigated as identified through the environmental impact assessment process for all phases of the development including: (i) Planning and design (ii) Pre-construction activities (iii) Construction activities (iv) rehabilitation of the environment after construction and where applicable post closure (v) where relevant, operation activities	Section 5 through 8
A description of proposed impact management actions, identifying the manner in which the impact management outcomes will be achieved, and must, where applicable, include actions to: (i) avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation (ii) comply with any prescribed environmental management standards or practices (iii) comply with any applicable provisions of the Act regarding closure, where applicable (iv) comply with any provisions of the Act regarding financial provision for rehabilitation, where applicable	Section 5 through 8
The method of monitoring the implementation of the impact management actions.	Section 5 through 8
The frequency of monitoring the implementation of the impact management actions.	Section 5 through 8
An indication of the persons who will be responsible for the implementation of the impact management actions.	Section 4 and 5 through 9
The time periods within which the impact management actions must be implemented.	Section 5 through 8
The mechanism for monitoring compliance with the impact management actions.	Section 4 and 5 through 9
A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations.	Section 4
An environmental awareness plan describing the manner in which: (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment	Section 4.5.1
Any specific information that may be required by the competent authority.	Relevant sections as required by Environmental Authorisation

ABBREVIATIONS

AC	Alternating Current
AfDB	African Development Bank Group
AIP	Alien and Invasive Plants
BA	Basic Assessment
BAR	Basic Assessment Report
CA	Competent Authority
CAA	Civil Aviation Authority
CBA	Critical Biodiversity Area
CMA	Catchment Management Agency
CSP	Concentrated Solar Power
CV	Curricula vitae
DC	Direct Current
DFFE	National Department of Forestry, Fisheries and the Environment
DAEARD&LR	Northern Cape Department of Agriculture, Environmental Affairs, Rural Development, and Land Reform
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEA&DP	Department of Environmental Affairs and Development Planning
DHSWS	Regional Department of Human Settlement, Water and Sanitation
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act, No. 73 of 1989
ECO	Environmental Compliance Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMF	Environmental Management Framework
EMI	Electromagnetic interference
EMPr	Environmental Management Programme
EO	Environmental Officer
ESA	Environmental Site Agent
ESIA	Environmental and Social Impact Assessment
FPO	Fire Protection Officers
FPA	Fire Protection Association
GG	Government Gazette
GIS	Geographic Information Systems
GN	Government Notice
Ha	Hectares
HIA	Heritage Impact Assessment
IDP	Integrated Development Plan
IFC	International Finance Corporation
IPP	Independent Power Producer
IRP	Integrated Resource Plan
ISO	International Organisation for Standardization
KFNR	Kathu Forest Nature Reserve
KM	Kilometre
KSP	Kathu Solar Park
kV	Kilo Volt
LED	Light Emitting Diode
MPRDA	Mineral and Petroleum Resources Development Act, No. 28 of 2002
MV	Medium Voltage
MW	Mega Watts
NCNCA	Northern Cape Nature Conservation Act, No. 9 of 2009
NCPHRA	Northern Cape Provincial Heritage Resources Agency
NCR	Noise Control Regulations
NEMA	National Environmental Management Act, No. 107 of 1998
NEM: AQA	National Environmental Management: Air Quality Act, No. 39 of 2004
NEM:BA	National Environmental Management: Biodiversity Act, No. 10 of 2004
NEM:PAA	National Environmental Management: Protected Areas Act, No. 57 of 2003

NEM:WA	National Environmental Management: Waste Act, No. 59 of 2008
NPAES	National Protected Areas Expansion Strategy (2008)
NERSA	National Energy Regulator of South Africa
NFA	National Forests Act, No. 84 of 1998
NHRA	National Heritage Resources Act, No. 25 of 1999
NHRTA	National Road Traffic Act, No. 93 of 1996
NWA	National Water Act, No. 36 of 1998
OHL	Overhead Transmission Line
PPA	Power Purchase Agreement
PPE	Personal protective equipment
PPP	Public Participation Process
PSDF	Provincial Spatial Development Framework
PV	Photovoltaic
PTS	Power Transformers Stations
REDZ	Renewable Energy Development Zones
RFI	Radio Frequency Interference
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SALA	Subdivision of Agricultural Land Act, No. 70 of 1970
SANRAL	South African National Road Agency
SANS	South Africa National Standards
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SKA	Square Kilometre Array
SOIC	Sishen Iron Ore Company
SPA	Solar PV Augmentation
spp	Species
STC	Strategic Transmission Corridor
SWMP	Stormwater Management Plan
SWSA	Strategic Water Source Area
ToR	Terms of Reference
VIA	Visual Impact Assessment
WUL	Water Use Licence
WULA	Water Use License Application
ZUTARI	Zutari (Pty) Ltd

1 PROJECT OVERVIEW AND INTRODUCTION

This chapter provides a general overview of this Environmental Management Programme (EMPr) and a summary of the purpose of the document and its structure. Relevant legislation pertaining to this document is also briefly discussed.

1.1 INTRODUCTION

Kathu Solar Park (rf) Pty Ltd (henceforth KSP) appointed Zutari (PTY) Ltd (henceforth Zutari) as the independent Environmental Assessment Practitioner (EAP) to undertake the application for Environmental Authorisation (EA) in terms of the National Environmental Management Act, No. 107 of 1998 (NEMA) and its Environmental Impact Assessment (EIA) Regulations of 2014 (General Notice (GN) R982 of 2014) for authorisation of a proposed solar photovoltaic (PV) facility at the existing KSP, with a design capacity of up to 12 MW.

In 2011, WSP Environment and Energy obtained an EA for the KSP Concentrated Solar Power (CSP) facility. This facility is located 10 km from the town of Kathu on the farm Kathu 465 and lies within the Gamagara Local Municipality and the John Taolo Gaetsewe District Municipality, in the Northern Cape. The CSP (**EA: 12/12/20/1994**) and associated transmission lines (**EA: 14/12/16/3/3/1/1406**) were authorised on 3 November 2011 and 5 October 2015, respectively. The plant was developed and constructed as part of round 3.5 of the Renewable Energy Independent Power Producer Procurement Program (REIPPPP). The plant reached Commercial Operation Date on 30 January 2019 and has been operating for four years. The project also received a Water Use License (WUL) on 18 December 2015 (**ref: 10/D41J/CGHI/4002**) and an amendment of the WUL on 11 October 2017 (**ref: 10/D41J/CGHI/4002**).

In a CSP system, the plant's auxiliary loads are supplied using the generated solar energy during production hours, known as online consumption (also referred to as self-consumption or parasitic consumption). During non-production hours and ramp-up periods, the auxiliary loads are supplied by Eskom from the grid, known as offline consumption. KSP intends to implement an on-site solar PV plant to supplement the energy requirements of the auxiliary loads, referred to as Solar PV Augmentation (SPA). The major benefit of such a system is the reduction of offline and online auxiliary power consumption, thus increasing revenue generation, cost savings from Eskom electricity imports and reducing the demand on Eskom's already strained generation capacity.

Zutari was appointed to undertake the application for EA for the Kathu SPA. The project is situated within the Northern Strategic Transmission Corridor (STC) (refer to **Figure 2-2**), which requires an application for the transmission lines to undergo an expedited Basic Assessment (BA) process, provided for in Government Notice (GN) 145 of 2021 (GN145/2021). However, this application was specifically for the SPA and associated infrastructure. The SPA is not within a Renewable Energy Development Zone (REDZ). The project triggers listed activities in Listing Notice 1 (GN 983 of 2014) of the NEMA EIA Regulations of 2014. Consequently, a BA process required by Regulation 20(1) of the EIA Regulations of 2014 (GN R982 of 2014) was needed. **The EA application does not include transmission lines.** The DFFE issued an EA (ref. 14/12/16/3/3/1/2985) for the project on 3 September 2024.

The EA states that the EMPr submitted with the final BAR is not approved. The specific EA conditions that are addressed by this final EMPr are the following:

- 13. *"The final layout map attached as Annexure: H and the final Environmental Management Programme (EMPr), attached as Annexure F: Environmental Management Programme submitted with the final BAR dated 09 July 2024 is **not** approved."*
- 14. *"A copy of the final layout map must be submitted to the Northern Cape: Department of Agriculture, Environmental Affairs, Rural Development and Land Reform. SANParks, the Department of Forestry, Fisheries and Environment: Forest Resource Protection, the Department of Forestry, Fisheries and*

Environment: Biodiversity and Conservation as well as the Department of Forestry, Fisheries and Environment: Integrated Environmental Authorisations and **all** registered Interested and Affected Parties for review and comment. The holder of this authorisation must consider such comments. Once amended, the final layout map must be submitted to the Department for written approval prior to commencement of the activity. All available biodiversity information must be used in the finalisation of the layout map. Existing infrastructure must be used as far as possible, e.g. roads. The final layout map must be informed with input from Department of Forestry, Fisheries and Environment: Forest Resource Protection, the Management Authority for Kathu Forest Nature Reserve and the Northern Cape: Department of Agriculture, Environmental Affairs, Rural Development and Land Reform. The final layout plan must include the following”:

- “14.1 Buffer areas around Kathu Forest Nature Reserve (KFNR) as per Norms and Standards for the Management of protected Areas in South Africa (GG no. 39878 of 31 March 2016, Government Notice No. 382) published in terms of the NEMPAA”;
- 14.2 All sensitive features (e.g., Critical Biodiversity Areas, Protected Areas, Nature Reserves, National Parks, Ecological Support Areas, Heritage Sites, wetlands, pans, and drainage channels) that will be affected by the proposed development and associated infrastructure.
- 14.3 All existing infrastructure on the site.
- 14.4 Laydown areas.
- 14.5 Soil heaps.
- 14.6 Buildings, including accommodation.
- 14.7 All "no-go" areas.
- 15. “The Environmental Management Programme (EMPr) submitted as part of the BAR is not approved and must be amended to include measures as dictated by the final layout map and micro-siting, and the provisions of this environmental authorisation. The EMPr must be made available for comments by registered Interested and Affected Parties, and the holder of this environmental authorisation must consider such comments. Once amended, the final EMPr must be submitted to the Department for written approval prior to commencement of the activity. Once approved, the EMPr must be implemented and adhered to”.
- 16. “The EMPr amendment must include the following:
 - 16.1. The Kathu Forest Nature Reserve Management Plan approved by the Minister or MEC.
 - 16.2. The requirements and conditions of this authorisation.
 - 16.3. All recommendations and mitigation measures recorded in the final BAR.
 - 16.4. All mitigation measures as listed in the specialist reports must be included in the EMPr and implemented.
 - 16.5. The final layout map.
 - 16.6. An alien invasive management plan to be implemented during construction and operation of the proposed development. The plan must include mitigation measures to reduce the invasion of alien species and ensure continuous monitoring and removal of alien species.
 - 16.7. A re-vegetation and habitat rehabilitation plan to be implemented during the construction and operation of the proposed development. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up recovery to natural habitats.
 - 16.8. An environmental sensitivity map indicating environmentally sensitive areas and features identified during the BAR process and the offset process.
- 16.9. A map combining the final layout map superimposed (overlain) on the environmental sensitivity map”.

1.2 PURPOSE OF THIS EMPR

The purpose of this document is to provide environmental management practices and recommendations to ensure that the known and possible unknown impacts associated with the Kathu SPA facility and associated infrastructure are avoided, managed, mitigated, and kept to acceptable levels. In this case acceptable level would mean adhering to a prescribed tool(s), strategy, procedure(s) or method(s) designed to reduce the impact significance and mitigate adverse environmental impacts. The recommendations included herein are applicable to the following stages of the proposed development:

- ▶ Planning and design;
- ▶ Pre-construction and construction;
- ▶ Operation; and
- ▶ Closure and decommissioning.

A PV facility with an anticipated life span in the order of 15 - 20 years is being proposed. Therefore, it is possible that the facility could be decommissioned in future to make the land available for a different land use (should other options for continuation not be feasible). Thus, the decommissioning scenario for the facility is described in this EMPr.

This EMPr aims for alignment and optimisation of environmental management processes with the conditions of EA that may arise. Any conditions of authorisation contained in the EA that contradict the recommendations made in this EMPr, will supersede the recommendations of this document. The EMPr must be updated to address conditions of the EA that are relevant to environmental management (should this be a condition of authorisation).

A hard copy of the EMPr must always be in the site office and made available to government officials upon request.

1.3 LEGAL REQUIREMENTS OF AN EMPR

The content of EMPrs must meet the requirements in Section 24N (2) and (3) of NEMA and Appendix 4 of the NEMA EIA Regulations of 2014. Appendix 4 of the EIA regulations specify the required contents of an EMPr.

The Department of Environmental Affairs & Development Planning (DEA&DP)'s¹ Guideline for Environmental Management Plans (2005) aims to inform and guide the preparation and implementation of EMPrs. The conditions of the guideline and requirements specified in Appendix 4 of the EIA Regulations of 2014 have been considered in compiling this document. The DEA&DP guideline defines an EMPr 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; and that the positive benefits of the project are enhanced”.

The EMPr must address the potential environmental impacts of the proposed activity on the environment throughout the project life cycle, including an assessment of the effectiveness of monitoring and management arrangements after implementation. EMPrs must be submitted together with the Environmental Impact Report (EIR) so that they can be considered simultaneously.

Section 24N (2) and (3) of the NEMA lists the requirements of an EMPr presented in Table 1-1.

¹ The DEA&DP's guideline is used even though the proposed project is based in the Northern Cape Province, as there is no national EMPr guideline.

Table 1-1: Requirements of an EMPr according to Section 24N (2) and (3) of the NEMA

- 24N. (2) *the environmental management programme must contain-*
- (a) *information on any proposed management, mitigation, protection or remedial measures that will be undertaken to address the environmental impacts that have been identified in a report contemplated in subsection 24(1A), including environmental impacts or objectives in respect of –*
 - i) *planning and design.*
 - ii) *pre-construction and construction activities.*
 - iii) *the operation or undertaking of the activity in question.*
 - iv) *the rehabilitation of the environment; and*
 - v) *closure, where relevant.*
 - (b) *details of –*
 - (i) *the person who prepared the environmental management programme; and*
 - (ii) *the expertise of that person to prepare an environmental management programme*
 - (c) *a detailed description of the aspects of the activity that are covered by the draft environmental management plan.*
 - (d) *information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a).*
 - (e) *information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on compliance.*
 - (f) *as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of any listed activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and*
 - (g) *a description of the manner in which it intends to-*
 - (i) *modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation.*
 - (ii) *remedy the cause of pollution or degradation and mitigation of pollutants; and*
 - (iii) *comply with any prescribed environmental management standards or practices.*
- (3) *the environmental management programme must, where appropriate-*
- (a) *set out time periods within which the measures contemplated in the environmental management programme must be implemented.*
 - (b) *contain measures regulating responsibilities for any environmental damage, pollution, pumping and treatment of extraneous water or ecological degradation as a result of prospecting or mining operations or related mining activities which may occur inside and outside the boundaries of the prospecting area or mining area in question; and*
 - (c) *develop an environmental awareness plan describing the manner in which-*
 - (i) *the applicant intends to inform his or her employees of any environmental risk which may result from their work; and*
 - (ii) *risks must be dealt with in order to avoid pollution or the degradation of the environment.*

1.4 STRUCTURE OF THE EMPR

The EMPr has been structured to include the following sections to address environmental management throughout the project life cycle:

- **Chapter 1:** Project overview and introduction
- **Chapter 2:** Project background
- **Chapter 3:** Legal framework
- **Chapter 4:** Roles and responsibilities
- **Chapter 5:** Summary of impacts and mitigation measures of the project
- **Chapter 6:** Specialist impacts and mitigation measures
- **Chapter 7:** Operational mitigation measures
- **Chapter 8:** Decommissioning phase
- **Chapter 9:** Non-compliance and penalties
- **Chapter 9:** Conclusions and way forward

1.5 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER AND ENVIRONMENTAL TEAM

Section 33 of EIA Regulations and Section 24N (2) and (3) of the NEMA requires that an EMPr must include the details of the person(s) who prepared the EMPr, and the expertise of that person to prepare an EMPr. A synopsis of the experience of Zutari's Environmental Assessment team for this project is provided hereunder. Full Curricula Vitae (CVs) are available in **Appendix A**.

REUBEN HEYDENRYCH is employed as an environmental assessment practitioner at Zutari. He has around 30 years' experience in the project management of various small and large-scale infrastructural and environmental projects.

He has been involved in EIA and planning processes in South Africa, Botswana, Kenya, Lesotho, Mozambique, Namibia, Nigeria, Rwanda, Tanzania, Uganda, Zambia, Zimbabwe, Zambia and Antarctica, as required by relevant national legislation, financial institution performance standards and in terms of international requirements as EIA team leader and team member. These projects have included environmental assessments for projects as diverse as fuel storage facilities, mines, industrial developments, telecommunications, power generation (solar, wind, hydro, coal and nuclear), power transmission/distribution, water and sewage infrastructure, transport (airports, rail and roads), residential developments and game lodges. Many of these were completed to lender safeguard requirements, including the European Investment Bank, International Finance Corporation (IFC), African Development Bank Group (AfDB) and Equator Principles.

Reuben also has experience in environmental advisory services and strategic environmental management, including strategic environmental assessments (SEAs), environmental scans, environmental feasibility studies and environmental management frameworks (EMFs); environmental management programmes (EMPRs) for construction and operation and environmental auditing, due diligence assessments, International Organisation for Standardization (ISO) 14001 systems development and auditing, legal compliance and waste and water use license audits.

He is registered with the Environmental Assessment Practitioners' Association of South Africa (EAPASA) (**registration no. 2021/3897**).

NATANYA WHITEHORN is as an environmental assessment practitioner (EAP) at Zutari. She specialises in environmental auditing and her expertise consists of risk assessment, environmental monitoring and social impact assessments (SIAs), including the study of human interaction with one another and the natural environment. She has experience in fieldwork for impact assessments, environmental monitoring as well as the public participation process (PPP), where, she has facilitated and translated at various landowner, stakeholder and public meetings and also gained experience in environmental compliance monitoring by working on a large construction project. Further significant experience includes her role as Project Manager (Environmental Lead) on various integrated environmental management (IEM) processes such as environmental impact assessments (EIAs), BARs and the development of environmental management plans (EMPs).

She has previous working experience in geo-informatics and geographic information systems (GIS). She has more than a decade of experience working with GIS, which she has gained whilst working on projects for the government, local authorities as well as the private sector. She has also gained skills in spatial representation and interpretation through her involvement in the engineering environment. Natanya has specialised in spatial analysis, data processing and mapping while her technical responsibilities include inter alia the evaluation of data, digitising, editing and converting spatial data and non-spatial data from various formats and manipulating data in Esri ArcMap with extension (XTools, ET Geowizards, ET Geotools), ArcView 3.2 and Planet GIS. She

has research experience on biodiversity, natural resources management, and human developmental issues and tutoring experience at a tertiary institution in the field of Information Science (IS).

Natanya obtained a Bachelor's degree (Honours) in Geography, majoring in Geo-Informatics and Strategic Environmental Planning, from the University of Johannesburg, South Africa, in 2002. She has also completed a South African Auditor and Training Certification Authority (SAATCA) Certified ISO 14001 Lead Auditors Course. She is a member of the International Association for Impact Assessment South Africa (IAIAsa) as well as the Geo-Information Society of South Africa (GISSA).

She is registered with EAPASA (**registration no. 2019/1526**).

ZINZI PORTIA XAKAYI is a proficient environmental consultant at Zutari with extensive experience in diverse environmental projects. Her responsibilities include the compilation of EMPs, BARs, EIA Reports, Environmental Screening Reports, Part 1 and Part 2 EA amendment applications and conducting Water Use Licence (WUL) applications. With a background in geo-informatics and geographic information systems (GIS), Zinzi brings two years of invaluable experience gained in the private sector. Her specialization in spatial analysis, data processing, and mapping is complemented by technical skills such as data evaluation, digitizing, editing, and converting spatial and non-spatial data using tools like Esri ArcMap, GeoMedia, and QGIS.

Since joining Zutari, Zinzi has played a role in renewable energy projects, contributing to the compilation of BARs, EIAs, EMPs, and conducting Public Participation Processes (PPP). Her expertise extends to feasibility screenings for photovoltaic (solar PV) projects in Limpopo, and she serves as an environmental compliance officer (ECO) for green building projects in Gauteng, where she conducts monthly audits and compiles ECO audit reports.

Furthermore, Zinzi has experience in managing projects, which includes conducting client meetings, meeting with various departments and competent authorities, sourcing information, collaborating with project teams, compiling technical and financial proposals, and preparing reports. She takes an active role in coordinating PPP and engaging with stakeholders.

She is registered as a candidate with the South African Council for Natural Scientific Professions (SACNASP **registration no. 155265**) and is registered as a professional EAP with EAPASA (**registration no. 2022/6136**).

1.6 PROJECT PHASING

From a practical perspective the project lifecycle will likely be phased as follows:

- ▶ Planning and design
- ▶ Pre-Construction
- ▶ Construction
- ▶ Operation
- ▶ Decommissioning

1.6.1 PLANNING AND DESIGN

This phase includes applications for environmental and other relevant authorisations. The planning and design phase investigate the possible impact of the proposed development on the receiving environment and recommend mitigation measures. This phase would have been concluded once the contractor views this document.

1.6.2 PRE-CONSTRUCTION

The pre-construction phase includes activities such as appointment of an Environmental Control Officer (ECO), pre-construction environmental workshop/induction training (conducted by the ECO), site demarcation, establishment of a site camp, demarcation of areas such as fuel storage and plant and animal rescue as well as review and approval of contractor's method statements. Specifications for these activities are included in this EMP. This phase also includes the application processes to obtain permits for e.g., permits required to remove any protected tree(s) or plant/animal species of conservation concern (SCC).

1.6.3 CONSTRUCTION

The construction phase commences with earthworks and all activities relating to the construction of the proposed project e.g., installation of services, construction of the SPA facility, water storage structures, laydown areas as well as associated auxiliary infrastructure.

The typical activities for the construction of a PV facility are as follows:

- ▶ Establishment of access roads: During the construction period internal roads need to be established; however, these roads will only be temporary. Existing roads will be used, where possible.
- ▶ Site preparation: Vegetation would need to be cleared for the footprint of the infrastructure as well as for the access roads to the site/internal roads and the laydown areas, etc. Topsoil stripped from the construction of access roads and infrastructure would need to be stockpiled in the designated areas and used to rehabilitate areas of the construction footprint.
- ▶ Transportation of equipment and components to the site: The main component of the proposed facility would be transported by road to the site. Excavators, graders, trucks and compacting equipment will need to be brought to the site.
- ▶ Establishment of workshops, temporary laydown areas and equipment camps: Once all the equipment has been brought to the site, dedicated laydown and equipment camps will be established. Fuel will most likely be stored on site during construction; appropriate mitigation measures must be employed to ensure no pollution occurs as a result.
- ▶ Construction of the PV array: The foundations for the PV panel array will be excavated. Another option would be to use a ramming system for the support structure which does not require excavation but is dependent on the geotechnical condition of the ground. Concrete and aggregates would need to be brought to the site. Trenches would also need to be excavated for underground connection of the panels to the inverters and subsequently to the CSP switchyard.
- ▶ Site rehabilitation: Removal of all construction equipment from the site and rehabilitation of areas where reasonable and practical.

1.6.4 OPERATION

The operational phase commences when the proposed development is being used for its intended purpose i.e., SPA facility. It is possible that there will be a period in the project life cycle where the construction and operational phase will overlap. This phase will include ongoing operation, monitoring, and maintenance of the SPA facility, and continuing environmental management requirements (e.g., removal of alien and invasive plant (AIP) species).

The proposed project's operational lifespan is estimated at approximately 15 to 20 years. The facility would create a small number of permanent employment opportunities during operation. The typical activities during the operational phase would be as follows:

- ▶ Operation of the electrical infrastructure and PV panels: Incoming solar radiation will be converted by the PV panels into electrical energy; associated inverters will convert this electrical energy into Alternating Current (AC). This AC will be stepped up via transformers and transmitted via transmission

cables to the switchyard at the CSP facility. Electrical and mechanical routine maintenance will also be carried out.

- ▶ Cleaning of PV panels using water: To ensure maximum radiation exposure by the PV panels it is important to undertake periodic cleaning, as dust, dirt, pollen, and bird droppings can reduce the efficiency of PV panels. Panels generally need to be cleaned quarterly, but the frequency depends on weather conditions. Some softeners may be added to the washing water.
- ▶ Site security: Security will be stationed 24 hours a day on the site. The entire development area would be fenced off and security cameras installed.

1.6.5 DECOMMISSIONING

The PV facility's life span is expected to be 15 to 20 years after commissioning. The possibility of upgrading the proposed facility to more advanced technologies, to extend its operational lifespan, would be investigated towards the end of this period. Should the facility undergo expansion or significant upgrading, an EA may be required at that time, in accordance with the prevailing legislation.

Should decommissioning be considered, it would potentially take 6 to 12 months to complete. The impacts of the decommissioning phase generally correlate closely with impacts identified for the construction phase. After disconnecting the PV infrastructure from the electricity network, the PV module components would be removed and recycled or resold as far as possible.

Should the activity ever cease or become redundant, the holder of the authorisation must undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and Competent Authority at that time.

The rehabilitation of the disturbed areas would form part of the decommissioning phase. The aim would be to establish the appropriate conditions required to restore the land as close as possible to its pre-development vegetation conditions or to another suitable use e.g. low intensity grazing by game species. The restoration activities would include the following:

- ▶ Removal of foreign materials and debris;
- ▶ Reshaping of the land to conform with the natural topography, if necessary;
- ▶ Breaking up compaction (ripping / scarifying) where required, loosening the soil and the redistribution of topsoil;
- ▶ Replanting with a suitable indigenous grass seed mix. Alternatively, the total footprint can immediately be reintroduced to game farming;
- ▶ Light irrigation to re-establish a biological soil crust and trigger germination and early growth; and
- ▶ Removal of alien vegetation for a period of no less than 1 year, or as otherwise prescribed by a rehabilitation specialist

2 PROJECT BACKGROUND

2.1 PROJECT LOCATION

The proposed SPA facility is located approximately 7 km northwest of Kathu on the farm Kathu 465, within the Gamagara Local Municipality in the Northern Cape (**Figure 2-1** below). To the north of the property is the T25 gravel road connecting the National Road, N14, with Sesheng in the north. The site is bordered by the Oupos farm to the north, the existing CSP facility to the west, the Kalahari Golf & Jag development to the south, the Sishen airfield to the southwest, and the Kathu Forest Nature Reserve (KFNR) to the east of the site. Furthermore, the project is situated within the Northern STC (**Figure 2-2**). The site belongs to Sishen Iron Ore Company (SIOC) and is currently rented by the project.

The western portion of the Kathu SPA facility is proposed to be situated on an area that was cleared for the construction yard of the CSP plant during its development. Vegetation has since re-grown in this area. This previously cleared segment occupies approximately 16 hectares (ha), while the remaining footprint of approximately 11 ha is on thicket habitat and bushveld to the east of the construction yard. The proposed site spans approximately 27 ha² on land formerly used for small-scale cattle farming before the CSP's development.

² The proposed permit area covers 27 ha, while the original laydown area within the existing CSP permit boundary is approximately 16 ha. This leaves 11 ha of indigenous vegetation to be cleared.

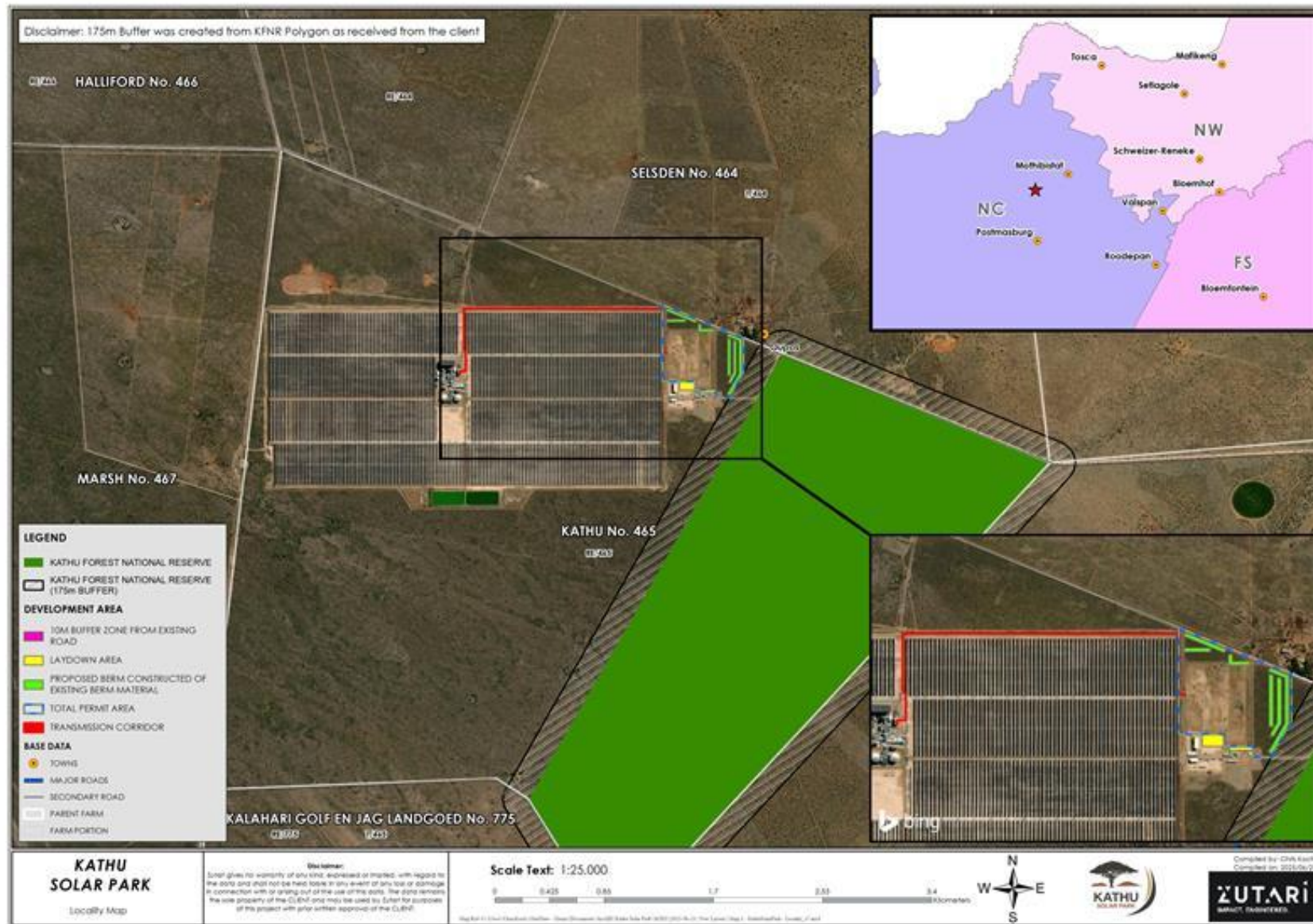


Figure 2-1: Kathu SPA Facility Locality Map.

Table 2-1 below gives a summary of the project's general site information.

Table 2-1: General Site information

Description of affected farm portion	Kathu Farm No. 465
Province	Northern Cape Province
District Municipality	John Taolo Gaetsewe District Municipality
Local Municipality	Gamagara Local Municipality
Ward Number	3
Closest towns	Kathu
21 Digit Surveyor General codes	C04100000000046500000
Type of technology	Solar photovoltaic (PV)
Structure Height	Panels ~2.2 m
Surface area to be covered (Development footprint)	Approximately 27 ha
Structure orientation	The panels will be fixed to a single-axis horizontal tracking structure, such that the orientation of the panels varies according to the time of the day, as the sun moves from east to west, or tilted at a fixed angle equivalent to the latitude at which the site is located.
Laydown area dimensions (EIA footprint)	Up to 2 ha of laydown area for the development of the Kathu SPA facility including the plant and associated infrastructure.
Generation capacity	Up to 12 MW
Current zoning	Industrial Zone 2. A portion of the project footprint is still zoned agriculture.

As seen in Figure 2-2 below, the project is within the Northern strategic transmission corridor.

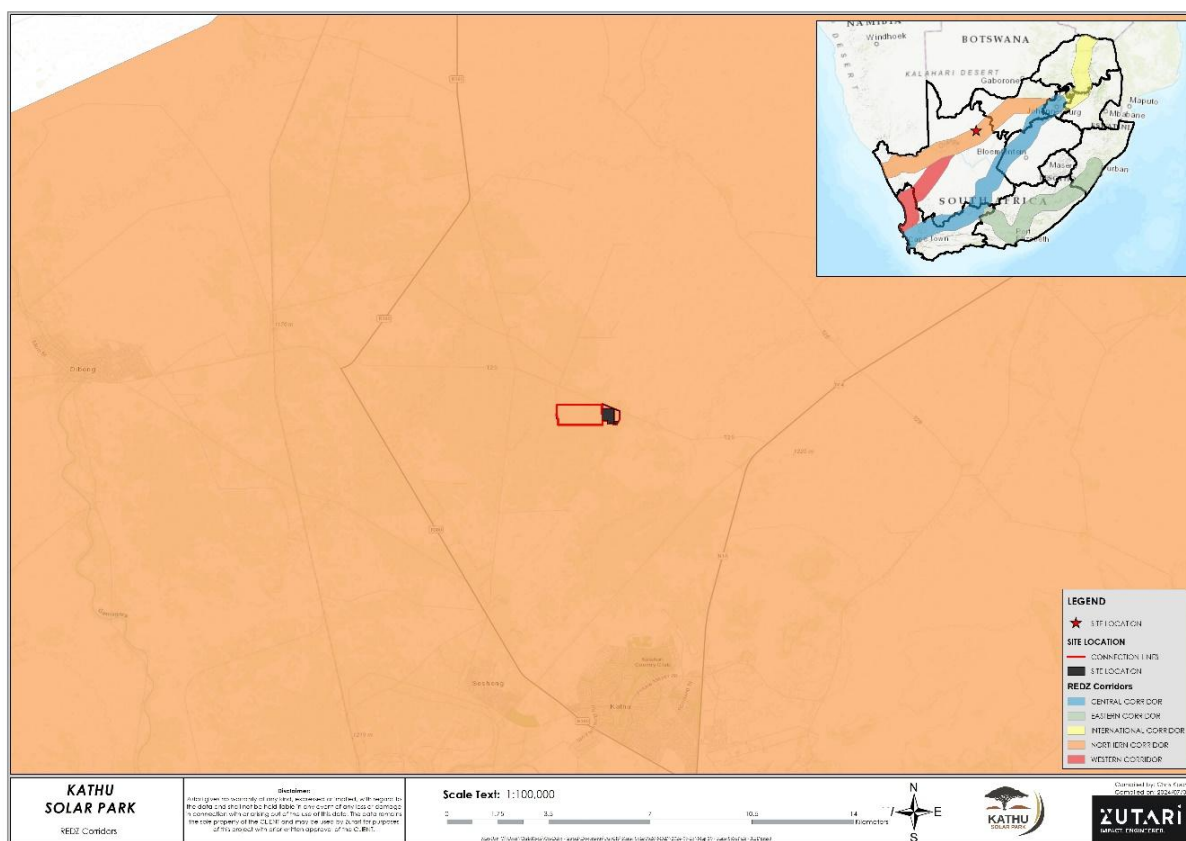


Figure 2-2: REDZ and Transmission Corridors of South Africa (red star shows the Kathu SPA location).

2.2 PROJECT OVERVIEW

PV technology produces direct current (DC), which is converted to AC via power electronic inverters.

Figure 2-3 below provides an overview of a typical solar PV power plant.

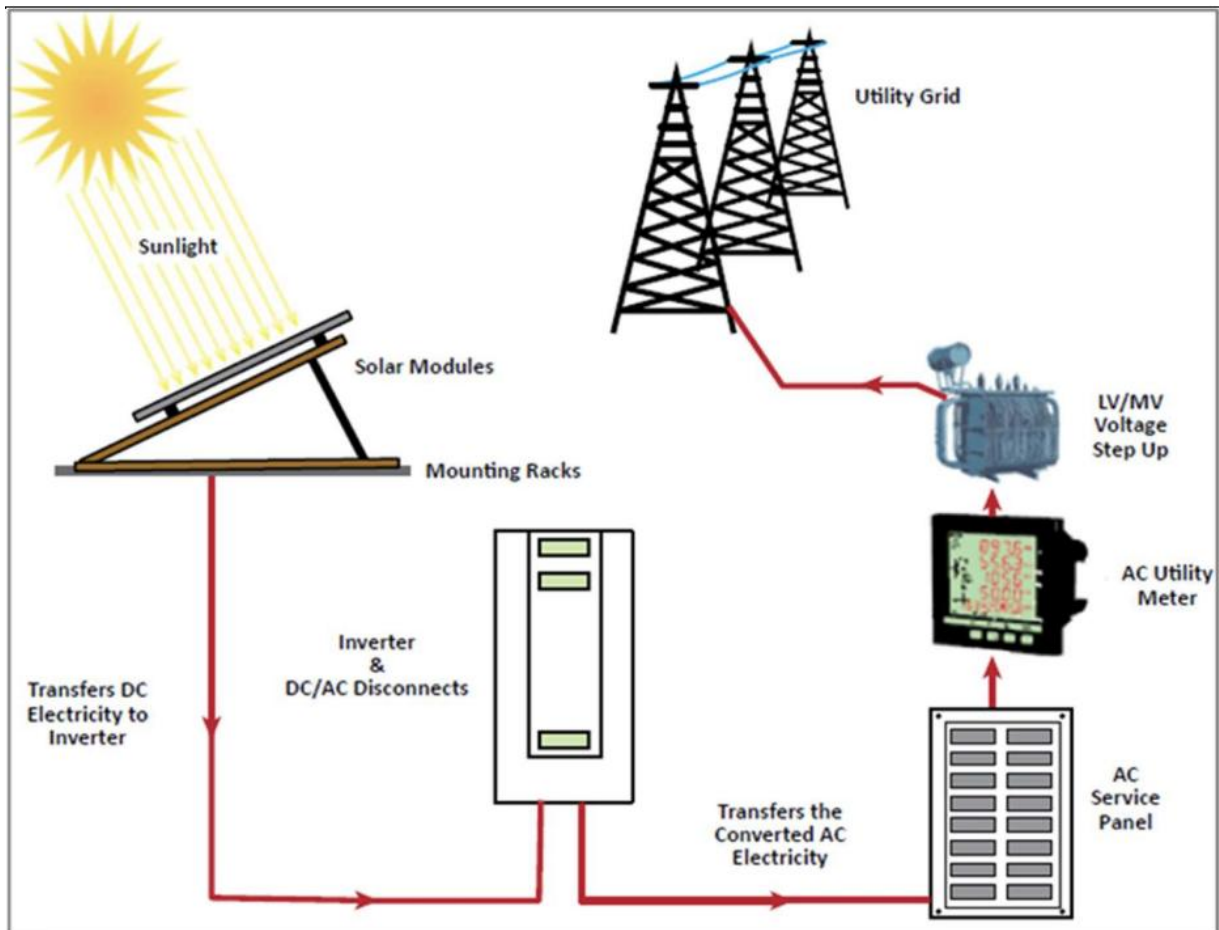


Figure 2-3: Overview of a solar PV power plant

The proposed project consists of the following components (amongst others) (refer to layout provided in **Figure 2-4** below³):

- **PV panel arrays**, which convert incoming sunlight into electrical energy;
- **Mounting structures** to support the PV panels;
- **Perimeter fencing** of the footprint;
- **Power Transformers Stations (PTS)** to step up voltage from inverters;
- **On-site inverters** to connect the Kathu SPA and the CSP;
- **Cabling between the project's components** to be laid underground (where practical, i.e., to connect the PV modules to the inverters, inverters to the PTSSs, and PTSSs to start of the switchyard;
- **Trenched cable using existing cable sleeves** to transmit power from the SPA to the switchyard at the CSP facility. The proposed cable is anticipated to have a maximum voltage of 33 kV;
- **Laydown areas**;
- **A weather station** within the fenced perimeter of the site; and
- **Access roads**: temporary construction access road for the construction period only as well as internal and perimeter access roads for the duration of construction, and for servicing and maintenance during operation.

Already existing structures developed for the CSP facility such as access roads and gates, administration buildings, control room, Medium Voltage (MV) switchboard and guard building will be used for the Kathu SPA facility, where possible.

³ See larger scale plan in Appendix B.

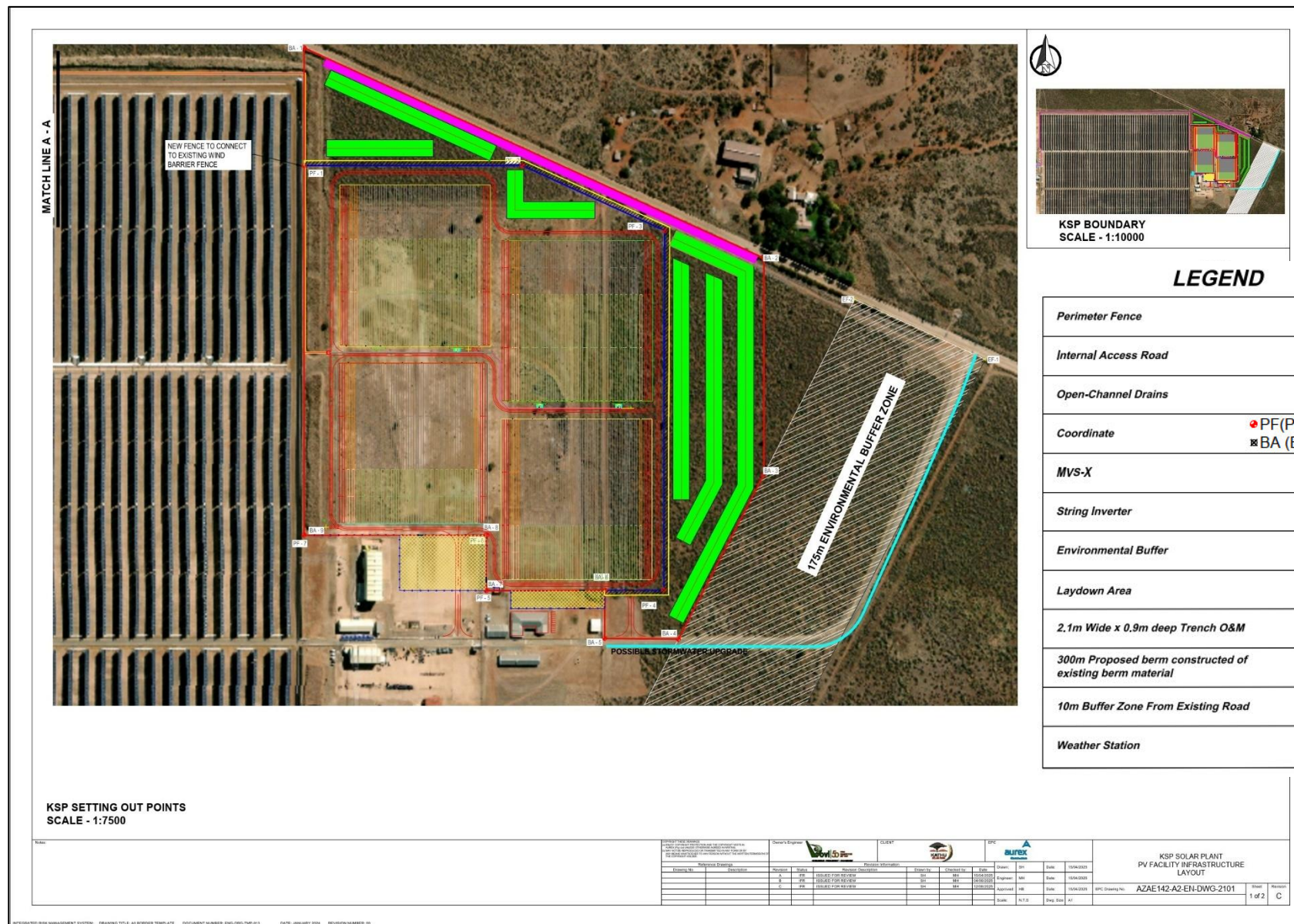


Figure 2-4: Kathu SPA Final Layout

Kathu SPA facility, Revision 2, Date 2025/06/26

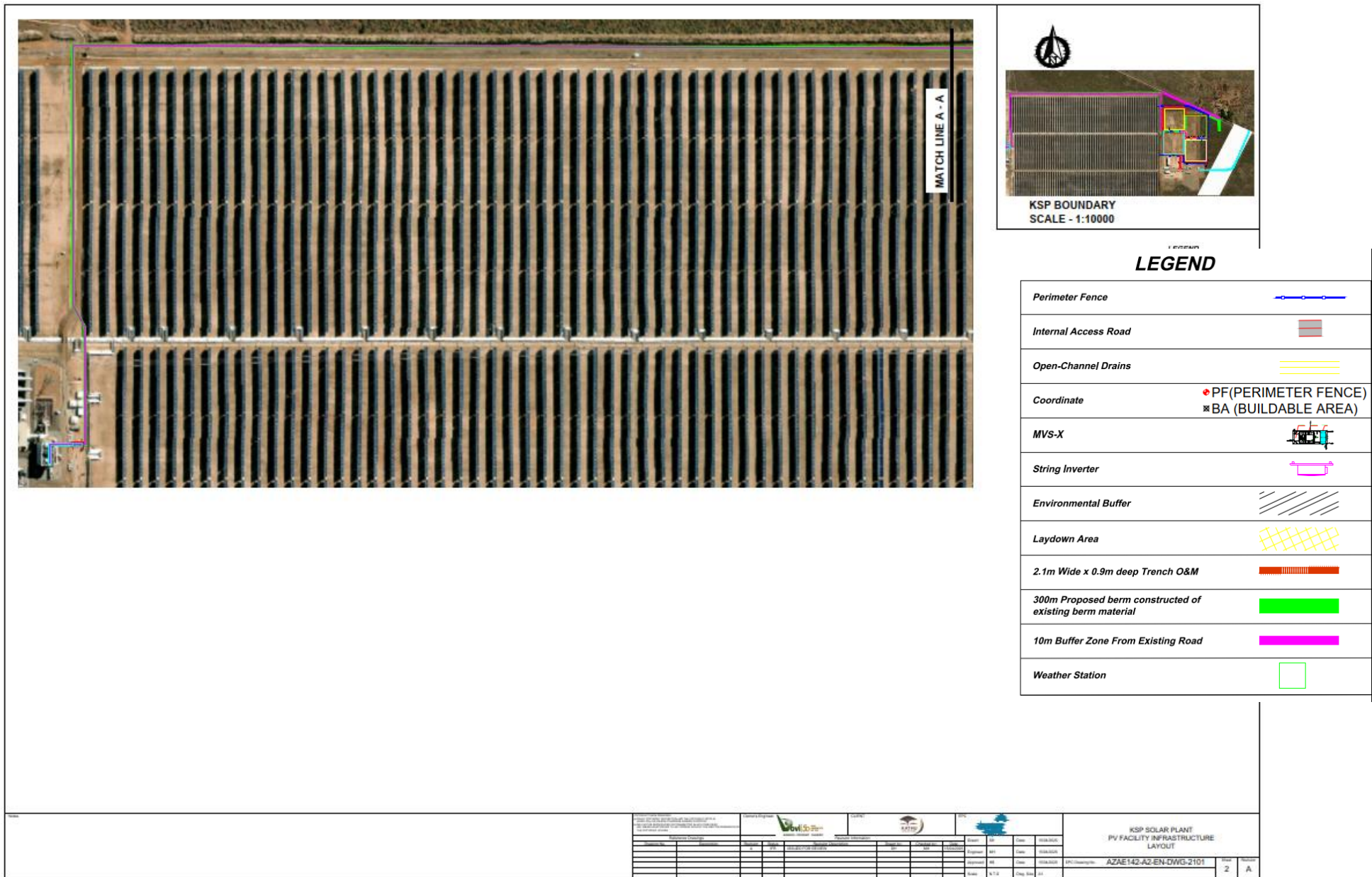


Figure 2-5: Kathu SPA underground cable route between the SPA and the existing CSP

2.3 NEED FOR THE PROJECT

The main need for the proposed SPA is to supplement the energy requirements of the CSP's auxiliary loads. The CSP facility's auxiliary loads are supplied using the generated solar energy during production hours, and during non-production hours and ramp-up periods, the auxiliary loads are supplied by Eskom from the grid. The major benefit of integrating an SPA system is the reduction of offline and online auxiliary power consumption, thus potentially increasing revenue generated under the existing Power Purchase Agreement (PPA), providing cost savings from Eskom electricity imports and reducing the demand on Eskom's already constrained grid. This indirectly contributes to the alleviation of the current energy crisis in South Africa.

The need for renewable energy and reasons for the desirability of solar energy include:

- ▶ Utilising the most abundant renewable energy resource available to South Africa;
- ▶ Meeting nationally appropriate emission targets in line with global climate change commitments under the Paris Accord;
- ▶ Enhancing energy security by diversifying generation; and
- ▶ Creating a more sustainable economy.

Within the local context, the Gamagara Local Municipality Integrated Development Plan (IDP) (2022) identified solar energy initiatives as one of the key drivers of economic growth within the local municipality. The John Taolo Gaetsewe District Municipality IDP (2023) motivates that the district will become self-reliant in the generation of electricity through investment and the exploitation of renewable energy sources. In addition, the development of the Kathu SPA facility project will boost economic development as envisaged by the Northern Cape Provincial Spatial Development Framework (PSDF).

2.4 DESCRIPTION OF THE AFFECTED AREA

The description of the environmental and social baseline has been informed by the specialist studies undertaken during the Environmental and Social Impact Assessment (ESIA) in 2011 and those undertaken to support this BAR application.

2.4.1 SOCIAL BASELINE

The John Taolo Gaetsewe District Municipality is the second smallest district in the Northern Cape, occupying only 7 % of the province (27 498.9 km²) (StatsSA 2016). Administratively, it comprises three Local Municipalities: Gamagara, Ga-Segonyana, and Joe Morolong. The Gamagara Local Municipality, where the proposed project is located, occupies 10 % of the district and experienced the highest population growth rate (3.5 %) between 2011 and 2016. However, it had the lowest average annual economic growth rate (-0.65 %) between 2011 and 2021, despite having the lowest unemployment rate of 27.7 % in 2021, up from 15.8 % in 2011 (John Taolo Gaetsewe District Municipality IDP, 2023).

Kathu is situated in the "Green Kalahari" which stretches from Upington to Dibeng (the "Dry Kalahari" stretches from Dibeng to the Botswana border). There are a number of game farms in the area which are important to the tourism sector. Cattle, goats and mutton sheep are reared, and some citrus is grown in Kathu (Nomad socio-economic consultancy, 2011). The Kathu Camelthorn/*Kameeldoring* Forest is a proclaimed national heritage site, since it constitutes the largest Camelthorn (*Acacia erioloba*) forest in southern Africa.

2.4.2 CLIMATE

Located in a semi-arid part of South Africa, the John Taolo Gaetsewe District Municipality receives between 500 mm annual rainfall in the south-eastern and 200 mm in the north-western part of the district. This is below the generally accepted average of 500 mm per annum for dry land cropping. The already low precipitation is often concentrated in a few downpours, which tend to occur towards the end of the summer season (notably in February) when temperatures and evaporation are high (John Taolo Gaetsewe District Municipality IDP, 2023).

The mean annual minimum/maximum temperatures in the district range between 8°C and 28°C, with the mean annual temperatures ranging between 16°C and 20°C (John Taolo Gaetsewe District Municipality IDP, 2023). As alluded to above, the semi-arid climate is accompanied by high evaporation due to the high summer temperatures, which limits the contribution of precipitation to the water reserves in the area.

2.4.3 BIODIVERSITY

The vegetation of this region is classified as Kathu Bushveld (Mucina and Rutherford, 2006), made up of 'open savanna to dense bush usually with a well-developed tree layer of medium to tall trees (height varies between 4 – 7 m). Vegetation in the study area comprises of 'a mixed *Tarchonanthus camphoratus* - *Senegalia mellifera* - *Vachellia erioloba* woodland. Intensive bush encroachment by *T. camphoratus* and *S. mellifera* occurs in the remaining areas.



Figure 2-6: Typical Kathu Bushveld vegetation - entrance road to the site from the N14.

2.4.4 TOPOGRAPHY

The topography is typical of the Kalahari, with flat to slightly undulating plains. Sporadic hills to the east of the property and the Asbestos Mountains (Kuruman Hills) to the north create some topographical relief. The site itself is regarded as flat with a very slight uphill slope from west to east (0, 45 %), the slope from north to south is virtually 0 % over an approximate distance of 470 m.

2.4.5 SOIL PROFILE

The soils occurring within the development area are present on hard or weathering rock and have minimal soil development. The soils are generally shallow, with depths ranging from 300 to 750 mm (WSP Environmental, 2011).

The soils are dominated by red-yellow, apedal, freely drained sandy soils with a high base status (high levels of Ca, Mg, K and Na). Lime is generally present in part or most of the landscape (Agricultural Geo-Referenced Information System, 2011). Hutton, Clovelly, and Mispah soil forms are expected to dominate within the study area.

2.4.6 HYDROLOGY

Evaporation far exceeds precipitation in this region. This leads to most the catchments, including the KSP study area, being defined as endoreic, where these portions of the catchment do not contribute to the catchment runoff. The rainfall of the area is comprised of less frequent, short duration, high intensity events. As a result, runoff is only produced during the wet season.

2.4.7 GROUNDWATER (ENDEMICVISION, 2024)

The proposed development is located within the Sishen or Kathu (48) groundwater Strategic Water Source Area (SWSA). Groundwater in this area forms a nationally important resource.

3 LEGAL AND PLANNING CONTEXT

There are a host of legal and policy documents and guidelines to consider when undertaking such a project. These have been detailed in the sections that follow.

3.1 RELEVANT LEGISLATION

An overview of the relevant legislation is provided in **Table 3-1** and further detail is provided in subsections to follow.

Table 3-1: Relevant legislation

Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
The Republic of South Africa Constitution Act, No. 108 of 1996 ("the Constitution")	The Constitutional Court	The environmental right contained in Section 24 of the Constitution provides that everyone is entitled to an environment that is not harmful to his or her well-being.
Astronomy Geographic Advantage Act, No. 21 of 2007	Department of Science & Technology transitioning to the Department of Science and Innovation and the Square Kilometre Array (SKA)	Electromagnetic interference (EMI), also called radio-frequency interference (RFI) when in the radio frequency spectrum, is a disturbance generated by an external source that affects an electrical circuit by electromagnetic induction, electrostatic coupling, or conduction. This aspect is of importance to the Radio telescopes associated with the SKA. According to the DFFE Screening Tool, the site has low sensitivity. Consequently, no RFI study has been commissioned.
Aviation Act, No. 74 of 1962	Civil Aviation Authority (CAA)	Tall electrical infrastructure can interfere with radio navigation equipment or present potential physical obstacles. The DFFE Screening tool identifies the area as a medium-sensitivity site from an Aviation perspective (the proposed site is within 8km of a civil aviation aerodrome) and, per the "Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Civil Aviation Installations" (GN 320 of 20 March 2020) a specialist compliance statement is required. As this is an addition to an already existing CSP plant, the EAP does not deem it necessary for any further assessment. No tall new structures that could pose constraints to flight are planned. During the EIA of the CSP plant in June 2011, consultation was conducted with the South African CAA regarding site selection criteria. Kathu Farm 465 was identified by the CAA as the most suitable site based on aviation impact considerations. Additionally, provisional obstacle parameters were provided by the CAA for the height of structures that could be built on the site. The approved heights will not be exceeded for this SPA development.
Conservation of Agricultural Resources Act, No. 43 of 1983 (CARA)	Department of Agriculture, Land Reform and Rural Development (DALRRD)	The purpose of this Act is to ensure that the natural agricultural resources of South Africa are conserved through maintaining the production potential of land, combating, and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants. As such, as part of the BA process, recommendations will be made to ensure that measures are implemented to maintain the agricultural production of land, prevent soil erosion, and protect any water bodies and natural vegetation on site. The 2011 Environmental and Social Impact Assessment (ESIA) report

		for the CSP plant revealed that the land is considered to be non-arable comprising low potential grazing land. As a precautionary measure, the applicant must ensure the control of undesired invasive alien plants listed in the regulation of the Act.
Environmental Conservation Act, No. 73 of 1989 (ECA)	Department of Forestry, Fisheries, and the Environment (DFFE)	Noise impacts associated with solar plants are generally confined to the construction phase and low-level noise “humming” during operation. In terms of section 25 of the ECA, the national Noise Control Regulations (GN R154 in Government Gazette (GG) No. 13717 dated 10 January 1992) (NCR) were promulgated. The NCRs were revised under GN Number R55 of 14 January 1994 to make it obligatory for all authorities to apply the regulations, unless provincial noise control regulations exist. No such regulations exist in the Northern Cape. No approval is required under the national NCRs. Noise mitigation measures are included in the EMPr.
Mineral and Petroleum Resources Development Act, No. 28 of 2002 (MPRDA)	Department of Mineral Resources and Energy (DMRE)	The site falls within Sishen Mine’s property and is subject to a mining right issued to Sishen Iron Ore Company (SIOC) by the Department of Mineral Resources⁴. There are no planned mining activities that will marginalise or impact on the site. Section 53 of the MPRDA, states that any person who intends to use the surface of any land in a manner which may be contrary to the objectives of the MPRDA or is likely to impede such objects must apply to the Minister for approval in the prescribed manner. As per the requirements of the MPRDA, all mining activities, including the extraction of material from borrow pits and quarries also require authorisation from DMRE. No mining permits for borrow pits have been included in this application.
National Environmental Management Act, No. 107 of 1998 (NEMA)	DFFE – Competent Authority Northern Cape Department of Agriculture, Environmental Affairs, Rural Development and Land Reform (DAEARD&LR) – Commenting Authority	Several listed activities in terms of NEMA Listing Notice 1 (GN R983 of 2014), have been triggered and need to be authorised for the proposed project (also see Table 3-2). Based on the listed activities triggered, the application for environmental authorisation will follow the BA process as set out in Regulations 19 - 20 of the EIA Regulations of 2014 (GN R982 of 2014).
National Environmental Management: Air Quality Act, No. 39 of 2004 (NEM:AQA)	Northern Cape DAEARD&LR Gamagara Local Municipality	The Act aims to regulate and protect the environment by providing reasonable measures for the prevention of air pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto. No activities that would require an Atmospheric Emissions License are envisaged. Specific to the project are the regulations about the control of fugitive noise and dust emissions that may arise from the project activities.
National Environmental Management: Biodiversity Act, No. 10 of 2004 (NEM:BA)	DFFE	The act calls for the management of all biodiversity within South Africa. The on-site verification indicated that two themes required greater assessment than originally anticipated. Numerous SCC were found on site. A National Freshwater Ecosystem Priority Areas (NFEPA) wetland (ephemeral pan) was found in the bushveld habitat, north of the existing CSP facility where an overhead transmission line (OHL) was initially proposed. Because of these findings,

⁴ Now referred to as the Department of Mineral Resources and the Energy (DMRE).

		the plant species and aquatic theme has an increased screening sensitivity rating from low to medium. In addition, three (3) habitat types were identified in the Kathu Bushveld Vegetation Type (listed as least concern), the anthropogenically created open woodland; the thicket and bushveld habitat. The open woodland is of low sensitivity, having been dozed historically. The thicket habitat is of moderate sensitivity because of the SCC and animal interactions found here. The thicket habitat is however already fragmented and is believed to become an isolated and unsustainable unit with further development. See section 7.3 of the BAR for the terrestrial ecology impact assessment summary.
National Environmental Management: Waste Act, No. 59 of 2008 (NEM:WA)	Northern Cape DAEARD&LR – General Waste DFFE - Hazardous Waste	The Act aims to regulate waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement, and to provide for matters connected therewith. The project would not trigger any waste management activities requiring a permit but must manage solid hazardous and domestic waste streams in all phases of the project and wastes must be handled, stored and disposed of in a manner that is consistent with the provisions of this legislation.
National Forests Act, No. 84 of 1998, as amended (NFA)	DFFE DALRRD	The NFA provides protection to tree species that may not be cut, destroyed, damaged or removed unless a permit has been granted by the DFFE. In this context, the nationally protected species <i>Boscia albitrunca</i> (Witgat boom) and <i>Vachellia erioloba</i> (Camelthorn Tree) were encountered on the site. Application for permission to destroy nationally protected trees in terms of the NFA must be made for each specimen that may be affected. The proposed development is situated directly next to the KFNr. A portion of the farm Kathu 465 was declared as a forest nature reserve under Section 8(1)(c)(i) of the NFA. The proposed development will not affect the protected area or defy the purpose of the protected area.
National Heritage Resources Act, No. 25 of 1999 (NHRA)	South African Heritage Resources Agency (SAHRA) Northern Cape Provincial Heritage Resources Agency (NCPHRA)⁵ – provincial heritage authority.	Section 38 of the NHRA is applicable since the DFFE screening tool indicates a very high archaeological and cultural heritage theme sensitivity. As such, a Heritage Impact Assessment (Appendix D of the BAR) have been undertaken as required by the NHRA. Comment on the project has been obtained from SAHRA during the PPP and appropriate mitigation measures have been included in the BAR and EMPr.
National Protected Areas Expansion Strategy (2008) (NPAES) & National Environmental Management: Protected Areas Act, No. 57 of 2003 (NEM:PAA)	DFFE	The NPAES for South Africa sets out targets for protected area expansion, identifies possible expansion areas and recommends a mechanism for protected area expansion. Protected areas in terms of the NEM:PAA are considered 'formal' protected areas in terms of the NPAES. The NPAES further identifies 'National Parks', 'informal protected areas' and 'focus areas'. The site is in an Ecological Support Area (ESA) and the CBA 1 and CBA 2 areas (the 644-ha Kathu Forest Nature

⁵ Previously referred to as Ngwao Boswa Kapa Bakone (NBKB)

		Reserve and the ± 4000 ha Kathu Protected Woodland) are <u>southeast</u> of the proposed development. The proposed development will not affect the protected area or defy the purpose of the protected area. The proposed development is not situated nearby any focus areas for expansion of protected areas. The proposed development is situated directly next to the KFNR, a forest nature reserve declared in terms of the NFA. Section 9 of the NEM:PAA acknowledges forest nature reserves declared in terms of the NFA as protected areas.
National Road Traffic Act, No. 93 of 1996 (NRTA)	South African National Road Agency (SANRAL) – national roads Northern Cape Department of Transport and Liaison	Certain vehicles and loads cannot be moved on public roads without exceeding the limitations in terms of the dimensions and/or mass as prescribed in the Regulations of the NRTA. SANRAL and the Northern Cape Department of Transport and Liaison will be provided with an opportunity to review and comment on this BA process.
National Veld and Forest Fire Act, No. 101 of 1998	DFFE	The purpose of the Act is to prevent and combat veld, forest and mountain fires throughout South Africa. The Act applies to the open countryside beyond the urban limit and puts in place a range of requirements. Fire protection has been considered in the EMPr. The Act sets out the responsibilities of landowners or persons in control of the land which includes: 1. Prepare firebreaks on their side of the boundary if there is a reasonable risk of wildfire 2. Have such equipment, protective clothing and trained personnel for extinguishing fires as are: • prescribed (in the regulations) • if there are no regulations, reasonably required in the circumstances 3. Take all reasonable steps to notify the Fire Protection Officers (FPO) of the local Fire Protection Association (FPA) (if there is one) when a fire breaks out 4. Do everything in their power to stop the spread of the fire.
National Water Act, No. 36 of 1998 (NWA)	Department of Water and Sanitation (DWS)	Section 21 of the NWA recognises water uses that require authorisation by DWS before commencement. Several freshwater features are located around the study area and the impact on these is considered in this BA process. Certain infrastructure may be located within the 500m, GN 509 zone of regulation and authorisation in the form of either a General Authorisation or Water Use License Application (WULA) may be required. It is important to reiterate that the Kathu SPA facility is intended as an addition to the Kathu CSP facility. The CSP facility received a WUL on 18 December 2015 (ref: 10/D41J/CGHI/4002) and an amendment of the WUL on 11 October 2017 (ref: 10/D41J/CGHI/4002). Although the SPA will not directly affect any watercourses, it will bring the boundaries of the development closer to some wetlands. Thus, the existing WUL must be amended to change the coordinates of the development footprint (DWS reference no. WU35673).
Subdivision of Agricultural Land Act, No. 70 of 1970 (SALA)	DALRRD	The purpose of this Act is to control the subdivision and, in connection therewith, the use of agricultural land. According to the Gamagara Town Planning Scheme, the portion of the existing CSP facility has been rezoned industrial zone 2, while the remainder of Kathu 465 remains agricultural. The proponent is required to confirm if the proposed Kathu SPA will be on the farm portion that is already zoned industrial 2. Subdivision applications should be made to DALRRD to allow for long-term leases, the subdivision or rezoning of agricultural land, as well as other prohibited actions in terms



		of the Act. If required, an application will be submitted to DALRRD for authorisation following the conclusion of the BA process. DALRRD has been included in the BA process to obtain comments and in-principle consent as part of the BA process.
The National Energy Act, No. 34 of 2008	DMRE	One of the objectives of this Act is to promote sustainable development of renewable energy infrastructure. The proposed project will contribute to this objective and generate energy from a renewable resource. The REIPPPP is guided by the National Energy Act, one of the purposes of which is to promote the sustainable development of renewable energy infrastructure.
Spatial Planning and Land Use Management Act, No. 16 of 2013 (SPLUMA)	Gamagara Local Municipality	According to the Gamagara Town Planning Scheme, the portion of the existing CSP facility has been rezoned industrial zone 2, while the remainder of Kathu 465 remains agricultural. The applicant must confirm whether must ensure that zoning of the remainder of the site that will be affected by the SPA is accordingly changes to suit the new land use.
Electricity Regulation Act, No. 4 of 2006	National Energy Regulator of South Africa (NERSA)	The Act provides a national regulatory framework for the electricity supply industry. The Act requires registration and licensing of anyone wanting to generate, transmit, reticulate, distribute, trade, or import and export electricity. The applicant must interact directly with NERSA regarding the transmission line linkages with the proposed Kathu SPA facility.
Northern Cape Nature Conservation Act, No. 9 of 2009 (NCNCA)	Northern Cape DAEARD&LR	The Northern Cape Nature Conservation Act provides inter alia for the sustainable utilisation of wild animals, aquatic biota and plants as well as permitting and trade regulations regarding wild fauna and flora within the province. The Act also lists protected fauna and flora under three schedules ranging from Endangered (Schedule 1), Protected (schedule 2) to Common (schedule 3). Most mammals, reptiles and amphibians are listed under Schedule 2, except for listed species, which are under Schedule 1. A permit is required for any activities which involve species listed under Schedule 1 or 2. In this context, a number of protected plants (i.e., <i>Boscia albitrunca</i>) were found on site. Application for permission to destroy protected flora in terms of the NCNCA must be made for each specimen that may be affected. Additionally, protected animals that are nesting or have active borrows on site must be considered. Similarly, application for permission to destroy protected fauna in terms of the NCNCA must be made for the species that may be affected. During site assessment, one tree with an owl perch and pellets along with several smaller nests was observed.
Fencing Act, No. 31 of 1963	Northern Cape DAEARD&L, or Gamagara Local Municipality	Section 17 requires that any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to the protection of flora. The aim of the Fencing Act (No. 31 of 1963) is to consolidate the laws relating to fences and the fencing of farms and other holdings.

3.2 LISTED ACTIVITIES IN TERMS OF NEMA

The proposed project considered in this application triggers activities listed in the 2014 EIA Regulations (GN R982 of 2014) as indicated in **Table 3-2**.

Table 3-2: Listed activities triggered by the preferred alternative for the proposed project

Activity No(s):	Listed Activity	Description of how the proposed project applies to the listed activity relates.
BA Activity(ies) as set out in Listing Notice 1 (GN984 of 2014, as amended) of the EIA Regulations, 2014 as amended		
LN 1 Act 1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where— (i) the electricity output is more than 10 megawatts but less than 20 megawatts.	The proposed Kathu SPA facility will generate an installed capacity of approximately 12 MWdc.
LN1 Act 27	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation.	Constructing the Kathu SPA facility and associated infrastructure is expected to result in the clearance of more than 1 ha of indigenous vegetation (approximately 11 ha) ⁶ .
LN1 Act 28	Residential, mixed, retail, commercial, industrial, or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare.	The proposed development and associated infrastructure are proposed on land that has been previously utilised for farming of cattle prior to the development of the existing CSP facility. The total land to be developed exceeds 1 ha and it outside an urban area

GN 4143 of 2023 (*Amendment of certain requirements for an application for Environmental Authorisation for a Renewable Energy Facility*) requires consent from Eskom for an EA application for renewable energy facilities within specified radii of Eskom substations. Eskom's written consent must be submitted together with the application for authorisation if the proposed renewable energy facility is located:

- within a radius of 2 km of a main electricity transmission substation; and
- within a radius of 1 km of a main electricity distribution substation.

An Eskom distribution substation, the 33/11 Kv Kalbas substation, is located north of the existing CSP, but it is more than 1 km from the closest point of the proposed SPA (see **Figure 3-1**). Hence, no Eskom consent is needed for this application.

⁶ The proposed permit area covers 27 ha, while the original laydown area within the existing CSP permit boundary is approximately 16 ha. This leaves 11 ha of indigenous vegetation to be cleared.

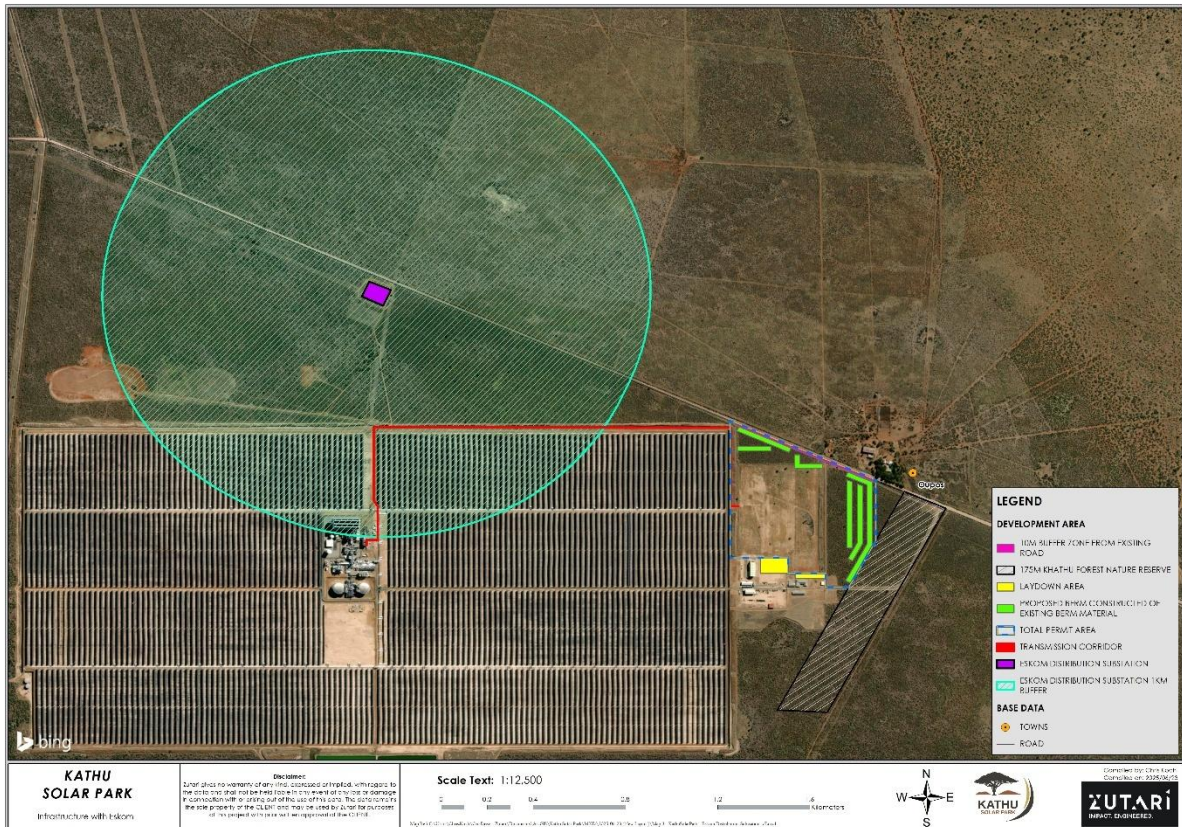


Figure 3-1: Proposed PV plant in relation to the existing Eskom distribution substation.

3.3 NATIONAL WATER ACT, NO. 36 OF 1998 (NWA)

The National Water Act, No. 36 of 1998 (NWA) requires all water uses to be licensed with the CA (i.e., the Regional Department of Human Settlement, Water and Sanitation (DHSWS) or relevant Catchment Management Agency (CMA)). Water use is defined broadly, and includes taking and storing water, activities which reduce stream flow, waste discharges and disposals, controlled activities (activities which impact detrimentally on a water resource), altering a watercourse, removing water found underground for certain purposes, and recreation.

In terms of the NFEPA (2011) and the National Biodiversity Assessment (NBA) 2018 National Wetlands Map 5, some NFEPA wetlands are identified close to the site. Notably, a bench wetland, characterised as a natural, flat bench ephemeral wetland, is located north of the existing Kathu CSP facility, situated less than 15 meters (m) from the OHL route that was **initially proposed**. Additionally, a valley floor wetland occurs 500 m east of the development footprint area. All other wetlands situated closer than 500 m to the site have already been affected by the existing Kathu CSP facility and will not be further affected by the SPA.

In accordance with GN 509 of 2016, a regulated area of a watercourse in terms of water uses as listed in Section 21 (c) and 21(i) is defined as:

- the outer edge of the 1 in 100-year flood line and/or delineated riparian habitat, whichever is the greatest distance, measured from the middle of the watercourse of a river, spring, natural channel, lake or dam;
- in the absence of a determined 1 in 100-year flood line or riparian area the area within 100 m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench; or

- a 500 m radius from the delineated boundary (extent) of any wetland or pan in terms of this regulation.

The following water uses as per section 21 of the Act are triggered by the proposed project activities:

Table 3-3: Triggered water uses in terms of Section 21 of the NWA

Notice No.	Activity No.	Description of Water Use
NWA, No. 36 of 1998	Section 21 (c)	Impeding or diverting the flow of water in a watercourse A valley floor wetland lies within 500 m east of the proposed development footprint area.
NWA, No. 36 of 1998	Section 21 (i)	Altering the bed, banks, course, or characteristics of a watercourse. A valley floor wetland lies within 500 m east of the proposed development footprint area.

The proposed development is located within the Sishen or Kathu (48) groundwater SWSA. Groundwater in this area forms a nationally important resource. The proposed development has a relatively small footprint and will not affect the SWSA habitat, since this is a groundwater resource and not a surface water resource area. The proposed development will not affect the water quality or quantity of this water resource since no additional abstraction is planned.

Given that the Kathu CSP project already possesses a valid WUL (DWS reference no. **WU35673**), and considering that no new water uses are triggered, the existing WUL remains unchanged.

3.4 NATIONAL HERITAGE RESOURCES ACT, NO. 25 OF 1998 (NHRA)

The National Heritage Resources Act, No. 25 of 1999 (NHRA) provides an integrated system for the management of national heritage resources and empowers civil society to conserve heritage resources for future generations. Section 38 of NHRA provides a list of activities that require the undertaking of a Heritage Impact Assessment (HIA).

Section 38: Heritage Resources Management

1. *"Subject to the provisions of subsection (7), (8) and (9), any person who intends to undertake a development categorised as –*
 - a. *the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 30m in length.*
 - b. *the construction of a bridge or similar structure exceeding 50m in length.*
 - c. *any development or other activity which will change the character of a site –*
 - i) *exceeding 5,000m² in extent; or*
 - ii) *involving three or more existing erven or subdivisions thereof; or*
 - iii) *involving three or more erven or divisions thereof which have been consolidated within the past five years; or*
 - iv) *the costs of which will exceed a sum set in terms of regulations by SAHRA or a provisional heritage resource authority.*

must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature, and extent of the proposed development."

Section 38(8) does not require approval from the heritage authority if an evaluation of the impact of such development on heritage resources is required in terms of any other legislation (such as NEMA), provided that the consenting authority ensures that the evaluation of impacts fulfils the requirements of the relevant heritage resources authority in terms of Section 38 (3) and any comments and

recommendations of the relevant resources authority with regard to such development have been taken into account prior to the granting of the consent. However, should heritage resources of significance be affected by the proposed development, a permit is required to be obtained prior to disturbing or destroying such resources as per the requirements of Section 48 of the NHRA, and SAHRA Permit Regulations (GN R668).

The proposed Kathu SPA facility will alter the site's character and is expected to cover an area of approximately 270,000 m² (27 ha), surpassing the threshold of 5,000 m². SAHRA approved the heritage impact assessment on 19 August 2024. A copy of this is attached as Appendix G.

3.5 DFFE SCREENING TOOL

Government Notice (GN) 960 of 2019 requires that the DFFE's a national web-based environmental screening tool must be used to produce a report that should be submitted with an EA application to the DFFE from 05 October 2019.

This report shows, on a high level, the site's sensitivity to the proposed development based on different environmental themes (including, inter alia, terrestrial ecology, visual and landscape, and heritage) and identifies assessment protocols that must be undertaken depending on the environmental theme's sensitivity rating within the development site. The potential restrictions and sensitivities identified by the DFFE screening tool are shown in **Table 3-4**. This table also records Zutari's response to the identified themes and sensitivities, based on Zutari's site visit and specialist assessments.

Assessment protocols that set out the "procedures to be followed for the assessment and minimum criteria for reporting of identified environmental themes in terms of section 24(5)(a) and (h) of the national environmental management act, 1998, when applying for environmental authorisation" were gazetted in GN 320 of 2020. These protocols in terms of reporting of the identified environmental themes were met in terms of NEMA.

Table 3-4: Site sensitivity verification table

SENSITIVITY THEME	VERY HIGH SENSITIVITY	HIGH SENSITIVITY	MEDIUM SENSITIVITY	LOW SENSITIVITY	OUTCOME OF THE SITE SENSITIVITY ASSESSMENT	IDENTIFIED SPECIALIST ASSESSMENTS	IMPACT ASSESSMENT VS COMPLIANCE STATEMENT
Agriculture Theme			X		N/A	None required	The DFFE Screening tool identifies the area as a medium-sensitivity site from an agricultural perspective. An assessment for this theme was not deemed necessary because the proposed Kathu SPA facility is situated on a farm that already hosts an existing Kathu CSP facility. Furthermore, the site and surroundings are only suitable for low intensity grazing and game farming due to the arid conditions. The remainder of the property is used only for game farming and conservation (e.g. the KFNR that occurs south-east of the proposed solar PV SPA).
Animal Species Theme			X		Confirmed as Medium to low sensitivity	Included as part of the Terrestrial Biodiversity Assessment	Terrestrial Animal Species Specialist Assessment This was highlighted as medium sensitivity by the DFFE Screening Tool report, particularly due to the presence of White-backed Vulture (<i>Gyps africanus</i>) in the area. The specialist has confirmed this rating to be of medium to low sensitivity. NB: The potential impact of the project on this species will be negligible, since no new above-ground powerlines are planned. The solar PV SPA will connect to the existing CSP via an underground cable.
Aquatic Biodiversity Theme				X	N/A	None required	The DFFE Screening tool identifies the area as a low-sensitivity site from an aquatic biodiversity perspective. An assessment for this theme was not deemed necessary because the proposed Kathu SPA facility is situated on a farm that already hosts an existing Kathu CSP facility. Although there is a valley floor wetland within 500 m east of the proposed development footprint area, there are no watercourses or wetlands either within the proposed project footprint or close enough to the proposed solar PV SPA footprint to be affected by it.
Archaeological and Cultural Heritage Theme	X				Low sensitivity	Heritage Impact Assessment	Heritage Impact Assessment Due to the proximity of the SPA facility to the Kathu Archaeological Complex, which has Grade 1 National Heritage status, a Phase 1 Heritage Impact Assessment was undertaken, instead of the specialist compiling only a Specialist Compliance Statement.
Avian Theme				X	N/A	None required	The DFFE screening tool identifies the area as a low-sensitivity site from an avian perspective, so no further assessment was considered necessary.

Civil Aviation (Solar PV) Theme			X		N/A	None required	The DFFE screening tool identifies the area as a medium-sensitivity site from a Civil Aviation (Solar PV) perspective. During the EIA of the Kathu CSP facility, the South African CAA was consulted on the site selection criteria and the Kathu Farm 465 was selected as by the South African CAA as the best site under consideration from an aviation impact perspective; moreover, provisional obstacle parameters were provided by the South African CAA for the height of the structures that may be built on the site. No transmission lines or other tall structures that could pose constraints to flight are planned. The existing CSP structures are taller than any new infrastructure planned for the solar PV components. Therefore, no further assessment was deemed necessary.
Defence Theme				X	N/A	None required	The DFFE screening tool identifies the area as a low-sensitivity site from a defence perspective and, per the “Protocol for The Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Defence Installations” (GN 320 of 20 March 2020) no further assessment is necessary.
Palaeontology Theme		X			Low sensitivity	Specialist Compliance Statement	Specialist Compliance Statement The DFFE Screening tool identifies the area as a high-sensitivity site from a palaeontological perspective. A palaeontological specialist provided an opinion about the potential impacts on this site. This opinion motivates for an exemption from a palaeontological impact assessment, citing that the majority of the project footprint has already been cleared of vegetation, making it very unlikely that there are any fossils within the project footprint.
Plant Species Theme				X	Medium sensitivity	Included as part of the Terrestrial Biodiversity Assessment	Terrestrial Plant Species Specialist Assessment The specialist rated this theme as medium sensitivity due to the occurrence of SCC. Therefore, this theme was assessed as part of the Terrestrial Biodiversity Assessment, and the findings are discussed in the Terrestrial Biodiversity Impact Assessment report.
RFI Theme				X	N/A	None required	An assessment for this theme was not deemed necessary due to the low sensitivity rating and lack of relevant infrastructure near the project area.
Landscape/Visual Impact Assessment					Confirmed low sensitivity	Landscape/Visual Impact Assessment	A Specialist Compliance Statement is included.
Terrestrial Biodiversity Theme	X				Confirmed as very high sensitivity	Terrestrial Biodiversity Assessment	Terrestrial Biodiversity Specialist Assessment The DFFE screening tool identifies the area as a very high-sensitivity site from a terrestrial biodiversity perspective and this was confirmed by the specialist and, per the “Protocol for the Specialist Assessment and Minimum Report Content Requirements for Environmental Impacts on Terrestrial Biodiversity” (GN 320 of 20 March 2020), a

							Terrestrial Biodiversity Specialist Assessment is required for this theme.
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4 ROLES AND RESPONSIBILITIES

This Chapter provides a description of the roles and responsibilities of the various parties involved with the construction of the proposed development.

4.1 CONTRACTOR

The Contractor must ensure that its sub-contractors, employees, etc., are fully aware of the environmental issues detailed in this EMPr. The Contractor shall liaise closely with the Site Engineer (SE), Environmental Officer (EO) and the Environmental Control Officer (ECO) and must ensure that the works on site are conducted in an environmentally sensitive (prevent actions that may cause environmental harm) manner and fully in accordance with the requirements of the EMPr, at all times.

The Contractor must ensure compliance of all site personnel/visitors to the EMPr and other conditions of approval where relevant.

4.2 DEVELOPER

Generally, the developer or applicant would refer to the holder of the EA, in this case Kathu Solar Park (rf) Pty Ltd, who would assume overall responsibility for the administration and implementation of the EA and EMPr.

The developer will be responsible for the following tasks amongst others:

- ▶ Impact on landscape character and sense of place;
- ▶ Ensure that all conditions of approval as contained in the EA are adhered to;
- ▶ Ensure that the requirements as set out in this EMPr are adhered to and implemented;
- ▶ Ensure all authorisations, permits, consents are in place and any other legal requirements are settled before construction commences;
- ▶ Allocate the responsibilities assigned to the ECO to an independent suitably qualified individual prior to the start of construction activities on site; and
- ▶ Provide all principal contractors working on the project with a copy of this EMPr as part of tender contract documentation to allow the contractors to cost for its requirements within their respective construction contracts.

4.3 SITE ENGINEER (SE)

The SE is responsible for ensuring that the contract is carried out to completion on time, in budget and that each Contractor fulfils his obligations in terms of conditions contained in the EA. The Engineer shall appoint a suitably qualified Environmental Site Agent (ESA) to assist with routine compliance monitoring, duties of the ESA to follow.

4.4 ENVIRONMENTAL SITE AGENT (ESA)

It is recommended ESA be appointed for the duration of construction. This person's appointment must take place prior to commencement of construction. The ESA will assist the ECO with day-to-day on-site monitoring of construction activities, compliance with this EMPr and specific conditions contained in the EA. The ESA's terms of reference (ToR) include, but are not limited to:

- ▶ Day to day monitoring of implementation of this EMPr;
- ▶ It is recommended that the ESA be on site daily when work is being undertaken in sensitive environments e.g. watercourses, vegetation and during the initial construction activities which

- include amongst others, site demarcation, identification of no-go areas, relocation of vegetation, vegetation clearance, site camp establishment and vegetation replantation;
- ▶ The ESA must assist the Contractor with environmental training of any new staff members or staff which did not attend the ECO's environmental induction training. On-going environmental awareness also falls within the responsibilities of the ESA;
 - ▶ Submit weekly compliance reports to the ECO;
 - ▶ Attend Contractor and engineering site meetings where relevant or where attendance is requested;
 - ▶ Maintain a detailed photographic record of construction activities;
 - ▶ Maintain a register of site instruction, non-compliances and action items and submit weekly to the ECO;
 - ▶ Keep all approved method statements on record or file;
 - ▶ Liaise with the public should there be any complaints, keep a register of any complaints and report to the ECO on weekly basis; and
 - ▶ The ESA must immediately consult with the SE and ECO should any non-compliances meriting a 'stop-work' instruction be observed.

4.4.1 ENVIRONMENTAL AWARENESS ON SITE

Prior to construction, the ESA must brief all Contractor teams involved in work on the project on their obligations towards environmental controls and methodologies in terms of this EMPr. It is recommended that the briefings take the form of an on-site talk and demonstration in association with the ECO. The education/awareness programme should be aimed at all levels of management and construction workers. All new employees arriving on site shall undergo this training. Environmental induction must be done according to the Contractor's Environmental Management System and must include all aspects of the site-specific EMPr.

The ESA must present environmental toolbox talks for continuous training of employees on a weekly basis. Toolbox talks must be conducted in an interactive way to ensure the employees understand the content and purpose of specific EMPr requirements. Relevant environmental site matters, incidents and issues shall form part of the Contractor's toolbox talks. The Contractor shall make a note of the environmental subjects discussed and keep a record of attendance.

As construction continues, an effort must be made by the Contractor to assess the training needs of workers on site. Cognisance must be taken of the specific work to be undertaken at the time and, if necessary, additional training on environmental requirements must be conducted to ensure all workers understand the risks involved as well as how to adequately implement mitigation measures.

A signed register documenting all employees' environmental training and awareness programmes must be kept on record for verification purposes.

4.4.2 RECORD-KEEPING

The ESA is responsible for maintaining all records in relation to the EMPr requirements on site. Such records must be made available to the ECO on request during the monthly audits, as well as at any time as requested by the ECO, auditor, officials, or project managers. Recordkeeping must be done in an orderly fashion with the intent of ensuring easy reference.

4.5 ENVIRONMENTAL CONTROL OFFICER (ECO)

The Developer shall appoint a suitably qualified ECO, who is independent, to monitor the Contractor's compliance with this EMPr and the conditions contained in the EA, and to address environmental site issues.

The ECO must be appointed before commencement of any authorised activities.

Once appointed, the name and contact details of the ECO must be submitted to the Director: Compliance Monitoring of the DFFE.

The ECO must remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is ready for operation.

The ECO shall work in close relation with the Contractor's appointed ESA. The designation is reserved for a suitably qualified (National Diploma / Degree in Natural Science or an equivalent qualification), independent, environmental manager, with adequate environmental knowledge to understand and implement the EMPr.

The duties of the ECO include but are not limited to:

- ▶ Liaison with the Developer, Project Manager and/or Engineer, ESA and the CA;
- ▶ Update the EMPr to include relevant conditions of approval contained in the EA (if applicable);
- ▶ Conduct environmental induction training with the contractor prior to commencement of work;
- ▶ Undertake ECO site inspections. The frequency of site inspections can be determined between the ECO, SE, ESA or any specific conditions of authorisation contained in the EA. It is recommended that the ECO be supported by a full-time ESA during the initial construction period/activities and that the ECO undertake monthly ECO inspections with the ESA. The ECO must attend/arrange a site meeting with the engineer, contractor and other relevant project team members during his/her site inspection to discuss any environmental matters;
- ▶ Compilation of ECO reports that must be submitted to the project team, CA, and developer (or any other authority/body deemed necessary by the project team). The ECO must liaise with the ESA to ensure that action items are carried out;
- ▶ Review ESA weekly compliance monitoring reports and include information in monthly ECO Reports;
- ▶ Monitoring compliance with the various environmental conditions/requirements contained in the EA and EMPr;
- ▶ Keeping record of all activities on site, problems identified, transgressions noted, and a task schedule of tasks undertaken by the ECO.
- ▶ Assist the ESA in reviewing of the Contractor's method statements;
- ▶ Ensuring that the requisite remedial action is implemented in the event of non-compliance;
- ▶ Ensuring the proactive and effective implementation and management of environmental protection measures;
- ▶ Ensuring that a register of public complaints is maintained by the Contractor and that any and all public comments or issues are appropriately reported and addressed;
- ▶ Attend monthly site meetings; and
- ▶ Recording and reporting of environmental incidents.

4.5.1 ENVIRONMENTAL INDUCTION/AWARENESS TRAINING

The ECO shall arrange with the Engineer and Contractor to conduct once-off environmental induction training at project start-up and must address, amongst others:

- ▶ Explanation of the environmental process that preceded the EA and why it was important to conduct the environmental process;
- ▶ Explanation of the conditions of authorisation contained in the EA;

- ▶ The sensitive environmental features located within and around the site;
- ▶ The reasons why mitigation measures are required and the benefits of implementing these measures;
- ▶ The EMPr and its contents (e.g. no-go areas, animals, littering etc.); and
- ▶ The role of the ECO and ESA.

4.5.2 PERMITS AND AUTHORISATIONS

The ECO must be knowledgeable of all licencing and permitting requirements (issued and required) applicable to the site and can assist the contractor with obtaining such permits should any be outstanding.

5 SUMMARY OF IMPACTS AND ASSOCIATED MITIGATION MEASURES

Table 5-1 to Table 5-7 covers the activities and associated environmental impacts that will occur during the proposed development of the Kathu SPA facility. These impacts are considered applicable to the entire project site.

The tables considers the expected impacts during the different phases of the project, as well as the mitigation measures and environmental management procedures required to manage the expected impacts. Furthermore, the tables include the following sections:

- ▶ Pre-construction and construction site environmental management;
- ▶ Flora and fauna;
- ▶ Heritage and palaeontology;
- ▶ Materials and waste;
- ▶ Dust;
- ▶ General construction activities; and
- ▶ Rehabilitation.

The following components are discussed:

- ▶ Activity: Component/activity of the project for which the impact has been identified’;
- ▶ Aspect: The aspect of the above activity which will be impacted;
- ▶ Impact: The environmental impact identified and to be mitigated; and
- ▶ Mitigation measure: Measures identified for implementation in terms of environmental management to reduce, rectify or contain the identified environmental impact. The following aspects of mitigation are discussed:
 - Objective: Desired outcome of mitigation measure; and
 - Mechanism: Method of achieving the objective.
- ▶ Performance indicators: Outcomes that will indicate achievement of objective/s.
- ▶ Responsibility: Party or parties identified for implementation of mitigation measure/s.
- ▶ Resources: Available resources to aid the implementation of mitigation.
- ▶ Schedule: Timeframe in which identified impact and mitigation measure is anticipated to occur.
- ▶ Verification: Party or parties identified as responsible for review and assessment of final outcome.

Table 5-1: Site Environmental Management

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Pre-construction								
Engineering Design	All the aspects listed in the EMPr	Design incompatible with the environment	Objective: ▶ To ensure the design of the PV facility takes the environment into account. Target: ▶ Assimilate requirements of the EMPr in design and construction management giving special attention to the impact ratings and suggestions of specialists; and ▶ The "no go"-zones identified by specialists shall be communicated to anyone entering the site, indicated/demarcated as such, and avoided during all phases of the project. This specifically includes the 175 m buffer around the KFNR, which must be clearly delineated as such.	• Design meets objectives and does not degrade the environment.	Contractor	Planning and design	Contractor/ Developer	Once-off
Establishment of the construction camp sites	Construction camp	Damage or loss of existing vegetation and changes to the area's water quality	Objective: ▶ To prevent negative influence on the surrounding surface and groundwater. Target: ▶ Site establishment shall take place in an orderly manner and all amenities shall be installed at camp sites before the main workforce move onto site; ▶ A method statement is required from the Contractor at appointment stage that includes the layout of the camp, management of ablution facilities and wastewater management; ▶ The planning and design for the construction camp must ensure that there is a minimum impact on the environment; ▶ A site plan of the construction camp must be provided indicating waste areas, storage areas and placement of ablution facilities; ▶ The construction camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction; ▶ The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to the developer; ▶ Where facilities are available the Contractor may make use of such facilities where it is viable and possible; ▶ The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities; ▶ The Contractor shall supply waste collection bins where such is not available, and all solid waste collected shall be disposed of at a registered waste dump; ▶ A certificate of safe disposal shall be obtained by the Contractor and kept on file; ▶ The Contractor shall provide a method statement about waste management in his site and activities. Under no circumstances may solid waste be burned on site; ▶ The construction camp must be placed on already disturbed land as far as possible; ▶ The construction camp should be fenced off so as to limit the removal of unnecessary vegetation; ▶ Fences and security access must be maintained, throughout the project; ▶ All fences removed to facilitate access will be replaced by the contractor once machinery and personnel have been removed from the site to the satisfaction of all the relevant landowners; and ▶ Emergency and contact numbers of the contractors must be available and prominently displayed on a signage board that is clearly visible.	• Construction camp established in compliance with objectives	Contractor, ESA	Pre-construction (site establishment)	ECO	Once-off
Establishment of the construction camp site.	Construction camp.	Loss of soil fertility.	Objective: ▶ The environmental objective when establishing the contractor's camp is to minimise the footprint of disturbance thereby preventing the degradation and loss of topsoil. Target:	• Establish the construction camp in compliance with objectives and no evidence of environmental degradation.	Contractor, ESA	Pre-construction (site establishment)	ECO	Once off

			▶ Allowance for one contractor's camp at the site; ▶ The construction camp site shall be strictly within the approved boundaries; ▶ Once the site has been cleared of vegetation, the topsoil should be stripped; ▶ Topsoil must be stored in a demarcated area protected from wind and rain; ▶ The topsoil stockpiles must not exceed 1.5 m in height; and ▶ The area must be rehabilitated once the construction camp has been decommissioned.					
Storage of topsoil.	Stripping and stockpiling of topsoil.	Mixing of topsoil and subsoil. Erosion of topsoil. Contamination of topsoil. Dust.	Objective(s): ▶ Topsoil is conserved, maintained, and reused. Target: ▶ The topsoil in the specific region is regarded as the top 300 mm (maximum) of the soil profile irrespective of the fertility appearance or physical depth, unless otherwise confirmed by the ECO; ▶ Topsoil is to be stripped up to this depth when it is in as dry a condition as possible in order to prevent compaction; ▶ Topsoil should be harvested at a depth of 100 mm from the open woodland area and 300 mm from thicket habitats; ▶ The topsoil, including the existing grass cover is to be shallowly ripped (only the depth of the topsoil) before removal. This is to ensure that organic plant material, and the natural seed base is included in the stripping process; ▶ Stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage, or any other material, which may inhibit the later growth of vegetation; ▶ The Contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding; ▶ All woody and herbaceous biomass arising from the site clearance should be reused on site in rehabilitation efforts, as far as possible. This may include chipped mulch or brush packing of previously disturbed areas, provided no alien invasive materials are present, for the ECOs approval. All grass and other vegetation should be left on the topsoil stockpiles so that they colonize the area after construction; ▶ Photographic record must be kept of the topsoil stockpiles; ▶ Dust and erosion of topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing of topsoil in areas exposed to high wind or excessively rainy conditions; ▶ The Contractor shall devise a soil conservation and stockpiling plan, to be approved by the ECO and Engineer, which shall detail: • Stockpile sizes, layout and form; • Means of erosion (wind and water) prevention for stockpiles; • The rehabilitation measures to be taken for the area occupied by the temporary stockpile; • A generic schedule of soil replacement for areas where work has been completed. Soil replacement should preferably run in parallel (where feasible) with the construction process; and • Soil erosion prevention measures for general site use. ▶ Alien vegetation growing on stockpiles must be eradicated; and ▶ Herbicides shall not be used to remove alien vegetation unless approved by the ECO. 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.	• Topsoil is kept free of weeds and contaminants and can be used for rehabilitation.	Contractor, ESA	Pre-construction (site establishment)	ECO	Weekly
Construction of site buildings.	Site buildings materials.	Soil pollution and permanent alternation to the natural environment.	Objective(s): ▶ To ensure the material for site buildings are recyclable and to minimise the impacts of the construction of the buildings on the environment. Target: ▶ No permanent structures will be permitted at the contractor's camp; ▶ Temporary structures shall be founded on a platform, either subsoil or screed slab;	• On site buildings constructed according to the requirements of the EMPr.	Contractor and ESA	Pre-construction (site establishment)	ECO	Once off

			▶ Buildings should preferably be prefabricated or constructed of re-usable/recyclable materials; ▶ All temporary structures must be soundly built and not pose a danger to workers; ▶ Containers are to be used for the storage of materials which have the potential to release pollutants into the environment; and ▶ All structure footprints to be rehabilitated and re-vegetated after construction is complete.					
Fencing of the construction sites that will be affected by the proposed project.	Demarcation of the site.	Unnecessary removal of vegetation. Loss of topsoil. Safety.	Objective(s): ▶ Whilst establishing the site, the footprint of disturbance must be minimised and the extent of soil erosion, loss of vegetation and the potential for the pollution of soils must be prevented. Target: ▶ All excavations posing a risk to both human and animal safety must be demarcated as indicated in the EMPr using danger tape with steel droppers or other methods approved by the ECO; ▶ Prior to any construction activities, the required 175 m buffer around the KFNR must be clearly delineated and strictly implemented. The width of the construction footprint must remain confined to the permitted area, as agreed upon by the ECO and the Engineer, and must be kept to a minimum as far as reasonably possible. Should additional space be required for the temporary storage of materials, the ECO must identify a suitable area away from any sensitive areas and outside the delineated 175 m buffer around the KFNR; and ▶ No personnel or construction materials will be allowed to move outside the designated / demarcated site during construction activities.	• The site is demarcated according to the requirements of this section of the EMPr.	Contractor and ESA	Construction sites must be fenced off along the alignment before site clearance.	Engineer, ECO	As construction proceeds.
Cooking of food	Cooking facilities	Type and placement of cooking facilities used, and how they will be used.	Objective(s): ▶ To ensure that the cooking facilities used on site do not pose risks to the environment. Target: ▶ The contractor must supply gas and /or electricity cooking facilities for the labourers at the construction camp; ▶ If gas cooking facilities are not available, fires (for the purposes of cooking) will be allowed in a demarcated area that has been cleared of any combustible materials; ▶ Firewood, or other suitable fuels, must be supplied by the Contractor; ▶ No vegetative matter may be removed from the area for firewood; and ▶ After use, all cooking fires must be extinguished.	• Evidence of presence of gas and / or electricity cooking facilities and / or demarcated area for cooking with fire.	Contractor	Pre-construction (site establishment) and during construction	ECO	Throughout construction
Operation of the sanitation system(s).	Sanitation systems.	Unpleasant odours on site. Inadequate number of latrines on site. Position of latrines and shower systems. Poor management of wastewater.	Objective(s): ▶ To ensure good sanitation system and management throughout the construction period. Targets: ▶ Adequate chemical toilets must be provided for all staff. Alternatively, existing ablution facilities on site can be utilised if available; ▶ Chemical toilets must be emptied / serviced on a regular basis to prevent them overflowing. Proof of this must be provided to the ECO; ▶ A minimum of one toilet must be provided per 15 persons at each working area within 100 m from worker activity, or as required by the Occupational Health & Safety Act; and ▶ Where shower facilities be provided for use by staff the following must be imposed: • Positioning of the showers, specifically the discharge point, must be placed in a way to ensure that erosion and build-up of detergents does not occur; • All discharge from the shower and other washing facilities must pass through a suitable filter to reduce the load of detergents to the environment; and • Use of the shower facilities must be limited to staff or authorised persons only.	• Adequate toilets and showers will be positioned at the right places as per the EMPr and ECO. • Absence of odours, erosion, and build-up of detergents.	Contractor	Pre-construction (site establishment) and during construction	ECO	Once off
Construction site								

Vehicle parking area. Storage of equipment.	Vehicle parking and parking area(s). Storage of equipment.	Pollution of soils. Disturbance of soils due to parking of vehicles outside of designated areas.	Objective(s): ▶ To ensure vehicles are parked according to the specifications in the EMPr and that equipment is handled appropriately. Target: ▶ No storage of vehicles or equipment will be allowed outside of the designated area; and ▶ Drip trays or any form of oil absorbent material must be placed underneath vehicles and equipment when not in use for periods longer than 3 days and / or for those vehicles and plant showing evidence of leaking hydrocarbons.	• Drip trays must be provided and placed under vehicles and equipment which are not being utilised on site.	Contractor and ESA	During construction	ECO	Whenever parking, servicing, or maintaining vehicles throughout the construction period.
Servicing and washing of vehicles and machinery	Workshop and Equipment Storage Areas	Water contamination, Soil contamination, Noise pollution.	Objective(s): ▶ To ensure that the environment is not polluted by ensuring that service areas and wash bays for vehicles and machinery are made available and utilised. Target: ▶ Where possible and practical, all maintenance of vehicles and equipment shall take place in a workshop area; ▶ During servicing of vehicles or equipment in the approved area, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are affected outside the workshop area; ▶ Leaking equipment shall be repaired immediately or be removed from site to facilitate repair; ▶ All potentially hazardous and non-degradable waste, including used ballast or the waste water effluent from washing the contaminated ballast, shall be collected, and removed to a registered waste site; ▶ Workshop areas shall be monitored for oil and fuel spills and such spills shall be cleaned and re-mediated to the satisfaction of the ECO; ▶ A method statement is required from the Contractor showing how to show procedures for dealing with possible emergencies that can occur, such as fire and accidental leaks and spillage; ▶ The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site; ▶ Should emergency repairs be necessary, drip trays or tarpaulins must be utilised to ensure the collection of the oil. The area for emergency repairs should be identified by the ECO; ▶ Should repair centers not be available in close proximity to the site, the contractor may erect maintenance areas / workshops at designated areas approved by the ECO; ▶ The contractor must ensure that delivery drivers and plant operators are informed of all relevant procedures and restrictions required ensuring compliance with this document; ▶ All vehicles and equipment must be well maintained to ensure that there are no oil or fuel leakages; and ▶ The following shall apply: • All contaminated soil / yard stone shall be removed and be placed in containers for further disposal; • Contaminated material can be taken to one central point where bioremediation can be done; • Smaller spills can be treated on site; • A specialist Contractor shall be used for the bioremediation of contaminated soil where the required remediation material and expertise is not available on site; and • All major spills of hazardous substances constituting a section 30 environmental incident (according to the NEMA) must be reported to the ECO and relevant authorities within 14 days of the incident occurring.	• Evidence of prescribed servicing and washing services.	Contractor, ESA	During construction	ECO	Whenever servicing or maintaining of vehicles or equipment throughout the construction period.
Personnel conduct	Personnel	Infringement of the EMPr requirements by personnel.	Objective(s): ▶ To ensure that personnel are adhering to the EMPr requirements. Target:	• Personnel wearing proper safety uniform. • Absence of trespassers on site.	Contractor and labourers.	Approved PPE must be issued to all employees prior to construction but	ECO	Throughout construction

			▶ The Contractor will adhere to all requirements of the Occupational Health and Safety Act (Act 56 of 2004), including the drafting of a suitable Health and Safety Plan which will be implemented during the construction phase; ▶ All personnel to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof; ▶ Toolbox talks to include aspects of the EMPr; ▶ Labourers associated with the contractor must be easily recognizable (i.e. company issued overalls with company name / logo etc.), and other persons will not be allowed within the construction camp at any time without prior permission from the project manager; ▶ The Contractor shall take all necessary precautions against trespassing on private properties; ▶ Warning signs must be placed on and around the site as per the Occupational, Health and Safety requirements; ▶ Adequate first aid services must be provided by the contractor at the contractor's camp; ▶ The contractor will be responsible for his own security arrangements and shall comply with all site security instructions; ▶ Basic firefighting equipment must be available on site; ▶ Personal protective equipment (PPE) to be provided and well maintained at contractor's camp; and ▶ All environmental incidents should be reported to ECO, investigated, documented, and kept on file.			must be used for the duration of the construction period.		
Construction activities	Safety of the Public / surrounding landowners.	Injuries to Public / landowners. Health of Public / landowners.	Objective(s): ▶ To ensure that the Public at large is not injured or affected negatively in any way. Target: ▶ The Contractor shall recognise that the Site is situated close to inhabited and agricultural areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding communities; ▶ Where the public could be exposed to danger by any of the Works or Site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and / or warning signs in English, Afrikaans, and SiSwati (or other language/s appropriate for the site), all to the approval of the Project Manager; ▶ All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three strands of wire and made clearly visible); and ▶ Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed structures and protective scaffolding.	• No injuries or health consequences to neighbouring people. • No complaints from neighbouring people.	Contractor and ESA	During construction	ECO	Throughout construction
Closure of the construction camp.	Construction camp.	Potential impacts associated with the closure of the construction camp.	Objective(s): ▶ To limit potential impacts on the environment for the period for which the construction camp is closed. Target: Should the construction camp be closed for a period of more than one week, a report on compliance will be lodged with the Contractor, Site Engineer confirming the following: ▶ No persons allowed other than project employees; ▶ Minimal materials are stored; ▶ All waste disposal bins will be emptied periodically; ▶ Materials are stored in leak-proof, sealable containers or packaging; ▶ The store area is secure and locked; ▶ Fire extinguishers are serviced and accessible; ▶ The area is secure from accidental damage through vehicle collision, etc.; ▶ Emergency and contact numbers of the contractor are available and prominently displayed; ▶ All stores will be secured;	• Closure of the construction camp in line with the requirements of the EMPr.	Engineer, Contractor and ESA	Closure of camp	Engineer, ECO	Whenever the construction camp is closed for longer than a week.

			▶ ▶ Chemical toilets are empty, kept hygienically clean and secured; and 24-hour security will be on site during this period.					
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Table 5-2: Flora and Fauna and Water

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Pre-construction								
Construction activities (Physical issues and their control).	Terrain	Scarring of soil surface, disturbance / loss of topsoil.	Objective(s): ▶ Minimise scarring of the soil surface and land features; ▶ Minimise disturbance and loss of topsoil; and ▶ Rehabilitate all disturbed areas. Target: ▶ Topsoil to be stripped to 300 mm where required by ECO; ▶ Topsoil only to be stripped where absolutely necessary; and ▶ The areas within and around the construction footprint may be disturbed by construction activities and must be rehabilitated to reinstate these areas. Furthermore, the cable proposed by the contractor along the northern boundary, outside the CSP fenceline, must remain within the road reserve, and no additional disturbance beyond this area should be permitted.	• No visible erosion scars once construction is completed. • Minimum loss of topsoil at the site. • No barren area visible 3 months after construction is completed. • All damaged areas successfully rehabilitated.	Contractor and ESA	Pre-construction	ECO	Vegetation will be cleared as construction proceeds.
Construction								
PV facility construction	Buffer	Encroachment into the 175 m buffer	Objective(s): ▶ Maintenance of the 175 m buffer Target: ▶ It must be ensured that there is no construction or development within the 175 m buffer between KFNR and the PV facility.	• No development within the 175 m buffer	ECO	Construction	ECO	Throughout project lifecycle.
PV facility construction	Floral habitat	Impact on floral habitat	Objective: ▶ Preservation of floral habitat characteristics Target: Essential construction phase mitigation measures: ▶ Avoid disturbance of moderately-high sensitivity habitat units as far as possible; ▶ Demarcate the construction footprint, and ensure that all construction activities remain within this footprint; ▶ Ensure that the proposed development footprint remains as small as possible, with disturbance to indigenous vegetation limited to a maximum of 11 hectares, or less where feasible, and preserve vegetation where necessary; ▶ Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; ▶ The cable proposed by the contractor along the northern boundary, outside the CSP fenceline, must remain within the road reserve, and no additional disturbance beyond this area should be permitted; and ▶ Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the project footprint. Recommended construction phase mitigation measures: ▶ All soils compacted as a result of construction activities falling outside of the footprint area should be ripped and profiled.	• Little or no alien species on construction site. • No disturbances beyond project footprint.	ECO	Construction	ECO	Throughout construction period.
PV facility construction	Floral diversity	Impact on floral diversity	Objective: ▶ Floral diversity outside footprint is not damaged unnecessarily. Target: Essential construction mitigation measures: ▶ Ensure that the proposed development footprint remains as small as possible, with disturbance to indigenous vegetation limited to a maximum of 11 hectares, or less where feasible, and preserve vegetation where necessary; ▶ Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; ▶ Prohibit the collection of plant material for firewood or for medicinal purposes; ▶ The cable proposed by the contractor along the northern boundary, outside the CSP fenceline, must remain within the road reserve, and no additional disturbance beyond this area should be permitted; and	• Little or no alien species on construction site. • No disturbances beyond project footprint.	ECO, Contractor	Construction	ECO	Throughout construction period.

			- Species specific and area specific eradication recommendations: - Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used; and - Footprint areas should be kept as small as possible when removing alien plant species.					
PV facility construction	Species conservation	Loss of floral SCC	Objective: - SCCs are preserved Target: Essential construction mitigation measures: - Prohibit the collection of plant material for medicinal purposes; - Edge effect control such as alien floral control needs to be implemented to ensure no further degradation outside of the proposed footprint area. Recommended construction mitigation measures: - Should any SCC or other protected plant species be encountered within the subject property in the future, the following should be ensured: - If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas; and - All rescue and relocation plans should be overseen by a suitably qualified specialist.	Successful transplantation of SCCs.	Contractor, ECO	Construction	ECO	Throughout construction period.
PV facility construction	Faunal habitat	Decreased faunal habitat area and integrity	Objective: - Faunal habitats are preserved Target: Essential construction phase mitigation measures: - It must be ensured that, as far as possible, all proposed infrastructure is placed outside of sensitive habitat areas. Where this is not possible, suitable mitigation measures, must be implemented; - Keep the construction footprint as small as possible to minimise impact on the surrounding faunal habitat.; - Demarcate the construction footprint, and ensure that all construction activities remain within this footprint; - Areas of increased ecological importance and sensitivity, including wetland and ridge areas, should be considered during all phases of the development planning and construction; - Restrict vehicles to travelling only on designated roadways to limit the ecological disturbance footprint of the proposed development activities; - Manage edge effects such as alien floral invasion such as alien floral invasion to ensure further loss of faunal habitat does not occur in the surrounding areas; - Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the development area; - Fires in the vicinity of development area should be prohibited during all development phases; - No trapping or hunting of fauna is to take place; - Recommended construction phase mitigation measures; and - Fence footprint areas to ensure that all activities are contained within the demarcated areas.	- No fires on site. - No destruction of natural vegetation units outside of footprint.	Contractor, ECO.	Construction	ECO	Throughout construction period.
PV facility construction	Faunal diversity	Decline in faunal diversity	Objective: - Faunal habitats are preserved Target: Essential construction mitigation measures: - Keep all development infrastructure within designated areas within the study area, whilst minimising the construction as far as possible; - Planning of temporary roads and access routes should take the site sensitivity plan into consideration. As far as possible pre-existing roads are to be used, whilst new roads must avoid any wetland and water systems.	No faunal deaths reported.	Contractor, ECO	Construction and operation	ECO	Throughout construction period

			Recommended construction mitigation measures: ▶ It is recommended that a speed limit of 40km/h be implemented on all roads running through and accessing the study area, to minimise the risk of vehicle collisions with faunal species.					
PV facility construction	Species conservation	Loss of faunal SCC	Objective: ▶ SCCs are preserved Target: Essential construction mitigation measures: ▶ Disturbance to important avifaunal habitat, such as the ridges and wetlands, must be minimised; and ▶ Ensure that as far as possible all development infrastructure is placed outside of sensitive areas.		ECO, Contractor	Construction	ECO	Throughout construction period.
PV facility construction	Wetland integrity	Wetland habitat and ecological structure fragmentation	Objective: ▶ Wetlands are protected Target: Essential mitigation measures for construction phase: ▶ Limit the footprint area of the construction activities to what is absolutely essential in order to minimise environmental damage. Construction vehicles must use existing roads where possible; ▶ During construction all building materials should be kept out of the wetland areas; ▶ All waste and remaining building materials should be removed from site on completion of the project; ▶ No vehicles should be allowed to indiscriminately drive through the wetlands; ▶ The duration in which soils are exposed during construction activities should remain as short as possible; ▶ The cable proposed by the contractor along the northern boundary, outside the CSP fenceline, must remain within the road reserve, and no additional disturbance beyond this area should be permitted; ▶ Concurrent rehabilitation is to take place as far as possible and footprint areas should be minimised as far as possible; Recommended mitigation measures for construction phase: ▶ As far as possible, all construction activities should occur in the low flow season, during the drier winter months.	• No construction materials are disposed of, and no driving occurs in wetland areas. • No erosion at site.	ECO, Contractor	Construction	ECO	Throughout construction period.
PV facility construction	Wetland hydrology	Impacts on Wetland Hydrological Function and Sediment Balance						Throughout construction period.
Operation								
PV facility operation	Floral habitat	Impact on floral habitat	Objective: ▶ Preservation of floral habitat characteristics Target: Essential operation phase mitigation measures: ▶ Ensure that operational related activities are kept strictly within the footprint area; and ▶ Alien and invasive vegetation control should take place throughout the operational phase of the development.	• Floral basal cover recovery on site.	Developer	Operation	Developer	Weekly
PV facility operation	Floral diversity	Impact on floral diversity	Objective: ▶ Floral diversity increases or remains as is. Target: Essential operation mitigation measures: ▶ Ensure that operational related activities are kept strictly within the footprint area; and ▶ Alien and invasive vegetation control should take place throughout the operational phase of the development.	• Floral basal cover recovery on site.	Developer	Operation	Developer	Weekly
PV facility operation	Species conservation	Loss of floral SCC	Objective: ▶ SCCs are preserved Target: Essential operational phase mitigation measures:	• Successful transplantation of SCCs.	Developer	Operation	Developer	Whenever site is visited for maintenance or panel washing purposes.

			▶ Ensure that operational related activities are kept strictly within the footprint area; ▶ Restrict vehicles to travelling only on designated roadways to limit the ecological footprint of the proposed development activities; and ▶ Prohibit the collection of plant material for medicinal purposes.					
PV facility operation	Faunal habitat	Decreased faunal habitat area and integrity	Objective: ▶ Faunal habitats are preserved Target: Essential operational phase mitigation measures: ▶ All disturbed areas must be rehabilitated; ▶ Ensure that operational related activities are kept strictly within the development footprint; ▶ Alien and invasive vegetation control should take place throughout the operational / maintenance phase of the development; and ▶ Restrict vehicles to travelling only on designated roadways to limit the ecological disturbance footprint of the proposed development activities.	• No fires on site. • No destruction of natural vegetation units outside of footprint.	Developer	Operation	Developer	Weekly
PV facility operation	Species conservation	Loss of faunal SCC	Objective: ▶ SCCs are preserved Target: Essential operational phase mitigation measures: ▶ Ensure that operational related activities are kept strictly within the development footprint; and ▶ Restrict vehicles to travelling only on designated roadways to limit the ecological disturbance footprint of the proposed development activities.	• Minimum loss of faunal SCC.	Developer	Operation	Developer	Weekly
PV facility operation	Wetland integrity	Wetland habitat and ecological structure fragmentation	Objective: ▶ Wetlands are protected Target: Essential mitigation measures for operational phase: ▶ Any area where active erosion is observed must be immediately rehabilitated in such a way as to ensure that the hydrology of the area is re-instated to conditions which are as natural as possible.	• No erosion originating at site.	Developer	Operation	Developer	Whenever site is visited for maintenance or panel washing purposes.
PV facility operation	Wetland hydrology	Impacts on Wetland Hydrological Function and Sediment Balance					Developer	Whenever eroded areas are encountered.
Precipitation and panel washing	Soil; dust	Soil erosion and/or water logged conditions	Objective: ▶ No soil erosion or water logging occurs on site. Panels function optimally. Target: ▶ The project area (and under PV panels) should be covered with grass; ▶ Surfaces/areas covered with road building material should be contained as far as possible; ▶ Any occurrences of soil erosion or waterlogged spots should be remediated immediately; and The number of roads within the panel footprint should be reduced as far as possible.	• Little runoff, water logging and soil erosion. • Dust doesn't accumulate on panels. • Adherence to the Stormwater Management Plan (SWMP).	Developer	Operation	Developer	Whenever site is visited for maintenance or panel washing purposes.
Decommissioning								
PV facility closure	Agriculture	Damage to agricultural equipment	Objective: ▶ Agriculture can continue after project is decommissioned Target: Any pole structures such as fences, sign boards, light poles etc. should be removed with the concrete footing and may not be cut off above surface.	• No infrastructure remains on site after closure of facility.	Contractor, Developer	Decommissioning	Developer	Once-off
PV facility closure	Soil	Impacts on land arability	Objective: ▶ Soil quality is improved after facility closure, or re-instated as close as possible to pre-commencement state. Target: ▶ The footprint of structures such as foundations (usually partly below surface), roads, parking areas, paved or tarred surfaces should be cleaned properly and waste material should be removed to a suitable disposal facility; ▶ The footprints should be ripped to alleviate compaction;	• All waste materials and decommissioned infrastructure are cleared from site. • Weeds are absent.	Contractor, Developer	Decommissioning	Developer	Once-off

			▶ After demolishing the structures the footprint may not be left abandoned and unproductive as weeds and aliens will immediately invade the area; ▶ The total footprint can immediately be reintroduced to crop farming or otherwise the soils should be ameliorated and seeded with a grass mixture such as <i>Digitria eriantha</i>, <i>Cenchrus ciliaris</i>; and ▶ A mixture of grass seed can be used provided the mixture is carefully selected to ensure the following: • Annual and perennial grasses are chosen; • Pioneer species are included; • All the grasses shall not be edible; • Species chosen will grow in the area without many problems; • Root systems must have a binding effect on the soil; and • The final product should not cause an ecological imbalance in the area.					
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Table 5-3: Heritage and Palaeontology

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Pre-construction								
PV facility construction	Heritage	Destruction of heritage resources	Objective: ▶ Compliance with relevant legislation and recommendations from SAHRA under Section 35, 36 and 38 of NHRA. Target: ▶ Include section on possible heritage finds in induction prior to construction activities take place; and ▶ Heritage chance finds are reported and dealt with as advised by the heritage specialist.	• No legal directives, legal compliance audit scores (legal register, ECO Monthly Checklist/Report).	Developer, ECO, Heritage specialist	Planning / Pre-Construction	ECO	Monthly
Method statement development	Fossil discovery	Destruction of fossils	Objective: ▶ Compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA. Target: ▶ Develop finds protocol for palaeontological resources.	• Completion and development of mitigation measures	Developer, ECO, Palaeontologist	Pre-construction	ECO	Once-off
PV facility site preparation	Heritage	Destruction of graves	Objective: ▶ Compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA. Target: ▶ If graves are discovered during the construction period, all construction work must immediately cease, and the ECO should be notified. Subsequently, upon investigation and advice from a heritage specialist, a precautionary buffer zone should be established around the gravesites. Alternatively, if feasible, the graves should be relocated.	• Grave buffer zones are avoided.	Developer, ECO, Heritage specialist	Pre-construction	ECO	Once-off
		Destruction of heritage resources	Objective: ▶ Compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA. Target: ▶ If heritage resources are discovered during the construction period, all construction work must immediately cease, and the ECO should be notified. Subsequently, upon investigation and advice from a heritage specialist, a precautionary buffer zone should be established around the historical structures identified on site.	• Historical structure 20 m buffer zones are avoided.	Contractor, Developer, Heritage specialist	Pre-construction	ECO	Once-off
			Objective: ▶ Compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA. Target: ▶ If so required by construction activities:	• Historical structure destruction permit obtained.	Contractor, Developer, Heritage specialist	Pre-construction & during construction	ECO	Once-off

			- The sites are to be documented through mapping and excavations to determine its layout and history; - Further archival research into the existence of the possible past presence of a school is to be conducted; - A mitigation permit should be applied for and issued by SAHRA under section 34 and 35 of the NHRA, as/if required; and - Upon completion of the abovementioned documentation, the applicant can apply for a destruction permit					
Construction								
PV facility construction	Heritage	Destruction of heritage resources	Objective: - Compliance with relevant legislation and recommendations from SAHRA under Section 35 and 38 of NHRA. Target: - Implement chance find procedures in cases where possible heritage finds area made.	- ECO Monthly Checklist/Report. - No heritage finds destroyed.	Developer, ECO, Heritage specialist	Construction	ESA and ECO	Weekly (ESA)/ Monthly (ECO)
PV facility site preparation	Heritage	Destruction of graves	Objective: - Compliance with relevant legislation and recommendations from SAHRA under the National Health Act, No 61 of 2003 and Section 35 and 38 of NHRA. Target: - If so required by construction activities, graves should be relocated with the necessary permits; and Destruction permits should also be applied for.	Completion of mitigation measures and obtaining relocation and destruction permits.	Contractor, Developer, Heritage specialist	Construction	ECO	Once-off
PV facility construction	Heritage	Destruction of heritage resources	Objective: - Minimisation of visual disturbance. Target: - The inverter housing within the PV panels should be minimal in size; - The colour of the roof-scape and exterior walls of buildings should be charcoal, and the colour of the exterior walls should be dark stone or dark grey or, where dark colours might affect the building temperature, natural/ neutral tones should be used instead; and - Perimeter fencing should be grey and visually permeable.	Dark grey or neutral/muted colours present on plant's ancillary infrastructure.	Contractor, Developer	Construction	Developer	Once-off
PV facility operation	Heritage	Disturbance / confusion of nocturnal fauna	Objective: - Little night-time lighting. Target: - Limit mounting lights and specifying foot lights and bollard level lighting; - Use minimum lumen or wattage in fixtures; - Place down lights and shielded fixtures; and - Place motion detectors on security lighting.	Limited night-time lighting beyond site perimeter.	Contractor, Developer, ECO	Construction, operation	Developer	Once-off
Operation								
PV facility operation	Heritage	Impact on landscape character	Objective: - Improvement of landscape character after construction. Target: - Grasses and low shrubs (less than 300 mm in height) should be planted underneath PV panels, if natural vegetation has not returned by the end of the first wet season	Proliferation of endemic vegetation under panels.	Contractor, Developer, ECO	Operation	Developer	Once-off
Decommissioning								
Project decommissioning	Visual	Impact on visual receptors	Objective: - Removal of visual disturbance. Target: - Remove all PV panels and ancillary infrastructure from site after project lifetime.	No complaints of glint and glare from motorists.	Contractor, Developer	Decommissioning	Developer	Once-off

Table 5-4: Materials and waste

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Pre-construction								
Transportation of material	Material transport	Traffic congestion.	Objective(s) To ensure that whilst material is transported, it cannot be of negative influence to the surrounding environment.	Mufflers and silencers fitted to construction vehicles and equipment.	Contractor and ESA	Prior to construction start	ECO	Throughout construction or

		Dust during transportation. Excessive noise.	Target: ▶ Existing access roads must be utilised as far as possible, with only the minimum new access roads being constructed where absolutely necessary; ▶ Adequate and appropriate traffic warning signage must be erected where applicable, along transport routes and access roads; ▶ The Contractor shall take preventative measures e.g. screening, muffling, timing, pre-notification of affected parties to minimise complaints regarding noise and vibration nuisance from sources; ▶ Fine materials (such as sand) must be covered during transportation; ▶ Appropriate response plans must be prepared by Contractors to ensure the fastest possible reaction to spills or accidents; ▶ Deliveries must be scheduled for off-peak hour traffic times; ▶ All trucks and vehicles removing spoil from the site must have load areas and must be covered by a tarpaulin (plastic / synthetic sheets (covers) to prevent rocks and spoil falling onto the road surfaces; ▶ Vehicle speeds on site should not exceed 40 km / hr. on gravel roads; ▶ All drivers and operators are to have licences for driving and moving of plant on site; and ▶ All road vehicles should be roadworthy. ▶ If abnormal loads are required the necessary transport permit must be secured.	• Covering of material during transportation. • Emergency reaction plan (for spills / accidents) always readily available on site.				as required by the ECO.
Storage of hazardous material	Hazardous material storage areas	Contamination of soil by hazardous material	Objective(s): ▶ To ensure adequate protection of soil and soil remediation measures in case of spills. Target: ▶ Hazardous materials, such as paint, cement, fuels, bitumen, oil, herbicides, battery acid or detergents, must be stored in sealed, lockable containers when not in use; ▶ A register shall be kept on all substances and be available for inspection at all times. Areas shall be monitored for spills and any spills shall be contained, cleaned, and rehabilitated immediately; ▶ No decantation into unmarked containers or containers with no or incorrect labelling; ▶ To avoid fire risks, no decanted fuel will be left unattended in the sun; ▶ When handling hazardous materials, manufacturer's specifications must be complied with. The 16 point Material Safety Data Sheet should be available on site; ▶ Reasonable care must be taken to prevent spills of any hazardous material when in use; ▶ All spills (minor and major) must be cleaned and remediated to the satisfaction of the ECO and ESA within 24 hours of occurrence; ▶ The contractor must ensure that there is a supply of absorbent material (e.g. Drizit) and clean-up materials readily available to absorb, break down and, where possible, encapsulate minor hazardous material spillages; ▶ No hazardous material may be stacked higher than 2 m; ▶ All products are to be stored with compatibility in mind; ▶ Storage areas shall display the required safety signs depicting "No smoking", "No naked flames" and "Danger". Containers shall be clearly marked to indicate contents as well as safety requirements; ▶ Any other hazardous substances stored in bulk will require bunding; and ▶ The contractor shall supply a method statement to the contractor for approval for the storage of hazardous materials prior to site preparation works. ▶ Northern Cape DAEARD&LR must be notified in terms of Part 8 of NEM:WA in the event of an "emergency situation"⁷ involving waste.	• Storage of hazardous materials in sealed and lockable containers. • No evidence of spills on site. • Absorbent and clean-up material readily available on site.	Contractor and ESA.	During construction	ECO	For the duration of the construction period dependent on the presence of hazardous material on site.

⁷ Defined as "a situation that has arisen suddenly that poses an imminent and serious threat to the environment, human life or property, including a 'disaster' as defined in section 1 of the Disaster Management Act, 2002 (Act No. 57 of 2002)" (NEMA section 30A(7)).

Storage of fuel	Storage areas	Contamination of soil by fuel. Inadequate remediation measures for spills.	Objective(s): ▶ To ensure that there is optimum environmental protection (especially soil) from fuel spills. Target: ▶ Fuel must be stored in above ground storage tanks or sealed containers, contained within a bunded area with sump drainage; ▶ All bunds must be designed to contain at least 110% of the tank or drum storage capacity (this shall apply to above ground storage, and include fuels, and oxy-acetylene cutting equipment); and ▶ No drainage from fuel storage areas shall be permitted.	• Established fuel storage areas in compliance with the objectives of the EMPr.	Contractor and ESA	Pre-construction (site establishment)	ECO	Once off
Construction and Operation								
Use of cement	Cement	Contamination of soil and surrounding environment by cement. Decrease in ambient air quality.	Objective(s): ▶ To ensure that the environment is protected from cement that will be used on site. Target: ▶ Cement must be delivered in sound and properly secured bags or in approved bulk containers; ▶ Cement in bags must be stored in containers to be provided at the construction camp and should only be opened when needed; ▶ The storage facility and surrounding area must be swept and cleaned regularly as necessary to ensure that cement products do not the pollute the surrounding environment; ▶ Empty cement bags are to be collected in hessian, material, or plastic bags which, once full, can be disposed of at a registered landfill site; ▶ Cement bags are not to be burnt on site; and ▶ No concrete batching is to occur on bare soil, but rather on lined specially constructed bunded areas.	• Cement delivery, storage and use will be in line with the EMPr requirements.	Contractor and ESA	During construction	ECO	As long as cement is in use on site.
Storage, removal, and disposal of construction waste	Construction waste	Land pollution. Compaction of soil by rubble. Decreased aesthetic integrity of the site.	Objective(s): ▶ To ensure that waste is correctly stored and disposed of, decreasing the visual and environmental impact during the construction and post construction period; ▶ To keep the site neat and clean; ▶ Disposal of rubble and refuse in an appropriate manner; ▶ Minimise litigation; and ▶ Minimise landowner complaints. Targets: ▶ No material shall be left on site that could be harmful to humans and animals; ▶ Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site for future use or recycling; ▶ Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work; ▶ Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities are introduced to site; ▶ Bins and containers must be made available by the contractor for the storage of construction waste; ▶ All construction waste shall be stored in waste skips located strategically on site. A licensed waste contractor shall collect these skips for removal to a licensed landfill site. No construction waste may be stored on site for longer than 30 days; ▶ The Contractor will be responsible to remove and transport all construction waste material off site to a registered waste disposal facility (proof of this, as well as a copy of the site's Registration Permit, must be provided by the Contractor to the ECO); ▶ Where domestic waste is collected by the relevant municipality itself, a collection receipt will be suitable proof of safe disposal; and ▶ No burning of waste will be permitted on site.	• Construction waste stored, collected, and disposed of as per the requirements of this EMPr.	Contractor and ESA	Waste bins / skips must be available prior to construction. Removal of waste throughout construction and operation.	ECO	The ESA will determine the frequency of waste removed from site.

Storage, removal, and disposal of domestic waste	Domestic waste	Land pollution, unpleasant odours, decreased aesthetic integrity of the site.	Objective(s): ▶ To ensure that waste is correctly stored and disposed of, decreasing the visual and possible environmental impact during the construction and post construction period. Target: ▶ The Contractor must supply waste bins at the construction camp for the storage of domestic waste; ▶ Personnel must be informed about the necessity of using the waste drums; ▶ The Contractor must do site clean-ups of litter other than construction waste on a daily basis, and dispose of it in the designated refuse bins provided at the Contractor's Camp; ▶ The contractor must ensure that general site-wide litter clean-up will occur at least once a week; and ▶ The Contractor must dispose of all domestic refuse generated by his staff and Sub-Contractors on a weekly basis at a registered waste disposal facility. The Contractor must provide proof of this to the ECO in the form of a safe disposal certificate.	• Evidence of domestic waste stored, removed, and disposed of according to the requirements indicated in this EMPr.	Contractor and ESA	The waste bins / skips must be available prior to construction. Removal of waste throughout construction and operation.	ECO	The ECO will determine the frequency of waste removal from site.
Storage, removal, and disposal of hazardous waste.	Hazardous waste	Soil pollution, groundwater contamination.	Objective(s): ▶ To ensure that soil and the rest of the surrounding environment on site is protected from hazardous waste. Target: ▶ The Contractor is required by the National Environmental Management: Waste Act (no 59 of 2008) and the globally harmonised system for the classification of waste to determine whether any substance (new or waste) stored on site is subject to controls contained within the act; ▶ All hazardous waste must be stored in sealed and suitably marked containers for removal to a registered hazardous waste disposal facility; ▶ Hazardous waste may only be stored on site for a period of 90 days, where after it must be disposed of at a registered hazardous waste disposal site; and ▶ Any oil spillage on site will be excavated to a depth determined between the ESA and ECO and disposed of for removal to a registered hazardous waste disposal site. Excavated areas are to be refilled with suitable replacement material. Alternative in-situ remediation techniques could be used, if approved by the ECO.	• All mitigation measures with regards to Hazardous waste mentioned in the EMPr are implemented.	Contractor and ESA	Hazardous wastes must be collected in sealable, safe containers. Removal of hazardous waste throughout the construction process.	ECO	During the entire construction period.

Table 5-5: Dust

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Construction								
Trenching and transport or soils	Dust, smoke, and emission control	Air pollution	Objective(s): ▶ To reduce the generation of dust on the construction site. Target: ▶ Dust suppression is to be conducted during construction or as complaints are received; ▶ The Contractor is to take appropriate measures to minimise the generation of dust as a result of excavation works. Such measures include frequent water spraying during low rainfall periods or by using chemical dust binding agents approved by the ECO; ▶ Speed limits must be enforced in all areas to reduce the generation of dust; ▶ Cover dump trucks before traveling on public roads; ▶ Keep soil moist while loading into dump trucks to minimise fugitive dust; ▶ Keep soil loads below the freeboard of the truck to minimise fugitive dust; ▶ Minimise drop heights when loaders dump soil into trucks; ▶ Revegetate disturbed areas as soon as possible after disturbance; ▶ When feasible, shut down idling construction machinery; and ▶ Tighten gate seals on dump trucks.	• Dust is kept at its lowest level on site.	Contractor and ESA	Throughout construction	ECO	During periods of low rainfall or as required by the ECO.

Table 5-6: General construction activities

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Construction								
Construction activities	Construction vehicles, plant, and machinery	Noise and vibration	Objective(s): - Noise on site kept to a minimum. Target: - Should construction have to continue after hours, all residents affected must be notified; and - All machinery and equipment must be maintained in good working order, and fitted with muffler systems designed for each particular piece of machinery.	- Construction vehicles and machinery fitted with mufflers silencers. - Working hours are adhered to.	Contractor and ESA	Throughout construction	ECO	Ongoing
Construction activities	Existing infrastructure	Disruption of services, damage to installations, damage, or loss of plant.	Objective(s): - To have control over and prevent temporary or permanent damage to plant and installations; - To prevent interference with the normal operation of plant and installations; and - Securing the safe use of infrastructure, plant and installations have control over actions and activities in close proximity to inhabited areas. Target: - Where pipelines are found along the route, the depth of the pipes under the surface shall be determined to ensure that proper protection is afforded to such structures; - Any damage to pipelines shall be repaired immediately; - All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties; 40 km/hr speed limits shall be enforced in such areas and all drivers shall be sensitised to this effect; - Upon completion of the project all roads directly damaged by construction activities shall be repaired to their original state; and - Power cuts to facilitate construction must be carefully planned. If possible, disruptions must be kept to a minimum and should be well advertised and communicated to the Landowners.	- No unplanned disruptions of services. - No damage to any plant or installations. - No complaints from authorities or Landowners regarding disruption of services. - No litigation due to losses of plant, installations, and crops.	Contractor, ESA.	Throughout construction	ECO	During construction
Concrete batching	Batching plants	Damage to vegetation. Damage to topsoil. Surface water contamination. Disturbance to the area.	Objective(s): - To ensure all agreements with Landowners are adhered to; and - To prevent complaints from Landowners. Successful rehabilitation of disturbed areas. Target: - The siting of batching plants shall be done in conjunction with the engineer and ECO; - The batching plant area shall be operated in such a way as to prevent contaminated water from running off the site and polluting waterbodies; - The developer shall ensure that all agreements reached with the Landowner are fulfilled and that such areas be rehabilitated once construction is completed; and - Should any claim be instituted against the developer, due to the actions of the Contractor at a batching plant site, the developer shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation.	- No complaints from Landowners. - All disturbed areas were successfully rehabilitated three months after the completion of the contract.	Contractor, ESA.	Throughout construction	ECO	During construction
Actions by site staff	Littering on site	Untidy and polluted site and surrounding land	Objective(s): - To maintain a neat and tidy workplace. Target: - Littering by the employees of the Contractor shall not be allowed; and - The ECO shall monitor the tidiness of the work sites as well as the campsite.	- No visible sign of littering. - No complaints from Landowners.	Contractor, ESA.	Throughout construction	ECO	During construction

Table 5-7: Rehabilitation

Activity	Aspect	Potential Impact	Mitigation Measure (Objective and Target)	Performance Indicator	Implementation Responsibility	Time Schedule	Verification Responsibility	Frequency
Construction and Decomissioning								
Rehabilitation of the construction site	Rehabilitation	Fauna and flora	Objective(s): ▶ To minimise damage to topsoil and the environment in construction areas; ▶ Successful rehabilitation of all damaged areas; ▶ Prevention of erosion. Target: ▶ All areas earmarked for construction shall have the topsoil removed separately and stored for later use during the rehabilitation of such areas; ▶ During backfilling operations, the Contractor shall take care not to dump the topsoil in the bottom of the foundation and then put spoil on top. Topsoil must also be replaced on top of the backfilled areas; ▶ Re-seeding shall be done on disturbed areas as directed by the ECO to prevent the loss of soil and dust generation; ▶ Maintenance of the re-seeded areas shall be conducted until an acceptable cover has been established, meaning 75% ground cover with no gaps exceeding 500 mm. Maintenance includes watering, mowing, and weeding as well as preventing the development of erosion channels; ▶ To get the best results in a specific area, consult with a specialist or the local extension officer of the Dept. of Agriculture; ▶ Re-seeding, as well as fencing in badly damaged areas, will always be at the discretion of the ECO unless specifically requested by the Landowner; ▶ The removal of all construction facilities and materials from the construction camp will be required, and rehabilitation carried out including the removal of concrete and compacted earth platforms, fuel storage tanks and chemical toilets; ▶ All-access roads no longer in use shall be rehabilitated; ▶ Any contaminated material or soil must be removed to a registered hazardous waste disposal facility and the prescribed re-vegetation process must then be followed thereafter; ▶ Rehabilitation must be carried out as soon as possible after the construction is completed; and ▶ All rehabilitation is to be done with approval of the developer's environmental management department.	• No loss of topsoil due to construction activities. • All disturbed areas successfully rehabilitated after decommissioning the solar plant.	Contractor, ESA.	During construction (in a phased manner) and decommissioning	ECO	Once-off

6 SPECIALIST IMPACTS AND MITIGATION

During the BA process, the following specialist studies were undertaken:

- ▶ Terrestrial Biodiversity Assessment;
- ▶ Landscape and Visual Impact Assessment (VIA) (compliance statement);
- ▶ Heritage Impact Assessment;
- ▶ Palaeontology Specialist Compliance Statement⁸.

Impacts and their recommended mitigation measures as detailed in the specialist studies are summarised below. These mitigation measures must be implemented throughout the construction, operational and decommissioning phases of the project.

6.1 TERRESTRIAL BIODIVERSITY (ENDEMICVISION, 2024)

The impact assessment presents the impacts prior to the implementation of mitigation measures and following the implementation of the mitigation hierarchy. The mitigated risk rating assumes that all proposed mitigation measures are implemented fully.

6.1.1 BIODIVERSITY IMPACTS SUMMARY PRE- AND POST-MITIGATION

Table 6-1 below provides a summary of impacts pre- mitigation and post mitigation when the specialist recommended mitigation measures are implemented.

Table 6-1: Biodiversity impact summary pre- and post-mitigation.

#	Impact	Pre-mitigation:	Post-mitigation:
		Significance	Significance
1	Loss of faunal diversity and SCC	High - negative	Low - negative
2	Loss of floral diversity and SCC	Very high - negative	Moderate - negative
3	IAP spp occurrence	Moderate - negative	Very low
4	Loss of habitat - ecological condition, structure, processes and functionality.	High - negative	Low - negative
3	Habitat deterioration - indirect loss of habitat	High - negative	Low - negative
6	Loss of topsoil	High - negative	Very low
7	Loss of fauna and flora specimens	High - negative	Very low
8	Catchment impacts on ephemeral pans	High - negative	Moderate - positive

6.1.2 IMPACT MANAGEMENT PLAN

The following tables present the impact management actions according to specific EMPr to ensure biodiversity impacts remain at the projected post-mitigation level.

⁸ Compiled in response to the interim comments received from SAHRA on 6 June 2024 (Case ID: **22417**).

Table 6-2: Reduce the loss of SCC flora and fauna species and local area diversity

Avoidance Measures	Reduction Measures	Remedial Measures	Compensate / Offset	Monitoring Measures
- The final design uses already disturbed areas first for laydown and topsoil storage. - The final design avoids impacting the bushveld habitat by redirecting the powerline within the CSP footprint area. - Avoid additional, unnecessary loss of habitat. Demarcate all areas that require vegetation clearance to reduce footprint expansion into surrounding intact areas. - All indigenous species is retained as far as possible and where alien species are encountered they are removed as per the AIP Management Plan. - Any nationally protected trees within close proximity of the development footprint or in temporary laydown areas to be identified and retained on site. - No person is allowed to 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 forest product derived from a protected tree. - Protected trees with active bird nests or other significant biodiversity features must not be destroyed without a valid Fauna Permit from the Provincial Conservation	- A search and rescue survey for all flora and fauna nests/burrows SCC should be conducted prior to the commencement of construction to determine the number of potentially impacted SCC. Destruction, clearing and/or relocation permits should be obtained from the relevant authority. - Reducing the loss of faunal species is partially possible by allowing movement corridors to surrounding intact habitats, specifically into the offset area. The practicality of such a corridor should be discussed and could also be used to move the Ostriches to the offset area. - Dozing and disturbance of the site should take place from the western side to the eastern side to allow for animal escape to safe areas instead of into adjacent traffic (T25 and other infrastructure (existing plant)). - Check protected trees for bird nests well before construction.	- Relocation of SCC plants should take place to suitable habitats before construction. - Ensure vegetated topsoil is stored in such a way that plant species can re-establish in future by means of seedbank and bulbs retained in the topsoil. - Ensure vegetation establishment before the first rain season after construction. This should include the temporary cleared areas, laydown, roads and topsoil dumps. - Should removal of a protected tree be required, obtain a permit in terms of Section 15(1) of the National Forests Act, 1998 (Act No. 84 of 1998). - If necessary, apply for a Fauna Permit from under the Northern Cape Nature Conservation Act, Act 9 of 2009 (NCNCA).	- Translocation of tree species are unfeasible and trees lost due to the development should be compensated for by planting saplings, supported with dryland sowing in areas suitable for woodland species. These areas should preferably be areas that need restoration or improvement. Because of the very low survival rate of both transplanted and sowing, a high replacement ratio should be implemented. - KSP manages areas where <i>Boscia albitrunca</i> seeds could be harvested locally for future re-establishment. A long-term harvesting and re-establishment community project could have both social and biodiversity benefits.	- Monitoring and reporting of survival of relocated SCC. - Monitor rehabilitation success. - Monitor adherence to protected tree permit conditions.

Authority, under the Northern Cape Nature Conservation Act, Act 9 of 2009 (NCNCA).				
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Table 6-3: Manage alien invasive species (see detailed management plan in Appendix C1)

Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
- Remove alien invasive species from the area before topsoil stripping to limit alien infestation of the topsoil after stockpiling and storage. - Prevent and limit alien invasive species establishing on site by conducting concurrent rehabilitation and vegetating bare areas as soon as possible.	Compile and implement an AIP management plan. The plan should indicate AIP distribution, preferred management methods, replacement of AIP with indigenous species and monitoring of AIP management success.	Reintroduce local indigenous seed and species on all bare areas and topsoil if topsoil is not vegetating from topsoil seedbank.	Alien vegetation monitoring and maintenance plans should be in place for the site during operational and rehabilitation phase.

Table 6-4: Re-instate functional habitats as far as possible (see detailed management plan in Appendix C2)

Avoidance Measures	Reduction Measures	Remedial Measures	Compensate / Offset	Monitoring Measures
The 175 m buffer must be clearly delineated during the construction phase. In addition, the following requirements must be adhered to: - Avoid ingress into proclaimed biodiversity offset area by maintaining a buffer between the planned development and the biodiversity offset area. - Impacts on the catchment area and ephemeral pans are avoided by implementing the preferred design. - Avoid any future fragmentation of the catchment area as far as possible. - Avoid additional, unnecessary loss of habitat. Demarcate all areas that require vegetation clearance to	Reduce habitat loss for, indirect impacts (dust, traffic, light).	Compile, implement and monitor a site-specific rehabilitation plan that will include the re-instatement of key elements of the specific habitats lost.	A possible compensation for the habitat loss and cumulative impact on remaining habitats is to increase the value of similar or more important habitats managed by the proponent. Such an effort would increase the net-biodiversity balance of the operation.	Rehabilitation success monitoring should take place frequently. It is proposed to consider monitoring the rehabilitation efforts in year 1,2,3,5,7 and 10, whereafter the rehabilitation efforts would hopefully be signed off.

reduce footprint expansion into surrounding intact areas.				
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Table 6-5: Limit indirect impacts (dust, light, traffic)

Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
- Travel on demarcated roads only and apply dust suppressant or wetting agent to seal road surfaces. Maintain speed limits to reduce dust on site and in area. - Night lighting should be limited to the development area only and not extend into the adjacent natural veld, specifically the bushveld habitat and offset areas.	- The dust impacts of the T25 have proven to have significant impacts on the surrounding vegetation. This is due to the road surface material being powdery and the increase in traffic because of the KSP. It is proposed that the proponent, as a key user and manager of the offset area also affected by the dust, collaborate with the local municipality and other prominent users towards a plan to improve road surface and/or manage dust on the long term. - If the site must be lit at night for security purposes, this should be done with low-UV type lights (such as most LEDs), which do not attract insects.	- Dust impacts cannot be remediated. - Where more than one roadkill is encountered, the area should be investigated for fauna breeding or migration and an alternative route considered.	Dust monitoring is applicable where this is a significant risk or impact on third parties must be monitored. Ensure compliance according to NEM:AQA and dust regulations where applicable.

Table 6-6: Manage interaction with fauna and flora during construction

Avoidance Measures	Reduction Measures	Remedial Measures	Monitoring Measures
- Site access should be controlled and no unauthorized persons should be allowed onto the site. If the facility is to be fenced, then no electrified strands should be placed within 30cm of the ground as some species such as tortoises, porcupine, armadillo, and pangolins 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. - All construction staff should undergo an environmental induction from a suitably qualified person regarding: - the importance of footprint and topsoil management - protected species identification and management - alien species identification and management - Reducing roadkill, illegal harvesting, uncontrolled dozing, illegal trapping.	- The collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the demarcated construction site. - Implement incident management procedure on site where actions by the contractor may result in EMP non-compliance.	- Any fauna directly threatened by the construction activities should be removed to similar, but protected habitats. - The likelihood of snake and other species encounters is likely during the construction phase and there is opportunity for KSP to have a community snake catcher available to relocate protected species encountered during construction.	Road kills and animal removal must be recorded for the project to give an indication of fauna activity in the area. Recording should include species, date, area. These records / photos and or videos should be used in environmental awareness and induction of staff to prevent future incidents. This data can also assist in understanding local distribution and utilisation patterns.

Table 6-7: Manage the KSP topsoil resource to ensure the best possible rehabilitation in the future.

Avoidance Measures	Reduction Measures	Remedial Measures	Compensate / Offset	Monitoring Measures
- The loss of topsoil is avoided in the final design where at least 2.6 ha are set aside for long term topsoil storage. - Topsoil should be harvested at a depth of 100 mm from the open woodland area and 300 mm from thicket habitats and stored on the demarcated areas at a height of approximately 1.5 m.	Avoid topsoil reduction from water and wind erosion by ensuring topsoil has sufficient vegetation cover.	Compile, implement and monitor a site-specific topsoil management plan. This plan can be a chapter in the rehabilitation management plan.	Compensation to reproduce topsoil artificially is financially and practically unfeasible.	Maintain a topsoil register of stockpile volumes, demarcation, condition, source area and management interventions (sowing, erosion control, alien species removal).

Besides the measures discussed in **Table 6-7**, the following topsoil harvesting requirements and volumes should be applied by the contractor during construction. The available topsoil footprint is greater than the required footprint, which allows for some margin to execute the best practical option. The total area required for topsoil stockpiling is 4.43 ha except where stack height is increased to 2 m, then the total area required for topsoil stockpiling is 3.49 ha.

Table 6-8: Topsoil requirements at a stack height of 1.5 m

Topsoil Requirement at a stack height of 1.5 m	m³	ha	m²	Width	Length	Depth harvested	Height stacked
Existing topsoil within development footprint	8 340	0.56	5 560	-	-	0.00	1.50
Topsoil material from historic laydown	14 166	0.94	141 655	345.50	410.00	0.10	1.50
Topsoil material from Bushveld area - North	36 819	2.45	138 787	173.50	707.37	0.30	1.50
Topsoil material from Bushveld area - East	7 107	0.47	23 691	52.80	448.70	0.30	1.50
Total hectares required for topsoil stockpiling	4.43						

Table 6-9: Topsoil requirements at a stack height of 2 m

Topsoil Requirement at a stack height of 2 m	m³	Ha	m²	Width	Length	Depth harvested	Height stacked
Existing topsoil within development footprint	8 339.84	0.56	5 559.89	-	-	0.00	1.50
Topsoil material from historic laydown	14 165.50	0.71	141 655.00	345.50	410.00	0.10	2.00
Topsoil material from Bushveld area - North	36 818.61	1.84	138 787.28	173.50	707.37	0.30	2.00
Topsoil material from Bushveld area - East	7 107.41	0.36	23 691.36	52.80	448.70	0.30	2.00
Total hectares required for topsoil stockpiling	3.46						

6.2 VISUAL IMPACTS (CREATE LANDSCAPE ARCHITECTURE AND CONSULTING, 2024)

The subsequent subsections below summarise the potential impacts and mitigation measures that are anticipated to arise during construction or rehabilitation and operation of the project.

6.2.1 CONSTRUCTION

6.2.1.1 Construction activities

The following construction phase activities (identified issues) may lead to negative landscape and visual impacts:

- ▶ Site clearing and levelling;
- ▶ Dust;
- ▶ Vehicle movements;
- ▶ Lights at night; and
- ▶ Construction of auxiliary infrastructure.

6.2.1.2 Construction impacts

Table 6-10: Construction phase impacts

Impact number	Impact description	Expected impact significance pre-mitigation	Expected impact significance post-mitigation
1	► Impact on landscape character and sense of place (Change in the landscape character and sense of place of the study area by the construction activities as listed under item 6.2.1.1. The construction of the proposed development will add to the industrial components within the existing context and could potentially result in negative changes to the landscape character and sense of place).	Low (negative)	Very low (negative)
2	► Impact on visual intrusion and VAC (The level of compatibility and the ability of the landscape to visually absorb the listed construction activities, including contrasts in form, line, colour, and texture resulting from vegetation clearing).	Low (negative)	Very low (negative)
3	► Impact as a result of visual exposure and visibility (The visibility and presence of the cleared PV Facility and its associated construction equipment and activities).	Low (negative)	Very low (negative)

6.2.2 OPERATION

6.2.2.1 Operational activities

The following operational activities (identified issues) may lead to negative landscape and visual impacts:

- Views of the PV panels;
- Reflectivity; and
- Increased traffic.

6.2.2.2 Operational impacts

Table 6-11: Operation phase impacts

Impact number	Impact description	Expected impact significance pre-mitigation	Expected impact significance post-mitigation
1	► Impact on landscape character and sense of place (Change in the landscape character and sense of place through the addition of industrial type infrastructure. The proposed development will add to the industrial components within the existing context and could potentially result in negative changes to the landscape character and sense of place).	Low (negative)	Very low (negative)
2	► Impact on visual intrusion and VAC (The level of compatibility and the ability of the landscape to visually absorb the proposed infrastructure, including contrasts in form, line, colour, and texture resulting from vegetation clearing).	Low (negative)	Very low (negative)

3	► Impact as a result of visual exposure and visibility (The visibility and presence of the cleared PV Facility and associated infrastructure, potential solar reflection of the PV panels).	Moderate (negative)	Low (negative)
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6.2.3 PROPOSED MITIGATION MEASURES

6.2.3.1 Detailed design

To reduce visual intrusion, fences must be of a robust mesh type. Shiny galvanized or white coloured fencing must be avoided for permanent security fencing around infrastructure areas. If practically feasible, the aesthetic look and feel of any new fences must be similar to existing one's of the adjacent facility. The security fence must be offset between any road and a 20 m green buffer zone must be kept in place to provide a visual buffer between potential receptors and the security fencing (this includes the indigenous *Acacia* trees and small shrubs along the existing gravel road).

6.2.3.2 Construction

The following are the proposed mitigation measures recommended to be implemented during the construction phase to reduce or mitigate the proposed impacts:

- Dust retardant measures need to be introduced to control wind-blown dust;
- The successful maintenance of vegetation buffers (especially to the north and the east) can significantly reduce this impact on the landscape. The current PV panel location, in relationship to its distance from main roads (such as the N14 and R380) and the town of Kathu already mitigate the impact;
- Construction activities should be restricted to daylight hours as far as possible to limit the need to bright floodlighting and the potential for sky glow.
- If night-time construction is needed, it is be limited as far as possible and lights should be directed away from neighbouring land owners.
- Vegetation clearance must be minimised by fencing off the work area and restricting vehicular access outside this area.
- There is a vegetation (soil) berm, (approximately 2,5m high) along the perimeter of the existing facility. This provides some visual screening from the current infrastructure. During site clearing there is an opportunity to create a similar berm along the perimeter of the newly proposed facility. Considering the proposed infrastructure height, this will serve as an effective visual screen.
- The Contractor shall not deface, paint, damage or mark any natural feature (e.g., rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand.
- A 10 m wide buffer zone must be retained to mitigate visual impacts adjacent to Oupos farm, located north east of the site. This measure is necessary to avoid destroying the existing trees that currently serve as a visual buffer between the SPA facility and the farm.

6.2.3.3 Operation⁹

The following are the proposed mitigation measures recommended to be implemented during the operational phase to reduce or mitigate the proposed impacts:

- Install low level lighting or limit mounting heights of lighting fixtures by utilising footlight or bollard level lights. The use of high light masts and high pole top security lighting should be avoided along the security fence of infrastructure areas. Any high-level masts should be covered to reduce glow and light spillage.

⁹ Some of the construction mitigation measures will also reduce impacts during operation.

- ▶ Use minimum lumen or wattage in light fixtures, where possible and practical.
- ▶ Up lighting of structures must be avoided where possible, with lighting installed downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass.
- ▶ All buildings must have “full cut off” light fixtures that direct light only below the horizontal.
- ▶ Use Yellow Light Emitting Diode (LED) lighting, or equivalent to reduce sky glow. Bluish white lighting is more likely to cause glare.
- ▶ Use motion detectors on security lighting at the office and other associated out buildings.
- ▶ A 10 m wide buffer zone must be retained to mitigate visual impacts adjacent to Oupos farm, located north east of the site. This measure is necessary to avoid destroying the existing trees that currently serve as a visual buffer between the SPA facility and farm.

6.3 HERITAGE AND ARCHAEOLOGICAL ASSESSMENT (MORRIS, 2024)

A low density of highly dispersed heritage traces in the form of isolated flaked stone artefacts lacking context or assemblage integrity was found within the footprint of the proposed Kathu SPA facility north of Kathu. A large proportion of the impact area comprises the previously cleared laydown area where artefacts present (low density) have already been disturbed.

From an archaeological perspective, the proximity of the SPA facility to the Kathu Archaeological Complex sites, which hold Grade 1 National Heritage status, indicates that the project footprint lies beyond the zone of high sensitivity. As a result, no mitigation measures are deemed necessary based on this impact assessment.

6.3.1 IMPACTS PER ALTERNATIVE DESIGN

The table below summarizes the impacts identified for the preferred design alternative. Mitigation measures are not recommended as necessary for the below identified impacts.

Table 6-12: Summary of impacts associated with the proposed design and layout alternatives.

Impact	Pre-mitigation:						Post-mitigation:					
	Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Option 1: Loss of archaeological resources - Occurrence of archaeological materials (only stone artefacts were observed) is widely dispersed, isolated finds, lacking assemblage integrity, and already disturbed in the previous laydown area. While duration of impact would be long-term where isolated artefacts are impacted, such impact would be highly localised (site specific) and low intensity. Mitigation measures not recommended as necessary.	Long-term	Site-specific	Negligible	Negligible	Fairly likely	Very low	Long-term	Site-specific	Negligible	Negligible	Unlikely	Very low

6.3.2 PROPOSED MITIGATION MEASURES

From an Archaeological and Cultural Heritage point of view, it is recommended that the proposed development be allowed to proceed; with the proviso that:

- ▶ should any archaeological sites, features or graves be exposed during construction or any prior or subsequent phase of the project, it must be reported immediately to SAHRA so that specialist investigation and evaluation can take place to determine a way forward.
- ▶ It is therefore recommended that an archaeological watching brief, aimed at monitoring the construction and excavation work for any archaeological deposits and features which may be exposed during these development activities, be implemented during the construction phase.

6.4 PALAEOONTOLOGICAL COMPLIANCE STATEMENT (BAMFORD, 2024)

According to the online South African Heritage Resources Information System (SAHRIS) palaeosensitivity map (**Figure 6-1**) the existing project and the augmentation project lie on highly sensitivity (orange) Tertiary Calcretes, of which could obscure palaeo-pans. No such feature is visible in the satellite imagery. In addition, the archaeologist noted that there were scatters of stone tools but no concentrations of tools or other artefacts such as occurs in the palaeo-pans of Kathu Townlands (Morris, 2024; in Zutari Draft BAR document: pp 119 - 120). It is unlikely, therefore, that there was or will be any impact on the palaeontological heritage. Nonetheless, if any fossils are found during excavations for foundations and amenities they can be rescued.

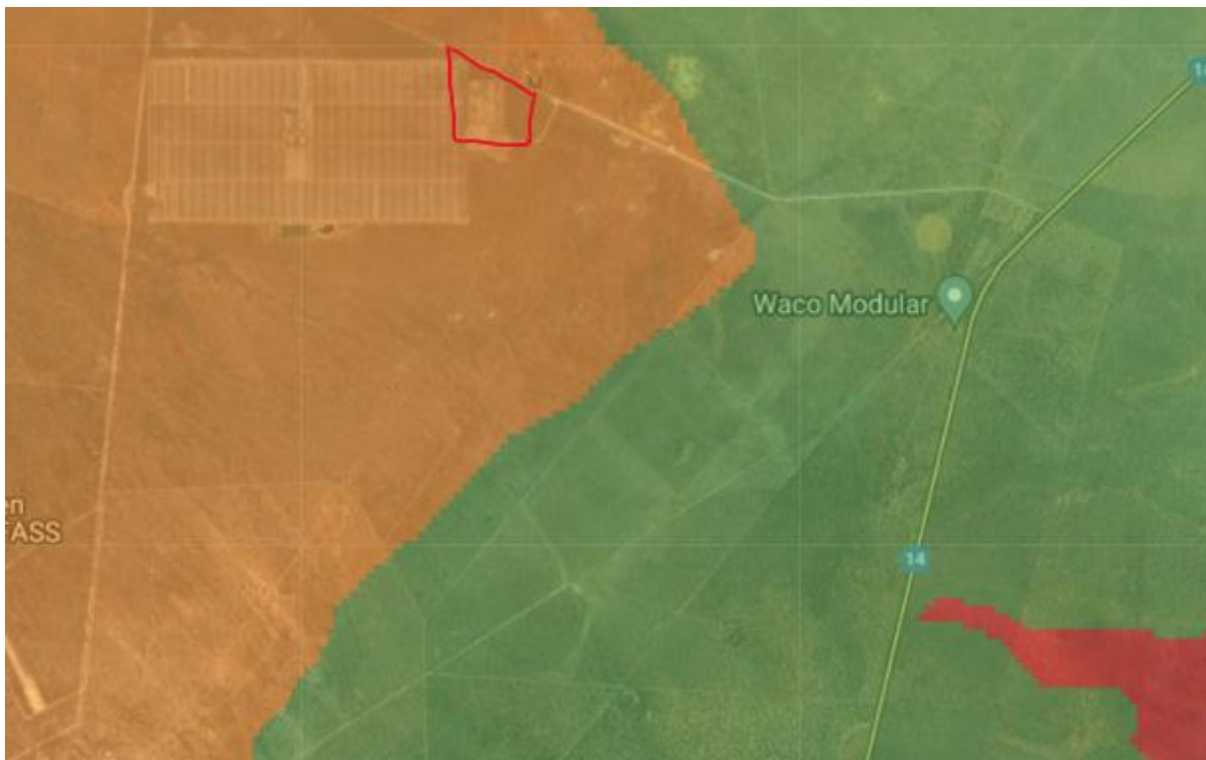


Figure 6-1: SAHRIS palaeosensitivity map for the proposed SPA (red polygon). Background colours indicate the following degrees of sensitivity: red = very highly sensitive; orange/yellow = high; green = moderate; blue = low; grey = insignificant/zero; white/ no colour = unknown sensitivity.

6.4.1 FOSSIL CHANCE FIND PROTOCOL

Monitoring Programme for Palaeontology – to commence once the excavations / drilling activities begin.

1. The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.
2. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted.

3. Photographs of similar fossils can be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones. This information will be built into the EMP's training and awareness plan and procedures if required by SAHRA/NCPHRA.
4. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment.
5. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible.
6. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA/NCPHRA permit must be obtained. Annual reports must be submitted to SAHRA/NCPHRA as required by the relevant permits.
7. If no good fossil material is recovered, then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA/NCPHRA once the project has been completed and only if there are fossils.
8. If no fossils are found and the excavations have finished, then no further monitoring is required.

7 OPERATIONAL MITIGATION

The operational phase commences when the proposed development is being used for its intended purpose i.e., generating electricity. It is possible that there will be a period in the project life cycle where the construction and operational phase will overlap. This phase will include ongoing operation, monitoring, and maintenance of the PV plant, as well as continuing environmental management requirements (e.g., removal of alien and invasive vegetation).

A written notification of operation must be given to the CA no later than 14 days prior to the commencement of the project's operational phase.

7.1 PV PANEL MAINTENANCE

7.1.1 CLEAN SOLAR PANELS FROM THE GROUND

For safety reasons, PV panels should be cleaned from the ground if possible. Make use of a good quality soft brush and a squeegee with a plastic blade on one side and a cloth covered sponge on the other coupled with a long extension – or as otherwise advised by the panel manufacturer.

7.1.2 WATER EFFICIENCY AND CLEANING OF SOLAR PANELS

To the extent possible and practical, cleaning of the solar panels should be done early in the morning or in the evening to prevent the water used in the cleaning process from evaporating too quickly. Measures to reduce, reuse and manage demand cleaning water must be investigated and implemented, this may include waterless cleaning, rainwater harvesting, dust repelling coatings, etc.

7.1.3 MATERIALS AND METHODS FOR CLEANING SOLAR PANELS

Do not use metal objects or harsh abrasive products for removing caked on materials. Scratching the glass on a solar panel can affect its performance as scratches will cast shadows. Avoid using detergents, if possible, as these may streak the glass of the panel. Use of abrasive powders also risks scratching the panels.

7.2 ALIEN INVASIVE PLANT MANAGEMENT PLAN

Please refer to Appendix C1.

7.3 RE-VEGETATION AND HABITAT REHABILITATION PLAN

Please refer to Appendix C2.

7.4 TOPSOIL REPLACEMENT AND SOIL AMELIORATION

- ▶ The principle of “progressive reinstatement” must be followed as determined by the ECO, ESA and Contractor. This includes the reinstatement of disturbed areas on an on-going basis, immediately after the specified construction activities for that area are concluded.
- ▶ Execute top soiling activity prior to the rainy season or any expected wet weather conditions.
- ▶ Execute topsoil placement concurrently with construction where possible and as agreed by the Engineer.

- ▶ Redistribute stockpiled topsoil. Replace herbaceous vegetation and reinstate grass in all areas cleared by the Contractor for the construction site, including temporary access routes and roads. Replace topsoil to the original depth.
- ▶ Place topsoil in the same area from where it was stripped. If there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil of similar quality may be brought from other areas of similar quality. Ensure that the soil brought in undergoes both physical and chemical tests and is to the satisfaction of the Landowner and Engineer.
- ▶ The suitability of substitute material will be determined by means of a soil analysis addressing soil fraction, fertility, pH and drainage.
- ▶ Topsoil suspected to be contaminated with the seed of weeds must be sprayed with specified herbicides.
- ▶ Herbicides should be for selective broad leafed weeds as approved by the ECO.
- ▶ Ensure that storm water run-off is not channelled parallel to the prevailing contours.
- ▶ After topsoil placement is complete, spread available stripped vegetation randomly by hand over the top-soiled area.
- ▶ Soil samples should be taken from the B1/2 horizon, typically at a depth of approximately 300 mm from thicket habitats and 100 mm from the open woodland area. This position in the soil horizon is where the nutrient levels are most available to plant roots, and is where the soil moisture/water content is best assessed. Recommendations as made by an accredited soil lab should be adhered to.

7.5 EROSION CONTROL

The areas surrounding the sites, particularly the watercourses and bare soil (open ground) must be monitored for signs of erosion and remedial actions implemented where required. The erosion management specifications described under the construction phase EMP must be fully implemented, where applicable.

7.6 WASTE MANAGEMENT

The incorrect management of solid waste can result in the pollution of soil, groundwater, and the general environment. Windblown litter can contribute to negative visual impacts and if consumed by grazing animals could result in fatality. The following waste management practices must be implemented during operation:

- ▶ Provide adequate scavenger proof waste bins at facility buildings and at the construction area;
- ▶ Set up a system for regular waste removal from approved facility – preferably weekly;
- ▶ All solid and liquid waste must be removed from the construction and operational areas and not discarded in the natural vegetation/veld;
- ▶ Minimise waste by sorting wastes into recyclable and non-recyclable waste types (an independent contractor can be appointed to conduct this recycling if practical).
- ▶ No waste may be buried or burned under any circumstances;
- ▶ Hazardous waste must be removed from the site by an approved service provider e.g. used oil – certificates of disposal should be maintained on file;
- ▶ No hazardous waste may be spoiled at the facility;
- ▶ A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the facility; and
- ▶ Littering by the employees shall not be allowed under any circumstances.
- ▶ Where solar panels require replacement or at closure, the owner must investigate recycling options available in the market at the time and avoid disposal of used or dysfunctional panels into landfill, as far as possible.

8 DECOMMISSIONING

The decommissioning phase commences when the project has reached the end of its lifespan and will therefore no longer be operational.

Unless the PV plant is refurbished by replacement of the PV panels, the PV plant may be decommissioned after approximately 15 - 20 years from the date of commissioning. The possibility of upgrading the proposed facility to more advantageous technologies would be investigated at the end of this period. Should the facility undergo expansion or significant upgrading, an environmental process may be required at that time, in accordance with the prevailing legislation at the time.

Should decommissioning be the favourable option, it would potentially take between 6 to 12 months. Care should be taken during decommissioning of the facility. All effort should be made to rehabilitate the land to a feasible land use at the time of closure by implementing the following mitigation measures:

- ▶ After disconnecting the PV infrastructure from the network, module components should be removed and recycled / resold as far as possible. The structures should be dismantled, and the concrete foundations would be removed. All underground cables should be excavated and removed. The buildings should be demolished and removed;
- ▶ Any pole structures such as fences, sign boards, light poles etc should be removed with the concrete footing and may not be cut off above surface;
- ▶ The footprint of structures such as foundations (usually partly below surface), roads, parking areas, paved or tarred surfaces should be cleaned properly, and waste material should be removed to a suitable disposal facility;
- ▶ The footprints should be ripped to alleviate compaction;
- ▶ After demolishing of the structures, the footprint may not be left abandoned and unproductive since weeds and aliens can be expected to immediately invade the area, management and control of alien vegetation must be implemented;
- ▶ Where materials and infrastructure are not resold or recycled, they would be disposed of at an approved landfill site. Any hazardous substances shall be removed and disposed of in terms of the requirements of the relevant legislation (e.g., Hazardous Substances Act, No. 15 of 1973) and the South Africa National Standards (SANS) specifications; and
- ▶ The rehabilitation of the disturbed areas would form part of the decommissioning phase and must take cognisance of the future proposed land use of the area. Since the PV facility comprises largely of recyclable or reusable materials, the residual risks associated with decommissioning would be minor. Should the need arise to decommission the PV facility, the foundations would need to be demolished and disposed of. Roads which are no longer required after decommissioning should be scarified and the areas rehabilitated with the assistance of a rehabilitation specialist.

A detailed decommissioning plan must be developed approximately 24 months before closure of the facility. The construction EMPr could be used as a guideline to facilitate the detailed decommission phase EMPr. Mitigation measures listed below are provisional mitigation measures:

- ▶ All PV structures, associated structures, fencing and cables should be removed, and resold or recycled, as far as possible;
- ▶ Building structures should be broken down (including foundations);
- ▶ The rubble should be managed according to NEM:WA and deposited at a registered landfill if it cannot be recycled or reused;
- ▶ Monitoring for soil erosion should be undertaken on a bi-annual basis for a year following the completion of closure phase;
- ▶ Shape footprint area to reflect natural landscape;
- ▶ Wind-blown rubble and dust management needs to be implemented as required;
- ▶ After cessation of disturbance, re-spread topsoil over the surface and re-vegetate. Any additional overburden (uncontaminated) must be re-spread below the topsoil layer, not mixed with it;

- ▶ Dispose of any subsurface spoils from excavations where they will not impact on agricultural land (for example use as road surfacing), or where they can't be effectively covered with topsoil;
- ▶ Control dust as per standard construction site measures;
- ▶ Disturbance of any stream channels should be limited to the designated access roads;
- ▶ Activities should as far as possible be limited to the delineated site for the proposed development;
- ▶ All disturbed areas should be rehabilitated and monitored to ensure that these areas do not become subject to erosion or invasive alien plant growth;
- ▶ The rehabilitated area must be monitored and must consider amongst others erosion, alien vegetation, re-establishment of indigenous vegetation and indigenous fauna moving back to the site; and
- ▶ Implement an effective system of stormwater run-off control where it is required.

9 NON-COMPLIANCE AND PENALTIES

The ECO must monitor compliance with this EMPr, and report results in monthly ECO Reports. Non-compliance must be reported to the CA as per the requirements of the EA.

Penalties/fines must be issued at the discretion of the Engineer as per the penalties' agreement between the Engineer and Contractor. The ECO to take up any non-compliance issues that may result in a fine/penalty with the Engineer.

The nature of the project activities may, even with the best of intentions, inevitably cause some form of environmental degradation. The costs of having to make good on such environmental degradation is usually sufficient punishment without the need to look to other punitive measures. The implementation of a penalty system therefore requires careful consideration. The following issues need to be considered in such a decision:

- ▶ Penalties would typically be warranted by persistent negligence on the part of the Contractor or failure to respond adequately to environmental considerations;
- ▶ Removal from site would typically be warranted where a particular staff member or piece of equipment is the cause of persistent environmental damage following previous warnings; and
- ▶ Suspension of the works would only be warranted under rare circumstances where the Contractor's actions have caused or are likely to cause significant environmental degradation.

The type and extent of the corrective measures required to address non-compliance depend on the nature of the transgression and the Contractor's history of compliance with environmental obligations. When deciding on the nature of any punitive actions, it must be recognised that effective implementation of the construction EMPr is dependent on the quality of the working relationships between the key role-players. Accordingly, an excessive response to non-compliance, particularly for a minor or unintentional transgression, may cause environmental degradation in the long term due to its effect in eroding the Contractor's commitment to meeting their environmental responsibilities. Other mechanisms, such as an expanded environmental induction programme, may prove more effective to control non-compliance in the long-term than purely punitive measures.

10 UPDATING OF THE EMPR

- ▶ The EMPr must be updated where the findings of the environmental audit reports, contemplated in Condition 26 of the EA, indicate insufficient mitigation of environmental impacts associated with the undertaking of the activity, or insufficient levels of compliance with the environmental authorisation or EMPr.
- ▶ The updated EMPr must contain recommendations to rectify the shortcomings identified in the environmental audit report.

- ▶ The updated EMPr must be submitted to the DFFE for approval together with the environmental audit report, as per Regulation 34 of the EIA Regulations, 2014 (GN R 982 of 2014). The updated EMPr must have been subjected to a public participation process, which process has been agreed to by the DFFE, prior to submission of the updated EMPr to the DFFE for approval.
- ▶ The holder of the authorisation must apply for an amendment of an EMPr if such an amendment is required before an audit is required. The amendment process is prescribed in Regulation 37 of the EIA Regulations, 2014 (GN R 982 of 2014). The holder of the authorisation must request comments on the proposed amendments to the impact management outcomes of the EMPr or amendments to the closure objectives of the closure plan from potentially interested and affected parties, including the competent authority, by using any of the methods provided for in the NEMA for a period of at least 30 days.

11 COMMUNICATION

11.1 RECORDING AND REPORTING TO THE DFFE

- ▶ All documentation e.g. audit/monitoring/compliance reports and notifications, required to be submitted to the DFFE in terms of this environmental authorisation, must be submitted to the Director: Compliance Monitoring of the DFFE.
- ▶ The holder of the environmental authorisation must, for the period during which the environmental authorisation and EMPr remain valid, ensure that project compliance with the conditions of the environmental authorisation and the EMPr are audited, and that the audit reports are submitted to the Director: Compliance Monitoring of the DFFE.
- ▶ The holder of the authorisation must submit environmental audit reports to the DFFE within 30 days of completion of the construction phase (i.e. within 30 days of site handover) and a final environmental audit report within 30 days of completion of rehabilitation activities.
- ▶ Environmental audit reports must be compiled in accordance with Appendix 7 of the NEMA EIA Regulations, 2014 (GN R 982 of 2014) and must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions as well as the requirements of the approved EMPr.
- ▶ 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.
- ▶ A written notification of commencement must be given to the DFFE no later than fourteen (14) days prior to the commencement of the activity. The notice must include a date on which it is anticipated that the activity will commence, as well as a reference number.

11.2 AVAILABILITY OF THE EA AND EMPR

A copy of the EA, the audit and compliance monitoring reports, and the approved EMPr must be made available for inspection and copying:

- ▶ 41.1 At the site,
- ▶ 41.2 To anyone on request; and
- ▶ 41.3 Where the holder of the Environmental Authorisation has a website, on such publicly accessible website.

12 CONCLUSIONS AND WAY FORWARD

The EMPr must be regarded as a living document and changes must be made to this EMPr as required as when the project evolves, while retaining the underlying principles and objectives on which the document is based. The compilation of the EMPr has incorporated environmental management best



practice principles, impacts and mitigation measures from the draft BAR and all environmental specialist assessment reports (i.e., included as **Annexure D** of the BAR). The recommendations of this EMPr should be implemented at all times throughout the project life cycle as described in this document and other supporting documentation.

13 REFERENCES

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14 APPENDICES

APPENDIX A: DETAILS OF THE EAP

APPENDIX B: DRAWINGS AND MAPS

APPENDIX C: MANAGEMENT PLANS

Appendix C1: Alien Invasive Management Plan

Appendix C2: Re-vegetation and Habitat Rehabilitation Plan

APPENDIX D: PERMIT APPLICATIONS FOR PROTECTED SPECIES

Appendix D1: Permit Application for Protected Trees

Appendix D2: Permit Application for Provincially Protected Plants

Appendix F: PUBLIC PARTICIPATION

Appendix G: SAHRA APPROVAL/COMMENT

In diversity there is beauty and
there is strength.

MAYA ANGELOU

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