

FINAL BASIC ASSESSMENT REPORT

Basic Assessment for the proposed development of the 290 MW Volta Solar Photovoltaic (PV) Facility (i.e., Volta PV Facility) and Battery Energy Storage System (BESS) and the proposed development of a 132 kV Power Line and associated EGI (i.e., Volta EGI) to the planned Artemis Main Transmission Substation (MTS) near Dealesville, Free State



APPENDIX K

Environmental Management Programme (132 kV Underground Power Line)

- EMPr for the planned 132 kV underground power lines that will enable the proposed PV facility to connect from the Volta PV collector substation SS B to the planned Artemis Main Transmission Station.



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1 INTRODUCTION

The Project Developer, VOLTA PV (PTY) Ltd (hereafter referred to as the “Project Applicant”), is proposing to design, construct and operate a Solar Photovoltaic (PV) power generation facility and associated infrastructure, approximately 4km west of the town of Dealesville, in the Free State Province. The proposed projects are located within the Tokologo Local Municipality and Lejweleputswa District Municipality. The PV facility will have a capacity of up to 290 MW. The associated infrastructure includes various structures, buildings and electrical grid infrastructure (EGI) such as, but not limited to, two 132 kV power lines, two on-site substations, and one Battery Energy Storage Systems (BESS). The proposed Solar PV facility will make use of PV solar technology to generate electricity from energy derived from the sun; and will connect to the national grid at the planned Artemis Main Transmission Substation. It is important to note that approval has been granted by the DFFE to submit combined applications for environmental authorisation (EA) in terms of Regulation 11(4) and the issuing of two Environmental Authorisations (EAs) (should they be granted) in terms of Regulation 25(1) and (2) of the EIA Regulations, 2014, as amended for the proposed developments, on the condition that the EMPr’s must be submitted separately and not packaged into one document. The Project Names and respective farm portions affected by the proposed PV facilities, EGI and associated infrastructure are shown in Table 1 below.

Table 1: Affected Farm Portions

Affected Farm Portion	Mooihoek (RE/1551)	Cornelia (RE/1550)	Carlton (RE/74)	Vadersrust (RE/822)	Modderpan (RE/750)	Oxford (1/1030)	Klipfontein (RE/305)	Leliehoek (RE/748)
Volta PV Facility	✓	✓	✓	✓		✓		
Volta EGI	✓	✓			✓		✓	✓

The proposed projects are located entirely within the Renewable Energy Development Zone 5 (i.e., Kimberley REDZ), one of the eleven REDZs formally gazetted in South Africa for the purpose of developing solar PV and wind energy generation facilities (Government Gazette 41445, Government Notice (GN) 114; 16 February 2018 and (GN) 144; 26 February 2021). In line with the gazetted process for projects located within a REDZ, the proposed project is subject to a Basic Assessment (BA) process instead of a full Scoping and Environmental Impact Assessment (EIA) process and a reduced decision making period of 57 days, in terms of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA) and the 2014 NEMA EIA Regulations (as amended) promulgated in Government Gazette 40772; in GN R326, R327, R325 and R324 on 7 April 2017. A BA Process in terms of Appendix 1 of the 2014 NEMA EIA Regulations (as amended) has therefore been undertaken for the proposed projects. The Competent Authority for the proposed projects is the National Department of Forestry, Fisheries, and the Environment (DFFE).

This EMPr has been prepared as part of the requirements of the 2014 NEMA EIA Regulations (as amended) and is being submitted to DFFE as part of the Application for EA for the proposed project. **This EMPr covers the proposed Volta EGI 132kV underground powerline only.** Figure 1 shows the overall locality of the proposed Volta PV project.

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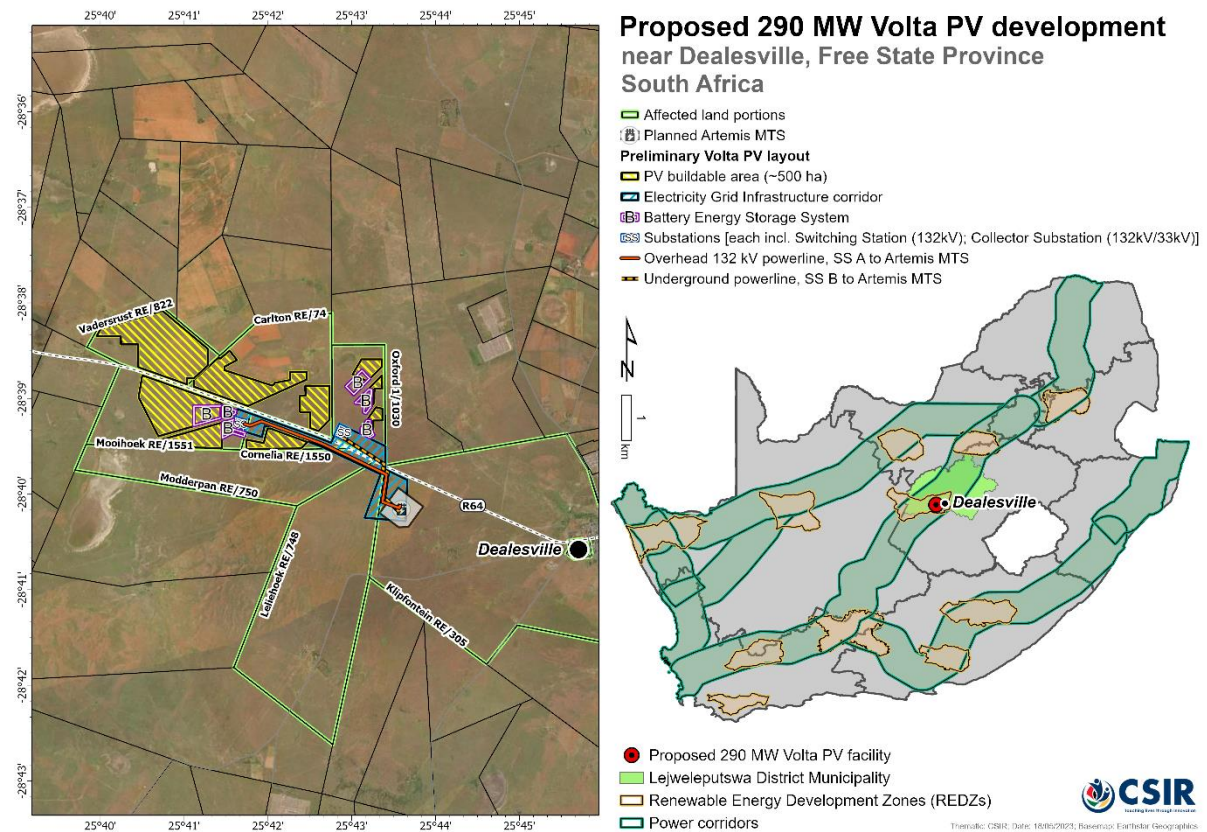


Figure 1: Locality map of the proposed Volta PV Facility and associated infrastructure situated near Dealesville in the Free State Province.

1.1 AUTHORS OF THE EMPr

This EMPr has been compiled by the Environmental Assessment Practitioner (Paul Lochner), the Project Manager (Abulele Adams), the Project Officers (Helen Antonopoulos and Sonto Mkize), and the various specialists on the team (as indicated in Table 2). The details and expertise of the CSIR and the specialists are provided in Section A of the Basic Assessment Report. The Curriculum Vitae of Paul Lochner is also included in Appendix A of this EMPr.

Paul Lochner has more than 28 years of experience in environmental assessment and management studies, primarily in the leadership and integration functions. This has included Strategic Environmental Assessments (SEA), EIAs and Environmental Management Plans. Paul is a Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA). Paul has extensive experience in conducting environmental assessment and management processes throughout South Africa.

Abulele Adams has 9 years of experience in the Environmental Management field and has been involved in various transport SEAs. She is a registered Professional Natural Scientist (400168/17) with the South African Council for Natural Scientific Professions (SACNASP).

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Helen Antonopoulos and Sonto Mkize are the Project Officers on the BA and are Environmental Consultants in training in the EMS group of the CSIR.

Table 2: Details of the BA Project Team

Name	Organisation	Role/ Specialist Study
CSIR Project Team		
Paul Lochner (<i>Registered EAP (2019/745)</i>)	CSIR	EAP and Project Leader
Abulele Adams (<i>Pr.Sci.Nat.</i>)	CSIR	Project Manager
Helen Antonopoulos	CSIR	Project Officer
Luanita Snyman-van der Walt (<i>Pr.Sci.Nat.</i>)	CSIR	Project Mapping
Sonto Mkize	CSIR	Project Officer
Specialists		
Johann Lanz (<i>Pr.Sci.Nat.</i>)	Private	Agricultural Compliance Statement
Lourens du Plessis (<i>GPr GISc</i>)	LOGIS	Visual Impact Assessment
Bryony Walmsley (<i>EAPASA</i>)		
Jaco van der Walt	Beyond Heritage	Heritage Impact Assessment (Archaeology Cultural Landscape)
Prof Marion Bamford	Private	Palaeontology
Corné Niemandt (<i>Pr.Sci.Nat.</i>)	Enviro-Insight	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Russel Tate (<i>Pr.Sci.Nat.</i>)	HCV Africa (Enviro-Insight)	Aquatic Biodiversity and Species Impact Assessment
Luke Verburgt (<i>Pr.Sci.Nat.</i>)	Enviro-Insight	Avifauna Impact Assessment
Tony Barbour	Private	Socio-Economic Impact Assessment
Debbie Mitchell	Ishecon	BESS Risk Assessment (PV only)
Merchandt Le Maitre (<i>Pr Tech Eng</i>)	Skerp Consulting Engineers	Traffic Impact Assessment
Hardy Luttig and Shane Teek	GEOSS South Africa (PTY) Ltd	Geohydrology Assessment
Hardy Luttig and Shane Teek		Desktop Geotechnical Assessment
Sonto Mkize, Abulele Adams (<i>Pr.Sci.Nat.</i>), Helen Antonopoulos	CSIR	Civil Aviation Site Sensitivity Verification
Sonto Mkize, Abulele Adams (<i>Pr.Sci.Nat.</i>), Helen Antonopoulos	CSIR	Defence Site Sensitivity Verification

1.2 PROJECT DESCRIPTION

It is important to point out at the outset that the exact specifications of the proposed project components will be determined during the detailed engineering phase (subsequent to the issuing of EAs, should they be granted for the proposed projects).

The proposed 290 MW Volta PV Facility will cover an approximate area of 500 hectares (ha). The total study area for the proposed PV Facility is approximately 720 ha. All infrastructure including access roads have been assessed as part of the BA Process. Several specialists assessed larger

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areas on the affected farm portions to avoid environmental constraints and sensitivities (highlighted by the specialists), during the siting and final design of the facilities and associated infrastructure.

The proposed projects will make use of PV technology to generate electricity from solar energy. Once a Power Purchase Agreement (PPA) is awarded, the proposed facility will generate electricity for a minimum period of 20 years. The construction phase for the proposed project is expected to be up to 24 months (worst case scenario). The components of the proposed solar facility will consist of the components outlined in Table 3 below:

Table 3: Description of the key components of the VOLTA PV, BESS, and EGI Projects

Project Description for VOLTA PV 290 MW Solar PV and BESS		
Component	Dimensions / Specifications	
Solar PV	Height of PV panels:	Max 3,5m
	Capacity of the PV Facility:	290 MW
	Area of PV Array (i.e. proposed area occupied by PV Modules):	500 hectares
	Total developable area (i.e. the area that includes all associated infrastructure within the fenced off area of the PV facility):	720 hectares
	Number of inverter-transformer stations:	1050 inverters 30 inverters (per Tx station) x 35 Tx stations 800V/33000V
	Area occupied by inverter-transformer stations and height:	The inverters are distributed evenly and mounted in the array field on a small plinth 2x2m, the 35 Tx stations are distributed evenly throughout the solar arrays each having underground cables (800V) from 30 inverters trenched to them. The Tx stations will have a 33 kV underground cable that carries the power to two 33/132kV collector stations as shown on the plan as Substations a & b (SSa & SSb).
Construction Compound	Construction camp area (ha):	2 – 3 Ha
	Temporary laydown area (ha):	2 to 3 Ha
Main access roads	Width of access roads (m):	5m
	Length of access roads (km):	Less than 500m
Internal access roads to be constructed between different development portions	Width of access roads (m):	4m
	Length of access roads (km):	Approx. 20km of internal roads – in order for security patrols and to access all the equipment (module cleaning and equipment maintenance)
Upgrading of existing access road/s	Yes / No:	Yes – no tar, only aggregate
	Current width (m):	4m turn into farm
	Upgraded width (m):	5m
Warehouse/Workshop	Maximum height (m):	3,6m
	Footprint (m ²):	300m ²
Site offices	Number of buildings:	4
	Maximum height (m):	3,6

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Project Description for VOLTA PV 290 MW Solar PV and BESS		
Component	Dimensions / Specifications	
	Footprint (m ²):	500m ²
Operational and Maintenance Control Centre Building	Maximum height (m):	2
	Footprint (m ²):	300m ²
Guard houses	Maximum height (m):	3,6
	Footprint (m ²):	100m ²
Ablution facilities	Maximum height (m):	3,6
	Footprint (m ²):	50m ²
Battery storage	Battery technology type (preferred):	Lithium-Ion, Sodium-Ion, Solid State
	Battery technology type (alternative):	Redox Flow, Liquid Metal (https://ambri.com/) and other technology types will be considered
	Approx. footprint (ha):	BESS Site B1: Mooihoek BESS N Mooihoek BESS S & Cornelia BESS = TOTAL 26.31ha BESS Site B2: Oxford BESS N, Oxford BESS C & Oxford BESS N = TOTAL 20.95ha
	Maximum height (m):	Containers approx.. 6x3 x 3 (3m max height)
	Capacity:	BESS Site B1; approx. .550MVA / 2200 Mwh (Store 100% of VOLTA PV average daily yield energy for 4 hours) BESS Site B2: approx. 450MVA / 1800Mwh The same Substations (SSa and SSb) and powerlines to Artemis MTS that are to be used for connecting the Solar PV to the grid will be used the for battery power evacuation at night when solar generation is inactive.
	For the storage and handling of a dangerous goods (e.g., electrolytes), where such storage occurs in containers on site, have a combined capacity of 80 m ³ or more but not exceeding 500 m ³ at any one time?	We have engaged a specialist to advise and ensure we can meet the Health and Safety Compliance and mitigate any hazardous substance risk Debra Mitchell from iSHEcon

Project Description for VOLTA EGI		
Component	Dimensions / Specifications	
On-site substation hub (including collector and/or switching yard)	Number of substation alternatives:	No alternatives as the Artemis MTS position has been set by ESKOM as well as collector substation SSa as they were set for REIPP Rounds 5 and 6 projects. The same Substations (SSa and SSb) and powerlines to Artemis MTS that are to be used for connecting the Solar PV to the grid will be used the for battery power (BESS Site 1 and BESS Site 2)

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Project Description for VOLTA EGI		
Component	Dimensions / Specifications	
		evacuation, at night when solar generation is inactive.
	Footprint (ha):	For each substation SSa and SSb a 0,7 ha platform for substation, surrounded by 4ha, fence. The remainder of 4ha is open ground for overhead lines to turn and connect into the substation
	Capacity:	Each approx. 500MVA on substations SSa and SSb
	Height (m):	Max 30 m (lightening conductors) 132kV OHL pylons need 16m clearance from ground (including earth and structure 20m maximum height) All other plant including transformers, CTs, VTs Breakers, SCADA and control room, fencing etc will be below 10m
Internal transmission and/or distribution lines	Under or aboveground:	Underground
	Capacity (kV):	800V from inverters to containerised mini-subs. 33kV from mini-subs to substations SSa and SSb
	If above: height (m) If below: maximum depth (m)	Max depth 1M
	If above - width of service road below powerline(s) (m):	As per ESKOM spec- see attached ESKOM restrictions document
	Length (m):	Estimate
Overhead transmission powerlines for connection of PV facility, via SSa to existing national grid and for connecting BESS Site 1 to national grid via SSa, at night when solar generation is inactive.	Capacity (kV):	132 kV
	Pylon type:	Monopole Twin circuit – various designs available
	Tower type:	Monopole
	Height (m):	Max 20m
	Foundation:	Concrete with anchors
	Width of registered servitude (m):	See attached ESKOM restrictions document 18 meters
	Width of service road below powerline (m):	5m
	Width of powerline corridor for specialist assessment (m):	30m
	Length of powerline (km):	Less than 4km from VOLTA PV collector substation SSa to Artemis MTS of 132kV overhead line
Underground transmission powerlines for connection of PV facility, via SSb to existing national grid and for connecting BESS Site 2 to national grid via SSb, at night	Capacity (kV)	132 kV
	Trench width (m)	3.6m
	Trench Depth (m)	1.2m
	Width of registered servitude (m):	15m
	Width of service road next to powerline (m):	5m
	Width of powerline corridor for specialist assessment (m):	30m

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Project Description for VOLTA EGI		
Component	Dimensions / Specifications	
when solar generation is inactive.	Length of powerline (km):	Less than 2.1km from VOLTA PV collector substation SSb to Artemis MTS of 132kV OHL
	Any additional infrastructure – please describe?	Danger tape will be placed 30cm above the cable and 70cm below ground (at least one tape for each circuit) At joins a widening of the trench will be needed (approx. double the width)

Based on the above project description, the following EMPRs are provided for the PV, BESS, and EGI:

- EMPr for the PV facility, BESS, and associated infrastructure, including the 33 kV underground power lines that connects the PV array to the on-site substations. This EMPr is in Appendix J of the BA Report and **complies with Appendix 4 of the NEMA EIA Regulations.**
- EMPr for the high voltage infrastructure at the on-site substation leading up to the Point of Connection (i.e., the Project Applicant's section of the proposed on-site substations and/or a switching substations) to be located at the proposed PV facility. This EMPr is included in Appendix I of the BA Report, and it **complies with the Generic EMPr published for substation development (Government Gazette 42323, GN 435, dated 22 March 2019).**
- EMPr for the high voltage infrastructure at the on-site substations extending from the Point of Connection (i.e., Eskom's section of the proposed on-site substations and/or a switching substations) to be located at the proposed PV facility. This EMPr is included in Appendix H of the BA Report, and it **complies with the Generic EMPr published for substation development (Government Gazette 42323, GN 435, dated 22 March 2019).**
- EMPr for the planned 132 kV overhead powerlines that will enable the proposed PV facility to connect from the Volta PV collector substation SS A to the planned Artemis Main Transmission Station (MTS). This EMPr is included in Appendix G of the BA Report, and it **complies with the Generic EMPr published for power line development (Government Gazette 42323, GN 435, dated 22 March 2019).**
- EMPr for the planned 132 kV underground powerlines that will enable the proposed PV facility to connect from the Volta PV collector substation SS B to the planned Artemis Main Transmission Station (MTS). This EMPr is included in Appendix K of the BA Report ([i.e., this report](#)), and it **complies with Appendix 4 of the 2014 NEMA EIA Regulations (as amended i.e., GN R326 dated 7 April 2017).**

The proposed project can be divided into the following three main phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

Each activity undertaken as part of the above phases may have environmental impacts and, where applicable, has been assessed in the specialist studies (included in Appendix D of this BA Report). Management and mitigation measures required to address all the impacts are included within this EMPr.

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The construction phase will take place subsequent to the issuing of the EAs from the DFFE and a successful BID in terms of the Renewable Energy Independent Power Producer Programme (REIPPPP) (i.e. the issuing of a PPA).

The main activities that will form part of the construction phase per project are:

- Removal of vegetation for the proposed infrastructure, where necessary;
- Excavations for infrastructure and associated infrastructure;
- Establishment of a laydown area for equipment;
- Stockpiling of topsoil and cleared vegetation, where necessary;
- Creation of employment opportunities;
- Transportation of material and equipment to site, and personnel to and from site; and
- Construction of the solar field, and additional infrastructure.

The following activities will occur during the operational phase of the PV project:

- The generation of electricity from the proposed solar facility; and
- Maintenance of the solar field and associated infrastructure.

During the life span of the proposed projects (approximately 20 years), on-going maintenance will be required on a scheduled basis.

Should it be decided not to extend the operational lifespan of the project beyond 20 years, the project will be decommissioned. The main aim of decommissioning is to return the land to its original, pre-construction condition. Should the unlikely need for decommissioning arise (i.e., if the facility becomes outdated or the land needs to be used for other purposes), the decommissioning procedure will involve removing the solar panels and associated infrastructures and covering the concrete footings with soil to a depth sufficient for the re-growth of natural vegetation. Whether all components of the solar facility will be removed still needs to be agreed upon with the landowner (some components may be useful for the landowner and therefore it could be decided that those remain on site). Any other supporting infrastructure no longer in use will be removed from the site and either disposed of at a registered disposal facility or recycled if possible.

It should be noted that a detailed project description (based on the conceptual design) is provided in Section A of the BA Report.

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1.3 ENVIRONMENTAL SENSITIVITIES

Section D of the BA Report provides a detailed description of the environmental features and sensitive areas that were identified and assessed in detail by the specialists for consideration in the layout and location of the proposed project. Refer to the specialist studies in Appendix D of the BA Report for details on the environmental sensitivities identified.

The preferred site for the proposed Volta PV project includes approximately 720 ha of land; however, the proposed solar facility and associated infrastructure require a development area of approximately 500 ha only. The larger 720 ha area was considered and assessed by the specialists in order to ensure that any development constraints or environmental sensitivities can be avoided in the final siting and location of the proposed facility.

Based on the findings of the specialist studies, an environmental sensitivity map has been produced. This map shows the sensitivities on site (e.g., terrestrial, aquatic, avifaunal, visual, agricultural, and heritage features) within the larger assessed area that was identified. Based on this map, the preferred location for the Volta PV, avoids the sensitive features that were identified by the specialists. Based on the boundaries of the assessed area and the constraints of the environmental sensitivities, a site layout has also been preliminarily determined for this project (Appendix D of this EMPr).

Appendix E of this EMPr includes the environmental sensitivity map which indicates the environmental sensitive areas and features identified during the BA Process (as described above), which is combined with the site layout.

1.4 IMPACTS IDENTIFIED DURING THE BA PROCESS

Based on the specialist studies (as shown in Table 2), the following main direct potential impacts, as indicated in Table 4, were identified and appropriate management and mitigation measures included within the EMPr (where required) to ensure the potential impacts are suitably addressed and managed during all phases of the project. Indirect and cumulative impacts are noted in Sections 4 to 10 of this EMPr.

It should be noted that other impacts for which specialist studies were not undertaken but where mitigation or management actions may be required, are also included in the EMPr.

Table 4: Impacts identified in the BA Process

KEY IMPACT	IMPACTS IDENTIFIED
Agriculture	<ul style="list-style-type: none">▪ The proposed underground powerline has negligible agricultural impact, regardless of its route and design and the agricultural potential of the land it traverses.▪ Minimal disturbance to the land during construction and decommissioning by erosion and topsoil loss.

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KEY IMPACT	IMPACTS IDENTIFIED
Visual	<p>Per the Visual Impact Assessment, the presence of underground cables will reduce the visual impacts outlined below.</p> <p><u>Construction Phase:</u></p> <ul style="list-style-type: none"> ▪ Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed infrastructure <p><u>Operational Phase:</u></p> <ul style="list-style-type: none"> ▪ Potential visual impact on sensitive visual receptors located within a 0.5 km radius of the grid connection infrastructure. ▪ Potential visual impact on sensitive visual receptors within a 0.5 – 1.5 km radius ▪ Potential visual impact on sensitive visual receptors within a 1.5 – 3km radius <p><u>Decommissioning Phase:</u></p> <ul style="list-style-type: none"> ▪ Increase in heavy vehicles utilising the roads to the site that may cause, at the very least, a visual nuisance to other road users and landowners in closer proximity (< 0.5 km) to the decommissioning activities.
Heritage and Cultural Landscape	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> ▪ Impact assessment of the Project on isolated Stone Age scatters (VT01 and VT12). <p><u>Operational Phase</u></p> <ul style="list-style-type: none"> ▪ Potential visual impacts to the cultural landscape and sense of place – see Visual Impact Assessment <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> ▪ Potential impacts to the cultural landscape
Palaeontology	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> ▪ Disturbance, damage or destruction of fossils within the development footprint due to excavations and surface clearance.

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KEY IMPACT	IMPACTS IDENTIFIED
Terrestrial Biodiversity and Species	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> ▪ Loss of habitat and sensitive features; ▪ Loss of protected species; ▪ Introduction and spread of alien invasive species ▪ Increased erosion and soil compaction; ▪ Littering and General Pollution; <p><u>Operational Phase</u></p> <ul style="list-style-type: none"> ▪ Increase in alien invasive species; ▪ Loss of species composition and diversity; ▪ Littering and General Pollution; <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> ▪ Alien invasive species management; and ▪ Loss of habitat.
Aquatic Biodiversity and Species	<p><u>Construction Phase</u></p> <ul style="list-style-type: none"> ▪ Operation of equipment and machinery ▪ Clearing vegetation for 75 m2 for substations and pylon footings ▪ Stockpiling of and placement construction materials ▪ Excavating/shaping landscape for the underground cable ▪ Final landscaping, backfilling and postconstruction rehabilitation <p><u>Operational Phase</u></p> <ul style="list-style-type: none"> ▪ Alteration of drainage ▪ Alteration of surface water flow dynamics ▪ Establishment of alien plants on disturbed areas <p><u>Decommissioning Phase</u></p> <ul style="list-style-type: none"> ▪ Operation of equipment and machinery. ▪ Clearing vegetation for laydown areas ▪ Stockpiling of and placement construction materials ▪ Excavating/shaping landscape ▪ Final landscaping, backfilling and postconstruction rehabilitation
Avifauna Assessment	<p><u>Construction Phase:</u></p> <ul style="list-style-type: none"> ▪ Disturbance of foraging and breeding behaviours of birds due to noise, dust and lighting; ▪ Loss of habitat due to clearing, trenching for the underground cable, alteration and exclusion from previously accessible habitats. <p><u>Operational Phase:</u></p> <ul style="list-style-type: none"> ▪ Continued disturbance due to operational activities (use of vehicles, lights etc.); ▪ Loss of habitat due to altered and excluded habitats; ▪ Direct mortality from electrocution or collision with infrastructure (specifically power lines);

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KEY IMPACT	IMPACTS IDENTIFIED
	<ul style="list-style-type: none"> ▪ Attraction to the facility exacerbating potential impacts described above. <p><u>Decommissioning Phase:</u></p> <ul style="list-style-type: none"> ▪ Continued disturbance due to operational activities (use of vehicles, lights etc.); ▪ Habitat loss reclamation from rehabilitation activities.
Socio-Economic	<p><u>Construction Phase:</u></p> <ul style="list-style-type: none"> ▪ Creation of employment and business opportunities during the construction phase ▪ Impacts associated with the presence of construction workers on local communities ▪ Impacts related to the potential influx of job-seekers ▪ Increased risks to livestock and farming infrastructure associated with the construction related activities and presence of construction workers on the site ▪ Increased risk of grass fires associated with construction related activities ▪ Nuisance impacts, such as noise, dust, and safety, associated with construction related activities and vehicles ▪ Impact on productive farmland <p><u>Operational Phase:</u></p> <ul style="list-style-type: none"> ▪ Development of infrastructure to improve energy security and support renewable sector ▪ Creation of employment and business opportunities associated with the operational phase ▪ The generation of additional income represents a significant benefit for the local affected farmer(s) and reduces the risks to their livelihoods posed by droughts and fluctuating market prices for farm outputs and inputs, such as fuel, feed etc. ▪ Visual impact associated with the proposed SEF and associated infrastructure and the potential impact on the areas rural sense of place ▪ Potential impact of the SEF on property values. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place ▪ Potential impact of SEF on local tourism. This is usually linked to the visual impact associated with the proposed facility and associated infrastructure and the potential impact on the areas rural sense of place. <p><u>Decommissioning Phase:</u></p> <ul style="list-style-type: none"> ▪ Social impacts associated with retrenchment including loss of jobs, and source of income. Decommissioning will also create temporary employment opportunities, which would represent a positive temporary impact
Geohydrology Study	<p><u>Construction Phase:</u></p> <ul style="list-style-type: none"> ▪ Ground water contamination by means of spillages with regards to oil, hydraulic fluids, fuels and dust control. <p><u>Operational Phase:</u></p> <ul style="list-style-type: none"> ▪ Ground water contamination by means of electrolyte leakage and mismanaged solar panel maintenance. <p><u>Decommissioning Phase:</u></p>

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KEY IMPACT	IMPACTS IDENTIFIED
	Ground water contamination by means of spillages with regards to oil, hydraulic fluids, and fuels and by means of electrolyte leakage/spillage.
Geotechnical Study	<p><u>Construction Phase:</u></p> <ul style="list-style-type: none"> ▪ Displacement of geologic materials. ▪ Contamination of geologic materials <p><u>Operational Phase:</u></p> <ul style="list-style-type: none"> ▪ Displacement of geologic materials ▪ Contamination of geologic materials <p><u>Decommissioning Phase:</u></p> <ul style="list-style-type: none"> ▪ Displacement of geologic materials. ▪ Contamination of geologic materials
Traffic ¹	<p><u>Construction, Operational and Decommissioning Phases</u></p> <ul style="list-style-type: none"> ▪ Increase in Traffic ▪ Increase of Incidents with pedestrians and livestock ▪ Increase in dust from gravel roads due to additional traffic generation ▪ Increase in Road Maintenance ▪ Additional Abnormal Loads ▪ Increase in dust from gravel roads from internal gravel roads ▪ New / Larger Access points

2 APPROACH TO PREPARING THE EMPr

2.1 COMPLIANCE WITH RELEVANT LEGISLATION

In terms of legal requirements, a crucial objective of the EMPr is to satisfy the requirements of Appendix 4 of the 2014 NEMA EIA Regulations (as amended i.e., GN R326 dated 7 April 2017), and Section 24N of the NEMA. These regulations regulate and prescribe the content of the EMPr and specify the type of supporting information that must accompany the submission of the report to the authorities. An overview of where the requirements are addressed in this EMPr is presented in Tables 5 and 6.

Table 5: Compliance with Section 24N of NEMA

Requirements of Section 24N of NEMA	Where it is included in this EMPr
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),	Columns detailing the impact description, mitigation and management objectives, and mitigation and management actions in Sections 4 to 10 of this EMPr.

¹ The Traffic Impact Statement is not a specialist study in terms of Appendix 6 of the EIA Regulations; however, it provides a general description of the potential traffic impacts and management actions.

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Requirements of Section 24N of NEMA	Where it is included in this EMPr
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, if applicable;	
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;	Section 1.1 and Appendix A of this EMPr. In addition, Appendix A of the BA Report.
c) a detailed description of the aspects of the activity that are covered by the environmental management programme;	Section 1 and Section 1.2 of this EMPr.
d) information identifying the persons who will be responsible for the implementation of the measures contemplated in paragraph (a);	Columns in Section 4 to 10 of the EMPr regarding the monitoring responsibility, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3.
e) information in respect of the mechanisms proposed for monitoring compliance with the environmental management programme and for reporting on the compliance;	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency, and responsibility in Sections 4 to 10 of this EMPr.
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	Sections 4 to 10 of this EMPr, as applicable to the post-construction, rehabilitation phase and the decommissioning phase.
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 migration of pollutants; and (iii) comply with any prescribed environmental management standards or practices.	The columns detailing the mitigation and management objectives, mitigation and management actions, and the monitoring methodology, frequency, and responsibility in Sections 4 to 10 of this EMPr.
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 polluted or extraneous water or ecological degradation which may occur inside and outside the boundaries of the operations in question; and	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency, and responsibility in Sections 4 to 10 of this EMPr. Section 9 of this EMPr includes an Environmental Awareness Plan.

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Requirements of Section 24N of NEMA	Where it is included in this EMPr
<p>c) develop an environmental awareness plan describing the manner in which-</p> <ul style="list-style-type: none"> (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. 	
<p>5) The Minister, the Minister responsible for mineral resources or an MEC may call for additional information and may direct that the environmental management programme in question must be adjusted in such a way as the Minister, the Minister responsible for mineral resources or the MEC may require.</p>	Not applicable at this stage.
<p>6) The Minister, the Minister responsible for mineral resources or an MEC may at any time after he or she has approved an application for an environmental authorisation approve an amended environmental management programme.</p>	Not applicable at this stage.
<p>7) The holder and any person issued with an environmental authorisation-</p> <ul style="list-style-type: none"> a) must at all times give effect to the general objectives of integrated environmental management laid down in section 23; b) must consider, investigate, assess and communicate the impact of his or her prospecting or mining on the environment; c) must manage all environmental impacts <ul style="list-style-type: none"> (i) in accordance with his or her approved environmental management programme, where appropriate; and (ii) as an integral part of the prospecting or mining, exploration or production operation, unless the Minister responsible for mineral resources directs otherwise; d) must monitor and audit compliance with the requirements of the environmental management programme; e) must, as far as is reasonably practicable, rehabilitate the environment affected by the prospecting or mining operations to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and f) is responsible for any environmental damage, pollution, pumping and treatment of polluted or extraneous water or ecological degradation as a result of his or her operations to which such right, permit or environmental authorisation relates. 	Throughout the EMPr
<p>8) Notwithstanding the Companies Act, 2008 (Act No. 71 of 2008), or the Close Corporations Act, 1984 (Act No. 69 of 1984), the directors of a company or members of a close corporation are jointly and severally liable for any negative impact on the environment, whether advertently or inadvertently caused by the company or close corporation which they represent, including damage, degradation, or pollution.</p>	Section 3 and Appendix B of this EMPr details the responsibility of the Project Applicant.

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Table 6: Compliance with Appendix 4 of the 2014 NEMA EIA Regulations (as amended)

Requirements of Appendix 4 of the 2014 NEMA EIA Regulations (as amended on 7 April 2017 in GN R326)	Where it is included in this EMPr?
1. (1) An EMPr must comply with section 24N of the Act and include: a) details of: (i) the EAP who prepared the EMPr; and (ii) the expertise of that EAP to prepare an EMPr, including a curriculum vitae;	Section 1.2 and Appendix A of this EMPr, and Section A of the BA Report . Appendix A of the BA Report includes the Curriculum Vitae of the specialists as well.
b) a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 1.2 of this EMPr
c) 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;	Appendix E of this EMPr
d) 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; and (v) where relevant, operation activities;	Columns detailing the impact description, mitigation and management objectives, and mitigation and management actions in Sections 4 to 10 of this EMPr.
f) a description of proposed impact management actions, identifying the manner in which the impact management outcomes contemplated in paragraphs (d) 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; and (iv) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable;	The columns detailing the mitigation and management actions in Sections 4 to 10 of this EMPr. The outlined management actions in this EMPr do not require any financial provisions for rehabilitation in terms of NEMA.
g) the method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	The columns detailing the monitoring methodology in Sections 4 to 10 of this EMPr.
h) the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	The columns detailing the monitoring frequency in Sections 4 to 10 of this EMPr.
i) an indication of the persons who will be responsible for the implementation of the impact management actions;	The columns detailing the monitoring responsibility in Sections 4 to 10 of this EMPr.

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Requirements of Appendix 4 of the 2014 NEMA EIA Regulations (as amended on 7 April 2017 in GN R326)	Where it is included in this EMPr?
j) the time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	The columns detailing the mitigation and management actions, and the monitoring methodology and frequency in Sections 4 to 10 of this EMPr.
k) the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	The columns detailing the mitigation and management actions, and the monitoring methodology, frequency, and responsibility in Sections 4 to 10 of this EMPr.
l) a program for reporting on compliance, taking into account the requirements as prescribed by the Regulations;	Sections 4 to 10 of the EMPr, including the requirements for monitoring and reporting on compliance and the responsible parties noted in Section 3 and Appendix B of this EMPr.
m) an environmental awareness plan describing the manner in which: <ul style="list-style-type: none"> (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; and 	Section 9 of this EMPr.
n) any specific information that may be required by the competent authority.	Not applicable at this stage
(2) Where a government notice <i>gazetted</i> by the Minister provides for a generic EMPr, such generic EMPr as indicated in such notice will apply.	Government Notice 435 includes two gazetted generic EMPrs for power lines and substation infrastructure. Separate EMPrs have been compiled in order to comply with Government Notice 435 for the power line and substation components of the proposed projects.

2.2 STRUCTURE AND CONTENTS OF THE EMPr

As noted above, separate EMPRs have been compiled for the power lines and on-site substations, which comply with the Generic EMPr for power line and substation development published in GN 435.

This EMPr covers all infrastructure of the proposed Volta PV project but excludes the management actions for the power line and substation developments. The overhead power line and underground powerline will be covered in separate EMPrs, which complies with the Generic EMPr published for power line development (Government Gazette 42323, GN 435, dated 22 March 2019) and Appendix 4 of the NEMA EIA Regulations (as amended on 7 April 2017 in GN R326), respectively. The on-site substation will also be covered in a separate EMPr which complies with the Generic EMPr for substation development published in GN 435.

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Where applicable, each section of the EMPr is divided into the following four phases of the project cycle:

- Planning and Design Phase (Pre-construction Phase);
- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

The EMPr includes the findings and recommendations of the BA Process and specialist studies. However, the EMPr is considered a “living” document and must be updated with additional information or actions during the design, construction, operational and decommissioning phases if applicable.

The EMPr follows an approach of identifying an over-arching goal and objectives, accompanied by management actions that are aimed at achieving these objectives (the outcomes). The management actions are presented in a table format in order to show the links between the goal and associated objectives, actions, responsibilities, and monitoring requirements and targets.

The management plans for the design, construction, operational and decommissioning phases consist of the following components:

- **Impact:** The potential positive or negative impact of the development that needs to be enhanced, mitigated, or eliminated.
- **Objectives:** The objectives necessary in order to meet the goal; these take into account the findings of the specialist studies.
- **Mitigation/Management Actions:** The actions needed to achieve the objectives of enhancing positive benefits and mitigating or eliminating negative impacts; taking into consideration factors such as responsibility, methods, frequency, resources required and prioritisation.
- **Monitoring:** The key monitoring actions required to check whether the objectives are being achieved, taking into consideration methodology, frequency, and responsibility.

In this EMPr, the following spatial parameters apply to the management actions, unless where specified differently:

- The study area is referred to as the larger assessed area (i.e., 720 ha and greater);
- The site as the footprint of the Volta Solar Facility (i.e., approximately 500 ha).

2.3 GOAL FOR ENVIRONMENTAL MANAGEMENT

The overall goal for environmental management for the Volta SEF project is to plan, design, construct and operate the project in a manner that:

- Minimises the ecological footprint of the project on the local environment;
- Minimises impacts on fauna, flora and freshwater ecosystems;

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- Facilitates harmonious co-existence between the project and other land uses in the area;
- Enhances the socio-economic benefits in the local area; and
- Contributes to the environmental baseline and understanding of environmental impacts of solar energy facility in a South African context.

3 ROLES AND RESPONSIBILITIES

Since the Generic EMPs are applicable for the on-site substations and power lines, it is best to adopt the definitions of the roles and responsibilities as captured in the gazetted EMPs of GN 435. This will allow consistency of the management of the project from an environmental perspective and will avoid any contradiction in terms of the roles and responsibilities.

The generic roles and responsibilities required for key role players are those of the:

- Project Developer / Developer's Project Manager (DPM);
- Developer Site Supervisor (DSS);
- Environmental Control Officer (ECO);
- Developer's Environmental Officer (DEO);
- Contractor; and
- Contractor's Environmental Officer (CEO).

The definitions of the roles and responsibilities are included in Appendix B of this EMP.

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4 ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. PLANNING AND DESIGN PHASE					
4.1. Impacts due to establishment of alien invasive plants as a result of the project	Ensure the appropriate removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	4.1.1. Compile an alien vegetation baseline and prepare an alien invasive vegetation management plan. Take into account the relevant legislation, including, but not limited to, the Alien and Invasive Species Regulations under the National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM: BA)).	<ul style="list-style-type: none"> Appoint a suitable specialist to compile an alien invasive vegetation management plan. Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ECO
B. CONSTRUCTION PHASE					
4.2. Impacts due to the establishment of and increased spread of alien invasive plants as a result of the project	Avoid establishment and reduce the spread of alien invasive plants due to the project activities.	4.2.1. Appoint a specialist or contractor to undertake a sweep and survey of the final development footprint site. 4.2.2. Establish an ongoing monitoring programme for the construction phase to detect and quantify any alien species that may become established as a result of the project activities and identify the problem species (as per Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) and NEM: BA).	<ul style="list-style-type: none"> Appoint a suitable vegetation contractor to inspect the site and document the extent of invasive alien vegetation, which will serve as a baseline. Prepare a monitoring programme for alien invasive species on the site (i.e., the 694-ha footprint), including mapping of alien invasive species. The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. 	<ul style="list-style-type: none"> Prior to the commencement of construction Once-off 	<ul style="list-style-type: none"> Project Developer, ECO, and Specialist Contractor ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		4.2.3. Ensure proper management of soil stockpiles. Do not import soil stockpiles from areas with alien plants to ensure proper management of stockpiles.	<ul style="list-style-type: none"> Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO Contractor and
		4.2.4. Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas.	<ul style="list-style-type: none"> Rehabilitate disturbed areas and monitor the presence of alien invasive species on site. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO Contractor and
		4.2.5. Keep clearance and disturbance of indigenous vegetation to a minimum.	<ul style="list-style-type: none"> Monitor and manage vegetation clearing by undertaking visual inspections to ensure minimal disturbance and to restrict activities to the demarcated project footprint. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO Contractor and
		4.2.6. Ensure that the footprint required for the proposed project activities (such as temporary stockpiling, earthworks, storage areas, site establishment etc.) is clearly demarcated and kept at a minimum.	<ul style="list-style-type: none"> Verify that the proposed project area is determined and demarcated prior to the commencement of the construction phase by undertaking visual inspections. 	<ul style="list-style-type: none"> Once-off prior to construction and as required during the construction process. 	<ul style="list-style-type: none"> ECO Contractor and
		4.2.7. Ensure that the spread of alien invasive vegetation within the project footprint, is immediately controlled and removed promptly, in a scheduled manner throughout the construction phase. The removal of	<ul style="list-style-type: none"> Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species. Map the distribution of any alien invasive species. The results should 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO Contractor and

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		alien vegetation on site during the construction phase should use registered control methods and take into consideration the Alien and Invasive Species Regulations published in terms of Section 97(1) of the NEM: BA, if applicable.	be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area.		
		4.2.8. The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.	<ul style="list-style-type: none"> ▪ Monitor the removal of the alien vegetation found on site via visual inspections. 	<ul style="list-style-type: none"> ▪ As necessary during the construction phase. 	<ul style="list-style-type: none"> ▪ ECO
		4.2.9. All construction machinery and plant equipment delivered to site for use during the construction phase should be cleaned in order to limit the introduction of alien species.	<ul style="list-style-type: none"> ▪ Clean machinery and equipment prior to the construction phase. ▪ ECO to conduct visual inspections to verify that machinery and equipment are cleaned and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Prior to the commencement of construction. ▪ As necessary during the construction phase. 	<ul style="list-style-type: none"> ▪ ECO and Contractor
C. OPERATIONAL PHASE					
4.3. Impacts due to establishment of alien invasive plants. Exotic weed invasion may result in the ousting of natural vegetation and alteration of ecological processes on site, with incremental impacts	<p>Reduce the establishment and spread of alien invasive plants.</p> <p>To remove exotic weeds as and when they may arise and thereby prevent alteration of</p>	<p>4.3.1. Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species during the operational phase of the proposed SEF (i.e., a minimum of 20 years).</p> <p>4.3.2. Ensure that the spread of alien invasive vegetation within the project footprint, is immediately</p>	<ul style="list-style-type: none"> ▪ Annual audit of project area and immediate surroundings. Map the distribution of any alien invasive species. The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. ▪ Monitor the presence of alien invasive plants during the operational phase via visual inspections and take action 	<ul style="list-style-type: none"> ▪ Annual ▪ Ongoing ▪ As necessary during the construction phase. 	<ul style="list-style-type: none"> ▪ Developer's Project Manager ▪ ECO and Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
on the adjacent veld types.	local and adjacent habitat forms.	<p>controlled and removed promptly, in a scheduled manner throughout the operational phase. The removal of alien vegetation on site during the operational phase should use registered control methods and take into consideration the Alien and Invasive Species Regulations published in terms of Section 97(1) of the NEM: BA, if applicable.</p> <p>4.3.3. The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species.</p>	<p>to remove and control these species. Map the distribution of any alien invasive species. The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area.</p> <ul style="list-style-type: none"> ▪ Monitor the removal of the alien vegetation found on site via visual inspections. 		
D. DECOMMISSIONING PHASE					
4.4. Exotic weed invasion of the decommissioned site resulting in ecological change Exotic weed invasion.	To reduce the spread of exotic weeds on disturbed lands that formed a portion of the PV facility.	4.4.1. All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally sourced seed of indigenous grass species that were recorded on site pre-construction.	<ul style="list-style-type: none"> ▪ Final external audit of area to confirm that area is rehabilitated to an acceptable level. 	<ul style="list-style-type: none"> ▪ Once off 	<ul style="list-style-type: none"> ▪ Contractor with advice from specialist
		4.4.2. Exotic weed control measures to be instituted through alien invasive vegetation management programme. Regular redress of alien invasive vegetation through the use of herbicide and manual removal.	<ul style="list-style-type: none"> ▪ Compile alien invasive vegetation management programme for a period of 12 months after the decommissioning exercise. ▪ Appoint contractor to undertake the alien invasive vegetation management programme. 	<ul style="list-style-type: none"> ▪ Alien invasive vegetation management programme to be undertaken every 6 months for a period of 12 months following decommissioning. 	<ul style="list-style-type: none"> ▪ Project Developer ▪ Project Developer ▪ Project Developer and Specialist/ Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			<ul style="list-style-type: none"> ▪ Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established after decommissioning and rehabilitation. ▪ Post bi-yearly monitoring of the project footprint to hinder proliferation of exotic species as a result of the development. Final external audit of the project footprint to confirm that area is free of alien invasive plants after 5 years. 	<ul style="list-style-type: none"> ▪ Prior to the commencement of the decommissioning phase. ▪ Once-off ▪ Once-off 	<ul style="list-style-type: none"> ▪ Project Developer and Specialist/Contractor

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5 TRAFFIC MANAGEMENT PLAN INCLUDING TRANSPORTATION PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. PLANNING AND DESIGN PHASE					
5.1. Increased traffic generation	Manage impact that additional traffic generation will have on road network	5.1.1. If abnormal loads need to be transported by road to the site, a permit will need to be applied for in terms of Section 81 of the National Road Traffic Act (Act 93 of 1996) and the National Road Traffic Regulations, 2000. In addition, authorisation needs to be obtained from the relevant road authorities to modify the road reserve to accommodate turning movements at intersections (if necessary).	<ul style="list-style-type: none"> ▪ Ensure that the permits are applied for and obtained prior to commencement. ▪ Verify that this has been undertaken by reviewing approved permits. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Contractor ▪ ECO
		5.1.2. Ensure that a port permit is applied for prior to construction (i.e., Guidelines for Agreements, Licenses and Permits in terms of the National Ports Act (Act 12 of 2005)).			
		5.1.3. The preferred route to the site should be further investigated and surveyed to ensure that abnormal loads are not obstructed at any point by geometric, height and width limitations along the route.	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer and Traffic Specialist
		5.1.4. Discussions must be held with the relevant landowners on which the internal gravel access farm road leading to the sites is located, prior to	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		commencement to confirm requirements and details of the agreement.			
		5.1.5. Ensure that the requirements for use of the gravel access farm road leading to the site are addressed and considered in the design, as and where applicable.	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
		5.1.6. Provide a Transport Traffic Plan to the Provincial and Municipal Road Department (if required).	<ul style="list-style-type: none"> ▪ Ensure that the plan is compiled and submitted prior to commencement. ▪ Verify that this has been undertaken by reviewing approved plans. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Contractor ▪ ECO
		5.1.7. Conduct a survey with local tourism businesses in the area to estimate which time(s) of the year roads will be used more frequently by tourists visiting the area in order to better plan for heavy loads during the construction and operational phases.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
		5.1.8. A geotechnical and geometric design report, including improvement proposals, must be compiled to ensure that all the roads that will be affected by the proposed project are adequately improved and maintained before any other construction activity may commence on any of the farm portions. Any design affecting any Proclaimed Provincial Road must be approved by	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>the relevant authorities (i.e., the Free State Department of Police, Roads, and Transport) before implementation thereof may commence.</p> <p>5.1.9. A similar geotechnical report must be compiled, and approval obtained from the relevant authorities prior to commencing with any major upgrade or decommissioning phase.</p>			
5.2. Accelerated degradation of road structure due to construction, operational and decommissioning phase traffic.	Limit the deterioration of the road condition due to construction, operational and decommissioning phase traffic.	5.2.1. A Road Maintenance Plan should be developed for the gravel external access roads (i.e., external public roads under the authority of the applicable municipality, such as the R64) that will be used. The plan should address requirements such as, but not limited to, grading, dust suppressant mechanisms, drainage (where required), signage, and speed limits. The Road Maintenance Plan must ensure regular maintenance of the roads. The Road Maintenance Plan must be communicated with the relevant authorities, where required, and must be provided to the surrounding community forum prior to commencement of construction.	<ul style="list-style-type: none"> ▪ Ensure that the plan is compiled and submitted prior to commencement. ▪ Verify that this has been undertaken by reviewing approved plans. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer, Traffic Specialist and Contractor ▪ ECO
B. CONSTRUCTION PHASE					
5.3. Increased traffic generation during the construction phase resulting in a reduction of road-	Plan the project to spread and reduce the amount of road-based traffic and avoid local congestion	5.3.1. Plan and stagger delivery trips so that they occur during the day and minimize construction vehicle movement and delivery trips through the town of Dealesville and on the regional road	<ul style="list-style-type: none"> ▪ Monitor and management of traffic generated and when trips are made. 	<ul style="list-style-type: none"> ▪ During construction 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
based level of service and potential congestion and delays on the surrounding road network.	periods during the construction phase.	during peak traffic periods (06:00-9:00 and 16:00-18:00).			
		5.3.2. Suitable parking areas should be designated for construction trucks and vehicles at the construction site camp in order to promote order and improve safety.	<ul style="list-style-type: none"> ▪ Monitor the placement of the designated parking area for trucks and vehicles via visual inspections and record and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Once-off prior to construction and as required during the construction phase. 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
		5.3.3. The use of public transport (buses and/or minibus taxis) to convey construction personnel to the site should be encouraged.	<ul style="list-style-type: none"> ▪ Contractor should record the arrival and departure times as well as the number of workers using public transport. 	<ul style="list-style-type: none"> ▪ Once a month on a randomly selected day. 	<ul style="list-style-type: none"> ▪ Appointed Contractor
5.4. Increased level of road accidents (involving pedestrians, animals, other motorists on the surrounding tarred/gravel road network) due to increased traffic during construction.	Minimise the impact of the construction activities on the local traffic and avoid accidents with pedestrians, animals, and other drivers on the surrounding roads. Reduce number of road accidents due to increased traffic during construction.	5.4.1. Well maintained vehicles should be used together with well-trained drivers during the construction phase. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. The Contractors must ensure that construction vehicles are roadworthy, properly serviced and maintained, and respect the vehicle safety standards implemented by the Project Developer.	<ul style="list-style-type: none"> ▪ Carry out random checks of driver licenses and conduct random visual inspections of construction vehicles for roadworthiness. 	<ul style="list-style-type: none"> ▪ Random visual inspection of vehicles weekly. 	<ul style="list-style-type: none"> ▪ Contractor
		5.4.2. To ensure reduced speeds along the roads, implement speed control mechanisms on site by means of a stop and go system, implement speed limits	<ul style="list-style-type: none"> ▪ Implement speed control mechanisms prior to commencement of construction. 	<ul style="list-style-type: none"> ▪ On-going ▪ Random during the 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		and placement of road signage for the speed limits on site.	<ul style="list-style-type: none"> ▪ Carry out random inspections to verify whether proper speed control is being implemented. 	construction phase	
		5.4.3. Adhere to all speed limits applicable to all roads used.	<ul style="list-style-type: none"> ▪ Ensure that speed limits are adhered to on site. ▪ Carry out random visual inspections to verify speed limits and general awareness of vehicle drivers. 	<ul style="list-style-type: none"> ▪ Daily ▪ Random during the construction phase 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ ECO
		5.4.4. Roadkill monitoring programme (inclusive of wildlife collisions record keeping) should be established.	<ul style="list-style-type: none"> ▪ Appropriate monitoring should be undertaken. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		5.4.5. Implement clear and visible signage and signals indicating movement of vehicles at intersections and in the vicinity of the nearby farm steads. The farm steads should be treated as a no-go area.	<ul style="list-style-type: none"> ▪ Implement clear signalisation. ▪ Carry out random inspections to verify whether proper construction signage is being implemented. 	<ul style="list-style-type: none"> ▪ On-going ▪ Random during the construction phase 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring					
			Methodology	Frequency	Responsibility			
5.5. Deterioration in the surface condition of the roads and accelerated degradation of road structure due to construction traffic.	Limit the deterioration of the road condition due to construction traffic.	5.5.1. Ensure that there is regular maintenance of the gravel external access roads (i.e., external public roads under the authority of the Free State Government, such as the R64) by the contractor during the construction phase in line with the agreed and approved maintenance plan.	<ul style="list-style-type: none"> ▪ Carry out visual inspections to verify if regular maintenance is being undertaken. ▪ Ensure that the internal farm access road to site is upgraded through photographic surveys and monitoring. 	<ul style="list-style-type: none"> ▪ Bi-monthly ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Project Developer, Contractor, and ECO 			
		5.5.2. Ensure that the upgrading of the internal farm access road (i.e., internal private roads leading off the P59-2) is undertaken to suitable standards as specified by the civil engineer and in accordance with the approved maintenance plan.						
		5.5.3. Ensure regular maintenance of the access roads in line with the approved maintenance plan. Ensure that the access roads are restored to its original pre-construction road condition or an improved condition at the end of the construction phase.						
		5.5.4. Construction activities will have a higher impact than the normal road activity and therefore the main access roads to site should be inspected on a weekly basis for structural damage.				<ul style="list-style-type: none"> ▪ Ensure that the main access road to site maintains current condition through photographic surveys and monitoring. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		5.5.5. Implement management strategies for dust generation e.g., apply dust suppressant on the gravel roads on site, exposed areas, and stockpiles. Avoid the use of potable water for dust suppression during the construction phase and consider the use of				<ul style="list-style-type: none"> ▪ Ensure dust management measures are in place to adequately decrease the generation of dust. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		alternative approved sources, where possible			
		5.5.6. Vehicles must not be overloaded during the construction phase in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading. The inspections should also verify if the trucks are covered with appropriate material (such as tarpaulin) if and where possible.	<ul style="list-style-type: none"> ▪ Perform visual inspection of vehicles during the construction phase. 	<ul style="list-style-type: none"> ▪ Random visual inspection of vehicles weekly. 	<ul style="list-style-type: none"> ▪ Appointed Contractor
5.6. Impact on air quality due to dust generation, noise and exhaust emissions from construction vehicles and equipment.	Limit the release of noise, pollutants, and dust emissions	5.6.1. Implement management strategies for dust generation e.g., apply dust suppressant on the gravel roads on site, exposed areas, and stockpiles. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible.	<ul style="list-style-type: none"> ▪ Ensure dust management measures are in place to adequately decrease the generation of dust. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		5.6.2. Postpone or reduce dust-generating activities during periods with strong wind. Earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased.	<ul style="list-style-type: none"> ▪ Ensure dust management measures are in place to decrease the dust generated. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		5.6.3. Avoid using old and unmaintained construction equipment (which generate high sound levels and greater exhaust	<ul style="list-style-type: none"> ▪ Manage noise levels and air pollutants from construction vehicles through checking the condition of vehicles. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		emissions) and ensure equipment is well maintained.			
C. OPERATIONAL PHASE					
5.7. Increased level of road accidents (involving pedestrians, animals, other motorists on the surrounding tarred/gravel road network) due to increased (but limited) traffic during the operational phase.	Minimise the impact of the operational activities on the local traffic and avoid accidents with pedestrians, animals, and other drivers on the surrounding tarred/gravel roads. Reduce number of road accidents due to increased traffic during the operational phase.	5.7.1. Well maintained vehicles should be used together with well-trained drivers during the operational phase, as required. Vehicle maintenance and driver competency should be monitored. Proof of driver competency as well as the vehicle checks should be verified and undertaken to ensure that vehicles are roadworthy and hence, do not pose a safety risk. Vehicles must be roadworthy, properly serviced and maintained.	<ul style="list-style-type: none"> ▪ Carry out random checks of driver licenses and conduct random visual inspections of vehicles for roadworthiness. 	<ul style="list-style-type: none"> ▪ Random visual inspection of vehicles weekly. 	<ul style="list-style-type: none"> ▪ Project Developer
		5.7.2. Adhere to all speed limits applicable to all roads used.	<ul style="list-style-type: none"> ▪ Ensure that speed limits on site are adhered to on site. ▪ Carry out random visual inspections to verify speed limits on site and general awareness of vehicle drivers. 	<ul style="list-style-type: none"> ▪ Daily ▪ Random during the operational phase 	<ul style="list-style-type: none"> ▪ Project Developer
		5.7.3. Implement clear and visible signage and signals indicating movement of vehicles at intersections and in the vicinity of the nearby farmsteads. The farmsteads should be treated as a no-go area.	<ul style="list-style-type: none"> ▪ Implement clear signalisation. ▪ Carry out random inspections to verify whether proper signage is being implemented. 	<ul style="list-style-type: none"> ▪ Ongoing ▪ Random during the operational phase 	<ul style="list-style-type: none"> ▪ Project Developer
		5.7.4. The use of public transport (buses and/or minibus taxis) or carpooling to convey operational personnel to the site should be encouraged.	<ul style="list-style-type: none"> ▪ Monitor the requirements 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		5.7.5. Limit access to the site to personnel.	<ul style="list-style-type: none"> Maintain a register of visitors and staff that enter site and restrict access to personnel. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> Project Developer
5.8. Accelerated degradation of road structure due to operational traffic.	Limit the deterioration of the road condition due to operational phase traffic.	5.8.1. The main access roads to site should be inspected on a weekly basis for structural damage.	<ul style="list-style-type: none"> Ensure that the main access road to site maintains current condition through photographic surveys and monitoring. 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> Project Developer
		5.8.2. Ensure that there is regular maintenance of the gravel external access roads (i.e., external public roads under the authority of the applicable municipality, such as the D619 and D823) by the operator during the operational phase in line with the agreed and approved maintenance plan.	<ul style="list-style-type: none"> Carry out visual inspections to verify if regular maintenance is being undertaken. Ensure that the internal farm access road to site is upgraded through photographic surveys and monitoring. 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> Project Developer
		5.8.3. Implement management strategies for dust generation e.g., apply dust suppressant on gravel roads on site, exposed areas, and stockpiles.	<ul style="list-style-type: none"> Ensure dust management measures are in place to adequately decrease the generation of dust. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> Project Developer
		5.8.4. Vehicles must not be overloaded during the operational phase (where applicable) in order to reduce impacts on the road structures, particularly the access roads leading to the site. Random visual inspection of vehicles should be undertaken in order to monitor for overloading (where applicable).	<ul style="list-style-type: none"> Perform visual inspection of vehicles. 	<ul style="list-style-type: none"> Random visual inspection of vehicles weekly. 	<ul style="list-style-type: none"> Project Developer
D. DECOMMISSIONING PHASE					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
5.9. Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.					

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6 STORM WATER MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. PLANNING AND DESIGN PHASE					
6.1. Impact of the project if a detailed storm water management plan is not correctly prepared.	To limit the effect of uncontrolled storm water run-off from developed areas onto natural areas	6.1.1. Prepare a detailed stormwater management plan outlining appropriate treatment measures to address runoff from disturbed portions of the site	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions. ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ Once-off during design followed by regular control ▪ During the planning and design phase 	<ul style="list-style-type: none"> ▪ Contractor ▪ ECO
B. CONSTRUCTION PHASE					
6.2. Diversion and impedance of surface water flows – Changes to the hydrological regime and increased potential for erosion. Diversion and increased velocity of surface water flows – reduction	Prevent interference with natural run-off patterns, diverting flows and increasing the velocity of surface water flows.	6.2.1. The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	<ul style="list-style-type: none"> ▪ Compile a Method Statement for Stormwater Management during the construction phase. ▪ Inspect and verify if a Method Statement for Stormwater Management has been compiled by the Contractor via audits prior to the commencement of the construction phase. 	<ul style="list-style-type: none"> ▪ Prior to the construction phase. ▪ Once-off prior to the commencement of the construction phase. 	<ul style="list-style-type: none"> ▪ Contractor ▪ ECO
		6.2.2. Erosion and sedimentation into water bodies must be minimised through the effective stabilisation (gabions and Reno mattresses or similar) and the re-vegetation of any disturbed riverbanks.	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> ▪ Weekly or Bi-weekly 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
in permeable surfaces		6.2.3. Reinforce soil slopes to minimise erosion during rehabilitation (as needed, and once construction in a specific area has ceased).	<ul style="list-style-type: none"> Monitor activities and record and report non-compliance. 	<ul style="list-style-type: none"> As needed during the construction phase 	<ul style="list-style-type: none"> ECO
		6.2.4. Any irrigation of the development area for landscaping or dust control purposes should be controlled, such that it does not result in any measurable increase in moisture being passed into natural drainage lines.	<ul style="list-style-type: none"> Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> Weekly or bi-weekly 	<ul style="list-style-type: none"> ECO
		6.2.5. Drainage along the sides of the roads should be designed so that it does not result in concentrated flows into watercourses.	<ul style="list-style-type: none"> Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> Weekly or bi-weekly 	<ul style="list-style-type: none"> ECO
		6.2.6. Perform periodic inspections and maintenance of soil erosion measures and stormwater control structures.	<ul style="list-style-type: none"> Monitor activities and record and report non-compliance. 	<ul style="list-style-type: none"> As needed during the construction phase 	<ul style="list-style-type: none"> ECO
6.3. Pollution of the surrounding environment as a result of the contamination of stormwater. Contamination could result from the spillage of chemicals, oils, fuels, sewage, solid waste, litter etc.	<p>To prevent contaminated stormwater from entering into and adversely impacting on freshwater ecosystems and reducing the water quality.</p> <p>To reduce sedimentation of nearby water systems.</p>	6.3.1. The appointed Contractor should compile a Method Statement for Stormwater Management during the construction phase.	<ul style="list-style-type: none"> Compile a Method Statement for Stormwater Management during the construction phase. Inspect and verify if a Method Statement for Stormwater Management has been compiled by the Contractor via audits prior to the commencement of the construction phase. 	<ul style="list-style-type: none"> Prior to the construction phase. Once-off prior to the commencement of the construction phase. 	<ul style="list-style-type: none"> Contractor ECO
		6.3.2. Provide secure storage for fuel, oil, chemicals, and other waste materials to prevent contamination of stormwater runoff. Fuels and chemicals (i.e., any	<ul style="list-style-type: none"> Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non- 	<ul style="list-style-type: none"> Weekly 	<ul style="list-style-type: none"> ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	To apply best practice principles in managing risks to storm water pollution.	hazardous materials and dangerous goods) used during the construction phase must be stored safely on site and in bunded areas. Fuel and chemical storage containers must be inspected to ensure that any leaks are detected early.	compliance and incidents. Monitor if spillages have taken place and if they are removed correctly.		
		6.3.3. All stockpiles must be protected from erosion and stored on flat areas where run-off will be minimised. Erosion and sedimentation into water bodies must be minimised through effective stabilisation. No stockpiling should take place within a watercourse.	<ul style="list-style-type: none"> ▪ Monitor the excavations and stockpiling process throughout the construction phase via visual site inspections. Record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO
		6.3.4. Stockpiles must be located away from river channels i.e., greater than 32 m.			
		6.3.5. Littering and contamination of water resources during construction must be prevented by effective construction camp management.	<ul style="list-style-type: none"> ▪ Monitor via site audits and record non-compliance and incidents (i.e., by implementing walk through inspections). 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		6.3.6. Emergency plans must be in place to deal with potential spillages (especially those leading to any watercourses).	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> ▪ Weekly or Bi-weekly 	<ul style="list-style-type: none"> ▪ ECO
		6.3.7. Erosion and sedimentation into water bodies must be minimised through the effective stabilisation (gabions and Reno mattresses or similar) and the re-vegetation of any disturbed riverbanks, as applicable.	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> ▪ Weekly or Bi-weekly 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		6.3.8. Ensure that the temporary site camp and ablution facilities are established at least 32 m away from the banks of the major drainage lines. The sensitivities captured in the sensitivity map included in Appendix E of this EMPr must also be considered when placing the site camp (the buffers assigned to water courses should also be avoided, where possible in this regard).	<ul style="list-style-type: none"> ▪ Monitor the placement of the site camp via visual inspections, and record and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Once-off prior to construction and as required during the construction phase. 	<ul style="list-style-type: none"> ▪ ECO
		6.3.9. Ensure that there is no ad-hoc and indiscriminate crossing of watercourses and channels by vehicles during the construction phase. Access routes across the site should be strictly demarcated and selected with a view to minimise impacts on drainage lines. Watercourses where no construction activities are proposed must be considered as no-go areas.	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> ▪ Weekly or Bi-weekly 	<ul style="list-style-type: none"> ▪ ECO
		6.3.10. Ensure that no waste materials or sediments are left in the surrounding drainage lines (as a result of the construction).	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions of the Stormwater Management Plan and Method Statement. 	<ul style="list-style-type: none"> ▪ Weekly or Bi-weekly 	<ul style="list-style-type: none"> ▪ ECO
		6.3.11. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	<ul style="list-style-type: none"> ▪ Monitor via site audits and record non-compliance and incidents (i.e., by implementing walk through inspections). ▪ 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
C. OPERATIONAL PHASE					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
6.4. Stormwater discharge into the surrounding environment during operations	<p>To minimise the contamination of stormwater by uncontrolled release of contaminated or grey water.</p> <p>To protect soil resources and prevent soil erosion.</p>	6.4.1. An operational phase Stormwater Management Plan should be designed and implemented, with a view to prevent the passage of concentrated flows from hardened surfaces and onto natural areas.	<ul style="list-style-type: none"> ▪ Compile a Stormwater Management Plan for the operational phase. ▪ Inspect and verify if a Stormwater Management Plan has been compiled prior to the commencement of the operational phase. 	<ul style="list-style-type: none"> ▪ Continuously during operational phase. ▪ Once-off prior to the commencement of the operational phase. 	<ul style="list-style-type: none"> ▪ Project Developer
		6.4.2. All release points into the natural environment must have appropriate energy dissipaters to minimise scouring/erosion.	<ul style="list-style-type: none"> ▪ Monitor activities and record and report non-compliance. ▪ Monitor the placement of energy dissipaters via visual inspections, and record and report any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer
		6.4.3. As far as reasonably possible, separate “clean” and “dirty” storm water. As far as reasonably possible, capture and contain “dirty” stormwater for appropriate disposal/discharge.	<ul style="list-style-type: none"> ▪ Monitor via site audits and record non-compliance and incidents (i.e., by implementing inspections). 	<ul style="list-style-type: none"> ▪ Weekly or as required during operations. 	<ul style="list-style-type: none"> ▪ Project Developer
		6.4.4. Regular inspections of stormwater infrastructure should be undertaken to ensure that it is kept clear of all debris and weeds.	<ul style="list-style-type: none"> ▪ Undertake regular inspections of the stormwater infrastructure (i.e., by implementing walk through inspections). 	<ul style="list-style-type: none"> ▪ Weekly/Monthly 	<ul style="list-style-type: none"> ▪ Project Developer

D. DECOMMISSIONING PHASE

6.5. The proposed solar facility would be expected to run for a minimum period of 20 years, after which it would either be decommissioned, alternatively upgraded or an application submitted to obtain a new license. Should the plant be decommissioned, the solar field would be rehabilitated to its original (pre-development) state. In the (unlikely) event that none of the mitigation measures outlined for the construction and operational phases of the proposed project had been implemented, the period of time for recovery to take place would be extended. In the event that decommissioning occurs, and assuming implementation of mitigation measures, the hydrological regime should fully recover over time to present day conditions.

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7 EROSION MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. PLANNING AND DESIGN PHASE					
7.1. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads.	Ensure that disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	7.1.1. Design an effective system of storm water run-off control, where required (e.g., areas with concentrated volumes of run-off). The system must effectively collect and safely disseminate run-off water from all accumulation points and prevent down slope erosion.	<ul style="list-style-type: none"> Ensure that the storm water run-off control is included in the engineering design. 	<ul style="list-style-type: none"> Once-off during the planning and design phase. 	<ul style="list-style-type: none"> Project Developer
B. CONSTRUCTION PHASE					
7.2. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface	Ensure that disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	7.2.1. Implement an effective system of storm water run-off control, where required. The system must effectively collect and safely disseminate run-off water from all accumulation points and prevent down slope erosion.	<ul style="list-style-type: none"> Undertake site inspections to verify the effectiveness and integrity of the storm water run-off control system and record any erosion on site or downstream. Corrective action must be implemented to the run-off control system if erosion occurs. 	<ul style="list-style-type: none"> Every 2 months during the construction phase 	<ul style="list-style-type: none"> ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
disturbance, vegetation removal, and the establishment of hard surface areas including roads.					
7.3. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by construction related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads.	Ensure that vegetation clearing does not pose a high erosion risk.	7.3.1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation. 	<ul style="list-style-type: none"> ▪ Every 3 months during the construction phase 	<ul style="list-style-type: none"> ▪ ECO
7.4. Increased wind erosion and resultant deposition of dust	Prevent wind erosion and resultant deposition of dust on surrounding indigenous vegetation.	7.4.1. Sand, stone, and cement should be stored in demarcated areas, and covered or sealed to prevent wind erosion and resultant deposition of dust on the surrounding indigenous vegetation.	<ul style="list-style-type: none"> ▪ Undertake regular inspections of the via site audits to verify that sand, stone, and cement are stored and handled as instructed. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO and Contractor
		7.4.2. During construction, efforts should be made to retain as much natural vegetation as possible on the site, to reduce disturbed areas and maintain plant cover, thus reducing erosion risks.	<ul style="list-style-type: none"> ▪ Monitor activities via site inspections and record and report non-compliance. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		7.4.3. All stockpiles must be protected from erosion and stored on flat areas where run-off will be minimised. Erosion and sedimentation into water bodies must be minimised through effective stabilisation.	<ul style="list-style-type: none"> ▪ Monitor the stockpiling process throughout the construction phase via visual site inspections. Record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO
7.5. Excessive loss of natural vegetation within the development footprint area from erosion	Prevent loss of natural vegetation through erosion.	7.5.1. Vegetation clearing during construction must be restricted to the footprint of the proposed project components and planned infrastructure only. It should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.	<ul style="list-style-type: none"> ▪ Monitor vegetation clearing throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible. 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO and Contractor ▪ ECO
		7.5.2. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinstate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas.	<ul style="list-style-type: none"> ▪ Rehabilitate disturbed areas and monitor the presence of alien invasive species on site. 	<ul style="list-style-type: none"> ▪ Daily (stockpiling) and once-off for the reinstatement of the topsoil layer 	<ul style="list-style-type: none"> ▪ ECO and Contractor
		7.5.3. Re-seed with locally sourced seed of indigenous vegetation species.	<ul style="list-style-type: none"> ▪ Re-seed with seeds of indigenous grass species. 	<ul style="list-style-type: none"> ▪ Once off 	<ul style="list-style-type: none"> ▪ ECO with advice from a Terrestrial Ecology Specialist (if required)
		7.5.4. Topsoil stockpiles not used in three months after stripping must be seeded to prevent dust and erosion.	<ul style="list-style-type: none"> ▪ Regular monitoring for erosion to ensure that no erosion problems are occurring at the 	<ul style="list-style-type: none"> ▪ Weekly initially and thereafter monthly 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			site. All erosion problems observed should be rectified as soon as possible.		
7.6. Erosion of surface soils, rilling and gulleys.	Measures to be implemented that address or avoid the loss of surface soils and exacerbates gully formation.	<p>7.6.1. Identify cause of erosion and possible means of redress (i.e., implement erosion control measures, where applicable), such as the use of geofabric, stone gabions and re-vegetation or similar measures.</p> <p>7.6.2. Erosion control measures should seek to reduce surface flow velocity and allow for settlement on site of silt laden surface waters. Washaways, excessive loss of soils and gulleys can be considered to be indicative of excessive erosion.</p>	<ul style="list-style-type: none"> ▪ Monitor the erosion on site during construction, as well as the implementation and effectiveness of erosion control on site (such as the use of geofabric, stone gabions and re-vegetation or similar measures). 	<ul style="list-style-type: none"> ▪ Ongoing and as required during erosion events. 	<ul style="list-style-type: none"> ▪ ECO and Project Developer
C. OPERATIONAL PHASE					
7.7. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land surface run-off characteristics.	Ensure that disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	7.7.1. Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	<ul style="list-style-type: none"> ▪ Undertake site inspections to verify the effectiveness and integrity of the storm water run-off control system and record any erosion on site or downstream. Corrective action must be implemented to the run-off control system if erosion occurs. 	<ul style="list-style-type: none"> ▪ Bi-annually 	<ul style="list-style-type: none"> ▪ Project Developer
7.8. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land	That denuded areas are re-vegetated to stabilise soil against erosion.	7.8.1. Facilitate re-vegetation of denuded areas throughout the site.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to record the progress of all areas that require re-vegetation. 	<ul style="list-style-type: none"> ▪ Bi-annually 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
surface run-off characteristics.					
7.9. Excessive loss of natural vegetation in the development footprint area and resulting impacts indigenous vegetation, faunal habitat, and habitat fragmentation.	Prevent loss of natural vegetation and minimise habitat fragmentation and the loss of connectivity as a result of erosion.	7.9.1. The use of silt fences, sandbags or other suitable methods must be implemented in areas that are susceptible to erosion. All erosion control mechanisms need to be regularly maintained.	<ul style="list-style-type: none"> ▪ Monitor efficiency of erosion control measures. 	<ul style="list-style-type: none"> ▪ Weekly or monthly 	<ul style="list-style-type: none"> ▪ Project Developer
		7.9.2. Conduct regular monitoring for erosion to ensure that no erosion problems are occurring at the site as a result of the roads and other infrastructure. Ensure that all erosion problems are rectified as soon as possible.	<ul style="list-style-type: none"> ▪ Undertake regular monitoring for erosion to ensure is reduced and rectified as soon as possible. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer
D. DECOMMISSIONING PHASE					
7.10. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by decommissioning related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads.	Ensure that disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	7.10.1. Implement an effective system of storm water run-off control, where required. The system must effectively collect and safely disseminate run-off water from all accumulation points and prevent down slope erosion.	<ul style="list-style-type: none"> ▪ Undertake site inspections to verify the effectiveness and integrity of the storm water run-off control system and record any erosion on site or downstream. Corrective action must be implemented to the run-off control system if erosion occurs. 	<ul style="list-style-type: none"> ▪ Every 2 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved. 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
7.11. Soil degradation as a result of erosion. Erosion can occur as a result of the alteration of the land surface run-off characteristics, which can be caused by decommissioning related land surface disturbance, vegetation removal, and the establishment of hard surface areas including roads.	Ensure that vegetation clearing does not pose a high erosion risk.	7.11.1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilize disturbed soil against erosion.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation. 	<ul style="list-style-type: none"> ▪ Every 4 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved. 	<ul style="list-style-type: none"> ▪ ECO

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8 HAZARDOUS SUBSTANCES, SPILLS, POLLUTION PREVENTION AND INCIDENTS

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. CONSTRUCTION PHASE					
8.1. Contamination of soil and risk of damage to vegetation and/or fauna through spillage of concrete and cement.	To control concrete and cement batching activities in order to reduce spillages and resulting contamination of soil, groundwater and the vegetation and/or fauna.	8.1.1. If any concrete mixing takes place on site, this must be carried out in a clearly marked, designated area at the site camp on an impermeable surface (such as on boards or plastic sheeting and/or within a bunded area with an impermeable surface).	<ul style="list-style-type: none"> Monitor the handling and storage of sand, stone and cement as instructed. 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> Project Developer Contractor and ECO
		8.1.2. Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies, and drains.	<ul style="list-style-type: none"> Monitor the handling and storage of sand, stone and cement as instructed. 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> Project Developer, Contractor, and ECO
		8.1.3. A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted.	<ul style="list-style-type: none"> Monitor the handling and storage of sand, stone and cement as instructed. 	<ul style="list-style-type: none"> Daily 	<ul style="list-style-type: none"> Project Developer, Contractor, and ECO
		8.1.4. Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	<ul style="list-style-type: none"> Monitor the handling and storage of sand, stone and cement as instructed. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> Daily Monthly 	<ul style="list-style-type: none"> Project Developer, Contractor, and ECO ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		8.1.5. Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site. Empty cement bags must be collected from the construction area at the end of every day. Sand and aggregates containing cement must be kept damp to prevent the generation of dust.	<ul style="list-style-type: none"> ▪ Monitor the handling and storage of sand, stone and cement as instructed. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ Project Developer, Contractor, and ECO
		8.1.6. Any excess sand, stone and cement must be removed from site at the completion of the construction period and disposed at a licenced waste disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	<ul style="list-style-type: none"> ▪ Monitor the handling and storage of sand, stone and cement as instructed. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer, Contractor, and ECO ▪ ECO
8.2. Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils.	To control and eliminate fuel and oil spillages which may result in soil contamination and damage to vegetation and/or fauna.	8.2.1. Ensure that adequate containment structures are provided for the temporary storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc.). Appropriate bund areas must be provided for the storage of these materials at the site camp. Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel). Leak detection monitoring systems must be implemented.	<ul style="list-style-type: none"> ▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		8.2.2. Monitor and inspect construction equipment and vehicles to ensure that no fuel spillage takes place. Ensure that drip trays are	<ul style="list-style-type: none"> ▪ Monitor the construction equipment and vehicles and monitor the occurrence of spills and 	<ul style="list-style-type: none"> ▪ Daily ▪ During spill events 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		provided for construction equipment and vehicles as required.	the management process thereof. <ul style="list-style-type: none"> ▪ Record all spills and lessons learnt. 		
		8.2.3. Contractor to compile a Method Statement for refuelling activities under normal and emergency situations. If on-site servicing and refuelling is required in emergency situations, a designated area must be created at the construction site camp for this purpose. Drip trays or similar impervious materials must be used during these procedures.	<ul style="list-style-type: none"> ▪ Verify if a Method Statement is compiled by reviewing approved and signed off reports. ▪ Monitor the refuelling/ servicing process and record the occurrence of any spillages. 	<ul style="list-style-type: none"> ▪ Once-off prior to commencement of construction . ▪ During emergency refuelling and servicing activities. 	<ul style="list-style-type: none"> ▪ ECO ▪ ECO
		8.2.4. Spilled fuel, oil or grease must be retrieved, and contaminated soil removed, cleaned, and replaced. Record and report all significant fuel, oil, hydraulic fluid, or electrolyte spills or leaks so that appropriate clean-up measures can be implemented. A copy of these records must be made available to authorities on request throughout the project lifecycle.	<ul style="list-style-type: none"> ▪ Monitor the handling and storage of fuels and oils via site audits and monitor and record if spillages have taken place and if so, are removed correctly and reported to authorities if significant. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily (or during spills) 	<ul style="list-style-type: none"> ▪ Contractor and ECO
		8.2.5. Contaminated soil to be collected by the Contractor (under observation of the ECO) and disposed of at a registered waste facility designated for this purpose. Proof of disposal	<ul style="list-style-type: none"> ▪ Monitor the correct removal of contaminated soil. Monitor waste disposal slips and waybills 	<ul style="list-style-type: none"> ▪ Daily (or during spills) 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		(i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	via site audits and record non-compliance and incidents.		
		8.2.6. A Spill Response Method Statement must be compiled by the Contractor for the construction phase in order to manage potential spill events.	<ul style="list-style-type: none"> ▪ Compile a Spill Response Method Statement. ▪ Audit signed and approved Spill Response Method Statement. 	<ul style="list-style-type: none"> ▪ Once-off (and thereafter updated as required during the construction phase). ▪ Once-off (and thereafter as required during the construction phase). 	<ul style="list-style-type: none"> ▪ Contractor and Project Developer, ECO
		8.2.7. The Contractor must ensure that adequate spill containment and clean-up equipment are provided on site for use during spill events.	<ul style="list-style-type: none"> ▪ Monitor via site audits and record incidents and non-compliance. 	<ul style="list-style-type: none"> ▪ Daily/Weekly 	<ul style="list-style-type: none"> ▪ ECO and Contractor
		8.2.8. Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required.	<ul style="list-style-type: none"> ▪ Ensure that a well-maintained portable bioremediation kit is available on site and that construction personnel and contractors are aware of its location and instructions 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>8.2.9. In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree and level of contamination, excavation and removal to a hazardous waste disposal facility could be necessary. If the spillage is widespread and the soil is considered to be significantly contaminated, a specialist will need to be immediately appointed to address the spillage. This will usually entail the collection of samples of the contaminated soil followed by analysis in terms of the 2014 National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (i.e., GN 331). If the soil is determined to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant, including notifying the Minister of Forestry, Fisheries, and the Environment of the significant contamination.</p>	<ul style="list-style-type: none"> ▪ Ensure that a suitably qualified specialist is appointed to collect and analyse the contaminated soil samples in terms of the 2014 Norms and Standards (i.e., GN 331) in order to determine if the soil is significantly contaminated or not. ▪ If the contaminated soil is considered to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant. 	<ul style="list-style-type: none"> ▪ During spill events 	<ul style="list-style-type: none"> ▪ Project Developer
		<p>8.2.10. The DFFE and the Free State DESTEA is to be immediately duly notified of any incident in terms of Section 30 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA). In terms of Section 30 of NEMA, an “incident” means an unexpected, sudden, and uncontrolled release of a hazardous substance, including from a major emission, fire, or explosion, that causes, has caused, or may cause significant harm to the environment, human life, or property.</p> <p>8.2.11. The Department of Human Settlements, Water and Sanitation must be immediately notified of any pollution to surface water or groundwater</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections and reported to the authorities when required. 	<ul style="list-style-type: none"> ▪ Throughout construction 	<ul style="list-style-type: none"> ▪ ECO and Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		resources due to the proposed project activities.			
		8.2.12. The Contractor must record and document all significant spill events.	<ul style="list-style-type: none"> ▪ Monitor documentation and records of significant spill events via audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ During spill events 	<ul style="list-style-type: none"> ▪ ECO
8.3. Impacts as a result of emergencies or incidents	Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies	8.2.13. Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project; 8.2.14. The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation; 8.2.15. All staff must be made aware of emergency procedures as part of environmental awareness training; 8.2.16. The relevant local authority must be made aware of a fire as soon as it starts; 8.2.17. In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented	<ul style="list-style-type: none"> ▪ Compile an ERAP ▪ Ensure that this is adhered to via onsite inspections and reported to the authorities when required. ▪ Ensure that this is undertaken via onsite inspections and reported to the authorities when required. ▪ Have emergency response drills to ascertain readiness and preparedness in terms of an Emergency response. 	<ul style="list-style-type: none"> ▪ Once-off (and thereafter updated as required during the construction phase). ▪ Throughout construction ▪ Throughout construction 	<ul style="list-style-type: none"> ▪ Contractor and Project Developer, ECO ▪ Contractor and Project Developer, ECO ▪ Throughout construction

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
8.4. Impacts to the environment and injuries to people as a result of fires	Prevention of uncontrollable fires.	8.2.18. Firefighting equipment must be available on all vehicles located on site; 8.2.19. The local Fire Protection Agency (FPA) must be informed of construction activities; 8.2.20. Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site; 8.2.21. Two way swap of contact details between ECO and FPA.	<ul style="list-style-type: none"> ▪ Ensure that this is in place via vehicle and onsite inspections and reported to the authorities when required. ▪ Inform the FPA of construction activities and swap contact details between ECO and FPAs 	<ul style="list-style-type: none"> ▪ Throughout construction ▪ At the start of construction 	<ul style="list-style-type: none"> ▪ ECO and Project Developer ▪ ECO
8.5. Risk of injury to public	All precautions are taken to minimise the risk of injury, harm or complaints.	8.2.22. Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; 8.2.23. All unattended open excavations must be adequately fenced or demarcated; 8.2.24. Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; 8.2.25. Ensure structures vulnerable to high winds are secured; 8.2.26. Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.	<ul style="list-style-type: none"> ▪ Ensure all precautions and measures are in place to ensure the safety of the public ▪ Maintain and check an incidents and complaints register 	<ul style="list-style-type: none"> ▪ Throughout construction ▪ Throughout construction on a daily or weekly basis as applicable 	<ul style="list-style-type: none"> ▪ ECO and Project Developer ▪ ECO to report all incidents and complaints to the Project Developer
B. OPERATIONAL PHASE					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
8.3. Contamination of soil and risk of damage to vegetation and/or fauna through spillage of fuels and oils	To control and eliminate fuel and oil spillages which may result in soil contamination and damage to vegetation and/or fauna.	8.3.1. Monitor and inspect maintenance equipment and vehicles to ensure that no fuel spillage takes place.	<ul style="list-style-type: none"> ▪ Implement specifications for maintenance equipment use as specified by the maintenance Contractor. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer
		8.3.2. Spilled fuel, oil or grease is retrieved during operations where possible and contaminated soil removed, cleaned, and replaced.	<ul style="list-style-type: none"> ▪ Monitor the handling and storage of fuels and oils via site audits and monitor and record if spillages have taken place and if so, are removed correctly and reported to authorities if significant. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ During spills 	<ul style="list-style-type: none"> ▪ Project Developer
		8.3.3. Record and report all significant fuel, oil, hydraulic fluid, or electrolyte spills or leaks so that appropriate clean-up measures can be implemented. A copy of these records must be made available to authorities on request throughout the project lifecycle.			
		8.3.4. Contaminated soil to be collected by the Contractor and disposed of at a registered waste facility designated for this purpose. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	<ul style="list-style-type: none"> ▪ Monitor the correct removal of contaminated soil. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ During spills 	<ul style="list-style-type: none"> ▪ Project Developer
		8.3.5. A Spill Response Plan must be compiled for the operational phase in order to manage potential spill events.			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
				as required).	
		8.3.6. Ensure that adequate spill containment and clean-up equipment are provided on site for use during spill events. Portable bioremediation kit (to remedy chemical spills) is to be held on site and used as required.	<ul style="list-style-type: none"> ▪ Ensure that a well-maintained portable bioremediation kit is available on site and that operational personnel are aware of its location and instructions. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Facility Manager
		8.3.7. In case of a spillage of hazardous chemicals where contamination of soil occurs, depending on the degree and level of contamination, excavation and removal to a hazardous waste disposal facility could be necessary. If the spillage is widespread and the soil is considered to be significantly contaminated, a specialist will need to be immediately appointed to address the spillage. This will usually entail the collection of samples of the contaminated soil followed by analysis in terms of the 2014 National Norms and Standards for the Remediation of Contaminated Land and Soil Quality (i.e., GN 331). If the soil is determined to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant, including notifying the Minister of Forestry, Fisheries and the Environment, of the significant contamination.	<ul style="list-style-type: none"> ▪ Ensure that a suitably qualified specialist is appointed to collect and analyse the contaminated soil samples in terms of the 2014 Norms and Standards (i.e., GN 331) in order to determine if the soil is significantly contaminated or not. ▪ If the contaminated soil is considered to be significantly contaminated, then compliance with Part 8 of the NEMWA should be achieved by the Applicant. 	<ul style="list-style-type: none"> ▪ During spill events 	<ul style="list-style-type: none"> ▪ Project Developer
		8.3.8. In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management:			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Waste Act 59 of 2008. Refer to Section 5.7 for procedures concerning storm and wastewater management and 5.8 for solid and hazardous waste management.			
		8.3.9. An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; 8.3.10. All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS);	<ul style="list-style-type: none"> ▪ Hazardous Chemical Substance (HCS) control sheet ▪ Material Safety Data Sheets (MSDS); 	<ul style="list-style-type: none"> ▪ Monthly and updated as required). ▪ Updated as required. 	<ul style="list-style-type: none"> ▪ Facility Manager ▪ Environmental Manager
		8.3.11. The Free State DESTEA is to be immediately duly notified of any incident in terms of Section 30 of the National Environmental Management Act (Act 107 of 1998, as amended) (NEMA). In terms of Section 30 of NEMA, an “incident” means an unexpected, sudden, and uncontrolled release of a hazardous substance, including from a major emission, fire, or explosion, that causes, has caused, or may cause significant harm to the environment, human life, or property. 8.3.12. The Department of Human Settlements, Water and Sanitation must be immediately notified of any pollution to surface water or groundwater resources due to the proposed project activities.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections and reported to the authorities when required. 	<ul style="list-style-type: none"> ▪ Throughout operations 	<ul style="list-style-type: none"> ▪ Environmental Manager
		8.3.13. Ensure that adequate containment structures are provided for the temporary storage of liquid dangerous goods and hazardous materials on site (such as chemicals, oil, fuel, hydraulic fluids, lubricating oils etc.). Appropriate bund areas must be provided for the storage of	<ul style="list-style-type: none"> ▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Facility Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>these materials at the PV facility. Bund areas should contain an impervious surface in order to prevent spillages from entering the ground. Bund areas should have a capacity of 110 % of the volume of the largest tank in the bund (tanks include storage of fuel/diesel). Leak detection monitoring systems must be implemented. The floor of the bund must be sloped, draining to an oil separator. Bunded areas to be suitably lined with a SABS approved liner.</p> <p>8.3.14. Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained;</p> <p>8.3.15. All empty externally dirty drums must be stored on a drip tray or within a bunded area;</p> <p>8.3.16. No unauthorised access into the hazardous substances storage areas must be permitted;</p> <p>8.3.17. No smoking must be allowed within the vicinity of the hazardous storage areas;</p> <p>8.3.18. Adequate fire-fighting equipment must be made available at all hazardous storage areas;</p> <p>8.3.19. Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used;</p> <p>8.3.20. An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times;</p>	audits and record non-compliance and incidents.		

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		8.3.21. The responsible operator must have the required training to make use of the spill kit in emergency situations; 8.3.22. An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken;			
8.4. Potential risk to employees due to incorrect handling of hazardous waste	Prevent injuries to employees	8.4.1. All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet; 8.4.2. Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available;	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Environmental Manager ▪ Facility Manager
8.5. Impacts due to management solid and liquid wastes disposed of on the site during operational phase.	Prevent environmental impacts as a result of the operational phase such as pollution.	8.5.1. All operation waste to be removed from the site by an appointed service provider.	<ul style="list-style-type: none"> ▪ Waste removal and disposal to be monitored throughout operation. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		8.5.2. All liquid waste or spills (used oil, paints, lubricating compounds and grease from vehicles passing through the entrance facility) to be packaged and disposed appropriately at a registered landfill site.	<ul style="list-style-type: none"> ▪ Monitor the correct removal of liquid waste or spills. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ During spills 	<ul style="list-style-type: none"> ▪ Project Developer
		8.5.3. Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided in order to avoid spillages.	<ul style="list-style-type: none"> ▪ Monitor the storage and handling of dangerous goods and hazardous materials on site via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Facility Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C. DECOMMISSIONING PHASE					
8.6. No specific impacts are associated with the decommissioning phase other than those from the operational phase that will still be relevant for the duration of the decommissioning phase due to on-going occupation of the area.					

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9 ENVIRONMENTAL AWARENESS AND FIRE MANAGEMENT PLAN

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. PLANNING AND DESIGN PHASE					
9.1. Potential impacts resulting from the lack of overall compliance with the conditions of the EA (issued by the DFFE)	Ensure compliance with all environmental conditions of approval (issued by the DFFE as part of the EA).	9.1.1. Audit the implementation of the EMPr requirements.	<ul style="list-style-type: none"> ▪ Audit report on compliance with actions and monitoring requirements. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer
		9.1.2. Establish clear and transparent reporting of the activities undertaken with regard to all recommendations included in the EMPr.	<ul style="list-style-type: none"> ▪ Audit report on compliance with actions and monitoring requirements. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer
B. CONSTRUCTION PHASE					
9.2. Potential risk of fire due to construction activities or behaviour of staff on site during the construction phase	Prevent fire on site resulting of workers smoking or starting fires (i.e., cooking, heating purposes).	9.2.1. Designate smoking areas, as well as areas for cooking, where the fire hazard could be regarded as insignificant.	<ul style="list-style-type: none"> ▪ Ad-hoc checks to ensure workers are smoking or cooking in designated areas only. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO and Contractor
		9.2.2. Educate workers on the dangers of open and/or unattended fires.	<ul style="list-style-type: none"> ▪ Ensure fire safety requirements are well understood and respected by construction personnel. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Ongoing. ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ ECO and Contractor ▪ Contractor/ECO ▪ ECO
		9.2.3. Prohibit open fires. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the construction phase.	<ul style="list-style-type: none"> ▪ Ensure fire safety requirements are well understood and respected by construction personnel. Provide basic fire safety training. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>9.2.4. Ensure that cooking takes place in a designated area shown on the site map. Ensure that no firewood or kindling may be gathered from the site or surrounds.</p>	<ul style="list-style-type: none"> Check compliance with specified conditions using a report card and allocate fines when necessary. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractors
		<p>9.2.5. Fire-fighting equipment must be made available at various appropriate locations on the construction site.</p>	<ul style="list-style-type: none"> Ensure fire safety requirements are well understood and respected by workers. Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company. 	<ul style="list-style-type: none"> On-going Bi-annually 	<ul style="list-style-type: none"> ECO and Contractor Contractor
9.3. Inappropriate behaviour of civil contractors and sub-contractors during the construction phase	<p>Prevent unnecessary impacts on the surrounding environment by ensuring that contractors are aware of the requirements of the EMPr.</p> <p>Ensure that contractors and sub-contractors do not induce impacts on the surrounding environment as a result of unplanned pollution on site.</p> <p>Ensure that actions by on-site contractors and sub-contractors and workers</p>	<p>9.3.1. Ensure that the EMPr and the EA (should it be granted by the DFFE), are included in all tender documentation and contractors and sub-contractors' contracts.</p>	<ul style="list-style-type: none"> Check compliance with specified conditions using a report card and allocate fines when necessary. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractors
		<p>9.3.2. Contractors and sub-contractors must use the ablution facilities situated in a designated area within the site; and no bathing/washing should be permitted outside the designated area.</p>	<ul style="list-style-type: none"> Check compliance with specified conditions using a report card and allocate fines when necessary. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractors
		<p>9.3.3. Portable chemical toilet/s (ablution facilities) at the construction camp, must be serviced weekly for the duration of the construction phase.</p>			
		<p>9.3.4. Care should be taken with the installation of conservancy tanks to prevent cracks that could lead to leaks over time. Proper and regular servicing</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	are properly managed in order to minimise impacts to surrounding environment.	must be scheduled to prevent possible groundwater contamination.			
		9.3.5. All litter will be deposited in a clearly labelled, closed, animal-proof disposal bin in the construction area; particular attention needs to be paid to food waste.	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions using a report card and allocate fines when necessary. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractors
		9.3.6. No person other than qualified specialist or personnel authorised by the Project Developer, will disturb, or remove plants outside the demarcated construction area.	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions using a report card and allocate fines when necessary. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractors
		9.3.7. No person other than qualified specialist or personnel authorised by the Project Developer, will disturb animals on the site.	<ul style="list-style-type: none"> ▪ Check compliance with specified conditions using a report card and allocate fines when necessary. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractors
		9.3.8. Educate workers on site about suitable behaviour on site and initiate environmental awareness. Staff must be informed that no trapping, snaring, or feeding of any animal will be allowed.	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Contractor/ ECO ▪ ECO
9.4. Inappropriate planning of site camp establishment.	Ensure that environmental issues are taken into consideration in the planning for site establishment.	9.4.1. All construction activities, materials, equipment, and personnel must be restricted to the actual construction area specified (as required to undertake the construction work), which includes the project footprint area and access roads. The construction area must be demarcated by the	<ul style="list-style-type: none"> ▪ Monitor compliance and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Before construction 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Contractor (excluding the access roads).			
		9.4.2. The Contractor should install and maintain Construction Site Information Boards in the position, quantity, design, and dimensions specified by the Project Developer.	<ul style="list-style-type: none"> ▪ Monitor compliance and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Before construction 	<ul style="list-style-type: none"> ▪ ECO
		9.4.3. General building materials should be stored in appropriate designated areas on site such that there will be no runoff from these areas towards sensitive systems. The site camp must be removed after construction.	<ul style="list-style-type: none"> ▪ Monitor compliance and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Before construction 	<ul style="list-style-type: none"> ▪ ECO
9.5. Increased animal road mortality	Reduction in animal mortality	9.5.1. The construction staff should be made aware of the presence of fauna and within the proposed project area. The construction personnel and staff must also be made aware of the general speed limits on site and must be alert at all times for potential crossings and should be trained on how to react in these situations.	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Contractor/ECO ▪ ECO
		9.5.2. To ensure that animals are not attracted to the site (and potentially resulting in increased road mortality), the waste collection bins and skips should be covered with suitable material, where appropriate, and the site camp must be kept clean on a daily basis.	<ul style="list-style-type: none"> ▪ Monitor the activities via visual inspections, and record and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		9.5.3. Establish a monitoring programme to record the number of faunal road mortalities and collisions. If it is established that the number of collisions and faunal fatalities increase within a specific area, then identify appropriate actions such as additional road signage and driver education to raise awareness.	<ul style="list-style-type: none"> ▪ Appropriate monitoring and recording of mortalities should be undertaken. ▪ Additional signage and driver education to be implemented if required. ▪ Exclusion fences should be installed, if needed to direct animals to safe road crossings. 	<ul style="list-style-type: none"> ▪ Weekly ▪ As required 	<ul style="list-style-type: none"> ▪ ECO ▪ ECO and Contractor
9.6. Increased energy consumption during the construction phase.	Reduce energy consumption where possible.	9.6.1. Encourage the use of energy saving equipment at the site camp site (such as low voltage lights and low pressure taps) and promote recycling. Construction personnel must be made aware of energy conservation practices as part of the Environmental Awareness Training programme.	<ul style="list-style-type: none"> ▪ Contractor to monitor energy usage via audits. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Contractor ▪ Contractor/ECO ▪ ECO
9.7. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during the construction phase.	9.7.1. Water conservation should be practiced as follows: <ul style="list-style-type: none"> ▪ Cleaning methods utilised for cleaning vehicles, floors, etc. should aim to minimise water use (e.g., sweep before wash-down). ▪ Ensure that regular audits (i.e., twice weekly) of water systems and all water-related infrastructure (e.g., pipes, pumps, reservoirs, toilets, taps, etc.) are conducted to identify possible water leakages. Such infrastructure must be immediately repaired. 	<ul style="list-style-type: none"> ▪ Monitor via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		9.7.2. Avoid the use of potable water for dust suppression during the construction phase and consider the use of alternative approved sources, where possible.			
		9.7.3. Make construction personnel aware of the importance of limiting water wastage, as well as reducing water use.	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on water usage and conservation. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Contractor/ECO ▪ ECO
C. OPERATIONAL PHASE					
9.8. Potential risk of fire due to behaviour of staff on site during the operational phase	Ensure appropriate and efficient fire prevention during the operational phase.	9.8.1. Designate smoking areas as well as areas for cooking, where the fire hazard could be regarded as insignificant.	<ul style="list-style-type: none"> ▪ Random inspections during a month to ensure workers are smoking or starting fires in designated areas only. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		9.8.2. Educate workers on the dangers of open and/or unattended fires.	<ul style="list-style-type: none"> ▪ Ensure fire safety requirements are well understood and respected by operational personnel. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Ongoing ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager ▪ Facility Manager ▪ Facility Manager
		9.8.3. Prohibit open fires. Appropriate fire safety training should also be provided to staff that are to be on the site for the duration of the operational phase.	<ul style="list-style-type: none"> ▪ Ensure fire safety requirements are well understood and respected by operational personnel. Provide basic fire safety training. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		9.8.4. Ensure that adequate fire-fighting equipment is available and easily accessible on site.	<ul style="list-style-type: none"> ▪ Ensure fire safety requirements are well understood and respected by workers. ▪ Assurance of functionality of fire extinguishers via inspections and certification by an accredited fire service company. 	<ul style="list-style-type: none"> ▪ On-going ▪ Bi-annually 	<ul style="list-style-type: none"> ▪ Facility Manager ▪ Project Developer
9.9. Increased energy consumption during the operational phase.	Reduce energy consumption where possible.	9.9.1. Encourage the use of energy saving equipment at the PV facility (such as low voltage lights and low-pressure taps) and promote recycling. Operational personnel must be made aware of energy conservation practices as part of the environmental awareness training programme.	<ul style="list-style-type: none"> ▪ Monitor energy usage via site investigations. ▪ Conduct training for all operational personnel. 	<ul style="list-style-type: none"> ▪ Monthly ▪ As and when required and ensure that all new staff are inducted. 	<ul style="list-style-type: none"> ▪ Facility Manager ▪ Project Developer
9.10. Impact on the regional water balance as a result of increased water usage.	Reduce water usage during operations.	9.10.1. Water conservation to be practiced in line with Energy Saving Policies as follows: <ul style="list-style-type: none"> ▪ Cleaning methods utilised for cleaning vehicles, floors, the offices etc. should aim to minimise water use (e.g., sweep before wash-down). ▪ Where possible, encourage the re-use of water. ▪ Ensure that regular audits (i.e., twice weekly) of water systems and all water-related infrastructure (e.g., pipes, pumps, reservoirs, toilets, taps, etc.) are conducted to identify possible water leakages. 	<ul style="list-style-type: none"> ▪ Record water usage during the operational phase, conduct audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Such infrastructure must be immediately repaired. 9.10.2. Consider installing water saving devices (e.g., dual flush toilets, automatic shut-off taps, etc.).			
		9.10.3. Carry out environmental awareness training with a discussion on water usage and conservation and make operational personnel aware of the importance of limiting water wastage.	<ul style="list-style-type: none"> ▪ Conduct training for all operational personnel. 	<ul style="list-style-type: none"> ▪ As and when required during operations and ensure that all new staff are inducted. 	<ul style="list-style-type: none"> ▪ Facility Manager
9.11. Non respect of waste management practices	Minimise the production of general waste. Ensure compliance with relevant waste management legislation. Minimise pollution of the environment.	9.11.1. Control and implement waste management plans. Ensure that relevant legislative requirements are respected.	<ul style="list-style-type: none"> ▪ Control of waste management practices throughout operation phase. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		9.11.2. Determine specific areas on site for temporary management of waste.			
		9.11.3. Promote waste reduction, re-use, and recycling opportunities on site during the operational phase.	<ul style="list-style-type: none"> ▪ Monitor waste generation and collection throughout operation. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		9.11.4. Ensure an adequate and sustainable use of resources.			
9.12. Excessive generation of wastewater on site during the operation phase	Maintain reasonable levels of wastewater generation	9.12.1. Wastewater must be collected and disposed of at a suitable licenced disposal facility. Proof of disposal (i.e., waste disposal slips or waybills) should be retained on file for auditing purposes.	<ul style="list-style-type: none"> ▪ Wastewater generation to be monitored throughout the operational phase. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Quarterly 	<ul style="list-style-type: none"> ▪ Facility Manager
D. DECOMMISSIONING PHASE					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
9.13.	Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.				

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10 SPECIFIC PROJECT RELATED ENVIRONMENTAL IMPACTS

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
A. PLANNING AND DESIGN PHASE					
A.1. AGRICULTURE AND SOILS IMPACTS					
10.1 Erosion	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	10.1.1. Design an effective system of stormwater run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points, and it must prevent any potential down slope erosion.	<ul style="list-style-type: none"> ▪ Ensure that the stormwater run-off control is included in the engineering design. 	<ul style="list-style-type: none"> ▪ Once-off during the design phase. 	<ul style="list-style-type: none"> ▪ Holder of the EA
A.2. VISUAL IMPACTS					
10.2. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.	Reduce visual intrusion of construction activities project wide.	10.2.1. Ensure that visual management measures are included in the EMP, monitored by an ECO, including the siting of the construction camps and material stockpiles in visually unobtrusive positions in the landscape, away from public roads.	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> ▪ During design cycle and before construction commences. 	<ul style="list-style-type: none"> ▪ Project Developer
10.3. Large construction vehicles and equipment will alter the natural character of the study area and	Minimise exposure of visual receptors to	10.3.1. Ensure that the design of the facility takes the following into consideration:	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase by 	<ul style="list-style-type: none"> ▪ During design cycle and before 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
expose visual receptors to impacts associated with construction.	impacts associated with construction	<ul style="list-style-type: none"> • An underground cable significantly reduces visual impacts associated with powerline. • Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible • Buildings on the site should be painted with natural tones that fit with the surrounding environment and non-reflective surfaces should be utilised where possible. • Existing gravel access roads are used as far as possible plan the layout and construction of roads and infrastructure with due cognisance of the topography to limit cut and fill requirements. • Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting. • 	reviewing signed minutes of meetings, designs or signed reports.	construction commences.	
A.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
10.4. Damage or destruction to archaeological sites or graves	Rescue information, artefacts or burials	10.4.1. Pre-construction survey of any as yet unsurveyed areas	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase and that an Archaeologist 	<ul style="list-style-type: none"> ▪ During design cycle and before 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	before extensive damage occurs	<p>10.4.2. It is recommended that the EGI is micro-sited to avoid the Tree lined avenue (Feature 871 as recorded by Orton 2016);</p> <p>10.4.3. The final pylon positions and underground powerline route should be subjected to a heritage walk down prior to development</p> <p>10.4.4. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA (Sityhilelo Ngcatsha/Natasha Higgitt 021 202 8660) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule</p> <p>10.4.5. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Ngqabutho Madida 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in</p>	<p>with suitable qualifications and experience is appointed to undertake a pre-construction survey by reviewing signed minutes of meetings or signed reports or the appointment letter.</p> <ul style="list-style-type: none"> ▪ Ensure that the pre-construction survey findings are taken into consideration during the planning and design phase, as necessary. 	construction commences.	

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>terms of section 51(1)e of the NHRA and item 5 of the Schedule.</p> <p>10.4.6. If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA</p>			
10.5. Visible landscape scarring.	Minimise landscape scarring	10.5.1. Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings, designs or signed reports. 	<ul style="list-style-type: none"> ▪ During design cycle and before construction commences. 	<ul style="list-style-type: none"> ▪ Project Developer
A.4. TERRESTRIAL BIODIVERSITY IMPACTS					
10.6. Potential impact on terrestrial biodiversity and species as a result of the proposed SEF.	Avoid or minimise impacts on terrestrial biodiversity and species on site regarding the placement of the infrastructure. Avoiding wetlands, rocky sheets and	<p>10.6.1. The underground powerline route should ideally avoid the Grassland habitat as far as possible; where this is not possible an effective rehabilitation plan must be drafted.</p> <p>10.6.2. Ensure that a walk-through survey is has been done once the final pylon positions and layout have been decided, which includes the</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the planning and design phase. 	<ul style="list-style-type: none"> ▪ During design cycle and before construction commences. 	<ul style="list-style-type: none"> ▪ Project Developer and Appointed Ecological Specialist.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	<p>rocky outcrops will reduce the chances of loss of protected species.</p> <p>Avoid areas delineated as CBA, where possible.</p>	<p>underground powerline, in order to obtain the number of applicable plants for which permits are required for their destruction.</p> <p>10.6.3. Ensure that the placing of infrastructure takes the sensitivity mapping of the ecological assessment into account to avoid and reduce impacts on sensitive habitats and protected species.</p> <p>10.6.4. Avoid areas delineated as CBA, where possible.</p>			
A.5. AQUATIC BIODIVERSITY AND SPECIES IMPACTS					
10.7. Alteration in flow regime	Avoid placement of infrastructure within wetland and wetland buffer zones.	<p>10.7.1. The proposed layout should be revisited, and every effort made to place the photovoltaic structures outside of the wetland and wetland buffer zones</p> <p>10.7.2. A temporary fence or demarcation must be erected around No-Go Areas outside the proposed works area prior to any construction taking place as part of the contractor planning phase when compiling work method statements to prevent access to the adjacent portions of the watercourse.</p> <p>10.7.3. Where development activities are located upslope from wetlands, effective stormwater management should be a priority during both construction and operational phase.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the design and construction phases and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>This should be monitored as part of the EMP.</p> <p>10.7.4. Where development activities are located upslope from wetlands, high energy stormwater input into the watercourses should be prevented at all costs.</p> <p>10.7.5. Effective culverts should be incorporated into the design of access roads.</p>			
10.8. Changes in sediment regimes	Avoid placement of infrastructure within wetland and wetland buffer zones.	<p>10.8.1. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area.</p> <p>10.8.2. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resulting from activities within and adjacent to the construction camp and work areas.</p> <p>10.8.3. Monitoring should be done to ensure that sediment pollution is timeously dressed.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the design and construction phases and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor
10.9. Introduction and spread of alien vegetation	Reduce the spread of alien invasive species	<p>10.9.1. It is imperative that an Alien Invasive Species (AIS) plant management plan be developed for the proposed Volta SEF, prior to the construction phase. The clearing and/or treatment of these species prior to any construction activities, will curb the spread of AIS plants due to the disturbance events caused by construction.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the design phase. 	<ul style="list-style-type: none"> ▪ Once-off during the planning and design phase 	<ul style="list-style-type: none"> ▪ Project Developer ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.10. Loss and disturbance of riparian/watercourse habitat and vegetation	Minimise loss of riparian habitat and vegetation	<p>10.10.1. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish.</p> <p>10.10.2. Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed.</p> <p>10.10.3. Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas.</p> <p>10.10.4. Operational activities should not impact on rehabilitated or naturally vegetated areas.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the design and construction phases and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO
10.11. Alteration in water quality due to pollution	Reduce the changes in water resources and surface water in terms of water quality	<p>10.11.1. Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone.</p> <p>10.11.2. Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse.</p> <p>10.11.3. The development footprint must be fenced off from the watercourses and</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the design and construction phases and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>no related impacts may be allowed into the watercourse i.e., water runoff from cleaning of equipment, vehicle access etc.</p> <p>10.11.4. Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer.</p> <p>10.11.5. Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</p> <p>10.11.6. Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse.</p> <p>10.11.7. Regular independent water quality monitoring should form part of operational procedures in order to identify pollution.</p> <p>10.11.8. Treatment of pollution identified should be prioritized according to best practice guidelines.</p> <p>10.11.9. Develop norms and practices for the treatment of spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills.</p> <p>10.11.10. Appoint a reliable contractor for the removal of refuse during the construction phase.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.12. Loss of aquatic biota	Minimise loss of aquatic biota	10.12.1. This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures proposed in the EMPr.	<ul style="list-style-type: none"> Ensure that this is taken into consideration during the design phase. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Environmental Manager
A.6. AVIFAUNA IMPACTS					
10.13. Entrapment of birds in the perimeter fences, leading to mortality.	Prevent mortality of avifauna	10.13.1. Increase the spacing between at least the top two wires (to a minimum of 30 cm) and ensure they are correctly tensioned. Use a single perimeter fence if possible.	<ul style="list-style-type: none"> Design the facility with a bird-friendly perimeter fence. 	<ul style="list-style-type: none"> Once-off prior to construction 	<ul style="list-style-type: none"> Project Developer and Contractor
10.14. Total or partial displacement of avifauna due to habitat transformation associated with the vegetation clearance and the presence of the solar PV plant and associated infrastructure.	Prevent unnecessary displacement of avifauna by ensuring that sensitive habitat is protected.	10.14.1. Maintain 100 m solar panel buffer zones around water reservoirs	<ul style="list-style-type: none"> All surface water (drainage lines, wetlands, dams, and pans) must be buffered by 50 m. No PV panels should be constructed in this zone, but associated infrastructure is allowed (e.g., roads). 	<ul style="list-style-type: none"> Once-off prior to construction 	<ul style="list-style-type: none"> Project Developer
A.7. SOCIO-ECONOMIC IMPACTS					
10.15. Creation of employment and business opportunities	Maximize potential job creation for locals	<p>10.15.1. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.</p> <p>10.15.2. Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely</p>	<ul style="list-style-type: none"> Review the labour and contractor policy 	<ul style="list-style-type: none"> Once-off during the planning and design phase. 	<ul style="list-style-type: none"> Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
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		<p>to be filled by people from outside the area.</p> <p>10.15.3. Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.</p> <p>10.15.4. Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.</p> <p>10.15.5. The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.</p> <p>10.15.6. Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.</p> <p>10.15.7. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</p>			

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			Methodology	Frequency	Responsibility
		10.15.8. The proponent should liaise with the GMM with regards the establishment of a database of local companies, specifically BBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.			
A.8. GEOTECHNICAL IMPACTS					
10.16. Increase in stormwater velocity	Minimise stormwater velocity	10.16.1. Rehabilitation of affected areas (such as revegetation). 10.16.2. Construction of temporary berms and drainage channels to divert surface water. 10.16.3. Minimize earthworks and fills. 10.16.4. Use existing road network and access tracks. 10.16.5. Correct engineering design and construction of gravel roads and water crossings. 10.16.6. Control stormwater flow. 10.16.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.17. Increase in soil and wind erosion due to clearing of vegetation.	Minimise soil and wind erosion	10.17.1. Rehabilitation of affected areas (such as revegetation). 10.17.2. Construction of temporary berms and drainage channels to divert surface water. 10.17.3. Minimize earthworks and fills. 10.17.4. Use existing road network and access tracks. 10.17.5. Correct engineering design and construction of gravel roads and water crossings. 10.17.6. Control stormwater flow. 10.17.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.18. Creation of drainage paths along access tracks.	Minimise drainage paths along access tracks	10.18.1. Rehabilitation of affected areas (such as revegetation). 10.18.2. Construction of temporary berms and drainage channels to divert surface water. 10.18.3. Minimize earthworks and fills. 10.18.4. Use existing road network and access tracks. 10.18.5. Correct engineering design and construction of gravel roads and water crossings. 10.18.6. Control stormwater flow. 10.18.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.19. Sedimentation of non-perennial features and excessive dust.	Minimise sedimentation of non-perennial features and excessive dust	10.19.1. Rehabilitation of affected areas (such as revegetation). 10.19.2. Construction of temporary berms and drainage channels to divert surface water. 10.19.3. Minimize earthworks and fills. 10.19.4. Use existing road network and access tracks. 10.19.5. Correct engineering design and construction of gravel roads and water crossings. 10.19.6. Control stormwater flow. 10.19.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.20. The displacement of natural earth material and overlying vegetation leading to erosion.	Minimise erosion due to displacement of natural earth material and overlying vegetation	10.20.1. Rehabilitation of affected areas (such as revegetation). 10.20.2. Construction of temporary berms and drainage channels to divert surface water. 10.20.3. Minimize earthworks and fills. 10.20.4. Use existing road network and access tracks. 10.20.5. Correct engineering design and construction of gravel roads and water crossings. 10.20.6. Control stormwater flow. 10.20.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.21. Potential groundwater and drainage feature contamination.	Avoid contamination of groundwater and drainage features	10.21.1. Vehicle and construction machinery repairs to be undertaken in designated areas with proper soil protection.	<ul style="list-style-type: none"> Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and ECO
10.22. Slope instability around structures.	Maximise slope stability around structures.	10.22.1. Avoid construction in steep slopes areas. 10.22.2. Design cut slopes according to detailed geotechnical analysis. 10.22.3. Design according to expected peak ground acceleration.	<ul style="list-style-type: none"> Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and Contractor
10.23. Damage of proposed development during construction.	Avoid damage to proposed development during construction	10.23.1. Avoid construction in steep slopes areas. 10.23.2. Design cut slopes according to detailed geotechnical analysis. 10.23.3. Design according to expected peak ground acceleration.	<ul style="list-style-type: none"> Ensure that these measures are taken into consideration in the planning and design phase. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and Contractor
A.9. CIVIL AVIATION IMPACTS					
10.24. Potential impacts on civil aviation installations as a result of the proposed project.	Minimise the impact on nearby landing strips and other civil aviation installations.	10.24.1. Ensure that feedback is obtained from the South African Civil Aviation Authority and relevant permits obtained, if necessary, and that recommendations are incorporated into the design, as necessary.	<ul style="list-style-type: none"> Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> During design cycle and before construction commences. 	<ul style="list-style-type: none"> Project Developer
A.10 GEOHYDROLOGY IMPACTS					
10.25. Ground water contamination by means of spillages with	To reduce the potential of	10.25.1. Avoid using old or damaged construction equipment and vehicles and ensure that they are well	<ul style="list-style-type: none"> Construction vehicles and equipment need to be monitored throughout the 	<ul style="list-style-type: none"> Four times per annum for the construction 	<ul style="list-style-type: none"> Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
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regards to oil, hydraulic fluids, fuels and dust control	groundwater contamination.	<p>maintained and regularly serviced in order to ensure no leakages. All vehicles and other equipment (generators etc.) must be regularly serviced to ensure they do not spill oil.</p> <p>10.25.2. Any engines that stand in one place for an excessive length of time must have drip trays. Diesel fuel storage tanks, if required, should be above ground on an impermeable concrete surface in a bunded area.</p> <p>10.25.3. Vehicles should be refuelled on paved (impervious) areas, optimally off-site. If off-site refuelling is not possible, a designated area and impermeable surface should be established at the construction site camp for this purpose. If liquid product is being transported it must be ensured this does not spill during transit.</p> <p>10.25.4. If spillages occur during refuelling, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, and reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p> <p>10.25.5. Emergency measures and plans must be put in place and rehearsed in order to prepare for accidental spillage.</p>	<p>construction phase. Monitor via site audits and record non-compliance and incidents.</p> <ul style="list-style-type: none"> ▪ Monitor the placement of fuel storage tanks and use of drip trays at the site camp via visual inspections. Monitor the usage of spill containment measures and record and report non-compliance. ▪ Monitor the placement and designation of the area for refuelling at the site camp via visual inspections. Monitor the occurrence of potential spills and the usage of spill containment measures and record and report non-compliance. ▪ Monitor the refuelling/ servicing process and record the occurrence of any spillages. ▪ Monitor the implementation of emergency spill containment and contingency plans, including holding emergency drills. Record and report non-compliance. ▪ Monitor the placement of vehicle and washing area via visual inspections. Monitor the correct disposal of spilled material or contaminated soil 	<p>period, i.e. at 3 months, 6 months, 9 months and 12 months.</p> <ul style="list-style-type: none"> ▪ Weekly ▪ Weekly ▪ Weekly ▪ Monthly ▪ Weekly ▪ Weekly 	

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.25.6. Vehicle and washing areas must also be on paved surfaces and the by-products removed to an evaporative storage area or a hazardous waste disposal site (if the material is hazardous).	and audit the waybills. Record and report non-compliance. <ul style="list-style-type: none"> Waste removal and disposal to be monitored. Monitor via site audits and record non-compliance and incidents. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 		
B. CONSTRUCTION PHASE					
B.1. AGRICULTURE AND SOILS IMPACTS					
10.26. Erosion	That vegetation clearing does not pose a high erosion risk.	10.26.1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilise disturbed soil against erosion.	<ul style="list-style-type: none"> Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation. 	<ul style="list-style-type: none"> Every 4 months during the construction phase 	<ul style="list-style-type: none"> ECO
10.27. Erosion	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	10.27.1. Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	<ul style="list-style-type: none"> Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring. 	<ul style="list-style-type: none"> Every 2 months during the construction phase 	<ul style="list-style-type: none"> ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.28. Topsoil loss	That topsoil loss is minimised	10.28.1. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	<ul style="list-style-type: none"> Record GPS positions of all significant occurrences (that is an area of greater than 25 square metres) of below-surface soil disturbance (e.g., excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area. 	<ul style="list-style-type: none"> As required, whenever areas are disturbed. 	<ul style="list-style-type: none"> ECO
B.2. VISUAL IMPACTS					
10.29. Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed facility and ancillary infrastructure.	Minimise exposure of visual receptors to impacts associated with construction	<p>10.29.1. Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible.</p> <p>10.29.2. Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e. in already disturbed areas) wherever possible.</p> <p>10.29.3. Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.</p> <p>10.29.4. Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.</p>	<ul style="list-style-type: none"> Ensure that this is taken into consideration prior to the commencement of construction. 	<ul style="list-style-type: none"> Once-off during the construction phase. 	<ul style="list-style-type: none"> Project Developer and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.29.5. Reduce and control construction dust using approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).</p> <p>10.29.6. Restrict construction activities to daylight hours whenever possible in order to reduce lighting impacts.</p> <p>10.29.7. Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works.</p>			
<p>10.30. Construction activities may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings.</p>	<p>Minimal visual intrusion by construction activities and intact vegetation cover outside of immediate construction work areas.</p>	<p>10.30.1. Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible.</p> <p>10.30.2. Reduce the construction phase through careful logistical planning and productive implementation of resources wherever possible.</p> <p>10.30.3. Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads.</p> <p>10.30.4. Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities.</p> <p>10.30.5. Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent).</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration prior to the commencement of construction. ▪ Conduct site inspections to monitor implementation and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Throughout the construction phase 	<ul style="list-style-type: none"> ▪ Project Developer ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.30.6. Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting, where possible.</p> <p>10.30.7. Rehabilitate all disturbed areas (if present or if required) immediately after the completion of construction works.</p>			
<p>10.31. Dust emissions and dust plumes from increased traffic on the gravel roads serving the construction site may evoke negative sentiments from surrounding viewers.</p>	<p>To reduce the effect of dust and noise from trucks and construction machinery on the surrounding landscape and receptors.</p>	<p>10.31.1. Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.</p> <p>10.31.2. Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible.</p> <p>10.31.3. Ensure that the EMPr is implemented during the construction phase via the appointment of an ECO.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to construction and the signed appointment letter of the ECO is kept on file. ▪ Conduct site inspections to monitor implementation and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Once-off prior to construction ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer ▪ ECO
<p>10.32. Surface disturbance during construction would expose bare soil (scarring) which could visually contrast with the surrounding environment.</p>	<p>Minimise ground disturbance due to the digging of trenches for the placement of underground powerlines.</p> <p>Minimise surface disturbance during construction.</p>	<p>10.32.1. Ensure that suitable dust suppression techniques are implemented on all access roads; in all areas where vegetation clearing has taken place; and on all soil stockpiles.</p> <p>10.32.2. Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.</p>	<ul style="list-style-type: none"> ▪ Conduct site inspections to monitor implementation and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.32.3. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</p> <p>10.32.4. Vegetation clearing should take place in a phased manner.</p>			
10.33. Temporary stockpiling of soil during construction may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.	To reduce visual impacts due to dust resulting from the temporary stockpiling of soil during construction.	<p>10.33.1. Ensure that suitable dust suppression techniques are implemented on all access roads; in all areas where vegetation clearing has taken place; and on all soil stockpiles.</p> <p>10.33.2. Position laydown areas and related storage/stockpile areas in unobtrusive positions in the landscape, where possible.</p> <p>10.33.3. Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.</p> <p>10.33.4. Vegetation clearing should take place in a phased manner.</p>	<ul style="list-style-type: none"> ▪ Conduct site inspections to monitor implementation and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ ECO
10.34. Litter on the construction site may result in visual pollution.	Minimise litter on construction site.	10.34.1. Maintain a neat construction site by removing litter, rubble, and waste materials regularly.	<ul style="list-style-type: none"> ▪ Conduct site inspections to monitor implementation and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ ECO
B.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
10.35. Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials	10.35.1. Pre-construction survey of any as yet unsurveyed areas	<ul style="list-style-type: none"> ▪ Appoint archaeologist to conduct survey 	<ul style="list-style-type: none"> ▪ Once-off 	<ul style="list-style-type: none"> ▪ Project developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	before extensive damage occurs	<p>10.35.2. Reporting chance finds as early as possible, protect <i>in situ</i> and stop work in immediate area</p> <p>10.35.3. Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources (outlined in Section 10.2) in case heritage resources are uncovered during the course of construction</p> <p>10.35.4. Recorded heritage features should be indicated on development plans and construction crews should be made aware that these sites should be avoided with the applicable buffer zones</p> <p>10.35.5. Once construction commences all aspects of the Project should be carried out within the approved footprint so as to avoid impacts to heritage resources</p> <p>10.35.6. It is recommended that the EGI is micro-sited to avoid the Tree lined avenue (Feature 871 as recorded by Orton 2016);</p> <p>10.35.7. The final underground powerline route should be subjected to a heritage walk down prior to development.</p> <p>10.35.8. If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist,</p>	<ul style="list-style-type: none"> ▪ Inform staff and carry out inspections of excavations 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ Whenever on site (at least weekly) 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.</p> <p>10.35.9. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA (Sityhilelo Ngcatsha/Natasha Higgitt 021 202 8660) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.</p> <p>10.35.10. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Ngqabutho Madida 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		terms of section 51(1)e of the NHRA and item 5 of the Schedule.			
10.36. Visible landscape scarring	Minimise landscape scarring	10.36.1. Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	<ul style="list-style-type: none"> ▪ Monitoring of surface clearance relative to approved layout 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ As required 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO
B.4. PALAEOLOGY IMPACTS					
10.37. Damage or destruction of palaeontological materials in excavations	Safeguarding, recording, and sampling of palaeontological materials encountered or exposed during construction (Chance Fossil Finds)	<p>10.37.1. Monitoring for fossil material of all major surface clearance and deeper (>1m) excavations by the Environmental Control Officer (ECO) on an on-going basis during the construction phase.</p> <p>10.37.2. Remove any fossils found when excavations commence Professional mitigation, involving the recording and judicious sampling of fossil material together with pertinent field data (stratigraphy, taphonomy), should conform to best practice. Fossil material collected must be curated within an approved repository (university or museum collection).</p> <p>10.37.3. Significant fossil finds should be safeguarded and reported at the earliest opportunity to the South African Heritage Resources Agency (SAHRA) for recording and sampling by a professional Palaeontologist</p>	<ul style="list-style-type: none"> ▪ Regular visual inspection of substantial excavations and cleared areas for fossil remains. Chance fossil finds to be safeguarded (site taped-off or fossils set aside) and reported to SAHRA for possible mitigation. 	<ul style="list-style-type: none"> ▪ Ongoing during the construction phase 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		(Contact details: 111 Harrington Street, Cape Town, 8001. PO Box 4637, Cape Town, 8000. Tel: 021 462 4502. Fax: 021 462 4509. Email: info@sahra.org.za).			
		10.37.4. Recording and judicious sampling of exceptional new fossil material and relevant geological data (e.g., stratigraphy, taphonomy) from the development footprint must be undertaken. Professional mitigation should conform to best practice. The Palaeontologist concerned will need a Fossil Collection Permit from SAHRA.	<ul style="list-style-type: none"> ▪ Standard palaeontological recording and collection methods (GPS / photos / field notes / careful wrapping of specimens for transport). 	<ul style="list-style-type: none"> ▪ Following report of significant new fossil finds by ECO 	<ul style="list-style-type: none"> ▪ Professional Palaeontologist assisted by ECO
		10.37.5. Curation of fossil specimens at an approved repository (e.g., museum).	<ul style="list-style-type: none"> ▪ Cataloging and safe storage of fossils plus key field data in an approved repository (museum / university). 	<ul style="list-style-type: none"> ▪ Following mitigation 	<ul style="list-style-type: none"> ▪ Professional Palaeontologist
		10.37.6. Final technical report on palaeontological heritage within study area submitted to SAHRA.	<ul style="list-style-type: none"> ▪ Minimum reporting requirements specified by the heritage resources agency (e.g., SAHRA). 	<ul style="list-style-type: none"> ▪ Following mitigation and preliminary analysis of fossil finds 	<ul style="list-style-type: none"> ▪ Professional Palaeontologist
B.5. TERRESTRIAL BIODIVERSITY IMPACTS²					
10.38. Habitat loss and fragmentation	Confine vegetation clearance to footprint and minimise	10.38.1. Only the planned placement of powerlines must be disturbed. Vegetation and topsoil removal	<ul style="list-style-type: none"> ▪ Ensure that mitigation measures are enforced. 	<ul style="list-style-type: none"> ▪ Throughout construction phase 	<ul style="list-style-type: none"> ▪ The Environmental Control Officer (ECO) should

² Management actions relating to alien invasive vegetation management are covered in Section 4 of this EMPr.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	disturbance of adjacent areas.	<p>outside of these areas must be avoided.</p> <p>10.38.2. No development should take place within High sensitivity areas or buffer zones. Accordingly, the Watercourse habitats should be avoided. The Grassland should be avoided where possible, but with appropriate mitigation and rehabilitation impacts can be reduced.</p> <p>10.38.3. No construction related activities, such as the site camp, storage of materials, temporary roads or ablution facilities may be located in the high sensitivity areas.</p> <p>10.38.4. The topsoil must not be disturbed, and heavy machinery must only be utilised to only drill holes for the erection of the PV panels, approximately 3.5m above ground.</p> <p>10.38.5. The grassland must not be transformed. Should this happen, a biodiversity offset agreement must be put into place prior to the commencement of development activities.</p>			monitor and report any incidents to the Holder of the EA
10.39. Loss of protected species	Minimise impact on protected species	10.39.1. Where the approved layout designs impact on individuals, permit applications are required for either the relocation or destruction of provincially protected species (Free State Nature Conservation Ordinance 8 of 1969).	<ul style="list-style-type: none"> ▪ Ensure compliance with these mitigation measures. 	<ul style="list-style-type: none"> ▪ Onset of the construction phase 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.39.2. Pylons or internal roads should be developed over watercourse so that a powerline could traverse over it.			
10.40. Increased dust levels	Avoid or minimise increased dust levels.	10.40.1. Dust control measures should be implemented.	<ul style="list-style-type: none"> ▪ Ensure that dust control measures are in place. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.
10.41. Alien species invasion	Avoid invasion by alien species.	10.41.1. Implement a monitoring program for the early detection of alien invasive plant species. 10.41.2. Employ a control program to combat declared alien invasive plant species.	<ul style="list-style-type: none"> ▪ Ensure implementation of a control programme to combat alien invasive plants. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.
10.42. Increased erosion and soil compaction	Minimise erosion	10.42.1. Utilise existing access routes as far as possible. 10.42.2. Confine the movement of vehicles to the access routes to and from the site and to the construction and operation areas. 10.42.3. Do not drive in the natural veld. 10.42.4. Rehabilitate new vehicle tracks and areas where the soil has been compacted as soon as possible. 10.42.5. Monitor the entire site for signs of erosion throughout the construction, operational and decommissioning phases of the project. 10.42.6. Refer to Aquatic Report mitigation measures relevant to watercourse	<ul style="list-style-type: none"> ▪ Ensure implementation of a control programme to combat alien invasive plants. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		crossings and development close to watercourses.			
10.43. Littering and general pollution	Avoid littering and minimise general pollution	<p>10.43.1. The site camp must not be located in high sensitivity areas and their buffer zones.</p> <p>10.43.2. Dangerous goods may not be stored within 100 m of a watercourse – refer to the BESS assessment for more details.</p> <p>10.43.3. Hydrocarbon fuels must be stored in a secure, bunded area.</p> <p>10.43.4. Sufficient waste disposal bins must be available on site and clearly marked. Skip bins may be required during the construction phase which must be emptied on a regular basis.</p> <p>10.43.5. Ablution facilities must be located outside sensitive areas and their buffer zones.</p> <p>10.43.6. Portable abluion facilities must be regularly cleaned and maintained in good working condition.</p> <p>10.43.7. Any spillage from abluion facilities must be cleaned up immediately and disposed of in an appropriate manner.</p> <p>10.43.8. Vehicles must be in good working condition, with no oil, water or fuel leaks. Vehicles must be regularly inspected and any problems corrected.</p>	<ul style="list-style-type: none"> ▪ Ensure that mitigation measures are enforced. 	<ul style="list-style-type: none"> ▪ Throughout construction phase 	<ul style="list-style-type: none"> ▪ The Environmental Control Officer (ECO) should monitor and report any incidents to the Holder of the EA

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.43.9. Refuelling may only take place in an appropriate, bunded area. Refuelling may not take place in sensitive areas. 10.43.10. Hydrocarbon spills must be contained and cleaned up immediately. Spill kits must be available on site in case of accidental spillage.			
B.6. AQUATIC BIODIVERSITY AND SPECIES IMPACTS					
10.44. Operation of equipment and machinery 10.45. Clearing vegetation for pylon footings 10.46. Stockpiling of and placement construction materials 10.47. Excavating/shaping and trenching landscape 10.48. Final landscaping, backfilling and postconstruction rehabilitation	<ul style="list-style-type: none"> ▪ Minimise impact of equipment and machinery on aquatic environment ▪ Minimise clearance of vegetation ▪ Reduce risk of hazardous stockpiling and placement of materials ▪ Minimise excavation 	10.48.1. All contractors and staff are to be familiarised with the method statement and have undergone an induction / training on the location of sensitive No-Go areas and basic environmental awareness using the mitigation provided in this report. 10.48.2. Access routes adjacent to the wetlands must make use of existing road ways and crossings where possible; 10.48.3. Areas where construction is to take place must be clearly demarcated. Any areas not demarcated must be avoided; 10.48.4. Storm-water generated from roadways must be captured and buffered, where flow velocities are to be significantly reduced before discharge into the environment. 10.48.5. Storm-water verges as well as other denuded areas must be grassed (re-	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>vegetated) with local indigenous grasses to protect against erosion;</p> <p>10.48.6. Any materials excavated must not be deposited in the wetlands or areas where it is prone to being washed downstream or impeding natural flow;</p> <p>10.48.7. The installation of sedimentation/erosion protection measures must be implemented before the start of construction, e.g., several rows of silt traps and fences (this is particularly important in the access roads leading or adjacent to the watercourses);</p> <p>10.48.8. Stockpiling or storage of materials and/or waste must be placed beyond the defined buffers in this report for each respective activity;</p> <p>10.48.9. No vehicles shall enter watercourse buffer zones outside of construction footprints;</p> <p>10.48.10. No vehicles shall be serviced on site; a suitable workshop with appropriate pollution control facilities should be utilised offsite;</p> <p>10.48.11. Hydrocarbons for refuelling purposes must be stored in a suitable storage device on an impermeable surface outside of the delineated wetland buffer zone;</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.48.12. Disturbed areas must be re-vegetated after completion of the phase;</p> <p>10.48.13. A three-month timeframe for the initiation of this action;</p> <p>10.48.14. Ripping of the soils should occur in two directions; and</p> <p>10.48.15. Removed vegetation and topsoil can be harvested and applied here.</p> <p>10.48.16. Drainage channels constructed for the access roads must be constructed so as not to result in erosion;</p> <p>10.48.17. An inspection of the drainage channels must be completed within 3 months following the end of activities and within a month after the first rainfall event which exceeds 50mm. Should excessive sediment be transported down the channels it is recommended that sediment screens are implemented;</p> <p>10.48.18. Sediment screens must be inspected, maintained and cleared every month or after significant rainfall (>150mm/24hrs);</p> <p>10.48.19. An alien vegetation removal and management plan must be implemented along the verges of the roads and crossing points;</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.48.20. General storm-water management practices should be included in the design phase and implemented during the construction phase of this project; and</p> <p>10.48.21. Following the completion of the phase, all construction materials and debris should be removed and disposed of in a suitable off-site area. An inspection should be completed within a week after the phase is completed.</p> <p>10.48.22. Where trenches are required for the underground powerline, it is recommended that the removed soils are stockpiled in a sequential fashion where topsoil's are not mixed with the subsoils. Once trenching is complete and backfilling is required, these soils must be put back in the logical order with subsoils placed in the trench and covered by topsoil's.</p> <p>10.48.23. The underground powerlines must be protected from lateral sub-surface flows by using a suitable casing of the engineers choice.</p> <p>10.48.24. Where sub-surface flows during trench construction are encountered it is recommended that trenching does not concentrate or divert these. Where there is significant sub-surface flows</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		encountered a hydrogeology study may be required.			
10.49. Alteration in flow regime	Avoid placement of infrastructure within wetland and wetland buffer zones.	<p>10.49.1. Where development activities are located upslope from wetlands, effective stormwater management should be a priority during both construction and operational phase. This should be monitored as part of the EMP.</p> <p>10.49.2. Where development activities are located upslope from wetlands, high energy stormwater input into the watercourses should be prevented at all costs.</p> <p>10.49.3. Effective culverts should be incorporated into the design of access roads.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor
10.50. Changes in sediment regimes	Avoid placement of infrastructure within wetland and wetland buffer zones.	<p>10.50.1. Where development is located upslope from wetlands, effective stormwater management including sediment barriers should be a priority during both construction and operational phase. This should be monitored as part of the EMP.</p> <p>10.50.2. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area.</p> <p>10.50.3. Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resulting from</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>activities within and adjacent to the construction camp and work areas.</p> <p>10.50.4. Monitoring should be done to ensure that sediment pollution is timeously dressed.</p>			
10.51. Introduction and spread of alien vegetation	Reduce the spread of alien invasive species	<p>10.51.1. Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.</p> <p>10.51.2. Undertake an Alien Plant Control Plan which specifies actions and measurable targets</p> <p>10.51.3. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards.</p> <p>10.51.4. Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan.</p> <p>10.51.5. Rehabilitate or revegetate disturbed areas.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.52. Loss and disturbance of riparian/watercourse habitat and vegetation	Minimise loss of riparian habitat and vegetation	<p>10.52.1. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish.</p> <p>10.52.2. Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed.</p> <p>10.52.3. Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas.</p> <p>10.52.4. Operational activities should not impact on rehabilitated or naturally vegetated areas.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO
10.53. Alteration in water quality due to pollution	Reduce the changes in water resources and surface water in terms of water quality	<p>10.53.1. Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone.</p> <p>10.53.2. Implementation of appropriate stormwater management around the excavation to prevent the ingress of run-off into the excavation and to prevent contaminated runoff into the watercourse.</p> <p>10.53.3. The development footprint must be fenced off from the watercourses and no related impacts may be allowed into the watercourse i.e., water runoff</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>from cleaning of equipment, vehicle access etc.</p> <p>10.53.4. Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer.</p> <p>10.53.5. Ensure that no operational activities impact on the watercourse or buffer area. This includes edge effects.</p> <p>10.53.6. Control of waste discharges and do not allow dirty water from operational activities to enter the watercourse.</p> <p>10.53.7. Regular independent water quality monitoring should form part of operational procedures in order to identify pollution.</p> <p>10.53.8. Treatment of pollution identified should be prioritized according to best practice guidelines.</p> <p>10.53.9. Develop norms and practices for the treatment of spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills.</p> <p>10.53.10. Appoint a reliable contractor for the removal of refuse during the construction phase.</p>			
10.54. Loss of aquatic biota	Minimise loss of aquatic biota	10.54.1. This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures mentioned above.	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the construction and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
B.7. AVIFAUNA IMPACTS					
10.55. Disturbance of foraging and breeding behaviours of birds due to noise, dust and lighting	Prevent the disturbance of foraging and breeding behaviour	<p>10.55.1. Adopt temporal avoidance strategies to prevent executing the most intensive activities generating noise and dust during the most sensitive period between December to March when it is the most likely time that waterbirds will be attracted the PAOI due to the presence of water. Therefore, intensive activities (e.g. trenching for the underground cable) should be scheduled as far as practically possible between April-November. Note that light activities such as normal vehicle use of the roads are not affected by this mitigation measure and these may proceed year-round.</p> <p>10.55.2. Minimise light pollution and fit external lighting with downward facing hoods.</p> <p>10.55.3. Enforce a speed limit of 40 km/h on site.</p> <p>10.55.4. If necessary apply dust-suppression measures (road wetting) to limit dust.</p>	<ul style="list-style-type: none"> ▪ Implementation temporal avoidance strategies. ▪ Ensure that construction personnel are made aware of the impacts of light pollution and ensure that downward facing hoods are effective in reducing light pollution. ▪ Ensure that construction personnel are made aware of the impacts of exceeding 40 km/h on site and ensure that the speed limit is clearly indicated by signage. Report non-compliance. ▪ Monitor the implementation of dust control mechanisms via site inspections and record and report non-compliance. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
10.56. Loss of habitat due to clearing, trenching for the underground cable, alteration and exclusion from previously accessible habitats and fire	Prevent unnecessary habitat loss	<p>10.56.1. Limit the areas cleared for construction purposes (e.g. laydown areas).</p> <p>10.56.2. Do not implement a bare earth policy for construction of road servitudes</p>	<ul style="list-style-type: none"> ▪ Ensure only designated areas are cleared for construction purposes. 	<ul style="list-style-type: none"> ▪ Daily ▪ Weekly ▪ Weekly ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.56.3. Rehabilitate all areas disturbed immediately after construction. 10.56.4. Prioritise existing roads for access routes. 10.56.5. Develop and implement an Alien and Invasive Plant Control Plan. 10.56.6. All staff must undergo a strict induction process to inform them of the importance of preventing fires.	<ul style="list-style-type: none"> ▪ Site inspections to ensure that a bare earth policy has not been implemented. ▪ Ensure all areas are rehabilitated immediately. Undertake site inspections to verify. ▪ Construction access roads must be clearly demarcated. Undertake site inspections to verify. ▪ Ensure that an Alien and Invasive Plant Control Plan is implemented during site inspection. ▪ Ensure that construction personnel are made aware of the impacts relating to unplanned fires during induction. 	<ul style="list-style-type: none"> ▪ Weekly ▪ Quarterly 	
B.8. SOCIO-ECONOMIC IMPACTS					
10.57. Creation of local employment, training, and business opportunities	Maximize potential job creation for locals	10.57.1. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase. 10.57.2. Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely	<ul style="list-style-type: none"> ▪ Composition of workforce to be monitored during construction to assess the number of local residents employed. Review of the registers held by the contractors. ▪ Undertake inspections to monitor compliance. 	<ul style="list-style-type: none"> ▪ Monthly or bi-monthly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>to be filled by people from outside the area.</p> <p>10.57.3. Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.</p> <p>10.57.4. Before the construction phase commences the proponent should meet with representatives from the MM to establish the existence of a skills database for the area. If such as database exists, it should be made available to the contractors appointed for the construction phase.</p> <p>10.57.5. The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.</p> <p>10.57.6. Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.</p> <p>10.57.7. The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
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		10.57.8. The proponent should liaise with the MM with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work.			
10.58. Impact of construction workers on local communities	Minimise increase of social ills and risky behaviours associated with workforce influx to the area.	<p>10.58.1. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.</p> <p>10.58.2. Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.</p> <p>10.58.3. The SEP and CHSSP should include a Grievance Mechanism that enables stakeholders to report resolve incidents.</p> <p>10.58.4. Where possible, the proponent should make it a requirement for contractors to implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories.</p> <p>10.58.5. The proponent should consider the option of establishing a Monitoring</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. ▪ Undertake audits to ensure that the community communication strategy is compiled, and that dates and outcomes of engagement are reviewed. Report non-compliance. ▪ Composition of workforce to be monitored during construction to assess the number of local residents employed. Review of the registers held by the contractors. ▪ Verify that a Code of Conduct is developed and is being implemented with written proof kept on file. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Monthly ▪ Monthly or bi-monthly ▪ Monthly ▪ Once-off training and ensure that all new staff are inducted. ▪ Annually ▪ Weekly ▪ As required ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>Committee (MC) for the construction phase that representatives from local landowners, farming associations, and the local municipality. This MC should be established prior to commencement of the construction phase and form part of the SEP.</p> <p>10.58.6. The proponent and contractor should develop a Code of Conduct (CoC) for construction workers. The code should identify which types of behaviour and activities are not acceptable. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation. The CoC should be signed by the proponent and the contractors before the contractors move onto site. The CoC should form part of the CHSSP.</p> <p>10.58.7. The proponent and the contractor should implement an HIV/AIDS, COVID-19, and Tuberculosis (TB) awareness programme for all construction workers at the outset of the construction phase. The programmes should form part of the CHSSP.</p> <p>10.58.8. The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contractor to effectively manage and monitor the movement of</p>	<ul style="list-style-type: none"> ▪ Hold Environmental Awareness Training to discuss social issues. All new staff should be inducted. Attendance registers should be monitored and kept on file. ▪ Verify that local HIV infection rates/ARV treatment loads are monitored annually with written proof kept on file. ▪ Verify that COVID regulations and safety precautions are developed and is being implemented with written proof kept on file. ▪ Hold relevant training sessions and ensure that all staff attend. Dates, duration, and content outline of prevention of disease training and register of attendance reviewed. ▪ Security records must be reviewed to verify no personnel stay over on site. Record and report any non-compliance. 		

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>construction workers on and off the site.</p> <p>10.58.9. The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.</p> <p>10.58.10. No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.</p>			
10.59. Influx of job seekers	Maximize potential job creation for locals.	<p>10.59.1. It is impossible to stop people from coming to the area in search of employment. However, as indicated above, the proponent should ensure that the employment criteria favour residents from the area.</p> <p>10.59.2. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.</p> <p>10.59.3. Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.</p> <p>10.59.4. The proponent, in consultation with the LM, should investigate the option of establishing a MC to monitor and identify potential problems that may arise due to the influx of job seekers to the area. The MC should also</p>	<ul style="list-style-type: none"> ▪ Composition of workforce to be monitored during construction to assess the number of local residents employed. Review of the registers held by the contractors. ▪ Undertake inspections to monitor compliance. 	<ul style="list-style-type: none"> ▪ Monthly or bi-monthly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>include the other proponents of solar energy projects in the area.</p> <p>10.59.5. The proponent should implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities.</p> <p>10.59.6. The proponent should implement a policy that no employment will be available at the gate.</p>			
10.60. Risk to safety, livestock, and farm infrastructure	Minimise the impact of the construction activities on the safety, livestock and farm infrastructure.	<p>10.60.1. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.</p> <p>10.60.2. Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.</p> <p>10.60.3. The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.</p> <p>10.60.4. All farm gates must be closed after passing through.</p> <p>10.60.5. Contractors appointed by the proponent should provide daily transport for low and semi-skilled workers to and from the site.</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. ▪ Security records must be reviewed to verify no personnel stay over on site. Record and report any non-compliance. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.60.6. The proponent should establish a MC and CoC for workers (see above).</p> <p>10.60.7. The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also cover loses and costs associated with fires caused by construction workers or construction related activities (see below).</p> <p>10.60.8. The proponent should implement a Grievance Mechanism that provides local farmers with an effective and efficient mechanism to address issues related to report issues related to damage to farm infrastructure, stock theft and poaching etc.</p> <p>10.60.9. The Environmental Management Plan (EMP) must outline procedures for managing and storing waste on site, specifically plastic waste that poses a threat to livestock if ingested.</p> <p>10.60.10. Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>of stock theft and trespassing on adjacent farms.</p> <p>10.60.11. Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the CoC. All dismissals must be in accordance with South African labour legislation.</p> <p>10.60.12. It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay overnight on the site.</p>			
10.61. Increased risk of grass fires	Minimise risk of fires	<p>10.61.1. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.</p> <p>10.61.2. Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.</p> <p>10.61.3. The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.</p>	<ul style="list-style-type: none"> ▪ Security records must be reviewed to verify no personnel stay over on site. Record and report any non-compliance. ▪ Undertake inspections to monitor compliance. ▪ Verify that a Code of Conduct is developed and is being implemented with written proof kept on file. 	<ul style="list-style-type: none"> ▪ Weekly ▪ Monthly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.61.4. Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.</p> <p>10.61.5. Smoking on site should be confined to designated areas.</p> <p>10.61.6. Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high-risk dry, windy summer months.</p> <p>10.61.7. Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.</p> <p>10.61.8. Contractor should provide fire-fighting training to selected construction staff.</p> <p>10.61.9. No construction staff, with the exception of security staff, to be accommodated on site overnight.</p> <p>10.61.10. As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.			
10.62. Nuisance impacts associated with construction related activities	Minimise noise, dust, safety impacts and damage to roads due to the heavy construction vehicles.	<p>10.62.1. Preparation and implementation of a Stakeholder Engagement Plan (SEP) prior to and during the construction phase.</p> <p>10.62.2. Preparation and implementation of a Community Health, Safety and Security Plan (CHSSP) prior to and during the construction phase.</p> <p>10.62.3. Timing of construction activities should be planned to avoid / minimise impact on key farming activities, including planting and harvesting operations.</p> <p>10.62.4. The proponent should establish a MC to monitor the construction phase and the implementation of the recommended mitigation measures. The MC should be established before the construction phase commences, and should include key stakeholders, including representatives from local farmers and the contractor(s). The MF should also address issues associated with damage to roads and other construction related impacts.</p> <p>10.62.5. Ongoing communication with landowners and road users during</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. ▪ Ensure that the traffic specialist is appointed, and the road maintenance programme is compiled prior to commencement of construction. ▪ Verify that this has been undertaken by reviewing approved plans and appointment letter. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Once-off during the planning and design phase ▪ Once-off during the planning and design phase. 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>construction period. This should be outlined in the SEP.</p> <p>10.62.6. The proponent should implement a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.</p> <p>10.62.7. Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition and repaired once the construction phase is completed.</p> <p>10.62.8. Repair of all affected road portions at the end of construction period where required.</p> <p>10.62.9. Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.</p> <p>10.62.10. All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.63. Impacts associated with loss of farmland	Reduce risks associated with short term employment	<p>10.63.1. The proponents should meet with the owners of the TW Group properties to address the concerns associated with the impact of the current layout on existing and future mining and farming infrastructure and operations.</p> <p>10.63.2. The loss of high-quality agricultural land should be avoided and or minimised by careful planning of the final layout of the proposed SEF facilities. The recommendations of the agricultural / soil assessment should be implemented.</p> <p>10.63.3. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</p> <p>10.63.4. Affected landowners should be consulted about the timing of construction related activities in advance.</p> <p>10.63.5. The footprint associated with the construction related activities (access roads, construction platforms, workshop etc.) should be minimised.</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. ▪ Record GPS positions of all significant occurrences (that is an area of greater than 25 square metres) of below-surface soil disturbance (e.g., excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.63.6. An Environmental Control Officer (ECO) should be appointed to monitor the establishment phase of the construction phase.</p> <p>10.63.7. All areas disturbed by construction related activities, such as access roads on the site, construction platforms, workshop area etc., should be rehabilitated at the end of the construction phase.</p> <p>10.63.8. The implementation of a rehabilitation programme should be included in the terms of reference for the contractor/s appointed. The specifications for the rehabilitation programme should be drawn up by the Environmental Consultants appointed to manage the EIA.</p> <p>10.63.9. The implementation of the Rehabilitation Programme should be monitored by the ECO.</p>			
B.9. IMPACTS RESULTING FROM THE BATTERY ENERGY STORAGE SYSTEMS (BESS)					
10.64. Human Health - chronic exposure to toxic chemical or biological agents	Minimise exposure to toxic chemicals or biological agents	<p>10.64.1. The construction phase will be managed according to all the requirements of the Occupational Health and Safety Act 85 of 1993 specifically the Construction Regulations.</p> <p>10.64.2. SHEQ policy in place.</p>	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure that all new staff are inducted. ▪ Monthly ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.64.3. A detailed construction Risk Assessment prior to work. 10.64.4. SHE procedure in place. 10.64.5. PPE to be specified. 10.64.6. SHE appointees in place. 10.64.7. Contractor's safety files in place and up to date. 10.64.8. All necessary health controls/practices to be in place, e.g., ventilation of welding and painting areas. 10.64.9. SHE monitoring and reporting programs in place. 10.64.10. Emergency response plan to be in place prior to beginning construction and to include aspects such as appointment of emergency controller, provision of first aid, first responder contact numbers.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 		
10.65. Human Health - exposure to noise	Minimise noise exposure	10.65.1. Health Risk Assessment to determine if equipment noise exceeds 85dB at workstation and 61dB at boundary of the site 10.65.2. Employees to be provided with hearing protection if working near equipment that exceeds the noise limits.	<ul style="list-style-type: none"> ▪ Conduct audits of the signed attendance registers. ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.66. Human Health - exposure to temperature extremes and/or humidity	Minimise exposure to temperature	10.66.1. Construction site facilities to comply with Occupational Health and Safety Act 85 of 1993 specifically the	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	extremes and/or humidity	<p>thermal, humidity, lighting, and ventilation requirements of the Environmental Regulations for Workplaces.</p> <p>10.66.2. Adequate potable water for employees to be provided during all phases of the project. Bore hole, bowser and tank or small water treatment plant may be required to provide potable water for the BESS installation staff during all phases of the project.</p>			
10.67. Human Health - exposure to psychological stress	Minimise exposure to psychological stress	10.67.1. Refer to Social Specialist Study for this project.			<ul style="list-style-type: none"> ▪ Project Developer
10.68. Human Health - exposure to ergonomic stress	Minimise exposure to ergonomic stress	<p>10.68.1. Training in lifting techniques.</p> <p>10.68.2. Ensure that despite the isolated location all the necessary equipment is available (and well maintained) during construction. Otherwise, employees may revert to unsafe practices. Isolated location, maintenance of construction equipment to ensure safe operation is critical. Ensure this is in place prior to project beginning.</p> <p>10.68.3. First aid provision on site.</p>	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. ▪ Conduct audits of the signed attendance registers. ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure that all new staff are inducted. ▪ Monthly ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.69. Human and Equipment Safety - exposure to fire radiation	Minimise exposure to fire radiation	<p>10.69.1. Fuels stored on site in dedicated, demarcated and bunded areas.</p> <p>10.69.2. Suitable fire-fighting equipment on site near source of fuel, e.g., diesel</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>tank, generators, mess, workshops etc.</p> <p>10.69.3. The company responsible for the facility at this stage is to have:</p> <p>10.69.4. 1. Emergency plan to be in place prior to commencement of construction.</p> <p>10.69.5. 2. Fuel spill containment procedures and equipment to be in place.</p> <p>10.69.6. 3. Hot-work permit and management system to be in place.</p> <p>10.69.7. Solid state battery design includes abuse tests such as drop test, impact, rapid discharge etc. Propagation tests for systems, e.g., heat insulating materials between cells/modules. Factory acceptance test prior to prior to leaving manufacture. Batteries are usually stored at 50% charge to prolong life but may be shipped fully discharged. This level of detail should be understood so as to assess the risk during transport and storage.</p> <p>10.69.8. The appointed contractor should ensure suitably competent transport companies are appointed. The company responsible for transportation should ensure:</p> <p>10.69.9. - Compliance with National Road Traffic Act regulation 8 – dangerous goods.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.69.10. - Port Authorities should be alerted to the overall project and the hazardous nature of the contents of battery containers being imported. Note. If, as per one of the typical suppliers (Tesla) indications, the containers are classified as IMDG Class 9 – the containers will not receive any special care in the ports and may be stored next to flammables. Port emergency response in particular need training on mitigating battery hazards.</p> <p>10.69.11. Prior to bringing any containers into the country a full Emergency response plan should be in place for the full route from the ship to the site. Drivers trained in the hazards of containerized batteries. Emergency plan to determine and address:</p> <p>10.69.12. - What gases would be released in a fire and are there inhalation hazards?</p> <p>10.69.13. - Extinguishing has two important elements, put out fire and to provide cooling. Different approaches may be needed for small fire – e.g., put out, and for large fires e.g., cool with copious quantities of water. Note inert gases and foam may put out the initial fire but fail to control thermal runaway or to cool the batteries resulting in reignition.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
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		<p>10.69.14. - What initial fire extinguishing medium should be used?</p> <p>10.69.15. - Are there any secondary gases or residues from use of extinguishers?</p> <p>10.69.16. - If water is appropriate, may need outside connections to inside sprinklers?</p> <p>10.69.17. - First responders need to know what media to use, especially if water totally unsuitable and if there are no connection points for water etc.</p> <p>10.69.18. - Must the container be left unopened or opened?</p> <p>10.69.19. - PPE to be specified including possible exposure to chemicals and fumes as well as radiate heat.</p> <p>10.69.20. - Containment of residues/water/damaged equipment.</p> <p>10.69.21. Suitable safe making and disposal plan for after the event i.e., how do responders deal with partially charged damage units, contaminated surfaces (e.g., HF residues).</p>			
10.70. Human and Equipment Safety - exposure to explosion over pressures	Minimise exposure to explosion	10.70.1. During transport this is only likely to happen due to possible inappropriate emergency response, e.g., opening	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		<p>containers when they may be the type that should be left to burn out.</p> <p>10.70.2. For simplicity one transport route would be preferable. The route needs to be assessed in terms of responding local services, rest places for drivers, refuelling if required, break down services available etc.</p> <p>10.70.3. Once an import route has been chosen, e.g., Richards Bay or Durban and along N2/N3/N11 etc., then the appointed transport company should ensure key emergency services on route could be given awareness training in battery fire/accident response. Emergency response planning and training referred to above may be important for key locations such as the mountain passes / tunnels.</p>	<ul style="list-style-type: none"> ▪ Conduct audits of the signed attendance registers ▪ Ensure that this is undertaken via onsite inspections. 	<p>that all new staff are inducted.</p> <ul style="list-style-type: none"> ▪ Monthly ▪ Prior to operations 	
10.71. Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Minimise exposure to acute toxic chemical and biological agents	<p>10.71.1. All necessary good hygiene practices to be in place, e.g., provision of toilets, eating areas, infectious disease controls.</p> <p>10.71.2. Policies and practice for dealing with known vectors of disease such as Aids, TB, COVID 19 and others.</p> <p>10.71.3. Awareness training for persons on site, safety induction to include animal hazards.</p> <p>10.71.4. First aid and emergency response to consider the necessary anti-venom,</p>	<ul style="list-style-type: none"> ▪ Conduct audits of the signed attendance registers ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		<p>anti-histamines, topical medicines etc.</p> <p>10.71.5. Due to isolated locations some distance from town, the ability to treat with anti-venom and extreme allergic reactions on site is critical to mitigate the impacts.</p> <p>10.71.6. Appointed transport company to ensure transport in accordance with Regulation 8 of the National Road Traffic Act 93 of 1996, Dangerous Goods. Not permitted to transport prescribed goods in manner not consistent with the prescriptions, e.g., consignor and consignee responsibilities. Prescription found in SANS 10228/29 and international codes for battery transport etc.</p> <p>10.71.7. Transport in sealed packages that are kept upright, protected from movement damage etc.</p> <p>10.71.8. Also packaged to ensure no short-circuiting during transport.</p> <p>10.71.9. Transport to prevent excessive vibration considerations as battery internal may be damaged leading to thermal run-away during commissioning.</p> <p>10.71.10. Pre-assembled containers will most likely be supplied. These will be fitted with the necessary protective measures by the supplier considering marine and road</p>			

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		<p>transport as well as lifting, setting down etc.</p> <p>10.71.11. Route selection to consider possible incidents along the way and suitable response, e.g., satellite tracking, mobile communication, 24/7 helpline response.</p> <p>10.71.12. Standard dangerous goods requirements for Hazmat labels, Trem cards, driver trained in the hazards of the load.</p> <p>10.71.13. Likelihood similar to fire above.</p>			
10.72. Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Minimise exposure to violent release of kinetic or potential energy	<p>10.72.1. The construction phase will be managed according to all the requirements of the Occupational Health and Safety Act 85 of 1993 specifically the Construction Regulations.</p> <p>10.72.2. SHEQ policy in place.</p> <p>10.72.3. A detailed construction Risk Assessment prior to work.</p> <p>10.72.4. SHE procedure in place.</p> <p>10.72.5. PPE to be specified.</p> <p>10.72.6. SHE appointees in place.</p> <p>10.72.7. Contractors' safety files in place and up to date.</p> <p>10.72.8. SHE monitoring and reporting programs in place.</p>	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		<p>10.72.9. Standard construction site rules regarding traffic, reversing sirens, rigging controls, cordoning off excavations etc.</p> <p>10.72.10. Civil and building structures to National Building Regulations and building Standards Act 103 of 1977 SANS 10400 and other relevant codes.</p> <p>10.72.11. Other constructions such as roads, sewers etc. also to relevant SANS standards.</p> <p>10.72.12. All normal procedures for working at heights, hot work permits, confined space entry, cordon off excavations etc. to be in place before construction begins.</p> <p>10.72.13. Emergency response plan to be in place before construction begins.</p>			
10.73. Human and Equipment Safety - exposure to electromagnetic waves	Minimise exposure to electromagnetic waves	<p>10.73.1. Standard maintenance of condition of electrical equipment and safe operating instructions.</p> <p>10.73.2. Ability to shut off power to systems in use on site.</p> <p>10.73.3. If persons are decanting fuels or dealing with other highly flammable materials care should be taken regarding possible static discharge, installations to be suitably designed and maintained.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		10.73.4. Lightning strike rate in the study area is very high. 10.73.5. Outside work must be stopped during thunderstorms. 10.73.6. Lighting conductors may be required for the final installation, to be confirmed during design phase.			
10.74. Environment - emissions to air	Reduce air emissions	10.74.1. May need to use dampening on roads etc. as per normal construction practices. 10.74.2. May need PPE (dust masks) for specific construction workers.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.75. Environment - emissions to water	Reduce water emissions	10.75.1. Normal construction site practices for preventing and containing fuels/paint/oil etc. spills. 10.75.2. Bunding under any temporary tanks, curbing under truck offloading areas and sealed surfaces (e.g., concrete) under truck parking area is particularly important. 10.75.3. Spill clean-up procedures to be in place before commencing construction. 10.75.4. Sewage and any kitchen liquids - containment and suitable treatment/disposal	<ul style="list-style-type: none"> ▪ Monitor if spillages have taken place and if so, are removed correctly. Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ During spills 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.76. Environment - emissions to earth	Reduce earth emissions	10.76.1. There will be packaging materials that will need to be disposed of after the entire system is connected and	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		<p>commissioned as well as after regular maintenance.</p> <p>10.76.2. There will need to be waste segregation (e.g., electronic equipment, chemicals) and management on the site.</p>			
10.77. Environment - waste of resources e.g., water, power etc	Reduce waste of resources	<p>10.77.1. Water usage to be monitored on site during construction.</p> <p>10.77.2. Handling protocols to be provided by battery supplier.</p> <p>10.77.3. End of Life plan needs to be in place before any battery containers enter the country as there may be damaged battery unit from day 1.</p> <p>10.77.4. Water management plan and spill containment plans to be in place.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.78. Public - Aesthetics	Reduce aesthetic impacts	<p>10.78.1. Refer to visual impact assessment.</p> <p>10.78.2. Visual impact assessment to include BESS installation when design details become available. Confirm any height limitations for Vanadium Redox Flow Battery (VRFB) BESS building (if utility scale)</p>			<ul style="list-style-type: none"> ▪ Project Developer
10.79. Investors - Financial	Minimise financial risk	<p>10.79.1. Design by experienced contractors using internationally recognized and proven technology.</p> <p>10.79.2. Project management with deviation monitoring.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer

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10.80. Employees and investors - Security	Maximise security	<p>10.80.1. Fencing around electrical infrastructure to SANS standard and Eskom Guidelines.</p> <p>10.80.2. The hazardous nature of the electrical and battery equipment should be clearly indicated – e.g., Skull and Cross Bones or other signs.</p> <p>10.80.3. Isolated location both helps and hinders security.</p> <p>10.80.4. Night lighting to be provided both indoors and outdoors where necessary.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer
10.81. Emergencies	Minimise the risk of emergencies	<p>10.81.1. All safety measures listed above.</p> <p>10.81.2. Emergency procedures need to be practiced prior to commencement of construction.</p> <p>10.81.3. If batteries are stored at 50% charge, thermal run away can happen while in storage on site waiting for installation. In addition, if involved in an external fire thermal run away can happen even with uncharged batteries. Except during shipping, ideally the units should not be stored any closer to each other than they would be in the final installation so that propagation is prevented, i.e., laydown area needs to be considered.</p> <p>10.81.4. The company in charge of the containers at each stage in the</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		transport process needs to be very clear so that responsibility for the integrity of the load and protection of the persons involved in transfer and coordination of emergency response on-route. E.g., if purchased from Tesla where does hand over occur to the South African contractor / owner, at the factory door in USA, at the port in RSA, at the site fence. For example, who will be accountable if there's thermal runaway event on a truck with a container that stops in a small town for driver refreshments			
10.82. Investors - Legal	Minimise the risk of legal action	<p>10.82.1. Use only internationally reputable battery suppliers who comply with all known regulations/guideline at the time of purchasing.</p> <p>10.82.2. Ensure only state of the art battery systems are used and not old technologies prone to fires/explosions etc.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer
B.10. GEOTECHNICAL IMPACTS					
10.83. Removal of rocks and other geologic materials for site levelling and grading, resulting in loss of geologic materials, e.g. topsoil removal/loss, and potentially the destruction of habitats of endemic species.	Minimise soil and wind erosion	<p>10.83.1. Favour dolerite as an aggregate (as opposed to Karoo sandstones and mudstones). Subject to investigation.</p> <p>10.83.2. Any road cuttings should be designed by an appropriately qualified professional.</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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		<p>10.83.3. Drainage in the region should be designed and managed appropriately.</p> <p>10.83.4. Investigate and confirm the geotechnical suitability of each structure (or other appropriate level of investigation) prior to construction (i.e. determine that soil with an adequate bearing capacity is obtained beneath each footing). Such investigations would not be required to fulfil the requirements of the EIA process. However, it would be necessary prior to construction.</p> <p>10.83.5. Only strip vegetation necessary for the next phase of construction.</p> <p>10.83.6. Install temporary drainage to divert stormwater away from active construction activities, where required.</p> <p>10.83.7. Stormwater Management Plan must be developed in the preconstruction phase. It should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flow directly into any natural systems (in consultation with suitably qualified professionals). Effective stormwater management must include effective stabilisation (e.g. gabions and Reno mattresses) of exposed soil.</p>			

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		<p>10.83.8. Suitable stormwater management systems must be installed along roads and other areas and be monitored during the first few months of use. Any erosion/sedimentation must be resolved through any additional interventions that may be necessary (e.g., extension, energy dissipaters, spreaders, etc.).</p> <p>10.83.9. Where impacted through construction-related activities, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled.</p> <p>10.83.10. Sloped areas stabilised using designed structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly.</p> <p>10.83.11. Any rehabilitation should be scheduled to ensure rehabilitation can take place at the optimal time for vegetation establishment.</p> <p>10.83.12. Where earthwork is being undertaken near any watercourses, slopes must be stabilised using suitable materials, e.g. sandbags or geotextile fabric, to prevent sand and rock from entering the channel.</p> <p>10.83.13. Appropriate rehabilitation and re-vegetation measures for any disturbed watercourse banks must</p>			

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		be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.			
10.84. Contamination of geologic materials as a consequence of the construction activities by earthworks machinery and other apparatus.	Minimise contamination of geologic materials	<p>10.84.1. During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented, e.g. including ensuring that construction equipment is well maintained.</p> <p>10.84.2. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained.</p> <p>10.84.3. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.</p> <p>10.84.4. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilt material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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10.85. Sedimentation of non-perennial features and excessive dust.	Minimise sedimentation of non-perennial features and excessive dust	10.85.1. Rehabilitation of affected areas (such as revegetation). 10.85.2. Construction of temporary berms and drainage channels to divert surface water. 10.85.3. Minimize earthworks and fills. 10.85.4. Use existing road network and access tracks. 10.85.5. Correct engineering design and construction of gravel roads and water crossings. 10.85.6. Control stormwater flow. 10.85.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.86. The displacement of natural earth material and overlying vegetation leading to erosion.	Minimise erosion due to displacement of natural earth material and overlying vegetation	10.86.1. Rehabilitation of affected areas (such as revegetation). 10.86.2. Construction of temporary berms and drainage channels to divert surface water. 10.86.3. Minimize earthworks and fills. 10.86.4. Use existing road network and access tracks. 10.86.5. Correct engineering design and construction of gravel roads and water crossings. 10.86.6. Control stormwater flow. 10.86.7. Limited excavations.	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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10.87. Potential groundwater and drainage feature contamination.	Avoid contamination of groundwater and drainage features	10.87.1. Vehicle and construction machinery repairs to be undertaken in designated areas with proper soil protection.	<ul style="list-style-type: none"> Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and ECO
10.88. Slope instability around structures.	Maximise slope stability around structures.	10.88.1. Avoid construction in steep slopes areas. 10.88.2. Design cut slopes according to detailed geotechnical analysis. 10.88.3. Design according to expected peak ground acceleration.	<ul style="list-style-type: none"> Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and Contractor
10.89. Damage of proposed development during construction.	Avoid damage to proposed development during construction	10.89.1. Avoid construction in steep slopes areas. 10.89.2. Design cut slopes according to detailed geotechnical analysis. 10.89.3. Design according to expected peak ground acceleration.	<ul style="list-style-type: none"> Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and Contractor
B.11. WASTE MANAGEMENT					
10.90. Pollution of the surrounding environment (including drainage lines) as a result of the handling, temporary stockpiling and disposal of general waste.	Reduce environmental impacts such as soil, surface water and groundwater contamination as a result of incorrect storage, handling and disposal of general waste.	10.90.1. General waste (i.e., construction waste, building rubble, discarded concrete, bricks, tiles, wood, glass, windowpanes, air conditioners, plastic, metal, excavated material, packaging material, paper and domestic waste etc.) generated during the construction phase should be stockpiled temporarily (i.e., once-off) on site in a designated area within suitable waste collection bins and skips (or similar). Waste collection bins and skips should be	<ul style="list-style-type: none"> Monitor the strategic placement of the temporary, designated waste stockpiling area at the site camp via visual inspections, and record and report any non-compliance. Monitor the temporary storage and handling of general waste on site via site audits and record non-compliance and incidents 	<ul style="list-style-type: none"> Once-off prior to the commencement of the construction phase and as required as the construction phase process evolves. Daily 	<ul style="list-style-type: none"> ECO and Contractor ECO

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			Methodology	Frequency	Responsibility
	<p>Minimise the production of waste.</p> <p>Ensure compliance with waste management legislation.</p>	covered with suitable material, where appropriate.	(i.e., conduct visual inspections of the temporary waste storage area).		
		10.90.2. Should the on-site stockpiling of general waste exceed 100 m ³ and a period of 90 days, then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.	<ul style="list-style-type: none"> ▪ Record the amount of general waste that is temporarily stockpiled at the designated area on site, as well as the duration and record non-compliance and incidents. ▪ Monitor the duration and amounts of general waste that is temporarily stockpiled at the designated area on site via site audits and record non-compliance and incidents (i.e., conduct visual inspections of the temporary waste storage area). ▪ Audit compliance with the Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) if the storage amounts are exceeded (i.e., only if required). 	<ul style="list-style-type: none"> ▪ Daily ▪ Weekly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Contractor ▪ ECO ▪ Project Developer
		10.90.3. Ensure that the designated stockpiling area for general waste (i.e., skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events.	<ul style="list-style-type: none"> ▪ Monitor the temporary, designated waste stockpiling area at the site camp, as well as the handling of general waste on site via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.90.4. Ensure that general waste generated during the construction phase is removed from the site on a regular basis, and safely disposed of at an appropriate, licenced waste disposal facility by an approved waste management Contractor. Waste disposal slips or waybills should be kept on file as proof of disposal. As a general principle, waste manifests must be obtained to prove legal disposal of waste.	<ul style="list-style-type: none"> ▪ Ensure that a suitable Waste Management Contractor is appointed to remove and dispose the general waste at an appropriate, licenced waste disposal facility. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Once-off prior to the construction phase. ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
		10.90.5. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.	<ul style="list-style-type: none"> ▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Daily ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ ECO and Contractor ▪ ECO and Contractor ▪ ECO
		10.90.6. Sufficient general waste disposal bins must also be provided for use by construction personnel throughout the site. These bins must be emptied on a regular basis.	<ul style="list-style-type: none"> ▪ Monitor general waste generation by construction staff and collection via audits throughout the construction phase. 	<ul style="list-style-type: none"> ▪ Daily or Weekly 	<ul style="list-style-type: none"> ▪ ECO and Contractor.
		10.90.7. Ensure that all general waste emanating from the construction phase is removed from site prior to the commencement of the	<ul style="list-style-type: none"> ▪ Undertake a final inspection at the end of the construction phase in order to verify and ensure that all general waste is removed from site and correctly disposed, prior to 	<ul style="list-style-type: none"> ▪ At the end of the construction phase. 	<ul style="list-style-type: none"> ▪ ECO and Contractor.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		rehabilitation and operational phases.	the commencement of the rehabilitation and operational phases.		
		10.90.8. Promote waste reduction, re-use, and recycling opportunities on site during the construction phase.	<ul style="list-style-type: none"> ▪ Monitor waste generation and collection throughout construction. ▪ Investigate if any complaints have been expressed by the surrounding community regarding waste handling. 	<ul style="list-style-type: none"> ▪ Weekly or bi-weekly 	<ul style="list-style-type: none"> ▪ ECO and Contractor
		10.90.9. Ensure an adequate and sustainable use of resources.	<ul style="list-style-type: none"> ▪ Monitor waste generation and collection throughout construction. 	<ul style="list-style-type: none"> ▪ Weekly or bi-weekly 	<ul style="list-style-type: none"> ▪ ECO and Contractor
		10.90.10. Control and implement waste management plans provided by contractors. Ensure that relevant legislative requirements are respected.	<ul style="list-style-type: none"> ▪ Control of waste management practices throughout construction phase 	<ul style="list-style-type: none"> ▪ Weekly or bi-weekly 	<ul style="list-style-type: none"> ▪ ECO and Contractor
10.91. Pollution of the surrounding environment as a result of the handling, temporary stockpiling and disposal of hazardous waste.	Reduce environmental impacts such as soil, surface water and groundwater contamination as a result of incorrect storage, handling and disposal of hazardous waste.	10.91.1. Hazardous waste (i.e., empty tins, oils, fuel spillages, spilled materials, and chemicals etc.) generated during the construction phase should be stockpiled temporarily (i.e., once-off) on site in a designated area in suitable waste collection bins and leak-proof storage skips (or similar). Waste collection bins and skips should be covered with suitable material, where appropriate. Hazardous waste must be stored separately from all other general	<ul style="list-style-type: none"> ▪ Monitor the strategic placement of the temporary, designated waste stockpiling area at the site camp via visual inspections, and record and report any non-compliance. ▪ Monitor the temporary storage and handling of hazardous waste on site via site audits and record non-compliance and incidents (i.e., conduct visual 	<ul style="list-style-type: none"> ▪ Once-off prior to the commencement of the construction phase and as required as the construction process evolves. ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO and Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		waste. The designated stockpiling area must be labelled correctly.	inspections of the temporary waste storage area).		
		10.91.2. Should the on-site stockpiling of hazardous waste exceed 80 m ³ , then the National Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) must be adhered to.	<ul style="list-style-type: none"> ▪ Record the amount of hazardous waste that is temporarily stockpiled at the designated area on site, as well as the duration and record non-compliance and incidents. ▪ Monitor the duration and amounts of hazardous waste that is temporarily stockpiled at the designated area on site via site audits and record non-compliance and incidents (i.e., conduct visual inspections of the temporary waste storage area). ▪ Audit compliance with the Norms and Standards for the Storage of Waste (published on 29 November 2013 under GN 926) if the storage amounts are exceeded (i.e., only if required). 	<ul style="list-style-type: none"> ▪ Daily ▪ Weekly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Contractor ▪ ECO ▪ Project Developer
		10.91.3. Ensure that the designated stockpiling area for hazardous waste (i.e., leak proof skips and waste collection bins) is inspected on a daily basis to verify its condition and integrity, particularly after rainfall events.	<ul style="list-style-type: none"> ▪ Monitor the temporary, designated waste stockpiling area at the site camp, as well as the handling of hazardous waste on site via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.91.4. Ensure that all hazardous waste is removed from the site on a regular basis, and safely disposed at an appropriate, licenced hazardous waste disposal facility by an approved waste management Contractor.	<ul style="list-style-type: none"> ▪ Ensure that a suitable Waste Management Contractor is appointed to remove and dispose the hazardous waste at an appropriate, licenced hazardous waste disposal facility. ▪ Monitor waste disposal slips and waybills via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Once-off prior to the construction phase. ▪ Weekly 	<ul style="list-style-type: none"> ▪ Project Developer/ Contractor ▪ ECO
		10.91.5. Ensure that the construction site is kept clean at all times and that construction personnel are made aware of correct waste disposal methods. Littering must be prevented through effective site camp management.	<ul style="list-style-type: none"> ▪ Monitor the condition of the site camp throughout the construction phase via visual site inspections. Record non-compliance and incidents. ▪ Carry out Environmental Awareness Training. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Daily ▪ Once-off training and ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ ECO and Contractor ▪ ECO and Contractor ▪ ECO
		10.91.6. Ensure that all hazardous waste emanating from the construction phase is removed from site prior to the commencement of the rehabilitation and operational phases.	<ul style="list-style-type: none"> ▪ Undertake a final inspection at the end of the construction phase in order to verify and ensure that all general waste is removed from site and correctly disposed, prior to the commencement of the rehabilitation and operational phases. 	<ul style="list-style-type: none"> ▪ At the end of the construction phase. 	<ul style="list-style-type: none"> ▪ ECO and Contractor.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.91.7. All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means.	<ul style="list-style-type: none"> Waste removal and disposal to be monitored throughout construction 	<ul style="list-style-type: none"> Weekly or bi-weekly 	<ul style="list-style-type: none"> ECO and Contractor
		10.91.8. Adequate containers for the cleaning of equipment and materials (paint, solvent) must be provided as to avoid spillages.	<ul style="list-style-type: none"> Waste removal and disposal to be monitored throughout construction 	<ul style="list-style-type: none"> Weekly or bi-weekly 	<ul style="list-style-type: none"> ECO and Contractor
		10.91.9. Wastewater from construction and painting activities must be collected in a designated container and disposed of at a suitable disposal point off site.	<ul style="list-style-type: none"> Waste removal and disposal to be monitored throughout construction 	<ul style="list-style-type: none"> Weekly or bi-weekly 	<ul style="list-style-type: none"> ECO and Contractor
		10.91.10. Control and implement waste management plans provided by contractors. Ensure that relevant legislative requirements are respected.	<ul style="list-style-type: none"> Control of waste management practices throughout construction phase. 	<ul style="list-style-type: none"> Weekly or bi-weekly 	<ul style="list-style-type: none"> ECO and Contractor
B.12. HUNTING PRACTICES ON ADJACENT FARMS					
10.92. Potential impact on construction activities and personnel as a result of hunting practices on adjacent farms.	To ensure safety of construction activities and personnel as a result of hunting operations on adjacent farms.	10.92.1. Ensure that an open communication strategy is created and maintained between the Project Developer, Contractor and owners (or managers) of the adjacent farms where hunting takes place in order to ensure that the Project Developer	<ul style="list-style-type: none"> Monitor and record the notifications received from the owners (or managers) of the adjacent farms where hunting takes place. Carry out Environmental Awareness Training and ensure that safety aspects 	<ul style="list-style-type: none"> On-going Once-off at the commencement of construction and ensure that all new staff are inducted Monthly 	<ul style="list-style-type: none"> Project Developer, ECO and Contractor Project Developer, ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>and Contractor are made aware of planned hunts.</p> <p>10.92.2. Ensure that construction personnel are made aware of the planned hunts and are trained on the necessary protocols to be taken.</p>	<p>are discussed in terms of hunting operations on adjacent farms. Conduct audits of the signed attendance registers.</p> <ul style="list-style-type: none"> ▪ Carry out random inspections to ensure that planned hunts are being communicated to the Project Developer and that construction personnel are being duly informed. 		<ul style="list-style-type: none"> ▪ Project Developer, ECO and Contractor
B.13. BATS					
10.93. Potential impact on bats as a result of construction activities.	To minimize potential impacts on any bats during the construction phase.	<p>10.93.1. A suitably qualified bat specialist must be consulted with prior to the commencement of construction (post Environmental Authorisation, should such authorisation be granted) to verify the need for a bat monitoring programme, and if such a programme is required then it must be undertaken.</p> <p>10.93.2. Any signs of bat collisions / fatalities are to be recorded during the construction phase.</p>	<ul style="list-style-type: none"> ▪ Verify the consultation with a bat specialist prior to the commencement of construction to determine the need for a bat monitoring programme. If required, ensure that this is undertaken. ▪ Record any signs of bat collisions / fatalities and report it to the necessary specialists. 	<ul style="list-style-type: none"> ▪ Once-off prior to the commencement of construction and as required thereafter ▪ Weekly and as required 	<ul style="list-style-type: none"> ▪ Project Developer, ECO and Contractor ▪ ECO
B.14 GEOHYDROLOGY IMPACTS					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.94. Ground water contamination by means of spillages with regards to oil, hydraulic fluids, fuels and dust control	To minimize potential ground water contamination.	<p>10.94.1. During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented, e.g. including ensuring that construction equipment is well maintained.</p> <p>10.94.2. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained.</p> <p>10.94.3. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.</p> <p>10.94.4. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilt material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p> <p>10.94.5. Any construction vehicles/engines that stand in one place for an excessive length of time must have drip trays</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.94.6. It is advised that the water source to be used for dust control should be of such quality that it does not jeopardise the ground water quality upon possible infiltration.</p> <p>10.94.7. Ground water quality monitoring to be done prior and during construction in order to identify possible ground water contamination.</p>			
C. OPERATIONAL PHASE					
C.1. AGRICULTURE AND SOILS IMPACTS					
10.95. Erosion	That denuded areas are re-vegetated to stabilise soil against erosion.	10.87.1. Facilitate re-vegetation of denuded areas throughout the site.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to record the progress of all areas that require re-vegetation. 	<ul style="list-style-type: none"> ▪ Bi-annually 	<ul style="list-style-type: none"> ▪ Facility Environmental Manager
10.96. Erosion	That existence of hard surfaces causes no erosion on or downstream of the site.	10.88.1 Maintain the storm water run-off control system. Monitor erosion and remedy the storm water control system in the event of any erosion occurring.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off control system in the event of any erosion occurring. 	<ul style="list-style-type: none"> ▪ Bi-annually 	<ul style="list-style-type: none"> ▪ Facility Environmental Manager
C.2. VISUAL IMPACTS					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.97. The PV arrays may be perceived as an unwelcome visual intrusion, particularly in more natural undisturbed settings	To reduce the visual intrusion of the operation infrastructure on the surrounding landscape and receptors.	<p>10.97.1. Buildings on the site should be painted with natural tones that fit with the surrounding environment.</p> <p>10.97.2. Non-reflective surfaces should be utilised where possible.</p> <p>10.97.3. As far as possible, limit the number of maintenance vehicles which are allowed to access the site.</p> <p>10.97.4. As far as possible, limit the amount of security and operational lighting present on site.</p> <p>10.97.5. Ensure that outdoor or security lighting are fitted with reflectors to minimise light spillage, as recommended during the planning and design phase.</p> <p>10.97.6. Ensure that internal power lines are located underground where possible, as recommended during the planning and design phase.</p> <p>10.97.7. Ensure that discrete outdoor signage is used and prohibit intrusive commercial, or billboard signage is prohibited, as recommended during the planning and design phase.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. ▪ Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of the lighting and wastes on the site by the appointed Environmental Manager. 	<ul style="list-style-type: none"> ▪ Once-off prior at the beginning of the operational phase. ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.98. The proposed solar PV facility will alter the visual character of the surrounding area and expose potentially sensitive visual receptor locations to visual impacts.		<p>10.98.1. Restrict vegetation clearance on the site to that which is required for the correct operation of the facility.</p> <p>10.98.2. As far as possible, limit the number of maintenance vehicles which are allowed to access the site.</p> <p>10.98.3. Ensure that suitable dust suppression techniques are implemented on all gravel access roads.</p> <p>10.98.4. As far as possible, limit the amount of security and operational lighting present on site.</p> <p>10.98.5. Light fittings for security at night should reflect the light toward the ground and prevent light spill.</p> <p>10.98.6. Lighting fixtures should make use of minimum lumen or wattage.</p> <p>10.98.7. Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.</p> <p>10.98.8. If economically and technically feasible, make use of motion detectors on security lighting.</p> <p>10.98.9. Buildings on the site should be painted with natural tones that fit with the surrounding environment.</p> <p>10.98.10. Non-reflective surfaces should be utilised where possible.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. ▪ Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of the lighting and wastes on the site by the appointed Environmental Manager. 	<ul style="list-style-type: none"> ▪ Once-off prior at the beginning of the operational phase. ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.99. Glint and glare may impact nearby receptors.		<p>10.99.1. As far as possible, limit the amount of security and operational lighting present on site.</p> <p>10.99.2. Light fittings for security at night should reflect the light toward the ground and prevent light spill.</p> <p>10.99.3. Lighting fixtures should make use of minimum lumen or wattage.</p> <p>10.99.4. Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.</p> <p>10.99.5. If economically and technically feasible, make use of motion detectors on security lighting.</p> <p>10.99.6. Buildings on the site should be painted with natural tones that fit with the surrounding environment.</p> <p>10.99.7. Use vegetation screening if glint and glare issues become evident where possible.</p> <p>10.99.8. Non-reflective surfaces should be utilised where possible.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. ▪ Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of the lighting and wastes on the site by the appointed Environmental Manager. 	<ul style="list-style-type: none"> ▪ Once-off prior at the beginning of the operational phase. ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager
10.100. Dust emissions and dust plumes from maintenance vehicles accessing the site via gravel roads may evoke negative sentiments from surrounding viewers.		<p>10.100.1. Ensure that suitable dust suppression techniques are implemented on all gravel access roads.</p> <p>10.100.2. As far as possible, limit the number of maintenance vehicles which are allowed to access the site.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. ▪ Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of 	<ul style="list-style-type: none"> ▪ Once-off prior at the beginning of the operational phase. ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Environmental Manager ▪ Project Developer and

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			the lighting and wastes on the site by the appointed Environmental Manager.		Environmental Manager
10.101. The night-time visual environment will be altered as a result of operational and security lighting at the proposed PV facility.		<p>10.101.1. As far as possible, limit the amount of security and operational lighting present on site.</p> <p>10.101.2. Light fittings for security at night should reflect the light toward the ground and prevent light spill.</p> <p>10.101.3. Use vegetation screening if glint and glare issues become evident where possible.</p> <p>10.101.4. Lighting fixtures should make use of minimum lumen or wattage.</p> <p>10.101.5. Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.</p> <p>10.101.6. If economically and technically feasible, make use of motion detectors on security lighting.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. ▪ Ensure that visual mitigation measures are monitored by management on an on-going basis, including the control of the lighting and wastes on the site by the appointed Environmental Manager. 	<ul style="list-style-type: none"> ▪ Once-off prior at the beginning of the operational phase. ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Environmental Manager ▪ Project Developer and Environmental Manager
C.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
10.102. Visible landscape scarring	Minimise landscape scarring	10.102.1. Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	<ul style="list-style-type: none"> ▪ Monitoring of surface clearance relative to approved layout 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ As required 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C.4. TERRESTRIAL BIODIVERSITY IMPACTS³					
10.103. Loss of species composition and diversity	Minimise loss of species composition and diversity	<p>10.103.1. The loss of species composition and diversity cannot be mitigated due to a permanent structure which will change microclimatic conditions for the life of the facility operation.</p> <p>10.103.2. A rehabilitation plan is required to restore each habitat to a natural state that is representative of the respective vegetation type after decommissioning.</p>	<ul style="list-style-type: none"> ▪ Ensure compliance with these mitigation measures. 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ As required 	<ul style="list-style-type: none"> ▪ ECO
10.104. Littering and general pollution	Minimise littering and general pollution	<p>10.104.1. Vehicles must be in good working condition, with no oil, water or fuel leaks.</p> <p>10.104.2. Vehicles must be regularly inspected and any problems corrected.</p> <p>10.104.3. Refuelling may only take place in an appropriate, designated bunded area.</p> <p>10.104.4. Any spillages must be reported immediately and dealt with appropriately.</p> <p>10.104.5. Spill kits must be available on site in case of accidental spillage.</p>	<ul style="list-style-type: none"> ▪ Ensure compliance with these mitigation measures. 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ As required 	<ul style="list-style-type: none"> ▪ ECO

³ Management actions relating to alien invasive vegetation management are covered in Section 4 of this EMPr.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.104.6. Sufficient waste disposal bins must be available on site and clearly marked. 10.104.7.			
10.105. Impact on animal species	Avoid or minimise impacts that could potentially affect animal behaviour.	10.105.1. Proper waste management procedures should be put in place.	<ul style="list-style-type: none"> Ensure compliance with these mitigation measures. 	<ul style="list-style-type: none"> Monthly 	<ul style="list-style-type: none"> The ECO should monitor and report to the Holder of the EA.
10.106. Increased alien species invasion	Avoid invasion by alien species.	10.106.1. Compile an alien and invasive species control and monitoring plan in terms of NEMBA. 10.106.2. Implement a monitoring program for the early detection of alien invasive plant species and employ a control program to combat declared alien invasive plant species.	<ul style="list-style-type: none"> Ensure implementation of a monitoring and control programme to combat alien invasive plants. 	<ul style="list-style-type: none"> Every three months 	<ul style="list-style-type: none"> The ECO should monitor and report to the Holder of the EA.
C.5. AQUATIC BIODIVERSITY AND SPECIES IMPACTS					
10.107. Alteration in flow regime and drainage	Avoid placement of infrastructure within wetland and wetland buffer zones.	10.107.1. Watercourse monitoring should take place annually as part of the environmental management plan. 10.107.2. The access road and silt traps (if installed) must be inspected monthly for signs of erosion. When erosion is observed, the area should be rehabilitated within 3 months. In addition, inspections following a >200mm/24 hr rainfall event must occur within 3 months of the event	<ul style="list-style-type: none"> Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> On-going Once off prior to the commencement of operations. 	<ul style="list-style-type: none"> ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.107.3. Effective culverts should be incorporated into the design of access roads.</p> <p>10.107.4. No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. Should domestic water be required to be discharge, the management of nitrogen concentrations is imperative.</p> <p>10.107.5. All stockpiles and hazardous waste storage areas must be bunded by either a cut-off trench directed to a Pollution Control Dam or via a berm.</p> <p>10.107.6. The implementation of a suitable storm-water management plan for the disturbance footprint must be in place and implemented by this phase</p>			
10.108. Changes in sediment regimes	Avoid placement of infrastructure within wetland and wetland buffer zones.	<p>10.108.1. The proposed layout should be revisited, and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zones.</p> <p>10.108.2. Where development is located upslope from wetlands, effective stormwater management including sediment barriers should be a priority during both construction and operational phase. This should be monitored as part of the EMP.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.108.3. Monitoring should be done to ensure that sediment pollution is timeously dressed.			
10.109. Introduction and spread of alien vegetation on disturbed areas	Reduce the spread of alien invasive species.	<p>10.109.1. Alien invasive management programmes should continue throughout the duration of the activity.</p> <p>10.109.2. An annual audit of the roads for signs of environmental disturbance outside of the footprint area must be conducted.</p> <p>10.109.3. Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish.</p> <p>10.109.4. Undertake an Alien Plant Control Plan which specifies actions and measurable targets</p> <p>10.109.5. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction/earthworks in that area and returning it where possible afterwards.</p> <p>10.109.6. Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		to establish, as specified in the Alien Vegetation Management Plan.			
10.110. Loss and disturbance of riparian/watercourse habitat and vegetation	Minimise loss of riparian habitat and vegetation.	<p>10.110.1. Monitor the establishment of alien invasive species within the areas affected by the construction and take immediate corrective action where invasive species are observed to establish.</p> <p>10.110.2. Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed.</p> <p>10.110.3. Operational activities should not take place within watercourses or buffer zones, nor should edge effects impact on these areas.</p> <p>10.110.4. Operational activities should not impact on rehabilitated or naturally vegetated areas.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager
10.111. Alteration in water quality due to pollution	Reduce the changes in water resources and surface water in terms of water quality	<p>10.111.1. No discharge of domestic water must occur if possible. Domestic water must be reused for dust suppression. Should domestic water be required to be discharge, the management of nitrogen concentrations is imperative.</p> <p>10.111.2. All stockpiles and hazardous waste storage areas must be bunded by either a cut-off trench</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>directed to a Pollution Control Dam or via a berm.</p> <p>10.111.3. Regular independent water quality monitoring should form part of operational procedures in order to identify pollution.</p> <p>10.111.4. Treatment of pollution identified should be prioritized according to best practice guidelines.</p> <p>10.111.5. Develop norms and practices for the treatment of spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills.</p> <p>10.111.6. Appoint a reliable contractor for the removal of refuse during the operational phase.</p>			
10.112. Loss of aquatic biota	Minimise loss of aquatic biota.	10.112.1. This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures mentioned above.	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager
C.6. AVIFAUNA IMPACTS					
10.113. Electrocution of priority species on the in the onsite substation.	Prevent the mortality of SCC	10.113.1. It is recommended that wherever possible, existing electrical transmission infrastructure is utilised. Where the creation of new transmission lines is necessary attempts should be made to minimise the route length to the closest	<ul style="list-style-type: none"> ▪ Investigate the electrocution incident and implement appropriate mitigation by insulating the hardware 	<ul style="list-style-type: none"> ▪ As and when required 	<ul style="list-style-type: none"> ▪ Facility Operational Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>existing substation and that the route be aligned with existing powerlines as far as possible. Additionally, the route should avoid or minimise wetland/riverine crossings.</p> <p>10.113.2. Install Eskom-approved bird flight diverters (flappers or coils) on new transmission lines (particularly the earth wire). This can help to increase the visibility of transmission lines especially the thinner earth line with which most collisions tend to be associated. If the transmission lines are long or if budget is constraining then prioritise portions of the transmission lines that pass near to or cross wetlands/riverine habitats.</p> <p>10.113.3. Design of overhead electrical lines must take into account potential for electrocution by large species and pre-emptively avoid the likelihood of this by increasing distances between spans to avoid faecal “streamers” or large open wings creating a short</p>			
10.114. Poisoning and death from chemical use to clean and maintain solar panels	Minimise toxic surfactants, dust suppressants and other chemicals in the maintenance of the solar panels	<p>10.114.1. Avoid or minimise the use of chemical surfactants and dust suppressants on site.</p> <p>10.114.2. Where necessary ensure that none of the cleaning water enters nearby wetlands and seeps through runoff</p> <p>10.114.3. Do not clean before an imminent rainstorm.</p>	<ul style="list-style-type: none"> ▪ Ensure that this undertaken during the operational phase 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Facility Operational Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
C.7. SOCIO-ECONOMIC IMPACTS					
10.115. Establishment of infrastructure to improve energy security and support the renewable sector.	Enhance energy security for South Africa and realise opportunity to enhance growth of renewable sector	<p>10.115.1. Maximise the number of employment opportunities for local community members.</p> <p>10.115.2. Implement training and skills development programs for members from the local community.</p> <p>10.115.3. Maximise opportunities for local content and procurement.</p>	<ul style="list-style-type: none"> ▪ Composition of workforce to be monitored during operations to assess the number of local residents employed. Review of the employment registers. ▪ Record of skills training to be reviewed. Register of attendance reviewed. 	<ul style="list-style-type: none"> ▪ Monthly or Bi-monthly ▪ As required 	<ul style="list-style-type: none"> ▪ Project Developer
10.116. Creation of employment opportunities	Maximize potential job creation for locals	<p>10.116.1. The enhancement measures to enhance local employment and business opportunities during the construction phase (section 10.66) also apply to the operational phase.</p> <p>10.116.2. The proponent should investigate providing training and skills development to enable locally based service providers to provide the required services for the operational phase.</p>	<ul style="list-style-type: none"> ▪ Composition of workforce to be monitored during construction to assess the number of local residents employed. Review of the registers held by the contractors. ▪ Undertake inspections to monitor compliance. 	<ul style="list-style-type: none"> ▪ Monthly or Bi-monthly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.117. Generate income for affected landowner	Enhance benefits for affected landowner	<p>10.117.1. Implement agreements with affected landowners.</p> <p>10.117.2. The loss of high-quality agricultural land should be avoided and or minimised by careful planning in the final layout of the proposed SEF facility. The recommendations</p>	<ul style="list-style-type: none"> ▪ Record GPS positions of all significant occurrences (that is an area of greater than 25 square metres) of below-surface soil disturbance (e.g., excavations). Record the date of topsoil stripping and replacement. Check that 	<ul style="list-style-type: none"> ▪ Monthly ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>of the agricultural / soil assessment should be implemented.</p> <p>10.117.3. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.</p>	<p>topsoil covers the entire disturbed area.</p> <ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. 		
10.118. Visual impact and impact on sense of place	Minimise visual impact and impact on sense of place	<p>10.118.1. Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns</p> <p>10.118.2. Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.</p> <p>10.118.3. Maintain the general appearance of the facility as a whole.</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. 	<ul style="list-style-type: none"> ▪ Once-off 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor
10.119. Potential impact on property values	Minimise potential impact on property values	<p>10.119.1. The proponent should meet with the owner of Gouda to discuss the visual impact on property and identify and agree on mutually acceptable and effective mitigation measures. This is in line with the recommendations contained in the VIA that the proponent consult adjacent landowners in order to inform them of</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. 	<ul style="list-style-type: none"> ▪ Once-off 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>the development and to identify any (valid) visual impact concerns.</p> <p>10.119.2. Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns.</p> <p>10.119.3. Investigate the potential to screen affected receptor sites (if applicable and located within 1km of the facility) with planted vegetation cover.</p> <p>10.119.4. Maintain the general appearance of the facility as a whole.</p>			
10.120. Impact on tourism	Minimise impact on tourism	<p>10.120.1. The proponent should meet with the owner of Gouda to discuss the visual impact on property and identify and agree on mutually acceptable and effective mitigation measures. This is in line with the recommendations contained in the VIA that the proponent consult adjacent landowners in order to inform them of the development and to identify any (valid) visual impact concerns.</p> <p>10.120.2. Consult adjacent landowners (if present) in order to inform them of the development and to identify any (valid) visual impact concerns.</p> <p>10.120.3. Investigate the potential to screen affected receptor sites (if</p>	<ul style="list-style-type: none"> ▪ Undertake inspections to monitor compliance. ▪ 	<ul style="list-style-type: none"> ▪ Once-off 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>applicable and located within 1km of the facility) with planted vegetation cover.</p> <p>10.120.4. Maintain the general appearance of the facility as a whole.</p>			
C.8. IMPACTS RESULTING FROM THE BATTERY ENERGY STORAGE SYSTEMS (BESS)					
10.121. Human Health - chronic exposure to toxic chemical or biological agents	Minimise exposure to toxic chemicals or biological agents	<p>10.121.1. The operation and maintenance phase will be managed according to all the requirements of the Occupational Health and Safety Act 85 of 1993.</p> <p>10.121.2. Safety, Health, Environmental and Quality (SHEQ) policy in place.</p> <p>10.121.3. A detailed Risk Assessment of all normal operating and maintenance activities on site to be compiled, and form the basis of operating instructions, prior to commencing commissioning.</p> <p>10.121.4. Safety, Health, and Environmental (SHE) procedure in place, e.g., PPE specified, management of change, integrity monitoring.</p> <p>10.121.5. SHE appointees in place.</p> <p>10.121.6. Training of staff in general hazards on site.</p> <p>10.121.7. All necessary health controls/ practices to be in place,</p>	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. ▪ Conduct audits of the signed attendance registers. ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure that all new staff are inducted. ▪ Monthly ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>e.g., ventilation of confined areas, occupational health monitoring if required and reporting programs in place.</p> <p>10.121.8. Emergency response plan for full operation and maintenance phase to be in place prior to beginning commissioning and to include aspects such as appointment of emergency controller, emergency isolation systems for electricity, emergency isolation and containment systems for electrolyte, provision of PPE for hazardous materials response, provision of emergency facilities for staff at the main office building, provision of first aid facilities, first responder contact numbers etc.</p> <p>10.121.9. Solid-state batteries sealed, individual batteries in modules which are also sealed, pre-packed in the container.</p> <p>10.121.10. VRFB Batteries facilities normally within buildings but may be containerized.</p> <p>10.121.11. Maintenance procedures will be in place should equipment need to be opened, e.g., pumps drained and decontaminated prior to repair in workshop etc.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.121.12. PPE will be specified for handling battery parts and other equipment on site.</p> <p>10.121.13. Training of staff in hazards of chemicals on site.</p> <p>10.121.14. Possible detectors with local alarms if regulated occupational exposure limits are exceeded etc. prior to entry for inspection of battery containers.</p> <p>10.121.15. Labelling of all equipment.</p> <p>10.121.16. Confined space entry procedures if entering tanks.</p> <p>10.121.17. There needs to be careful thought given to procedures to be adopted before entering into the BESS or a container particularly after a BMS shut down where there may be flammable or toxic gases present, a fire etc.</p> <p>10.121.18. Safety Data Sheets (SDSs) to be available on site.</p> <p>10.121.19. Operating manuals to be provided including start-up, shut-down, steady state, monitoring requirements.</p> <p>10.121.20. Maintenance manuals with make safe, decontamination and repair procedures.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.121.21. Proposed maintenance schedules e.g., checklists for weekly, monthly, annual etc.</p> <p>10.121.22. Provided portable equipment for calibration and for testing/verification of defective equipment, e.g., volt/current meters, infrared camera.</p>			
10.122. Human Health - exposure to noise	Minimise noise exposure	<p>10.122.1. Design to ensure continuous noise does not exceed 85dB within the facilities or at any other location on site or 61 dB at the site boundary, e.g., emergency generator, air compressor etc.</p> <p>10.122.2. Employees to be provided with hearing protection if working near equipment that exceeds the noise limits.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.123. Human Health - exposure to temperature extremes and/or humidity	Minimise exposure to temperature extremes and/or humidity	<p>10.123.1. Occupational Health and Safety Act 85 of 1993 specifically the thermal, humidity, lighting, and ventilation requirements of the Environmental Regulations for Workplaces.</p> <p>10.123.2. Ensure containers are temperature controlled as required to remain within the optimal battery operating temperature range.</p> <p>10.123.3. Lighting to be provided inside any buildings, inside the containers, possibly linked to the</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>door opening and outdoors where necessary.</p> <p>10.123.4. Night work is likely for VRFB. Suitable lighting to be provided including emergency lighting for safe building exit in the event of power failure.</p> <p>10.123.5. Adequate potable water to be provided during all phases of the project.</p> <p>10.123.6. Suitable lighting to be provided including emergency lighting for safe building exit in the event of power failure.</p> <p>10.123.7. PPE for operations and maintenance staff to be suitable for the weather conditions.</p>			
10.124. Human Health - exposure to psychological stress	Minimise exposure to psychological stress	<p>10.124.1. Staff rotation to other activities within the site may be necessary.</p> <p>10.124.2. Performance monitoring of inspections / maintenance tasks in particular will be necessary.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer
10.125. Human Health - exposure to ergonomic stress	Minimise exposure to ergonomic stress	<p>10.125.1. Training in lifting techniques.</p> <p>10.125.2. Training in working at heights.</p> <p>10.125.3. If equipment is at height (see OHS Act General Safety Regulation 6), ensure suitable safe</p>	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. ▪ Conduct audits of the signed attendance registers. 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure that all new staff are inducted. ▪ Monthly 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		(electrically and physically) ladders / harnesses etc. are available. 10.125.4. Working at height procedure to be in place.	<ul style="list-style-type: none"> Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> Prior to operations 	
10.126. Human and Equipment Safety - exposure to fire radiation	Minimise exposure to fire radiation	<p>10.126.1. Grass cutting and fire breaks around the BESS installations to prevent veld fires. No combustible materials to be stored in or near the batteries or electrical infrastructure. Separation of site diesel tank, transformers from BESS and vice versa.</p> <p>10.126.2. There are BESS design codes from the USA and standards of practice that can be used e.g., UL9540, NFPA 855 and DNV GL RP 43.</p> <p>10.126.3. Detailed FMEA/Hazop/Bowtie to done during design at the component level and system levels. Safety integrity level rating of equipment (failure probably) with suitable redundancy if required. Site Acceptance Testing as part of commissioning of each unit and the overall system. Abuse tests conducted by supplier.</p> <p>10.126.4. BMS should be checking individual cell voltage as well as stack, module, container, system voltages/current etc. BMS tripping the cell and possibly the stack/building unit or</p>	<ul style="list-style-type: none"> Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> Ongoing 	<ul style="list-style-type: none"> Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>module/rack/container if variations in voltage. Diagnostics easily accessible. Diagnostics able to distinguish cell from stack or cell from module faults. Protective systems are only as good as their reliability and functionality testing is important, e.g., testing that all battery trips actually work. Fire resistant barrier between the batteries and the PCS side if in the same container, or separate containers.</p> <p>10.126.5. As per SANS Standards, suitable ingress protection level provided for electrical equipment, e.g., IP55 - 66. If air cooling into container, suitable dust filters to be provided. Smoke detectors linked to BMS & alerts in control room.</p> <p>10.126.6. Effects of battery aging to be considered. Solid state battery life starts to be impacted above 40 deg C and significant impacts above 50 deg C with thermal run away starting at 65-70 deg C. BMS trips system at 50 deg C. Temperature monitoring to be in place. Regular infrared scanning. Data needs to be stored for trend analysis.</p> <p>10.126.7. Data indicates an event frequency of 0.001 per installation and with 100 units this would mean an event once 10 years, i.e., a low probability event.</p>			

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			Methodology	Frequency	Responsibility
		<p>10.126.8. Most events will be small not resulting in injuries, but this is possible if the event is not controlled.</p> <p>10.126.9. Protective systems functionality testing.</p> <p>10.126.10. Prior to commencement of cold commissioning, emergency plan from transport and construction phase to be extended to operational phase and to include the hazards of the electrically live system. Procedure to address solid state container fires - extinguishing, ventilating, entering as appropriate or not. PPE for container firefighting include fire retardant, chemically resistant, nitrile gloves, antistatic acid resistant boots, full face shields, BA sets.</p> <p>10.126.11. A planned fire response to prevent escalation to an explosion or an environmental event.</p> <p>10.126.12. Suitable supply of fire extinguishing medium and cooling medium</p> <p>10.126.13. Consider fire water for cooling adjacent equipment – BESS units.</p> <p>10.126.14. Can use fogging nozzles to direct smoke.</p> <p>10.126.15. Ensure procedures in place for clean up after event Lingering HF</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>and other toxic residues in the soil and on adjacent structures.</p> <p>10.126.16. Procedures to be in place for IR scanning (or other suitable method) to determine if batteries are still smouldering / are sufficient cooled to handle as batteries may still be active some weeks after an event.</p> <p>10.126.17. Smoke or gas detector systems that are not part of the original battery container package, need to be linked to the main control panel for the entire system so that issues can be detected and responded to rapidly.</p> <p>10.126.18. Modern lithium container design put the PCS in another part of the container with a fire rated wall separating it from the battery. Alternately the PCS is another container altogether.</p> <p>10.126.19. VRFB building systems PCS in another area separating it from the batteries and other equipment</p>			
10.127. Human and Equipment Safety - exposure to explosion over pressures	Minimise exposure to explosion	<p>10.127.1. Electrical equipment will be specified to suit application.</p> <p>10.127.2. Emergency response plan and employee training referred to above is to be in place.</p>	<ul style="list-style-type: none"> ▪ Carry out Environmental Awareness Training with a discussion on the risks associated with the BESS. ▪ Conduct audits of the signed attendance registers 	<ul style="list-style-type: none"> ▪ Prior to operations and as required by the Environmental Manager. Ensure that all new staff are inducted. 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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			Methodology	Frequency	Responsibility
		<p>10.127.3. This is only really likely to happen due to possible inappropriate emergency response, e.g., opening containers when they may be the type that should be left to burn out.</p> <p>10.127.4. Modern state of the art containers has ventilation systems for vapours.</p> <p>10.127.5. Undertake a hazardous area classification of the inside of the container to confirm the rating of electrical equipment, due to possible leaks of electrolyte or generation of flammable gases under thermal run away. Emergency response plan and employee training referred to above is critical.</p> <p>10.127.6. Suitable training of selected emergency responders who may be called out to the facilities is critical.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Prior to operations 	
10.128. Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Minimise exposure to acute toxic chemical and biological agents	<p>10.128.1. All necessary good hygiene practices to be in place, e.g., provision of toilets, eating areas, infectious disease controls.</p> <p>10.128.2. Policies and practice for dealing with known vectors of disease such as Aids, TB, COVID 19 and others.</p> <p>10.128.3. Awareness training for persons on site, safety induction to include animal hazards.</p>	<ul style="list-style-type: none"> ▪ Conduct audits of the signed attendance registers ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Monthly ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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			Methodology	Frequency	Responsibility
		<p>10.128.4. First aid and emergency response to consider the necessary anti-venom, anti-histamines, topical medicines etc.</p> <p>10.128.5. Due to isolated locations some distance from town, the ability to treat with anti-venom and extreme allergic reactions on site is critical to mitigate the impacts</p> <p>10.128.6. Acid resistant PPE (e.g., overalls, gloves, eyeglasses) to be specified for all operations in electrolyte areas.</p> <p>10.128.7. Acid resistant PPE (e.g., overalls, gloves, eyeglasses) to be specified for all operations in electrolyte areas.</p> <p>10.128.8. PPE to be increased (e.g., full-face shield, aprons, chemical suits) for operations that involve opening equipment and potential exposure, e.g., sampling, maintenance.</p> <p>10.128.9. All operators/maintenance staff trained in the hazards of chemicals on site.</p> <p>10.128.10. Batteries contained, modules contained and all inside a container that acts as bund.</p> <p>10.128.11. Electrolyte contained, modules contained inside a building that is banded.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.128.12. Refer to fire above as all the protective measures apply to prevent toxic smoke. 10.128.13. Refer to fire above as all the measures apply to mitigate toxic smoke. 10.128.14. 24/7 helpline response. 10.128.15. Standard dangerous goods requirements for Hazmat labels. 10.128.16. All operators/maintenance staff trained in the hazards.			
10.129. Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Minimise exposure to violent release of kinetic or potential energy	10.129.1. Apart from pumps, no major moving parts during operation. 10.129.2. Maintenance equipment to be serviced and personnel suitably trained in the use thereof. 10.129.3. Normally just small vehicles on site, bakkies, grass cutting, cherry-pickers etc. Possibly large cranes if large equipment or elevated structure removed/replaced. 10.129.4. Traffic signs, rules etc. in place on site. 10.129.5. All normal working at heights, hot work permits, confined space entry, cordon off unsafe areas/works etc. to be in place. 10.129.6. Emergency response plan. 10.129.7. Civil design to take seismic activity into account.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.130. Human and Equipment Safety - exposure to electromagnetic waves	Minimise exposure to electromagnetic waves	<p>10.130.1. Codes and guidelines for electrical insulation.</p> <p>10.130.2. Suitable PPE to be specified.</p> <p>10.130.3. Low voltage equipment (e.g., batteries) separated from high voltage (e.g., transmission to grid).</p> <p>10.130.4. Ensure trained personnel and refer to guideline – IEE 1657 – 2018.</p> <p>10.130.5. Ensure compliance with Eskom Operating Regulations for high voltage systems including access control, permit to work, safe work procedures, live work, abnormal and emergency situations, keeping records.</p> <p>10.130.6. Electromagnetic fields, impact on other equipment e.g., testing devices, mobile phones – malfunction, permanent damage.</p> <p>10.130.7. Software also needs to be kept as update to date as reasonably practicable.</p> <p>10.130.8. Consider suitably located Emergency stop buttons for the facility and the other equipment on site.</p> <p>10.130.9. PPE to consider static accumulation for entering the facility, and particularly the battery containers especially after a high</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>temperature shut down where there could possibly be flammable materials.</p> <p>10.130.10. The procedures for responding to alarm and auto shut down on containers, needs to consider that there may be a dangerous environment inside and how to protect personnel who may enter to respond.</p> <p>10.130.11. Lightning strike rate in proposed development area is very high.</p> <p>10.130.12. All outside work must be stopped during thunderstorms.</p> <p>10.130.13. Lighting conductors may be required for the installation, to be confirmed during design.</p>			
10.131. Environment - emissions to air	Reduce air emissions	10.131.1. Especially after any warning alarms have gone off, but possibly even normally the container could be treated as entering a confined space and similar procedures could be in place, e.g., do not enter alone, gas testing prior to entering, ensure adequate ventilation	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.132. Environment - emissions to water	Reduce water emissions	10.132.1. Bunding under any outdoors tanks, curbing under truck offloading areas and sealed surfaces (e.g., concrete) under truck parking area is particularly important.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.132.2. Electrolyte areas fully bunded to 110% of largest tank, or more.</p> <p>10.132.3. Sewage and any kitchen liquids - containment and suitable treatment/disposal. Sewage and any kitchen liquids - containment and suitable treatment/disposal.</p> <p>10.132.4. Procedures for dealing with damaged/leaking equipment as well as clean-up of spills.</p> <p>10.132.5. Normal site practices for preventing and containing diesel/paint etc spills.</p> <p>10.132.6. Waste management plan to be in place e.g., liquid waste treatment or suitable removal and disposal will be provided.</p> <p>10.132.7. Spill clean-up procedures to be in place before bringing container on site, including spill kits – non-combustible materials, hazmat disposal.</p> <p>10.132.8. The National Environment Management Act (NEMA) has a list of substances with Reportable spill Quantities, ensure compliance with this.</p> <p>10.132.9. Process controls in place to prevent contamination and deterioration of electrolyte leading to excessive purging.</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.132.10. Ensure proposed locations of the BESS facilities are a suitable distance from the closest water course. In the event of a major spill if this is too close it may not allow time for mitigation to be taken. Adequate secondary and possibly tertiary containment systems may then be needed on site.			
10.133. Environment - emissions to earth	Reduce emissions earth	10.133.1. Implement waste segregation (e.g., electronic equipment, chemicals, domestic) and management on the site.	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.134. Environment - waste of resources e.g., water, power etc	Reduce waste of resources	10.134.1. Water usage to be monitored on site. 10.134.2. Handling protocols to be provided by supplier of batteries. 10.134.3. Handling protocols to be provided by supplier of electrolyte. 10.134.4. Water management plan and spill containment plans to be in place. 10.134.5. Investigate end of Life plan for solid state batteries - reuse/recovery/reconditioning. 10.134.6. Similarly, for decommissioned containers – reuse/recovery / repurpose	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.135. Public - Aesthetics	Reduce aesthetic impacts	10.135.1. Refer to Visual Impact Assessment which is to include the	<ul style="list-style-type: none"> ▪ Monitor if spillages have taken place and if so, are removed correctly. Monitor 	<ul style="list-style-type: none"> ▪ During spills 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>BESS installation once design details are available.</p> <p>10.135.2. Confirm any height limitations for VRFB BESS building (if utility scale).</p>	<p>waste disposal slips and waybills via site audits and record non-compliance and incidents.</p>		
10.136. Investors - Financial	Minimise financial risk	<p>10.136.1. Design by experienced contractors using internationally recognized and proven technology.</p> <p>10.136.2. Project management with deviation monitoring.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer
10.137. Employees and investors - Security	Maximise security	<p>10.137.1. Fencing around electrical infrastructure to SANS standard and Eskom Guidelines.</p> <p>10.137.2. Consider motion detection lights and CCTV.</p> <p>10.137.3. The hazardous nature of the electrical and battery equipment should be clearly indicated – e.g., Skull and Cross Bones or other signs.</p> <p>10.137.4. Isolated location both helps and hinders security.</p> <p>10.137.5. Night lighting to be provided both indoors and outdoors where necessary.</p> <p>10.137.6. Cyber security needs monitoring.</p> <p>10.137.7. Remote access to system needs to be negotiated and controlled.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.137.8. Password controls, levels of authority etc. Protection of the National Electricity Grid from Cyber-attacks accessing through the BESS.</p> <p>10.137.9. Cyber emergency procedures – should be in place prior to commissioning.</p>			
10.138. Emergencies	Minimise risk of emergencies	<p>10.138.1. All safety measures listed above.</p> <p>10.138.2. Emergency procedures need to be practiced prior to commencement of operations.</p> <p>10.138.3. Escape doors should swing open outwards and not into the container. Doors should be able to be hooked open when persons are inside the container, i.e., they should not be automatically self-closing.</p> <p>10.138.4. More than one exit from buildings.</p> <p>10.138.5. Storage of spare batteries (e.g., in stores on site or elsewhere) also needs to consider possible thermal run away.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.139. Investors - Legal	Minimise the risk of legal action	<p>10.139.1. Use only internationally reputable battery suppliers who comply with all known regulations/guideline at the time of purchasing.</p> <p>10.139.2. Ensure only state of the art battery systems are used and not old</p>	<ul style="list-style-type: none"> ▪ Ensure that this is undertaken prior to operations via onsite inspections. 	<ul style="list-style-type: none"> ▪ Prior to operations 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		technologies prone to fires/explosions etc.			
C.9. WASTE MANAGEMENT					
10.140. Pollution of the surrounding environment as a result of the handling, temporary storage and disposal of solid waste (general and hazardous).	Reduce soil and groundwater contamination as a result of incorrect storage, handling and disposal of general and hazardous waste.	10.140.1. Sufficient waste collection bins and skips (or similar) should be provided at the PV facility. Waste collection bins and skips should be covered with suitable material and correctly labelled, and should be kept in a designated, demarcated area, where access control is monitored and managed.	<ul style="list-style-type: none"> ▪ Monitor waste generation and collection throughout the operational phase. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.2. Segregation of hazardous waste from general waste to be in place. Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types.	<ul style="list-style-type: none"> ▪ On-site inspection of waste segregation. ▪ Control of waste management practices throughout operational phase. 	<ul style="list-style-type: none"> ▪ Weekly ▪ Weekly 	<ul style="list-style-type: none"> ▪ Facility Manager ▪ Facility Manager
		10.140.3. General waste and hazardous waste should be removed from the site on a regular basis and disposed of at an appropriate, licenced waste disposal facility. Hazardous waste should be removed by an approved waste management Contractor. General solid waste could be removed from the site by municipal services. Waste disposal slips or waybills should be kept on file for auditing purposes as proof of disposal, as applicable	<ul style="list-style-type: none"> ▪ Inspection of the waste storage area. ▪ Monitor via site audits and record non-compliance and incidents. Facility Manager to monitor and audit disposal slips. 	<ul style="list-style-type: none"> ▪ Daily ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.140.4. Ensure that the PV facility is kept clean at all times and that operational personnel are made aware of correct waste disposal methods.	<ul style="list-style-type: none"> ▪ Conduct training for all operational personnel. ▪ Monitor the state of PV facility via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Once-off during operations and ensure that all new staff are inducted. ▪ Daily 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.5. No solid waste may be burned or buried on site.	<ul style="list-style-type: none"> ▪ Monitor via site audits and record non-compliance and incidents. 	<ul style="list-style-type: none"> ▪ Daily 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.6. Waste amounts shall be recorded on a monthly basis.	<ul style="list-style-type: none"> ▪ Waste amounts to be documented. 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.7. All operational waste (concrete, steel, rubbles etc.) to be removed from the site and waste hierarchy of prevention, as the preferred option, followed by reuse, recycling, recovery must be implemented, where possible.	<ul style="list-style-type: none"> ▪ Waste removal and disposal to be monitored 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.8. Other non-hazardous solid waste (e.g., packaging material) to be disposed of at a licensed landfill.	<ul style="list-style-type: none"> ▪ Waste removal and disposal to be monitored 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.9. All liquid waste (used oil, paints, lubricating compounds and grease) to be packaged and disposed of by appropriate means.	<ul style="list-style-type: none"> ▪ Waste removal and disposal to be monitored 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
		10.140.10. Adequate containers for the cleaning of equipment and materials	<ul style="list-style-type: none"> ▪ Waste removal and disposal to be monitored 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		(paint, solvent) must be provided as to avoid spillages.			
		10.140.11. Wastewater from operations and painting activities must be collected in a designated container and disposed of at a suitable disposal point off site.	<ul style="list-style-type: none"> ▪ Waste removal and disposal to be monitored 	<ul style="list-style-type: none"> ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
C.10. HUNTING PRACTICES ON ADJACENT FARMS					
10.141. Potential impact on operational activities and personnel as a result of hunting practices on adjacent farms.	To ensure safety of operational activities and personnel as a result of hunting operations on adjacent farms.	<p>10.141.1. Ensure that an open communication strategy is created and maintained between the Project Developer and owners (or managers) of the adjacent farms where hunting takes place in order to ensure that the Project Developer are made aware of planned hunts.</p> <p>10.141.2. Ensure that operational personnel are made aware of the planned hunts and are trained on the necessary protocols to be taken.</p>	<ul style="list-style-type: none"> ▪ Monitor and record the notifications received from the owners (or managers) of the adjacent farms where hunting takes place. ▪ Carry out Environmental Awareness Training and ensure that safety aspects are discussed in terms of hunting operations on adjacent farms. Conduct audits of the signed attendance registers. ▪ Carry out random inspections to ensure that planned hunts are being communicated to the Project Developer and that operational personnel are being duly informed. 	<ul style="list-style-type: none"> ▪ On-going ▪ Once-off at the commencement of operations and ensure that all new staff are inducted ▪ Monthly 	<ul style="list-style-type: none"> ▪ Facility Manager
C.11. BATS					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.142. Potential impact on bats as a result of operational activities.	To minimize potential impacts on any bats during the operational phase.	10.142.1. Any signs of bat collisions / fatalities are to be recorded during the operational phase.	<ul style="list-style-type: none"> ▪ Record any signs of bat collisions / fatalities and report it to the necessary specialists. 	<ul style="list-style-type: none"> ▪ Weekly and as required 	<ul style="list-style-type: none"> ▪ Environmental Manager
C.12 GEOTECHNICAL IMPACTS					
10.143. Displacement of geologic materials leading to increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion.	Minimise erosion	<p>10.143.1. Install drainage to divert stormwater away from activities, roads/tracks, structures, where required.</p> <p>10.143.2. Generic management for typical infrastructure of the proposed development, including:</p> <p>10.143.3. Stormwater Management Plan must be developed in the preconstruction phase and should detail the stormwater structures and management interventions that must be installed to manage the increase of surface water flows directly into any natural systems, where possible and lawful. Effective stormwater management must include effective stabilisation (e.g. gabions and Reno mattresses) of exposed soil etc.</p> <p>10.143.4. 2. Suitable stormwater management systems must be installed along roads and other areas and monitored during the first few months of use. Any erosion / sedimentation must be resolved through any additional interventions that may be necessary (e.g.,</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>extension, energy dissipaters, spreaders, etc.).</p> <p>10.143.5. 3. Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments.</p> <p>10.143.6. 4. No regular maintenance activities to take place outside of the authorised footprint and all vehicles to remain on authorised roads and tracks.</p>			
10.144. Contamination of geologic materials as a consequence of typical maintenance activities, as example, washing of solar panels, or spillages associated with battery energy storage facilities.	Minimise contamination of geologic materials	<p>10.144.1. During the execution of the operations, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained;</p> <p>10.144.2. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover/bunding. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained.</p> <p>10.144.3. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.</p> <p>10.144.4. If spillages occur, they should be contained and removed as</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.			
C.13 GEOHYDROLOGY IMPACTS					
10.145. Ground water contamination by means of electrolyte leakage and mismanaged solar panel maintenance	Minimise the potential of ground water contamination	<p>10.145.1. Electrolyte spillage to be mitigated through leak detection, double containment and suitably designed bunding for the structure, approved by a qualified professional.</p> <p>10.145.2. BESS should be buffered 50 m from existing boreholes, structures and public roads as this could potentially avoid mild impacts with regards to container fires and case explosions. Adhering hereto, this might suppress ground water contamination in the case of an accident.</p> <p>10.145.3. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal should be obtained and retained on file for auditing purposes.</p> <p>10.145.4. Maintenance of solar panels to be closely monitored and the use of hazardous chemical products to be</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>avoided when solar panels are cleaned.</p> <p>10.145.5. Recycled water for maintenance purposes should be of such a quality that it would not jeopardise underground resources.</p> <p>10.145.6. Groundwater quality monitoring to be done during project operation in order to identify possible ground water contamination.</p>			
D. DECOMMISSIONING PHASE					
D.1. AGRICULTURE AND SOILS IMPACTS					
10.146. Erosion	That vegetation clearing does not pose a high erosion risk.	10.146.1. Maintain where possible all vegetation cover and facilitate re-vegetation of denuded areas throughout the site, to stabilise disturbed soil against erosion.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to record the occurrence of and re-vegetation progress of all areas that require re-vegetation. 	<ul style="list-style-type: none"> ▪ Every 4 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved. 	<ul style="list-style-type: none"> ▪ ECO
10.147. Erosion	That disturbance and existence of hard surfaces causes no erosion on or downstream of the site.	10.147.1. Implement an effective system of storm water run-off control, where it is required - that is at any points where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.	<ul style="list-style-type: none"> ▪ Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control system and to specifically record the occurrence of any erosion on site or downstream. Corrective action must be implemented to the run-off 	<ul style="list-style-type: none"> ▪ Every 2 months during the decommissioning phase, and then every 6 months after completion of decommissioning, until final sign-off is achieved. 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			control system in the event of any erosion occurring.		
10.148. Topsoil loss	That topsoil loss is minimised	10.148.1. If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface.	<ul style="list-style-type: none"> ▪ Record GPS positions of all significant occurrences (that is an area of greater than 25 square metres) of below-surface soil disturbance (e.g., excavations). Record the date of topsoil stripping and replacement. Check that topsoil covers the entire disturbed area. 	<ul style="list-style-type: none"> ▪ As required, whenever areas are disturbed. 	<ul style="list-style-type: none"> ▪ ECO
D.2. VISUAL IMPACTS					
10.149. Vehicles and equipment required for decommissioning will alter the natural character of the study area and expose visual receptors to visual impacts.	Minimise exposure of visual receptors to impacts associated with decommissioning.	<p>10.149.1. Carefully plan to minimize the decommissioning period and avoid delays.</p> <p>10.149.2. All infrastructure that is not required for post-decommissioning use should be removed.</p> <p>10.149.3. All cleared areas should be rehabilitated as soon as possible.</p> <p>10.149.4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</p> <p>10.149.5. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</p>	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority. 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily ▪ Quarterly 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.149.6. Rehabilitate access roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.	<ul style="list-style-type: none"> ▪ Monitor rehabilitated areas quarterly for at least a year following decommissioning and implement remedial action as and when required. 		
10.150. Decommissioning activities may be perceived as an unwelcome visual intrusion.	Reduce visual intrusion of decommissioning activities.	<p>10.150.1. Carefully plan to minimize the decommissioning period and avoid delays.</p> <p>10.150.2. All infrastructure that is not required for post-decommissioning use should be removed.</p> <p>10.150.3. All cleared areas should be rehabilitated as soon as possible.</p> <p>10.150.4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</p> <p>10.150.5. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</p>	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority. ▪ Monitor rehabilitated areas quarterly for at least a year following decommissioning and implement remedial action as and when required. 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.151. Dust emissions and dust plumes from increased traffic on the gravel roads serving the decommissioning site may evoke negative sentiments from surrounding viewers.	To reduce the effect of dust and noise from trucks on the surrounding landscape and receptors.	<p>10.151.1. Carefully plan to minimize the decommissioning period and avoid delays.</p> <p>10.151.2. All infrastructure that is not required for post-decommissioning use should be removed.</p> <p>10.151.3. All cleared areas should be rehabilitated as soon as possible.</p> <p>10.151.4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</p> <p>10.151.5. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</p> <p>10.151.6. Rehabilitate access roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.</p>	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority. 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Contractor and ECO
10.152. Surface disturbance during decommissioning would expose bare soil (scarring) which could visually contrast with the surrounding environment.	Minimise surface disturbance during decommissioning.	<p>10.152.1. Carefully plan to minimize the decommissioning period and avoid delays.</p> <p>10.152.2. All infrastructure that is not required for post-decommissioning use should be removed.</p> <p>10.152.3. All cleared areas should be rehabilitated as soon as possible.</p>	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Ensure that procedures for the removal of structures and stockpiles during the 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.152.4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</p> <p>10.152.5. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</p> <p>10.152.6. Rehabilitate access roads and servitudes not required for the post-decommissioning use of the site. If necessary, an ecologist should be consulted to give input into rehabilitation specifications.</p>	<p>decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority.</p> <ul style="list-style-type: none"> ▪ Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required. 		
<p>10.153. Temporary stockpiling of soil during decommissioning may alter the flat landscape. Wind blowing over these disturbed areas could result in dust which would have a visual impact.</p>	<p>To reduce visual impacts due to dust resulting from the temporary stockpiling of soil during decommissioning.</p>	<p>10.153.1. Carefully plan to minimize the decommissioning period and avoid delays.</p> <p>10.153.2. All infrastructure that is not required for post-decommissioning use should be removed.</p> <p>10.153.3. All cleared areas should be rehabilitated as soon as possible.</p> <p>10.153.4. Ensure that dust suppression procedures are maintained on all gravel access roads throughout the decommissioning phase.</p> <p>10.153.5. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</p>	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority. 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.154. Decommissioned infrastructure left on the site may be visually intrusive.	Reduce visual intrusion caused by decommissioned infrastructure left on site.	<p>10.154.1. Carefully plan to minimize the decommissioning period and avoid delays.</p> <p>10.154.2. All infrastructure that is not required for post-decommissioning use should be removed.</p> <p>10.154.3. All cleared areas should be rehabilitated as soon as possible.</p> <p>10.154.4. Maintain a neat decommissioning site by removing rubble and waste materials regularly.</p>	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures and ensure good housekeeping is maintained. Record and report any non-compliance. ▪ Ensure that procedures for the removal of structures and stockpiles during the decommissioning phase are implemented, including recycling of materials and rehabilitation of the site to a visually acceptable standard as prescribed in a rehabilitation plan, and signed off by the delegated authority. 	<ul style="list-style-type: none"> ▪ Daily ▪ Daily 	<ul style="list-style-type: none"> ▪ Contractor and ECO ▪ Contractor and ECO
D.3. HERITAGE IMPACTS (ARCHAEOLOGY AND CULTURAL LANDSCAPE)					
10.155. Visible landscape scarring	Minimise landscape scarring	10.155.1. Ensure disturbance is kept to a minimum and does not exceed project requirements. Rehabilitate areas not needed during operation.	<ul style="list-style-type: none"> ▪ Monitoring of surface clearance relative to approved layout 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ As required 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO
10.156. Potential impacts to the cultural landscape	Minimise potential impacts to the cultural landscape	<p>10.156.1. Employ best practice.</p> <p>10.156.2. Minimise the disturbance footprint.</p> <p>10.156.3. Employ dust suppression measures.</p> <p>10.156.4. Ensure effective rehabilitation of all areas.</p>	<ul style="list-style-type: none"> ▪ Ensure mitigation measures are adhered to. 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ As required 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.157. Damage or destruction of archaeological sites or graves	Rescue information, artefacts or burials before extensive damage occurs	<p>10.157.1. Pre-construction survey of any as yet unsurveyed areas.</p> <p>10.157.2. Any additional changes to the layout should be subjected to a heritage walkdown prior to development;</p> <p>10.157.3. A qualified archaeologist must undertake the above-mentioned heritage walkdown and must submit a walkdown report to SAHRA for comments prior to the commencement of development;</p>	<ul style="list-style-type: none"> ▪ Appoint archaeologist to conduct survey 	<ul style="list-style-type: none"> ▪ Once-off 	<ul style="list-style-type: none"> ▪ Project developer
		<p>10.157.4. Reporting chance finds as early as possible, protect <i>in situ</i> and stop work in immediate area.</p> <p>10.157.5. If heritage resources are uncovered during the course of the development, a professional archaeologist or palaeontologist, depending on the nature of the finds, must be contracted as soon as possible to inspect the heritage resource. If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.</p> <p>10.157.6. If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments,</p>	<ul style="list-style-type: none"> ▪ Inform staff and carry out inspections of excavations 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ Whenever on site (at least weekly) 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA (Sityhilelo Ngcatsha/Natasha Higgitt 021 202 8660) must be alerted as per section 35(3) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.</p> <p>10.157.7. If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Ngqabutho Madida 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.</p>			
		<p>10.157.8. Regular monitoring of the development footprint by the ECO to implement the Chance Find Procedure for heritage and palaeontology resources in case heritage resources are uncovered during the course of construction.</p>	<ul style="list-style-type: none"> ▪ Inform staff and carry out inspections of excavations 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ Whenever on site (at least weekly) 	<ul style="list-style-type: none"> ▪ ECO
		<p>10.157.9. Recorded heritage features should be indicated on development plans and construction crews should be made aware that these sites</p>	<ul style="list-style-type: none"> ▪ Monitoring of heritage features and buffer zones during construction 	<ul style="list-style-type: none"> ▪ Ongoing basis ▪ Whenever on site (at least weekly) 	<ul style="list-style-type: none"> ▪ Construction Manager or Contractor ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>should be avoided with the applicable buffer zones.</p> <p>10.157.10. Once construction commences all aspects of the Project should be carried out within the approved footprint so as to avoid impacts to heritage resources.</p> <p>10.157.11. A 30m buffer must be maintained around all the identified burial grounds (VT101, VT010 and site 881) along with the Stone Cairn (VT005).</p>			
D.4. PALAEOLOGY IMPACTS					
10.158. Damage or destruction of palaeontological materials.	Safeguarding, recording, and sampling of palaeontological materials encountered or exposed during decommissioning (Chance Fossil Finds)	<p>10.158.1. The ECO should be made aware of the possibility of important fossil remains (bones, teeth, petrified wood, plant-rich horizons, fossil termitaria etc.) being found or unearthed during the decommissioning phase of the development. Ensure that monitoring of all major cleared sites for fossil remains is undertaken on an ongoing basis by the ECO during the decommissioning phase. Refer to the Chance Fossil Finds Procedure (Appendix C of this EMP).</p> <p>10.158.2. Significant fossil finds should be safeguarded and reported at the earliest opportunity to the South African Heritage Resources Agency (SAHRA) for recording and sampling by a professional</p>	<ul style="list-style-type: none"> ▪ Regular visual inspection of substantial excavations and cleared areas for fossil remains. Chance fossil finds to be safeguarded (site taped-off or fossils set aside) and reported to SAHRA for possible mitigation. 	<ul style="list-style-type: none"> ▪ Ongoing during the construction phase 	<ul style="list-style-type: none"> ▪ ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		Palaeontologist (Contact details: 111 Harrington Street, Cape Town, 8001. PO Box 4637, Cape Town, 8000. Tel: 021 462 4502. Fax: 021 462 4509. Email: info@sahra.org.za).			
		10.158.3. Recording and judicious sampling of exceptional new fossil material and relevant geological data (e.g., stratigraphy, taphonomy) from the development footprint must be undertaken. Professional mitigation should conform to best practice. The Palaeontologist concerned will need a Fossil Collection Permit from SAHRA.	<ul style="list-style-type: none"> ▪ Standard palaeontological recording and collection methods (GPS / photos / field notes / careful wrapping of specimens for transport). 	<ul style="list-style-type: none"> ▪ Following report of significant new fossil finds by ECO 	<ul style="list-style-type: none"> ▪ Professional Palaeontologist assisted by ECO
		10.158.4. Curation of fossil specimens at an approved repository (e.g., museum).	<ul style="list-style-type: none"> ▪ Cataloging and safe storage of fossils plus key field data in an approved repository (museum / university). 	<ul style="list-style-type: none"> ▪ Following mitigation 	<ul style="list-style-type: none"> ▪ Professional Palaeontologist
		10.158.5. Final technical report on palaeontological heritage within study area submitted to SAHRA.	<ul style="list-style-type: none"> ▪ Minimum reporting requirements specified by the heritage resources agency (e.g., SAHRA). 	<ul style="list-style-type: none"> ▪ Following mitigation and preliminary analysis of fossil finds 	<ul style="list-style-type: none"> ▪ Professional Palaeontologist
D.5. TERRESTRIAL BIODIVERSITY AND SPECIES IMPACTS⁴					
10.159. Loss of habitat	Minimise habitat loss	10.159.1. The loss of vegetation is unavoidable within the approved	<ul style="list-style-type: none"> ▪ Ensure that mitigation measures are enforced. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ The ECO should monitor and

⁴ Management actions relating to alien invasive vegetation management are covered in Section 4 of this EMPr.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		layout development footprint, but sensitive areas must be avoided. 10.159.2. A rehabilitation plan is required to restore each habitat to a natural state after decommissioning.			report to the Holder of the EA.
10.160. Clearance of vegetation	Minimise disturbance and clearance of vegetation.	10.160.1. Unnecessary clearance of natural vegetation should be avoided.	<ul style="list-style-type: none"> ▪ Ensure that mitigation measures are enforced. 	<ul style="list-style-type: none"> ▪ Every three months 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.
10.161. Impact on animal behaviour	Avoid or minimise impacts that could potentially affect animal behaviour.	10.161.1. Proper waste management procedures should be put in place.	<ul style="list-style-type: none"> ▪ Ensure compliance with these mitigation measures. 	<ul style="list-style-type: none"> ▪ Impact on animal behaviour 	<ul style="list-style-type: none"> ▪ Avoid or minimise impacts that could potentially affect animal behaviour.
10.162. Increased alien species invasion	Avoid invasion by alien species.	10.162.1. Compile an alien and invasive species control and monitoring plan in terms of NEMBA. 10.162.2. Implement a monitoring program for the early detection of alien invasive plant species and employ a control program to combat declared alien invasive plant species.	<ul style="list-style-type: none"> ▪ Ensure implementation of a monitoring and control programme to combat alien invasive plants. 	<ul style="list-style-type: none"> ▪ Every three months 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.
D.6. AQUATIC BIODIVERSITY AND SPECIES IMPACTS					
10.163. Operation of equipment and machinery 10.164. Clearing vegetation for access roads	<ul style="list-style-type: none"> ▪ Minimise impact of equipment and machinery on aquatic environment 	10.167.1. A suitable rehabilitation and closure plan must be developed for the project. 10.167.2. It is recommended that all infrastructure installed is effectively	<ul style="list-style-type: none"> ▪ Ensure mitigation measures are complied with 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ The ECO should monitor and report to the Holder of the EA.

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<p>10.165. Stockpiling of and placement materials</p> <p>10.166. Excavating/shaping landscape</p> <p>10.167. Final landscaping, backfilling and postconstruction rehabilitation</p>	<ul style="list-style-type: none"> ▪ Minimise clearance of vegetation for access roads ▪ Reduce risk of hazardous stockpiling and placement of materials ▪ Minimise excavation 	<p>decommissioned and removed from the site.</p> <p>10.167.3. All contractors and staff are to be familiarised with the method statement and have undergone an induction / training on the location of sensitive No-Go areas and basic environmental awareness using the mitigation provided in this report.</p> <p>10.167.4. Access routes into or adjacent to the wetlands must make use of existing road ways and crossings where possible;</p> <p>10.167.5. Areas where construction is to take place must be clearly demarcated. Any areas not demarcated must be avoided;</p> <p>10.167.6. Storm-water generated from roadways must be captured and buffered, where flow velocities are to be significantly reduced before discharge into the environment.</p> <p>10.167.7. Storm-water verges as well as other denuded areas must be grassed (re-vegetated) with local indigenous grasses to protect against erosion;</p> <p>10.167.8. Any materials excavated must not be deposited in the wetlands or areas where it is prone to being washed downstream or impeding natural flow;</p>			<ul style="list-style-type: none"> ▪ Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.167.9. The installation of sedimentation/erosion protection measures must be implemented before the start of construction, e.g., several rows of silt traps and fences (this is particularly important in the access roads leading or adjacent to the watercourses);</p> <p>10.167.10. Stockpiling or storage of materials and/or waste must be placed beyond the defined buffers in this report for each respective activity;</p> <p>10.167.11. No vehicles shall enter watercourse buffer zones outside of construction footprints;</p> <p>10.167.12. No vehicles shall be serviced on site; a suitable workshop with appropriate pollution control facilities should be utilised offsite;</p> <p>10.167.13. Hydrocarbons for refuelling purposes must be stored in a suitable storage device on an impermeable surface outside of the delineated wetland buffer zone;</p> <p>10.167.14. Disturbed areas must be re-vegetated after completion of the phase;</p> <p>10.167.15. A three-month timeframe for the initiation of this action;</p> <p>10.167.16. Ripping of the soils should occur in two directions; and</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.167.17. Removed vegetation and topsoil can be harvested and applied here.</p> <p>10.167.18. Drainage channels constructed for the access roads must be constructed so as not to result in erosion;</p> <p>10.167.19. An inspection of the drainage channels must be completed within 3 months following the end of activities and within a month after the first rainfall event which exceeds 50mm. Should excessive sediment be transported down the channels it is recommended that sediment screens are implemented;</p> <p>10.167.20. Sediment screens must be inspected, maintained and cleared every month or after significant rainfall (>150mm/24hrs);</p> <p>10.167.21. An alien vegetation removal and management plan must be implemented along the verges of the roads and crossing points;</p> <p>10.167.22. General storm-water management practices should be included in the design phase and implemented during the construction phase of this project; and</p> <p>10.167.23. Following the completion of the phase, all construction materials and debris should be removed and</p>			

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		disposed of in a suitable off-site area. An inspection should be completed within a week after the phase is completed.			
10.168. Alteration in flow regime	Avoid placement of infrastructure within wetland and wetland buffer zones.	<p>10.168.1. The proposed layout should be revisited, and every effort made place the photovoltaic structures outside of the wetland and wetland buffer zone so that during decommissioning these sensitive ecosystems are not disturbed</p> <p>10.168.2. Do not increase hardened surfaces and compaction of the soils after the removal of the solar panels and related infrastructure.</p> <p>10.168.3. Rehabilitation of exposed soil surfaces should commence as soon as practical after completion of removal of the solar panels and related infrastructure.</p> <p>10.168.4. Culverts must remain in place and must not be removed if the given road is not removed during the decommissioning phase.</p> <p>10.168.5. Vehicle movement should be restricted to designated decommissioning areas to prevent the increase in hardened surfaces and subsequent increase in runoff.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going ▪ Once off prior to the commencement of operations. 	ECO and Contractor
10.169. Changes in sediment regimes	Avoid placement of infrastructure within	10.169.1. The proposed layout should be revisited, and every effort made place the photovoltaic structures	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the 	<ul style="list-style-type: none"> ▪ On-going 	ECO and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
	wetland and wetland buffer zones.	<p>outside of the wetland and wetland buffer zones.</p> <p>10.169.2. Vehicle movement should be restricted to the minimum that is required for decommissioning. Unnecessary movement of vehicles will increase the degradation of paths and dirt roads leading to increased erosion risk.</p> <p>10.169.3. Progressive rehabilitation must occur. Rehabilitation has to take place as soon as decommissioning commences to prevent soil erosion.</p> <p>10.169.4. Monitoring should be done to ensure that sediment pollution is timeously dressed.</p>	operational phase and record any non-compliance.		
10.170. Introduction and spread of alien vegetation	Reduce the spread of alien invasive species	<p>10.170.1. invasive species within the areas affected by the decommissioning and take immediate corrective action where invasive species are observed to establish.</p> <p>10.170.2. Undertake an Alien Plant Control Plan which specifies actions and measurable targets</p> <p>10.170.3. Retain vegetation and soil in position for as long as possible, removing it immediately ahead of decommissioning /earthworks in that area and returning it where possible afterwards.</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.170.4. Rehabilitation must occur concurrently with decommissioning.</p> <p>10.170.5. The mixture of vegetation seed must be used during rehabilitation. The mix must include annual and perennial species, pioneer species, species which are indigenous to the area to ensure there is no ecological imbalance in the area.</p> <p>10.170.6. Long-term monitoring for the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish, as specified in the Alien Vegetation Management Plan.</p>			
10.171. Loss and disturbance of riparian/watercourse habitat and vegetation	Minimise loss of riparian habitat and vegetation	<p>10.171.1. Amend SEF designs to exclude wetlands as well as buffer areas.</p> <p>10.171.2. Vehicle movement should be restricted to the minimum that is required for decommissioning.</p> <p>10.171.3. Rehabilitation of decommissioned areas must commence concurrently with decommissioning.</p> <p>10.171.4. Monitor the establishment of alien invasive species within the areas affected by the decommissioning and take immediate corrective action where</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>invasive species are observed to establish.</p> <p>10.171.5. Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed.</p> <p>10.171.6. Decommissioning activities should not impact on rehabilitated or naturally vegetated areas.</p>			
10.172. Alteration in water quality due to pollution	Reduce the changes in water resources and surface water in terms of water quality	<p>10.172.1. Amend SEF designs to exclude wetlands as well as buffer areas.</p> <p>10.172.2. Provision of adequate sanitation facilities located outside of the watercourse or its associated buffer zone.</p> <p>10.172.3. Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer.</p> <p>10.172.4. Ensure that no decommissioning activities impact on the watercourse or buffer area. This includes edge effects.</p> <p>10.172.5. Control of waste discharges and do not allow dirty water from decommissioning activities to enter the watercourse.</p> <p>10.172.6. Regular independent water quality monitoring should form part of</p>	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>decommissioning procedures in order to identify pollution.</p> <p>10.172.7. Treatment of pollution identified should be prioritized according to best practice guidelines.</p> <p>10.172.8. Develop norms and practices for the treatment of spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills.</p> <p>10.172.9. Appoint a reliable contractor for the removal of refuse during the operational phase.</p>			
10.173. Loss of aquatic biota	Minimise loss of aquatic biota	10.173.1. This impact is not easily mitigated. Further loss in diversity can be minimised by following the mitigation measures mentioned above	<ul style="list-style-type: none"> ▪ Ensure that this is taken into consideration during the operational phase and record any non-compliance. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ ECO and Environmental Manager
D.7. AVIFAUNA IMPACTS					
10.174. Continued disturbance due to decommission activities (use of vehicles, lights etc.)	Prevent the disturbance of foraging and breeding behaviour	10.174.1. Adopt temporal avoidance strategies to prevent executing the most intensive activities generating noise and dust during the most sensitive period between December to March when it is the most likely time that waterbirds will be attracted the PAOI due to the presence of water. Therefore, intensive activities (e.g. trenching for the underground cable) should be scheduled as far as practically possible between April-	<ul style="list-style-type: none"> ▪ Implementation temporal avoidance strategies. ▪ Ensure that construction personnel are made aware of the impacts of light pollution and ensure that downward facing hoods are effective in reducing light pollution. ▪ Ensure that construction personnel are made aware of the impacts of exceeding 40 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>November. Note that light activities such as normal vehicle use of the roads are not affected by this mitigation measure and these may proceed year-round.</p> <p>10.174.2. Minimise light pollution and fit external lighting with downward facing hoods.</p> <p>10.174.3. Enforce a speed limit of 40 km/h on site.</p> <p>10.174.4. If necessary apply dust-suppression measures (road wetting) to limit dust.</p>	<p>km/h on site and ensure that the speed limit is clearly indicated by signage. Report non-compliance.</p> <ul style="list-style-type: none"> ▪ Monitor the implementation of dust control mechanisms via site inspections and record and report non-compliance. 		
10.175. Habitat loss reclamation from rehabilitation activities	Prevent unnecessary habitat loss	<p>10.175.1. Remove all infrastructure not originally present prior to the construction phase</p> <p>10.175.2. Rehabilitate all areas disturbed immediately after decommission activities and removal of infrastructure</p> <p>10.175.3. Continue to implement an Alien and Invasive Plant Control Plan until the rehabilitation specialist deems it unnecessary.</p>	<ul style="list-style-type: none"> ▪ Undertake site inspections to verify that all infrastructure is removed. ▪ Ensure all areas are rehabilitated immediately. Undertake site inspections to verify. ▪ Ensure that an Alien and Invasive Plant Control Plan is implemented during site inspection. 	<ul style="list-style-type: none"> ▪ Weekly 	<ul style="list-style-type: none"> ▪ Contractor and ECO
D.8. SOCIO-ECONOMIC IMPACTS					

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.176. Social impacts associated with decommissioning	Minimise job losses	<p>10.176.1. The proponent should ensure that retrenchment packages are provided for all staff retrenched when the plant is decommissioned.</p> <p>10.176.2. All structures and infrastructure associated with the proposed facility should be dismantled and transported off-site on decommissioning.</p>	<ul style="list-style-type: none"> ▪ Verify that retrenchment practices are compliant with South African labour legislation. ▪ Verify that the Project Developer implemented succession training of locally employed staff before the plant is decommissioned. 	<ul style="list-style-type: none"> ▪ Once-off during the decommissioning phase 	<ul style="list-style-type: none"> ▪ Contractor and ECO
D.9. GEOTECHNICAL IMPACTS					
10.177. Displacement of geologic materials leading to increased unnatural hard surfaces yielding increased runoff, potentially increasing erosion.	Minimise erosion	<p>10.177.1. Only drive and park vehicles where necessary.</p> <p>10.177.2. Land rehabilitation to near natural state, i.e. removal of foundations and backfilling of any resultant voids within the soil, as well as removal of hard surfaced areas. Replacement soil should be sourced locally to ensure homogeneity.</p> <p>10.177.3. Reinstate natural topography where cut-to-fill embankments have been constructed.</p> <p>10.177.4. Implement generic environmental management procedures for infrastructure.</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
<p>10.178. Contamination of geologic materials as a consequence of typical decommissioning activities</p> <p>10.179.</p>	<p>Minimise contamination of geologic materials</p>	<p>10.179.1. During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that equipment is well maintained;</p> <p>10.179.2. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained.</p> <p>10.179.3. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.</p> <p>10.179.4. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
<p>10.180. The displacement of natural earth material and overlying vegetation leading to erosion.</p>	<p>Minimise erosion due to displacement of natural earth material and overlying vegetation</p>	<p>10.180.1. Limited excavations</p> <p>10.180.2. Vehicle and construction machinery repairs to be undertaken in designated</p>	<ul style="list-style-type: none"> ▪ Ensure that these mitigation measures are monitored on an on-going basis, and any non-compliances reported. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.180.3. areas with proper soil protection. 10.180.4. Frequent checks and conditional monitoring 10.180.5. Avoid steep slopes areas. 10.180.6. Design cut slopes according to detailed geotechnical analysis.			
10.181. Potential oil spillages due to clearance of structures.	Minimise risk of oil spillages due to clearance of structures	10.181.1. Limited excavations 10.181.2. Vehicle and construction machinery repairs to be undertaken in designated 10.181.3. areas with proper soil protection. 10.181.4. Frequent checks and conditional monitoring 10.181.5. Avoid steep slopes areas. 10.181.6. Design cut slopes according to detailed geotechnical analysis.	<ul style="list-style-type: none"> ▪ Ensure that these mitigation measures are monitored on an on-going basis, and any non-compliances reported. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor
10.182. Slope instability around structures.	Maximise slope stability around structures	10.182.1. Limited excavations 10.182.2. Vehicle and construction machinery repairs to be undertaken in designated 10.182.3. areas with proper soil protection. 10.182.4. Frequent checks and conditional monitoring. 10.182.5. Avoid steep slopes areas.	<ul style="list-style-type: none"> ▪ Ensure that these mitigation measures are monitored on an on-going basis, and any non-compliances reported. 	<ul style="list-style-type: none"> ▪ On-going 	<ul style="list-style-type: none"> ▪ Project Developer and Contractor

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		10.182.6. Design cut slopes according to detailed geotechnical analysis.			
D.10. IMPACTS RESULTING FROM THE BATTERY ENERGY STORAGE SYSTEMS (BESS)					
10.183. Human Health - chronic exposure to toxic chemical or biological agents	Minimise exposure to toxic chemicals or biological agents	10.183.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during disassembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.184. Human Health - exposure to noise	Minimise noise exposure	10.184.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during disassembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.185. Human Health - exposure to temperature extremes and/or humidity	Minimise exposure to temperature extremes and/or humidity	10.185.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during disassembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.186. Human Health - exposure to psychological stress	Minimise exposure to psychological stress	10.186.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during disassembling 	<ul style="list-style-type: none"> ▪ Project Developer
10.187. Human Health - exposure to ergonomic stress	Minimise exposure to ergonomic stress	10.187.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during disassembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.188. Human and Equipment Safety - exposure to fire radiation	Minimise exposure to fire radiation	10.188.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during disassembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.189. Human and Equipment Safety - exposure to explosion over pressures	Minimise exposure to explosion	10.189.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.190. Human and Equipment Safety - exposure to acute toxic chemical and biological agents	Minimise exposure to acute toxic chemical and biological agents	10.190.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.191. Human and Equipment Safety - exposure to violent release of kinetic or potential energy	Minimise exposure to violent release of kinetic or potential energy	10.191.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.192. Human and Equipment Safety - exposure to electromagnetic waves	Minimise exposure to electromagnetic waves	10.192.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.193. Environment - emissions to air	Reduce air emissions	10.193.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.194. Environment - emissions to water	Reduce water emissions	10.194.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.195. Environment - emissions to earth	Reduce earth emissions	10.195.1. End of Life shutdown procedure including a Risk Assessment of the specific activities involved.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		<p>10.195.2. Where possible re-purpose the solid-state batteries/containers and equipment with associated environmental impact considered.</p> <p>10.195.3. Disposal according to local regulations and other directives such as the European Batteries Directive.</p> <p>10.195.4. End of life, which is affected by temperature and time, cycles etc, should be predefined and the monitoring should be in place to determine if it has been reached.</p>			
10.196. Environment - waste of resources e.g., water, power etc	Reduce waste of resources	10.196.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer and ECO
10.197. Public - Aesthetics	Reduce aesthetic impacts	10.197.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer
10.198. Investors - Financial	Minimise financial risk	10.198.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer
10.199. Employees and investors - Security	Maximise security	10.199.1. As per construction and operational phases.	<ul style="list-style-type: none"> ▪ Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> ▪ As required during dissembling 	<ul style="list-style-type: none"> ▪ Project Developer

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
10.200. Emergencies	Minimise risk of emergencies	10.200.1. As per construction and operational phases.	<ul style="list-style-type: none"> Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> As required during disassembling 	<ul style="list-style-type: none"> Project Developer and ECO
10.201. Investors - Legal	Minimise the risk of legal action	10.201.1. Applicants should seek the opinion from a waste consultant on how to correctly dispose of hazardous waste.	<ul style="list-style-type: none"> Carry out site visits and inspections of the sites to verify the implementation of mitigation measures 	<ul style="list-style-type: none"> As required during disassembling 	<ul style="list-style-type: none"> Project Developer
D.11. WASTE MANAGEMENT					
10.202. Generation of waste due to disassembly of the solar facility.	Avoid substantial negative impacts at the decommissioning phase due to insufficient planning.	10.202.1. Suitable receptacles must be provided for the temporary storage of various waste types such as scrap metal and concrete, until it is removed to the nearest licensed landfill.	<ul style="list-style-type: none"> Audit the implementation of mitigation measures recommended for the decommissioning phase. 	<ul style="list-style-type: none"> During the decommissioning phase 	<ul style="list-style-type: none"> ECO
		10.202.2. Waste separation is encouraged and therefore receptacles should be labelled to reflect the different waste types.	<ul style="list-style-type: none"> Audit the implementation of mitigation measures recommended for the decommissioning phase. 	<ul style="list-style-type: none"> During the decommissioning phase 	<ul style="list-style-type: none"> ECO
D.12. BATS					
10.203. Potential impact on bats as a result decommissioning.	To minimize potential impacts on any bats during the decommissioning phase.	10.203.1. Any signs of bat collisions / fatalities are to be recorded during the decommissioning phase.	<ul style="list-style-type: none"> Record any signs of bat collisions / fatalities and report it to the necessary specialists. 	<ul style="list-style-type: none"> Weekly and as required 	<ul style="list-style-type: none"> ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
D.13 GEOHYDROLOGY IMPACTS					
10.204. Ground water contamination (1) by means of spillages with regards to oil, hydraulic fluids, and fuels, as well as by means of electrolyte leakage/spillage.	Minimise potential ground water contamination	<p>10.204.1. During the execution of the decommissioning, appropriate measures to prevent pollution and contamination of the environment must be implemented e.g. including ensuring that equipment is well maintained;</p> <p>10.204.2. Provision must be made for refuelling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained.</p> <p>10.204.3. Where refuelling away from the dedicated refuelling station is required, a mobile refuelling unit must be used. Appropriate ground protection such as drip trays must be used.</p> <p>10.204.4. If spillages occur, they should be contained and removed as rapidly as possible, with correct disposal procedures of the spilled material, as reported. Proof of disposal (waste disposal slips or waybills) should be obtained and retained on file for auditing purposes.</p> <p>10.204.5. Chemical ground water monitoring to be done during project decommissions in order to identify</p>	<ul style="list-style-type: none"> ▪ Ensure that these measures are taken into consideration via onsite inspections. 	<ul style="list-style-type: none"> ▪ Ongoing 	<ul style="list-style-type: none"> ▪ Project Developer and ECO

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Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
		possible ground water contamination. Implement generic environmental management procedures for infrastructure.			

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11 APPENDIX A – CV OF THE EAP

CV OF PAUL LOCHNER

Name of firm	CSIR
Name of staff	Paul Lochner
Profession	Environmental Assessment and Management
Position in firm	Manager: CSIR Environmental Management Services
Nationality	South African

BIOGRAPHICAL SKETCH

Paul Lochner is an environmental assessment practitioner (EAP) at the CSIR in Stellenbosch, with more than 28 years of experience in a wide range of environmental assessment and management studies. Paul commenced work at CSIR in 1992, after completing a B.Sc. degree in Civil Engineering and a Masters in Environmental Science, both at the University of Cape Town. His initial work at focused on wetlands and estuarine management; environmental engineering in the coastal zone; and coastal zone management plans. Since 2008, Paul has been the leader and manager of the Environmental Management Services (EMS) group within CSIR that has been at the forefront of advancing environmental assessment in South Africa. This group currently consists of approximately 10 to 20 environmental scientists, planners and engineers, with offices in Stellenbosch, Cape Town and Durban. Paul's particular experience is in environmental planning and assessment for renewable energy, electricity grid infrastructure, desalination, oil & gas, wetlands & coastal zone management, and industrial & port development. He has been closely involvement in the research and application of Strategic Environmental Assessment (SEA) in South Africa, and also has wide experience in Environmental & Social Impact Assessment, Environmental Management Programmes (EMPRs) and Environmental Screening Studies. He has been the project leader for over 40 SEAs and EIAs over the past 28 years. He also served as project leader for a suite of SEAs commissioned by the DFFE from 2014 to 2020. Paul is a Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA).

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TERTIARY EDUCATION

Year	Degree	Institution
1992	MPhil in Environmental Science	University of Cape Town
1990	BSc in Civil Engineering awarded with Honours	University of Cape Town

PROFESSIONAL REGISTRATION

- Environmental Assessment Practitioners Association of South Africa (EAPASA), Registration Number 2019/745
- Member of the International Association for Impact Assessment South Africa (IAIAsa)

EMPLOYMENT RECORD

Period	Employer	Position
1992 - current	CSIR (Stellenbosch)	Environmental scientist
2008 – current	CSIR (Stellenbosch)	Group Leader

LIST OF KEY PROJECT EXPERIENCE

Date	Project Description	Role	Client
2022-ongoing	Review of permitting and governance for the Mogalakwena Mine, Limpopo	Project leader	Anglo American Platinum
2021-ongoing	Advisory services for environmental permitting for Anglo American's Carbon Neutrality and Smart Power projects in South Africa, Namibia, Botswana and Zimbabwe	Project leader	Anglo American Platinum
2021-ongoing	Permitting strategy for innovative pilot projects for the Mogalakwena platinum mine	Project leader	Anglo American Platinum
2022	Opportunities and constraints analysis for offshore wind potential for South Africa - inventory and collation of spatial data	Project leader	World Bank
2021-2022	Environmental assessment training and support to provincial government in the independent power producer sector in the Eastern Cape province	Project leader	Dept of Economic Development, Environmental Affairs & Tourism, Eastern Cape
2021	Renewable Energy Feasibility Plan for the Atlantis Special Economic Zone, Cape Town	Lead co-leader	Atlantis Special Economic Zone
2021	Basic Assessment for 1350 MW Aardvark solar PV facilities near Copperton	Project leader	ABO Wind
2020-2021	Basic Assessments for 1575 MW Solar Photovoltaic Facilities and associated Electrical Grid Infrastructure near Touws River, Western Cape	Project leader	Veroniva

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Date	Project Description	Role	Client
2019	Independent Expert review of the ecology study as part of the EIA and EMPR for diamond prospecting at Bloemhof Dam Nature Reserve, North West province	Independent reviewer	DEA Appeals Office
2018-2019	Greater Saldanha Bay Strategic Environmental Assessment (SEA): Phase 1 Monitoring and Decision Support System	Project leader	Western Cape provincial government
2018-2019	Environmental Screening Study for a proposed 100 to 150 megalitre/day desalination facility for City of Cape Town, Phase 1: Pre-feasibility study	Project co-leader	City of Cape Town and iX Engineers
2018-2019	EIA for 150 MW wind power project in Ghana	Proposal and EIA Quality Assurance	Volta River Authority and Seljen Consult Ltd
2019	Environmental Assessment for the Kenhardt solar PV facility and electrical infrastructure (100 MW x 3), Northern Cape	Project leader	Scatec Solar Africa (Pty) Ltd
2017-2019	SEA for Wind & Solar Photovoltaic Energy development in South Africa (Phase 2)	Project reviewer	DEA & national Dept of Energy (DOE)
2017-2019	SEA for the Expansion of EGI Corridors in South Africa	Project reviewer	DEA, DOE, iGas, Eskom (national electricity utility)
2017-2019	SEA for Energy Corridors and development of a gas pipeline network for South Africa	Project reviewer	DEA, DOE, iGas, Eskom (national electricity utility)
2017-2019	SEA for Aquaculture Development in South Africa (marine and freshwater)	Project leader	DEA and national Dept of Agriculture Forestry and Fisheries (DAFF)
2018	Environmental Assessments for the Vryburg Solar project (115 MW x 3) in the Vryburg Renewable Energy Development Zone (REDZ)	Co-project manager and co-author	Veroniva & Scatec
2018	EIA for West Bank Waste Water Treatment works marine outfall pipeline, East London	Independent reviewer	WSP and Buffalo City Municipality
2017-2018	Site selection and environmental screening for a proposed 120 – 150 ML/day desalination plant for the City of Cape Town	Project leader	City of Cape Town and iX Engineers
2017-2018	EIA and EMP for Icyari Coltan Mine, Rwanda	Project reviewer	Mawarid Mining Rwanda Ltd (MMRL), UAE
2016-2017	SEA for the Square Kilometre Array radio-telescope in the Karoo, South Africa	Project leader	DEA and DST
2016-2017	SEA for Shale Gas Development in the Karoo region of South Africa	Project co-leader	DEA and other government departments
2015-2016	SEA for the development of Electrical Grid Infrastructure for South Africa	Project leader	DEA and Eskom (national electricity utility)
2017	EIA for the 75 MW x 12 solar photovoltaic energy projects near Dealesville, Free State	Project leader	Mainstream Renewable Power SA
2014-2015	EIA for Ishwati Emoyeni 140 MW wind energy project and supporting electrical infrastructure at Murraysburg, Western Cape	Project leader	Windlab South Africa

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Date	Project Description	Role	Client
2012-2015	SEA for identification of renewable energy zones for wind and solar photovoltaic projects in South Africa	Project leader	DEA and other national government departments
2012-2013	Environmental Screening Study (ESS) for a desalination plant for the City of Cape Town	Project leader	City of Cape Town & WorleyParsons
2012-2013	EIA for the desalination plant for the Saldanha area	Project leader	West Coast District Municipality & WorleyParsons
2012-2013	EIA for the manganese export terminal at the Port of Ngqura and Coega Industrial Development Zone (IDZ)	Project leader	Transnet
2011 – 2012	EIA (x2) for 100 MW solar photovoltaic project at Blocuso and 100 MW solar PV project at Roode Kop in the Northern Cape	Project leader	Mainstream Renewable Power
2011 – 2012	EIA (x2) for 75 MW solar photovoltaic project at GlenThorne and 75 MW project at Valleydora, in the Free State	Project leader	Solaire Direct
2010-2011	More than 10 Basic Environmental Assessments (BAs) for solar photovoltaic projects in the Western Cape, Northern Cape, Eastern Cape and Free State	Project leader	Conducted for Dutch, German, French and South African companies
2010/2011	EIA for a 100 MW wind project at Zuurbron and a 50 MW wind project Broadlands in the Eastern Cape	Project leader	WindCurrent SA (German-based company)
2010-2011	EIAs (x4) for the proposed InnoWind wind energy projects near Swellendam, Heidelberg, Albertinia and Mossel Bay (totalling approx 210 MW), Western Cape, South Africa	Project leader	InnoWind South Africa (Pty) Ltd
2009-2010	EIA for the proposed Electrawinds wind energy facility of 45-75 MW capacity in the Coega IDZ, Eastern Cape	Project leader	Electrawinds N.V. (Belgium)
2009-2010	EIA for proposed 180 MW Jeffreys Bay wind energy project, Eastern Cape	Project Leader and co-author	Mainstream Renewable Power South Africa
2009-2010	EIA for the proposed 70 megalitre/day desalination plant at Mile 6 near Swakopmund, Namibia	Project leader	NamWater, Namibia
2009	ESS for a proposed Deepwater Port, Container Hub and Industrial Development Zone, Ghana	Project Manager	Project Management International Pty Ltd
2009	EMP for the Operational Phase of the Berg River Dam, Franschoek, South Africa	Project leader and report co-author	TCTA (national water supply utility), South Africa
2006	Environmental Impact Assessment (EIA) for extension of Port of Ngqura, Eastern Cape	Project Leader and co-author	Transnet National Port Authority
2004-2005	Environmental and Social Impact Assessment (ESIA) report for the proposed alumina refinery near Sosnogorsk, Komi Republic, Russia	Project manager and co-author	Komi Aluminium Russia, IFC, European Bank for Reconstruction & Development (EBRD)
2005	Guideline for Environmental Management Plans (EMPs) for the Western Cape province	Author	Dept of Environmental Affairs & Development

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Date	Project Description	Role	Client
			Planning, Western Cape
2003	Environmental Management Plan for the Operational Phase of the wetlands and canals at Century City, Cape Town	Project leader and lead author	Century City Property Owners' Association
2002	Environmental Impact Assessment for the proposed Pechiney aluminium smelter at Coega, South Africa	Project Manager and lead author	Pechiney, France
1999-2000	Cape Action Plan for the Environment: a biodiversity Strategy and Action Plan for the Cape Floral Kingdom - legal, institutional, policy, financial and socio-economic component	Project manager and contributing writer	World Wide Fund for Nature (WWF): South Africa and Global Environment Facility (GEF)
1999	Management Plan for the coastal zone between the Eerste and Lourens River, False Bay, South Africa	Project manager and lead author	Heartland Properties and Somchem (a Division of Denel)
1998	Environmental Assessment of the Mozal Matola Terminal Development proposed for the Port of Matola, Maputo, Mozambique	Project manager and author	SNC-Lavalin-EMS
1996-1997	Strategic Environmental Assessment (SEA) for the proposed Industrial Development Zone and Harbour at Coega, Port Elizabeth, South Africa	SEA project manager and report writer	Coega IDZ Initiative Section 21 Company
1995-1996	Environmental Impact Assessment and EMP for Development Scenarios for Thesen Island, Knysna, South Africa	Project manager and report writer	Thesen and Co.
1996	Environmental Impact Assessment for the Blouvllei wetlands at Century City, Cape Town	Project manager and report writer	Ilco Homes Ltd (now Monex Ltd)
1995	Environmental Impact Assessment for the Saldanha Steel Project, South Africa	Report author and project manager	Saldanha Steel Project
1994	Environmental Impact Assessment for the upgrading of resort facilities on Frégate Island, Seychelles	Project management, co-author, process facilitator	Schneid Israelite and Partners
1994	Environmental Impact Assessment for exploration drilling in offshore Area 2815, Namibia	Project manager and lead author	Chevron Overseas (Namibia) Limited
1994	Management Plan for the Rietvllei Wetland Reserve, Cape Town	Project manager and lead author	Southern African Nature Foundation (now WWF-SA)

RECENT JOURNAL PUBLICATIONS AND PEER REVIEWED PAPERS

A comprehensive list of publications is available on request, with a summary provided below of recent journal publications, book chapters and peer reviewed conference papers:

Fischer D, Lochner P and Annergarn H, 2019. Evaluating the effectiveness of Strategic Environmental Assessment to facilitate renewable energy planning and improved decision-making: a South African case study, *Impact Assessment and Project Appraisal* - article ID: IAPA 1619389.

Cape L., Retief F., Lochner P., Fischer T., and Bond A., 2018. Exploring pluralism: Different stakeholder views of the expected and realised value of strategic environmental assessment (SEA). *Environmental Impact Assessment Review*, Volume 69, March 2018, Pages 32-41.

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Cape L., Lochner P. and Fischer D., 2017. SEAs for major infrastructure programmes in SA. *IAIA17 Conference Proceedings - 37th Annual Conference of the International Association for Impact Assessment*, 4-7 April 2017 | Le Centre Sheraton Montreal | Montreal | Canada | www.iaia.org

Schreiner, G.O., Scholes, R.J., Snyman-Van der Walt, L., De Jager, M., S, Esterhuyse., Dlodla, A., Lochner, P.A., Wright, J., Atkinson, D., Hardcastle, P., Kotze, H. 2017. Advancing a participatory and science-based approach to policy formulation for shale gas development in South Africa. *In: Eds Whitton, J., Cotton, M., Brasier, K. 2017. Citizen and other stakeholder participation in unconventional fossil fuel land use decision-making, policy formation, regulatory practice or other governance mechanisms.* London: Routledge.

Lochner P, Mabin M & Cape L, 2015, Recent Strategic Environmental Assessment experience in South Africa and national principles, in *IAIA16 (Japan) Conference Proceedings*.

LANGUAGE CAPABILITIES

	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Afrikaans	Average	Average	Average

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12 APPENDIX B – ROLES AND RESPONSIBILITIES

Responsible Person(s)	Role and Responsibilities
Developer's Project Manager (DPM)	<p><u>Role</u> The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.
Developer Site Supervisor (DSS)	<p><u>Role</u> The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	<p><u>Role</u> The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr.</p>

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Responsible Person(s)	Role and Responsibilities
	<p>The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested & Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e., those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.</p> <p><u>Responsibilities</u> The responsibilities of the ECO will include the following:</p> <ul style="list-style-type: none"> - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
developer Environmental Officer (dEO)	<p><u>Role</u> The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities.</p>

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Responsible Person(s)	Role and Responsibilities
	<p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	<p><u>Role</u></p> <p>The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities.</p> <p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	<p><u>Role</u></p> <p>Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer, and the public. As a minimum the cEO shall meet the following criteria:</p>

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Responsible Person(s)	Role and Responsibilities
	<p><u>Responsibilities</u></p> <ul style="list-style-type: none"> - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

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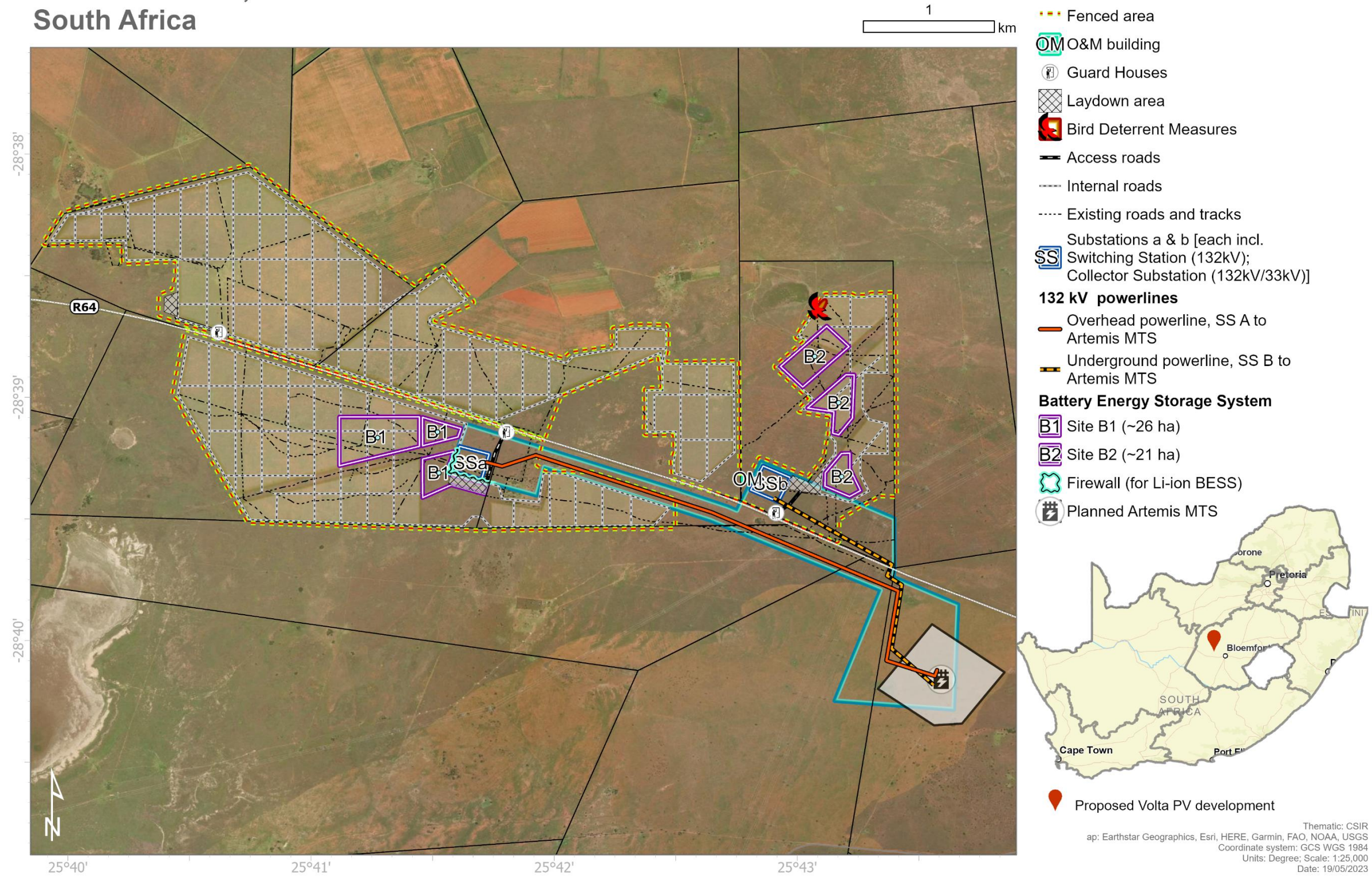
Basic Assessment for the proposed development of the 290 MW Volta Solar Photovoltaic (PV) Facility (i.e., Volta PV Facility) and Battery Energy Storage System (BESS) and the proposed development of a 132 kV Power Line and associated EGI (i.e., Volta EGI) to the planned Artemis Main Transmission Substation (MTS) near Dealesville, Free State

13 APPENDIX C – CHANCE FIND PROCEDURE FOR PALAEOLOGICAL RESOURCES

CHANCE FOSSIL FINDS PROCEDURE: Proposed solar PV facility and associated EGI near Dealesville, Free State	
Province and region:	Free State: Lejweleputswa District Municipality / Tokologo Local Municipality.
Responsible Heritage Resources Agency	The South African Heritage Resources Agency (Contact details: 111 Harrington Street, Cape Town, 8001. PO Box 4637, Cape Town, 8000. Tel: 021 462 4502. Fax: 021 462 4509. Email: info@sahra.org.za).
Rock unit(s)	Kalahari Group, Tierberg Group, Karoo Supergroup, Jurassic dykes, Early Permian.
Potential fossils	Dolomites, sandstones, shales and sands are typical for the country and only some might contain fossil plant, insect, invertebrate and invertebrate traces.
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (<i>N.B.</i> safety first!), safeguard site with security tape / fence / sandbags if necessary.
	2. Record key data while fossil remains are still <i>in situ</i> : <ul style="list-style-type: none"> • Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo • Context – describe position of fossils within stratigraphy (rock layering), depth below surface • Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (<i>e.g.</i>, rock layering)
	3. If feasible to leave fossils <i>in situ</i> : <ul style="list-style-type: none"> • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation • Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume
	3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <ul style="list-style-type: none"> • <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (<i>e.g.</i>, entire block of fossiliferous rock) • Photograph fossils against a plain, level background, with scale • Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags • Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist • Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
	4. If required by Heritage Resources Agency, ensure that a suitably qualified specialist palaeontologist is appointed as soon as possible by the developer.
	5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency.
Specialist palaeontologist	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (<i>e.g.</i> , museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Agency. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.

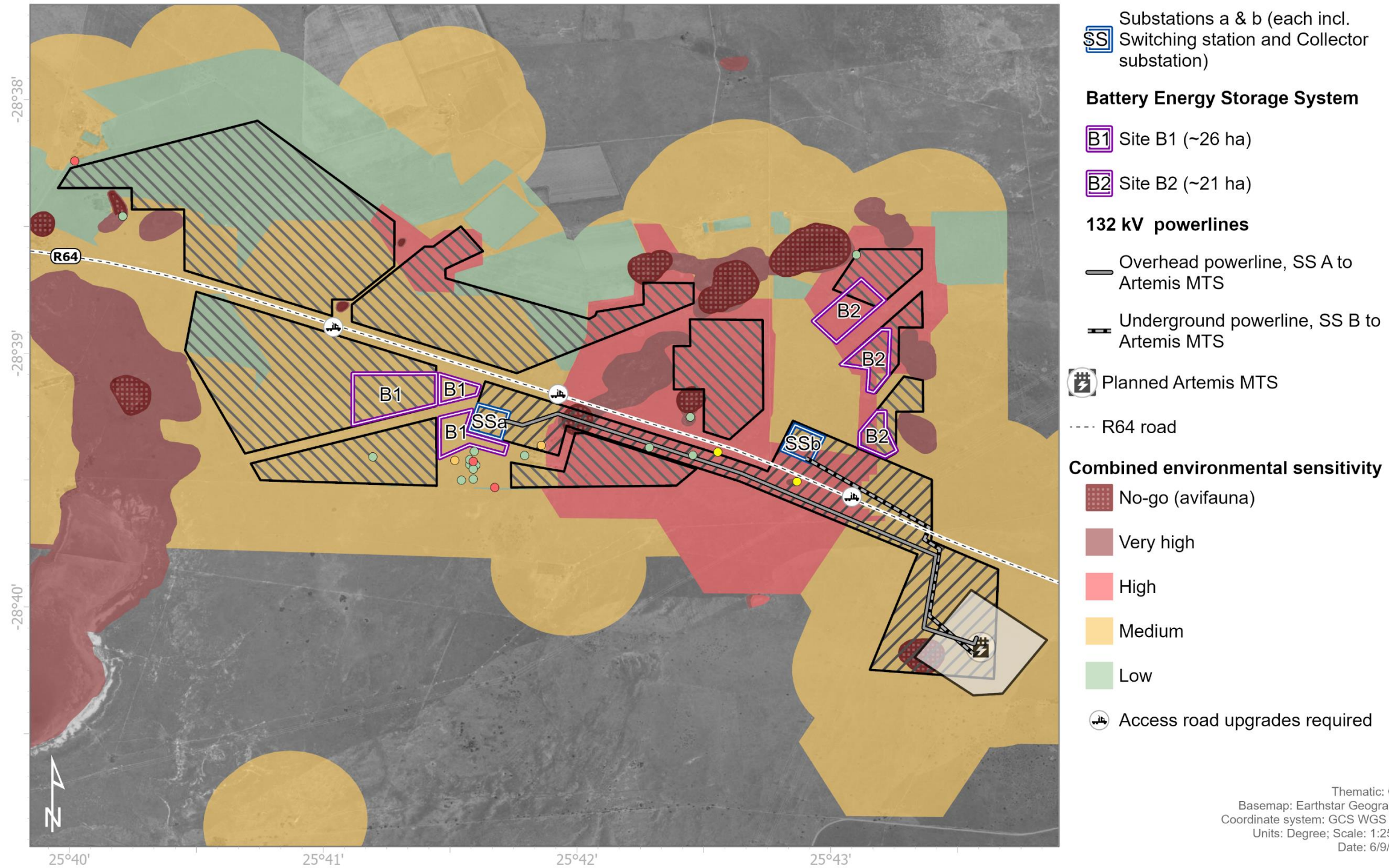
14 APPENDIX D – SITE LAYOUT MAP

Proposed 290 MW Volta PV development near Dealesville, Free State Province South Africa



15 APPENDIX E – COMBINED LAYOUT AND SENSITIVITY MAP

**Proposed 290 MW Volta PV development
near Dealesville, Free State Province
South Africa**



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16 APPENDIX F – ALIEN INVASIVE SPECIES CONTROL AND MONITORING PLAN & ALIEN INVASIVE VEGETATION MANAGEMENT PLAN

Introduction

An “invasive species” is any species whose establishment and spread outside of its natural distribution range (i) threatens ecosystems, habitats or other species or has a demonstrable potential to threaten ecosystems, habitats or other species; and (ii) may result in economic or environmental harm or harm to human health. Alien invasive plant species are globally considered as one of the greatest threats to biodiversity and ecosystems integrity.

The Alien and Invasive Species (AIS) Regulations and the AIS list was published in 2020 (NEM:BA 2020a & b).

The following categories of declared weeds and invader plants are recognised in South Africa:

Category 1a Listed Invasive Species refers to species that must be combatted or eradicated. Landowners are obliged to take immediate steps to combat or eradicate Category 1a species.

Category 1b Listed Invasive Species refers to species that must be controlled. If an Invasive Species Management Programme has been developed, landowners are obliged to control the species in accordance with such programme. The following species were recorded in the area:

<i>Flaveria bidentis</i>	<i>Opuntia</i> sp.	<i>Cuscuta campestris</i>
<i>Prosopis</i> sp.	<i>Arundo donax</i>	<i>Datura ferox</i>
<i>Cereus jamacaru</i>	<i>Cirsium vulgare</i>	<i>Opuntia ficus-indica</i>
<i>Solanum elaeagnifolium</i>	<i>Verbena bonariensis</i>	<i>Verbena brasiliensis</i>
<i>Xanthium spinosum</i>		



Category 2 Listed Invasive Species refer to species that require a permit to carry out a restricted activity e.g. cultivation, within an area specified in the Notice or an area specified in the permit, as the case may be. Category 2 includes plant species that have economic, recreational, aesthetic or other valued properties, notwithstanding their invasiveness. It is important to note that a Category 2 species that fall outside the demarcated area specified in the permit, becomes a Category 1b invasive species. Permit-holders must take all the necessary steps to prevent the escape and spread of the species outside of the land or the area specified in the Notice or permit.

<i>Acacia mearnsii</i>
<i>Eucalyptus camaldulensis</i>

These species are exempted for existing plantations.










Category 3 Listed Invasive Species refer to species that are subject to exemptions and prohibitions as specified in the Notice. Category 3 species are less-transforming invasive species that are regulated by activity. The principal focus with these species is to ensure that they are not introduced, sold or transported. However, a Category 3 plant species becomes a Category 1b species within riparian areas.

Appendix G, Table 1: Identified alien plant species in the area (adapted from ARC, 2020)

SPECIES NAME	COMMON NAME	ILLUSTRATION
NEMBA Category: 1B invaders		
<i>Flaveria bidentis</i>	Smelter's-Bush	
<i>Prosopis glandulosa</i> var. <i>torreyana</i>	Honey Mesquite	





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SPECIES NAME	COMMON NAME	ILLUSTRATION
NEMBA Category: 1B invaders		
<i>Prosopis velutina</i>	Velvet Mesquite	
<i>Arundo donax</i>	Giant reed	
<i>Cereus jamacaru</i>	Queen of the night cacti	
<i>Cirsium vulgare</i>	Spear thistle	
<i>Cuscuta campestris</i>	Common & lucerne dodder	
<i>Datura ferox</i>	Large thorn apple	
<i>Opuntia ficus-indica</i>	Sweet prickly pear	
<i>Solanum elaeagnifolium</i>	Silver-leaf bitter apple	
<i>Verbena bonariensis</i>	Purple top, tall verbena	

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SPECIES NAME	COMMON NAME	ILLUSTRATION
NEMBA Category: 1B invaders		
<i>Verbena brasiliensis</i>	Slender wild verbena	
<i>Xanthium spinosum</i>	Spiny cocklebur	
NEMBA Category: 2 invaders		
<i>Acacia mearnsii</i>	Black wattle	
<i>Eucalyptus camaldulensis</i>	River red gum	

Prevention and control of alien invasive plant species

The removal of alien vegetation through mechanical mechanisms or application of a herbicide is likely to be required in order to curtail proliferation. The appointed ECO of the project is to be consulted prior to application of the herbicide. A specialist or contractor should be appointed prior to construction commencement to undertake a sweep and survey of the final development footprint site, with an alien invasive plant management team to remove exotic vegetation. The following measures should be applied:

- Herbicides for the control of alien species should be applied according to the relevant instructions, material safety data sheets (MSDS), and by appropriately trained personnel.
- No alien species should be used in rehabilitation or landscaping.
- Cleared areas may need to be fenced-off during rehabilitation to exclude livestock and wildlife.
- Implement a monitoring program for the early detection of alien invasive plant species. Employ a control program to combat declared alien invasive plant species
- Material brought onto site e.g. building sand should be regularly checked for the germination of alien species.

There are a number of strategies that can be employed to prevent the introduction of new invasive plant species:

- Limiting their introductions by humans;
- Creating a buffer zone of alien-free vegetation around the site;
- Integrated catchment management with the surrounding neighbours because areas around and upstream of the site provide an unlimited source of seed which invade downstream areas; and
- Maintaining a healthy grass cover by sound veld management and judicious burning of the grass sward.

Alien invaders should be controlled by mechanical and/or chemical means. Mechanical means include ringbarking (girdling), uprooting, chopping, slashing and felling. An axe, chain saw or brush cutter can be used. Stumps or ringbarked stems should be treated immediately with a chemical weed killer. Follow-up treatment is usually needed.

Refer to Table 2 below for an Alien Invasive Vegetation Management Plan, which incorporates the mitigation measures and strategies outlined above.

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ALIEN INVASIVE VEGETATION MANAGEMENT PLAN					
Impact	Mitigation/ Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
E. DESIGN PHASE					
Impacts due to establishment of alien invasive plants	Ensure the appropriate removal of alien invasive vegetation from the proposed project area and prevent the establishment and spread of alien invasive plants due to the project activities.	<ul style="list-style-type: none"> Ensure compliance with relevant Environmental Specifications for the control and removal of alien invasive plant species. Appoint a specialist or contact relevant authorities to seek guidance on the removal of the alien vegetation on site. Compile and finalise an alien weed eradication programme. 	<ul style="list-style-type: none"> Appoint a suitable specialist/ Contractor or contact the relevant authorities to seek guidance on the removal of the planted alien invasive species. Appoint a suitable specialist to compile an alien invasive vegetation eradication plan. Ensure that this is taken into consideration during the planning and design phase by reviewing signed minutes of meetings or signed reports. 	<ul style="list-style-type: none"> Once-off during the design phase. Once-off during the design phase. Once-off during the design phase. 	<ul style="list-style-type: none"> Project Developer (Scatec Solar) Project Developer (Scatec Solar) ECO
F. CONSTRUCTION PHASE					
Impacts due to the establishment of and increased spread of alien invasive plants	Avoid establishment and reduce the spread of alien invasive plants due to the project activities.	<ul style="list-style-type: none"> Appoint a specialist or contractor to undertake a sweep and survey of the final development footprint site, with an alien invasive eradication team to remove exotic vegetation prior to the commencement of construction. Establish an ongoing monitoring programme for the construction phase to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) and National Environmental Management: Biodiversity Act (Act 10 of 2004) (NEM: BA)). 	<ul style="list-style-type: none"> Appoint a suitable vegetation contractor to inspect the site and remove any exotic weeds prior to the commencement of construction. ECO to ensure that this is taken into consideration and implemented. Prepare monitoring programme which will monitor the presence of alien invasive species on the site. If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. 	<ul style="list-style-type: none"> Prior to the commencement of construction Once-off 	<ul style="list-style-type: none"> Project Developer (Scatec Solar), ECO and Specialist Contractor ECO and Contractor
		<ul style="list-style-type: none"> Ensure proper management of soil stockpiles. Do not import soil stockpiles from areas with alien plants to ensure proper management of stockpiles. 	<ul style="list-style-type: none"> Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractor
		<ul style="list-style-type: none"> Undertake rehabilitation of disturbed areas as soon as possible after construction. Stockpile the shallow topsoil layer separately from the subsoil layers. Reinststate the topsoil layers (containing seed and vegetative material) when construction is complete to allow the plants to rapidly re-colonise the bare soil areas. 	<ul style="list-style-type: none"> Rehabilitate disturbed areas and monitor the presence of alien invasive species on site. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractor
		<ul style="list-style-type: none"> Keep clearance and disturbance of indigenous vegetation to a minimum. 	<ul style="list-style-type: none"> Monitor and manage vegetation clearing by undertaking visual inspections to ensure minimal disturbance and to restrict activities to within demarcated areas. 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractor
		<ul style="list-style-type: none"> Ensure that the footprint required for the proposed project activities (such as temporary stockpiling, earthworks, storage areas, site establishment etc.) is kept at a minimum. 	<ul style="list-style-type: none"> Verify that the proposed project area is determined and outlined prior to the commencement of the construction phase by undertaking visual inspections. 	<ul style="list-style-type: none"> Once-off prior to construction and as required during the construction process. 	<ul style="list-style-type: none"> ECO and Contractor
		<ul style="list-style-type: none"> Ensure that alien invasive vegetation found on site, within the proposed project footprint, is immediately controlled and removed promptly, in a scheduled manner throughout the construction phase. The removal of alien vegetation on site during the construction phase should use registered control methods and take into consideration the Alien and Invasive Species Regulations published in terms of Section 97(1) of the NEM: BA, if applicable. 	<ul style="list-style-type: none"> Monitor the presence of alien invasive plants during the construction phase via visual inspections and take action to remove and control these species. If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the 	<ul style="list-style-type: none"> On-going 	<ul style="list-style-type: none"> ECO and Contractor

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ALIEN INVASIVE VEGETATION MANAGEMENT PLAN					
Impact	Mitigation/ Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	Frequency	Responsibility
			project area. Any alien invasive should be cleared from site.		
		<ul style="list-style-type: none"> The removed alien invasive vegetation should be immediately disposed at a suitable waste disposal facility and should not be kept on site for prolonged periods of time, as this will enhance the spread of these species. 	<ul style="list-style-type: none"> Monitor the removal of the alien vegetation found on site via visual inspections. 	<ul style="list-style-type: none"> As necessary during the construction phase. 	<ul style="list-style-type: none"> ECO
		<ul style="list-style-type: none"> All construction machinery and plant equipment delivered to site for use during the construction phase should be cleaned in order to limit the introduction of alien species. 	<ul style="list-style-type: none"> Clean machinery and equipment prior to the construction phase. ECO to conduct visual inspections to verify that machinery and equipment are cleaned, and report any non-compliance. 	<ul style="list-style-type: none"> Prior to the commencement of construction. As necessary during the construction phase. 	<ul style="list-style-type: none"> ECO and Contractor
G. OPERATIONAL PHASE					
.1. Impacts due to establishment of alien invasive plants. Exotic weed invasion may result in the ousting of natural vegetation and alteration of ecological processes on site, with incremental impacts on the adjacent veld types.	Reduce the establishment and spread of alien invasive plants. To remove exotic weeds as and when they may arise and thereby prevent alteration of local and adjacent habitat forms.	<ul style="list-style-type: none"> Continue with on-going monitoring programme to detect and quantify any alien species that may become established and identify the highly invasive species during the operation phase. 	<ul style="list-style-type: none"> Annual audit of project area and immediate surroundings. If any alien invasive species are detected then the distribution of these should be mapped (GPS co-ordinates of concentrations of plants). The results should be interpreted in terms of the risk posed to sensitive habitats within and surrounding the project area. 	<ul style="list-style-type: none"> Annual 	<ul style="list-style-type: none"> Operations and Maintenance Contractor
		<ul style="list-style-type: none"> Immediately control any alien plants that become established using registered control methods. Use of herbicides and undertake manual removal of alien vegetation on site where this may arise. Regular address and redress of weeds identified on site by a suitable contractor. The clearance of exotic weed to be undertaken bi-annually at a minimum and on a needs basis at an intermittent level. 	<ul style="list-style-type: none"> Monitor the use of herbicide sprays and manual removal of alien vegetation by undertaking visual inspections and reporting any non-compliance. Maintain register of weed spraying activities and ensure that herbicide use is recorded. 	<ul style="list-style-type: none"> Bi-annually 	<ul style="list-style-type: none"> Project Developer (Scatec Solar) and Environmental Manager
H. DECOMMISSIONING PHASE					
<ul style="list-style-type: none"> Exotic weed invasion of the decommissioned site resulting in ecological change 	To prevent the excessive growth and propagation of exotic weeds on disturbed lands that formed a portion of the PV facility.	<ul style="list-style-type: none"> All natural areas must be rehabilitated with species indigenous to the area. Re-seed with locally-sourced seed of indigenous grass species that were recorded on site pre-construction. 	<ul style="list-style-type: none"> Final external audit of area to confirm that area is rehabilitated to an acceptable level. 	<ul style="list-style-type: none"> Once off 	<ul style="list-style-type: none"> Lead Contractor with advice from specialist
		<ul style="list-style-type: none"> Exotic weed control measures to be instituted through weed control programme. Regular redress of exotic weed through the use of herbicide and manual removal. 	<ul style="list-style-type: none"> Compile weed eradication programme for a period of 12 months after the decommissioning exercise. Appoint contractor to undertake the weed eradication programme. Monitor newly disturbed areas where infrastructure has been removed to detect and quantify any aliens that may become established after decommissioning and rehabilitation. Final external audit of area to confirm that area is free of alien invasive plants after 5 years. 	<ul style="list-style-type: none"> Weed eradication exercise to be undertaken every 6 months for a period of 12 months following decommissioning. Prior to the commencement of the decommissioning phase. Once-off Once-off 	<ul style="list-style-type: none"> Project Developer (Scatec Solar) Project Developer (Scatec Solar) Facility Manager and Specialist/ Contractor Facility Manager and Specialist/ Contractor