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 H

Environmental Management Programme (Eskom Substation)

- 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 switching substations) to be located at the proposed PV facility.

CSIR
Touching lives through innovation

Volta PV

CONTENTS

TABLES

FIGURES

1. INTRODUCTION

The Project Developer, VOLTA PV (PTY) Ltd (hereinafter referred to as VOLTA PV), is proposing to design, construct and operate a Solar Photovoltaic (PV) power generation facility and associated infrastructure, approximately 6 km 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 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. 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 (SS), and one Battery Energy Storage Systems (BESS). The powerlines, PV facility including BESS are covered in a separate EMPr.

The proposed projects fall within the REDZ 5 (i.e., Kimberley REDZ) which was promulgated in GN 114 in February 2018. The REDZs represent areas where wind and solar PV development is being incentivised from resource, socio-economic and environmental perspectives. To date, the DFFE has gazetted 11 REDZs as well as procedures for submitting environmental impact assessment applications and reduced environmental authorisation timeframes within these REDZs, which have reduced the review timeframes by half and significantly simplified the authorisation process. The REDZs were identified in two phases, with the first 8 being identified through an SEA process which concluded in March 2015 and gazetted in February 2018 and the 3 additional REDZs concluded in March 2019 and gazetted in February 2021. A BA Process is undertaken instead of a full Scoping and EIA Process and is subjected to a reduced decision-making timeframe.

In addition, five EGI Power Corridors were gazetted for implementation on 16 February 2018 in Government Gazette 41445, GN 113 and an additional two expanded corridors were gazetted 29 April 2021. The Gazette documented notice, given by the Minister of Environmental Affairs, of alternative procedures to be followed when applying for EA for large scale electricity transmission and distribution development activities, identified in terms of section 24(2)(a) of the NEMA in the identified Strategic Transmission Corridors (i.e., areas declared as geographical areas of strategic importance). Developers proposing to submit applications for EA for large scale electricity transmission infrastructure within any of the five gazetted Strategic Transmission Corridors, that trigger Listed Activity 9 of Listing Notice 2 of the 2014 NEMA EIA Regulations (as amended), or any other listed and specified activities that are necessary for the realisation of such infrastructure and facilities, would need to follow a BA Process, as opposed to a full Scoping and EIA Process. The proposed project also falls within the Central EGI Corridor. The fact that the proposed project falls within the Central EGI Corridor is important as it indicates that the proposed project aligns with the strategic objectives of the country in terms of infrastructure placement.

The Draft EMPr was released with the Draft BA Report to all Interested and Affected Parties (I&APs), Organs of State and stakeholders for a 30-day review and commenting period, which extended from 31 March 2023 to 3 May 2023, excluding public holidays. All comments received

during the 30-day comment period are captured in the Comments and Responses Report (Appendix D Part 2 of the Final BA Report).

Two site on-site SS are proposed, SSA and SSB. The Project Applicant is also proposing to develop a 132 kV power line, a 33/132 kV Step-down SS and a Collector SS (if required) to feed the electricity generated by the proposed VOLTA PV Facility. The respective farm portions affected by the proposed VOLTA PV Facility, and associated infrastructure are shown in Table C.2-1 below. These properties cover approximately 500 ha.

Affected Farm Portion	Mooihoek (RE/1551)	Cornelia (RE/1550)	Modderpan (RE/750)	Oxford (1/1030)	Klipfontein (RE/305)	Leliehoek (RE/748)
Volta EGI	✓	✓	✓	✓	✓	✓
SS A	✓					
SS B				✓		
SG Code	**F0040000000015 5100000**	**F004000000001 55000000**	**F004000000000 75000000**	**F004000000001 03000001**	**F0040000000 0030500000**	**F0040000000 0074800000**

Table C.2-1: Affected Farm Portions

This EMPr has been prepared as part of the requirements of the 2014 NEMA EIA Regulations (as amended) and is being submitted to the DFFE as part of the Application for EA for the proposed project. **This EMPr deals with the Substations that will be managed Eskom.** Figure C.2-1 shows the overall locality of the proposed VOLTA PV project (PV, BESS and EGI), showing the boundary of the affected farm portions and the PV project footprint of approximately 720 ha that is recommended for approval in Section E of the BAR.

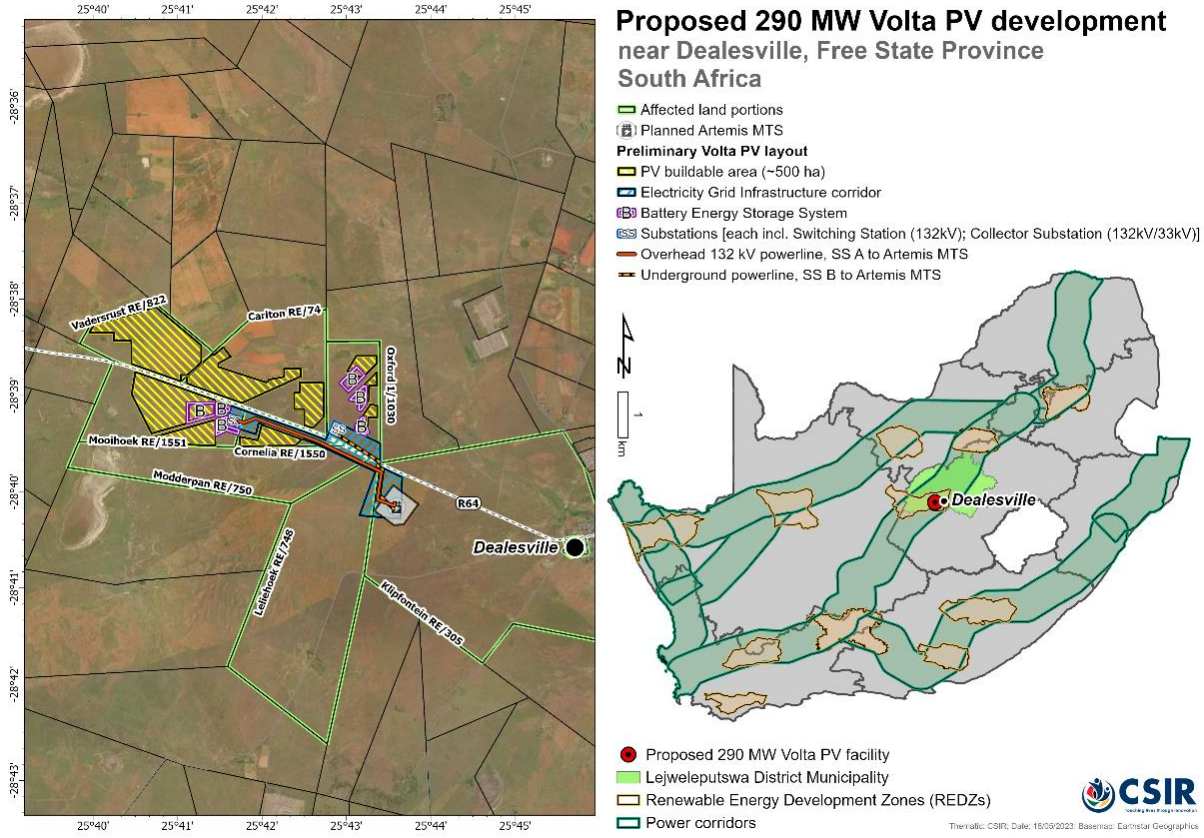


Figure C.2-1: Locality map of the proposed VOLTA PV and associated infrastructure situated near Dealesville in the Free State Province.

1.1 AUTHORS OF THE EMPr

This EMPr has been compiled by the Environmental Assessment Practitioner, Paul Lochner (EAP 2019/745), Project Manager, Abulele Adams, and the Project Officers, Helen Antonopoulos and Sonto Mkize, with inputs provided by the various specialists on the team (as indicated in Table 3). The Curriculum Vitae of Paul Lochner and Abulele Adams are also included in Appendix A of this EMPr.

Paul Lochner (EAP, Technical Advisor and Quality Assurance)

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 he 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).

Abulele Adams (Project Manager & GIS mapping)

Abulele Adams, serves as the Project Manager, in the EMS group of the CSIR. She 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).

Table C.2-2: Details of the BA Project Team

Name	Organisation	Role/ Specialist Study
CSIR Project Team		
Paul Lochner (*Registered EAP (2019/745)*)	CSIR	EAP and Project Leader
Abulele Adams (*Pr.Sci.Nat*.)	CSIR	Project Manager
Helen Antonopoulos	CSIR	Project Officer
Luanita Snyman-van der Walt (*Pr.Sci.Nat.*)	CSIR	Project Mapping
Sonto Mkize	CSIR	Project Officer
Specialists		
Johann Lanz (*Pr.Sci.Nat.*)	Private	Agricultural Compliance Statement
Lourens du Plessis (*GPr GISc*)	LOGIS	Visual Impact Assessment
Bryony Walmsley (*EAPASA*)		
Jaco van der Walt	Beyond Heritage	Heritage Impact Assessment (Archaeology, Cultural Landscape)
Prof Marion Bamford	Private	Palaeontology
Corné Niemandt (*Pr.Sci.Nat.*)	Enviro-Insight	Terrestrial Biodiversity, Terrestrial Plant Species, and Terrestrial Animal Species
Russel Tate (*Pr.Sci.Nat.*)	HCV Africa (Enviro-Insight)	Aquatic Biodiversity and Species Impact Assessment
Luke Verburgt (*Pr.Sci.Nat.*)	Enviro-Insight	Avifauna Impact Assessment
Tony Barbour	Private	Socio-Economic Impact Assessment
Debbie Mitchell	Ishecon	BESS Risk Assessment (PV only)
Merchandt Le Maitre (*Pr Tech Eng*)	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 (*Pr.Sci.Nat.*), Helen Antonopoulos	CSIR	Civil Aviation Site Sensitivity Verification
Sonto Mkize, Abulele Adams (Pr.Sci.Nat.), 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 VOLTA PV, BESS and EGI SEF will cover an approximate area of 720 hectares (ha) and have the capacity to export up to 290 MW of electricity. The area specified here excludes access roads leading to the site.

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 and a maximum period of 25 years. The construction phase for the proposed project is expected to be up to 18. The components of the proposed VOLTA PV SEF are provided in table C.2-3 and Table C.2.4 below:

Table C.2-3: Description of the key components of the VOLTA PV and BESS project

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 (m²):	300m2
Site offices	Number of buildings:	4
	Maximum height (m):	3,6
	Footprint (m²):	500m2
Operational and Maintenance Control Centre Building	Maximum height (m):	2
	Footprint (m²):	300m2

Project Description for VOLTA PV 290 MW Solar PV and BESS		
Component	**Dimensions / Specifications**	
Guard houses	Maximum height (m):	3,6
	Footprint (m²):	100m2
Ablution facilities	Maximum height (m):	3,6
	Footprint (m²):	50m2
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

Table C.2-4: Description of the key components of the VOLTA EGI project

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) 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 when solar generation is inactive.	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
	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)

In order to transmit the electricity generated from the proposed VOLTA PV Facility into the Artemis MTS, or alternatively to transmit the electricity into the national electrical grid network as part of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP), the Project Applicant is undertaking a BA Process for the supporting EGI.

A 132 kV overhead and underground transmission power line is assessed in the BA Process, which extends approximately 4 and 2 km respectively, from the proposed two VOLTA PV on-site substation to a switching substation at the proposed Eskom Artemis MTS.

This EMPr for substation managed by Eskom to be located at the proposed PV facility. This EMPr is included in Appendix H of this BA Report. It is required to comply with the Generic EMPr published for substation development (Government Gazette 42323, GN 435, dated 22 March 2019).

A separate EMPr has been compiled for the proposed VOLTA PV Facility and BESS, VOLTA PV Overhead Powerline EGI and VOLTA PV Underground Powerline and all associated infrastructure, including the 22 kV or 33 kV underground power lines that connects the PV array to the on-site substation. Both the VOLTA PV and BESS and Underground Powerline EMPrs comply with Appendix 4 of the 2014 NEMA EIA Regulations (as amended).

In addition, a separate EMPr has been compiled for the 132 kV overhead transmission power line at the on-site substation. This EMPr is included in Appendix G of this BA Report, and it complies with the Generic EMPr published for power line development (Government Gazette 42323, GN 435, dated 22 March 2019).

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 C of this BA Report). Management and mitigation measures required to address all the impacts are included within this EMPr.

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, substations, 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 (a minimum period of 20 years and a maximum period of 25 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.

1.3 ENVIRONMENTAL SENSITIVITIES

Section B 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.

The preferred site for the proposed the VOLTA PV Facility project covers an area of 720 ha.

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 SEF, 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 EIA Process (as described above), which is combined with the site layout.

1.4 IMPACTS IDENTIFIED DURING THE EIA PROCESS

Based on the specialist studies (as shown in Table C.2-5), the following main direct potential impacts, as indicated in Table C.2-5, 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.

Table C.2-5: Impacts identified in the BA Process

IMPACT THEME	IMPACTS IDENTIFIED
AGRICULTURE	**Construction and Decommissioning Phase** • Occupation of land - Agricultural land directly occupied by the development infrastructure will become restricted for agricultural use, with consequent potential loss of agricultural productivity for the duration of the project lifetime. • Soil erosion and degradation – Erosion can occur as a result of the alteration of the land surface run-off characteristics, predominantly through the establishment of hard surface areas including roads. Loss of topsoil can result from poor topsoil management during construction related excavations. Soil erosion and loss of topsoil are completely preventable. The stormwater management that will be an inherent part of the engineering on site and standard, best-practice erosion control and topsoil management measures recommended and included in the Environmental Management Programme (EMPr), are likely to be effective in preventing soil erosion and loss of topsoil. Indirect: • Increased financial security for farming operations – Reliable and predictable income will be generated by the farming enterprises through the lease of the land to the energy facilities. This is likely to increase their cash flow and financial security and could improve farming operations and productivity through increased investment into farming.

IMPACT THEME	IMPACTS IDENTIFIED
	• Improved security against stock theft and other crime due to the presence of security infrastructure and security personnel at the energy facility.
VISUAL	**Construction Phase:** ▪ Potential visual impact of construction activities on sensitive visual receptors in close proximity to the proposed infrastructure **Operational Phase:** ▪ 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 – 3 km radius **Decommissioning Phase:** ▪ 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. **Cumulative Impacts:** ▪ The potential impact on the sense of place of the region.
HERITAGE AND CULTURAL LANDSCAPE	**Construction Phase** ▪ Impact assessment of the Project on isolated Stone Age scatters (VT01 and VT12). **Operational Phase** ▪ Potential visual impacts to the cultural landscape and sense of place – see Visual Impact Assessment **Decommissioning Phase** ▪ Potential impacts to the cultural landscape **Cumulative impacts** ▪ Potential impacts to heritage resources
PALAEONTOLOGY	**Construction Phase** • Disturbance, damage or destruction of fossils within the development footprint due to excavations and surface clearance.
TERRESTRIAL BIODIVERSITY AND SPECIES	**Construction Phase:** ▪ 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; **Operational Phase:** ▪ Increase in alien invasive species; ▪ Loss of species composition and diversity; ▪ Littering and General Pollution; **Decommissioning Phase:**

IMPACT THEME	IMPACTS IDENTIFIED
	Such alterations and changes will be dependent upon the expectant post-decommissioning land use and operation cease of the PV Facilities and associated infrastructure. However, abandonment of the site would probably result in: ▪ Alien invasive species management; ▪ Loss of habitat; **Cumulative Impacts:** The cumulative impact assessment considers other proposed, approved and existing power lines within the 30 km radius. Given the above, cumulative impacts arising from the implementation of this project and other land use changes in the region are likely to exhibit the following: ▪ Habitat loss and fragmentation
AQUATIC BIODIVERSITY	**Construction Phase:** ▪ 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 **Operational Phase:** ▪ Alteration of drainage ▪ Alteration of surface water flow dynamics ▪ Establishment of alien plants on disturbed areas **Decommissioning Phase:** Such alterations and changes will be dependent upon the expectant post-decommissioning land use and operation cease of the PV Facilities and associated infrastructure. However, abandonment of the site would probably result in: ▪ 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 **Cumulative Impacts:** The cumulative impact assessment considers other proposed, approved and existing power lines within the 30 km radius. Given the above, cumulative impacts arising from the implementation of this project and other land use changes in the region are likely to exhibit the following: **Construction Phase:** ▪ Operation of equipment and machinery ▪ Clearing vegetation for laydown yards and buildings

IMPACT THEME	IMPACTS IDENTIFIED
	▪ Stockpiling of and placement construction materials ▪ Excavating/shaping landscape ▪ Final landscaping, backfilling and postconstruction rehabilitation **Operational Phase:** ▪ Alteration of drainage ▪ Alteration of surface water flow dynamics ▪ Establishment of alien plants on disturbed areas **Decommissioning Phase:** ▪ Operation of equipment and machinery. ▪ Clearing vegetation ▪ Stockpiling of and placement construction materials ▪ Excavating/shaping landscape ▪ Final landscaping, backfilling and postconstruction rehabilitation
AVIFAUNA	**Construction Phase:** ▪ 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. **Operational Phase:** ▪ Continued disturbance due to operational activities (use of vehicles, lights etc.); ▪ Loss of habitat due to altered and excluded habitats; ▪ Attraction to the facility exacerbating potential impacts described above. **Decommissioning Phase:** ▪ Continued disturbance due to operational activities (use of vehicles, lights etc.); ▪ Habitat loss reclamation from rehabilitation activities. **Cumulative Impacts:** ▪ Please see Appendix C.13 for a detailed description of cumulative impacts

2. APPROACH TO PREPARING THE EMPr

2.1 COMPLIANCE WITH RELEVANT LEGISLATION

As noted in the Gazetted EMPrs noted above (dated March 2019), the NEMA requires that an EMPr be submitted where a BA or EIA is being undertaken for an Application for EA. The content of an EMPr must either contain the information set out in Appendix 4 of the 2014 NEMA EIA Regulations (as amended) promulgated in Government Gazette 40772 and GN R326 on 7 April 2017 or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. As part of the 2016 EGI SEA, a generic EMPr was also compiled for the development and expansion of (a) overhead electricity transmission and distribution infrastructure; and (b) substation infrastructure for the transmission and distribution of electricity. On 2 March 2018, these two Generic EMPrs were gazetted in Government Gazette 41473, GN 162 and GN 163, for public comment for a period of 45 days. **On 22 March 2019, these two Generic EMPrs were gazetted for implementation in Government Gazette 42323, GN 435**. It is therefore understood that these gazetted EMPrs must be applied by all parties involved in the EA Process. This EMPr therefore subscribes to the requirements of the gazetted EMPrs (Gazette 42323, GN 435).

Since the Generic EMPrs have been gazetted and are applicable to the proposed project, the following has been undertaken:

- Section 1 of Part B of the gazetted Generic EMPr contains a pre-approved template with aspects that are common to the development of substation infrastructure. This section will be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity. This section will not be submitted to DFFE as it has already been pre-approved gazetted. To allow I&APs access to the pre-approved EMPr template for consideration through the decision-making process, the template is being released with the Draft EIA Report for a 30-day commenting period. It is included in Appendix F of this EMPr.

- Section 2 of Part B of the gazetted Generic EMPr has been completed to include site specific information, a preliminary infrastructure layout and development footprint site map, and a declaration that the Applicant will comply with the pre-approved template provided in Part B: Section 1 of the gazetted EMPr. This will be submitted to the DFFE for review and decision-making and has been included in Section 4 (site specific information), Section 5 (preliminary infrastructure layout) and Section 6 (declaration of the Applicant) of this EMPr.

- Part C of the gazetted Generic EMPr has been compiled and included in Section 7 of this EMPr. It includes site specific impact management outcomes and impact management actions that are not included in the pre-approved generic EMPr. It will be submitted to the DFFE together with the BA Report, for consideration of, and decision on, the Applications for EA. This section has been prepared by the EAP, with input from relevant specialists. This section of the EMPr is a supplement to the gazetted EMPr and provides site specific mitigation measures identified in the specialist studies contained in Appendix C of the BA Report. It was confirmed with the DFFE Interpretation Query Unit in February 2020 that if Part C the gazetted Generic EMPr is required, the impact management outcomes and impact management actions

must be provided; whilst the columns under the headings, "Implementation" and "Monitoring" can only be completed by the relevant parties after the EA is issued (as per Part B – Section 1).

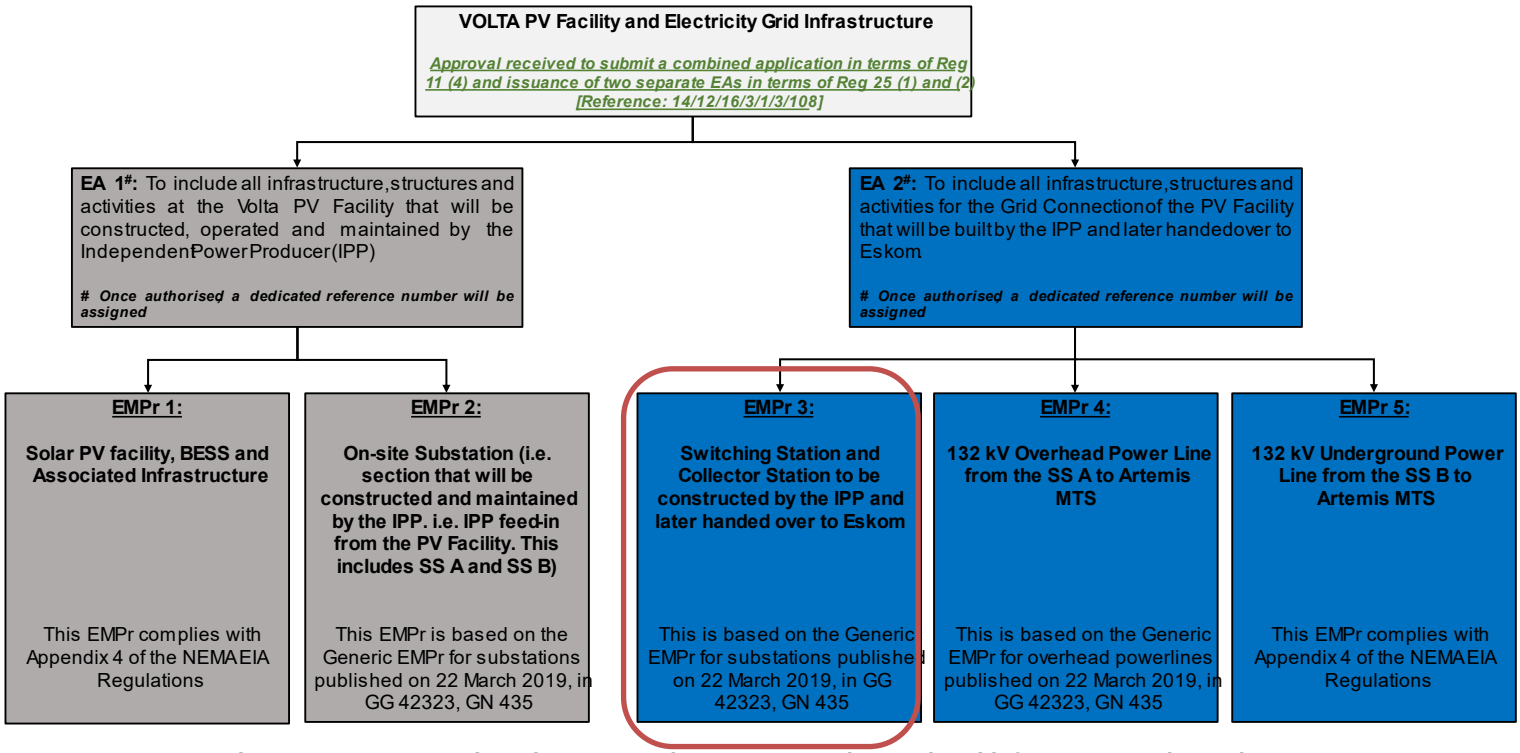


Figure C.2-2: Approach to the proposed VOLTA PV and associated infrastructure situated near Dealesville in the Free State Province.

2.2 STRUCTURE AND CONTENTS OF THE EMPr

This Site Specific EMPr includes the following:

- Section 4: Site specific information;
- Section 5: Preliminary infrastructure layout and development footprint site map;
- Section 6: Declaration that the Applicant will comply with the pre-approved template provided in Part B: Section 1 of the gazetted EMPr (which is included in Appendix F of this EMPr);
- Section 7: Site-Specific EMPr as required by Part C of the gazetted EMPr.

The Site-Specific EMPr follows the same template as that of Part B – Section 1 of the gazetted EMPr, as recommended. Where applicable, each section of the Site-Specific EMPr is divided into the following four phases of the project cycle:

- Planning and Design Phase;
- Construction Phase;
- Operational Phase; and

- Decommissioning Phase.

The overall goal for environmental management for the proposed 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;
- 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 electrical grid infrastructure in a South African context.

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 PV (i.e., approximately 500 ha).
- The on-site substation hub (approximately 4 ha) incorporating the facility substation (± 2 ha), Switching Station and Collecting Station (± 2 ha) and a BESS (± 4 ha) and associated O&M buildings.

3. ROLES AND RESPONSIBILITIES

Since the Generic EMPrs 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 EMPrs 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 EMPr.

4. SITE SPECIFIC INFORMATION

4.1 CONTACT DETAILS AND DESCRIPTION OF THE PROJECT

4.1.1 Details of the Applicant

Project: VOLTA PV Facility – EMPr for the On-Site Substation

Name of Applicant	VOLTA PV (Pty) Ltd
Name of Applicant Representative	Mark Bleloch
Telephone Number:	+27 81 529 0312
Physical Address:	5th Floor Mariendahl House, Newlands on Main, 11 Main Road Tel: 021 888 2400 Fax: 021 888 2693 Newlands, Cape Town, 7700

4.1.2 Details and Expertise of the EAP and Co-Author

Company of the EAP	Council for Scientific and Industrial Research (CSIR)
Name of EAP	Paul Lochner
Telephone Number:	021 888 2486 or 084 442 3646
Fax Number:	021 888 2693
Email Address:	PLochner@csir.co.za
Expertise of the EAP (Curriculum Vitae included):	**Qualifications:** ▪ B.Sc. Civil Engineering (awarded with Honours), University of Cape Town ▪ M. Phil. Environmental Science, University of Cape Town **Experience:** ▪ Paul has more than 28 years of experience in environmental assessment and management. **Professional Registration and Affiliations:** ▪ Registered EAP (2019/745) with the Environmental Assessment Practitioners Association of South Africa (EAPASA) ▪ International Association for Impact Assessment, South African Affiliate. **Curriculum Vitae of Paul Lochner is included in Appendix A of this EMPr.**

Company of the co-author	Council for Scientific and Industrial Research (CSIR)
Name of co-author	Abulele Adams
Telephone Number:	+27 21 888 2400
Email Address:	Aadams1@csir.ac.za
Expertise of the co-author (Curriculum Vitae included):	**Qualifications:** ▪ MSc Geography ▪ BSc Hon GIS ▪ BSc Environmental Science **Experience:** ▪ Abulele has more than 9 years' experience in environmental assessment).

	Professional Registration and Affiliations: ▪ International Association for Impact Assessment, South African Affiliate. ▪ South African Council for Natural Scientific Professionals– Registered Professional. **Curriculum Vitae of Abulele Adams is included in Appendix A of this EMPr.**

4.1.3 Project Name

Project Name	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

4.1.4 Description of the Project

Refer to Section 1.2 of this EMPr for a detailed description of the proposed projects.

4.1.5 Project Location

The on-site substations will be constructed on the Mooihoek and Oxford farms. The proposed coordinates of the mid-point of the proposed VOLTA PV Facility on-site substations are provided in Table C.2-6 below.

Table C.2-6: Mid-point coordinates of the proposed Volta PV and EGI project area and on-site substation hubs

SUBSTATION CENTROIDS	No	Lat_y_dms	Long_x_dms
SS A	1	28° 39' 16.19408485" S	25° 41' 39.31018229" E
SS B	1	28° 39' 21.36315937" S	25° 42' 53.42427042" E

5. LAYOUT AND DEVELOPMENT FOOTPRINT SITE MAP

This section includes maps of sensitivities, as well as the preliminary infrastructure layout. As noted above, the feature and sensitivity map were prepared based on specialist findings and existing databases. Individual feature and sensitivity maps are included in the specialist studies (Appendix C of the BA Report). Individual feature maps for each specialist theme, where relevant, are also included in Section B and Section D of the BA Report. Relevant to this EMPr, the combined sensitivity and layout maps for the proposed development are included in Appendix C of this EMPr.

6. APPLICANT DECLARATION

The proponent/applicant or holder of the EA affirms that he/she will abide and comply with the prescribed impact management outcomes and impact management actions as stipulated in part B: section 1 of the generic EMPr and have the understanding that the impact management outcomes and impact management actions are legally binding. The proponent/applicant or holder of the EA affirms that he/she will provide written notice to the CA 14 day prior to the date on which the activity will commence of commencement of construction to facilitate compliance inspections.

Name: Mark Bleloch

Position: consultant with VOLTA PV (Pty) LTD directors proxy

Signature Proponent/applicant/ holder of EA Date:

9/06/2023

With proxy from directors

Mark Bleloch Pr.Eng 920 460

7. PROJECT SPECIFIC EMPR

The project specific EMPr is presented below per specialist theme.

7.1 SOILS AND AGRICULTURE

Important Note: The Agricultural Compliance Statement has concluded that there are no additional mitigation measures required, over and above what has already been included in the Generic EMPr for overhead electricity transmission and distribution infrastructure as per Government Notice 435, which was published in Government Gazette 42323 on 22 March 2019. Please refer to Appendix C.1 of the Final BA Report for the Agricultural Compliance Statement.

The impact of the substations is a loss of approximately 8.2 hectares of agricultural land. The amount of land loss is fairly small and the land is of insufficient land capability for crop production. The significance of the agricultural impact is therefore assessed as low.

7.2 VISUAL IMPACTS

Impact Management Outcomes: Reduce visual intrusion of construction, operational and decommissioning activities and infrastructure on the surrounding landscape and receptors.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
PLANNING AND DESIGN PHASE						
▪ 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. ▪ Retain and maintain natural vegetation (if present) immediately adjacent to the development footprint. ▪ Make use of existing roads wherever possible and plan the layout and construction of roads and infrastructure with due cognisance of the topography to limit cut and fill requirements. ▪ Plan all roads, ancillary buildings and ancillary infrastructure in such a way that clearing of vegetation is minimised.	To be completed post EA by relevant parties					

Impact Management Outcomes: Reduce visual intrusion of construction, operational and decommissioning activities and infrastructure on the surrounding landscape and receptors.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Consolidate infrastructure and make use of already disturbed sites rather than undisturbed areas. ▪ Consult a lighting engineer in the design and planning of lighting to ensure the correct specification and placement of lighting and light fixtures for the Facility and the ancillary infrastructure. The following is recommended: ▪ Shield the sources of light by physical barriers (walls, vegetation, or the structure itself). ▪ Limit mounting heights of fixtures, or use foot-lights or bollard lights. ▪ Make use of minimum lumen or wattage in fixtures. ▪ Making use of down-lighters or shielded fixtures. ▪ Make use of Low Pressure Sodium lighting or other low impact lighting. ▪ Make use of motion detectors on security lighting, so allowing the site to remain in darkness until lighting is required for security or maintenance purposes.						
CONSTRUCTION PHASE						
▪ Ensure that vegetation cover adjacent to the development footprint (if present) is not unnecessarily removed during the construction phase, where possible. ▪ Reduce the construction phase through careful logistical planning and productive implementation of resources wherever possible. ▪ Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. ▪ Ensure that rubble, litter, and disused construction materials are appropriately stored (if not removed daily) and then disposed regularly at licensed waste facilities. ▪ Reduce and control construction dust through the use of approved dust suppression techniques as and when required (i.e. whenever dust becomes apparent). ▪ Restrict construction activities to daylight hours in order to negate or reduce the visual impacts associated with lighting, where possible. ▪ Rehabilitate all disturbed areas (if present/if required) immediately after the completion of construction works.	To be completed post EA by relevant parties					
OPERATIONAL PHASE						
▪ Maintain roads and servitudes to forego erosion and to suppress dust. ▪ Monitor rehabilitated areas, and implement remedial action as and when required. ▪ Investigate and implement (should it be required) the potential to screen visual impacts at affected receptor sites.	To be completed post EA by relevant parties					

Impact Management Outcomes: Reduce visual intrusion of construction, operational and decommissioning activities and infrastructure on the surrounding landscape and receptors.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
DECOMMISSIONING PHASE						
▪ Remove infrastructure not required for the post-decommissioning use of the site. ▪ 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. ▪ Monitor rehabilitated areas quarterly for at least a year following decommissioning, and implement remedial action as and when required.	To be completed post EA by relevant parties					

7.3 HERITAGE IMPACTS (ARCHAEOLOGY, PALAEONTOLOGY, AND CULTURAL LANDSCAPE)

Impact Management Outcomes: Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance. Rescue information, artefacts or burials before extensive damage occurs. Minimise landscape scarring						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
PLANNING AND DESIGN PHASE						
▪ Once construction commences all aspects of the Project should be carried out within the approved footprint so as to avoid impacts to heritage resources; ▪ 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. ▪ It is recommended that the EGI is micro-sited to avoid the Tree lined avenue (Feature 871 as recorded by Orton 2016). ▪ The final pylon positions and underground powerline route should be subjected to a heritage walk down prior to development. ▪ minimum of 5 m away from all graves. The power line and associated service track must be located at least 50 m from the graves. ▪ Minimise duration of construction period. ▪ Make use of existing tracks where possible for final alignment. ▪ Ensure effective rehabilitation of areas not needed during operation. ▪ The heritage walk down report must be submitted to SAHRA for comments prior to the commencement of the development. ▪ 38(4)c(i) – 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; ▪ 38(4)c(ii) – 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. ▪ 38(4)d – See section 51(1) of the NHRA regarding offences; 38(4)e – The following conditions apply with regards to the appointment of specialists:	To be completed post EA by relevant parties					

Impact Management Outcomes: Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance. Rescue information, artefacts or burials before extensive damage occurs. Minimise landscape scarring						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ i) 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 my be required subject to permits issued by SAHRA.						
CONSTRUCTION PHASE						
<u>Archaeological and cultural impact mitigation</u> ▪ 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. ▪ Once construction commences all aspects of the Project should be carried out within the approved footprint so as to avoid impacts to heritage resources; ▪ 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. ▪ It is recommended that the EGI is micro-sited to avoid the Tree lined avenue (Feature 871 as recorded by Orton 2016). ▪ The final pylon positions and underground powerline route should be subjected to a heritage walk down prior to development. ▪ minimum of 5 m away from all graves. The power line and associated service track must be located at least 50 m from the graves. ▪ Minimise duration of construction period. ▪ Make use of existing tracks where possible for final alignment. ▪ Ensure effective rehabilitation of areas not needed during operation. <u>Palaeontological impact mitigation</u> ▪ The ESO, DEO and ECO should be made aware of the possibility that fossil remains (e.g. plants and bones, etc.) may be unearthed during excavations in the north-eastern portion of the corridor as delineated in Appendix F of the EMPr. ▪ Photographs of similar fossils must be provided to the construction contractor (as included in the Appendix E of the EMPr) and must be incorporated into the training, environmental awareness, and induction programme for construction personnel.	To be completed post EA by relevant parties					

Impact Management Outcomes: Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance. Rescue information, artefacts or burials before extensive damage occurs. Minimise landscape scarring						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ During excavations the rocks and discard must be given a cursory inspection by the ESO or designated person. Only if fossils are found in the delineated potential fossiliferous rock, then the Chance Fossil Finds Protocol (see Appendix E of this EMPr) must be implemented. ▪ The standard Chance Fossil Finds Protocol must be implemented by the ECO, ESO, DEO, CEO and, where necessary, a palaeontological specialist (refer to Appendix E of this EMPr). ▪ Construction staff sighting potential objects of palaeontological significance are to cease construction at sighted location and report to the field supervisor or Environmental Site Officer (ESO) who, in turn, must report to the ECO. ▪ If paleontological resources are uncovered during the course of the development, a professional palaeontologist must be contracted as soon as possible to inspect the paleontological resource. ▪ Photographs must be sent to the contracted palaeontologist for a preliminary assessment and if deemed necessary the palaeontologist should visit the site. ▪ Significant fossil finds should be safeguarded and reported at the earliest opportunity to the SAHRA's Archaeology, Palaeontology and Meteorites (APM) Unit (Natasha Higgitt/Phillip Hine 021 462 5402) as per section 35(3) of the NHRA. Non-compliance with section 35(3) of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule. ▪ If the newly discovered resources prove to be of palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; ▪ The contracted palaeontologist will liaise with SAHRA on the nature of the find and consequent actions (permitting and collection of find). ▪ Any fossils found by the palaeontologist should be removed. Only a professional Palaeontologist may excavate uncovered fossils with an appropriate permit obtained from SAHRA and all fossil material collected must be properly curated in an approved repository. ▪ Monitoring for fossil remains on an on-going basis by ESO/ DEO / CEO during the construction phase.						
OPERATIONAL PHASE						
▪ Ensure that the relevant construction mitigation and management measures are adhered to during the operation phase.	To be completed post EA by relevant parties					

Impact Management Outcomes: Avoid impacts (preferred) or locate and sample or rescue sites/burials before disturbance. Rescue information, artefacts or burials before extensive damage occurs. Minimise landscape scarring						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Ensure disturbance is kept to a minimum and does not exceed project requirements ▪ Ensure that all maintenance vehicles and activities stay within designated areas.						
DECOMMISSIONING PHASE						
▪ Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase. ▪ Ensure disturbance is kept to a minimum and does not exceed project requirements. ▪ Minimise duration of decommissioning period. ▪ Monitor for the presence of fossils. Construction staff sighting potential objects of palaeontological significance are to cease construction at sighted location and report to the field supervisor who, in turn, must report to the ECO. ▪ If paleontological resources are uncovered during the course of the development, a professional palaeontologist must be contracted as soon as possible to inspect the paleontological resource. ▪ Significant fossil finds should be safeguarded and reported at the earliest opportunity to the SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit (Natasha Higgitt/Phillip Hine 021 462 5402) as per section 35(3) of the NHRA. Non-compliance with section 35(3)of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule. ▪ If the newly discovered resources prove to be of palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA; ▪ The contracted palaeontologist will liaise with SAHRA on the nature of the find and consequent actions (permitting and collection of find). ▪ Any fossils found by the palaeontologist should be removed. Only a professional Palaeontologist may excavate uncovered fossils with an appropriate permit obtained from SAHRA and all fossil material collected must be properly curated in an approved repository. ▪ Ensure effective rehabilitation of all areas after completion.	To be completed post EA by relevant parties					

7.4 TERRESTRIAL BIODIVERSITY

- **Impact Management Outcomes: Maintain all activities to the designated footprint and existing roadways or built structures. Avoidance of unnecessary disturbance to site and surrounds and established buffers where required. Ensure appropriate management of alien vegetation on site. Minimize the alteration of plant communities and species.**

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
PLANNING AND DESIGN PHASE						
▪ Project Developer and Appointed Ecological Specialist to 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. ▪ Ensure the necessary permits or licenses are identified and applied for as applicable. Await response and provision of permit. Undertake plant rescue if and where required by permits. ▪ 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 (see Appendix G). Compile and finalise invasive alien plant management programme (see Appendix G).	To be completed post EA by relevant parties					
CONSTRUCTION PHASE						
<u>General</u> ▪ Limited development should take place within High sensitivity areas or buffer zones. Accordingly, the Watercourse habitats should be avoided for the placement of pylons and underground cabling. The Grassland should be avoided where possible, but with appropriate mitigation and rehabilitation impacts can be reduced. ▪ 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. ▪ The topsoil and vegetation disturbed for the underground trenches must be replaced and rehabilitated where necessary. ▪ Only the planned placement of powerlines must be disturbed. Vegetation and topsoil removal outside of these areas must be avoided. ▪ Utilise existing access routes as far as possible. ▪ Confine the movement of vehicles to the access routes to and from the site and to the construction and operation areas. ▪ Do not drive in the natural veld. ▪ Rehabilitate new vehicle tracks and areas where the soil has been compacted as soon as possible.	To be completed post EA by relevant parties					

▪ **Impact Management Outcomes: Maintain all activities to the designated footprint and existing roadways or built structures. Avoidance of unnecessary disturbance to site and surrounds and established buffers where required. Ensure appropriate management of alien vegetation on site. Minimize the alteration of plant communities and species.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Monitor the entire site for signs of erosion throughout the construction, operational and decommissioning phases of the project. ▪ Refer to Aquatic Report mitigation measures relevant to watercourse crossings and development close to watercourses.. ▪ The site camp must not be located in high sensitivity areas and their buffer zones. ▪ Dangerous goods may not be stored within 100 m of a watercourse – refer to the BESS assessment for more details. ▪ Hydrocarbon fuels must be stored in a secure, bunded area. ▪ 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. ▪ Ablution facilities must be located outside sensitive areas and their buffer zones. ▪ Portable ablution facilities must be regularly cleaned and maintained in good working condition. ▪ Any spillage from ablution facilities must be cleaned up immediately and disposed of in an appropriate manner. ▪ Vehicles must be in good working condition, with no oil, water or fuel leaks. Vehicles must be regularly inspected and any problems corrected. ▪ Refuelling may only take place in an appropriate, bunded area. Refuelling may not take place in sensitive areas. ▪ Hydrocarbon spills must be contained and cleaned up immediately. Spill kits must be available on site in case of accidental spillage <u>Vegetation clearance</u> ▪ Avoidance is the best measure. All suitable habitats should be excluded from the proposed development, where relevant. ▪ 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) ▪ Compile an alien and invasive species control and monitoring plan in terms of NEMBA <u>Alien Invasive Plant Species Control</u>						

▪ **Impact Management Outcomes: Maintain all activities to the designated footprint and existing roadways or built structures. Avoidance of unnecessary disturbance to site and surrounds and established buffers where required. Ensure appropriate management of alien vegetation on site. Minimize the alteration of plant communities and species.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Compile an alien and invasive species control and monitoring plan in terms of NEMBA. ▪ 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. Appoint a specialist or contractor to undertake a sweep and survey of the final development footprint site, with an alien invasive plant management team to remove exotic vegetation prior to the commencement of construction (see Appendix G). ▪ 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.						
OPERATIONAL PHASE						
▪ 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. ▪ A rehabilitation plan is required to restore each habitat to a natural state that is representative of the respective vegetation type after decommissioning. ▪ Compile an alien and invasive species control and monitoring plan in terms of NEMBA. ▪ Vehicles must be in good working condition, with no oil, water or fuel leaks. ▪ Vehicles must be regularly inspected and any problems corrected. ▪ Refuelling may only take place in an appropriate, designated bunded area. ▪ Any spillages must be reported immediately and dealt with appropriately. ▪ Spill kits must be available on site in case of accidental spillage. ▪ Sufficient waste disposal bins must be available on site and clearly marke	To be completed post EA by relevant parties					
DECOMMISSIONING PHASE						

▪ **Impact Management Outcomes: Maintain all activities to the designated footprint and existing roadways or built structures. Avoidance of unnecessary disturbance to site and surrounds and established buffers where required. Ensure appropriate management of alien vegetation on site. Minimize the alteration of plant communities and species.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ The loss of vegetation is unavoidable within the approved layout development footprint, but sensitive areas must be avoided. ▪ Compile an alien and invasive species control and monitoring plan in terms of NEMBA ▪ A rehabilitation plan is required to restore each habitat to a natural state after decommissioning. ▪ Ensure that there is appropriate disposal of materials and waste during decommissioning activities. ▪ Unnecessary clearance of natural vegetation should be avoided. ▪ Excessive dust can be reduced by spraying water onto the roads or other disturbed areas during construction activities. ▪ Areas where infrastructure are removed, must be revegetated with indigenous plant species. ▪ No alien species should be used for rehabilitation/revegetation or any other purpose. ▪ 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. ▪ The use of structures which may inhibit movement of fauna, e.g. mesh or electric fencing should be avoided, where feasible.	To be completed post EA by relevant parties					

7.5 AQUATIC BIODIVERSITY

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
PLANNING AND DESIGN PHASE						
▪ The proposed layout should be reviewed during the detailed designed phase (post-EA, but prior to construction), by an environmental professional (e.g. EAP, ECO or ecological specialist) to confirm that the pylon structures have been placed outside of the delineated wetland and wetland buffer zones (as shown in mapped in Figure D.6). ▪ In terms of Government Notice 509 of 2016, where the final detailed design locates power line infrastructure (e.g. pylons, etc.) within the 500 m regulated area of a watercourse, a General Authorisation must be obtained by the EA holder for the relevant section 21 water use activity as provided in the National Water Act (Act 36 of 1998), as amended, ▪ Utilisation should be made of existing disturbed areas where possible. ▪ Ensure that the Department of Water and Sanitation are consulted to confirm the need and requirements of a Water Use Licence. The relevant requirements of the National Water Act (Act 36 of 1998, as amended) regarding water use and pollution management must be always adhered to. ▪ Develop an Alien Plant Control Plan which specifies actions and measurable targets (preliminary guide available in Appendix G).	To be completed post EA by relevant parties					
CONSTRUCTION PHASE						
▪ 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. ▪ Access routes adjacent to the wetlands must make use of existing road ways and crossings where possible; ▪ Areas where construction is to take place must be clearly demarcated. Any areas not demarcated must be avoided; ▪ Storm-water generated from roadways must be captured and buffered, where flow velocities are to be significantly reduced before discharge into the environment. ▪ Storm-water verges as well as other denuded areas must be grassed (re-vegetated) with local indigenous grasses to protect against erosion; ▪ Any materials excavated must not be deposited in the wetlands or areas where it is prone to being washed downstream or impeding natural flow;	To be completed post EA by relevant parties					

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ 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); ▪ Stockpiling or storage of materials and/or waste must be placed beyond the defined buffers in this report for each respective activity; ▪ No vehicles shall enter watercourse buffer zones outside of construction footprints; ▪ No vehicles shall be serviced on site; a suitable workshop with appropriate pollution control facilities should be utilised offsite; ▪ Hydrocarbons for refuelling purposes must be stored in a suitable storage device on an impermeable surface outside of the delineated wetland buffer zone; ▪ Disturbed areas must be re-vegetated after completion of the phase; - A three-month timeframe for the initiation of this action; - Ripping of the soils should occur in two directions; and - Removed vegetation and topsoil can be harvested and applied here. ▪ Drainage channels constructed for the access roads must be constructed so as not to result in erosion; ▪ 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; ▪ Sediment screens must be inspected, maintained and cleared every month or after significant rainfall (>150mm/24hrs); ▪ An alien vegetation removal and management plan must be implemented along the verges of the roads and crossing points; ▪ General storm-water management practices should be included in the design phase and implemented during the construction phase of this project; and ▪ 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. ▪ 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 sub-soils placed in the trench and covered by topsoil's.						

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ The underground powerlines must be protected from lateral sub-surface flows by using a suitable casing of the engineers choice. ▪ 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 encountered a hydropedology study may be required.						
OPERATIONAL PHASE						
▪ The implementation of a suitable storm-water management plan for the disturbance footprint must be in place and implemented by this phase; ▪ 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; ▪ An annual audit of the roads for signs of environmental disturbance outside of the footprint area must be conducted; and ▪ Alien invasive management programmes should continue throughout the duration of the activity. ▪ Watercourse monitoring should take place annually as part of the environmental management plan. <u>Management of spills, stormwater and pollution</u> ▪ Develop norms and practices for the treatment of hydrocarbon or chemical spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills. ▪ Control waste discharges and do not allow wastewater from operational activities to enter the watercourse. ▪ Effective culverts should be incorporated into the design of access roads. ▪ Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer. ▪ Monitoring should be done to ensure that sediment pollution is timeously dressed. ▪ Treatment of pollution identified should be prioritized according to best practice guidelines. ▪ Ongoing monitoring of the structures, in particular before the rainfall period, should be undertaken to ensure that the integrity of the structures is intact and that they are not	To be completed post EA by relevant parties					

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
blocked with debris. Ongoing monitoring post large rainfall events should also be undertaken to identify and address any erosion occurring within the watercourses. ▪ Regular independent water quality monitoring should form part of operational procedures in order to identify pollution. ▪ 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 EMPr. <u>Alien Invasive Plant Species Control and Rehabilitation</u> ▪ Implement the Alien Plant Control Plan which was developed in the planning and design phase. ▪ Invasive alien plant material that has been cleared should be removed from the site; ▪ 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. ▪ Operational activities should not impact on rehabilitated or naturally vegetated areas. ▪ Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed.						
DECOMMISSIONING PHASE						
▪ A suitable rehabilitation and closure plan must be developed for the project. ▪ It is recommended that all infrastructure installed is effectively decommissioned and removed from the site. ▪ 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. ▪ Access routes into or adjacent to the wetlands must make use of existing road ways and crossings where possible; ▪ Areas where construction is to take place must be clearly demarcated. Any areas not demarcated must be avoided; ▪ Storm-water generated from roadways must be captured and buffered, where flow velocities are to be significantly reduced before discharge into the environment. ▪ Storm-water verges as well as other denuded areas must be grassed (re-vegetated) with local indigenous grasses to protect against erosion;	To be completed post EA by relevant parties					

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Any materials excavated must not be deposited in the wetlands or areas where it is prone to being washed downstream or impeding natural flow; ▪ 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); ▪ Stockpiling or storage of materials and/or waste must be placed beyond the defined buffers in this report for each respective activity; ▪ No vehicles shall enter watercourse buffer zones outside of construction footprints; ▪ No vehicles shall be serviced on site; a suitable workshop with appropriate pollution control facilities should be utilised offsite; ▪ Hydrocarbons for refuelling purposes must be stored in a suitable storage device on an impermeable surface outside of the delineated wetland buffer zone; ▪ Disturbed areas must be re-vegetated after completion of the phase; - A three-month timeframe for the initiation of this action; - Ripping of the soils should occur in two directions; and - Removed vegetation and topsoil can be harvested and applied here. ▪ Drainage channels constructed for the access roads must be constructed so as not to result in erosion; ▪ 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; ▪ Sediment screens must be inspected, maintained and cleared every month or after significant rainfall (>150mm/24hrs); ▪ An alien vegetation removal and management plan must be implemented along the verges of the roads and crossing points; ▪ General storm-water management practices should be included in the design phase and implemented during the construction phase of this project; and ▪ 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. <u>Demarcation of Working Area</u> ▪ For all project-related components within the site, the aquatic features of high sensitivity should be demarcated by the appointed ECO before the commencement						

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
of the decommissioning activities and treated as no-go areas during the decommissioning phase. ▪ Ensure that no decommissioning activities impact on the watercourse or buffer area. This includes edge effects. <u>Waste Management and Housekeeping</u> ▪ Appoint a reliable contractor for the removal of refuse during the decommissioning phase. ▪ Ensure that there is appropriate disposal of materials and waste. ▪ Provision of adequate ablution facilities for personnel; these ablution facilities should not be placed within 100m of any of any aquatic features or its associated buffer zone delineated within the site. <u>Management of spills, stormwater and pollution</u> ▪ Control of waste discharges and do not allow dirty water from decommissioning activities to enter the watercourse. ▪ Culverts must remain in place and must not removed if the given road is not removed during the decommissioning phase. ▪ Develop norms and practices for the treatment of hydrocarbon or chemical spills such as oil or hydraulic fluid. Ensure that the required equipment is available on hand to contain any spills. ▪ Maintenance of construction vehicles/equipment should not take place within the watercourse or watercourse buffer. ▪ 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 hardened surfaces (compaction) and consequent erosion risk. ▪ Monitoring should be done to ensure that sediment pollution is timeously dressed. ▪ Treatment of pollution identified should be prioritized according to best practice guidelines. ▪ Regular independent water quality monitoring should form part of decommissioning procedures in order to identify pollution. <u>Alien Invasive Plant Species Control and Rehabilitation</u>						

Impact Management Outcomes: Limit the disturbance of aquatic habitat; minimise potential for erosion. Limit the potential for contamination/pollution of aquatic ecosystems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Implement the Alien Plant Control Plan which was developed in the planning and design phase. ▪ Monitor the establishment of alien invasive species within the areas affected by the decommissioning and take immediate corrective action where invasive species are observed to establish. ▪ Invasive alien plant material that has been cleared should be removed from the site; ▪ 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. ▪ Progressive rehabilitation must occur. Rehabilitation has to be take place as soon as decommissioning commences to prevent soil erosion. ▪ Rehabilitation of any disturbed areas within the aquatic features and the recommended buffer areas should be undertaken immediately following completion of the disturbance activity according to rehabilitation measures as included in a method statement for that specific activity. ▪ A mixture of indigenous vegetation seed must be used during rehabilitation. The mix must include: Annual and perennial species, pioneer species. These species must be indigenous to the area to ensure there is no ecological imbalance in the area. ▪ Monitor rehabilitation and the occurrence of erosion twice during the rainy season for at least two years and take immediate corrective action where needed. ▪ Decommissioning activities should not impact on rehabilitated or naturally vegetated areas.						

7.6 AVIFAUNA IMPACTS

Impact Management Outcomes: Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.) Prevent bird collisions with the 132 kV power lines						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
CONSTRUCTION PHASE						
▪ 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. ▪ Minimise light pollution and fit external lighting with downward facing hoods. ▪ Enforce a speed limit of 40 km/h on site. ▪ If necessary apply dust-suppression measures (road wetting) to limit dust. ▪ Limit the areas cleared for construction purposes (e.g. laydown areas). ▪ Do not implement a bare earth policy for construction of road servitudes ▪ Rehabilitate all areas disturbed immediately after construction. ▪ Prioritise existing roads for access routes. ▪ Develop and implement an Alien and Invasive Plant Control Plan. ▪ All staff must undergo a strict induction process to inform them of the importance of preventing fires. ▪ A site-specific CEMPr must be implemented, which gives appropriate and detailed description of how construction activities must be conducted. All contractors are to adhere to the CEMPr and should apply good environmental practice during construction. The CEMPr must specifically include the following: ▪ Activity should be restricted to a working corridor as close as possible to the footprint of the infrastructure. ▪ Vegetation clearance should be limited to what is absolutely necessary. ▪ Driving restricted to authorised roads; ▪ Measures to control noise and dust should be applied according to current best practice in the industry. ▪ Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum as far as practical. ▪ Access to the rest of the property must be restricted.	To be completed post EA by relevant parties					

Impact Management Outcomes: Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.) Prevent bird collisions with the 132 kV power lines						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Strict application of all recommendations in the biodiversity specialist report pertaining to the limitation of the footprint. ▪ Entire power line to be fitted with Eskom approved Bird Flight Diverters (BFDs).						
OPERATIONAL PHASE						
▪ Limit the areas cleared for construction purposes (e.g. laydown areas). ▪ Do not implement a bare earth policy for construction of road servitudes ▪ Rehabilitate all areas disturbed immediately after construction. ▪ Prioritise existing roads for access routes. ▪ Develop and implement an Alien and Invasive Plant Control Plan. ▪ All staff must undergo a strict induction process to inform them of the importance of preventing fires. ▪ 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. ▪ Minimise light pollution and fit external lighting with downward facing hoods. ▪ Enforce a speed limit of 40 km/h on site. ▪ If necessary apply dust-suppression measures (road wetting) to limit dust. ▪ wherever possible, alignment to existing electrical transmission infrastructure is undertaken. ▪ Where the creation of new transmission lines is necessary, attempts should be made to minimise the route length to the closest existing substation and that the route be aligned with existing powerlines/roads as far as possible. Additionally, the route should avoid wetland crossings or potentially be routed underground if this is not possible. ▪ Install Eskom-approved bird flight diverters (flappers or coils) on the new above-ground transmission lines and any guide-wires used to anchor infrastructure such as pylons. This can help to increase the visibility of transmission lines and other infrastructure, especially the thinner earth line with which most collisions tend to be associated.	To be completed post EA by relevant parties					

Impact Management Outcomes: Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.) Prevent bird collisions with the 132 kV power lines						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Bird flight diverters need to be closely spaced (<15 m[5]) on OHPLs and must glow in the dark or have a light source to make the transmission lines more visible .This is specifically important because the proposed OHPL will be placed underneath existing OHPLs at right angles and will need to take every precaution to prevent collisions by flamingos that migrate at night. ▪ 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. ▪ In all areas where service road intersect with semi natural or natural habitat, all fences must be set back at least (strictly) 75 metres from the edge of every service road in order to allow for vulnerable species such as bustards, storks, cranes and korhaans to obtain adequate height after being flushed by vehicle traffic. Alternatively, the fences must be placed completely adjacent to the roads with a maximum of 3 metres buffer and marked with fence flappers in order to reduce flush-related collisions. ▪ wherever possible, alignment to existing electrical transmission infrastructure is undertaken. ▪ Where the creation of new transmission lines is necessary, attempts should be made to minimise the route length to the closest existing substation and that the route be aligned with existing powerlines/roads as far as possible. Additionally, the route should avoid wetland crossings or potentially be routed underground if this is not possible. ▪ Install Eskom-approved bird flight diverters (flappers or coils) on the new above-ground transmission lines and any guide-wires used to anchor infrastructure such as pylons. This can help to increase the visibility of transmission lines and other infrastructure, especially the thinner earth line with which most collisions tend to be associated. ▪ Bird flight diverters need to be closely spaced (<15 m5) on OHPLs and must glow in the dark or have a light source to make the transmission lines more visible .This is specifically important because the proposed OHPL will be placed underneath existing OHPLs at right angles and will need to take every precaution to prevent collisions by flamingos that migrate at night. ▪ 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.						

Impact Management Outcomes: Prevent unnecessary displacement of avifauna by ensuring that contractors are aware of the requirements of the Construction Environmental Management Programme (CEMPr.) Prevent bird collisions with the 132 kV power lines						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ In all areas where service road intersect with semi natural or natural habitat, all fences must be set back at least (strictly) 75 metres from the edge of every service road in order to allow for vulnerable species such as bustards, storks, cranes and korhaans to obtain adequate height after being flushed by vehicle traffic. Alternatively, the fences must be placed completely adjacent to the roads with a maximum of 3 metres buffer and marked with fence flappers in order to reduce flush-related collisions.						
DECOMMISSIONING PHASE						
▪ 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. ▪ Minimise light pollution and fit external lighting with downward facing hoods. ▪ Enforce a speed limit of 40 km/h on site. ▪ If necessary apply dust-suppression measures (road wetting) to limit dust. ▪ Limit the areas cleared for construction purposes (e.g. laydown areas). ▪ Do not implement a bare earth policy for construction of road servitudes ▪ Rehabilitate all areas disturbed immediately after construction. ▪ Prioritise existing roads for access routes. ▪ Develop and implement an Alien and Invasive Plant Control Plan. ▪ All staff must undergo a strict induction process to inform them of the importance of preventing fires.	To be completed post EA by relevant parties					

7.7 GENERIC MANAGEMENT ACTIONS TO SUPPLEMENT APPENDIX E OF THIS EMPR

Impact Management Outcomes: Ensure overall best practice is achieved.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
CONSTRUCTION PHASE						
▪ 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 D 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). ▪ 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. ▪ 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. Leak detection monitoring systems must be implemented. ▪ 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. ▪ The National Department of Forestry, Fisheries and the Environment, and the Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs are 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. ▪ 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.	To be completed post EA by relevant parties					

Impact Management Outcomes: Ensure overall best practice is achieved.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Portable chemical toilet/s (ablution facilities) at the construction camp, must be serviced weekly for the duration of the construction phase by an appropriately licensed service provider. ▪ Care should be taken with the installation of conservancy tanks to prevent cracks that could lead to leaks over time. Proper and regular servicing must be scheduled to prevent possible groundwater contamination. ▪ 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. ▪ Ensure that the contact details of the local municipality, Eskom and emergency response officials, such as the police and fire department are kept on file and clearly sign-posted on site (and, where possible, at key locations along the EGI corridor). ▪ 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 and Contractor are made aware of planned hunts. ▪ Ensure that construction personnel are made aware of the planned hunts and are trained on the necessary protocols to be taken. ▪ Any signs of bird collisions / fatalities are to be recorded during the construction phase ▪ An Environmental File is to be created by the EA holder or the contractor and be situated within the site camp throughout the construction phase and with the EA holder thereafter. The environmental file is to include the following: - Copies of all approvals, including: Environmental Authorization, Water Use Licence and any other license/permit/approval. - A copy of the approved EMPr - Copies of waste disposal slips - Disposal slips or cleaning/servicing slips for ablution facilities (i.e. chemical toilets) - All EMR's (Environmental Monitoring Reports) and ECO instructions - Copies of Environmental Induction Registers - A Complaints Register - Updated method statements - Material Safety Data Sheets (MSDS) for all hazardous substances utilised on site. - Copies of audit reports						

Impact Management Outcomes: Ensure overall best practice is achieved.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
- An Incident Register - Copies of purchase orders for rehabilitation material etc.						
OPERATIONAL PHASE						
▪ Ensure that the relevant construction mitigation and management measures are adhered to during the operation phase.	To be completed post EA by relevant parties					
DECOMMISSIONING PHASE						
▪ Ensure that the relevant construction mitigation and management measures are adhered to during the decommissioning phase.	To be completed post EA by relevant parties					

7.8 GEOHYDROLOGY IMPACTS

Impact Management Outcomes: To reduce the impact of the proposed project on the groundwater resources. To prevent the lowering of groundwater levels as a result of over-abstraction (should ground water be used during the project phases). To reduce the potential of groundwater pollution.

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
DESIGN PHASE						
▪ 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. ▪ 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. ▪ 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. ▪ 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. ▪ Any construction vehicles/engines that stand in one place for an excessive length of time must have drip trays ▪ 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.	To be completed post EA by relevant parties.					
CONSTRUCTION PHASE						
▪ Electrolyte spillage to be mitigated through leak detection, double containment and suitably designed bunding for the structure, approved by a qualified professional. ▪ 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. ▪ Maintenance of solar panels to be closely monitored and the use of hazardous chemical products to be avoided when solar panels are cleaned. ▪ Recycled water for maintenance purposes should be of such a quality that it would not jeopardise underground resources. ▪ Groundwater quality monitoring to be done during project operation in order to identify possible ground water contamination.	To be completed post EA by relevant parties.					
DECOMMISSIONING PHASE						

Impact Management Outcomes: To reduce the impact of the proposed project on the groundwater resources. To prevent the lowering of groundwater levels as a result of over-abstraction (should ground water be used during the project phases). To reduce the potential of groundwater pollution.

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
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; ▪ 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. ▪ 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. ▪ 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. ▪ Chemical ground water monitoring to be done during project decommissions in order to identify possible ground water contamination.	To be completed post EA by relevant parties.					

7.9 TRAFFIC IMPACTS

Impact Management Outcomes: Manage impact that additional traffic generation will have on the road network. Plan the project to spread and reduce the amount of road-based traffic and avoid local congestion periods during the construction phase.

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
DESIGN PHASE						
▪ 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 and authorisation needs to be obtained from the relevant road authorities to modify the road reserve to accommodate turning movements at intersections (if necessary). ▪ The route to the sites should be further investigated to ensure that abnormal loads are not obstructed at any point by geometric, height and width limitations along the route. ▪ Discussions must be held with the relevant landowners on which the internal gravel access farm road leading to the sites is located, prior to commencement to confirm requirements and details of the agreement. ▪ Ensure that the requirements for use of the gravel access farm road leading to the sites are addressed and considered in the design, as and where applicable. ▪ Provide a Transport Traffic Plan to the Provincial and Municipal Road Department (if required). ▪ 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. ▪ 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 the relevant authorities (i.e., the Mpumalanga Department of Public Works, Roads, and Transport) before implementation thereof may commence. ▪ A similar geotechnical report must be compiled, and approval obtained from the relevant authorities prior to commencing with any major upgrade or decommissioning phase. ▪ 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 D619 and D823) 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	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage impact that additional traffic generation will have on the road network. Plan the project to spread and reduce the amount of road-based traffic and avoid local congestion periods during the construction phase.

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
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.						
CONSTRUCTION PHASE						
The impacts during the construction stage are temporary and short term in nature. The impacts can be mitigated to an acceptable level. Traffic is expected to return to normal levels after construction is completed. ▪ Noise, dust and exhaust pollution during the construction phase cannot be completely mitigated but the following mitigation measures will significantly reduce the impact: ▪ The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods. ▪ Dust suppression of gravel roads during the construction phase, as required. ▪ The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road networks. ▪ Staff and general trips should occur outside of peak traffic periods as far as possible. ▪ The preferred abnormal load travel routes should be surveyed to identify problem areas (e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification). ▪ Design and maintenance of internal roads. Any internal gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.	To be completed post EA by relevant parties.					
OPERATIONAL PHASE						
▪ The impacts during the operation stage are long term in nature. It must however be noted that the cleaning of solar PV panels occurs four (4) times a year thus, the number of occurrences of this trip generator is low. The impacts can be mitigated to an acceptable level. Traffic is expected return to normal levels after cleaning is completed. ▪ Noise, dust, and exhaust pollution cannot be completely mitigated but the following mitigation measures will significantly reduce the impact: ▪ The delivery of water to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Manage impact that additional traffic generation will have on the road network. Plan the project to spread and reduce the amount of road-based traffic and avoid local congestion periods during the construction phase.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible Person	**Method of Implementation**	**Timeframe for Implementation**	**Responsible Person**	**Frequency**	**Evidence of Compliance**
▪ Dust suppression of gravel roads during the construction phase, as required. ▪ The use of on-site water sources (e.g., borehole water) would decrease the traffic impact on the surrounding road networks. ▪ Maintenance of internal roads to maintain good riding quality.						
DECOMMISSIONING PHASE						
▪ Ensure that the construction mitigation and management measures are adhered to during the decommissioning phase.	To be completed post EA by relevant parties.					

7.10 GENERIC MANAGEMENT ACTIONS TO SUPPLEMENT APPENDIX F OF THIS EMPR

Impact Management Outcomes: Ensure overall best practice is achieved.

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
CONSTRUCTION PHASE						
▪ 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 temporary site camp and ablution facilities (the buffers assigned to water courses should also be avoided, where possible in this regard). ▪ 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. ▪ 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. Leak detection monitoring systems must be implemented. ▪ 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. ▪ The National Department of Environment, Forestry and Fisheries and the Western Cape Department of Environmental Affairs and Development Planning (DEADP) Pollution and Chemicals Management Directorate are 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. ▪ 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.	To be completed post EA by relevant parties.					

Impact Management Outcomes: Ensure overall best practice is achieved.

Impact Management Actions	Implementation			Monitoring		
	Responsible Person	Method of Implementation	Timeframe for Implementation	Responsible Person	Frequency	Evidence of Compliance
▪ Portable chemical toilet/s (ablution facilities) at the construction camp, must be serviced weekly for the duration of the construction phase. ▪ Care should be taken with the installation of conservancy tanks to prevent cracks that could lead to leaks over time. Proper and regular servicing must be scheduled to prevent possible groundwater contamination. ▪ 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. ▪ Ensure that the contact details of the local municipality, Eskom, and emergency response officials, such as the police and fire department are kept on file and clearly sign-posted on site. ▪ 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 and Contractor are made aware of planned hunts. ▪ Ensure that construction personnel are made aware of the planned hunts and are trained on the necessary protocols to be taken. ▪ 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. ▪ Any signs of bat collisions / fatalities are to be recorded during the construction phase.						
OPERATIONAL PHASE						
▪ Ensure that the relevant construction mitigation and management measures are adhered to during the operation phase.	To be completed post EA by relevant parties.					
DECOMMISSIONING PHASE						
▪ Ensure that the relevant construction mitigation and management measures are adhered to during the decommissioning phase.	To be completed post EA by relevant parties.					

8. APPENDIX A – CV OF THE EAP & CO-AUTHOR

CV OF PAUL LOCHNER

Employer: Council for Scientific and Industrial Research (CSIR)
PO Box 320, Stellenbosch, 7600, South Africa
Phone: +27 21 888 2486 (w), +27 84 442 3646 (cell)
Email: plochner@csir.co.za
Date of Birth: 13 June 1969
Nationality: South African

BIOSKETCH

Paul Lochner is an environmental assessment practitioner at the CSIR in Stellenbosch, with 28 years of experience in a wide range of environmental assessment and management studies. His 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 in South Africa, and also has wide experience in Environmental & Social Impact Assessment, Environmental Management Programs and Environmental Screening Studies.

PERSONAL SKILLS AND CAPABILITIES

- Holistic understanding of environmental and social aspects at policy, program and project levels
- Ability to lead, inspire and motivate a team of environmental scientists in a consulting business
- Coordination of experts from diverse disciplines to support evidence-based decision-making
- Ability to integrate of environmental, social and economic aspects within a systems model
- Design of innovative processes to respond effectively to proposals and meet needs of clients
- Review and quality assurance for environmental assessment processes and reports
- Project management, financial management, report writing and communication skills.

EDUCATION

- BSc (Civil Engineering) awarded with Honours, *University of Cape Town*, 1990
- MPhil (Environmental Science), *University of Cape Town,* 1992

EMPLOYMENT

- Environmental scientist at CSIR (Stellenbosch) from October 1992 to present.
- Group Leader of CSIR Environmental Management Services since August 2008.

PROFESSIONAL REGISTRATION

- Environmental Assessment Practitioners Association of South Africa (EAPASA), Registration Number 2019/745

PROFESSIONAL MEMBERSHIP AND POSITIONS HELD

- Member of the International Association for Impact Assessment (IAIA)
- 1996 to present: Chairperson of Blouvlei Intaka Island Environmental Committee at Century City, Cape Town, which oversees management of the Intaka Island Nature Reserve
- 2010 to present: Chairperson of Intaka Island Environmental Trust, that oversees the operation of the Eco-centre and education program at the Intaka Island Nature Reserve
- 2017: Conference Organising Committee member and Program Director for IAIA South Africa national conference, August 2017, Goudini.

LANGUAGE CAPABILITY

	Speaking	*Reading*	*Writing*
English	Excellent	Excellent	Excellent
Afrikaans	Average	Average	Average

TRACK RECORD OF PROFESSIONAL EXPERIENCE

This is an abbreviated record of experience. A full record is available on request. Projects are located in South Africa unless otherwise stipulated.

Duration	Project description	Role	Client
2019 (in progress)	**Basic Assessments** for proposed PV and EGI Developments near Ceres	Project leader	Veroniva (PTY) Ltd
2019 (in progress)	**Environmental scoping** for a Desalination Plant and Water Carriage System for water supply to Windhoek and the central coastal area of Namibia	Project author	NamWater (Namibia) and KfW Development Bank (Germany)
2019 (in progress)	**Environmental Performance Compliance Study** for Foundries in South Africa	Project reviewer	National Foundries Technology Network
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)

Duration	Project description	Role	Client
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
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)

Duration	Project description	Role	Client
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 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 Blouvlei 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 Rietvlei 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.

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., Dludla, 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*.

CV OF ABULELE ADAMS

CURRICULUM VITAE – Abulele Adams Pr.Sci.Nat

Address: PO Box
7600, South Afric
Cell : +2772 239
Email: abuadams

Touching lives through innovation

Present position: Senior Environmental Scientist
Full Name: Adams, Abulele
Professional Registration: Pr.Sci.Nat. Environmental Science – Reg 400168/17
Nationality: South African
Marital Status: Single
Languages: English and isiXhosa
Years of professional Experience: 9 years

BIOSKETCH

Abulele has been working as an environmental assessment practitioner at the Council for Scientific and Industrial Research (CSIR) since January 2014. She holds a Master of Science in Geography from the Nelson Mandela Metropolitan University (now Nelson Mandela University) in Port Elizabeth. Her undergraduate degree was a BSc in environmental science with Honors in Geographic Information Systems. She also completed a year of courses in the Sustainability Economics and Management Masters programmes at the Carl von Ossietzky University of Oldenburg, Germany.

Abulele has worked on the South African National Strategic Infrastructure Projects including the Phase 1 and Phase 2 National Wind & Solar PV Strategic Environmental Assessment (SEA), Electricity Grid Infrastructure SEA as well as the Square Kilometre Array SEA which were commissioned by the national Department of Environment, Forestry and Fisheries. In addition, she has worked on a municipal capacity development project which aims at collaborating with local municipalities to increase capacity in strategic planning areas including municipal Integrated Development Plans and Spatial Development Frameworks. Abulele is a past president of the International Association for Impact Assessment (IAIA) South Africa as well as the International Association for Impact Assessment Students and Young Professionals Section Co-Chair Committee. She is the current chair for the IAIA Climate Change Symposium taking place in Cape Town, South Africa in September 2022. She is also the recipient of the Mail and Guardian 200 Young South Africans list that celebrates young people who are making strides in their chosen fields, and charting the way for the many other South Africans.

PROJECT TRACK RECORD

The following table presents a list of projects that Abulele Adams has been involved in to date:

Completion Date	Project description	Role	Client	Country
In progress	**Development of a Research and Guidanc Document** for the Department of Economi Development, Environmental Affairs an Tourism for Environmental Officials in Support o Environmental Assessments for Renewabl energy Projects in the Eastern Cape	Project Manager	Department of Economi Development, Environmenta Affairs and Tourism	South Africa
In progress	**Anglo Municipal Capability & Partnershi Programme**	Municipal Coordinator	Anglo American	South Africa
In progress	**National Foundry Technology Networ Environmental Compliance and Performanc Improvement for the Foundry Industry i South Africa – Phase 2**	Project Manager	The National Foundry Technolog Network	South Africa
In progress	**Anglo American Smart Power**	Technical - GIS	Anglo American	South Africa Namibia
October 2021	**Biodiversity and Land use Project** - Development of site specific biodiversit protocols for environmental impact assessment	Project manager	South Africa National Biodiversit Institute (SANBI)	South Africa
December 2020	**EIA review -** Proposed Inyanda-Roodeplaa wind energy facility, Farm Roodeplaat Uitenhage, Eastern Cape.	Project manager Reviewer	National Department o Environment, Forestry an Fisheries	South Africa
September 2020	**Environmental Screening Study (x4)** for th development of the proposed Secunda Impumelelo and eGoli 1 Renewable Energ Facilities (REFs) and the eGoli 2 Wind Energ Facility, and BAs (x4) for the supporting electrica infrastructure	Technical - GIS	ENERTRAG South Africa (Pty) Lt	South Africa
September 2020	**A desktop fatal flaw assessment** of th property affected by the proposed developmen of Project Suikerbekkie, a Solar PV energ facility near Windmeul, Western Cape Province	Project member Technical - GIS	ABO Wind Renewable Energie (Pty) Ltd	South Africa
July 2020	**Environmental Compliance and Performanc Improvement** for the Foundry Industry in Sout Africa	Technical-GIS	The National Foundry Technolog Network	South Africa
May 2020	**A desktop fatal flaw assessment** of th properties affected by the propose development of Project Rinkhals 1 and 2, a Sola PV energy facility near Kimberley, Northen Cape Province	Project member Technical - GIS	ABO Wind Renewable Energie (Pty) Ltd	South Africa
April 2020	**A desktop fatal flaw assessment** of th properties affected by the propose development of two Solar PV energy project near Kimberley, Northern Cape and Vryburg North West Province.	Project member Technical - GIS	ABO Wind Renewable Energie (Pty) Ltd	South Africa

Completion Date	Project description	Role	Client	Country
January 2020	**3 x Basic Assessments** for Phase 2 Scatec Solar PV 4, 5 and 6 near Kenhardt, Northern Cape	Project member Technical-GIS	Scatec Africa Solar	South Africa
December 2019	**MCDP High Level Scan** of Municipal Development Planning Capacity Implications	Project member reviewer	Anglo American	South Africa
October 2019	**CSIR review** of potential for large-scale wind farm development in the Kouga area	Technical-GIS	RedCap Energy	South Africa
July 2019	**Environmental & Social Impact Assessment** for the 2 x 75 MW Wind Energy Facility in the Greater Accra Region, Ghana	Project manager Technical-GIS	Volta River Authority	Ghana
October 2019	**Strategic Environmental Assessment (SEA)** for roll out of photovoltaic solar energy in South Africa Phase 2	Project manager Technical-GIS	National Department of Environmental Affairs	South Africa
August 2018	**Special Needs and Skills Development Programme**	Technical -GIS	National Department of Environmental Affairs	South Africa
May 2017	**Strategic Environmental Assessment (SEA)** for Square kilometre Array phase 1	Project member Technical-GIS	National Department of Environmental Affairs	South Africa
March 2017	**Basic Assessment** for broiler chicken farm and abattoir in Pretoria	Project manager Technical-GIS	Edward Teffu	South Africa
March 2016	**Strategic Environmental Assessment (SEA)** for Electricity Grid Infrastructure	Project member stakeholder engagement Technical –GIS and project support	National Department of Environmental Affairs	South Africa
March 2015	**Environmental Screening study** for the Amatikulu Aquaculture phase 1 project	Project member - technical GIS	Department of Agriculture Forestry and Fisheries	South Africa
August 2014	**National Strategy for Sustainable Development review**	Project member research	National Department of Environmental Affairs	South Africa
December 2014	**Strategic Environmental Assessment (SEA)** for roll out of photovoltaic solar energy in South Africa.	Project member technical GIS stakeholder engagement and project support	National Department of Environmental Affairs	South Africa

EMPLOYMENT RECORD

- **2014** Environmental Scientist and Assessment Practitioner. Council for Scientific and Industrial Research – Implementation Unit - Stellenbosch

QUALIFICATIONS

- MSc Geography

  - Thesis: Towards Measuring Corporate Sustainability in the Nelson Mandela Bay Automotive Manufacturing Sector
- BSc Hons. Geographic Information Systems
  - Modules: Human environment Interaction, Cartography, Geographic Information Systems, remote Sensing and Environmental Impact Studies
- BSc Environmental Science
  - Majors: Botany and Geography

SHORT-COURSES, CONFERENCES GUEST LECTURES AND WORKSHOPS

Date	Workshop and conference description	Location
September 2022	International Association for Impact Assessment Climate Change Symposiun	Cape Town, South Africa
May 2022	NCPC-SA 5th biennial Industrial Efficiency Conference on 25 and 26 May 202	Pretoria, South Africa
May 2022	International Association for Impact Assessment Annual Conference	Vancouver, Canada
October 2021	WindAc Africa	Cape Town, South Africa
September 2021	International Association for Impact Assessment South Africa Nationa Conference	Online
October 2020	Windaba	Online
May 2020	International Association for Impact Assessment Annual Conference	Online
September 2019	Conference on Wind Energy and Wildlife Impacts	Stirling, Scotland
August 2019	International Association for Impact Assessment South Africa Nationa Conference	Bela-Bela, South Africa
May 2019	International Association for Impact Assessment Annual Conference	Brisbane, Australia
May 2018	International Association for Impact Assessment Annual Conference	Durban, South Africa
August 2017	Guest lecture on strategic environmental assessment for the strategi infrastructure projects in support of the SA national development plan	University of Cape Town
October 2016	Project Management Principles and Practices with MS 2 accreditation throug the University of Pretoria	Pretoria, South Africa
August 2016	International Association for Impact Assessment South Africa Nationa Conference	Port Elizabeth, South Africa
September 2015	International Renewable Energy Conference on renewable energy resourc data for Africa	Nairobi, Kenya
July 2015	Project Management 1 accreditation through the CSIRs Innovation Leadership and Learning Academy Project Management Course	Pretoria, South Africa
February 2015	IAIA WC Workshop for Integrating Climate Change into EIA practice	Cape Town, South Africa
January 2015	CSIR Media & Science Communication Training on January 2015 at CSIF Stellenbosch	Stellenbosch, South Africa
August 2014	International Association for Impact Assessment South Africa Nationa Conference from August 2014	Midrand, South Africa
June 2014	Society of South African Geographers Annual Conference	East London, South Africa
November 2014	Clim-A-Net workshop - DAAD Germany-South Africa exchange programme	Port Elizabeth, South Africa

Date	Workshop and conference description	Location
April 2014	Clim-A-Net workshop – DAAD Germany-South Africa exchange programme	Lushoto, Tanzania
June 2012	Clim-A-Net workshop - DAAD Germany-South Africa exchange programme - Summer School programme	Oldenburg, Germany

LANGUAGES

	Speaking	Reading	Writing
isiXhosa (Home language)	Excellent	Excellent	Excellent
English	Excellent	Excellent	Excellent
isiZulu	Fair	Fair	Fair
Afrikaans	Basic	Basic	Basic

PROFESSIONAL AFFILIATIONS

- South African Council for Natural Scientific Professions (SACNASP) Professional Natural Scientist (Membership number: 400168/17)
- International Association for Impact Assessment (IAIA) South Africa National Executive Committee member 2017 – current. Membership Number 3583

Awards

2019 Mail and Guardian 200 Young South Africans – Environment Category

2018 International Association for Impact Assessment (IAIA) award to the DEA- CSIR-SANBI team for their role in the advancement of environmental assessment in southern Africa, through the program of SEAs conducted for energy planning for South Africa over the past 5 years

2016 International Association for Impact Assessment (IAIA) South Africa National Conference - best poster

2015 CSIR Implementation Unit Excellence Awards: Outstanding Contribution by a Team - National Wind and Solar PV and Electricity Grid Infrastructure Strategic Environmental Assessments

2012 Golden Key International Academic Honours Association

9. APPENDIX B – ROLES AND RESPONSIBILITIES

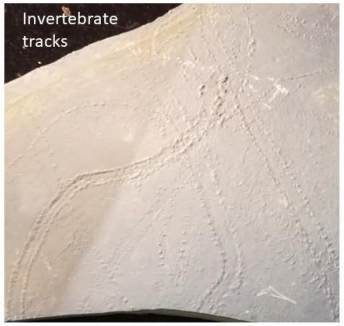
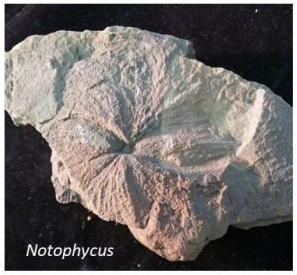
Responsible Person(s)	Role and Responsibilities
Developer's Project Manager (DPM)	Role The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted 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. Responsibilities - 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)	Role 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. Responsibilities - 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)	Role 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

Responsible Person(s)	Role and Responsibilities
	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. 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. <u>Responsibilities</u> The responsibilities of the ECO will include the following: - 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;

Responsible Person(s)	Role and Responsibilities
	- 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)	Role 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. Responsibilities - 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	Role 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. Responsibilities - project delivery and quality control for the development services as per appointment;

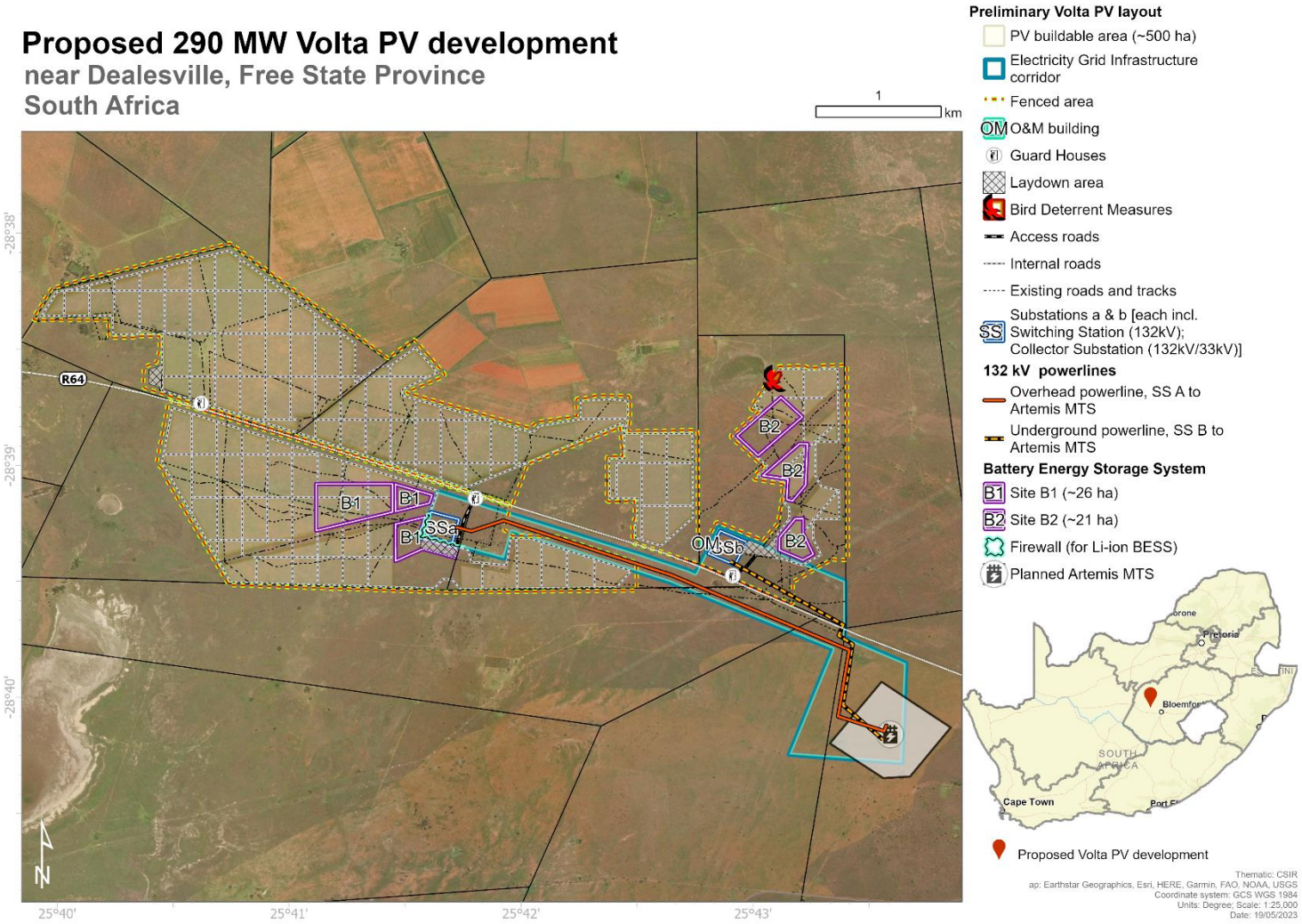
Responsible Person(s)	Role and Responsibilities
	- employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented 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)	<u>Role</u> 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: <u>Responsibilities</u> - 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.

10. APPENDIX C – CHANCE FIND PROCEDURE FOR PALAEONTOLOGICAL RESOURCES

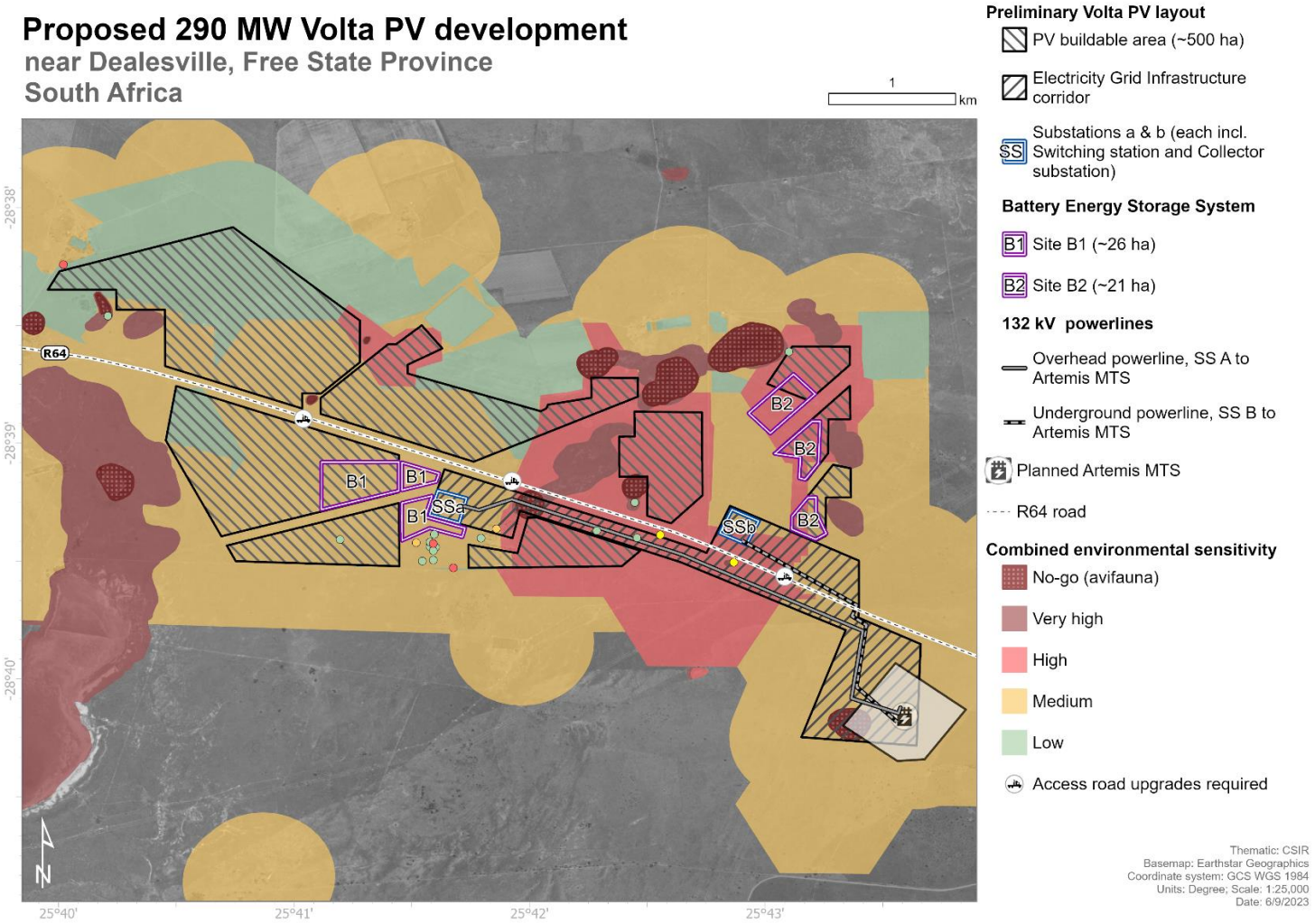
Province & region:	Free State Province (Tokologo Local Municipality)
Responsible Heritage Resources Agency	**South African Heritage Resources Agency (SAHRA): Archaeology, Palaeontology and Meteorites (APM) Unit** Contact person: Natasha Higgitt or Phillip Hine Postal address: PO Box 4637, Cape Town, 8000 Physical address: 111 Harrington Street, Cape Town, 8001. Telelphone number: 021 462. Fax number: 021 462 4509. Email: nhiggitt@sahra.org.za or info@sahra.org.za).
Rock unit(s)	Tierberg formation and Quaternary deposits.
Potential fossils	Plants (e.g. glossopterids, ferns and sphenophytes), insects, bone or trace fossils    
PROTOCOL:	The following procedure is only required if fossils are seen on the surface and when drilling/excavations commence.

Environmental Site Officer and Environmental Control Officer	1. When excavations begin the rocks and discard must be given a cursory inspection by the environmental officer or designated person. Any fossiliferous material (plants, insects, bone or coal) should be put aside in a suitably protected place. This way the project activities will not be interrupted. 2. Photographs of similar fossils must be provided to the developer to assist in recognizing the fossil plants, vertebrates, invertebrates or trace fossils in the shales and mudstones (for example see Figures 7-8). This information will be built into the EMP's training and awareness plan and procedures. 3. Photographs of the putative fossils can be sent to the palaeontologist for a preliminary assessment. 4. If there is any possible fossil material found by the developer/environmental officer then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. 5. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. 6. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils. 7. If no fossils are found and the excavations have finished then no further monitoring is required.
PROTOCOL: Specialist Palaeontologist	8. If there is any possible fossil material found by the developer/environmental officer/miners then the qualified palaeontologist sub-contracted for this project, should visit the site to inspect the selected material and check the dumps where feasible. 9. Fossil plants or vertebrates that are considered to be of good quality or scientific interest by the palaeontologist must be removed, catalogued and housed in a suitable institution where they can be made available for further study. Before the fossils are removed from the site a SAHRA permit must be obtained. Annual reports must be submitted to SAHRA as required by the relevant permits. 10. If no good fossil material is recovered then no site inspections by the palaeontologist will be necessary. A final report by the palaeontologist must be sent to SAHRA once the project has been completed and only if there are fossils.
General	11. If no fossils are found and the excavations have finished then no further monitoring is required

11. APPENDIX D – SITE LAYOUT RECOMMENDED FOR APPROVAL



12. APPENDIX E – COMBINED LAYOUT AND SENSITIVITY MAP



13. APPENDIX F – PRE-APPROVED GAZETTED EMPR FOR SUBSTATION DEVELOPMENT (GN 435)

PRE-APPROVED GENERIC EMPR TEMPLATE FOR SUBSTATION INFRASTRUCTURE FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY GOVERNMENT GAZETTE 42323, GOVERNMENT NOTICE 435

SECTION 5: IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

This section provides a pre-approved generic EMPr template with aspects that are common to the development of substation infrastructure for the transmission and distribution of electricity. There is a list of aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and for each aspect a set of prescribed impact management outcomes and associated impact management actions have been identified. Holders of EAs are responsible to ensure the implementation of these outcomes and actions for all projects as a minimum requirement, in order to mitigate the impact of such aspects identified for the development or expansion of substation infrastructure for the transmission and distribution of electricity.

The template provided below is to be completed by providing the information under each heading for each environmental impact management action.

The completed template must be signed and dated on each page by both the contractor and the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must also be duly signed and dated on each page by the contactor and the holder of the EA. This template, once signed and dated, is legally binding. The holder of the EA will remain responsible for its implementation.

5.1. Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities; – The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; – Refresher environmental awareness training is available as and when required; – All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; – The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering. – Environmental awareness training must include as a minimum the following:						

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures; d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. – A record of all environmental awareness training courses undertaken as part of the EMPr must be available; – Educate workers on the dangers of open and/or unattended fires; – A staff attendance register of all staff to have received environmental awareness training must be available. – Course material must be available and presented in appropriate languages that all staff can understand.						

5.2. Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; – Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; – Sites must be located where possible on previously disturbed areas;						

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***; and – The use of existing accommodation for contractor staff, where possible, is encouraged.						

5.3. Access restricted areas

Impact management outcome: Access to restricted areas prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identification of access restricted areas is to be informed by the environmental assessment, site walk through and any additional areas identified during development; – Erect, demarcate and maintain a temporary barrier with clear signage around the perimeter of any access restricted area, colour coding could be used if appropriate; and – Unauthorised access and development related activity inside access restricted areas is prohibited.						

5.4. Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities; – All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition – All contractors must be made aware of all these access routes. – Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense; – Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the development of new roads; – In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with ***section 4.9: photographic record***; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor;						

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands – Access roads must only be developed on a pre-planned and approved roads.						

5.5. Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible; – Existing and new gates to be recorded and documented in accordance with **section *4.9: photographic record***; – All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner; – At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner; – Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; – Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; – Original tension must be maintained in the fence wires; – All gates installed in electrified fencing must be re-electrified; – All demarcation fencing and barriers must be maintained in good working order for the duration of the development activities; – Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable; – Any temporary fencing to restrict the movement of live-stock must only be erected with the permission of the landowner. – All fencing must be developed of high quality material bearing the SABS mark; – The use of razor wire as fencing must be avoided; – Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; – On completion of the development phase all temporary fences are to be removed;						

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

5.6. Water Supply Management

Impact management outcome: Undertake responsible water usage**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; – The Contractor must ensure the following: a. The vehicle abstracting water from a river does not enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. – Ensure water conservation is being practiced by: a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged.						

5.7. Storm and wastewater management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager;						

– All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; – Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; – Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.						

5.8. Solid and hazardous waste management

Impact management outcome: Wastes are appropriately stored, handled and safely disposed of at a recognised waste facility**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All measures regarding waste management must be undertaken using an integrated waste management approach; – Sufficient, covered waste collection bins (scavenger and weatherproof) must be provided; – A suitably positioned and clearly demarcated waste collection site must be identified and provided; – The waste collection site must be maintained in a clean and orderly manner; – Waste must be segregated into separate bins and clearly marked for each waste type for recycling and safe disposal; – Staff must be trained in waste segregation; – Bins must be emptied regularly; – General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company; – Hazardous waste must be disposed of at a registered waste disposal site; – Certificates of safe disposal for general, hazardous and recycled waste must be maintained.						

5.9. Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; – In the event of a spill, prompt action must be taken to clear the polluted or affected areas; – Where possible, no development equipment must traverse any seasonal or permanent wetland – No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur; – Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; – There must not be any impact on the long term morphological dynamics of watercourses or estuaries; – Existing crossing points must be favored over the creation of new crossings (including temporary access) – When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; b) No altering of the bed, banks, course or characteristics of a watercourse c) 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; d) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and e) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.						

5.10. Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General:						

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Indigenous vegetation which does not interfere with the development must be left undisturbed; – Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species; – Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing; – Permits for removal must be obtained from the relevant CA prior to the cutting or clearing of the affected species, and they must be filed; – The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; – Trees felled due to construction must be documented and form part of the Environmental Audit Report; – Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris; – Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained; – A daily register must be kept of all relevant details of herbicide usage; – No herbicides must be used in estuaries; – All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to ***Section 5.3: Access restricted areas***. Alien invasive vegetation must be removed and disposed of at a licensed waste management facility.						

5.11. Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; – The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme; – Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present;						

– Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; – No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; – No deliberate or intentional killing of fauna is allowed; – In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and – No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.						

5.12. Protection of heritage resources

Impact management outcome: Impact to heritage resources is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify, demarcate and prevent impact to all known sensitive heritage features on site in accordance with the No-Go procedure in ***Section 5.3: Access restricted areas***; – Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; – All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.						

5.13. Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– 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.; – All unattended open excavations must be adequately fenced or demarcated; – Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; – Ensure structures vulnerable to high winds are secured;						

– Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.						

5.14. Sanitation

Impact management outcome: Clean and well maintained toilet facilities are available to all staff in an effort to minimise the risk of disease and impact to the environment.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available; – The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances; – Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; – A copy of the waste disposal certificates must be maintained.						

5.15. Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.

Impact Management Actions	Implementation			Monitoring		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area; – Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS; – The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area; – Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable;						

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Free condoms must be made available to all staff on site at central points; – Medical support must be made available; – Provide access to Voluntary HIV Testing and Counselling Services.						

5.16. Emergency procedures

Impact management outcome: Emergency procedures are in place to enable a rapid and effective response to all types of environmental emergencies.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Compile an Emergency Response Action Plan (ERAP) prior to the commencement of the proposed project; – The Emergency Plan must deal with accidents, potential spillages and fires in line with relevant legislation; – All staff must be made aware of emergency procedures as part of environmental awareness training; – The relevant local authority must be made aware of a fire as soon as it starts; – In the event of emergency necessary mitigation measures to contain the spill or leak must be implemented (see ***Hazardous Substances section 5.17***).						

5.17. Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; – All hazardous substances must be stored in suitable containers as defined in the Method Statement; – Containers must be clearly marked to indicate contents, quantities and safety requirements; – All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers; – Bunded areas to be suitably lined with a SABS approved liner;						

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; – All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); – All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet; – 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; – The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; – The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall); – The floor of the bund must be sloped, draining to an oil separator; – 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; – All empty externally dirty drums must be stored on a drip tray or within a bunded area; – No unauthorised access into the hazardous substances storage areas must be permitted; – No smoking must be allowed within the vicinity of the hazardous storage areas; – Adequate fire-fighting equipment must be made available at all hazardous storage areas; – 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; – 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; – The responsible operator must have the required training to make use of the spill kit in emergency situations; – An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; – 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: 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.***						

5.18. Workshop, equipment maintenance and storage

Impact management outcome: Soil, surface water and groundwater contamination is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible and practical all maintenance of vehicles and equipment must take place in the workshop area; – During servicing of vehicles or equipment, especially where emergency repairs are effected outside the workshop area, a suitable drip tray must be used to prevent spills onto the soil. The relevant local authority must be made aware of a fire as soon as it starts; – Leaking equipment must be repaired immediately or be removed from site to facilitate repair; – Workshop areas must be monitored for oil and fuel spills; – Appropriately sized spill kit kept onsite relevant to the scale of the activity taking place must be available; – The workshop area must have a bunded concrete slab that is sloped to facilitate runoff into a collection sump or suitable oil / water separator where maintenance work on vehicles and equipment can be performed; – Water drainage from the workshop must be contained and managed in accordance Section ***5.7: Storm and wastewater management***.						

5.19. Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Concrete mixing must be carried out on an impermeable surface; – Batching plants areas must be fitted with a containment facility for the collection of cement laden water. – Dirty water from the batching plant must be contained to prevent soil and groundwater contamination – Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains; – A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted; – Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility; – Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site; – Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to ***Section 5.20: Dust emissions***)						

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater**.**						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility; – Temporary fencing must be erected around batching plants in accordance with Section ***5.5: Fencing and gate installation***.						

5.20. Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; – Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; – Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; – During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; – Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; – Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; – Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas; – Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks; – For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

5.21. Blasting

Impact management outcome: Impact to the environment is minimised through a safe blasting practice.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Any blasting activity must be conducted by a suitably licensed blasting contractor; and – Notification of surrounding landowners, emergency services site personnel of blasting activity 24 hours prior to such activity taking place on Site.						

5.22. Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for communication and emergency only; – All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; – Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers; – Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.						

5.23. Fire prevention

Impact management outcome: Prevention of uncontrollable fires.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Designate smoking areas where the fire hazard could be regarded as insignificant; – Firefighting equipment must be available on all vehicles located on site; – The local Fire Protection Agency (FPA) must be informed of construction activities; – Contact numbers for the FPA and emergency services must be communicated in environmental awareness training and displayed at a central location on site;						

Impact management outcome: Prevention of uncontrollable fires.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Two way swop of contact details between ECO and FPA.						

5.24. Stockpiling and stockpile areas

Impact management outcome: Reduce erosion and sedimentation as a result of stockpiling.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All material that is excavated during the project development phase (either during piling (if required) or earthworks) must be stored appropriately on site in order to minimise impacts to watercourses, watercourses and water bodies; – All stockpiled material must be maintained and kept clear of weeds and alien vegetation growth by undertaking regular weeding and control methods; – Topsoil stockpiles must not exceed 2 m in height; – During periods of strong winds and heavy rain, the stockpiles must be covered with appropriate material (e.g. cloth, tarpaulin etc.); – Where possible, sandbags (or similar) must be placed at the bases of the stockpiled material in order to prevent erosion of the material.						

5.25. Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone; – Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards; – Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly;						

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Rehabilitation of the disturbed areas must be managed in accordance with ***Section 5.35: Landscaping and rehabilitation***; – All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.						

5.26. Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a licensed landfill site, if not used for backfilling purposes; – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; – Management of equipment for excavation purposes must be undertaken in accordance with ***Section 5.18: Workshop, equipment maintenance and storage***; and – Hazardous substances spills from equipment must be managed in accordance with ***Section 5.17: Hazardous substances***.						

5.27. Installation of foundations, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs during the installation of foundation, cable trenching and drainage system.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Batching of cement to be undertaken in accordance with **Section *5.19: Batching plants***; and – Residual solid waste must be disposed of in accordance with **Section *5.8: Solid waste and hazardous management***.						

5.28. Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Management of dust must be conducted in accordance with Section ***5. 20: Dust emissions***; – Management of equipment used for installation must be conducted in accordance with Section **5.*18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills must be conducted in accordance with Section ***5.17: Hazardous substances***; and – Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.						

5.29. Steelwork Assembly and Erection

Impact management outcome: No environmental degradation occurs as a result of steelwork assembly and erection.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– During assembly, care must be taken to ensure that no wasted/unused materials are left on site e.g. bolts and nuts – Emergency repairs due to breakages of equipment must be managed in accordance with ***Section 5. 18: Workshop, equipment maintenance and storage*** and ***Section 5.16: Emergency procedures***.						

5.30. Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with **Section *5.8: Solid waste and hazardous Management***; – Management of equipment used for installation shall be conducted in accordance with **Section 5.*18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills shall be conducted in accordance with ***Section 5.17: Hazardous substances***.						

5.31. Testing and Commissioning (all equipment testing, earthing system, system integration)

Impact management outcome: No environmental degradation occurs as a result of Testing and Commissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.						

5.32. Socio-economic

Impact management outcome: enhanced socio-economic development.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Develop and implement communication strategies to facilitate public participation; – Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; – Sustain continuous communication and liaison with neighboring owners and residents – Create work and training opportunities for local stakeholders; and – Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.						

5.33. Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in ***sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage***; – Hazardous storage areas must be well ventilated; – Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service; – Emergency and contact details displayed must be displayed;						

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and emergency personnel; – Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; – Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; – Structures vulnerable to high winds must be secured; – Wind and dust mitigation must be implemented; – Cement and materials stores must have been secured; – Toilets must have been emptied and secured; – Refuse bins must have been emptied and secured; – Drip trays must have been emptied and secured.						

5.34. Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment; – Oil containing equipment must be stored to prevent leaking or be stored on drip trays; – All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers; – Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as to prevent spillage and pollution of the environment; – The Contractor must also be equipped to contain and clean up any pollution causing spills; and – Disposal of unusable material must be at a licensed waste disposal site.						

5.35. Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site; – All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983 – All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983; – Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition; – Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners; – Rehabilitation of access roads outside of farmland; – Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition; – Stockpiled topsoil must be used for rehabilitation (refer to ***Section 5.24: Stockpiling and stockpiled areas***); – Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; – Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; – Subsoil must be ripped before topsoil is placed; – The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; – Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. – Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following:						

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area						

6. ACCESS TO THE GENERIC EMPr

Once completed and signed, to allow the public access to the generic EMPr, the holder of the EA must make the EMPr available to the public in accordance with the requirements of Regulation 26(h) of the EIA Regulations.