RIETKLOOF WIND FARM (RF) (PTY) LTD

ENVIRONMENTAL MANAGEMENT PROGRAMME

RIETKLOOF 132KV DISTRIBUTION LINE, WESTERN CAPE PROVINCE, SOUTH AFRICA (REF: 14/12/16/3/3/1/1590)

09 DECEMBER 2021

DRAFT

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QUALITY MANAGEMENT[1]

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This Amended Environmental Management Programme report (Report) has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of Rietkloof Wind Farm (RF) (Pty) Ltd (Client), to provide the Client with an understanding of the mitigation measures required for the proposed project.

Unless otherwise agreed by us in writing, we do not accept responsibility or legal liability to any person other than the Client for the contents of, or any omissions from, this Report.

To prepare this Report, we have reviewed only the documents and information provided to us by the Client or any third parties directed to provide information and documents to us by the Client. We have not reviewed any other documents in relation to this Report, except where otherwise indicated in the Report.

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LIST OF ACRONYMS / ABBREVIATIONS

BA	Basic Assessment
CAA	Civil Aviation Authorities
CITES	Convention of International Trade in Endangered Species
CLO	Community Liaison Officer
CSF	Co-ordinating Social Facilitator
DALRRD	Department of Agriculture, Land Reform and Rural Development
DEA	Department of Environmental Affairs
DEAT	Department of Environmental Affairs and Tourism
DFFE	Department of Forestry, Fisheries and the Environment
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
EIR	Environmental Impact Assessment Report
EMPr	Environmental Management Programme report (this report)
EMS	Environmental Management Systems
ER	Engineers Representative
ESCO	Environmental Onsite Compliance Officer
GWH	Giga-Watt Hours
HWC	Heritage Western Cape
I&AP	Interested and Affected Party
IEC	Independent Environmental Consultant
IEM	Integrated Environmental Management
IPP	Integrated Power Producers
KPI	Key Performance Indicator
MW	Mega-Watt
NEM:BA	National Environmental Management: Biodiversity Act
NEMA	National Environmental Management Act
OHSA	Occupational Health and Safety Act
PC	Principal Contractor
PSC	Project Steering Committee
S&EIR	Scoping and Environmental impact assessment process
SAHRA	South African Heritage Resource Agency
SWMP	Storm Water Management Plan
WEF	Wind Energy Facility

DEFINITIONS

The definitions contained within this document are for explanatory purposes only. In the event that any conflict occurs between the definitions herein and those contained within the final contract, those within the contract shall prevail.

Alien Vegetation:	Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) and the National Environmental Management: Biodiversity Act (10/2004): Alien and Invasive Species Regulations, 2014 (GNR 598). Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable
Construction Camp:	Construction camp (site camps) refers to all storage and stockpile sites, site offices, container sites, workshops and testing facilities, and other areas required for undertaking construction activities.
Electrical infrastructure:	For the purpose of this EMPr, this refers to the 33/132kV onsite substation and the overhead 132kV distribution line, associated 31m servitude and service roads.
Environmental Aspect:	An environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.
Environmental Authorisation (EA):	A written statement from the relevant environmental authority, with or without conditions, that records its approval of a planned undertaking to build or upgrade a section of road and the mitigating measures required to prevent or reduce the effects of environmental impacts during the life of a contract.
Environmental Impact:	An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.
Environmental Impact Assessment:	The process of examining the environmental effects of a development. The assessment requires detailed/specialist studies of significant issues that have been identified during the environmental scoping.
Environmental Management Programme:	An environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented; and that the positive benefits of the projects are enhanced.
Environmental Management System:	The internationally accepted and recognized environmental management system (EMS) which enables companies, organizations and operations to systematically manage, prevent and reduce environmental problems and associated costs. In terms of ISO 14001 and EMS is defined as, "that part of the overall management system includes organizational structure, planning activities, responsibilities, procedures, processes and resources for developing, implementing, reviewing and maintaining the environmental policy."
Environmental Policy:	A statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and for the setting of its environmental objectives and targets.
External Auditor:	A suitably qualified and experienced independent expert as per the required auditor qualifications.

Independent Environmental Consultant:	A suitably qualified and experienced independent environmental consultant (IEC) appointed by the Engineer to perform the obligations specified in the Contract. The IEC shall provide reports to the regulatory authority, the Engineer and any other parties as specified by the regulatory authority.
Interested and Affected Party (I&AP):	Refers to an I&AP party contemplated in section 24(4)(d) of the NEMA (1998, Act No. 107) and which, in terms of that section, includes – a) Any person, groups of persons, organisation interested in or affected by an activity, and; b) Any organ of state that may have jurisdiction over any aspect of the activity.
Liaison Committee:	A liaison committee consisting of a representative from Rietkloof Wind Farm (RF) (Pty) Ltd, the Contractor, the Project Manager, and any other role-player deemed necessary by the members of the committee (the 'Liaison Committee') to review the progress of the contract in implementing and complying with its obligations in terms of this EMPr.
Method Statement:	A written submission by the contractor in response to the specification or a request by the Project Manager, setting-out the plant, materials, labour and method the contractor proposes using to carry-out an activity, identified by the relevant specification or the IEC when requesting the method statement, in such detail that the IEC is enabled to assess whether the contractor's proposal is in accordance with the EMPr and associated specifications.
Mitigate:	The implementation of practical measures to reduce the adverse impacts, or to enhance beneficial impacts of a particular action.
No-Go Area:	Areas where construction activities are prohibited.
Open Space:	For the purposes of this Management Plan, Open Space areas include all areas impacted by construction activities including all approved buffers.
Pollution:	According to the NEMA (Act No. 107 of 1998), pollution can be defined as, "Any change in the environment caused by (i) substances; (ii) radioactive or other waves; or (iii) noise, odours, dust or heat emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future".
Rehabilitation:	To re-establish or restore to a healthy, sustainable capacity or state.
Site:	The area in which construction is taking place.
Species of Special/Conservation Concern (SSC or SCC):	Those species listed in the rare, indeterminate, or monitoring categories of the South African Red Data Books, and/or species listed in globally near threatened, nationally threatened or nationally near threatened categories (Barnes, 1998).
Threatened species:	Threatened species are defined as: a) species listed in the endangered or vulnerable categories in the revised South African Red Data Books or listed in the globally threatened category; b) species of special conservation concern (i.e. taxa described since the relevant South African Red Data Books, or whose conservation status has been highlighted subsequent to 1984); c) species which are included in other international lists; or d) species included in Appendix 1 or 2 of the Convention of International Trade in Endangered Species (CITES).
Topsoil:	The top 100mm of soil and may include top material e.g. vegetation and leaf litter.

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1 INTRODUCTION

Rietkloof Wind Farm (RF) (Pty) Ltd (Rietkloof) propose to develop electrical infrastructure in the form of a single 132 kilovolt (kV), above-ground electrical power line (distribution line). This line will be required to evacuate up to 140 megawatt (MW) of energy (via a 33/132kV on-site substation) from the proposed Rietkloof Wind Energy Facility (WEF), located near Laingsburg in the Western Cape Province of South Africa.

The proposed Rietkloof WEF (DFFE Ref. No. 14/12/16/3/3/2/1/1977) was authorised through a merged Environmental Authorisation (EA) in September 2019 and was awarded preferred bidder status in Round 5 of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in October 2021.

1.1 STRUCTURE OF THE EMPR

This Environmental Management Programme (EMPr) is a set of requirements to manage environmental impacts anticipated during the planning, construction, operation and decommissioning phases. This EMPr was compiled as part of an Environmental Impact Assessment (EIA) process undertaken in 2016, in terms of the 2014 EIA Regulations of the National Environmental Management Act (Act 107 of 1998) (as amended) (NEMA) for the Rietkloof 132kV electrical infrastructure.

The structure of the EMPr is as follows:

- Chapter 1: Provides an introduction to the EMPr, an overview of the EMPr objectives, the legal requirements and the scope and content of the EMPr;
- Chapter 2: Provides the details of the Environmental Assessment Practitioner (EAP);
- Chapter 3: This Chapter outlines the project description, including the site location;
- Chapter 4: Detailed environmental impact and sensitivities (including relevant specialist walkdowns undertaken in 2021) for the Rietkloof WEF powerline site;
- Chapter 5: Details of the scope of the EMPr based on the four relevant phases of the development (namely, design and planning, construction, operation and decommissioning);
- Chapter 6: Details the Roles and Responsibilities of the relevant parties involved in the development, implementation and management of the EMPr;
- Chapter 7: Details the requirements and methods of reporting during the implementation and monitoring of the EMPr;
- Chapter 8: Details the monitoring required during the construction and operational phases of the powerline;
- Chapter 9: Provides an outline of the environmental awareness process, including the monitoring thereof;
- Chapter 10: Outlines the compliance procedures of the EMPr;
- Chapter 11: Details the list of mitigation and management requirements for the four phases of the project lifecycle
- Chapter 12: Outlines the specific Management Plans which form part of the EMPr
- Chapter 13: Outlines the Closure Planning procedure;
- Chapter 14: Outlines the Grievance procedures relevant to the EMPr; and
- Chapter 15: Summarises the concluding statements relevant to the EMPr at the time of publication.

It is important to note that the EMPr is a dynamic document and will be amended throughout the life-cycle of the project.

1.2 OBJECTIVES OF THE EMPR

The EMPr has been compiled to provide recommendations and guidelines according to which compliance monitoring must be conducted during the design, construction, operational and rehabilitation phases of the project, as well as to ensure that all relevant factors are considered to ensure for environmentally responsible development.

The EMPr is specific to the proposed 33/132kV onsite substation, 132kV overhead distribution line and grid connection for the Rietkloof WEF.

This EMPr informs all relevant parties [the Holder of the EA, the Contractor, the Environmental Control Officer (ECO) and all other staff, contractors and consultants, employed by Rietkloof (responsible for the implementation of the power line at the site) as to their duties in the fulfilment of the legal requirements for the design, construction, operation and rehabilitation of the 132kV electrical infrastructure project, with particular reference to the prevention and mitigation of anticipated potential environmental impacts.

All parties should note that obligations imposed by the EMPr are legally binding in terms of the EA, granted by the relevant environmental permitting authority. The objectives of an EMPr are to:

- Ensure compliance with regulatory authority stipulations and guidelines which may be local, provincial, national and/or international;
- Ensure that there is sufficient allocation of resources on the project budget so that the scale of EMPr-related activities is consistent with the significance of project impacts;
- Verify environmental performance through information on impacts as they occur;
- Respond to unforeseen events;
- Provide feedback for continual improvement in environmental performance;
- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- Detail specific actions deemed necessary to assist in mitigating the environmental or social impact of the project;
- Identify measures that could optimize beneficial impacts;
- Create management structures that addresses the concerns and complaints of Interested and Affected Parties (I&APs) with regards to the development;
- Establish a method of monitoring and auditing environmental management practices during all phases of the activity;
- Ensure that safety recommendations are complied with;
- Specify time periods within which the measures contemplated in the final environmental management programme must be implemented, where appropriate.

1.3 FORM AND FUNCTION OF AN EMPR

An EMPr focuses on sound environmental management practices, which will be undertaken to minimise adverse impacts on the environment through the lifetime of a development. In addition, an EMPr identifies what measures will be in place or will be implemented to manage any incidents and emergencies that may occur during operation of the facility. As such the EMPr provides specifications that must be adhered to, in order to minimise adverse environmental impacts associated with the operations of the facility.

The content of the EMPr is consistent with the requirements as set out in Regulation 23 and Appendix 4 of the 2014 EIA Regulations (as amended) stated in **Table 1-1** below.

1.4 LEGAL REQUIREMENTS

Construction must be undertaken according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction, operation and decommissioning activities associated with the project. The Contractor should note that obligations imposed by the approved EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

The contractor must identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key legislation currently applicable

to the design, construction and implementation phases of the project must be complied with. The list of applicable legislation provided below is intended to serve as a guideline only and is not exhaustive:-

- The Constitution of the Republic of South Africa Act 108 of 1996;
- Environment Conservation Act 73 of 1989;
- National Environmental Management Act 107 of 1998;
- National Environmental Management: Protected Areas Act 57 of 2003;
- National Environmental Management: Biodiversity Act 10 of 2004;
- National Forests Act 43 of 1983;
- National Water Act 36 of 1998;
- Conservation of Agricultural Resources Act 43 of 1983;
- National Veld and Forest Fire Act 101 of 1998;
- Hazardous Substances Act 15 of 1973;
- National Heritage Resources Act 25 of 1999;
- Atmospheric Pollution Prevention Act 45 of 1965;
- National Environmental Management: Air Quality Act 39 of 2004;
- National Environmental Management: Waste Management Act 59 of 2008;
- Mineral and Petroleum Resources Development Act 28 of 2002;
- Health Act 63 of 1977;
- Electrical Machinery Regulations, 2011 (OHSA 1993);
- Fertilisers, farm feeds, Agricultural Remedies and Stock Remedies Act (No 36 of 1947) – herbicide use;
- Occupational Health and Safety Act 85 of 1993;
- White Paper on the Conservation and Sustainable Use of South Africa's Biological Diversity; and
- All relevant provincial legislation, Municipal by-laws and ordinances.

The permitting applicable to this project is indicated in Table 1-3 of this report.

The contractor shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.

The contents of the Environmental Management Programme report (EMPr) are consistent with the requirements as set out in Appendix 4 of the EIA Regulations published as GNR. 982 (as amended) in terms of Chapter 5 of the National Environmental Management Act No 107 of 1998 (NEMA), as amended. Table 1-1cross-references the sections within the EMPr with the legislated requirements as per Appendix 4 of GNR 982 (as amended).

Table 1-1: Legislation Requirements as Detailed in Appendix 4 of GNR 982 (as amended)

	REQUIREMENT	**EMPR REFERENCE**
(a)	details of— (i) the EAP who prepared the EMPr; and (ii) the expertise of the EAP to prepare an EMPr	Section 2.1 and 2.2 **Appendix A**
(b)	a detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Chapter 3

	REQUIREMENT	EMPR REFERENCE
(c)	a description of the impact management objectives, including management statements, identifying the impacts that need to be avoided, managed and/or mitigated as identified through the environmental impact assessment process for all phases of the development including— (i) planning and design; (ii) pre-construction activities; (iii) construction activities; (iii) where relevant operation activities; and (iv) rehabilitation of the environment after construction and where applicable post closure	Chapter 11
(d)	a description of impact management outcomes, identifying the standard of impact management required for the aspects contemplated in paragraph (c);	Chapter 11
(e)	a description of impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (c) and (d) will be achieved, and may include actions to — (i) modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation; (ii) remedy the cause of pollution or degradation and migration of pollutants; (iii) comply with any prescribed environmental management standards or practices; (iv) comply with any applicable provisions of the Act regarding closure, where applicable; (v) comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable	Chapter 11
(f)	the method of monitoring the implementation of the impact management actions contemplated in paragraph (e);	Chapter 11
(g)	the frequency of monitoring the implementation of the impact management actions contemplated in paragraph (e);	Chapter 11
(h)	an indication of the persons who will be responsible for the implementation of the impact management actions;	Chapter 11
(i)	the time periods within which the impact management actions contemplated in paragraph (e) must be implemented;	Chapter 11
(j)	the mechanism for monitoring compliance with the impact management actions contemplated in paragraph (e);	Chapter 7
(k)	a program for reporting on compliance, taking into account the requirements as prescribed by these Regulations; and	Chapter 9
(l)	an environmental awareness plan describing the manner in which— (i) the applicant intends to inform his or her employees of any environmental risk which may result from their work; and (ii) risks must be dealt with in order to avoid pollution or the degradation of the environment.	Chapter 9

1.5 GENERIC EMPR FOR SUBSTATION AND OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE

NEMA requires that an EMPr be submitted where an EIA has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation. The content of an EMPr must either contain the information set out in Appendix 4 of the EIA Regulations, 2014, as amended, or must be a generic EMPr relevant to an application as identified and gazetted by the Minister in a government notice. Once the Minister has identified, through a government notice, that a generic EMPr is relevant to an application for EA, that generic EMPr must be applied by all parties involved in the EA process, including, but not limited to, the applicant and the CA.

GN 435 of 22 March 2019 identified a generic EMPr relevant to applications for substations and overhead electricity transmission and distribution infrastructure which require authorisation in terms of Section 42(2) of NEMA. Applications for overhead electricity transmission and distribution infrastructure and applications for the development or expansion of substation infrastructure for the transmission and distribution of electricity that trigger Activity 11 or 47 of Listing Notice 1 or Activity 9 of Listing Notice 2 and any other listed or specified activities must use the generic EMPrs.

The objective of the generic EMPr is to prescribe and pre-approve generally accepted impact management outcomes and impact management actions, which can commonly and repeatedly be used for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure and the development or expansion of substation infrastructure for the transmission and distribution of electricity. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

Both the generic EMPr for transmission lines as well as the generic EMPr for substations have been used as a basis for this EMPr. The Generic Environmental Management Programme (EMPr) for the Development and Expansion for Overhead Electricity Transmission and Distribution Infrastructure is attached as **Appendix C** and the Generic Environmental Management Programme (EMPr) for the Development and Expansion of Substation Infrastructure for the Transmission and Distribution of Electricity is attached as **Appendix D.**

1.6 PERMITS REQUIRED

The following permits (**Table 1-2**) have been identified as being required prior to construction commencing. It is the Holder of the Environmental Authorisation's (assuming a positive decision is reached on this Basic Assessment application) responsibility to obtain the appropriate permits.

Table 1-2: Permitting required for this electrical infrastructure

RELEVANT LEGISLATION	COMPLIANCE REQUIREMENT	TIMEFRAME
National Environmental Management Act (107 of 19989) (NEMA) AND Environmental Impact Assessment (EIA) Regulations, 2014 (as amended)	Application for authorisation	An EA was issued on 23 November 2016 (DFFE Ref No: 14/12/16/3/3/1/1590)
The National Environment Management: Biodiversity Act (10 of 2004)	An ecological walkdown has been undertaken. Protected or endangered flora species have been identified along the alignment. A final check of each pole position should be undertaken prior to construction to identify whether the final positions will require any species	Permit applications must be submitted by the Holder of the EA to Cape Nature prior to the commencement of construction.

RELEVANT LEGISLATION	COMPLIANCE REQUIREMENT	TIMEFRAME
	to be removed or damaged during the construction phase. In this event, the Holder of the EA will need to apply for the necessary permit(s) in terms of this Act.	
Nature and Environmental Conservation Ordinance 1974	An ecological walkdown has been undertaken. Protected or endangered flora species have been identified along the alignment. A final check of each pole position should be undertaken prior to construction to identify whether the final positions will require any species to be removed or damaged during the construction phase. In this event, the Holder of the EA will need to apply for the necessary permit(s) in terms of this Act.	Permit applications must be submitted by the Holder of the EA to Cape Nature prior to the commencement of construction.
National Water Act (36 of 1998)	The distribution line and its associated service roads may alter the bed, banks, course or characteristics of a watercourse or impede the flow of a watercourse. In terms of Section 21 c and i, applications for these activities must be submitted to the relevant Catchment Management Agency in order to obtain a General Authorisation or Water Use Licence.	The relevant Water Use License Applications have been submitted to the DWA.
National Forests Act (84 of 1998)	The ecological specialist has confirmed that there are no trees that will be impacted by the proposed layout.	N/A
Subdivision of Agricultural Land Act (No. 70 of 1970	Long-term lease agreements (over 10 years) on portion/s of agricultural land require the consent from the Minister of Agriculture, Forestry and Fisheries before they can be registered. Some of the leases for the project may be on agricultural land and will require consent from DALRRD.	In the event that this becomes relevant, submission to DALRRD by the Holder of the EA should occur prior to the commencement of construction.
Mineral and Petroleum Resources Development Act (107 of 2002) (MPRDA)	No borrow pits or mining activities will be required	N/A
National Heritage Resources Act (25 of 1999)	The project has been registered with South African Heritage Resource Agency (SAHRA) and Heritage Western Cape (HWC). A phase I heritage assessment was undertaken to determine if heritage features occur on site and what level impact assessment (if any) maybe required (see Chapter 4).	If applicable, applications must be submitted the HWC.

RELEVANT LEGISLATION	COMPLIANCE REQUIREMENT	TIMEFRAME
	In the event that archaeological or historically significant sites would be destroyed, damaged, excavated, altered or defaced by the proposed project activity the relevant permit will need to be granted before the project can continue.	
National Road Traffic Act (No. 93 of 1996)	All the requirements stipulated in the NRTA will need to be complied with during the construction and operational phases of the proposed power line.	For all project phases, to be managed by the Holder of the EA.
Civil Aviation Act (Act No. 13 of 2009): 13th Amendment of the Civil Aviation Regulations (2011)	Due to requirements of the Act to ensure the safety of aircrafts, and as power lines, overhead wires and cables are considered as flight obstacles, the developer must engage directly with the Civil Aviation Authority (CAA) regarding the structural details of the facility.	Prior to construction commencing, to be managed by the Holder of the EA and submitted to the CAA.

1.7 CONDITIONS OUTLINED IN ENVIRONMENTAL AUTHORISATION

For the purposes of demonstrating adherence to the requirements of the EA for the proposed Rietkloof WEF, **Table 1-3** cross references the sections within this updated EMPr Report as per the applicable EA conditions and DFFE requirements.

Table 1-3: Requirements as detailed in the Conditions of the EA (Ref Number: 14/12/16/3/3/1/1590)

NO.	CONDITION [PARAPHRASED]	ACTION
15	A copy of the final development layout map must be made available for comments by registered Interested and Affected Parties and the applicant must consider such comments. Inclusion requirements are listed.	As part of the finalisation of the EMPr process a final development layout has been included in Figure 3-3.
16	The Environmental Management Programme (EMPr) submitted as part of the BAR is not approved and must be amended to include measures as dictated by the final site lay-out map and micro-siting: and the provisions of this environmental authorisation. The EMPr must be made available for comments by registered Interested and Affected Parties and the applicant must consider such comments. Once amended, the final EMPr must be submitted to the Department for written approval prior to commencement of the activity.	As part of the finalisation of the EMPr process a final development layout has been included in **Figure 3-3**. This EMPr and final development layout map is being released for a 30-day comment period (**9 December 2021 to 31 January 2022**), and comments received from I&APs will be incorporated into the Final EMPr for submission to the Department in order to comply with this condition.
21	The EMPr amendment must include the following: 21.1. All recommendations and mitigation measures recorded in the BAR and specialist studies.	WSP has been commissioned to update the EMPr (compliant with the requirements of this condition). The environmental sensitivities identified during the BA phase, informed by specialist assessments, as well as those identified during the specialist walkdown, were

NO.	CONDITION [PARAPHRASED]	ACTION
	21.2. The location and specific mitigation measures including the locations for the inclusion of bird flappers in consultation with the avifaunal specialist. 21.3. All mitigation measures as listed in the specialist reports must be included in the EMPr and implemented. 21.4. The requirements and conditions of this authorisation. 21.5. The final site layout map.	used to inform the final site layout developed in this EMPr. The mitigation measure requested by the Avifauna Specialist have been included in Section 4.4.4. As part of the finalisation of the EMPr process a final development layout has been included in **Figure 3-3**
37	The substation location of Alternative 5 must be relocated and placed in close proximity to Turbine 31 and Turbine 32.	The location of the Authorised Substation (Alternative 5) has not been relocated to be in close proximity to Turbine 31 and 32. This is due to the fact that the ecology report shows that the area south and between turbines 31 and 32 is a very-high ecological sensitivity area. The area to the north and between turbines 31 and 32 is very steep and would require excessive amounts of blasting to establish a flat area large enough for the substation. Refer to **Figure 4-2** and **Figure 4-3** of this EMPr for a map combining the final layout map overlain onto the environmental sensitivity map.
38	The powerline route Alternative A1b must be realigned to start at the new location of Substation 5.	
39	Anti-collision devices such as bird flappers must be installed where the powerline crosses avifaunal corridors.	Birds and Bats Unlimited undertook a walkdown of the powerline route. The results of their assessment are included in Section 4.4.4 and **Appendix E**.
41	A permit must be obtained from the relevant nature conservation agency for the removal or destruction of any indigenous protected and endangered plant and animal species if required.	Where such permits are required, the EA holder commits to completing this in line with the condition requirements. The ecology walkdown recommended that a flora and fauna search and rescue (relocation) must be undertaken before commencement of vegetation clearing and should preferable be undertaken in the Spring season. . A comprehensive list of species for which permits will be required is provided in Appendix 1: Plant Species of Conservation Concern (Red listed) and Appendix 2: Flora Protected in Terms of Provincial of the Ordinance(s) of the Ecology & Biodiversity Walkdown Report (**Appendix F**).
46	An integrated waste management approach must be implemented that is based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate.	A waste management plan is included in Section 12.9 of this EMPr.

2 DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

2.1 2016 ENVIRONMENTAL ASSESSMENT PRACTITIONER

Coastal & Environmental Services (EOH CES) prepared the original Draft EMPr in 2016. Table 2-1 provides the details of original EAP.

Table 2-1: Details of the EAP

EAP	**MARK HARDY**
Company	Coastal and Environmental Services, trading as EOH Coastal &
Physical Address	Environmental Services (EOH CES), Cape Town branch.
Postal Address	The Point, Suite 408, 4th Floor, 76 Regent Road Sea Point, Cape Town,
Telephone	8001
Fax	Same as above
Website	+27 21 045 0900
Email	046 622 6564

Coastal & Environmental Services (EOH CES), established in 1990, is a specialist environmental consulting company based in South Africa with offices in Port Elizabeth, Grahamstown, East London, Cape Town, Maputo and Johannesburg. We believe that a balance between development and environmental protection can be achieved by skilful, considerate and careful planning. EOH CES has considerable experience in terrestrial, marine and freshwater ecology, the Social Impact Assessment (SIA) process, and state of environment reporting (SOER), Integrated Waste Management Plans (IWMP), Spatial Development Frameworks (SDF), public participation, as well as the management and co-ordination of all aspects of the Environmental Impact Assessment (EIA) and Strategic Environmental Assessment (SEA) processes. EOH CES has been active in all of the above fields, and in so doing have made a positive contribution to towards environmental management and sustainable development in South Africa and many other African countries.

2.2 2021 ENVIRONMENTAL ASSESSMENT PRACTITIONER

WSP was appointed in the role of Independent EAP to update the EMPr in compliance with Condition 16 of the approved EA. The CV of the EAP is available in **Appendix A**. **Table 2-2** details the relevant contact details of the EAP.

Table 2-2: Details of the EAP

EAP	**WSP GROUP AFRICA (PTY) LTD**
Company Registration:	1999/008928/07
Contact Person:	Ashlea Strong

Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
Postal Address:	P.O. Box 98867, Sloane Park 2151, Johannesburg
Telephone:	011 361 1392
Fax:	011 361 1301
Email:	Ashlea.Strong@wsp.com

STATEMENT OF INDEPENDENCE

Neither WSP nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report, nor do they have any business, financial, personal or other interest that could be reasonably regarded as being capable of affecting their independence. WSP has no beneficial interest in the outcome of the assessment.

3 PROPOSED PROJECT DESCRIPTION

3.1 DESCRIPTION OF PROPOSED ACTIVITY

The current EMPr relates to the following project:

3.1.1 BACKGROUND

Rietkloof propose to develop electrical infrastructure in the form of a single 132 kilovolt (kV), above-ground electrical power line (distribution line). This line will be required to evacuate up to 147 megawatt (MW) of energy from the proposed Rietkloof WEF, located near Laingsburg in the Western Cape Province of South Africa. This energy will ultimately be distributed to the national grid, through connections with an external Eskom substation.

The proposed Rietkloof WEF (DFFE Ref. No. 14/12/16/3/3/2/1/1977) was authorised through a merged Environmental Authorisation (EA) in September 2019 and was awarded preferred bidder status in Round 5 of the Renewable Energy Independent Power Producer Procurement Programme (REIPPPP) in October 2021).

3.1.2 PROJECT DESCRIPTION

A generalised depiction of the infrastructure associated with this application is shown in **Figure 3-1**. The project entails connection from an on-site substation (A), evacuation via a 132kV overhead line (B), and the ultimate connection with an Eskom substation (C).

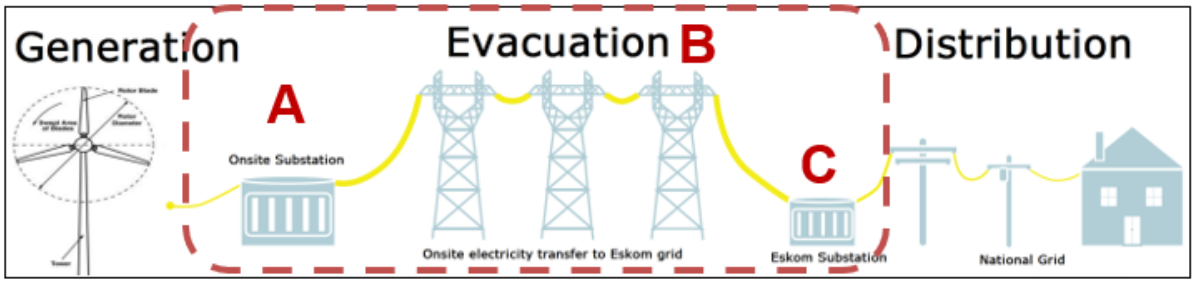

Figure 3-1: Typical WEF electricity evacuation process. The red dotted square indicates the components relevant to this document.

A. **One 33/132Kv Substation (A)** including the internal components such as transformers, isolators, cabling and light mast, as required by Eskom. This 33/132kV on-site substation will have a footprint of up to 200m x 200m that that will be inclusive of site offices, storage areas, ablution facilities and the maintenance building. This substation will be the interface between the different connections from the wind turbines (from the WEF mentioned above), by receiving all the 33kV connection cables and powerlines from the individual turbines, from where one 132kV line will evacuate the power to an external substation owned by Eskom. The on-site substation is denoted with a large, red "A" on **Figure 3-1**.

B. **132kV overhead distribution line (B)** to connect the onsite 33/132kV substation mentioned above, to the national grid. The pylons for this line will have an average spacing between 250m and 300m, and will consist of a mixture of self-supporting monopoles, guyed monopoles as well as lattice structures. The maximum height will be up to 32m, regardless of the design type used. The servitude will be up to 31m wide. A 200m wide corridor will be applied for to allow for micro-sitting. It must be noted that the powerline will be managed by Eskom. This distribution line is denoted with a large, red "B" on **Figure 3-1**.

C. **Connection to the national grid (C)** in order to connect to the Rietkloof Wind Farm to the National Grid the powerline will connect to the Bon Espirange satellite 132kV substation located approximately 7km from the project boundary. The Bon Espirange satellite substation is currently under construction. The Bon

Espirange Substation will be managed by Eskom. The Bon Espirange Substation is denoted with a large, red "C" in **Figure 3-1**.

3.2 SITE LOCATION

The proposed project is located within the same property and adjacent to the proposed Rietkloof WEF (Reference Number: 14/12/16/3/3/1/1977/AM1), roughly 15km along the R354 heading north towards Sutherland (**Figure 3-2**).

The majority of the project footprint lies within the Western Cape Province. The project is located within Ward 1 of the Laingsburg Local Municipality seated within the Central Karoo District Municipality (located in the Western Cape).

The final layout map of the powerline is included in **Figure 3-3**. **Table 3-1** outlines the property portions affected by the authorised powerline alignment.

Table 3-1: Project Property Portions

PORTION AND FARM	NAME	FARM NAME	SURVEYOR ID
RE/210	Standvastigheid Familie Trust	Standvastigheid	C07200000000021000000
2/210	Eskom SOC Limited	Standvastigheid	C07200000000021000002
1/73	Douglas & Esme Calldo	Bon Espirange	C04300000000007300001
RE/74	A D V Le Roux Family Trust c/o Andries Le Roux	Fortuin	C04300000000007400000
3/74	A D V Le Roux Family Trust c/o Andries Le Roux	Fortuin	C04300000000007400003
1/75	A D V Le Roux Family Trust c/o Andries Le Roux	Brandvalley	C04300000000007500001
1/76	Mooi Nooientjies Trust c/o Christo Matthee	Barendskraal	C04300000000007600001
1/77	Du Toit Thiersen (Pty) Ltd c/o Johan du Toit	Hartjieskraal	C04300000000007700001
RE/77	Ernest Marais	Hartjieskraal	C04300000000007700000
105	Douglas & Esme Calldo	Aprils Kraal	C04300000000010500000
RE/73	Piet Conradie	Bon Espirange	C04300000000007300000
1/74	Ou Mure Boerdery c/o Polla van der Westhuizen	Ou Mare	C04300000000007400001
1/76	Mooi Nooientjies Trust c/o Christo Matthee	Barendskraal	C04300000000007600001
RE/284	ZB Loots Familie Trust / Ziegfriedt Loots	Nuwerus	C04300000000028400000

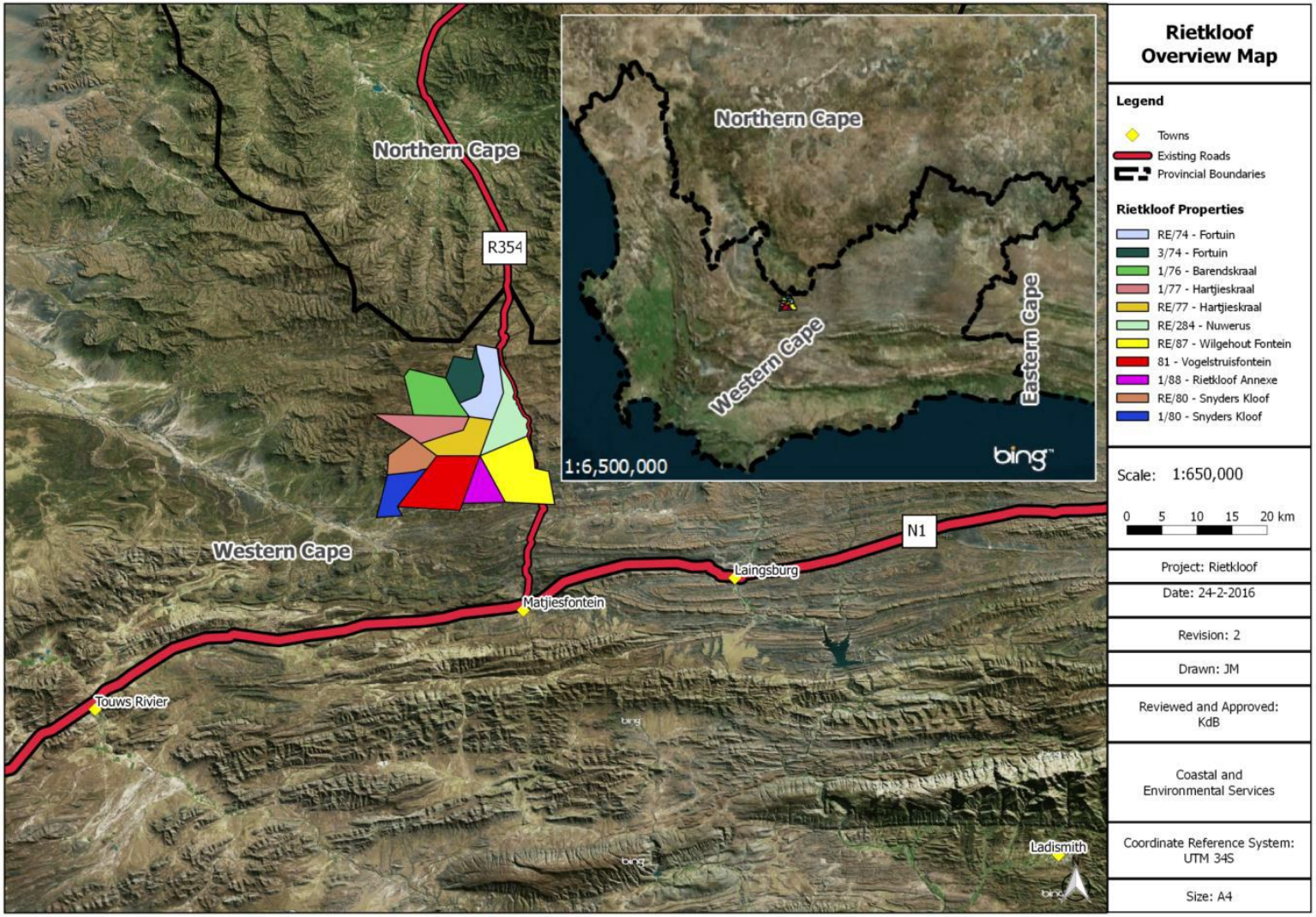

Figure 3-2: Project locality map, indicting the general location of the project study area.

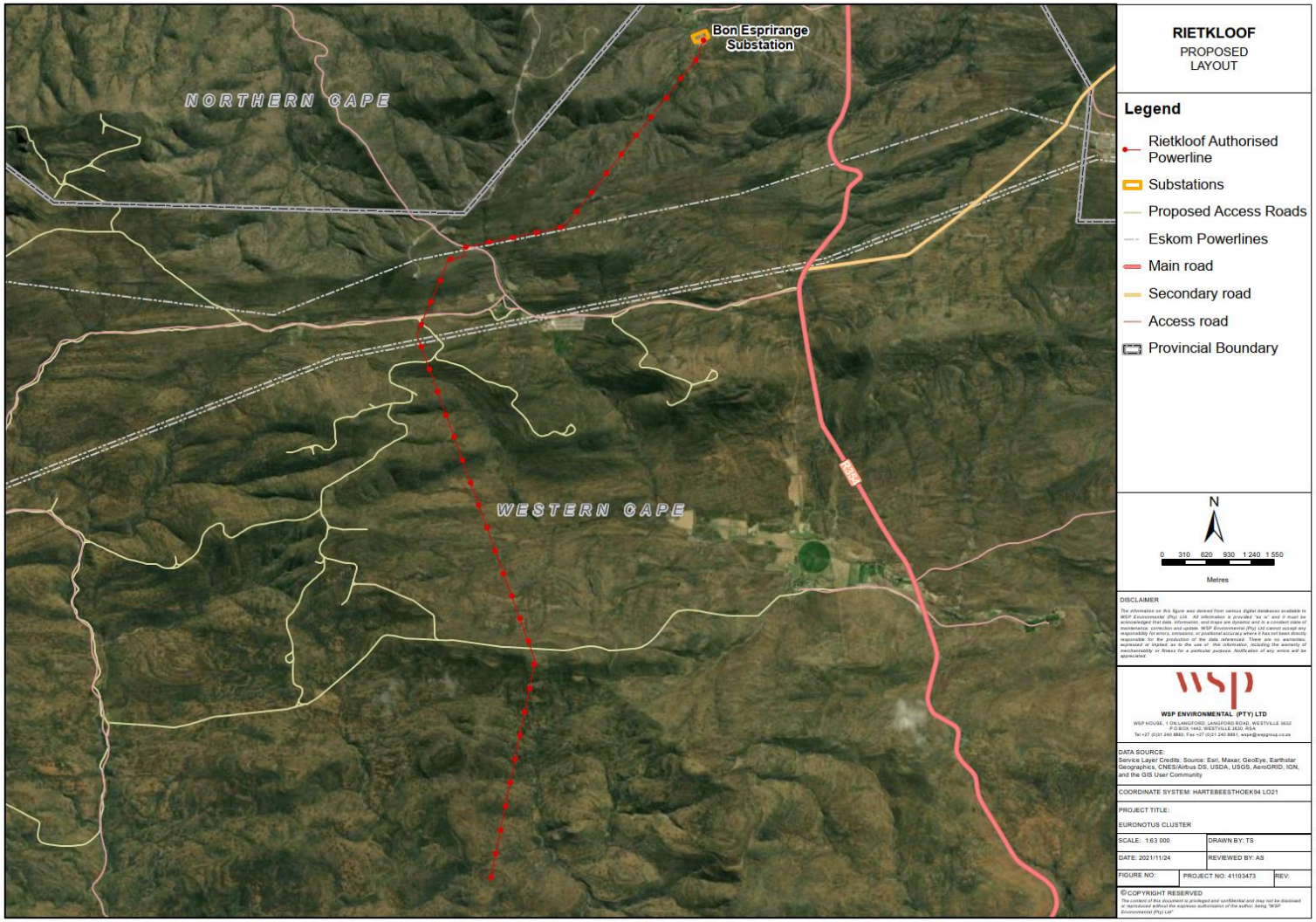

Figure 3-3: Final Layout Map

3.3 ACTIVITIES ASSOCIATED WITH THE PROJECT LIFE-CYCLE

Table 3-2 outlines the activities that are expected and likely to impact on the environment during the course of the project's life-cycle.

During the operational phase, the pylons and substation would need to be accessed for routine maintenance. The frequency will be on a needs be basis. In order to access the pylons, the access road would need to be maintained in a state that allows for 4x4 access i.e. jeep track. The servitude will be maintained and monitored to avoid erosion and the establishment of alien invasive plant species.

Table 3-2: Summary of various activities throughout the project life-cycle.

PHASE	DURATION	ACTIVITES
Planning phase	Approximately 2 years	– Detailed geotechnical investigations to inform detailed designs – Final site walkthroughs by specialists to inform micro-sitting (this has been undertaken as part of the finalisation of this EMPr)
Construction phase	12 – 18 months	– Site Establishment – Setting out of construction area – Delivery of equipment to site
Civil and Electrical Works		– Topsoil stripping, where necessary, and bulk earthworks (if needed) for roads, hardstanding and pylon foundations. – Concrete works – Fixing reinforcement – Cable ducting, trenching and laying – Road and hardstanding construction (placement of aggregate layers) – Guy-wiring of pylons – Pylon erection and electrical cable stringing (where there is an overhead power line) – Above activities but within the substation and relevant to substation construction and including building construction works e.g. bricklaying, roofing, installation and testing of electrical equipment such as transformers and switchgear – Testing and commissioning of pylons and conductors
Operational phase	20 years as a minimum	– Maintenance of the infrastructure

4 ENVIRONMETNAL IMPACTS AND SENSITIVITIES

4.1 2016 - IMPACTS SUMMARY

The specialists involved in the 2016 BA process, assessed the potential impacts associated with the proposed project using the CES assessment methodology. To ensure a direct comparison between various specialist studies, the CES standard rating scale were used to assess and quantify the identified impacts.

Four factors were considered for each of the impacts, namely:

1. Relationship of the impact to temporal scales - the **temporal** scale defines the significance of the impact at various time scales, as an indication of the duration of the impact.
2. Relationship of the impact to **spatial** scales - the spatial scale defines the physical extent of the impact.
3. The severity of the impact - the **severity/beneficial** scale is used in order to scientifically evaluate how severe negative impacts would be, or how beneficial positive impacts would be on a particular affected system (for ecological impacts) or a particular affected party. The severity of impacts can be evaluated with and without mitigation in order to demonstrate how serious the impact is when nothing is done about it. The word 'mitigation' means not just 'compensation', but also the ideas of containment and remedy. For beneficial impacts, optimization means anything that can enhance the benefits. However, mitigation or optimization must be practical, technically feasible and economically viable.
4. The likelihood of the impact occurring - the likelihood of impacts taking place as a result of project actions differs between potential impacts. There is no doubt that some impacts would occur (e.g. loss of vegetation), but other impacts are not as likely to occur (e.g. vehicle accident), and may or may not result from the proposed development. Although some impacts may have a severe effect, the likelihood of them occurring may affect their overall significance.

Each criterion was ranked with scores assigned as presented in Appendix B to determine the overall **significance** of an activity. The criterion is then considered in two categories, viz. effect of the activity and the likelihood of the impact. The total scores recorded for the effect and likelihood are then read off the matrix, to determine the overall significance of the impact. The overall significance is either negative or positive.

Table 4-1 indicates the impacts determined during the environmental impact assessment process, as per the basic assessment report drafted in 2016.

Table 4-1: Summary of impacts for this project, as determined in the Basic Assessment Report.

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
1 Heritage Impact	Construction phase The Destruction of Precolonial / Stone Age material (BV_SA1 – BV_SA2) Duration: Permanent Extent: Regional Consequence: Very severe Probability: Definite **VERY HIGH**	Construction phase The Destruction of Precolonial / Stone Age material (BV_SA1 – BV_SA2) Duration: Permanent Extent: Regional Consequence: Slight Probability: Definite **MODERATE**
	Construction phase Damage to stone walling features (BV_SW1 – BV_SW2) Duration: Permanent Extent: Study site Consequence: Very severe Probability: May occur	**Construction phase** **Damage to stone walling features (BV_SW1 – BV_SW2)** Duration: Long term Extent: Study site Consequence: Slight Probability: May occur

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
	VERY HIGH	**MODERATE**
	Construction phase The destruction of Graves (formal and informal burials) (RKPL_G1 – RKPL_G2) Duration: Permanent Extent: Study site Consequence: Very severe Probability: May occur **VERY HIGH -**	Construction phase The destruction of Graves (formal and informal burials) (RKPL_G1 – RKPL_G2) Duration: Long term Extent: Study site Consequence: Slight Probability: May occur **VERY HIGH -**
	Construction phase Damage to Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS4) Duration: Permanent Extent: Study site Consequence: Very severe Probability: Definite **VERY HIGH -**	Construction phase Damage to Homesteads / Farmhouse Complexes (BV_HS1 – BV_HS4) Duration: Long term Extent: Study site Consequence: Slight Probability: Definite **MODERATE -**
	Operation phase Change of character of the region and subsequent cultural Landscape impact Duration: Long term Extent: Study site Consequence: Very severe Probability: Definite **VERY HIGH**	Operation phase Change of character of the region and subsequent cultural Landscape impact Duration: Medium term Extent: Study site Consequence: Moderate Probability: Definite **MODERATE -**
	Cumulative Impact Impact of the construction of the proposed substation and powerlines on the cultural landscape Duration: Long term Extent: Study site Consequence: Very severe Probability: Definite **VERY HIGH -**	Cumulative Impact Impact of the construction of the proposed substation and powerlines on the cultural landscape Duration: Medium term Extent: Study site Consequence: Moderate Probability: Definite **MODERATE -**
2.Impact to Palaeontology	Construction Impacts to fossil heritage resources Duration: Permanent Extent: Localised Consequence: Moderate Probability: May occur **MODERATE –**	Construction Impacts to fossil heritage resources Duration: Permanent Extent: Localised Consequence: Slight Probability: May occur **LOW –**
	Cumulative Impacts Cumulative Impact to fossil heritage resources Duration: Permanent Extent: Localised Consequence: Slight Probability: Definite **LOW -**	Cumulative Impacts Cumulative Impact to fossil heritage resources Duration: Permanent Extent: Localised Consequence: Slight Probability: Definite

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
		LOW -
3. Avifauna Impacts	Construction phase Disturbance during construction of the sub- stations and power lines (relevant to all power line alternatives and all four sub-station locations). Duration: Short term Extent: Localised Consequence: Slight Probability: Definite **LOW –**	Construction phase Disturbance during construction of the sub- stations and power lines (relevant to all power line alternatives and all four sub-station locations). Duration: Short term Extent: Localised Consequence: Slight Probability: Definite **LOW -**
	Construction phase Loss of habitat as result of grounded features – namely the sub-stations, pylon bases, and associated service tracks during the construction phase. Duration: Long term Extent: Localised Consequence: Slight Probability: Definite **MODERATE –**	Construction phase Loss of habitat as result of grounded features – namely the sub-stations, pylon bases, and associated service tracks during the construction phase. Duration: Long term Extent: Localised Consequence: Slight Probability: Definite **MODERATE –**
	Operational phase Bird mortality through collision with the overhead lines during the operational phase (relevant to all powerline alternatives). Duration: Long term Extent: Localised Consequence: Moderate Probability: Definite **MODERATE –**	Operational phase Bird mortality through collision with the overhead lines during the operational phase (relevant to all powerline alternatives). Duration: Long term Extent: Localised Consequence: Moderate Probability: Definite **MODERATE –**
	Operation phase All alternative lines barring CH1a and CH1b (see below) Duration: Long term Extent: Localised Consequence: Moderate Probability: Definite **MODERATE -**	Operation phase All alternative lines barring CH1a and CH1b (see below) Duration: Long term Extent: Localised Consequence: Slight Probability: May occur **LOW -**
	Operation phase CH1a and CH1b Duration: Long term Extent: Localised Consequence: Severe Probability: Definite **HIGH -**	Operation phase CH1a and CH1b Duration: Long term Extent: Localised Consequence: Slight Probability: Definite **MODERATE -**
	Operation phase Indirect impacts Duration: Long term Extent: Localised	Operation phase Indirect Impacts Duration: Long term Extent: Localised

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
	Consequence: Slight Probability: Unlikely Mitigation: Easy **LOW -**	Consequence: Slight Probability: Unlikely Mitigation: Easy **LOW**
	Cumulative Impact – Electrocution Duration: Long term Extent: Regional Consequence: Slight Probability: May Occur **LOW –**	Cumulative Impacts - Electrocution Duration: Long term Extent: Regional Consequence: Slight Probability: May Occur **LOW –**
	Cumulative Impact – Habitat Destruction Duration: Long term Extent: Regional Consequence: Slight Probability: Will Occur **LOW –**	Cumulative Impact – Habitat Destruction Duration: Long term Extent: Regional Consequence: Slight Probability: Will Occur **LOW –**
	Cumulative Impact – Displacement Duration: Long term Extent: Localised Consequence: Slight Probability: May Occur **LOW –**	Cumulative Impact – Displacement Duration: Medium-Long term Extent: Localised Consequence: Slight Probability: May Occur **LOW –**
	Cumulative Impact – Solar Array Collision Duration: Long term Extent: Regional Consequence: Moderate Probability: May Occur **LOW**	Cumulative Impact - Solar Array Collision Duration: Long term Extent: Regional Consequence: Low Probability: May Occur **LOW**
	Cumulative Impact – Wind Turbine Collision Duration: Long term Extent: Regional Consequence: Low Probability: May Occur **LOW –**	Cumulative Impact – Wind Turbine Collision Duration: Long term Extent: Regional Consequence: Low Probability: May Occur **LOW –**
	Cumulative Impacts Duration: Long term Extent: Regional Consequence: Moderate Probability: Will Occur **LOW –**	Cumulative Impacts Duration: Long term Extent: Regional Consequence: Low Probability: May Occur **LOW –**
5. Social Impacts	Social and visual impact of the power line Duration: Medium term Extent: Study area Consequence: Slight Probability: Probable	Social and visual impact of the power line Duration: Medium term Extent: Study area Consequence: Slight Probability: Probable

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
	LOW –	**LOW –**
	Cumulative impact Duration: Medium term Extent: Regional Consequence: Slight Probability: Probable **LOW**	Cumulative impact Duration: Medium term Extent: Regional Consequence: Slight Probability: Probable **LOW**
6. Ecological impacts	Construction phase Impact on vegetation and listed plant species due to transformation within the development footprint. Duration: Permanent Extent: Localised Consequence: Moderate Probability: Definite **MODERATE –**	Construction phase Impact on vegetation and listed plant species due to transformation within the development footprint. Duration: Permanent Extent: Localised Consequence: Slight Probability: Probable **LOW –**
	Construction phase Direct faunal impacts due to construction phase noise and physical disturbance. Duration: Short term Extent: Localised Consequence: Severe Probability: Probable **MODERATE –**	Construction phase Direct faunal impacts due to construction phase noise and physical disturbance. Duration: Short term Extent: Localised Consequence: Moderate Probability: May Occur **LOW –**
	Operation phase Following construction, the site will be highly vulnerable to soil erosion Duration: Medium term Extent: Localised Consequence: Severe Probability: Definite **MODERATE -**	Operation phase Following construction, the site will be highly vulnerable to soil erosion Duration: Short term Extent: Localised Consequence: Moderate Probability: Probable **LOW –**
	Operation phase Following construction, the site will be highly vulnerable to alien plant invasion Duration: Permanent Extent: Study area Consequence: Moderate Probability: Probable **MODERATE –**	Operation phase Following construction, the site will be highly vulnerable to alien plant invasion Duration: Short term Extent: Localised Consequence: Low Probability: May occur **LOW –**
	Decommissioning phase Faunal Impacts due to Decommissioning Phase activities such as noise and disturbance due to the presence of construction staff and the operation of heavy machinery Duration: Short term Extent: Study area	Decommissioning phase Faunal Impacts due to Decommissioning Phase activities such as noise and disturbance due to the presence of construction staff and the operation of heavy machinery Duration: Short term Extent: Study area

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
	Consequence: Moderate Probability: Probable **MODERATE –**	Consequence: Moderate Probability: May occur **LOW-**
	Decommissioning phase Soil Erosion Risk Duration: Long term Extent: Localised Consequence: Moderate Probability: Probable **MODERATE –**	Decommissioning phase Soil Erosion Risk Duration: Medium term Extent: Localised Consequence: Slight Probability: Probable **LOW –**
	Decommissioning phase Alien plant invasion will be highly likely within disturbed areas following decommissioning Duration: Long term Extent: Study area Consequence: Moderate Probability: Probable **MODERATE –**	Decommissioning phase Alien plant invasion will be highly likely within disturbed areas following decommissioning Duration: Medium term Extent: Localised Consequence: Slight Probability: Probable **LOW –**
	Cumulative Impact Impacts on Critical Biodiversity Areas and broad-scale ecological processes Duration: Long term Extent: Study area Consequence: Moderate Probability: Probable **MODERATE –**	Cumulative Impact Impacts on Critical Biodiversity Areas and broad-scale ecological processes Duration: Long term Extent: Study area Consequence: Slight Probability: Probable **LOW -**
6. Traffic impacts	Construction phase Duration: Short term Extent: Regional Consequence: Slight Probability: Definite **LOW**	Construction phase Duration: Short term Extent: Regional Consequence: Slight Probability: Definite **LOW**
7. Visual impact	Operation phase Duration: Long term Extent: Localised Consequence: Slight Probability: May occur **LOW –**	Operation phase Duration: Long term Extent: Localised Consequence: Slight Probability: May occur **LOW -**
	Cumulative Impact Duration: Long term Extent: Localised Consequence: Severe Probability: Definite **HIGH –**	Cumulative Impact Duration: Long term Extent: Localised Consequence: Moderate Probability: May occur **MODERATE -**
8. Surface water impacts	Construction phase Duration: Short term Extent: Localised	Construction phase Duration: Short term Extent: Localised

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
	Consequence: Moderate Probability: May occur **MODERATE –**	Consequence: Slight Probability: Unlikely **LOW -**
9. Erosion impact	Construction phase Duration: Short term Extent: Localised Consequence: Severe Probability: Definite **MODERATE –**	Construction phase Duration: Short term Extent: Localised Consequence: Moderate Probability: Probable **LOW -**
	Decommissioning phase Duration: Long term Extent: Localised Consequence: Moderate Probability: Probable **MODERATE –**	Decommissioning phase Duration: Medium term Extent: Localised Consequence: Slight Probability: Probable **LOW -**
	Cumulative impact Duration: Short term Extent: Regional Consequence: Moderate Probability: Definite **MODERATE –**	Cumulative impact Duration: Short term Extent: Localised Consequence: Slight Probability: May occur **LOW -**
10. Impact on energy production;	Operation phase Duration: Long term Extent: National Consequence: Slight Probability: Definite **MODERATE +**	Operation phase Duration: Long term Extent: National Consequence: Moderately beneficial Probability: Definite **MODERATE +**
11. Impact to soil and land capabilities	Construction phase Loss of agricultural land. The proposed layout avoids all cultivated land. Once construction is completed, the servitude can continue to be used as grazing. Duration: Short term Extent: Study area Consequence: Moderate Probability: Probable **MODERATE -**	Construction phase Loss of agricultural land. The proposed layout avoids all cultivated land. Once construction is completed, the servitude can continue to be used as grazing. Duration: Short term Extent: Study area Consequence: Slight Probability: Probable **MODERATE -**
	Cumulative impact Cumulative soil erosion from adjacent project works Duration: Short term Extent: Regional Consequence: Moderate Probability: Probable **MODERATE –**	Cumulative impact Cumulative soil erosion from adjacent project works Duration: Short term Extent: Localised Consequence: Slight Probability: May occur **LOW -**
12. Noise impacts associated with the construction phase	Construction phase Construction phase activities will incur elevated noise levels through machinery, staff	Construction phase Construction phase activities will incur elevated noise levels through machinery, staff

Impact	Significance category – BEFORE mitigation	Significance category – AFTER mitigation
	on site and vehicles Duration: Short term Extent: Study area Consequence: Slight Probability: Definite **LOW –**	on site and vehicles Duration: Short term Extent: Study area Consequence: Slight Probability: May occur **LOW –**
13. Dust impacts associated with the construction phase impacting on SALT, SKA or SAAO	Construction phase Construction phase activities will liberate greater quantities of dust than the current land use, albeit temporarily Duration: Short term Extent: Study area Consequence: Slight Probability: Definite **LOW –**	Construction phase Construction phase activities will liberate greater quantities of dust than the current land use, albeit temporarily Duration: Short term Extent: Study area Consequence: Slight Probability: May occur **LOW -**
	Cumulative impact Duration: Short term Extent: Study area Consequence: Slight Probability: Definite **LOW –**	Cumulative impact Duration: Short term Extent: Study area Consequence: Slight Probability: May occur **LOW –**

4.2 2016 - SPECIALIST KEY FINDINGS

The following sections summarise the key specialist issues determined during the specialist phase.

4.2.1 HERITAGE

A phase 1 archaeological impact assessment (AIA) was undertaken by Booth Heritage Consulting to assess heritage features2, including the built environment and other cultural heritage resources, located within the project footprint.

The survey was conducted to determine the range and importance of the exposed and in situ archaeological heritage material remains, sites and features; to establish the potential impact of the development; and to make recommendations to minimize possible damage to the archaeological heritage. The assessment informed the Basic Assessment process for the proposed Rietkloof WEF electrical infrastructure to ensure that negative impacts are mitigated if avoidance is not possible and to enhance any positive impacts.

It must be noted that the layout for the final powerline alternatives were not finalised by the time that the survey was conducted for the Rietkloof WEF, associated infrastructure and access roads, therefore the brief summary of findings is a generalised summary observed during the survey of the WEF. Heritage resources located nearby, within 200m, to the proposed powerline route have been identified and included in this report. It must be emphasized that once the final layout for the powerlines has been confirmed an archaeological heritage walk-through will be conducted to determine the positioning of the pylons and make further recommendations.

The assumption of the field study was to locate very little precolonial archaeological heritage material and several historical features and associated artefacts. This assumption arose from previous studies conducted on parts of site and proximity (ACO Associates 2011, 2013, 2014), and from the author's experience in conducting studies for the Hidden Valley (now Karusa, Soetwater and the Great Karoo) WEFs (Booth 2010, 2011, 2015).

As assumed the area held several of historical features (stone walling kraals and cottages) some with associated historical artefacts situated along the access roads in the valleys and associated with the homestead settlements.

The area, however, also held evidence of both Middle and Later Stone Age stone artefacts alongside water courses and on the flat floodplains. The heritage resources encountered are briefly explained below:

— **Precolonial / Stone Age material (RKPL_SA1 – RKPL_SA4)**

Both Later Stone Age and Middle Stone Age stone artefact scatters were identified mainly on the flat floodplains up to the foot of the mountains as well as within the valleys along water courses. The artefacts were manufactured from fine-grained chalcedony material as well as hornfels and local shale raw materials.

No other cultural or organic archaeological heritage materials were assumed to be directly related or associated with the stone artefact scatters. In several instances stone artefacts would occur within the same vicinity as historical built environment structures, stone walling features as well as historical artefact scatters, similarly situated on the flat floodplains and within the valleys close to water courses.

— **Stone Walling Features (RKPL_SW1 - RKPL_SW3)**

Up to three (3) stone walling features were documented along the access routes on the flat floodplains and in the valleys. These features include historical stone packed dwellings / cottages as well as kraals, pens, and a threshing floor. Historical artefacts were also located within the vicinity of some of the stone packed dwellings and kraals.

— **Historical Artefact Scatters (RKPL_Hist1)**

The historical artefacts scatter include fragments of glass, ceramics and metal material probably dating to the late 19th century. These scatters are mainly identified to be associated within the vicinity of stone packed dwellings / cottages and/or stone packed kraals.

— **Built Environment Structures (RKPL_BE1 – RKPL_BE3)**

These exclude structures that have been constructed by the historical stone packing method. The structures may be younger than 60 years and with very little or no heritage significance. These include abandoned buildings, used and unused reservoirs and drinking troughs. These structures occur across the landscape along the existing access roads.

The farm houses and associated buildings situated on the homestead / farm complex have been outlined and as a whole are considered as homesteads (described below).

— **Graves (formal and informal burials) (RKPL_G1 – RKPL_G2)**

The historical family cemeteries are usually situated within close proximity or apart of the homestead. RKPL_G1 is a family cemetery situated across a watercourse from the Hartjieskraal homestead. RKPL_G2 resemble informal stone packed burials that may be associated with the ruins of a stone walling cottage situated in a valley next to a watercourse on the farm Hartjieskraal 77.

— **Homesteads / Farmhouse Complexes (RKPL_HS1 – RKPL_HS2)**

Four homesteads / farm complexes were identified and demarcated where the proposed power line routes will pass. These have been demarcated purely for ease of reference, description and mitigation measures. Most of these homesteads / farm complexes include historically stone packed features including kraals and dwellings as well as nineteenth century farmhouses, modern buildings and typically historical graveyards. These earlier buildings and features have most likely been modified over time for maintenance purposes for continued and contemporary occupation. The homesteads are situated either adjacent to the proposed access roads or in some cases the proposed internal access roads are expected to go through the homesteads.

These homesteads include the farm house and associated staff accommodation, outbuildings and stone walling features and built environment structures.

4.2.2 AVIFAUNAL

An avifauna impact assessment was undertaken African Insights3 to assess the potential impacts on avifauna. The findings indicate that there are three groups of birds (1. Bustards; 2. Birds of prey; 3. Waterbirds) potentially at risk of collision with the overhead line:

1. The following avifauna sensitive features were identified onsite: 1. Farm dams and cultivated fields
2. Flightpath between the Ou Mure and Fortuin farm dams

Provided the final routing takes full cognisance of the avifaunal preferences (bearing in mind the preferences of other specialists and the technical requirements), and the suggested mitigation measures are followed, the disturbance and habitat loss resulting from the proposed development are, though of negative impact, minor and inconsequential in regional terms even allowing for cumulative impact.

The risk of bird deaths as a result of collision with infrastructure, though negative, is extremely low for the greater part of the local avifauna and, though somewhat higher, is also considered low – and at an acceptable level – for the three groups of birds of anticipated greater risk. Again the contribution to the likely cumulative threat is minor and acceptable.

If the Central Hub option is chosen then, from an avifaunal perspective, the amended routes north of the col are, by far the preferred route as it avoids both the col and the Fortuin area. The second choice is amended routes across the col as it will cross the col at a height considered to be above that at which most birds will fly when using this part of their flight-path. The routes to the south of the col are, avifaunally, the least preferred. Any of the powerlines from the onsite substations to the central hub can proceed.

If the Bon Espirange option is chosen then, from an avifaunal perspective, the routes north of the col are, by far the preferred route. The second choice are the routes across the col followed by the routes to the south of the col which is, avifaunally, the least preferred. Any of the powerline routes from the onsite substations to Komsberg can proceed. All proposed substation locations are acceptable.

4.2.3 ECOLOGY

An ecological impact assessment4 was undertaken by Simon Todd Consulting to assess the potential impacts on ecological features.

Although there are some areas within the study area and within the powerline corridors that are considered high sensitivity, the footprint of the development is low and the powerlines themselves are sufficiently flexible that any sensitive features potentially within the footprint can be avoided. As a result, the direct impact of habitat loss resulting from the development of the grid connection infrastructure is seen to be low. The major concerns regarding the development of the Rietkloof grid connection infrastructure is likely to stem from secondary impacts such as erosion. Several of the routes traverse steep slopes and the access roads required for construction of the power lines in these areas will remain vulnerable to erosion for the life is the development. This can however be well mitigated though the use of erosion control structures and regular monitoring during the lifespan of the development.

Overall and with the suggested mitigation measures applied, the impact of the Rietkloof Grid Connection infrastructure would be local in nature and of low significance.

The preferred alternatives from an ecological point of view are:

<u>On-site substation to Central Hub Substation to Komsberg or Bon Espirange</u>:

- The shorter routes are preferable, except for the connection to Komsberg which is seen as preferable to the connection to Bon Espirange as there is already an existing 400kV line along the large part of the route to Komsberg SS.

<u>Rietkloof on-site substation to Bon Espirange East</u>:

- The shorter routes are preferable and the option from Substation 1 is the preferred option.
- The route from substation 3 is least preferred.

<u>Rietkloof on-site substation to Bon Espirange Substation West</u>

- Most of these options traverse the high-lying ground in the centre of the site which is considered sensitive. As a result, the options from substations 3,4,5,6 and 7 are least desirable, but are not considered fatally flawed.

4.2.4 OTHER SPECIALISTS

DEA&DP and HWC requested that a **Visual Impact Assessment** be undertaken to inform the Basic Assessment process. Although, an overhead 132kV distribution line could typically result in visual impact to the surrounding environment, a visual impact assessment was not undertaken. The proposed overhead 132kV distribution line will run along the existing 400kV and 765kV Eskom power lines within the project area and along the existing 11kV power line from the project area to the Bon Espirange Substation. Therefore, there are likely to be no additional visual impacts to the visual impacts already experienced as a result of the existing Eskom 765kV, 400kV and 11kV lines. In addition, there's very little mitigation options to reduce the visibility of an overhead powerline.

The proposed layout applied the mitigation measure of following existing infrastructure as far as possible in order to not impact new areas. Therefore, a visual impact assessment was not undertaken.

HWC furthermore requested that a **Palaeontology Impact Assessment (PIA)** be undertaken for the proposed development. Dr. John Almond, a palaeontology specialist responded to this request by confirming that the entire 132kV distribution line project footprint has already been assessed in terms of palaeontological heritage impacts in the course of combined desktop and field-based studies by himself for the two WEFs (including relevant substations) as well as for several neighbouring transmission line, substation and alternative energy projects. All these previous studies have concluded that, while fossil material such as Palaeozoic vertebrate, trace fossil and petrified wood remains do indeed occur in this region of the Karoo, the overall palaeontological sensitivity here is generally low because well-preserved, scientifically important fossils are very rare. None of the few, small areas of high palaeontological sensitivity that have been identified in previous field assessment reports will be directly impacted by the distribution lines. Bedrock excavations into potentially fossiliferous bedrocks during construction of the 132kV distribution line pylons and associated access roads are likely to be small in volume. The impact significance of the proposed 132kV distribution lines is therefore rated as Low (negative). Given their low impact significance and the fact that the entire development footprint has been previously assessed, no further specialist palaeontological studies are considered necessary in this regard (Please see addendum letter and PIA in Appendix D of the BAR).

A comment was also received from DEA (now known as the DFFE) requiring a social impact assessment and a **Traffic Impact Assessment**. The traffic impact assessment (Aurecon, 2016) assessed the traffic associated with the construction and operation of the 132kV distribution line and substation and therefore informed this assessment. The traffic and transport plan are included in Appendix D.

The **Social Impact Assessment (SIA)** undertaken to inform the WEF EIA, was considered sufficient to inform this BA process. The SIA (Barbour and van der Merwe, July 2016) found that the potential social impacts associated with the establishment of 33kV overhead power lines and the associated substation will be limited, specifically within the context of the establishment of the wind turbines associated with the proposed WEF. In addition, the power lines are located on the site. The proposed 132kV distribution lines for the proposed Brandvalley WEF will follow the existing 765kV Eskom power line for 5km before heading north for 1.2km and then follow the existing 400kV distribution line before linking up with the Bon Espirange substation. The short sections where the distribution line does not follow existing Eskom powerlines are located within the development footprint. The significance of the visual and associated social impacts associated with the establishment of a new 132kV line is therefore likely to be Low Negative. In addition, as indicated in the SIA of the 33kV lines, the impact of a powerline should be viewed within the context of the establishment of the wind turbines associated with the proposed WEF. Also note that this study area has been identified as a Renewable Energy Development Zone by the Strategic Environmental Assessment (SEA) for Wind and Solar PV energy in South Africa undertaken by the CSIR (2015). The area has therefore been identified as an area where renewable energy should be concentrated. Based on this information and the social specialist's experience of the study area, a SIA is not required for the proposed 132 kV distribution line (Please see addendum letter and SIA in Appendix D of the BAR).

4.3 2016 - LAYOUT

In order to avoid sensitive features identified by specialists, the following amendments were made to the preliminary layout:

- •**Substation alternative 5** (preferred alternative) was rotated less than 45 degrees in order to avoid the 200m buffer zone proposed around high-sensitive bat areas identified by an assessment undertaken for the WEF. It should be noted that the bat sensitivity buffer was only recommended for wind turbine positions and are not applicable to the other infrastructure. However, the layout was amended nonetheless. There were no avifaunal, heritage or surface water features identified in the vicinity of the 33/132kV onsite substation 5. Substation position 5 are located within a medium-low ecological sensitive area and therefore no further amendments are required to the layout.
- **The 33/132kV onsite substation alternative 6** was shifted 50m west from the initial proposed location in order to avoid the 200m buffer zone proposed around high-sensitive bat areas identified by an assessment undertaken for the WEF. It should be noted that the bat sensitivity buffer was only recommended for wind turbine positions and are not applicable to the other infrastructure. However, the layout was amended nonetheless. There were no avifaunal, heritage or surface water features identified in the vicinity of the

33/132kV onsite substation 6. Substation position 6 are located within a medium-low ecological sensitive area and therefore no further amendments are required to the layout.

- The majority of the **132kV distribution line 200m buffer corridors** remained unchanged as the sensitive features identified can be avoided through micro-sitting the pylon positions. However, a slight shift in the corridors were required in order for it to align with the newly amended positions for the onsite substations 5 and 6. The 132kV distribution line corridors (200m) were shifted slightly in order to connect with the amended substation position 5, 6 and central hub-substation. The majority of the corridor remained unchanged as the watercourses and 32m buffer zone, wetlands, heritage features and associated buffers and avifaunal sensitive areas can be avoided through micro-sitting within the 200m corridor.
- **The central hub substation** was moved approximately 100m south from the initial proposed location in order to avoid the very-high sensitive ecological area. The amended layout avoids all watercourses and 32m buffer zones. There are no avifaunal or heritage sensitive features within the vicinity of the central hub substation.

4.4 2021 - FINDINGS OF THE SPECIALIST WALKDOWNS

4.4.1 AGRICULTURAL

An Agricultural Assessment of the powerline alignment and adequacy of the EMPr in terms of the impacts on agricultural resources was undertaken by Johann Lanz.

Electrical grid infrastructure has negligible agricultural impact in this environment for three reasons:

- Overhead transmission lines have no agricultural impact because all agricultural activities that are viable in this environment, can continue completely unhindered underneath transmission lines.
- The direct, permanent, physical footprint of the development that has any potential to interfere with agriculture, is entirely insignificant within this agricultural environment.
- The affected land has very low agricultural potential, anyway.

The only possible source of impact is minimal disturbance to the land during construction and decommissioning.

Figure 4-1 illustrates the substation and power line route, overlaid on the agricultural screening tool sensitivity map. The route is almost entirely on land of low agricultural sensitivity and hence of very low agricultural potential.

Because the proposed power line has negligible agricultural impact, the proposed layout is entirely acceptable in terms of agricultural impact.

No additional mitigation measures have been recommended for inclusion in this EMPr.

The Agricultural Walkdown Report is included in **Appendix G.**

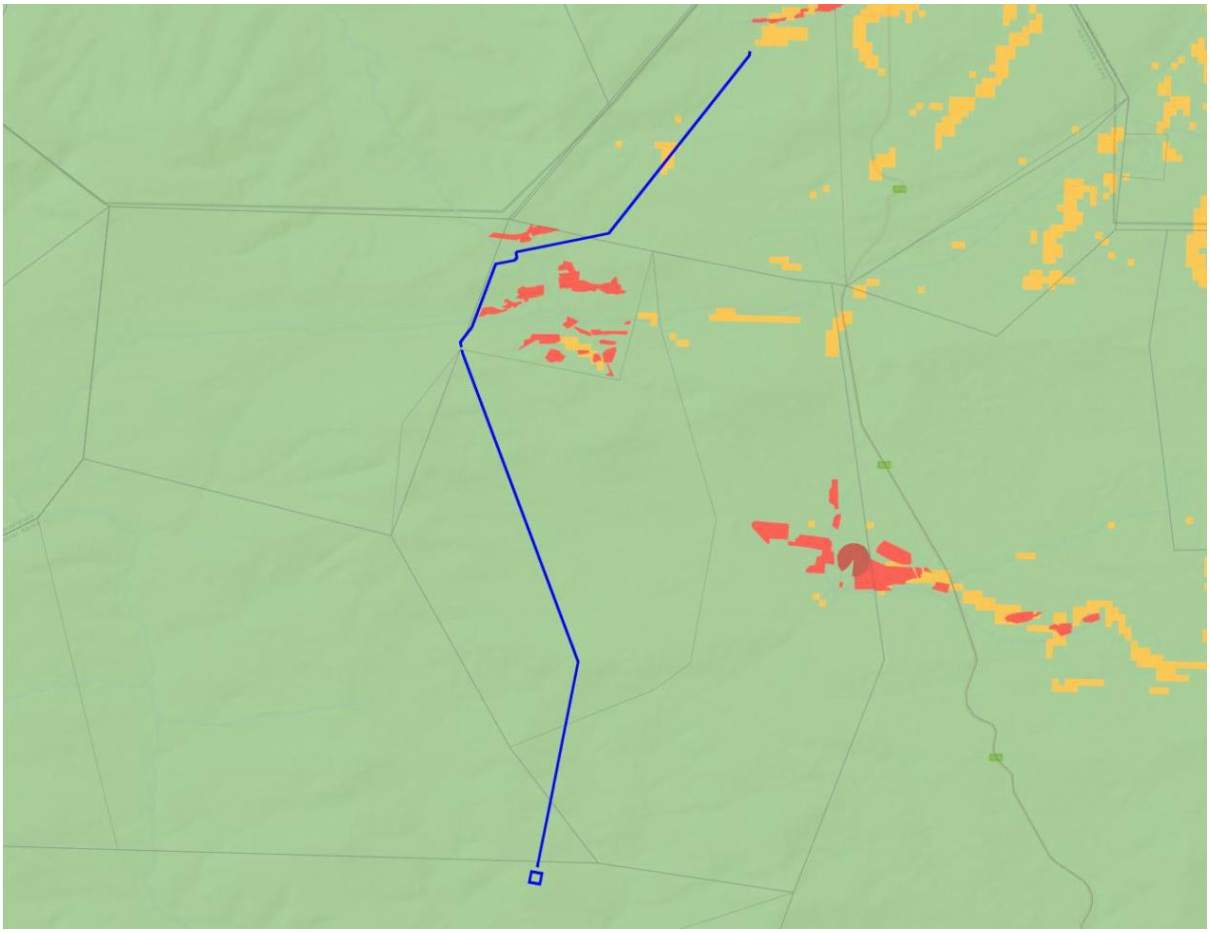

Figure 4-1: The proposed power line and substation overlaid on agricultural sensitivity, as given by the screening tool (green = low; yellow = medium; red = high; dark red = very high)

4.4.2 TERRESTRIAL ECOLOGY & BIODIVERSITY

Trusted Partners was commissioned to undertake and ecological site walkdown for the proposed powerline alignment. Several Species of Conservation Concern (SCC), in addition to those identified during the initial ecological assessment, were identified during the 2021 walkdown. These species are classified as either Critically rare (CR), Vulnerable (VU), Near Threatened (NT), Rare (R), or Endangered (E), The identified floral species of conservation concern include *Antimima androsacea* (CR), *Antimima loganii* (VU), *Brunsvigia josephinae* (VU), *Euryops sulcatus* (VU), *Geissorhiza karooica* (NT), *Indigofera hantamensis* (R), *Lotononis venosa* (E), *Romulea eburne* (VU), *Romulea hallii* (VU), *Romulea syringodeoflora* (NT).

Sensitive areas identified either during the initial ecological assessment and/or observed during the 2021 walkdown include the following:

- Rocky Outcrops and Ridges on slopes and mountain peaks;
- Rivers, seeps, wetlands and pans; and
- Sub-population of flagged species of conservation concern.

Applicable mitigation measures have been added to EMPr. The ecology walkdown recommended that a flora and fauna search and rescue (relocation) must be undertaken before commencement of vegetation clearing and should preferable be undertaken in the Spring season. A comprehensive list of species for which permits will be required is provided in Appendix 1: Plant Species of Conservation Concern (Red listed) and Appendix 2: Flora Protected in Terms of Provincial of the Ordinance(s) of the Ecology & Biodiversity Walkdown Report (**Appendix F**).

4.4.3 SURFACE WATER

A freshwater ecological assessment as part of the water use authorisation process for the proposed Rietkloof WEF was undertaken by Freshwater Ecologist Network (FEN) Consulting (Pty) Ltd.

The assessment indicates that a large drainage network of ephemeral watercourses, associated with the Groot, Roggeveld, Muishond and Wilgebos Rivers were identified as well as various Channelled Valley Bottom Wetlands. Majority of these watercourses are considered to be in a largely natural to moderately modified ecological condition and of high ecological importance and sensitivity.

The proposed powerline will traverse episodic drainage lines, an ephemeral tributary and a channelled valley bottom from the Roggeveld River system, all of which range from a largely natural to moderately modified ecological condition and are considered to be of High Ecological Importance and Sensitivity (EIS).

It was determined that the proposed development will have a Low risk significance on the watercourses without the implementation of mitigation measures. The risk significance can be reduced should the powerline support structures be located at least 32 m from a watercourse and the watercourse road crossings only be constructed during the driest period of the year; the impacts significance for the construction and operation for these components can be considered low with mitigation. It is noted that a portion of the proposed powerline (northern section) will fall within an existing powerline servitude and as such, existing infrastructure (such as roads) can be utilised.

Based on the findings of the assessment, no fatal flaws in terms of freshwater ecological aspects were identified and based on the risk assessment. With the adherence to cogent, well-conceived and ecologically sensitive construction plans and the implementation of the mitigation measures provided in this report and providing that general good construction practice is adhered to, from a freshwater conservation perspective the proposed development is considered acceptable.

The mitigation measures recommended in the report have been incorporated into this EMPr.

The freshwater assessment report further states that authorisation by means of a Water Use Licence Application (WULA) in terms of Sections 21 (c) and (i) of the National Water Act, 1998 (Act No. 36 of 1998) must be obtained from the Department of Water and Sanitation (DWS) prior to the commencement of any works. It can be confirmed that this application has been submitted as required.

The Surface water report is included in **Appendix H**.

4.4.4 BIRDS

Birds and Bats Unlimited was commissioned to undertake the required walkthrough of the final powerline alignment. This walk-through was to determine if Priority bird species may be impacted by the proposed 132kV overhead power line (OHPL) that exports energy from the Rietkloof wind farm to the national grid.

Five collision-prone Priority species were recorded on site – three of which are Red Data species – within the Rietkloof environs. They were Endangered Black Harriers and Vulnerable Verreaux's Eagles and Ludwig's Bustards. Least Concern but priority species included Booted Eagles, Jackal Buzzards, and Pale Chanting Goshawks. All of these species were recorded in flight over the grid corridor routing in 36-hours' observation over three days in late July 2021.

The following mitigation measure have been recommended and have been included in Section 11 of the EMPr:

- The entire line must be fitted with bird diverters to reduce collision frequency.
- where proposed and existing lines run parallel, the pylons should be staggered to reduce large bird collisions.
- Bird-friendly support structures must be used for the 132kV line such that the conductors are slung below the towers to avoid avian electrocutions.

The Avifauna Walkdown Report is included in **Appendix E**.

4.4.5 BATS

Animalia Consultants was appointed to provide comment with regards to the impact of the powerline alignment on bats.

A site visit was conducted on 13 September 2021 by Animalia Consultants (Pty) Ltd to verify the grid connection route, in relation to bat sensitivity. The impact of overhead powerlines on bats are considered minimal in South Africa. However, pylon construction can pose a threat to underground bat cave roosts.

The proposed powerline route from the Rietkloof WEF facility to the Bon Espirange substation does not cross over any known bat caves, and therefore is not predicted to have a significant negative impact on bat populations in the site area.

The proposed grid connection route is acceptable from a bat sensitivity perspective if all conditions of the EA are adhered to.

No mitigation measures have been recommended for inclusion in this EMPr

The Bat Walkdown Letter is included in **Appendix I.**

4.4.6 VISUAL

An assessment of the final powerline alignment from a visual perspective was undertaken by SiVEST.

It was noted that the original EMPr submitted with the 2016 BA report does not include any specific mitigation measures in respect of visual impacts that may result from the power line development have been re-assessed with a view to formulating mitigation measures for inclusion in the EMPr.

Potential visual issues / impacts resulting from the proposed development of the power line and associated electrical infrastructure are outlined below.

- Construction Phase
  - Potential visual intrusion resulting from large construction vehicles and equipment;
  - Potential visual impacts of increased dust emissions from construction activities and related traffic;
  - Potential visual scarring of the landscape as a result of site clearance and earthworks; and
  - Potential visual pollution resulting from littering on the construction site.
- Operational Phase
  - Potential alteration of the visual character of the area;
  - Potential visual intrusion resulting from infrastructure dominating the skyline in a largely natural / rural area;
  - Potential visual effect on surrounding farmsteads; and
  - Potential alteration of the night time visual environment as a result of operational and security lighting at the associated substations.
- Decommissioning Phase
  - Potential visual intrusion resulting from vehicles and equipment involved in the decommissioning process;
  - Potential visual impacts of increased dust emissions from decommissioning activities and related traffic; and
  - Potential visual intrusion of any remaining electrical infrastructure on the site.

The additional mitigation measures have been included into the EMPr in Section 11 below.

The Visual specialist statement is included in **Appendix J.**

4.4.7 HERITAGE

A detailed heritage walkdown and micro-siting of the final powerline alignment was undertaken by CTS Heritage between 24 and 28 July 2021. The final alignment was assessed to determine archaeological resources likely to be impacted by the approved development.

All of the heritage resources identified in the Heritage Impact Assessment (HIA), completed in 2016, have been recorded on SAHRIS and mapped relative to the final alignment. The final layout for the Rietkloof WEF grid connection avoids impact to all known significant heritage resources present within the development area. The walkdown of the final layout of the grid alignment revealed no new significant heritage resources that are likely to be impacted. Therefore, no additional mitigation measures have been recommended.

The Heritage Walkdown Report is included in **Appendix K.**

4.4.8 DESKTOP GEOTECHNICAL

A geotechnical desktop level study was undertaken by JG Afrika for the final powerline alignment. The aim of the study was to assess the geological and geotechnical conditions across the study area, and to provide information on the topographical feasibility of the site for the proposed project, as well identify the geological and geotechnical influences and/or constraints on the construction structures.

Competent founding conditions for the powerline pylons are anticipated at relatively shallow, slightly weathered bedrock, which will have to be assessed during the detailed investigation stage of the project prior to construction.

Consideration can be given to the following foundation types for the pylons:

- Foundation holes for the pylons must be drilled to standard specification depth of 2-3m below natural ground level. The pylons will be planted, and the foundations will be backfilled, stabilised through compaction, and capped at ground level. The advantage of drilled foundations is minimum excavation during construction.

The proposed substation site is underlain by the Abrahamskraal Formation. According to the geological map series 3220, Sutherland, the substation spans a fold feature. The site lies on a flat slope of 0-2.2˚. The proposed site is likely to be characterised by shallow transported soils. The site does not traverse any drainage features. Consideration can be given to the following foundation types for the substation:

- Normal strip footings
- Spread footings

It is important to select the correct foundation type and optimize the design, as such a detailed and comprehensive geotechnical investigation is required. This will be undertaken prior to construction and upon finalisation of the layout plan. The presence of uplift and downward forces in the form of wind loads must be taken into consideration during foundation design.

The mitigation measures suggested in the study have been incorporated into this EMPr.

This assessment is included in **Appendix L.**

4.4.9 SENSITIVITY MAP

Figure 4-2 and **Figure 4-3** illustrate the sensitivity map for the powerline alignment overlain by the Final layout for the Rietkloof 132kV overhead powerline. A3 versions of the maps have been included in **Appendix B**

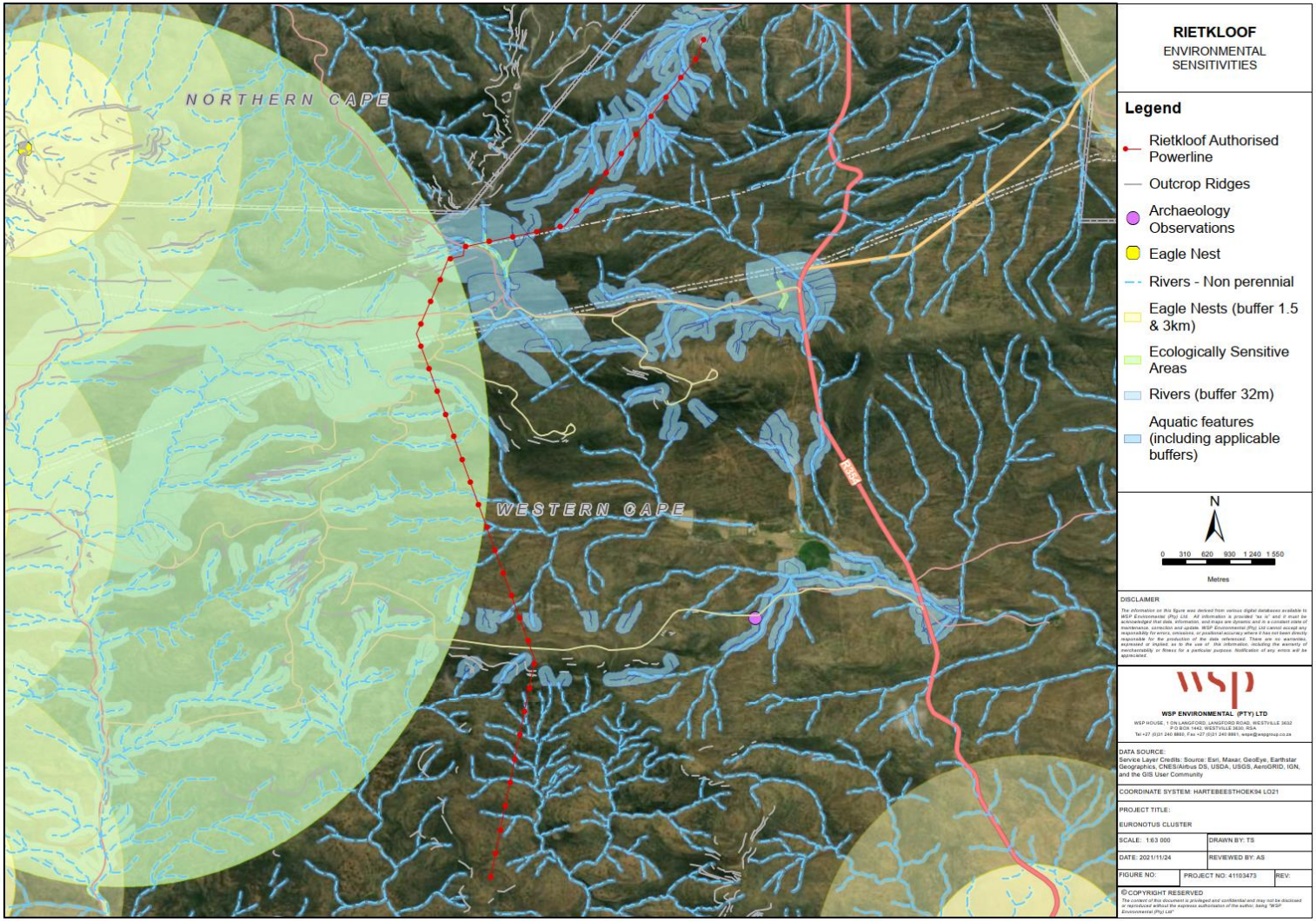

Figure 4-2: Environmental sensitivity map overlain over the Final Powerline Layout

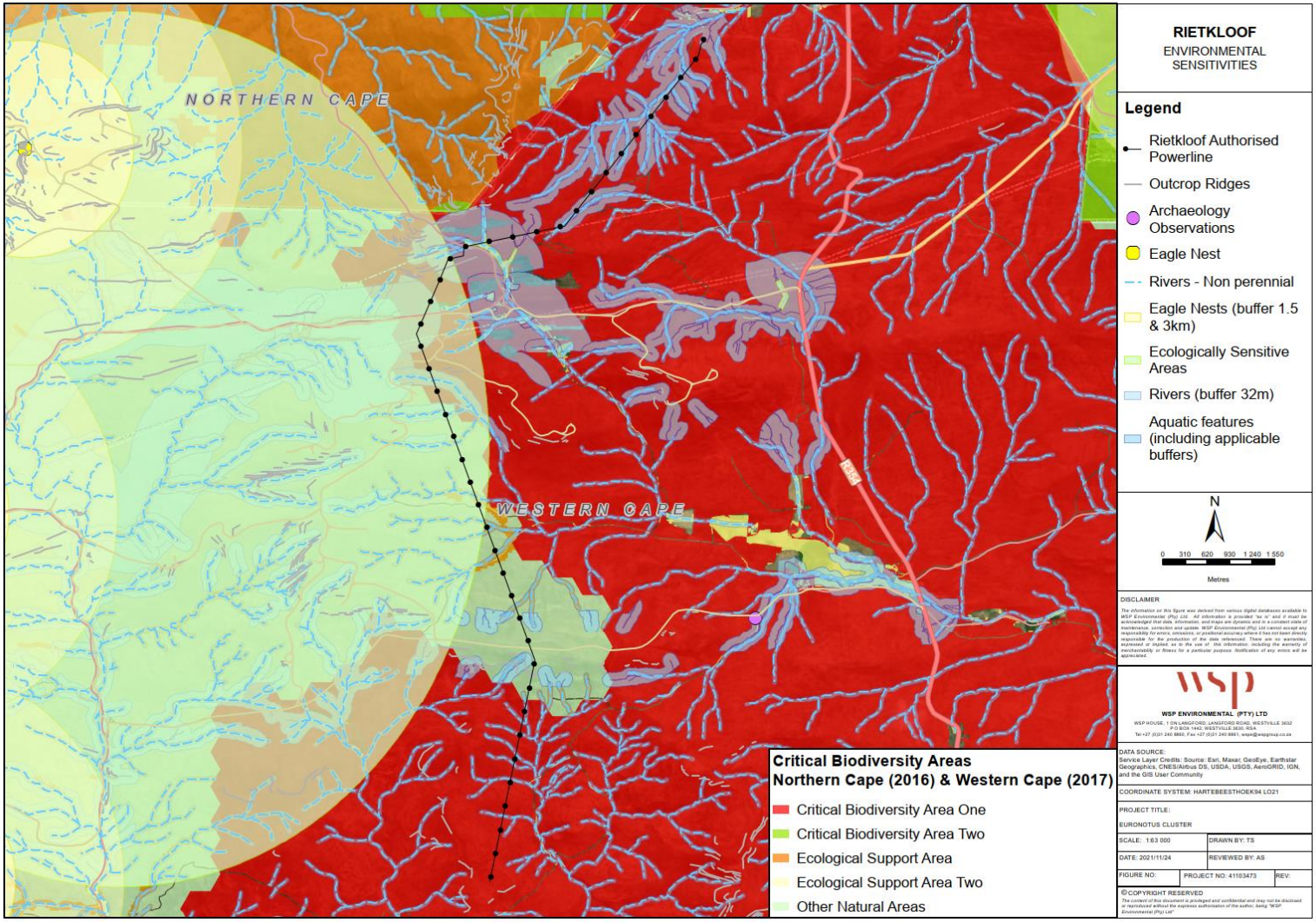

Figure 4-3: Environmental sensitivity map overlain over the Final Powerline Layout (inclusive of CBAs)

5 SCOPE OF THE EMPR

In order to ensure a holistic approach to the management of environmental impacts during the design, construction, operation of the proposed distribution line, this EMPr sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved.

The EMPr is a dynamic document subject to influences and changes as are wrought by variations to the provisions of the project specification.

5.1 LAYOUT OF THE EMPR

The EMPr is divided into four phases of development. Each phase has specific issues unique to that period of the construction and operation of the distribution line and associated infrastructure. The impacts are identified and given a brief description. The three phases of the development are then identified as below:

5.1.1 DESIGN AND PLANNING PHASE

This section provides specifications for actions to be completed prior to the construction work commencing. Generally it involves due diligence, planning design and layout, specifying contractor's method statements, roles and responsibilities, as well as acquiring all authorisation documents (EA, permits, and licences).

5.1.2 CONSTRUCTION PHASE

This section of the EMPr provides management principles for the construction phase of the project. Environmental actions, procedures and responsibilities as required during the construction phase are specified. These specifications will form part of the contract documentation and therefore the Contractor will be required to comply with these specifications to the satisfactory of the Holder of the EA and ECO.

5.1.3 OPERATIONAL AND MAINTENANCE PHASE

This section of the EMPr provides management principles for the operation and maintenance phase of the project. Environmental actions, procedures and responsibilities as required during the operation and maintenance phase are specified.

5.1.4 DECOMMISSIONING PHASE

This section includes principles for the decommissioning and closure phase of the project. At this point in time, decommissioning of the electrical infrastructure is not foreseen. However, should the line be decommissioned after the 20-year operational phase, the impacts will be more or less the same as during construction. This section will be required to be re-visited and updated at the time of rehabilitation.

6 ROLES AND RESPONSIBILITIES

Formal responsibilities are necessary to ensure that key management measures/procedures are executed. Rietkloof Wind Farm (RF) (Pty) Ltd, the Holder of the EA, will be responsible for the overall control of the project site during the pre-construction, construction, operation, decommissioning and rehabilitation phases of the project. Rietkloof's responsibilities will include the following:

- Appointing an independent environmental control officer (ECO) for the duration of the Construction phase and to notify the DFFE of their contact details, in line with Condition 27 of the EA;
- Being fully familiar with the BA Report, EA conditions and the EMPr;
- Applying for an amendment of the EA from the DFFE in the event that the approved scope changes in line with the prevailing legislation;
- The overall implementation of the EMPr;
- Ensuring compliance, by all parties, and the imposition of penalties for noncompliance;
- Implementing corrective and preventive actions, where required;
- Preventing pollution and actions that will harm or may cause harm to the environment;
- Ensuring the activity does not commence within 30 days of the EA being issued;
- Notifying the DFFE within 14 days that construction activity will commence;
- Notifying the DFFE in writing within 24 hours if any condition in the EA cannot be or is not adhered to;
- Notifying the DFFE should minor changes to the layout be required (as confirmed by the Environmental Onsite Compliance Officer (ESCO) and ECO); and
- Notifying the DFFE 14 days prior to commencement of the operational phase.

Specific roles and responsibilities for the construction phase of this project are as defined in **Table 6-1** below.

Table 6-1: Roles and Responsibilities- Construction

RESPONSIBLE PERSON	RESPONSIBILITIES
Holder of the EA	– The Holder of the EA shall take overall responsibility for the adherence to the EMPr and EA conditions.
Project Manager	– Ensure Rietkloof and the contractor(s) are aware of all specifications, legal constraints pertaining to the project specifically with regards to the environment; – Ensure that all stipulations within the EMPr and conditions of the environmental authorisation are communicated and adhered to by Rietkloof and its contractor(s); – Monitor the implementation of the EMPr and conditions of the environmental authorisation throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes; and – Be fully conversant with the BAR for the project, the conditions of EA and all relevant environmental legislation.
Site Manager	– Be fully conversant with the BAR, the conditions of EA and the EMPr; – Approve method statements (co-approval with ECO); – Provide support to the ECO; – Be fully conversant with all relevant environmental legislation and ensure compliance thereof; – Be responsible for the implementation of the EMPr and conditions of the EA; – Ensure that audits are conducted to ensure compliance to the EMPr and conditions of the EA; – Liaise with the Project Manager or his delegate, the ECO and others on matters concerning the environment; – Prevent actions that will harm or may cause harm to the environment, and take steps to prevent pollution and unnecessary degradation onsite; and

RESPONSIBLE PERSON	RESPONSIBILITIES
	– Confine construction activities to demarcated areas.

Environmental Officer (EO)	– The EO must be appointed by the Contractor/ Project Manager and is responsible for managing the day-to-day onsite implementation of the EMPr, and for the compilation of weekly environmental monitoring reports. In addition, the EO must act as liaison and advisor on all environmental and related issues, seek advice from the ESCO and ECO when necessary, and ensure that any complaints received from I&APs are duly processed and addressed and that conflicts are resolved in an acceptable manner and timely manner. The EO shall be a full-time dedicated member of the Contractor's team and must be approved by Rietkloof.
	– The following qualifications, qualities and experience are recommended for the individual appointed as the EO:
	  – A relevant environmental diploma or degree in natural sciences, as well as experience in construction site monitoring, excluding health and safety;
	  – A level-headed and firm person with above-average communication and negotiating skills. The ability to handle and address conflict management situations will be an advantage; and
	  – Relevant experience in environmental site management and EMPr compliance monitoring.
	– The EO's responsibilities include:
	  – Monitoring, on a daily basis, environmental specifications on site and compliance with the conditions of the EA, environmental legislation and EMPr;
	  – Keeping a register of compliance / non-compliance with the environmental specifications;
	  – Identifying and assessing previously unforeseen, actual or potential impacts on the environment;
	  – Ensuring that a brief weekly environmental monitoring report is submitted to the ESCO;
	  – Conducting site inspections during the defect's liability period, and bringing any environmental concerns to the attention of the ESCO and Contractor;
	  – Advising the Contractor on the rectification of any pollution, contamination or damage to the construction site, rights of way and adjacent land;
	  – Attending site meetings (scheduled and ad hoc);
	  – Presenting the environmental awareness training course to all staff, Contractors and Sub contractors, and monitoring the environmental awareness training for all new personnel on-site, as undertaken by the Contractor;
	  – Ensuring that a copy of the EA and the latest version of the EMPr are available on site at all times;
	  – Ensuring that the Contractor is made aware of all applicable changes to the EMPr;
	  – Assisting the Contractor in drafting environmental method statements and/or the Environmental Policy where such knowledge/expertise is lacking;
	  – Undertaking daily environmental monitoring to ensure the Contractor's activities do not impact upon the receiving environment. Such monitoring shall include dust, noise and water monitoring; and
	  – Maintaining the following on site:
	  ▪ A weekly site diary.
	  ▪ A non-conformance register (NCR).
	  ▪ An I&AP communications register, and
	  ▪ A register of audits.
	– The EO will remain employed until all rehabilitation measures, as required for implementation due to construction damage, are completed and the site is handed over to the Holder of the EA.

RESPONSIBLE PERSON	RESPONSIBILITIES

Environmental Onsite Compliance Officer (ESCO)	– A suitably qualified ESCO must be appointed by the Holder of the EA to monitor the project compliance onsite on a full-time basis.
	– Responsibilities of the ESCO include:
	  – Be fully conversant with the BAR, the conditions of EA and the EMPr;
	  – Be fully conversant with all relevant environmental legislation and ensure compliance thereof;
	  – Approve method statements (co-approval with Site Manager);
	  – Remain employed until the completion of the construction activities; and
	  – Report to the Project Manager, including all findings identified onsite.
	– In addition, the ESCO will:
	  – Undertake monthly inspections of the site and surrounding areas to audit compliance with the EMPr and conditions of the environmental authorisation;
	  – Take appropriate action if the specifications contained in the EMPr and conditions of the environmental authorisation are not followed;
	  – Monitor and verify that environmental impacts are kept to a minimum, as far as possible; and
	  – Ensure that activities onsite comply with all relevant environmental legislation.

ECO	– A suitably qualified external ECO must be appointed by the Holder of the EA to audit the project compliance in terms of the EMPr and conditions of the EA on a monthly basis, during the construction phase, in line with Condition 27 of the EA. – The costs of the ECO shall be borne by the Holder of the EA (proof of appointment must be maintained onsite).
Contractors, Staff and Service Providers	– Complying with the Holder of the EA's environmental management specifications; – Be conversant with all EMPr and conditions of the EA, and ensure compliance thereto; and – Adhering to any environmental instructions issued by the Site Manager/Project Manager on the advice of the ESCO.

7 REPORTING AND COMPLIANCE

To ensure accountable and demonstrated implementation of the EMPr, a number of reporting systems, documentation controls and compliance mechanisms must be in place. **Table 7-1** indicates the minimum requirements as set out in the generic EMPrs for the development of overhead transmission and distribution infrastructure and for the development and expansion of substation infrastructure for the transmission and distribution of electricity.

Table 7-1: Documentation Reporting and Compliance Requirements as per the generic EMPrs

ASPECT	REFER TO GENERIC EMPR (PART A)
Document control/Filing system	Section 4.1
Documentation to be available	Section 4.2
Weekly Environmental Checklist	Section 4.3
Environmental site meetings	Section 4.4
Required Method Statements	Section 4.5
Environmental Incident Log (Diary)	Section 4.6
Non-compliance	Section 4.7
Corrective action records	Section 4.8
Photographic record	Section 4.9
Complaints register	Section 4.10
Claims for damages	Section 4.11
Interactions with affected parties	Section 4.12
Environmental audits	Section 4.13
Final environmental audits	Section 4.14

Refer to: Part A, Section 4 of the Generic EMPr for the development of overhead transmission and distribution infrastructure, attached as Appendix C and Part A, Section 4 of the Generic EMPr for the development and expansion of substation infrastructure for the transmission and distribution of electricity, attached as Appendix D.

8 ENVIRONMENTAL MONITORING

A monitoring programme will be implemented for the duration of the construction of the Rietkloof 132kV overhead distribution line project, including the associated infrastructure. This programme will include:

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impact sites along the routes prior to construction.
- The internal ESCO will monitor the day-to-day site activities on an ongoing basis and will produce weekly monitoring reports.
- The external ECO will undertake monthly audits to ensure compliance with the EMPr and conditions of the EA during the construction activities and will report to the Site Manager should any non-compliance be identified, or corrective action deemed necessary.
- Compilation of an audit report with a rating of compliance with the EMPr and EA.
- The contractors EO and the internal ESCO shall keep a photographic record of any damage to areas outside the demarcated site and construction area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal. The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the Landowner or community. All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible party.

9 ENVIRONMENTAL AWARENESS

Legislation (NEMA) requires that Rietkloof develop an environmental awareness plan that describes the manner in which they intend to inform employees of any environmental risks which may result from their work and the manner in which the risks must be dealt with in order to avoid pollution or the degradation of the environment. In recognition of the need to protect our environment, environmental management should not only be a legal obligation but also as a moral obligation.

It is important to ensure that all relevant personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and ongoing minimisation of environmental degradation and harm.

To achieve effective environmental management, it is important that employees, contractors (including subcontractors) are aware of the responsibilities in terms of the relevant environmental legislation and the contents of the EMPr, conditions of the EA.

Rietkloof will provide appropriate resources to facilitate social and environmental awareness training during the construction, operational and decommissioning phases of the project. Rietkloof will require that all managers associated with the project adhere to the mitigation/management measures detailed in the EMPr and identify, evaluate, and minimise risks to the social, physical and biophysical environments. This will be implemented by educating employees in social and environmental matters and responsibilities relating to performance of their assigned tasks. Furthermore, employees will be entrusted to maintain the necessary level of environmental performance for their activities. Contractors, and their associated sub-contractors, will also need to demonstrate compliance to mitigation/ management measures included in the EMPr.

The following methodology described below in **Sections 9.1.1** will be used to implement and ensure environmental and social awareness and competence:

9.1.1 INTERNAL COMMUNICATION

Internal communication of environmental and social issues to ensure environmental awareness will be achieved by using any combination of the following means:

- Meetings;
- Memos;
- Notice boards;
- Briefs;
- Reports;
- Monthly themes;
- Daily operational bulletins;
- Newsletters;
- E-mail;
- Telephone; and
- Induction training.

STANDARD MEETINGS

The following standard meetings will be held at specific times to ensure that environmental and social awareness; potential problems; complaints etc. are heard and addressed proactively:

- Safety, Health and Environmental Meetings will be held monthly by the Senior Management;
- Safety, Health and Environmental Meetings will be held weekly (during construction) and monthly (during operation) by the relevant personnel, environmental and social issues will form part of the agenda; and
- Communication between all personnel and Senior Management will be facilitated through the appropriate reporting lines, or by using complaint and incident forms.

ENVIRONMENTAL AND SOCIAL TALK TOPICS

Monthly environmental and social talk topics will be compiled and distributed to relevant personnel and will be displayed on appropriate notice boards. As a minimum, the following topics must be covered:

- Water Quality;
- Water Use and Consumption;
- Air Quality i.e. dust;
- Power Consumption and Energy Efficiency;
- Waste Management;
- Fauna and Flora;
- Emergency Procedures;
- Incidents Reporting;
- Systems;
- Noise;
- Heritage Impacts;
- Landowner Etiquette; Speed Limits;
- Health Risks (such as HIV/ Aids); and
- General Awareness (e.g. World Environment Day, National Arbour Day).

GENERAL COMMUNICATIONS

Communication to the community, government, landowners, neighbouring farmers, environmental groups, non-government organisations and other stakeholders will be communicated to ensure environmental and social awareness by means of the following, as undertaken during this BA process:

- Fax or E-mail;
- Telephone;
- Formal meetings; and
- Open days.

TRAINING

It is important to ensure that all personnel, contractors and their sub-contractors have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. As a minimum environmental training must include the following:

- Employees must have a basic understanding of the key environmental features of the site and the surrounding environment;
- Employees will be thoroughly familiar with the requirements of the EMPr and the environmental specifications as they apply to the project;
- Employees must undergo training for the operation and maintenance activities associated with project and have a basic knowledge of the potential environmental impacts that could occur and how they can be minimised and mitigated;
- Awareness of any other environmental matters, which are deemed to be necessary by the Environmental Officer; and
- Training must include the environment, health and safety as well as basic HIV/AIDS education.

The following facets of the training form part of this Environmental and Social Awareness Plan:

- **Induction**: Environmental and social awareness training will be given at induction when personnel join the company and/or return from leave. Induction training will also be given to visitors entering the site. induction training will include, *inter alia*:

  - A discussion on the environmental concept, what does it comprise of and how do we interact with it;
  - A description on the components and phase of the specific renewable power generation facility;
  - A general account of how the facility and its associated activities can affect the environment giving rise to what are called environmental impacts; and
  - A discussion on what staff can do in order to help prevent the negative environmental impacts from degrading the environment i.e. environmental impact management.
- **Job Specific Training**: Job specific training programmes will be developed as and when required. The programs will be based on the significant environmental and social aspects/ impacts that are identified during regular audits and site inspections. Supervisory staff will be equipped with the necessary knowledge and information to guide their employees on environmental and social aspects applicable to performing a specific task.
- **Competency Training**: The ESCO will be responsible for the environmental and social competency and awareness training of Middle Management and supervisors. This training will be performed both on a one-on-one basis and through workshops and presentations. Competence and the effectiveness of training and development initiatives will be determined through the following methods:
  - Trend analysis of incidents reported; and
  - Analysis of work areas during visits and audits.
- The process to declare competency of personnel is documented in the ISO9001:2000 procedure. This plan will be amended periodically considering operational changes, learning experienced during its implementation and other activities that can affect the risk profiles.
- **Training Records**: Training can be done either in a written or verbal format but will be in an appropriate format for the receiving audience. Persons having received training must indicate in writing that they have indeed attended a training session and have been notified in detail of the contents and requirements of the EMPr. The attendance registers must be kept on file.

10 COMPLIANCE WITH THE EMPR

A copy of the EMPr must be kept on site at all times during the construction period. The EMPr will be binding on all contractors operating on the site and must be included within the Contractual Clauses. It should be noted that in terms of the National Environmental Management Act No 107 of 1998 (Section 28) those responsible for environmental damage must pay the repair costs both to the environment and human health and the preventative measures to reduce or prevent further pollution and/or environmental damage (The 'polluter pays' principle).

10.1 NON-COMPLIANCE

The contractors shall act immediately when notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ESCO should be made aware of any complaints.

Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed. Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit. The Contractor is deemed not to have complied with the EMPr if, inter alia:

- there is evidence of contravention of the EMPr specifications within the boundaries of the construction site, site extensions and roads;
- there is contravention of the EMPr specifications which relate to activities outside the boundaries of the construction site.
- environmental damage ensues due to negligence;
- construction activities take place outside the defined boundaries of the site; and/or
- the Contractor fails to comply with corrective or other instructions issued by the Project Manager within a specific time period.

It is recommended that the Project Manager /contractors institute penalties for the following less serious violations and any others determined during the course of work as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or un-repaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Removal and/or damage to fauna, flora or cultural or heritage objects on site.
- Urination and defecation anywhere except at designated facilities.

10.2 EMERGENCY PREPAREDNESS

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the construction period. Such activities and impacts may include, *inter alia*:

- Accidental discharges to water and land.
- Accidental exposure of employees to hazardous substances.
- Accidental fires.
- Accidental spillage of hazardous substances.

- Accidental toxic emissions into the air.
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans shall include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel and contact details.
- Details of emergency services available (e.g. the fire department, spill clean-up services, etc.).
- Internal and external communication plans, including prescribed reporting procedures where required by legislation.
- Actions to be taken in the event of different types of emergencies.
- Incident recording, progress reporting and remediation measures required to be implemented.
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release.
- Training plans, testing exercises and schedules for effectiveness.

The Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No 85 of 1993), the NEMA, 1998 (Act No 107 of 1998), the National Water Act, 1998 (Act No 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

10.3 INCIDENT REPORTING AND REMEDY

If a leakage or spillage of hazardous substances occurs on site, the local emergency services must be immediately notified of the incident. The following information must be provided:

- the location;
- the nature of the load;
- the extent of the impact; and
- the status at the site of the accident itself (i.e. whether further leakage is still taking place, whether the vehicle or the load is on fire).

Written records must be kept on the corrective and remedial measures decided upon and the progress achieved therewith over time. Such progress reporting is important for monitoring and auditing purposes. The written reports may be used for training purposes in an effort to prevent similar future occurrences.

10.4 PENALTIES

Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the EMPr, the developer and/or Contractor shall be liable and penalties imposed if any permit conditions are contravened. The following violations, and any others determined during the course of work, should be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities (if applicable).
- Pollution of water sources.
- Unnecessary removal or damage to trees.

11 ENVIRONMENTAL SPECIFICATIONS FOR THE PROJECT LIFE CYCLE

The Environmental specifications / controls are presented in two sections, firstly the general environmental attributes as per the pre-approved generic EMPrs, followed by site specific environmental attributes.

11.1 GENERAL CONTROL MEASURES

This section refers to construction related activities that are common to most power line projects as defined within the pre-approved generic EMPrs. For each activity, a set of prescribed environmental controls and associated management actions have been identified. Contractors shall implement these controls as a minimum requirement for mitigating the impact of particular construction related activities.

These control measures are defined within Part B: Section 1 of the pre-approved generic EMPrs (attached as **Appendix C** and **Appendix D**). The format of a general environmental control is shown below, see **Table 11-1**. The boxes shaded in green are predefined and represent minimum standards for the management of that particular aspect. The Contractor will be required to adhere to all impact management actions (where applicable to the construction related activity) for the Project. The boxes shaded in red assign responsibility for the implementation and monitoring of the impact management actions. This implementation and monitoring information is project specific and shall be completed by the Contractor prior to commencement of construction.

Table 11-1: Format of a general environmental control illustrating aspects which are predefined versus those which still need to be completed by the contractor

Management Objective:	Predefined as part of Generic EMPr					
Management Outcome:	Predefined as part of Generic EMPr					
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
Predefined as part of Generic EMPr	To be completed by Contractor	To be completed by Contractor	To be completed by Contractor	To be completed by Contractor	To be completed by Contractor	To be completed by Contractor

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. 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.

The construction related activities addressed within Part B: Section 1 of the pre-approved generic EMPrs are outlined in **Table 11-2.**

Table 11-2: Activities and management measures as per generic EMPr (Part B: Section 1)

ACTIVITY	REFER TO GENERIC EMPR FOR THE DEVELOPMENT OF OVERHEAD TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE, ATTACHED AS APPENDIX D (PART B: SECTION 1)	REFER TO GENERIC EMPR FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE, ATTACHED AS APPENDIX E (PART B: SECTION 1)
Environmental awareness training	5.1	5.1
Site Establishment development	5.2	5.2
Access restricted areas	5.3	5.3
Access roads	5.4	5.4
Fencing and Gate installation	5.5	5.5
Water Supply Management	5.6	5.6
Storm and wastewater management	5.7	5.7
Solid and hazardous waste management	5.8	5.8
Protection of watercourses and estuaries	5.9	5.9
Vegetation clearing	5.10	5.10
Protection of fauna	5.11	5.11
Protection of heritage resources	5.12	5.12
Safety of the public	5.13	5.13
Sanitation	5.14	5.14
Prevention of disease	5.15	5.15
Emergency procedures	5.16	5.16
Hazardous substances	5.17	5.17
Workshop, equipment maintenance and storage	5.18	5.18
Batching plants	5.19	5.19
Dust emissions	5.20	5.20
Blasting	5.21	5.21
Noise	5.22	5.22
Fire prevention	5.23	5.23
Stockpiling and stockpile areas	5.24	5.24
Finalising tower positions	5.25	
Civil works		5.25

ACTIVITY	REFER TO GENERIC EMPR FOR THE DEVELOPMENT OF OVERHEAD TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE, ATTACHED AS APPENDIX D (PART B: SECTION 1)	REFER TO GENERIC EMPR FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE, ATTACHED AS APPENDIX E (PART B: SECTION 1)
Excavation (and Installation) of foundations	5.26	5.26
Installation of foundations, cable trenching and drainage systems		5.27
Assembly and erecting towers	5.27	
Installation of equipment (circuit breakers, current Transformers, Isolators, Insulators, surge arresters, voltage transformers, earth switches)		5.28
Stringing (and cabling)	5.28	5.30
Testing and Commissioning (all equipment testing, earthing system, system integration)		5.31
Socio-economic	5.29	5.32
Temporary closure of site	5.30	5.33
Dismantling of old equipment		5.34
Landscaping and rehabilitation	5.31	5.35

Refer to: Part B – Section 1 of the Generic EMPr for the development of overhead transmission and distribution infrastructure, attached as Appendix C and Part B – Section 1 of the Generic EMPr for the development and expansion of substation infrastructure for the transmission and distribution of electricity, attached as Appendix D.

11.2 SITE SPECIFIC CONTROL MEASURES

A variety of potential impacts are associated with the planning & design, construction, operation and rehabilitation activities for this project. These impacts can be categorised as general impacts as well as site specific impacts. General best practice rules to construction should be followed at all times. In addition to this the specific mitigation measures and recommendations as highlighted by the BAR are highlighted below. Codes used for the tables are explained below (Table 11-1):

Table 11-3: Reference to acronyms used in Chapter 11

RESPONSIBILITY	TIME FRAMES (PHASING)
RE = Resident Engineer	DP = Entirety of the Design Phase
PM = Project Manager	CP = Entirety of the Construction Phase
ECO = Environmental Control Officer	OP = Entirety of the Operation Phase

RESPONSIBILITY	TIME FRAMES (PHASING)
PC = Primary Contractor	RP = Entirety of the Rehabilitation phase
ESCO = Environmental Site COfficer	PL = Entirety of the Project Lifecycle (All phases)
EAP = Environmental Assessment Practitioner	
LC = Liaison Committee	
D = Proponent/Holder of the EA	

INTERPRETATION

Responsibility is written in order of relevance. i.e. should an activity be the responsibility of the more than one party, the first mentioned party will be primarily responsible for the implementation of said activity, with the second, third and fourth mentioned the second, third and fourth responsible party, respectively. Regardless of whether there is more than one party stated for a particular activity, the primary responsible party remains responsible for the action in its entirety, unless all parties are collectively required for the completion of such task, in which case all parties are liable for their component of the completion. Should uncertainty or ambiguity exist, the responsibilities shall be determined in consultation with the Project Manager and the ECO onsite, and it is the responsibility of all parties to identify where such uncertainty exists, prior to construction commencing. An example is stated below:

- *Issue*: Invasive species management on-site (control activities)
- *Mitigation measures*: Monitoring of a control programme; Schedules of a control programme; implementation of a control programme; ensuring all staff conduct work using safety equipment.
- *Responsible*: ECO; PC; ESCO.
- *Timeframes*: PL.

This activity thus required the ECO for monitoring and scheduling of the control programme, and Primary contractor for implementation and safety gear, and the ESCO for mediation and arbitration of issues should they occur, for the entirety of the project life cycle.

11.2.1 PLANNING & DESIGN PHASE

DESIGN PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Mitigation measures**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
1	**Traffic & Transport**	Minimise disturbance and safety concerns related to the increase in elevated vehicles volumes	Roads condition may deteriorate and become unsafe due to higher volume of traffic on roads	1 Project planning must include a plan for transport management plan that will be implemented especially during the construction phase of the development. 2 The necessary road traffic permits must be obtained for transporting parts, containers, materials and construction equipment to the site. 3 Careful planning of the routes taken by heavy vehicles must highlight areas of road that may need to be upgraded in order to accommodate these vehicles. Once identified these areas must be upgraded if necessary.	– Approved transport management plan exists – Appropriate road permits obtained – Identified areas upgraded prior to traffic increase, if required	– All permits obtained prior to construction; – Routes planned ahead and approved by the EA holder prior to construction; – Once off monitoring prior to construction by ECO	PM ; PC; ECO; ESCO	DP
2	**Ecological Open space management plan**	Minimise impacts to sensitive ecology	– Habitat loss through incorrect placement of infrastructure	1 A search and rescue operation must be undertaken by a qualified botanist/ horticulturalist prior to commencement of construction. All Species of Conservation Concern (SCC) identified within the development footprints must be transplanted to a refuge area. 2 No collection of indigenous plants may be allowed on the property outside of those undertaken by the designated person(s). 3 Employees should undergo environmental awareness training and be sensitized to the need to avoid disturbance to the indigenous vegetation outside the development footprints. 4 All recommendations of the Alien Vegetation, Rehabilitation, Fire and Flora and Fauna Management Plans are applicable to Open Space Areas. 5 The applicant must consider reducing the development footprint to avoid or minimise the clearance of vegetation and habitat disturbance; 6 For the purposes of this Management Plan, Open Space areas should include all areas impacted by construction activities including all approved buffers.	– A search and rescue plan approved and implemented (if recommended by the ecologist) prior to construction – Environmental awareness training prior to construction phase, as produced by ECO and approved by PM.	– Less than 2 staff members on site not having been through environmental awareness training during at all times; – Specific management plans as mentioned conducted appropriately, as determined by ECO	PC ,ECO; ESCO	DP and CP
3	**Ecological degradation**	Promote ecological vigour and sustainability on site throughout design phase	Habitat destruction from improper planning	1 Routes should also be adjusted within the 200m corridor to avoid areas of high sensitivity, as far as possible, as informed by a preconstruction walk-though survey. 2 Minimise development footprint within the Very High sensitivity parts of the site as informed by the preconstruction walk- through survey. 3 Minimise the development footprint as far as possible and rehabilitate disturbed areas that are no longer required by the operational phase of the development. 4 Avoid impact to potential corridors such as the riparian corridors associated with the larger drainage lines within the facility area as far as possible. 5 Demarcate all areas to be cleared with construction tape or similar material. However caution should be exercised to avoid using material that might entangle fauna.	– High sensitivity areas avoided where possible	– All cleared areas demarcated prior to clearing – Demarcations correspond to the EA boundaries, as determined by the ECO; – Once off monitoring prior to construction clearing	PC ; ECO; ESCO	DP

DESIGN PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Mitigation measures**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				6 A pre-construction walk-through survey of the final layout of the distribution lines should be conducted by an ecological specialists to asses where further mitigation measures and recommendations are required with respect to potentially sensitive environmental heritage features. 7 The number of access and service tracks should be limited as far as possible. 8 Only areas absolutely necessary required should be cleared within the proposed servitude for the distribution line. 9 The final routes must be adjusted within their corridors to avoid areas of high sensitivity as far as possible, as informed by a pre-construction walk-through survey;				
4	**Environmental Legislation and Policy**	Ensure all pertinent guidelines and legislation is incorporated into project planning	Criminal prosecution, project cease and desist or hefty fines may be levied on parties breaking the law pertaining to the environment. Additionally, harm will be incurred to the environment should proper process not be followed	1 Ensure that all relevant legislation and policy is consulted and further ensure that the project is compliant with such legislation and policy. In addition, planning for the construction and operation of the proposed energy facility should consider available best practice guidelines. 2 The applicant must apply for the 'mitigation hierarchy' prior to submitting the final proposal to the competent authority for consideration. 3 These should include (but are not restricted to): 1. Local and District Spatial Development Frameworks; and 2. Local Municipal bylaws.	— All permits, licencing and authorisations have been obtained	— All permits, licencing and authorisations have been obtained prior to construction commencing; — Method statements approved prior to construction; — Once off monitoring ECO	Holder of the EA (all); EAP (authorisations & licencing); ECO; PC (permits); ESCO	PL
5	**Stormwater Management Plan and Erosion**	Manage surface runoff to minimise pollution and erosion on site	An increase in erosion potential and topsoil loss will be incurred from insufficient planning and management of stormwater flow during the project	1 Structures must be located at least 32 m away from identified drainage lines. If this is not technically feasible, the required approvals must be obtained in terms of the NWA. 2 Water Use Licences will be required, where relevant, prior to construction. 3 A Storm Water Management Plan must be designed and implemented to ensure maximum water seepage at the source of water flow. 4 The plan must include management mitigation measures for water pollution, waste water management and the management of surface erosion e.g. by considering the applicability of contouring, etc. 5 Although no hard stand is currently located within 32 m of a channel edge, future deviations of the layout must take in consideration the no hard standing surfaces must be constructed within 32 m from a channel edge, except for roads. 6 Any stormwater management features must be suitably designed and constructed to maintain stormwater flow to acceptable levels and minimise risk of erosion and scouring. 7 No stormwater runoff should be discharged directly into the drainage line/seep, where it could lead to erosion.	— Final design including necessary stormwater infrastructure to manage runoff	— Stormwater management plan developed prior to construction commencing — Method statement complies with SWMP	PM	PL
6	**Waste Management Plan**	Reduce contamination and health risks	Environmental harm may be induced through poor waste management	1 Must develop a waste management plan for handling on site waste.	— Waste management plan developed	— Waste manage plan, as well as storage and	PM, ECO; ESCO	PL

DESIGN PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Mitigation measures**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				2 Designate an appropriate area where waste can be stored before disposal	prior to construction commencing	disposal areas approved by ECO prior to construction;		
7	**Electromagnetic Interference**	No interference with existing communication systems	Incorrect placement of the pylons could impact on existing communication systems; Corona effect from high voltage lines may cause disturbance to fauna in the area	1 Accurate siting of pylons must take place in the planning and design phase to reduce these effects. 2 If complaints are received from surrounding landowners regarding this issue, the Holder of the EA must investigate and mitigate these issues to the best of their abilities.	— Final design avoids interference with existing communication systems	— Approved layout and siting as per EA; — Once off monitoring by ECO prior to construction	D ; PM ; ECO; ESCO	DP
8	**Architecture of ancillary infrastructure**	Reduce visual impact of facility	Visual impact from ancillary infrastructure	1 Ensure that the surfaces of all project structures and buildings visible to the public are maintained such that: a their colours minimize visual intrusion and contrast by blending with the existing colours of the surrounding landscape, b their colours and finishes do not create excessive glare, and 2 Their colours and finishes are consistent with local policies and ordinances.	— Appropriate colour, finishes and siting of ancillary structures	— Appropriate colour, finishes and siting of ancillary structures — No monitoring required	D ; PM ; PC	PL
9	**Flight safety**	Ensure facility registered with aviation authorities to reduce flight safety risk	Although unlikely, a power line represents a flight path risk, and as such should be conducted and planned for appropriately	1 Inform the civil aviation authority (CAA) of the finalised layout and location of the power lines, including the technical descriptions of the project (for example, height, pylon type, highest point, voltage, maintenance periods etc.).	— CAA fully informed of the proposed development	— Authorities informed prior to submission of final BAR.	D ; EAP	DP
10	**Heritage**	Preserve and/or minimise damage to heritage resources	Irreparable heritage resource loss during project	1 Substation 7 situated south on the Farm Hartjiesfontein 81 not favoured for the establishment of the substation based on archaeological sensitivities identified. 2 An archaeological heritage walk-through survey of the final layout of the preferred power line route must be conducted to assess the changes where further recommendations and mitigatory measures may be made if necessary. 3 A walk-through of the final layout of the preferred power line alternative should be conducted before any final mitigation measures can be established 4 38. This EMPr must be submitted to HWC, the heritage authority for any Western Cape 5 developments, and as a commenting authority in terms of the National Heritage Resources Act 25 of 1999, Section 38.	— Walk through conducted prior to clearing — Heritage reports submitted to HWC during the EIA process.	— Walk through conducted and sensitive zones demarcated;	Holder of the EA, PC; ECO; ESCO	DP
11	**Avifaunal**	Reduce bird fatalities from collision and electrocution with overhead powerlines	Bird mortality from collision and electrocution with cable conductors, habitat loss	1 Minimization of the loss of bird habitat by not clearing vegetation from the entire service tract and where possible using a single track to install and service the local power lines. 2 No powerline routes 1) near Fortuin dam and 2) through, or across, the col between Ou Mure and Fortuin farms, or for these localities unless powerlines are elevated.	— Design of facility as per avifaunal recommendations	— Final design	Holder of the EA, PC; ECO; ESCO	DP

DESIGN PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Mitigation measures**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				3 The entire line must be fitted with bird diverters to reduce collision frequency. The main aim is to alert bird to the lines in the immediate post-construction years when the lines will be a novel risk which locally resident birds will, over years, learn to compensate for. 4 Avoidance of construction of sub-stations during the main breeding season for local birds which is the period August to October inclusive, as far as possible. 5 Where the proposed and the existing lines parallel, the pylons should be staggered to reduce large bird collisions. 6 Bird-friendly support structures must be used for the 132kV line such that the conductors are slung below the towers to avoid avian electrocutions.				
12	**Geotechnical**	Selection of the correct foundation type and optimization of the design	Tower and substation founding conditions	1 Consideration can be given to the following foundation types for the pylons: a Foundation holes for the pylons must be drilled to standard specification depth of 2-3m below natural ground level. The pylons will be planted, and the foundations will be backfilled, stabilised through compaction, and capped at ground level. The advantage of drilled foundations is minimum excavation during construction. 2 Consideration can be given to the following foundation types for the substation: a Normal strip footings b Spread footings 3 The presence of uplift and downward forces in the form of wind loads must be taken into consideration during foundation design	– Design of facility as per geotechnical recommendations	– Final design	Holder of the EA, PC; ECO; ESCO	DP

11.2.2 CONSTRUCTION PHASE

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
1	**Storage of Hazardous substances**	Minimise pollution and safety risks through proper planning	Accidental spillage or leaks of hazardous materials pose health and environmental harm risk	1 All hazardous substances such as paints, diesel and cement must be stored in a bunded area with an impermeable surface beneath them. 2 Cement mixing must be done at a single location which should be suitably located.	– Storage of hazardous substances in compliance with the approved Method Statement	– Method Statement (to be developed by the Contractor for approval by the ECO.)	PC; ECO; ESCO	Immediately prior to CP
2	**Open space management plan and Site Management**	Necessary services secured	Health and safety concerns relating to poor sanitation; Environmental harm from poor waste management; Fauna and flora disturbance.	1 The contractor shall establish all infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment. 2 The contractor shall submit a method statement for site clearance for approval by the ECO in consultation with the Project Manager and ESCO. Site establishment shall take place in an orderly manner and all required amenities shall be installed prior to the main workforce moving onto site. 3 The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities. 4 Safe drinking water for human consumption shall be available at convenient locations on site. All water used on site must be taken from a legal source and comply with the recognised standards for potable and other uses. 5 The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. 6 The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes. 7 The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a municipal registered landfill. These bins must be equipped with animal proof lids to ensure the contents are not accessible to wild or domestic animals. A certificate of disposal shall be obtained by the Contractor and kept on file. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement (i.e. how and where he intends to dispose of the waste) with regard to waste management. The disposal of waste shall be in accordance with all relevant legislation. Under no circumstances may solid waste be burnt on site. 8 ECO to assist in siting of structures and supervise any bush clearing for the construction camp. Construction camp should be fenced to avoid sprawl. 9 Open space areas should be kept as contiguous blocks of vegetation as far as possible and no additional barriers	– Water, sanitation, electricity and waste services secured in line with the approved Method Statement	– One portable toilet per 10 staff members roughly equally spaced or at strategic intersections of the site; – At least 20L potable water on site per staff member per day from the commencement of construction; – Waste disposal systems in place and in working order, as determined by the ECO, from the onset of construction; – Ablution facilities maintained, cleaned and emptied daily; – Alien management plan implemented throughout construction phase	PC ; PM ; ECO; ESCO	Immediately prior to DP and throughout the CP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				(except for approved roads and fences) should be constructed that may impede faunal movement; **10** All open space areas must be kept alien and weed free; **11** Only indigenous species from a list approved by the Environmental Control Officer (ECO) may be used for any rehabilitation work in open space areas; **12** No waste should be disposed of in open space areas, including but not restricted to cigarette butts and uneaten foodstuffs (i.e. fruit cores and peels) that may attract scavengers. It is recommended that receptacles be placed strategically to minimise this, especially during the construction phase; **13** An archaeological and ecological walk through of the site must be conducted prior to construction commencing, in order to ascertain where sensitive areas are and where micro-siting of the pylons must occur. These measures must be strictly adhered to during construction. Micro-siting will involve the precise placement of the pylon structures being moved slightly in order to accommodate any fine scale ecological or heritage features of importance.				
3	**Vegetation Clearing**	Minimise vegetation clearing in order to promote ecological sustainability and vigour and minimise erosion	Fauna and flora disturbance and harm via uncontrolled and unplanned clearing; Increased erosion and runoff from poorly laid out spoil sites	**1** A flora and fauna search and rescue (relocation) must be undertaken before commencement of vegetation clearing. A more comprehensive list of species for which permits will be required is provided in Appendix 1: Plant Species of Conservation Concern (Red listed) and Appendix 2: Flora Protected in Terms of Provincial of the Ordinance(s) of the Ecology & Biodiversity Walkdown Report (**Appendix F**). **2** Site clearing must take place in phased manner, as and when required. Areas must not be cleared by more than two months in advance, in order to reduce erosion risks. The area to be cleared must be clearly demarcated and this footprint strictly maintained. **3** Vegetation clearing must be restricted to the identified sites for the substation, distribution line servitude (if required) and ancillary infrastructure lay down areas that have been identified as necessary for development of the project. **4** Silt fences and erosion control measures must be implemented in areas where these risks are more prevalent. These include steep areas. **5** The Contractor shall ensure that all work is undertaken in a manner which minimises the impact on vegetation outside the immediate area of the Works. No tree or shrub outside the area of the Works shall be felled, topped, cut or pruned until it has been clearly marked for this purpose by the Project Coordinator. The method of marking will be specified by the Project Coordinator, and the Contractor will be informed in writing; and no tree outside the area of the works shall be burned for any purpose.	— Site clearing minimised as far as possible and compliant to the approved Method Statement to reduce impacts to the environment	— Cleared areas rehabilitation commences within 1 week of fallow land use (i.e. no active construction ongoing anymore) – as determined by ECO; — Less than 2 non-compliance reports for lack of rehabilitation throughout entire construction phase; — Zero instances of clearance of vegetation not in the approved design plans; — No removed vegetation will be dumped onto adjacent intact vegetation and topsoil will be removed separately; — Site method statements approved by ECO prior to clearing commencing — Permits (as required)	PC ;ECO; ESCO	CP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				6 Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared. 7 Vegetation clearing shall take place in a phased manner in order to retain vegetation cover for as long as possible in order to reduce the size of areas where dust can be generated by wind.				
4	**Soil Impacts**	Reduce soil erosion and promote soil fertility	Increase soil erosion from poor management practices; Environmental pollution from concrete spillage or contamination; hazardous material spillages; health and safety impacts from poor bunding.	**Topsoil** 1 The full depth of topsoil should be stripped from areas affected by construction and related activities prior to the commencement of major earthworks. This should include the building footprints, working areas and storage areas. Topsoil must be reused where possible to rehabilitate disturbed areas. 2 Care must be taken not to mix topsoil and subsoil during stripping. 3 Polluted topsoil must be disposed of at a licensed landfill site. Waste manifests must be kept to prove that this has been disposed of legally. 4 Topsoil (an approximately 100 - 150 mm layer) shall be removed from areas to be disturbed during construction and safely stockpiled for landscaping purposes. 5 All plant material (grasses, herbs and larger bush clump species) removed from the site are to be mixed into the topsoil. 6 Topsoil stockpiles shall be convex and no more than 2 m high. 7 Stockpiles shall be located in areas agreed to by the ECO or PM. 8 Topsoil stockpiles shall not be subject to compaction greater than 1 500 kg/m2 and shall not be pushed by a bulldozer for more than 50 m. 9 Topsoil stockpiles shall be monitored regularly to identify any alien plants, which shall be removed when they germinate to prevent contamination of the seed bank. 10 Where feasible, spoil must be used for rehabilitation on-site. Where this is not possible spoil that is removed from the site must be removed to an approved spoil site or municipal licensed landfill site. 11 Appropriate measures, as agreed with the ECO/PM, shall be taken to protect topsoil stockpiles from erosion by wind or water by providing suitable stormwater and cut off drains, containment using hessian or similar material and/or by establishing suitable temporary vegetation. 12 Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank. 13 The Contractor shall be held responsible for the replacement, at his/her own cost, for any unnecessary loss of topsoil due to his failure to work according to the	— Stockpiles with low berms or brick walls present; — No concrete transport vehicle washed on site; — Subsoil and topsoil stockpiled separately; — Hazardous material bunded appropriately, with sufficient storage space; — Sufficient practices in place to actively manage erosion to avoid and or reduce it	— Stockpile locations as per agreed by ECO and PM prior to construction commencing; — No mixing of topsoil and subsoil layers on stockpiles; — Stockpiles covered appropriately, as determined by ECO, to reduce erosion; — Less than 3 Non-compliance reports for incorrect stockpiling or any of the soil mitigation measures contained in this aspect.	PC ; PM ; ESCO ; ECO	CP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				requirements of this Management Plan and Method Statement. **Soil Stripping** 1 No soil stripping must take place on areas within the site that the contractor does not require for construction works, or on areas of retained vegetation. 2 Subsoil and topsoil should, in all construction and lay down areas, be stockpiled separately to be returned for backfilling in the correct soil horizon order. 3 Construction vehicles must only be allowed to utilise existing tracks or pre- planned access routes. **Stockpiles** 1 Stockpiles should not be situated such that they obstruct natural water pathways and drainage channels. 2 Stockpiles should not exceed 1.5m in height. 3 If stockpiles are exposed to windy conditions or heavy rain, they should be covered either by vegetation or cloth. 4 Stockpiles may further be protected by the construction of berms or low brick walls around their bases. 5 Stockpiles should be kept clear of weeds and alien vegetation growth by regular weeding. **Fuel storage** 1 Topsoil and subsoil to be protected from contamination. 2 Fuel and material storage must be away from stockpiles. 3 Cement, concrete and chemicals must be mixed on an impermeable surface and provisions should be made to contain spillages or overflows into the soil. 4 Any storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. 5 Contaminated soil must be contained and disposed of off-site at an approved landfill site. Waste manifests must be kept to prove that this has been disposed of legally. **Concrete mixing** 1 No vehicles transporting concrete to the site may be washed on site. 2 If a batching plant is necessary, run-off should be managed effectively to avoid contamination of other areas of the site. Untreated run-off from the batch plant must not be allowed to get into the storm water system or any rivers, streams, wetlands or existing erosion channels / dongas. 3 If it is impractical to dispose of water at a WWTW then a Method Statement should be compiled to make provision for a system that will not allow waste water to contaminate the surrounding area.				

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				4 Drip trays should be used when off-loading concrete trucks to collect any concrete that spills. **Earthworks** 1 To take into consideration: 2 Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be spread over landscaped areas. 3 Wind screening and stormwater control should be undertaken to prevent soil loss from the site. 4 All erosion control mechanisms need to be regularly maintained. 5 Retention of vegetation where possible to avoid soil erosion 6 Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time. 7 Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed. No impediment to the natural water flow other than approved erosion control works is permitted.				
5	**Air Quality**	Reduce dust from construction activities to acceptable levels, avoid fires onsite as far as possible	High levels of dust from construction activities and personnel; fire risk due to poor control measures	**Dust control** 1 Damping down of un-surfaced and un-vegetated areas during dusty periods is required. Potable water must not be used for this and only water abstracted from sources approved by DWS in agreement with the landowners is permitted. 2 Retention of vegetation where possible will reduce dust travel. 3 Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas. 4 The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to the Landowner or neighbouring Communities. 5 A notice at the junction of the R354 and the access road must be installed with a phone number that public can use to lodge complaints about dust. 6 A speed limit of 30km/h must not be exceeded on dirt roads (if any). 7 Any complaints or claims emanating from the lack of dust control shall be attended to immediately by the Contractor. **Emissions control** 1 Regular servicing of vehicles in order to limit gaseous emissions (to be done off-site). 2 Regular servicing of on-site toilets to avoid potential odours.	— No open fires on site; — No dust levels beyond emission standards;	— Zero non-compliance reports for work outside agreed to work hours, as determined by ECO; — Less than 2 speeding incidents every two weeks as determined by the ECO; — Less than 2 dust complaints per month in complaints register; — Firefighting equipment available on site at all times; — Zero non-compliance with firefighting equipment on-site; — Monthly monitoring ECO	PC ; ESCO ; PM ; ECO	CP, OP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				3 Allocated cooking areas must be provided. **Fire prevention** 1 All cooking shall be done in demarcated areas that are safe in terms of runaway or uncontrolled fires. It is recommended that a formal "braai area" is constructed at the site office for cooking. 2 The Contractor shall have operational firefighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated thorough a typical risk assessment process. It may be required to increase the level of protection, especially during the winter months.				
6	**Water Quality**	Manage risk of pollution and contamination to water sources on site	Contamination of natural water resources through spillages of hazardous materials; ecosystem damage from illegal water use; health and safety risks from poor sanitation and potable water supply on-site;	**Sanitation** 1 Adequate sanitary and ablutions facilities must be provided for construction workers 2 The facilities must be regularly serviced to reduce the risk of surface or groundwater pollution. **Hazardous materials** 1 Use and /or storage of materials, fuels and chemicals which could potentially leak into the ground must be controlled in a manner that prevents such occurrences. 2 All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. 3 The bund wall must be high enough to contain 110% of the total volume of the stored hazardous material with an additional allocation for potential high runoff stormwater events. 4 Any hazardous substances must be stored at least 100m from any of the water bodies on site. 5 Contaminated wastewater (such as concrete wastewater) must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected and removed from the site for appropriate disposal at a licensed commercial facility. 6 Waste manifests must be kept to prove legal disposal at a hazardous landfill site **Water resources** 1 Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing, washing of clothing or for any construction related activities. 2 Municipal water (or another source approved by the ECO) should be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, concrete mixing, compacting, etc.	— Ablution facilities available on-site within first day on-site; — Appropriate bunding in place, with correct quantities and quality material used — Staff trained in natural water use — Management measures in place to avoid pollution and contamination of surface water features	— Hazardous chemical stored appropriately and locked away with access control, as determined by the ECO; — Hazardous substances storage less than 100m away from water sources; — Zero hazardous waste non-compliance reports for entire phase; — Monthly ECO monitoring	PC ; ESCO ; PM ; ECO	CP, OP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				3 Compaction of backfilled material must attain low soil permeability. 4 Site design and operation must that surface/storm water is diverted away from excavation trenches. 5 Backfilling of trenches must be done in such a way that water ponding and erosion of the backfilled trench are avoided. 6 Avoid impacting potential corridors, such as the riparian corridors with associated larger drainage lines through careful placement of pylon positions. **Stormwater** 1 The site must be managed in a manner that prevents pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemical pollutants. 2 Temporary cut-off drains and berms may be required to capture stormwater and promote infiltration. 3 Hazardous substances must be stored at least 100m away from any water bodies on site to avoid pollution.				
7	**Noise**	Reduce noise levels on site to acceptable levels	High noise levels from construction activities; disturbance to fauna; noise complaints from.	1 Construction site yards, workshops, and other noisy fixed facilities should be located well away from noise sensitive areas. Once the proposed final layouts are made available by the contractor(s), the sites must be evaluated in detail and specific mitigation measures designed into the system. 2 Noise levels must be kept within acceptable limits. All noise and sounds generated must adhere to SABS 0103 specifications for maximum allowable noise levels for residential areas. No pure tone sirens or hooters may be utilised except where required in terms of SABS standards or in emergencies	— Noise receptors included in layout design; — Machinery used on-site are maintained;	— Noise generating equipment and construction site sited as per EA accepted layout plan; Noise levels within acceptable levels; Less than 2 noise complaints in register per month; — Monthly Eco monitoring	PC ; ESCO ; ECO ; PM	DP, CP
8	**Biodiversity**	Minimise impacts to fauna throughout the construction phase	Disturbance and harm to fauna and flora near the construction site reducing onsite biodiversity;	1 Any animals rescued or recovered will be relocated in suitable habitat away from the substation and line infrastructure. An expert who holds a Competency Certificate to handle Dangerous and Venomous Reptiles should be contracted to remove any animals 2 Cleared vegetation can be used to form wood piles and logs and stumps. Dead or decaying wood piles should be created as these will provide valuable refuge areas especially due to the clearance of vegetation cover. 3 Logs and stumps also provide important habitats for several reptile species as well as smaller mammals, amphibians, arachnids and scorpions. With time they will eventually be reduced to valuable compost by several animal species. Dead trees and stumps will also be used for nesting purposes by barbets, hoopoes, owls, hornbills as well as perching or hunting platforms for birds like the kingfisher. 4 Any lizards, gecko’s, monitors or snakes encountered should be allowed to escape to suitable habitat away from	— Construction undertaken in a manner to reduce impacts to fauna	— Less than 1 animal fatality per month; — No disturbance of hydrological features on-site; — No hydrological contamination from construction activities; — Safety wear worn at all times in field; — Less than 2 non-compliance reports for safety wear per month; — Monthly ECO monitoring	PC ; ESCO ; ECO	PL

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				the disturbance. No reptile should be intentionally killed, caught or collected during any phase of the project. **5** General avoidance of snakes is the best policy if encountered. Snakes should not be intentionally harmed or killed and allowed free movement away from the area. **6** Appropriate footwear should be worn in the field. **7** During construction activities wherever possible work should be restricted to one area at a time. This will give smaller birds, mammals, reptiles and amphibians an opportunity to move into undisturbed areas close to their natural habitat. The contractor must ensure that no faunal species are disturbed, trapped, hunted or killed during the construction phase. **8** No further vegetation clearance except for the removal of alien invasive species. All remaining indigenous vegetation not affected by the approved layout must be conserved wherever possible. **9** No roads shall be cut through river- and stream banks (riparian vegetation) without obtaining the required approvals in terms of the NWA and active management to avoid erosion. **10** There must be no unnecessary disturbance of natural vegetation. Where unavoidable, such disturbed areas must be rehabilitated. **11** Implement a worker environmental education program and implement best management practices.				
9	**Waste Management**	Manage health and safety risks associated with waste on-site	Environmental contamination from poor waste management, leaking or spilled hazardous materials.	**Construction rubble** **12** Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the relevant Municipality. Waste manifests must be kept to prove that this has been disposed of legally. **Litter management** **1** Sufficient waste bins (with animal proof lids) must be provided at the construction site for different types of waste disposal and for recycling purposes. **2** Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site. **3** A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site. **4** Littering by the employees of the Contractor shall not be allowed under any circumstances. The ECO shall monitor the neatness of the work sites as well as the Contractor campsite. **5** Sanitary bins must be provided for women. **6** All waste must be removed from the site and transported to a landfill site as approved by the relevant Municipality. Hazardous waste	— Waste management and management of hazardous materials Method Statement to be developed by the Contractor for approval by the ECO.	— Spill kit on-site at all times; — Waste bins on-site from first week, at appropriate locations and sufficient number present. ; — Waste collected daily, removed weekly; — Appropriate bunding for hazardous materials, with sufficient storage; — Zero hazardous waste environmental incidents; — Sufficient number and placed chemical toilets available on site; — Emergency response methods statements approve by ECO and PM prior to construction commencing; — Staff trained in emergency response procedures	PC ; ESCO ; PM ; ECO	CP, OP, RP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				7 All waste hazardous materials must be carefully stored as advised by the ECO, and then disposed of off-site at a licensed landfill site. 8 Contaminants to be stored safely to avoid spillage 9 Machinery must be properly maintained to keep oil leaks in check. **Sanitation** 1 The Contractor shall install mobile chemical toilets on the site. 2 Staff shall be sensitised to the fact that they should use these facilities at all times. 3 No indiscriminate sanitary activities on site shall be allowed. 4 Ablution facilities shall be within 100m from workplaces but not closer than 100m from any natural water bodies or boreholes. There should be enough toilets available to accommodate the workforce. Male and females must be accommodated separately where possible. Alternatively ablution facilities may be located in a place approved by the ECO. 5 Toilets shall be serviced regularly and the ECO shall inspect toilets regularly. 6 Potable water must be provided for all construction staff.		— Appropriate amount of spill kits on site at all times; — Emergency response training conducted for all staff; — Emergency response protocol available in softcopy on site; — Sanitary bins provided in each toilet (1 per 10 staff members) located spaced throughout site; — Effluent removed from site once weekly, and daily — emptying of effluent from portable toilets; — Less than 2 construction or litter non-compliance reports per month; — Zero hazardous waste, sanitation and remedial action non-compliance for the entire phase, as determined by ECO; — Monthly monitoring by ECO		
10	**Health and Safety**	Reduce health and safety risk on site	Health and safety risk from poor safety planning and procedures	**Worker safety** 1 Implementation of safety measures, work procedures and first aid must be implemented on site. 2 A health and safety plan in terms of the Occupational Health and Safety Act (Act No. 85 of 1993) must be drawn up to ensure worker safety. 3 Contractors must ensure that all equipment is maintained in a safe operating condition. 4 A record of health and safety incidents must be kept on site. 5 Any health and safety incidents must be reported to the Project Coordinator immediately. 6 First aid facilities must be available on site at all times. 7 Workers have the right to refuse work in unsafe conditions. 8 Material stockpiles or stacks must be stable and well secured to avoid collapse and possible injury to site workers. **Worker facilities**	— Health and Safety Plan to be developed by Contractor for approval by the ECO.	— Staff trained in appropriate safety procedures; — Health and safety record log book initiated; — Sufficient quantity and quality of protective gear available on-site; — Firefighting equipment in working condition, present on site from day one; — Emergency numbers clearly displayed; — Speed limit issued and communicated to all; — Less than 3 speeding incidents each week on-site; — Spill emergency response procedures communicated;	PC ; ESCO ; ECO ; PM	PL

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				1 Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness **Protective gear** 1 Personal Protective Equipment (PPE) must be made available to all construction staff and the wearing and use of PPE must be compulsory. Hard hats and safety shoes must be worn at all times and other PPE worn where necessary i.e. dust masks, ear plugs, hard hat, safety boots and overalls etc. 2 No person is to enter the site without the necessary PPE. 3 The construction camp must remain fenced for the entire construction period. 4 Potentially hazardous areas such as trenches are to be demarcated and clearly marked with orange snow netting. The ESCO must check the trenches before work commences to ensure that no animal species have fallen in. 5 Adequate warning signs of hazardous working areas must be erected in suitable locations. 6 Uncovered manholes and excavations must be clearly demarcated 7 Emergency numbers for local police, fire department, Eskom and the Municipality must be placed in a prominent area. 8 Firefighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank. 9 A speed limit of 30km/h must be adhered to by all vehicles and machinery. **Hazardous Material Storage** 1 Staff that will be handling hazardous materials must be trained to do so. 2 Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor. 3 All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material. 4 The provisions of the Hazardous Chemical Substances Regulations promulgated in terms of the Occupational Health and Safety Act 85 of 1993 and the SABS Code of Practise must be adhered to. This applies to solvents and other chemicals possibly used in the construction time. **Procedure in the event of a petrochemical spill** 1 The individual responsible for or who discovers the petrochemical spill must report the incident to the Project		— No open fires on site; — Designated smoking area created and adhered to. — First aid kit available on site at all times;		

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				Coordinator, ECO and or Contractor as soon as reasonably possible. 2 The problem must be assessed and the necessary actions required will be undertaken. 3 The immediate response must be to contain the spill. **Fire management** 1 Firefighting equipment should be present on site at all times as per Occupational Health and Safety Act. 2 All construction staff must be trained in fire hazard control and firefighting techniques. 3 All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances. 4 No open fires will be allowed on site unless in a demarcated area identified by the ECO. This area must be equipped with fire extinguishers. 5 Smoking may only be conducted in demarcated areas as agreed upon by the ECO and contractor. This area must be equipped with fire extinguishers				
11	**Security**	Promote safety and security on site, and control for violence or unrest as far as possible	Safety risk from uncontrolled access to site, theft or property damage risks.	1 Antisocial activities such as consumption or illegal selling of alcohol, drug utilisation or selling on site are prohibited. 2 Any persons found to be engaged in such activities shall have disciplinary and / or criminal action taken against them. 3 No person shall enter the site unless authorised to do so by the contractor, Project Coordinator and ECO. All visitors must report to the site office on arrival, undergo induction training, sign an indemnity form and be in possession of the correct PPE clothing to wear while on site. 4 If any fencing interferes with the construction process, such fencing shall be deviated until construction is completed. The deviation of fences shall be negotiated and agreed with the landowner in writing by the ECO. 5 Trespassing on private / commercial properties adjoining the site is forbidden. 206. The site must be secured in order to reduce the opportunity for criminal activity in the locality of the construction site 6 No drugs, alcohol, fire arms or weapons of any kind allowed on site (baring medication); 7 No hunting, trading or selling of items of any kind allowed on or near site; 8 Intoxication while on site will not be allowed. If necessary, breathalysing may be instigated for staff members.	— Access control to and from site arranged and active;	— No theft incidents on-site; — Zero persons injured; — No hunting or harvesting or informal trade on-site; — Access control in place and efficient from day one; — Zero weapons on site at all times; — Less than 2 unauthorised entries to site per months; — Less than 2 intoxicated staff members found on site per month; — Zero trade found on site; — Monthly monitoring ECO	PC ; ESCO ; PM ; ECO	CP, OP
12	**Social Environment**	Manage procurement, labour, and community members to avoid social unrest of violence	Social unrest, protest or work stoppages due to the social upheaval	1 All contact with affected parties shall be courteous at all times. The rights of the affected parties shall be respected at all times. 2 A complaints register should be kept on site. Details of complaints should be incorporated into the audits as part of the monitoring process. This register is to be tabled during monthly site meetings.	— Complaints register initiated and maintained; — Transport and traffic managed according to	— Complaints register maintained on site at all times; — Less than three complaints logged every two weeks;	PM ; D ; ESCO ; ECO ;	PL

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				3 No interruptions other than those negotiated shall be allowed to any essential services. 4 Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site. 5 Road rehabilitation should take place during and once construction is completed. 6 Construction traffic should only make use of approved routes. 7 Where possible unskilled job opportunities should be afforded to local community members. 8 Equal opportunities for employment should be created to ensure that the local female population also have access to these opportunities. Females should be encouraged to apply for positions. 9 Payment should comply with applicable Labour Law legislation in terms of minimum wages. 10 Local companies should be given the opportunity to tender for the provision of locally-sourced materials, labour, plant, transport, etc. 11 A Grievance Mechanism in included in Section 14 and should be implemented 12 Early, clear, and effective communication with affected and adjacent landowners prior to and throughout the construction phase is critical. 13 Procedures and timeframes should be identified for reporting and addressing incidents, such as damage to gates and fences etc. Based on the comments from the affected land owners, it would appear that the role played by the ECO involved in the existing projects can be improved. The ECO and CLP should liaise closely with each other throughout the construction phase. 14 Contractor training must include making workers aware of the consequences of their actions and the impact that they may have on farming activities. A Contractor Training programme should be developed and implemented prior to the commencement of the construction phase.	approved Method Statement; — Local community to benefit from procurement of services and goods as far as possible	— No planned pickets or work stoppages (mediation prior required); — Monthly monitoring by ECO		
13	**Cultural and Heritage Artefacts**	Avoid, as far as possible, damage to heritage resources on-site	Irreparable damage to heritage resources within the project region	1 Local museums as well as the South African Heritage Resource Agency (SAHRA) and the HWC should be informed if any artefacts are uncovered in the affected area and mitigation measures recommended by SAHRA should be followed. 2 The contractor must ensure that his workforce is aware of the necessity of reporting any possible historical or archaeological finds to the ECO so that appropriate action can be taken. 3 Any discovered artefacts shall not be removed under any circumstances. Any destruction of a site can only be allowed once a permit is obtained and the site has been mapped and noted.	— Work undertaken near identified heritage resources as per the approved Method Statement; any new significant heritage resources uncovered communicated to the appropriate Heritage Authority (HWC or SAHRA)	— All resources found on site left in-situ and reported to the appropriate heritage authority; — No damage to heritage resources throughout the PL; — Resources found communicated to SAHRA and HWC within three days;	All parties while present on-site	PL

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				4 Permits shall be obtained from the Heritage Resource Agency		— All efforts made to assist date collection on-site; — Monthly monitoring ECO		
14	**Construction site decommissioning**	Reduce biodiversity impact from construction closeout activities prior to commencement of operational phase	Environmental contamination from decommissioning activities (spills and leaks)	**Removal of equipment** 1 All structures comprising the construction camp are to be removed from site. 2 The area that previously housed the construction camp is to be checked for spills of substances such as oil, paint, etc., and these shall be cleaned up and contaminants disposed of appropriately. 3 All hardened surfaces within the construction camp area should be ripped, all imported materials removed, and the area shall be top soiled and rehabilitated using the guidelines as set out in the section on Flora and Fauna that forms part of this document. **Temporary services** 1 The Contractor must arrange the cancellation of all temporary services. 2 Temporary roads must be closed and access across these blocked. 3 All areas where temporary services were installed are to be rehabilitated to the satisfaction of the ECO. **Associated infrastructure** 1 Surfaces are to be checked for waste products from activities such as concrete batching and cleared in a manner approved by the ECO. 2 All surfaces hardened due to construction activities are to be ripped and imported material thereon removed. 3 All rubble is to be removed from the site to an approved disposal site as approved by the ECO. Burying of rubble on site is prohibited. Waste manifests must be kept to prove that this has been disposed of legally. 4 The site is to be cleared of all litter. Waste manifests must be kept to prove that this has been disposed of legally. 5 The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 6 Fences, barriers and demarcations associated with the construction phase are to be removed from the site. 7 All residual stockpiles must be removed or spread on site as directed by the ECO. 8 All unused building materials must be removed from the site. 9 The Contractor must repair any damage that the construction works has caused to neighbouring properties, specifically, but not limited to, damage caused by poor storm water management. **Rehabilitation**	— • ECO signoff on final EMPr guidelines and measures for rehabilitation and decommissioning prior to final closure of site. — Construction close-out is in line with approved Method Statement which is to be developed by the Contractor for approval by the ECO.	— • No structures left behind on — site; — • Topsoil rehabilitated as per topsoil management set out in this document; — All rubble and waste disposed of at a suitable disposal facility; — No burial of rubble on site; — Soil stockpiles spread and shaped as required in this document; — Less than 5cm rubble left on site after clearance cumulatively, as determined by ECO; — 95% of hardened surfaces ripped prior to closure; — All litter removed from site; — All stockpiles spread in accordance with soil management plant; — Monthly monitoring ECO No temporary structures, equipment or material left on site; — Topsoil managed as per topsoil management set out in this document; — All rubble and waste disposed of at a suitable disposal facility; — No burial of rubble on site; — Soil stockpiles spread and shaped as required in this document;	PC ; SC ; ESCO ; PM ; ECO	RP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				1 Disturbed areas of natural vegetation as well as cut and fills must be rehabilitated as soon as possible to prevent further soil erosion. 2 Re-seeding shall be done on disturbed areas as directed by the ECO. Only seeds of indigenous plants must be used. 3 Recommended rehabilitation is in the form of active re-vegetation of affected areas, including areas where surface disturbances resulted from construction, as well as areas that were used for alternative or other functions, such as storage areas, parking bays, etc.; 4 Existing access roads should be left 'as is' for future use during maintenance operations; 5 In accordance with the Conservation of Agricultural Resources Act, No 43 of 1983, slopes in excess of 2% must be contoured and slopes in excess of 12% must be terraced. Other methods of rehabilitation may also be used at the discretion of the ECO, e.g. stone pitching, logging, etc. Contour banks shall be spaced according to the slope on tower sites. The type of soil shall also be taken into consideration. 6 Final inspection in order to ensure adherence to EMPr guidelines, completion of localised/ remaining areas of impact, monitoring of rehabilitation success, etc.				
15	**Fire management plan**	The site is prone to fire and it is imperative that the necessary precautionary measures implemented to minimise fire risk.	Runaway fires, habitat loss, faunal mortality, loss of plant SCCS	1 Ensure that all personnel are aware of the fire risk and the need to extinguish cigarettes before disposal, in appropriate waste disposal container. 2 The risk of fire is highest in the late summer and autumn months, during high wind velocities and dry periods. To avoid and manage fire risk the following steps should be implemented: 3 Have on site fire-fighting equipment and ensure that all personnel are educated how to use it and procedures to be followed in the event of a fire. 4 Identify the relevant authorities and structures responsible for fighting fires in the area and shall liaise with them regarding procedures should a fire commence. 5 Ensure that all the necessary telephone numbers etc. are posted at conspicuous and relevant locations in the event of an emergency. 6 Should a contractor be found responsible for the outbreak of a fire, he shall be liable for any associated costs. 7 No open fires shall be allowed on site for the purpose of cooking or warmth. Bona fide braai fires (such braai fires shall be limited to the traditional "month end" braais and not individual daily cooking fires) may be lit within the construction camp or site. 8 The Contractor shall take all reasonable steps to prevent the accidental occurrence or spread of fire. The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel	— Firefighting equipment available on site and in working condition	— All personnel trained for fire risk prior to conducting work; — Zero open fires on site at all times — No unauthorised fires on site at any given time; — Monthly ECO monitoring	PC, ECO; ESCO	CP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				are aware of the procedure to be followed in the event of a fire. The appointed fire officer shall notify the Fire and Emergency Services in the event of a fire and shall not delay doing so until such time as the fire is beyond his / her control. **9** The Contractor shall ensure that there is basic fire-fighting equipment on site at all times. This equipment shall include fire extinguishers and beaters. The Contractor shall pay the costs incurred by organisations called to put out fires started by himself/herself, his/her staff or any sub-contractor. The Contractor shall also pay the costs incurred to reinstate burnt areas as deemed necessary the PM. **10** Any work that requires the use of fire may only take place at that designated area and as approved by the PM. Fire-fighting equipment shall be available in these areas. **11** The Contractor shall ensure that the telephone number of the local Fire and Emergency Service are displayed at the site offices. **12** The Independent Contractor is to ascertain the fire requirements and shall submit a fire contingency plan Method Statement to the PM and ECO				
16	**Ecological**	Reduce general construction impacts on ecology and ecosystems; Reduce habitat loss, hydrological contamination and floral and faunal disturbance	Habitat loss, hydrological contamination, floral SCC loss, faunal disturbance and mortality,	**1** The illegal collection, hunting or harvesting of any plants or animals at the site should be strictly forbidden. Personnel should not be allowed to wander off the construction site. **2** The development footprint should be kept to a minimum and natural vegetation should be encouraged to return to disturbed areas. **3** Regular alien clearing should be conducted using the best-practice methods for the species concerned. The use of herbicides should be avoided as far as possible. **4** Preconstruction environmental induction for all construction staff on site to ensure that basic environmental principles are adhered to. This includes awareness as to no littering, appropriate handling of pollution and chemical spills, avoiding fire hazards, minimizing wildlife interactions, remaining within demarcated construction areas etc. **5** No dogs or cats should be allowed on site apart from that of the landowners. **6** No fires should be allowed within the site as there is a risk of runaway veld fires. **7** No fuelwood collection should be allowed on-site. **8** No unauthorized persons should be allowed onto the site and site access should be strictly controlled and vehicles which need to roam around the site should be accompanied by the ECO or security personnel. **9** Due to the disturbance at the site as well as the increased runoff generated by the hard infrastructure, alien plant species are likely to be a long-term problem at the site and	— All construction activities undertaken must be in line with approved Method Statements with the aim to reduce impacts to fauna and flora. The method statement must be developed by the Contractor for approval by the ECO. — Rehabilitation (revegetation of disturbed areas) — Cleared areas demarcated	— No hunting, harvesting or trading on site; — Only demarcated areas in the design phase pre-construction area cleared of vegetation; — No pets allowed on site; — Runoff control features implemented — Zero incidents of illegal farming, hunting, collections or trading of any kind on-site, as determined by the ECO; — Zero pets on site at all times, less than 2 non-compliance reports for pets per month; — Alien control plan implemented; — Monthly monitoring ECO	PC; PM ; ECO ; ESCO	CP + OP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				a long-term control plan will need to be implemented. Problem woody species such as Prosopis are already present in the area and are likely to increase rapidly if not controlled. **10** During construction any fauna directly threatened by the construction activities should be removed to a safe location by the ECO or other suitably qualified person. **11** Ensure that temporary infrastructure areas are within low sensitivity areas, preferably previously transformed areas if possible. **12** Erosion management should take place according to the Erosion and Rehabilitation Plan. **13** If any parts of site such as construction camps must be lit at night, this should be done with low-UV type lights (such as most LEDs), which do not attract insects and which should be directed downwards. **14** All personnel should undergo environmental induction with regards to fauna and in particular awareness about not harming or collecting species such as snakes, tortoises and owls which are often persecuted out of superstition. **15** All roads and other hardened surfaces should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. **16** Any potentially dangerous fauna such snakes or fauna threatened by the decommissioning activities should be removed to a safe location. **17** Any roads that will not be rehabilitated should have runoff control features which redirect water flow and dissipate any energy in the water which may pose an erosion risk. **18** All erosion problems observed should be rectified as soon as possible, using the appropriate erosion control structures and revegetation techniques. **19** All hazardous materials should be stored in the appropriate manner to prevent contamination of the site. Any accidental chemical, fuel and oil spills that occur at the site should be cleaned up in the appropriate manner as related to the nature of the spill. **20** All construction vehicles should adhere to a low speed limit (40km/h for cars and 30km/h for trucks) to avoid collisions with susceptible species such as snakes and tortoises and rabbits or hares. Speed limits should apply within the facility as well as on the public gravel access roads to the site.				
17		Manage relocation of plants and animals appropriately to reduce harm, promote growth and establishment, and conserve floral and faunal components on site	Faunal general: Faunal mortality, faunal disturbance	**1** No fauna present on the property may be wilfully harmed unless it threatens the life of an employee. **2** Hunting, disturbance and collection of animals in the area must be prohibited. **3** Construction areas must be screened for slow moving fauna before any activities commence and removed if necessary.	— Relocation of fauna and flora compliant to the approved Method Statement (to be developed by the	— Minimal disturbance to fauna and flora of the project region. — Appropriate capturing devices employed	PC; PM ; ECO PC, ECO; ESCO	CP + OP CP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				4 Any animals injured by the construction activities should be taken to a veterinarian for treatment. 5 Minimise impacts on faunal habitat by adhering to the vegetation specialist recommendations. 6 Vehicle speeds should be kept to a minimum (no greater than 30km/h on-site) by using informative signage and speed humps. 7 If certain areas are found to involve unusually high mortality rates, then suitable mitigation (e.g. the erection of low fences alongside the problem area) may be required. Seasonal mortality to amphibians moving to breeding sites around dams should be monitored and road traffic at night during peak amphibian breeding periods should be controlled. 8 Monitor excavations daily and rescue any trapped fauna. When filled with water the excavations should be checked twice a day. Release the rescued fauna in a suitable habitat adjacent to the study area. 9 The removal of trees should not be undertaken during the breeding season (September to November). 10 Domestic waste should be placed in suitable covered containers and removed from the site on a regular basis to reduce the attraction of scavenging animals, e.g. gulls and monkeys. 11 External and internal fences must be monitored for traps.	Contractor for approval by the ECO.)	— Professional relocation for large mammals required — Zero hunting on site; — Less than 3 speeding incidents per month on site; — Monthly monitoring by ECO — Zero harm to reptiles relocated; — Search and rescue conducted prior to clearance of an area if recommended by the ecologist in light of the walkthrough; — Large mammals found on site (that cannot be herded away to another suitable camp) must be relocated by a professional; — Zero immobilisers or tranquilisers used on large mammals found on site; — Zero avoidable harm to amphibians on site; — Amphibians to be transported on moist substrate; — Less than three non-compliance reports for combined relocation objective per month — Monthly monitoring ECO		
18			Reptile: Reptile disturbance and mortality	1 An on foot search conducted by a professional reptile team is to be carried out to search for reptiles within every possible habitat. This is achieved by walking to find reptiles during the day which are sun basking, hunting etc.; lifting features such as rock, where reptiles may be retreating etc.; and searching the roads after dark in the immediate areas around the proposed development site. The last mentioned method is only used when practical. The theory behind this method is that nocturnal reptile species often cross roads at night or moon bask after dark (sleep on the road surface to absorb heat from the road). 2 Once caught, each reptile will be placed into transport containers suited for that individual reptile. 3 Cannibalistic reptiles will be transported separately. 4 The transport containers will be kept cool to decrease stress for the reptiles. 292. The reptiles will be relocated as soon as possible after they have been caught. 5 Professional equipment (such as hook sticks and goggles) will be used to ensure limited harm to the reptiles and to prevent the team members from being bitten by venomous snakes and to prevent venom sprayed into one's eyes from Rinkhals. 6 Baited traps will not be used. 7 Nooses will not be used as this causes injury to lizards. 8 Safety procedures will be in place for the reptile's release.				

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
19			Mammals: Mammal mortality and disturbance	1 In terms of the conducted survey, the areas demarcated for clearing do not pose a risk/threat to mammals, for example: the presence of mammals was minimal. 2 If a mammal is trapped within an area where construction is taking place then a professional handler will be called upon to remove the mammal. 3 Protective clothing such as gloves will be used when handling mammals. 4 All staff used in the capture and relocation of mammals will be inoculated against Rabies and Tetanus.				
20			Amphibians: Amphibian mortality and disturbance	1 Amphibians will be caught by hand and net. 2 Amphibians will be placed into transport containers with damp substrates to avoid dehydration. 3 Tadpoles may be collected; they will be placed into water containers and released as soon as possible. 4 During release, the tadpoles will be allowed to acclimatize to the new water in terms of temperature, pH etc. 5 Breeding adult frogs and toads may be captured at night when they are exposed.	–	–		
21			Vegetation: Loss of habitat, loss of plant SCC	Protected plant species will be removed from the designated construction footprint and relocated to adjacent areas of similar habitat that will not be affected by construction. Plant search and rescue will only be conducted within the area where direct construction activities are to occur as per the approved project EMPr. In terms of the site survey conducted, it is noted that the type of plant species together with the amount of plant species impacted is not significant enough to justify the setting up a nursery for this project. A qualified botanist must conduct a Search & Rescue operation prior to commencement of construction, in consulted with the appointed ECO to remove all SCC from impacted areas. 1 Areas to be cleared of vegetation must be clearly demarcated before clearing commences. 2 Areas must only be stripped of vegetation as and when required and in particular only once all SCC have been relocated for that area. 3 Once site boundaries are demarcated, the area to be cleared of vegetation will be surveyed by the plant search and rescue team under the supervision of the botanist and ECO to identify species suitable for rescue and commence removal of plants. 4 This material should be appropriately removed from its locality and immediately relocated into adjacent areas of similar habitat that will not be disturbed by construction. 5 Wherever possibly any seed-bearing material will be collected immediately and planted as soon as possible. 6 All applicable permits must be kept on site and in the possession of the flora search and rescue team at all times.	– Search and rescue implemented by a professional botanist prior to construction clearing; – Where possible, seed collected and storage appropriately for rehabilitation use;	– Zero known SCC present harmed through clearing activities; – Seeds stored as per a professional botanist' instruction for ongoing rehabilitation throughout the construction and operation phase; – Less than 3 non-compliance reports for this objective per month; – Monthly monitoring by ECO	PC, ECO; ESCO	CP + OP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				7 Should a portion of an access road be newly constructed, the route shall be selected to have a minimal disturbance to natural vegetation under the guidance of the ECO and botanical specialist. No other routes shall be used by vehicles or personnel for the purpose of gaining access to the site. 8 Once search and rescue and plant relocation is complete, a short audit report and certificate of clearance will be issued by the respective contractor or botanical specialist and copies will be supplied to DFFE and DALRRD				
22	**Avifauna**	Minimise bird mortality	Collision mortality and electrocution	1 Construction of the substation must not occur during the main breeding season for local birds, namely August to October. 2 Avoidance of construction of sub-stations during the main breeding season for local birds which is the period August to October inclusive, as far as possible. 3 The entire line must be fitted with bird diverters to reduce collision frequency. 4 Where the proposed and the existing lines parallel, the pylons should be staggered to reduce large bird collisions. 5 Bird-friendly support structures must be used for the 132kV line such that the conductors are slung below the towers to avoid avian electrocutions 6 Avoidance of construction of sub-stations during the main breeding season for local birds, which is the period August to October inclusive, as far as possible. 7 Clear only areas where absolutely necessary, not from the entire servitude of the line. 8 Minimise the number of service tracks	— Minimise vegetation clearing to reduce impacts to avifauna	— Reduce incidental vegetation clearance and habitat loss — Monthly monitoring ECO	PC ; ECO; ESCO	CP
23	**Visual**	Avoid or minimize construction impacts on existing visual resources and potentially sensitive receptor locations in the surrounding area.	Potential impact on visual resources as a result of the proposed power line and electrical infrastructure	1 Carefully plan to minimise the construction period and avoid construction delays. 2 Inform any receptors within 500m of construction works of the construction programme and schedules. 3 Position storage/stockpile areas in unobtrusive positions in the landscape, where possible. 4 Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 5 Vegetation clearing should take place in a phased manner. 6 Make use of existing gravel access roads where possible. 7 Limit the number of vehicles and trucks travelling to and from the construction, where possible. 8 Ensure that dust suppression techniques are implemented: a on all access roads; b in all areas where vegetation clearing has taken place; c on all soil stockpiles. 9 Maintain a neat construction site by removing litter, rubble and waste materials regularly.	— Minimise visual impacts on visual resources	— Ensure that visual management measures are monitored by an ECO. This will include monitoring activities associated with visual impacts such as the siting and management of soil stockpiles, screening and dust suppression. — Regular reporting to an environmental management team must also take place during the construction phase.	PC ; ECO; ESCO	CP
24	**Surface Water Resources**	Avoid impacts on surface water resources	— Loss of watercourse vegetation, associated	It is assumed that the proposed powerline support structures will be located outside of the watercourses and at least 32 m (as far as possible/feasible) from the delineated edge of a			PC ; ESCO ; PM ; ECO	CP, OP

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
			habitat and ecosystem services; — Transportation of construction materials can result in disturbances to soil, and increased risk of sedimentation/erosion; — Soil and stormwater contamination from potentially spilled oils and hydrocarbons originating from construction vehicles. — Earthworks could be potential sources of sediment, which may be transported as runoff into the downstream watercourse areas; — Exposure of soil, leading to increased runoff, and erosion, and thus increased sedimentation of the watercourses; — Increased sedimentation of the watercourses, leading to smothering of vegetation associated in the watercourses — Proliferation of alien and/or invasive vegetation as a result of disturbances.	watercourses (It is acknowledged that the proposed substation is located 90 m from the closest watercourse) – this in itself is considered a mitigation measure, which entails no direct negative impacts from occurring on the watercourses. Nevertheless, the following mitigation measure must be implemented: 1 As far as practically possible, all construction works (with specific mention of upgrading any road crossings) be undertaken during the driest period of the year when the flow is very low in the watercourses; 2 Due to the accessibility of the sites, limit the crossings of watercourse where possible. Use must be made of existing watercourse crossing to access the project sites where possible. This will limit edge effects, erosion and sedimentation of the watercourses during the construction phase; 3 The reaches of the watercourses where no activities are planned (i.e., no support structures and no spanning of the powerline over the watercourse) must be considered no-go areas; 4 Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the watercourses and their associated 32m NEMA Zone of Regulation (ZoR); 5 Removed vegetation must be stockpiled outside of the delineated boundary of the watercourse, if possible. Should it not be possible, the removed vegetation may be stockpiled in the watercourse, for the duration of the construction period. The footprint areas and height of these stockpiles should be kept to a minimum. Should the vegetation not be suitable for reinstatement after the construction phase or be alien/invasive vegetation species, all material must be disposed of at a registered garden refuse site and may not be burned or mulched on site	— Minimise impacts on surface water resources	— Zero impacts on delineated boundary of the watercourse; — Monthly ECO monitoring		
25			— Disturbances of soil leading to potential impacts to the watercourse vegetation, increased alien vegetation proliferation in the footprint areas, and in turn to altered watercourse habitat; — Altered runoff patterns, leading to	1 Excavation of pits for the support structures foundation and the foundation of the substation may result in loose sediments within the andscape, specifically if works are taken during a period of rainfall (if applicable). As such, sediment traps should also be installed downstream/downgradient of the construction area. Sediment traps can be created by pegging an appropriate geotextile across the entire width of the work area at the specified support tower, held down by cobbles/boulders or by geotextile wrapped hay bales spanning the width of the work area and staked into position; 2 During excavation activities, soil must be stockpiled upgradient of the excavated area. Mixture of the lower and				

CONSTRUCTION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
			increased erosion and sedimentation of the watercourses. – Potential contamination of surface water (if present) as a result of mixing and casting of concrete for foundations	upper layers of the excavated soil should be kept to a minimum. This soil must be used to backfill the pits (support structures), immediately after installation of the support structures and/or other infrastructure; 3 Material used as bedding material (at the bottom of the excavated pit) should be stockpiled outside of the 32m NEMA ZoR and as close as possible to the support structures footprint area. Once the pit has been excavated, the bedding material should directly be placed within the pit, rather than stockpiling it alongside the pit; 4 When the powerline is strung between the support structures and during final construction of the substation, no vehicles my indiscriminately drive through the watercourses, use must be made of the dedicated access roads. **Control measures for concrete mixing on site**: 5 No mixed concrete may be deposited outside of the designated construction footprint; 6 As far as possible, concrete mixing should be restricted to the batching plant. Additionally, batter / dagga board mixing trays and impermeable sumps should be provided, onto which any mixed concrete can be deposited while it awaits placing; and 7 Concrete spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site. **With regards to backfilling of the concrete encasing**: 8 Soil removed for excavating the pit should be used as backfill material; All excavated pits must be compacted to natural soil compaction levels to prevent the formation of preferential surface flow paths and subsequent erosion. Conversely, areas compacted as a result of construction activities (within the 5 m buffer zone) must be loosened to natural soil compaction levels; 9 Any remaining soil following the completion of backfilling of the pits are to be spread out thinly surrounding the installed support structures (outside of the delineated watercourses) to aid in the natural reclamation process; and 10 The construction footprint must be limited to the pit area and an additional 5 m buffer (to allow for the stockpiling and movement of personnel). The area must be rehabilitated after the completion of the construction phase, including revegetation thereof with indigenous vegetation. In addition, alien vegetation eradication of the footprint area must be undertaken.				

11.2.3 OPERATIONAL PHASE

OPERATIONAL PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
1	**Ecology**	Minimise faunal harm and floral loss	Fauna mortality and impacts to flora from maintenance vehicle crossing	1 Ensure that maintenance staff and vehicles remain on designated roads and paths within the site. 2 Avoid unnecessary disturbance of existing bush/thicket patches. 3 Regular monitoring for erosion after construction to ensure that no erosion problems have developed as result of the disturbance. 4 Regular monitoring for alien plants within the development footprint as well as adjacent areas which receive runoff from the facility as there are also likely to be prone to invasion problems. 5 Limit vehicles on site; 6 Limit roads on site	— Control measures implemented to manage invasive alien species; — Ongoing rehabilitation of areas disturbed during the construction phase	— Zero unnecessary roads established on site; — Monthly invasive species clearing programme conducted; — Monthly invasive species monitoring — Monthly ECO monitoring	PC, ECO	CP + RP
2	**Avifaunal**	Reduce collision mortality and electrocution of avifauna as far as possible	Avifaunal mortality from collision with overhead conductors or accidental electrocution	1 Route lines to avoid sensitive areas or bird flight corridors; 2 Monitoring for high number of bird incidents, and investigate additional measures should high mortality rates be reported (in conjunction with an avifaunal specialist). 3 Where overhead power lines cross valleys, bird flight diverters should be placed on the line at a spacing of 5m. In the identified avifaunal sensitive area (Ou Mure-Fortuin) day and night visible bird flight diverters should be placed at 2 m intervals. It is accepted that diverters are likely to deteriorate across the operational life of the lines. The main aim is to alert bird to the lines in the immediate post-construction years when the lines will be a novel risk which locally resident birds will, over years, learn to compensate for	— Monitoring programme in place; — Flight diverters placed; — Planning appropriately implemented to avoid sensitive areas	— Less than 3 bustard, bird of prey or water bird deaths from overhead collisions every 6 months. Avifauna monitoring to be undertaken and appropriate adaptive management implemented should unacceptable levels of mortality be recorded. — Flight diverters at 5m intervals spaced and present on each conductor placed on pylons across water features; — EA arrived design implemented; — Monthly monitoring by ECO	PM ; D ; PC	OP
3	**Socio-Economic**	Minimise social unrest and maximise benefits to the local community	Enhancing the positive social impacts and mitigating the negative social impacts	1 Ensure that if the community trust business model is implemented, the board of trustees s representative of the surrounding communities, and that proper oversight procedures are established prior to operation of the facility.	— Monitoring of social commitments	— Oversight procedures established, trust and board established; — No monitoring required	D ; PM	PL
4	**Storage of hazardous substances**	Control hazardous substances on site during operation	Health and safety risk represented by hazardous substance leakages	1 Ensure that all hazardous substances are stored in appropriately bunded locations.	— Hazardous substances management subject to an approved management plan which must be developed by the Contractor for approval by the ECO.	— Zero hazardous substance spillage or containment incident per year	PM ; PC ; ESCO	OP

OPERATIONAL PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
5	**Operating equipment**	Reduce noise on site during operation	High noise levels	1 Lower noise emission levels from inverters and transformers can be achieved by housing them in enclosed structures	— Noise emissions managed to acceptable levels	— Less than 1 noise complaint per month	PM ; PC ;	OP
6	**Stormwater management**	Reduce erosion on site	Increased erosion risk	1 Maintain recommendations of the Storm Water Management Plan. 2 Ongoing monitoring must be undertaken for erosion and establishmet of alien invasive plant species.	— Storm water management plan implemented according to the approved method statement (to be developed by the Contractor for approval by the ECO) and maintained throughout operation phase	— Storm water plan implemented and maintained throughout operation phase	PC ; PM ; ESCO	OP
7	**Waste management**	Control waste produced	Health and safety risk associated with poor	1 Develop and implement a waste management plan incorporating recycling and waste minimization and legal aspects into the plan. 2 Develop and implement a worker education plan for waste management in the work environment.	— Waste management plan implemented throughout operational phase	— Waste management plan implemented throughout operational phase	PC ; PM ; ESCO	OP
8	**Fire management plan**	Fire management measures in place	Runaway fire risk, habitat loss, faunal disturbance	Any requirements of the local Fire Protection Association must be adhered in consultation with the relevant landowners as per the requirements of the National Veld and Forest Fire legislation which may include: 1 Formation of a Fire Protection Association (FPA); 2 Duty to prepare and maintain firebreaks; 3 Requirements for firebreaks; 4 Readiness for firefighting; 5 Actions to fight fires. 6 In areas other than designated development footprints within the Open Space area, a network of firebreaks must be maintained and overlap with any firebreaks managed by the landowners to ensure that fires are not able to spread over the development. I. All road reserves will serve as firebreak; II. All firebreaks must be maintained as required by the local Fire Chief 7 Firebreaks are to be positioned and prepared in such a way as to cause the least disturbance to soil and biodiversity. Firebreaks should be free from combustible material, e.g. pruning's and leaf litter. 8 Ensure firefighting equipment is maintained and in good working order before the start of each fire season.	— Prepare firebreaks in accordance with the FPA; — Zero smoking on site — Approved measures in place to avoid accidental fires	— Prepare firebreaks in accordance with the FPA; — Zero smoking on site	PC ; PM ; ECO	OP

OPERATIONAL PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
				9 Smoking outside of designated safe areas must not be permitted. Flicking of cigarette butts into adjacent vegetation will not be permitted. 10 Suitable signage must be provided on site, including entrance warning of fire risk and warnings not to flick cigarette butts into vegetated areas.				
9	**Visual**	Avoid or minimize operational impacts on existing visual resources and potentially sensitive receptor locations in the surrounding area.	Potential impact on visual resources as a result of the proposed grid connection infrastructure.	1 Where possible, limit the amount of security and operational lighting present at substations. 2 o Where possible, avoid placing lights on pylon structures. 3 o Light fittings for security at night should reflect the light toward the ground and prevent light spill. 4 o Lighting fixtures should make use of minimum lumen or wattage. 5 o Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used. 6 o Where possible, limit the number of maintenance vehicles using access roads. 7 o Buildings on the substation sites should be painted with natural tones that fit with the surrounding environment. 8 o Non-reflective surfaces should be utilised where possible.	— Minimise visual impacts on visual resources	— Ensure that visual mitigation measures are monitored by the management team on an on-going basis. This will include monitoring activities associated with visual impacts such as the control of signage, lighting and maintenance vehicles on access roads.	PC ; PM ; ECO	OP
10	**Surface Water**	Avoid impacts on surface water resources	— Disturbance to soil and ongoing erosion as a result of periodic maintenance activities; — Altered water quality (if surface water is present) as a result of increased availability of pollutants.	1 Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the watercourses may be permitted; 2 During periodic maintenance activities of the powerline and substation, monitoring for erosion should be undertaken; 3 Should erosion be noted at the base of the support structure that may potentially impact on a watercourse in the surrounding area, the area must be rehabilitated by infilling the erosion gully and revegetation thereof with suitable indigenous vegetation; 4 Monitoring for the establishment for alien and invasive vegetation species must be undertaken, specifically for access roads through or along the watercourses used to service the powerline and substation. Should alien and invasive plan species be identified, they must be removed and disposed of as per an alien and invasive species control plan and the area must be revegetated with suitable indigenous vegetation.	— Minimise impacts on surface water resources	— Zero impacts on delineated boundary of the watercourse;	PC ; PM ; ECO	OP
			—	5	—	—		

11.2.4 REHABILITATION PHASE

REHABILITATION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
1	**Ecology**	Minimise harm to fauna and flora on site from rehabilitation activities	Inappropriate rehabilitation, restoration resulting in environmental degradation	**1** Construction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment. **2** Ensure that all bare land is rehabilitated after decommissioning. **3** Wherever excavation is necessary for decommissioning, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. **4** Wherever excavation is necessary, topsoil should be set aside and replaced after construction to encourage natural regeneration of the local indigenous species. **5** There should be regular monitoring for erosion for at least 2 years after decommissioning by the applicant to ensure that no erosion problems develop as result of the disturbance, and if they do, to immediately implement erosion control measures. **6** The recovery of the indigenous shrub layer should be encouraged through leaving some areas intact through the construction phase to create a seed source for adjacent cleared areas. **7** Due to the disturbance at the site alien plant species are likely to be a long-term problem at the site following decommissioning and regular control will need to be implemented until a cover of indigenous species has returned. **8** All above-ground infrastructure should be removed from the site. Below-ground infrastructure such as cabling can be left in place if it does not pose a risk, as removal of such cables may generate additional disturbance and impact. **9** All cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. These can be cut when dry and placed on the cleared areas if natural recovery is slow. **10** All disturbed and cleared areas should be revegetated with indigenous perennial shrubs and grasses from the local area. **11** Recovery/rehabilitation of the indigenous shrub layer must be conducted with specialist restorative ecological input.	— All bare land associated with the construction phase rehabilitated using appropriate vegetation	— No new access roads created; — Zero above ground infrastructure remaining after decommissioning; — 95% of all disturbed areas revegetated as per rehabilitation plan; — Monthly monitoring ECO	PC ; ESCO ; ECO	RP
2	**Noise sensitive receptors**	Reduce noise associated with decommission and rehabilitation works	Decommissioning activities may induce high noise volumes	**1** Machinery that causes noise must only be operated at appropriate times (during the day and at normal working hours).	— Noise emissions reduced to an acceptable level	— Less than two noise complaints per week of rehabilitation;	PC ; ESCO ; ECO	RP

REHABILITATION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
						– Monthly monitoring ECO		
3	**Pollution**	Minimise and control pollution on site	Decommission, spills and leaks of hazardous waste and litter can pollute and contaminate habitats	1 Littering must be avoided and litter bins should be made available at various strategic points on site. Refuse from the construction site should be collected on a regular basis and deposited at an appropriate landfill. 2 No storage of fuels and hazardous materials should be permitted near sensitive water resources. All hazardous substances (e.g. diesel, oil drums, etc.) to be stored in a bunded area. 3 Ensure adequate storm water management by implementing recommendations of the Storm Water Management Plan during construction.	– Rehabilitation activities undertaken as per plan developed by the Contractor for approval by the ECO.	– Zero hazardous waste non-compliance reports; – Waste disposed of at appropriate facilities; – No rubble burying; – All project related items are removed from project region; – No hazardous material incidents during rehabilitation. Less than two littering fines or non-compliance reports per week issued; – Monthly monitoring by ECO	PC ; ESCO ; ECO	RP
4	**Dust**	Manage dust emissions	Decommissioning activities will increase dust levels in the immediate vicinity of the project	1 Reduce fugitive/nuisance dust by implementing the following: a. Damping down of un-surfaced and un-vegetated areas; b. Retention of vegetation where possible; c. Demolitions and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of sand and dust into neighbouring areas; d. A speed limit of 30km/h must not be exceeded on dirt roads. 2 Any complaints or claims emanating from the lack of dust control should be attended to immediately by the Contractor.	– Speed limit introduced; – Dust emissions reduced to an acceptable level using appropriate and approved methods	– Less than one speed incident per week; – Less than two dust complaints per week;	PC ; ESCO ; ECO	RP
5	**Traffic & Transport**	Control vehicle movements to and from the site	Increased traffic will be induced through the transport of waste, rubble and project equipment to and from site during rehabilitation	1 Deconstruction vehicles and machinery should make use of existing infrastructure such as roads as far as possible to minimise disturbance on the receiving environment. 2 There must be no unnecessary disturbance of existing vegetation.	– No unauthorised routes being used by vehicles	–	PC ; ESCO ; ECO	RP
6	**Soil Erosion**	Reduce soil loss and promote ongoing soil fertility	An increase in soil erosion and surface flow may result from the decommissioning and closure of old infrastructure and buildings related to the project	1 After the removal of all project-related structures, the disturbed soils should be re-vegetated to avoid unnecessary soil erosion	– Rehabilitation plan to be developed by the Contractor for approval by the ECO. – Contractor to implement and monitor approved		PC ; ESCO ; ECO	RP

REHABILITATION PHASE MITIGATION MEASURES								
#	**Aspect**	**Objective**	**Potential Impact**	**Specification**	**Outcomes**	**Indicator and monitoring**	**Responsibility**	**Timeframe**
					Rehabilitation Plan			
7	**Land use**	Manage site for future land use	Land use alteration is required after the closure of the project. Land use changes may not be required should zoning remaining consistent.	1 Ensure that an appropriate land use is adopted.	– Land use zoning changes investigated and effected if applicable	– Rezoning (if required) or properties to agriculture prior to decommissioning; – Once off monitoring by ECO prior to site closure	PM ; D	RP
8	**Heritage**	Reduce impacts to heritage resources	Irreparable damage to heritage resources on site	1 Effective rehabilitation of the landscape after decommissioning must be implemented 2 Buffers around heritage resources are to be respected by the vehicles passing through the site	– Buffers around sensitive heritage features in place and maintained	– Buffers in place and maintained	PC ; ECO	RP
9	**Open space management plan**	Manage open areas to promote rehabilitation	Loss of habitat, loss of plant SCC	1 Cleared vegetation must not be piled onto adjacent intact vegetation outside of the designated footprint, even for temporary storage. 2 Rehabilitation guidelines for the development as a whole must prioritise the use of indigenous grass, tree and shrub species are to be used in the soil stabilisation landscaping of the development once construction is completed, if required.	– Indigenous plants used for rehabilitation	– Indigenous plants used for rehabilitation; – Monthly monitoring by ECO	PC ; ECO	RP
10	**Visual**	Avoid or minimize impacts of decommissioning activities on existing visual resources and potentially sensitive receptor locations in the surrounding area.	Potential impact on visual resources as a result of the proposed grid connection infrastructure.	1 Carefully plan to reduce the decommissioning period. 2 Inform receptors within 500m of decommissioning works of the decommissioning programme and schedules. 3 All infrastructure that is not required for post-decommissioning use should be removed. 4 Minimise vegetation clearing and rehabilitate cleared areas as soon as possible. 5 Make use of existing gravel access roads where possible. 6 Limit the number of vehicles and trucks travelling to and from the proposed sites, where possible. 7 Ensure that dust suppression techniques are implemented: a on all access roads; b in all areas where vegetation clearing has taken place; and c on all soil stockpiles.	– Minimise visual impacts on visual resources	– Ensure that procedures for the removal of structures and stockpiles during decommissioning are implemented, including recycling of materials. In addition, it must be ensured that rehabilitation of the site to a visually acceptable standard is undertaken.	PC ; ECO	RP

12 SPECIFIED MANAGEMENT PLANS

12.1 REHABILITATION AND LANDSCAPE MANAGEMENT PLAN

Re-vegetating and rehabilitating the site once constructed through a comprehensive landscaping effort will benefit the potential faunal species that may find refuge on the site, and promote ecological function and connectivity on site. Linked to this, is the creation, preservation and maintenance of tracts of natural and ornamental vegetation in all stages of ecological succession, interconnected by corridors or green belts for escape, foraging, breeding and exploratory movements. In terms of the scope of the construction activities, landscaping and rehabilitation will be minimal; many instances will require clean-up activities together with planting ground stabilizing vegetation. If extensive rehabilitation is required then the approved site EMPr will be addressed for further assistance. The Rehabilitation and Landscaping Plan will focus on the following areas:

- Road verges during and after road construction is completed;
- Stormwater soak away features and landscaped areas;
- The transformed portions of the site not developed must be rehabilitated by planting indigenous plant species occurring in the area.
- Areas where pockets of alien invasive species have been removed.
- A list of indigenous plants used during rehabilitation must be approved by the ECO prior to commencement of rehabilitation activities.

12.1.1 VEGETATION

The re-vegetation process will not only focus on the rehabilitation of the road verges but also on all exposed soil, transformed areas and areas where alien invasive species have been removed within the site. Restoration must be undertaken as soon as possible after completion of construction activities to reduce the amount of habitat converted at any one time and to speed up the recovery to natural habitats.

RE-VEGETATION PROCEDURES

According to the national vegetation map (Mucina & Rutherford, 2006) the vast majority of the power line routes are within the Central Mountain Shale Renosterveld vegetation, while only a small area around the Komsberg substation falls within the Koedoesberge-Moordenaars Karoo vegetation type.

CENTRAL MOUNTAIN SHALE RENOSTERVELD

All plants collected from this vegetation type prior to construction must be transplanted in similar environments onsite in the Rehabilitation Phase. In addition, a seeding programme must be initiated in order to promote growth, as this region has slow expected growth rates. The approach should rather be to avoid impacting this vegetation type in preference, so disturbance should be kept to a minimum.

KOEDOESBERGE-MOORDENAARS KAROO

All plants collected from this vegetation type prior to construction must be transplanted in similar environments onsite in the Rehabilitation Phase. The following is required:

- Spread stockpiled subsoil to an average depth of 1m
- Spread stockpiled topsoil to a minimum depth of 10cm • Avoid impacting any large bush clumps.

Out-planting Procedures

Plot preparation	The plots will be prepared as follows: — 1. Prior to rehabilitation of the site, all remnants of foreign debris shall be removed from the site. — 2. All plots will be covered first with 1m deep subsoil and then with topsoil (minimum of 10cm deep). Soils will be manually spread evenly over the surface. Topsoil must be spread to the original depth (10cm), and deeper where sufficient top soil remains. — 3. As topsoil will contain all cleared vegetation, no additional treatment will be required.
Plant Preparation	Plants must undergo a period of 'hardening-off' during which they have been exposed to full, direct sunlight and been under a reduced watering regime. The individual plants destined for each plot will be grouped into plot-specific, marked baskets, before they leave the nursery. Each plant will be labelled with an aluminium label, giving species code, and a specific numeral identifying the plot. Before the out-planting commences, the equipment necessary for the proper handling and placing of all required materials shall be on hand, in good condition and to acceptable approved standards. — Planting should preferably be done during the rainy season. — Unless otherwise specified by the ESCO / ECO, excavate square holes of 800mm x 800mm x 800mm on average for trees and 500mm x 500mm x 500mm on average for shrubs. — Backfill planting holes with topsoil. As much of the soil from container plants as possible must be retained around the roots of the plant during planting. — The soil must cover all the roots and be well firmed down to a level equal to that of the surrounding in situ material — After planting, each plant must be well watered, adding more soil upon settlement if necessary. — Stake all trees and tall aloes using three weather resistant wooden or steel stakes anchored firmly into the ground. Two of the three stakes are to be located on the windward side of the plant. Galvanised wire binding, 3 mm thick, covered with a 20mm diameter plastic hosepipe must be tied tightly to the stakes, half to two thirds the height of the tree above the ground and looped around the trunk of the tree. — Place stakes at least 500mm apart and away from the stem and roots of the tree, so as not to damage the tree or its roots. — Thoroughly water plants as required until the plants are able to survive independently (i.e. depending on the rainfall). — A raised circular 200mm high subsoil berm, placed 500mm (shrubs) to 750mm (trees) from the plant's stem must be provided for the watering. Do not simply leave the excavated plant hole partially backfilled for this purpose – the berm must be raised above the natural soil level. — Water aloes and bulbs once directly after transplanting to settle the soil — Remove stakes and wire binds over time as required, as plants become established.
Seeding	— A professional botanist knowledgeable regarding this vegetation type should conduct a seed collection exercise during early summer, in order to enrich the seed bank of the existing topsoil. This is necessary as out-planting is typically not very successful, with high mortality expected. An additional seed bank

	will assist in restoring the area, including sowing for a larger variety of species than that planted. — Sow seed into topsoil prior to spreading, in order to mix throughout the layer — Addition of a mulch layer may assist with the survival of the seedlings — Reseeding after the 1st year may be required in order to promote further succession of native species; — For rehabilitation to be successful, the final vegetation covers should resemble composition and density of non-disturbed vegetation (prior to construction), with invasive species at maintenance levels;
Maintenance	— Water all transplanted plants as specified. — Watering must commence and continue immediately after transplanted. — Check all plants for pests and diseases on a regular basis and treat the plants accordingly, using approved method and products as per manufacturers specifications. — Once revegetated, areas should be protected from trampling and soil erosion, as well as unauthorised personnel, vehicles and construction equipment; — Should areas be converted to grazing, consultation with the landowner is necessary to come to terms regarding the exclusion of the plot for a while, to allow for plant to mature prior to grazing commencing. Plots should be isolated for at least 2 years, as slow growth is expected in this area. — Isolated areas are to be fenced off. Fencing shall be removed once the area is deemed sufficiently rehabilitated. — Control weeds by means of extraction, cutting or other approved methods. — For planted areas that have failed to establish, replace plants with the same species as originally specified. The same species as originally specified must be used unless otherwise specified by the ESCO / ECO.

In order to rehabilitate transformed and invaded areas, the following landscaping techniques will be employed:

- Clearing of vegetation should take place in accordance with the construction programme, instead of exposing large tracts of land simultaneously.
- Clearing of invaded areas should be undertaken as per the Alien Management Plan;
- No re-useable topsoil should be removed from the site.
- Sods used in re-vegetation should be obtained directly from the veld, but not from the sensitive areas on site. Veld sods shall contain at least a 50 mm topsoil layer and the roots shall be minimally disturbed. They shall be obtained either from the near vicinity of the site from an area selected by the Project Manager or ECO, or from areas of the proposed development site that are earmarked for development. The soil shall be compatible with that removed from the area to be re-vegetated and shall not have been compacted by heavy machinery.
- Indigenous seeds may be harvested for purposes of re-vegetation in areas that are free of alien invasive vegetation, either at the site prior to clearance or from suitable neighbouring sites;
- The stockpiled vegetation from the clearing operations should be reduced to mulch;
- Indigenous plant material must be kept separate from alien material. The indigenous vegetative material shall be reduced by either mechanically means (chipper) or by hand- axing to sticks no longer than 100 mm. The chipped material should be mixed with the topsoil at a ratio not exceeding 1:1;
- Mulch is to be harvested from areas that are to be denuded of vegetation during construction activities, provided that they are free of seed-bearing alien invasive plants;
- No harvesting of vegetation may be done outside the area to be disturbed by construction activities;
- Mulches shall be collected in such a manner as to restrict the loss of seed;
- Brush-cut mulch shall be stored for as short a period as possible, and seed released from stockpiles shall be collected for use in the rehabilitation process.

- Re-vegetated areas should be monitored every 3 months for the first 12 months and every 6 months thereafter;
- Re-vegetated areas showing inadequate surface coverage (less than 30% within 9 months after re-vegetation) should be intensely managed to improve scratcher-vegetation;
- All seeded, planted or sodded grass areas and all shrubs or trees planted are to be irrigated at regular intervals;
- Where herbicides are used to clear vegetation, species-specific chemicals should be applied to individual plants only. General spraying should be strictly prohibited;
- All horticultural activities should meet the following requirements:
  - o Activities must be limited to the building environs and certain landscaped areas;
  - o fertiliser, pesticide and herbicide use should be strictly controlled;
- Invertebrate pests should be controlled using the least environmentally damaging insecticides. Pyrethroids and Phenylpyrazoles are preferable to Acetylcholines. Insecticides that are specific to the pest (species specific) should be favoured. The lowest effective dosages must be applied. Supplier's advice should be sought. Fungal pathogens should be used in preference to chemical insecticides; and no dumping of any materials in undeveloped open areas and buffer strips (biological corridors) should be permitted. Activities in the surrounding open undeveloped areas must be strictly regulated.

12.1.2 WEEDS AND ALIEN VEGETATION

- The Contractor will be responsible for controlling any alien invasive species. The Contractor shall ensure that all weeds and alien invasive species are removed.
  - Alien management should be as per recommendation of the Alien Management Plan.
  - Ongoing monitoring must be undertaken for erosion and establishment of alien invasive plant species.
- If during the establishment period, non-indigenous weeds or other non-indigenous plants are present in the planted areas, such vegetation shall be removed by hand.
- The areas where alien vegetation must be removed:
  - Areas within the demarcated wider development footprint
  - If alien vegetation is currently used by people such as farm workers etc. for fire wood, then the vegetation may be left for this purpose.

12.1.3 SOIL STABILISATION & STOCKPILING

As several of the routes and access roads required for the construction of the power lines traverse steep slopes, exposed regions will remain vulnerable to erosion for the entire lifespan of the proposed development. As such, the following mechanisms and mitigation measures are to be employed for the construction and operation phases, in order to minimise this concern.

Control Structures:

The use of fibre rolls should be investigated for linear erosion control on each side of the access roads specifically, as this has been identified as one area where significant erosion may occur. Fibre rolls are composed of hessian bag material, straw or other suitable natural fibre material formed and compressed into a tubular shape. These structures, when placed into small dug depressions of 5cm deep and staked down with wooden stakes or dowel sticks, may allow for erosion control in regions of moderate rainfall. These materials are relatively inert, low cost, moderately biodegradable and allow water to pass through, while silt is held back. Placing these structured in short succession (2-5m apart) in very steep areas may assist in reducing the runoff and erosion experienced during rainfall events. An alternative to fibre rolls by the use of short (25cm tall), geotextile silt-fences, staked every three metres, placed on each side along access roads, for the length of the roads. These nets will capture windblown and waterborne soil up to knee height, and reduce wind and water erosion.

Monitoring:

As a basis for monitoring, it is essential to ensure that the erosion and sediment control measures are properly installed, well maintained and functioning as intended on a daily basis. A timely response by the contractor to any

noted deficiencies is highly important to prevent, minimise and control erosion, as well as demonstrating due diligence in compliance with regulatory requirements. A regular inspection program should be planned and implemented to determine when erosion control measures need maintenance and/or repair. Documentation of all inspections should be kept on site throughout the construction phase and at a minimum up to one year after the operation phase commences. To monitor, the ECO shall:

- Identify personnel: Names and contact information of project members assigned to each task.
- A communication protocol should also be developed to ensure effective reporting and compliance.
- Obtain construction drawings detailing the erosion and sediment controls installed, which must be updated through the construction period, and once at the commencement of the operational phase.
- High risk areas (such as areas with greatest gradient) should be identified on these drawings and routinely evaluated.
- Conduct visual inspections of the erosion control mechanisms, to indicate regions where measures any have failed and are in need of repair, or where installation was unsatisfactory and requires redoing.
- Should a large storm event be anticipated, monitoring should commence as soon as possible and damage repaired prior to the event, if possible.
- All damaged erosion control measures should be repaired and/or replacement within 48 hours of the inspection.

Monitoring frequency shall be:

- On a weekly basis;
- After every rainfall event;
- Daily during extended rainfall periods.

Mitigation measures:

- Soil stockpiles during the construction phase should be placed in such a manner that natural drainage pattern is not disrupted (i.e. no stockpiles should be located in or adjacent to any seepage or drainage areas);
- Topsoil stockpiles older than six months should be enriched prior to use in rehabilitation activities to ensure the effectiveness of the topsoil;
- No imported soil material should be used on the property, unless it can be ensured that it is free of exotic and alien vegetation seeds;
- Where necessary, appropriate dust suppression techniques should be employed, such as regular watering of exposed areas and stockpiles;
- It is recommended that exposed areas of soil be stabilised as soon as possible, either through appropriate surfacing (e.g. roads) or through landscaping (e.g. servitudes, etc.); and
- It is recommended that topsoil be stockpiled separately to subsoil for use as the final soil layer during rehabilitation.
- The natural topography of the site should, as far as possible, be maintained during and after construction (i.e. indiscriminate levelling or elevating of the site should be avoided);
- Where any additional slope elevation has occurred this must be levelled and contoured to reduce the slope as well as erosion potential while un-vegetated.
- In the case of surface wash-away or wind erosion, the Contractor shall implement remedial measures as soon as possible in order to prevent further erosion;
- Appropriate erosion control/ soil stabilisation measures are to be implemented;
- During construction the Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas.
- Any runnels or erosion channels developed during the construction period or during the vegetation establishment period shall be backfilled and compacted by the Contractor, and the areas restored to a proper condition;
- Installing silt fences wherever surface runoff is likely to occur;

- Additional stabilisation of cleared areas to prevent and control erosion must be actively managed. The method of stabilisation should be determined in consultation with the ECO and Project Manager. The following methods (or a combination) may be considered, depending on the specific conditions of the site:
  - Brushcut packing
  - Mulch or chip cover
  - Straw stabilising (at the rate of one bale/m² and rotated into the top 100mm of the completed earthworks)
  - Watering
  - Planting / sodding
  - Hand seeding
  - Hydroseeding
  - Soil binders and anti-erosion compounds
  - Mechanical cover or packing structures:
    - Geofabric
    - Hessian cover
    - Armourflex
    - Log / pole fencing
    - Retaining walls
- Traffic and movement over stabilised areas is to be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ECO;
- Anti-erosion compounds, consisting of an organic or inorganic material, may be employed to bind soil particles together. Products used must be proven able to suppress dust and erosion; and
- Areas to be landscaped that have been compacted to the development activity must be ripped and seeded.
- Wind screening and stormwater control should be undertaken to prevent soil loss from the site.
- All erosion control mechanisms need to be regularly maintained.
- Retention of vegetation where possible to avoid soil erosion
- Vegetation clearance should be phased to ensure that the minimum area of soil is exposed to potential erosion at any one time.
- Re-vegetation of disturbed surfaces should occur immediately after the construction activities are completed.
- No impediment to the natural water flow other than approved erosion control works is permitted.

12.1.4 MONITORING

A monitoring programme shall be put in place not only to ensure compliance with the approved site EMPr throughout the construction phase, but also to monitor any environmental issues and impacts which require attention over the vegetation establishment phase, post construction.

An ECO must be appointed to ensure compliance with the EMPr and to carry out monitoring activities, which may be required on an annual or biannual basis for the lifespan of the wind farm.

12.2 SEARCH AND RESCUE PLAN

A search and rescue plan shall be developed prior to the commencement of the construction phase to manage the impact of the proposed development on plant species.

Threatened and Protected Species are protected and regulated by the National Environment Management: Biodiversity Act (10 of 2004), Northern Cape Conservation Ordinance of 1974, the Nature and Environmental Conservation Ordinance 1974 and Western Cape Nature Conservation Laws Amendment Act of 2000.

The following measures must be taken to finalise the search and rescue plan:

8 Prior to commencement of construction, a final site walkthrough will be undertaken by an ecologist to record the presence of any species of conservation concern within the final footprint of all infrastructure including pylon positions, substation and any access roads.
9 The final site walkthrough shall be undertaken during the wet seasons, typically August and September in order to locate and identify all listed and protected species within the footprint.
10 The mitigation hierarchy that shall be applied must strive to move/ microsite the infrastructure to avoid the species. Due to various constraints, avoidance might not be feasible. If avoidance is not possible and plants species would be impacted, the ecologist will consider translocation of the plants.
11 A plan shall be prepared detailing the number of plants per species, the locations of the suitable plant species that are candidates for translocation, the area where the plants must be translocated to and any further mitigation measures to ensure successful translocation.
12 It should be noted that not all species are necessarily good candidates for translocation. However, the plan shall strive to allow for maximum transplantation of conservation important species.
13 Any further mitigation and monitoring measures to be implemented during the construction and operational phases will be included in the updated EMPr.

The relevant permits will be applied for prior to undertaking any activities that could impact on Threatened and Protected Species.

12.3 ALIEN VEGETATION MANAGEMENT PLAN

12.3.1 BACKGROUND AND LEGISLATIVE FRAMEWORK

The DFFE manages Invasive Alien Species under the National Environmental Management: Biodiversity (NEMBA) Act 10 of 2004. In addition, this regulation published in the Government Gazette on 1 August 2014, stipulate categories for the classification of invasive potential (and thus risk), of the different known problem species in the country. These classes loosely model that of Henderson (2001), which provides the invasive status classification, as outlined in the Conservation of Agricultural Resources Act (No. 43 of 1983a). These plants can be classified as Category 1, 2 or 3 species, and as a 'Declared Weed' or 'Declared Invader' according to their level of invasiveness in South Africa. The description of the abovementioned classifications are:

- **Category 1a**: invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway. Category 1a species include, for example, the yellow water lily (Nuphar lutea), yellow flag (Iris pseudocorus), bur cactus (Opuntia salmiana), hop wattle (Acacia stricta) and kangaroo wattle (Acacia paradoxa).
- **Category 1b**: Invasive species that may not be owned, imported into South Africa, grown, moved, sold, given as a gift or dumped in a waterway.
- **Category 2** plants: (Commercially used plants) may be grown in demarcated areas providing that there is a permit and that steps are taken to prevent their spread
- **Category 3** plants: (Ornamentally used plants) may no longer be planted; existing plants may remain, as long as all reasonable steps are taken to prevent the spreading there of, except within the floodline of watercourses and wetlands
- **Declared weed** (category 1): Prohibited on any land or water surface in South Africa, Must be controlled, or eradicated where possible (except in biological control reserves)
- **Declared invader** (category 2): Allowed only in demarcated areas under controlled conditions, Import of propagative material and trading allowed only by permit holders, Outside demarcated areas must be controlled, or eradicated where possible (except in biological reserves), Prohibited within 30 m of the 1:50 year floodline of watercourses or wetlands unless authorization obtained.

— **Declared** invader (category 3): No further plantings allowed (except with special permission), No trade of propagative material, Existing plants may remain but must be prevented from spreading, Prohibited within 30m or the 1:50 year floodline of watercourses or wetlands, or as directed by the executive officer.

It is essential that alien invasive species be removed from the study area. Following the Working for Water guidelines for effective alien vegetation removal (DWAF, 2009), this alien removal programme should consist of the following three phases:

1. Initial control: Clearing and eradication of alien invasive stands so as to drastically reduce the existing population. This control is conducted at the onset of the construction phase;
2. Follow-up control: Control of re-growth (including seedlings, root suckers and coppice growth); which should be conducted annually for the first 5 years of operation, 6-monthly for the construction period;
3. Maintenance control: Sustain alien plant numbers with on-going annual monitoring for the life of the project, and if necessary implement additional control methods to avoid re-establishment of alien invasive stands.

12.3.2 POTENTIAL ALIEN INVASIE PLANT SPECIES ON SITE

A few alien plant species were recorded on-site, which require management. These species are indicated in the below, with their common names and their risk classification.

Species name	Common name	Classification
Prosopis spp.	Mesquite	1b species in Western Cape, category 3 in the Northern Cape
Bromus spp.	Cheat grass / ripgut	Naturalised invader, not listed
Lolium spp.	Perennial rye grass	Naturalised invader, not listed
Avena fatua	Wild Oat	Naturalised invader, not listed
Salsola kali	Tumbleweed	1b
Dittrichia graveolens	Stinkwort	Naturalised invader, not listed
Amsinckia retrorsa	Rigid fiddleneck	Naturalised invader, not listed
Conyza bonariensis	Hairy Fleabane / Horseweed	Naturalised invader, not listed

12.3.3 GENERAL MEASURES TO REDUCE INVASION OF ALIEN SPECIES

— Cuttings must be burnt in an open clearing where the risk of spreading fire is minimal, in order to kill the seeds on the plants.
— Should any invasive Acacia species be present on site, burning shall not be applied.
— Follow up to cleared site must be conducted every three months to remove upcoming seedlings.
— In cases where large scale alien plant removal has been conducted, measures to stabilise the soil from wind and water erosion must be taken. Soils may be mulched and planted with indigenous pioneer species.
— Continued monitoring throughout the life of the project will be required as the risk of alien plant species invasion is never eliminated.
— Limit access roads to as few as possible, utilising existing tracks where feasible.
— Ensure specific areas for turning are provided for heavy vehicles so that unnecessary vegetation disturbance is minimised.
— Employ locally sourced soil for construction as far as possible, in order to limit the import of seed-laden soil from other parts of the country.
— Prioritise containment of existing invasions (in terms of area covered) over larger invasions.

Containment is the goal.

- Prioritise sparse populations of existing aliens (in terms of density) over that of dense populations. Limiting spread is the goal.
- Identify and plan control and monitoring efforts to aid one another.
- Train staff in invasive species spread and control efforts during induction training, to increase awareness surrounding the issue.

Control operations shall be conducted with the following frequency on a needs basis determined through monitoring (see below):

- *Initial control*: Once upon commencement of construction
- *Follow up control: once every three months for the entirety of the construction period. Annually for the first 5 years of the operational period.*
- *Maintenance control*: Conducted annually for the operational phase, and once every three months for the decommissioning and rehabilitation phase.

Monitoring operations shall be conducted with the following frequency:

- Initial control inspection: Once prior to construction commencing, encompassing the whole site (where disturbance will occur, i.e. on the layout footprint). A post-clearance inspection must also be conducted within one week of the clearing operation, to ensure the operation was effective and to identify regions for future clearing.
- Follow up inspections: Once every three months, to identify problematic areas or regions where growth has started to take hold again, and to ensure easier control of the newly emerged seedlings or herbs.
- Maintenance control: Once an area has been cleared of 95% of the invasive species, it is deemed under maintenance. Control actions for these regions should occur annually, or sooner if required. Monitoring must occur once every 6 months to ensure all areas remain under maintenance conditions.
- Decommissioning monitoring: Due to elevated disturbance occurring during decommissioning, monthly inspections are required for the duration of this phase. These inspections will help identify areas of new growth that may become problematic after closure, and as such early action can be taken.

12.3.4 WEED REMOVAL (INITIAL CONTROL PROGRAMME)

There are a number of possible methods which can be used to control alien invasive species; these include mechanical, chemical and biological control. The sections below outline possible techniques used in mechanical and chemical control methods. Table 12-1 (below) outlines specific management details for each of the alien invasive species identified on site.

As the species identified in the ecological report for this region include mainly grasses and herbs, mechanical clearing methods are limited in efficacy. Cut stump and frill treatments are also traditionally reserved for woody plant species, and as such are not applicable in the treatment of species found in this particular instance.

According to Todd (2011), mowing, fire, herbicide application and grazing are the four general categories of grass control in South Africa. Fire and mowing are difficult practically for control, as it means that natural vegetation will suffer if not applied correctly. Often, circumstances do not allow for successful physical control of the region, and the only available option is herbicide application. Due to the good condition of the study area, with mainly natural vegetation of similar height to that of the invasive grasses (i.e. roughly knee height), mowing and fire are not practical options. Especially in the light of fire tolerance and fire adapted grass species, such as Avena spp., for which fire may actually increase the reproductive potential of the species. It is for this reason that chemical control is the primary suggested control method for invasive alien species in the study area. Fire and mowing are not discussed, as they are not regarded feasible for the existing land use and for the effective control of the herbs.

Mechanical Control Methods

Mechanical methods for alien plant removal may include felling, removing or burning invading alien plants. The following mechanical methods for felling are recommended:

- Hand pulling: Grip the young plant low down and pull out by hand (using gloves).

- Ring barking: Bark is removed to from the bottom of the stem to a height of 0.75-1.0 m to below ground level. Bush knives or hatchets can be used for debarking.
- Frill or Ring-bark: Using an axe or bush knife, angled cuts are made downward into the cambium layer through the bark in a ring; herbicide is applied into the cuts.
- Cut stump treatment: Stems should be cut as low as practical as stipulated on the herbicide label. Chemical herbicides are applied in diesel or water as recommended. Applications in diesel should be to the whole stump and exposed roots and in water to the cut area as recommended on the label.

Chemical Control Methods

Chemical methods for alien plant removal include using a number of approved environmentally safe herbicides, which are applied to the leaves, stems or stumps of alien invader species (details of herbicides suitable for the various species are provided in **Table 12-1**).

Table 12-1: Summary of methods to be used for removal of alien invasive species identified on site

SPECIES NAME	HAND PULL OR HOE*	HERBICIDE
Prosopis spp.	Seedlings and samplings	The chemical and mechanical control of Mesquite has been found to be unfeasible financially, as control costs outweigh property values (Zachariades, Hoffman & Roberts 2011). As such, biological control is suggested, under supervision of the Agricultural Research Council (ARC), employing approved insects. Should smaller populations occur on site, mechanical clearing of new growth, coupled with regular herbicidal treatment should continue until populations are at maintenance levels. Cut stump treatment with Picloram has been shown to be effective in SMALL populations in the past. — Basal Bark/Cut Stump Treatment The basal bark application of usually 'Garlon 600' mixed in diesel onto the bark from ground level to knee height all the way around the Stem, during the active growing season. Cut stump treatments on any size plant at any time of the year using similar herbicides are also useful. — Foliar (Overall) Spray Treatment Foliar sprays are best applied on dense thickets of seedlings less than 1.5 metres tall. The plants must be actively growing with a large area of foliage. A wetting agent must be added to the mix. Garlon, Grazon DS and Access are all herbicides that can be used.
Bromus spp.	Seedlings or entire plant	According to CABI (2016), a range of herbicide treatments has been successfully used for control of B. diandrus in South Africa: In cereals, pre-emergence applications of cyanazine + terbuthylazine, chlorsulfuron + terbuthylazine, and metribuzin (Dastgeib et al., 2003) or post-emergence applications of clethodim, haloxyfop (Nott, 2002); or sulfosulfuron (Agenbag and Crous, 1999). In legumes, post-emergence treatments fluazifop, quizalofop (le Roux et al., 1995) and simazine + paraquat (Leys and Plater, 1993).
Lolium spp	Seedlings or entire plant	Foliar application during the active growing season of tepraloxydim (cyclohexanone) 50 g / L (Aramo® herbicide).
Avena fatua	Seedlings or entire plant	Pre-emergent soil application of Pyroxasulfone (Pyrazole) 850 g/kg (Sakura® herbicide). Care must be taken to not spray soil outside of the edges of current infestations, and to reduce spray drift and unintended exposure to other plants.
Salsola kali	Seedlings or entire plant	Nicosulfuron (sulfonyl urea) 750 g/kg (Accent®) as foliar spray, post-emergence. Contains 720 g / ℓ dimethenamid-P (Frontier® Optima) for pre-emergence application. Care must be taken to not spray soil outside of the edges of current infestations, and to reduce spray drift and unintended exposure to other plants.

SPECIES NAME	HAND PULL OR HOE*	HERBICIDE
Dittrichia graveolens	Seedlings or entire plant	The salt formulation of triclopyr (Garlon 3A®) in a post-emergence, foliar spray application while plants are still young. Waxes on mature leaves create uptake problems, and as such earlier control efforts will be more effective. For Stinkwort, this is generally just before or at the time of bolting. Triclopyr is selective and relatively safe on grasses, and may be also be used. Glyphosate (Roundup Pro) may also be used.
Amsinckia retrorsa	Seedlings or entire plant	Glyphosate (Round-Up Biactive®, Weedmaster Duo® (360 g/L); Metsulfuron-methyl (Brush-Off®, Associate ® (600 g/Kg)) or Metsulfuron-methyl + glyphosate (Trounce®, Cut-Out® (various formulations), applied during the active growing season. Different application rates are suggested for different size target plant. Further reading available at http://dpipwe.tas.gov.au/invasive-species-site/Pages/Amsinckia---Herbicides-for- Control.aspx
Conyza bonariensis	Entire plant	MCPA® and Sorgomil Gold 600®, or paraquat and glyphosate based products (though resistance has been shown). Treat plants using foliar spray soon after bolting.

*Avoid mechanically clearing during dry periods or when plants are desiccated, in particular tumbleweed. This is primarily due to the seed dispersal mechanisms for most grasses and tumbleweed being through dessication and wind-blow dispersal. Control should be focussed on new growth using chemical means, as more uptake will occur and greater absorption will lead to greater efficacy.

12.3.5 VISUAL MANUAL FOR ALIEN-INVASIVE PLANT SPECIES IDENTIFICATION

The following plates provide a guide to the alien invasive plant species found within the power line project site. Each species is described in terms of how it looks, timing of flowering and/or fruiting.

PROSOPIS SPP. (Mesquite)

Scientific name	*P. glandulosa var. torreyana (honey mesquite) and P. velutina* (velvet mesquite)
Common name(s)	Mesquite
Description	*Prosopis glandulosa* exhibits drooping branches with feathery foliage and straight, paired spines. The species can grow up to 15 m, at a medium growth rate.
Leaves	Leaves are deciduous, twice compound, bright-green and feathery, with leaflets up to 5cm long and 7cm wide.
Flowers	Flowers have pale, yellow, elongated spikes with straight, yellow seedpods.
Fruits	Fruit display a long, yellowish brown pod at maturity, somewhat flattened and with slight constrictions between the seeds

	
Proposed control methods	
Seedlings	Hand pull or hoe over small areas
Mature or large plants	Foliar spray Cut stump and herbicide Biological control (should only be conducted in cooperation with the department of agriculture).

(Pictures source: Wikipedia, 2016).

BROMUS SPP. (Ripgut)

Scientific name	*Bromus diandrus*
Common name(s)	Ripgut
Description	B. diandrus is an annual tufted grass with unbranched culms, occurring throughout much of the western cape, and southern part of the Northern Cape, flowering from September to January.
Leaves	Great brome leaves are rough, hairy, dull and often have visible purple stripes along the leaf veins. The leaf sheath is tubular, the ligule is prominent and membranous, and the stems are hairy
Flowers	Flowers are a loose, nodding panicle with long stalked spikelets
Fruits	

	
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

LOLIUM SPP. (Perennial rye grass)

Scientific name	Lolium perenne
Common name(s)	Perennial ryegrass
Description	The plant is a low-growing, tufted, hairless grass, with a bunching
Leaves	The leaves are dark green, smooth and glossy on the lower surface, with untoothed parallel sides and prominent parallel veins on the upper surface. The leaves are folded lengthwise in bud or rolled (Lolium multiflorum), and has an overall flat appearance. Leaf sheaths at the base are usually tinged pink and hairless. Stems grow up to 90 cm. (Wikipedia, 2016)
Flowers	The inflorescence is unbranched, with spikelets on alternating sides edgeways-on to the stem
Fruits	The anthers are pale yellow. Perennial ryegrass has a fibrous root system, with thick main roots and thinner lateral branches. Roots are usually arbuscular mycorrhizal. (Wikipedia, 2016)

 Source: www.horsedvm.com, 2016	 Source: S. Navie, Biosecurity Queensland (2016)
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

AVENA FATUA (wild oat)

Scientific name	*Avena fatua*
Common name(s)	Wild oat
Description	A. fatua is an annual tufted grass with erect culms, varying from 25 to 120 cm. (CABI, 2016)
Leaves	Leaf blades are dark green, up to 40 cm long and with a membranous ligule, which is 1 to 6 mm long and often irregularly toothed. Sheaths are smooth or slightly hairy, especially in younger plants. (CABI, 2016)
Flowers	The inflorescence of A. fatua is a loose, open panicle with 2 to 3- flowered pedicelled spikelets. (CABI, 2016
Fruits	Grains are 6 to 8 mm long.

 Source: S. Navie, Biosecurity Queensland (2016)	 Source: S. Navie, Biosecurity Queensland (2016)
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

SALSOLA KALI (common saltwort)

Scientific name	*Salsa kaoli*
Common name(s)	Common saltwort
Description	S. kali is a low herb, 5-50 cm tall, papillose to hispid or, occasionally, glabrous. Stems are erect to ascending, branching from the base (CABI, 2016).
Leaves	Leaves are alternate with linear blades, roughly 1-2 mm wide, fleshy, usually not swollen at base, apex acuminate, forming a firm spine, 1-1.5-2.2 mm long. (CABI, 2016)
Flowers	Flowers with bracteoles free or becoming connate and adnate to perianth base; perianth segments with comparatively narrow wing, or in lower flowers occasionally wingless, with weak or firm, acute apex, glabrous; fruiting perianth 4-6(-8) mm diameter" (CABI, 2016)
Fruits	Inflorescences interrupted at maturity, usually 1-flower per axil of bract; bracts alternate, not imbricate at maturity, reflexed, not distinctly swollen at base, apex narrowing into subulate spine" (CABI, 2016).

 Source: www.invasives.org.za, 2016	 Source: Eattheweeds.com, 2016
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

DITTRICHIA GRAVEOLENS (Stinkwort)

Scientific name	*Dittrichia graveolens*
Common name(s)	Stinkwort
Description	Dittrichia graveolens is a branching subshrub, growing to 130 cm tall, with a pungent smell. (Wikipedia, 2016)
Leaves	Leaves are long and narrow, pointed at each end, with small teeth along the edges and glandular hairs on the surfaces (Wikipedia, 2016).
Flowers **Fruits**	One plant can produce numerous yellow flower heads with as many as 16 ray florets and 40 disc florets (Wikipedia, 2016).
 Source: mundaringps.wa.edu.au (2016)	 Source: Wikipedia (2016
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

AMSINCKIA RETRORSA (Rough Fiddleneck)

Scientific name	*Amsinckia retrorsa*
Common name(s)	Rough fiddleneck
Description	Rigid fiddleneck is a colourful annual and weed. Plants have erect, simple to few-branched stems from 10- 100 cm high. The stems are covered with long, spreading, stiff hairs with and undercoat of shorter, softer hairs that point downwards. (http://science.halleyhosting.com/, 2016)
Leaves	The leaves are linear to linear-oblong in shape, measuring up to 12 cm long and up to 1 cm wide. The herbage of the leaves is similar to that of the stems, but the hairs may be more appressed. The basal leaves are more numerous and crowded, while those of the stems are more widely spaced and are reduced in size. (http://science.halleyhosting.com/, 2016
Flowers **Fruits**	The inflorescence consists of a scorpioid spike which uncoils and elongates with age. The 5 sepals are generally equal in size and shape and measure from 5-12 mm long. Individual sepals are linear to linear-lanceolate in shape and measure from 7-10 mm long. The corolla consists of a tube from 5-8 mm long that is barely exserted from the calyx while the limbs or lobes of the corolla range from 1.5-5 mm long. The corolla is typically orange or orange-yellow with reddish markings in the open throat (http://science.halleyhosting.com/, 2016)
 Source: www.tss.oregonstate.edu, 2016	 Source: malag.aes.oregonstate.edu, 2016
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

CONYZA BONARIENSIS (Hairy fleabane)

Scientific name	*Conyza bonariensis*
Common name(s)	Hairy fleabane
Description	"*C. bonariensis* is an erect annual with one or more stems from a basal rosette, up to 60 cm or occasionally 100 cm in

	height. All parts of the plant are finely pubescent and greyish in colour." (CABI, 2016)
Leaves	"Leaves linear to oblanceolate, mostly about 5 mm wide, entire, but often wavy-edged, with very short or hooked hairs less than 0.5 mm long." (CABI, 2016)
Flowers	The inflorescence has long branches resulting in an almost corymbose effect, with most flowering heads about the same level. Individual flower heads are greyish-green, 4-5 mm diameter when fresh (broader in pressed specimens) with cream-coloured disc florets and no ray florets. (CABI, 2016)
Fruits	
 Source: iSpot.co.za, 2016	 Source: www.roundthebend.org.au, 2016
Proposed control methods	
Seedlings	Hand pull or hoe over small areas Foliar spray
Mature or large plants	Foliar spray Mowing at selective growth stages

12.3.6 MONITORING

Due to their persistent nature and prodigious seeding and reproduction, invasive alien plants require coordinated, consistent monitoring and control efforts. For this project, where invasive species are mainly located along already disturbed regions such as farmsteads, roads, cattle feedstock's, pens, and farm dams, the monitoring efforts should be focussed on these areas. This is especially important as the majority of the project region is currently under good, natural veld with little invasion. Monitoring should be conducted by the ECO (contractually), and ESCO (incidentally, or on an ad-hoc basis). The ECO should familiarise himself/herself with the identification of the species mentioned above, and be able to identify them in-field. Should any doubt exist, a professional botanist should be consulted in order to ensure the ECO is able to identify these species accurately.

The ESCO shall survey all high priority regions (disturbed areas) every two weeks throughout the construction phase, and include in his monthly report finding from these surveys. The objective will be to identity the presence of absence of target species on-site, and to identify the efficacy and ongoing clearance control offered by the methods mentioned above. New occurrences of problem species must be noted for clearance, and included in the clearing teams' objective for clearing to commence within two weeks of positive identification.

During the operation phase, monitoring may be relaxed to a once every six months event, where surveys for all disturbed regions (i.e. all regions cleared and frequented by the construction efforts) is to be conducted. Findings shall be captured yearly and included in the rehabilitation reporting.

Reports should be made available upon request.

12.3.7 GENERAL CONTROL EFFORTS

In general, control efforts must:

- Avoid fire as a clearing / control method;
- Avoid mowing as a clearing / control method;
- All biocontrol measures must be conducted in consultation with the Plant Protection Research Institute (DoA – Pretoria), in order to ensure the correct agent is being employed, and the region isn't at risk.
- A clearing roster must be drawn up by the ECO and approved by the developer prior to clearing commencing, in order to allow for a work schedule for all invasive species occurrences on-site. This roster will be updated as clearing occurs and new instances are observed. This roster will be used to track progress and act as proof of clearing conducted;
- Prioritise small populations over large populations;
- Prioritise less dense infestations to denser infestations;
- Ensure clearing of fringes of existing populations prior to the clearing of the centre (i.e. outside inward, not inwards to the outside clearing);
- Ensure all control teams are equipped with the appropriate Protective wear and do not conduct work without them on;
- Apply herbicide to plants at new growth, as opposed to mature plants (this improves uptake);
- Ensure the correct herbicide is selected for each species, and the correct dosage is used.

Dosage must at all times follow that of the label;

- Ensure the correct clearing method is selected and used for each species;
- Clearing must be conducted every three months for herbaceous species, and once every six months for Mesquite. Once maintenance levels have been achieved, clearance may occur annually for the duration of the operation phase.
- Should these clearing methods above prove ineffectual, a professional clearing organisation or botanist (Working for Water, or the City of Cape Town invasive Species Unit) must be approached for a species-specific management plan, to be followed for each species.

12.4 TRAFFIC MANAGEMENT PLAN

A management plan has been included in Appendix C and additional mitigation measures are included in this section to ensure traffic is managed.

12.4.1 INTRODUCTION

The purpose of this plan is to ensure that traffic management is undertaken in a safe and efficient manner in order to avoid negative traffic impacts under routine and non-routine circumstances. The requirements presented in this plan shall apply to all construction personnel.

12.4.2 COMPLIANCE WITH TRAFFIC RULES

The following measures must be implemented:

- A Traffic Control Officer or Officers must be appointed.
- All construction vehicles and vehicles associated with the project must comply with the relevant traffic and transport licencing requirements.
- Operators and drivers must have the relevant licences / permits to operate the vehicles.
- All contractors and construction vehicles must comply with traffic rules on public and other roads within the project area.
- Where construction will obstruct existing access alternative temporary access routes must be provided.

- Arrangements for abnormal loads to be authorised by the relevant authorities, and the local population to be informed of routes and times of deliveries.
- A disciplinary procedure to address incidents of speeding or other traffic offences by site personnel and subcontractors, including the possibility of dismissal for repeat offences.
- A procedure to monitor the loads of vehicles to ensure adherence to statutory load restrictions, and for dealing with transgressions of vehicle loading limits.

Traffic safety procedures, transport routes and construction schedules intended to be applied during the construction phase must be in consultation with members of the local community, the local authority and affected landowners prior to the common concrete of construction activities. The scope of such engagement should include the designation of routes for construction vehicles, procedures for complaints and emergency procedures shall be concluded in consultation with local community members, affected land owners and local emergency and traffic authorities. In this regard, appropriate measures shall be taken to ensure that:

- The routes used by construction vehicles (as far as possible) avoid areas of high pedestrian traffic;
- Adequate signage is used to warn local community members of hazards (e.g. site access, construction vehicles turning);
- Information dissemination and awareness is conducted to inform community members of increased traffic risks and appropriate precautionary measures; and
- Community members are aware of the Contractors' construction (and delivery) schedules.

12.4.3 TRAFFIC SIGNAGE

Traffic signage is to be securely erected at appropriate points (ensuring visibility) along all access roads and public roads (in consultation with the relevant traffic authorities) to indicate the following:

- Road hazards such as blind corners or loose gravel;
  - appropriate speed limits;
  - turning traffic;
  - the Site access;
  - routes to be used by construction vehicles, where appropriate; • that caution should be taken by motorists or pedestrians;
  - no-go areas for vehicles; and
  - any relevant traffic control information

12.4.4 ROADS

- All access roads must be clearly demarcated and "No Entry" signs must clearly indicate those roads that are not to be used by contractors or delivery vehicles.
- Make use of existing roads and tracks where feasible, rather than creating new routes.
- Routes should not traverse slopes with gradients in excess of 8%. Where this is unavoidable the road surface must be stabilised using methods approved by the Engineer.
- Avoid routes through drainage lines and riparian zones wherever possible. Where access through drainage lines and riparian zones is unavoidable, only one road is permitted, constructed perpendicular to the drainage line. Avoid roads that follow drainage lines within the floodplain.
- Allow for safe pedestrian crossing where necessary.
- All the necessary temporary road traffic signs should be erected to ensure safe traffic flow conditions.
- Where temporary road closures are necessary the dates and durations of the closures must be signposted well in advance at the entrances and exits of the affected roads, and alternative routes clearly indicated.

12.4.5 ROAD MAINTENANCE

- A procedure for reporting and addressing hazards, accidents and other emergency situations shall be established by the Project Manager and implemented.
- Clean and make good any damage to private roads caused by the Contractor during the construction phase.
- Should any damage occur on private access roads that will not be upgraded during the construction phase, these roads must be rehabilitated to a pre-construction state.
- Dust suppression on gravel roads and control of material being transported to and from the site must be managed to reduce the impact of dust to surrounding landowners.
- The provincial roads department must be informed of any damage to public roads that occurs as a result of use by construction traffic.
- Where possible, existing roads on Site shall be used as access roads.
- Maintain all access routes and roads adequately in order to minimise erosion and undue surface damage.
- Repair rutting and potholing and maintain stormwater control mechanisms.
- Spillages of materials on public roads must be cleaned up immediately they occur.

12.4.6 PROJECT VEHICLES

- Deliveries of normal load construction materials to the site, should, as far as possible, be scheduled to avoid peak hours to reduce the hourly volumes of heavy traffic.
- Enforce speed limits at all times on site roads. The movement of construction vehicles shall not be undertaken during peak morning and afternoon traffic times so as to avoid causing an impact on commuters. Materials and labour shall, as far as possible, be sourced locally in order to minimise transport related impacts and transport safety risks.
- Vehicles may not leave the designated roads and tracks and turnaround points must be limited to specific sites.
- The movement of all vehicles within the Site must be along designated roadways.
- Restrictions on the times at which heavy vehicles are permitted to travel on public roads. As far as possible heavy traffic should avoid morning and evening peak traffic periods. Heavy vehicles should as far as possible travel on public roads only during weekdays. High volumes of heavy vehicles should be avoided on Saturday mornings, and no heavy vehicles should travel on public roads on Saturday afternoons, all day Sunday and on public holidays unless approved by the relevant transport authorities.
- Abnormal loads must, as far as possible, be scheduled to avoid peak hours, to minimise disruption to peak-hour traffic.
- The contractor must provide high-occupancy transport for as many of its workers as possible to reduce the number of peak-hour vehicle trips.

12.4.7 VEHICLE MAINTENANCE

- All vehicles and machinery used during the Project shall be regularly maintained and repaired where necessary.
- Passenger vehicles must be inspected on a regular basis to ensure that they are in good working order and are not overloaded.

12.4.8 TRANSPORT OF CONSTRUCTION EQUIPMENT AND MATERIALS

- Construction equipment and materials must be properly secured to / contained in the appropriate vehicle.
- The weight bearing capacity of construction vehicles must be adhered to.

12.4.9 PASSENGER SAFETY

- The carrying capacity of passenger vehicles must be adhered to;
- No employee shall be transported on the back of open trucks;
- Assembly points for construction workers to be located in a safe area (reasonable distance from high volume traffic or danger zones);
- The contractor is to conduct vehicle and passenger safety training, emphasizing any risks/dangers of construction traffic and explain precautionary measures to be taken.

12.5 FIRE MANAGEMENT PLAN

The Contractor shall take all the necessary precautions to ensure that fires are not started as a consequence of his activities on site. The Contractor, sub-contractors and all employees are expected to be conscious of fire risks. The Contractor shall hold fire prevention talks with staff to create an awareness of the risks of fire. Regular reminders to his staff on this issue are required.

12.5.1 FIRE PREVENTION

- A fire officer is to be appointed by the contractor;
- “No-smoking” signs to be placed in areas used for storage of oil and fuel;
- Basic fire fighting equipment shall be readily available on site;
- Employees shall be made aware of the procedures in the event of a fire;
- Smoking shall only be permitted in designated smoking areas. Fire extinguishers will be available in these areas at all times;
- Prevention of runaway fires by keeping vegetation short in working areas;
- Ensure that no fires are lit close to the natural bush or plantations;

12.5.2 FIRE CONTROL

- The Contractor shall take all the necessary precautions to ensure that fires are not started as a result of his activities on site. If any fires occur the Fire Department of the nearest municipality should be notified;
- All fires must be prohibited on site and only designated cooking areas will be allowed where fire-fighting equipment is available;
- Any fires that occur shall be reported to the ECO immediately who will then liaise with the local Fire Protection Agency;
- Fires and fire hazards need to be managed appropriately. Smoking should only be allowed in a designated area where a fire hydrant is available;
- The Contractor shall appoint a Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed;
- The Contractor shall forward the name of the Fire Officer to the ECO for his approval within 7 days of being on site;
- The Contractor shall ensure that there is basic fire fighting equipment available on site at all times. This shall include at least rubber beaters when working in urban open spaces and natural areas, and at least one fire extinguisher of the appropriate type when welding or other “hot” activities are undertaken;
- The Contractor shall be liable for any expenses incurred by any organisations called to assist with fighting fires that were started as a result of his activities or personnel, and for any cost relating to the rehabilitation of burnt areas, or consequential damages.

12.5.3 EMERGENCY PROCEDURES

- The Contractor shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it;
- If any fires occur the Fire Department of the nearest municipality should be notified;
- Any fires that occur shall be reported to the ECO immediately who will liaise with the local Fire Protection Agency;
- The Contractor shall ensure that his employees are aware of the procedures to be followed in the event of a fire.
- Fire extinguishers to be serviced by an accredited service provider on an annual basis.

12.6 EROSION MANAGEMENT PLAN

12.6.1 PURPOSE

Exposed and unprotected soils are the main cause of erosion in most situations. The Erosion Management Plan addresses the management and mitigation of potential impacts relating to soil erosion. The objective of the plan is to provide:

- A general framework for soil erosion and sediment control, which enables the contractor to identify areas where erosion can occur and is likely to be accelerated by construction- related activities;
- An outline of general methods to monitor, manage and rehabilitate erosion prone areas, ensuring that all erosion resulting from all phases of the development is addressed.

12.6.2 EROSION AND SEDIMENT CONTROL PRINCIPLES

The goal of erosion control during and after construction within the study area should be to:

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

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

12.6.3 GENERAL EROSION CONTROL

The Contractor should take all reasonable measures to prevent soil erosion resulting from the construction activities as well as to prevent the restriction or increase in the flow of storm water caused by the presence of temporary / permanent works. Erosion prevention measures must be implemented to the satisfaction of the Engineer and the ECO. Areas affected by construction related activities must be monitored regularly for evidence of erosion. Areas particularly susceptible to erosion include areas stripped of topsoil and soil stockpiles and steep slopes (gradients > 6 %). Where evidence of erosion appears, the construction of contour berms, cut-off drains or planting of grass sods may be necessary. Where soil erosion does occur, the Contractor shall reinstate such areas and areas damaged by the erosion, at his own cost and to the satisfaction of the Engineer and ECO.

12.6.4 PREVENTATIVE MEASURES

- The Contractor is to provide a method statement on erosion control showing clearly how cleared surfaces and stormwater will be managed on site during construction and rehabilitation;
- Wind screening and stormwater control will be undertaken to prevent soil loss from the study site;
- All erosion control mechanisms will be regularly maintained;

- Re-vegetation of disturbed surfaces will occur immediately after the construction activities are completed;
- In the case of existing surface wash-away and wind erosion, the Contractor shall implement remedial measures as soon as possible in order to prevent further erosion;
- During construction, the Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in streams and from scouring the slopes, banks or other areas;
- Traffic and movement over stabilised areas is to be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the ECO

12.6.5 EROSION AND SEDIMENT CONTROL MEASURES

- Re-vegetate areas that have been disturbed as soon as possible;
- Cut and fill slopes must be made stable and be re-vegetated as soon as possible during the construction phase;
- Newly formed terraces within the facility must be vegetated in order to stabilise the soil;
- Where erosion and/or sedimentation, whether on or off the site, occurs despite the Contractor complying with the foregoing, rectification shall be carried out in accordance with details specified by the ECO;
- Where erosion and/or sedimentation occur due to the fault of the Contractor, rectification shall be carried out to the reasonable requirements of the ECO and at the expense of the Contractor;
- If the Site is closed for a period exceeding 5 days, the Contractor, in consultation with the ECO, shall carry out the following checklist procedure:
  - Excavated and filled slopes and stockpiles are at a stable angle and capable of accommodating normal expected water flows;
  - Re-vegetated areas have a watering schedule and the supply to such areas is secured.

12.7 HAZARDOUS SUBSTANCES PLAN

The special mitigation measures pertaining to the hazardous substance bunding and monitoring have been included in the construction and operation measures, contained in Chapter 11 of this report. However, in general, the contractor shall be responsible for the implementation of hazardous substance management measures, as detailed below. This plan therefore provides specific measures to control, monitoring and limit hazardous substance spillage and environmental damage resulting therefrom. The Project Manager shall ensure effective and accurate implementation of hazardous substance management, the ECO shall ensure compliance monitoring with below specifications and reporting thereon. The timeframe shall be the duration of the construction phase.

12.7.1 TRAINING

Ensure that all personnel that use or handle hazardous material are trained:

- In the use and potential dangers of the materials.
- To understand what a Materials Safety Data Sheet (MSDS) is, and be able to interpret the information thereon.
- On emergency response procedures required to counter the nature and hazards of an accidental release.
- The handling and storage practices, for all containers with which they will come into contact.

12.7.2 MATERIAL TYPES

- Use materials with low life cycle impact.
- Use materials with low embodied energy (i.e. materials that require less total energy to extract, manufacture, transport, construct, maintain and dispose of).
- Reduce materials containing volatile organic compounds and formaldehyde.

- Avoid xylene and toluene solvents in paints, glues and carpets as well as polyurethane.
- Where possible use water based paint.
- Do not use chlorofluorocarbons (CFCs), polychlorinated biphenyl (PCBs), persistent organic pollutants (POPs) (in pesticides), ozone depleting substances (ODSs) and materials containing asbestos.

12.7.3 CONTROL PLANNING FOR HAZARDOUS MATERIALS ON SITE

- Document the types and quantities of hazardous materials present on the proposed project site, including the following information:
  - Name and description (e.g. composition of a mixture) of the hazardous material.
  - Classification (e.g. code, class or division) of the hazardous material.
  - Regulatory reporting threshold quantity of the hazardous material.
  - Quantity of hazardous material used per month.
  - Characteristic(s) that make(s) the hazardous material hazardous (e.g. flammability, toxicity, etc.).
  - Analysis of potential spill and release scenarios using available industry statistics on spills and accidents where available.
  - Analysis of the potential for uncontrolled reactions such as fire and explosions.
  - Analysis of potential consequences based on the physical geographical characteristics of the site, including aspects such as its distance to settlements, water resources, and other environmentally sensitive areas.
- Identify locations of hazardous materials and associated activities on an emergency plan site map.
- Detail the availability of specific personal protective equipment and training needed to respond to an emergency.
- Detail availability of spill response equipment sufficient to handle at least initial stages of a spill and a list of external resources for equipment and personnel, if necessary, to supplement internal resources.

12.7.4 UNCONTROLLED RELEASES

- Prevent uncontrolled releases of hazardous material to the environment or uncontrolled reactions that might result in fire or explosion using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of the hazard.
- Implement management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented and controlled through engineering measures.
- Store all hazardous (reactive, flammable, corrosive and toxic) materials in clearly identified, fit-for-purpose containers or vessels.
- Clean any accidental spills immediately, and treat the spilled material and use cleaning products as hazardous waste.
- Describe response activities in the event of a spill, release, or other chemical emergency in an incident report that must include, inter alia:
  - Internal and external notification procedures.
  - Specific responsibilities of individuals or groups.
  - Decision process for assessing severity of the release, and determining appropriate actions.
  - Facility evacuation routes.
  - Post-event activities such as clean-up and disposal, incident investigation, employee re-entry, and restoration of spill response equipment.

12.7.5 REACTION, FIRE AND EXPLOSION PREVENTION

Reactive, flammable, and explosive materials must be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion. Such prevention practices include:

- Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas.
- Provision of material-specific storage for extremely hazardous or reactive materials.
- Use of flame arresting devices on vents from flammable storage containers.
- Storage of hazardous materials in an area of the facility separated from the main construction activities.

12.7.6 PLANNING COORDINATION

Procedures should be prepared for:

- Informing the public and emergency response agencies.
- Documenting first aid and emergency medical treatment.
- Taking emergency response actions.
- Reviewing and updating the emergency response plan to reflect changes and ensuring that the employees are informed of such changes.
- Using, inspecting, resting and maintaining the emergency response equipment.

12.7.7 STORAGE OF HAZARDOUS MATERIALS

- Locate chemicals stored in drums in areas with a secondary containment capacity of at least 10% exceeding of the maximum stored quantity of chemicals.
- Drum stack heights must not exceed two drum heights on pallets. All defective pallets must be replaced immediately. A minimum space of 80 cm must be left open between stacks and 100 cm between stacks and a wall.
- Chemical products must be secured when not needed to prevent tampering and vandalism.
- Provide warning notices, fire-fighting facilities and protection from weather damage.
- Keep products in their original containers unless they are not re-sealable, with all stored products and containers being labelled, and original labels and MSDS retained.
- Store acetylene, propane, and oxygen cylinders in dedicated areas where they will be protected from collision or ignition sources.
- Label containers so that the hazard nature of the material is clear.
- Ensure compliance with all national, regional and local legislation with regard to the storage, transport and use of hydrocarbons, chemicals, solvents, explosives and any other harmful and hazardous substances and materials.
- The Contractor must provide proof to the Project Manager that, if required, the relevant authorisation to store such substances has been obtained from the relevant authority. In addition, hazard signs indicating the nature of the stored materials must be clearly displayed on the storage facility or containment structure.
- Petrochemicals, oils and identified hazardous substances must only be stored under controlled conditions. All hazardous materials (e.g. bitumen binders) must be stored in a secured, appointed area that is fenced and has restricted entry. Storage of bituminous products must only be in suitable containers approved by the Project Manager.
- Keep a record of all hazardous substances stored on site for submission to the ESCO and fro verification to the ECO.
- Store all hazardous substances in secure, safe and weatherproof facilities, underlain by a bunded concrete slab to protect against soil and water pollution.

12.7.8 HANDLING OF HAZARDOUS MATERIALS

- Ensure that personnel who handle hazardous substances have been educated and trained in terms of the correct handling, use and disposal thereof.
- Empty containers in which hazardous substances were kept are to be treated as hazardous waste. Such containers must not be reused for any purpose.

- Obtain Material Safety Data Sheets (MSDS) for all hazardous chemical formulations before use and all materials must be handled according to the instructions.
- In response to and in addition to the information contained on the MSDS the following must also be determined:
  - What personal protective equipment (PPE) is required.
  - What emergency actions may be needed (i.e. first aid, firefighting media, etc.).
  - The weight of the container so that proper personnel and/or equipment will be utilised during handling.
  - Access and egress routes.
  - Containers holding flammable materials to be grounded during transfers of contents

12.7.9 TRANSPORT OF HAZARDOUS MATERIALS

- Provide for controlled loading/unloading areas, underlain by an impervious paving or PVC sheet to protect against soil and water pollution.
- All hazardous waste containers designated for off-site transport to be secured and labelled with the contents and associated hazards, be properly loaded and be accompanied by a shipping paper (i.e. manifest) describing the loads and its associated hazards.
- Transporters of hazardous materials must ensure that:
  - The vehicle is suitable and registered for the purpose it is being used.
  - The vehicle displays clear markings in English indicating the nature of the materials being carried, what to do in the event of an emergency, and an emergency telephone number (24 hour) of a responsible person who can provide advice in the event of an emergency.

12.7.10 DETECTION OF LEAKAGE OR SPILLAGE OF HAZARDOUS MATERIAL

All bunded areas containing hazardous material shall be visually inspected daily to determine whether any spillage or leakages occurred. If a spill or leakage is detected, it shall be reported to the ESCO, ECO and Project Manager and be dealt with according to this Hazardous Substances Plan.

12.7.11 FLAMMABLE LIQUIDS

- No combustible material (e.g. wood, rags, paper, carton boxes) are to be kept in the presence of flammable liquids.
- 'No Open Flames' and 'No Smoking' symbolic signs are to be displayed in the vicinity of the flammable liquid storage areas. Flammable liquids are to be issued only on a need-to-use basis and strict control is to be exercised to ensure that persons do not draw more than what is needed for the specific job.
- An adequate number and type of fire-fighting equipment is to be available in the close vicinity of the flammable liquid store.
- Flammable liquid stores are to be equipped with approved flameproof electrical equipment.
- Flammable liquid containers in the flammable liquid stores are to be clearly marked/labelled as to their contents. They are to be provided with earthed drip trays.
- Locations are to display MSDS information and handling/storage instructions. MSDSs are to be available for all flammable/hazardous products at the location where such substances are present.
- The number of 200 litre drums containing flammable liquids is to be kept to a minimum and the position is to be strictly controlled. The necessary signs should be visible at these storage areas.
- Flammable liquid tanks are to be properly earthed in order to prevent static electricity accumulating.
- Drainage points on flammable liquid tanks are to be provided with threaded caps or blanking plates.
- Bund walls are to surround storage tanks containing flammable liquids and these must be able to contain the entire volume of the contents plus 10% in case of spillage.

- Adequate precautions must be taken, such as wearing relevant protective equipment when handling substances.

12.8 PROTECTION OF HYDROLOGICAL FEATURES AND SENSITIVE AREAS

The following measures will be used to protect hydrological features (streams, rivers, pans, wetlands, dams and catchment) and other environmentally sensitive areas from impacts associated with construction. These measures must be read in conjunction with those contained in Chapter 11, as they relate to surface water management.

12.8.1 WATER USE

- Water may not be sourced from the river for any purposes during the construction process;
- The Contractor shall not permit his employees to make use of any natural water sources for the purposes of swimming, personal washing and the washing of machinery or clothes.
- Where possible all wash water will be recycled for use, as wash water again or for dust suppression where applicable;

12.8.2 PROTECTION FROM DIRECT OR NDIRECT SPILLAGE OR POLLUTANTS

Streams, rivers, underground water and dams will be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, wash water, organic materials and bituminous products.

- Potential pollutants of any kind and in any form shall be kept, stored, and used in such a manner that any escape can be contained and that the water table and surface water is not endangered. Water containing such pollutants as chemicals, washing detergents, sewerage, fuels, paints and solvents and hydrocarbons shall be contained and discharged into an impermeable storage facility for removal from the site or for recycling; This particularly applies to runoff from fuel depots/workshops/truck washing areas;
- Wash down areas shall be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted. The Contractor shall notify the ECO immediately of any pollution incidents on Site;
- As part of the Pollution Control Method Statement, the Contractor shall submit a plan to the ECO detailing how the contaminated water will be managed on site;
- No maintenance, including emergency maintenance, of plant can take place within 50m of any hydrological features;
- No toilets will be erected within 50m of any hydrological features;
- If the Site is closed for a period exceeding 5 days, the Contractor, in consultation with the ECO, shall carry out the following checklist procedure:
  - Hazardous fuel stores are secure;
  - Cement and materials stores are secure;
  - Toilets are empty and secured;
  - Refuse bins are empty and secured;
  - Bunding is clean and treated with appropriate material that will absorb/ breakdown and where possible be designed to encapsulate minor hydrocarbon spillage;
  - Drip trays are empty & secure.

12.8.3 MEASURES TO PROTECT SURFACE WATER FEATURES FROM STORMWATER RUNOFF

There are various drainage lines and other watercourses within the proposed development area. Although the project area receives low levels of rainfall per annum, the rain events can be short and intense. By increasing the

hardened surfaces within the project area through gravel road construction, it could impact surface water features through increased runoff during these rainfall events.

Once the servitude and location of the access roads are confirmed, the runoff can be determined. This will inform the specific storm water infrastructure to be used to manage runoff. The design of the road should include measures to ensure that water runoff from gravel roads should are not directly channelled towards drainage lines by including measures to dissipate the runoff to reduce velocity and thereby risk of erosion. Ongoing monitoring of storm water control features shall be undertaken during the operational phase.

12.9 WASTE MANAGEMENT PLAN

The development of a Waste Management Plan (WMP) for the proposed Brandvalley WEF is required to promote sustainable waste management during the life cycle of the project. The objective of the plan is to ensure that effective methods are implemented with regards to storage, handling, transportation and disposal of waste generated as a result of the project.

The Project Manager shall ensure effective implementation of the WMP, in conjunction with the measures indicated in Chapter 7 of this EMPr, However, a detailed waste management method statement must be developed by the Contractor prior to commencement of construction.

12.9.1 WASTE HIERARCHY

A waste is any solid, liquid or contained gaseous material that is being discarded by, disposal, recycling, burning or incineration. Waste management options for a particular waste need to be considered according to the Waste Management Hierarchy (**Figure 12-1**) which reflects the relative sustainability of each of the options. One of the key principles underlying the waste management hierarchy is to ensure that waste is dealt with as high up the waste hierarchy as possible. Since all waste disposal options have some impact on the environment, the only way to avoid impact is not to produce waste in the first place, and waste reduction is therefore at the top of the hierarchy. Re-use, followed by recovery techniques (recycling, composting and generating energy from waste) follow, while disposal to landfill or by incineration (the worst options) are at the bottom of the hierarchy.

In deciding on the most appropriate disposal route, both environmental and economic costs and benefits need to be considered. This decision must be reached taking into account all the costs and impacts associated with waste disposal, including those associated with the movement of waste.

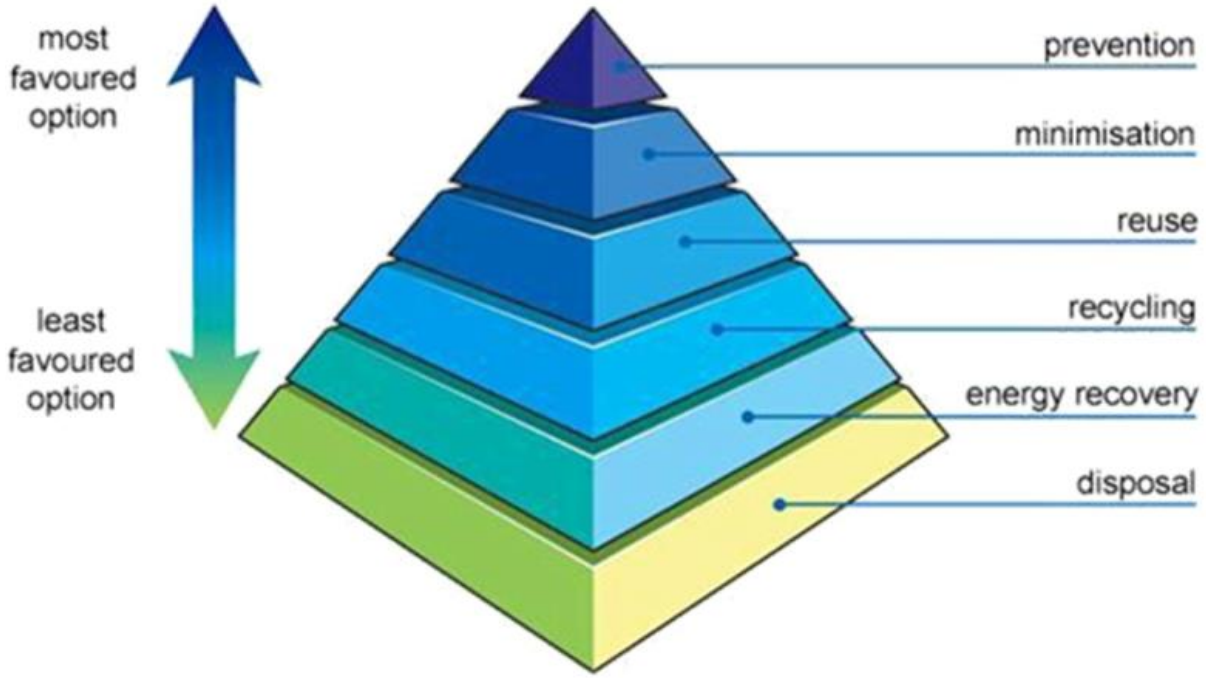

Figure 12-1: Waste Hierarchy

12.9.2 PROJECT STAGES

The purpose of this section is to assess the construction, operational processes of the proposed Rietkloof WEF in order to identify short comings, like raw materials procurement, infrastructure, employee training, health and safety, transportation, storage, compliance with legislative requirements, emergency preparedness and waste streams arising from an operation and its related activities, as well as the current waste management practices per waste stream. The assessment serves as the baseline against which any problem areas or gaps in waste management practises, process technology and environmental authorisations are identified and against which future performance objectives, activities and targets can be set.

The project stages are described below with the waste generation and management methods described in the corresponding tables below them including:

- Details on how waste will be managed during the construction and operational phases taking into consideration the waste management hierarchy;
- Details of the procedure for the separation of non-recyclable and recyclable waste;
- Details of the management of non-recyclable waste i.e. how waste will be stored on site during construction and operational phases, including the frequency for the removal of waste from the site and an indication of the landfill site where it will be disposed;
- Details for the management of recyclable waste e.g. the type of waste materials that will be recycled on site and the details pertaining to the offloading, sorting, handling, storage and collection procedures for the waste types (e.g. compaction and bailing, breaking of glass etc.); and
- The frequency for the removal of waste from the proposed development to where it will be finally managed must be included.

Waste Management at the project site will be undertaken in line with the EMPr to consider the correct disposal of general and hazardous waste generated on the project. **Table 12-2** describes the different waste products that the proposed project will produce, as well as the various options to dispose of them. Waste will mainly be generated during the construction phase. During operation, contractors are only on the site for limited amount of time as and when maintenance is required.

Table 12-2: Waste Management Options

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
Hydrocarbons (Contaminated soil)	Hazardous	Fuel and oil spillages can be a source of contamination of water sources and the soil. Management options include: — Using spill kits to clean any spillages; — Ensure storage facilities are maintained and meet industry regulations; — Transportation and storage of fuel must be regulated and correctly managed according to the EMPr; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; — Co-ordinate waste removal with the removal of waste from the contractor laydown area; and — All hazardous waste is to be disposed of at a registered hazardous landfill (safe disposal certificates must be obtained).

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
Contaminated Personal Protective Equipment (PPE)	Hazardous	PPE can be contaminated during handling of hydrocarbons. Management options include: — Store contaminated PPE in hazardous waste skips along the servitude; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; — Co-ordinate waste removal with the removal of waste from the contractor laydown area ; and — Ensure contaminated PPE is disposed of at a registered hazardous landfill (safe disposal certificates must be obtained).
General waste	General	General waste (inorganic matter) can be disposed of as per normal and form part of the municipal waste management system. Management options include: — Ensure waste is stored securely in refuse bins; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; and — Co-ordinate waste removal with the general removal of waste from the contractor laydown area .
Food waste	General	Food waste is generated as site personnel take their meals on the construction site. Management options include: — Store any waste and packaging into a labelled food waste bin; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day; — Co-ordinate waste removal with the removal of waste from the contractor laydown area; and — Co-ordinate waste removal with the general removal of waste.

12.9.3 TRAINING

Ensure that all personnel are provided training and awareness regarding waste management. The training should, as a minimum, include the following:

- The importance of hazardous waste minimisation, management and disposal;
- Prohibit the mixing of general waste with hazardous waste;
- Prohibit littering, and the significant environmental impacts, actual or potential, as a result of littering and improper storage and/or disposal of waste; and
- Cleaning of areas where hazardous waste spills have occurred and dispose of the hazardous material appropriately. Key personnel must be trained on handling spillages.

12.9.4 WASTE STORAGE

- The EO and Project Manager must ensure that all Contractors have a detailed waste management method for the storage and handling of all wastes specific to their activities.
- A dedicated waste management team must be appointed to ensure effective waste management on site.
- Designated waste areas must be established on site for the storage of all waste streams prior to be collected for disposal by the relevant waste contractors. This area must be suitable and pose potential for environmental contamination/pollution (located away from water resources).
- An adequate number of labelled or colour coded waste bins must be placed at the construction site areas during construction activities in order to minimise littering. The bins must be removed from the site on a regular basis for disposal at a registered or licensed disposal facility.

- Prohibit the mixing of general waste with hazardous waste. Should general waste be mixed with hazardous waste, it should be considered hazardous waste.
- Hazardous waste must be stored in covered waste receptacles located in bunded hard surfaced areas as per the requirements outlined in relevant legislation.
- Frequent monitoring and maintenance of septic tanks and portable toilets must be undertaken by the respective construction contractors and appointed contractor respectively.
- Waste recycling must be encouraged, and separate waste receptacles for recyclable material must be provided.
- Prohibit littering and burning of waste onsite.
- Storage of waste on site must be undertaken in line with applicable Regulations and best practice guidelines.

12.9.5 WASTE DISPOSAL

- All waste collection and disposal must be undertaken by a licenced/registered waste contractor, and information pertaining to the licensing of the contractor must be provided to the waste management team.
- The waste contractor must provide information on the recycling and disposal site, and issue applicable waste manifests for waste collection for disposal. All waste must be disposed of at a licenced facility.
- Retain records such as waybills and waste manifests associated with waste removal, transportation and disposal (safe disposal certificates

12.10 HIV/AIDS MANAGEMENT PLAN

Should the project be developed, an HIV/AIDS plan will be developed, however for input into this EMPr, a generic and high-level management plan has been compiled.

12.10.1 OBJECTIVES OF THIS PLAN

The overall objectives of the HIV/AIDS management plan are:

- Create awareness around HIV/AIDS amongst onsite personnel;
- Mitigate and manage the spread of HIV/AIDS onsite; and
- Provide support for staff who have HIV/AIDS

12.10.2 GUIDING PRINCIPLES

1. **Non- discrimination:** The respect of human rights and dignity of persons infected or affected by HIV/ AIDS requires equality between individuals living with HIV/AIDS and those without. No employee will be discriminated against on the basis of his or her real or perceived HIV positive status. This includes access to training and promotion.
2. **Job Security:** Employees with HIV infection or AIDS will not be dismissed on the grounds of their status. Persons with AIDS-related illnesses should be able to work for as long as medically fit in available, appropriate work (reasonable accommodation).
3. **Confidentiality :** All persons with HIV or AIDS have the legal right to privacy. No employee or applicant for a job shall be required to disclose HIV-related personal information. Nor should co-workers be obliged to reveal such information about fellow workers. Company management and medical staff as well as union leaders and officials are bound by strict confidentiality about a person's status.
4. **Voluntary Counselling and Testing (VCT) :** No HIV/AIDS testing will be required for job applicants or for persons already in employment. Individuals are encouraged to know their HIV status through testing. Testing must be voluntary, confidential and with the informed and written consent of the person concerned. Professional pre- and post-testing counselling services must be available.

5. **Treatment and Care :** Workers infected with HIV and suffering from AIDS and their dependents are entitled to the same health services as those with other diseases. Treatment with antiretroviral drugs must be available when VCT is advocated. Dependents of workers who have died from AIDS or AIDS-related diseases must have access to the same care as those who have died from other diseases or industrial accidents.
6. **Gender Equality :** The gender dimensions of the epidemic are recognised by the social partners. Gender discrimination at the workplace is ruled out. Sexual harassment and the exploitation of dependency of women is an offence.
7. **Occupational Health and Safety :** The work environment must be healthy and safe. Tools which bear the danger of injuries such as cuts should not be shared between workers.In case of accidents which involve blood and body fluid emissions, first aid must be exercised with the use of protective barriers, such as gloves and masks, which prevent direct contact with blood or other body fluids.
8. **Prevention and Behaviour Change :** Employees with HIV and AIDS shall not be unfairly discriminated against in the allocation of employee benefits. With regard to sick leave, HIV and AIDS related illness will be treated no different from other chronic or life threatening conditions. Health and social security schemes run by the company shall give the same benefits to those with HIV and AIDS as to any other worker. The same applies to separation allowance, retirement schemes and pension benefits.
9. **Prevention and Behaviour Change :** HIV infection is preventable. The parties will promote prevention efforts at the workplace, within families and in the wider community. Because it is within the power of each individual to avoid HIV infection, it is expected that employees take responsibility of their own health. They are urged to avoid risky behaviour such as unprotected sexual intercourse and the injection of drugs through shared needles.

12.10.3 IMPLEMENTAION

The plan will be implemented onsite through the following:

1. This HIV/AIDS management plan shall be made known and explained to all employees through the distribution of the text as a brochure in the appropriate languages and through meetings.
2. The implementation of this plan includes information and education activities aimed at communicating correct information about HIV/AIDS and eradicating myths in order to eliminate stigma and discrimination.
3. Rietkloof will organise and if necessary and appropriate with the participation of health professionals, regular awareness and prevention programmes about HIV/AIDS during working time.
4. As condoms and femidoms are an effective barrier to sexually transmitted infections and HIV transmission, condoms and femidoms will be made available at no cost on the construction site.
5. Meetings, information and training activities should be included in an action programme with an implementation plan for a defined period of time. This should include material to be acquired or produced. The company should make provisions in its budgetary process to include the cost of activities and materials.
6. Disputes or grievances arising from the application of the principles of this policy and its implementation are dealt with by the HIV/AIDS Committee and/or in established dispute resolution or grievance procedures.

12.11 COVID-19

PREVENTION AND RESPONSE

A dedicated team with responsibilities to identify and implement actions to mitigate the effects of COVID-19 on the company and community should be appointed.

INFORMATION

Information dissemination and training are an effective way to reduce the risk for both the company and the general public.

COVID-19 symptoms include: fever, tiredness, difficulty breathing, dry cough, chills, repeated shaking with chills, muscle pain, headache, sore throat, and new loss of taste or smell. Some patients may have nasal congestion, runny nose, or diarrhoea. Symptoms may appear two to 14 days after exposure to the virus.

EMPLOYEE QUESTIONNAIRE

To prevent potentially infected staff from entering the workplace and infecting co-workers, a short questionnaire could be used. Workers should only report to work if they answer "no" to all the questions.

The following is an example:

- Have you, in the last two weeks, been in close contact with a person who has COVID-19?
- Have you, in the last two weeks, been in a country/region with a high number of cases of COVID-19?
- Do you have a fever?
- Have you used medications such as paracetamol or aspirin to suppress fever in the last 24 hours?
- Are you coughing (even mildly)?
- Do you currently experience shortness of breath?

PREVENTION METHODS

SICK PERSONS TO STAY HOME

Workers requested to stay away from work in cases where they exhibit any COVID-19 symptoms or have been in close contact with a confirmed COVID-19 patient during the previous 14 days.

Workers who do not feel well should seek immediate medical advice. An employee who works while evidencing mild COVID-19 symptoms can risk spreading this infectious disease to others.

COUGH HYGIENE

To reduce the risk of infected persons spreading the virus by coughing and sneezing, workers are to be instructed to follow the cough etiquette outlined below:

- Cover the mouth and nose with a tissue when coughing or sneezing, and dispose of the used tissue in a wastebasket.
- When no tissue is available, cough or sneeze into the upper sleeve or elbow, not into the hands.
- Clean hands after coughing or sneezing, preferably by thorough water-soap handwashing, following the recommendations of health organizations. If soap and water are not available, use a hand sanitizing gel.

SOCIAL DISTANCING

To prevent person-to-person infection, it is important to minimize direct contact as much as possible. The contractor is to inform workers about the hazards of close contacts, including with direct co-workers, and promote alternative behaviours, such as maintaining safe distances and using alternatives for handshakes.

HAND SANITATION

Promote frequent and thorough water-soap hand washing and provide enough places for workers to wash their hands. If soap and running water are not immediately available, provide alcohol-based hand rubs containing at least 60% alcohol. Ensure that these facilities are sufficient in number and are available close to the work area.

CLEANING AND DISINFECTING

Frequently – and at least daily - clean touched surfaces, such as tables, light switches, appliances, countertops, handles, desks, phones, keyboards, toilets, taps, sinks, and so forth. Use the cleaning agents that are routinely used in these areas and follow the directions on the labels. For multiuse equipment, clean after every use.

Workers are to be instructed to clean their work areas and equipment at the end of each shift. Equipment and instructions on how to do this are to be provided.

12.12 CHANCE FIND PROCEDURE

The following procedural guidelines must be considered if previously unknown heritage resources are exposed or found during the construction of the Rietkloof WEF project area.

IDENTIFICATION AND EXPOSURE

Archaeological resources may be identified during construction or accidentally exposed. The initial procedure when such sites are found aim to avoid further damage. The following steps and reporting structure must be observed in all instances:

7 Stop all work in the area to avoid damaging the feature;
8 Do not further disturb any heritage resource that you may encounter;
9 The identifier must immediately inform his/her supervisor of the discovery;
10 The supervisor must ensure that the site is secured and control access;
11 The supervisor must then inform the relevant ECO;
12 The ECO shall contact the SAHRA and HWC and appoint an archaeological consultant to record the site and excavate if necessary; and
13 Work may only resume once clearance is given in writing by the archaeologist and SAHRA.

GRAVES AND MIDDENS:

If a grave or midden is uncovered on site, the following steps and reporting structure must be observed in all instances:

1 Stop all work in the area to avoid damaging the feature;
2 Do not further disturb any heritage resource that you may encounter;
3 The identifier must immediately inform his/her supervisor of the discovery;
4 The supervisor must ensure that the site is secured and control access;
5 The supervisor must then inform the relevant ECO;
6 The ECO must contact SAHRA, the National Monuments Council (NMC) and the South African Police Service (SAPS);
7 In the case of graves, arrangements shall be made for an undertaker to carry out exhumation and reburial in consultation with SAPS after a permit has been obtained from SAHRA to do so;
8 The undertaker will, together with the NMC, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred; and
9 Work may only resume once clearance is given in writing by the NMC.

PALAEONTOLOGICAL SITES

1 Should any fossil remains, such as vertebrate bones, teeth or petrified wood, be found or exposed anywhere within the project area, the following steps and reporting structure must be observed in all instances:
2 Stop all work in the area to avoid damaging the feature;
3 Do not further disturb any heritage resource that you may encounter;
4 The identifier must immediately inform his/her supervisor of the discovery;
5 The supervisor must ensure that the site is secured and control access;
6 The supervisor must then inform the relevant ECO;
7 The ECO shall contact the SAHRA and HWC and appoint a palaeontological consultant to record the site and excavate if necessary; and
8 Work may only resume once clearance is given in writing by the palaeontologist and SAHRA/HWCA

13 CLOSURE PLANNING

Final site cleaning - the contractor shall clear and clean the site and ensure that everything not forming part of the permanent works is removed from site before issuing the completion certificate or as otherwise agreed.

Rehabilitation - the contractor (landscape architect/horticulturist) shall be responsible for rehabilitating and re-vegetation of all areas disturbed/areas earmarked for rehabilitation during construction to the satisfaction of the Project Manager and ECO.

13.1 POST-CONSTRUCTION ENVIRONMENTAL AUDIT

Typically, a post-construction environmental audit must be carried out and submitted to DFFE at the expense of the Holder of the EA so as to fulfil conditions of the EA granted. Objectives should be to audit compliances with the key components of the EMPr, to identify main areas requiring attention and recommend priority actions. The audit should be undertaken annually during the operational phase and should cover a cross section of issues, including implementation of environmental controls, environmental management and environmental monitoring.

Results of the audits should inform changes required to the specifications of the EMPr or additional specifications to deal with any environmental issues which arise on site and have not been dealt with in the current document.

13.2 MANAGEMENT REVIEW AND REVISION OF THE EMPR

The EMPr is to be reviewed annually for the first three years from the commencement of construction and then once every five years thereafter, by an independent environmental consultant, unless otherwise specified by the authorities. The auditor is to highlight issues to be addressed in the EMPr or changes required during the annual audit. These points are to be included as an annexure to the EMPr and to be considered during the review process. Any recommended changes to the EMPr requiring approval from DFFE, should be submitted to DFFE for approval.

13.3 GENERAL REVIEW OF EMPR

The EMPr will be reviewed by the ECO on an ongoing basis throughout the construction phase. Based on observations during site inspections and issues raised at site meetings, the ECO will determine whether any procedures require modification to improve the efficiency and applicability of the EMPr on site.

Any such changes or updates will be registered in the ECO’s record, as well as being included as an annexure to this document. Annexure of this nature must be distributed to all relevant parties.

14 GRIEVANCE PROCEDURE

14.1.1 GRIEVANCE MECHANISM - EXTERNAL

A grievance mechanism is a tool used to address affected communities' concerns and complaints and is an important pillar of the stakeholder engagement process, since it creates opportunities for companies and communities to identify problems and discover solutions together. The Project proponent can benefit from understanding community concerns and complaints and addressing them through all stages of project development.

Where it is anticipated that a new project will involve ongoing risk and adverse impacts on surrounding communities, the project proponent is required to establish a grievance mechanism to receive and facilitate resolution of the affected communities' concerns and complaints about the proponent's environmental and social performance. The grievance mechanism should be scaled to risks and adverse impacts of the project, address concerns promptly, use an understandable and transparent process that is culturally appropriate and readily accessible to all segments of the affected communities, and do so at no cost to communities and without retribution. The mechanism should not impede access to judicial and administrative remedies.

The grievance mechanism described in this section includes both complaints and grievances (hereinafter referred to only as 'grievances') raised by stakeholders.

PURPOSE

The grievance mechanism describes the way the Proponent and community can work together to find solutions to grievances.

OBJECTIVES

The objectives of the grievance mechanism include:

- To be respectful of complainant culture, values, traditions and views;
- To resolve grievances at the local level and in a timely manner;
- To identify the root causes of grievances and address systemic issues;
- To provide a process that is dialogue based, with the complainant and the Proponent cooperating in the investigation, discussion, resolution and announcement of the grievance and result;
- To ensure fair, equitable and consistent outcomes to resolve grievances;
- To enhance and continuously improve the ability of the Proponent to fairly address community concerns.

SCOPE AND RESPOSIBLE PARTIES

A grievance mechanism is primarily for the community to raise relevant concerns about the Project / Proponent's activities and is to be implemented throughout the life cycle of the Project (i.e. throughout assessment, construction, and implementation phases).

WSP will only be involved in the stakeholder engagement and grievance management process for the assessment phase. The Project proponent and the Contractor will be responsible for implementation of the grievance mechanism throughout the construction phase. Once established, the Project infrastructure is to be handed over to Eskom for operation and maintenance, who will be responsible for managing grievances in line with their existing complaint handling process (not covered herein).

GRIEVANCE REDRESS PROCEDURE

This grievance mechanism sets out the following steps to be taken to resolve grievances.

1. **Register grievance**
    - A grievance can be submitted in a written letter, e-mail, fax, or raised verbally in person or via telephone.

- Grievances raised during the assessment process are to be submitted to the EAP via the details provided as per the stakeholder engagement notifications. The EAP will notify the Proponent of the grievance.
- Grievances raised during the implementation process are to be submitted to the Proponent / Contractor via the relevant details, which are to be made available to registered stakeholders prior to commencement of onsite activities, as well as via site notice boards.
- In the event that a complaint is raised verbally, the responsible person must obtain the approval of the complainant as to the documented complaint (by way of signature of the Receipt of Grievance Form). Should the complainant have literacy issues, the responsible person may request that a third party (friend / relative of complainant) is available to verify / approve the contents of the documented complaint to the satisfaction of the complainant.
- The submission should include the nature of the grievance, the date when it occurred and the name and contact details of the complainant.
- Grievances will be accepted anonymously or through a third party (e.g. unions, NGOs, local authorities, community representatives, etc.).
- Individuals have the right to request that their name be kept confidential throughout the grievance process.
- As men and women may communicate their grievances differently, and also have different types of grievances, the complainant may request that their grievance is processed by a female / male representative. In the event that such a request is made, the Proponent, as far as reasonably practicable, will accommodate this request.

2. **Within a Week (7 days) of receiving the grievance the Proponent will:**
   - Enter the grievance into the Proponent's records that track grievances;
   - Assess the grievance according to specific criteria and if necessary, develop an appropriate approach for the particular grievance;
   - Provide a written acknowledgement of the grievance including the name of the responsible person to contact about progress, an explanation of the steps that will be taken to investigate, discuss and resolve the grievance, and an anticipated timetable for processing the grievance.
3. **Processing the Grievance:**

   The responsible person will:
   - Identify the parties involved;
   - Clarify issues and concerns raised by the grievance through direct dialogue;
   - Classify the grievance in terms of seriousness according to the gravity of the allegation, the potential impact on an individual's or a group's welfare and safety, or the public profile of the issue;
   - Convene a staff group with expertise relative to the grievance;
   - Determine the method for resolving the grievance – the most common approaches, not excluding others, will be:
     i. The Proponent proposes a solution;
     ii. The Proponent and aggrieved party decide together the solution;
     iii. The Proponent and aggrieved party defer to a third party for mediation / arbitration.
   - Gather views of other stakeholders, including those of the Proponent and if necessary, an agreed neutral technical opinion;
   - Determine initial options that parties have considered and explore various approaches for settlement;
   - Conduct the process as agreed;
   - Close the grievances by signing the Complaint Close-Out Form (i.e. that the grievance has been resolved satisfactory to both parties).

- The Proponent may "close" the grievance even if the complainant is not satisfied with the outcome. This option can be pursued by the Proponent in the case that the complainant is unable to substantiate a grievance, or if there is an obvious speculative or fraudulent attempt. In such situations, the Proponent's efforts to investigate the grievance and to arrive at a conclusion will be well documented and the complainant advised of the situation. The Proponent (or contractors working for the Proponent) will not dismiss grievances based on a cursory review and close them in their grievance record unless the complainant has been notified and had the opportunity to provide supplementary information / evidence;
- Keep a record that tracks the progress and communications for each grievance.

4. Processing Timeline

- The Proponent will aim to bring the grievance to a resolution within 30 days of receiving the grievance. The grievance shall be acknowledged within 7 days by the responsible person, and responded to within 30 days. If the matter takes longer than 30 days to resolve, the complainant will be informed through dialogue and in writing, of the reason for the delay, any advances or difficulties encountered and the anticipated new resolution date.

RECOURSE

If the complainant is not satisfied with the outcome of the grievance process the aggrieved party has the right to address the grievance via the judicial system.

MANAGING, TRACKING, RECORDING GRIEVANCES – INTERNALLY

In terms of managing grievances the Proponent will:

- appoint a senior manager to oversee the Grievance Mechanism. Another member of staff will be appointed to carry out the day-to-day work in this area and involve specialist staff and external parties, where required, who may need to be consulted to resolve a grievance.
- maintain a register of grievances. All activities, including registration of the grievance and the progress through to outcome will be recorded.
- ensure that grievances and resolutions are communicated internally to all staff through monthly reports.
- launch the Grievance Mechanism and regularly remind communities that it is available to use.

Contractors are expected to follow this Grievance Procedure. Contractor shall be proactive and available to participate in the grievance resolution processes. Contractor participation is intended to allow for specific contractor grievances to be addressed efficiently.

Contractors shall ensure that all individual contractor employees are aware of the Grievance Procedure. Contractors will receive any grievance from an individual or community and notify the Proponent thereof immediately.

Contractors shall not make any direct agreements or resolution with local communities without prior coordination of such actions with the Proponent.

The Contractor's community relations team (or equivalent) will attend all coordination meetings requested by the Proponent, as required. The contractor community relations management (or equivalent) will report to the the Proponent's management team on a regular basis – in regards to social incidents and community relations issues. The Proponent, or their representative, will conduct regular audits on contractors to ascertain compliance with this Grievance Procedure.

DISCLOSURE OF THE GRIEVANCE MECHANISM

The grievance mechanism will be made public through:

- Stakeholder engagement during the BA assessment; and
- Stakeholder engagement during the implementation phase.

14.1.2 GRIEVANCE MECHANISM - INTERNAL

The Proponent will establish a Grievance Mechanism that will set out the process for workers to communicate their grievances. The grievance mechanism will be available to workers of the Proponent, Contractors and subcontractors.

A Code of Conduct will set out practice measures that the construction workers will have to adhere to, to ensure a positive relationship is built and maintained with the landowners and local communities.

15 CONCLUSION

Although all foreseeable actions and potential mitigations or management actions are contained in this document, the EMPr should be seen as a day-to-day management document. The EMPr thus sets out the environmental and social standards, which would be required to minimise the negative impacts and maximise the positive benefits of the Rietkloof 132kV electrical infrastructure. The EMPr could thus change daily, and if managed correctly lead to successful planning & design, construction, operational and decommissioning phases.

All attempts should be made to have this EMPr available, as part of any tender documentation, so that the engineers and contractors are made aware of the potential cost and timing implications needed to fulfil the implementation of the EMPr, thus adequately costing for these.

APPENDIX

A CV OF EAP

APPENDIX

B

A3 MAPS

APPENDIX

C GENERIC EMPR FOR OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE

APPENDIX

D GENERIC EMPR FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY

APPENDIX

E AVIFAUNA WALKDOWN REPORT

APPENDIX

F

ECOLOGY AND BIODIVERSITY WALKDOWN REPORT

APPENDIX

G AGRICULTURAL WALKDOWN REPORT

APPENDIX

H

SURFACE WATER REPORT

APPENDIX

I

BAT WALKDOWN LETTER

APPENDIX

J VISUAL STATEMENT

APPENDIX

K HERITAGE WALKDOWN REPORT

APPENDIX

L GEOTECHNICAL ASSESSMENT