KARREEBOSCH WIND FARM (RF) (PTY) LTD

KARREEBOSCH 132KV POWERLINE AND SUBSTATION

SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PROGRAMME

DFFE REFERENCE:14/12/16/3/3/1/2608

18 OCTOBER 2022

FINAL

KARREEBOSCH 132KV POWERLINE AND SUBSTATION

SITE SPECIFIC ENVIRONMENTAL MANAGEMENT PROGRAMME

KARREEBOSCH WIND FARM (RF) (PTY) LTD

TYPE OF DOCUMENT (VERSION)
FINAL

PROJECT NO.: 41103843
DATE: OCTOBER 2022

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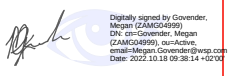
QUALITY MANAGEMENT

ISSUE/REVISION	FIRST ISSUE	REVISION 1	REVISION 2	REVISION 3
Remarks	Draft EMPr for Public Review	Final EMPr		
Date	August 2022	October 2022		
Prepared by	Jennifer Green	Megan Govender		
Signature				
Checked by	Ashlea Strong	Ashlea Strong		
Signature		 Ashlea Strong 2022.10.18 13:38:28 +02'00'		
Authorised by	Ashlea Strong	Ashlea Strong		
Signature		 Ashlea Strong 2022.10.18 13:59:28 +02'00'		
Project number	41103843	41103843		
Report number	01	01		
File reference	\\corp.pbwan.net\za\Central_Data\Projects\41100xxx\41103843 - Karreebosch WEF Part 2 & BAR\41 ES\01-Reports\03-BAR\			

SIGNATURES

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This site specific Environmental Management Programme (EMPr) Report (Report) for the Proposed Karreebosch 132kV Overhead Powerline (OHPL) and substation has been prepared by WSP Group Africa Proprietary Limited (WSP) on behalf and at the request of Karreebosch Wind Farm (RF) (Pty) Ltd (Client), as part of the application process for Environmental Authorisation.

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.

DOCUMENT DESCRIPTION

CLIENT

Karreebosch Wind Farm (RF) (Pty) Ltd

PROJECT NAME

Proposed Karreebosch 132kV Overhead Powerline and Substation

REPORT TYPE

Final Site-Specific Environmental Management Programme

WSP PROJECT NUMBER

41103843

DFFE PRE-APPLICATION NUMBER

2022-07-0009

DFFE REFERENCE NUMBER

14/12/16/3/3/1/2608

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WSP

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Visual Specialist	SLR Consulting (Pty) Ltd: Kerry Schwartz

ACRONYMS

AIS	Alien and Invasive Species
BA	Basic Assessment
BAR	Basic Assessment Report
BBBEE	Broad Based Black Economic Empowerment
BPEO	Best Practicable Environmental Option
BSP	Biodiversity Spatial Plan
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act (Act 43 of 1983)
CBA	Critical Biodiversity Area
CH	Critical Habitat
CIA	Cumulative Impact Assessment
CR	Critically Endangered
CRR	Comments and Responses Report
CSP	concentrated solar power
CV	Curriculum vitae
DEA	Department of Environmental Affairs
DFFE	Department of Forestry, Fisheries and the Environment
DEA&DP	Department of Environmental Affairs and Development Planning
DMRE	Department of Mineral Resources and Energy
DoA	Department of Agriculture
DoT	Department of Transport
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EDL	episodic drainage line
EGI	Electricity Grid Infrastructure
EHS	Environmental, Health and Safety
EIA	Environmental Impact Assessment

EMF	Environmental Management Framework
EMPr	Environmental Management Programme
EN	Endangered
EP	Equator Principles
EPL	Ecosystem Protection Level
EPFI	Equator Principles Financial Institution
ERA	Electricity Regulation Act (Act 4 of 2006)
ESA	Ecological Support Area
ESA	Early Stone Age
ESMS	Environmental and Social Management System
ETS	Ecosystem Threat Status
EWT	Endangered Wildlife Trust
FI	Financial Institution
FPIC	Free, Prior, and Informed Consent
GA	General Authorisation
GBIF	Global Biodiversity Information Facility
GM	Grievance Mechanism
GG	Government Gazette
GHG	Greenhouse Gases
GIIP	Good International Industry Practice
GN	Government Notice
GNR	Government Notice Regulation
GPS	Global Positioning System
HWC	Heritage Western Cape
IBA	Important Bird Area
ICAO	International Civil Aviation Organisation
ICP	Informed Consultation and Participation
IDP	Integrated Development Plan
IEP	Integrated Energy Plan
IFC	International Finance Corporation
IPPPP	Independent Power Producer Procurement Programme
IRP	Integrated Resource Plan

IUCN	International Union for Conservation of Nature
LC	Least Concern
LSA	Later Stone Age
LUPA	Land Use Planning Act (Act 3 of 2014)
MF	Monitoring Forum
MP	Moderately Protected
MSA	Middle Stone Age
MSDS	Material Safety Data Sheets
NDP	National Development Plan
NEMA	National Environmental Management Act (Act 107 of 1998)
NEMAQA	National Environment Management Air Quality Act (No. 39 of 2004)
NEMBA	National Environmental Management Biodiversity Act (Act 10 of 2004)
NEMPAA	National Environmental Management Protected Areas Act (Act 57 of 2003)
NEMWA	National Environmental Management Waste Act (Act 59 of 2008)
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resource Act (Act 25 of 1999)
NID	Notice of Intent to Develop
NIP	National Infrastructure Plan
NP	Not Protected
NT	Near Threatened
NWA	National Water Act (Act 36 of 1998)
OEC	Obstacle Evaluation Committee
OHPL	Overhead Powerline
OHSA	Occupational Health and Safety Act (Act 85 of 1993)
ONA	Other Natural Areas
PA	Protected Area
PES	Present Ecological State
PICC	Presidential Infrastructure Coordinating Commission
POSA	Plants of South Africa
PP	Poorly Protected
PPE	Personal Protective Equipment

PPP	Public Participation Process
PS	Performance Standard
PSDF	Provincial Spatial Development Framework
PV	Photovoltaic
REDZ	Renewable Energy Development Zones
REIPPPP	Renewable Energy Independent Power Producer Procurement Programme
SAAF	South African Air Force
SA CATS	South African Civil Aviation Technical Standards
SACAA	South African Civil Aviation Authority
SAHRA	South African Heritage Resources Agency
SAIIAE	South African Inventory of Inland Aquatic Ecosystems
SANBI	South African National Biodiversity Institute
SAPAD	South Africa Protected Areas Database
SARPs	Standards and Recommended Practices
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEA	Strategic Environmental Assessment
SER	Stakeholder Engagement Report
SIA	Social Impact Assessment
SIP	Strategic Integrated Projects
SKEP	Succulent Karoo Ecosystem Programme
SO	Spatial objective
SPLUMA	Spatial Planning and Land Use Management Act (Act 16 of 2013)
STD	sexually transmitted disease
UN	United Nations
VEC	Valued Environmental and Social Components
VU	Vulnerable
WBG	World Bank Group
WCBSP	Western Cape Biodiversity Spatial Plan
WEF	Wind Energy Facility
WMA	Water Management Area
WML	Waste Management Licence

WP	Well Protected
WSP	WSP Group Africa (Pty) Ltd
WUL	Water Use Licence

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TABLES

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APPENDICES

1 INTRODUCTION

Changes made from the Environmental Management Programme (EMPr) submitted with the Draft Basic Assessment Report (BAR) have been underlined in this Final report for ease of reference to the updates made in this report.

1.1 BACKGROUND AND TERMS OF REFERENCE

Karreebosch Wind Farm (RF) (Pty) Ltd propose to construct a 132kV twin tern double circuit overhead powerline (OHPL), an onsite 33/132kV substation (and associated road infrastructure) to evacuate power for the authorised Karreebosch WEF (Ref: 14/12/16/3/3/2/807/AM3, which is currently undergoing a Part 2 EA amendment, final layout and EMPr approval process) to the existing Komsberg substation via the existing Bon Espirange substation.

The proposed OHPL is situated near Matjiesfontein in the Laingsburg Local Municipality within the Central Karoo District Municipality of the Western Cape Province as well as near Sutherland in the Karoo Hoogland Local Municipality in the Namakwa District Municipality of the Northern Cape, South Africa (**Figure 1-1)**.

The proposed Karreebosch OHPL will evacuate power from the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3), located in the Northern Cape Province, and will connect to the existing Komsberg substation. The WEF site is located approximately 40 km north of Matjiesfontein.

The entire extent of the proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located within one (1) of the Strategic Transmission Corridors, namely the Central Corridor, as defined in and in terms of the procedures laid out in Government Notice (GN) No. 113. The proposed OHPL project (DFFE Reference: 14/12/16/3/3/1/2608) will therefore be subject to a Basic Assessment (BA) Process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA process is the national Department of Forestry, Fisheries and Environment (DFFE).

This site-specific Environmental Management Programme (EMPr, form part of Part C of the Generic EMPrs included as **Appendix C** and **Appendix D**.

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Figure 1-1: Locality map of the Karreebosch OHPL Alternatives considered in order to determine the final pre-negotiated route

1.2 TERMS OF REFERENCE AND DETAILS OF THE EAP

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed Project. This site-specific Environmental Management Programme (EMPr) was compiled as part of the BA process and must be read in conjunction with the generic EMPrs and Basic Assessment Report (BAR) in support of the EA application. This site-specific Environmental Management Programme (EMPr, form part of Part C of the Generic EMPrs included as **Appendix C** and **Appendix D.** The CV of the EAP is available in **Appendix A**. **Table 1-1** details the relevant contact details of the EAP.

Table 1-1: Details of the EAP

EAP	**WSP GROUP AFRICA (PTY) LTD**
Contact Person:	Ashlea Strong
Physical Address:	Building C, Knightsbridge, 33 Sloane Street, Bryanston, Johannesburg
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EAP Qualifications:	— Masters in Environmental Management, University of the Free State — B Tech, Nature Conservation, Technikon SA — National Diploma in Nature Conservation, Technikon SA
EAPASA Registration Number:	EAPASA (2019/1005)

To adequately identify and assess potential environmental impacts, the EAP was supported by a number of specialists, the details of which are provided in the BAR.

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.

1.3 ENVIRONMENTAL MANAGEMENT PROGRAMME STRUCTURE

Table 1-2 cross-references the sections within the EMPr with the legislated requirements as per Appendix 4 of GNR 326.

Table 1-2: Legislation Requirements as Detailed in Appendix 4 of GNR 326

APPENDIX 3 LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 326		REPORT SECTION
(a)	Details of	
	i) the EAP who compiled the EMPr; and	Section 1.2 **Appendix A**
	ii) the expertise of the EAP, including a Curriculum Vitae	Section 1.2 **Appendix A**
(b)	Detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description;	Section 3
(c)	A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that any areas that should be avoided, including buffers;	Section 3 **Appendix B**
(d)	A description of the impact management objectives, including management statements, identifying the impacts and risks that need to be avoided, managed and mitigated as identified through the environmental impact assessment process for all phases of the development including-	
	i) Planning and design;	Section 3
	ii) Pre-construction activities;	Section 3
	iii) Construction activities	Section 3
	iv) Rehabilitation of the environment after construction and where applicable post closure; and	Section 7
	v) Where relevant, operation activities.	
(e)	A description and identification of impact management outcomes required for the aspects contemplated in paragraph (d);	Section 7
(f)	A description of proposed impact management actions, identifying the manner in which the impact management objectives and outcomes contemplated in paragraphs (d) and (e) will be achieved, and must, where applicable, include actions to -	
	i) Avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation;	Section 7
	ii) Comply with any prescribed environmental management standards or practices;	
	iii) comply with any applicable provisions of the Act regarding closure, where applicable; and	
	iv) Comply with any provisions of the Act regarding financial provisions for rehabilitation, where applicable	
(g)	The method of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6
(h)	The frequency of monitoring the implementation of the impact management actions contemplated in paragraph (f);	Section 6
(i)	An indication of the persons who will be responsible for the implementation of the impact management actions;	Section 6 Section 7

APPENDIX 3 LEGISLATED REQUIREMENTS AS PER THE NEMA GNR 326		REPORT SECTION
(j)	The time periods within which the impact management actions contemplated in paragraph (f) must be implemented;	Section 7
(k)	The mechanism for monitoring compliance with the impact management actions contemplated in paragraph (f);	Section 6
(l)	A program for reporting on compliance, taking into account the requirements as prescribed by the Regulations	Section 6
(m)	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	Section 6
	ii) Risks must be dealt with in order to avoid pollution or the degradation of the environment; and	
(n)	any specific information that may be required by the competent authority	N/A

1.4 APPLICABLE DOCUMENTATION

The site specific EMPr (this Report) is to be read in conjunction with following documentation:

- Final BAR for the proposed construction of the Karreebosch 132kV Overhead Powerline and Substation (WSP, 2022);
- Site Sensitivity Verification and Agricultural Compliance Statement for the Proposed Karreebosch 132kv Powerline and Substation in the Northern and Western Cape Provinces, near Matjiesfontein (Lanz, 2022);
- Avifaunal Impact Assessment: Bon Karreebosch 132kV Overhead Power Line and substation for the Karreebosch Wind Energy Facility located in the Northern Cape and Western Cape Provinces (Chris van Rooyen Consulting, 2022);
- Terrestrial Biodiversity & Ecology: Karreebosch 132kv Powerline and Substation (Trusted Partners ,2022);
- Karreebosch 132kV Overhead Powerline and 33/132kV Substation: Desktop Geotechnical Report (JG Afrika, 2022);
- Heritage Impact Assessment In terms of Section 38(8) of the NHRA for the Proposed establishment of 132kV Overhead Powerline and 33/132kV Substation to evacuate power from the Karreebosch Wind Energy Facility (WEF) to the National Grid in the Western and Northern Cape (CTS, 2022);
- Social Impact Assessment for Karreebosch Powerline and Substation Northern and Western Cape Province (Barbour, 2022);
- Freshwater Ecological Assessment for the Proposed 132kv Overhead Powerline and 33/132kv Substation associated with the Proposed Karreebosch Wind Energy Facility, between Sutherland and Matjiesfontein in the Western and Northern Cape Provinces (FEN, 2022);
- Karreebosch 132kV Powerline and Substation Transport Impact Assessment (JG Afrika, 2022);
- Karreebosch 132kV Powerline and Substation Transport Management Plan (JG Afrika, 2022)
- Visual Impact Assessment for the Karreebosch 132kv Powerline and Substation (SLR Consulting, 2022); and
- EA (once issued by DFFE).
- Generic EMPr Development of Overhead Powerline Infrastructure
- Generic EMPr Development of Substation Infrastructure

2 GOVERNANCE FRAMEWORK

2.1 NATIONAL LEGAL AND REGULATORY

The South African regulatory framework establishes well-defined requirements and standards for environmental and social management of industrial and civil infrastructure developments. Different authorities at both national and regional levels carry out environmental protection functions. The applicable legislation and policies are shown in **Table 2.1** and **Table 2.2.**

Table 2.1: Applicable Legislation

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
The Constitution of South Africa (No. 108 of 1996)	Section 24(b) of the Constitution provides that "*everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation [and] promote conservation.*" The Constitution cannot manage environmental resources as a stand-alone law, hence additional legislation has been promulgated in order to manage the various spheres of both the social and natural environment. Each promulgated Act and associated Regulations are designed to focus on various industries or components of the environment to ensure that the objectives of the Constitution are effectively implemented and upheld in an on-going basis throughout the country. In terms of Section 7, a positive obligation is placed on the State to give effect to the environmental rights.
National Environmental Management Act (No. 107 of 1998)	In terms of Section 24(2) of the National Environmental Management Act (No. 107 of 1998) (NEMA), the Minister may identify activities which may not commence without prior authorisation. On 7 April 2017, the Minister thus published GNR 327 (Listing Notice 1), 325 (Listing Notice 2) and 324 (Listing Notice 3) listing activities that may not commence prior to authorisation. The regulations outlining the procedures required for authorisation are published in GNR 326 EIA Regulations (2014, as amended). Listing Notice 1 and Listing Notice 3 identify activities that require a BA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. Listing Notice 2 identifies activities that require a Scoping and EIA process to be undertaken, in terms of the EIA Regulations, prior to commencement of that activity. **Listed Activities 11, 12, 14, 19, 24 and 27, 28, 48, 47 and 56 of GNR 327 and Listed Activities 4, 10, 12, 14, 18 and 23 of GNR 324** are considered applicable to the Karreebosch OHPL and therefore a BA process must be followed to obtain an EA.
Strategic Transmission Corridors: GNR113	Notice of identification in terms of section 24(5)(a) and (b) of the National Environmental Management Act. 1998, of the procedure to be followed in applying for environmental authorisation for large scale electricity transmission and distribution development activities identified in terms of section 24(2)(a) of the National Environmental Management Act. 1998 when occurring n geographical areas of strategic importance. **Applicability:** It is understood that the proposed project infrastructure falls within the approved Strategic Transmission Corridors and as such would only be subject to a Basic Assessment Process, as per GN 113 of 16 February 2018 (repealed by GN 787 of 17 July 2020) as well as a 57 day authority review period.
Adoption of the standard for the development and expansion of powerlines and substation within identified geographical areas and the	In terms of GN R. 2313: Adoption of the standard for the development and expansion of powerlines and substation within identified geographical areas and the exclusion of this infrastructure from the requirements to obtain environmental authorisation, Paragraph 10 states as follows "An application for environmental authorisation for the activities contained in paragraph 5 of this Government Notice, submitted in terms

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
exclusion of this infrastructure from the requirements to obtain environmental authorisation (GN R. 2313)	of the EIA Regulations or Government Notice No. 113, which is pending on the date of coming into effect of the Standard and exclusion contemplated in this Notice, must be finalised in accordance with the procedures of the EIA Regulations or Government Notice No. 113, read with the EIA Regulations, or may be withdrawn. **Applicability:** The proposed powerline is located within the Central Transmission Corridor, however as per the DFFE Screening Tool (Powerline), the following themes had a very high / high sensitivity: — Animal Species Theme — Aquatic Biodiversity Theme — Archaeological and Cultural Heritage Theme — Palaeontology Theme — Terrestrial Biodiversity Theme As per the DFFE Screening Tool (Substation), the following themes had a very high / high sensitivity: — Animal Species Theme — Palaeontology Theme — Terrestrial Biodiversity Theme The Biodiversity Specialist confirmed high sensitivity themes (Section 9.1.2 of the Final BAR) within the project area. Therefore, this application does not fall within the ambit of GNR 2313 and is subject to a full BA Process[1].
Renewable Energy Development Zones: GNR 145	The Strategic Environmental Assessment for Wind and Solar Photovoltaic Energy in South Africa, 2015 identified 8 Renewable Energy Development Zones (REDZ) that are of strategic importance for large scale wind and solar photovoltaic development. These REDZ together with the procedures to be followed when applying for environmental authorisation for a large scale wind and solar facility within these areas were published under Government Notice No. 114, Government Gazette 41445 of 16 February 2018. **Applicability:** The associated Karreebosch WEF falls within the *Renewable Energy Development Zone 2: Komsberg '* for Large scale wind and solar photovoltaic energy facilities.
Listing Notice 1: GNR 327	***Activity 11(i):*** *The development of facilities or infrastructure for the transmission and distribution of electricity—* *(i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;* **Applicability:** The project involves the construction of a 132kV OHPL (400m wide corridor) to evacuate electricity from the authorised Karreebosch WEF (Ref 14/12/16/3/3/2/807/AM3) to feed it into the National Grid. The project will also include the Karreebosch on-site 33/132kV substation as well as the potential

[1]This approach was confirmed by DFFE during a clarification meeting held with DFFE on 04 October 2022 as a result of comments received from DFFE on the Draft BAR (Meeting Minutes included in Appendix C-3 of the Stakeholder Engagement Report, attached as Appendix D of the Final BAR (this report)).

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	expansion of the Komsberg Substation. The infrastructure is located outside of the urban edge..
	Activity 12 (ii), (a) and (c): *The development of—* *(ii) infrastructure or structures with a physical footprint of 100 square metres or more;* *where such development occurs—* *(a) within a watercourse; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse* **Applicability:** The project will entail the construction of OHPL tower structures, access roads and associated infrastructure (buildings and other infrastructure) with a physical footprint of approximately 100m^2 or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse.
	Activity 14: *The development and related operation of facilities or infrastructure, for the storage, or for the storage and handling, of a dangerous good, where such storage occurs in containers with a combined capacity of 80 cubic metres or more but not exceeding 500 cubic metres.* **Applicability:** More than 80 m^3 (but less than 500 m^3) of diesel will be temporarily stored in above ground storage tanks within the construction camp for use during the construction phase. It should be noted that the above ground diesel storage tanks will be located within the Karreebosch WEF construction camp to be used for both the WEF and OHPL during construction.
	Activity 19: *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse.* **Applicability:** The project will involve the excavation, removal, infilling, depositing and moving of 10m3 or more of soil, sand, shells, shell grit, pebbles or rock from a watercourse for the construction of the OHPL servitude, access roads and substation.
	Activity 24 (ii) *The development of a road—* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* **Applicability:** The road associated with the OHPL servitude does not have a road reserve and the road may in locations exceed 8m in width, to be developed within the 14m wide road servitude.
	Activity 27:

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for- *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.* **Applicability:** The project includes the clearance of an area of 1 hectare (ha) or more, but less than 20ha of indigenous vegetation. This is not triggered as a result of the proposed power line as it is linear infrastructure. The proposed development however involves the construction of one (1) new substation (up to 3ha) and one (1) new O&M building (up to 1ha) which will occupy an area of approximately 4 ha in total. All vegetation on the substation and O&M building sites will need to be cleared for construction. Cleared vegetation will amount to an area of up to approximately 4 ha.
	Activity 28(ii): *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.* **Applicability:** The project will entail the construction of OHPL tower structures, access roads and associated infrastructure (buildings and other infrastructure) with a physical footprint of greater than 1 ha outside of an urban area on land that is zoned for agriculture.
	Activity 47 *The expansion of facilities or infrastructure for the transmission and distribution of electricity where the expanded capacity will exceed 275 kilovolts and the development footprint will increase.* ***Applicability:*** The project will also include potential expansion of the 400kV Komsberg Substation
	Activity 48(i)(a)(c): *The expansion of –* *(i) infrastructure or structures where the physical footprint is expanded by 100 square metres or more;* *where such expansion occurs—* *(a) within a watercourse; or* *(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;* **Applicability:** The OHPL will require the expansion of roads and other infrastructure by 100m2 or more within a watercourse or within 32m from a watercourse. Some of the existing access roads will need to be upgraded to be used as the OHPL servitude access roads and will traverse watercourses.
	Activity 56(i) and (ii):

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (i) where the existing reserve is wider than 13,5 meters; or *(ii) where no reserve exists, where the existing road is wider than 8 metres; excluding where widening or lengthening occur inside urban areas.* **Applicability:** For the OHPL, internal access roads will be required to access the substation, O&M building and powerline towers. Existing roads will be used wherever possible; however, where required, existing access roads will need to be upgraded by widening more than 6m and/or by lengthening by more than 1km
Listing Notice 3: GNR 324	***Activity 4 (g) (ii) (bb) and (ee) and (i) (ii) (aa):*** *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* ***g. Northern Cape*** *ii. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* ***i. Western Cape*** *ii. Areas outside urban areas;* *(aa) Areas containing indigenous vegetation;* **Applicability:** The OHPL 400m wide corridor of the final pre-negotiated route traverse Critical Biodiversity Areas (according to the Western Cape Biodiversity Spatial Plan, 2017 and the Northern Cape Critical Biodiversity Areas, 2016) and fall within a National Protected Areas Expansion Strategy Focus Area. The OHPL will require an access road (of wider than 4m but less than 14m). The OHPL traverses both the Northern Cape and Western Cape Provinces.
	Activity 12 (g) (ii) and (i) (ii): *The clearance of an area of 300 square metres or more of indigenous vegetation. Except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.* ***g Northern Cape*** *ii. Within critical biodiversity areas identified in* *bioregional plans;* ***i. Western Cape*** *ii. Within critical biodiversity areas identified in bioregional plans.* **Applicability:** The construction of the OHPL tower structures, access roads and substation(s) will potentially require the clearance of indigenous vegetation where the combined area to be cleared will exceed 300 m^2. The OHPL 400m wide corridor of the final pre-negotiated route traverses Critical Biodiversity Areas (according to the Western Cape Biodiversity Spatial Plan, 2017 and the Northern Cape Critical Biodiversity Areas, 2016). The OHPL traverses both the Northern Cape and Western Cape Provinces.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	Activity 14 (ii) (a) and (c) (g) (ii) (bb) and (ff) (i)(i)(bb)(ff) *The development of—* *(ii) infrastructure or structures with a physical footprint of 10 square metres or more;* *where such development occurs—* *(a) within a watercourse;* *(b) in front of a development setback; or* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;.* ***g Northern Cape*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.* ***i. Western Cape*** *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans* **Applicability:** The proposed development will entail the construction of OHPL tower structures, access roads and associated infrastructure (buildings and other infrastructure) with a physical footprint of approximately 10m2 or more within a surface water feature / watercourse or within 32m of a surface water feature / watercourse. The OHPL 400m wide corridor of the final pre-negotiated route traverses Critical Biodiversity Areas (according to the Western Cape Biodiversity Spatial Plan, 2017 and the Northern Cape Critical Biodiversity Areas, 2016) and falls within National Protected Areas Expansion Strategy Focus Areas. The OHPL traverses both the Northern Cape and Western Cape Provinces.
	Activity 18 (g) (ii) (bb)(ee)(ii), (i)(ii)(aa) *The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre.* ***g. Northern Cape*** *ii. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *(ii) Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland;* ***i. Western Cape*** *ii. All areas outside urban areas:* *(aa) Areas containing indigenous vegetation;* **Applicability:**

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	For the OHPL, internal access roads will be required to access the substations, O&M building and powerline towers. Existing roads will be used wherever possible; however, where required, existing access roads will need to be upgraded by widening more than 4m and/or by lengthening more than 1km. The roads fall within Critical Biodiversity Areas (according to the Western Cape Biodiversity Spatial Plan, 2017 and the Northern Cape Critical Biodiversity Areas, 2016) and fall within National Protected Areas Expansion Strategy Focus Areas, within a watercourse and within 100m of a watercourse and areas containing indigenous vegetation. The OHPL traverses both the Northern Cape and Western Cape Provinces.
	Activity 23 (ii)(a)(c) (g).(ii) (bb) and (ee)and (i).(i). (bb) and (ff) *The expansion of—* *(ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs—* *(a) within a watercourse;* *(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;* *g. Northern Cape* *ii. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* *i. Western Cape* *i. Outside urban areas:* *(bb) National Protected Area Expansion Strategy Focus areas;* *(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;* **Applicability:** The OHPL will require the expansion of roads and other infrastructure by 10m2 or more within a watercourse or within 32m from a watercourse. Some of the existing access roads will need to be upgraded to be used as the OHPL servitude access roads and will traverse watercourses. The OHPL and roads fall within Critical Biodiversity Areas (according to the Western Cape Biodiversity Spatial Plan, 2017 and the Northern Cape Critical Biodiversity Areas, 2016) and fall within National Protected Areas Expansion Strategy Focus Areas, within a watercourse and within 100m of a watercourse and areas containing indigenous vegetation. The OHPL traverses both the Northern Cape and Western Cape Provinces.
Section 30 of the National Environmental Management Act (No. 107 of 1998)	Section 30 of NEMA deals with the reporting of and response to "incidents" and provides for certain statutory duties and responsibilities of the person responsible for the incident (the 'responsible person') and outlines the permissible actions of the 'relevant authority' to which the incident is reported. Section 30 deals with the reporting of and response to an unexpected, sudden and uncontrolled release of a hazardous substance, including from a major emission, fire or explosion, that causes, has caused or may cause significant harm to the environment, human life or property which is defined as an "incident" in section 30(1) of NEMA. **Applicability:**

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	Hazardous materials are not a key issue as small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. However, an Emergency Preparedness and Response Plan is included in Section 8.3 of the EMPr which notes the protocol to follow in the event that an incident occurs.
National Environmental Management Biodiversity Act (No. 10 of 2004)	The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) was promulgated in June 2004, within the framework of NEMA, to provide for the management and conservation of national biodiversity. NEMBA's primary aims are for the protection of species and ecosystems that warrant national protection, the sustainable use of indigenous biological resources, and the fair and equitable sharing of benefits arising from bioprospecting involving indigenous biological resources. In addition, NEMBA provides for the establishment and functions of the South African National Biodiversity Institute (SANBI). SANBI was established primarily to report on the status of the country's biodiversity and conservation status of all listed threatened or protected species and ecosystems. SANBI revised the Western Cape datasets during 2017 identifying CBAs as well as ecological support areas and published the 2017 Western Cape Biodiversity Spatial Plan (WCBSP). The identification of CBAs for the Northern Cape was undertaken using a Systematic Conservation Planning approach utilising the Northern Cape CBAs (2016), the Namakwa District Biodiversity Plan (Desmet and Marsh, 2008), and the Succulent Karoo Ecosystem Plan (Driver et al., 2003). The CBA maps indicate the most efficient selection and classification of land portions requiring safeguarding to meet national biodiversity objectives. As the proposed Karreebosch OHPL traverses a CBA, as well as the proposed substation site alternatives being situated on a CBA and ESA, a biodiversity impact assessment has been undertaken as part of the BA Process. The Threatened or Protected Species (TOPS) Regulations were promulgated on 1 June 2007 in terms of Section 91(1)(g), (h) and (i) of NEMBA. TOPS aims to further regulate the permit system set out in NEMBA, provide for the prohibition and regulation of restricted activities, and provide for the protection of wild populations of listed and threatened or protected species. The minister published amendments to the TOPS on 29 April 2014, which was updated to include for the regulations and registration of a number of activities for the capture, farming and handling of threatened or protected species (e.g. captive breeding facilities, sanctuaries, game farms and nurseries).
National Environmental Management Protected Areas Act (No. 57 of 2003)	The purpose of the National Environmental Management Protected Areas Act (No. 57 of 2003) (NEMPAA) is to, inter alia, provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes. To this end, it provides for the declaration and management of various types of protected areas. Section 50(5) of NEMPAA states that "*no development, construction or farming may be permitted in a nature reserve or world heritage site without the prior written approval of the management authority*." The Karreebosch OHPL route and substation site does not fall within any proclaimed protected areas as per NEMPAA. The Tanqua National Park is the closest National Park, situated 56 km to the north-west.
National Water Act (No. 36 of 1998)	The purpose of the National Water Act (No. 36 of 1998) (NWA) is to provide a framework for the equitable allocation and sustainable management of water resources. Both surface and groundwater sources are national resources, which cannot be owned by any individual, and rights to which are not automatically coupled to land rights, but for which prospective users must apply for authorisation and register as users. The NWA also provides for measures to prevent, control and remedy the pollution of surface and groundwater sources. The Act aims to regulate the use of water and activities (as defined in Part 4, Section 21), which may impact on water resources through the categorisation of 'listed water uses.' Defined water use activities require the approval of DWS in the form of a General Authorisation (GA) or Water Use Licence (WUL) authorisation.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	The proposed OHPL route and associated servitude access roads has several watercourse crossings. All the natural watercourses associated with the proposed development (including the ephemeral rivers and tributaries with riparian vegetation and the episodic drainage lines with no riparian vegetation) will be regulated by Section 21(c) and (i) of the NWA. All the natural watercourses will thus require authorisation from the Department of Water and Sanitation (DWS). Quantities of water required for the construction of the OHPL and substation are unknown at this stage. However, based on the proposed installation methodology (i.e. no concrete foundations), limited volumes of water will be required for installation of the OHPL and substation. As such, the main demand for water will be for dust suppression (non-potable) and to service the site camp (potable). The contractor appointed for the construction of the OHPL will be required to arrange a suitable water supply. Should groundwater be abstracted as part of project activities, a WUL/GA would potentially be required.
National Heritage Resources Act (No. 25 of 1999)	The National Heritage Resource Act (Act No. 25 of 1999) (NHRA) serves to protect national and provincial heritage resources across South Africa. The NHRA provides for the protection of all archaeological and palaeontological sites, the conservation and care of cemeteries and graves by the South African Heritage Resource Agency (SAHRA), and lists activities which require any person who intends to undertake to notify the responsible heritage resources agency and furnish details regarding the location, nature, and extent of the proposed development. In terms of the Section 38 of NHRA, any person who intends to undertake a linear development including, inter alia, a powerline, exceeding 300m in length or a development that exceeds 5000m^2 must notify the heritage resources authority and undertake the necessary assessment requested by that authority. As the proposed Karreebosch OHPL is approximately up to 14.51 km in length, a Notice of Intent to Develop (NID) is required. A Heritage NID was submitted to Heritage Western Cape (HWC) for the project on **3 August 2022**. Construction activities should be conducted carefully, and all activities ceased if any archaeological, cultural and heritage resources are discovered. HWC should be notified and investigation conducted in accordance with the Chance Find Procedure to be established for the Project before any activities can commence.
National Environmental Management Waste Act (No. 59 of 2008)	The National Environmental Management Waste Act (No. 59 of 2008) (NEMWA) is subsidiary and supporting legislation to NEMA. NEMA is a framework legislation that provides the basis for the regulation of waste management. NEMA also contains policy elements and gives a mandate for further regulations to be promulgated. It is anticipated that activities on the site will not trigger the NEMWA list of waste management activities that require a Waste Management Licence (WML). However, waste handling, storage and disposal during the construction and operational phase of the project must be undertaken in accordance with the requirements of this Act and the Best Practicable Environmental Option (BPEO) which will be incorporated into the site-specific Environmental Management Programme (EMPr) as well as the generic EMPrs
National Environment Management Air Quality Act (No. 39 of 2004)	The National Environment Management: Air Quality Act (No. 39 of 2004) (NEMAQA) came into effect on 11 September 2005. Persons undertaking such activities listed under GNR 893, as amended, are required to possess an Atmospheric Emissions License (AEL). The National Dust Control Regulations (GNR 827) were promulgated in terms of Section 32 of NEMAQA, which aim at prescribing general measures for the control of dust in both residential and non-residential areas. Although no AEL will be required for the construction and operation of the OHPL and substation, the dust control regulations will be applicable during construction.

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
Conservation of Agricultural Resources Act (No. 43 of 1983)	The Conservation of Agricultural Resources Act (Act 43 of 1983) (CARA) provides for the implementation of control measures for soil conservation works as well as alien and invasive plant species in and outside of urban areas. In terms of the amendments to the regulations under the CARA, landowners are legally responsible for the control of alien species on their properties. Various Acts administered by the DFFE and the DWS, as well as other laws (including local by-laws), spell out the fines, terms of imprisonment and other penalties for contravening the law. Although no fines have yet been placed against landowners who do not remove invasive species, the authorities may clear their land of invasive alien plants and other alien species entirely at the landowners' cost and risk. The CARA Regulations with regards to alien and invasive species have been superseded by NEMBA Alien and Invasive Species (AIS) Regulations which became law on 1 October 2014.
Civil Aviation Act (No. 13 of 2009)	Civil aviation in South Africa is governed by the Civil Aviation Act (Act 13 of 2009). This Act provides for the establishment of a stand-alone authority mandated with controlling, promoting, regulating, supporting, developing, enforcing and continuously improving levels of safety and security throughout the civil aviation industry. This mandate is fulfilled by SACAA as an agency of the Department of Transport (DoT). SACAA achieves the objectives set out in the Act by complying with the Standards and Recommended Practices (SARPs) of the International Civil Aviation Organisation (ICAO), while considering the local context when issuing the South African Civil Aviation Regulations. All proposed developments or activities in South Africa that potentially could affect civil aviation must thus be assessed by SACAA in terms of the Civil Aviation Regulations and South African Civil Aviation Technical Standards (SA CATS) to ensure aviation safety. Potential impacts from the power lines must be reviewed by these authorities. The Obstacle Evaluation Committee (OEC) which consists of members from both the SACAA and South African Air Force (SAAF) fulfils the role of streamlining and coordinating the assessment and approvals of proposed developments or activities that have the potential to affect civil aviation, military aviation, or military areas of interest. The Sutherland Aerodrome is approximately 38km north east of the OHPL. The DEA Screening Tool Report identified Civil Aviation as having low sensitivity for the proposed OHPL. SACAA have been included on the project stakeholder database. Refer to the SER (Appendix D of the FBAR) for comments received. An Application for the Approval of Obstacles will also be submitted to SACAA.
Occupational Health and Safety Act (No. 85 of 1993)	The National Occupational Health and Safety Act (No. 85 of 1993) (OHSA) and the relevant regulations under the Act are applicable to the proposed project. This includes the Construction Regulations promulgated in 2014 under Section 43 of the Act. Adherence to South Africa's OHSA and its relevant Regulations is essential.
National Energy Act (No. 34 of 2008)	The National Energy Act aims to ensure that diverse energy resources are available, in sustainable quantitates, and at affordable prices, to the South African economy in support of economic growth and poverty alleviation, taking into account environmental management requirements and interactions amongst economic sectors. The main objectives of the Act are to: — Ensure uninterrupted supply of energy to the Republic; — Promote diversity of supply of energy and its sources; — Facilitate effective management of energy demand and its conservation; — Promote energy research; — Promote appropriate standards and specifications for the equipment, systems and processes used for producing, supplying and consuming energy; — Ensure collection of data and information relating to energy supply, transportation and demand;

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	— Provide for optimal supply, transformation, transportation, storage and demand of energy that are planned, organised and implemented in accordance with a balanced consideration of security of supply, economics, consumer protection and a sustainable development; — Provide for certain safety, health and environment matters that pertain to energy; — Facilitate energy access for improvement of the quality of life of the people of Republic; — Commercialise energy-related technologies; — Ensure effective planning for energy supply, transportation, and consumption; and — Contribute to sustainable development of South Africa's economy. In terms of the act, the Minister of Energy is mandated to develop and, on an annual basis, review and publish the Integrated Energy Plan (IEP) in the Government Gazette. The IEP analyses current energy consumption trends within different sectors of the economy (i.e. agriculture, commerce, industry, residential and transport) and uses this to project future energy requirements, based on different scenarios. The IEP and the Integrated Resource Plan are intended to be updated periodically to remain relevant. The framework is intended to create a balance between energy demand and resource availability so as to provide low-cost electricity for social and economic development, while taking into account health, safety and environmental parameters.
Electricity Regulation Act (No. 4 of 2006)	The Electricity Regulation Act (No. 4 of 2006) (ERA) aims to: — Achieve the efficient, effective, sustainable and orderly development and operation of electricity supply infrastructure in South Africa; — Ensure that the interests and needs of present and future electricity customers and end users are safeguarded and met, having regard to the governance, efficiency. effectiveness and long-term sustainability of the electricity supply industry within the broader context of economic energy regulation in the Republic: — Facilitate investment in the electricity supply industry; — Facilitate universal access to electricity; — Promote the use of diverse energy sources and energy efficiency; — Promote competitiveness and customer and end user choice; and — Facilitate a fair balance between the interests of customers and end users, licensees, investors in the electricity supply industry and the public. The Act establishes a National Energy Regulator as the custodian and enforcer of the National Electricity Regulatory Framework. The Act also provides for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated.
Procedures for the Assessment and Minimum Criteria for Reporting on Identified Environmental Themes **(GNR 320, 20 March 2020 and GNR 1150, 30 October 2020)**	The protocols provide the criteria for specialist assessment and minimum report content requirements for impacts for various environmental themes for activities requiring environmental authorisation. The protocols replace the requirements of Appendix 6 of the EIA Regulations, 2014, as amended. The assessment and reporting requirements of the protocols are associated with a level of environmental sensitivity identified by the national web based environmental screening tool (screening tool). Two Screening Reports were generated for the project for powerline and substation categories. The following environmental themes were applicable to the Karreebosch OHPL and Substation project: — Agricultural Theme — Animal Species Theme — Aquatic Biodiversity Theme — Archaeological and Cultural Heritage Theme — Civil Aviation Theme — Defence Theme

APPLICABLE LEGISLATION	DESCRIPTION OF LEGISLATION
	— Palaeontology Theme — Plant Species Theme — Terrestrial Biodiversity Theme

Table 2.2: Applicable Policies

APPLICABLE POLICY	DESCRIPTION OF POLICY
National Development Plan	The National Development Plan aims to eliminate poverty and reduce inequality by 2030. The NDP identifies a number of enabling milestones. Of relevance to the proposed development the NDP refers to the need to produce sufficient energy to support industry at competitive prices and ensure access for poor households, while reducing carbon emissions per unit of power by about one-third. In this regard the infrastructure is not just essential for faster economic growth and higher employment. It also promotes inclusive growth, providing citizens with the means to improve their own lives and boost their incomes. Infrastructure is essential to development. Chapter 3, Economy and Employment, identifies some of the structural challenges specific to South Africa, including an energy constraint that will act as a cap on growth and on options for industrialisation. The NDP notes that from an environmental perspective South Africa faces several related challenges. The reduction of greenhouse gas emissions and shift to a green low-carbon economy, is one of these challenges. In terms of implementation the NDP identifies three phases. The first two are of specific relevance to the proposed project. The first phase (2012–2017) notes that ensuring the supply of energy and water is reliable and sufficient for a growing economy. The second phase (2018–2023) involves building on the first phase to lay the foundations for more intensive improvements in productivity. The provision of affordable and reliable energy is a key requirement for this to take place. Chapter 4, Economic infrastructure, notes that economic infrastructure provides the foundation for social and economic development. In this regard South Africa must invest in a strong network of economic infrastructure designed to support the country's medium- and long-term economic and social objectives. The plan envisages that, by 2030, South Africa will have an energy sector that promotes: — Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation. — Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change. More specifically, South Africa should have adequate supply security in electricity and in liquid fuels, such that economic activity, transport, and welfare are not disrupted. The plan sets out steps that aim to ensure that, in 20 years, South Africa's energy system looks very different to the current situation. In this regard coal will contribute proportionately less to primary-energy needs, while gas and renewable energy resources, will play a much larger role.
Integrated Resource Plan 2010 – 2030	The integrated resource plan (IRP) is an electricity capacity plan which aims to provide an indication of the country's electricity demand, how this demand will be supplied and what it will cost. On 6 May 2011, the then Department of Energy (DoE) released the Integrated Resource Plan 2010-2030 (IRP 2010) in respect of South Africa's forecast energy demand for the 20-year period from 2010 to 2030. The promulgated IRP 2010–2030 identified the preferred generation technology required to meet expected demand growth up to 2030. It incorporated government objectives such as affordable electricity, reduced greenhouse gas (GHG) emissions, reduced

APPLICABLE POLICY	DESCRIPTION OF POLICY
	water consumption, diversified electricity generation sources, localisation and regional development. The IRP recognises that Solar photovoltaic (PV), wind and concentrated solar power (CSP) with storage present an opportunity to diversify the electricity mix, to produce distributed generation and to provide off-grid electricity. Renewable technologies also present huge potential for the creation of new industries, job creation and localisation across the value chain.
New Growth Path (23 November 2010)	Government released the New Economic Growth Path Framework on 23 November 2010. The aim of the framework is to enhance growth, employment creation and equity. The policy's principal target is to create five million jobs over the next 10 years and reflects government's commitment to prioritising employment creation in all economic policies. The framework identifies strategies that will enable South Africa to grow in a more equitable and inclusive manner while attaining South Africa's developmental agenda. Central to the New Growth Path is a massive investment in infrastructure as a critical driver of jobs across the economy. In this regard the framework identifies investments in five key areas namely: energy, transport, communication, water, and housing.
National Infrastructure Plan (2012)	The South African Government adopted a National Infrastructure Plan (NIP) in 2012. The NIP aims to transform the South African economic landscape while simultaneously creating significant numbers of new jobs and strengthening the delivery of basic services. It outlines the challenges and enablers which needs to be addressed in the building and developing of infrastructure. The Presidential Infrastructure Coordinating Commission (PICC) was established by the Cabinet to integrate and coordinate the long-term infrastructure build. The plan also supports the integration of African economies. In terms of the plan Government will invest R827 billion over the next three years to build new and upgrade existing infrastructure. The aim of the investments is to improve access by South Africans to healthcare facilities, schools, water, sanitation, housing and electrification. The plan also notes that investment in the construction of ports, roads, railway systems, ***electricity plants***, hospitals, schools and dams will contribute to improved economic growth.
Strategic Integrated Projects	As part of the NIP and in terms of Section 8(1)(a) read with Section 7(1) of the Infrastructure Development Act, as amended (Act 23 of 2014), large-scale infrastructure projects, known as Strategic Integrated Projects (SIPs), have been identified across all nine provinces. Eighteen (18) SIPs have been prioritised as part of the NIP. SIPs cover catalytic projects that can fast-track development and growth. Work is being aligned with key cross-cutting areas: human settlement planning and skills development. The SIPs comprise: — Five Geographically focussed SIPs (SIP 1 to 5); — Three Spatial SIPs (SIP 6, 7 and 11); — Three Energy SIPs (SIP 8 to 10); — Three Social Infrastructure SIPs (SIP 12 to 14); — Two Knowledge SIPs (SIP 15 and 16); — One Regional Integration SIP (SIP 17); and — One Water and Sanitation SIP (SIP 18). **SIP 10: Electricity Transmission and Distribution for All** aims to "*expand the transmission and distribution network to address historical imbalances, provide access to electricity for all and support economic development*" in South Africa. SIP 10 recognises that a reliable transmission network with adequate capacity to meet customer needs is a fundamental condition for the provision of a reliable electricity supply in South Africa. To remain reliable, the transmission system requires not only maintenance, but must also be developed and expanded to meet changing electricity demand and energy generation requirements. A reliable transmission network and an effective process for enabling network expansion, is therefore critical to the realisation of development plans and services, including job creation, the provision of

APPLICABLE POLICY	DESCRIPTION OF POLICY
	quality education and health care, and the upliftment of previously disadvantaged communities. The Strategic Environmental Assessment (SEA) for Electricity Grid Infrastructure (EGI) in South Africa (CSIR, 2016) identified five Strategic Transmission Corridors that are of strategic importance for the rollout of the supporting large-scale electricity transmission and distribution infrastructure in terms of SIP 10. The EGI SEA identified the optimal location for strategic corridors where transmission infrastructure expansion is needed to enable the regionalised balancing of future demand and supply requirements, whilst minimising negative impacts to the environment. GN 113 of 16 February 2018 approved the Strategic Transmission Corridors, which support areas where long-term electricity grid infrastructure will be developed and where an integrated decision-making process for applications for EA in terms of NEMA will be followed. Applications for EA for large scale electricity transmission and distribution facilities, when such facilities trigger Activity 9 of Listing Notice 2 of the EIA Regulations (2014, as amended) and any other listed activities necessary for the realisation of such facilities, and where the greater part of the proposed facility is to occur in one or more such Strategic Transmission Corridors, must follow a BA procedure (and not a full S&EIA). The timeframe for decision-making is 57 days. Routes that have been pre-negotiated with landowners must be submitted as part of the application for an EA. The proposed Karreebosch OHPL and substation falls within the Central Strategic Transmission Corridor of the promulgated Strategic Transmission Corridors per GN 113 and will be subject to the shorter decision-making timeframes.
Integrated Energy Plan (25 November 2016)	The development of a National Integrated Energy Plan (IEP) was envisaged in the White Paper on the Energy Policy of the Republic of South Africa of 1998 and, in terms of the National Energy Act, 2008 (Act No. 34 of 2008), the Minister of Energy is mandated to develop and, on an annual basis, review and publish the IEP in the Government Gazette. The purpose of the IEP is to provide a roadmap of the future energy landscape for South Africa which guides future energy infrastructure investments and policy development. The IEP notes that South Africa needs to grow its energy supply to support economic expansion and in so doing, alleviate supply bottlenecks and supply-demand deficits. In addition, it is essential that all citizens are provided with clean and modern forms of energy at an affordable price. As part of the Integrated Energy Planning process, eight key objectives are identified, namely: — Objective 1: Ensure security of supply. — Objective 2: Minimise the cost of energy. — Objective 3: Promote the creation of jobs and localisation. — Objective 4: Minimise negative environmental impacts from the energy sector. — Objective 5: Promote the conservation of water. — Objective 6: Diversify supply sources and primary sources of energy. — Objective 7: Promote energy efficiency in the economy. — Objective 8: Increase access to modern energy. The IEP provides an assessment of current energy consumption trends within different sectors of the economy (i.e., agriculture, commerce, industry, residential and transport) and uses this information to identify future energy requirements, based on different scenarios. The scenarios are informed by different assumptions on economic development and the structure of the economy and also take into account the impact of key policies such as environmental policies, energy efficiency policies, transport policies and industrial policies, amongst others. Based on this information the IEP then determines the optimal mix of energy sources and technologies to meet those energy needs in the most cost-effective manner for each of the scenarios. The associated environmental impacts, socio-economic benefits

APPLICABLE POLICY	DESCRIPTION OF POLICY
	and macroeconomic impacts are also analysed. The IEP is therefore focused on determining the long-term energy pathway for South Africa, taking into account a multitude of factors which are embedded in the eight objectives. As part of the analysis four key scenarios were developed, namely the Base Case, Environmental Awareness, Resource Constrained and Green Shoots scenarios: — The Base Case Scenario assumes that existing policies are implemented and will continue to shape the energy sector landscape going forward. It assumes moderate economic growth in the medium to long term. — The Environmental Awareness Scenario is characterised by more stringent emission limits and a more environmentally aware society, where a higher cost is placed on externalities caused by the supply of energy. — The Resource Constrained Scenario in which global energy commodity prices (i.e. coal, crude oil and natural gas) are high due to limited supply. — The Green Shoots Scenario describes an economy in which the targets for high economic growth and structural changes to the economy, as set out in the National Development Plan (NDP), are met. The IEP notes that South Africa should continue to pursue a diversified energy mix which reduces reliance on a single or a few primary energy sources. In terms of existing electricity generation capacity, the IEP indicates that existing capacity starts to decline notably from 2025, with significant plant retirement occurring in 2031, 2041 and 2048. By 2050 only 20% of the current electricity generation capacity remains. As a result, large investments are required in the electricity sector in order to maintain an adequate supply in support of economic growth. By 2020, various import options become available, and some new coal capacity is added along with new wind, solar and gas capacity. The mix of generation capacity technologies by 2050 is considerably more diverse than the current energy mix, across all scenarios. The main differentiating factors between the scenarios are the level of demand, constraints on emission limits and the carbon dioxide externality costs. In all scenarios the energy mix for electricity generation becomes more diverse over the period to 2050, with coal reducing its share from about 85% in 2015 to 15–20% in 2050 (depending on the scenario). Solar, wind, nuclear, gas and electricity imports increase their share. The Environmental Awareness and Green Shoots scenarios take on higher levels of renewable energy. An assessment of each scenario against the eight objectives with reference to renewable energy notes while all scenarios seek to ensure that costs are minimised within the constraints and parameters of each scenario, the Base Case Scenario presents the least cost followed by the Environmental Awareness, Resource Constrained and Green Shoots scenarios respectively when total energy system costs are considered. In terms of promoting job creation and localisation potential the Base Case Scenario presents the greatest job creation potential, followed by the Resource Constrained, Environmental Awareness and Green Shoots scenarios respectively. In all scenarios, approximately 85% of total jobs are localisable. For electricity generation, most jobs result from solar technologies followed by nuclear and wind, with natural gas and coal making a smaller contribution. The Environmental Awareness Scenario, due to its stringent emission constraints, shows the lowest level of total emissions over the planning horizon. This is followed by the Green Shoots, Resource Constrained and Base Case scenarios. These trends are similar when emissions are considered cumulatively and individually by type.
National Protected Area Expansion Strategy, 2010	The National Protected Area Expansion Strategy 2010 (NPAES) areas were identified through a systematic biodiversity planning process. They present the best opportunities for meeting the ecosystem-specific protected area targets set in the NPAES and were designed with strong emphasis on climate change resilience and requirements for protecting freshwater ecosystems. These areas should not be seen as future boundaries of protected areas, as in many cases only a portion of a particular focus area would be required to meet the protected area targets set in the NPAES. They are also not a replacement for fine scale planning which may identify a range of different priority sites based on local requirements, constraints and opportunities

APPLICABLE POLICY	DESCRIPTION OF POLICY
	(NPAES, 2010, initial draft release 2018). The OHPL and substation falls within an NPAES focus area.

2.2 PROVINCIAL AND MUNICIPAL LEGAL AND REGULATORY FRAMEWORK

Table 2-3: Provincial and Municipal Plans

APPLICABLE PLAN	DESCRIPTION OF PLAN
Northern Cape Nature Conservation Act (Act No. 9 of 2009)	The purpose of the act is to provide for the sustainable utilisation of wild animals, aquatic biota and plants; to provide for the implementation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora; to provide for offences and penalties for contravention of the Act; to provide for the appointment of nature conservators to implement the provisions of the Act and to provide for the issuing of permits and other authorisations. Schedule 1 and 2 of the Act give extensive lists of specially protected and protected fauna and flora species.
Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000):	This Act lists Protected species, requiring permits for removal (CapeNature) relating to The Nature and Environmental Conservation Ordinance, 1974.
Cape Nature and Environmental Conservation Ordinance (No. 19 of 1974)	The purpose of this ordinance to consolidate and amend the laws relating to nature conservation and to provide for matters incidental thereto. It is proposed in the Western Cape Biodiversity Draft Bill, 2019, that the Ordinance is repealed in so far as it relates to the Western Cape Province.
Northern Cape CBA Map (2016)	The Northern Cape CBA Map identifies biodiversity priority areas, CBAs and Ecological Support Areas (ESAs), which, together with Protected Areas, are important for the persistence of a viable representative sample of all ecosystem types and species, as well as the long-term ecological functioning of the landscape as a whole. The Northern Cape Critical Biodiversity Area (CBA) Map updates, revises and replaces all older systematic biodiversity plans and associated products for the province. These include the: – Namakwa District Biodiversity Sector Plan;(2018) ▪ Cape Fine-Scale Plan (only the extent of the areas in the Northern Cape i.e. Bokkeveld and Nieuwoudtville); and ▪ Richtersveld Municipality Biodiversity Assessment. As the proposed Karreebosch OHPL traverses a CBA as well as the substations site being located on a CBA and ESA, a biodiversity impact assessment has been undertaken as part of the BA Process.
Northern Cape Provincial Growth and Development Plan(2005)	The Northern Cape Provincial Growth and Development Plan (NCPGDP) is aligned with NDP-2030 and seeks to eradicate poverty, inequality and halve unemployment by 2030. The NCPGDP identifies four key drivers to achieve the vision and reduce poverty and unemployment. Economic transformation and growth, social transformation and human welfare and environmental sustainability and resilience are relevant to identifying and assessing needs.

APPLICABLE PLAN	DESCRIPTION OF PLAN
	— Economic transformation and growth, which is aimed at creating employment opportunities and thereby reducing poverty. Skills development and training is identified as a key need. — Social transformation and human welfare, which is aimed at improving education levels, access to affordable and quality health care, improved safety, and security, and creating sustainable human settlements. — Environmental sustainability and resilience, which is aimed at protecting the regions natural resources and addressing the threats posed by climate change.
Northern Cape Provincial Growth and Development Strategy (2005)	The NCPGDS identifies poverty reduction as the most significant challenge facing the government and its partners. All other societal challenges that the province faces emanate predominantly from the effects of poverty. The NCPGDS notes that the only effective way to reduce poverty is through long-term sustainable economic growth and development. The sectors where economic growth and development can be promoted include: — Agriculture and Agro-processing; — Fishing and Mariculture; — Mining and mineral processing; — Transport; — Manufacturing; and — Tourism. However, the NCPGDS also notes that economic development in these sectors also requires: — Creating opportunities for lifelong learning; — Improving the skills of the labour force to increase productivity; — Increasing accessibility to knowledge and information. The achievement of these primary development objectives depends on the achievement of a number of related objectives that, at a macro-level, describe necessary conditions for growth and development. These are: — Developing requisite levels of human and social capital; — Improving the efficiency and effectiveness of governance and other development institutions; and — Enhancing infrastructure for economic growth and social development. Of specific relevance to the Project, the NCPGDS make reference to the need to ensure the availability of inexpensive energy. The section notes that in order to promote economic growth in the Northern Cape the availability of electricity to key industrial users at critical localities at rates that enhance the competitiveness of their industries must be ensured. At the same time, the development of new sources of energy through the promotion of the adoption of energy applications that display a synergy with the province's natural resource endowments must be encouraged. The NCPGDS also highlights the importance of close co-operation between the public and private sectors in order for the economic development potential of the Northern Cape to be realised. The NCPGDS also highlights the importance of enterprise development, and notes that the current levels of private sector development and investment in the Northern Cape are low. In addition, the province also lags in the key policy priority areas of SMME Development and Black Economic Empowerment. The proposed OHPL therefore has the potential to create opportunities to promote private sector investment and the development of SMMEs in the Northern Cape Province. In this regard, care will need to be taken to ensure that the proposed Project does not negatively impact on the region's natural environment. In this regard, the NCPGDS notes that the sustainable utilisation of the natural resource base on which agriculture depends is critical in the Northern Cape with its fragile eco-systems and vulnerability to climatic variation. The document also indicates that due to the province's exceptional natural and cultural attributes, it has the potential to become the preferred

APPLICABLE PLAN	DESCRIPTION OF PLAN
	adventure and ecotourism destination in South Africa. Care therefore needs to be taken to ensure that the development of large renewable energy projects, such as the proposed WEF and associated grid infrastructure, do not affect the tourism potential of the province.
Northern Cape Provincial Spatial Development Framework (2012)	The Northern Cape Provincial Spatial Development Framework (NCSDF) (2012) lists a number of sectoral strategies and plans are to be read and treated as key components of the PSDF. Of these there are a number that are relevant to the proposed Project. These include: – Sectoral Strategy 1: Provincial Growth and Development Strategy of the Provincial Government; – Sectoral Strategy 2: Comprehensive Growth and Development Programme of the Department of Agriculture, Land Reform and Rural Development; – Sectoral Strategy 5: Local Economic Development (LED) Strategy of the Department of Economic Development and Tourism; – Sectoral Strategy 11: Small Micro Medium Enterprises (SMME) Development Strategy of the Department of Economic Development and Tourism; – Sectoral Strategy 12: Tourism Strategy of the Department of Economic Development and Tourism; and – Sectoral Strategy 19: Provincial renewable energy strategy (to be facilitated by the Department of Economic Development and Tourism). Under Section B 14.4, Energy Sector, the NCSDF (2012), notes the total area of high radiation in South Africa amounts to approximately 194 000 km^2 of which the majority falls within the Northern Cape. It is estimated that, if the electricity production per km^2 of mirror surface in a solar thermal power station were 30.2 MW and only 1% of the area of high radiation were available for solar power generation, then generation potential would equate to approximately 64 GW. A mere 1.25% of the area of high radiation could thus meet projected South African electricity demand in 2025 (80 GW) (NCPSDF, 2012). However, the SDF does indicate that this would require large investments in transmission lines from the areas of high radiation to the main electricity consumer centres. Section C8.2.3, Energy Objectives, sets out the energy objectives for the Northern Cape Province. The section makes specific reference to renewable energy. The objectives are listed below: – Promote the development of renewable energy supply schemes. Large-scale renewable energy supply schemes are strategically important for increasing the diversity of domestic energy supplies and avoiding energy imports while minimizing detrimental environmental impacts. – Develop and institute innovative new energy technologies to improve access to reliable, sustainable, and affordable energy services with the objective to realize sustainable economic growth and development. The goals of securing supply, providing energy services, tackling climate change, avoiding air pollution, and reaching sustainable development in the province offer both opportunities and synergies which require joint planning between local and provincial government as well as the private sector. – Develop and institute energy supply schemes with the aim to contribute to the achievement of the targets set by the White Paper on Renewable Energy (2003). This target relates to the delivery of 10 000 GWh of energy from renewable energy sources (mainly biomass, wind, solar, and small-scale hydro) by 2013. Section C8.3.3, Energy Policy, sets out the policy guidelines for the development of the energy sector, with specific reference to the renewable energy sector. – The construction of infrastructure must be strictly regulated in terms of the spatial plans and guidelines put forward in the PSDF. They must be carefully placed to avoid visual impacts on landscapes of significant symbolic,

APPLICABLE PLAN	DESCRIPTION OF PLAN
	aesthetic, cultural or historic value and should blend in with the surrounding environment to the extent possible. EIAs/BAs undertaken for such construction must assess the impacts of such activities.
Western Cape Spatial Development Framework (2014)	The Western Cape Provincial Spatial Development Framework, 2014 (PSDF) is an approved structure plan in terms of the Spatial Planning and Land Use Management Act (Act 16 of 2013) (SPLUMA) and the Land Use Planning Act (Act 3 of 2014) (LUPA) and aims to give spatial expression to the NDP and One Cape 2040 initiatives. It provides guidelines for district, metropolitan and local municipal spatial initiatives such as Integrated Development Plans (IDPs) and Spatial Development Frameworks (SDFs). The PSDF is a broad-based document and does not control development or land use proposals at a micro-scale (e.g. individual properties). It is, however, relevant in setting out overarching planning policy guidelines adopted by the Provincial Government, and major development applications need to take guidance from and be evaluated in terms of these policy guidelines. The Western Cape PSDF is underpinned by three interrelated themes, namely: — Sustainable use of the Western Cape's spatial assets (resources); — Opening up opportunities in the Provincial space-economy (space economy); and — Developing integrated and sustainable settlements (settlement). The WCPSDF also includes the following spatial agenda: — Grow the Province's economy in partnership with the private sector, non-government and community based organisations; — Use infrastructure investment as the primary lever to ensure urban and rural spatial transitions; and — Improve the sustainable use of the Province's spatial assets and resources. Key spatial challenges are outlined in Chapter 2 of the PSDF. Energy security and climate change response are identified as key high-level future risk factors. With regard to energy use, the PSDF notes that the Cape Metro (albeit the province's most efficient user) and West Coast regions are the Province's main energy users. It further notes that the Western Cape's electricity is primarily drawn from the national grid, which is dominated by coal-based power stations, and that the province currently has a small emergent renewable energy sector in the form of wind and solar generation facilities located in its more rural, sparsely populated areas. With regard to renewable energy, the following policy provisions are of relevance: — Policy R.4.6: Pursue energy diversification and energy efficiency in order for the Western Cape to transition to a low carbon, sustainable energy future, and delink economic growth from energy use. — R.4.7: Support emergent Independent Power Producers (IPPs) and sustainable energy producers (wind, solar, biomass and waste conversion initiatives) in suitable rural locations (as per recommendations of the Strategic Environmental Assessments for wind energy (DEA&DP) and renewable energy (DFFE). Water scarcity is identified as probably the key risk associated with climate change. Policy provisions are made with regard to climate change adaptation and mitigation. Concerning renewable energy, the following is of relevance: — R.4.16: Encourage and support renewable energy generation at scale.
Western Cape Infrastructure Framework (2013)	The Western Cape Infrastructure Framework (WCIF) (2013) was developed by the WCP Provincial Department of Transport and Public Works in terms of the Provincial Government's mandate to coordinate provincial planning under Schedule 5A of the Constitution. The objective of the WCIF is to align the planning, delivery and management of infrastructure to the strategic agenda and vision for the province, as outlined in the 2009-2014 Draft Provincial Strategic Plan. The One Cape 2040 and 2013 Green is Smart strategy were other key informants.

APPLICABLE PLAN	DESCRIPTION OF PLAN
	The document notes that given the status quo of infrastructure in the province, and the changing and uncertain world facing the Western Cape over the 2-3 decades a new approach to infrastructure is needed. Namely one that satisfies current needs and backlogs, maintains the existing infrastructure, and plans proactively for a desired future outcome. The 2040 vision requires a number of transitions to shift fundamentally the way in which infrastructure is provided and the type of infrastructure provided in WCP. The WCIF addresses new infrastructure development under five major 'systems' (themes), and outlines priorities for each. Energy is one of the 'systems' identified. The document notes that a provincial demand increase of 3% per year is anticipated for the period 2012-2040. Key priorities are in matching energy generation/ sourcing with the demand needed for WCP economic growth. Additionally, the energy focus should be on lowering the provincial carbon footprint, with an emphasis on renewable and locally generated energy. Three key transitions are identified for the WCP Energy 'system' infrastructure, namely: — Shifting transport patterns to reduce reliance on liquid fuels. — Promoting natural gas as a transition fuel by introducing gas processing and transport infrastructure. — Promoting the development of renewable energy plants in the province and associated manufacturing capacity
Namakwa Biodiversity Sector Plan (2008)	Northern Cape Department of Environment and Nature Conservation published the Namakwa Biodiversity Sector Plan in 2008. The purpose of the plan is to ensure that biodiversity information can be accessed and utilized by local municipalities within the Namakwa District Municipality (NDM) to inform land use planning and development as well as decision making processes within the NDM. Furthermore, it is intended to help guide land use planning, environmental assessments and authorisations and natural resource management in order to promote development that occurs in a sustainable manner. The plan includes a map of CBAs for the Namakwa District. The CBA map indicates the most efficient selection and classification of land portions requiring safeguarding to meet national biodiversity objectives. As the proposed Karreebosch OHPL traverses a CBA, as well as the substation being located on CBA and ESA sites, a biodiversity impact assessment has been undertaken as part of the BA Process.
Namakwa Bioregional Plan (2018 draft)	Northern Cape Department of Environment and Nature Conservation released the draft Namakwa Bioregional Plan in 2018. This plan is intended to help guide land-use planning, environmental assessments and authorisations; and, natural resource management in order to promote development which occurs in a sustainable manner. It has been developed to further the awareness of the unique biodiversity in the area, the value this biodiversity represents to people as well as the management mechanisms that can ensure its protection and sustainable utilization. The purpose of this document is to ensure that biodiversity information can be accessed and utilized by local municipalities within the Namakwa District Municipality (NDM) to inform land use planning and development as well as decision making processes within the NDM. The plan includes a map of CBAs for the Namakwa District. The CBA map indicates the most efficient selection and classification of land portions requiring safeguarding to meet national biodiversity objectives. As the proposed Karreebosch OHPL traverses a CBA as well as the substation being located on CBA and ESA sites, a biodiversity impact assessment has been undertaken as part of the BA Process.
Karoo Hoogland Integrated Development Plan (2017 – 2022)	The KH IDP (2017-2022) identifies four Key Performance Areas (KPAs). KPA 1, Basic Service Delivery and KPA 2, Local Economic Development, are the most relevant to the proposed project.

APPLICABLE PLAN	DESCRIPTION OF PLAN
	KPA 1: Basic Service Delivery — Strategic Objectives: ▪ Provide quality of living human settlements with adequate infrastructure — Outcome: ▪ Improved quality of municipal basic service delivery in formalised areas: potable water, waste water, electricity, and solid waste ▪ Improved mobility through the provision of quality municipal roads and storm water drainage — Programme: — Electrification — Water and Sanitation. — Roads and Storm water. — Waste Management. — Health Services. — Education and Libraries. — Safety and Security. — Climate Change. — Public Transport. — Environmental Management **KPA 2:** Local Economic Development — Strategic Objectives: ▪ Transform Urban areas to vibrant economic centres that are safe and secure. ▪ Promote growth and diversification of the local economy. ▪ Promote BBBEE development. ▪ Promote healthy living and working environments. ▪ Promote social cohesion through economic and social development — Outcome: ▪ Renewed urban economic centres. ▪ Growing and diversifying local economy. ▪ Sustainable BBBEE enterprises and SMME's in the local economy. ▪ Improved levels of employment in the local economy. ▪ Improved quality of public health services. ▪ Improved social integration and cohesion — Programme: ▪ Economic growth and development. ▪ Poverty Alleviation. ▪ Tourism. ▪ SMME Development In terms of KPA 2, Local Economic Development (LED), the IDP highlights the importance of private public partnerships for achieving economic development in the KH. The LED policy framework identifies a number of LED Policy Pillars/Thrusts. Of relevance to the Needs Assessment these include building a diverse economic base, developing learning and skilful economies, and enterprise development and support. The IDP identifies a number of projects associated with the LED Pillar/Thrusts. Of relevance these include: **Building a diverse economic base** — Investigate possible opportunities for development of renewable energy. **Developing learning and skilful local economies**

APPLICABLE PLAN	DESCRIPTION OF PLAN
	— Identify skill gaps and implements skills development and training programmes **Developing inclusive economies** — Support the informal and rural economy. — Support development of women and the youth. — Establish community gardens. The IDP also highlights the need to support for the rural economy, with specific reference to the One House Hold One Hectare (1HH1HA) Programme. The Objectives of the 1HH1HA Programme include reducing poverty in rural areas, creating opportunities for Black Commercial Smallholding Farmers, improving security of tenure for historically disadvantaged (HD) rural communities and develop farming skills. The benefits for the 1HH1HA Programme include job creating, poverty alleviation, food security, skills development, security of tenure and restoration of dignity to marginalised HD rural communities. KPA 2, Local Economic Development (LED) identifies the need to address the challenges facing vulnerable groups in the KH, including the youth and physically and mentally challenged members of the community. The high unemployment levels and the lack of meaningful employment opportunities represents a key challenge faced by the youth in the KH. There are also inadequate educational facilities/institutions such as Technikons, FET colleges and Universities in the KH and ND. The IDP also refers to the need to interact with National and Provincial and District agencies aimed at youth development. The provision of quality education at Early Child Development (ECD) is also a key need. The challenges facing ECDs include lack of proper facilities and support material at learning centres, lack of funding, and food security. The IDP also highlights the threat posed by climate change, noting it threatens food security, poverty alleviation and sustainable socio-economic growth. Vulnerable households are at most risk. A combination of increasing temperatures and reduced and/or more variable rainfall could have severe negative impacts for the Namakwa District, including the KHM. In this regard the KHM is characterised by high levels of poverty and inequality, isolated communities, and a large geographical area, which results in a vulnerable population. Large numbers of people, both private and communal, are also directly dependent on agriculture, and therefore on functioning ecosystems and water regimes, for their livelihoods. These communities and households are therefore directly affected by the risks posed by climate change. The IDP notes that the KHM is likely to be one of the most affected municipalities in terms of the impact of climate change on water quality and availability. Addressing these threats and the needs associated with the threat posed by climate change is therefore a key challenge.
Karoo Hoogland Spatial Development Framework (2019)	The KH Spatial Development Framework (SDF) (2019) identifies list four strategies, namely: **Strategy 1: Enhance local connectivity** The objectives of Strategy 1 include improving the connection between the towns of Sutherland, Williston and Fraserberg and the surrounding rural areas, and support for the diversification of economies, tourism, the knowledge economy, the green economy and alternative energy-related enterprise development. **Strategy 2: Protecting local resources** The objectives of Strategy 2 include integrated management and prioritisation of Karoo Hoogland's natural and man-made cultural landscape resources and protection of high value agricultural land. The actions identified include alien vegetation clearing and

APPLICABLE PLAN	DESCRIPTION OF PLAN
	riverine and wetland management and environmental awareness and education programmes. **Strategy 3: Urban and rural development** The objectives of Strategy 3 include more sustainable land reform process and in areas closer to urban centres, creating opportunities for increased food security and economic development for rural dwellers, creation of sustainable and accessible employment opportunities, and improved opportunities in the Tourism Sector. The actions identified include establishing opportunities for urban agriculture (home, school and community gardens) to promote household food security and improved nutrition, create opportunities for local food producers to market their products (farmers markets, etc.), and establishment of artisan workshops to provide local population with the chance to develop skills to participate within the economic sectors. Tourism and the renewable energy sector are identified as key drivers in terms of development in the KH. **Strategy 4: Enhance infrastructure development** The objectives of Strategy 3 include, maintain basic services and addressing backlogs, improving public facilities and access to these facilities, improving public transport and access to public transport and recycling programmes
Laingsburg Municipality Integrated Development Plan (2017 – 2022_	The LM IDP (2017-2022) identifies six priority area of which the following are relevant to the project: — Environmental and Spatial Development. — Local Economic Development. — Basic Service Delivery. — Social and Community Development. **Priority 1: Environmental and Spatial Development** The focus of Priority 1 is on creating a safe municipal area, the conservation of the town's heritage and, or relevance to the renewable energy sector, creating a clean green oasis in the Karoo. It also seeks to restore dignity in rural areas. A number of strategic objectives are associated with each of the priority areas listed in the IDP. **Priority 2: Local Economic Development** The focus of Priority 2 is on creating opportunities to ensure growth and development of the Laingsburg municipal economy. Of relevance to the renewable energy sector the IDP notes the commitment of the municipality create an enabling environment and incentives to attract investment to the area. A number of strategic objectives are associated with each of the priority areas listed in the IDP. *Strategic Objective 2: Promote local economic development* The focus areas for supporting economic development and creating employment are the tourism sector and support for Small Medium Micro Enterprise Developments (SMME's). **Priority 3: Basic Service Delivery** The focus of Priority 3 is to maintain and improve current levels of service delivery in the LM. The IDP also notes that well maintained infrastructure also supports and promote local economic development. **Priority 4: Social and Community Development** The focus of Priority 4 is on promoting equal accessibility for available opportunities for all, especially the poor and the youth. Priority 4 also seeks to create opportunities for moral regeneration by implementing awareness programmes, skills development and training and the provision of free basic services.

APPLICABLE PLAN	DESCRIPTION OF PLAN
	Strategic Objective 4: Improve the standards of living of all people in Laingsburg The IDP lists a number of projects associated with Strategic Objective 3, including implementation of a crime prevention and rehabilitation programme, establishment of ECD Centres, ensuring the effective operation of the towns Thusong Service Centre, and supporting old age facilities in the town. Improved living standards are also linked to a skilled and educated population. The IDP therefore highlights the need to improve overall literacy levels and create opportunities to support education and skills development and training. A SWOT Analysis undertaken as part of the IDP process lists the strengths, weaknesses, opportunities, and threats facing the LM. The following are relevant to the Needs Assessment. **Strengths** — Stable municipality. — Well-located in terms of access by road and rail. — Good infrastructure in place. — Nice clean town. — Strong, professional administration with professional. — Good public participatory and ward committee system. — Established tourism office. — Thusong Service Centre. **Weaknesses** — Narrow income base. — Small business sector. **Opportunities** — Establishment of economic development infrastructure. — Development of light industrial area. — Green Energy. — Training and Skills Development. — Establishment of organised Business sector **Threats** — Aging municipal infrastructure. — Climate change and drought. — High level of grant dependency. — Skills shortages and difficulty in retaining scarce skills. — Low literacy rates and high drop-out rates for school children. — Large distances to large towns. — Poor condition of gravel roads in rural areas. — High water losses from municipal infrastructure. The IDP highlights the threat posed by the impact of climate change, specifically given the key role played by the agriculture to the local economy. The key risks are linked to the long term rise in temperature, variability in precipitation and changes in precipitation patterns and growing season etc. The IDP notes that water availability is the most important limiting factor affecting the agriculture sector (crop and animal production) in the LM. Climate change therefore has the potential to impact on employment and food security.
Laingsburg Local Economic Development	The Laingsburg Local Economic Development (LED) and Tourism Strategy (2019-2029) is informed by and aligned with relevant national, provincial, district and local

APPLICABLE PLAN	DESCRIPTION OF PLAN
(LED) and Tourism Strategy (2019-2029)	policies and plans, including the National Development Plan and Western Cape Strategic Plan (2019-2024). The aim of the LED and Tourism Strategy is to guides the long-term sustainable planning and development of the Laingsburg economy. This includes reducing poverty within the Laingsburg Municipal area. The LED strategy is based on the overall vision outlined in the IDP. The Strategy assesses the current socio-economic environment, outlines strategic goals for the next ten-years, it recommends a series of actions to achieves those goals by leveraging existing assets and strengths, overcoming existing weaknesses and threats, and developing new assets and strengths. The LED Strategy therefore identifies key socio-economic needs facing the LM and strategies to address these needs. The LED aims to create job opportunities by assisting the local economy to grow by developing more small business in the municipal area, specifically for HD members of the community. One of the key drivers for LED is tourism. Tourism has the ability and potential to create long-term work opportunities. The LED and Tourism Strategy identifies a number of key socio-economic trends, challenges and key considerations that have a bearing on the project. These include: – Climate changes poses a number of challenges to the agricultural sector in Western Cape, including the LM area. – Laingsburg as a drought prone area is faced with the increased competition for water resources from agricultural and other uses, including urban and industrial. – The Municipality will need to develop and implement strategies to address climate change and the impact of drought. The predicted increase in the frequency and severity of droughts will have a negative impact on agriculture. – Agriculture is the backbone of Laingsburg economy. However, the agriculture sector is not diverse, the dominant activity is sheep (wool and meat) farming. – There is a lack of formal employment, including self-employment opportunities, in the LM. – The LM has high unemployment rates, low-income levels, and high illiteracy rates. The high illiteracy rates are linked to the high percentage of school drop outs. This has resulted in high poverty rates and increasing levels of substance abuse in Laingsburg. – There is a shortage of skilled labour. – There is a high degree of grant dependency. The LED also identifies the development of a renewable energy centre as strategic initiative.

2.3 INTERNATIONAL STANDARDS AND GUIDELINES

2.3.1 IFC PERFOMANCE STANDARDS

The International Finance Corporation (IFC) is an international financial institution that offers investment, advisory, and asset management services to encourage private sector development in developing countries. The IFC is a member of the World Bank Group (WBG) and is headquartered in Washington, D.C., United States. It was established in 1956 as the private sector arm of the WBG to advance economic development by investing in strictly for-profit and commercial projects that purport to reduce poverty and promote development.

The IFC's stated aim is to create opportunities for people to escape poverty and achieve better living standards by mobilizing financial resources for private enterprise, promoting accessible and competitive markets, supporting businesses and other private sector entities, and creating jobs and delivering necessary services to those who are poverty-stricken or otherwise vulnerable. Since 2009, the IFC has focused on a set of development goals that its projects are expected to target. Its goals are to increase sustainable agriculture opportunities, improve health and education, increase access to financing for microfinance and business clients, advance infrastructure, help small businesses grow revenues, and invest in climate health.

The IFC is owned and governed by its member countries but has its own executive leadership and staff that conduct its normal business operations. It is a corporation whose shareholders are member governments that provide paid-in capital and which have the right to vote on its matters. Originally more financially integrated with the WBG, the IFC was established separately and eventually became authorized to operate as a financially autonomous entity and make independent investment decisions. It offers an array of debt and equity financing services and helps companies face their risk exposures, while refraining from participating in a management capacity. The corporation also offers advice to companies on making decisions, evaluating their impact on the environment and society, and being responsible. It advises governments on building infrastructure and partnerships to further support private sector development.

The IFC's Sustainability Framework articulates the Corporation's strategic commitment to sustainable development and is an integral part of IFC's approach to risk management. The Sustainability Framework comprises IFC's Policy and Performance Standards on Environmental and Social Sustainability, and IFC's Access to Information Policy. The Policy on Environmental and Social Sustainability describes IFC's commitments, roles, and responsibilities related to environmental and social sustainability. IFC's Access to Information Policy reflects IFC's commitment to transparency and good governance on its operations and outlines the Corporation's institutional disclosure obligations regarding its investment and advisory services. The Performance Standards (PSs) are directed towards clients, providing guidance on how to identify risks and impacts, and are designed to help avoid, mitigate, and manage risks and impacts as a way of doing business in a sustainable way, including stakeholder engagement and disclosure obligations of the client in relation to project-level activities. In the case of its direct investments (including project and corporate finance provided through financial intermediaries), IFC requires its clients to apply the PSs to manage environmental and social risks and impacts so that development opportunities are enhanced. IFC uses the Sustainability Framework along with other strategies, policies, and initiatives to direct the business activities of the Corporation to achieve its overall development objectives. The PSs may also be applied by other financial institutions (FIs).

The Project is considered a Category B project in terms of the IFC Policy on E&S Sustainability (2012), having the potential to cause limited adverse environmental or social risks and/or impacts that are few in number, generally site specific, largely reversible, and readily addressed through mitigation measures.

The objectives and applicability of the eight PSs are outlined in **Table 2-4**.

Table 2-4: Objectives and Applicability of the IFC Performance Standards

REFERENCE REQUIREMENTS	PROJECT SPECIFIC APPLICABILITY
Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts	
Overview	Performance Standard 1 underscores the importance of managing environmental and social performance throughout the life of a project. An effective Environmental and Social Management System (ESMS) is a dynamic and continuous process initiated and supported by management, and involves engagement between the client, its workers, local communities directly affected by the project (the Affected Communities) and, where appropriate, other stakeholders.
Objectives	— To identify and evaluate environmental and social risks and impacts of the project. — To adopt a mitigation hierarchy to anticipate and avoid, or where avoidance is not possible, minimize, and, where residual impacts remain, compensate/offset for risks and impacts to workers, Affected Communities, and the environment. — To promote improved environmental and social performance of clients through the effective use of management systems.

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	— To ensure that grievances from Affected Communities and external communications from other stakeholders are responded to and managed appropriately. — To promote and provide means for adequate engagement with Affected Communities throughout the project cycle on issues that could potentially affect them and to ensure that relevant environmental and social information is disclosed and disseminated.		
Aspects	1.1	Policy	The IFC Standards state under PS 1 (Guidance Note 23) that "*the breadth, depth and type of analysis included in an ESIA must be proportionate to the nature and scale of the proposed project's potential impacts as identified during the course of the assessment process*." The FBAR is the final deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations. In addition, an EMPr has been compiled (this report). Karreebosch Wind Farm (RF) (Pty) Ltd will develop a corporate ESMS which aligns with the Equator Principles, the IFC Performance Standards and applicable WBG/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable Good International Industry Practice (GIIP). All Karreebosch Wind Farm (RF) (Pty) Ltd renewable energy projects, from inception, development, construction, operation, and any decommissioning are required to fully comply with the ESMS requirements and expectations.
	1.2	Identification of Risks and Impacts	
	1.3	Management Programmes	
	1.4	Organisational Capacity and Competency	
	1.5	Emergency Preparedness and Response	
	1.6	Monitoring and Review	
	1.7	Stakeholder Engagement	
	1.8	External Communication and Grievance Mechanism	
	1.9	Ongoing Reporting to Affected Communities	
Performance Standard 2: Labour and Working Conditions;			
Overview	Performance Standard 2 recognises that the pursuit of economic growth through employment creation and income generation should be accompanied by protection of the fundamental rights of workers.		
Objectives	— To promote the fair treatment, non-discrimination, and equal opportunity of workers. — To establish, maintain, and improve the worker-management relationship. — To promote compliance with national employment and labour laws. — To protect workers, including vulnerable categories of workers such as children, migrant workers, workers engaged by third parties, and workers in the client's supply chain. — To promote safe and healthy working conditions, and the health of workers. — To avoid the use of forced labour.		
Aspects	2.1	— Working Conditions and Management of Worker Relationship — Human Resources Policy and Management — Working Conditions and terms of Engagement — Workers organisation	Even though the nature and scale of the project is considered to be small, PS2 is considered applicable as a contractor will be appointed to undertaken the required scope of work. The BA Report and the EMPr, however, incorporate the requirements for compliance with local and international Labour and Working legislation and good practice on the part of the contractors. Formal human resource and labour policies will be compiled in the event that the project is developed in the future as part of the project specific ESMS/corporate ESMS

REFERENCE		REQUIREMENTS	PROJECT SPECIFIC APPLICABILITY
		— Non-Discrimination and Equal Opportunity — Retrenchment — Grievance Mechanism	
	2.2	— Protecting the Workforce — Child Labour — Forced Labour	
	2.3	Occupational health and Safety	
	2.4	Workers Engaged by Third Parties	
	2.5	Supply Chain	
Performance Standard 3: Resource Efficiency and Pollution Prevention			
Overview	Performance Standard 3 recognises that increased economic activity and urbanisation often generate increased levels of pollution to air, water, and land, and consume finite resources in a manner that may threaten people and the environment at the local, regional, and global levels. There is also a growing global consensus that the current and projected atmospheric concentration of greenhouse gases (GHG) threatens the public health and welfare of current and future generations. At the same time, more efficient and effective resource use and pollution prevention and GHG emission avoidance and mitigation technologies and practices have become more accessible and achievable in virtually all parts of the world.		
Objectives	— To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. — To promote more sustainable use of resources, including energy and water. — To reduce project related GHG emissions.		
Aspects	3.1	— Policy Resource Efficiency — Greenhouse Gases — Water Consumption	PS3-related impacts, such as the management of construction waste, hazardous substances, and stormwater are assessed in **Section 7** of this report. There are no material resource efficiency issues associated with the Project. Refer to the EMPr (this report) for general resource efficiency measures.
	3.2	— Pollution Prevention — Air Emissions — Stormwater — Waste Management — Hazardous Materials Management — Pesticide use and Management	The project is not GHG emissions intensive and a climate resilience study or a GHG emissions-related assessment is not deemed necessary for a project of this nature. However, as supporting infrastructure to the Karreebosch WEF, the OHPL and substation seeks to facilitate resource efficiency and pollution prevention by contributing to the South African green economy. Dust air pollution in the construction phase has been adequately addressed in the EMPr. The Project will not result in the release of industrial effluents. Potential pollution associated with sanitary wastewater is low and mitigation measures have been included in this EMPr. Land contamination of the site from historical land use (i.e. low intensity agricultural / grazing) is not considered to be a cause for concern.

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
			The waste generation profile of the project is not complex. Waste mitigation and management measures have been included in this EMPr. Hazardous materials are not a key issue; small quantities of construction materials (oil, grease, diesel fuel etc.) are the only wastes expected to be associated with the project. This EMPr identifies these anticipated hazardous materials and recommends relevant mitigation and management measures.
Performance Standard 4: Community Health, Safety, and Security			
Overview	Performance Standard 4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts.		
Objectives	— To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. — To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimizes risks to the Affected Communities		
Aspects	4.1	— Community Health and Safety — Infrastructure and Equipment Design and Safety — Hazardous Materials Management and Safety — Ecosystem Services — Community Exposure to Disease — Emergency Preparedness and Response	The requirements included in PS 4 have been addressed in the BAR process and the development of this EMPr. The following generic plans have been included in this EMPr: — Emergency Response Plan; — Transport Management Plan; — COVID-19 and HIV/AIDS Management Plan; and — Security Policy. All plans will be made site specific as part of the financial close process, in the event that the project is developed in the future. The location of the powerline outside of the security perimeter of the WEF results in potential risk of electrocution and potential electromagnetic fields exposure. These risks are qualitatively evaluated in the BA and the clients' standard safety and security measures. Additional measures are detailed in this EMPr.
	4.2	Security Personnel	
Performance Standard 5: Land Acquisition and Involuntary Resettlement			
Overview	Performance Standard 5 recognises that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons that use this land. Involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or other means of livelihood) as a result of project-related land acquisition and/or restrictions on land use.		
Objectives	— To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. — To avoid forced eviction. — To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation, and the informed participation of those affected. — To improve, or restore, the livelihoods and standards of living of displaced persons.		

REFERENCE	REQUIREMENTS		PROJECT SPECIFIC APPLICABILITY
	— To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites.		
Aspects	5.1	— Displacement — Physical Displacement — Economic Displacement — Private Sector Responsibilities under Government Managed Resettlement	PS5 is not applicable to the proposed Karreebosch OHPL and substation as no physical or economic displacement or livelihood restoration will be required. The proposed OHPL route and substation is located on privately owned land that is utilised for agriculture by the landowners. The land will continue to be used for agriculture (largely small stock grazing) without impediment by the OHPL.
Performance Standard 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources			
Overview	Performance Standard 6 recognizes that protecting and conserving biodiversity, maintaining ecosystem services, and sustainably managing living natural resources are fundamental to sustainable development.		
Objectives	— To protect and conserve biodiversity. — To maintain the benefits from ecosystem services. — To promote the sustainable management of living natural resources through the adoption of practices that integrate conservation needs and development priorities.		
Aspects	6.1	Protection and Conservation of Biodiversity	The OHPL and substation traverses a CBA and ESA. A Biodiversity Impact Assessment as well as an Avifaunal Impact Assessment and Freshwater Ecology Impact Assessment have been undertaken for the proposed Karreebosch OHPL and substation. The methodologies for the specialist assessments included a combination of literature review, in-field surveys and sensitivity mapping. This largely complies with the PS 6 general requirements for scoping and baseline assessment for determination of biodiversity and ecosystem services issues. The determination of habitat sensitivity was undertaken within the legal and best practice reference framework for South Africa. The prevalence of invasive alien species on the site is low; however, the BAR process had noted the propensity for the spread of alien invasive species in the construction and operational phases and mitigation and management measures are included in this EMPr.
Performance Standard 7: Indigenous People			
Overview	Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. In many cases, their economic, social, and legal status limits their capacity to defend their rights to, and interests in, lands and natural and cultural resources, and may restrict their ability to participate in and benefit from development. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded.		
Objectives	— To ensure that the development process fosters full respect for the human rights, dignity, aspirations, culture, and natural resource-based livelihoods of Indigenous Peoples.		

	— To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not possible, to minimize and/or compensate for such impacts. — To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. — To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the project's life-cycle. — To ensure the Free, Prior, and Informed Consent (FPIC) of the Affected Communities of Indigenous Peoples when the circumstances described in this Performance Standard are present. — To respect and preserve the culture, knowledge, and practices of Indigenous Peoples.		
Aspects	7.1	General — Avoidance of Adverse Impacts — Participation and Consent	As per the international instruments under the United Nations (UN) Human Rights Conventions, no indigenous peoples are present within the study area.
	7.2	Circumstances Requiring Free, Prior, and Informed Consent — Impacts on Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use — Critical Cultural Heritage — Relocation of Indigenous Peoples from Lands and Natural Resources Subject to Traditional Ownership or Under Customary Use	
	7.3	Mitigation and Development Benefits	
	7.4	Private Sector Responsibilities Where Government is Responsible for Managing Indigenous Peoples Issues	
Performance Standard 8: Cultural Heritage			
Overview	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations.		
Objectives	— To protect cultural heritage from the adverse impacts of project activities and support its preservation. — To promote the equitable sharing of benefits from the use of cultural heritage.		

REFERENCE		REQUIREMENTS	PROJECT SPECIFIC APPLICABILITY
Aspects	8.1	Protection of Cultural Heritage in Project Design and Execution	In accordance with the prevailing national legislation, a NID has been submitted for this project on 2nd August 2022. Proof of the NID Submission has been included in **Appendix H**. In addition an additional field survey was undertaken by a heritage specialist and an assessment has been undertaken and is provided in **Appendix F7.** A Chance Find Procedure is included in this EMPr (**Appendix G**).

2.3.2 EQUATOR PRINCIPLES

The Equator Principles (EPs) is a risk management framework, adopted by financial institutions, for determining, assessing, and managing environmental and social risk in projects and is primarily intended to provide a minimum standard for due diligence to support responsible risk decision-making.

The EPs apply globally to all industry sectors and to five financial products 1) Project Finance Advisory Services, 2) Project Finance, 3) Project-Related Corporate Loans, 4) Bridge Loans and 5) Project-Related Refinance and Project-Related Acquisition Finance. The relevant thresholds and criteria for application is described in detail in the Scope section of the EP. Currently 118 Equator Principles Financial Institutions (EPFIs) in 37 countries have officially adopted the EPs, covering the majority of international project finance debt within developed and emerging markets. EPFIs commit to implementing the EPs in their internal environmental and social policies, procedures and standards for financing projects and will not provide Project Finance or Project-Related Corporate Loans to projects where the client will not, or is unable to, comply with the EPs.

While the EPs are not intended to be applied retroactively, EPFIs apply them to the expansion or upgrade of an existing project where changes in scale or scope may create significant environmental and social risks and impacts, or significantly change the nature or degree of an existing impact. The EPs have greatly increased the attention and focus on social/community standards and responsibility, including robust standards for indigenous peoples, labour standards, and consultation with locally affected communities within the Project Finance market.

The EPs have also helped spur the development of other responsible environmental and social management practices in the financial sector and banking industry and have supported member banks in developing their own Environmental and Social Risk Management Systems.

The requirements and applicability of the EPs are outlined in **Table 2-5**.

It should be noted that Principles 8 and 10 relate to a borrower's code of conduct and are therefore not considered relevant to the BA process and have not been included in this discussion.

Table 2-5: Requirements and Applicability of the Equator Principles

REQUIREMENT		PROJECT SPECIFIC APPLICABILITY	
Principle 1: Review and Categorisation			
Overview	When a project is proposed for financing, the EPFI will, as part of its internal social and environmental review and due diligence, categorise such project based on the magnitude	Based upon the significance and scale of the Project's environmental and social impacts, the proposed project is regarded as a Category B project i.e. a project with potential limited adverse

REQUIREMENT	PROJECT APPLICABILITY	SPECIFIC
	of its potential impacts and risks in accordance with the environmental and social screening criteria of the IFC. Using categorisation, the EPFI's environmental and social due diligence is commensurate with the nature, scale, and stage of the Project, and with the level of environmental and social risks and impacts. The categories are: — Category A: Projects with potential significant adverse environmental and social risks and/or impacts that are diverse, irreversible or unprecedented; — Category B: Projects with potential limited adverse environmental and social risks and/or impacts that are few in number, generally site-specific, largely reversible and readily addressed through mitigation measures; and — Category C: Projects with minimal or no adverse environmental and social risks and/or impacts.	environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures.
Principle 2: Environmental and Social Assessment		
Overview	For all Category A and Category B Projects, the EPFI will require the client to conduct an appropriate Assessment process to address, to the EPFI's satisfaction, the relevant environmental and social risks and scale of impacts of the proposed Project (which may include the illustrative list of issues found in Exhibit II). The Assessment Documentation should propose measures to minimise, mitigate, and where residual impacts remain, to compensate/offset/remedy for risks and impacts to Workers, Affected Communities, and the environment, in a manner relevant and appropriate to the nature and scale of the proposed Project. The Assessment Documentation will be an adequate, accurate and objective evaluation and presentation of the environmental and social risks and impacts, whether prepared by the client, consultants or external experts. For Category A, and as appropriate, Category B Projects, the Assessment Documentation includes an Environmental and Social Impact Assessment (ESIA). One or more specialised studies may also need to be undertaken. For other Category B and potentially C Projects, a limited or focused environmental or social assessment may be appropriate, applying applicable risk management standards relevant to the risks or impacts identified during the categorisation process.	The FBAR is the final deliverable from the BA process undertaken for the proposed Project. The impact assessment comprehensively assesses the key environmental and social impacts and complies with the requirements of the South African EIA Regulations (2014, as amended). In addition, a site-specific EMPr (this document) has been compiled, which is to be read in conjunction with the generic powerline and substation EMPRs.
Principle 3: Applicable Environmental and Social Standards		

REQUIREMENT	PROJECT APPLICABILITY	SPECIFIC
Overview	The Assessment process should, in the first instance, address compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues. The EPFI's due diligence will include, for all Category A and Category B Projects globally, review and confirmation by the EPFI of how the Project and transaction meet each of the Principles. For Projects located in Non-Designated Countries, the Assessment process evaluates compliance with the then applicable IFC PS and WBG EHS Guidelines. For Projects located in Designated Countries, compliance with relevant host country laws, regulations and permits that pertain to environmental and social issues.	As South Africa has been identified as a non-designated country, the reference framework for environmental and social assessment is based on the IFC Performance Standards (PS) and applicable Industry Specific Environmental, Health, and Safety (EHS) Guidelines. In addition, the BA process has been undertaken in accordance with NEMA (the host country's relevant legislation).
Principle 4: Environmental and Social Management System and Equator Principles Action Plan		
Overview	For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS). Further, an Environmental and Social Management Plan (ESMP) will be prepared by the client to address issues raised in the assessment process and incorporate actions required to comply with the applicable standards. Where the applicable standards are not met to the EPFI's satisfaction, the client and the EPFI will agree on an Equator Principles Action Plan (EPAP). The EPAP is intended to outline gaps and commitments to meet EPFI requirements in line with the applicable standards.	Karreebosch Wind Farm (RF) (Pty) Ltd will have a project specific ESMS which will align with the Equator Principles, the IFC Performance Standards and applicable World Bank/IFC Environmental, Health and Safety (EHS) and Sector specific Guidelines and applicable GIIP. The proposed project, from inception, development, construction, operation, and any decommissioning will be required to fully comply with the requirements of the ESMS. The project specific ESMS will be compiled in the event that the project is developed in the future. Management and monitoring plans outlined in this EMPr will be incorporated into the ESMS for the proposed Project.
Principle 5: Stakeholder Engagement		
Overview	EPFI will require the client to demonstrate effective Stakeholder Engagement as an ongoing process in a structured and culturally appropriate manner with Affected Communities Workers and, where relevant, Other Stakeholders. For Projects with potentially significant adverse impacts on Affected Communities, the client will conduct an Informed Consultation and Participation process. To accomplish this, the appropriate assessment documentation, or non-technical summaries thereof, will be made available to the public by the borrower for a reasonable minimum period in the relevant local language and in a culturally appropriate manner. The borrower will take account of and document the process and results of the consultation, including any actions agreed resulting from the consultation.	The BA process included an extensive stakeholder engagement process which complied with the South African EIA Regulations (2014, as amended). The process included consultations with local communities, nearby businesses and a range of government sector stakeholders (state owned enterprises, national, provincial and local departments). The consultation process was tailored to the risks and impacts of the Project; the Project's phase of development; the language preferences of the Affected Communities; their decision-making processes; and the needs of disadvantaged and vulnerable groups. No Indigenous People will be affected. The stakeholder engagement process solicits interest from potentially interested parties through the placement of site notices and newspaper advertisements as well as written and telephonic communication.

REQUIREMENT	PROJECT APPLICABILITY	SPECIFIC
	Disclosure of environmental or social risks and adverse impacts should occur early in the Assessment process, in any event before the Project construction commences, and on an ongoing basis. All Projects affecting Indigenous Peoples will be subject to a process of Informed Consultation and Participation, and will need to comply with the rights and protections for Indigenous Peoples contained in relevant national law, including those laws implementing host country obligations under international law.	The stakeholder engagement process undertaken, is detailed in Section 3.6 of the BAR.
Principle 6: Grievance Mechanism		
Overview	For all Category A and, as appropriate, Category B Projects, the EPFI will require the client, as part of the ESMS, to establish effective grievance mechanisms which are designed for use by Affected Communities and Workers, as appropriate, to receive and facilitate resolution of concerns and grievances about the Project's environmental and social performance. The borrower will inform the Affected Communities and Workers about the grievance mechanism in the course of the stakeholder engagement process and ensure that the mechanism addresses concerns promptly and transparently, in a culturally appropriate manner, and is readily accessible, at no cost, and without retribution to the party that originates the issue or concern.	This EMPr includes a Grievance Mechanism Process for Public Complaints and Issues. This procedure effectively allows for external communications with members of the public to be undertaken in a transparent and structured manner. This procedure will be revised and updated as part of the EMPr amendment process in the event that the project is developed in the future and incorporated into the Project specific ESMS.
Principle 7: Independent Review		
Overview	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an Independent Review of the Assessment Documentation including the ESMPs, the ESMS, and the Stakeholder Engagement process documentation in order to assist the EPFI's due diligence, and assess Equator Principles compliance.	This principle will only become applicable in the event that the project is developed in the future.
Principle 9: Independent Monitoring and Reporting		
Overview	To assess Project compliance with the Equator Principles after Financial Close and over the life of the loan, the EPFI will require independent monitoring and reporting for all Category A, and as appropriate, Category B projects. Monitoring and reporting should be provided by an Independent Environmental and Social Consultant; alternatively, the EPFI will require that the client retain qualified and experienced external experts to verify its monitoring information, which will be shared with the EPFI in accordance with the frequency required.	This principle will only become applicable in the event that the project is developed in the future.

2.4 OTHER GUIDELINES AND BEST PRACTICE RECOMMENDATIONS

2.4.1 WORLD BANK GROUP ENVIRONMENTAL, HEALTH, AND SAFETY GUIDELINES

EHS GENERAL GUIDELINES

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with general and industry-specific examples of GIIP. They contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs.

The EHS General Guidelines contain information on cross-cutting environmental, health and safety issues potentially applicable to all industry sectors, used together with the relevant industry sector guideline(s), to guide the development of management and monitoring strategies for various project-related impacts.

EHS GUIDELINES FOR ELECTRIC POWER TRANSMISSION AND DISTRIBUTION

The EHS Guidelines for Electric Power Transmission and Distribution (2007) include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

The Guidelines includes industry-specific impacts and management, provides a summary of EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of a facility, along with recommendations for their management. Additionally, it includes performance indicators and monitoring related to the environment an occupational health and safety.

These Guidelines have been considered in the impact assessment and formulation of mitigation measures in this EMPr.

2.4.2 GENERIC EMPR RELEVANT TO AN APPLICATION 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 that trigger Activity 11 of Listing Notice 1 or Activity 9 of Listing Notice 2 and any other listed or specified activities must use the generic EMPr.

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. The use of a generic*

EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature."[2]

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**.

[2] DEA (2019) *Appendix 1: Generic Environmental Management Programme (EMPr) for the Development and Expansion for Overhead Electricity Transmission and Distribution Infrastructure*

3 PROJECT DESCRIPTION

3.1 LOCATION OF THE PROPOSED PROJECT

The proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located 35km north of Matjiesfontein, and extends across two provinces, namely the Northern and Western Cape Provinces. The proposed Karreebosch OHPL will extend from the proposed Karreebosch onsite 33/132kV substation, which is situated in Ward 3 of the Karoo Hoogland Local Municipality in the Namakwa District Municipality in the Northern Cape into Ward 2 of the Laingsburg Local Municipality in the Central Karoo District Municipality in the Western Cape Province, where it will connect to the existing 400kV Komsberg substation via the existing Bon Espirange substation.

The proposed Karreebosch OHPL will evacuate power from the authorised Karreebosch WEF from the proposed on-site substation, located in the Northern Cape Province and will connect to the existing Komsberg substation., via the existing Bon Espirange substation.

The centre point of the OHPL is located at 32°53'57.00"S 20°30'45.20"E. **Table 3-1** below provides the centre co-ordinates of existing and proposed substations.

Table 3-1: Co-ordinates of substations along the OHPL route

POINT	CO-ORDINATES	
Karreebosch WEF Substation	32°51'39.93"S	20°28'46.28"E
Bon Espirange substation	32°55'11.28"S	20°32'3.64"E
Komsberg Substation	32°56'0.70"S	20°35'42.82"E

The final pre-negotiated route[3] for the transmission of generated power from the Karreebosch WEF onsite substation to the existing Komsberg substation via the Bon Espirange substation includes the Substation Option 1 and powerline Route 1A, together with Route 3 and the route from Bon Espirange Substation to Komsberg Substation, which is approximately 14.5 km in length. The final pre-negotiated route and substation is illustrated in **Figure 3-1** and the co-ordinates are included in **Table 3-2**.

Table 3-2: Co-ordinates of the final pre-negotiated route including the substation

POINT	CO-ORDINATES	
Route Alignment 1A		
15	20° 28' 47.71" E	32° 51' 39.6" S
17	20° 28' 55.42" E	32° 52' 0.84" S
19	20° 29' 3.62" E	32° 52' 21.72" S

[3] As per the Environmental Impact Assessment (EIA) Regulations 2014, as amended, Appendix 1 of Government Notice Regulation (GNR) 326 identifies the legislated requirements that must be contained within a Basic Assessment Report (BAR). Section 3(1)(h) of Appendix 1 requires alternatives to be assessed in order to determine the preferred alternative. Chapter **Error! Reference source not found.** of the associated final BAR details the assessment of alternatives, and presents the **final pre-negotiated route** in section **Error! Reference source not found.** as concluded by the specialists (which comprises of Routes 1A, 3, and the route from Bon Espirange to Komsberg substations) as required by GN 113 of 16 February 2018 (repealed by GN 787 of 17 July 2020). This approach was confirmed by DFFE during a clarification meeting held with DFFE on 04 October 2022 as a result of comments received from DFFE on the Draft BAR (Meeting Minutes included in Appendix C-3 of the Stakeholder Engagement Report, attached as Appendix D of the Final BAR).

POINT	CO-ORDINATES	
20	20° 29' 20.69" E	32° 53' 5.64" S
9	20° 30' 7.13" E	32° 53' 19.68" S
10	20° 30' 17.71" E	32° 53' 33.0" S
11	20° 30' 43.06" E	32° 53' 55.32" S
Route Alignment 3		
1	20° 31' 14.15" E	32° 54' 22.32" S
2	20° 31' 31.76" E	32° 54' 52.2" S
3	20° 31' 49.37" E	32° 55' 6.24" S
4	20° 32' 1.18" E	32° 55' 8.04" S
5	20° 32' 2.72" E	32° 55' 10.2" S
6	20° 30' 45.68" E	32° 53' 57.48" S
Bon Espirange to Komsberg Route		
26	20° 32' 12.8" E	32° 55' 9.12" S
27	20° 32' 53.52" E	32° 55' 11.28" S
28	20° 33' 38.27" E	32° 55' 32.88" S
29	20° 34' 49.87" E	32° 55' 39.0" S
30	20° 35' 10.07" E	32° 55' 45.12" S
31	20° 35' 29.47" E	32° 55' 50.16" S
32	20° 35' 39.3" E	32° 55' 51.6" S
33	20° 35' 43.3" E	32° 56' 3.84" S
Proposed onsite Substation		
		
S1-1	32°51'35.72"S	20°28'44.23"E

POINT	CO-ORDINATES	
S1-2	32°51'36.70"S	20°28'49.99"E
S1-3	32°51'42.99"S	20°28'48.51"E
S1-4	32°51'42.22"S	20°28'42.93"E
Potential Komsberg MTS Expansion		
		
MTS1	32°55'51.18"S	20°35'29.62"E
MTS2	32°55'51.58"S	20°35'52.78"E
MTS3	32°56'11.32"S	20°35'50.70"E
MTS4	32°56'9.59"S	20°35'27.32"E

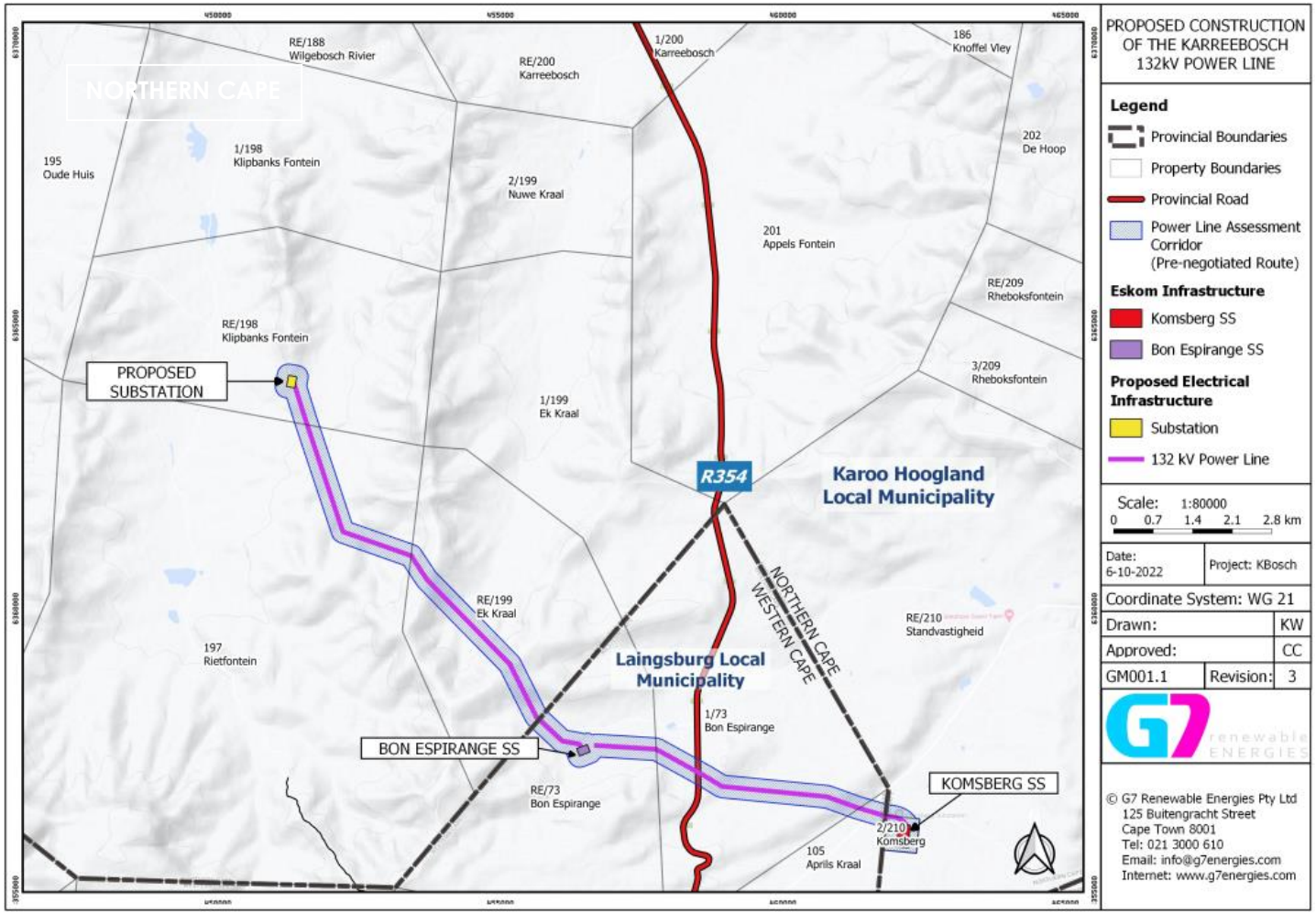


Figure 3-1: The final pre-negotiated route and onsite substation in relation to affected land portions[3]

3.2 PROJECT INFRASTRUCTURE

The proposed Project includes the following components:

- 132kV twin tern double circuit overhead powerline;
- 33/132kV onsite Substation;
- Access road along the powerline servitude; and
- Potential modifications and/or expansions to the existing substation (Komsberg).

3.2.1 OVERHEAD POWERLINE

The OHPL will be a 132kV twin tern double circuit overhead powerline. The powerline towers will either be lattice or monopole structures. Figure 3-2 below provides an example of a conventional lattice tower compared with a monopole structure. Pole positions will only be available once the powerline detail design has been completed for the Eskom Design Review Team (DRT). However, a 400m wide assessment corridor is being considered and has been walked down by the specialists for approval to allow for micro siting of tower positions once the detailed design has been completed. It is anticipated that towers will be located on average 200m to 250m apart; however, longer spans may be needed due to terrain and watercourse crossings.

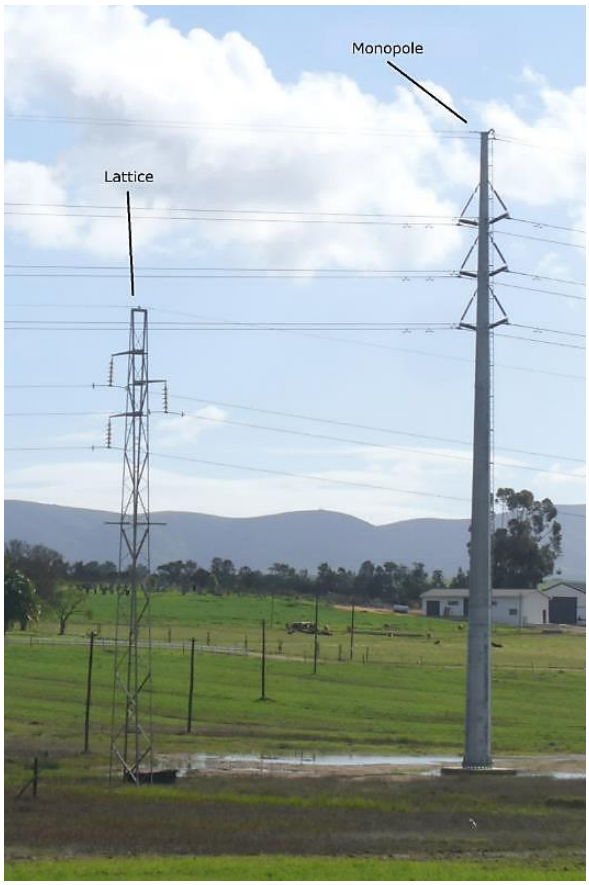


Figure 3-2: Conventional lattice powerline tower compared with a steel monopole structure

3.2.2 SERVITUDE

A 400m wide OHPL corridor (200m on either side of the centre line) has been assessed by the specialists for the purposes of the BAR. The registered servitude will fall within this 400m wide assessment corridor and will be 31m wide (15.5 m on either side of the centre line). The Right of Way servitude (servitude road) will be up to 14m wide (7m on either side of centre line), resulting in a total servitude width of 45m in total. The length of the final pre-negotiated powerline route is approximately 14.51 km in length in its entirety from the onsite substation to the Komsberg Substation. The OHPL servitude width is approximately 45m (22.5 m either side of the OHPL, including access roads), and the area of investigation is approximately 945 000 m^2 (i.e. servitude).

The final pre-negotiated route comprises of a corridor as shown in Figure 3-1 . The final line routing and associated final pylon positions will fall within the final pre-negotiated route. These detail designs are dependent on the outcome of Eskom's Budget Quote application process currently underway, and the final layout map within the EMPR will be updated accordingly[3].

The servitude is required to ensure safe construction, maintenance and operation of the powerline. Registration of the servitude grants the operator the right to erect, operate and maintain the powerline and to access the land to carry out such activities, but it does not constitute full ownership of the land. It should be noted that the OHPL and 132kV portion of the onsite substation will be ceded to Eskom post-construction. Construction and operation activities and access to the powerline and substation will be carried out with due respect to the affected landowners. The servitude required for the Project will be registered at the Deeds Office and will form part of the title deed of the relevant properties once the environmental authorisation has been obtained.

3.2.3 SUBSTATIONS

The Karreebosch OHPL will be routed from the proposed onsite Karreebosch 33/132kV substation (associated with the approved Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3) to the existing Bon Espirange substation, after which it will evacuate power from the existing 400kV Komsberg substation.

The switching station portion of the substation (132kV), included in this assessment, will ultimately be transferred to Eskom for their operation and maintenance. The IPP collector portion of the substation (33kV) will remain under the ownership of Karreebosch. The 33/132kV switching substation at the Karreebosch WEF site has been assessed as part of the BAR with a 200m x 150m (3 ha) footprint.

A 200m assessment area surrounding the proposed substation has been included within the final pre-negotiated as part of this assessment for micro siting, with a slight funnel leading into the existing Bon Espirange and Komsberg substations to allow for greater flexibility for micro siting for incoming proposed line connections. The proposed Karreebosch OHPL may require an extension of the existing 400kV Komsberg substation, and therefore, the entire Komsberg substation property has been assessed as part of the BAR.

3.2.4 SITE ACCESS

The OHPL and associated infrastructure will be accessed via roads forming part of the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3 which is currently undergoing of a Part 2 EA amendment, final layout and EMPr approval process), where possible. The preferred OHPL routing will require an associated servitude road (following beneath the proposed OHPL) to be constructed which will be used to construct, operate and maintain the powerline. Existing roads will be used as much as possible, where feasible. However, additional access roads may be required to provide access to sections of the powerline route. New sections of access roads will deviate off existing roads (within the 400m wide assessment corridor), as needed to access tower positions. Access roads will be mostly two-track gravel roads up to 14m in width following beneath the OHPL in order to access tower structures for construction and maintenance purposes.

3.3 PROPOSED PROJECT DEVELOPMENT ACTIVITIES

The typical steps involved in the construction and operation of an OHPL is summarised below:

- Planning Phase

- Step 1: Surveying of the development area and negotiation with affected landowners; and
- Step 2: Final design and micro-siting of the infrastructure based on geotechnical, topographical conditions and potential environmental sensitivities.

— Construction Phase
- Step 3: Vegetation clearing;
- Step 4: Assembly and erection of infrastructure on site;
- Step 5: Stringing of conductors; and
- Step 6: Rehabilitation of disturbed areas and protection of erosion sensitive areas.

— Operation Phase
- Step 7: Continued maintenance during operation.

3.3.1 CONSTRUCTION PHASE

CONSTRUCTION SCHEDULE

Construction of the OHPL is anticipated to take 12 - 24 months.

SITE ESTABLISHMENT AND TRANSPORTATION OF MATERIALS AND EQUIPMENT TO SITE

The selected Contractor will make use of the construction camp established for authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3) , including but not be limited to, temporary offices, laydown areas for equipment and materials, storage facilities, ablutions, waste storage and handling area, and parking area. The location and extent of the Contractors camp, to be established within the Project area, will be undertaken in line with specifications detailed within this EMPr. Materials are to be collected on a daily basis from the contractor laydown area for the construction activities along the servitude. This limits areas to be impacted for storage along the servitude as well as for security purposes when activities cease at the end of each day.

Building materials will most likely be sourced from Worcester approximately 180km from the site or alternatively from Cape Town approximately 300 km from the site. A significant reduction in heavy vehicle trips can be achieved by using mobile batching plants. In addition to this, temporary construction material stockpile yards could be commissioned on vacant land near the proposed site, within the footprint of disturbance anticipated for the project. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

Components are expected to be locally sourced and transported to site using appropriate National and Provincial routes. It is expected that the components will generally be transported to site with normal heavy load vehicles. Mobile plants required for the installation of the OHPL will be determined by the contractor.

LABOUR REQUIREMENTS

During site preparation and installation of Project related infrastructure, the selected Contractor working on behalf of Karreebosch is anticipated to require 20 - 30 people to undertake the required works. Approximately 5% of workers would be highly skilled, 15% medium skilled, and 80% low skilled.

VEGETATION CLEARING

Due to the nature of the vegetation within the Project area, which is predominantly sparse, low shrubs, limited vegetation clearing will be required. Clearing of vegetation will be limited to pylon areas to facilitate the installation of each pylon. Clearing will be done in phases along the OHPL route as required prior to installation activities.

INSTALLATION OF OHPL

Standard OHPL installation methods will be employed, which entails the drilling of holes, planting of monopoles (compaction only, no concrete casting) and stringing of the conductors. It is not envisaged that any large excavations and stabilized backfill will be required. However, this will be verified on site once the geotechnical assessment has been undertaken at each monopole position (part of construction works).

The Project will utilise either lattice or monopole structures with a maximum height up to 36m above ground level, which are reported to have a life expectancy of more than 25 years. The actual height of the pylons will vary based on the site topography to maintain the specified clearance of the transmission lines.

Once the pylons have been installed, the lines will be strung. The Contractor in collaboration with Eskom will be responsible for functional testing and commissioning of the OHPL. This consists of connecting the line from the Karreebosch WEF to the national grid, to transmit power.

INSTALLATION OF THE SUBSTATION

The Karreebosch OHPL will be routed from the proposed onsite Karreebosch 33/132kV substation (associated with the approved Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3 which is currently undergoing a Part 2 EA amendment, final layout and EMPr approval process)) to the existing Bon Espirange substation, after which it will connect to the existing 400kV Komsberg substation. A 200m assessment area surrounding the proposed substation (which has a footprint of 200m x 250m (3ha)), has been included in the final pre-negotiated route for micro siting, with a slight funnel leading into the existing Bon Espirange and Komsberg substations to allow for greater flexibility for micro siting the incoming proposed line connection. The proposed Karreebosch OHPL may require an extension of the existing 400kV Komsberg substation, and therefore, the entire Komsberg substation property was assessed as part of the BA process.

DEMOBILISATION

Upon completion of the installation phase, any temporary infrastructure will be removed, and the affected areas rehabilitated.

3.3.2 OPERATIONAL PHASE

Eskom will be responsible for managing the operations of the OHPL in line with their internal management systems. Eskom is considered to have the requisite expertise to operate and maintain the transmission line. Eskom will adhere to all existing Safety Codes and Guidelines for the operation and maintenance of the OHPL infrastructure.

During the operational phase, there will be little to no Project-related movement along the servitude as the only activities are limited to maintaining the servitude (including maintenance of access roads and cutting back or pruning of vegetation to ensure that vegetation does not affect the OHPL), inspection of the powerline infrastructure and repairs when required. Inspections are likely to be on an annual basis. Limited impact is expected during operation since there will not be any intrusive work done outside of maintenance in the event that major damage occurs to site infrastructure.

Operation of the OHPL will involve the following activities, discussed below.

SERVITUDE MANAGEMENT AND ACCESS ROAD MAINTENANCE

Servitude and access road maintenance is aimed at eliminating hazards and facilitating continued access to the OHPL. The objective is to prevent all forms of potential interruption of power supply due to overly tall vegetation/climbing plants or establishment of illegal structures within the right servitude. It is also to facilitate ease of access for maintenance activities on the transmission line. During the operational phase of the project, the servitude will be maintained to ensure that the OHPL functions optimally and does not compromise the safety of persons within the vicinity of the line.

TRANSMISSION LINE MAINTENANCE AND OPERATIONS

Eskom will develop comprehensive planned and emergency programmes through its technical operations during the operation and maintenance phase for the OHPL. The maintenance activities will include:

- Eskom's Maintenance Team will carry out periodic physical examination of the OHPL and its safety, security and integrity.
- Defects that are identified will be reported for repair. Such defects may include defective conductors, flashed over insulators, defective dampers, vandalised components, amongst others.
- Maintenance / repairs will then be undertaken.

3.3.3 DECOMMISSIONING PHASE

Decommissioning will be considered when the OHPL is regarded obsolete and will be subject to a separate authorisation and impact assessment process. This is not expected to occur in the near future.

3.4 NEED AND DESIRABILITY OF THE PROJECT

The DEA&DP Guideline (2013) states that the essential aim of need and desirability is to determine the suitability (i.e. is the activity proposed in the right location for the suggested land-use/activity) and timing (i.e. is it the right time to develop a given activity) of the development. Therefore, need and desirability addresses whether the development is being proposed at the right time and in the right place. Similarly, the 'Best Practicable Environmental Option' (BPEO) as defined in NEMA is "*the option that provides the most benefit and causes the least damage to the environment as a whole, at a cost acceptable to society, in the long term as well as in the short term*."

The development of renewable energy and the associated energy infrastructure is strongly supported at a national, provincial, and local level. The development of, and investment in, renewable energy and associated energy distribution infrastructure is supported by the National Development Plan, New Growth Path Framework and National Infrastructure Plan, which all highlight the importance of energy security and investment in energy infrastructure. The development of the proposed power line is therefore supported by key policy and planning documents and is in line with South Africa's strategic energy planning context.

Furthermore, the proposed Karreebosch OHPL is located within the Central Strategic Transmission Corridor per GN 113 of 2018. Strategic Transmission Corridors support areas where long-term electricity grid infrastructure will be developed. **Figure 3-3** below shows the location of the five corridors and the approximate location of the Karreebosch OHPL within the Central Corridor. The associated WEF also falls within the Komsberg REDZ area.

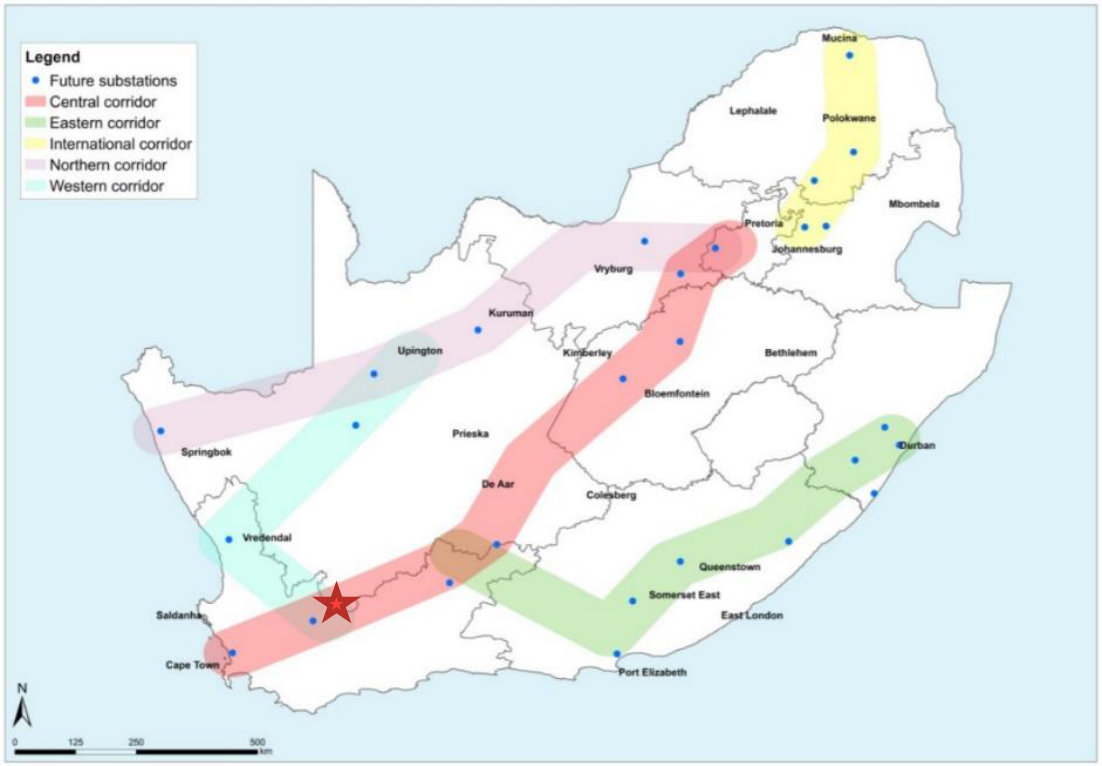


Figure 3-3: Strategic Transmission Corridors (GN 113 of 2018) (red star is approximate location of Karreebosch OHPL)

The energy security benefits associated with the authorised Karreebosch WEF are dependent upon it being able to connect to the national grid via the establishment of grid connection infrastructure. The proposed OHPL is

therefore essential supporting infrastructure to the wind energy development, which, once developed, will generate power from renewable energy resources.

The land on which the OHPL will be constructed is located between the authorised Karreebosch WEF site and the existing Komsberg substation. The land is all privately owned agricultural land, which is zoned for agriculture. It is not necessary for each of the properties to be rezoned as the land will continue to be used for agriculture. No physical or economic displacement is anticipated as a result of this project.

Furthermore, negative environmental impacts associated with the activity will be mitigated to acceptable levels in accordance with the site-specific EMPr and generic EMPrs (this report).

4 IMPACT ASSESSMENT

A summary of the identified impacts and corresponding significance ratings for the final pre-negotiated route for the powerline and substation is provided in **Table 4-1** below.

Table 4-1: Impact Summary

REF.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Air Quality	Generation of Dust and PM	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
Noise	Noise Emissions	Construction Decommissioning	**Low**	(-)	**Very Low**	(-)
Geotechnical	Soil Erosion	Construction	**Moderate**	(-)	**Very Low**	(-)
	Soil Erosion	Operation	**Low**	(-)	**Very Low**	(-)
	Soil Erosion	Decommissioning	**Low**	(-)	**Very Low**	(-)
Soils	Soil Contamination	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Soil Contamination	Operation	**Low**	(-)	**Very Low**	(-)
Hydrology	Impact on Local Hydrology	Construction Decommissioning	**Low**	(-)	**Very Low**	(-)
	Deterioration of Groundwater Quality	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
Freshwater	Vehicular Movement	Construction Decommissioning	**Low**	(-)	**Low**	(-)
	Vegetation Removal	Construction Decommissioning	**Low**	(-)	**Low**	(-)
	Excavations	Construction Decommissioning	**Low**	(-)	**Low**	(-)
	Concrete Mixing and Casting	Construction Decommissioning	**Low**	(-)	**Low**	(-)
	Creation of new roads	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Upgrading existing roads	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Vehicular Movement along powerline	Operation	**Low**	(-)	**Very Low**	(-)
	Vehicular movement along roads	Operation	**Low**	(-)	**Very Low**	(-)

REF.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Biodiversity	Loss of Indigenous Vegetation	Construction Decommissioning	**Moderate**	(-)	**Moderate**	(-)
	Loss of Flora SCC	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Susceptibility to Invasion	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Susceptibility to Erosion	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Disturbances to Ecological Processes	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Disturbances to Aquatic and Riparian Habitat and Processes	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Loss of Faunal Habitat	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Impacts to Faunal Processes	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Loss of Faunal SCC	Construction Decommissioning	**Low**	(-)	**Low**	(-)
	Loss of Indigenous Vegetation	Operation	**Moderate**	(-)	**Moderate**	(-)
	Loss of Flora SCC	Operation	**Low**	(-)	**Low**	(-)
	Susceptibility to Invasion	Operation	**Low**	(-)	**Low**	(-)
	Susceptibility to Erosion	Operation	**Low**	(-)	**Low**	(-)
	Disturbances to Ecological Processes	Operation	**Low**	(-)	**Low**	(-)
	Disturbances to Aquatic and Riparian Habitat and Processes	Operation	**Low**	(-)	**Low**	(-)
	Loss of Faunal Habitat	Operation	**Low**	(-)	**Low**	(-)

REF.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Impacts to Faunal Processes	Operation	**Low**	(-)	**Low**	(-)
	Loss of Faunal SCC	Operation	**Low**	(-)	**Low**	(-)
Avifauna	Displacement of Priority Species (Disturbance)	Construction	**Moderate**	(-)	**Low**	(-)
	Displacement of Priority Species (Transformation)	Construction	**Moderate**	(-)	**Low**	(-)
	Electrocutions	Operation	**Low**	(-)	**Low**	(-)
	Collisions	Operation	**Moderate**	(-)	**Moderate**	(-)
	Displacement of Priority Species (Transformation)	Decommissioning	**Moderate**	(-)	**Low**	(-)
Visual	Visual Disturbance	Construction	**Low**	(-)	**Low**	(-)
	Visual Landscape	Operation	**Low**	(-)	**Low**	(-)
	Visual Disturbance	Decommissioning	**Low**	(-)	**Low**	(-)
Waste	Improper Waste Management	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
Traffic	Increased Local Traffic	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Increased Local Traffic	Operation	**Low**	(-)	**Low**	(-)
Heritage	Damage to Archaeological Resources	Construction Decommissioning	**Very Low**	(-)	**Very Low**	(-)
	Damage to Palaeontological Resources	Construction Decommissioning	**Moderate**	(-)	**Very Low**	(-)
Socio-economic	Creation of Employment, Training and Business Opportunities	Construction Decommissioning	**Low**	(+)	**Moderate**	(+)

REF.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
	Presence of Construction Workers and Impact on Family Structures and Social Networks	Construction Decommissioning	**Low**	(-)	**Very Low**	(-)
	Risk to Safety, Livestock and Farm Infrastructure	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Construction Activities and Vehicles	Construction Decommissioning	**Low**	(-)	**Very Low**	(-)
	Veld Fires	Construction Decommissioning	**Moderate**	(-)	**Low**	(-)
	Improved Energy Security and Establishment of Infrastructure	Operation	**Moderate**	(+)	**Moderate**	(+)
	Creation of Employment Opportunities	Operation	**Very Low**	(+)	**Low**	(+)
	Income Generation for Farmers	Operation	**Low**	(+)	**Moderate**	(+)
	Sense of Place	Operation	**Low**	(-)	**Low**	(-)
	Impacts on Farming Operations During Maintenance	Operation	**Moderate**	(-)	**Low**	(-)
	Property Values	Operation	**Low**	(-)	**Low**	(-)
	Tourism	Operation	**Low**	(-)	**Low**	(-)
Health and Safety	Employee Health & Safety	Construction	**Moderate**	(-)	**Low**	(-)
	Employee Health & Safety	Operation	**Moderate**	(-)	**Low**	(-)
Cumulative Impacts						
Social	Sense of Place	Cumulative	**Low**	(-)	**Moderate**	(-)

REF.	IMPACT DESCRIPTION	PHASE	WITHOUT MITIGATION		WITH MITIGATION	
			SIGNIFICANCE	STATUS	SIGNIFICANCE	STATUS
Geotechnical	Soil Erosion	Cumulative	**Moderate**	(-)	**Very Low**	(-)
Biodiversity	Loss of Indigenous Vegetation	Cumulative	**Moderate**	(-)	**Moderate**	(-)
	Loss of Flora SCC	Cumulative	**Moderate**	(-)	**Low**	(-)
	Susceptibility to Invasion	Cumulative	**Moderate**	(-)	**Low**	(-)
	Susceptibility to Erosion	Cumulative	**Moderate**	(-)	**Low**	(-)
	Disturbances to Ecological Processes	Cumulative	**Moderate**	(-)	**Low**	(-)
	Disturbances to Aquatic and Riparian Habitat and Processes	Cumulative	**Moderate**	(-)	**Low**	(-)
	Loss of Faunal Habitat	Cumulative	**Moderate**	(-)	**Low**	(-)
	Impacts to Faunal Processes	Cumulative	**Moderate**	(-)	**Low**	(-)
	Loss of Faunal SCC	Cumulative	**Low**	(-)	**Low**	(-)
Avifauna	Displacement due to Disturbance	Cumulative	**Moderate**	(-)	**Low**	(-)
	Collisions	Cumulative	**High**	(-)	**Moderate**	(-)
	Electrocutions	Cumulative	**Low**	(-)	**Low**	(-)
Visual	Visual	Cumulative	**Moderate**	(-)	**Moderate**	(-)
Traffic	Dust and Noise	Cumulative	**High**	(-)	**Moderate**	(-)

5 ENVIRONMENTAL MANAGEMENT OBJECTIVES

5.1 EMPR OBJECTIVES

The EMPr has the following objectives:

- Encourage good management practices through planning and commitment to environmental issues;
- Minimise disturbance of the natural environment;
- Prevent or minimise all forms of pollution;
- Prevent water wastage;
- Promote the prevention, reduction, reuse, recycling and recovery of waste and develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste;
- Adopt the best practical means available to prevent or minimise adverse environmental impacts;
- Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
- Describe all monitoring procedures required to identify impacts on the environment; and
- Train onsite personnel with regard to their environmental obligations.

Please note: This EMPr is a working document and therefore subject to change depending on the requirements of the various Project phases. When applicable, these changes are to be approved in accordance with legislative requirements.

5.2 ENVIRONMENTAL OBJECTIVES AND TARGETS

To facilitate compliance with the EMPr, the Proponent must comply with all relevant legislation and standards and make all personnel aware of the requirements of the EMPr, as well as the prescribed penalties should a non-conformance be identified during the different phases of the proposed Project.

It is recommended that environmental objectives (as outlined in this document) be emphasised to the Proponent as minimum requirements. Objectives include:

- Encourage good management practices through planning and commitment to environmental issues; and
- Provide rational and practical environmental guidelines to:
  - Minimise disturbance of the natural environment;
  - Minimise fugitive emissions;
  - Minimise impact of added traffic into the area;
  - Ensure surface and groundwater resource protection;
  - Prevent or minimise all forms of pollution;
  - Protect indigenous flora and fauna;
  - Prevent soil erosion;
  - Promote sustainable use of resources;
  - Adopt the best practical means available to prevent or minimise adverse environmental impacts;
  - Comply with all applicable laws, regulations, standards and guidelines for the protection of the environment;
  - Promote the reduction, reuse, recycling and recovery of waste;
  - Develop waste management practices based on prevention, minimisation, recycling, treatment or disposal of waste;
  - Describe all monitoring procedures required to identify impacts on the environment;

- Define how the management of the environment is reported and performance evaluated; and
- Train onsite personnel with regard to their environmental obligations.

6 MANAGEMENT PROCEDURES AND ADMINISTRATIVE REQUIREMENTS

6.1 ORGANISATION, STRUCTURE AND RESPONSIBILITY

Formal responsibilities are necessary to ensure that key management measures/procedures are executed. The Proponent will be responsible for the overall control of the project site during the pre-construction, construction, operation, decommissioning and rehabilitation phases of the project. The Proponent'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;
- Being fully familiar with the associated BA Report, EA conditions and the EMPr;
- Applying for an amendment of the EA from the DFFE as and when required 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 that the construction activity will commence (as indicated in the EA);
- Notifying the DFFE in writing within 24 hours if any condition in the EA cannot be or is not adhered to; 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
Proponent / Holder of the EA	– The Proponent (holder of the EA) shall take overall responsibility for the adherence to the EMPrs and EA conditions and all other applicable licenses and permits issued to the Proponent.
Project Manager	– Ensure the Proponent 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 EMPrs and conditions of the environmental authorisation are communicated and adhered to by the Proponent and its contractor(s); – Monitor the implementation of the EMPrs 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 and EMPrs for the project, the conditions of EA, all other applicable licenses and permits issued to the Proponent., and all relevant environmental legislation.
Site Manager	– Be fully conversant with the BAR, the conditions of EA and the EMPrs all other applicable licenses and permits issued to the Proponent; – Approve method statements (co-approval with ECO); – Provide support to the ECO; – Be fully conversant with all relevant environmental legislation and ensure compliance thereof;

RESPONSIBLE PERSON	RESPONSIBILITIES
	– Be responsible for the implementation of the EMPrs and conditions of the EA; – Ensure that audits are conducted to ensure compliance to the EMPrs 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 – 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 EMPrs, 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 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 the Proponent.
	– The following qualifications, qualities and experience are recommended for the individual appointed as the EO:
	  – Suitably qualified, 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 EMPrs 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 EMPrs and all other applicable licenses and permits issued to the Proponent;
	  – 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 ECO;
	  – Conducting site inspections during the defect's liability period, and bringing any environmental concerns to the attention of the ECO 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 EMPrs 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:

RESPONSIBLE PERSON	RESPONSIBILITIES
	▪ 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.
ECO	– A suitably qualified ECO must be appointed by the Holder of the EA to monitor the project compliance with the EMPrs and conditions of the EA and all other applicable licenses and permits issued to the Proponent, where required, on a monthly basis. The costs of the ECO shall be borne by the Holder of the EA (proof of appointment must be maintained onsite). – Responsibilities of the ECO include: – Be fully conversant with the BAR, the conditions of EA and the EMPrs; – Be fully conversant with all relevant environmental legislation, all other applicable licenses and permits issued to the Proponent 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 ECO will: – Undertake monthly inspections of the site and surrounding areas to audit compliance with the EMPrs and conditions of the EA; – Take appropriate action if the specifications contained in the EMPrs and conditions of the EA 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.
Contractors, Staff and Service Providers	– Complying with the Holder of the EA's environmental management specifications; – Be conversant with all EMPrs and conditions of the EA, all other applicable licenses and permits issued to the Proponent, where relevant, and ensure compliance thereto; and – Adhering to any environmental instructions issued by the Site Manager/Project Manager on the advice of the ECO.

Refer to: Table 1 (Part A, Section 3) of the Generic EMPr for the development of overhead transmission and distribution infrastructure, attached as Appendix C and Table 1 (Part A, Section 3) of the Generic EMPr for the development and expansion of substation infrastructure for the transmission and distribution of electricity, attached as Appendix D.

6.2 ENVIRONMENTAL AWARENESS PLAN

Legislation (NEMA) requires that the Proponent 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, the contents of the EMPrs, and conditions of the EA.

The proponent will provide appropriate resources to facilitate social and environmental awareness training during the construction, operational and decommissioning phases of the project. The Proponent will require that all managers associated with the project adhere to the mitigation/management measures detailed in the EMPrs 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 EMPrs.

The following methodology described below in **Sections 6.2.1** will be used to implement and ensure environmental and social awareness and competence:

6.2.1 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;
- No-Go Areas and site sensitive areas
- 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; and
- Formal meetings and open days (if requested).

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 EMPrs and EA 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 Environmental Officer 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 EMPrs and EA. The attendance registers must be kept on file.

6.3 ENVIRONMENTAL DOCUMENTATION 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 6-2** 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 6-2: Documentation Reporting and Compliance Requirements as per the generic EMPrs

ASPECT	REFER TO GENERIC EMPRS (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

ASPECT	REFER TO GENERIC EMPRS (PART A)
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.

7 ENVIRONMENTAL CONTROLS

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

7.1 GENERAL CONTROL MEASURES

This section refers to construction related activities that are common to most OHPL and substation 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 7-1**. 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 7-1: 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 as follows:

Table 7-2: 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 C (PART B: SECTION 1)	REFER TO GENERIC EMPR FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE, ATTACHED AS APPENDIX D (PART B: SECTION 1)
Environmental awareness training	5.1	5.1
Site Establishment development	5.2	5.2

ACTIVITY	REFER TO GENERIC EMPR FOR THE DEVELOPMENT OF OVERHEAD TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE, ATTACHED AS APPENDIX C (PART B: SECTION 1)	REFER TO GENERIC EMPR FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE, ATTACHED AS APPENDIX D (PART B: SECTION 1)
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
Excavation (and Installation) of foundations	5.26	5.26

ACTIVITY	REFER TO GENERIC EMPR FOR THE DEVELOPMENT OF OVERHEAD TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE, ATTACHED AS APPENDIX C (PART B: SECTION 1)	REFER TO GENERIC EMPR FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE, ATTACHED AS APPENDIX D (PART B: SECTION 1)
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.

7.2 SITE SPECIFIC CONTROL MEASURES

This section refers to site specific actions or mitigation measures related to the Project and are based on findings from the BA Report and associated specialist studies.

This section identifies various actions which are undertaken throughout the construction and operational phases. Not every action will be required during the entire course of activities. Therefore, the actions identified herein have been given priority timeframes for proposed implementation. **Table 7-3** below shows the structure of the site-specific EMPr.

Table 7-3: Structure of EMPr

COLUMN	DESCRIPTION
Activity/Aspect	Highlights the various activities/aspects associated with the project i.e. the contractors' activities that will interact with the environment.
Environmental Measures and Action Plans	Indicates the actions required to prevent and /or minimise the potential impacts on the environment that are associated with the project.

Responsibility	Indicates the party responsible for implementing the environmental measures and action plans laid out in the site specific EMPr. Please note that the Site Manager will have authority to stop works if/as necessary.
Priority Timeframe	Indicates when the actions for the specific aspect must be implemented and/or monitored.

The following assumptions have been made in the development of the environmental specification in this site specific EMPr:

- An environmental file containing the information/documentation required by this site specific EMPr is to remain onsite and to be made available at the request of the auditor or similar monitoring body; and
- For ease of reference, any person(s) employed to assist in the Project (i.e. contractors, sub-contractor and permanent and temporary staff) will be collectively referred to as 'onsite personnel'.

It should be noted that at this point of the Project planning process, the necessity for and timing of the decommissioning phase is unknown. Before decommissioning, the holder of the EA will need to follow the related legal permitting process in terms of NEMA and other legislation applicable at the time. The future associated permitting process will further supplement any commitments made within this document.

Table 7-4 outlines the site specific EMPr for the proposed Project.

This site-specific Environmental Management Programme (EMPr, form part of Part C of the Generic EMPrs included as **Appendix C** and **Appendix D.**

Table 7-4: Site Specific Environmental Management Programme

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
1. CONTRACTOR LAYDOWN AREA AND SITE ACCESS			
Objectives: — To implement measures to minimise impacts on the environment from the initiation of construction activities through planning, careful site access route selection and implementation of mitigation measures. **Indicator and Compliance Mechanisms:** — Health, safety, environmental and community incident and complaints management system register. — Close-out on incidents. — Monitoring and audit reports. — Inductions training and register. — Environmental awareness programme/toolbox talks.			
a) Project Initiation of Construction Activities	i) Prior to commencement of onsite activities - an ECO is to be appointed as an independent quality controller and monitoring agent to manage and verify compliance with the EA and EMPr.	PM / Contractor	Once-Off
	ii) Ensure construction activities remain within the demarcated project footprint.	Contractor / EO EO & ECO (monitor)	Construction
	iii) Any no-go areas identified must be demarcated before construction commences. This includes all wetlands and any sensitive areas such as heritage sites or sensitive plant species, unless a permit is obtained		Construction
	iv) Contractor laydown areas, temporary concrete batching areas, vehicle re-fuelling areas and material storage facilities are to remain outside of the watercourses and their associated 32m NEMA Zone of Regulation (ZoR) as well as any sensitive areas		Construction
	v) All personnel and contractors to undergo Environmental Awareness Training. A signed register of attendance must be kept for proof. Discussions are required on sensitive environmental receptors within the project area to inform contractors and site staff of the presence of Red / Orange List species, their identification, conservation status and	ECO (initial training) EO (continued training) EO & ECO (monitor)	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	importance, biology, habitat requirements and management requirements the EA and within the EMPr.		
	vi) Site clearing must be limited to the footprint of the infrastructure requirements.	Contractor / EO EO & ECO (monitor)	Construction
	vii) Locate adequate firefighting equipment, such as fire extinguishers, at laydown areas and with vehicles and make all personnel aware of fire prevention and firefighting measures. Firefighting equipment must be securely placed and inspected monthly.	Contractor / EO EO & ECO (monitor)	Construction Operation
2. VEHICLE, EQUIPMENT AND MACHINERY MANAGEMENT			
Objectives: — To implement measures to minimise impacts on the environment from poorly maintained equipment, machinery and vehicles onsite. **Indicator and Compliance Mechanisms:** — Vehicle and Equipment maintenance programme — Visual inspection of equipment/plant storage areas and active site area, signage, spill kits, etc. (photographic records) — Health, safety, environmental and community incident and complaints management system register. — Close-out on incidents. — Monitoring and audit reports. — Transport route delineation. — Compliance with SANS 10228. — Daily equipment, machinery and vehicle checklists. — Equipment, machinery and vehicle service records. — Incident Classification and Reporting Procedure.			
a) Maintenance of Equipment, Machinery and Vehicles	i) Only minor emergency repair / maintenance work may be undertaken on machinery onsite or within the site camp area.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) All construction vehicles, plant, machinery, and equipment must be checked daily to ensure hydrocarbon leaks (including fuel and hydraulic fluids) are not occurring. Leaking equipment must be repaired immediately or be removed from site to facilitate repair.	Contractor / EO EO & ECO (monitor)	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iii) All construction vehicles, plant, machinery and equipment must be regularly maintained, in line with a maintenance schedule, to prevent leaks, ensure roadworthiness, and reduce emissions.	Contractor / EO EO & ECO (monitor)	Construction Operation
b) Traffic Congestion	i) The movement of vehicles into and out of the site, as well as transporting of equipment / materials to and from site, must be undertaken in line with the approved Contractors Method Statement; to ensure the impact on public areas is minimised, such as ensuring that abnormal loads are moved outside of peak traffic hours, and reasonable measures are taken to ensure that public and staff safety is managed adequately.	Contractor / EO EO & ECO (monitor)	Construction Operation
c) Site Access	i) When the powerline is spun between pylons, and when maintenance is undertaken, no vehicles may indiscriminately drive through the watercourses expect for where authorised to do so. Dedicated access roads must be used.	Contractor / EO EO & ECO (monitor)	Construction Operation
3. FUEL AND CHEMICAL MANAGEMENT			
Objectives: — To ensure the correct storage, handling and disposal of fuels and chemicals in order to prevent impacts to the surrounding environment. **Indicator and Compliance Mechanisms:** — Maintenance records. — Material safety data sheets (MSDS). — Health, safety, environmental and community incident and complaints management system register. — Chemicals Management Procedure. — Monitoring and audit reports. — Training records.			
a) Fuel and Chemical Management	i) A spill management plan must be put in place to ensure that should there be any chemical spill out or over that it does not run into the surrounding areas.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Securely fence and lock the storage areas to accommodate all hazardous substances such as fuel, oils, and chemicals. The storage area must be roofed, and the floor must be an impermeable surface and suitably bunded as per the requirements outlined in SANS 10089-1 (2008). If storage capacity triggers licensing, required licences must be acquired.	Contractor / EO EO & ECO (monitor)	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iii) Label all liquids (chemicals and hydrocarbons) stored onsite for easy identification. Material Safety Data Sheets (MSDS) for onsite chemicals, hydrocarbon materials and hazardous substances must be readily available. MSDS must include mitigation measures to ameliorate potential environmental impacts which may result from a spill, incorporating health and safety mitigation measures.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iv) Keep fuels, oils or other chemicals used outside of the bunded area to a minimum and use suitable secondary containment in the form of drip trays.	Contractor / EO EO & ECO (monitor)	Construction Operation
	v) Wooden poles, if used, should be pre-treated at an appropriate facility to ensure chemical fixation and prevent leaching, and to impede the formation of surface residues within the servitude.	Contractor / EO EO & ECO (monitor)	Construction Operation
b) Health and Safety	i) Display “no smoking” and “no naked flame” signs in and around the project area, as well as near the hazardous material store.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Adequate fire-fighting equipment must be made available at all hazardous storage areas.	Contractor / EO EO & ECO (monitor)	Construction Operation
4. TRAFFIC MANAGEMENT			
Objectives: — To ensure that the trips generated by the construction and operational activities associated with the proposed facility are mitigated as far as possible to: ▪ Reduce the traffic impact on the surrounding road network; ▪ Reduce potential conflicts that may results from the development traffic and the general traffic/public; and ▪ To identify potential routes for vehicles travelling to the site, particularly heavy and abnormal load vehicles. **Indicator and Compliance Mechanisms:** — Induction training and records. — Relevant SANS Codes of Practice. — Incident Classification and Reporting Management Procedure. — Health, safety, environmental and community incident and complaints management system register. — Monitoring and audit reports.			

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
a) Traffic management	i) The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods as much as possible.	Contractor / EO EO & ECO (monitor)	Construction
	ii) Dust suppression of gravel roads during the construction phase, as required.	Contractor / EO EO & ECO (monitor)	Construction
	iii) Regular maintenance of gravel roads is required by the Contractor during the construction phase and by the Owner/Facility Manager during the operational phase.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iv) The use of mobile batch plants and quarries near the site would decrease traffic on the surrounding road network.	Contractor / EO EO & ECO (monitor)	Construction
	v) Staff and general trips should occur outside of peak traffic periods as far as possible.	Contractor / EO EO & ECO (monitor)	Construction
	vi) Consider scheduling shift changes to occur during off peak hours as far as possible.	Contractor / EO EO & ECO (monitor)	Operation
	vii) It is recommended that appropriate signage is accommodated to warn road users of the access points and that the road reserve be maintained to prevent obstructions to sight lines.	Contractor / EO EO & ECO (monitor)	Construction Operation
	viii) A minimum road width of 8m is recommended for the access points and the internal roads can have a minimum width of 5m.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ix) The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	x) It is recommended that the site access to the facility be access controlled. It is also recommended that security staff be stationed on site at the access during construction.	Contractor / EO EO & ECO (monitor)	Construction
	xi) A minimum stacking distance of 25m is recommended between the road edge of the external road and the access control.	Contractor / EO EO & ECO (monitor)	Construction Operation
	xii) It needs to be noted that all access and internal roads should be investigated for their topographical suitability, i.e., feasibility for plant and truck access and height clearance for any Eskom lines, Telkom lines or similar. -	PM / Contractor / EO	Construction
	xiii) Staggered intersections should be avoided where possible.	PM / Contractor / EO	Construction
	xiv) The access points to the site will need to be able to cater for construction and abnormal load vehicles	PM / Contractor / EO	Construction
	xv) All road markings and signage need to be in accordance with the South African Road Traffic Signs Manual (SARTSM).	Contractor / EO EO & ECO (monitor)	Construction Operation
5. WASTE MANAGEMENT			
Objectives: — To ensure the correct handling, storage, transportation and disposal of general waste and hazardous waste. **Indicator and Compliance Mechanisms:** — Induction training and records. — Waste Management Plan (WMP). — Relevant SANS Codes of Practice. — Waste Manifests (all waste streams), waybills (general waste) and Safety disposal certificates (hazardous waste). — Emergency preparedness and response procedure. — Incident Classification and Reporting Management Procedure. — Health, safety, environmental and community incident and complaints management system register. — Monitoring and audit reports.			

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
a) General Waste Management	i) General waste generated as a result of construction activities must be managed in accordance with a WMP (see Section 8.1 of this EMPr). The procedure must be reviewed to ensure compliance with legislative amendments.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Train and inform all onsite personnel regarding general waste minimisation, management, and disposal as per the WMP.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iii) Prohibit littering and burning of waste onsite.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iv) Refuse bins will be emptied when full and storage of domestic waste shall be in covered waste skips.	Contractor / EO EO & ECO (monitor)	Construction Operation
	v) Retain records such as waybills and waste manifests associated with waste removal, transportation and disposal.	Contractor / EO EO & ECO (monitor)	Construction Operation
	vi) Prohibit the mixing of general waste with hazardous waste. Should general waste be mixed with hazardous waste, it will be considered hazardous waste. See below for managing hazardous waste.	Contractor / EO EO & ECO (monitor)	Construction Operation
	vii) Recover, recycle and reuse waste where possible. Seek to use suppliers who reuse their packaging so that they can collect after initial unpacking onsite.	Contractor / EO EO & ECO (monitor)	Construction Operation
	viii) It is recommended that all waste be removed from site immediately to prevent rodents and pests entering the site.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ix) No dumping of litter, rubble or cleared vegetation on site should be allowed. As such it is advised vegetation cuttings (especially Alien Invasive Plants) to be carefully collected and disposed of at a separate waste facility.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
b) Hazardous Waste Management	i) Adequate sanitary facilities and ablutions (a minimum of one toilet per 10 persons, or as required by OHSA) must be provided for all personnel throughout the Project area. Use of these facilities must be enforced. Portable toilets must be located outside of the 1:100-year floodline and must be regularly emptied at a municipal wastewater treatment works.	Contractor / EO EO & ECO (monitor)	Construction
	ii) Any recyclable material which is considered hazardous is to be collected and transferred by a permitted/trained waste contractor in accordance with the SANS 10228 for transport to the approved recycling/recovery facility.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iii) Train and inform all onsite personnel regarding hazardous waste minimisation, management and disposal as per the WMP in Section 8.1 of this EMPr.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iv) Clean areas where hazardous waste spills have occurred and dispose of the hazardous material appropriately. Key personnel must be trained on handling spillages.	Contractor / EO EO & ECO (monitor)	Construction Operation
	v) Retain records of appropriate safety disposal certificates associated with hazardous waste removal, transportation and disposal.	Contractor / EO EO & ECO (monitor)	Construction Operation
	vi) The emergency preparedness and response plan (Section 8.3 of this EMPr or the site specific one developed) must be implemented. The plan must be placed in key locations around the site, visible to all employees.	Contractor / EO EO & ECO (monitor)	Construction Operation
	vii) Ensure that waste manifest documentation (as per the Waste Classification and Management Regulations – GNR 634) is prepared and maintained for the generation, transportation and disposal of waste.	Contractor / EO EO & ECO (monitor)	Construction
	viii) Report any major spill incidents to the Department within 24 hours of occurrence, in accordance with Section 30 of NEMA.	Contractor / EO EO & ECO (monitor)	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
6. FRESHWATER MANAGEMENT			
Objectives: — To protect the integrity and ecological functioning and prevent pollution of freshwater sources in the vicinity of the project. **Indicator and Compliance Mechanisms:** — Induction training and records. — Monitoring and audit reports.			
a) Site preparation prior to construction activities.	i) The proposed powerline support structures must be located outside of the watercourses and at least 32 m (as far as possible/feasible) from the delineated edge of watercourses.	PM Contractor / EO EO & ECO (monitor)	Construction
	ii) 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;	PM Contractor / EO EO & ECO (monitor)	Construction
	iii) 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	Contractor / EO EO & ECO (monitor)	Construction
	iv) Contractor laydown areas, vehicle re-fuelling areas and material storage facilities to remain outside of the watercourses and their associated 32 m NEMA Zone of Regulation (ZoR);	Contractor / EO EO & ECO (monitor)	Construction
	v) 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.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
b) Installation of the support structures and spanning of the proposed powerline.	i) Excavation of pits for the support structures foundation and the foundation of the substation may result in loose sediments within the landscape, 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;	Contractor / EO EO & ECO (monitor)	Construction
	ii) During excavation activities, soil must be stockpiled upgradient of the excavated area. Mixture of the lower and 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;	Contractor / EO EO & ECO (monitor)	Construction
	iii) No stockpiling of topsoil is to take place within close proximity to a watercourse, and suitable dust suppression actions (as needed) must be implemented for the duration of the construction works, especially considering the action of wind within these semi-arid landscapes;	Contractor / EO EO & ECO (monitor)	Construction
	iv) 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;	Contractor / EO EO & ECO (monitor) Contractor / EO EO & ECO (monitor)	Construction
	v) 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.	Contractor / EO EO & ECO (monitor)	Construction
c) Concrete Mixing and casting of concrete for foundations.	i) No mixed concrete may be deposited outside of the designated construction footprint;	Contractor / EO EO & ECO (monitor)	Construction
	ii) 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.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iii) Concrete spilled outside of the demarcated area must be promptly removed and taken to a suitably licensed waste disposal site.	Contractor / EO EO & ECO (monitor)	Construction
	iv) Soil removed for excavating the pit should be used as backfill material;	Contractor / EO EO & ECO (monitor)	Construction
	v) 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;	Contractor / EO EO & ECO (monitor)	Construction
	vi) 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	Contractor / EO EO & ECO (monitor)	Construction
	vii) 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.	Contractor / EO EO & ECO (monitor)	Construction
d) Creation of new road crossings within watercourses	i) It is imperative that all construction works be undertaken during the dry periods when there is no flow within the watercourses, and thus no diversion of flow would be necessary; ii) The throughflow structures must be designed to ensure that the structures are geotechnically sound and that they are hydraulically stable, even if a 1:100 year flood event was to occur. The designs should include culverts installed intermittently to ensure a free draining landscape. It is recommended that a suitably qualified hydrologist be consulted to provide guidance on the relevant sizes and width requirements to ensure that hydraulic functioning of the system is maintained; iii) In addition, the crossings must be designed such that should they be overtopped, they remain stable and do not lead to excessive downstream erosion and incision. It must be ensured that the final design accounts for appropriate wetting frequencies and patterns are maintained in the pre-development condition (with input from the freshwater ecologist, where necessary);	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iv) The reaches of the EDLs where no activities are planned to occur must be considered no-go areas. These no-go areas can be marked at a maximum distance of 5 m upstream and downstream of the proposed road upgrade crossing. This 5 m buffer area would allow for construction personal, vehicles (if applicable) to enter the watercourse crossing where the road is proposed to be constructed; v) The removed vegetation must be stockpiled outside of the delineated boundary of the watercourse. The footprint areas of these stockpiles should be kept to a minimum, and may not exceed a height of 2 m. 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.		
e) Upgrading of existing access roads within watercourses associated with the Tankwa River system, Wilgebos River system and Meintjiesplaas River system:	i) The construction footprint must be limited to a construction Right of Way that comprises a 5 m construction buffer (upstream and downstream of the watercourse crossing) only. ii) Upgrading of the informal roads must take cognisance of the delineated extent of the watercourse traversed by this existing informal access road and that located within close proximity to the road. Should the road be increased in width, the road must be expanded on the side opposite of the watercourse, to ensure that the remaining natural buffer between the access road and the watercourse remains intact; iii) Material to be used (gravel – if applicable) as part of the upgrading of the existing roads must be stockpiled outside the delineated extent of the watercourses (preferably at least 32 m from the watercourse) to prevent sedimentation thereof and to avoid any other vegetation being impacted by the construction activities. These stockpiles may not exceed a height of 2 m and should be protected from wind using tarpaulins; iv) The disturbed area surrounding the road must be revegetated with suitable indigenous vegetation to prevent the establishment of alien vegetation species and to prevent erosion from occurring; v) The alien vegetation management plan as compiled by the terrestrial/botanical ecologist is highly recommended and supported by the freshwater specialist and must be implemented concurrently with the commencement of construction; and vi) •All existing alien and invasive vegetation should be removed. All material must be disposed of at a registered garden refuse site and may not be burned or mulched on site.	Contractor / EO EO & ECO (monitor)	Construction
	vii) During the excavation activities, any soil/sediment or silt removed from the watercourse may be temporarily stockpiled in the road reserve but outside the delineated extent of the		

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	watercourse. These stockpiles may not exceed 2 m in height, and their footprint should be kept to a minimum. Stockpiling of removed materials may only be temporary (may only be stockpiled during the period of construction at a particular site) and should be disposed of at a registered waste disposal facility; viii) • Excavated materials should not be contaminated, and it should be ensured that the minimum surface area is taken up. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, for later usage as backfill material or as part of rehabilitation activities; ix) • Care must be taken to ensure that no scouring or erosion occurs as a result of the proposed culvert crossing. Installation of riprap or gabion mattresses and/or concrete aprons associated with any culverts; x) • All construction material (with specific mention of prefabricated culvert structures) must be stockpiled in the laydown area and must only be imported to the construction site when required; xi) • Machinery/vehicles used to install culvert structures must be parked on the existing road surface and may not enter the watercourses; and xii) • Reno-mattresses or riprap must be installed at the outlet side of the culvert/bridge structures to ensure energy dissipation and prevent concentrated runoff into the downstream watercourse. The reno mattress/riprap must be installed flush with the culvert outlet.		
f) Excavation and soil compaction activities within the watercourses	i) During the excavation activities, any soil/sediment or silt removed from the watercourse may be temporarily stockpiled in the road reserve but outside the delineated extent of the watercourse. These stockpiles may not exceed 2 m in height, and their footprint should be kept to a minimum. Stockpiling of removed materials may only be temporary (may only be stockpiled during the period of construction at a particular site) and should be disposed of at a registered waste disposal facility; ii) Excavated materials should not be contaminated, and it should be ensured that the minimum surface area is taken up. Mixture of the lower and upper layers of the excavated soil should be kept to a minimum, for later usage as backfill material or as part of rehabilitation activities; iii) Care must be taken to ensure that no scouring or erosion occurs as a result of the proposed culvert crossing. Installation of riprap or gabion mattresses and/or concrete aprons associated with any culverts;	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iv) All construction material (with specific mention of prefabricated culvert structures) must be stockpiled in the laydown area and must only be imported to the construction site when required; v) Machinery/vehicles used to install culvert structures must be parked on the existing road surface and may not enter the watercourses; and vi) Reno-mattresses or riprap must be installed at the outlet side of the culvert/bridge structures to ensure energy dissipation and prevent concentrated runoff into the downstream watercourse. The reno mattress/riprap must be installed flush with the culvert outlet.		
g) Operation and maintenance of the powerline, substation, proposed main access road and other existing roads traversing watercourses (where applicable).	i) Maintenance vehicles must make use of dedicated access roads and no indiscriminate movement in the watercourses may be permitted.	Contractor / EO EO & ECO (monitor)	Operation
	ii) During periodic maintenance activities of the powerline and substation, monitoring for erosion should be undertaken;	Contractor / EO EO & ECO (monitor)	Operation
	iii) 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; and	Contractor / EO EO & ECO (monitor)	Operation
	iv) Hot spots for the build-up of debris and excess sediment must be identified and when necessary, debris/excess sediment must be removed by hand to prevent future flooding and potential damage to infrastructure;	Contractor / EO EO & ECO (monitor)	Operation
	v) Routine maintenance of the roads must be undertaken to ensure that no concentration of flow and subsequent erosion occurs due to the road crossings/instream infrastructure. Such maintenance activities must specifically be undertaken after high rainfall events;	Contractor / EO EO & ECO (monitor)	Operation
	vi) Stormwater runoff from the road crossings should be monitored (by the Operation and Maintenance (O&M) Manager), to ensure it does not result in erosion of the watercourses. Stormwater should be allowed to diffusely spread across the landscape, by ensuring adequate surface roughness in the watercourse (through vegetation and rocky areas); and	Contractor / EO EO & ECO (monitor)	Operation
	vii) 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	Contractor / EO	Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	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.	EO & ECO (monitor)	
h) Hydrology	i) Ensure the storm water management plan (**Appendix G**) is implemented by an appropriate engineer. Here, the engineer should ensure both natural run-off (that which can be released into the natural landscape with no detrimental effect) and excess artificial run-off generated by the proposed development structures. Other structures that may be considered are semi-permeable surfaces that can absorb artificial run-off but releases a certain amount into the landscape. Energy dissipating structures can also be used.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Spill prevention kits must be available on site. Eco-friendly alternatives are recommended.		
	iii) Activities/maintenance to stop during heavy rainfall periods.		
	iv) Drip trays to be present and maintenance must only occur in designated lined areas.		
7. BIODIVERSITY MANAGEMENT			
Objectives: — Prevent the further loss and fragmentation of vegetation communities and the CBA 1 and CBA 2 areas in the vicinity of the project area (including water resource areas); — As far as possible, reduce the negative fragmentation effects of the development and enable safe movement of faunal species; and — Prevent the direct and indirect loss and disturbance of faunal species and community (including occurring and potentially occurring species of conservation concern). **Indicator and Compliance Mechanisms:** — Induction training and records. — Monitoring and audit reports.			
a) Vegetation	i) Blanket clearing of vegetation must be limited to pylons, 4x4 access tracks (where needed) and substation footprints. No clearing outside of footprint to take place.	Contractor / EO EO & ECO (monitor)	Construction
	ii) Topsoil must be stripped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iii) The Relocation of Species of Conservation Concern Plan & Biodiversity Management Plan must be implemented ▪ Necessary permits must be obtained for all species listed in: o NEM:BA Threatened or Protected Species (ToPS) species listed in terms of the ToPS o regulations and including red-listed species. o Northern Cape Nature Conservation Act (Act no. 9 of 2009) o The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape o Nature Conservation Laws Amendment Act, Act 2 of 2000 ▪ Areas to be cleared of vegetation will be clearly demarcated before clearing commences. ▪ Flora search and rescue is to be conducted before vegetation clearing takes place. ▪ Plants to be rescued should include both Species of Conservation Concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation and that are amenable to transplanting. ▪ Areas should only be stripped of vegetation as and when required and in particular once Species of Conservation Concern have been relocated for that area. ▪ Search and Rescue is best undertaken during early Spring period. ▪ Should site construction occur in a phased manner, then clearing activities should take place also in a phased manner, ahead of construction work.	Contractor / EO EO & ECO (monitor)	Construction Operation
b) Flora Species	i) A flora search and rescue is likely to be required within pylon and substation footprints as per: ▪ Northern Cape Nature Conservation Act (Act no. 9 of 2009) ▪ Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000): ▪ NEMBA Threatened or Protected Species (TOPS).	ECO (monitor) Biodiversity/Botanical Specialist	Pre-Construction
	iv) The Relocation of Species of Conservation Concern Plan & Biodiversity Management Plan must be implemented ▪ Necessary permits must be obtained for all species listed in:	EO & ECO (monitor) Project Proponent	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	○ NEM:BA Threatened or Protected Species (ToPS) species listed in terms of the ToPS ○ regulations and including red-listed species. ○ Northern Cape Nature Conservation Act (Act no. 9 of 2009) ○ The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape ○ Nature Conservation Laws Amendment Act, Act 2 of 2000 ▪ Areas to be cleared of vegetation will be clearly demarcated before clearing commences. ▪ Flora search and rescue is to be conducted before vegetation clearing takes place. ▪ Plants to be rescued should include both Species of Conservation Concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation and that are amenable to transplanting. ▪ Areas should only be stripped of vegetation as and when required and in particular once Species of Conservation Concern have been relocated for that area. ▪ Search and Rescue is best undertaken during early Spring period. ii) Should site construction occur in a phased manner, then clearing activities should take place also in a phased manner, ahead of construction work.		
c) Sensitive Species 142	i) The 4x4 tracks supporting the OHPLs across the project must be developed to follow a 'path of least resistance' and without the use of bulldozers or other earth moving equipment, as much as practically possible.	EO & ECO (monitor) Project Proponent	Construction
	ii) Vegetation and any Sensitive Species 142 should not be removed/relocated to create the 4x4 track but rather left in situ (i.e., create the track by simply driving repeatedly over the same route). If any Sensitive Species 142 clumps are within the 4x4 track route it would be recommended to divert slightly to avoid if possible. This will achieve the following: a. Improved survival of Sensitive Species 142 (and other geophytic plants) by leaving them in situ rather than relocating them; b. Retention of topsoil and the seed bank in situ improves rehabilitation/regeneration of vegetation; and c. Keeping a natural/endemic vegetative embedded into the soil decreases local erosion and topsoil loss from high wind.	EO & ECO (monitor) Project Proponent	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iii) Where bulldozers or other earth moving equipment are used, then permits must be obtained for prior rescue and relocation of Sensitive Species 142 and any other protected species. iv) All protected species within any pylon footprint must be rescued and relocated		
	v) The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised: ▪ Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements. ▪ A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase. ▪ Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. ▪ Removal of alien plants are to be done according to the Working for Water Guidelines. ▪ The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas. ▪ All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site.	Contractor / EO EO & ECO (monitor)	Construction Operation
d) Erosion	i) Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover crop planted once construction is completed.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Topsoil must be stripped and stockpiled separately and replaced on completion.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iii) If natural vegetation re-establishment does not occur, a suitable grass must be applied	Contractor / EO EO & ECO (monitor)	Construction Operation
e) Ecological processes	i) Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
f) Aquatic and Riparian Processes	i) Pylon placement should span any aquatic and riparian features, rivers, non-perennial watercourses and any wetlands/pans.	Contractor / EO EO & ECO (monitor)	Construction Operation
g) Faunal Habitat	i) Blanket clearing of vegetation must be limited to the footprint.. ii) It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.	Contractor / EO EO & ECO (monitor)	Construction Operation
h) Faunal Processes	i) It is recommended that a faunal search and rescue be conducted before construction commences (i.e. clearing of vegetation), particularly for reptile species, although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.	Contractor / EO EO & ECO (monitor)	Construction
i) Faunal Species	vi) The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised: ▪ Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements. ▪ A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase. ▪ Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. ▪ Removal of alien plants are to be done according to the Working for Water Guidelines. ▪ The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas. ▪ All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site.	Contractor / EO EO & ECO (monitor) Biodiversity Specialist	Construction Operation
	i) No animals are to be harmed or killed during the course of operations.	Contractor / EO EO & ECO (monitor)	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	ii) Workers are not allowed to snare any faunal species.	Contractor / EO EO & ECO (monitor)	Construction Operation
8. AVIFAUNA MANAGEMENT			
Objectives: — To prevent loss of diversity of indigenous avifaunal communities and loss of important avifaunal habitat. **Indicator and Compliance Mechanisms:** — Induction training and records. — Monitoring and audit reports.			
a) Displacement due to disturbance	i) Implement a 1.5km No Go zone around the Verreaux's Eagle nest at 32°51'59.27"S 20°30'12.02"E (Beacon Hill).	Project developer	Pre-Construction
b) Displacement due to disturbance	i) Construction and decommissioning activity should be restricted to the immediate footprint of the infrastructure as much as possible.	Contractor / EO EO & ECO (monitor)	Construction Decommissioning
	ii) Access to the remainder of the site should be strictly controlled to prevent unnecessary disturbance of priority species as much a practically possible..	Contractor / EO EO & ECO (monitor)	Construction Decommissioning
	iii) Measures to control noise and dust should be applied according to current best practice in the industry.	Contractor / EO EO & ECO (monitor)	Construction Decommissioning
	iv) Maximum use should be made of existing access roads and the construction of new roads should be kept to a minimum. Construction vehicles must stick to designated access roads as much as possible.	Contractor / EO EO & ECO (monitor)	Construction Decommissioning
	v) A 1.5km No Go buffer should be implemented around the Verreaux's Eagle nest at 32°51'59.27"S 20°30'12.02"E (Beacon Hill).	Contractor / EO EO & ECO (monitor)	Construction Decommissioning

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	vi) Vegetation clearance should be limited to what is absolutely necessary.	Contractor / EO EO & ECO (monitor)	Construction
	vii) The mitigation measures proposed by the vegetation specialist must be strictly enforced.	Contractor / EO EO & ECO (monitor)	Construction Decommissioning
	viii) Dismantling activity should be restricted to the immediate footprint of the infrastructure as much as possible.	Contractor / EO EO & ECO (monitor)	Decommissioning
	ix) Bird Flight Diverters must be fitted to the entire powerline according to the applicable Eskom Engineering Instruction (Eskom Unique Identifier 240 – 93563150: The utilisation of Bird Flight Diverters on Eskom Overhead Lines). These devices must be installed as soon as the conductors are strung.	Contractor / EO EO & ECO (monitor) Avifaunal Specialist	Construction
c) Displacement due to habitat transformation in the substations	i) Adhere to the recommendations of the vegetation/terrestrial biodiversity specialist ii) Monitor rehabilitation via site audits and site inspections to ensure compliance. Record and report any non-compliance.	Contractor / EO EO & ECO (monitor)	Construction
d) Mortality of avifauna due to electrocution in the onsite substations	i) The hardware within the proposed substation yard is too complex to warrant any mitigation for electrocution at this stage. It is recommended that if on-going impacts are recorded once operational, site specific mitigation (insulation) be applied reactively. This is an acceptable approach because Red List priority species are unlikely to frequent the substation. ii) Monitor the electrocution mortality in the substations. Apply mitigation if electrocution happens regularly.	Facility operator Avifaunal Specialist	Operation
9. SOIL AND LAND MANAGEMENT			
Objectives: — To prevent any disturbance, erosion or contamination of soil resources. **Indicator and Compliance Mechanisms:**			

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
— Induction training and records. — WMP. — Incident Classification and Reporting Management Procedure. — Health, safety, environmental and community incident and complaints management system register. — Monitoring and audit reports.			
a) Erosion Management	i) Implement the stormwater and erosion management Plan compiled by NatureStamp 2022 contained in **Appendix G**	Contractor / EO EO & ECO (monitor)	Construction
10. WATER MANAGEMENT			
Objectives: — To implement measures to prevent the contamination on surface and groundwater resources. — To prevent erosion. **Indicator and Compliance Mechanisms:** — Induction training and records. — Incident Classification and Reporting Management Procedure. — Environmental awareness programme/toolbox talks. — Stormwater Management Plan.			
a) Surface and Groundwater Management	i) All stormwater generated by medium to high-risk contamination 'dirty' areas must not be allowed to discharge into the surrounding environment.	Contractor / EO EO & ECO (monitor)	Construction
	ii) Areas with the potential to contaminate the groundwater must be underlain by hardstanding of suitable integrity.	Contractor / EO EO & ECO (monitor)	Construction
	iii) Any cement mixing shall be completed on impervious hardstanding surfaces to prevent spillage to the environment.	Contractor / EO EO & ECO (monitor)	Construction
	iv) Earthmoving construction activities should ideally take place within periods of low to little flow to reduce the risk of sediment-laden runoff from the construction activities/site washing into any nearby watercourses.	Contractor / EO EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
b) Fire	i) Contractor shall compile and provide a Fire Management Plan to be implemented throughout the construction process. The Fire Management Plan is to be reviewed and approved by the PM. Section 8.22 of the EMPr outlines minimum aspects to be included within the Fire Management Plan.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Training on fire prevention is to be undertaken as part of the Environmental Awareness Training issued to all staff.	ECO (initial training) EO (continued training) EO & ECO (monitor)	Construction Operation
	iii) No illicit fires must be allowed during the construction phase of the proposed development.	Contractor / EO EO & ECO (monitor)	Construction Operation
11. SITES OF CULTURAL OR HERITAGE SIGNIFICANCE			
Objectives: — To ensure that sites/artefacts of heritage value are identified and protected. **Indicator and Compliance Mechanisms:** — Reporting as per Chance Find Procedure. — Monitoring and audit reports.			
a) Cultural and/or Heritage Sites and Palaeontology	i) A Chance Find Procedure is provided in Section 8.5. This procedure must be implemented to manage any heritage resources that may be encountered. ii) Should any buried archaeological resources or burials be uncovered during the course of development activities, work must cease in the vicinity of these finds. The relevant heritage authority (the South African Heritage Resources Agency (SAHRA) in the Northern Cape and Heritage Western Cape (HWC) in the Western Cape) must be contacted immediately in order to determine an appropriate way forward.	Contractor / EO EO & ECO (monitor)	Construction
12. HEALTH AND SAFETY			
Objectives: — To ensure health and safety of staff and the public. **Indicator and Compliance Mechanisms:** — Health, safety, environmental and community incident and complaints management system register.			

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
— Incident Classification and Reporting Management Procedure. — Monitoring and audit reports.			
a) Health and Safety	i) The appointed contractor will be responsible for the development of a comprehensive health and safety protocol, as well as safe work instruction method statements, that are to be used by employees in completing their tasks and which must be adhered to throughout the construction phase.	Contractor / EO EO & ECO (monitor)	Construction
	ii) The Contractor is to appoint a health and safety officer to monitor safety conditions during construction activities.	Contractor / EO EO & ECO (monitor)	Construction
	iii) All onsite personnel are required to undergo induction training and regular toolbox talks to raise awareness of health and safety.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iv) The contractor is to ensure all employees are properly trained to use specific equipment or machinery and provide all staff with appropriate PPE and ensure they are trained in proper use thereof.	Contractor / EO EO & ECO (monitor)	Construction Operation
	v) Train all onsite personnel handling chemical or hazardous substances in the use of such substances and the environmental, health and safety consequences of incidents.	Contractor / EO EO & ECO (monitor)	Construction Operation
	vi) Train personnel on how to deal with snake encounters, as well as encounters with other dangerous animals known to occur in the area.	Contractor / EO EO & ECO (monitor)	Construction Operation
	vii) Provide onsite personnel with sufficient potable water for drinking.	Contractor / EO EO & ECO (monitor)	Construction Operation
	viii) Live-wire work is to be conducted only by trained workers with strict adherence to specific safety and insulation standards.	Contractor / EO EO & ECO (monitor)	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	ix) Develop and implement a fall protection program that includes training in climbing techniques and use of fall protection measures; inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others	Contractor / EO EO & ECO (monitor)	Construction Operation
	x) Occupational Electric and magnetic fields (EMF) exposure should be prevented or minimized through the preparation and implementation of an EMF safety program.	Contractor / EO EO & ECO (monitor)	Construction Operation
b) Public Safety	i) Restrict public access by ensuring fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site.	Contractor / EO EO & ECO (monitor)	Construction Operation
	ii) Should security personnel be engaged to safeguard Project equipment, these should be licenced service providers adequately trained on the use of minimal force.	Contractor / EO EO & ECO (monitor)	Construction Operation
	iii) All visitors to active work areas are to undergo site induction and be made aware of the risks associated with the site.	Contractor / EO EO & ECO (monitor)	Construction
13. SOCIO-ECONOMIC ENVIRONMENT			
Objectives: — To ensure that the negative socio-economic impacts are mitigated and managed. — To ensure that the positive socio-economic impacts are enhanced. **Indicator and Compliance Mechanisms:** — Employment records and community engagement local enterprise development records.			
a) Labour Legislation	i) Ensure compliance with local and international labour legislation and good practice on the part of the contractors.	PM Contractor	Construction Operation
b) Employment	i) Where reasonable and practical, the proponent should appoint local contractors and implement a 'locals first' policy, especially for semi and low-skilled job categories. However, due to the low skills levels in the area, the majority of skilled posts are likely to be filled by people from outside the area.	PM	Construction Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	ii) Where feasible, efforts should be made to employ local contactors that are compliant with Broad Based Black Economic Empowerment (BBBEE) criteria.	PM	Construction Operation
	iii) Before the construction phase commences, the proponent should meet with representatives from the Local Municipality to establish the existence of a skills database for the area. If such as database exists it should be made available to the contractors appointed for the construction phase.	PM	Pre-Construction
	iv) The local authorities, community representatives, and organisations on the interested and affected party database should be informed of the final decision regarding the project and the potential job opportunities for locals and the employment procedures that the proponent intends following for the construction phase of the project.	PM & Contractor	Pre-Construction
	v) Where feasible, training and skills development programmes for locals should be initiated prior to the initiation of the construction phase.	PM & Contractor	Pre-Construction
	vi) The recruitment selection process should seek to promote gender equality and the employment of women wherever possible.	PM & Contractor	Pre-Construction
c) Local Business Opportunities	i) The proponent should liaise with the local municipality with regards the establishment of a database of local companies, specifically BBBEE companies, which qualify as potential service providers (e.g., construction companies, catering companies, waste collection companies, security companies etc.) prior to the commencement of the tender process for construction service providers. These companies should be notified of the tender process and invited to bid for project-related work. *Note that while preference to local employees and companies is recommended, it is recognised that a competitive tender process may not guarantee the employment of local labour for the construction phase.*	PM & Contractor	Pre-Construction
d) Community Safety	i) The proponent and the contractor should implement an awareness programme for communicable diseases (including HIV/AIDS and COVID-19) for all construction workers at the outset of the construction phase.	PM & Contractor EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	ii) The proponent and the contractor(s) should develop a code of conduct for the construction phase. The code should identify which types of behaviour and activities are not acceptable. The Code of Conduct should be signed by the proponent, the Contractors and all workers before the contractors move onto site. Construction workers in breach of the code should be subject to appropriate disciplinary action and/or dismissed. All dismissals must comply with the South African labour legislation.		
	iii) The contractor should provide transport for workers to and from the site on a daily basis. This will enable the contactor to effectively manage and monitor the movement of construction workers on and off the site.	Contractor EO & ECO (monitor)	Construction
	iv) The contractor must ensure that all construction workers from outside the area are transported back to their place of residence within 2 days for their contract coming to an end.		
	v) No construction workers, with the exception of security personnel, should be permitted to stay over-night on the site.		
e) Protection of Livestock and Infrastructure	i) The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc. during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.	PM & Contractor	Construction
	ii) All farm gates must be closed after passing through.	Contractor EO & ECO (monitor)	Construction
	iii) The proponent should consider the option of establishing a Monitoring Forum (MF) that includes local farmers and develop a Code of Conduct for construction workers. This committee should be established prior to commencement of the construction phase. The Code of Conduct should be signed by the proponent and the contractors before the contractors move onto site.	PM & EO	Pre-Construction
	iv) The proponent should hold contractors liable for compensating farmers and communities in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. This should be contained in the Code of Conduct to be signed between the proponent, the contractors, and neighbouring landowners. The agreement should also	PM & Contractor EO & ECO (monitor)	Construction

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	cover loses and costs associated with fires caused by construction workers or construction related activities.		
	v) Contractors appointed by the proponent must ensure that all workers are informed at the outset of the construction phase of the conditions contained in the Code of Conduct, specifically consequences of stock theft and trespassing on adjacent farms.		
	vi) Contractors appointed by the proponent must ensure that construction workers who are found guilty of stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation.		
f) Heavy Vehicle Management / Grievances	i) Ongoing communication with landowners and road users during construction period.	EO / EO ECO (monitor)	Construction
	ii) The MF should also address issues associated with damage to roads and other construction related impacts		
	iii) Establishment of a Grievance Mechanism that provides local farmers and other road users with an effective and efficient mechanism to address issues related to construction related impacts, including damage to local gravel farm roads.		
	iv) Implementation of a road maintenance programme throughout the construction phase to ensure that the affected roads maintained in a good condition.		
	g) Dust suppression measures must be implemented on un-surfaced roads, such as wetting on a regular basis and ensuring that vehicles used to transport building materials are fitted with tarpaulins or covers.		
	v) Repair of all affected road portions at the end of construction period where required.		
	vi) All vehicles must be roadworthy, and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits.		
h) Energy Security	i) Maximise the number of employment opportunities for local community members, where feasible.	PM / EO	Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	ii) Implement training and skills development programs for members from the local community.		
	iii) Maximise opportunities for local content and procurement.		
i) Veld Fires	i) The proponent should enter into an agreement with the local farmers in the area whereby damages to farm property etc., during the construction phase will be compensated for. The agreement should be signed before the construction phase commences.	Contractor / EO EO & ECO (monitor)	Construction
	ii) Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas.		
	iii) Smoking on site should be confined to designated areas.		
	iv) Contractor should ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy summer months.		
	v) Contractor should provide adequate fire-fighting equipment on-site, including a fire fighting vehicle.		
	vi) Contractor should provide fire-fighting training to selected construction staff.		
	vii) As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire-fighting costs borne by farmers and local authorities.		
j) Improved energy security and establishment of energy infrastructure	i) Maximise the number of employment opportunities for local community members, where feasible. ii) Implement training and skills development programs for members from the local community. iii) Maximise opportunities for local content and procurement	PM / EO	Operation

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
k) Implement agreements with affected landowners.	i) Implement agreements with affected landowners.	PM / EO	Operation
l) Impact on farming operations during maintenance	i) Affected property owners should be notified in advance of the timing and duration of maintenance activities.	PM / EO	Operation
	ii) Maintenance teams must ensure that all farm gates must be closed after passing through.		
	iii) Property owners should be compensated for damage to farm property and or loss of livestock or game associated maintenance related activities.		
	iv) Movement of traffic and maintenance related activities should be strictly contained within designated areas associated with transmission lines and substations.		
	v) Strict traffic speed limits must be enforced.		
	vi) No maintenance workers should be allowed to stay over-night on the affected properties		
14. VISUAL LANDSCAPE			
Objectives: — To ensure that impacts to the surrounding visual landscape is kept to a minimum or mitigated as far as possible. **Indicator and Compliance Mechanisms:** — Maintenance records. — Incident reporting system. — Induction training and records. — Health, safety, environmental and community incident and complaints management system register. — Monitoring and audit reports.			
a) Visual landscape	i) Carefully plan to minimise the construction period and avoid construction delays as much as possible.	Contractor / EO EO & ECO (monitor)	Construction
	ii) Inform receptors within 500m of the proposed power line and / or substation of the construction programme and schedules.		

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	iii) Minimise vegetation clearing and rehabilitate cleared areas as soon as possible.		
	iv) Vegetation clearing should take place in a phased manner.		
	v) Maintain a neat construction site by removing rubble and waste materials regularly.		
	vi) Make use of existing gravel access roads where possible.		
	vii) Limit the number of vehicles and trucks travelling to and from the construction site, where possible.		
	viii) Ensure that dust suppression techniques are implemented, as needed: a. on all access roads; b. in all areas where vegetation clearing has taken place; c. on all soil stockpiles		
b) Vehicles and lighting	i) As far as possible, limit the number of maintenance vehicles using access roads.	EO & EO (monitor)	Operation
	ii) As far as possible, limit the amount of security and operational lighting at the proposed substation.		
	iii) Light fittings for security at night should reflect the light toward the ground and prevent light spill.		
	iv) Lighting fixtures should make use of minimum lumen or wattage.		
	v) Mounting heights of lighting fixtures should be limited, or alternatively, foot-light or bollard level lights should be used.		
	vi) If possible, make use of motion detectors on security lighting.		
	vii) Buildings on the substation site should be painted with natural tones that fit with the surrounding environment.		

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	viii) Non-reflective surfaces should be utilised where possible		
15. AIR QUALITY			
Objectives: — To ensure that air quality impacts to the surrounding area is kept to a minimum or mitigated as far as possible. — To ensure that odour impacts to the surrounding environment are minimal or mitigated **Indicator and Compliance Mechanisms:** — Maintenance records. — Incident reporting system. — Induction training and records. — Health, safety, environmental and community incident and complaints management system register. — Monitoring and audit reports. — Odour Management Plan. — Air Quality Impact Assessment. — Records of PPE.			
a) Dust and Particulate Matter	i) When required, dust suppression methods such as water suppression must be used, especially during dry and windy periods. Dust must be visually monitored on a daily basis and reasonable measures implemented to ensure emissions are minimised.	Contractor / EO EO & ECO (Monitor)	Construction
	ii) All materials transported to, or from, site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering or wetting friable materials.		
	iii) Ensure that all vehicles and machines are adequately maintained to minimise emissions.	Contractor / EO EO & ECO (Monitor)	Construction Operation
16. REHABILITATION			
Objectives: — To return disturbed sites to a natural state characteristic to the area. **Indicator and Compliance Mechanisms:** — Rehabilitation Plan			
a) Rehabilitation and Landscaping	i) Implement Rehabilitation Plan as follows:	Contractor / EO	All phases

ACTIVITY/ASPECT	ENVIRONMENTAL MANAGEMENT AND MITIGATION MEASURE	RESPONSIBLE PERSON	PRIORITY TIMEFRAME
	▪ On completion of construction, the surface of any work areas, especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area. ▪ The disturbed areas can be seeded with suitable grasses and local indigenous seed mix, if deemed to be required, however, vegetation is likely to re-establish without input. ▪ Excavations may not be used for the dumping of construction wastes. ▪ Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations and must be disposed of appropriately. ▪ Final rehabilitation must comply with the requirements mentioned in the Rehabilitation Plan.	EO & ECO (Monitor)	

8 METHOD STATEMENTS / MANAGEMENT PLANS

A defined in the generic EMPr various method statements are to be compiled and implemented throughout the construction phase (refer to Part A: Section 4.5 of the generic EMPrs attached as **Appendix C** and **Appendix D**).

This section provides an overview of various aspects / thematic areas and requirements whereby the Method Statements / management plans must be developed and followed throughout the proposed construction and operation of the 132kV OHPL. It must be noted that these method statement / management plans can be updated at any stage depending on any changes that may occur on the site.

This section provides and overview of the following aspects:

- Waste Management ;
- Fire Management;
- Emergency Preparedness and Response;
- COVID-19;
- Chance Find Procedure;
- Security Plan;
- HIV/AIDS; and
- Grievance Mechanism Procedure.

The following additional plans are included in the Appendices:

- Traffic Management Plan (**Appendix E**);
- Biodiversity and Terrestrial Ecology Plans (**Appendix F**), as contained in the Specialist Report, inclusive of mitigation measures for**:**
  - Site Preparation and Vegetation Clearing
  - Relocation of Species of Conservation Concern;
  - Rehabilitation and Landscaping; and
  - Maintenance Management
- Stormwater and Erosion Management Plan (**Appendix G**).

8.1 WASTE MANAGEMENT

8.1.1 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 8-1**) 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.

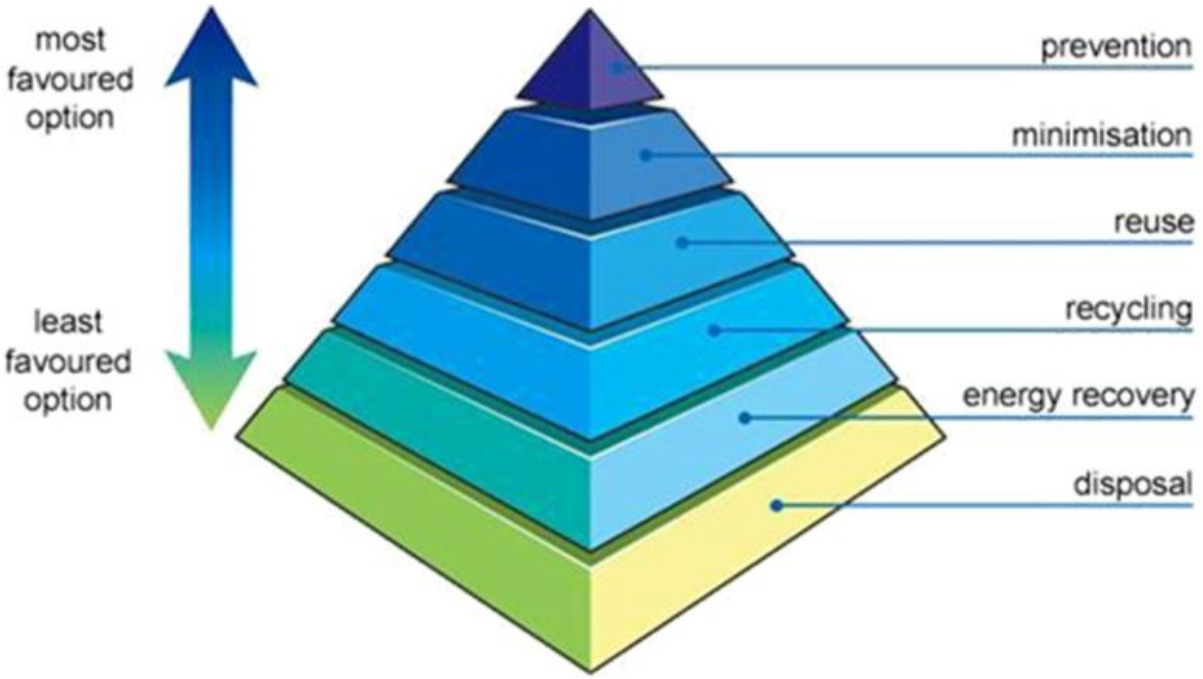


Figure 8-1: Waste Hierarchy

8.1.2 PROJECT STAGES

The purpose of this section is to assess the construction and operational processes of the proposed OHPL 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 is to be undertaken in line with the EMPr to consider the correct disposal of general and hazardous waste generated on the project. **Table 8-1** describes different waste products that the proposed project will likely produce, as well as the various options to dispose of them. Waste will mainly be generated during the construction phase. During operation, contractors are anticipated to only be on the site for limited amounts of time, as and when maintenance is required. To facilitate recycling, separate bins should be provided to allow for separation at source. Local recyclers should be approached to assist with accepting recyclable materials.

Table 8-1: Waste Management Options

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
Hydrocarbons / Contaminated soils / water	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; — In the event of a significant spill or leak of hazardous substances (e.g., petrol, diesel, etc.) used during the proposed activities, such an incident(s) must be reported to the relevant authorities, including the Pollution and Chemicals Management Directorate in accordance with section 30 of the NEMA, 1998.; — 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. Storage of waste, especially during the construction phase, must be in accordance with the National Norms and Standards for the Storage of Waste promulgated in GN No. 926 of 29 November 2013. No waste may be stored for more than 90 days; — 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).
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. Hazardous waste skips must be properly labelled and have a lid; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day. Storage of waste, especially during the construction phase, must be in accordance with the National Norms and Standards for the Storage of Waste promulgated in GN No. 926 of 29 November 2013. No waste may be stored for more than 90 days; — 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 covered / sealable refuse bins; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day. Storage of waste, especially during the construction phase, must be in accordance with the National Norms and Standards for the Storage of Waste promulgated in GN No. 926 of 29 November 2013. No waste may be stored for more than 90 days; — Co-ordinate waste removal with the general removal of waste from the contractor laydown area.

WASTE	TYPE OF WASTE	MANAGEMENT OPTIONS
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 sealable, labelled food waste bin; — Waste generated along servitude to be taken to the contractor laydown area at the end of each day. Storage of waste, especially during the construction phase, must be in accordance with the National Norms and Standards for the Storage of Waste promulgated in GN No. 926 of 29 November 2013. No waste may be stored for more than 90 days; — Co-ordinate waste removal with the removal of waste from the contractor laydown area.
Organic Waste	Vegetation	The clearance of vegetation associated with pre-construction and construction activities will result in the generation of organic waste. This waste should not be sent to a landfill, where possible. Management options include: — Using vegetation as compost on site; and/or — Sending vegetation to a licensed waste management facility to be chipped, if applicable.

8.2 FIRE MANAGEMENT PLAN

The purpose of fire management is to address firefighting requirements throughout the construction of the project and to preserve and protect human life as well as tangible goods and equipment in the event of a fire.

Mitigation and management measures include, but are not limited to the following:

- All construction camps shall be provided with portable fire extinguishing equipment, in accordance with all relevant legislation and must be readily accessible.
- The Contractor shall take specific measures to prevent the spread of veld fires, caused by activities at the campsites. These measures must include appropriate instruction of employees about fire risks and designated smoking areas.
- Fire prevention equipment must be present at all storage facilities.
- No open fires shall be allowed on site under any circumstance. No cooking shall be done onsite to prevent runaway fires.
- The Contractor shall have operational fire-fighting equipment available on site at all times. The level of firefighting equipment must be assessed and evaluated through a typical risk assessment process.
- Emergency numbers for local police and fire department etc. must be placed in a prominent area.
- 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.
- All construction staff must be trained in fire hazard control and firefighting techniques. Translators are to be used where necessary.
- All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances.
- Smoking must only be conducted in demarcated areas.
- An appropriate company must regularly maintain firefighting equipment.

8.3 EMERGENCY PREPAREDNESS AND RESPONSE

Appropriate resources must be provided to respond to accidental and emergency situations for operations and activities during construction and operation phases. The procedures will include plans for addressing training,

resources, responsibilities, communication and all other aspects required to effectively respond to emergencies associated with their respective hazards.

The purpose of emergency preparedness and response plan (EPRP) / method statement is to ensure that the relevant parties are adequately prepared and able to respond effectively to potential emergency situations that may arise during project activities. These potential emergency situations include medical emergencies and fires.

All activities associated with the project will require site-specific emergency response plans to mitigate impacts, which meet or exceed all applicable regulations.

The objectives of this plan are as follows:

- Protect the workers, communities and the environment through the development of emergency response strategies and capabilities;
- Set out the framework for hazard identification in order to define procedures for response to the situations including the development of contingency measures;
- Structure a process for rapid and efficient response to, and manage emergency situations during, the construction and operational phases of the project; and
- Assign responsibilities for responding to emergency situations.

The EPRP must take the incident procedures referred to in Section 30 of NEMA into account. In the event of a significant spill or leak of hazardous substances (e.g., petrol, diesel, etc.) used during the proposed activities, such an incident(s) must be reported to the relevant authorities, including the Pollution and Chemicals Management Directorate in accordance with section 30 of the NEMA, 1998.

ROLES AND RESPONSIBILITIES

Roles, responsibility and authority shall be defined, documented and communicated in order to facilitate effective emergency response through implementation of the EPRP.

The table below outlines roles and responsibilities related to each position.

Emergency Response representative(s)
— Actively participate in the facilities planning, implementation and reviewing of the sites EPRP. — Ensure all staff members are aware of the procedures outlined in the EPRP. — Setting up regular practical training schedules (drills) to ensure that all staff are prepared encase of an emergency. — Report any incidents that occur to senior management staff and/or the relevant authorities. — Appoint an Emergency Response (ER) team which includes an appropriate first aid representative and a fire warden. — Ensure that the appointed ER team undergo the correct training. — Appoint an appropriate Emergency Coordinator.
First Aid representative(s)
— Ensuring the first aid box is properly stocked to meet all foreseeable incidents which may occur. — Ensure that the boxes are properly safeguarded, and that First Aiders name appears on the box. — Should any activity involve hazardous chemical substances, or any other specific first aid emergencies, this must be brought to the attention of the emergency coordinator. — Ensure the first aid certificate is current. — Ensure that there is always a first aider available at each shift.
Fire warden(s)
— Ensure that the firefighting equipment is regularly serviced. — Attend the relevant firefighting training. — Report any unserviceable or damaged fire-fighting equipment to the ER. — Ensure the firefighting certificate is current. — Ensure that there is always a firefighter available at each shift.
Emergency Co-ordinator
— Ensure that an update of the EPRP is kept on file and is easily accessible in case of an emergency. — Ensure that all staff have been issued with the correct Personal Protective Equipment (PPE). — Ensure that a list of emergency telephone numbers, including those of the Emergency Response team, are visible to all staff at a number of locations around the facility.

- In the case of an emergency, the emergency coordinator is responsible for undertaking roll call at the designated Assembly points.

EMERGENCY COMMUNICATIONS AND COORDINATION PLAN

In an emergency situation where there is an immediate threat to communities, personnel or the environment, the Project Manager will be notified immediately. The Project Manager will dispatch the Emergency Response Coordinator who will determine the appropriate plan of action depending on the severity of the emergency, the people affected, and the need to evacuate.

If there is a developing emergency or unusual situation, where an emergency is not imminent, but could occur if no action is taken, the Project Manager (or if the Project Manager is absent, the Environmental Officer) is to be informed immediately.

If an emergency situation poses a direct threat to communities in the area, the Environmental Officer and/or Social Officer (if relevant) will advise persons in the vicinity of the emergency to evacuate due to the potential risk. The appropriate government authorities will immediately be notified of such an emergency evacuation. The Emergency Response Coordinator will be tasked with responding to the potential risk. Should the emergency situation be such that it can be managed by the Project Company, equipment and personnel will be deployed to the maximum extent necessary, so as to prevent/minimise potential risks.

RESPONSE TO INCIDENTS

An incident is any occurrence that has caused, or has the potential to cause, a negative impact on people, the environment or property (or a combination thereof). It also includes any significant departure from standard operating procedures. The reporting and investigation of all potential and actual incidents that could have a detrimental impact on human health, the natural environment or property is required so that remedial and preventive steps must be taken to reduce the potential or actual impacts because of all such incidents.

Any incident must immediately be reported to the relevant authorities and all the necessary documentation must be completed and submitted to the relevant authorities within the prescribed timeframes.

The actions resulting from any formal or informal investigations will be used to update the EMPr.

VERIFICATION

An environmental emergency response system will be developed for the execution of emergency drills that will include the following, inter alia:

- Fire Drills;
- Emergency Evacuation Drills; and
- Environmental Drills.

Reporting and monitoring requirements for the plan will include:

- Monthly inspections and audits;
- Reporting at the time of the incident and monthly spill reporting developed by the Environmental and Quality, Health and Safety departments; and
- Bi-annual emergency response drills.

Emergency response drills and reporting will be maintained by the Project Manager and will provide information regarding required revisions to training or the emergency response actions. Each incident reported will be reviewed and investigated upon occurring. Actions will be identified where possible to improve the site's overall response to emergencies. Updates/revisions that are necessary to protect worker or community health and safety will be implemented immediately after approval by the Project Manager.

This plan will be amended periodically in light of operational changes, learning experienced during its implementation and other activities that can affect the risk profiles.

POTENTIAL RISKS

The following emergency situations have been identified as potential threats at the proposed powerline route:

- Fire;

— Spills (hazardous chemicals / dangerous goods).

It must be noted that there is a minor risk associated with these risks as only a very small quantity of chemicals or hazardous substances are anticipated to be stored on site.

Fire	Responsibility
— Raise the alarm	Employee who detected/caused the fire
— Switch of all automated systems within the facility	ER Team
— Evacuate all personnel in the building	ER Team
— Contact all relevant emergency services	Emergency Coordinator
— Report to the emergency Assembly Point and await further instructions	All Staff
— Remove all vehicles from the premises	ER Team and security
— Undertake roll call and report all missing staff to the ER team	ER Coordinator
— Evacuate remaining staff to a safe location outside the site boundaries	ER Team
— Contain fire until Emergency services arrives	Fire warden
— Provide First Aid, if required	First Aid representative
Spill	**Responsibility**
— Contain the spillage using an onsite spill kit	Employee who discovered/caused the spill
— Advice emergency services (if required)	Emergency coordinator
— Provide First Aid (if required)	First Aid representative
— Determine if there is any soil, groundwater, or other environmental impact	Emergency coordinator
— Ensure that all absorbents used from the spill kits are disposed of in the correct manner.	Emergency coordinator
— Inform the DFFE and DWS of any major spillages.	Emergency coordinator
— Ensure that the incident is recorded in the incidents register.	Emergency coordinator

The following emergency centres were identified along with the corresponding emergency telephone numbers.

Emergency Centre	Telephone Number
— Emergency Services	10177 (Ambulance / Fire Brigade)
— Police Emergency Services	10111
— SAPS Laingsburg	023 551 8200
— Suicide Crisis Line	0800 12 13 14
— COVID-19 Public Hotline	0800 029 999

8.4 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, should it be required.

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.

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.

8.5 CHANCE FIND PROCEDURE

The following procedure must be considered in the event that previously unknown heritage resources, including burial grounds or graves, are exposed or found during the life of the project. In addition, *Appendix 2 (**Figure 8-2**) of the Palaeontological Impact Assessment (Almond, 2021), CHANCE FOSSIL FINDS PROTOCOL: Karreebosch WEF grid connection to the Komsberg MTS between Matjiesfontein and Sutherland*, must be implemented in the case of a fossil find on the site.

Province & region:	Western Cape (Laingsburg Local Municipality) and Northern Cape (Karoo Hoogland Local Municipality)	
Responsible Heritage Resources Agency	Heritage Western Cape for the Western Cape (Contact details: Heritage Western Cape. 3rd Floor Protea Assurance Building, 142 Longmarket Street, Green Market Square, Cape Town 8000. Private Bag X9067, Cape Town 8001. Tel: 021 483 5959 Email: ceoheritage@westerncape.gov.za) SAHRA for the Northern Cape (Contact details: South African Heritage Resources Agency. 111 Harrington Street, Cape Town. PO Box 4637, Cape Town 8000, South Africa. Tel : 021 462 4502).	
Rock unit(s)	Abrahamskraal Formation (Lower Beaufort Group, Karoo Supergroup), Late Caenozoic alluvium, colluvium, eluvium	
Potential fossils	Fossil vertebrate bones, teeth, large burrow casts, trackways, petrified wood, plant-rich beds in the Abrahamskraal Fm bedrocks. Fossil mammal bones, teeth, horncores, freshwater molluscs, plant material, calcretised termitaria in Late Caenozoic alluvium.	
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (*N.B.* safety first!), safeguard site with security tape / fence / sand bags if necessary.	
	2. Record key data while fossil remains are still *in situ:* • Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo • Context – describe position of fossils within stratigraphy (rock layering), depth below surface • Photograph fossil(s) *in situ* with scale, from different angles, including images showing context (*e.g.* rock layering)	
	3. If feasible to leave fossils *in situ*: Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Agency for work to resume	3. If *not* feasible to leave fossils *in situ* (emergency procedure only): *Carefully* remove fossils, as far as possible still enclosed within the original sedimentary matrix (*e.g.* entire block of fossiliferous rock) Photograph fossils against a plain, level background, with scale Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist Alert Heritage Resources Agency and project palaeontologist (if any) who will advise on any necessary mitigation
	4. If required by Heritage Resources Agency, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.	
	5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Agency	
Specialist palaeontologist	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (*e.g.* museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Authority. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Agency minimum standards.	

Figure 8-2: Chance Fossil Finds Protocol

CULTURAL HERITAGE, STRUCTURES, ARCHAEOLOGY, PALAEONTOLOGY, METEORS AND PUBLIC MONUMENTS

- The heritage resource must be avoided and all activities in the immediate vicinity temporarily ceased;
- The PM/EO and/or EO must be notified of the discovery;
- A qualified specialist must be deployed to consider the heritage resource, either via communicating with the EO/EO via telephone or email, or based on a site visit and recommend appropriate mitigation measures;
- Should the specialist conclude that the find is a heritage resource protected in terms of the NHRA, the EO/EO will notify SAHRA and/or HWC;
- SAHRA/HWC may require that a HIA in terms of NHRA Section 38 must take place that may include rescue excavations; and
- If the newly discovered heritage resources prove to be of archaeological or palaeontological significance, a Phase 2 rescue operation may be required subject to permits issued by SAHRA.

If any evidence of archaeological sites or remains (e.g. remnants of stone-made structures, indigenous ceramics, bones, stone artefacts, ostrich eggshell fragments, charcoal and ash concentrations), fossils or other categories of heritage resources are found during the proposed development, SAHRA Archaeology, Palaeontology and Meteorites (APM) Unit (Natasha Higgitt/Phillip Hine 021 462 5402) must be alerted as per section 35(3) of the National Heritage Resources Act (no. 25 of 1999) (NHRA). Non-compliance with section 35(3) of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.

BURIAL GROUNDS AND GRAVES

- In the event that human remains are accidently exposed, the EO/EO must immediately be notified of the discovery in order to take the required further steps:
  - The local SAPS will be notified;
  - A suitably qualified specialist will be deployed to inspect the exposed burial and determine in consultation with the SAPS the temporal context of the remains, (i.e. authentic burial grave (informal or older than 60 years) or archaeological (older than 100 years)) and if any additional graves may exist in the vicinity;
- Should the specialist conclude that the find is a heritage resource protected in terms of the NHRA, the EO/EO will notify SAHRA and/or HWC;
- SAHRA/HWC may require that an identification of interested parties, consultation and /or grave relocation take place;
- Consultation must take place in terms of Regulations 39, 40 and 42 of NHRA; and
- Grave relocation must take place in terms of Regulation 34 of NHRA.

If unmarked human burials are uncovered, the SAHRA Burial Grounds and Graves (BGG) Unit (Thingahangwi Tshivhase/Mimi Seetelo 012 320 8490), must be alerted immediately as per section 36(6) of the NHRA. Non-compliance with section 36(3) of the NHRA is an offense in terms of section 51(1)e of the NHRA and item 5 of the Schedule.

8.6 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.

8.6.1 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

8.6.2 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.

8.6.3 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 Karreebosch 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.

8.7 SECURITY POLICY

A generic high-level security policy has been compiled for this final EMPr. Should the project be developed further, a site-specific policy will be produced.

This procedure shall be applicable to all staff working on the Project to comply with the relevant regulations and international standards.

The overarching objective is to protect the people and assets in a way that minimises conflict and respects the human rights of its diverse stakeholders, avoids creating or worsening conflict and address security threats in as peaceful a way as possible. The IFC Performance Standards and supporting World Bank Group Environmental, Health and Safety Guidelines have been adopted as the overarching standards associated with human rights, labour force management, vulnerable groups and stakeholder engagement to guide it towards achievement of appropriately high levels of environmental and social performance throughout the Project's life cycle.

A security company must be employed to guard the site and monitor access and must be registered with the Private Security Industry Regulatory Authority (PSIRA). The company should be utilised for the project life-cycle, alternatively different companies can be used for the construction, operations and decommissioning phases. The choice is at the discretion of the Holder of the EA.

The following guiding principles have been developed for site security:

- All access roads (to the powerline servitude) shall be gated, where feasible, to restrict access to the general public. Gates will be required to be kept locked when construction is occurring, where possible, or when powerline or substation maintenance is not occurring.
- The Contractor, prior to arriving on site, will assess any risks posed by its security arrangements to people within and outside the Project site.
- No firearms allowed on site or in vehicles transporting staff to / from site (unless used by security personnel).
- The Operations and Maintenance Building ("O&M building") shall be locked at all times when Project personnel are not inside.
- The security arrangements must take account of the principles of proportionality and good international practice in relation to hiring, rules of conduct, training, equipping, and monitoring of security;
- The contractor and Holder of the EA:
    - is required to make reasonable inquiries to ensure that those providing security are not implicated in past abuses; and
    - Ensure that the security company is adequately trained in the use of force and appropriate conduct, and they act within the applicable law.
- A grievance mechanism for affected communities shall be provided to express any concerns about security arrangements.

8.8 GRIEVANCE MECHANISM

8.8.1 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).

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 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 construction and operational phase.

8.8.2 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.

9 CONCLUSION

In terms of NEMA, everyone (i.e. all persons engaging in any component of this project) is required to take reasonable measures to ensure that they do not pollute the environment. 'Reasonable measures' includes informing and educating employees about the environmental risks associated with their work and training them to operate in an environmentally responsible manner.

The Proponent also recognises that, in terms of NEMA, the cost to repair any environmental damage will be borne by the person responsible for the damage. Should the above-mentioned environmental guidelines and mitigation measures be adopted, it is anticipated that the negative environmental impacts of the proposed Project will be mitigated adequately. The Proponent and the selected Contractor shall appoint relevant personnel, as well as an independent ECO, to monitor the site periodically throughout construction to ensure that the required environmental controls are in place and working effectively. During operation and maintenance the area specific Environmental Manager and EO, with the support of the maintenance supervisor, will monitor environmental controls.

APPENDIX

A EAP CV

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

CAREER SUMMARY

Ashlea is a Principal Associate with 19 years' experience in the environmental field. She currently provides technical and strategic expertise on a diverse range project in the environmental management field, including environmental scoping and impact assessment studies, environmental management plans, waste and water management, as well as the provision of environmental management solutions and mitigation measures. Ashlea has been involved in the management of a number of large EIAs specifically within the energy sector such as the Medupi Power Station, and Pebble-Bed Modular Reactor (PBMR) and numerous Renewable Energy Developments and Transmission Powerlines. She also has significant environmental auditing experience and expertise having undertaken over 70 compliance audits. Ashlea holds a Masters in Environmental Management; a BTech (Nature Conservation), and a National Diploma (Nature Conservation). She is also a Registered Environmental Assessment Practitioner.

Countries of experience gained include South Africa, Mozambique, Zimbabwe and Zambia.

9 years with WSP

19 years of experience

Area of expertise

Auditing

ESIR

Energy

Infrastructure

Mining

Training

Waste Management

Language

English – Fluent

Afrikaans - Fluent

EDUCATION

Masters in Environmental Management, University of the Free State, South Africa	2006
B Tech, Nature Conservation, Technikon SA, South Africa	2001
National Diploma in Nature Conservation, Technikon SA, South Africa	1999

ADDITIONAL TRAINING

Conduct outcomes-based assessment (NQF Level 5), South African Qualifications Authority (SAQA)	2009

PROFESSIONAL MEMBERSHIPS

Registered Environmental Assessment Practitioner (Registration Number: 2019/1005)	2020

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

PROFESSIONAL HISTORY

WSP Group Africa (Pty) Ltd	May 2013 - present
Lidwala Consulting Engineers	April 2010 – April 2013
GIBB	January 2009 – March 2010
Bohlweki Environmental	August 2004 – December 2008
Vuka Environmental	August 2003 – July 2002

PROFESSIONAL EXPERIENCE

Energy Sector

G7 Renewable Energies, Karreebosch Wind Energy Facility Project, Matjiesfontein, Western Cape.
2022-2023
Project Manager
Undertaking of a Part 2 Amendment Process as well as the Amendment of the Environmental Management Programme for a 140MW Wind Energy Facility

G7 Renewable Energies, Karreebosch to Komsberg 132kV Powerline Project, Matjiesfontein, Western Cape.
2022-2023
Project Manager
Compilation of a Basic Assessment and Environmental Management Programme for the 132kV Powerline

Enertrag, Camden Renewable Energy Complex, Ermelo, Mpumalanga.
2021-2023
Project Manager
Compilation of four Environmental Impact Assessments, three Basic Assessments and associated Environmental Management Programmes for the Camden Renewable Energy Complex, including two wind energy facilities, a solar energy facility, one 400kV Gird Connection and three 132kV grid Connections.

Enertrag, Dalmanutha Renewable Energy Complex, Belfast, Mpumalanga.
2022-2023
Project Manager
Compilation of one Environmental Impact Assessment, four Basic Assessments and associated Environmental Management Programmes for the Dalmanutha Renewable Energy Complex, including two wind energy facilities and associated Grid Connections

Enertrag, Mukondeleli and Impumelelo Wind Energy Facilities, Secunda, Mpumalanga.
2022-2023
Project Manager
Compilation of two Environmental Impact Assessments, two Basic Assessments and associated Environmental Management Programmes for the Secunda Renewable Energy Complex, including two wind energy facilities and associated Grid Connections

Red Rocket South Africa Limited, Brandvalley Wind Energy Facility Project, Matjiesfontein, Western Cape.
2021-2022
Project Manager
Undertaking of a Part 2 Amendment Process as well as the Amendment of the Environmental Management Programme for a 140MW Wind Energy Facility

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

Red Rocket South Africa Limited, Bon Espirange to Komsberg 132kV Powerline Project, Matjiesfontein, Western Cape.
2021-2022
Project Manager
Compilation of a Basic Assessment and Environmental Management Programme for the 132kV Powerline

Red Rocket South Africa Limited, Rietkloof Wind Energy Facility Project, Matjiesfontein, Western Cape.
2021-2022
Project Manager
Undertaking of a Part 2 Amendment Process as well as the Amendment of the Environmental Management Programme for a 140MW Wind Energy Facility

Calodex (Pty) Ltd., 100MW Solar Photovoltatic (PV) Plant, Springs in Gauteng, South Africa
2021
Project Director
This project involved the compilation of a Basic Assessment and Environmental Management Plan for a 100MW Solar PV Plant.

Eskom Holdings SOC Limited, Erica 400kV Loop-in-Loop-out (LILO) Powerline, Cape Town, Western Cape, South Africa.
2020
Compilation of an environmental screening assessment for the Erica 400kV LILO Powerline.

BioTherm Energy, Maralla East and West Wind Energy Facilities, Sutherland in the Northern and Western Cape, South Africa.
2019
Project Manager
Compilation of two Part 2 Amendment Process for the changes in technical scope of the Wind Energy Facilities.

Eskom Holdings SOC Limited, Ruigtevallei 132kV Powerline, Gariep in the Free State, South Africa
2019
Project Manager
Compilation of a Part 2 Amendment Process for the deviation of the Ruigtevallei – Dreunberg 132 kV powerline.

Globeleq, Nakonde and Mpika Wind Energy Projects, Zambia
2018
Project Manager
Compilation of two Environmental Project Briefs for the establishment of meteorological masts.

G7 Renewable Energies, Rietkloof Wind Energy Facility Project, Matjiesfontein, Western Cape.
2018
Project Director
Compilation of a Basic Assessment and Environmental Management Programme for a 140MW Wind Energy Facility.

Southern African Power Pool (SAPP), Mozambique – Zambia Interconnector Powerline, Mozambique
2018
Project Manager
This project involved the compilation of the Environmental and Social Impact Assessment and Environmental and Social Management Plan for a 300km 400kV powerline between Tete, in Mozambique, and Chipata, in Zambia.

Eskom Holdings SOC Limited, Ankerlig – Koeberg 132kV powerline walkdown, South Africa
2017

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

Project Manager
This project involved the compilation of a Construction and Operation Environmental Management Plans for the Ankerlig – Koeberg 132kV powerline.

WSP | Parsons Brinckerhoff, Gwanda 100MW Solar Project, Gwanda, Matebeleland South Province, Zimbabwe
2018
Project Manager
This project involved the high-level review of the Environmental Impact Assessment for a 100MW Photovoltaic (PV) Solar Project against relevant legislation and international standards.

WSP | Parsons Brinckerhoff, Southern Energy Coal Fired Power Station, Hwange, Zimbabwe
2016
Project Manager
This project involved the high-level review of the Environmental Impact Assessment for the Southern Energy Coal Fired Power Station against relevant legislation and standards.

BioTherm Energy (Pty) Ltd, Proposed Solar and Wind Projects, Aggenys and Sutherland Northern and Western Cape Provinces, South Africa
2015
Project Manager
This project involved the compilation of 15 Environmental Impact Assessments and Environmental Management Plans for 2 Solar and 2 Wind energy Projects.

Central Energy Fund (CEF), Proposed Solar Park, Northern Cape Province, South Africa
2012
Strategic Environmental Advisor
This project involved the provision of process expertise for the compilation of an Environmental Impact Assessment and Environmental Management Plan for the proposed Solar Park.

Eskom Transmission, Proposed Tabor - Nzhelele 400kV Transmission Lines and associated infrastructure, Limpopo Province, South Africa
2012
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a 100km 400kV powerline between Louis Trichardt and Musina in the Limpopo Province.

Eskom Holdings SOC Limited, Retrofitting of the existing Electrostatic Precipitators with Fabric Filter Plants at Units 2, 3 and 4 at the Grootvlei Power Station, South Africa
2012
Project Manager
This project involved the compilation of a Basic Assessment Report and Environmental Management Plan for the proposed retrofitting of the existing Electrostatic Precipitators with Fabric Filter Plants at the Grootvlei Power Station.

Parsons Brinkerhoff Africa and Mulilo Power, Proposed Mulilo Coal Fired Power Station and associated infrastructure as well as associated power lines and substations, Musina, Limpopo, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Generation, Pebble Bed Modular Reactor Demonstration Plant and Associated Infrastructure, Western Cape, South Africa

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Transmissions, Proposed Bantamsklip – Kappa 765 kV Transmission Lines and associated infrastructure, Karoo, Western and Northern Cape, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for four 260km 765kV powerlines between the Bantamsklip Nuclear Power Station Site and the proposed new Kappa Substation.

Eskom Transmission Proposed Bantamsklip – Bacchus, Bacchus - Kappa and Bacchus – Muldersvlei 400 kV Transmission Lines and associated infrastructure, Western and Northern Cape, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Distribution – Central region.Westgate – Tarlton – Kromdraai 132 kV Sub-Transmission line and associated infrastructure, Gauteng, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom, Environmental Scoping Study for the proposed new distribution line and substation, Dundonald, Mpumalanga, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan for a 132kV powerline as well as a new substation in the Tarlton area of Gauteng. Also involved in the Public Participation Process.

Eskom Distribution, The proposed new 132 kV sub-transmission line between the Dinaledi and GaRankuwa substations for Eskom, GaRankuwa, Northwest, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom, Transmission Expansion of the Transmission powerline network and associated infrastructure between the Perseus substation and the Beta substation, Free State, South Africa
2008
Project Manager
This project involved the compilation of an alignment specific construction Environmental Management Plan for the 13km 765kV Perseus Beta Turn-ins.

Eskom Distribution – Central Region, Tarlton – Kromdraai 132 kV Sub-Transmission line and associated infrastructure, Gauteng, South Africa
2008
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

Eskom Distribution – Central Regio, Basic Assessment for the proposed Watershed – Mmabatho 88kV Power line. Northwest, South Africa
2008
Project Manager
This project involved the compilation of a Basic Assessment and Environmental Management Plan.

Eskom Distribution – Central Region, Proposed Watershed – Mmabatho 88kV Power line. Northwest, South Africa
2007
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Holdings SOC Limited, Proposed Combined Cycle Gas Turbine Plant and Associated Infrastructure near Majuba, Mpumalanga, South Africa
2007
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Generation, Proposed Capacity Increase of the Atlantis OCGT Plant and Associated Infrastructure, Western Cape, South Africa
2006
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Holdings SOC Limited, Proposed Concentrated Solar Thermal Plant in the Northern Cape, South Africa
2006
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Holdings SOC Limited, Proposed Underground Coal Gasification plant, Eskom, Mpumalanga, South Africa
2006
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Generation, Proposed new Coal-fired Power Station in the Lephalale Area for Eskom, Limpopo, South Africa
2005
Project Manager
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Eskom Generation, Proposed Open Cycle. Gas Turbine Power Station at Atlantis for Eskom, Western Cape, South Africa
2005
Environmental Consultant
This project involved the compilation of an Environmental Impact Assessment and Environmental Management Plan.

Infrastructure Sector

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

Sasol South Africa Limited, Boegoebaai Green Hydrogen Project, Northern Cape, South Africa
2022-2023
Project Manager
This project involved the compilation of an High level Environmental Screening for the Project, in preparation future Environmental Impact Assessment Processes

Enertrag, Hendrina Green Hydrogen and Ammonia Facility, Mpumalanga, South Africa
2022-2023
Project Director
This project involved the undertaking of an Environmental Impact Assessment, including the compilation of an Environmental Management Programme

Enertrag, Camden Green Hydrogen and Ammonia Facility, Mpumalanga, South Africa
2021-2023
Project Director
This project involved the undertaking of an Environmental Impact Assessment, including the compilation of an Environmental Management Programme

Anglo American, Emalahleni Water Treatment Plant Amendment Project (EWRP), Emalahleni, Mpumalanga, South Africa.
2020
Project Manager
Compilation of a Part 1 Amendment Process for the changes to the EWRP Environmental Authorisation as well as an update of the Environmental Management Programme.

Eskom Holdings SOC Limited, Hendrina Leachate Dam, South Africa
2018
Project Manager
This project involves the compilation of a Basic Assessment and Environmental Management Plan for a leachate Dam at the Domestic Waste Landfill Site at the Hendrina Power Station.

S**ANRAL, Rehabilitation of the R34 between Vryburg and Schweizer-Reneke, Vryburg and Schweizer-Reneke, Northwest, South Africa**
2016
Project Manager
This project involved the compilation of a Basic Assessment and Environmental Management Plan.

Envirocin Incineration Systems CC, Proposed Expansion of the Cremation Facilities at the Envirocin Pet Crematorium, Kyasands, Gauteng, South Africa
2013
Project Manager
This project involves the compilation of a basic assessment for the expansion of the cremation facilities.

Industrial Development Corporation of SA (Pty) Ltd, Proposed Kraft Paper Mill in Frankfort, Frankfort, Free State, South Africa
2013
Project Manager
This project involved the undertaking of an Environmental Impact Assessment, including the compilation of an Environmental Management Programme.

SANRAL, Rehabilitation of the N14 between Delerayville and Sannieshof, Northwest, South Africa
2011
Project Manager
This project involved the compilation of a Basic Assessment and Environmental Management Plan as well as the construction of a new bridge over the Hartsriver. This project also included the compilation of Water Use License and Mining Permit Applications.

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

Makhado Municipality, Proposed new Waterfall Cemetery, Limpopo, South Africa
2011
Project Manager
This project involved the compilation of a Basic Assessment and Environmental Management Plan.

Johannesburg Roads Agency, Route determination of the proposed Metro Boulevard, Weltevreden Park Area, Gauteng, South Africa
2008
Project Manager
This project involved the undertaking of an Environmental Impact Assessment.

Eskom Generation, Proposed new fuel supply pipeline between Milnerton and Atlantis, Western Cape, South Africa
2007
Project Manager
This project involved undertaking an Environmental Impact Assessment for the proposed new fuel supply pipeline between Milnerton and Atlantis to supply the Ankerlig Power Station.

Mining Sector

Rietvlei Mining Company, Establishment of the Proposed Rietvlei Opencast Coal Mine, Middelburg, Mpumalanga, South Africa
2013
Project Manager
This project involves the undertaking of an integrated environmental authorisation process, including an Environmental Impact Assessment, Environmental Management Programme Report, Waste Management License Application and Water Use License Application.

AngloGold Ashanti, Decommissioning of Redundant Infrastructure at the Vaal River Operations, Northwest and Free State, South Africa
2013
Project Manager
This project involves undertaking an integrated Environmental Authorisation and Waste Management License process for the proposed decommissioning of redundant infrastructure.

AngloGold Ashanti (Pty) Ltd, Decommissioning of Redundant Infrastructure at the West Wits Operations, Gauteng, South Africa
2013
Project Manager
This project involves undertaking a Basic Assessment process for the proposed decommissioning of redundant infrastructure.

Exxaro Coal (Pty) Ltd Inyanda Mine Pegasus South Expansion, Middelburg, Mpumalanga, South Africa
2011
Project Manager
This project included the compilation of an Environmental Impact Assessment, Environmental Management Plan, the Amendment of the existing Environmental Management Programme Report and the amendment of the existing Water Use License.

Sishen Iron Ore (Pty) Ltd, Sishen Infrastructure Program, Northern Cape, South Africa
2010
Project Manager
This project involved the compilation of an Environmental Impact Assessment and an Environmental Management Plan for the infrastructure expansion programme.

Sound Mining Solutions, Prospecting Permit Applications in the Kuruman area of the Northern Cape, South Africa

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

2011
Project Manager
This project involved the compilation of Environmental Management plans as part of six applications for Prospecting Permits.

Limpopo Department of Roads and Transport, Borrow pits required by the Limpopo Department of Roads and Transport, Limpopo, South Africa
2010
Project Manager
This project involved the compilation of Environmental Management plans as part of the applications for Mining Permits for borrow pits required for the rehabilitation of provincial roads.

Eskom Generation, Borrow pits required for the Medupi Coal Fired Power Station, Limpopo, South Africa
2008
Project Manager
This project involved the compilation of Environmental Management plans as part of the applications for Mining Permits for borrow pits.

Eskom Generation. Borrow pits required for the Ingula Pumped Storage Scheme, KwaZulu-Natal, South Africa
2008
Project Manager
This project involved the compilation of Environmental Management plans as part of the applications for Mining Permits.

Eskom Generation Project Manager, Mining Right Application for a 23 Hectare Borrow Pit required for the Steelpoort Pumped Storage Scheme, Mpumalanga, South Africa
2007
Project Manager
This project entailed the compilation of the required Environmental Management Programme Report in support of a Mining Right Application.

Minexpo, Renewed Mining and Prospecting Activities on the farm Quaggaskop 215, Vanrhynsdorp, Western Cape, South Africa
2004
Environmental Consultant
This project involved the compilation of an Environmental Management Programme Report for the recommencement of mining and prospecting activities.

Waste Management

Sasol Secunda Operations, Sasol Waste Management Environmental Management Programme, Secunda, South Africa
2019
Project Manager
Compilation of an operational Environmental Management Programme for the Sasol Waste Ash Facility, Charlie 1 Disposal Facility and the Waste Recycling Facility.

Eskom Holdings SOC Limited, Proposed continuous Ashing at Majuba Power Station, Mpumalanga, South Africa
2012
Project Manager
This project entailed the compilation Environmental Impact Assessment and Waste Management License Application for the proposed continuous ashing project at the Majuba Power Station in Mpumalanga.

Eskom Holdings SOC Limited, Proposed continuous Ashing at Tutuka Power Station, Mpumalanga, South Africa
2012
Project Manager
This project entailed the compilation Environmental Impact Assessment and Waste Management License Application for the proposed continuous ashing project at the Tutuka Power Station in Mpumalanga.

Hendrina Power Station, Proposed extension of Ash Dams at Hendrina Power Station, Mpumalanga, South Africa
2011
Project Manager
This project entailed the compilation Environmental Impact Assessment and Waste Management License Application for the proposed extension of the ash dams at the Hendrina Power Station in Mpumalanga.

Coega Development Corporation, Phase 1 of the Environmental Impact Assessment for the Proposed Regional General and Hazardous Waste Processing Facility, Eastern Cape
2005
Project Manager
This project entailed the compilation Environmental Impact Assessment for the Proposed Regional General and Hazardous Waste Processing Facility in the Eastern Cape.

Auditing

Sasol Chemical Industries, Secunda Synfuels Operations Waste Management License Audits for the Sasol Secunda, Mpumalanga, South Africa
2014 – 2021
Lead Auditor
These projects involve the annual and biannual environmental compliance auditing of the Waste Management licenses for various waste facilities

South 32. Compliance Audits at South 32, Mpumalanga, South Africa
2016 – 2020
Project Manager
This project involved the environmental compliance audits of the Water Use Licenses for the BMK, Douglas, Klipfontein and Middelburg Mine North and South Sections at South 32 in Mpumalanga.

South 32, Compliance Audits at Middelburg Water Reclamation Plant (MWRP), Mpumalanga, South Africa
2016 – 2020
Project Manager
This project involved the environmental compliance audits of the Water Use License and Waste Management License for the MWRP at South 32 in Mpumalanga.

Nedbank, BioTherm Round 4 Lenders Technical Advisor, South Africa
2018 – 2021
Project Manager – Environmental
Environmental monitoring of the construction of the Konkoonsies II and Aggeneys Photovoltaic Solar Plants against the IFC Performance Standards.

Eskom Holdings SOC Limited, Water Use Licence Audits, Delmas, Mpumalanga, South Africa
2019
Lead Auditor
External compliance audits of the water use licences for the Delmas and Argent Powerlines in Mpumalanga.

Sasol Oil (Pty) Ltd, Sasol Alrode and Pretoria West Depot Audits, Pretoria, South Africa
2016 – 2020
Lead Auditor

Ashlea Strong

Environmental Planning & Advisory, Principal Associate

Environmental compliance audits for environmental authorisations and environmental management plans for the Sasol Alrode and Pretoria West Depots.

Sasol Oil (Pty) Ltd, Sasol Regulation 34 Audits, South Africa
2019
Lead Auditor
Environmental compliance audits for 13 authorisations for the Sasol Owned Petrol Filling Stations.

Anglo American Platinum. Regulation 34 Audits at Mogalakwena Mine, Limpopo Province, South Africa
2019
Project Manager
Environmental compliance audits of the EMPR and various environmental authorisations at the Mogalakwena Mine.

Sasol Secunda Operations, Sasol Environmental Authorisations and Environmental Management Plans for the Secunda Operations, Secunda, South Africa
2019
Lead Auditor
Environmental compliance audits for 49 authorisations for the Sasol Secunda.

Palabora Company, Waste Management Licence Compliance Audit and PCB Plan Close Out Audit, Phalaborwa, Limpopo, South Africa
2019
Project Manager
Environmental compliance audit of a WML and the PCB Plan for the Palabora Mine.

Sasol Mining, Water Use Licence Compliance, Secunda, South Africa
2018
Project Manager
Environmental compliance audit of six WULs held by mining operations.

South 32, Legal Assessment at South 32, Klipfontein and Middelburg Mine North and South Sections at South 32 in Mpumalanga, South Africa

2019
Project Manager and Lead Auditor
This project involved the assessment of legal compliance against the mine's legal register.

Investchem (Pty) Ltd, InvestChem Annual Environmental Compliance Monitoring, Kempton Park, Gauteng, South Africa
2013 – 2019
Lead Auditor
This project involved the annual environmental compliance auditing for InvestChem's Sulphonation Plant. The monitoring included InvestChem's compliance to various commitments contained in their environmental management programmes and conditions within their environmental authorisations (records of decision).

Sasol Oil (Pty) Ltd, Compliance Audits at Sasol Alrode and Pretoria West Depots, Gauteng, South Africa
2015 – 2019
Project Manager and Lead Auditor
Annual Environmental compliance auditing of the Environmental authorisations at the Alrode and Pretoria West Depots in Gauteng.

Eskom Holdings, Water Use Licence for the Letabo Power Station, Free State, South Africa
2018
Project Manager

Environmental compliance audit of the WUL held by Eskom Letabo Power Station.

Seriti Coal, Compliance Audits at Kriel Colliery, Kriel, Mpumalanga, South Africa
2018
Project Manager
This project involved the environmental compliance audits of the Water Use Licenses.

South 32, Legal Assessment at South 32, Mpumalanga, South Africa
2017
Project Manager and Lead Auditor
This project involved the assessment of legal compliance against the mine's legal register for the BMK, Douglas, Klipfontein and Middelburg Mine North and South Sections.

South 32, EMPR Performance Assessment Report at South 32, Mpumalanga, South Africa
2016
Project Manager
This project involved the formal assessment and verification of the Environmental Management Programme Report for the BMK, Douglas, Klipfontein and Middelburg Mine North and South Sections.

ACWA Power, Solafrica Bokpoort CSP Power Plant (Pty) Ltd. Compliance Audit for the Bokpoort Concentrating Solar Power (CSP) Facility, Groblershoop, Northern Cape, South Africa
2016
Lead Auditor
This project involved the environmental compliance auditing of the Waste Management License, Environmental Authorisation and Water Use License.

Anglo Thermal Coal, EMPR Performance Assessment Report for the Landau Colliery, Mpumalanga, South Africa
2013
Auditor
This project involved the formal assessment and verification of the Landau Colliery Environmental Management Programme Report, conducted in accordance with Regulation 55 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002).

AfriSam Southern Africa (Pty) Ltd, Waste Management License Audit for the Slagment Operation, Vanderbijlpark, Gauteng, South Africa
2013
Lead Auditor
This project involved the annual environmental compliance auditing for AfriSam's Slagment Operation in Vanderbijlpark in Gauteng Province. The audit included AfriSam's compliance to the conditions of their waste management license.

Anglo American Thermal Coal, EMPR Performance Assessment Report for the New Vaal Colliery, Free State, South Africa
2006 – 2007
Auditor
This project involved the formal assessment and verification of the New Vaal Colliery Environmental Management Programme Report, conducted in accordance with Regulation 55 of the Mineral and Petroleum Resources Development Act (No. 28 of 2002).

Environmental Control

Wood South Africa (on behalf of Sasol South Africa Limited), Clean Fuels Projects (EHN & MFO, Large Tanks) Project, Secunda
2022-2024
Project Director

This project involved the monthly auditing of the contractor's compliance with the conditions of the environmental authorisation and environmental management plan for the Sasol Clean Fuels Projects in Secunda.

SANRAL.N14, rehabilitation between Sannieshof and Delareyville, Northwest, South Africa
2012
Environmental Control Officer
This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan as well as ad hoc environmental advise to the Project Engineer and SANRAL.

Victor Khanye Municipality. Delmas and Bontleng Wastewater Treatment Works, Mpumalanga, South Africa
2009
Environmental Control Officer
This project involved a once off compliance audit of the above-mentioned Wastewater Treatment Works.

Mkhondo Local Municipality. Nkonjaneni Water Borne Sewer Project in Piet Retief, Mpumalanga, South Africa
2009
Environmental Control Officer
This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan as well as ad hoc environmental advise to the Project Engineer.

ERWAT, Upgrading of the Waterval Water Care Works, Gauteng, South Africa
2005 – 2007
Environmental Control Officer
This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan.

City of Tshwane Lotus Gardens, Ext 2 Township establishment, Gauteng, South Africa
2003
Environmental Control Officer
This project involved the monthly auditing of the contractor's compliance with the conditions of the approved Environmental Management Plan.

Training

SANRAL, N14 rehabilitation between Sannieshof and Delareyville, Northwest, South Africa
2012
Project Manager
This project involved the provision of training for the staff of the N14 rehabilitation project with regards to the contents of the environmental management plan.

Mintek, Training in Environmental Aspects and Rehabilitation for the Small-Scale Mining Division of Mintek, City, Province, South Africa
2004
Trainer
This project involved the provision of environmental awareness training for delegates involved in the small-scale miner training programme run by the Mintek small scale mining division.

Transwerk, Training in Environmental Aspects and Impacts, Germiston, Gauteng, South Africa
2004
Trainer
This project involved the provision of environmental aspects and impacts training for the staff of Transwerk in Germiston.

UNIVERSITEIT VAN DIE VRYSTAAT

UNIVERSITY OF THE FREE STATE

HIERMEE WORD VERKLAAR DAT DIE THIS IS TO CERTIFY THAT THE

Magister in Omgewingsbestuur
Magister in Environmental Management

TOEGEKEN IS AAN
HAS BEEN CONFERRED UPON

ASHLEA-ROBYN STRONG

Met effek vanaf with effect from
1 Februarie / February 2006

NADAT AAN DIE STATUTE EN REGULASIES VAN DIE UNIVERSITEIT VOLDOEN IS. AS BEWYS DAARVAN PLAAS ONS ONS ONDERSKEIE HANDTEKENINGE EN DIE SEëL VAN DIE UNIVERSITEIT HIERONDER.

IN ACCORDANCE WITH THE STATUTES AND REGULATIONS OF THE UNIVERSITY. AS WITNESS OUR RESPECTIVE SIGNATURES AND THE SEAL OF THE UNIVERSITY BELOW.

VISEKANSELIER/VICE-CHANCELLOR

DEKAAN/DEAN

REGISTRATEUR/REGISTRAR

BLOEMFONTEIN
2006-04-25
2003049109

Environmental Assessment Practitioners Association of South Africa

Registration No. 2019/1005

Herewith certifies that

Ashlea-Robyn Strong

is registered as an

Environmental Assessment Practitioner

Registered in accordance with the prescribed criteria of Regulation 15. (1) of the Section 24H Registration Authority Regulations (Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).

Effective: 01 March 2022

Expires: 28 February 2023

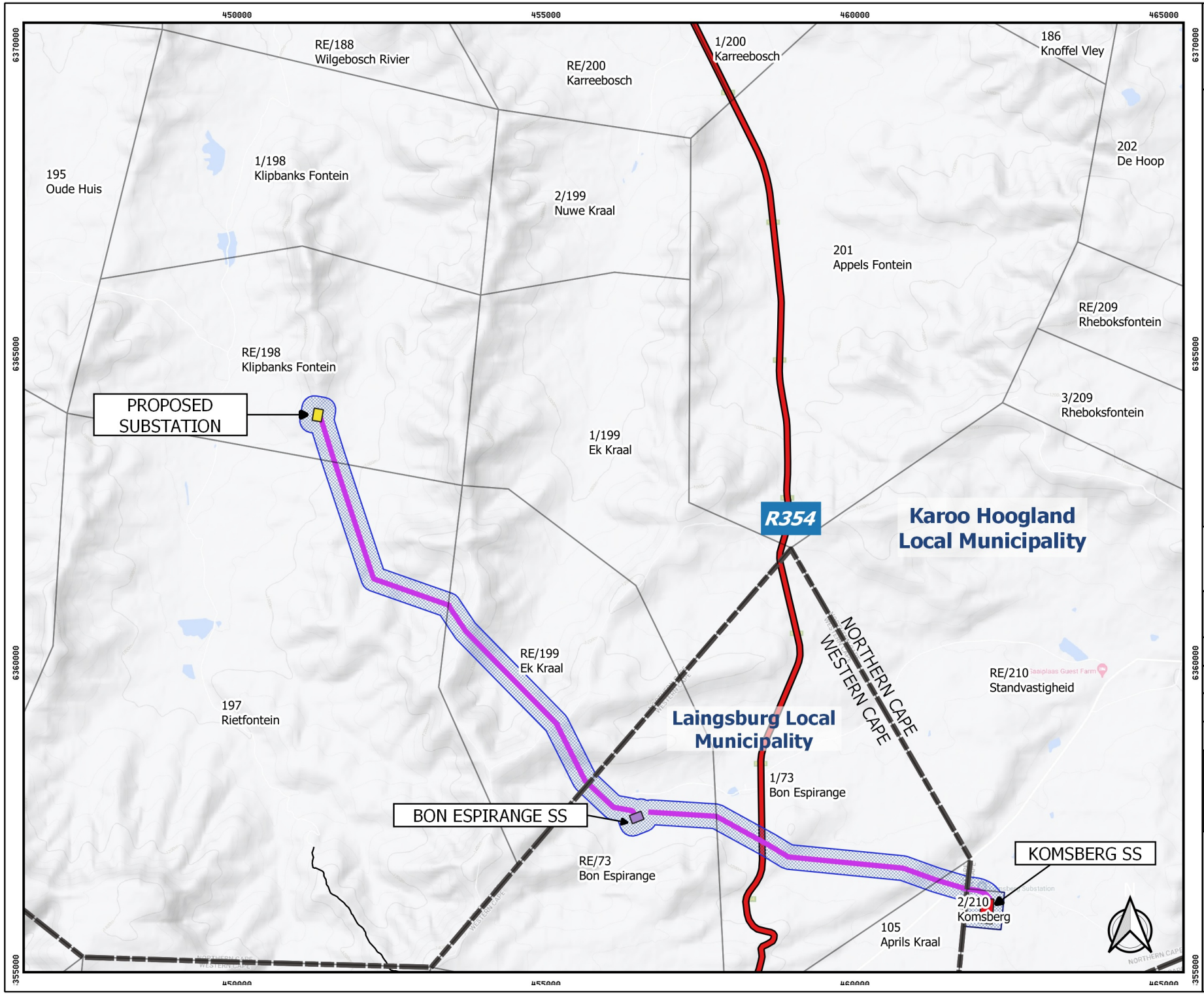
Chairperson

Registrar

SAQA
SOUTH AFRICAN QUALIFICATIONS AUTHORITY

APPENDIX

B LAYOUT MAP



PROPOSED CONSTRUCTION OF THE KARREEBOSCH 132kV POWER LINE

Legend

- Provincial Boundaries
- Property Boundaries
- Provincial Road
- Power Line Assessment Corridor (Pre-negotiated Route)

Eskom Infrastructure

- Komsberg SS
- Bon Espirange SS

Proposed Electrical Infrastructure

- Substation
- 132 kV Power Line

Scale: 1:80000

0 0.7 1.4 2.1 2.8 km

Date: 6-10-2022	Project: KBosch
Coordinate System: WG 21	
Drawn:	KW
Approved:	CC
GM001.1	Revision: 3

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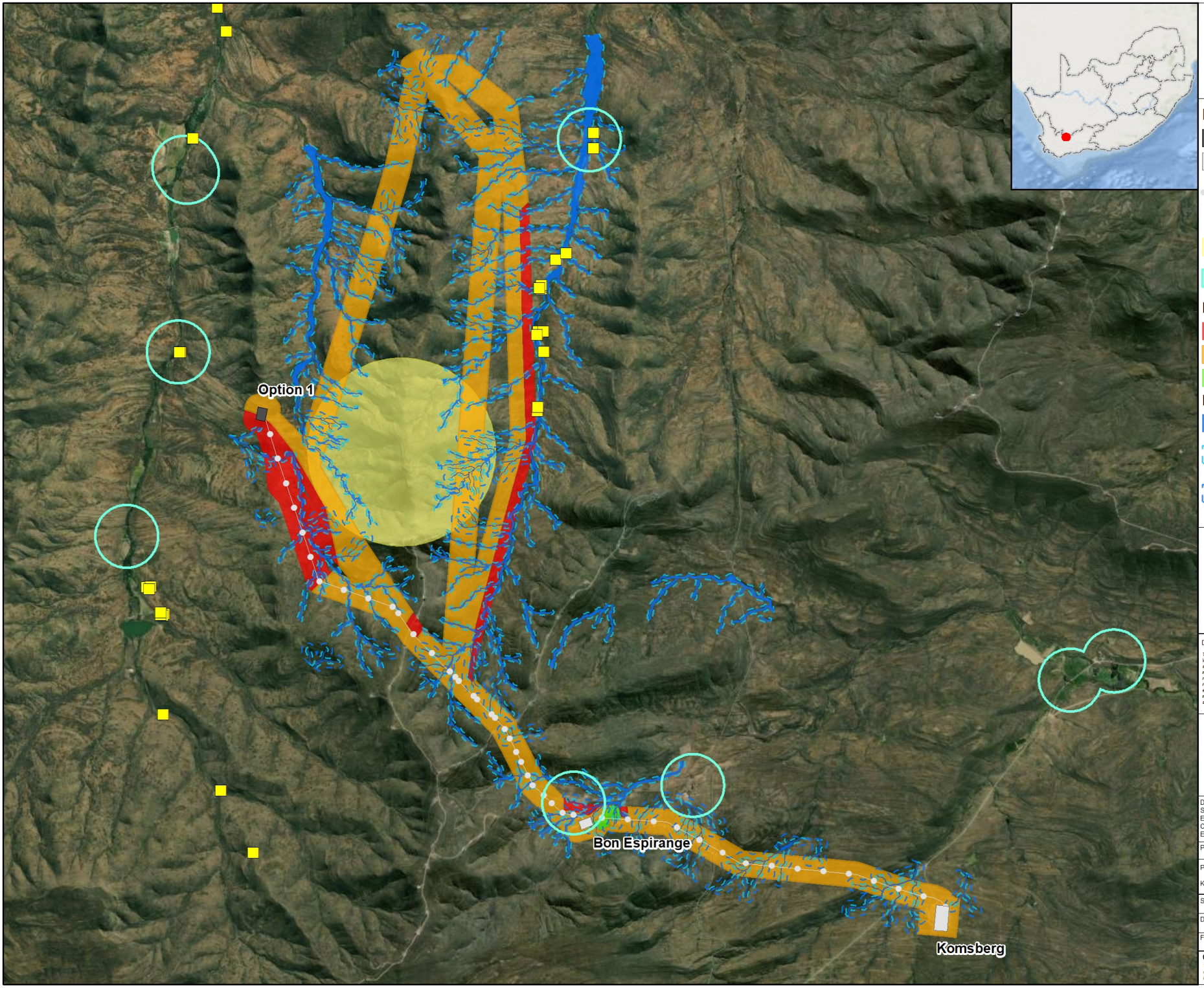
Internet: www.g7energies.com



KARREEBOSCH WIND FARM (RF) (PTY) LTD

GRID SENSITIVITY

Legend

- Preferred Substation
- Existing Substations
- Preferred Powerline Route
- Heritage Locations
- Avifauna Sensitivity
- Visual Proximity To Receptors

Ecological Sensitivity

- High
- Moderate
- Very Low

Freshwater Sensitivity

- River System
- 32 m Zone of Regulation (NEMA)
- GN509 Zone of Regulation

N

0 690 1 380 2 070 2 760

Metres

DISCLAIMER

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DATA SOURCE:
SERVICE LAYER CREDITS: SOURCE: ESRI, MAXAR, EARTHSTAR GEOGRAPHICS, AND THE GIS USER COMMUNITY
ESRI, GARMIN, GEBCO, NOAA NGDC, AND OTHER

PROJECTION: Hartebeesthoek94 Lo21

PROJECT TITLE:

KARREEBOSCH WEF Part 2 & BAR

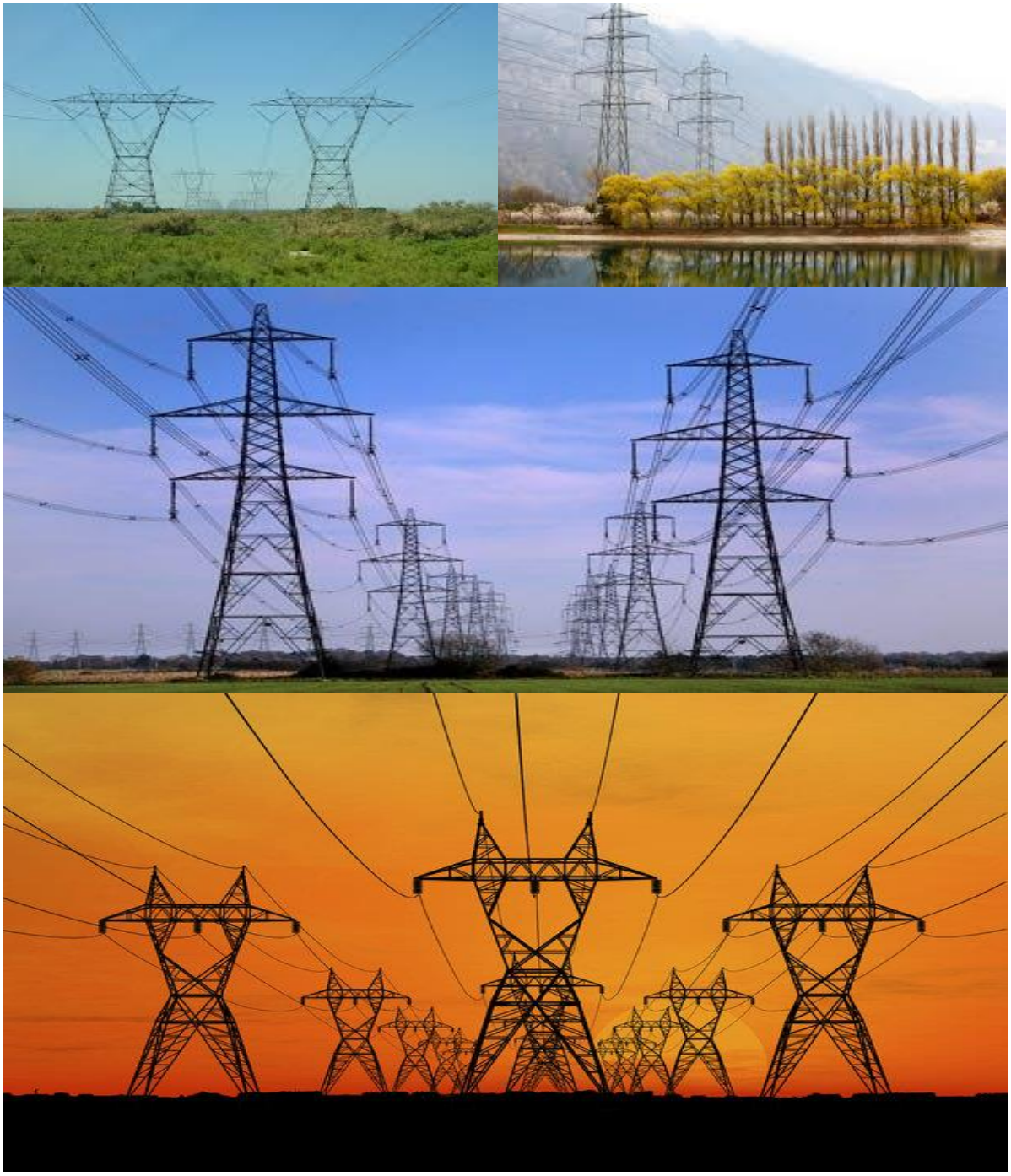
SCALE: 1:78 000	DRAWN BY: TS
DATE: 2022/10/07	REVIEWED BY: AS

FIGURE NO:	PROJECT NO: 41103843	REV:

APPENDIX

C POWERLINE GENERIC EMPR

APPENDIX 1
GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE DEVELOPMENT AND EXPANSION FOR OVERHEAD ELECTRICITY TRANSMISSION AND DISTRIBUTION INFRASTRUCTURE



environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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INTRODUCTION

1. Background

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended, (EIA Regulations) 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 competent authority (CA).

2. Purpose

This document constitutes a generic EMPr relevant to applications for the development or expansion of overhead electricity transmission and distribution infrastructure, and all listed and specified activities necessary for the realisation of such infrastructure.

3. Objective

The objective of this 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. The use of a generic EMPr is intended to reduce the need to prepare and review individual EMPrs for applications of a similar nature.

4. Scope

The scope of this generic EMPr applies to the development or expansion of overhead electricity transmission and distribution infrastructure requiring EA in terms of NEMA, i.e. with a capacity of 33 kilovolts or more. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realisation of such infrastructure.

5. Structure of this document

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and	Definitions, acronyms, roles & responsibilities and documentation and reporting.

Part	Section	Heading	Content
		information and is **not legally binding**	
B	1	Pre-approved generic EMPr template	Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of overhead electricity transmission and distribution infrastructure, which are presented in the form of a template that has been pre-approved. The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity. Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column. Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template **is not required** to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA. To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA will comply with the pre-approved generic EMPr template contained in Part B: Section 1, and understands that the impact management outcomes and impact management actions are **legally binding**. The preliminary infrastructure layout must be finalized to inform the final EMPr that is to be submitted with the basic assessment

Part	Section	Heading	Content
			report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and actions have been either pre-approved or approved in terms of Part C. This section **must be** submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of Part B: section 2 not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.
C		Site specific sensitivities/ attributes	If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (Part B: section 1) This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if Part C is applicable to the site, it **is required** to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP, and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding. This section applies only **to additional** impact management outcomes and impact management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not

Part	Section	Heading	Content
			already included in Part B: section 1.
Appendix 1			Contains the method statements to be prepared prior to commencement of the activity. The method statements are **not required** to be submitted to the competent authority.

6. Completion of part B: section 1: the pre-approved generic EMPr template

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
  - a 'responsible person',
  - a method for implementation,
  - a timeframe for implementation
- For monitoring
  - a responsible person
  - frequency
  - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must be signed and dated on each page by 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.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the corridor in which the proposed overhead

electricity transmission and distribution infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps must identify features both within the planned working area and any known sensitive features in the surrounding landscape within 50m from the development footprint. The overhead transmission and distribution profile must be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions must be used.

Sub-section 3 is the declaration that the applicant/proponent or holder of the EA in the case of a change of ownership must complete, which confirms that the applicant/EA holder will comply with the pre-approved generic EMPr template in Section 1 and understands that the impact management outcomes and actions are legally binding.

(a) Amendments to Part B: Section 2 – site specific information and declaration

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"hazardous substance" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover applicable details with regard to:

(i) Construction procedures;
(ii) Plant, materials and equipment to be used;
(iii) Transporting the equipment to and from site;
(iv) How the plant/ material/ equipment will be moved while on site;
(v) How and where the plant/ material/ equipment will be stored;
(vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
(vii) Timing and location of activities;
(viii) Compliance/ non-compliance; and
(ix) Any other information deemed necessary by the Project Manager.

"slope" means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

"solid waste" means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

"spoil" means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

"topsoil" means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil; and

"works" means the works to be executed in terms of the Contract

2. ACRONYMS and ABBREVIATIONS

CA	Competent Authority
cEO	Contractors Environmental Officer
dEO	Developer Environmental Officer
DPM	Developer Project Manager
DSS	Developer Site Supervisor
EAR	Environmental Audit Report
ECA	Environmental Conservation Act No. 73 of 1989
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ERAP	Emergency Response Action Plan
EMPr	Environmental Management Programme Report
EAP	Environmental Assessment Practitioner
FPA	Fire Protection Agency
HCS	Hazardous chemical Substance
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
MSDS	Material Safety Data Sheet
RI&AP's	Registered interested and affected parties

3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

The effective implementation of this generic EMPr is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMPr gives guidance to the various environmental roles and reporting lines, however, project specific requirements will ultimately determine the need for the appointment of specific person(s) to undertake specific roles and or responsibilities. As such, it must be noted that in the event that no specific person, for example, an environmental control officer (ECO) is appointed, the holder of the EA remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 1: *Guide to roles and responsibilities for implementation of an EMPr*

Responsible Person (s)	**Role and Responsibilities**
Developer's Project Manager (DPM)	Role The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. Responsibilities - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.
Developer Site Supervisor (DSS)	Role The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS

Responsible Person (s)	Role and Responsibilities
	is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr. <u>Responsibilities</u> - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	<u>Role</u> The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non- compliance with the Performance Specifications as set out in the EA and EMPr. The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.

Responsible Person (s)	Role and Responsibilities
	Responsibilities The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.

Responsible Person (s)	Role and Responsibilities
developer Environmental Officer (dEO)	Role The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities. Responsibilities - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO; - Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	Role The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing

Responsible Person (s)	Role and Responsibilities
	the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion for overhead electricity transmission and distribution infrastructure activities. Responsibilities - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	Role Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors, labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: Responsibilities - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site;

Responsible Person (s)	Role and Responsibilities
	- Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION 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 for all overhead electricity transmission and distribution infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. At a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

The ECOs shall monitor and ensure that the contractors perform in accordance with these method statements. Completed and agreed method statements between the holder of the EA and the contractor shall be captured in Appendix 1.

4.6 Environmental Incident Log (Diary)

The ECOs are required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance notice would not be issued. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr) that may be addressed immediately by the ECOs. (For example a contractor's staff member littering or a drip tray that has not been emptied);
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr which as a single event would have a minor impact but which if cumulative and continuous would have a significant effect (for example no toilet paper available in the ablutions for an afternoon); and
- General environmental information such as road kills or injured wildlife.

The ECOs are to record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer. The Log is to be kept in the EMPr file and at a minimum the following will be recorded for each environmental incident:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident; and
- Record of repeat minor offences by the same contractor or staff member.

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

A non-compliance notice will be issued to the responsible contractor by the ECOs via the DSS or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO 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 CA 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 a deviation from the environmental conditions, impact management outcomes and impact management actions , as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);
9. Any non-conformances deemed to be "significant";
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and
14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
5. Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in (**section 4.11**) below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in (**section 4.10**) above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and
4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes must be included in the EMPr file and be submitted to the CA at intervals as indicated in the EA.

An Environmental Audit Report must be prepared monthly. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

PART B: SECTION 1: Pre-approved generic EMPr template

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

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

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

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

5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities; – The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; – Refresher environmental awareness training is available as and when required; – All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; – The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a)Safety notifications; and b) No littering. – Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures;						

d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j)Fire prevention; and k) Disease prevention. – A record of all environmental awareness training courses undertaken as part of the EMPr must be available; – Educate workers on the dangers of open and/or unattended fires; – A staff attendance register of all staff to have received environmental awareness training must be available. – Course material must be available and presented in appropriate languages that all staff can understand.						

5.2 Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location						

of key infrastructure and services (where applicable), including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; – Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; – Sites must be located where possible on previously disturbed areas; – The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***; and – The use of existing accommodation for contractor staff, where possible, is encouraged.						

5.3 Access restricted areas

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

area, colour coding could be used if appropriate; and – Unauthorised access and development related activity inside access restricted areas is prohibited.						

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Access to the servitude and tower positions must be negotiated with the relevant landowner and must fall within the assessed and authorised area; – An access agreement must be formalised and signed by the DPM, Contractor and landowner before commencing with the activities; – The access roads to tower positions must be signposted after access has been negotiated and before the commencement of the activities; – All private roads used for access to the servitude must be maintained and upon completion of the works, be left in at least the original condition – All contractors must be made aware of all these access routes. – Any access route deviation from that in the written agreement must be closed and re-vegetated immediately, at the contractor's expense; – Maximum use of both existing servitudes and existing roads must be made to minimize further disturbance through the						

development of new roads; – In circumstances where private roads must be used, the condition of the said roads must be recorded in accordance with ***section 4.9: photographic record***; prior to use and the condition thereof agreed by the landowner, the DPM, and the contractor; – Access roads in flattish areas must follow fence lines and tree belts to avoid fragmentation of vegetated areas or croplands – Access roads must only be developed on pre-planned and approved roads.						

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible; – Existing and new gates to be recorded and documented in accordance with **section *4.9: photographic record***; – All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner; – At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner;						

– Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; – Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; – Original tension must be maintained in the fence wires; – All gates installed in electrified fencing must be re-electrified; – All demarcation fencing and barriers must be maintained in good working order for the duration of overhead transmission and distribution electricity infrastructure development activities; – Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where appropriate and would not cause harm to the sensitive flora; – Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner. – All fencing must be developed of high quality material bearing the SABS mark; – The use of razor wire as fencing must be avoided; – Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; – On completion of the development phase all temporary fences are to be removed; – The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

5.6 Water Supply Management

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

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; – All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; – Natural storm water runoff not contaminated during the development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; – Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.						

5.8 Solid and hazardous waste management

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

5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; – In the event of a spill, prompt action must be taken to clear the polluted or affected areas; – Where possible, no development equipment must traverse any seasonal or permanent wetland – No return flow into the estuaries must be allowed and no disturbance of the Estuarine Functional Zone should occur; – Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; – There must not be any impact on the long term morphological dynamics of watercourses or estuaries; – Existing crossing points must be favored over the creation of new crossings (including temporary access) – When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse						

b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.						

5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General: – Indigenous vegetation which does not interfere with the development must be left undisturbed; – Protected or endangered species may occur on or near the development site. Special care should be taken not to damage such species; – Search, rescue and replanting of all protected and endangered species likely to be damaged during project development must be identified by the relevant specialist and completed prior to any development or clearing;						

– Permits for removal must be obtained from the Department of Agriculture, Forestry and Fisheries prior to the cutting or clearing of the affected species, and they must be filed; – The Environmental Audit Report must confirm that all identified species have been rescued and replanted and that the location of replanting is compliant with conditions of approvals; – Trees felled due to construction must be documented and form part of the Environmental Audit Report; – Rivers and watercourses must be kept clear of felled trees, vegetation cuttings and debris; – Only a registered pest control operator may apply herbicides on a commercial basis and commercial application must be carried out under the supervision of a registered pest control operator, supervision of a registered pest control operator or is appropriately trained; – A daily register must be kept of all relevant details of herbicide usage; – No herbicides must be used in estuaries; – All protected species and sensitive vegetation not removed must be clearly marked and such areas fenced off in accordance to ***Section 5.3: Access restricted areas***. **Servitude:** – Vegetation that does not grow high enough to cause interference with overhead transmission and distribution infrastructures, or cause a fire hazard to any plantation, must not be cut or trimmed unless it is growing in the road access area, and then only at the discretion of the Project Manager; – Where clearing for access purposes is essential, the maximum width to be cleared within the servitude must be in accordance to distance as agreed between the land						

owner and the EA holder – Alien invasive vegetation must be removed according to a plan (in line with relevant municipal and provincial procedures, guidelines and recommendations) and disposed of at a recognised waste disposal facility; – Vegetation must be trimmed where it is likely to intrude on the minimum vegetation clearance distance (MVCD) or will intrude on this distance before the next scheduled clearance. MVCD is determined from SANS 10280; – Debris resulting from clearing and pruning must be disposed of at a recognised waste disposal facility, unless the landowners wish to retain the cut vegetation; – In the case of the development of new overhead transmission and distribution infrastructures, a one metre "trace-line" must be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along the "trace-line". Alternative methods of stringing which limit impact to the environment must always be considered.						

5.11 Protection of fauna

Impact management outcome: Minimise disturbance to fauna.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; – The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the						

development programme; – Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present; – Nesting sites on existing parallel lines must documented; – Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; – Bird guards and diverters must be installed on the new line as per the recommendations of the specialist; – No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; – No deliberate or intentional killing of fauna is allowed; – In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and – No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.						

5.12 Protection of heritage resources

Impact management outcome: Minimise impact to heritage resources.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify, demarcate and prevent impact to all known						

sensitive heritage features on site in accordance with the No-Go procedure in ***Section 5.3: Access restricted areas***; – Carry out general monitoring of excavations for potential fossils, artefacts and material of heritage importance; – All work must cease immediately, if any human remains and/or other archaeological, palaeontological and historical material are uncovered. Such material, if exposed, must be reported to the nearest museum, archaeologist/ palaeontologist (or the South African Police Services), so that a systematic and professional investigation can be undertaken. Sufficient time must be allowed to remove/collect such material before development recommences.						

5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.; – All unattended open excavations must be adequately fenced or demarcated; – Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; – Ensure structures vulnerable to high winds are secured; – Maintain an incidents and complaints register in which all						

incidents or complaints involving the public are logged.						

5.14 Sanitation

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

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

toilets to ensure compliance to health standards; – A copy of the waste disposal certificates must be maintained.						

5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area; – Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS; – The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area; – Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable; – Free condoms must be made available to all staff on site at central points; – Medical support must be made available; – Provide access to Voluntary HIV Testing and Counselling Services.						

5.16 Emergency procedures

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

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives substituted where possible; – All hazardous substances must be stored in suitable						

containers as defined in the Method Statement; – Containers must be clearly marked to indicate contents, quantities and safety requirements; – All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers; – Bunded areas to be suitably lined with a SABS approved liner; – An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; – All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); – All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet; – Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available; – The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; – The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall); – The floor of the bund must be sloped, draining to an oil separator;						

– Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained; – All empty externally dirty drums must be stored on a drip tray or within a bunded area; – No unauthorised access into the hazardous substances storage areas must be permitted; – No smoking must be allowed within the vicinity of the hazardous storage areas; – Adequate fire-fighting equipment must be made available at all hazardous storage areas; – Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used; – An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times; – The responsible operator must have the required training to make use of the spill kit in emergency situations; – An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; – In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to ***Section 5.7*** for procedures concerning ***storm and waste water management*** and ***5.8*** for ***solid and hazardous waste management.***						

5.18 Workshop, equipment maintenance and storage

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

5.19 Batching plants

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

in accordance with ***Section 5.5: Fencing and gate installation***.						

5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; – Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; – Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; – During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; – Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; – Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO;						

– Vehicle speeds must not exceed 40 km/h along dust roads or 20 km/h when traversing unconsolidated and non-vegetated areas; – Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks; – For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

5.21 Blasting

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

5.22 Noise

Impact Management outcome: Unnecessary noise is prevented by ensuring that noise from construction activities is mitigated.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

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

5.23 Fire prevention

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

– Two way swop of contact details between ECO and FPA.						

5.24 Stockpiling and stockpile areas

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

5.25 Finalising tower positions

Impact management outcome: No environmental degradation occurs as a result of the survey and pegging operations.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No vegetation clearing must occur during survey and pegging operations; – No new access roads must be developed to facilitate access for survey and pegging purposes; – Project manager, botanical specialist and contractor to agree on final tower positions based on survey within assessed and approved areas; – The surveyor is to demarcate (peg) access roads/tracks in consultation with ECO. No deviations will be allowed without the prior written consent from the ECO.						

5.26 Excavation and Installation of foundations

Impact management outcome: No environmental degradation occurs as a result of excavation or installation of foundations.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a recognised disposal site, if not used for backfilling purposes; – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; – Management of equipment for excavation purposes must						

be undertaken in accordance with ***Section 5.18: Workshop equipment maintenance and storage***; and – Hazardous substances spills from equipment must be managed in accordance with ***Section 5.17: Hazardous substances***. – Batching of cement to be undertaken in accordance with **Section *5.19 : Batching plants***; – Residual cement must be disposed of in accordance with **Section *5.8: Solid and hazardous waste management***.						

5.27 Assembly and erecting towers

Impact management outcome: No environmental degradation occurs as a result of assembly and erecting of towers.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Prior to erection, assembled towers and tower sections must be stored on elevated surface (suggest wooden blocks) to minimise damage to the underlying vegetation; – In sensitive areas, tower assembly must take place off-site or away from sensitive positions; – The crane used for tower assembly must be operated in a manner which minimises impact to the environment; – The number of crane trips to each site must be minimised; – Wheeled cranes must be utilised in preference to tracked cranes; – Consideration must be given to erecting towers by helicopter or by hand where it is warranted to limit the extent of environmental impact; – Access to tower positions to be undertaken in accordance						

with access requirements in specified in Section 8.4: Access Roads; – Vegetation clearance to be undertaken in accordance with general vegetation clearance requirements specified in Section 8.10: Vegetation clearing; – No levelling at tower sites must be permitted unless approved by the Development Project Manager or Developer Site Supervisor; – Topsoil must be removed separately from subsoil material and stored for later use during rehabilitation of such tower sites; – Topsoil must be stored in heaps not higher than 1m to prevent destruction of the seed bank within the topsoil; – Excavated slopes must be no greater that 1:3, but where this is unavoidable, appropriate measures must be undertaken to stabilise the slopes; – Fly rock from blasting activity must be minimised and any pieces greater than 150 mm falling beyond the Working Area, must be collected and removed; – Only existing disturbed areas are utilised as spoil areas; – Drainage is provided to control groundwater exit gradient with the spill areas such that migration of fines is kept to a minimum; – Surface water runoff is appropriately channeled through or around spoil areas; – During backfilling operations, care must be taken not to dump the topsoil at the bottom of the foundation and then put spoil on top of that; – The surface of the spoil is appropriately rehabilitated in accordance with the requirements specified in Section 5.29: Landscaping and rehabilitation;						

– The retained topsoil must be spread evenly over areas to be rehabilitated and suitably compacted to effect re-vegetation of such areas to prevent erosion as soon as construction activities on the site is complete. Spreading of topsoil must not be undertaken at the beginning of the dry season.						

5.28 Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Where possible, previously disturbed areas must be used for the siting of winch and tensioner stations. In all other instances, the siting of the winch and tensioner must avoid Access restricted areas and other sensitive areas; – The winch and tensioner station must be equipped with drip trays in order to contain any fuel, hydraulic fuel or oil spills and leaks; – Refueling of the winch and tensioner stations must be undertaken in accordance with Section 5.17: Hazardous substances; – In the case of the development of overhead transmission and distribution infrastructure, a one metre "trace-line" may be cut through the vegetation for stringing purposes only and no vehicle access must be cleared along "trace-lines". Vegetation clearing must be undertaken by hand, using chainsaws and hand held implements, with vegetation being cut off at ground level. No tracked or wheeled						

mechanised equipment must be used; – Alternative methods of stringing which limit impact to the environment must always be considered e.g. by hand or by using a helicopter; – Where the stringing operation crosses a public or private road or railway line, the necessary scaffolding/ protection measures must be installed to facilitate access. If, for any reason, such access has to be closed for any period(s) during development, the persons affected must be given reasonable notice, in writing; – No services (electrical distribution lines, telephone lines, roads, railways lines, pipelines fences etc.) must be damaged because of stringing operations. Where disruption to services is unavoidable, persons affected must be given reasonable notice, in writing; – Where stringing operations cross cultivated land, damage to crops is restricted to the minimum required to conduct stringing operations, and reasonable notice (10 work days minimum), in writing, must be provided to the landowner; – Necessary scaffolding protection measures must be installed to prevent damage to the structures supporting certain high value agricultural areas such as vineyards, orchards, nurseries.						

5.29 Socio-economic

Impact management outcome: Socio-economic development is enhanced.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

– Develop and implement communication strategies to facilitate public participation; – Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; – Sustain continuous communication and liaison with neighboring owners and residents – Create work and training opportunities for local stakeholders; and – Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.						

5.30 Temporary closure of site

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

emergency personnel; – Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; – Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; – Structures vulnerable to high winds must be secured; – Wind and dust mitigation must be implemented; – Cement and materials stores must have been secured; – Toilets must have been emptied and secured; – Refuse bins must have been emptied and secured; – Drip trays must have been emptied and secured.						

5.31 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed to a registered waste site and certificates of disposal provided; – All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983 – All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983; – Berms that have been created must have a slope of 1:4 and						

be replanted with indigenous species and grasses that approximates the original condition; – Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners; – Rehabilitation of tower sites and access roads outside of farmland; – Indigenous species must be used for with species and/grasses to where it compliments or approximates the original condition; – Stockpiled topsoil must be used for rehabilitation (refer to Section ***5.24: Stockpiling and stockpiled areas***); – Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; – Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; – Subsoil must be ripped before topsoil is placed; – The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; – Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled ; – Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. – Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture						

is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area						

6 ACCESS TO THE GENERIC EMPr

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

PART B: SECTION 2

7 SITE SPECIFIC INFORMATION AND DECLARATION

7.1 Sub-section 1: contact details and description of the project

7.1.1 Details of the applicant:

Karreebosch Wind Farm (RF) (Pty) Ltd is the project proponent (Applicant) with regards to the application for the construction and operation of the Karreebosch 132kV OHPL.

PROPONENT: **KARREEBOSCH WIND FARM (RF) (PTY) LTD**

Contact Person:	Dr Kilian Hagemann
Physical Address:	125 Buitengracht Street, 5th Floor, Cape Town
Telephone:	+27 21 300 01613
Email:	karreebosch@g7energies.com

Refer to Section 1.2 of the EMPr

7.1.2 Details and expertise of the EAP:

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed construction of the powerline. The CV of the EAP is available in Appendix A. The EAP declaration of interest and undertaking is included in Appendix B.

EAP **WSP GROUP AFRICA (PTY) LTD**

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

Refer to Section 1.3 of the EMPr

7.1.3 Project name:

Proposed Karreebosch to Komsberg 132kV Overhead Powerline

7.1.4 Description of the project:

Refer to Section 3 of the EMPr

Karreebosch Wind Farm (RF) (Pty) Ltd propose to construct a 132kV twin tern double circuit overhead powerline (OHPL), an onsite 33/132kV substation and associated road infrastructure to evacuate power for the authorised Karreebosch WEF (Ref: 14/12/16/3/3/2/807/AM3) to the existing Komsberg substation via the existing Bon Espirange substation.

The proposed OHPL is situated near Matjiesfontein in the Laingsburg Local Municipality within the Central Karoo District Municipality of the Western Cape Province as well as near Sutherland in the Karoo Hoogland Local Municipality in the Namakwa District Municipality of the Northern Cape, South Africa

The entire extent of the proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located within one (1) of the Strategic Transmission Corridors, namely the Central Corridor, as defined in and in terms of the procedures laid out in Government Notice (GN) No. 113. The proposed OHPL and substation project will therefore be subject to a Basic Assessment (BA) Process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA process is the national Department of Forestry, Fisheries and Environment (DFFE).

7.1.5 Project location:

Refer to Section 3.1 of the EMPr

The proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located 35km north of Matjiesfontein, and extends across two provinces, namely the Northern and Western Cape Provinces. The proposed Karreebosch OHPL will extend from the proposed Karreebosch onsite 33/132kV substation, which is situated in Ward 3 of the Karoo Hoogland Local Municipality in the Namakwa District Municipality in the Northern Cape into Ward 2 of the Laingsburg Local Municipality in the Central Karoo District Municipality in the Western Cape Province, where it will connect to the existing 400kV Komsberg substation via the existing Bon Espirange substation.

The OHPL and associated infrastructure will be accessed via roads forming part of the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3), where possible. The preferred OHPL routing will require an associated servitude road (following beneath the proposed OHPL) to be constructed which will be used to construct, operate and maintain the powerline. Existing roads will be used as much as possible, where feasible. However, additional access roads may be required to provide access to sections of the powerline route. New sections of access roads will deviate off existing roads (within the 400m wide assessment corridor), as needed to access tower positions. Access roads will be mostly two-track

gravel roads up to 14m in width following beneath the OHPL in order to access tower structures for construction and maintenance purposes.

The proposed Karreebosch OHPL will evacuate power from the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3), located in the Northern Cape Province and will connect to the existing Komsberg substation.

The centre point of the OHPL is located at 32°53'57.00"S 20°30'45.20"E. Table 4-1 below provides the co-ordinates of existing and proposed substations.

Table 4-1: Co-ordinates of substations along the OHPL route

POINT	CO-ORDINATES	
Proposed Karreebosch WEF Proposed Substation Option 1	32°51'39.93"S	20°28'46.28"E
Karreebosch WEF Substation Option 2	32°48'41.87"S	20°30'24.71"E
Existing Bon Espirange substation	32°55'11.28"S	20°32'3.64"E
Existing Komsberg Substation	32°56'0.70"S	20°35'42.82"E

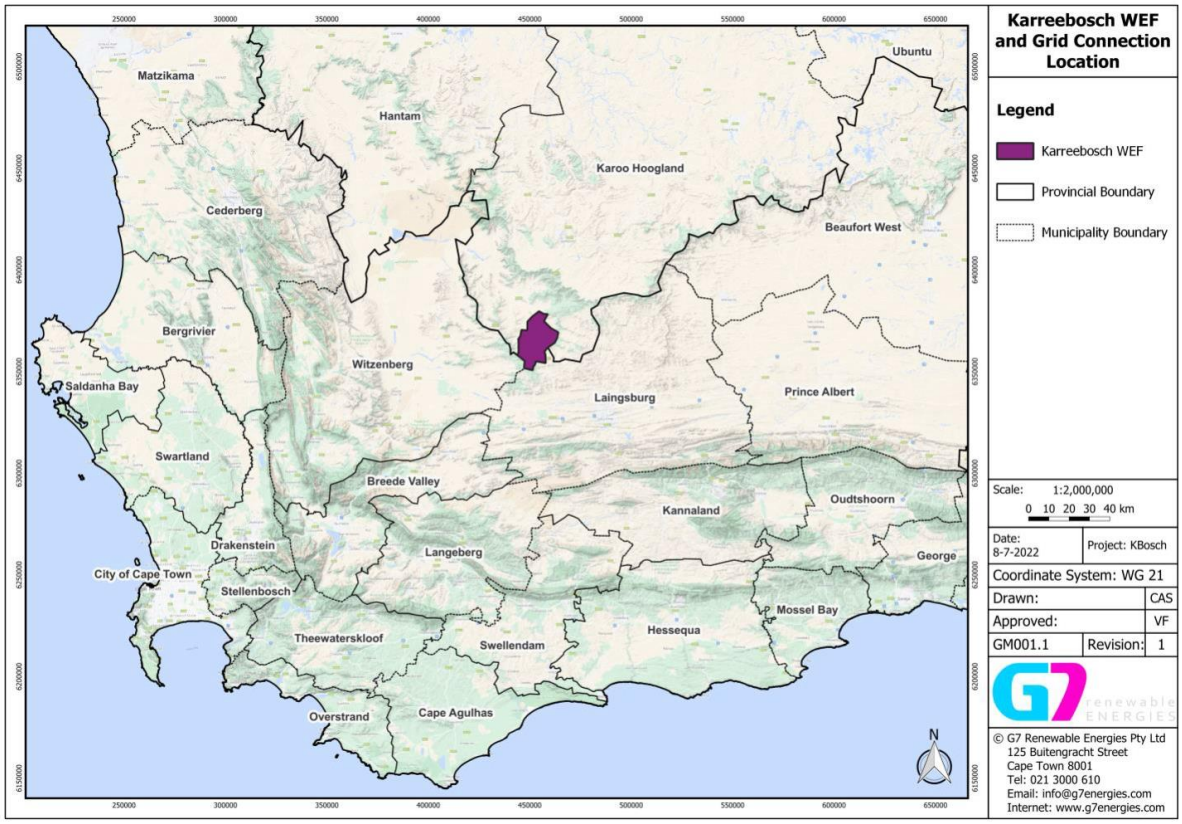


Figure 0-1: Locality of the Proposed Karreebosch 132kV OHPL

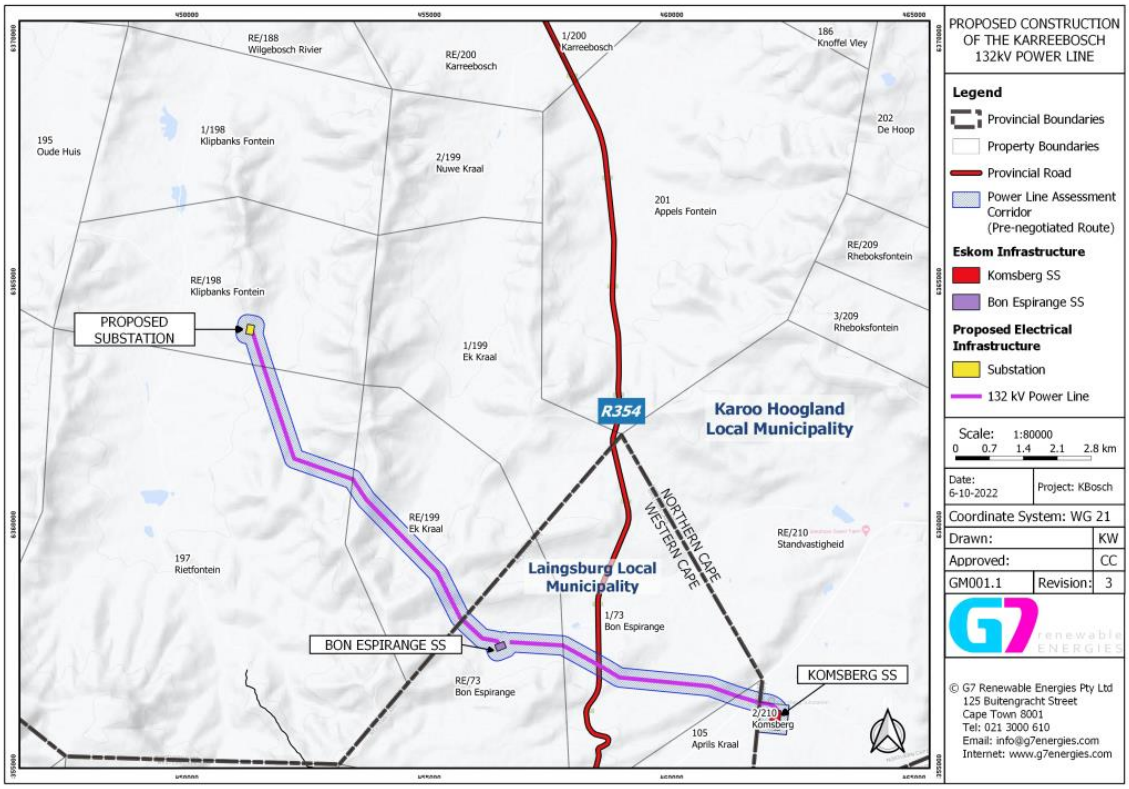


Figure 0-2: The proposed 132kV OHPL in relation to affected land portions

7.16 Preliminary technical specification of the overhead transmission and distribution:

Refer to Section 3 of the EMPr

The OHPL will be a 132kV twin tern double circuit overhead powerline. The powerline towers will either be lattice or monopole structures. Figure 4-3 below provides an example of a conventional lattice tower compared with a monopole structure. Pole positions will only be available once the powerline detail design has been completed for the Eskom Design Review Team (DRT). However, a 400m wide assessment corridor is being considered and has been walked down by the specialists for approval to allow for micro siting of tower positions once the detailed design has been completed. It is anticipated that towers will be located on average 200m to 250m apart; however, longer spans may be needed due to terrain and watercourse crossings.

A 400m wide OHPL corridor (200m on either side of the centre line) has been assessed by the specialists for the purposes of the BAR. The registered servitude will fall within this 400m wide assessment corridor and will be 31m wide (15.5 m on either side of the centre line). The Right of Way servitude (servitude road) will be up to 14m wide (7m on either side of centre line), resulting in a total servitude width of 45m in total. The length of the longest powerline route alterative (Option 2C – see "Alternatives" section below) is 20.52 km, which will result in a servitude area (and area of investigation for this BAR) of up to 92.3 ha. The actual development footprint will however be much less given the nature of the OHPL and substation development.

The servitude is required to ensure safe construction, maintenance and operation of the powerline. Registration of the servitude grants the operator the right to erect, operate and

maintain the powerline and to access the land to carry out such activities, but it does not constitute full ownership of the land. It should be noted that the OHPL and 132kV portion of the onsite substation will be ceded to Eskom post- construction. Construction and operation activities and access to the powerline and substation will be carried out with due respect to the affected landowners. The servitude required for the Project will be registered at the Deeds Office and will form part of the title deed of the relevant properties once the environmental authorisation has been obtained.

7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. raptor nest, threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features in the surrounding landscape. The overhead transmission and distribution profile shall be illustrated at an appropriate resolution to enable fine scale interrogation. It is recommended that <20 km of overhead transmission and distribution length is illustrated per page in A3 landscape format. Where considered appropriate, photographs of sensitive features in the context of tower positions shall be used.

Refer to Section 3.4 of the EMPr

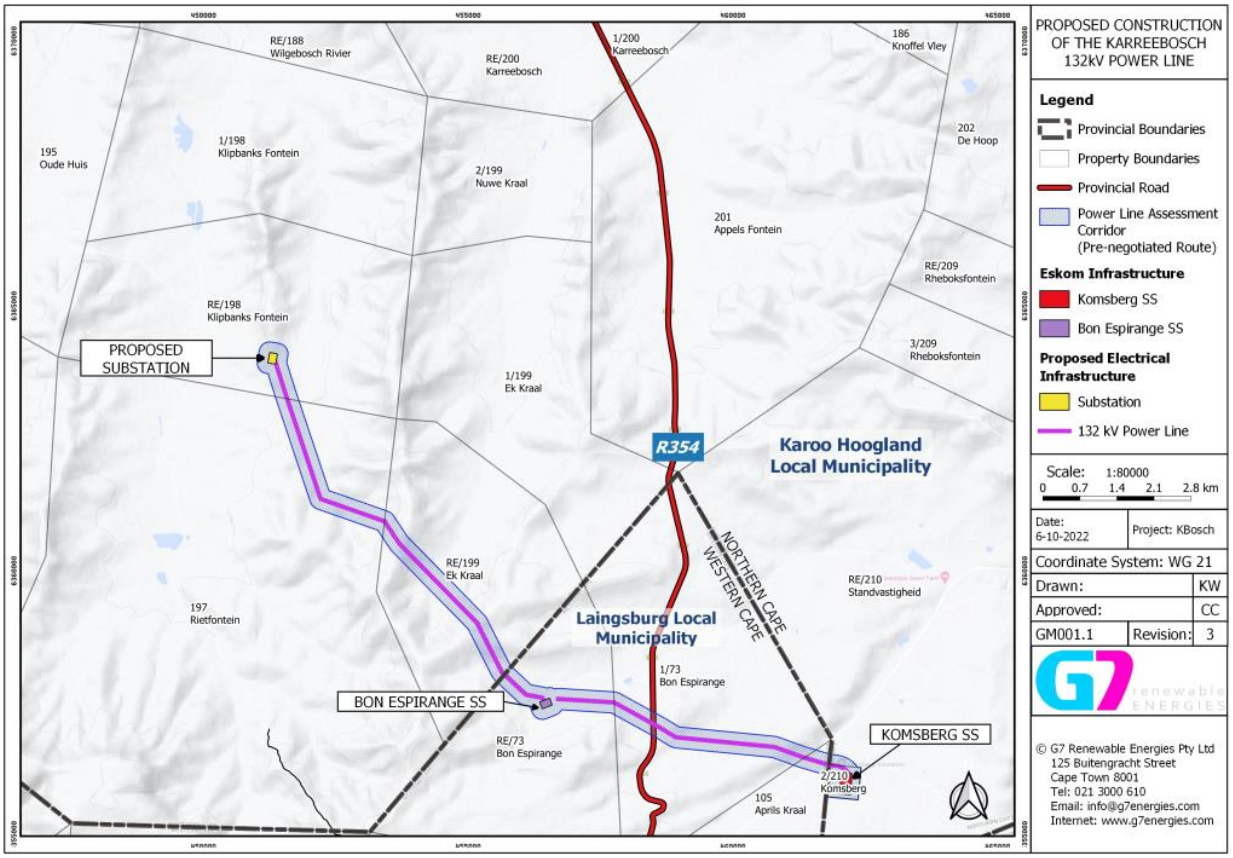


Figure 0-3: Location of the Proposed Karreebosch to Komsberg 132kV Overhead Powerline

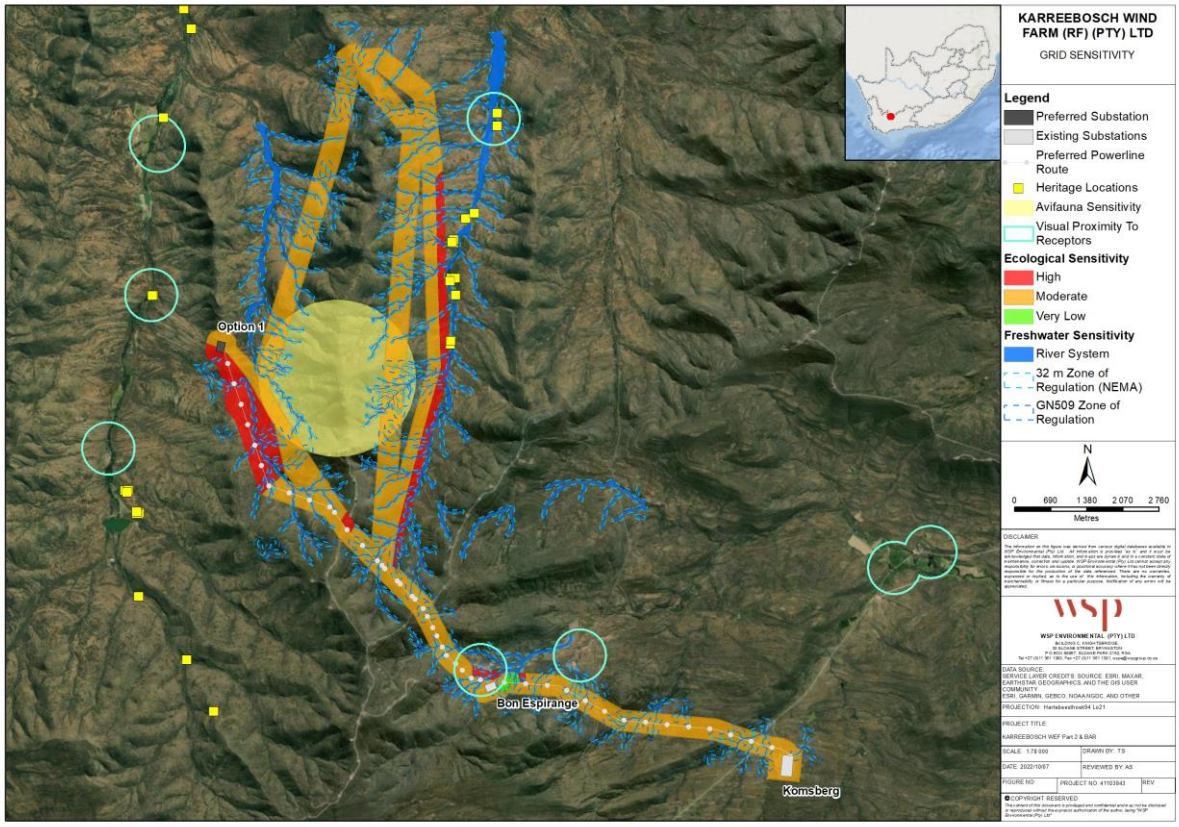


Figure 0-4: Combined Sensitivity Map for the Karreebosch to Komsberg OHPL

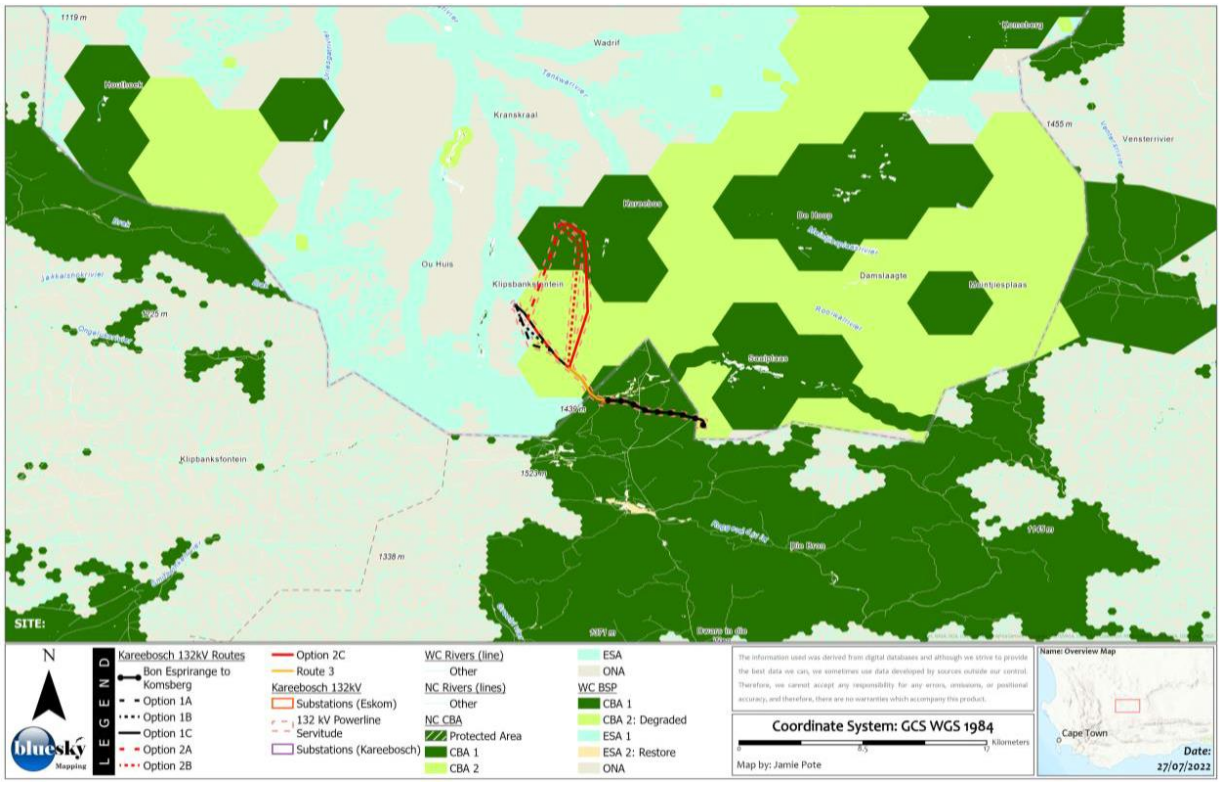


Figure 0-5: Northern Cape and Western Cape Critical Biodiversity Areas

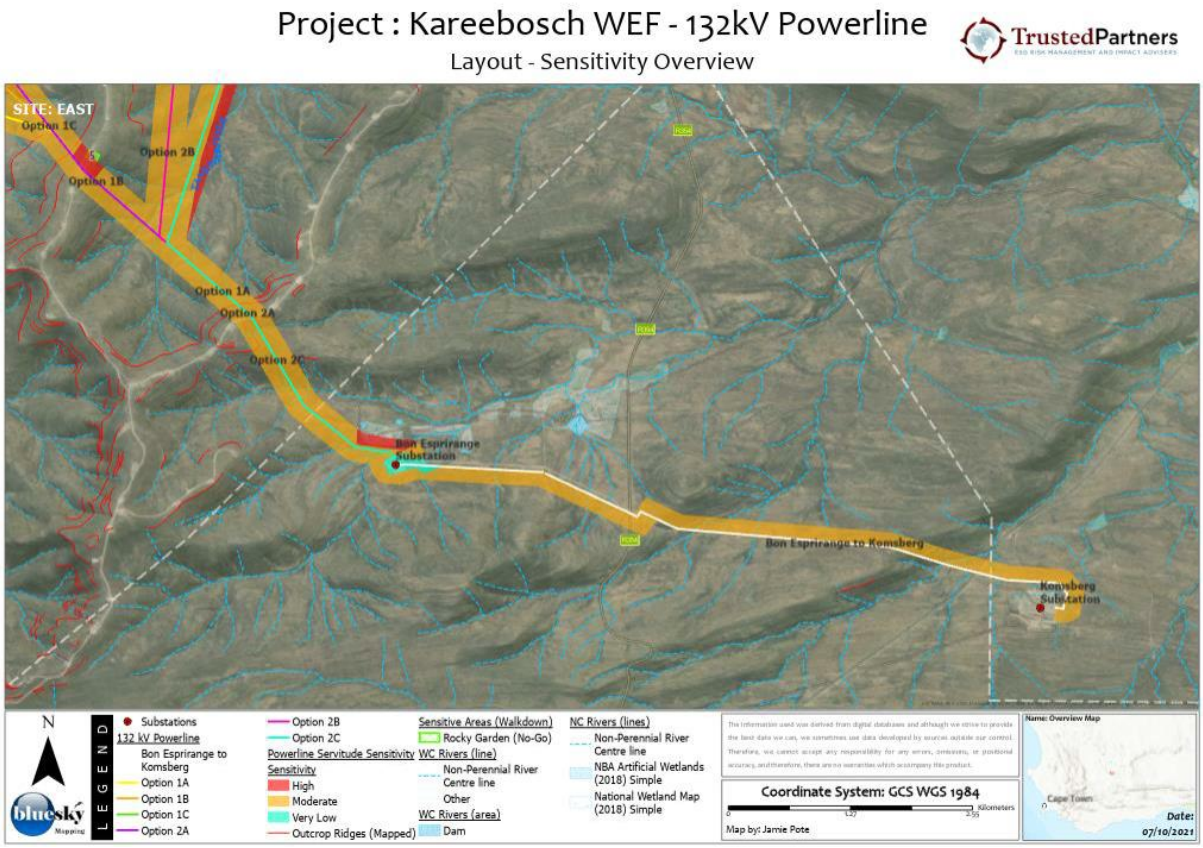


Figure 0-6: Overall Species Sensitivity (East)

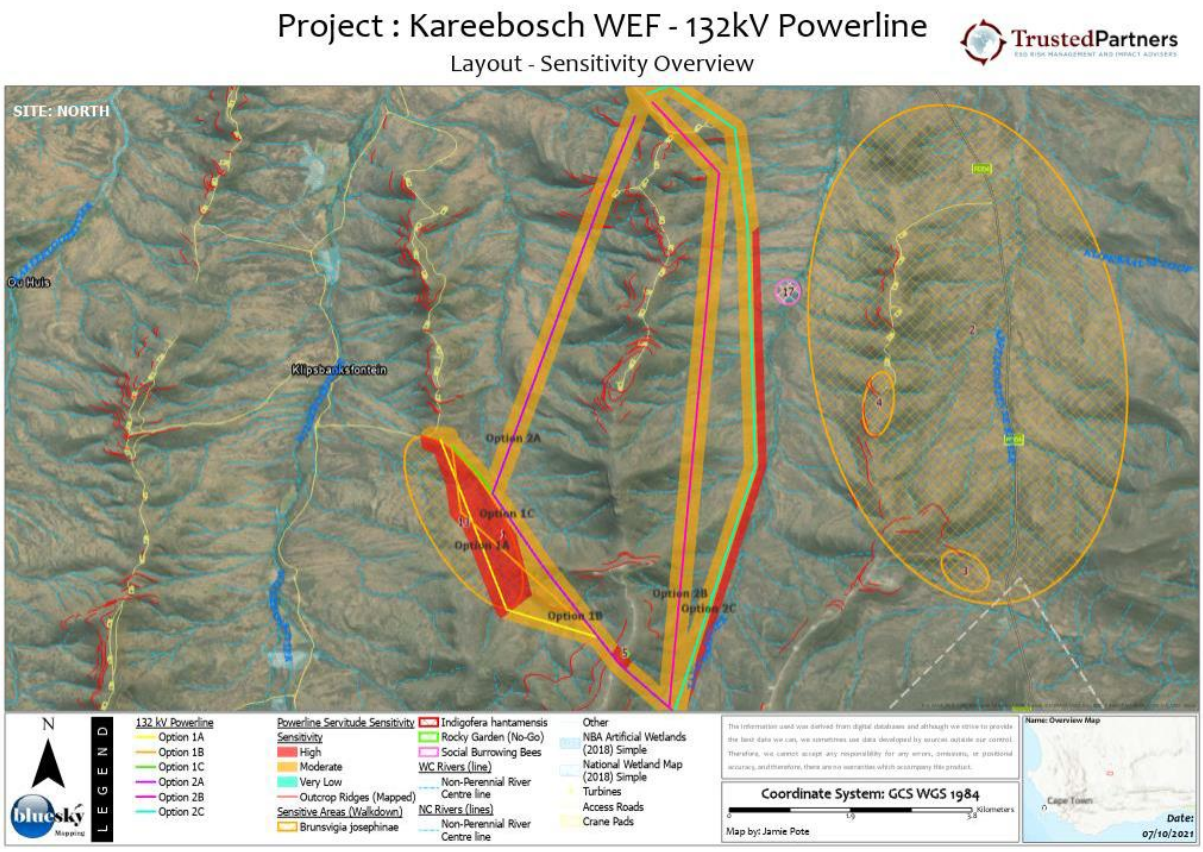


Figure 0-7: Overall Species Sensitivity (North)

Figure 0-8: The conceptual presentation of the zones of regulation relation to the delineated watercourses that form part of the Tankwa and Wilgebos River system within the northern portion of the investigation area. (Take note due to the scale of the map: Substation Option 2 is located approximately 20m from the delineated extent of an episodic drainage line)

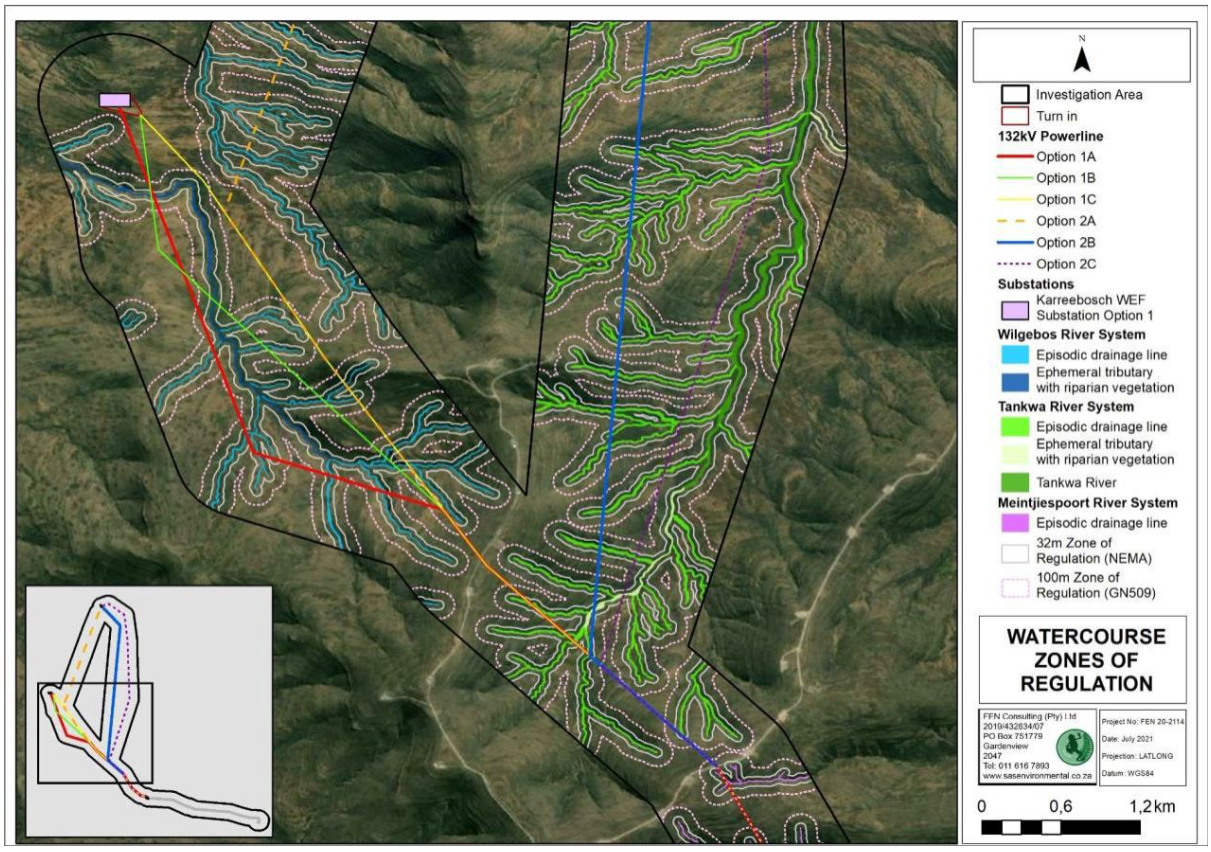


Figure 0-9: The conceptual presentation of the zones of regulation in relation to the delineated watercourses that form part of the Tankwa and Wilgebos River system within the central portion of the investigation area.

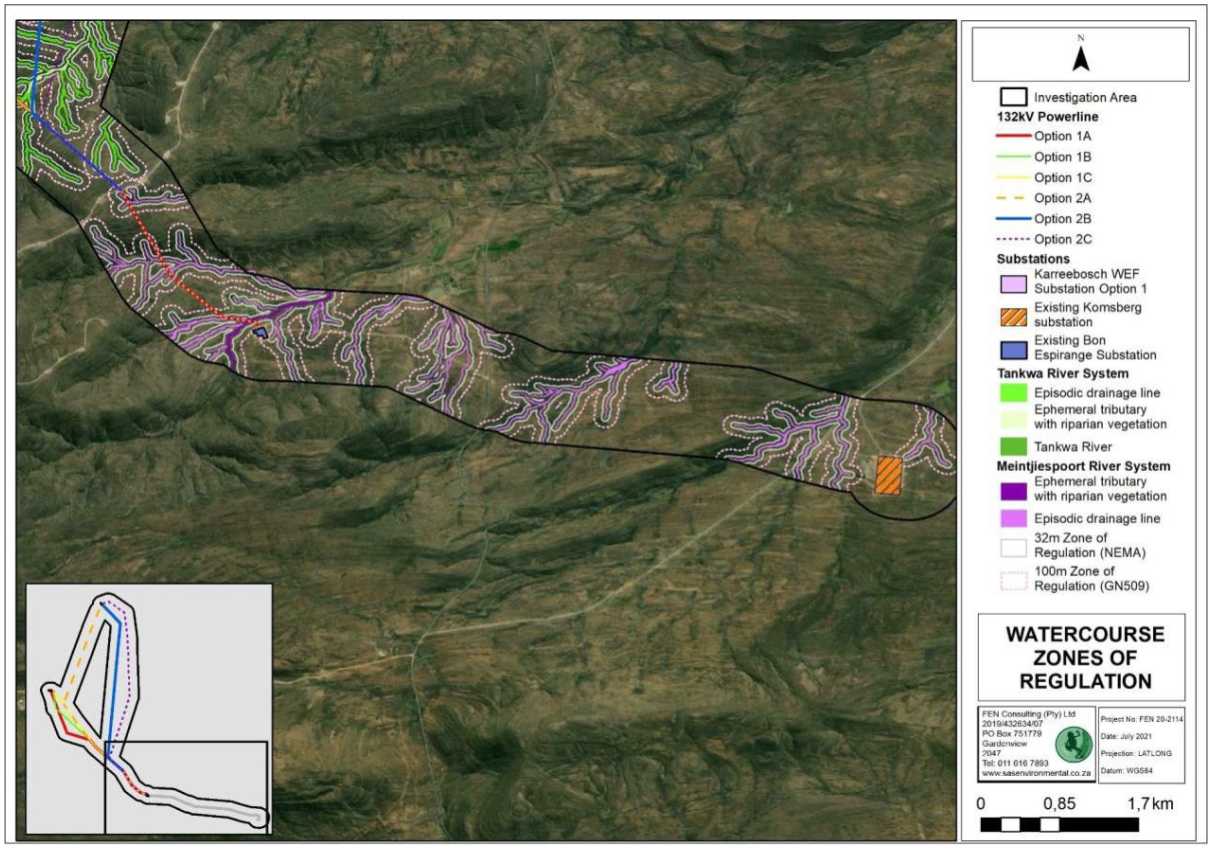


Figure 0-10: The conceptual presentation of the zones of regulation in relation to the delineated watercourses that form part of the Wilgebos and Meintjiesplaas River system within the southern portion of the investigation area.

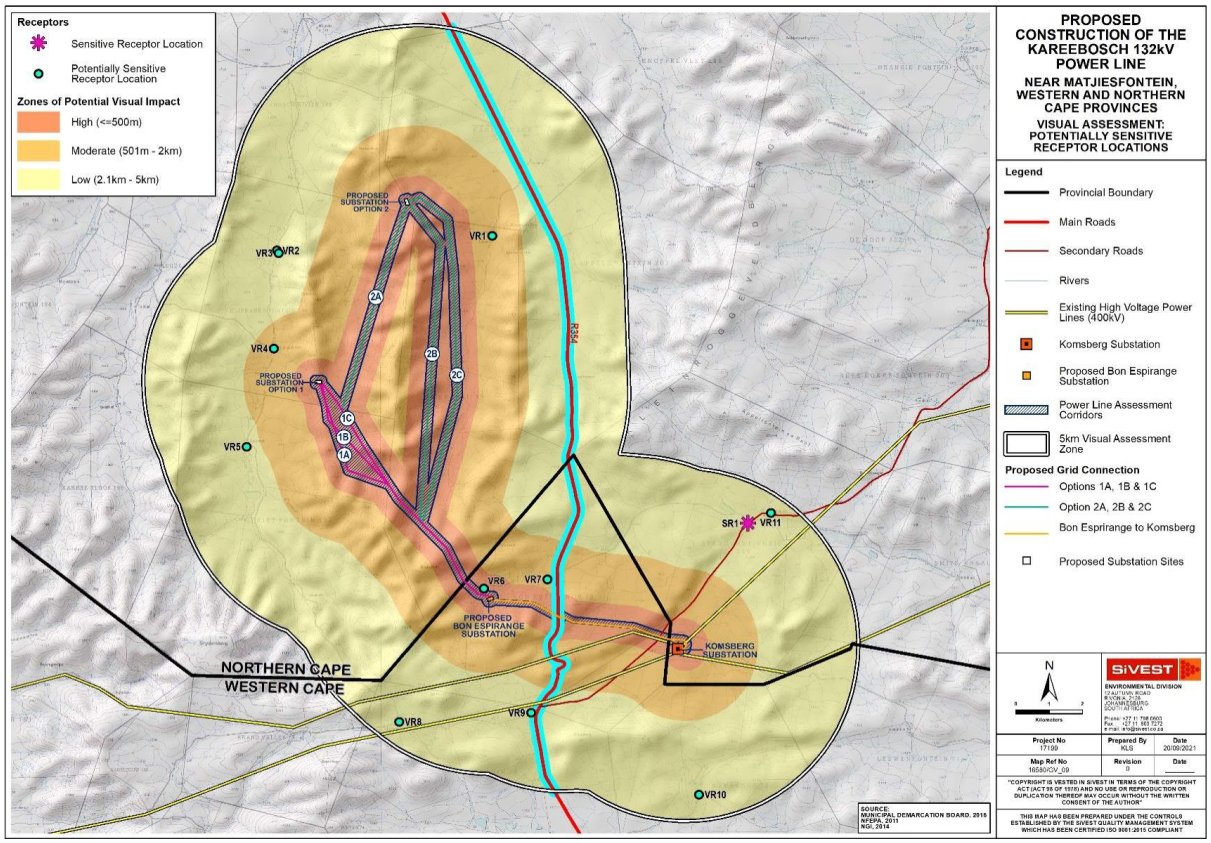


Figure 0-11: Potentially sensitive receptor locations within 5kms of the proposed Kareebosch 132kV OHPL

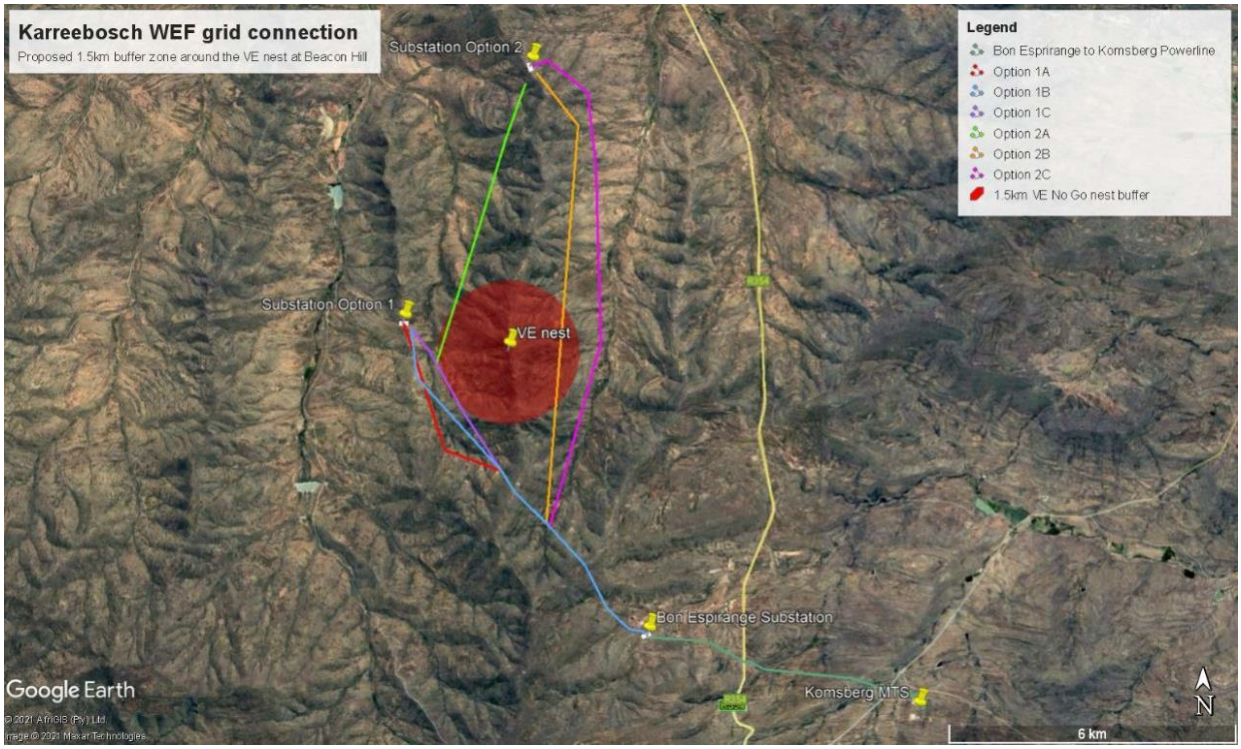
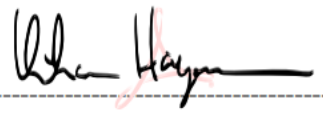


Figure 0-12: A 1.5km No Go buffer should be implemented around the Verreaux's Eagle nest at 32°51'59.27"S 20°30'12.02"E (Beacon Hill).

7.3 Sub-section 3: Declaration

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



Signature Proponent/applicant/ holder of EA

25 July 2022

Date:

7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

Refer to Section 7.2 of the site-specific EMPR (WSP, 2022). Please refer to the Site specific EMPr for all the site-specific mitigation measures that are applicable.

APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.

APPENDIX

D SUBSTATION GENERIC EMPR

GENERIC ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) FOR THE DEVELOPMENT AND EXPANSION OF SUBSTATION INFRASTRUCTURE FOR THE TRANSMISSION AND DISTRIBUTION OF ELECTRICITY

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

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INTRODUCTION

1. Background

The National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA) requires that an environmental management programme (EMPr) be submitted where an environmental impact assessment (EIA) has been identified as the environmental instrument to be utilised as the basis for a decision on an application for environmental authorisation (EA). The content of an EMPr must either contain the information set out in Appendix 4 of the Environmental Impact Assessment Regulations, 2014, as amended (EIA Regulations) 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 competent authority (CA).

2. Purpose

This document constitutes a generic EMPr relevant to applications for the development or expansion of substation infrastructure for the transmission and distribution of electricity, and all listed and specified activities necessary for the realisation of such infrastructure.

3. Objective

The objective of this 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 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.

4. Scope

The scope of this generic EMPr applies to the development or expansion of substation infrastructure for the transmission and distribution of electricity requiring EA in terms of NEMA. This generic EMPr applies to activities requiring EA, mainly activity 11 and 47 of the Environmental Impact Assessment Regulations Listing Notice 1 of 2014, as amended, and activity 9 of the Environmental Impact Assessment Regulations Listing Notice 2 of 2014, as amended, and all associated listed or specified activities necessary for the realization of such infrastructure.

5. Structure of this document

This document is structured in three parts with an Appendix as indicated in the table below:

Part	Section	Heading	Content
A		Provides general guidance and information	Definitions, acronyms, roles & responsibilities and documentation and reporting.

Part	Section	Heading	Content
		and is **not legally binding**	
B	1	Pre-approved generic EMPr template	Contains generally accepted impact management outcomes and impact management actions required for the avoidance, management and mitigation of impacts and risks associated with the development or expansion of substation infrastructure for the transmission and distribution of electricity, which are presented in the form of a template that has been pre-approved. The template in this section is to be completed by the contractor, with each completed page signed and dated by the holder of the EA prior to commencement of the activity. Where an impact management outcome is not relevant, the words "not applicable" can be inserted in the template under the "responsible persons" column. Once completed and signed, the template represents the EMPr for the activity approved by the CA and is legally binding. The template **is not required** to be submitted to the CA as once the generic EMPr is gazetted for implementation, it has been approved by the CA. To allow interested and affected parties access to the pre-approved EMPr template for consideration through the decision-making process, the EAP on behalf of the applicant /proponent must make the hard copy of this EMPr available at a public location and where the applicant has a website, the EMPr should also be made available on such publicly accessible website.
	2	Site specific information	Contains preliminary infrastructure layout and a declaration that the applicant/holder of the EA will comply with the pre-approved generic EMPr template contained in Part B: Section 1, and understands that the impact management outcomes and impact management actions are **legally binding**. The preliminary infrastructure layout must be

Part	Section	Heading	Content
			finalized to inform the final EMPr that is to be submitted with the basic assessment report (BAR) or environmental impact assessment report (EIAR), ensuring that all impact management outcomes and impact management actions have been either pre-approved or approved in terms of Part C. This section **must be** submitted to the CA together with the final BAR or EIAR. The information submitted to the CA will be considered to be incomplete should a signed copy of Part B: section 2 not be submitted. Once approved, this Section forms part of the EMPr for the development and is legally binding.
C		Site specific sensitivities/ attributes	If any specific environmental sensitivities/ attributes are present on the site which require site specific impact management outcomes and impact management actions, not included in the pre-approved generic EMPr, to manage impacts, these specific impact management outcomes and impact management actions must be included in this section. These specific environmental attributes must be referenced spatially and impact management outcomes and impact management actions must be provided. These specific impact management outcomes and impact management actions must be presented in the format of the pre-approved EMPr template (Part B: section 1) This section will not be required should the site contain no specific environmental sensitivities or attributes. However, if Part C is applicable to the site, it **is required** to be submitted together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. Once approved, Part C forms part of the EMPr for the site and is legally binding. This section applies only **to additional** impact management outcomes and impact

Part	Section	Heading	Content
			management actions that are necessary for the avoidance, management and mitigation of impacts and risks associated with the specific development or expansion and which are not already included in Part B: section 1.
Appendix 1			Contains the method statements to be prepared prior to commencement of the activity. The method statements are **not required** to be submitted to the competent authority.

6. Completion of part B: section 1: the pre-approved generic EMPr template

The template is to be completed prior to commencement of the activity, by providing the following information for each environmental impact management action:

- For implementation
  - a 'responsible person',
  - a method for implementation,
  - a timeframe for implementation
- For monitoring
  - a responsible person
  - frequency
  - evidence of compliance.

The completed template must be signed and dated by the holder of the EA prior to commencement of the activity. The method statements prepared and agreed to by the holder of the EA must be appended to the template as Appendix 1. Each method statement must be signed and dated on each page by 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.

7. Amendments of the impact management outcomes and impact management actions

Once the activity has commenced, a holder of an EA may make amendments to the impact management outcomes and impact management actions in the following manner:

- Amendment of the impact management outcomes: in line with the process contemplated in Regulation 37 of the EIA Regulations; and
- Amendment of the impact management actions: in line with the process contemplated in Regulation 36 of the EIA Regulations.

8. Documents to be submitted as part of part B: section 2 site specific information and declaration

Part B: Section 2 has three distinct sub-sections. The first and third sub-sections are in a template format. Sub-section two requires a map to be produced.

Sub-section 1 contains the project name, the applicant's name and contact details, the site information, which includes coordinates of the property or farm in which the proposed substation infrastructure is proposed as well as the 21-digit Surveyor General code of each cadastral land parcel and, where available, the farm name.

Sub-section 2 is to be prepared by an EAP and must contain his/her name and expertise including a curriculum vitae. This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout using the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features and within 50 m from the development footprint.

Sub-section 3 is the declaration that the applicant (s)/proponent (s) or holder of the EA in the case of a change of ownership must complete which confirms that the applicant/EA holder will comply with the pre-approved 'generic EMPr' template in Section 1 and understands that the impact management outcomes and impact management actions are legally binding.

(a) Amendments to Part B: Section 2 – site specific information and declaration

Should the EA be transferred, Part B: Section 2 must be completed by the new applicant/proponent and submitted with the application for an amendment of the EA in terms of regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted as part of such an application for an amendment to an EA will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART A – GENERAL INFORMATION

1. DEFINITIONS

In this EMPr any word or expression to which a meaning has been assigned in the NEMA or EIA Regulations has that meaning, and unless the context requires otherwise –

"clearing" means the clearing and removal of vegetation, whether partially or in whole, including trees and shrubs, as specified;

"construction camp" is the area designated for key construction infrastructure and services, including but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management;

"contractor" - The Contractor has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract, are in line with the Environmental Management Programme and that Method Statements are implemented as described.

"**hazardous substance**" is a substance governed by the Hazardous Substances Act, 1973 (Act No. 15 of 1973) as well as the Hazardous Chemical and Substances Regulations, 1995;

"method statement" means a written submission by the Contractor to the Project Manager in response to this EMPr or a request by the Project Manager and ECO. The method statement must set out the equipment, materials, labour and method(s) the Contractor proposes using to carry out an activity identified by the Project Manager when requesting the Method Statement. This must be done in such detail that the Project Manager and ECO is able to assess whether the Contractor's proposal is in accordance with this specification and/or will produce results in accordance with this specification;

The method statement must cover as a minimum applicable details with regard to:

(i) Construction procedures;
(ii) Plant, materials and equipment to be used;
(iii) Transporting the equipment to and from site;
(iv) How the plant/ material/ equipment will be moved while on site;
(v) How and where the plant/ material/ equipment will be stored;
(vi) The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
(vii) Timing and location of activities;
(viii) Compliance/ non-compliance; and
(ix) Any other information deemed necessary by the Project Manager.

"slope" means the inclination of a surface expressed as one unit of rise or fall for so many horizontal units;

"solid waste" means all solid waste, including construction debris, hazardous waste, excess cement/ concrete, wrapping materials, timber, cans, drums, wire, nails, food and domestic waste (e.g. plastic packets and wrappers);

"spoil" means excavated material which is unsuitable for use as material in the construction works or is material which is surplus to the requirements of the construction works;

"topsoil" means a varying depth (up to 300 mm) of the soil profile irrespective of the fertility, appearance, structure, agricultural potential, fertility and composition of the soil;

"works" means the works to be executed in terms of the Contract

2. ACRONYMS and ABBREVIATIONS

CA	Competent Authority
cEO	Contractors Environmental Officer
dEO	Developer Environmental Officer
DPM	Developer Project Manager
DSS	Developer Site Supervisor
EAR	Environmental Audit Report
ECA	Environmental Conservation Act No. 73 of 1989
ECO	Environmental Control Officer
EA	Environmental Authorisation
EIA	Environmental Impact Assessment
ERAP	Emergency Response Action Plan
EMPr	Environmental Management Programme Report
EAP	Environmental Assessment Practitioner
FPA	Fire Protection Agency
HCS	Hazardous chemical Substance
NEMA	National Environmental Management Act, 1998 (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act ,2004 (Act No. 10 of 2004)
NEMWA	National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)
MSDS	Material Safety Data Sheet
RI&AP's	Registered Interested and affected parties

3. ROLES AND RESPONSIBILITIES FOR ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) IMPLEMENTATION

The effective implementation of this generic EMPr is dependent on established and clear roles, responsibilities and reporting lines within an institutional framework. This section of the EMPr gives guidance to the various environmental roles and reporting lines, however, project specific requirements will ultimately determine the need for the appointment of specific person(s) to undertake specific roles and or responsibilities. As such, it must be noted that in the event that no specific person, for example, an environmental control officer (ECO) is appointed, the holder of the EA remains responsible for ensuring that the duties indicated in this document for action by the ECO are undertaken.

Table 1: *Guide to roles and responsibilities for implementation of an EMPr*

Responsible Person(s)	**Role and Responsibilities**
Developer's Project Manager (DPM)	Role The Project Developer is accountable for ensuring compliance with the EMPr and any conditions of approval from the competent authority (CA). Where required, an environmental control officer (ECO) must be contracted by the Project Developer to objectively monitor the implementation of the EMPr according to relevant environmental legislation, and the conditions of the environmental authorisation (EA). The Project Developer is further responsible for providing and giving mandate to enable the ECO to perform responsibilities, and he must ensure that the ECO is integrated as part of the project team while remaining independent. Responsibilities - Be fully conversant with the conditions of the EA; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Developer and its Contractor(s); - Issuing of site instructions to the Contractor for corrective actions required; - Monitor the implementation of the EMPr throughout the project by means of site inspections and meetings. Overall management of the project and EMPr implementation; and - Ensure that periodic environmental performance audits are undertaken on the project implementation.
Developer Site Supervisor (DSS)	Role The DSS reports directly to the DPM, oversees site works, liaises with the contractor(s) and the ECO. The DSS

Responsible Person(s)	Role and Responsibilities
	is responsible for the day to day implementation of the EMPr and for ensuring the compliance of all contractors with the conditions and requirements stipulated in the EMPr. <u>Responsibilities</u> - Ensure that all contractors identify a contractor's Environmental Officer (cEO); - Must be fully conversant with the conditions of the EA. Oversees site works, liaison with Contractor, DPM and ECO; - Must ensure that all landowners have the relevant contact details of the site staff, ECO and cEO; - Issuing of site instructions to the Contractor for corrective actions required; - Will issue all non-compliances to contractors; and - Ratify the Monthly Environmental Report.
Environmental Control Officer (ECO)	<u>Role</u> The ECO should have appropriate training and experience in the implementation of environmental management specifications. The primary role of the ECO is to act as an independent quality controller and monitoring agent regarding all environmental concerns and associated environmental impacts. In this respect, the ECO is to conduct periodic site inspections, attend regular site meetings, pre-empt problems and suggest mitigation and be available to advise on incidental issues that arise. The ECO is also required to conduct compliance audits, verifying the monitoring reports submitted by the cEO. The ECO provides feedback to the DSS and Project Manager regarding all environmental matters. The Contractor, cEO and dEO are answerable to the Environmental Control Officer for non-compliance with the Performance Specifications as set out in the EA and EMPr. The ECO provides feedback to the DSS and Project Manager, who in turn reports back to the Contractor and potential and Registered Interested &Affected Parties' (RI&AP's), as required. Issues of non-compliance raised by the ECO must be taken up by the Project Manager, and resolved with the Contractor as per the conditions of his contract. Decisions regarding environmental procedures, specifications and requirements which have a cost implication (i.e. those that are deemed to be a variation, not allowed for in the Performance Specification) must be endorsed by the Project Manager. The ECO must also, as specified by the EA, report to the relevant CA as and when required.

Responsible Person(s)	Role and Responsibilities
	Responsibilities The responsibilities of the ECO will include the following: - Be aware of the findings and conclusions of all EA related to the development; - Be familiar with the recommendations and mitigation measures of this EMPr; - Be conversant with relevant environmental legislation, policies and procedures, and ensure compliance with them; - Undertake regular and comprehensive site inspections / audits of the construction site according to the generic EMPr and applicable licenses in order to monitor compliance as required; - Educate the construction team about the management measures contained in the EMPr and environmental licenses; - Compilation and administration of an environmental monitoring plan to ensure that the environmental management measures are implemented and are effective; - Monitoring the performance of the Contractors and ensuring compliance with the EMPr and associated Method Statements; - In consultation with the Developer Site Supervisor order the removal of person(s) and/or equipment which are in contravention of the specifications of the EMPr and/or environmental licenses; - Liaison between the DPM, Contractors, authorities and other lead stakeholders on all environmental concerns; - Compile a regular environmental audit report highlighting any non-compliance issues as well as satisfactory or exceptional compliance with the EMPr; - Validating the regular site inspection reports, which are to be prepared by the contractor Environmental Officer (cEO); - Checking the cEO's record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; - Checking the cEO's public complaints register in which all complaints are recorded, as well as action taken; - Assisting in the resolution of conflicts; - Facilitate training for all personnel on the site – this may range from carrying out the training, to

Responsible Person(s)	Role and Responsibilities
	reviewing the training programmes of the Contractor; - In case of non-compliances, the ECO must first communicate this to the Senior Site Supervisor, who has the power to ensure this matter is addressed. Should no action or insufficient action be taken, the ECO may report this matter to the authorities as non-compliance; - Maintenance, update and review of the EMPr; - Communication of all modifications to the EMPr to the relevant stakeholders.
developer Environmental Officer (dEO)	<u>Role</u> The dEOs will report to the Project Manager and are responsible for implementation of the EMPr, environmental monitoring and reporting, providing environmental input to the Project Manager and Contractor's Manager, liaising with contractors and the landowners as well as a range of environmental coordination responsibilities. <u>Responsibilities</u> - Be fully conversant with the EMPr; - Be familiar with the recommendations and mitigation measures of this EMPr, and implement these measures; - Ensure that all stipulations within the EMPr are communicated and adhered to by the Employees, Contractor(s) ; - Confine the development site to the demarcated area; - Conduct environmental internal audits with regards to EMPr and authorisation compliance (on cEO); - Assist the contractors in addressing environmental challenges on site; - Assist in incident management: - Reporting environmental incidents to developer and ensuring that corrective action is taken, and lessons learnt shared; - Assist the contractor in investigating environmental incidents and compile investigation reports; - Follow-up on pre-warnings, defects, non-conformance reports; - Measure and communicate environmental performance to the Contractor; - Conduct environmental awareness training on site together with ECO and cEO;

Responsible Person(s)	Role and Responsibilities
	- Ensure that the necessary legal permits and / or licenses are in place and up to date; - Acting as Developer's Environmental Representative on site and work together with the ECO and contractor;
Contractor	Role The Contractor appoints the cEO and has overall responsibility for ensuring that all work, activities, and actions linked to the delivery of the contract are in line with the EMPr and that Method Statements are implemented as described. External contractors must ensure compliance with this EMPr while performing the onsite activities as per their contract with the Project Developer. The contractors are required, where specified, to provide Method Statements setting out in detail how the impact management actions contained in the EMPr will be implemented during the development or expansion of substation infrastructure for the transmission and distribution of electricity activities. Responsibilities - project delivery and quality control for the development services as per appointment; - employ a suitably qualified person to monitor and report to the Project Developer's appointed person on the daily activities on-site during the construction period; - ensure that safe, environmentally acceptable working methods and practices are implemented and that equipment is properly operated and maintained, to facilitate proper access and enable any operation to be carried out safely; - attend on site meeting(s) prior to the commencement of activities to confirm the procedure and designated activity zones; - ensure that contractors' staff repair, at their own cost, any environmental damage as a result of a contravention of the specifications contained in EMPr, to the satisfaction of the ECO.
contractor Environmental Officer (cEO)	Role Each Contractor affected by the EMPr should appoint a cEO, who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr). The Contractor's representative can be the site agent; site engineer; a dedicated environmental officer; or an independent consultant. The Contractor must ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that she/he can interact effectively with other site Contractors,

Responsible Person(s)	Role and Responsibilities
	labourers, the Environmental Control Officer and the public. As a minimum the cEO shall meet the following criteria: <u>Responsibilities</u> - Be on site throughout the duration of the project and be dedicated to the project; - Ensure all their staff are aware of the environmental requirements, conditions and constraints with respect to all of their activities on site; - Implementing the environmental conditions, guidelines and requirements as stipulated within the EA, EMPr and Method Statements; - Attend the Environmental Site Meeting; - Undertaking corrective actions where non-compliances are registered within the stipulated timeframes; - Report back formally on the completion of corrective actions; - Assist the ECO in maintaining all the site documentation; - Prepare the site inspection reports and corrective action reports for submission to the ECO; - Assist the ECO with the preparing of the monthly report; and - Where more than one Contractor is undertaking work on site, each company appointed as a Contractor will appoint a cEO representing that company.

4. ENVIRONMENTAL DOCUMENTATION 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 for all substation infrastructure projects as a minimum requirement.

4.1 Document control/Filing system

The holder of the EA is solely responsible for the upkeep and management of the EMPr file. As a minimum, all documentation detailed below will be stored in the EMPr file. A hard copy of all documentation shall be filed, while an electronic copy may be kept where relevant. A duplicate file will be maintained in the office of the DSS (where applicable). This duplicate file must remain current and up-to-date. The filing system must be updated and relevant documents added as required. The EMPr file must be made available at all times on request by the CA or other relevant authorities. The EMPr file will form part of any environmental audits undertaken as prescribed in the EIA Regulations.

4.2 Documentation to be available

At the outset of the project the following preliminary list of documents shall be placed in the filing system and be accessible at all times:

- Full copy of the signed EA from the CA in terms of NEMA, granting approval for the development or expansion;
- Copy of the generic and site specific EMPr as well as any amendments thereof;
- Copy of declaration of implementing generic EMPr and subsequent approval of site specific EMPr and amendments thereof;
- All method statements;
- Completed environmental checklists;
- Minutes and attendance register of environmental site meetings;
- An up-to-date environmental incident log;
- A copy of all instructions or directives issued;
- A copy of all corrective actions signed off. The corrective actions must be filed in such a way that a clear reference is made to the non-compliance record;
- Complaints register.

4.3 Weekly Environmental Checklist

The ECOs are required to complete a Weekly Environmental Checklist, the format of which is to be agreed prior to commencement of the activity. The ECOs are required to sign and date the checklist, retain a copy in the EMPr file and submit a copy of the completed checklist to the DSS on a weekly basis.

The checklists will form the basis for the Monthly Environmental Reports. Copies of all completed checklists will be attached as Annexures to the Environmental Audit Report as required in terms of the EIA Regulations.

4.4 Environmental site meetings

Minutes of the environmental site meetings shall be kept. The minutes must include an attendance register and will be attached to the Monthly Report that is distributed to attendees. Each set of minutes must clearly record "Matters for Attention" that will be reviewed at the next meeting.

4.5 Required Method Statements

The method statement will be done in such detail that the ECOs are enabled to assess whether the contractor's proposal is in accordance with the EMPr.

The method statement must cover applicable details with regard to:

- development procedures;
- materials and equipment to be used;
- getting the equipment to and from site;
- how the equipment/ material will be moved while on site;
- how and where material will be stored;
- the containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur;
- timing and location of activities;
- compliance/ non-compliance with the EMPr; and
- any other information deemed necessary by the ECOs.

Unless indicated otherwise by the Project Manager, the Contractor shall provide the following method statements to the Project Manager no less than 14 days prior to the commencement date of the activity:

- Site establishment – Camps, Lay-down or storage areas, satellite camps, infrastructure;
- Batch plants;
- Workshop or plant servicing;
- Handling, transport and storage of Hazardous Chemical Substance's;
- Vegetation management – Protected, clearing, aliens, felling;
- Access management – Roads, gates, crossings etc.;
- Fire plan;
- Waste management – transport, storage, segregation, classification, disposal (all waste streams);
- Social interaction – complaints management, compensation claims, access to properties etc.;
- Water – use (source, abstraction and disposal), access and all related information, crossings and mitigation;
- Emergency preparedness – Spills, training, other environmental emergencies;
- Dust and noise management methodologies;
- Fauna interaction and risk management – only if the risk was identified – wildlife interaction especially on game farms; and
- Heritage and palaeontology management.

The ECOs shall monitor and ensure that the contractors perform in accordance with these method statements. Completed and agreed method statements between the holder of the EA and the contractor shall be captured in Appendix 1.

4.6 Environmental Incident Log (Diary)

The ECOs are required to maintain an up-to-date and current Environmental Incident Log (environmental diary). The Environmental Incident Log is a means to record all environmental incidents and/or all non-compliance notice would not be issued. An environmental incident is defined as:

- Any deviation from the listed impact management actions (listed in this EMPr) that may be addressed immediately by the ECOs. (For example a contractor's staff member littering or a drip tray that has not been emptied);
- Any environmental impact resulting from an action or activity by a contractor in contravention of the environmental stipulations and guidelines listed in the EMPr which as a single event would have a minor impact but which if cumulative and continuous would have a significant effect (for example no toilet paper available in the ablutions for an afternoon); and
- General environmental information such as road kills or injured wildlife.

The ECOs are to record all environmental incidents in the Environmental Incident Log. All incidents regardless of severity must be reported to the Developer. The Log is to be kept in the EMPr file and at a minimum the following will be recorded for each environmental incident:

- The date and time of the incident;
- Description of the incident;
- The name of the Contractor responsible;
- The incident must be listed as significant or minor;
- If the incident is listed as significant, a non-compliance notice must be issued, and recorded in the log;
- Remedial or corrective action taken to mitigate the incident; and
- Record of repeat minor offences by the same contractor or staff member.

The Environmental Incident Log will be captured in the EAR.

4.7 Non-compliance

A non-compliance notice will be issued to the responsible contractor by the ECOs via the DSS or Project Manager. The non-compliance notice will be issued in writing; a copy filed in the EMPr file and will at a minimum include the following:

- Time and date of the non-compliance;
- Name of the contractor responsible;
- Nature and description of the non-compliance;
- Recommended / required corrective action; and
- Date by which the corrective action to be completed.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the development site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. The ECO 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 CA 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 a deviation from the environmental conditions, impact management outcomes and impact management actions activities, as approved in generic and site specific EMPr as relevant as set out in the EMPr, which deviation has, or may cause, an environmental impact.

4.8 Corrective action records

For each non-compliance notice issued, a documented corrective action must be recorded. On receiving a non-compliance notice from the DSS, the contractor's cEO will ensure that the corrective actions required take place within the stipulated timeframe. On completion of the corrective action the cEO is to issue a Corrective Action Report in writing to the ECOs. If satisfied that the corrective action has been completed, the ECOs are to sign-off on the Corrective Action Report, and attach the report to the non-compliance notice in the EMPr file. A corrective action is considered complete once the report has signed off by the ECOs.

4.9 Photographic record

A digital photographic record will be kept. The photographic record will be used to show before, during and post rehabilitation evidence of the project as well used in cases of damages claims if they arise. Each image must be dated and a brief description note attached.

The Contractor shall:

1. Allow the ECOs access to take photographs of all areas, activities and actions.

The ECOs shall keep an electronic database of photographic records which will include:

1. Pictures of all areas designated as work areas, camp areas, development sites and storage areas taken before these areas are set up;
2. All bunding and fencing;
3. Road conditions and road verges;
4. Condition of all farm fences;
5. Topsoil storage areas;
6. All areas to be cordoned off during construction;
7. Waste management sites;
8. Ablution facilities (inside and out);
9. Any non-conformances deemed to be "significant";
10. All completed corrective actions for non-compliances;
11. All required signage;
12. Photographic recordings of incidents;
13. All areas before, during and post rehabilitation; and
14. Include relevant photographs in the Final Environmental Audit Report.

4.10 Complaints register

The ECOs shall keep a current and up-to-date complaints register. The complaints register is to be a record of all complaints received from communities, stakeholders and individuals. The Complaints Record shall:

1. Record the name and contact details of the complainant;
2. Record the time and date of the complaint;
3. Contain a detailed description of the complaint;
4. Where relevant and appropriate, contain photographic evidence of the complaint or damage (ECOs to take relevant photographs); and
5. Contain a copy of the ECOs written response to each complaint received and keep a record of any further correspondence with the complainant. The ECO's written response will include a description of any corrective action to be taken and must be signed by the Contractor, ECO and affected party. Where a damage claim is issued by the complainant, the ECOs shall respond as described in (**section 4.11**) below.

4.11 Claims for damages

In the event that a Claim for Damages is submitted by a community, landowner or individual, the ECOs shall:

1. Record the full detail of the complaint as described in (**section 4.10**) above;
2. The DPM will evaluate the claim and associated damage and submit the evaluation to the Senior Site Representative for approval;
3. Following consideration by the DPM, the claim is to be resolved and settled immediately, or the reason for not accepting the claim communicated in writing to the claimant. Should the claimant not accept this, the ECO shall, in writing report the incident to the Developer's negotiator and legal department; and
4. A formal record of the response by the ECOs to the claimant as well as the rectification of the method of making payments not amount will be recorded in the EMPr file.

4.12 Interactions with affected parties

Open, transparent and good relations with affected landowners, communities and regional staff are an essential aspect to the successful management and mitigation of environmental impacts.

The ECOs shall:

1. Ensure that all queries, complaints and claims are dealt within an agreed timeframe;
2. Ensure that any or all agreements are documented, signed by all parties and a record of the agreement kept in the EMPr file;
3. Ensure that a complaints telephone numbers are made available to all landowners and affected parties; and
4. Ensure that contact with affected parties is courteous at all times;

4.13 Environmental audits

Internal environmental audits of the activity and implementation of the EMPr must be undertaken. The findings and outcomes included in the EMPr file and submitted to the CA at intervals as indicated in the EA.

The ECOs must prepare a monthly EAR. The report will be tabled as the key point on the agenda of the Environmental Site Meeting. The Report is submitted for acceptance at the meeting and the final report will be circulated to the Project Manager and filed in the EMPr file. At a frequency determined by the EA, the ECOs shall submit the monthly reports to the CA. At a minimum the monthly report is to cover the following:

- Weekly Environmental Checklists;
- Deviations and non-compliances with the checklists;
- Non-compliances issued;
- Completed and reported corrective actions;
- Environmental Monitoring;
- General environmental findings and actions; and
- Minutes of the Bi-monthly Environmental Site Meetings.

4.14 Final environmental audits

On final completion of the rehabilitation and/or requirements of the EA a final EAR is to be prepared and submitted to the CA. The EAR must comply with Appendix 7 of the EIA Regulations.

PART B: SECTION 1: Pre-approved generic EMPr template

5. IMPACT MANAGEMENT OUTCOMES AND IMPACT MANAGEMENT ACTIONS

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

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

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

5.1 Environmental awareness training

Impact management outcome: All onsite staff are aware and understands the individual responsibilities in terms of this EMPr.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All staff must receive environmental awareness training prior to commencement of the activities; – The Contractor must allow for sufficient sessions to train all personnel with no more than 20 personnel attending each course; – Refresher environmental awareness training is available as and when required; – All staff are aware of the conditions and controls linked to the EA and within the EMPr and made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr; – The Contractor must erect and maintain information posters at key locations on site, and the posters must include the following information as a minimum: a) Safety notifications; and b) No littering. – Environmental awareness training must include as a minimum the following: a) Description of significant environmental impacts, actual or potential, related to their work activities; b) Mitigation measures to be implemented when carrying out specific activities; c) Emergency preparedness and response procedures;						

d) Emergency procedures; e) Procedures to be followed when working near or within sensitive areas; f) Wastewater management procedures; g) Water usage and conservation; h) Solid waste management procedures; i) Sanitation procedures; j) Fire prevention; and k) Disease prevention. – A record of all environmental awareness training courses undertaken as part of the EMPr must be available; – Educate workers on the dangers of open and/or unattended fires; – A staff attendance register of all staff to have received environmental awareness training must be available. – Course material must be available and presented in appropriate languages that all staff can understand.						

5.2 Site Establishment development

Impact management outcome: Impacts on the environment are minimised during site establishment and the development footprint are kept to demarcated development area.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– A method statement must be provided by the contractor prior to any onsite activity that includes the layout of the construction camp in the form of a plan showing the location of key infrastructure and services (where applicable), including						

but not limited to offices, overnight vehicle parking areas, stores, the workshop, stockpile and lay down areas, hazardous materials storage areas (including fuels), the batching plant (if one is located at the construction camp), designated access routes, equipment cleaning areas and the placement of staff accommodation, cooking and ablution facilities, waste and wastewater management; – Location of camps must be within approved area to ensure that the site does not impact on sensitive areas identified in the environmental assessment or site walk through; – Sites must be located where possible on previously disturbed areas; – The camp must be fenced in accordance with ***Section 5.5: Fencing and gate installation***; and – The use of existing accommodation for contractor staff, where possible, is encouraged.						

5.3 Access restricted areas

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

– Unauthorised access and development related activity inside access restricted areas is prohibited.						

5.4 Access roads

Impact management outcome: Minimise impact to the environment through the planned and restricted movement of vehicles on site.

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

croplands – Access roads must only be developed on a pre-planned and approved roads.						

5.5 Fencing and Gate installation

Impact management outcome: Minimise impact to the environment and ensure safe and controlled access to the site through the erection of fencing and gates where required.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Use existing gates provided to gain access to all parts of the area authorised for development, where possible; – Existing and new gates to be recorded and documented in accordance with **section *4.9: photographic record***; – All gates must be fitted with locks and be kept locked at all times during the development phase, unless otherwise agreed with the landowner; – At points where the line crosses a fence in which there is no suitable gate within the extent of the line servitude, on the instruction of the DPM, a gate must be installed at the approval of the landowner; – Care must be taken that the gates must be so erected that there is a gap of no more than 100 mm between the bottom of the gate and the ground; – Where gates are installed in jackal proof fencing, a suitable reinforced concrete sill must be provided beneath the gate; – Original tension must be maintained in the fence wires; – All gates installed in electrified fencing must be re-electrified; – All demarcation fencing and barriers must be maintained in						

good working order for the duration of the development activities; – Fencing must be erected around the camp, batching plants, hazardous storage areas, and all designated access restricted areas, where applicable; – Any temporary fencing to restrict the movement of life-stock must only be erected with the permission of the land owner. – All fencing must be developed of high quality material bearing the SABS mark; – The use of razor wire as fencing must be avoided; – Fenced areas with gate access must remain locked after hours, during weekends and on holidays if staff is away from site. Site security will be required at all times; – On completion of the development phase all temporary fences are to be removed; – The contractor must ensure that all fence uprights are appropriately removed, ensuring that no uprights are cut at ground level but rather removed completely.						

5.6 Water Supply Management

Impact management outcome: Undertake responsible water usage.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All abstraction points or bore holes must be registered with the DWS and suitable water meters installed to ensure that the abstracted volumes are measured on a daily basis; – The Contractor must ensure the following: a. The vehicle abstracting water from a river does not						

enter or cross it and does not operate from within the river; b. No damage occurs to the river bed or banks and that the abstraction of water does not entail stream diversion activities; and c. All reasonable measures to limit pollution or sedimentation of the downstream watercourse are implemented. – Ensure water conservation is being practiced by: a. Minimising water use during cleaning of equipment; b. Undertaking regular audits of water systems; and c. Including a discussion on water usage and conservation during environmental awareness training. d. The use of grey water is encouraged.						

5.7 Storm and waste water management

Impact management outcome: Impacts to the environment caused by storm water and wastewater discharges during construction are avoided.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Runoff from the cement/ concrete batching areas must be strictly controlled, and contaminated water must be collected, stored and either treated or disposed of off-site, at a location approved by the project manager; – All spillage of oil onto concrete surfaces must be controlled by the use of an approved absorbent material and the used absorbent material disposed of at an appropriate waste disposal facility; – Natural storm water runoff not contaminated during the						

development and clean water can be discharged directly to watercourses and water bodies, subject to the Project Manager's approval and support by the ECO; – Water that has been contaminated with suspended solids, such as soils and silt, may be released into watercourses or water bodies only once all suspended solids have been removed from the water by settling out these solids in settlement ponds. The release of settled water back into the environment must be subject to the Project Manager's approval and support by the ECO.						

5.8 Solid and hazardous waste management

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

– General waste produced onsite must be disposed of at registered waste disposal sites/ recycling company; – Hazardous waste must be disposed of at a registered waste disposal site; – Certificates of safe disposal for general, hazardous and recycled waste must be maintained.						

5.9 Protection of watercourses and estuaries

Impact management outcome: Pollution and contamination of the watercourse environment and or estuary erosion are prevented.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All watercourses must be protected from direct or indirect spills of pollutants such as solid waste, sewage, cement, oils, fuels, chemicals, aggregate tailings, wash and contaminated water or organic material resulting from the Contractor's activities; – In the event of a spill, prompt action must be taken to clear the polluted or affected areas; – Where possible, no development equipment must traverse any seasonal or permanent wetland – No return flow into the estuaries must be allowed and no disturbance of the Estuarine functional Zone should occur; – Development of permanent watercourse or estuary crossing must only be undertaken where no alternative access to tower position is available; – There must not be any impact on the long term morphological dynamics of watercourses or estuaries; – Existing crossing points must be favored over the creation of						

new crossings (including temporary access) – When working in or near any watercourse or estuary, the following environmental controls and consideration must be taken: a) Water levels during the period of construction; No altering of the bed, banks, course or characteristics of a watercourse b) During the execution of the works, appropriate measures to prevent pollution and contamination of the riparian environment must be implemented e.g. including ensuring that construction equipment is well maintained; c) Where earthwork is being undertaken in close proximity to any watercourse, slopes must be stabilised using suitable materials, i.e. sandbags or geotextile fabric, to prevent sand and rock from entering the channel; and d) Appropriate rehabilitation and re-vegetation measures for the watercourse banks must be implemented timeously. In this regard, the banks should be appropriately and incrementally stabilised as soon as development allows.						

5.10 Vegetation clearing

Impact management outcome: Vegetation clearing is restricted to the authorised development footprint of the proposed infrastructure.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
General: – Indigenous vegetation which does not interfere with the development must be left undisturbed; – Protected or endangered species may occur on or near the						

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

5.11 Protection of fauna

Impact management outcome: Disturbance to fauna is minimised.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– No interference with livestock must occur without the landowner's written consent and with the landowner or a person representing the landowner being present; – The breeding sites of raptors and other wild birds species must be taken into consideration during the planning of the development programme; – Breeding sites must be kept intact and disturbance to breeding birds must be avoided. Special care must be taken where nestlings or fledglings are present; – Special recommendations of the avian specialist must be adhered to at all times to prevent unnecessary disturbance of birds; – No poaching must be tolerated under any circumstances. All animal dens in close proximity to the works areas must be marked as Access restricted areas; – No deliberate or intentional killing of fauna is allowed; – In areas where snakes are abundant, snake deterrents to be deployed on the pylons to prevent snakes climbing up, being electrocuted and causing power outages; and – No Threatened or Protected species (ToPs) and/or protected fauna as listed according NEMBA (Act No. 10 of 2004) and relevant provincial ordinances may be removed and/or relocated without appropriate authorisations/permits.						

5.12 Protection of heritage resources

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

5.13 Safety of the public

Impact management outcome: All precautions are taken to minimise the risk of injury, harm or complaints.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Identify fire hazards, demarcate and restrict public access to these areas as well as notify the local authority of any potential threats e.g. large brush stockpiles, fuels etc.;						

– All unattended open excavations must be adequately fenced or demarcated; – Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding; – Ensure structures vulnerable to high winds are secured; – Maintain an incidents and complaints register in which all incidents or complaints involving the public are logged.						

5.14 Sanitation

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

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Mobile chemical toilets are installed onsite if no other ablution facilities are available; – The use of ablution facilities and or mobile toilets must be used at all times and no indiscriminate use of the veld for the purposes of ablutions must be permitted under any circumstances; – Where mobile chemical toilets are required, the following must be ensured: a) Toilets are located no closer than 100 m to any watercourse or water body; b) Toilets are secured to the ground to prevent them from toppling due to wind or any other cause; c) No spillage occurs when the toilets are cleaned or emptied and the contents are managed in accordance						

with the EMPr; d) Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out; e) Toilets are emptied before long weekends and workers holidays, and must be locked after working hours; f) Toilets are serviced regularly and the ECO must inspect toilets to ensure compliance to health standards; – A copy of the waste disposal certificates must be maintained.						

5.15 Prevention of disease

Impact Management outcome: All necessary precautions linked to the spread of disease are taken.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Undertake environmentally-friendly pest control in the camp area; – Ensure that the workforce is sensitised to the effects of sexually transmitted diseases, especially HIV AIDS; – The Contractor must ensure that information posters on AIDS are displayed in the Contractor Camp area; – Information and education relating to sexually transmitted diseases to be made available to both construction workers and local community, where applicable; – Free condoms must be made available to all staff on site at central points; – Medical support must be made available; – Provide access to Voluntary HIV Testing and Counselling						

Services.						

5.16 Emergency procedures

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

5.17 Hazardous substances

Impact management outcome: Safe storage, handling, use and disposal of hazardous substances.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The use and storage of hazardous substances to be minimised and non-hazardous and non-toxic alternatives						

substituted where possible; – All hazardous substances must be stored in suitable containers as defined in the Method Statement; – Containers must be clearly marked to indicate contents, quantities and safety requirements; – All storage areas must be bunded. The bunded area must be of sufficient capacity to contain a spill / leak from the stored containers; – Bunded areas to be suitably lined with a SABS approved liner; – An Alphabetical Hazardous Chemical Substance (HCS) control sheet must be drawn up and kept up to date on a continuous basis; – All hazardous chemicals that will be used on site must have Material Safety Data Sheets (MSDS); – All employees working with HCS must be trained in the safe use of the substance and according to the safety data sheet; – Employees handling hazardous substances / materials must be aware of the potential impacts and follow appropriate safety measures. Appropriate personal protective equipment must be made available; – The Contractor must ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers; – The tanks/ bowsers must be situated on a smooth impermeable surface (concrete) with a permanent bund. The impermeable lining must extend to the crest of the bund and the volume inside the bund must be 130% of the total capacity of all the storage tanks/ bowsers (110% statutory requirement plus an allowance for rainfall);						

– The floor of the bund must be sloped, draining to an oil separator; – Provision must be made for refueling at the storage area by protecting the soil with an impermeable groundcover. Where dispensing equipment is used, a drip tray must be used to ensure small spills are contained; – All empty externally dirty drums must be stored on a drip tray or within a bunded area; – No unauthorised access into the hazardous substances storage areas must be permitted; – No smoking must be allowed within the vicinity of the hazardous storage areas; – Adequate fire-fighting equipment must be made available at all hazardous storage areas; – Where refueling away from the dedicated refueling station is required, a mobile refueling unit must be used. Appropriate ground protection such as drip trays must be used; – An appropriately sized spill kit kept onsite relevant to the scale of the activity/s involving the use of hazardous substance must be available at all times; – The responsible operator must have the required training to make use of the spill kit in emergency situations; – An appropriate number of spill kits must be available and must be located in all areas where activities are being undertaken; – In the event of a spill, contaminated soil must be collected in containers and stored in a central location and disposed of according to the National Environmental Management: Waste Act 59 of 2008. Refer to ***Section 5.7*** for procedures concerning ***storm and waste water management*** and ***5.8*** for ***solid and hazardous waste management.***						

5.18 Workshop, equipment maintenance and storage

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

5.19 Batching plants

Impact management outcome: Minimise spillages and contamination of soil, surface water and groundwater.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Concrete mixing must be carried out on an impermeable surface; – Batching plants areas must be fitted with a containment facility for the collection of cement laden water. – Dirty water from the batching plant must be contained to prevent soil and groundwater contamination – Bagged cement must be stored in an appropriate facility and at least 10 m away from any water courses, gullies and drains; – A washout facility must be provided for washing of concrete associated equipment. Water used for washing must be restricted; – Hardened concrete from the washout facility or concrete mixer can either be reused or disposed of at an appropriate licenced disposal facility; – Empty cement bags must be secured with adequate binding material if these will be temporarily stored on site; – Sand and aggregates containing cement must be kept damp to prevent the generation of dust (Refer to ***Section 5.20: Dust emissions***) – Any excess sand, stone and cement must be removed or reused from site on completion of construction period and disposed at a registered disposal facility; – Temporary fencing must be erected around batching plants in accordance with Section ***5.5: Fencing and gate***						

installation.						

5.20 Dust emissions

Impact management outcome: Dust prevention measures are applied to minimise the generation of dust.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Take all reasonable measures to minimise the generation of dust as a result of project development activities to the satisfaction of the ECO; – Removal of vegetation must be avoided until such time as soil stripping is required and similarly exposed surfaces must be re- vegetated or stabilised as soon as is practically possible; – Excavation, handling and transport of erodible materials must be avoided under high wind conditions or when a visible dust plume is present; – During high wind conditions, the ECO must evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working will cease altogether until the wind speed drops to an acceptable level; – Where possible, soil stockpiles must be located in sheltered areas where they are not exposed to the erosive effects of the wind; – Where erosion of stockpiles becomes a problem, erosion control measures must be implemented at the discretion of the ECO; – Vehicle speeds must not exceed 40 km/h along dust roads						

or 20 km/h when traversing unconsolidated and non-vegetated areas; – Straw stabilisation must be applied at a rate of one bale/10 m² and harrowed into the top 100 mm of top material, for all completed earthworks; – For significant areas of excavation or exposed ground, dust suppression measures must be used to minimise the spread of dust.						

5.21 Blasting

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

5.22 Noise

Impact Management outcome: Prevent unnecessary noise to the environment by ensuring that noise from development activity is mitigated.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– The Contractor must keep noise level within acceptable limits, Restrict the use of sound amplification equipment for						

communication and emergency only; – All vehicles and machinery must be fitted with appropriate silencing technology and must be properly maintained; – Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible or applicable, provide transport to and from the site on a daily basis for construction workers; – Develop a Code of Conduct for the construction phase in terms of behaviour of construction staff. Operating hours as determined by the environmental authorisation are adhered to during the development phase. Where not defined, it must be ensured that development activities must still meet the impact management outcome related to noise management.						

5.23 Fire prevention

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

– Two way swop of contact details between ECO and FPA.						

5.24 Stockpiling and stockpile areas

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

5.25 Civil works

Impact management outcome: Impact to the environment minimised during civil works to create the substation terrace.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible	Method of	Timeframe for	Responsible	Frequency	Evidence of

	person	implementation	implementation	person		compliance
– Where terracing is required, topsoil must be collected and retained for the purpose of re-use later to rehabilitate disturbed areas not covered by yard stone; – Areas to be rehabilitated include terrace embankments and areas outside the high voltage yards; – Where required, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – These areas can be stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Rehabilitation of the disturbed areas must be managed in accordance with ***Section 5.35: Landscaping and rehabilitation***; – All excess spoil generated during terracing activities must be disposed of in an appropriate manner and at a recognised landfill site; and – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes.						

5.26 Excavation of foundation, cable trenching and drainage systems

Impact management outcome: No environmental degradation occurs as a result of excavation of foundation, cable trenching and drainage systems.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All excess spoil generated during foundation excavation must be disposed of in an appropriate manner and at a						

licensed landfill site, if not used for backfilling purposes; – Spoil can however be used for landscaping purposes and must be covered with a layer of 150 mm topsoil for rehabilitation purposes; – Management of equipment for excavation purposes must be undertaken in accordance with ***Section 5.18: Workshop, equipment maintenance and storage***; and – Hazardous substances spills from equipment must be managed in accordance with ***Section 5.17: Hazardous substances***.						

5.27 Installation of foundations, cable trenching and drainage systems

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

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

Impact management outcome: No environmental degradation occurs as a result of installation of equipment.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

– Management of dust must be conducted in accordance with Section ***5. 20: Dust emissions***; – Management of equipment used for installation must be conducted in accordance with Section ***5.18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills must be conducted in accordance with Section ***5.17: Hazardous substances***; and – Residual solid waste must be recycled or disposed of in accordance with ***Section 5.8: Solid waste and hazardous management***.						

5.29 Steelwork Assembly and Erection

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

5.30 Cabling and Stringing

Impact management outcome: No environmental degradation occurs as a result of stringing.		
Impact Management Actions	**Implementation**	**Monitoring**

	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Residual solid waste (off cuts etc.) shall be recycled or disposed of in accordance with **Section 6.8: *Solid waste and hazardous Management***; – Management of equipment used for installation shall be conducted in accordance with **Section *5.18: Workshop, equipment maintenance and storage***; – Management hazardous substances and any associated spills shall be conducted in accordance with ***Section 5.17: Hazardous substances***.						

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

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

5.32 Socio-economic

Impact management outcome: enhanced socio-economic development.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance

– Develop and implement communication strategies to facilitate public participation; – Develop and implement a collaborative and constructive approach to conflict resolution as part of the external stakeholder engagement process; – Sustain continuous communication and liaison with neighboring owners and residents – Create work and training opportunities for local stakeholders; and – Where feasible, no workers, with the exception of security personnel, must be permitted to stay over-night on the site. This would reduce the risk to local farmers.						

5.33 Temporary closure of site

Impact management outcome: Minimise the risk of environmental impact during periods of site closure greater than five days.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– Bunds must be emptied (where applicable) and need to be undertaken in accordance with the impact management actions included in ***sections 5.17: Hazardous substances and 5.18: Workshop, equipment maintenance and storage***; – Hazardous storage areas must be well ventilated; – Fire extinguishers must be serviced and accessible. Service records to be filed and audited at last service; – Emergency and contact details displayed must be displayed; – Security personnel must be briefed and have the facilities to contact or be contacted by relevant management and						

emergency personnel; – Night hazards such as reflectors, lighting, traffic signage etc. must have been checked; – Fire hazards identified and the local authority must have been notified of any potential threats e.g. large brush stockpiles, fuels etc.; – Structures vulnerable to high winds must be secured; – Wind and dust mitigation must be implemented; – Cement and materials stores must have been secured; – Toilets must have been emptied and secured; – Refuse bins must have been emptied and secured; – Drip trays must have been emptied and secured.						

5.34 Dismantling of old equipment

Impact management outcome: Impact to the environment to be minimised during the dismantling, storage and disposal of old equipment commissioning.

Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All old equipment removed during the project must be stored in such a way as to prevent pollution of the environment; – Oil containing equipment must be stored to prevent leaking or be stored on drip trays; – All scrap steel must be stacked neatly and any disused and broken insulators must be stored in containers; – Once material has been scrapped and the contract has been placed for removal, the disposal Contractor must ensure that any equipment containing pollution causing substances is dismantled and transported in such a way as						

to prevent spillage and pollution of the environment; – The Contractor must also be equipped to contain and clean up any pollution causing spills; and – Disposal of unusable material must be at a licensed waste disposal site.						

5.35 Landscaping and rehabilitation

Impact management outcome: Areas disturbed during the development phase are returned to a state that approximates the original condition.						
Impact Management Actions	**Implementation**			**Monitoring**		
	Responsible person	Method of implementation	Timeframe for implementation	Responsible person	Frequency	Evidence of compliance
– All areas disturbed by construction activities must be subject to landscaping and rehabilitation; All spoil and waste must be disposed of to a registered waste site; – All slopes must be assessed for contouring, and to contour only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983 – All slopes must be assessed for terracing, and to terrace only when the need is identified in accordance with the Conservation of Agricultural Resources Act, No 43 of 1983; – Berms that have been created must have a slope of 1:4 and be replanted with indigenous species and grasses that approximates the original condition; – Where new access roads have crossed cultivated farmlands, that lands must be rehabilitated by ripping which must be agreed to by the holder of the EA and the landowners; – Rehabilitation of access roads outside of farmland; – Indigenous species must be used for with species and/grasses to where it compliments or approximates the						

original condition; – Stockpiled topsoil must be used for rehabilitation (refer to ***Section 5.24: Stockpiling and stockpiled areas***); – Stockpiled topsoil must be evenly spread so as to facilitate seeding and minimise loss of soil due to erosion; – Before placing topsoil, all visible weeds from the placement area and from the topsoil must be removed; – Subsoil must be ripped before topsoil is placed; – The rehabilitation must be timed so that rehabilitation can take place at the optimal time for vegetation establishment; – Where impacted through construction related activity, all sloped areas must be stabilised to ensure proper rehabilitation is effected and erosion is controlled; – Sloped areas stabilised using design structures or vegetation as specified in the design to prevent erosion of embankments. The contract design specifications must be adhered to and implemented strictly; – Spoil can be used for backfilling or landscaping as long as it is covered by a minimum of 150 mm of topsoil. – Where required, re-vegetation including hydro-seeding can be enhanced using a vegetation seed mixture as described below. A mixture of seed can be used provided the mixture is carefully selected to ensure the following: a) Annual and perennial plants are chosen; b) Pioneer species are included; c) Species chosen must be indigenous to the area with the seeds used coming from the area; d) Root systems must have a binding effect on the soil; e) The final product must not cause an ecological imbalance in the area						

6 ACCESS TO THE GENERIC EMPr

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

PART B: SECTION 2

7 SITE SPECIFIC INFORMATION AND DECLARATION

7.1 Sub-section 1: contact details and description of the project

7.1.1 Details of the applicant:

Karreebosch Wind Farm (RF) (Pty) Ltd is the project proponent (Applicant) with regards to the application for the construction and operation of the Karreebosch 33/132kV Substation.

PROPONENT: Karreebosch Wind Farm (RF) (Pty) Ltd

Contact Person:	Dr Kilian Hagemann
Postal Address	125 Buitengracht Street, 5th Floor, Cape Town
Telephone:	+27 21 300 01613
Email:	karreebosch@g7energies.com

Refer to Section 1.2 of the EMPr

7.1.2 Details and expertise of the EAP:

WSP was appointed in the role of Independent EAP to undertake the BA processes for the proposed construction of the powerline. The CV of the EAP is available in Appendix A. The EAP declaration of interest and undertaking is included in Appendix B.

EAP **WSP GROUP AFRICA (PTY) LTD**

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

EAP	**WSP GROUP AFRICA (PTY) LTD**
Email:	Ashlea.Strong@wsp.com

Refer to Section 1.3 of the EMPr

7.1.3 Project name:

Proposed Bon Espirange to Komsberg 132kV Overhead Powerline

7.1.4 Description of the project:

Refer to Section 3 of the EMPr

Karreebosch Wind Farm (RF) (Pty) Ltd propose to construct a 132kV twin tern double circuit overhead powerline (OHPL), an onsite 33/132kV substation and associated road infrastructure(here after referred to as the Project) to evacuate power for the authorised Karreebosch WEF (Ref: 14/12/16/3/3/2/807/AM3) to the existing Komsberg substation via the existing Bon Espirange substation.

The proposed OHPL is situated near Matjiesfontein in the Laingsburg Local Municipality within the Central Karoo District Municipality of the Western Cape Province as well as near Sutherland in the Karoo Hoogland Local Municipality in the Namakwa District Municipality of the Northern Cape, South Africa

The entire extent of the proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located within one (1) of the Strategic Transmission Corridors, namely the Central Corridor, as defined in and in terms of the procedures laid out in Government Notice (GN) No. 113. The proposed OHPL and substation project will therefore be subject to a Basic Assessment (BA) Process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA process is the national Department of Forestry, Fisheries and Environment (DFFE).

7.1.5 Project location:

Refer to Section 3.1 of the EMPr

The proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located 35km north of Matjiesfontein, and extends across two provinces, namely the Northern and Western Cape Provinces. The proposed Karreebosch OHPL will extend from the proposed Karreebosch onsite 33/132kV substation, which is situated in Ward 3 of the Karoo Hoogland Local Municipality in the Namakwa District Municipality in the Northern Cape into Ward 2 of the Laingsburg Local

Municipality in the Central Karoo District Municipality in the Western Cape Province, where it will connect to the existing 400kV Komsberg substation via the existing Bon Espirange substation.

The proposed Karreebosch OHPL will evacuate power from the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3), located in the Northern Cape Province and will connect to the existing Komsberg substation.

The centre point of the OHPL is located at 32°53'57.00"S 20°30'45.20"E. Table 4-1 below provides the co-ordinates of existing and proposed substations.

Table 4-1: Co-ordinates of substations along the OHPL route

POINT	CO-ORDINATES	
Proposed Karreebosch WEF Proposed Substation Option 1	32°51'39.93"S	20°28'46.28"E
Karreebosch WEF Substation Option 2	32°48'41.87"S	20°30'24.71"E
Existing Bon Espirange substation	32°55'11.28"S	20°32'3.64"E
Existing Komsberg Substation	32°56'0.70"S	20°35'42.82"E

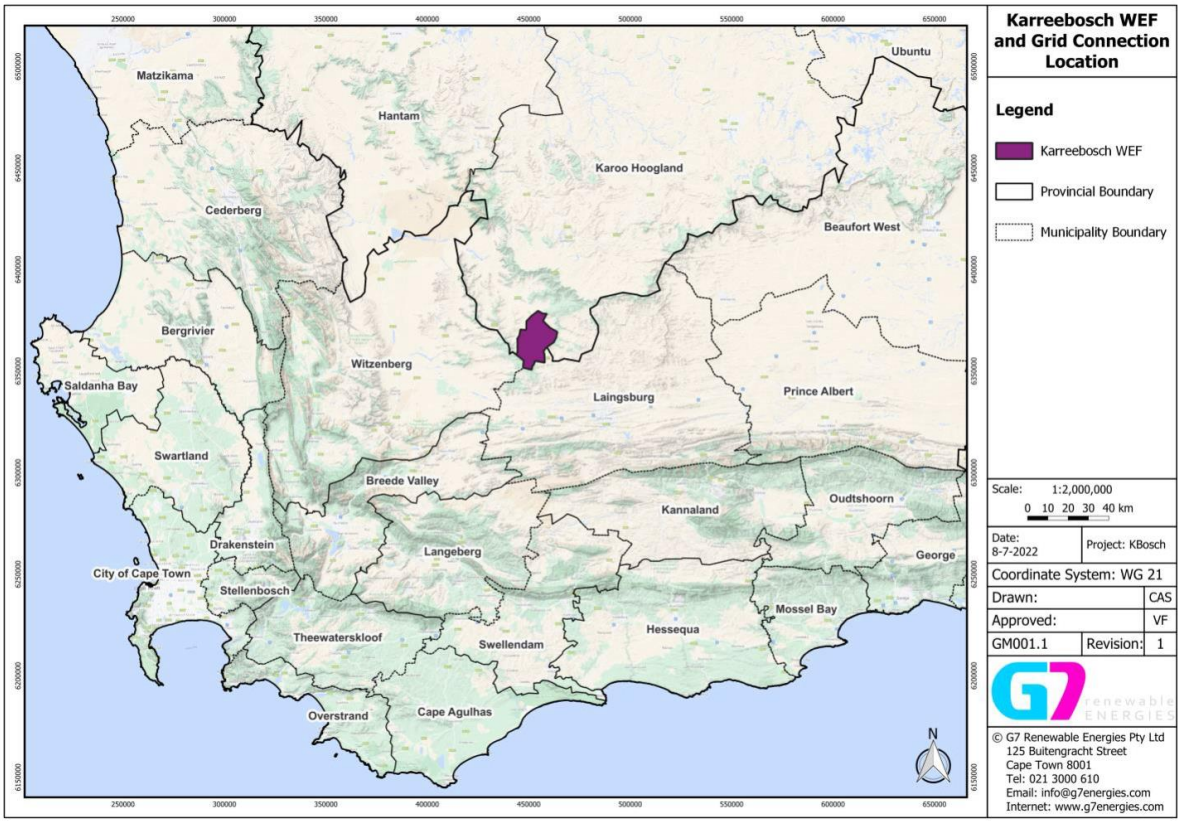


Figure 0-1: Locality of the Proposed Karreebosch 33/132kV substation

Figure 0-2: The proposed substation alternatives in relation to affected land portions

7.2 Sub-section 2: Development footprint site map

This sub-section must include a map of the site sensitivity overlaid with the preliminary infrastructure layout. The sensitivity map must be prepared from the national web based environmental screening tool, when available for compulsory use at: https://screening.environment.gov.za/screeningtool. The sensitivity map shall identify the nature of each sensitive feature e.g. threatened plant species, archaeological site, etc. Sensitivity maps shall identify features both within the planned working area and any known sensitive features within 50 m from the development footprint.

Refer to Section 3.4 of the EMPr

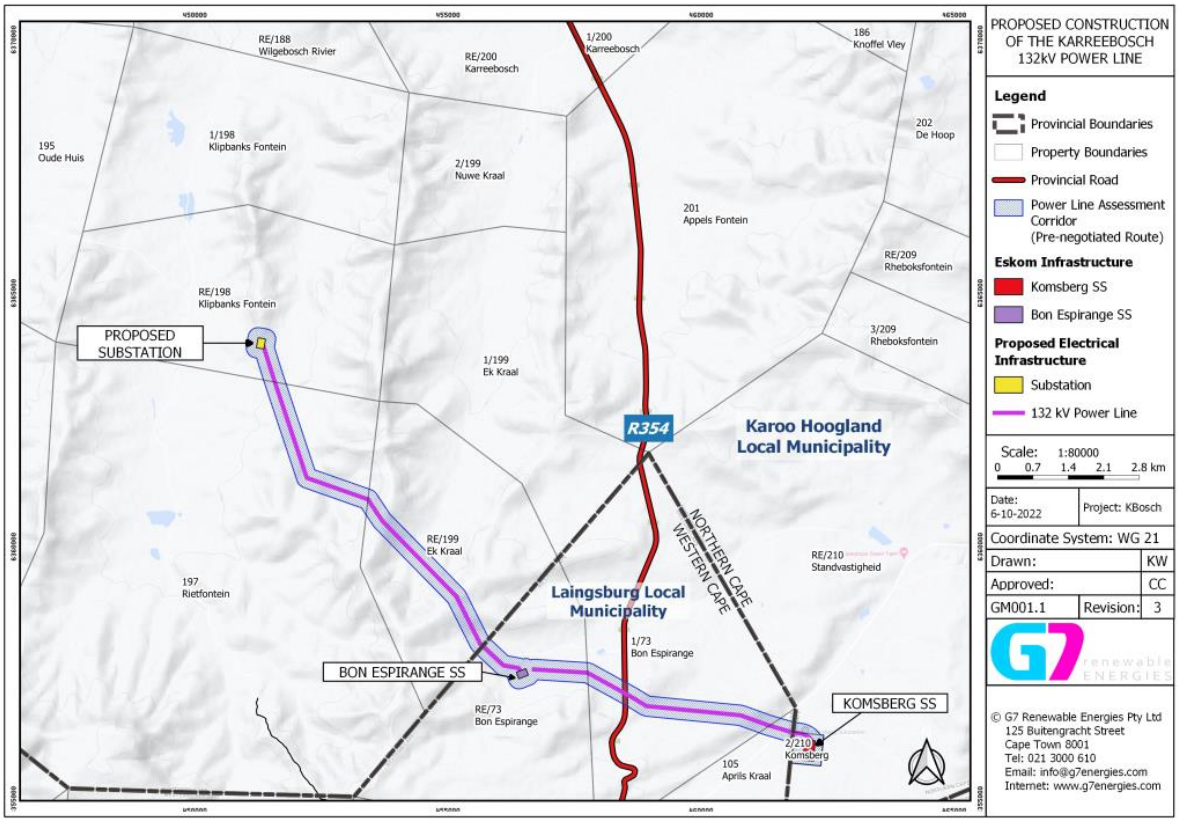


Figure 0-3: Location of the Proposed Karreebosch 33/132kV substation

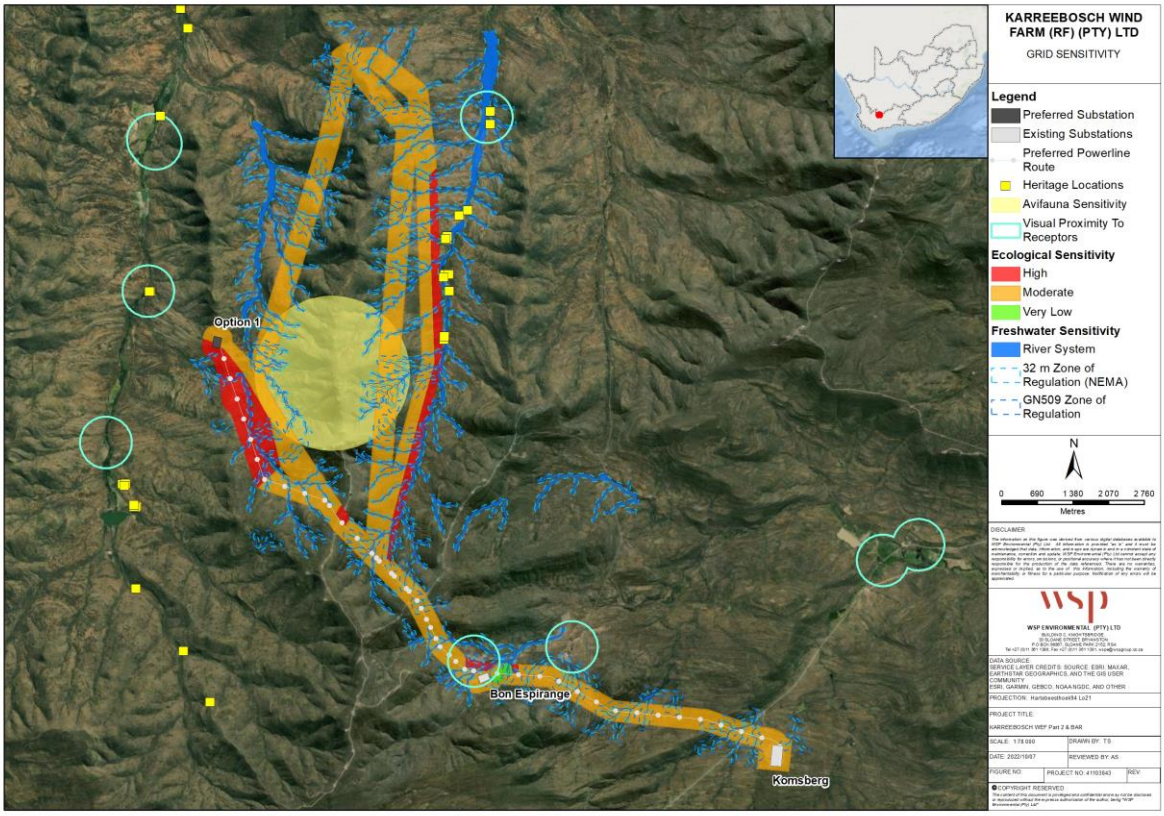


Figure 0-4: Combined Sensitivity Map for the Karreebosch 33/132kV substation

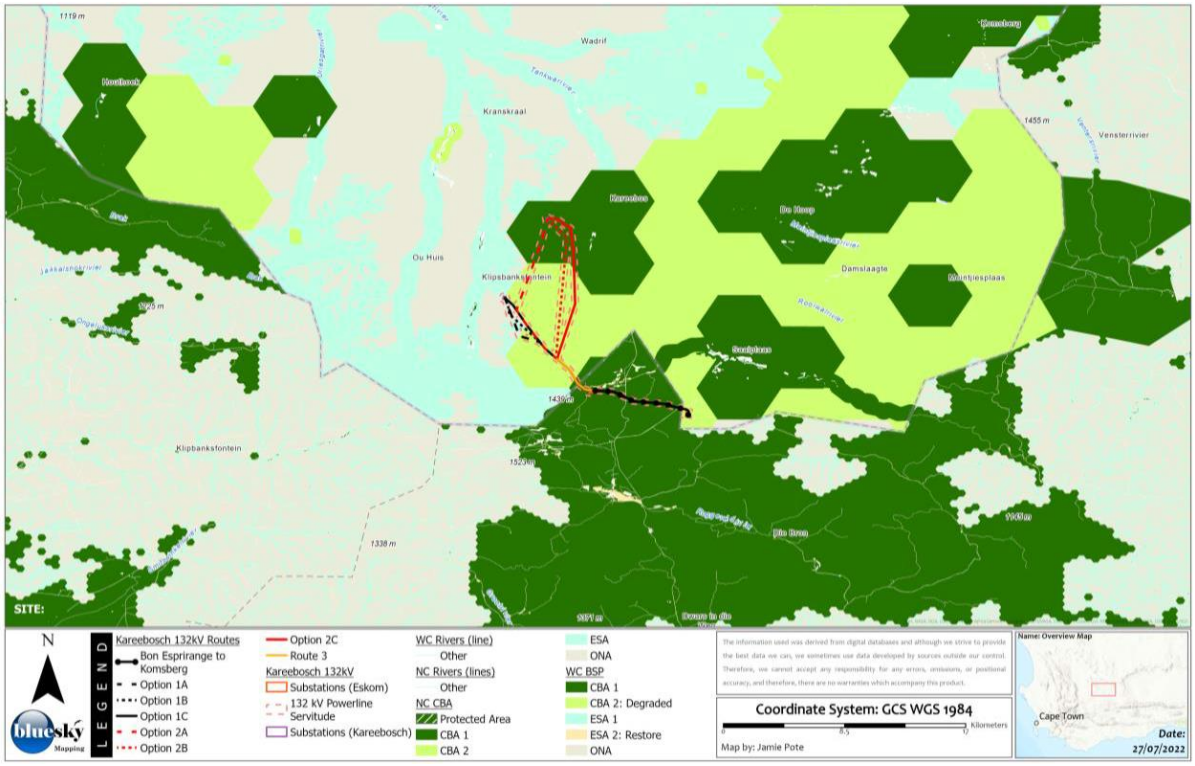


Figure 0-5: Northern Cape and Western Cape Critical Biodiversity Areas

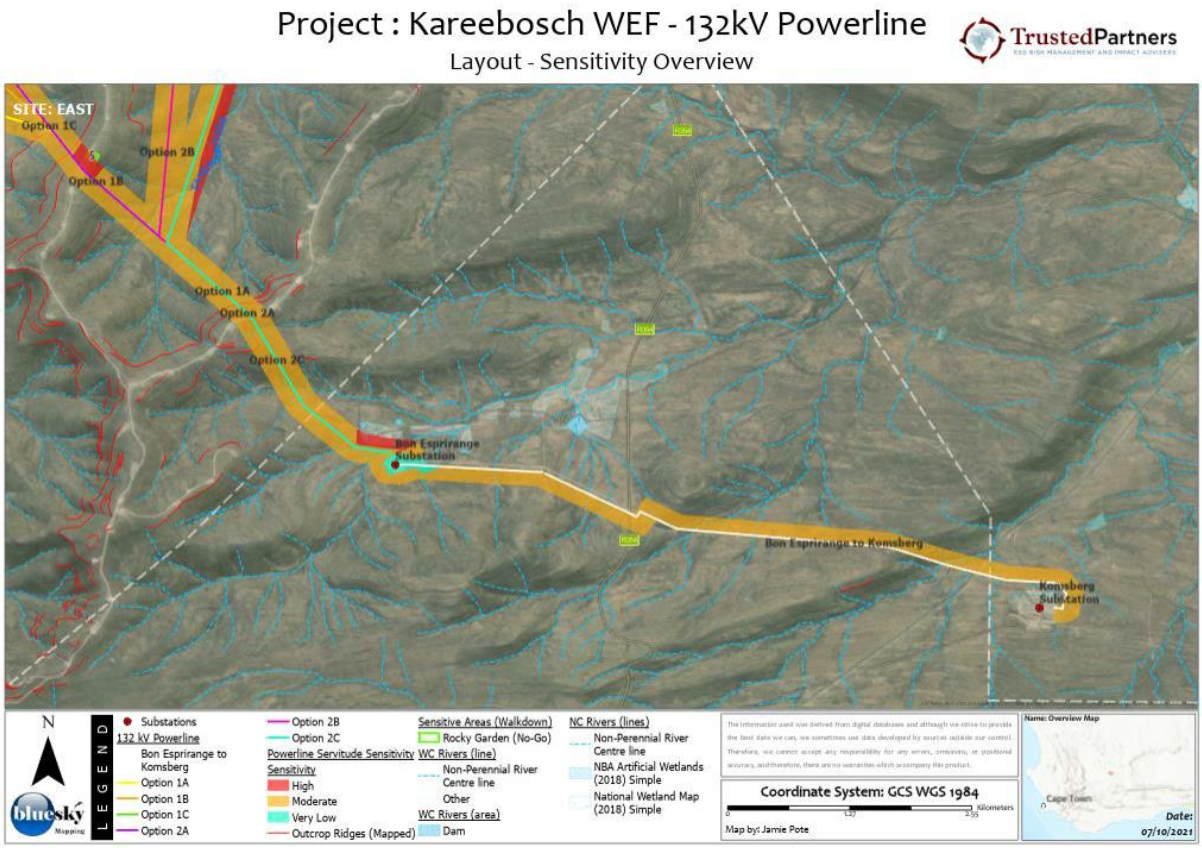


Figure 0-6: Overall Species Sensitivity (East)

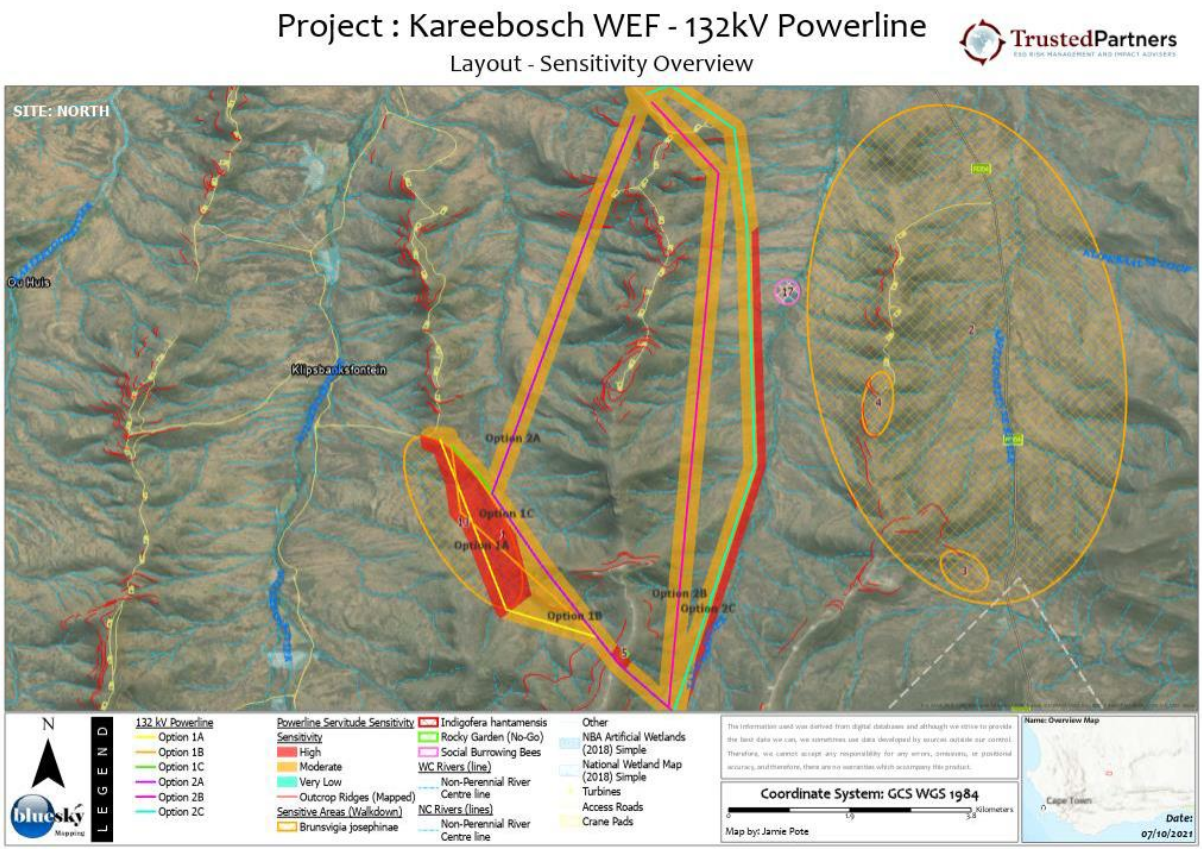


Figure 0-7: Overall Species Sensitivity (North)

Figure 0-8: The conceptual presentation of the zones of regulation relation to the delineated watercourses that form part of the Tankwa and Wilgebos River system within the northern portion of the investigation area. (Take note due to the scale of the map: Substation Option 2 is located approximately 20m from the delineated extent of an episodic drainage line)

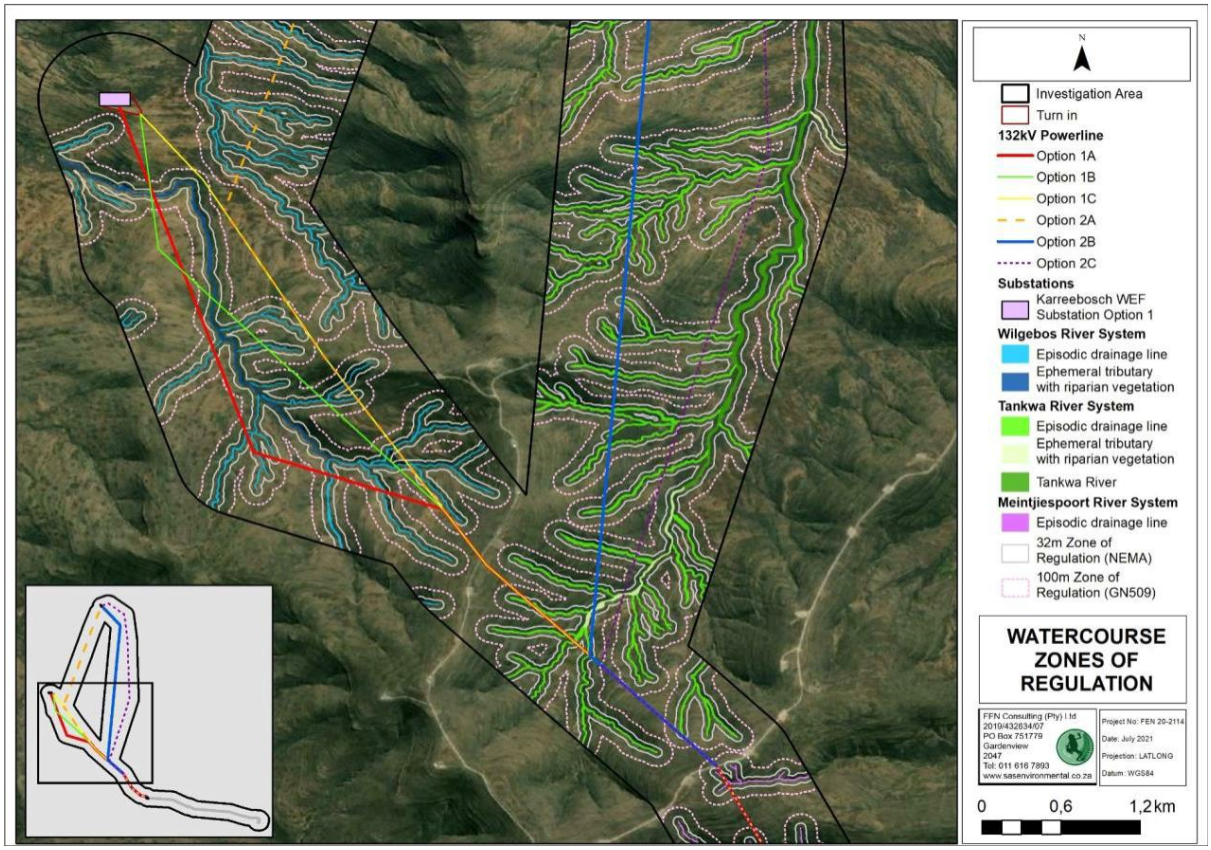


Figure 0-9: The conceptual presentation of the zones of regulation in relation to the delineated watercourses that form part of the Tankwa and Wilgebos River system within the central portion of the investigation area.

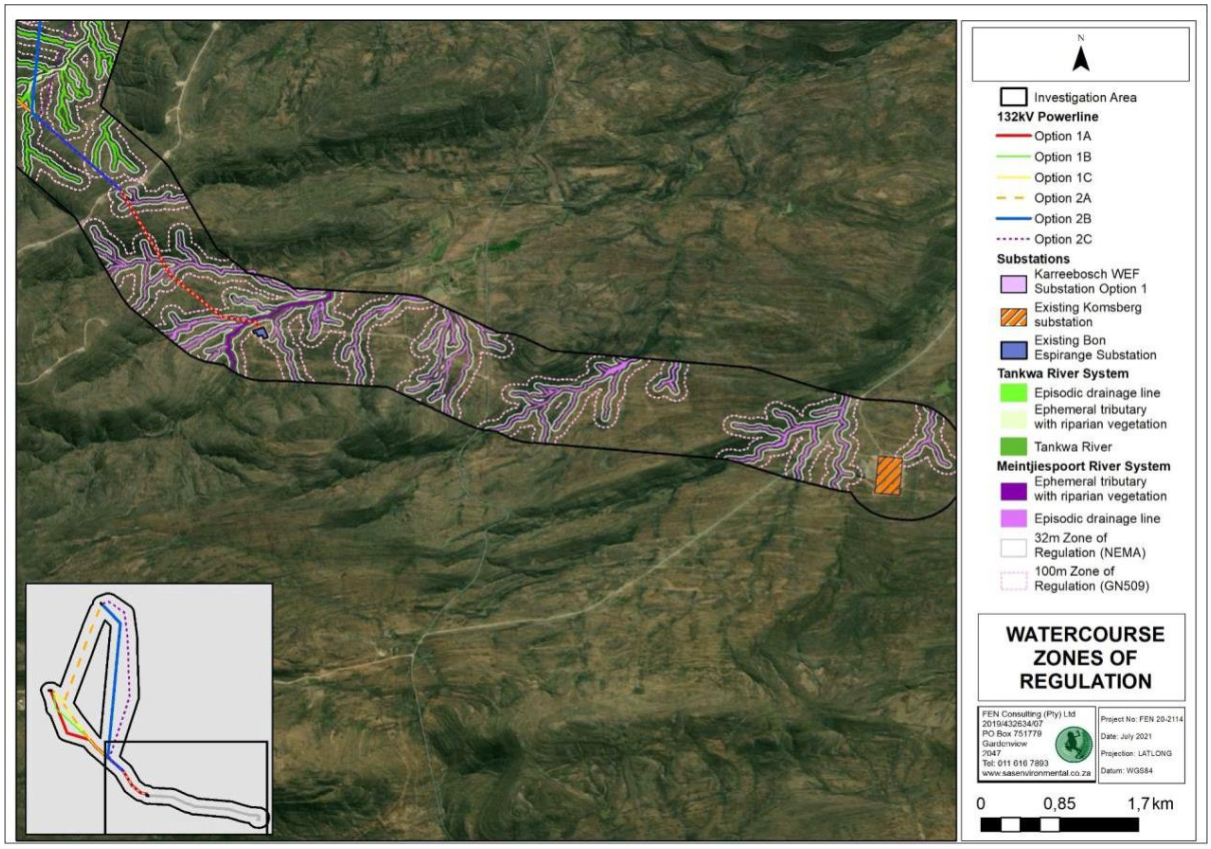


Figure 0-10: The conceptual presentation of the zones of regulation in relation to the delineated watercourses that form part of the Wilgebos and Meintjiesplaas River system within the southern portion of the investigation area.

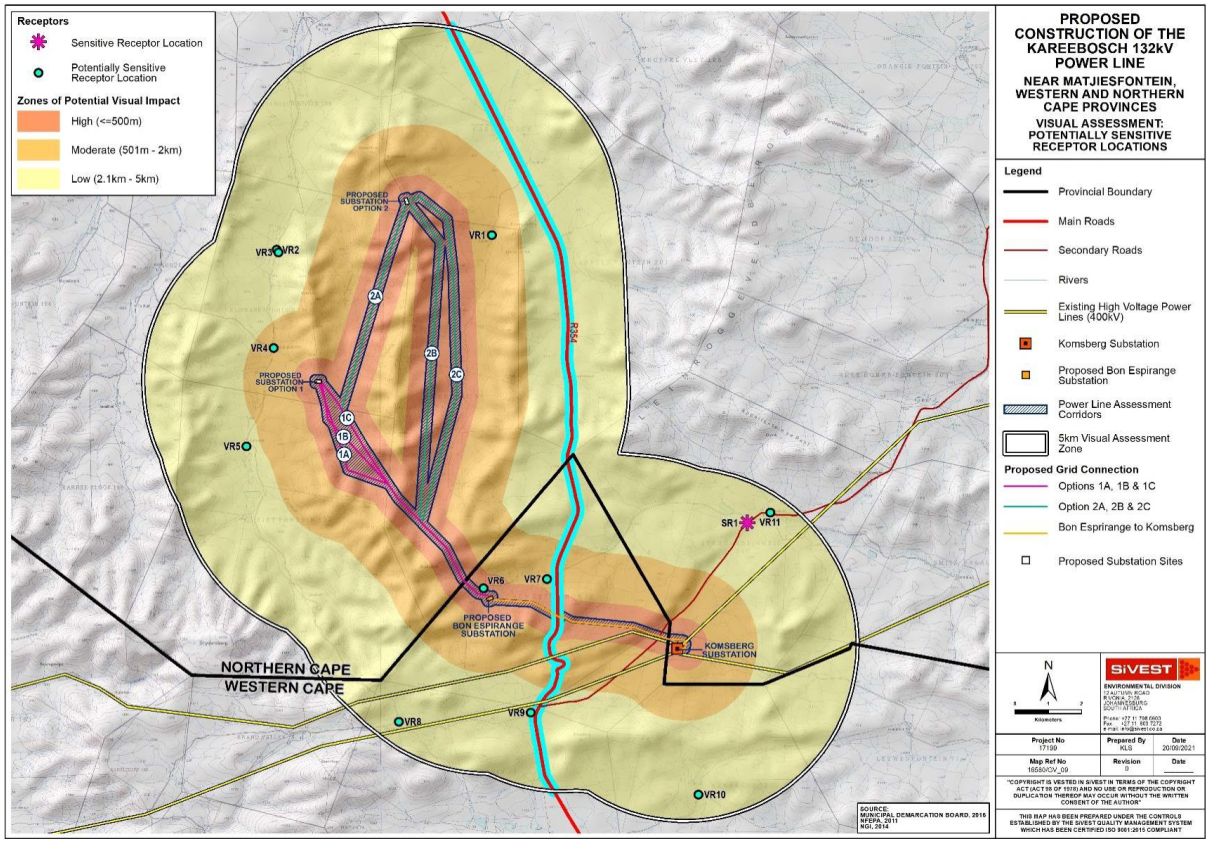


Figure 0-11: Potentially sensitive receptor locations within 5kms of the proposed Kareebosch substation

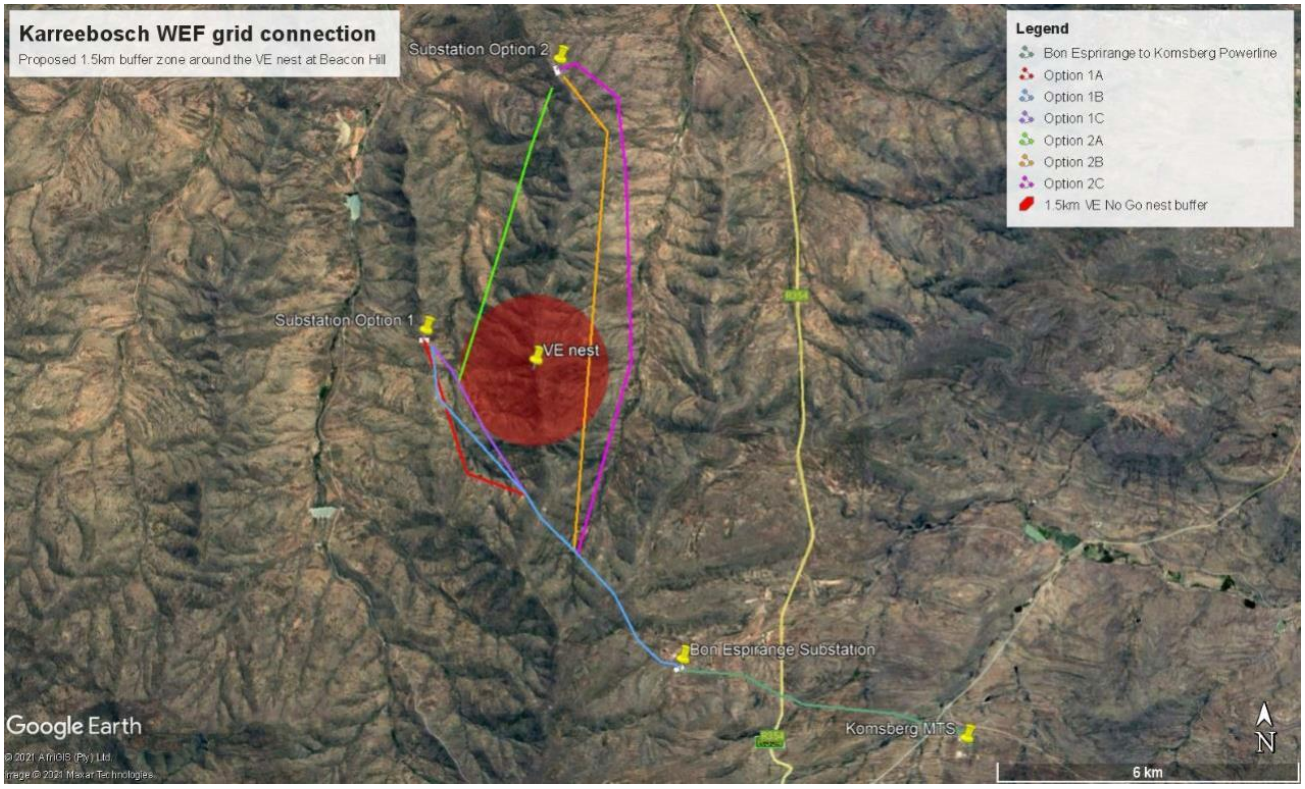
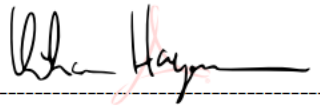


Figure 0-12: A 1.5km No Go buffer should be implemented around the Verreaux's Eagle nest at 32°51'59.27"S 20°30'12.02"E (Beacon Hill).

7.3 Sub-section 3: Declaration

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



Signature Proponent/applicant/ holder of EA

25 July 2022

Date:

7.4 Sub-section 4: amendments to site specific information (Part B; section 2)

Should the EA be transferred to a new holder, Part B: Section 2 must be completed by the new holder and submitted with the application for an amendment of the EA in terms of Regulations 29 or 31 of the EIA Regulations, whichever applies. The information submitted for an amendment to an environmental authorisation will be considered to be incomplete should a signed copy of Part B: Section 2 not be submitted. Once approved, Part B: Section 2 forms part of the EMPr for the development and the EMPr becomes legally binding to the new EA holder.

PART C

8 SITE SPECIFIC ENVIRONMENTAL ATTRIBUTES

If any specific environmental sensitivities/attributes are present on the site which require more specific impact management outcomes and actions, not included in the pre-approved generic EMPr template, to manage impacts, those impact management outcomes and impact management actions must be included in this section. These specific management controls must be referenced spatially, and must include impact management outcomes and impact management actions. The management controls including impact management outcomes and impact management actions must be presented in the format of the pre-approved generic EMPr template. This applies only to additional impact management outcomes and impact management actions that are necessary.

If Part C is applicable to the development as authorised in the EA, it is required to be submitted to the CA together with the BAR or EIAR, for consideration of, and decision on, the application for EA. The information in this section must be prepared by an EAP and the name and expertise of the EAP, including the curriculum vitae are to be included. Once approved, Part C forms part of the EMPr for the site and is legally binding.

This section will **not be required** should the site contain no specific environmental sensitivities or attributes.

NOT REQUIRED

No Environmental Sensitivities Identified within the Substation Site Footprint.

Please refer to the Site Specific EMPr for all site specific mitigation measures.

APPENDIX 1: METHOD STATEMENTS

To be prepared by the contractor prior to commencement of the activity. The method statements are **not required** to be submitted to the CA.

APPENDIX

E TRAFFIC MANAGEMENT PLAN

JG AFRIKA
EXPERIENCE QUALITY INTEGRITY

KARREEBOSCH 132kV POWERLINE AND SUBSTATION TRANSPORT MANAGEMENT PLAN

August 2022
REVISION 5

Prepared by:

JG AFRIKA (PTY) LTD

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VERIFICATION PAGE	Qual-frm-026
	Rev 14

TITLE: Karreebosch 132kV Powerline and substation -Traffic Management Plan		
JGA REF. NO. 5611_01	**DATE:** 15/08/2022	**REPORT STATUS** Issue 06

CARRIED OUT BY:	**COMMISSIONED BY:**
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AUTHOR A Ramawa	**CLIENT CONTACT PERSON** A Strong

SYNOPSIS

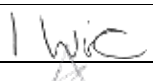
Preparation of a Traffic Management Plan for the proposed Karreebosch 132kV Powerline to be established for the Karreebosch Wind Energy Facility. The site is located approximately 35 km north of Matjiesfontein and extends across two provinces, namely the Northern and Western Cape Provinces.

KEY WORDS:

Wind Energy Facility, WEF, Transport Management Plan, TMP

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.

Verification	Capacity	Name	Signature	Date
By Author	Engineer	A Ramawa		15/08/2022
Checked by:	Consultant	I Wink		15/08/2022
Authorised by:	Director	D Petersen		15/08/2022

Filename:	https://jgafrika.sharepoint.com/sites/Job5611-team-100-WIP-Internal-Eng/Shared Documents/100-WIP-Internal-Eng/104-Studies/Karreebosch 132kV powerline TMP_15-08-2022.docx

Report template version: 2017-10-30

KARREEBOSCH 132kV POWERLINE
TRANSPORT MANAGEMENT PLAN

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TABLES

FIGURES

1 INTRODUCTION & SCOPE OF WORK

1.1 Introduction

WSP appointed JG Afrika Pty (Ltd) to provide a Traffic Management Plan (TMP) for developing the 132kV overhead power line, 33/132 KV substation and associated infrastructure. The powerline is required to evacuate the power generated by the proposed Karreebosch Wind Energy Facility (WEF).

1.1.1 Permitting process

The entire extent of the proposed 132kV Karreebosch Overhead Powerline (OHPL), 33/132kV Substation and associated infrastructure is located within one (1) of the Strategic Transmission Corridors, namely the Central Corridor, as defined in and in terms of the procedures laid out in Government Notice (GN) No. 113. The proposed OHPL project will therefore be subject to a Basic Assessment (BA) Process in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) (as amended) and Appendix 1 of the EIA Regulations, 2014 promulgated in Government Gazette 40772 and GN R326, R327, R325 and R324 on 7 April 2017. The competent authority for this BA process is the national Department of Forestry, Fisheries and Environment (DFFE).

1.1.2 Project Location

The proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is located 35km north of Matjiesfontein and extends across two provinces, namely the Northern and Western Cape Provinces. The proposed Karreebosch OHPL will extend from the proposed Karreebosch onsite 33/132kV substation, which is situated in Ward 3 of the Karoo Hoogland Local Municipality in the Namakwa District Municipality in the Northern Cape into Ward 2 of the Laingsburg Local Municipality in the Central Karoo District Municipality in the Western Cape Province, where it will connect to the existing 400kV Komsberg substation via the existing Bon Espirange substation.

The proposed Karreebosch OHPL will evacuate power from the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3, which is currently undergoing a Part 2 EA amendment, final layout and EMPr approval process), located in the Northern Cape Province, and will connect to the existing Komsberg substation.

The proposed Karreebosch OHPL is proposed to be located over thirteen (13) properties **Table 1-1**.The location and layout of the properties on which the OHPL is located is provided in **Figure 1-1** below.

Table 1-1:Properties on which the OHPL is located

OHPL and Substation Alternative	Farm Name and Number	21 digit SG Code	Municipality / Province	Farm size (ha)
Komsberg Substation **Bon Espirange to Komsberg Route**	Portion 2 of Farm Standvastigheid No. 210	C07200000000021000002	Karoo Hoogland LM / Namakwa DM / Northern Cape	43.30
Bon Espirange to Komsberg Route	Farm Aprils Kraal No. 105	C04300000000010500000	Laingsburg LM / Central Karoo DM / Western Cape	559.68
Bon Espirange to Komsberg Route	Portion 1 of farm Bon Espirange No. 73	C04300000000007300001	Laingsburg LM / Central Karoo DM / Western Cape	1916.64
Bon Espirange Substation **Bon Espirange to Komsberg Route** **Route 3**	Remainder of farm Bon Espirange No. 73	C04300000000007300000	Laingsburg LM / Central Karoo DM / Western Cape	1764.25
Option 1A **Option 1B** **Option 1C** **Option 2B** **Option 2C** **Route 3**	Remainder of farm Ek Kraal No.199	C07200000000019900000	Karoo Hoogland LM / Namakwa DM / Northern Cape	1407.48
Option 2B **Option 2C**	Portion 1 of farm Ek Kraal No. 199	C07200000000019900001	Karoo Hoogland LM / Namakwa DM / Northern Cape	1772.90
Option 2B **Option 2C**	Portion 2 (Nuwe Kraal) of farm Ek Kraal No. 199	C07200000000019900002	Karoo Hoogland LM / Namakwa DM / Northern Cape	824.94
Option 2B **Option 2C**	Remainder of farm Karreebosch No. 200	C07200000000020000000	Karoo Hoogland LM / Namakwa DM / Northern Cape	1538.34
Substation Option 2 **Option 2A** **Option 2B** **Option 2C**	Remainder of farm Wilgebosch Rivier No. 188	C07200000000018800000	Karoo Hoogland LM / Namakwa DM / Northern Cape	2898.91
Option 2A	Portion 1 of farm Klipbanks Fontein No. 198	C07200000000019800001	Karoo Hoogland LM / Namakwa DM / Northern Cape	1886.62
Substation Option 1 **Option 1A** **Option 1B** **Option 1C** **Option 2A**	Remainder of farm Klipbanks Fontein No. 198	C07200000000019800000	Karoo Hoogland LM / Namakwa DM / Northern Cape	1886.62
Option 1A **Option 1B** **Option 1C**	Farm Rietfontein No. 197	C07200000000019700001	Karoo Hoogland LM / Namakwa DM / Northern Cape	5873.66
Alternative: Bon Espirange to Komsberg Route	Remainder of Farm Standvastigheid No. 210	C07200000000021000000	Karoo Hoogland LM / Namakwa DM / Northern Cape	4716.71

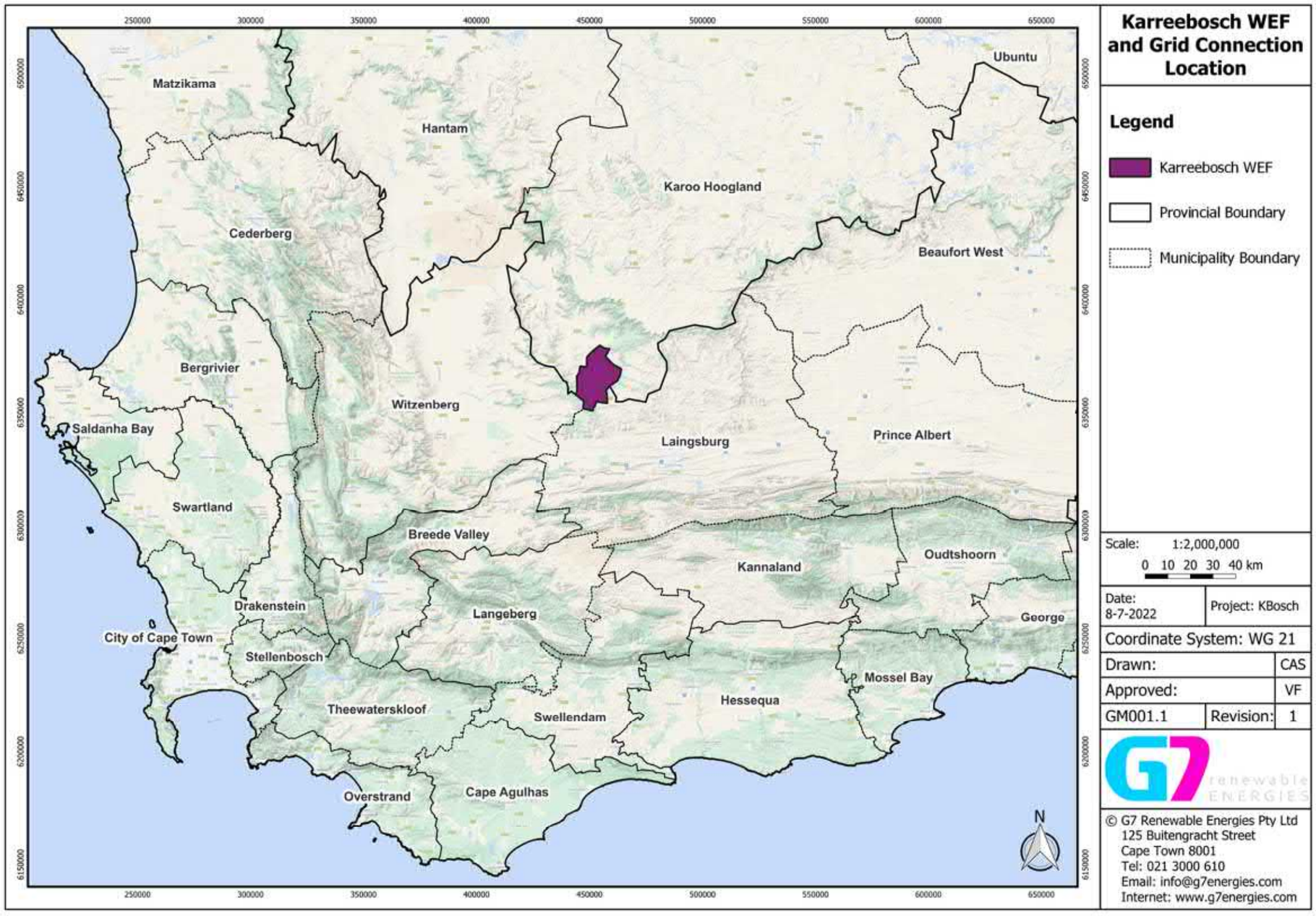


Figure 1-1: Locality Map

1.1.3 Project infrastructure

OVERHEAD POWERLINE

The OHPL will be a 132kV twin tern double circuit overhead powerline. The powerline towers will either be steel lattice or monopole structures. **Figure 1-2** below provides an example of a conventional lattice tower compared with a monopole structure. Pole positions will only be available once the powerline detail design has been completed by the Eskom Design Review Team (DRT). However, a 400m wide assessment corridor is being considered and has been walked down by the specialists for approval to allow for micro siting of tower positions once the detailed design has been completed. It is anticipated that towers will be located on average 200m to 250m apart; however, longer spans may be needed due to terrain and watercourse crossings.

Figure 1-2:Conventional lattice powerline tower compared with a steel monopole structure

POWERLINE ALTERNATIVES

Only one (1) OHPL route is technically feasible for the section of the proposed powerline directly preceding the existing Bon Espirange Substation (Route 3) and for the section connecting the Bon Espirange substation to the Komsberg substation (Bon Espirange to Komsberg Route), which is approximately 9.2 km in length. ***No alternatives can therefore be provided for these two sections of the OHPL (Route 3 and Bon Espirange to Komsberg Route, as per*** **Figure 1-3** *below.*

Six (6) OHPL route alternatives (Options 1A, 1B, 1C, 2A, 2B and 2C) are proposed between the Karreebosch WEF onsite 33/132kV substation (with substation alternatives: Option 1 and Option 2) and Route 3 preceding the existing Bon Espirange Substation. As noted above, all of the six OHPL route alternatives follow the same routing from their point of convergence on Remainder of farm Ek Kraal No.199, approximately 3.1 km before the Bon Espirange Substation, to the Komsberg Substation situated on Portion 2 of Farm Standvastigheid No. 210.

These alternatives, as depicted in **Figure 1-3**, are described below:

- **OHPL Route Option 1:** Three (3) OHPL route alternatives are being considered for the link between Substation Option 1 and the Bon Espirange Substation and Komsberg Substation:
  - Option 1A (approximately 14.51 km in length in its entirety from Substation Option 1 to the Komsberg Substation);
  - Option 1B (approximately 17.28 km in length in its entirety from Substation Option 1 to the Komsberg Substation); and
  - Option 1C (approximately 13.91 km in length in its entirety from Substation Option 1 to the Komsberg Substation).
- **OHPL Route Option 2:** Three (3) powerline corridor route alternatives were considered for the link between Substation Option 2 and the Bon Espirange Substation and Komsberg Substation:
  - Option 2A (approximately 20.47 km in length in its entirety from Substation Option 1 to the Komsberg Substation);
  - Option 2B (approximately 16.63 km in length in its entirety from Substation Option 1 to the Komsberg Substation); and
  - Option 2C (approximately 20.52 km in length in its entirety from Substation Option 1 to the Komsberg Substation).

Alternatives 1A-C feed out of Substation Option 1 proposed in the south-central portion of the Farm Klipbanksfontein 198/1. Alternatives 2A-C feed out of Substation Option 2 proposed in the south-eastern corner of Wilgebosch Rivier 188/RE.

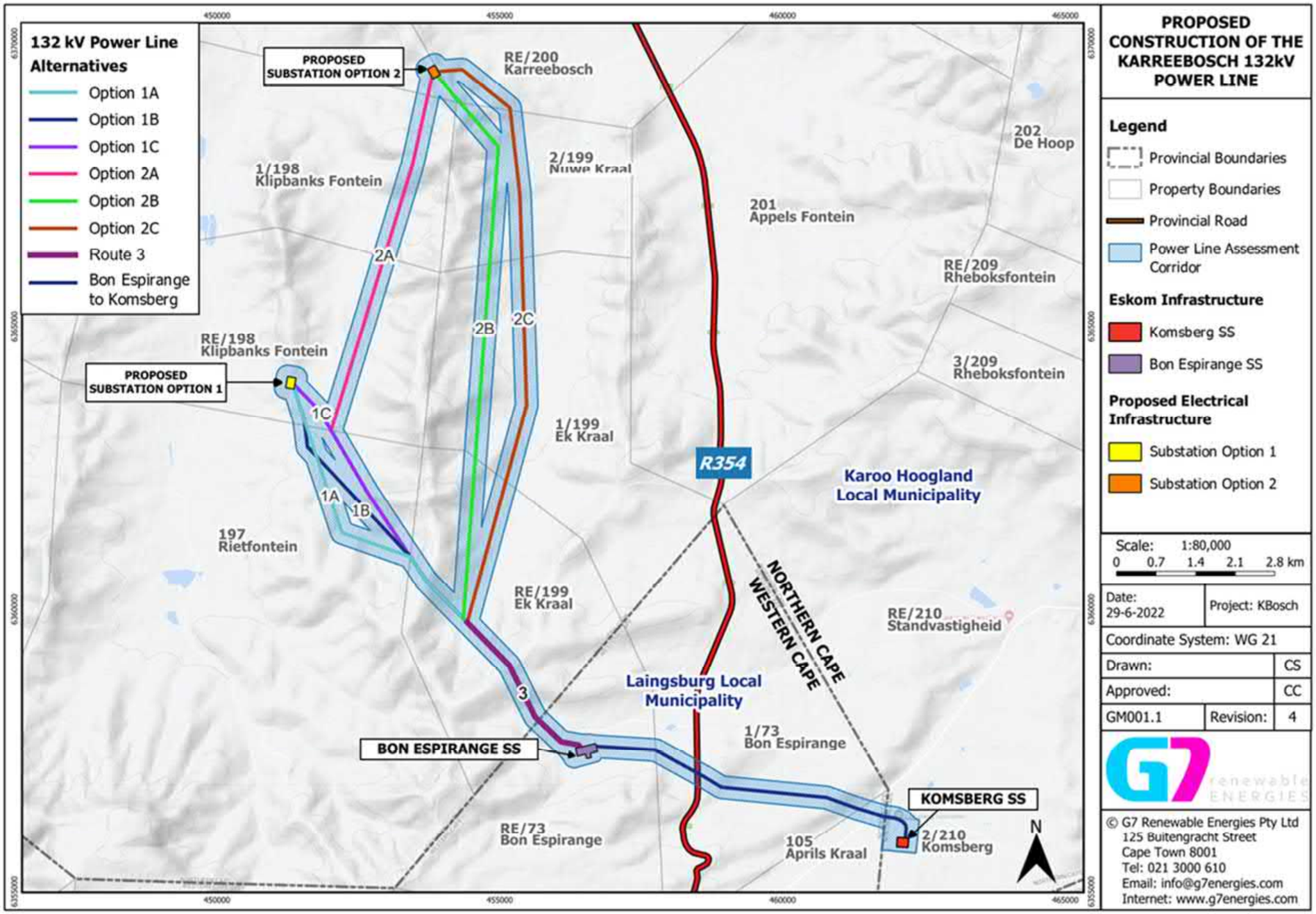


Figure 1-3:Powerline Route and Substation Alternatives for the Karreebosch OHPL

SERVITUDE

A 400m wide OHPL corridor (200m on either side of the centre line) has been assessed by the specialists for the purposes of the Basic Assessment Report (BAR). The registered servitude will fall within this 400m wide assessment corridor and will be 31m wide (15.5 m on either side of the centre line). The Right of Way servitude (servitude road) will be up to 14m wide (7m on either side of centre line), resulting in a total servitude width of 45m in total. The length of the longest powerline route alterative (Option 2C – see "Alternatives" section above) is 20.52 km, which will result in a servitude area of up to 92.3 ha.

The servitude is required to ensure safe construction, maintenance and operation of the powerline. Registration of the servitude grants the operator the right to erect, operate and maintain the powerline and to access the land to carry out such activities, but it does not constitute full ownership of the land. It should be noted that the OHPL will be ceded to Eskom post-construction. Construction and operation activities and access to the powerline will be carried out with due respect to the affected landowners. The servitude required for the Project will be registered at the Deeds Office and will form part of the title deed of the relevant properties once the environmental authorisation has been obtained.

SUBSTATIONS

Two alternative 33/132kV onsite substation locations at the Karreebosch WEF site have been assessed as part of this TMP, each with a 200m x 150m (3 ha) footprint. A 200m assessment area surrounding the proposed substation alternatives have been included as part of this assessment for micro siting, with a slight funnel leading into the existing Bon Espirange and Komsberg substations to allow for greater flexibility for micro siting for incoming proposed line connections. The proposed Karreebosch OHPL may require an extension of the existing 400kV Komsberg substation, and therefore, the entire Komsberg substation property has been assessed as part of this TMP.

2 PURPOSE OF THE TRAFFIC MANAGEMENT PLAN

A Traffic Management Plan (TMP) is required to ensure that the trips generated by the construction and operational activities associated with the proposed facility are mitigated as far as possible to:

- reduce the traffic impact on the surrounding road network.
- reduce potential conflicts that may results from the development traffic and the general traffic/public; and
- identify potential routes for vehicles travelling to the site, particularly heavy and abnormal load vehicles.

This Traffic Management Plan has been prepared to enable the identification and implementation of best practice requirements in respect of the management of traffic associated with the construction and operation of the facility.

3 ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations apply:

- This TMP is based on the project information provided by the Client.
- Maximum vertical height clearances along the haulage route are at least 5.2m to be able to accommodate abnormal loads.
- The imported elements will be transported from the most feasible port of entry, which is deemed to be the Port of Saldanha.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads.
- Material for the construction will be sourced locally as far as possible.

4 SOURCE OF INFORMATION

Information used in a transport study includes:

- Project information provided by the Client
- Google Earth. kmz provided by the Client
- Google Earth Satellite Imagery
- Chief surveyor general website
- TRH11, Dimensional and mass limitations and other requirements for abnormal loads, August 2009
- The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads”, 2000
- National Road Traffic Act, Act 93 of 1996
- National Department of Transport (NDoT), Manual for Traffic Impact Studies, October 2005
- Department of Transport (DoT), Geometric Design of Rural Roads, 1988
- SANS 10280/NRS 041-1:2008 Overhead Power Lines for Conditions Prevailing in South Africa
- Manual for Traffic Impact Studies, Department of Transport, 1995
- TRH26 South African Road Classification and Access Management Manual, COTO
- TMH 16 South African Traffic Impact and Site Traffic Assessment Manual (Vol 1), COTO, August 2012
- TMH 16 South African Traffic Impact and Site Traffic Assessment Manual (Vol 2), COTO, February 2014

5 SITE DESCRIPTION

5.1 General

The proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is to be located 35km north of Matjiesfontein, and extends across two provinces, namely the Northern and Western Cape Provinces. The proposed Karreebosch OHPL will extend from the proposed Karreebosch onsite 33/132kV substation, which is situated in Ward 3 of the Karoo Hoogland Local Municipality in the Namakwa District Municipality in the Northern Cape into Ward 2 of the Laingsburg Local Municipality in the Central Karoo District Municipality in the Western Cape Province, where it will connect to the existing 400kV Komsberg substation via the existing Bon Espirange substation.

5.2 Site access points

The proposed Karreebosch powerline can be accessed from a main site access point off the R354, located at the site's eastern end. The R354 is a Class 2 minor arterial route running in a north-south-direction from Matjiesfontein to the R356 in the Northern Cape. The road is a surfaced single carriageway with one lane per direction.

The main access (Access 01) is located off an existing access road. Access 01 will be used to access the site for the construction, operation, and maintenance of the powerline. Access 01 is located off an existing access road; therefore, access spacing restrictions are not envisaged.

Access 01 is located off a straight horizontal curve with relatively flat terrain; therefore, sight line restrictions are not envisaged.

It is also recommended that appropriate signage is accommodated to warn road users of the access points and that the road reserve be maintained to prevent obstructions to sight lines.

It should be noted that road upgrades may be required along existing access roads to accommodate expected vehicles. Additional roads may need to be established to access the entire powerline route.

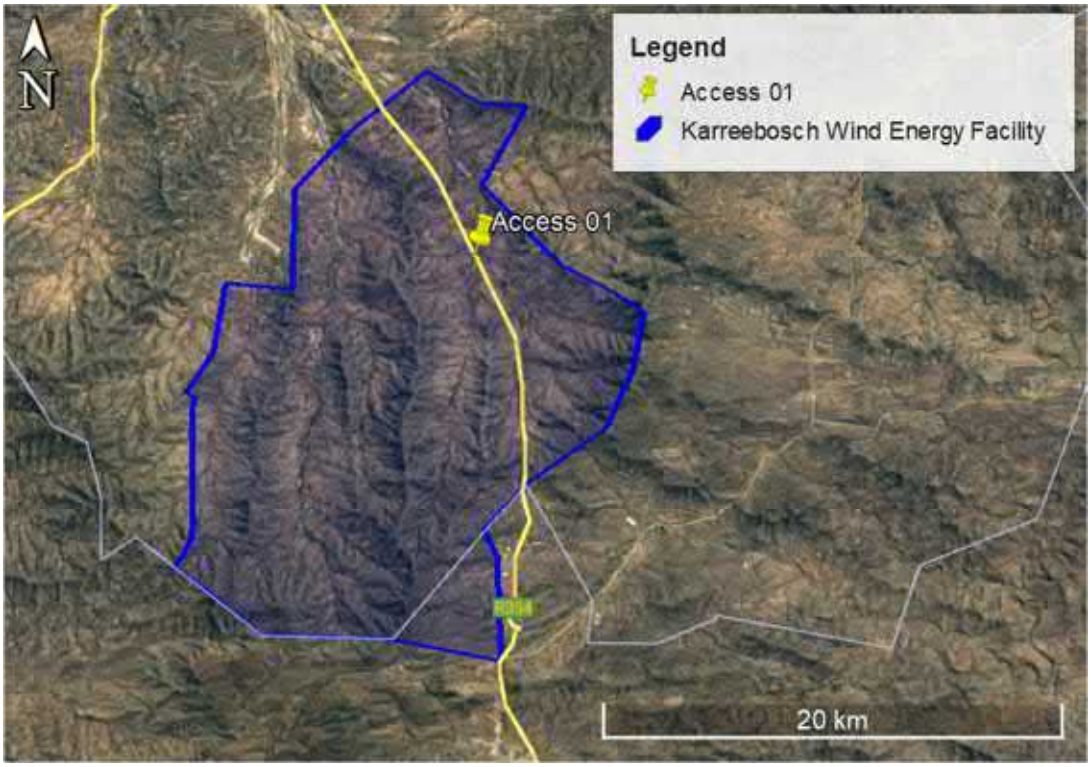


Figure 5-1:The Proposed Site Access

It is recommended that the following aspects be considered for the detailed design of the site access points:

- staggered intersections should be avoided where possible.
- The access points to the site will need to be able to cater for construction and abnormal load vehicles.
- A minimum road width of 8m is recommended for the access points and the internal roads can have a minimum width of 5m.
- The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely.
- It is recommended that the site access to the facility be access controlled. It is also recommended that security staff be stationed on site at the access during construction.
- A minimum stacking distance of 25m is recommended between the road edge of the external road and the access control.
- All road markings and signage need to be in accordance with the South African Road Traffic Signs Manual (SARTSM).

6 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRAFFIC MANAGEMENT PLAN

6.1 Components

Powerlines are a system of overhead transmission lines and underground cables. Their main function is to transfer power from an electrical generation source to a substation from which distribution to the consumer will occur.

The materials/components required for powerlines include:

- Towers/poles to support the electrical cables. These can be made from wood, steel, aluminium, concrete or reinforced plastic options,
- Wire conductors typically made of aluminium,
- foundations for towers/poles,
- Dampers,
- Ground wires,
- Insulators, and
- Transformer.

The Karreebosch powerline components are expected to be locally sourced and transported to the site using appropriate National and Provincial routes. It is expected that the components will generally be transported to the site with normal heavy load vehicles. The expected abnormal vehicles will comprise of lifting equipment required to off-load and assemble the components.

Figure 6-1: Typical High voltage Power Transmission system (Chakraborty, 2017)

6.2 Applicable Legislation and Permit Requirements

Key legal requirements pertaining to the transport requirements for the proposed development are:

- Abnormal load permits, (Section 81 of the National Road Traffic Act), and
- Authorisation from Road Authorities to modify the road reserve to accommodate turning movements of abnormal loads at intersections.

7 TRAFFIC MANAGEMENT PLAN

This Traffic Management Plan has been prepared in respect of the planning phase of the proposed facility. The Traffic Management Plan should be updated prior to the commencement of the construction phase, when detailed information regarding the delivery of components, traffic data and construction activities are available. A designated personnel member of the Contractor's team will be the custodian of the plan and the custodian will ensure that all personnel and subcontractors are trained to ensure compliance. The requirements of the Traffic Management Plan shall apply to all construction personnel and subcontractors appointed to provide vehicles, machinery or drivers. The TMP needs to be reviewed every four months or immediately after an incident, when corrective measures will be incorporated into the TMP.

Prior to the commencement of the operational phase, the plan should be updated to include the operational traffic requirements. A copy of the TMP should be kept at the facility. A designated employee should ensure that the plan is enforced and ensure that the TMP is available to all relevant personnel and external maintenance/repair teams. The TMP should be reviewed annually or immediately after an incident, when corrective measures will be incorporated into the TMP.

7.1 Preliminary Transport Requirements

With the implementation of mitigation measures as outlined in the Traffic Impact Assessment (TIA) conducted for the project, it is expected that the delivery of the components to the site during the construction phase will not result in a significant increase in traffic.

Abnormal vehicle trips are limited to the lifting equipment required to offload components and to assemble the powerline. The number of abnormal vehicle trips is expected to be low, and these trips are expected to arrive early in the construction phase to prepare for the construction of the powerline. Component and equipment delivery can be staggered and planned to occur outside of the peak traffic periods as much as possible (peak traffic periods for rural areas are assumed to be between 6:30am – 8am and 4pm-6pm). This will assist in mitigating the impact on the surrounding road network.

7.1.1 Construction traffic

Construction traffic will include vehicles for deliveries, removal of materials and construction staff.

1. **Material and component delivery:** Vehicle trips from material and component delivery vary depending on the construction task/program, fuel supply arrangements, as well as distance from the material source to the site. Not enough detail about the powerline is known at this stage to provide an estimated trip generation volume for material and component traffic.

   The materials and components expected for the powerline construction can generally be transported by normal heavy load vehicles. Project planning can be used to reduce delivery trips during peak hours. In addition to this, using a mobile batch plant as well as temporary construction material stockpile yards near the proposed site can also reduce peak hour trips.

2. **Construction machinery:** Cranes for pylon/tower assembly, heavy vehicles required for earthworks etc. These vehicles are expected to have negligible traffic impact as they will arrive on site in preparation for construction. Once on site, these vehicles will produce internal site traffic with minimal effect on the external road network.

3. **Site personnel and workers:**

Based on information obtained from similar projects, the following trip generation assumptions are made for construction personnel:

	Activity	traffic comments	Approx. team size	Approx. duration at a point (i.e., tower location)
1	Centre line pegging and identification of new gates	(light vehicle access)	3	1 day
2	Access Negotiations	(light vehicle access)	1	1 day
3	Tower Pegging	(light vehicle access)	5	1 days
4	New gate installation	(light vehicle access)	5	1 days
5	Foundation nominations (for main structure and anchors)	(heavy vehicle access)	5	2 days
6	Excavation of foundation	(heavy vehicle access)	10	2 days
7	Foundation steelwork (reinforcing)	(heavy vehicle access)	10	2 days
8	Foundation (concrete) pouring	(heavy vehicle access)	20	2 days
9	Delivery of tower steelwork	(heavy vehicle access)	5	1 day
10	Assembly team / Punching and painting	(light vehicle access)	10	3 days
11	Erection	(abnormal load vehicle access)	20	2 days
12	Stringing	(abnormal load vehicle access) (intensive vehicle activity likely within the working area)	50	7 days
13	Sag and tension	(heavy vehicle access)	10	3 days
14	Rehabilitation	(heavy and light vehicle access)	5 to 15	2 – 10 days

It is assumed that the same team numbers will move from point to point of the powerline construction to another. Based on this assumption a maximum of 50 to 70 workers can be expected on site a day.

Based on traffic station data sourced from the Western Cape Government Road Network Information System, there are no taxis or busses operating along the R354. It is recommended that the majority of construction personnel be transported to and from site by means of busses or minibus taxis.

Busses have an average of 60 passenger capacity while minibus taxis have an average passenger capacity of 15. Assuming approximately 20% highly skilled personnel will travel by means of passenger vehicles the following trips are assumed:

- for the skilled personnel, a maximum of 14 trips are expected.
- The remaining 56 workers can travel by bus (i.e., 1 bus trip) or 4 (four) minibus taxi trips.

Depending on the construction schedule, a maximum of 18 peak hour site personnel trips is assumed for the purposes of this assessment. This volume is deemed to generate an insignificant traffic impact.
The potential transport impacts imposed by the construction traffic are temporary, short term in nature, and can be mitigated to an acceptable level.

7.1.2 Operational traffic

Traffic during the operational phase will consist of maintenance staff maintaining the development. The trips generated during this phase is low as trips will only be for occasional maintenance requirements. A conservative worst-case estimate of between5 to 15 peak hour staff trips are assumed at this stage.

7.1.3 Decommissioning phase

The decommissioning phase will generate construction related traffic including transportation of people, construction materials, water and equipment. It is therefore expected that the decommissioning phase will generate the same impact as that of the construction phase.

Proposed mitigation measures during the construction, operational and maintenance, and decommissioning phase include:

- When possible, the delivery of components and construction materials to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of batch plants (if required) and quarries near the site would decrease the impact on the surrounding road network.
- Stockpiling of materials near the site can also help reduce peak hour trips.
- Staff and general trips should occur outside of peak traffic periods as far as possible.

7.2 Transport Coordinator

It is recommended that a transport coordinator (or similar designation) be appointed to ensure compliance of the TMP. The coordinator shall make all the necessary arrangements to maintain the required traffic measures for the duration of the construction period.

7.3 Stakeholder Engagement

Interested and affected parties are to be informed of all transport activities taking place that may affect them or require approval (e.g., local community, the local authorities, law enforcement and affected landowners.)

Stakeholder engagement should address and provide information to stakeholders regarding general construction activities, construction vehicles routes, projected timelines, procedures for complaints and emergency procedures.

7.4 Licensing

All construction vehicles shall have the necessary licences, a valid roadworthy certificate and shall comply with the relevant traffic and transport licencing requirements (such as abnormal loads or hazardous materials).

All drivers of vehicles shall have the requisite licences to operate any vehicle (or machinery) operated by them on site or on any public roads. A professional driving permit (PrDP) is required if any of the following vehicles are operated:

- Goods vehicles, (more than 3 500 kg).
- Breakdown vehicles.
- Buses (any bus).
- Minibus taxis (more than 3 500 kg), transporting 12 or more people, including the driver.
- Vehicles used to transport people for payment.
- Goods vehicle carrying dangerous goods (more than 3 500 kg).
- Road tank vehicles for petroleum-based flammable liquids.
- Motor vehicles transporting 12 or more people, including the driver.

7.5 Construction Staff

All staff shall be transported safely to site in appropriate vehicles. Staff shall not be allowed to be transported to site on the back of open trucks. Passenger vehicles shall not exceed the carrying capacity of the vehicle.
Collections/Drop-off points for staff shall be located at a safe distance from traffic and construction activities. Roads and areas used by construction vehicles shall, as far as possible be avoided by all personnel. Designated pedestrian pathways shall be demarcated where appropriate.

All staff shall receive the appropriate site safety induction training. Drivers shall be adequately trained in the identification and avoidance of road hazards, vehicle maintenance and care and safety requirements. All staff shall be informed of the construction site risks and training shall include appropriate precautionary measures required to be undertaken to facilitate safe and efficient traffic management (e.g., understanding signage, crossing roadways and utilising designated pedestrian pathways, reporting incidents).

7.6 Inspection of all Routes

A dry run of all routes (see **Section 8**) is to be undertaken to identify any areas to avoid or obstacles that might disrupt the movement of the construction vehicles. All issues affecting the movement of construction vehicles are to be addressed immediately by the Contractor and relevant stakeholders e.g., law enforcement, relevant roads department and authorities.

7.7 Maintenance of vehicles

All vehicles and construction plant shall be regularly maintained, repaired when necessary and inspected on a regular basis to ensure that the vehicles are in good working order. Construction and passenger vehicles shall be monitored to ensure that vehicles are not overloaded.

7.8 Maintenance of roads

The Contractor should maintain private roads used by construction vehicles, repairing any damage caused by construction traffic. Where gravel roads are used, the roads should be maintained, and dust control measures should be implemented to avoid dust pollution.

It must, however, be noted that the relevant Road Authority may request repair or upgrades of public roads affected by the site traffic. This stipulation is typically expressed as part of the development approval as a condition of approval.

7.9 Signage

Signage, in accordance with the South African Road Traffic Signs Manual, will be required at appropriate locations along all access roads, the internal roads to the site and public roads used by construction vehicles (in consultation with the relevant traffic authorities) to indicate the following:

- all road and pedestrian hazards;
- site access
- site offices
- wayfinding signs on internal roads e.g. parking, toilets, emergency assembly point
- crossing points;
- speed limits;
- turning traffic;
- dedicated routes for construction vehicles and staff
- no-go areas
- any traffic control information which may be relevant to the construction activity at the time.

It is recommended that flagmen be implement when high volumes of construction traffic are expected to help direct the traffic, thus ensuring the safe movement of the vehicles and reducing the potential conflicts.

7.10 Speed limit

All drivers operating vehicles shall comply with the posted speed limits (or the maximum allowable speed as per the permit for abnormal load vehicles) on public roads as well as a proposed 40km/h speed limit within the construction site and access roads.

The failure to adhere to the prescribed speed limits is an offence and disciplinary action may be taken by the Contractor.

7.11 Abnormal Loads/vehicle travel

The expected abnormal vehicles will comprise of lifting equipment required to off-load and assemble the components. Abnormal loads/vehicles will be transported to site as per the following:

7.11.1 Abnormal Load Considerations

Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Traffic Act (Act No. 93 of 1996):

- Length: 22m for an interlink, 18.5m for truck and trailer and 13.5m for a single unit truck
- Width: 2.6m
- Height: 4.3m measured from the ground. Possible height of load – 2.7m.
- Weight: Gross vehicle mass of 56t resulting in a payload of approximately 30t
- Axle unit limitations: 18t for dual and 24t for triple-axle units
- Axle load limitation: 7.7t on front axle and 9t on single or rear axles

Any dimension / mass outside the above will be classified as an Abnormal Load and will necessitate an application to the Department of Transport and Public Works for a permit that will give

authorisation for the conveyance of said load. A permit is required for each Province that the haulage route traverses.

7.11.2 Further Guideline Documentation

The Technical Recommendations for Highways (TRH 11): "Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads" outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.

The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power/mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the Road Traffic Act and the relevant regulations.

7.11.3 Permitting – General Rules

The limits recommended in TRH 11 are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or to modify the conditions under which a permit is granted. It is understood that:

a) A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, abnormally heavy traffic during certain periods or for any other reason.
b) A permit can be withdrawn if the vehicle upon inspection is found in any way not fit to be operated.
c) During certain periods, such as school holidays or long weekends an embargo may be placed on the issuing or permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

7.11.4 Load Limitations

The maximum load that a road vehicle or combination of vehicles will be allowed to carry legally under permit on a public road is limited by:

- the capacity of the vehicles as rated by the manufacturer;
- the load which may be carried by the tyres;
- the damaging effect on pavements;
- the structural capacity on bridges and culverts;
- the power of the prime mover(s);
- the load imposed by the driving axles and
- the load imposed by the steering axles.

7.11.5 Dimensional Limitations

A load of abnormal dimensions may cause an obstruction and danger to other traffic. For this reason, all loads must, as far as possible, conform to the legal dimensions. Permits will only be considered for indivisible loads, i.e. loads that cannot, without disproportionate effort, expense or risk of damage, be divided into two or more loads for the purpose of transport on public roads. For each of the characteristics below there is a legally permissible limit and what is allowed under permit.

- Width
- Height
- Length
- Front Overhang
- Rear Overhang
- Front Load Projection
- Rear Load Projection
- Wheelbase
- Turning Radius
- Stability of Loaded Vehicles

7.11.6 Preferred Abnormal load route

The preferred route should be surveyed to identify problem areas e.g., intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification. After the road modifications have been implemented, it is recommended to undertake a “dry-run”, to ensure that the abnormal load vehicles will cause limited disruptions. It

needs to be ensured that gravel sections (if any) of the transport routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.

Any low hanging overhead lines (lower than 5.1m) e.g., Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.

8 POTENTIAL ROUTES TO THE PROPOSED SITE

8.1 Proposed main access road to the proposed Facility

The main access (access 01) to the site is located off the R354. A desktop study was undertaken using typical traffic data available on Google Maps. The typical traffic conditions in the area comprise mostly light traffic volumes. It is however still recommended to travel outside of peak hours (peak traffic periods for rural areas are assumed to be 6:30am – 8am and 4pm-6pm) to mitigate traffic disruptions as far as possible.

Figure 8-1: Routes from the nearest towns to site

8.2 Main Route for the Transportation of Materials, Plant and People to the proposed site

It is envisaged that the workforce will most likely reside in Sutherland, Matjiesfontein, Touws River or Laingsburg as the closest communities. These towns connect to the site via the N1 and the R354.Due to a lack of public transport near the site it is recommended that the majority of construction personnel be transported to and from the site by means of busses. This will reduce the number of trips bound for the site.

Building materials will most likely be sourced from Worcester approximately 179km form the site or alternatively from Cape Town approximately 306 km from the site. A significant reduction in heavy vehicle trips can be achieved by using mobile batch plants. In addition to this, temporary construction material stockpile yards could be commissioned on vacant land near the proposed site. Delivery of materials to the mobile batch plant and the stockpile yard could be staggered to minimise traffic disruptions.

Figure 8-2: Envisaged route for material delivery

9 CONCLUSION

9.1 General

This report pertains to the Traffic Management Plan (TMP) associated with the development of the Karreebosch 132kV overhead power line, 33/132 KV substation and associated infrastructure. The powerline is required to evacuate the power generated by the proposed Karreebosch Wind Energy Facility (WEF).

The proposed 132kV Karreebosch OHPL, 33/132kV Substation and associated infrastructure is to be located 35km north of Matjiesfontein, and extends across two provinces, namely the Northern and Western Cape Provinces. The proposed Karreebosch OHPL will extend from the proposed Karreebosch onsite 33/132kV substation, which is situated in Ward 3 of the Karoo Hoogland Local Municipality in the Namakwa District Municipality in the Northern Cape into Ward 2 of the Laingsburg Local Municipality in the Central Karoo District Municipality in the Western Cape Province, where it will connect to the existing 400kV Komsberg substation via the existing Bon Espirange substation.

The proposed Karreebosch OHPL will evacuate power from the authorised Karreebosch WEF (EA Ref: 14/12/16/3/3/2/807/AM3, which is currently undergoing a Part 2 EA amendment, final layout and EMPr approval process), located in the Northern Cape Province, and will connect to the existing Komsberg substation.

9.2 Components

- Powerline systems comprise of components such as Towers/poles, conductors, foundations, Dampers, Ground wires, Insulators, and Transformer. These items can generally be transported by normal heavy load vehicles.
- The expected abnormal vehicles will comprise of lifting equipment required to off-load and assemble the components. Mobile cranes usually exceed mass and legal dimension limits and must therefore be operated under permit.

9.3 Traffic Management Plan

- This TMP has been prepared to enable the identification and implementation of all legal and best practice requirements in respect of the management of traffic associated with the construction and operation of the facility
- The Traffic Management Plan has been prepared in respect of the planning phase of the proposed facility. The Traffic Management Plan should be updated prior to the commencement of the construction phase and the operational phase.
- Not enough detail about the powerline is known at this stage to provide an estimated trip generation volume for material and component traffic. The potential transport impacts imposed by the construction traffic are however temporary, short term in nature, and can be mitigated to an acceptable level.

Mitigation measures include:

- ✓ Where possible, the delivery of components and construction materials to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- ✓ using a mobile batch plant as well as temporary construction material stockpile yards near or on the proposed site.
- ✓ Transporting site personnel to and from the site by means of busses. This will reduce the number of trips bound for the site.

- Traffic during the operational phase will be low (i.e., estimated 5-15 peak trips) as trips will only be for occasional maintenance requirements.
- For abnormal load vehicles, it is recommended to undertake a “dry-run” with the largest abnormal load vehicle, to ensure that the vehicle can access the site.

9.4 Access Road

- The main access to the site provides access to the project site and connects off the R354.
- Additional access roads or tracks may be required to provide access to sections of the powerline route.
- The main access (access 01) is located off an existing access point thus access spacing restrictions are not envisaged. This access is located off a straight horizontal curve section of the R354 thus sight line issues are not envisaged.
- It is recommended that appropriate signage is accommodated to warn road users of the access points and that the road reserve be maintained to prevent obstructions to sight lines.
- It needs to be noted that all access and internal roads should be investigated for their topographical suitability, i.e., feasibility for plant and truck access and height clearance for any Eskom lines, Telkom lines or similar.
- staggered intersections should be avoided where possible.
- The access points to the site will need to be able to cater for construction and abnormal load vehicles.
- A minimum road width of 8m is recommended for the access points and the internal roads can have a minimum width of 5m.
- The radius at the access point needs to be large enough to allow for all construction vehicles to turn safely.
- It is recommended that the site access to the facility be access controlled. It is also recommended that security staff be stationed on site at the access during construction.
- A minimum stacking distance of 25m is recommended between the road edge of the external road and the access control.
- All road markings and signage need to be in accordance with the South African Road Traffic Signs Manual (SARTSM).

9.5 Preferred Route for Materials, Plant and Labour

- It is envisaged that the majority of materials, will be sourced from Worcester approximately 179km from the site or alternatively from Cape Town approximately 306 km from the site. The route utilises the N1 and R354 to access the site.
- It is envisaged that the workforce will most likely reside in Sutherland, Matjiesfontein, Touws River or Laingsburg as the closest communities. The travel routes form these towns to the site include the N1 and the R354. These are higher order routes as such geometric limitations are not envisaged.

10 REFERENCES

1. Chakraborty, R., 2017. *Studies on Silicone Rubber Insulators used for High Voltage Transmission.* [Online] Available at: https://www.researchgate.net/publication/324703849_Studies_on_Silicone_Rubber_Insulators_used_for_High_Voltage_Transmission [Accessed 17 August 2021].

APPENDIX

F BIODIVERSITY & TERRESTRIAL ECOLOGY PLANS

13 Management Programs

Table 25 lists specific mitigation measures that must be implemented and adhered to. These must be conditions of authorisation.

Table 25: Specific Mitigation Measures and Recommendations

IMPACT	MITIGATION MEASURES
Vegetation	Blanket clearing of vegetation must be limited to a limited to 4x4 access tracks (were need) and substations footprints. No clearing outside of footprint to take place. Topsoil must be striped and stockpiled separately during site preparation and replaced on completion where revegetation will take place.
Flora Species	A flora search and rescue is likely to be required within pylon and substation footprints as per: Northern Cape Nature Conservation Act (Act no. 9 of 2009) Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000): NEMBA Threatened or Protected Species (TOPS).
Alien Invasive Species	A suitable weed management strategy to be implemented in construction and operation phases.
Erosion	Suitable measures must be implemented in areas that are susceptible to erosion. Areas must be rehabilitated, and a suitable cover vegetation planted once construction is completed. Topsoil must be stripped and stockpiled separately and replaced on completion. If natural vegetation re-establishment does not occur, a suitable grass must be applied.
Ecological Processes	Blanket clearing of vegetation must be limited to the development footprint, and the area to be cleared must be demarcated before any clearing commences.
Aquatic and Riparian processes	Pylon placement should span any aquatic and riparian features, rivers, non-perennial watercourses and any wetlands/pans.
Faunal Habitat	Blanket clearing of vegetation must be limited to the footprint. It is important that clearing activities are kept to the minimum and take place in a phased manner, where applicable. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
Faunal Processes	It is recommended that a faunal search and rescue be conducted before construction commences (i.e. clearing of vegetation), although experience has shown that there could still be some mortalities as these species are mobile and may thus move onto site once construction is underway. A reptile handler should be on call for such circumstances.
Faunal Species	No animals are to be harmed or killed during the course of operations. Workers are NOT allowed to snare any faunal species.

13.1 Site Preparation and Vegetation Clearing Plan

The following flora relocation plan is recommended for inclusion in the EMPr and Flora removal permit applications:

Necessary permits must be obtained for all species listed in:

- NEM:BA Threatened or Protected Species (ToPS) species listed in terms of the ToPS regulations and including red-listed species.
- Northern Cape Nature Conservation Act (Act no. 9 of 2009)
- The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000

Areas to be cleared of vegetation will be clearly demarcated before clearing commences.

Flora search and rescue is to be conducted before vegetation clearing takes place.

Plants to be rescued should include both Species of Conservation Concern requiring removal for relocation as well as species that would be suitable for use in rehabilitation and that are amenable to transplanting.

Areas should only be stripped of vegetation as and when required and in particular once Species of Conservation Concern have been relocated for that area.
Search and Rescue is best undertaken during early Spring period.
Should site construction occur in a phased manner, then clearing activities should take place also in a phased manner, ahead of construction work.

The following fauna relocation plan is recommended for inclusion in the EMPr and Fauna removal permit applications:
Necessary permits must be obtained for all species listed in:

- NEM:BA Threatened or Protected Species (ToPS) species listed in terms of the ToPS regulations and including red-listed species.
- Northern Cape Nature Conservation Act (Act no. 9 of 2009)
- The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000

13.2 Relocation of Species of Conservation Concern

The following general approach is recommended for translocation of species of conservation concern including Sensitive Species 142 where is affected by the activity:

- Season dependant, collect seed from any large mature and seed-bearing specimens that fall within the disturbance footprint before commencement (most likely during late autumn/early winter). This seed should be stored in cool dry conditions and sown in the following spring after rain and end of cold spells. The collected seed can include plant material to which the seed is attached.
- Locate and dig out any small individuals and/or seedlings, ensuring that disturbance to the root ball is minimal and plant in bags using locally sourced soil or replant directly into adjacent area. Any bagged plants must be stored in cool partially sunny conditions and kept watered, but not over watered for the duration of the construction period or until replanted.
- Any seed that was collected as per point 1, can then be sown and lightly raked to ensure some coverage with ground. It was noted from the site investigation that occasional seedlings or juveniles are present.
- Similarly, the bagged plants, should any have survived, can be replanted as well.
- Season and rainfall dependant, some after care watering of the translocated plants may be required.

With particular reference to the large population of *Sensitive Species 142* situated within the alignment of OHP Options 1A and 1C, and inasmuch that *Sensitive Species 142* is a subterrain geophyte:

- The 4x4 tracks supporting the OHPs across the project must be developed to follow a 'path of least resistance' and without the use of bulldozers or other earth moving equipment, as much as practically possible.
- Vegetation and any *Sensitive Species 142* should not be removed/relocated to create the 4x4 track but rather left *in situ* (i.e., create the track by simply driving repeatedly over the same route). If any *Sensitive Species 142* clumps are within the 4x4 track route it would be recommended to divert slightly to avoid if possible. This will achieve the following:
    - Improved survival of *Sensitive Species 142* (and other geophytic plants) by leaving them *in situ* rather than relocating them;
    - Retention of topsoil and the seed bank *in situ* improves rehabilitation/regeneration of vegetation; and
    - Keeping a natural/endemic vegetative embedded into the soil decreases local erosion and topsoil loss from high wind.
- Where bulldozers or other earth moving equipment are used, then permits must be obtained for prior rescue and relocation of *Sensitive Species 142* and any other protected species.
- All protected species within any pylon footprint must be rescued and relocated.

Plants to be relocated should be dug out with as little damage to roots as possible and replanted in the adjacent landscape. A hand-spade should not be used but rather a small hand-pick (e.g., geologists pick) to minimise root damage. It is recommended that a small amount of water is provided to the disturbed roots after replanting, if undertaken outside of a rainy period.

13.3 Rehabilitation and Landscaping Plan

- On completion of construction, the surface of any work areas, especially if compacted due to hauling and dumping operations shall be scarified to a depth of at least 200 mm and graded to an even surface condition and the previously stored topsoil will be returned to its original depth over the area.
- The disturbed areas can be seeded with suitable grasses and local indigenous seed mix, if deemed to be required, however, vegetation is likely to re-establish without input.
- Excavations may not be used for the dumping of construction wastes.
- Waste (non-biodegradable refuse) will not be permitted to be deposited in the excavations and must be disposed of appropriately.
- Final rehabilitation must comply with the requirements mentioned in the Rehabilitation Plan.

13.4 Open Space Management/Conservation Plan

None are applicable for this project.

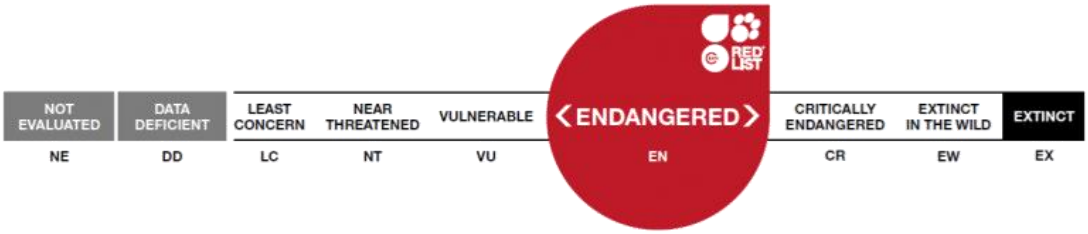
13.5 Maintenance Management Plan

Ongoing maintenance is likely to be required in the long-term, which could include re-excavation of portions of services for maintenance/replacement of defective components and leak repair. All measures of this report, including the EMPr should be adhered for any maintenance requirements. Any excavated areas must be stabilised and rehabilitated as per the measures indicated in this report and EMPr.

19 Appendix 1 – Flora and Fauna Species of Conservation Concern

Species include those having elevated conservation status or identified as being having a distribution range overlapping or in proximity to the site. The list includes species from various online database sources that were also screened for possible occurrence, as well as data from original ecological assessment (Todd, 2011, 2014, 2016, 2019) have been included and verified for any recent name and status changes. Species that were previously noted, but now confirmed to either not having overlapping distribution ranges (due to improved databases and distribution records), or have not been recorded, are included for clarification.

The IUCN Red List Categories define the extinction risk of species assessed. Nine categories extend from NE (Not Evaluated) to EX (Extinct). Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) species are considered to be threatened with extinction. Additional non-IUCN status categories include Rare and Critically Rare, as determined by SANBI as possibly under threat, but not yet evaluated in terms of the IUCN criteria and categories.



Permits for the identified species would be required either in terms of the respective Provincial legislation and/or under the NEMBA Threatened of Protected Species (ToPS).

Scientific Name	Family	Status[16]	Comment
Plants			
Acmadenia argillophila	Rutaceae	NT	Not recorded, found to the south in the Swartberg.
Adromischus maculatus	Crassulaceae	LC, NC	Present on site or vicinity
Adromischus mammillaris	*Crassulaceae*	EN, NC	Not recorded, known locations in Calitzdorp area
Adromischus phillipsiae	Crassulaceae	Rare, NC, NEST (M)	Not recorded. Roggeveld Mountains to Kamiesberg. Sheltered rock crevices in loam soil.
Agathosma acocksii	Rutaceae	VU, NC	Not recorded. Witberg to the south, outside of project area in Fynbos.
Albuca concordiana	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Aloe comptonii	Asphodelaceae	*LC, WC, NC*	Present on site or vicinity
Aloe longistyla	*Asphodelaceae*	LC, WC, NC	Not recorded, Widespread species
Aloidendron dichotomum	Asphodelaceae	VU, WC, NC	Not recorded
Amphithalea spinosa	Fabaceae	VU	Not recorded. NEST projected, known locations to the south in the Hex River Valley/ Witteberg area
Amphithalea villosa	Fabaceae	NT	Not recorded
Anisodontea procumbens	Malvaceae	Rare	Not recorded.
Antimima androsacea	Aizoaceae	CR Rare, WC, NC	A range-restricted species (EOO 10 km²), known from one site where it is not threatened. Sutherland, Roggeveld Escarpment. In vicinity but not recorded at proposed powerline.

[16] IUCN Red List Categories: **LC** – Least Concern; **NT** - Near Threatened; **VU** – Vulnerable; **EN** – Endangered; **CR** – Critically Endangered; **NE** – Not Evaluated. **WC** – Western Cape Nature Conservation Laws Amendment Act (Act No 3 of 2000); **NC** – Northern Cape Naure Conservation Act (Act No 9 of 2009). **ToPS** – Threatened or Protected Species in terms of NEMBA.

Scientific Name	Family	Status[16]	Comment
Antimima emarcescens	Aizoaceae	VU, WC, NC	Not recorded.
Antimima hamatilis	Aizoaceae	VU, WC, NC	Not recorded, known locations to the south in the Robertson/Worcester area
Antimima karroidea	*Aizoaceae*	LC, WC, NC	Not recorded. Karoo Endemic, widespread.
Antimima loganii	Aizoaceae	VU, WC, NC	Poorly known and apparently rare species. Its distribution range is not well known, but occurrence records suggest that it is very small. There is currently one known location, but it is likely an underestimate, as it may be overlooked due to taxonomic uncertainty. It is potentially threatened by overgrazing. Endemic to Roggeveld Escarpment near Sutherland in the Northern Cape.
Antithrixia flavicoma	Asteraceae	VU	Not recorded. Outside of range (Namaqualand).
Aspalathus candicans	*Fabaceae*	EN	Not recorded, known locations in Worcester area to the south-west
Aspalathus intricata subsp. anthospermoides	Fabaceae	Rare, NC	Not recorded.
Aspalathus intricata subsp. intricata	Fabaceae	Rare, NC	Not recorded.
Aspalathus intricata subsp. oxyclada	Fabaceae	Rare, NC	Not recorded.
Asparagus mollis	Asparagaceae	VU, NEST (M)	Not recorded.
Astroloba corrugata	Asphodelaceae	*LC, WC, NC*	Present on site or vicinity
Astroloba herrei	Asphodelaceae	VU, WC, NC	Not recorded, known locations to the south in the Swartberg mountains around Matjiesfontein & Prince Albert
Astroloba robusta	Asphodelaceae	LC, WC, NC	Present on site or vicinity
Babiana cuneata	Iridaceae	*LC, WC, NC*	Present on site or vicinity
Babiana sambucina	Iridaceae	EN, WC, NC	Not recorded
Boophone disticha	Amaryllidaceae	LC, WC, NC	Present on site or vicinity
Braunsia apiculata	Aizoaceae	LC, WC, NC	Present on site or vicinity
Braunsia stayneri	Aizoaceae	Rare, WC, NC	Not recorded.
Brunsvigia comptonii	*Amaryllidaceae*	LC, WC, NC	Present on site. Widespread and not in danger of extinction. Common and widespread in project area.
Sensitive Species 142	Amaryllidaceae	VU, WC, NC	Long-lived bulb occurs as widely scattered subpopulations in lowland areas that are subject to continued habitat loss to. Herbarium specimens record about 18 subpopulations, and an estimated further 70 unrecorded subpopulations may exist. All subpopulations consist of fewer than 50 adult plants and are declining due to collection on an ongoing basis for medicinal purposes. Nieuwoudtville to Baviaanskloof.
Brunsvigia striata	Amaryllidaceae	LC, WC, NC	Present on site or vicinity

Scientific Name	Family	Status[16]	Comment
Bulbine abyssinica	Asphodelaceae	LC, WC, NC	Present on site or vicinity
Bulbine succulenta	Asphodelaceae	LC, WC, NC	Present on site or vicinity
Bulbinella cauda-felis	Asphodelaceae	LC, WC, NC	Present on site or vicinity
Calamophyllum teretiusculum	*Aizoaceae*	DDT, WC, NC	Not recorded. Karoo Endemic, taxonomically problematic.
Calobota elongata	Fabaceae	VU	Not recorded
Cerochlamys gemina	*Aizoaceae*	LC, WC, NC	Not recorded. Karoo Endemic, localised population south of the site.
Cheiridopsis namaquensis	Aizoaceae	*LC, WC, NC*	Present on site or vicinity
Cineraria lobata subsp. lasiocaulis	Asteraceae	Rare	Not recorded.
Cleretum booysenii	Aizoaceae	Rare, WC, NC	Not recorded.
Cliffortia arborea	Rosaceae	VU	Not recorded.
Conophytum minimum	Aizoaceae	LC, WC, NC	Present on site or vicinity
Conophytum truncatum	Aizoaceae	NE, WC, NC	Not recorded
Cotyledon cuneata	Crassulaceae	*LC, NC*	Present on site or vicinity
Cotyledon orbiculata	Crassulaceae	*LC, NC*	Present on site or vicinity
Cotyledon tomentosa	Crassulaceae	LC, NC	Present on site or vicinity
Crassula altropurpurea	Crassulaceae	LC, NC	Present on site or vicinity
Crassula clavata	Crassulaceae	*LC, NC*	Present on site or vicinity
Crassula columnaris	Crassulaceae	*LC, WC, NC*	Present on site or vicinity
Crassula congesta subsp. laticephala	Crassulaceae	Rare, NC	Not recorded
Crassula cotyledonis	Crassulaceae	LC, NC	Present on site or vicinity
Crassula dodii	*Crassulaceae*	DD, NC	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.
Crassula hemisphaerica	*Crassulaceae*	LC, NC	Not recorded, Widespread species
Crassula muscosa	Crassulaceae	LC, NC	Present on site or vicinity
Crassula orbicularis	Crassulaceae	*LC, NC*	Present on site or vicinity
Crassula pageae	Crassulaceae	LC, NC	Present on site or vicinity
Crassula roggeveldii	Crassulaceae	Rare, NC	Not recorded
Crassula rupestris	Crassulaceae	*LC, NC*	Present on site or vicinity
Crassula tecta	Crassulaceae	LC, NC	Present on site or vicinity
Crassula tetragona	Crassulaceae	LC, NC	Present on site or vicinity
Crassula tomentosa	Crassulaceae	LC, NC	Present on site or vicinity
Crassula umbella	Crassulaceae	LC, NC	Present on site or vicinity
Cromidon hamulosum	*Scrophulariaceae*	DD	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.
Deilanthe peersii	*Aizoaceae*	LC, WC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Delosperma sphalmanthoides	Aizoaceae	VU, WC, NC	Not recorded.
Diascia macrophylla	*Scrophulariaceae*	LC, WC, NC	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.
Drimia arenicola	*Hyacinthaceae*	LC, WC, NC	Not recorded. Known from Northern Cape, range overlaps with site.
Drimia karooica	*Hyacinthaceae*	LC, WC, NC	Not recorded, Widespread species
Drosanthemum comptonii	*Aizoaceae*	DDT, WC, NC	Not recorded. Karoo Endemic, taxonomically problematic.

Scientific Name	Family	Status[16]	Comment
Drosanthemum framesii	Aizoaceae	*LC, WC, NC*	Present on site or vicinity
Drosanthemum hispidum	Aizoaceae	LC, WC, NC	Present on site or vicinity
Drosanthemum worcesterense	Aizoaceae	EN, WC, NC	Not recorded.
Duvalia caespitosa	Apocynaceae	*LC, NC*	Present on site or vicinity
Duvalia parviflora	Apocynaceae	VU, NC	Not recorded, known locations in the south around Ladismith & Oudtshoorn
Erica glandulipila	Ericaceae	Rare, WC, NC	Not recorded.
Eriocephalus grandiflorus	Asteraceae	Rare, NEST (M)	Not recorded. Present in area
Eriocephalus microphyllus var. carnosus	Asteraceae	EN	Not recorded.
Euphorbia loricata	Euphorbiaceae	LC, NC	Present on site or vicinity
Euphorbia mauritanica	Euphorbiaceae	*LC, NC*	Present on site or vicinity
Euphorbia multiceps	Euphorbiaceae	LC, NC	Present on site or vicinity
Euphorbia multifolia	Euphorbiaceae	LC, NC	Present on site or vicinity
Euryops namaquensis	Asteraceae	VU	Not recorded. Outside of range (Namaqualand/ Knersvlakte) quarts patches.
Gasteria disticha	*Asphodelaceae*	CR, WC, NC	Not recorded, known locations in Worcester area to the south-west
Geissorhiza karooica	Iridaceae	NT, WC, NC	A range restricted species, EOO 497 km², known from six locations where it is potentially threatened by habitat loss and degradation as a result of overgrazing and erosion. Known from Roggeveld Mountains to Matjiesfontein.
Geissorhiza spiralis	Iridaceae	VU, WC, NC	Not recorded.
Gibbaeum gibbosum	Aizoaceae	LC, WC, NC	Present on site or vicinity
Gibbaeum pubescens	Aizoaceae	LC, WC, NC	Present on site or vicinity
Gladiolus venustus	Iridaceae	*LC, WC, NC*	Present on site or vicinity
Globulariopsis wittebergensis	Scrophulariaceae	Rare	Not recorded.
Gnidia cyanea	Thymelaeaceae	Rare	Not recorded.
Gonialoe variegata	Asphodelaceae	*LC, WC, NC*	Present on site or vicinity
Haemanthus coccineus	Amaryllidaceae	*LC, WC, NC*	Present on site or vicinity
Haworthia arachnoidea	Asphodelaceae	LC, WC, NC	Present on site or vicinity
Haworthia blackburniae	Asphodelaceae	NE, WC, NC	Not recorded
Haworthia cooperi	Asphodelaceae	NE, WC, NC	Not recorded
Haworthia cymbiformis	Asphodelaceae	NE, WC, NC	Not recorded
Haworthia marumiana	Asphodelaceae	NE, WC, NC	Not recorded
Haworthia mirabilis	*Asphodelaceae*	DDT, WC, NC	Not recorded, found to the west near Nieuwoudtville
Haworthia nortieri var. pehlemanniae.	*Asphodelaceae*	LC, WC, NC	Not recorded. Karoo Endemic, widespread.
Haworthia pulchella	Asphodelaceae	NE, WC, NC	Not recorded
Haworthia wittebergensis	Asphodelaceae	Rare, WC, NC	Not recorded.
Helictotrichon barbatum	Poaceae	VU	Not recorded.

Scientific Name	Family	Status[16]	Comment
Helictotrichon namaquense	Poaceae	VU	Not recorded.
Helictotrichon roggeveldense	Poaceae	EN	Not recorded.
Heliophila elata	Brassicaceae	VU	Not recorded
Hereroa crassa	*Aizoaceae*	LC, WC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Hermannia pillansii	Malvaceae	CR Rare	Not recorded.
Hesperantha flava	Iridaceae	Rare, WC, NC	Not recorded. Present in area
Hesperantha glabrescens	Iridaceae	Rare, WC, NC	Not recorded.
Holothrix aspera	Orchidaceae	LC, WC, NC	Present on site or vicinity
Holothrix secunda	Orchidaceae	LC, WC, NC	Present on site or vicinity
Holothrix villosa	Orchidaceae	LC, WC, NC	Present on site or vicinity
Hoodia pilifera	Apocynaceae	NT, NC	Not recorded
Hypodiscus sulcatus	Restionaceae	VU, WC, NC	Not recorded, known locations in the south around Laingsburg/Touwsrivier (Matjiesfontein Shale Renosterveld)
Indigofera hantamensis	Fabaceae	Rare	A rare species, known from only three subpopulations scattered over a large area. Not threatened. Roggeveld to Calvinia. Few individuals recorded, uncommon.
Ixia mollis	Iridaceae	VU, WC, NC	Not recorded
Ixia oxalidiflora	Iridaceae	VU, WC, NC	Not recorded. Present in area
Ixia parva	Iridaceae	VU, WC, NC	Not recorded.
Ixia rivulicola	Iridaceae	VU, WC, NC	Not recorded.
Jamesbrittenia thunbergii	*Scrophulariaceae*	LC, NC	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.
Lachenalia aurioliae	Hyacinthaceae	*LC, WC, NC*	Present on site or vicinity
Lachenalia comptonii	Hyacinthaceae	LC, WC, NC	Not recorded. Karoo Endemic, Tankwa Karoo to the Roggeveld Escarpment south-west of Sutherland and Matjiesfontein.
Lachenalia ensifolia	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Lachenalia isopetala	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Lachenalia juncifolia	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Lachenalia martinae	Hyacinthaceae	VU, WC, NC	Not recorded
Lachenalia obscura	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Lachenalia violacea	Hyacinthaceae	*LC, WC, NC*	Present on site or vicinity
Lachenalia whitehillensis	Hyacinthaceae	NT, WC, NC	Not recorded
Lachenalia zebrina	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Lampranthus amoenus	*Aizoaceae*	EN, WC, NC	Not recorded, known locations in the Cape Flats to the south-west
Lampranthus haworthii	Aizoaceae	LC, WC, NC	Present on site or vicinity
Leobordea globulosa	Fabaceae	VU	Not recorded.

Scientific Name	Family	Status[16]	Comment
Leucadendron cadens	Proteaceae	Rare, WC, NC	Not recorded
Leucadendron sp. nov. (Acocks 23716 NBG)	Proteaceae	CR EN, WC, NC	Not recorded.
Lotononis comptonii	Fabaceae	EN	Not recorded, known locations to the south in the Swartberg
Lotononis densa subsp. congesta	Fabaceae	VU	Not recorded, known locations to the west (Piketberg)
Lotononis gracilifolia	Fabaceae	EN	Not recorded, known locations to the south in the Laingsburg/Worcester area
Lotononis venosa	Fabaceae	EN, NEST (M)	An endemic species to the Klein Roggeveld escarpment (extent of occurrence 84km², and area of occupancy 16km²). It is known from four locations. Some of the habitat has been transformed for crop cultivation in the past. Overgrazing by livestock and more frequent and persistent droughts are causing ongoing habitat degradation. Klein Roggeveld Mountains. Not recorded.
Malephora lutea	Aizoaceae	LC, WC, NC	Present on site or vicinity
Massonia depressa	Hyacinthaceae	LC, WC, NC	Present on site or vicinity
Mesembryanthemum nodiflorum	Aizoaceae	LC, WC, NC	Present on site or vicinity
Monsonia crassicaulis	Geraniaceae	*LC, NC*	Present on site or vicinity
Moraea aspera	Iridaceae	VU, WC, NC	Not recorded. Outside of range (Hantam).
Moraea ciliata	Iridaceae	*LC, WC, NC*	Present on site or vicinity
Moraea cuspidata	Iridaceae	*LC, WC, NC*	Present on site or vicinity
Moraea miniata	Iridaceae	*LC, WC, NC*	Present on site or vicinity
Moraea polyanthos	Iridaceae	*LC, WC, NC*	Present on site or vicinity
Moraea polystachya	Iridaceae	LC, WC, NC	Present on site or vicinity
Muraltia karroica	Polygalaceae	VU	Not recorded, found to the south in the Swartberg.
Nemesia anisocarpa	*Scrophulariaceae*	LC, NC	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.
Nenax velutina	Rubiaceae	Rare	Not recorded.
Octopoma nanum	Aizoaceae	VU, WC, NC	Not recorded
Oftia glabra	Scrophulariaceae	Rare	Not recorded.
Ornithogalum juncifolium	Hyacinthaceae	LC, WC, NC	Not recorded
Oxalis convexula	Oxalidaceae	LC, NC	Present on site or vicinity
Oxalis dregei	Oxalidaceae	*LC, NC*	Present on site or vicinity
Oxalis marlothii	Oxalidaceae	EN, NC	Not recorded. Present in area
Oxalis melanosticta	Oxalidaceae	LC, NC	Present on site or vicinity
Oxalis pes-caprae	Oxalidaceae	LC, NC	Present on site or vicinity
Pauridia breviscapa	Hypoxidaceae	Rare, WC, NC, NEST (M)	Not recorded.
Pectinaria articulata	Apocynaceae	LC, NC	Present on site or vicinity
Pectinaria longipes subsp. longipes	*Apocynaceae*	LC, NC	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.

Scientific Name	Family	Status[16]	Comment
Peersia frithii	Aizoaceae	VU, WC, NC	Not recorded. Present in area
Pelargonium magenteum	Geraniaceae	*LC, NC*	Present on site or vicinity
Pelargonium alternans	Geraniaceae	*LC, NC*	Present on site or vicinity
Pelargonium magenteum	*Geraniaceae*	*LC, NC*	Not recorded. Roggeveld-Hantam endemic, Known from general area. Widespread.
Pelargonium stipulaceum subsp. ovato-stipulatum	*Geraniaceae*	*LC, NC*	Not recorded. Karoo Endemic, widespread.
Pelargonium torulosum	Geraniaceae	*Rare, NC*	Not recorded
Phiambolia hallii	Aizoaceae	Rare, WC, NC	Not recorded.
Phylica comptonii	Rhamnaceae	Rare, NC	Not recorded.
Phylica retorta	Rhamnaceae	Rare, NC	Not recorded.
Phyllobolus amabilis	Aizoaceae	Rare, WC, NC	Not recorded
Piaranthus comptus	*Apocynaceae*	LC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Piaranthus geminatus	Apocynaceae	*LC, NC*	Present on site or vicinity
Pleiospilos nelii	*Aizoaceae*	LC, WC, NC	Not recorded. Outside of range.
Polhillia involucrata	Fabaceae	EN, NC	Not recorded.
Protea convexa	Proteaceae	CR EN, WC, NC	Not recorded. NEST projected, known locations in Northern Cederberg, Witteberg and Klein Swartberg mountains.
Protea lepidocarpodendron	Proteaceae	NT, WC, NC	Not recorded
Psoralea karooensis	Fabaceae	Rare	Not recorded.
Pterygodium inversum	Orchidaceae	EN, WC, NC	Not recorded, found to the west in the Ceres/Malmesbury area
Quaqua parviflora subsp. gracilis	*Apocynaceae*	LC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Restio aridus	Restionaceae	VU	Not recorded.
Restio esterhuyseniae	Restionaceae	Rare, WC, NC	Not recorded.
Restio karooicus	Restionaceae	LC, WC, NC	Not recorded.
Rhinephyllum graniforme	*Aizoaceae*	LC, WC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Rhodocoma vleibergensis	Restionaceae	Rare, WC, NC	Not recorded.
Romulea eburnea	Iridaceae	VU, WC, NC	A rare, localized endemic to the Roggeveld Escarpment, where it is known from two locations and potentially threatened by habitat degradation due to overgrazing. Klein Roggeveld.
Romulea hallii	Iridaceae	VU [D2], WC, NC	A Roggeveld endemic known from two locations, (EOO 39km²). It is potentially threatened by road maintenance and expansion and livestock overgrazing. Roggeveld Plateau southwest of Sutherland.
Romulea multifida	Iridaceae	VU, WC, NC	Not recorded. Present in area. South African endemic. Roggeveld Plateau. Roggeveld Shale Renosterveld.
Romulea syringodeoflora	Iridaceae	NT, WC, NC	A range restricted Roggeveld endemic (EOO 474km²), known from nine location and possibly occurring at a few more in unsurveyed parts of its range. Experiencing ongoing decline of habitat to crop cultivation as well as habitat degradation as a result of livestock

Scientific Name	Family	Status[16]	Comment
			overgrazing. Stony shale flats and slopes, Roggeveld Plateau.
Romulea tortuosa	*Iridaceae*	LC, WC, NC	Present on site. Common on site on flat rocky outcrops. Widespread endemic. Occasional on south-facing slopes, not affected.
Ruschia acocksii	Aizoaceae	Rare, WC, NC	Not recorded.
Ruschia altigena	Aizoaceae	Rare, WC, NC	Not recorded.
Ruschia cradockensis	Aizoaceae	LC, WC, NC	Present on site or vicinity
Ruschia crassa	*Aizoaceae*	LC, WC, NC	Present on site or vicinity
Ruschia karrooica	*Aizoaceae*	LC, WC, NC	Not recorded. Karoo Endemic, widespread.
Ruschia perfoliata	*Aizoaceae*	LC, WC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Sarcocaulon crassicaule)			
Secale strictum subsp. africanum	Poaceae	CR EN	Not recorded. NEST projected. Roggeveld-Hantam endemic, Found on riverbanks.
Selago albomontana	Scrophulariaceae	Rare	Not recorded.
Sensitive Species 1107	Asphodelaceae	Rare, WC, NC, NEST (M)	Not recorded
Sensitive Species 1138	Aizoaceae	Rare, WC, NC, NEST (M)	Not recorded
Sensitive Species 142	Amaryllidaceae	VU, WC, NC, NEST (M)	Long-lived bulb occurs as widely scattered subpopulations in lowland areas that are subject to continued habitat loss to. Herbarium specimens record about 18 subpopulations, and an estimated further 70 unrecorded subpopulations may exist. All subpopulations consist of fewer than 50 adult plants and are declining due to collection on an ongoing basis for medicinal purposes. Nieuwoudtville to Baviaanskloof.
Sensitive Species 338	Amaryllidaceae	Rare, WC, NC, NEST (M)	Not recorded
Sensitive Species 346	Geraniaceae	Rare, NC, NEST (M)	Not recorded
Sensitive Species 620	Crassulaceae	Rare, NC, NEST (M)	Not recorded. Karoo Endemic, A range-restricted habitat specialist endemic to the Ceres Karoo and Roggeveld. Site overlaps with possible range, may be present in shaded crevices on south facing slopes.
Sensitive Species 711	Amaryllidaceae	Rare, WC, NC, NEST (M)	Not recorded
Sensitive Species 722	Crassulaceae	Rare, NC, NEST (M)	Not recorded
Sensitive Species 886	Asteraceae	Rare, NEST (M)	Not recorded
Sensitive Species 936	Asphodelaceae	Rare, WC, NC, NEST (M)	Not recorded

Scientific Name	Family	Status[16]	Comment
Sericocoma pungens	*Amaranthaceae*	LC, WC, NC	Not recorded, Widespread species
Stapelia rufa	Apocynaceae	LC, NC	Present on site or vicinity
Strumaria karoopoortensis	Amaryllidaceae	VU, WC, NC	Not recorded
Strumaria pubescens	Amaryllidaceae	Rare, WC, NC	Not recorded
Strumaria undulata	*Amaryllidaceae*	DDT, WC, NC	Not recorded. Karoo Endemic, taxonomically problematic.
Tankwana hilmarii	*Aizoaceae*	CR, WC, NC	Not recorded, known locations to the south of Laingsburg
Thesium marlothii	*Santalaceae*	DDT	Not recorded. Karoo Endemic, taxonomically problematic.
Trachyandra sanguinorhiza	Asphodelaceae	Rare, WC, NC	Not recorded
Trichodiadema hallii	*Aizoaceae*	DDT, WC, NC	Not recorded. Karoo Endemic, taxonomically problematic.
Trichodiadema marlothii	Aizoaceae	LC, WC, NC	Present on site or vicinity
Trichodiadema mirabile	Aizoaceae	LC, WC, NC	Present on site or vicinity
Tridentea gemmiflora	Apocynaceae	LC, NC	Present on site or vicinity
Tridentea parvipuncta subsp. parvipuncta	*Apocynaceae*	LC, NC	Not recorded. Great Karoo endemic, Known from general area. Widespread.
Tritonia florentiae	Iridaceae	Rare, WC, NC	Not recorded.
Tylecodon faucium	Crassulaceae	Rare, NC	Not recorded. Karoo Endemic, A range-restricted habitat specialist endemic to the Ceres Karoo and Roggeveld Mountains (extent of occurrence 1516 km²), known from five subpopulations, this species has no recorded threats and is listed Rare nationally and Least Concern globally. Shaded rock crevices, often on south-facing slopes. Site overlaps with possible range, may be present in shaded crevices on south facing slopes.
Tylecodon paniculatus	Crassulaceae	LC, NC	Present on site or vicinity
Tylecodon reticulatus	Crassulaceae	LC, NC	Present on site or vicinity
Tylecodon wallichii	Crassulaceae	LC, NC	Present on site or vicinity
Wurmbea capensis	Colchicaceae	VU	Not recorded. Outside of range (Swartland area).
Zaluzianskya mirabilis	Scrophulariaceae	Rare, NEST (M)	Not recorded.
Mammals			
Bunolagus monticularis (Riverine rabbit)	Lagomorpha	CR	**Not Present.** Confined to riparian bush on the narrow alluvial fringe of seasonally dry watercourses in the Central Karoo. Presence highly unlikely. Site is outside of known distribution range.
Felis nigripes (Black-footed cat)	Carnivora	VU	Associated with arid country with MAR 100-500 mm, particularly areas with open habitat that provides some cover in the form of tall stands of grass or scrub. May a be transient species.
Birds			
Aquila verreauxii (Verreaux's Eagle)	Accipitridae	VU	Nesting pairs within or peripheral to the site and may be subject to loss of foraging habitat and the risk of collision with the turbine blades.
Polemaetus bellicosus (Martial Eagle)	Accipitridae	EN	Nesting pairs within or peripheral to the site and may be subject to loss of foraging

Scientific Name	Family	Status[16]	Comment
			habitat and the risk of collision with the turbine blades. (Vulnerable globally - IUCN)
Circus maurus (Black Harrier)	Accipitridae	EN	Nesting pairs within or peripheral to the site and may be subject to loss of foraging habitat and the risk of collision with the turbine blades. **(Endangered Globally - IUCN)**
Neotis ludwigii (Ludwig's Bustard)	Otididae	EN	Seasonal influxes of this threatened endemic may be displaced from foraging areas and exposed to collision risk with the turbine blades and with new power lines. (Endangered Globally - IUCN)
Reptiles			
Psammobates tentorius tentorius (Karoo Tent Tortoise)	Testudinidae	NT	Tortoises are highly susceptible to collisions with motor vehicles and trucks on new roads
Psammobates tentorius veroxii (Bushmanland Tent Tortoise)	Testudinidae	NT	Tortoises are highly susceptible to collisions with motor vehicles and trucks on new roads
Amphibians			
None of Concern			
Invertebrates			
Aloeides thyra orientis (Red copper)	Lycaenidae	LC	In vicinity of known distribution range of related subspecies (Brenton Blue). Host plants are not present on site.

20 Appendix 2: Biodiversity Environmental Management Plan

Specific measures relating to management of Biodiversity Impacts that must be included in the project Environmental Management Programme (EMPr). This Environmental Management Plan (EMP) contains guidelines, operating procedures and rehabilitation control requirements, which will be binding on the holder of the environmental authorisation after approval of the EMP. The impacts identified and listed in Table 18 will be managed / controlled as set out under mitigating measures (Table 25) and as detailed in this section for the more significant impacts during the construction phase.

20.1 Protection of Flora and Fauna

The following actions must be implemented at construction phase.

- Search and rescue operations for Species of Conservation Concern must be undertaken before the commencement of site clearing activities.
- Indigenous vegetation encountered on the sites that are to be conserved and left intact.
- It is important that clearing activities are kept to the minimum and take place in a phased manner. This allows animal species to move into safe areas and prevents wind and water erosion of the cleared areas.
- Stripped vegetation should be temporarily stored during operations and to be used later to stabilise slopes.
- No animals are to be harmed or killed during the course of operations.
- Workers are NOT allowed to collect any flora or snare any faunal species. All flora and fauna remain the property of the landowner and must not be disturbed, upset or used without their expressed consent.
- No open fires are permitted on site.
- Rehabilitation of vegetation of the site must be done as described in the Rehabilitation Plans.

20.2 Flora Search and Rescue

The following flora relocation plan is recommended:

- Respective permits to be obtained from the relevant competent authorities.
- When the final tower positions are known, where necessary plant search and rescue should be undertaken within the defined footprint areas.
- Flora search and rescue is to be conducted prior to vegetation clearing takes place.
- These species are to be replanted as soon as practically possible in a suitable area of similar vegetation, where future development is unlikely to occur, or within a nearby protected area.

20.3 Fauna Search and Rescue

Inasmuch that almost all fauna will voluntary vacate areas of construction/high activity, the following is recommended for inclusion in the EMP:

Necessary permits must be obtained for all species listed in:

  - NEM:BA Threatened or Protected Species (ToPS) species listed in terms of the ToPS regulations and including red-listed species.
  - Northern Cape Nature Conservation Act (Act no. 9 of 2009) - several species
  - The Nature and Environmental Ordinance 19 of 1974, (as amended by the Western Cape Nature Conservation Laws Amendment Act, Act 2 of 2000
- Any tortoise found in a construction footprint area should be moved to an area of safety greater than 100 metres aways.
- Removal of snakes must be undertaken by a competent snake handler.
- Once caught, each snake must be individually transported in suitable container.
- The transport containers must be kept cool to decrease stress for the reptiles.
- The reptiles will be relocated as soon as possible after they have been caught.

20.4 Alien and Invasive Plan Management Plan

The following mitigation measures have been identified in order to ensure that the introduction and spread of alien invasive vegetation is minimised:

- Alien species must be removed from the site as per the National Environmental Management: Biodiversity Act (No. 10 of 2004) requirements.
- A suitable weed management strategy must be implemented in the construction phase and carried through the operational phase.
- Weeds and alien species must be cleared by hand before the rehabilitation phase of the areas. Removal of alien plants are to be done according to the Working for Water Guidelines.
- The Contractor is responsible for the removal of alien species within all areas disturbed during construction activities. Disturbed areas include (but are not limited to) access roads, construction camps, site areas and temporary storage areas.
- All alien plant material (including brushwood and seeds) should be removed from site and disposed of at a registered waste disposal site.

20.5 Fires

- No open fires are permitted on site.
- The Contractor must ensure that an emergency preparedness plan is in place in order to fight accidental fires or veld fires, should they occur. The adjacent landowners/users/managers should also be informed or otherwise involved.

20.6 Top Soil Aspects

- Topsoil shall be removed from all areas where physical disturbance of the surface will occur.
- All available topsoil shall be removed prior to commencement of any operations.
- The removed topsoil shall be stored on high ground within the site footprint outside the 1:50 flood level within demarcated areas.
- Topsoil shall be kept separate from overburden and shall not be used for building or maintenance of roads.
- The stockpiled topsoil shall be protected from being blown away or being eroded.

20.7 Dust

- If required, water spray vehicles will be used to control wind cause by strong winds during activities on the works. Similar water-free methods may also be implemented.

20.8 Stormwater and Erosion Control

- Stormwater Management Plans must be developed for the site.
- Visual inspections will be done on a regular basis with regard to the stability of water control structure, erosion and siltation.
- Sediment-laden runoff from cleared areas must be prevented from entering rivers and streams.

20.9 Operating Procedures in the Site

- Construction shall only take place within the approved demarcated site.
- The holder of the environmental authorisation shall ensure that operations take place only in the demarcated areas as described in this report.
- No workers will be allowed to damage or collect any indigenous plant or snare any animal.
- No firewood to be collected on site and the lighting of fires must be prohibited.
- Cognisance is to be taken of the potential for endangered species occurring in the area. It is considered unlikely, however, that these species will be affected by the proposed activity.

20.10 Excavations

Whenever any excavation is undertaken, the following procedures shall be adhered to:

- Excavations shall take place only within the approved demarcated site.

- Once excavations have been filled with overburden, rocks and coarse natural materials and profiled with acceptable contours (including erosion control measures), the previous stored topsoil shall be returned to its original depth over the area.

20.11 Monitoring and Reporting

Adequate management, maintenance and monitoring will be carried out annually for two years.
To minimise adverse environmental impacts associated with operations it is intended to adopt a progressive rehabilitation programme, which will entail carrying out the proposed rehabilitation procedures concurrently with activity.

APPENDIX

G STORMWATER AND EROSION MANAGEMENT PLAN

HYDROLOGICAL ASSESSMENT, STORM WATER MANAGEMENT & EROSION CONTROL PLAN

FOR THE PROPOSED KARREEBOSCH WIND ENERGY FACILITY PART 2 AMENDMENT, FINAL LAYOUT & EMPR APPROVAL PROCESS AND BASIC ASSESSMENT PROCESS FOR THE ASSOCIATED GRID INFRASTRUCTURE

KAROO HOOGLAND LOCAL MUNICIPALITY, NAMAKWA DISTRICT MUNICIPALITY, NORTHERN AND WESTERN CAPE PROVINCES

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July 2022
FINAL REPORT

Acronyms

DEDTEA	Department of Economic Development, Tourism and Environmental Affairs
DWS	Department of Water and Sanitation
ECO	Environmental Control Officer
EIA	Environmental Impact Assessment
GA	General Authorisation
GIS	Geographical Information System
HEC-RAS	Hydrologic Engineering Center's (CEIWR-HEC) River Analysis System
MAP	Mean Annual Precipitation
MAT	Mean Annual Temperature
NFEPA	National Freshwater Priority Area
OHL	Over Head Lines
QC	Quaternary Catchment
SAWS	South African Weather Service
SWAT	Soil & Water Assessment Tool
SWMP	Storm Water Management Plan
UPD	Utility Programme for Drainage
WEF	Wind Energy Facility
WMA	Water Management Area
WULA	Water Use License Application

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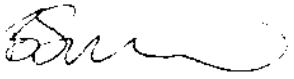
Specialist Details & Declaration

This report has been prepared in accordance with Section 13: General Requirements for Environmental Assessment Practitioners (EAPs) and Specialists as well as per Appendix 6 of GNR 982 – Environmental Impact Assessment Regulations and the National Environmental Management Act (NEMA, No. 107 of 1998 as amended 2017) and Government Notice 704 (GN 704). It has been prepared independently of influence or prejudice by any parties.

The details of Specialists are as follows –

Table 1 Details of Specialist

Specialist	Task	Qualification and accreditation	Client	Signature
Bruce Scott-Shaw NatureStamp SACNASP:118673	Fieldwork, modelling & report	BSc, BSc Hon, MSc, PhD, Hydrology	G7 Renewable Energies (Pty) Ltd	 Date: 29/07/2022
Nick Davis Isikhungusethu Environmental Services	GIS & Review	BSc, BSc Hon, MSc Hydrology	G7 Renewable Energies (Pty) Ltd	 Date: 29/107/2022

Details of Authors:

Bruce is a hydrologist, whose focus is broadly on hydrological perspectives of land use management and climate change. He completed his MSc under Prof. Roland Schulze in the School of Bioresources Engineering and Environmental Hydrology (BEEH) at the University of KwaZulu-Natal, South Africa. Throughout his university career he has mastered numerous models and tools relating to hydrology, soil science and GIS. Some of these include ACRU, SWAT, ArcMap, Idrisi, SEBAL, MatLab and Loggernet. He has some basic programming skills on the Java and CR Basic platforms. Bruce completed his PhD at the Center for Water Resources Research (UKZN), which focused on rehabilitation of alien invaded riparian zones and catchments using indigenous trees. Bruce is currently affiliated to the University of KwaZulu-Natal where he is a post-doctoral student where he runs and calibrates hydrological and soil erosion models. Bruce has presented his research around the world, including the European Science Foundation (Amsterdam, 2010), COP17 (Durban, 2011), World Water Forum (Marseille, 2012), MatLab advanced modelling (Luxembourg, 2013), World Water Week (Singapore, 2014), Forests & Water, British Colombia, (Canada, 2015), World Forestry Congress (Durban, 2015), Society for Ecological Restoration (Brazil, 2017). Conservation Symposium (Howick, South Africa, 2018) and SWAT modelling in Siem Reap (Cambodia, 2019). As a consultant, Bruce is the director and principal hydrologist of NatureStamp (PTY) Ltd. In this capacity he undertakes flood studies, calculates hydrological flows, performs general hydrological modelling, stormwater design, dam designs, wetland assessments, water quality assessments, groundwater studies and soil surveys.

Nicholas Davis is a hydrologist whose focus is broadly on hydrological perspectives of land use management, climate change, estuarine and wetland systems. Throughout his studies and subsequent work at UKZN he has mastered several models and programs such as ACRU, HEC-RAS, ArcMap, QGIS, Indicators of Hydrologic Alteration software (IHA) and Idrisi. He has moderate VBA programming skills, basic UNIX and python programming skills.

1. INTRODUCTION

1.1 Project Background and Description of the Activity

Karreebosch Wind Farm (Pty) Ltd. are undertaking a Part 2 amendment (including final layout and EMPr approval process) for the Karreebosch WEF, which will also supplement the WULA process. In addition, a separate Basic Assessment (BA) process for the associated grid infrastructure (132kV overhead powerline and 33kV/132kV substation) is being undertaken.

As part of the specialist requirements, a Floodline & Hydrological Assessment (including Stormwater Water Management Plan (SWMP)) is required in alignment with Government Notice 704 (GN 704 of the National Water Act). The location and layout of the site can be seen in Figure 1. The hydrological assessment complies with IFC Performance Standards (PSs), Appendix 6 of the NEMA EIA Regulations (2014, as amended) and comply with the DWS WUL/GA reporting requirements in terms of the National Water Act.

The requirement for the hydrological assessment is in part due to the potential presence of watercourse features on site and the impervious nature of the proposed activity. A key component of the investigation will be potential flood areas, accommodation of peak storm events, best practice erosion control and the general impact of the development on downstream surface water resources for water users in the catchment. The proposed infrastructure is as follows:

- Overhead Powerline (OHL)
- Servitudes
- Substations
- Site Access
- Turbines (40)
- Laydown Areas
- Construction Camp

The proposed wind energy facility (WEF) and associated grid infrastructure will be located on the following properties:

Farm Description	21-Digit Surveyor General (SG) Code	Area (ha)
Western Cape Province		
Portion 1 of Farm Bon Espirange No. 73	C04300000000007300001	1916,6474
Farm Aprils Kraal No. 105	C04300000000010500000	559,6837
Remainder of Farm Bon Espirange No. 73	C04300000000007300000	1764,2561
Remainder of Farm Brandvalley No. 75	C04300000000007500000	1981,9465
Northern Cape Province		
Farm Roode Wal No. 187	C07200000000018700000	2457,9713
Remainder of Farm Wilgebosch Rivier No. 188	C07200000000018800000	2898,914
Remainder of Farm Klipbanks Fontein No. 198	C07200000000019800000	1886,6226
Portion 1 of Farm Klipbanks Fontein No. 198	C07200000000019800001	1886,6226
Remainder of Farm Ek Kraal No. 199	C07200000000019900000	1407,4834
Portion 1 of Farm Ek Kraal No. 199	C07200000000019900001	1780,0948
Portion (Nuwe Kraal) of Farm Ek Kraal No. 199	C07200000000019900002	824,9459
Remainder of Farm Karreebosch No. 200	C07200000000020000000	1538,3432
Farm Appels Fontein No. 201	C07200000000020100000	4382,0063
Portion 2 of Farm Standvastigheid No. 210	C07200000000021000002	43,3064
Farm Rietfontein No. 197	C07200000000019700000	5873,6625
Farm Oude Huis No. 195	C07200000000019500000	1638,2716
Portion 1 of Farm Karree Kloof No. 196	C07200000000019600001	1859,8862
Portion 1 of Farm Karreebosch No. 200	C07200000000020000001	1550,7552
Remainder of Farm Standvastigheid No. 210	C07200000000021000000	4716,7192

1.2 Impact of Wind Energy Facilities on Hydrology

Wind Energy Facilities (WEF) in South Africa, which are becoming more abundant, may impact on the distribution of rainfall entering a catchment. The largest impacts are during construction as the size of the turbines require large vehicle/machines to transport to their destination, require deep piled foundations and large temporary storage areas. This results in potential erosion and an increase in stormflow. This is particularly relevant where slopes are steep. Following the construction phase, the impacts of WEFs on the hydrology is relatively low as natural and/or agricultural activities can continue and the disturbed footprint can be allowed to be rehabilitated without further disturbances.

In the context of this report, the following impacts are relevant:

- Change in runoff rates due to impeding structures (excavation and installation of foundations/crane pads for turbines and substation).
- Reduction in surface and groundwater quality through excavation for cables, foundations and crane pads leading to sedimentation and potential spills.
- Increased flood risk due to increased impervious areas.
- Potential erosion around construction areas, impervious surfaces and drip from blades.
- Potential erosion due to the widening of existing roads.

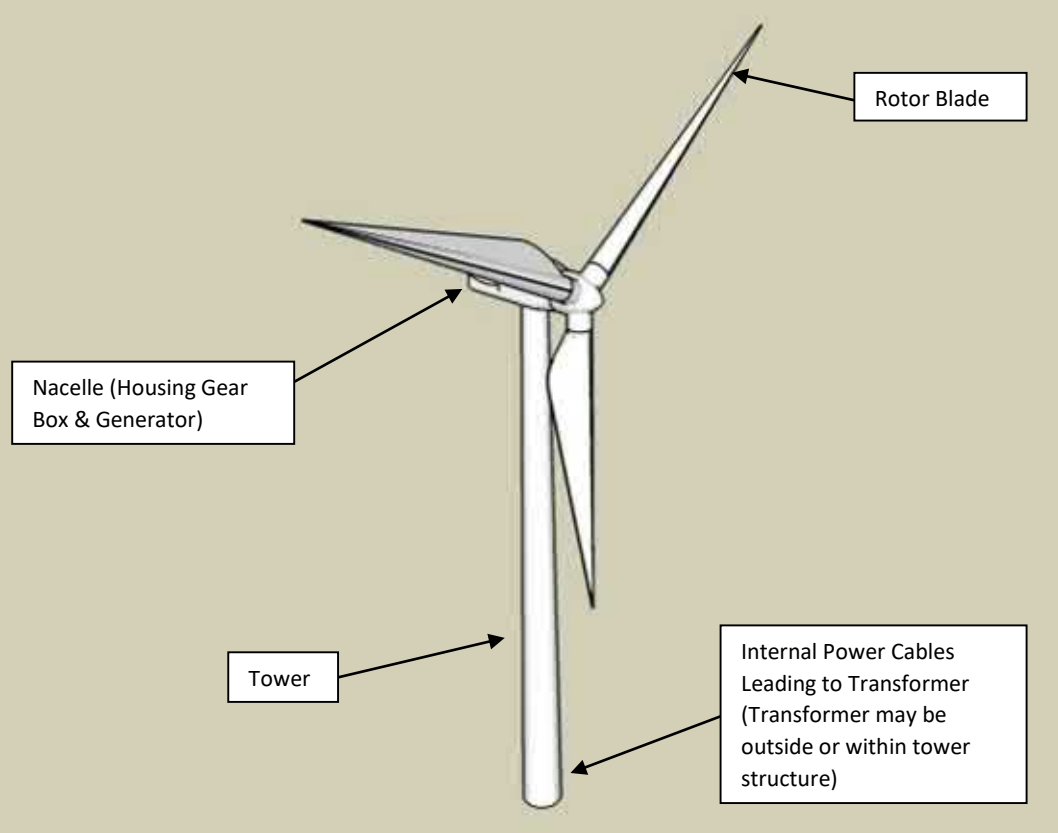


Figure 1 Typical design of a wind turbine (Suzlon model)

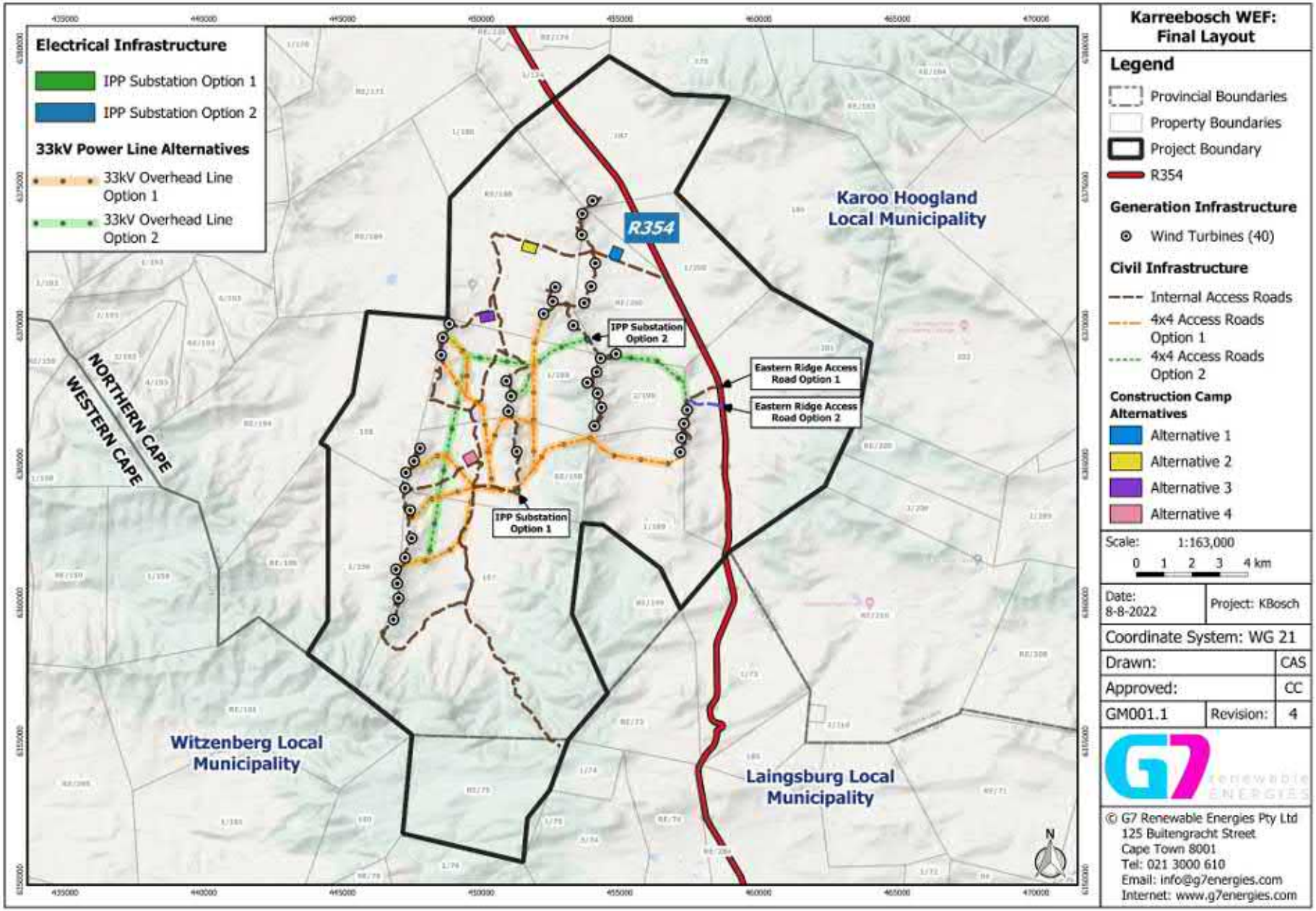


Figure 2 Locality map of the proposed Karreebosch WEF

1.3 Terms of reference

NatureStamp has been appointed to compile a flood assessment, SWMP for the Karreebosch WEF, powerline and substation (including all alternatives proposed) and associated access roads. The SWMP is in accordance with GN 704.

The terms of reference are as follows -

i. Flood Analysis and SWMP

- Site hydrological assessment, undertaken by the:
  a. Analysis of surface areas of the site;
  b. Analysis of sensitive areas on site;
  c. Analysis of existing storm water structures on site; and
  d. Determination of areas with clean and dirty water.
- Hydraulic design analysis, illustrated by the:
  a. Determination of the design storm event (1:2, 1:10, 1:50 & 1:100 year return period);
  b. Determination of the capability of proposed structures; and
  c. Recommendation of mitigation options and improvements.
  d. Classify access roads as per SANRAL Drainage Manual. Recommend the design flood frequency for all stormwater infrastructure typically constructed on a WEF (culverts, bridges or drifts for watercourse crossings, road drainage channels etc.).
- Erosion control plan
  a. Compilation of erosion control measures;
  b. Identification of high risk areas, exclusion areas and potential stockpile areas;
  c. Final erosion mitigation measures and rehabilitation objectives.
- Flood Hydrology:
  a. Hydraulic analysis, illustrated by the:
  - Compilation of the river reach model and flood line using HEC-RAS and HEC-geoRAS;
  - Determination of the flood risk and flood hazard throughout the study site; and
  - Recommendation of mitigation options associated with the hydraulic analysis.
  b. Consolidate results in a report with:
  - Flood line maps; and
  - A final flood line report.
- Consolidate results in a report with:
  a. Storm water maps;
  b. CAD storm water drawings and flood extents; and
  c. A storm water management plan and flood report.

ii. Water balance assessment:

- analysing climate data from the SAWS and other databases using nearby rainfall stations (input or known data);
- determining any water demands and water outputs; and
- determining whether water in the system is clean or contaminated.
- Development of a static water balance. The information gathered in the desktop assessment and during the site visit will be used to create a process water flow diagram. A series of models will be considered for use in this balance study. The Department of Water Affairs and Forestry, 2006 Best Practice Guideline G2: Water and Salt Balances was followed in this study.
- Produce a water balance study report with recommendations. An average annual water balance will be provided including an average dry and average wet month water balance. A set of recommendations will be provided to assist in the WULA and help the land owners to manage their water appropriately.

iii. Final Reports:

- Storm water maps/layouts
- CAD drawings for SW infrastructure and floodlines
- SWMP and Flood report (this report)

2. STUDY SITE

The site is located along the catchment divide of Quaternary Catchment E23A, falling under the Olifants/Doorn Management Area (WMA). The authorized Karreebosch WEF area sits on the plateau of Roggeveld mountain range that is almost entirely natural excepts for some small structures and gravel roads.

The WEF and associated grid infrastructure is in the Witzenberg & Karoo Hooglandlocal Municipality and the Cape Winelands & Namakwa District Municipality. The properties are currently zoned as natural land with some agricultural land use with low agricultural potential, and seasonal grazing still occurs across the site.

Rainfall in the region occurs throughout the year (mostly March to August), with a mean annual precipitation of 253 mm (observed from rainfall station 0044765 W – Lynch, 2003). The reference potential evaporation (ET_o) is approximately 2 490 mm (A-pan equivalent, after Schulze, 2011) and the mean annual evaporation is between 1 800 – 2 000 mm, which exceeds the annual rainfall. This suggests a high evaporative demand and a water limited system. Summers are warm to hot and winters are cold with snow events. The mean annual temperature is approximately 22.5 °C in summer and 8.8 °C in the winter months (Table 2 – Schulze, 2003). The underlying geology of the site is sedimentary Ecca Shale of the Karoo formation (Permian period) and the soils overlain are shallow sandy-clay-loam ranging from Mispah to Glenrosa form in this particular area.

Table 2 Mean monthly rainfall and temperature observed at Karreebosch (derived from historical data)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Rainfall (mm)	7.4	10.4	18.2	21.4	29.8	43.1	32.9	32.2	19.1	15.9	11.8	11.5	**253.8**
Average Maximum Temperature (°C)	31.9	31.7	28.9	23.9	19.1	15.2	15.2	16.7	20.2	24.2	27.3	30.0	**23.7**
Average Minimum Temperature (°C)	13.7	14.0	12.8	10.5	8.0	5.6	4.8	5.5	6.9	9.0	10.8	12.8	**9.5**

Figure 3 General setting of the proposed Karreebosch WEF and OHPL site

3. METHODOLOGY

The following methodology was followed in order to meet the objectives as detailed in the terms of reference.

Table 3 Data type and source for the hydrological assessment

Data Type	Year	Source/Reference
Aerial Imagery	2013, 2016	Surveyor General
1:50 000 Topographical	2011	Surveyor General
2& 5m Contour	2010	Surveyor General
River Shapefile	2011	NFEPA
Geology Shapefile	2011	Council of Geoscience, 2015/National Groundwater Archive
Land Cover	2015	Department of Environmental Affairs, Republic of South Africa
Water Registration	2013, 2016	WARMS - DWS

*Data will be provided on request

3.1 Catchment Assessment

The pre-development conditions were assessed as follows -

- The vegetation and surface characteristics of the watercourse were assessed for the determination of the Manning's n-values;
- The presence and dimensions of any storm water structures, such as culverts, bridges, drains, berms and gutters that would divert flow during a storm event were noted;
- The overall state of drainage channels, streams and nearby rivers was assessed;
- The slope of the study site as well as evidence of erosion around the site were noted; and
- The elevation throughout the site in order to verify contour data.

In accordance with GN 704, the main objectives of a SWMP were:

1. To accommodate post-development storm events;
2. To keep clean and dirty water separated;
3. To contain any dirty water within a system; and
4. To prevent contamination of clean water.

A range of storm water design events were considered. 2-meter contours obtained from the Surveyor General were obtained and improved using a GPS. Rainfall data was extracted using the rainfall extraction utility tool (Kunz, 2003). Contributing catchment areas were calculated using the derived elevation model.

The critical contributing catchment area was determined for use in both the watershed delineation tool and HEC-HMS and SWAT models. The sub-catchments were delineated using the 5m contour set as an input. This was used to create a Digital Elevation Model (DEM) that was then used as an input to the watershed tool (Figure 4).

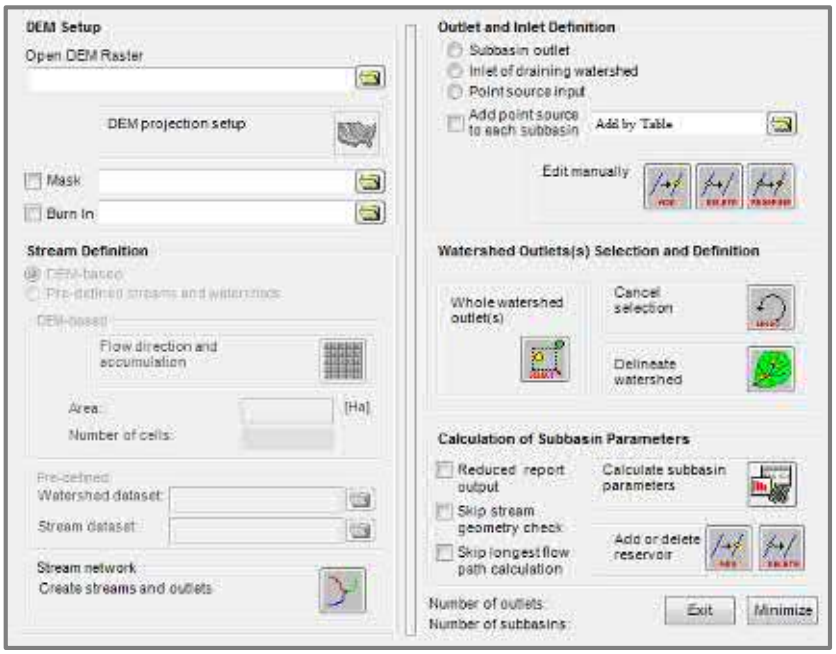


Figure 4 Soil Water Assessment Tool (*SWAT*) watershed delineation tool for sub-catchment delineation and stream network creation

3.2 Design Flood Determination

The peak flows for the 1:5, 1:10, 1:50 and 1:100 flood events were calculated for the catchments using the rational method, the SCS-SA model, the rational method and the Standard Design Flood Method as outlined in the SANRAL Drainage Manual (2013) in areas where flow data was not available. Additionally, an area corrected flow was also calculated using catchments with flow data to compare to the design rainfall/runoff calculations.

The SCS-SA model is a hydrological storm event simulation model suitable ideally for application on catchments that have a contributing catchment of less than 30 km². The model has been used widely both internationally and nationally for the estimation of flood peak discharges and volume (Schulze *et al*., 1992). The type of surface in the drainage basin is also important.

The Rational Method becomes more accurate as the amount of impervious surface, such as pavements and rooftops, increases. As a result, the Rational Method is most often used in urban and suburban areas (ODOT Hydraulics Manual, 2014).

3.3 Flood Line Determination

Modelling of the flood lines was undertaken using the U.S. Army Corps of Engineers' HEC-RAS v4.1 programme, which is commonly used throughout South Africa. Numerous cross sections were created throughout the contributing area (Figure 5). Ineffective areas/hydraulic structures were digitized and included in the model. Land use coverage was used to determine the Manning's n-values in a GIS platform. Each cross section may have had numerous values on either side of the channel depending on the site characteristics. Manning's N-values were obtained from the HEC-RAS Hydraulic Reference Manual (2010) for the channel areas (a value of between 0.03 and 0.04 was used depending on the presence or absence of rock features and debris). Design flood values were used as an input for the relevant reaches.

Given the slope of the catchment and the distance to downstream hydrological infrastructure, some inundation within the study site would occur but not from external features on the watercourse. As such, Normal Depth was selected for the reach boundary conditions. The slope of the channel was used as the value for the backwater calculation of the initial condition. Some inundation structures were included in the cross sections where these were structures present (Figure 6). Varying reach boundary conditions were set for these sites.

Figure 5 provides an overview of one of the impeding structures along the river. A cross-section shows the delineated area with unique station variables at each site.

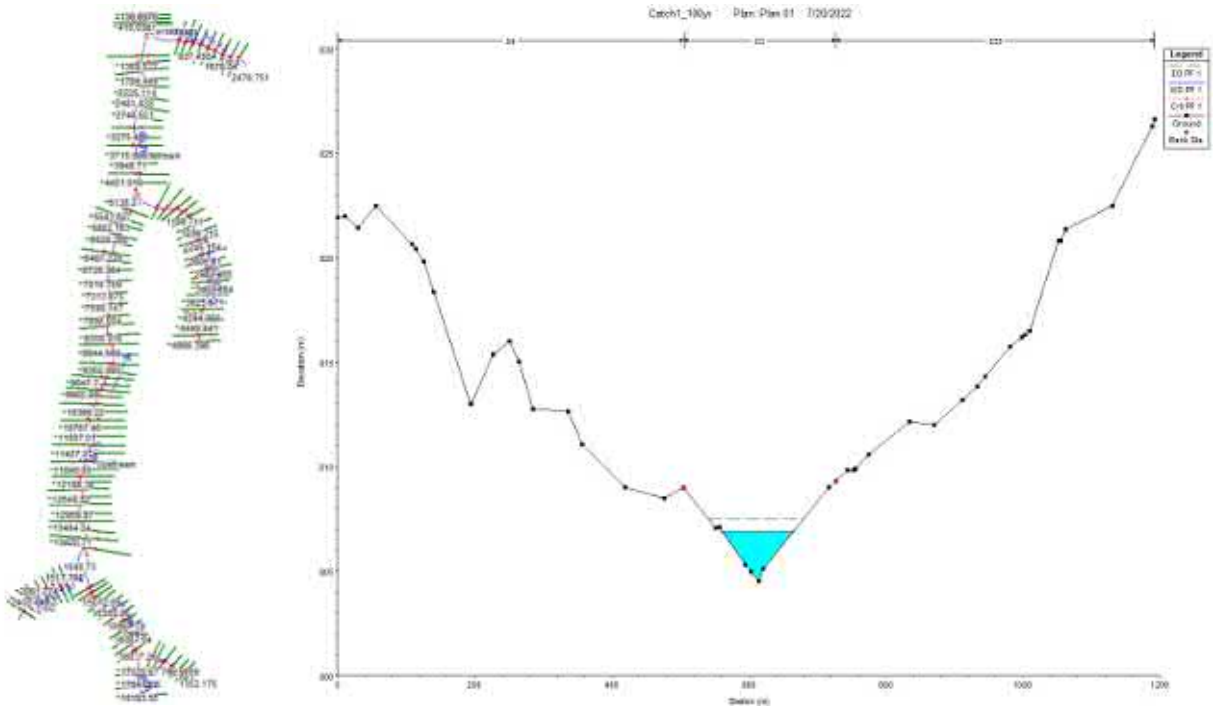


Figure 5 Channel cross sections and channel velocities developed for the relevant sections of the Tankwa tributary

At each profile, a unique peak flow was calculated for each return period. Nine (9) different volumes (linked to the 9 unique profiles) were calculated using either flow or design rainfall calculations. This was undertaken for each catchment.

3.4 Flood Line Determination for Minor Channels

As HEC-RAS and HEC-geoRAS are highly sensitive to the resolution of the terrain data used in the model, small non-perennial channels such as drainage lines are often not captured within the model. In most cases the flood output is not required for such channels as the flood generated would be negligible. However, it is good practice to ensure that all channels or drainage lines are adequately covered. As such, the author has developed a simple model to generate a flood depth through GIS. The model considers the flood generated for nearby smaller catchments and applies and area weighted correction. The model generates a flood height based on this estimation within the existing terrain model. Figure 6 provides a schematic of this model.

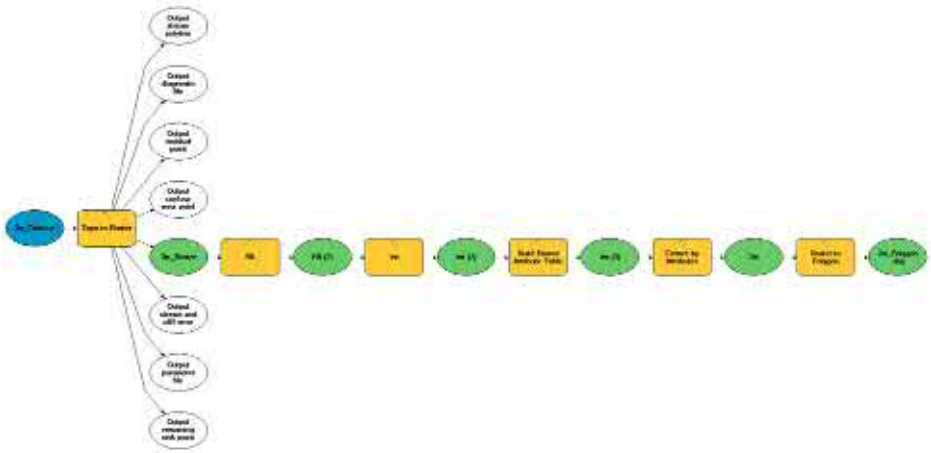


Figure 6 GIS model for flood generation in small channels

3.5 Design Storm Determination

The peak flows for the 1:2, 1:5, 1:10, 1:50 and 1:100 storm events were calculated for the catchments using the rational method as outlined in the SANRAL Drainage Manual (6th Edition, 2013). The type of surface in the drainage basin is an important component in the design calculations. The SANRAL Rational Method becomes more accurate as the amount of impervious surface, such as pavements and rooftops, increases. As a result, the Rational Method is most often used in urban and suburban areas (ODOT Hydraulics Manual, 2014). The Utility Programme for Drainage (Sinotech) was used to run the rational method, determine drainage grid and kerb drainage calculations.

It is recommended for infrastructure that the 1:50 year return design for a 30-minute storm is used as a typical event to design for. The areas of the proposed infrastructure can be seen in Table 4. Roads and culverts were assessed separately and adopt a 1:20 year return period.

Table 4 Activity/Infrastructure areas

Activity/Infrastructure	Impervious	Area
Access Roads, internal roads and culverts (new, widened & 4x4)	Partial	119.82 ha
Powerline access incl. Komsberg (included above)	Partial	41.5 ha
Transformers/Substation	Yes	3.4 ha
Construction Camp & Operations Building	Yes	14 ha
Lay Down Area (incl. Crane Pads Turbine Footprint)	Yes	40.14 ha

3.6 Storm Water Design Principles

The objective of the Stormwater Management Plan is to control runoff flows and prevent detrimental impacts on receiving waters, considering both the quality and quantity of the stormwater runoff. As the existing site has natural impervious areas, steep slopes and shallow soils, the velocity of stormwater runoff would be considered high. However, as the site is located near the catchment divide, there are little to no upper catchment contributions.

Stormwater management design principles to be followed on site include:

- The establishment and maintenance of grass and plants adjacent to newly constructed infrastructure and graded roads.
- Hazardous or environmentally dangerous chemicals kept on site must be kept outside of the 1:00 year flood line and watercourses or appropriately bunded.
- Groundcover should be maintained during construction to ensure erosion protection.
- Flow concentration points should avoid unstable soil areas and/or stockpiles.
- All pollution from the surfaces should not flow directly into water resources.
- Ensure aesthetic designs.

The above-mentioned principles are to be used as a conceptual stormwater management guide.

3.7 Water Balance

There are three methods to consider when undertaking a water and salt balance. These are manual methods, spreadsheet-based models and standalone PC based models (after DWAF, 2006), described as follows:

3.7.1 Manual Calculation

Manual calculations are the simplest option which involves a rapid screening of a site for quick and simple once off results. This approach is more suited to very simple systems where there is a limited level of complexity in the hydrological partitions. This approach does not require any equipment (field or desktop based). However, this approach may not be suitable for moderate to complex systems and could become impractical where larger repetitive calculations are required. This approach does not present the data visually as in some models. Although the water balance of this site is relatively simple, this approach was not used.

3.7.2 Spreadsheet Based Models

Spreadsheet based models are commonly used by specialists as they allow for calculations to be undertaken quickly. These are calculations undertaken in Excel or MATLAB using recognised runoff algorithms. The user of such sheets can easily see the algorithms used in the model and can add or modify the functions according to the user requirement. However, there is a potential for greater user error and editing outputs can be time consuming.

3.7.3 Standalone PC Based or High-End Software

Many software platforms are available to users looking to compile a water and salt balance. Some of the software is specifically designed for this purpose whereas others are more general accounting models. These models can be used for larger and more complex systems. These models/tools are user friendly and can produce data is a logical and aesthetically pleasing format. The input layout can often help the user to understand the water balance process. Furthermore, it is relatively simple to change variables and quickly run scenarios. However, this approach can be confusing if the user is inexperienced and can cost a lot of money for the license. An example of one of the models considered in this study is GoldSim and HEC-HMS.

A water balance was calculated for the existing development using WR2012 data in a spreadsheet-based model and run through HEC-HMS. The output included an annual, wet month and dry month assessment.

4. LIMITATIONS AND ASSUMPTIONS

In order to apply generalized and often rigid design methods or techniques to natural, dynamic environments, a number of assumptions are made. Furthermore, a number of limitations exist when assessing such complex hydrological systems. The following constraints may have affected this assessment:

- Manning's n - values (the channels roughness coefficient) was estimated on site. However, most of these values were informed assumptions as all of the flow on site would be overland flow (limited channels exist within the site).
- There were no sub-surface servitudes identified on site. It was assumed that storm water concentrations points would be undertaken at strategic locations.
- It was assumed that culverts would be partially obstructed by debris.
- It was assumed that the roads are impervious.
- It was assumed that all storm water systems on site were 90 % unblocked.
- It was assumed that all roofs and roads would have standard sized culverts and gutters.
- 2-meter and 5-meter contour interval data and Digital Elevation Models (DEMs) were used in the design flood estimation (development of the elevation model) within the greater catchment area. Within a 500 m radius of the site, a detailed topographical survey was undertaken. Given the flood proposed, this resolution was of sufficient accuracy for the flood line determination.
- Given the setting of the site (numerous rocky outcrops) it was difficult to determine which channels would be fully active in a small flood and which are remnant channels which have since been bypassed. As such, the HEC-geoRAS and HEC-RAS models cannot be used to a very high level of accuracy in certain areas as they are usually used on larger catchment areas.

5. RESULTS AND DISCUSSION

The following results were used as input to the selected models and have been provided here.

5.1 Desktop Assessment

5.1.1 National Freshwater Ecosystem Priority Areas (NFEPA) Project / Assessment

In accordance with the NFEPA guidelines CSIR (2011), the relevant reach of the Tankwa, Wilgebos and Kleinpoorts (and their associated riparian areas) have been classified as a FEPA system (Class C – Moderately Modified), which indicates that this river system is a national freshwater conservation priority but has been disturbed to some extent. Small artificial FEPA dams were identified within the study site. Some natural systems are present but are limited to the riparian areas. A freshwater ecology study has been undertaken by FEN (2022) and should be referred to for the spatial extent of aquatic resources.

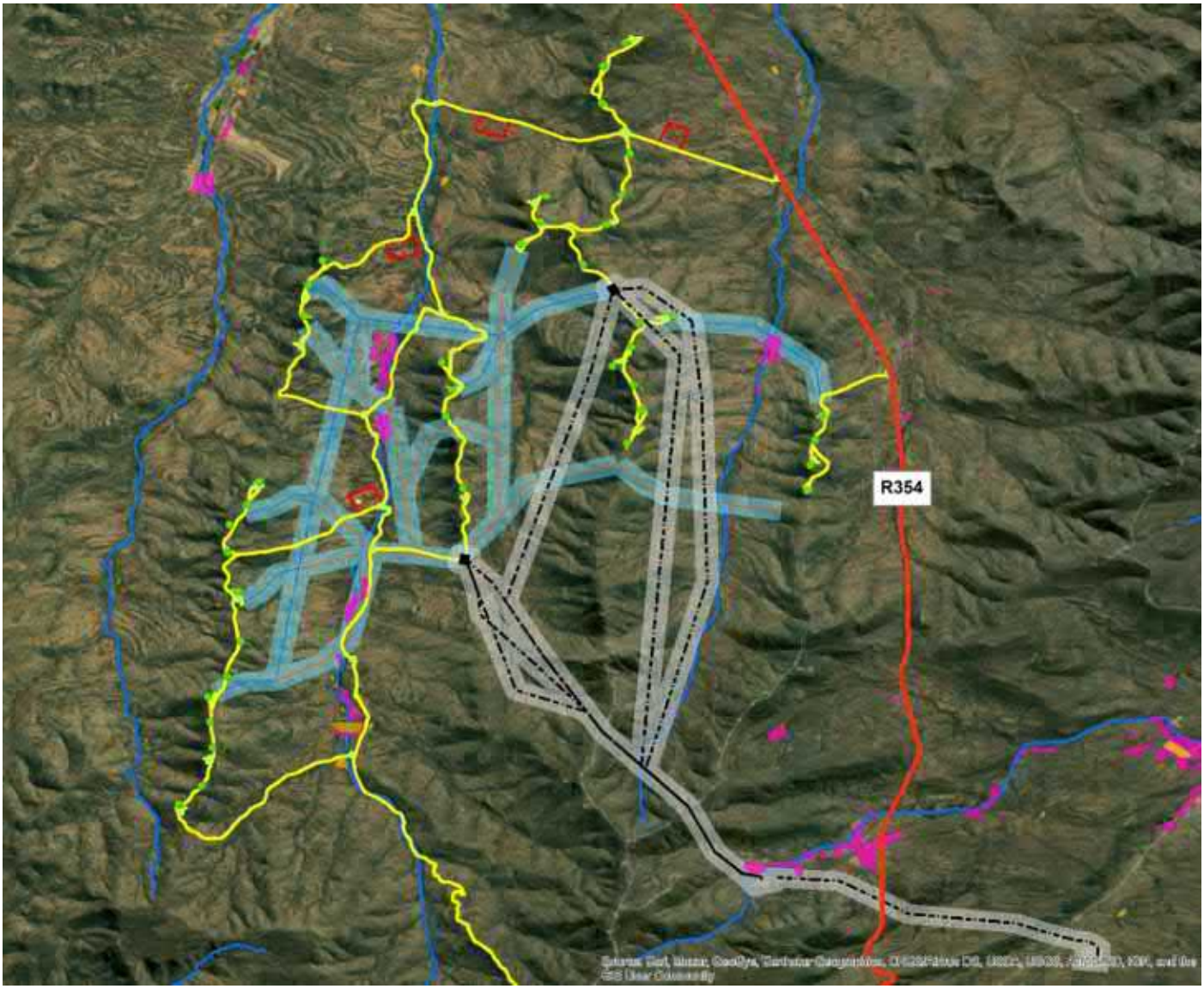


Figure 7 NFEPA rivers (blue), wetlands (pink) and artificial systems (orange) in relation to the proposed Karreebsoch WEF and Grid Infrastructure

5.1.2 Terrain, Soils, Geology & Vegetation

Contour lines (5 meter) were used to calculate the slope of each of the banks. The soils and geology were obtained from GIS layers. Various vegetation databases were used to determine the likely or expected vegetation types (Mucina & Rutherford, 2006; Scott-Shaw & Escott, 2011). A number of recognized databases

(*c.f.* Table 4) were utilized in achieving a comprehensive review and allowing any regional or provincial conservation and biodiversity concerns to be highlighted.

Natural vegetation of the area is Koedoesberge-Moordenaars Karoo (SKv 6, Mucina and Rutherford, 2006). This occurs within the Succulent Karoo biome. The desktop analysis revealed that the area is a least threatened area, with the potential for some flagged fauna and flora (e.g. red data species and endangered wildlife) being found from the C-plan, SEA and MINSET databases. However, this does not necessarily mean that rare or endangered species will occur in the area of interest.

- **Distribution:** Western Cape and Northern Cape (smaller portion) Provinces: Koedoesberge and Pienaar se Berg low mountain ranges bordering on southern Tanqua Karoo and separated by the Klein Roggeveld Mountains from the Moordenaars Karoo in the broad area of Laingsburg and Merweville. The unit also includes the Doesberg region east of Laingsburg and piedmonts of the Elandsberg as far as beyond the Gamkapoort Dam at Excelsior (west of Prince Albert).
- **Altitude:** 500–1 250 m (most of the area at 680–1 120 m).
- **Vegetation & Landscape Features:** Slightly undulating to hilly landscape covered by low succulent scrub and dotted by scattered tall shrubs, patches of 'white' grass visible on plains, the most conspicuous dominants being dwarf shrubs of Pteronia, Drosanthemum and Galenia.
- **Geology & Soils:** Mudstone mainly, shale and sandstone of the Adelaide Subgroup (Beaufort Group), accompanied by sandstone, shale and mudstone of the Permian Waterford Formation (Ecca Group) and sandstone and shale of other Ecca Group Formations as well as Dwyka Group diamictites (all of the Karoo Supergroup). This geology gives rise to shallow, skeletal soils. Region is classified as Fc land type (Lime generally present, Glenrosa and Mispah forms), with Ib land type (Rock areas with miscellaneous soils) playing a subordinate role.
- **Climate:** Probability of rain is given for the entire year, but it is higher in winter. MAP slightly above 200 mm. There are two slight rainfall optima: one in March and another spread from May to August. MAT close to 16°C and incidence of frost relatively high (30 days).
- **Conservation:** Least threatened. Target 19%. Only a very small portion enjoying statutory conservation in the Gamkapoort Nature Reserve. Transformed only to a very small extent. No serious alien plant invasions recorded. Erosion is moderate (88%) and only to lesser extent high or very low.

5.1.3 Site Analysis

A detailed site assessment was undertaken through the site visit (12th – 15th of July 2022) and supported by desktop data. This is important as it assisted in determining the Manning's n values (Chow, 1959), that are used to create an additional input spatial file used in HEC-RAS.

The site is almost entirely dominated by low shrub, which was confirmed during the site visit. Basal cover is low resulting in an increase stormflow potential.

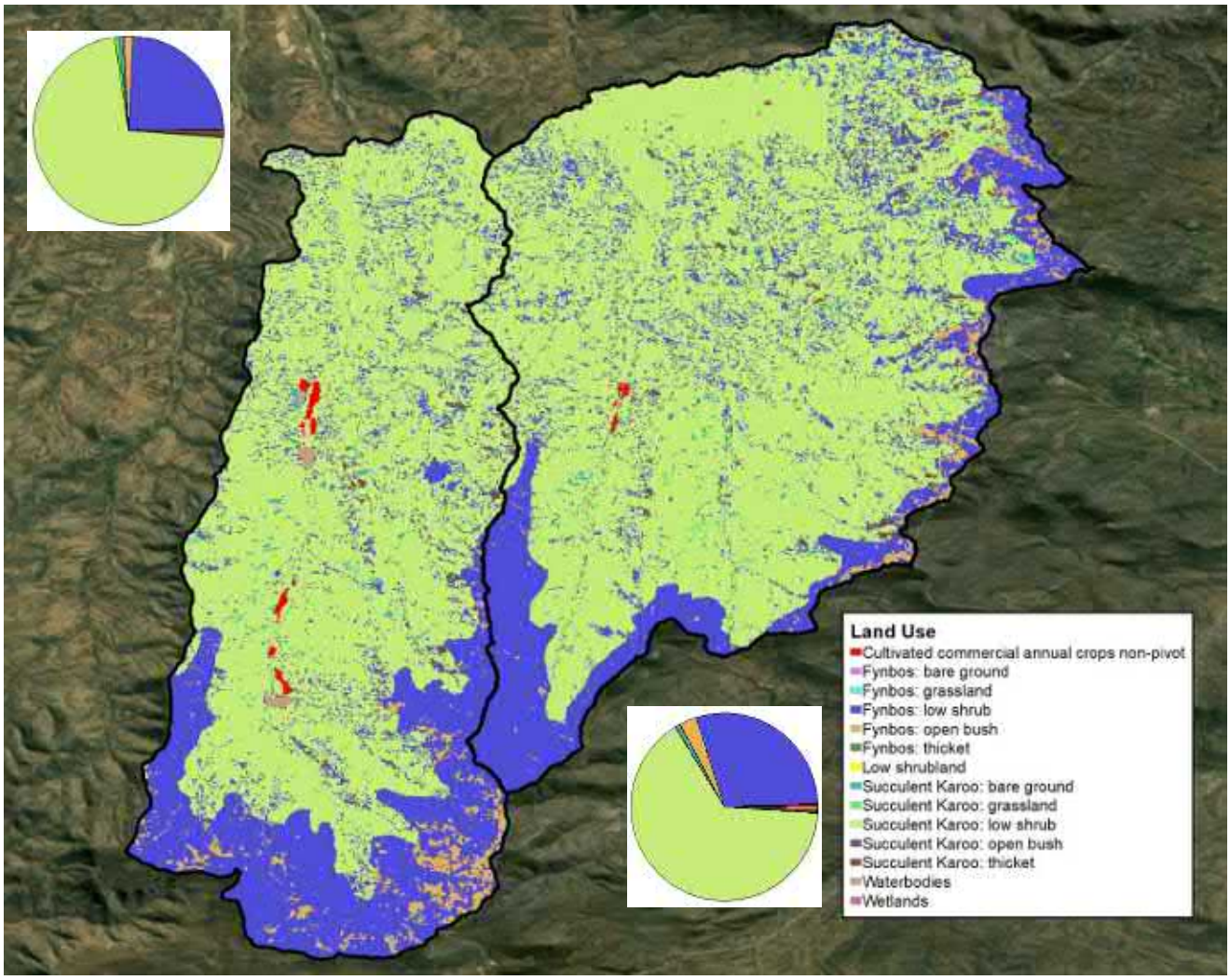


Figure 8 Land cover for the Karreebosch WEF catchment area

Table 5 Catchment land use areas used for modelling the peak discharge

Land Use	Area (ha)	Percentage	Area (ha)	Percentage
Cultivated commercial annual crops non-pivot	9.63	0.06	43.38	0.36
Fynbos: bare ground	18.35	0.12	11.16	0.09
Fynbos: grassland	9.76	0.06	6.26	0.05
Fynbos: low shrub	3712.11	24.01	3545.46	29.31
Fynbos: open bush	241.46	1.56	368.04	3.04
Fynbos: thicket	3.24	0.02	1.26	0.01
Low shrubland	21.07	0.14	17.28	0.14
Mines	1.08	0.01	0.00	0.00
Succulent Karoo: bare ground	104.37	0.67	84.86	0.70
Succulent Karoo: grassland	114.94	0.74	21.22	0.18
Succulent Karoo: low shrub	11036.65	71.38	7864.13	65.02
Succulent Karoo: open bush	44.11	0.29	22.91	0.19
Succulent Karoo: thicket	141.69	0.92	71.31	0.59
Waterbodies	1.44	0.01	32.94	0.27
Wetlands	2.61	0.02	4.79	0.04
Total	**15462.51**	**100**	**12095.00**	**100**

The catchment was divided into sub-catchments based on connections between tributaries (Figure 9). This was undertaken using the Soil Water Assessment Tool (SWAT). The catchment area of Karreebosch is relatively small with all channels on-site being non-perennial in nature and would only have flowing water succeeding moderate to high rainfall events.

Figure 9 Plateau position of the internal roads/turning circles, laydown areas and turbines at Karreebosch WEF

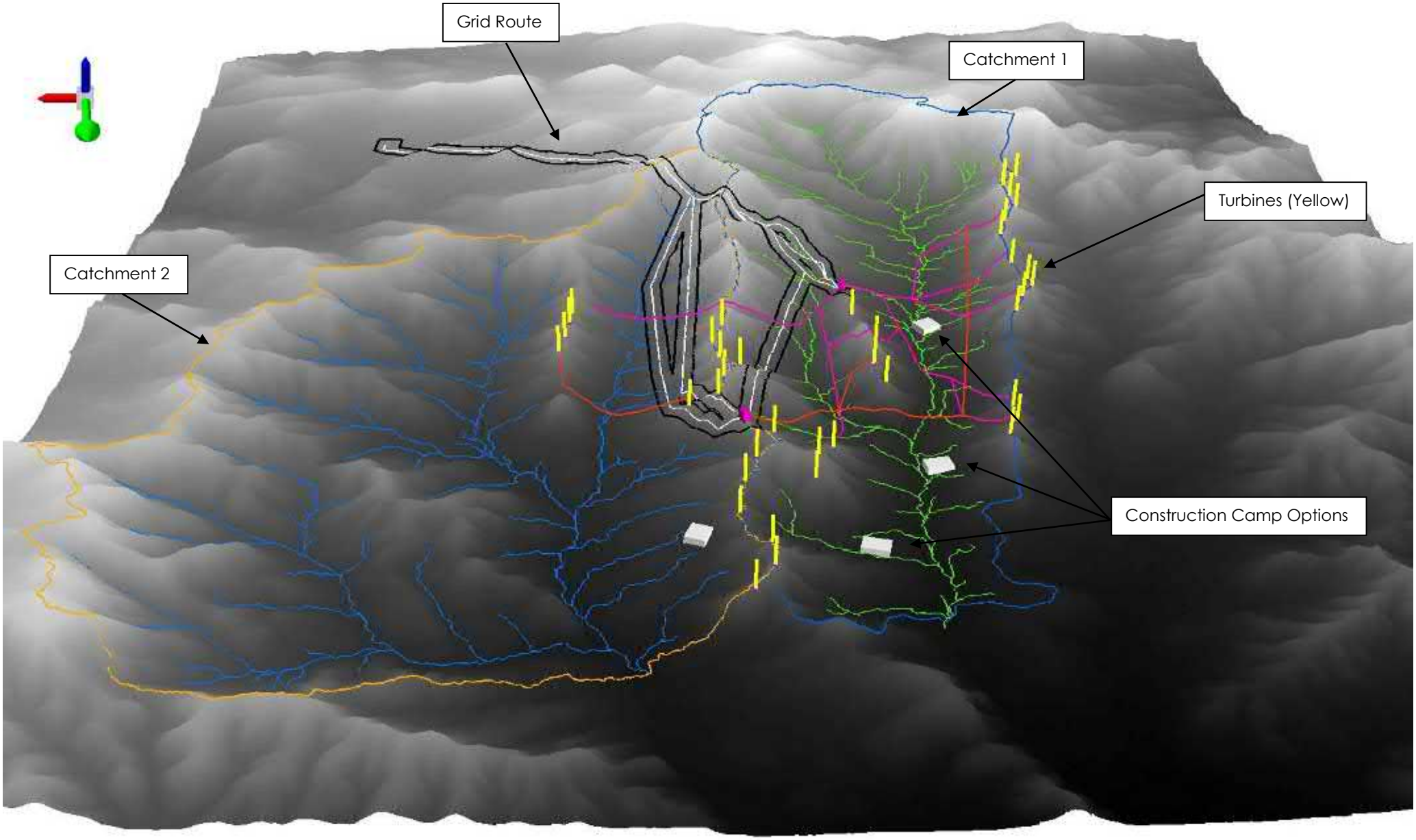


Figure 10 Exaggerated terrain model for the catchment associated with the proposed Karreebosch WEF (north –green arrow)

5.2 Climate Analysis

The long term annual rainfall data (Station 0044765 W – 41 km from the site) as well as design rainfall was sourced for the study area. The long term annual rainfall for numerous stations was extracted using the Daily Rainfall Extraction Utility (Lynch, 2003). Mean Annual Precipitation (MAP) for the study area is approximately 253 mm (Figure 11 – Lynch, 2003; Climate Forecast System Reanalysis (CFSR)). Some inconsistencies were identified in this record (e.g. some missing data in the earlly1900s and some large flood events not being recorded), these were verified using nearby stations and corrected as such. The best rainfall records were synthesized with the more recent data to create a new rainfall record that could be used in the design flood estimation. The station in close proximity, with similar altitude and MAP and a reliable record was selected.

Table 6 Comparison of values from some of the rainfall stations that were assessed during the data analysis

Station No.	Estimated MAP (mm)	Observed MAP (mm)	Years	Reliable	Patched	Altitude (m)	Station Name
004050 W	224	225	122	32.4	32.9	776	Touwsrivier (SAR)
0066027 W	259	259	120	56.5	43.1	1372	Brandvlei
0045134 W	151	151	56	62	34.5	930	Dwars In
0044765 W	252	252	120	58.7	40.5	1067	Pieter Meintjies (SAR)
0044286 W	206	207	122	41.0	58.7	866	Jan De Boers
0045134 W	170	173	120	80.3	19.3	902	Matjiesfontein (SAR)

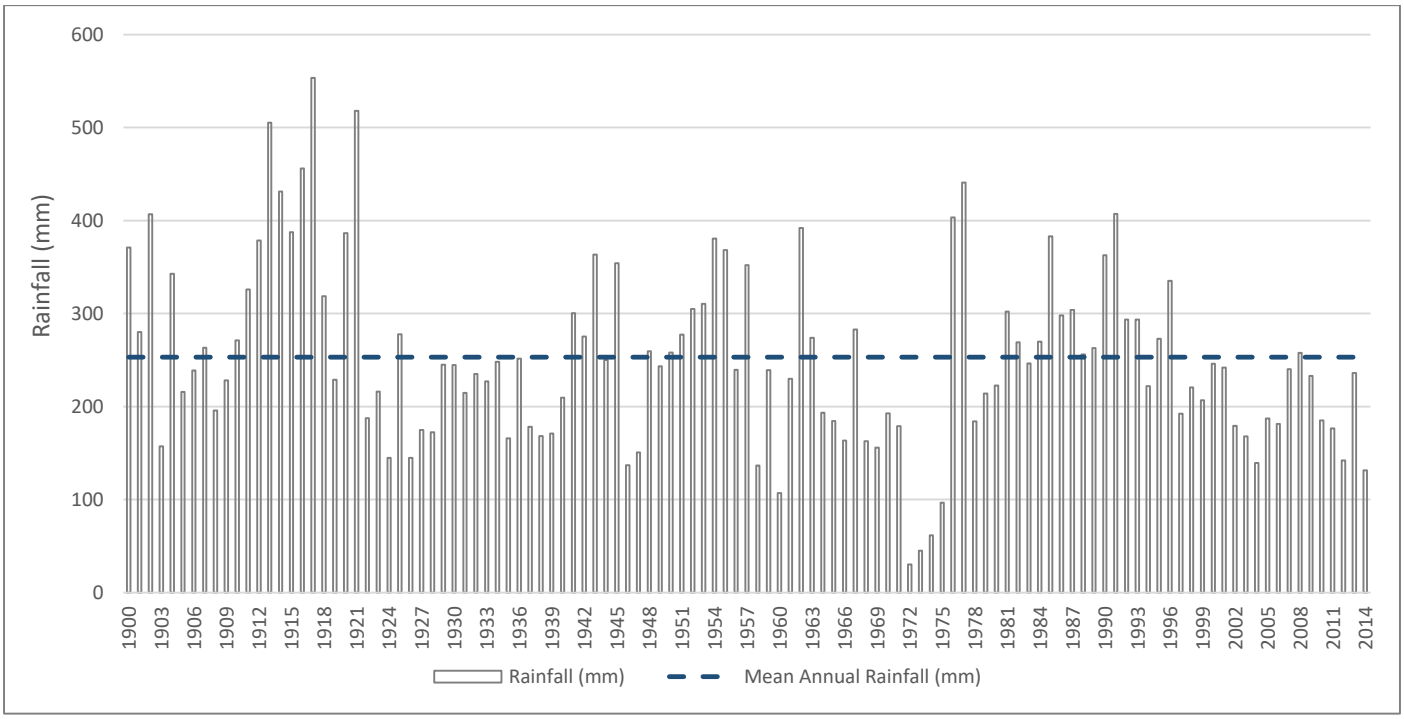


Figure 11 Long-term annual rainfall (annual in blue) near the proposed Karreebosch WEF and associated infrastructure

5.3 Design Rainfall

Design rainfall differs from mean annual rainfall as it is rainfall associated with an events rainfall depth for a specified storm duration and a recurrence interval (frequency of occurrence). The design rainfall used is dependent on the method used to determine the peak discharge. The SCS-SA method uses 1 day-rainfall for various return periods while the Rational and SDF Methods use rainfall intensity linked to the catchments Time of Concentration (Tc) and Storm Duration. The Design Rainfall Estimation (DRE) tool which uses observed rainfall data was included for comparative purposes. The results of the design rainfall assessment have been provided in Annexure A. A summary of these results has been provided in Table 7.

Table 7 Design rainfall for the Karreebosch WEF

Station Name & ID	Obs MAP	Years	Altitude (m)	Design Rainfall (mm)						
				2	5	10	20	50	100	200
Pieter Meintjies - 0044765 W	252	100	1067	32.0	47.0	58.2	70.2	87.5	101.9	117.7

5.4 Hydraulic Structures

An assessment was undertaken on any structures, which was populated in HEC-RAS. According to SANRAL (2016), the discharge capacity of the structures such as culverts would be determined by the following equation:

$$Q_{ideal} = CbH^{1.5}$$

where: Q = Discharge ($m^3.s^{-1}$)
C = Discharge Coefficient
G = Gravitational Constant (9.81 $m.s^{-1}$)
b = Side Width (m)
H = Headwater Depth (m)

The roads throughout the site have been assumed to be class 3 roads. As such, the 1:20 year event should be used in sizing the culverts. This peak event varies throughout the catchment position and whether a major or minor crossing occurs. Thirteen crossing points have been proposed. It is recommended that for major crossings, the proponent utilizes a low level crossing or portal culverts and for minor crossings, the proponent uses pipe culverts. Once the final dimensions of the road and exact crossing points have been determined, the size of each culvert can be calculated.

Using Mannings formula for an open channel ($Q = 1.486/n)AR_h^{2/3}S^{1/2}$), the average discharge capacity of a natural channel adjacent to the road would be **0.41 $m^3.s^{-1}$**.

5.5 Design Peak Discharge

The design runoff results obtained for the 1:2, 1:15, 1:10, 1:20, 1:50 and 1:100 year flood events for the various river reaches are summarized in Table 8. The populated calculation sheets for the rational, SCS and SDF methods can be seen in Annexure B, C & D. The high contrast in values is due to the catchment size limitations of the design approaches. It is expected by the authors that the estimates from the rational and SDF are over designed. This is likely due to smaller catchment areas and rainfall value that may not be representative of the entire catchment. Furthermore, the lack of vegetation and the presence of eroded channels has resulted in a much shorter time of concentration than what would have occurred in past decades. The design values indicate that the larger design events were vastly different between models whereas the smaller more frequent events were similar between models. This is likely due to the recommended catchment areas that these models are designed for. Given the results, the SCS model was considered to be the most appropriate model if design rainfall were to be used. As such, the 1:100 year flood event, which is used in Water Use License Applications would discharge a total of 411.1 and 756.7 $m^3.s^{-1}$ respectively (Table 8).

Table 8 Adopted design peak discharge values ($m^3.s$-1) run through HEC-RAS for the catchment area

Catchment	Peak Discharge ($m^3.s^{-1}$)	Return Period						
		2	5	10	20	50	100	200
1 (119 km^2)	Rational	147.472	231.040	303.977	388.220	510.776	626.142	723.227
	SDF	33.49	107.42	175.39	251.97	365.75	461.00	561.92
	SCS-SA	42.6	96.9	146.7	210.6	314.5	411.1	522.7
2 (153 km^2)	Rational	169.0	284.7	368.1	447.8	653.0	802.2	1047.5
	SDF	38.64	123.94	202.37	290.72	422.00	531.91	648.34
	SCS-SA	97.9	200.2	292.1	407.9	590.5	756.7	946.5

5.6 Hydraulic Modelling

Various hydraulic models were produced in HEC-RAS and exported to HEC-geoRAS by importing river centreline, cross sections, water surfaces and flow data from GIS layers and the hydrologic model. This allowed for inundation mapping and flood line polygons to be generated. The water surface TIN was converted to a GRID, and then actual elevation model was subtracted from the water surface grid. The area with positive results (meaning the water surface is higher than the terrain) illustrated the flood area (Figure 12),

whereas the area with negative results illustrated the dry areas not inundated by the flood. Inundation can be seen along the watercourse (Figure 13). Further results are provided in Annexure B, C and D.

Any areas outside of the proposed development footprint were not included in the flood generation model although the contributing catchment area was accurately accounted for.

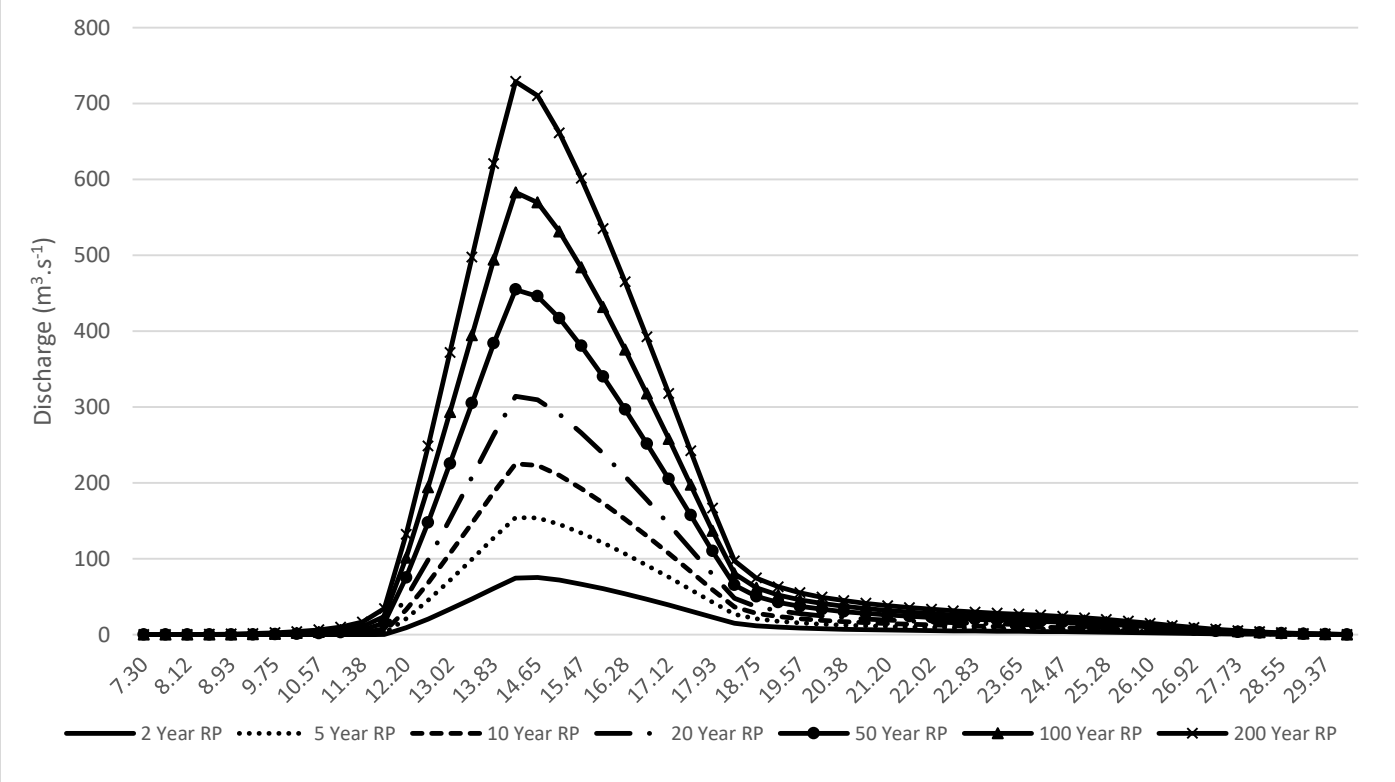


Figure 12 Post-development hydrograph for the proposed Karreebosch WEF and associated grid infrastructure (Catchment 1)

Through the flood analysis, it is clear that the proposed infrastructure (Construction camp, laydowns, OHPL, internal access roads and onsite Substations) will not be at risk of damage through flooding from the channels. This is largely due to the general low rainfall in the area and the small catchments on the site, resulting in less accumulated surface runoff. Additionally, the structures are mostly placed on plateau areas, well outside of the flood extent. The post-development state will result in a very slight increased peak flow due to an increase in impervious structures and a resultant increase in storm flow. This has been accommodated through the storm water management plan. The site is also at increased risk of erosion due to areas of poor basal cover, the increase in hardened surfaces and the steep terrain. This is true for both the pre-development and post-development state. Although the laydown areas and crane pads are on the plateau of the mountain, they do still pose a risk of triggering erosion channels. In similar vein, the roads that traverse up steep slopes need to be secured against erosion.

Ephemeral drainage lines were not an output as the catchment area was too small to derive a meaningful spatial output (although this area was still used as a model input). In such cases, the delineated watercourse and its buffer would be far greater than the derived flood extent.

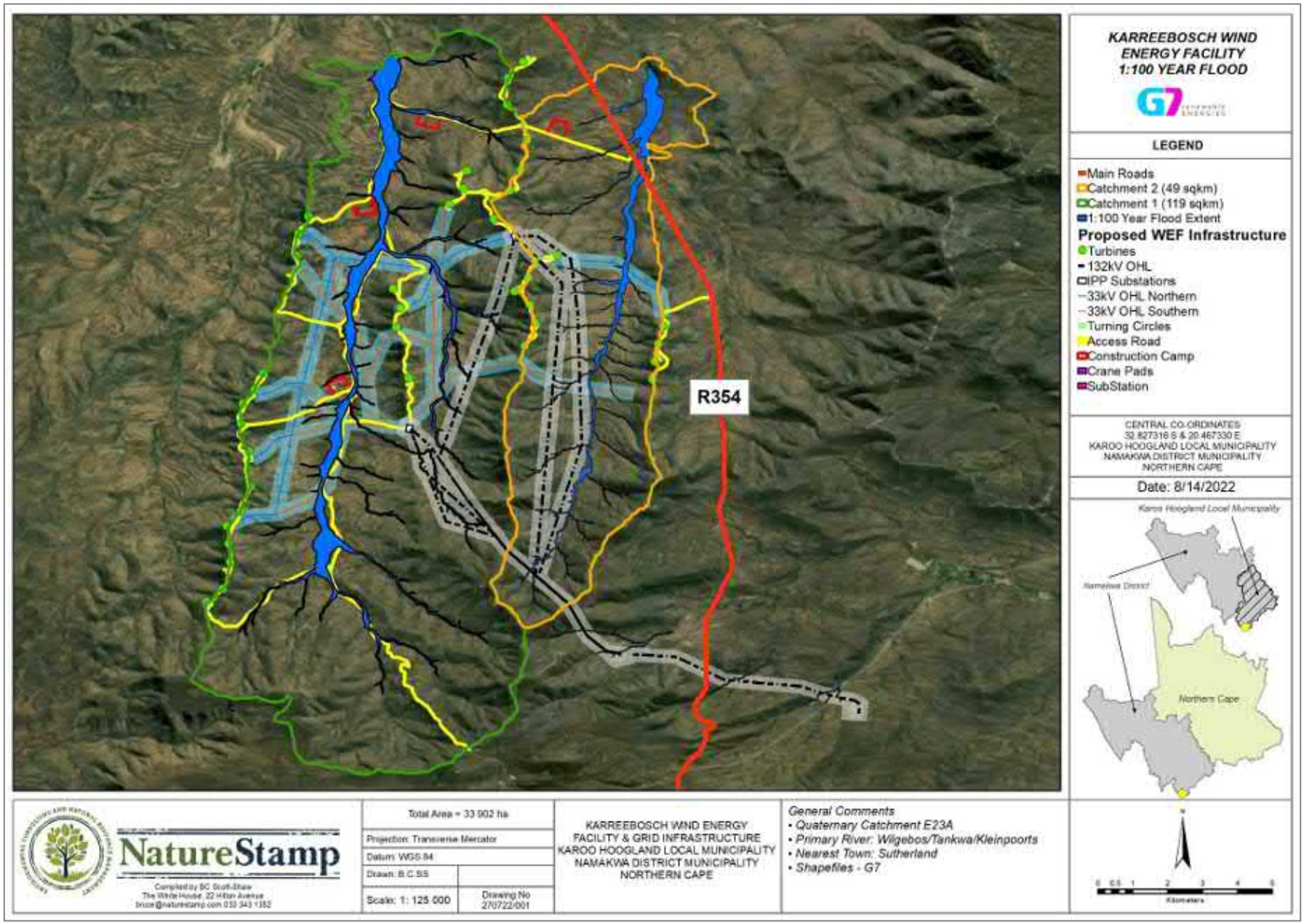


Figure 13 Steady state analysis of the 1:100 year flood event for the proposed Karreebosch WEF and Grid infrastructure

5.7 Design Storm Determination

5.7.1 Rational Method using Surface Drainage Utility

From the rational method, used in the calculation of peak flows and rainfall intensity, based on various basic spatial and descriptive input parameters pertaining to the site in question, average rainfall intensity per hour was calculated for the 2, 5, 10, 20, 50 and 100-year 30 minute, 1 hourly and daily events. The results pertaining to this study are the 1 in 50 year, (for infrastructure). Peak flows shows an average increase in **0.11 m³/s** for post-development conditions. This is low, mostly as much of the roads are pre-existing. This results in an excess of **0.065 m³/s** that needs to be attenuated per hectare of impervious surface. These outputs have then been used as inputs for the calculations in the following subsections.

5.7.2 Drainage Grid Calculations

It is assumed that the gravel roads that will be utilized will be of the open drains which are recessed into the ground. Dimensions were assumed as a typical dirt road drain (1 meters in width and recessed below the level of the culvert / kerb by approximately 0.3 meters). New roads were considered in the stormwater calculations. The roads would be between 4 to 12 meters with wide cut-off drains would be placed strategically and increased in high slope areas. Drains were assessed to determine if they could handle certain design events, the following calculation was used (SANRAL Drainage Manual 5th Edition):

$$Q = 1.77 \times A\sqrt{H}$$

Where: Q = Flow Capacity ($m^3.s^{-1}$)
A = Area of inlet (m^2)
H = Submergence (m)

Therefore A = (0.65 * 0.375) = 0.24 m^2
H = 0.2 (assumed for the site)

Drowned conditions were assumed and a blockage coefficient of 0.3 was assumed due to the small amount of debris likely on site. The equation $Q = CFA\sqrt{2gH}$ was used in this setting. Although open drains are being used, the aforementioned calculation was used as a guideline to see if the excess runoff could be accommodated.

The results show that each cut-off drain could handle **0.41 $m^3.s^{-1}$** after which water would exceed the channel and flows would not be attenuated. As such, if a cut-off drain is placed for every 5 ha of contributing area, there would be sufficient flow attenuation. This further shows that the excess flows on site would be accommodated by the proposed drain structures.

5.8 Storm water Control

- Cut-off drains as per the design recommendations must be installed to facilitate the control of surface water runoff velocities from roads (250 mm depth, variable width depending on site/existing road conditions);
- Any erosion caused from excess discharge adjacent to road and/or crane pad areas must be rehabilitated immediately. This would involve re-vegetation, geotextiles or rock gabions. This would be identified by the ECO;
- Stone protection structures, such as gabion baskets, would be required at any steep sections and where intersections occur;
- Runoff around the WEF infrastructure, substations, pylons and construction camps need to be protected by erosion protection and channels to increase infiltration and promote the natural runoff regime. Runoff should not be concentrated at one point. Structures would include rainwater harvesting at the construction camp, berms and cut-off drains along steep road areas and berms around crane pads with cutoff drains with rockeries;
- Storm water discharge should be dispersed across each impervious area. Around such structures, assurance is needed that the ground remains vegetated and protected from erosion. Small rocks from construction should be placed along the edges of impervious areas; and
- Washing of equipment should avoid harmful chemicals.

Figure 14 Existing lay-down area and turbine for the nearby Perdekraal site as a comparative example

5.9 Storm Water Management Structures

The overall aim of the stormwater structures is to attenuate increases in flow due to the development to their predevelopment state. Any excess flow from the proposed development should not be concentrated towards one point. However, the natural flow channels as per the pre-development state should be promoted. The WEF and road grading should have structures as illustrated in Figures 15 and 16.

All runoff under the development footprint can and should be contained and managed within the site boundary of each laydown area. Temporary storm water structures should be put in place if pollution and spills are evident on site. The construction camp should be completely rehabilitated after construction through re-vegetation and erosion control. Guidelines should be followed based on the wetland/riparian assessments and rehabilitation plan. The IPP substation option (Figure 17) are both of low risk as they are situated on the plateau and have little to no catchment area. The substations would need a PCD of 123 m^3 to attenuate potential dirty water on the footprint. Construction camp option one and two are considered suitable due to their proximity to access points, existing roads and contributing catchment areas.

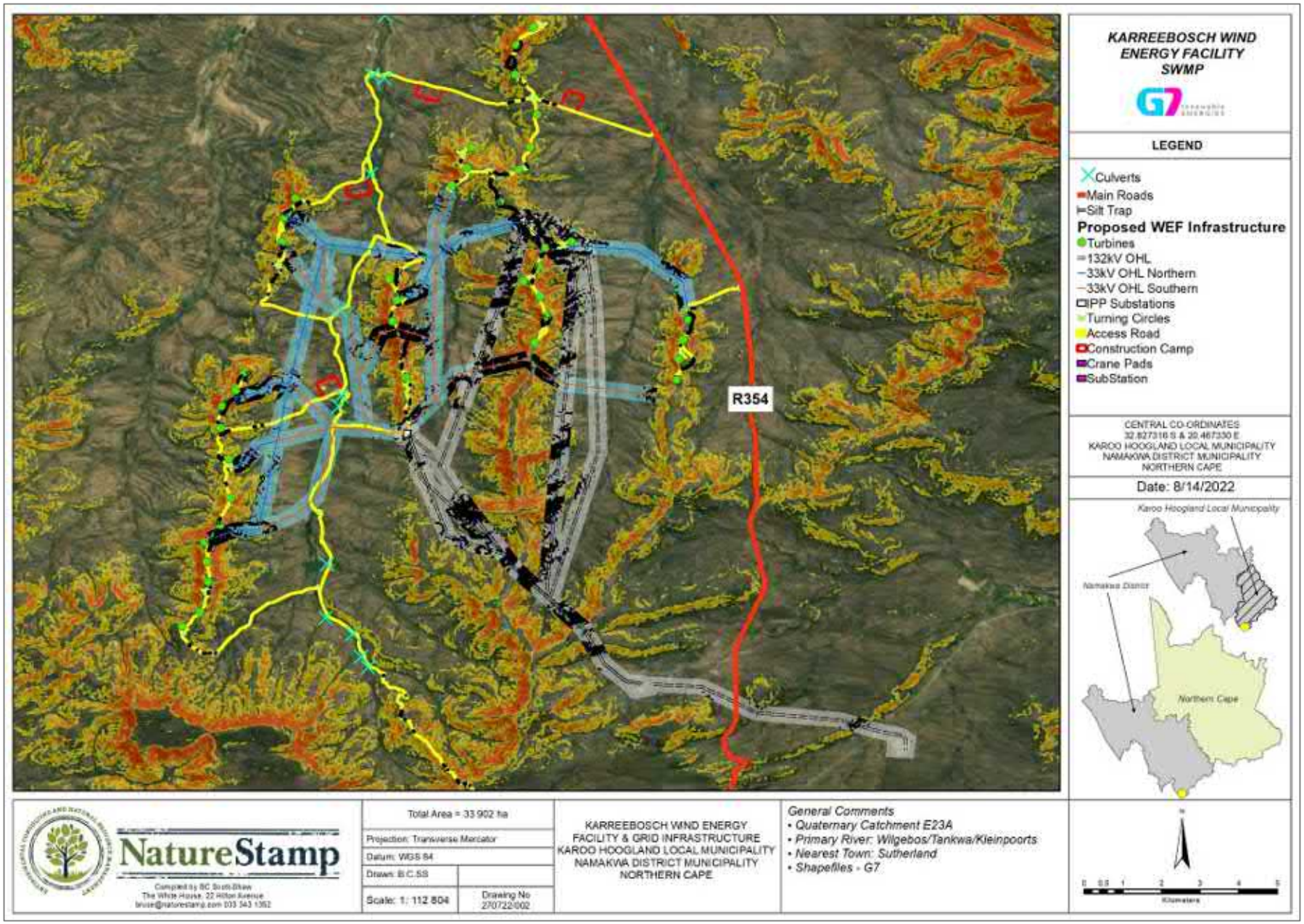


Figure 15 Storm water management plan for linear servitudes showing high risk area in pink and slopes exceeding 12° in red

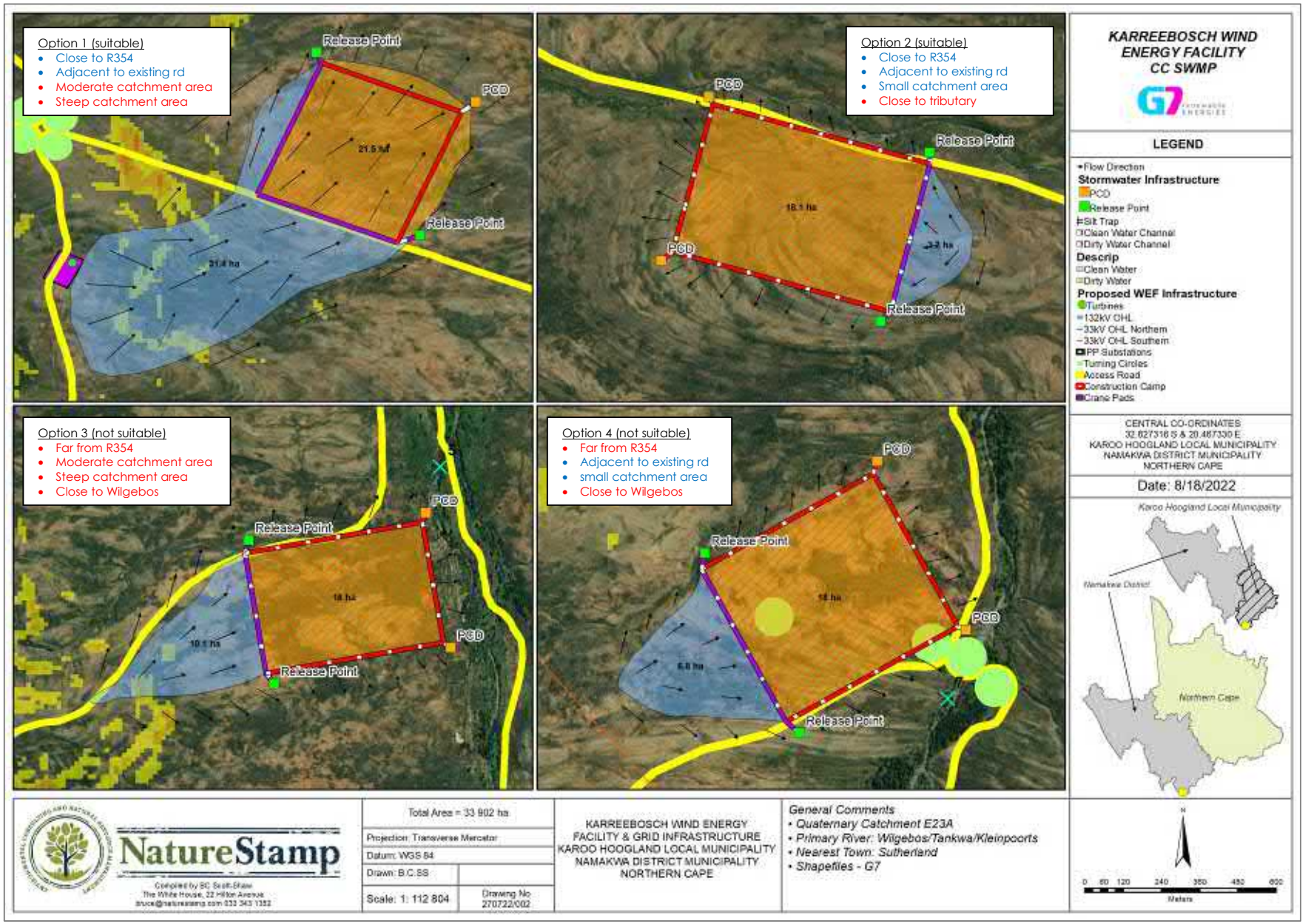


Figure 16 Storm water management plan for construction camp infrastructure showing high risk area in yellow/red

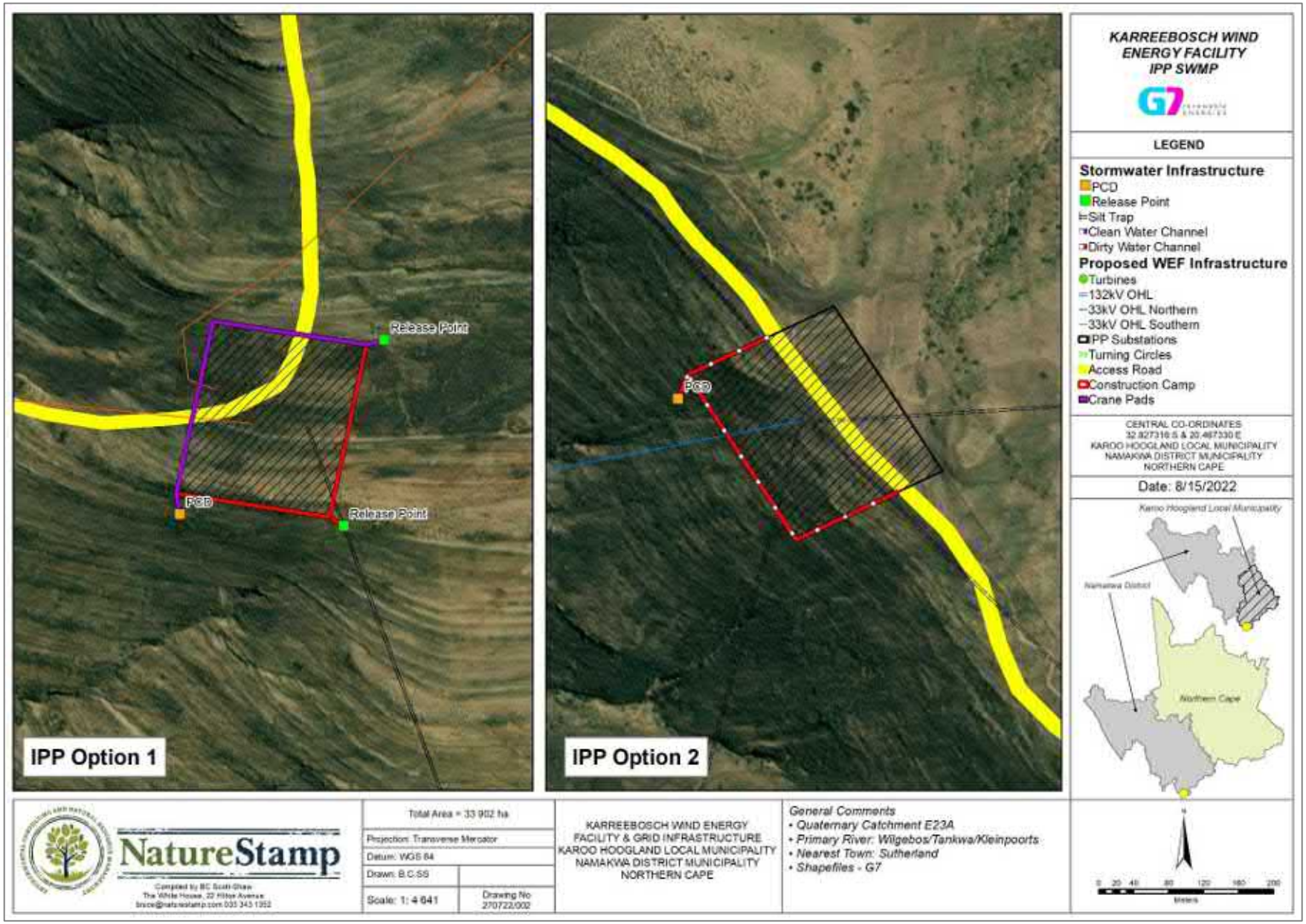
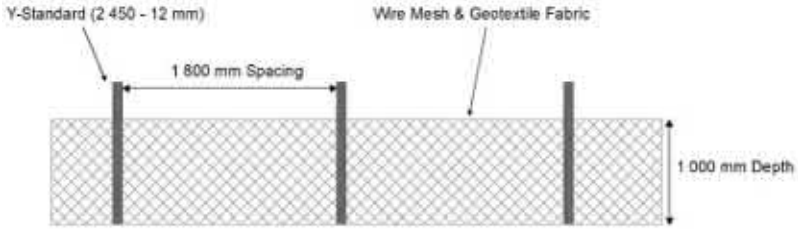
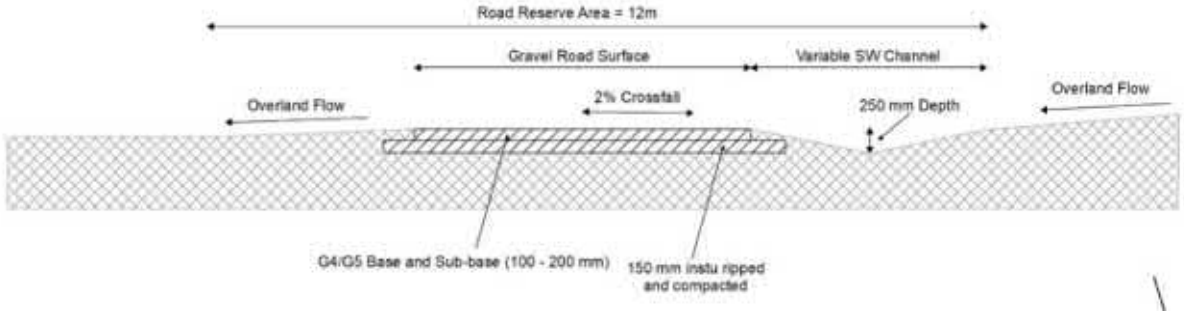
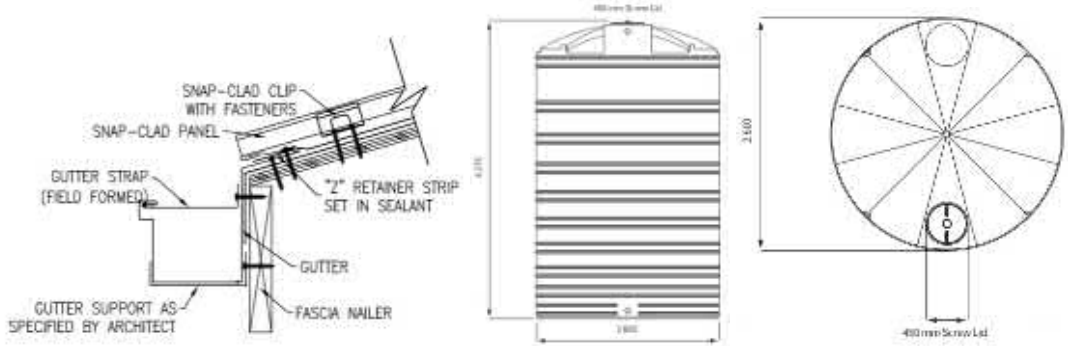


Figure 17 Storm water management plan for IPP substation infrastructure

Table 9 Intervention measures per unit at Karreebosch

Unit	Activity/Risk	Severity	Intervention
Preliminary Stage			
Access Roads	Route planning	Low	• Ensure watercourse crossings are kept to a minimum where possible; • Ensure steep slopes are avoided where possible; • Ensure existing roads are used where possible.
Laydown Areas/Camps	Site planning	Low	• Ensure sites are flat; • Ensure sites are away from watercourses in compliance with the conditions of the WULA; • Ensure the bearing capacity and bed rock is stable for foundations and platform weight.
OHL	Route planning	Low	• Ensure watercourse crossings are kept to a minimum where possible;
Construction Stage			
Access Roads	Expansion of gravel roads to between 8 to 12 meters. Grading of roads. Risk of erosion and sedimentation	Moderate	• Temporary silt traps in any development areas where the slope exceeds 12° (see design and layout in light blue below).  • Storm water runoff be directed to the lower side of the gravel roads. At this point it should then be collected in side drains and disposed of in designated places by means of suitable outlet structures (cut-off drains and rockeries) and berms.  • No dirty water must be directed into watercourses. • Roads should be constructed at-grade to allow for continued flow; • Only include side drains where inundation or damage may occur otherwise the natural flow path would be interrupted; • At crossings, stone protection walls should be constructed on either side to reduce scour; • All storm water runoff be directed to the lower side of the gravel roads. At this point it should then be collected in side drains and disposed of in designated places by means of suitable outlet structures and berms.

Laydown Areas	Contamination from construction activities. Risk of erosion and sedimentation	Moderate	• Compounds, storage and lay-down areas must be clear of all debris, and the area must be level and free draining and have the same bearing capacity and proof testing as the Crane Pad. • No dirty water must be directed into watercourses. • Emergency pumps should be in place to remove any water at the bottom of excavated areas if needed. • Temporary silt traps and berms should be constructed around the footprint (see above)
Construction Camp	Potential pollution from staff. Potential oil spills from vehicles and equipment. Risk of erosion and sedimentation	Moderate	• Drains and berms at concentration points to manage and divert surface flow/ runoff from all structures during operation. • Gutters, downpipes and storage tanks (10 000 L) should be installed to attenuate storm events.  • No dirty water must be directed into watercourses. • Flows must be attenuated and subsequently directed towards natural flow paths. • Effluent from construction staff must be treated on-site otherwise it should be removed from the site. • The calculated attenuation volume required for the entire camp is 943 m3. Some of this could be accommodated within rainwater harvesting structures.
OHL	Disturbance of soil and vegetation from collector footprint.	Low	• Temporary silt traps in any development areas where the slope exceeds 12°. • Revegetation of any disturbed areas. • Underground cabling areas should ensure sub-soil and top-soil are layered as per their natural state. • Steep areas should have additional erosion control measures put in place.
Operation Stage			
Access Roads	Operation of vehicles along roads. Potential erosion channels.	Low	• Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control systems. • Immediate rehabilitation should erosion occur. • Temporary silt traps to continue for 1 year during operation in any areas where the slope exceeds 12°.
Laydown Areas/Camps	Increased stormflow from surface Risk of erosion and sedimentation	Low	• Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control systems. • Immediate rehabilitation should erosion occur.
OHL	Continued disturbance of soil and vegetation from collector footprint.	Low	• Undertake a periodic site inspection to verify and inspect the effectiveness and integrity of the storm water run-off control systems. • Immediate rehabilitation should erosion occur.

5.10 Water Balance

5.10.1 WR2012 Analysis

The data obtained for the site showed a mean annual evaporation of 1 810 mm, 1 895 mm and 1 870 mm for the three QCs. The naturalized flow mean annual runoff for the greater catchment is 16.58 million m^3 for the E23A catchment area of 762 km^2.

Table 10 WR2012 data relevant to the Karreebosch WEF

								NATURALISED FLOW MARs			
	BASIC INFORMATION							1920 - 1989	1920 - 2004	1920 - 2009	Change in MAR
	Catchment area		S-pan evaporation			Rainfall		MAR (WR90)	MAR (WR2005)	MAR (WR2012)	WR2005 to WR2012
Quaternary	Gross	Net	evap	MAE WR2005	MAE WR90	Rainfall	MAP	Net	Net	Net	(percent)
catchment	(km2)	(km2)	zone	(mm)	(mm)	zone	(mm)	(mcm)	(mcm)	(mcm)	(percent)
E23A	762	762	15B	1895	1895	E2A	254	7.70	15.22	16.58	8.9

5.10.2 Water Balance

Data from the developers was provided to the specialists. This data allowed for an assessment of the proposed structures and the expected water usage/requirements (Figure 18). The proponent requires water for construction activities (concrete mixing etc.), water for staff (potable and ablutions) and water for general maintenance. The key goal of the water balance assessment is to determine the runoff from structures. The greatest runoff was from the access roads as these will be widened to allow for large vehicle access. However, overall, the volumes of water are very small and this is a low intensive water use activity, particularly during operation.

Further details regarding the source of water will be confirmed. This water balance assumes the following:

- Water will be obtained from groundwater abstraction and a small amount from rainwater harvesting.
- The volume required for the construction phase is 45 000 m^3 per annum.
- Storage facilities (10 000 L tanks) have been accounted for and would also act as attenuation structures.
- Clean water would be directed into JoJo tanks from any building infrastructure.
- All sewage will be removed from the site by a suitable waste disposal company.

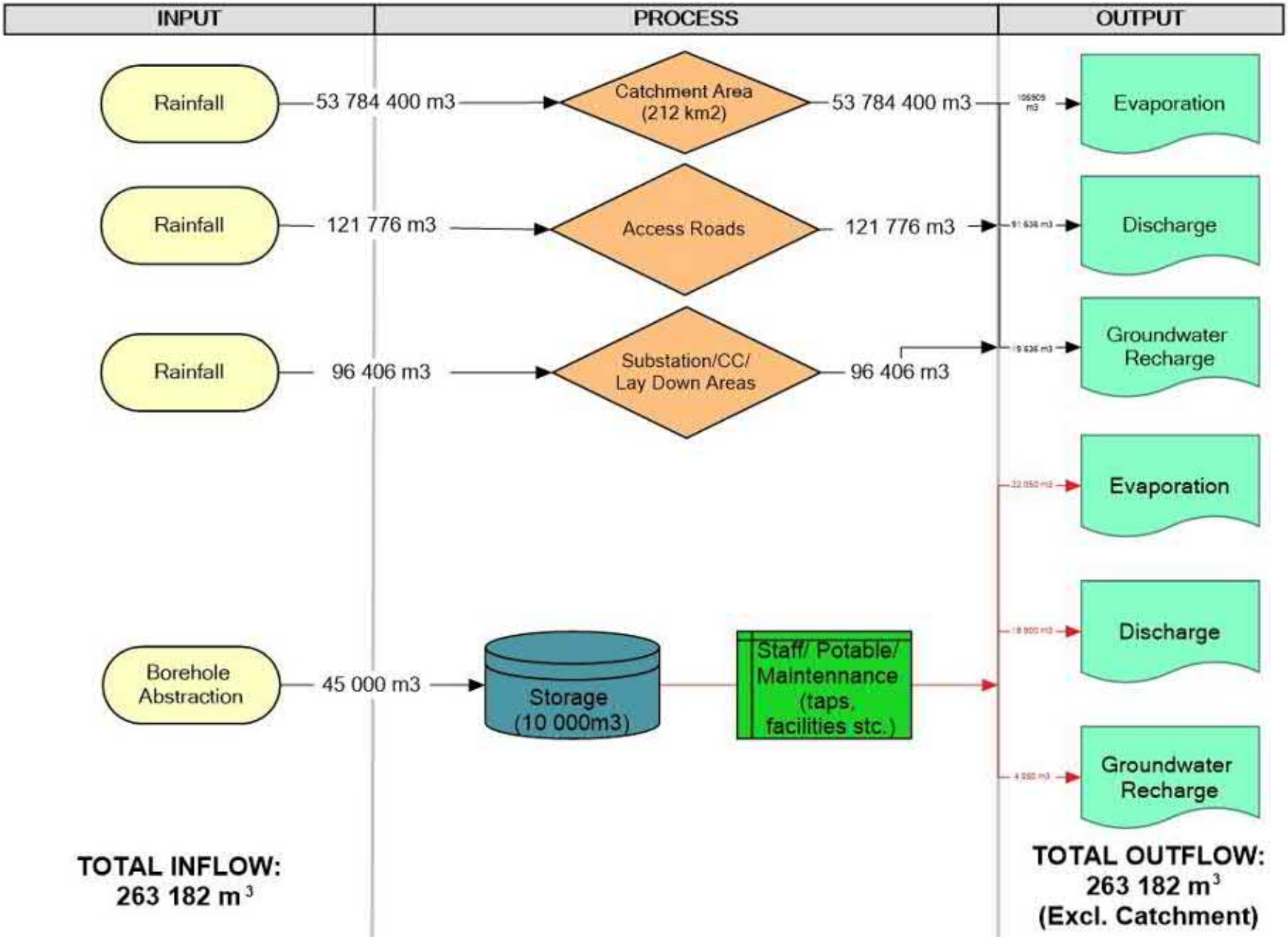


Figure 18 Annual water balance for the construction of the proposed Karreebosch WEF

6. POTENTIAL SURFACE WATER IMPACTS & MITIGATION

The site for the proposed Karreebosch WEF Project and its associated grid infrastructure is mostly natural (succulent Karroo). The primary surrounding impacts are farming areas, asphalt and dirt roads, which cross watercourse areas leading to a loss/disturbance of wetland area and potential pollution of the watercourses. Most of the site is lightly vegetated due to the dry climate.

6.1 Present Impacts

Within and around the Karreebosch WEF footprint, the existing impacts on surface water and respective catchment areas include -

- The clearance of natural habitat for settlements and associated roads;
- Hardened surfaces resulting in a reduction in infiltration;
- Concentrated flow paths from drain outlets/dongas along the roads;
- Historical modification of watercourse systems for agriculture and infrastructure construction; and
- Various servitudes.

In the broader catchment, similar impacts are present as noted for the site proposed for the Karreebosch WEF project. Additional existing impacts on the groundwater resources and respective catchment areas include -

- Infrastructure development within wetland systems (wetland encroachment) or river banks – leading to a direct loss of wetland systems and decrease in groundwater recharge;
- Slight expansion of agricultural areas resulting in an increased water demand and an increase in water pollution;
- Cumulative increases in WEFs within the greater area;
- Unregulated boreholes that may put strain on the limited groundwater resources; and
- Poor or absent sanitation – direct water pollution.

6.2 Potential Impacts During Construction

Some impacts will occur during construction. These include –

- Vegetation clearing (roads, construction camp, substation, lay down areas);
- Enhanced runoff and erosion potential due to open surface areas, spoil/stockpile areas and compacted areas;
- Decrease in water quality due to potential spills/contaminants from vehicles, machinery and cement mixing areas;
- Spread of alien invasive plants, particularly in disturbed areas;
- Loss of wetland area (including aquatic flora and fauna) at crossing points;
- Alteration of flow pattern due to changes in flow paths.

The identified construction impacts have been classified in the form of impact tables (Tables 11 and 12).

Table 11 Increase in surface runoff and general change in hydrology

Issue	**Impact on Local Hydrology**	
Description of Impact		
o Increase in surface runoff due to hardened surfaces. o Increase in the erosion potential due to concentrated flow paths. o Reduction in infiltration reducing groundwater recharge.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Medium
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Low
Probability	Probable	Possible / frequent
Significance	Low -	Very Low -
Degree to which impact can be reversed	The impact is partially reversible if adequate storm water structures are put in place. Additionally, the construction footprint could be minimised with spoil areas being placed on already disturbed areas and concentration points being allowed to infiltrate appropriately.	
Degree to which impact may cause irreplaceable loss of resources	Without mitigation there would be a net loss groundwater recharge. Additionally, there would be an increase in open soil leading to erosion and loss of soil stability.	
Degree to which impact can be mitigated	There is a reasonable scope for mitigation measures to be effective. A storm water management plan would encourage infiltration and reduce this impact.	
Mitigation actions		
The following measures are recommended:	Ensure the storm water management plan is implemented by an appropriate engineer. Here, the engineer should ensure both natural run-off (that which can be released into the natural landscape with no detrimental effect) and excess artificial run-off generated by the proposed development structures. Other structures that may be considered are semi-permeable surfaces that can absorb artificial run-off but releases a certain amount into the landscape. Energy dissipating structures can also be used.	
Monitoring		
The following monitoring is recommended:	o All impervious surfaces to be monitored to ensure drains etc. are functional. o Ensure all clean water is dissipated towards the natural flow area and all dirty water is directed towards a control structure. o Ensure no sediments are allowed to enter the system.	
Cumulative impacts		
Nature of cumulative impacts	The cumulative impact considers the combined impact of the surrounding linked developments. The site for the project is natural. The cumulative impact would be low due to the significant distances for the type of development, low rainfall and the low impact on surface water resources in the given area.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

Table 12 Potential spills from construction areas, storage areas and machinery

Issue	**Potential Spills Contaminating Surface Water**	
Description of Impact		
o Spills from machinery. o Spills from vehicles. o Spills from cement mixing areas. o Litter from staff. o Increase risk of pollutants being washed into the nearby watercourse systems.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Construction	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	High	Medium
Probability	Probable	Possible / frequent
Significance	Medium -	Low -
Degree to which impact can be reversed	The impact is partially reversible if spill management plans (including spill kits) are put in place. Staff should be trained on preventing spills. Maintenance must occur in designated areas. Hazardous chemicals need to be bunded.	
Degree to which impact may cause irreplaceable loss of resources	Should hazardous chemicals enter watercourses, long-term damage may occur. This is likely without mitigation.	
Degree to which impact can be mitigated	There is a good scope for mitigation measures to be effective.	
Mitigation actions		
The following measures are recommended:	o Spill prevention kits must be available on site. Eco-friendly alternatives are recommended. o Activities to stop during heavy rainfall periods. o Drip trays to be present and maintenance only to occur in designated lined areas.	
Monitoring		
The following monitoring is recommended:	o The ECO must confirm all designated maintenance areas. o Basic water quality to be checked in the event of a spill and monitored. o The ECO must audit any likely pollution areas regularly.	
Cumulative impacts		
Nature of cumulative impacts	The cumulative impact would be low due to the lack of open surface water and the low rainfall. Cumulative impacts could occur without mitigation.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Medium -	Very Low -

6.3 Potential Impacts During Operation

Some impacts will occur during operation. These include –

- Enhanced runoff and erosion potential due to an increase in impervious and compacted areas leading to more surface water discharge, particularly during extreme events; and
- Decrease in water quality due to potential spills/contaminants from maintenance vehicles, infrastructure and equipment.

The identified operation impacts have been classified in the form of impact tables (Tables 13 and 14) which addresses both water quality and quantity. Although infrequent, rainfall events exceeding 80 mm in a day have occurred here. As such, these events need to be accommodated to match the pre-development state and ensure the continued hydrological patterns.

Table 13 Impact on local hydrology during operation

Issue	**Impact on Local Hydrology**	
Description of Impact		
o Increase in surface runoff due to impervious surfaces. o Increase in the erosion potential due to concentrated flow paths. o Reduction in infiltration. o Increase risk of pollutants being washed into the system.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Low
Probability	Probable	Possible / frequent
Significance	Low -	Very Low -
Degree to which impact can be reversed	The impact is partially reversible if adequate long-term storm water structures are put in place. Discharge should match pre-development state.	
Degree to which impact may cause irreplaceable loss of resources	Without mitigation there would be an increase in erosion which would cause irreplaceable damage to the ecosystem and future loss in infiltration.	
Degree to which impact can be mitigated	There is a reasonable scope for mitigation measures to be effective. A storm water management plan must be followed.	
Mitigation actions		
The following measures are recommended:	Ensure the storm water management plan is implemented by an appropriate engineer. Here, the engineer should ensure both natural run-off (that which can be released into the natural landscape with no detrimental effect) and excess artificial run-off generated by the proposed operation structures. Other structures that may be considered are semi-permeable surfaces that can absorb artificial run-off but releases a certain amount into the landscape. Energy dissipating structures can also be used. Clean and dirty water must be separated.	
Monitoring		
The following monitoring is recommended:	o All impervious surfaces to be monitored to ensure drains etc. are functional. o Ensure all clean water is dissipated towards the natural flow area and all dirty water is directed towards a control structure. o Ensure no sediments are allowed to enter the system.	
Cumulative impacts		
Nature of cumulative impacts	The cumulative impact would be low due the limited rainfall. The structures have a relatively low impact on surface water in the given area.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

Table 14 Impact on surface water quality during operation

Issue	**Potential Spills**	
Description of Impact		
o Spills from maintenance equipment. o Spills from maintenance vehicles. o Litter from staff. o Spills from the hydrogen plant/refueling plant.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Operation	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Medium	Low
Duration	Short-term	Short-term
Extent	Local	Local
Consequence	Medium	Low
Probability	Probable	Possible / frequent
Significance	Low -	Very Low -
Degree to which impact can be reversed	The impact is partially reversible if spill management plans (including spill kits) are put in place. Staff must be trained on preventing spills. Maintenance must occur in designated areas. Hazardous chemicals need to be bunded. Spills must be prevented from entering the sub-surface.	
Degree to which impact may cause irreplaceable loss of resources	Should hazardous chemicals enter the unsaturated zone, long-term damage may occur. This is likely without mitigation.	
Degree to which impact can be mitigated	There is a good scope for mitigation measures to be effective.	
Mitigation actions		
The following measures are recommended:	o Spill prevention kits must be available on site. Eco-friendly alternatives are recommended. o Activities/maintenance to stop during heavy rainfall periods. o Drip trays to be present and maintenance must only occur in designated lined areas.	
Monitoring		
The following monitoring is recommended:	o The ECO must confirm all designated maintenance areas. o Basic water quality to be checked in the event of s spill. o The ECO must audit any likely pollution areas regularly.	
Cumulative impacts		
Nature of cumulative impacts	The cumulative impact would be low due to the significant distances away from surface users and the overall low impact. Cumulative impacts could occur without mitigation.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Low -	Very Low -

Table 15 Impact of the 'No-Go' alternative

Issue	No Go Alternative	
Description of Impact		
o Impact accrued due to the development not proceeding. o The natural environment would subsequently not change. o Pre-existing impacts would continue with a slight projected increase in impacts. o Due to water and financial constraints, landowners are likely to construct more water pipelines to increase availability and distribution.		
Type of Impact	Direct	
Nature of Impact	Negative	
Phases	Planning	
Criteria	**Without Mitigation**	**With Mitigation**
Intensity	Low	N/A
Duration	Long-term	
Extent	Local	
Consequence	Low	
Probability	Probable	
Significance	Low -	
Degree to which impact can be reversed	The impact is reversible if future activities follow best practice guidelines.	
Degree to which impact may cause irreplaceable loss of resources	Not applicable.	
Degree to which impact can be mitigated	Not applicable.	
Mitigation actions		
The following measures are recommended:	Not applicable.	
Monitoring		
The following monitoring is recommended:	Not applicable.	
Cumulative impacts		
Nature of cumulative impacts	The cumulative impact would be low/negligible.	
Rating of cumulative impacts	**Without Mitigation**	**With Mitigation**
	Very Low -	N/A

6.4 Potential Cumulative Impacts

In relation to an activity, cumulative impact "means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may be significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities" (NEMA EIA Reg GN R982 of 2014). It is important to consider the bigger picture where numerous small impacts can lead to greater cumulative impacts. The recommended mitigation measures are aligned with the identified construction and operation impacts. Key mitigation measures would be to minimize Stormwater runoff, share construction access roads, utilize the same spoil areas and utilize water efficiently.

The South African government gazetted[1] eight (8) areas earmarked for renewable energy development in South Africa. These areas are known as Renewable Energy Development Zones (REDZ) and this project falls within the Komsberg REDZ.

These existing surrounding projects of varying approval status are listed below. Given the site's location within the Komsberg REDZ, it is considered to be located within the renewable energy hub that is developing in this focus area. From a hydrological perspective, due to the low rainfall and suggested mitigation measures, the proposed development would have a **low negative impact**.

[1] Government Notice 114 of 16 February 2018.

1. 140MW Rietrug Wind Energy Facility Near Sutherland, Northern Cape Province.(EA Ref:12/12/20/1782/1/AM5)
2. 140MW Sutherland 1 Wind Energy Facility near Sutherland, Northern Cape and Western Cape Provinces. (EA Ref:12/12/20/1782/2/AM6)
3. 140 MW Sutherland 2 Wind Energy Facility near Sutherland, Northern Cape Provinces.(EA Ref: 12/12/20/1782/3/AM3)
4. 150MW Perdekraal (West) Wind Energy Facility, Western Cape Province.(EA Ref: 12/12/20/1783/1/AM5)
5. 147MW Perdekraal (East) Wind Energy Facility, Western Cape Province. (EA Ref:12/12/20/1783/2/AM5)
6. 140MW Roggeveld Phase 1 Wind Farm, North of Matjiesfontein, Northern Cape and Western Cape Provinces. (EA Ref:12/12/20/1988/1/AM6)
7. 140 MW Karusa Wind Energy Facility,Phase 1, Karoo Hoogland Municipality, Northern Cape Province. (EA Ref:12/12/20/2370/1/AM6)
8. 140MW Soetwater Wind Farm Phase 2, Karoo Hoogland Municipality, Northern Cape Province. (EA Ref:12/12/20/2370/2/AM6)
9. 140MW Great Karoo Wind Energy Facility Phase 3, Karoo Hoogland Municipality, Northern Cape Province.(EA Ref: 12/12/20/2370/3/AM5)
10. 310MW Pienaarspoort Wind Energy Facility Phase 1, Witzenberg local Municipality, Western Cape Province.(EA Ref: 14/1/1/16/3/3/1/2318)
11. 360MW Pienaarspoort Wind Energy Facility Phase 2, Witzenberg local Municipality, Western Cape Province.(EA Ref:14/12/16/3/3/1/2441)
12. 226MW Kudusberg Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces. (EA Ref:14/12/16/3/3/1/1976/1/AM3)
13. 325WM Rondekop Wind Energy Facility between Matjiesfontein and Sutherland in Western and Northern Cape Provinces (14/12/16/3/3/1115)
14. 183MW Rietkloof Wind Energy Facility near Matjiesfontein in the Western Cape Province. (14/12/16/3/3/1/1977/AM3)
15. 200 MW Esizayo Wind Energy Facility Expansion near Laingsburg, Western Cape.(EA Ref:14/12/16/3/3/1/2542)
16. Oya Energy Facility located near Laingsburg, Western and Northern Cape Provinces.(EA Ref:14/12/16/3/3/2/2009/AM1)
17. 140MW Gunsfontein Wind Energy Facility Karoo Hoogland Municipality, Northern Cape Province.(EA Ref:14/12/16/3/3/2/826)
18. 275MW Komsberg West near Laingsburg, Western Cape Provinces. (14/12/16/3/3/2/856/AM4)
19. 275 Komsberg East near Laingsburg, Western Cape Provinces. (14/12/16/3/3/2/857/AM4)
20. 140MW Brandvalley Wind Energy Facility, within the Laingsburg and Witzenberg Local Municipalities in the Western and Northern Cape Province. (EA Ref:14/12/16/3/3/2/900/AM2)
21. 140 MW Maralla East Wind Energy Facility, Namakwa and Central Karoo District Municipalities, Western and Northern Cape Provinces. (14/12/16/3/3/2/962/AM1
22. 140 MW Maralla West Wind Energy Facility, Karoo Hoogland local Municipality, Northern Cape Province.(EA Ref: 14/12/16/3/3/2/963/AM1)
23. 140MW Esizayo Wind Farm, Laingsburg Local Municipality Western Cape Province. (EA Ref:14/12/16/3/3/2/967/AM3)
24. 10MW Inca Photovoltaic Facility near Sutherland, Northern Cape Province.(EA Ref:12/12/20/2235)

6.5 Impacts associated with Climate Change Projections

The following potential impacts may arise as a result of climatic changes in the future, which would possibly affect the Karreebosch Facility drainage areas and surrounding environment:

- Increase in extreme weather events such as powerful rain/thunderstorms, strong winds, intense heat waves, severe coldness and increased lightning strikes.

- This would likely cause flooding within the watercourses, which could damage the surrounding environment.
- The risk of contamination of watercourses would increase due to significantly greater volumes of runoff, which may lead to disease outbreaks and human health problems.
- Alien vegetation uses more water than indigenous vegetation, therefore reducing natural water supplies / choking natural watercourses. Alien plants have the ability to overpower indigenous vegetation and becoming overgrown within rivers and streams.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr) INPUT

The objectives of the EMPr is to ensure that any impacts remain at a low risk/sensitivity.

Table 16 Rehabilitation actions for inclusion into the EMPr

Objective	Action	Timing
Manage Surface Water Usage	1. Recycle water where possible	With immediate effect (Construction & Operation)
	2. Ensure storm water structures promote infiltration	With immediate effect (Construction)
Ensure surface and groundwater quality is not impacted upon	3. In the event of a spill, implement a spill contingency plan and monitor surface water for 6 months if spill is not contained.	Construction and Operation
Manage stormwater from the roads and infrastructure areas	4. Ensure appropriate storm water infrastructure is installed to dissipate flow and direct away from concentrated paths.	During winter months
	5. Ensure drip trays are used under vehicles/machinery and that impervious floor surfaces are constructed to ensure chemicals and waste do not enter the sub-surface.	With immediate effect throughout construction.
Manage spills during construction	6. Ensure drip trays are used under vehicles/machinery and erosion control measures are implemented. 7. Ensure a spill contingency plan is put into place.	With immediate effect ECO to check every 2 months
Manage watercourse areas	8. Ensure wetland buffers are marked so that activities do not occur near them. 9. Remove alien species and manage indigenous species as per the vegetation component.	With immediate effect and ongoing
Manage spills during operation	10. Completely lined infrastructure (concrete bunded area), with the capacity to contain 110% of the total amount of chemicals stored within any construction area. 11. Spills must be completely removed from the site. 12. Fire extinguisher equipment installed within permanent structures. 13. Ensure air circulation to prevent the build up of chemicals. 14. Implement the storm-water management plan and ensure appropriate water diversion systems are put in place. 15. Compile (and adhere to) a procedure for the safe handling of chemicals. 16. Compile an emergency response plan and implement should an emergency occur. 17. Ensure that spill kits (if appropriate) are available on site for clean-up of spills and leaks. 18. Drip-trays or containment measures must be placed under equipment that poses a risk when not in use. 19. Immediately clean up spills and dispose of contaminated soil at a licensed waste disposal facility. 20. Dispose of waste appropriately to prevent pollution of soil and groundwater. 21. On-site maintenance to be done over appropriate drip trays/containment measures and any hazardous substances must be disposed of appropriately. 22. Record and report all fuel, oil, hydraulic fluid or electrolyte spills to the PM / Engineer / ERP so that appropriate clean-up measures can be implemented.	With immediate effect/Ongoing

7.1 Potential Spill Scenarios

Due to the nature of the activity, there is a chance of potential spills occurring on site (equipment etc.). The potential spill scenarios are outlined as follows:

1. Spills and leaks from vehicles. These incidents are likely to be the smallest and least concerning spills to take place on site. Regular removal of spills and leaks should be undertaken on-site. Eco-friendly detergents should be used.
2. A storm or flood event occurs during construction, resulting in structures being exceeded. All activities should stop and a spill management plan be executed. Furthermore, erosion control actions should be initiated.

7.2 Mitigation Measures and Recommendations (Spill Management Plan)

As guided by the DWS, the following soil erosion measures would be put into place –

- Erosion control measures should be put in place to minimize erosion along the construction areas. Extra precautions must be taken in areas where the soils are deemed to be highly erodible.
- Soil erosion onsite should be prevented at all times, i.e. post- construction activities.
- Erosion measures should be implemented in areas prone to erosion such as near water supply points, edges of slopes etc. These measures could include the use of sand bags, hessian sheets, retention or replacement of vegetation if applicable and in accordance with the EMPR and the biodiversity impact assessment.

- Where the land has been disturbed during construction, it must be rehabilitated and re-vegetated back to its original state after construction.
- Stockpiling of soil or any other material used during the construction phase must not be allowed on or near slopes, near a watercourse or water body. This is to prevent pollution of the impediment of surface runoff (further details are provided in the EMPr).

In order to reduce the potential impact of spills on site the following must be adhered to:

- Emergency numbers are provided on site – e.g. Spilltech, fire department, ambulance, etc.;
- Spill cleaning kits such as a Drizit kit are available on site;
- All chemicals on site are recorded in the inventory of hazardous substances;
- Equipment, machinery and vehicles are regularly checked and maintained in good order;
- Machinery and equipment maintenance is undertaken in designated areas;
- Drip trays are to be placed underneath machinery and equipment during maintenance;

In the instance of a spill on site the following procedure must be followed:

1. Locate the source of the spill;
2. Stop the spill and prevent further spreading;
3. The appropriate oil sponge, absorbent or spill kit (e.g. DriZit) can then be used to clean and remove the spilled substance(s);
4. Spills from trucks/tractors must be contained within a concreted site area and prevented from spreading;
5. Spilled petrochemicals can then be cleaned up and removed using the appropriate oil sponge, absorbent or spill kit (e.g. DriZit);
6. The spill must be reported to the site manager / supervisor and ECO;
7. Depending on the significance of the spill, the incident may also need to be reported to the DEA&DP (WC), DAEARD&LR (NC) and DWS.

7.3 Erosion Control Plan

There is an overlap between the storm water management and erosion control. The erosion control is particularly relevant during construction and at certain locations during operation. The removal of vegetation also leaves the site at a higher risk.

- Immediately rehabilitate eroded areas:
    - Install protective structures, e.g. geotextiles;
    - Ensure the slope remains gentle and stable;
    - Use vegetation plugs, rock packs or gabions where erosion is visible;
    - Immediately revegetate the area.
- Ensure that steeper areas are avoided and that the vegetation remains at these sites.
- Continual erosion monitoring should occur by a trained staff member.

The site should take into account the following erosion control mechanisms:

- Geotextiles;
- Gabion baskets;
- Soil binding chemicals;
- Hydroseeding techniques;
- Vegetation plugs;
- mulch

To ensure rehabilitation is effective, it is vital that the working area is managed correctly during the construction phase. An important part of this management will be that careful preservation and management of soil stockpiles should be implemented from the start of the site. The following points have been provided for use with the rehabilitation actions:

- Top- and subsoil stockpiles (used for road levelling and bank lifting) must not be stockpiled within 100m or within the 1:100 year floodplain of a watercourse.

- Naturally occurring vegetation removed by site clearance operations may be grubbed in with the topsoil for stockpiling.
- The topsoil shall not be buried or rendered in any other way inappropriate for rehabilitation use.
- Topsoil stripping (in widening and realignment areas) shall not occur in wet weather and during stripping and stockpiling, the topsoil shall not be subject to a compaction force greater than 1 500kg/m² and shall not be pushed for more than 50m.
- Topsoil shall also only be handled twice, once to strip and stockpile, and secondly to replace, level, shape and scarify if necessary.
- Top soil stockpiles must be protected against erosion and a record kept of all top soil quantities and should there be shortfalls of topsoil required for rehabilitation, adequate replacement material from commercial sources should be obtained as approved by the Engineer (preferably from areas identified with sourced excess topsoil).
- Equally, excess topsoil shall be landscaped and stabilized in accordance to the requirements of the Engineer and in consultation with the Contractor's Land Rehabilitation Specialist.
- Topsoil stockpiles should not be stockpiled for longer than 6 months if possible. If this can't be avoided, the stockpiles will need to be enriched or upgraded prior to rehabilitation. The Contractor shall consult with the Engineer with regards to matching preconstruction conditions or existing adjacent conditions.
- All stockpiles left for extended periods of time shall be stabilized using approved vegetation cover or other erosion control measures.
- Any excess subsoil must be removed from the road fringe once back filling is completed, and spoiled at an agreed spoil site (spoil sites to be agreed between landowner, ECO and Engineer).

8. CONCLUSION

The work undertaken for this report provides information on the flood and storm water components for the proposed Karreebosch WEF facility and associated grid infrastructure. The areas associated with the development are relatively small in contrast to the catchment area. However, the contributing catchment area is large as the development is distributed along a catchment divide. The site has existing roads. The site has a low vegetation cover and an undulating terrain indicating that it is at higher risk of erosion. As such, it essential that storm water and erosion control measures are strictly adhered to. Pollution control measures should also be appropriately implemented for the construction and operational phase. Temporary silt traps must be placed as recommended in this SWMP during construction. Additional structures such as cut-off drains, natural rockeries, rainwater harvesting and storage have been recommended for the operation of the site. Roads that cross watercourses require open drains and natural rockeries.

The flood component showed that the proposed infrastructure is not at risk of flood damage. The overall risk to watercourses is moderate during construction but low during operation, assuming that control measures and rehabilitation is adhered to and successful. It has been recommended that a low level crossing or portal culverts be adopted for major crossing points while pipe culverts be adopted for minor crossing points. At each crossing, the catchment area varies. The 1:20 year return period should be used in the design. Once the final dimensions and layout of the roads have been determined and the proponent's choice of culvert option has been determined, the size of each culvert can be determined. A typical trapezoidal drainage channel along the road areas will be able to accommodate 0.41 $m^3.s^{-1}$. The SCS-SA model was adopted in determining the peak values due to the catchment size and the natural state of the catchments.

Through the SWMP, dirty water was identified as water containing sediments around cleared areas during construction and potential spills/leaks from chemical storage areas. For the storm water component, the 1:50 year return period, 30-minute storm event was used in the design calculations. During construction, water would be attenuated, passed through silt traps and rockeries to allow for the sediments to be contained. Potential spills would be contained within lined structures on site and removed. All sewage would be removed from the site. As such, there is no risk of effluent contamination apart from minor spills from the removal by vehicles. However, should this happen, waste would be removed from site and the spill contained. Clean water would be attenuated and directed into storage tanks or natural flow paths during operation. Of the four construction camp options, site 1 and 2 are suitable while site 3 and 4 are not suitable.

Water requirements and usage on-site is low as shown in the water balance. The site requires 45 000 m^3/annum during construction and approximately 1 000 m^3/annum during operation. Should this 45 000 m^3 be required on one farm portion, a WUL would be required.

Regular checks should be made by the ECO and site manager. These measures should also be incorporated into the EMPr. Monitoring and follow up assessments are essential to maintaining the overall state and continued management of the watercourse system. **Monthly audits** should be undertaken by the ECO during construction and reports submitted identifying potential/existing erosion areas should they occur. Should any erosion areas be identified, the erosion control plan should be immediately implemented. Operational audits should continue for two years but occur every four months. Focus should be placed on maintaining the integrity of the watercourse and the impact the development may have on soil structure.

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ANNEXURE A Design Rainfall Values for Karreebosch WEF

Design Rainfall in South Africa: Ver 3 (July 2012)

User selection has the following criteria:

Coordinates: Latitude: 32 degrees 54 minutes; Longitude: 20 degreess 10 minutes

Durations requested: 5 m, 10 m, 15 m, 30 m, 45 m, 1 h, 2 h, 4 h, 6 h, 8 h, 10 h, 24 h, 1 d

Return Periods requested: 2 yr, 5 yr, 10 yr, 20 yr, 50 yr, 100 yr, 200 yr

Block Size requested: 0 minutes

Data extracted from Daily Rainfall Estimate Database File

The six closest stations are listed

Station Name	SAWS Number	Distance (km)	Record (Years)	Latitude (°)	Latitude (')	Longitude (°)	Longitude (')	MAP (mm)	Altitude (m)	Duration	Return Period (years) 2	2L	2U	5	5L	5U	10	10L	10U	20	20L	20U	50	50L	50U	100	100L	100U	200	200L	200U
DUMURE	0066027_W	36.4	73	32	57	20	30	340	1341	1 d	35.1	34.9	35.2	51.5	51.2	51.7	63.8	63.2	64.3	76.8	75.8	77.9	95.8	93.3	98.1	111.6	107.6	115.7	129.0	123.1	135.1
JAN-DE-BOERS	0044286_W	39.8	49	33	16	20	8	269	866	1 d	29.3	29.2	29.4	43.0	42.8	43.2	53.2	52.8	53.7	64.2	63.3	65.1	80.0	77.9	81.9	93.2	89.8	96.6	107.7	102.8	112.8
SPES BONA	0043516_W	45.1	67	33	6	19	48	127	619	1 d	20.1	20.0	20.2	29.4	29.3	29.6	36.5	36.2	36.8	44.0	43.4	44.6	54.8	53.4	56.2	63.9	61.6	66.2	73.8	70.4	77.3
PIETER MEINTJIES (SAR)	0044765_W	47.5	75	33	15	20	26	264	1064	1 d	32.0	31.9	32.2	47.0	46.8	47.2	58.2	57.7	58.7	70.2	69.2	71.2	87.5	85.2	89.6	101.9	98.2	105.6	117.7	112.4	123.3
DWARS-IN-DIE-WEG	0045184_W	48.5	80	33	4	20	35	159	998	1 d	25.9	25.8	26.0	38.0	37.9	38.2	47.1	46.7	47.6	56.8	56.0	57.6	70.8	69.0	72.6	82.5	79.5	85.5	95.4	91.0	99.9
TOUWSRIVIER (SAR)	0044050_W	49.0	99	33	20	20	2	223	774	1 d	29.1	29.0	29.2	42.7	42.5	42.9	52.9	52.5	53.4	63.8	62.9	64.7	79.5	77.5	81.4	92.6	89.3	96.0	107.0	102.2	112.1

Gridded values of all points within the specified block

Latitude (°)	Latitude (')	Longitude (°)	Longitude (')	MAP (mm)	Altitude (m)	Duration (m/h/d)	Return Period (years) 2	2L	2U	5	5L	5U	10	10L	10U	20	20L	20U	50	50L	50U	100	100L	100U	200	200L	200U
32	54	20	10	270	933	5 m	6.7	5.9	7.6	9.9	8.7	11.1	12.3	10.8	13.8	14.8	12.9	16.7	18.4	15.9	21.0	21.5	18.3	24.8	24.8	21.0	29.0
						10 m	9.8	8.5	11.0	14.3	12.5	16.2	17.7	15.4	20.2	21.4	18.4	24.4	26.7	22.7	30.8	31.1	26.2	36.3	35.9	29.9	42.3
						15 m	12.1	10.5	13.8	17.8	15.3	20.2	22.0	18.9	25.2	26.5	22.7	30.5	33.1	28.0	38.4	38.6	32.2	45.3	44.5	36.9	52.9
						30 m	15.4	13.3	17.6	22.6	19.5	25.8	28.1	24.0	32.2	33.8	28.8	39.0	42.2	35.5	49.1	49.1	40.9	57.8	56.8	46.8	67.5
						45 m	17.8	15.3	20.3	26.1	22.4	29.8	32.3	27.6	37.1	39.0	33.1	45.0	48.6	40.8	56.6	56.6	47.0	66.7	65.4	53.8	77.9
						1 h	19.7	16.9	22.5	28.9	24.7	33.0	35.8	30.5	41.1	43.1	36.6	49.8	53.7	45.1	62.7	62.6	51.9	73.9	72.3	59.4	86.3
						2 h	25.1	21.4	28.7	36.8	31.4	42.2	45.6	38.8	52.5	54.9	46.5	63.6	68.4	57.2	80.1	79.8	66.0	94.4	92.2	75.5	110.2
						4 h	29.0	23.6	34.4	42.6	34.6	50.5	52.8	42.7	62.9	63.6	51.2	76.2	79.3	63.1	95.9	92.4	72.7	113.0	106.8	83.2	132.0
						6 h	31.7	25.0	38.3	46.5	36.6	56.1	57.6	45.2	69.8	69.4	54.2	84.6	86.5	66.7	106.6	100.8	76.9	125.6	116.4	88.0	146.7
						8 h	33.7	26.0	41.2	49.4	38.1	60.5	61.2	47.1	75.3	73.7	56.4	91.2	91.9	69.5	114.8	107.1	80.1	135.4	123.8	91.7	158.1
						10 h	35.3	26.8	43.7	51.8	39.3	64.1	64.2	48.6	79.8	77.3	58.2	96.7	96.4	71.7	121.7	112.4	82.6	143.4	129.8	94.6	167.5
						24 h	42.5	30.3	54.9	62.4	44.5	80.5	77.3	54.9	100.2	93.2	65.8	121.4	116.2	81.1	152.8	135.4	93.4	180.1	156.4	106.9	210.3
						1 d	33.8	24.1	43.6	49.5	35.3	63.9	61.4	43.6	79.5	74.0	52.3	96.4	92.2	64.3	121.3	107.5	74.2	143.0	124.2	84.9	167.0

ANNEXURE B Rational Method for Karreebosch WEF

Description of Catchment	**Ongeluks/Tankwa River**						
River detail	**Ongeluks/Tankwa River**						
Calculated by	**B. Scott-Shaw**			**Date**		**10-Oct-22**	
Physical characteristics							
Size of catchment (A)	**119**	km²		Rainfall Region			
Longest Watercourse	**22.1**	km		**Area Distribution Factors**			
Average slope (S_{av})	**0.028**	m/m		Rural (α)	Urban (β)		Lakes (γ)
Dolomite Area ($D_{\%}$)	**0**	%		**1**	**0**		**0**
Mean Annual Rainfall (MAR)	**253**	mm					
Catchment Characteristics	**Steep/impermeable**	%					
r - look up from Table 3C.3	**Medium grass cover**	0.4					

Rural (1)					**Urban** (2)			
Surface Slope	**%**	**Factor**	**C_s**	**Description**		**%**	**Factor**	**C_2**
Vleis and Pans	5	0.05	0.003	**Lawns**				
Flat Areas	15	0.11	0.017	Sandy, flat (<2%)			0.075	-
Hilly	65	0.2	0.130	Sandy, steep (>7%)			0.175	-
Steep Areas	15	0.3	0.045	Heavy soil, flat (<2%)			0.15	-
Total	100	-	0.194	Heavy soil, steep (>7%)			0.3	-
Permeability	**%**	**Factor**	**C_p**	**Residential Areas**				
Very Permeable	0	0.05	-	Houses			0.4	-
Permeable	35	0.1	0.035	Flats			0.6	-
Semi-permeable	55	0.2	0.110	**Industry**				
Impermeable	10	0.3	0.030	Light industry			0.65	-
Total	100	-	0.175	Heavy Industry			0.75	-
Vegetation	**%**	**Factor**	**C_v**	**Business**				
Thick bush and plantation	0	0.05	-	City Centre			0.825	-
Light bush and farm-lands	42	0.15	0.063	Suburban			0.6	-
Grasslands	55	0.25	0.138	Streets			0.825	-
No Vegetation	3	0.3	0.009	Maximum flood			1.00	-
Total	100	-	0.210	Total		0	-	0.000

Time of concentration (T_c)	**Defined Watercourse**		Notes:		
Overland flow	Defined watercourse		*Pre-development Run-off*		
$T_c = 0.604\left(\frac{rL}{\sqrt{S_{av}}}\right)^{0.467}$	$T_c = \left(\frac{0{,}87L^2}{1000S_{av}}\right)^{0.385}$		*Tc =* *2.27521115*	*Latitude:*	*29°38'*
				Longitude:	*30°17'*
3.4 Hours	2.3 Hours				

Run-off coefficient							
Return period (years), T	**2**	**5**	**10**	**20**	**50**	**100**	**Max**
Run-off coefficient, C_1 ($C_1 = C_s + C_p + C_v$)	0.579	0.579	0.579	0.579	0.579	0.579	0.5785
Adjusted for dolomitic areas, C_{1D} (= $C_1(1-D_{\%})+C_1D_{\%}(\Sigma(D_{factor} \times C_{s\%}))$	0.5785	0.5785	0.5785	0.5785	0.5785	0.5785	0.5785

Adjustment factor for initial saturation, F_t	0.75	0.8	0.85	0.9	0.95	1	1
Adjusted run-off coefficient, C_{1T} (= C_{1D} x F_t)	0.433875	0.4628	0.491725	0.52065	0.549575	0.5785	0.5785
Combined run-off coeffiecient C_T (= $\alpha C_{1T} + \beta C_2 + \gamma C_3$)	0.433875	0.4628	0.491725	0.52065	0.549575	0.5785	0.5785
Rainfall							
Return period (years), T	**2**	**5**	**10**	**20**	**50**	**100**	**Max**
Point Rainfall (mm), P_T	32.0	47.0	58.2	70.2	87.5	101.9	117.7
Point Intensity (mm/hour), P_{IT} ($=P_T/T_C$)	14.1	20.7	25.6	30.9	38.5	44.8	51.7
Area Reduction Factor (%), ARF_T	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Average Intensity (mm/hour), I_T (= P_{IT} x ARF_T)	14.1	20.7	25.6	30.9	38.5	44.8	51.7
Return period (years), T	**2**	**5**	**10**	**20**	**50**	**100**	**Max**
Peak flow (m^3/s),	147.472	231.040	303.977	388.220	510.776	626.142	723.227

ANNEXURE C SDF Method for the Karreebosch WEF

Description of catchment		**Karreebsoch**					
River detail		**Tankwa Tributary**					
Calculated by		**BCSS**			**Date**	**21 July 2022**	
Physical characteristics							
Size of catchment (A)	**153**	km²	Time of Concentration (T_C)	$T_c = \left(\frac{0{,}87\,L^2}{1000\,S_{av}}\right)^{0{,}385}$		**2.46**	hours
Longest watercourse (L)	**24.4**	km					
Average slope (S_{av})	**0.05**	m/m					
SDF basin (0)#	**19**		Time of concentration, t (= 60 T_C)			**148**	minutes
2-year return period rainfall (M)	**34**	mm	Days of thunder per year (R)			**16**	days/year
TR102 n-day rainfall data							
Weather Service station		**Letjiesbos**	Mean annual precipitation (MAP)			**160**	mm
Weather Service station number		**69 483**	Coordinates				

Duration (days)	Return period (years)						
	2	5	10	20	50	100	200
1	**34**	**55**	**72**	**92**	**124**	**152**	**185**
2	**38**	**64**	**87**	**112**	**153**	**190**	**233**
3	**40**	**68**	**93**	**121**	**166**	**206**	**254**
7	**45**	**79**	**110**	**145**	**202**	**254**	**315**

Rainfall							
Return period (years), T	2	5	10	20	50	100	200
Point precipitation depth (mm) $P_{t,T}$	**22.36**	**37.73**	**49.35**	**60.97**	**76.34**	**87.96**	**99.58**
Area reduction factor (%), ARF (= (90000-12800lnA+9830lnt)^{0,4})	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Average intensity (mm/hour), I_T (= $P_{t,T}$ x ARF / T_C)	**9.09**	**15.34**	**20.06**	**24.79**	**31.03**	**35.76**	**40.48**

Run-off coefficients							
Calibration factors	C_2 (2-year return period) (%)		**10**	C_{100} (100-year return period) (%)			**35**
Return period (years)	2	5	10	20	50	100	200
Return period factors (Y_T)	0	0.84	1.28	1.64	2.05	2.33	2.58
Run-off coefficient (C_T), $C_T = \frac{C_2}{100} + \left(\frac{Y_T}{2{,}33}\right)\left(\frac{C_{100}}{100} - \frac{C_2}{100}\right)$	**0.10**	**0.19**	**0.24**	**0.28**	**0.32**	**0.35**	**0.38**
Peak flow (m³/s), Q_T = 0.278 x $C_T I_T A$	**38.64**	**123.94**	**202.37**	**290.72**	**422.00**	**531.91**	**648.34**

ANNEXURE D SCS Results for the Karreebosch WEF

CATCHMENT NAME : Karreebosc

PROJECT NO : 1

RUN NO : 1

TOTAL CATCHMENT AREA (km^2) : 153.00

STORM INTENSITY DISTRIBUTION TYPE : 3

CATCHMENT LAG TIME (h) : 2.22

COEFFICIENT OF INITIAL ABSTRACTION: 0.10

CURVE NUMBERS:	Initial	Final
Sub-catchment 1	79	79.0
Sub-catchment 2	79	79.0

RETURN PERIOD (YEARS)	2	5	10	20	50	100	200
DESIGN DAILY RAINFALL DEPTH (mm)	39	56	69	84	106	125	146

DESIGN STORMFLOW DEPTH (mm)

Sub-catchment 1	10.4	20.8	29.9	41.2	59.1	75.3	93.8
Sub-catchment 2	10.4	20.8	29.9	41.2	59.1	75.3	93.8

TOTAL RUNOFF DEPTH (mm)	10.4	20.8	29.9	41.2	59.1	75.3	93.8

DESIGN STORMFLOW VOLUME

(millions m^3)

Sub-catchment 1	1.1	2.2	3.2	4.4	6.2	7.9	9.9
Sub-catchment 2	0.5	1.0	1.4	2.0	2.8	3.6	4.4

TOTAL STORMFLOW VOLUME (millions m^3)	1.6	3.2	4.6	6.3	9.0	11.5	14.3

COMPUTED CURVE NUMBER	79.0	79.0	79.0	79.0	79.0	79.0	79.0

PEAK DISCHARGE (m^3/s)	97.9	200.2	292.1	407.9	590.5	756.7	946.5

ANNEXURE E **Surface drainage calculations**

Utility Programs for Drainage
Surface drainage calculations

Sinotech

Project: Sutherland
Designer: ND/BCSS
Date: 14 October 2020
Description: Gravel roads at Sutherland WEFs site
Filename: E:\Work\2020\Sutherland_Raod_surafce Calcs\Sutherland.sdp

SURFACE DRAINAGE CALCULATIONS

DEPTH OF FLOW ON ROAD SURFACE

INPUT DATA

Road crossfall (n1):	0.1 %
Road gradient (n2):	15 %
Width of road way (w):	10 m
Rainfall intensity (I):	85.4 mm/h

RESULTS

Slope of flow path (Sf):	15.00 %
Length of flow path (lf):	1500.03 m
Flow depth of water (d):	24.06 mm
Comments:	The flow depth is greater than 6.0 mm.