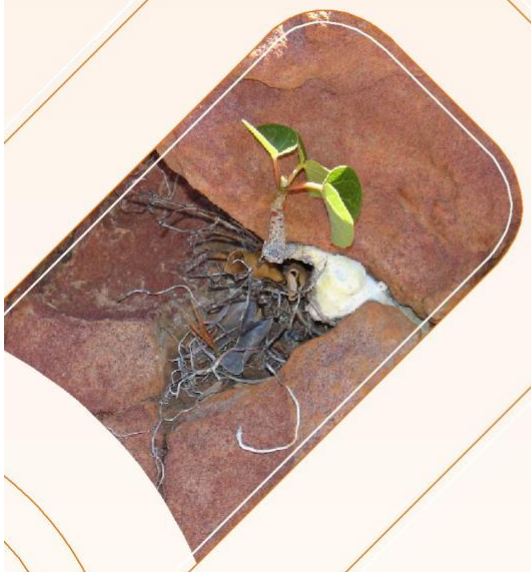

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION OF THE ±370km 765kV-POWER LINE FROM GAMMA S/S TO KAPPA S/S AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN WESTERN AND NORTHERN CAPE PROVINCE

July 2018

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NZUMBULULO

DRAFT REPORT

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION OF THE ±370km 765kV-POWER LINE FROM GAMMA S/S TO KAPPA S/S AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN WESTERN AND NORTHERN CAPE PROVINCE

July 2018

Prepared by: Hellen Mlotshwa

External Review: Eskom Holdings

For and on behalf of

Nzumbululo Environmental,

Health and Safety Solutions (EHS)

Approved by: Dr. McEdward Murimbika

Signed:

This report has been prepared by Nzumbululo Environmental Health and Safety solutions the trading name of Nzumbululo (Pty) Limited, one of the few consultancies able to combine natural, cultural and social environmental expertise under a one-stop consultancy supported by local expertise and knowledge with sub-Saharan regional reach and experience.

TITLE:	ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION OF ±370km 765kV-POWERLINE FROM GAMMA S/S KAPPA S/S IN AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN WESTERN AND NORTHERN CAPE PROVINCE.

PURPOSE OF SCOPE:

The purpose of this Draft Environmental Programme is to describe the environmental values and factors that may be impacted on by the proposed construction of a +- 370km 765kVpowerline project in Limpopo Province. The programme is part of EIA study being conducted in compliance with the National Environmental Management Act (Act 107 of 1998) and Government Notices No. R. 544, R545 and R546 of June 2010. The EIA process is required in order to get approval for the project from a competent authority. As such, an application was lodged with the Department of Environmental Affairs (DEA) for the proposed construction of 765kv +- 370 km was assigned a reference number NEAS Reference DEA/EIA/0001267/2012 DEA Reference 14/12/16/3/3/2/353.

DOCUMENT VERIFICATION			
Signature:	Position:		
Name:	Date:		
ENDORSED Client Project Responsible Officer to sign off.			
Signature	Position		
Name:	Date:		

1.1 Nzumbululo RAICE terms

R	Responsible: the person actually produces the document
A	Accountable: the person who has to answer for quality assurances
C	Consulted: those who are consulted before the document is finalised
I	Informed: those who must be informed when the document is published
E	Endorsed: those who must approve the final document before it is published by the client

Issue	Date	Reason For Issue	Responsible	Accountable
1		Environmental Impact assessment Internal Project Review	H. Mlotshwa	Dr. M. Murimbika
2		Eskom Project Manager Review	H. Mlotshwa	Dr. Murimbika

Citation:	ENVIROMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION OF THE 370km 765kV-POWERLINE FROM GAMMA S/S TO KAPPA S/S AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN THE WESTERN CAPE PROVINCE.
Recipients:	PREPARED FOR: ESKOM SOC Limited Megawatt Park Maxwell Drive P.O Box 1091 Johannesburg Tel: 011 800 6812 Fax: 0 86 660 5639 E-mail: MokgwaLL@eskom.co.za
NZUMBULULO REFERENCE NO.	HESSA REF NO: 2012_JHB.HESSA_ENV.PRO_0003

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION OF THE ±370km 765kV-POWER LINE FROM GAMMA S/S TO KAPPA (KURUSON) S/S AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN NORTHERN AND WESTERN CAPE PROVINCE

Authorship: This Report has been prepared for Eskom transmission by Nzumbululo Heritage Solutions.

Geographic Co-ordinate Information: Geographic co-ordinates in this report were obtained using a hand-held Garmin Global Positioning System device. The manufacturer states that these devices are accurate to within +/- 5 m.

Maps: Maps included in this report use data extracted from the NTS Map and data from Google Earth Pro were also utilised.

Disclaimer: Nzumbululo Heritage Solutions is not responsible for omissions and inconsistencies that may result from information not available at the time this report was prepared.

Signed by Principle EAP:

_____

H Mlotshwa
July 2018

DEFINITIONS

"Air pollution means any change in the composition of the air, caused by smoke**,** soot, dust (including fly ash), cinders and solid particles of any kind, gases, fumes, aerosols and odorous substances" (Air Quality Act, 2004).

"**Alternative"** means a different means of meeting the general purpose and need of a proposed activity." (National Environmental Management Act, 1998 (Act No. 107 of 1998), Guideline 5, June 2006).

"Construction means the building, erection or expansion of a facility, structure or infrastructure that is necessary for the undertaking of an activity, but excludes any modification, alteration or upgrading of such facility, structure or infrastructure that does not result in a change to the nature of the activity being undertaken or an increase in the production, storage or transportation capacity of that facility, structure or infrastructure;" (National Environmental Management Act, 1998 (Act No. 107 of 1998), Regulation 386 of 2006).

"Interested and affected party"- refers to:

(a) Any person, group of persons or organization interested in or affected by an activity; and

(b) Any organ of state that may have jurisdiction over any aspect of the activity;" (R385, 2006).

"linear activity- means an activity that is undertaken across several properties and which affects the environment or any aspect of the environment along the course of the activity in different ways, and includes a road, railway line, power line, pipeline or canal" (National Environmental Management Act, 1998 (Act No. 107 of 1998) Regulation 385 of 2006).

"Public participation process- means a process in which potential interested and affected parties are given an opportunity to comment on, or raise issues relevant to, specific matters."(R385, 2006).

"Plan of study for environmental impact assessment- means a document contemplated in regulation **28**(1)(i) which forms part of a scoping report and sets out how an environmental impact assessment must be conducted;"(R543, 2010).

"Significant impact- means an impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment."(R385, 2006).

ABBREVIATIONS

DEA Department of Environmental Affairs

EAP Environmental Assessment Practitioner

ECO Environmental Control Officer

EIA Environmental Impact Assessment

EMF Electrical and magnetic field

EIAR Environmental Impact Assessment Report

EMP Environmental Management Plan

HeSSA Nzumbululo Heritage Solutions South Africa

IAPs Interested and Affected Parties

ICNIRP International Commission for Non- ionising Radiation Protection

MWMegawatt

NEMA National Environmental Management Act (Act No: 107 of 1998)

PPP Public Participation Process

PSP Public Service Provider

TRFR's Transformers

NIRP2 National Integrated Resource Plan

ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE PROPOSED CONSTRUCTION OF THE ±370km 765kV-POWER LINE FROM GAMMA S/S TO KAPPA S/S AND ASSOCIATED SUBSTATION WORKS TO ACCOMODATE THE POWERLINE IN NORTHERN AND WESTERN CAPE PROVINCE.

2 INTRODUCTION

Nzumbululo Heritage Solutions was appointed by Eskom Holdings SOC Limited (Transmission) to conduct an Environmental Impact Assessment (EIA) study for the proposed construction of a +/-370km 765kV transmission powerline, infrastructures and associated auxiliary and substation infrastructure. The powerline will traverse from the Gamma Sub Station outside Victoria West Town in the Northern Cape Province to Kappa Substation close to Touwsrivier in the Western Cape Province.

The proposed powerline and associated auxiliary and substation works are all listed activities as defined by GNR 545 (Listing Notice 1) of 18 June 2010 of the National Environmental:

Activity 8 (I): "The construction of facilities or infrastructure, for the transmission and distribution of electricity with a capacity of 275 kilovolts or more, outside an urban area or industrial complex."

The above-defined activities require a full Environmental Impact Assessment (EIA) study, in line with the 2006 Regulations. The EIA is specifically conducted in order to acquire the environmental authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) (NEMA). The application for environmental authorisation for the proposed development was lodged in May 2012 with the lead environmental authority, the Department of Environmental Affairs (DEA). The DEA Application Reference for this study is 14/12/16/3/3/2/353) and NEAS: DEA/EA/0001267/2012 (Acknowledgement letter is attached in Appendix 2).

2.1 Motivation for the Development

Electricity cannot be stored, It is therefore necessary to generate and deliver power over long distances at the very instant it is needed. In South Africa, thousands of kilometers of high voltage Transmission power lines transmit power, mainly from the Power Stations located at the Mpumalanga and Limpopo (Waterberg) coalfields, to major substation where the voltage is reduced for distribution to industry, businesses, homes and farms all over the country.

For Eskom Transmission to honor its mandate and commitment to meet the increasing needs of the end users, it has to establish and expand its infrastructure of Transmission power lines and Substations on an ongoing basis. Due to substantial annual load growth, load shifts and step loads, it has become necessary to reinforce the existing electrical infrastructure.

Most towns and cities purchase electricity in bulk from Eskom and sell it to households, industrialists and other end users within their areas of jurisdiction, while Eskom also sells bulk electricity directly to end users in some parts of South Africa.

MANDATE

Eskom has a mandate to satisfy potential customer needs, which implies certain responsibilities. One of the most significant of these is to find and maintain the balance between satisfying the needs of society and remaining within the capabilities of the environment. In order to achieve this, Eskom must continually re-asses its present infrastructure and take into account new developments to ensure that there is a continued supply of electricity, without significantly impacting on the environment.

1.4 Alternative Transmission Line Corridors

Technically feasible alternative transmission line corridors have been identified for investigation within the EIA process. These alternatives were selected on the basis of the local topography, as well on technical criteria. Through the EIA process, a preferred transmission power line corridor will be nominated for consideration in the decision-making process by the National Department of Environmental Affairs (DEA), as competent authority for this project. Should the proposed project be authorised by

the DEA, Eskom will enter into a negotiation process with each affected landowner. The negotiation process is independent of the EIA process, and will be undertaken directly by Eskom Transmission.

Three alternative powerline corridors have been identified for this project, each planning and environmental studies corridors of 2000m in width. The final servitude would be a corridor required to accommodate 55m constructions of the 765kV power line transmission towers. The receiving environment for the proposed transmission power line consists of rural village traditional, towns and commercial farmlands distributed between Gamma and Kappa Substations. (Refer to map attached appendix 1)

2.1.1 Legislative requirements

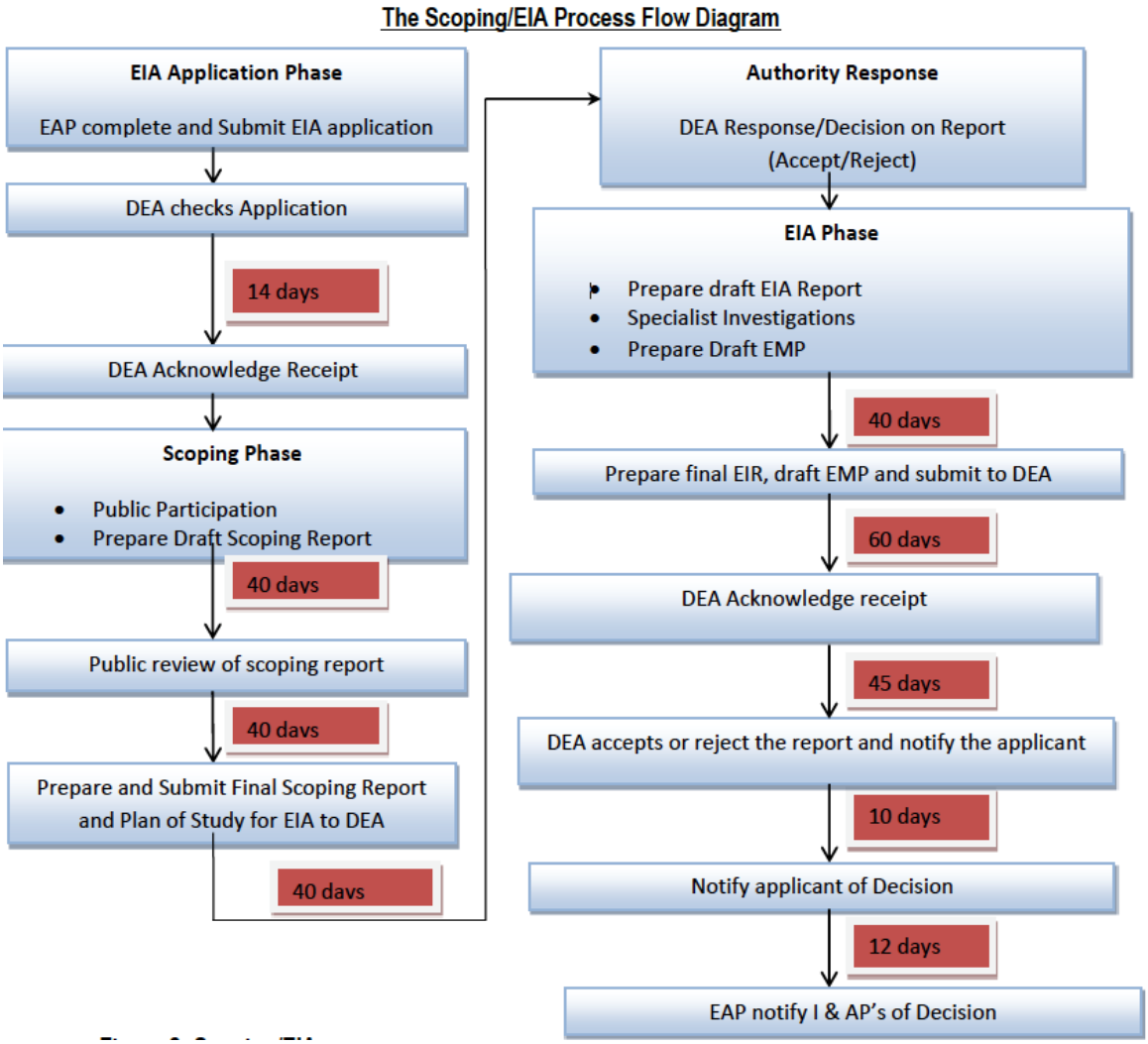
The construction of the 765kV transmission powerline, including associated infrastructures, is an activity identified in terms of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), in respect of the Environmental Impact Assessment (EIA) Regulations No. R543 of 2010, which stipulates that such developments, may not commence without Environmental Authorisation (EA) from the National Department of Environmental Affairs (DEA).

The National Department of Environmental Affairs (DEA) is the competent authority for this project. An application for authorisation has been acknowledged by DEA (under Application Reference number 14/12/16/3/3/2/353.Through the decision-making process, DEA will be supported by the Western cape Department of Economic Development, Environment and Tourism.

2.1.2 The EIA process

The EIA study and the EIR outcome are planning and decision-making processes and tools respectively undertaken in terms of Section 24 (5) of the National Environmental Management Act (NEMA), Act No. 107 of 1998. The EIA has parallel and integrated processes namely: a technical assessment process and public participation process (PPP). The technical process investigates "hard" information: facts based on scientific

and technical study, statistics or technical data. It identifies the potential negative and positive consequences of a proposed project or development at an early stage, and recommends ways to enhance positive impacts and to avoid or reduce or mitigate negative impacts. The PPP exercise engages the public and I&AP's on the issues relating to the proposed development including identifying community concerns and gather inputs from other relevant parties. Figure 2 below illustrates the EIA process. The findings of an EIA also guide the technical and financial investigations relating to the viability of the proposed development. The EIA regulations also require that an EMP be developed to guide the planning, development and subsequent operation of the development. The provisions of the EMP will be legally binding on Eskom Holdings SOC and on its contractors to ensure a sustainable development.



This report presents the Draft Environmental Management Programme (EMPR) for the proposed 765kV powerline and Substation work. The EMPR will form part of the EIA phase and is drafted following the drafting of Environmental Impact Assessment Report. This draft report will be finalised after comments period and submitted to DEA with the EIA for decision-making on the proposed development.

2.2 THE LEGAL FRAMEWORK

The proposed development of a 765kV powerline and substation works, Western and Northern Cape Province triggers the following Acts:

Table 1.1: Environmental Statutory Requirements.

ACT	ACT NO	REMARKS
Atmospheric Pollution Prevention Act	45 of 1965	Controls all forms of air pollution. -smoke control zones -dust control -air pollution from waste
National Forest Act	84 of 1998	Provides measures for the protection of certain forests and trees
Advertising On Roads And Ribbon Development Act	21 of	Prohibits the depositing or leaving of certain articles or materials near certain roads -structures near roads -waste near roads
Conservation of Agricultural Resources Act	43 of 1983	Controls the utilisation and protection of wetlands, soil conservation, control and prevention of veld fires, control of weeds and invasive plants.
Agricultural Pests Act	36 of 1983	Provides control to prevent and combat agricultural pests, including importation of exotic plants and animals
National Veld and Forest Fire Act	101 of 1998	Deals with the establishment of fire protection Associations, responsibilities for the preparation and maintenance of fire breaks
National Environmental	107 of 1998	Provides for cooperative environmental governance by establishing principles for decision making on matters

Management Act		affecting the environment.
Environment Conservation Act	73 of 1989	Provides control for the effective protection and utilisation of the environment, littering, waste disposal, noise and various other activities, which may have a detrimental effect on the environment -provides for waste management
Fencing Act	31 of 1963	Prohibits damage to property owners gates and fences Prohibits climbing or crawling over or through fences without permission
Hazardous Substances Act	15 of 1973	Sale of group I, II, III and letting, use, operation, application and installation of group III hazardous substances. Transportation of hazardous substances.
Health Act	63 of 1977	Control of health aspects of waste disposal and water treatment Regulates, rubbish, sewage
National Roads Act	54 of 1971	Prohibits disposal of waste near National roads
Occupational Health and Safety Act	85 of 1993	Protects workers from exposure to hazardous substances and working conditions
National Heritage Resources Act	25 of 1999	Controls for the protection of natural, cultural and prehistoric and historical resources.
National Water Act	36 of 1998	Provides for all aspects relating to pollution of surface

The proposed construction of powerline and substation works is a listed activity in line with the NEMA (Act 107 of 1998), Government Notice No. R544. This mean the development require statutory impact assessment studies prior to the development being approved.

2.2.1 Eskom Guidelines

The following Eskom guidelines are also relevant to the proposed development:

- Air Quality Management Policy (ESKPBAAA3)
- The Control Of Dust Exposure Within Eskom (ESKADAAD6)
- Environmental Impact Assessment (ESKPVAAL7)

- Passive Fire Protection For Oil Filled Equipment In High Voltage Yards (FSGASAAQ8)
- Standard For Bush Clearance And The Maintenance Of Overhead Powerlines (ESKASABG3)
- Guidelines For Weed Eradication At Eskom Substations Using Herbicides (TRR/S.92/034)
- Oil Spill Clean-Up And Rehabilitation (ESKAGAAD7)

2.3 STRUCTURE OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPR)

The EMPR provides proposed mitigation measures that will be taken to address the environmental impacts identified during the EIA process for the following phases:

- Construction
- Operational
- Decommissioning

2.3.1 Objectives of the EMPR

The EMPR has been compiled in order to achieve the following objectives

- To outline mitigation measures and environmental specifications, which are, required to be implemented for all phases of the project.
- In order to minimize the extent of the environmental impacts.
- To prevent long term or permanent environmental degradation.
- To outline functions and responsibilities for persons responsible for the implementation of the EMPR.
- Precautions against damage and claims arising from damage are taken timeously.

2.4 ENVIRONMENTAL AWARENESS TRAINING

The Contractor shall ensure that adequate environmental awareness training of senior site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMPR. The presentation shall be conducted, as far as is possible, in the employees' language of choice. As a minimum, training should include:

- Explanation of the importance of complying with the EMPR.

- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this EMPR and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPR.

The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

2.5 PERSONS RESPONSIBLE FOR THE IMPLEMENTATION OF THE EMPR

The following persons will be responsible for the implementation of the EMPR:

- Project Manager (PM)
- Environmental Control Officer (ECO)
- Contractor (C)
- Site Manager (SM)

2.5.1 Responsibilities of the Project Manager

- Conduct audits to ensure compliance with the EMPR
- Should be aware of the contents of the EMPR.
- Confine construction activities to the demarcated construction site.
- Prevent actions that will harm the environment and take steps to control pollution on site.

2.5.2 Responsibilities of the Environmental Control Officer

- Ensure that activities on site comply with all relevant environmental legislation.
- Should be fully conversant with the EMPR.
- Monitor and verify that environmental impacts are kept to minimum.
- Take appropriate measures if conditions in the EMPR are not adhered to.
- Should have in depth knowledge of the environmental legislation and environmental policies/ standards and ensure compliance with them.

- Compile monthly progress and monitoring reports.

2.5.3 Responsibilities of the Contractor

- Should comply with the environmental management specifications stipulated in the EMPR
- Preserve the natural environment by limiting destructive actions on site.
- Ensure that the construction staff receives appropriate training before construction activities commence.
- Should appoint a dedicated person, Environmental Control Officer (ECO).
- The contractor should oversee site works
- Liaise with PM and ECO

2.5.4 Responsibility of the Site Manager

- The contract manager should oversee site works
- Liaise with Contractor, PM and ECO

2.6 REPORTING STRUCTURE

The diagram (1.1) below indicates the reporting structure of the persons responsible for the implementation of the EMPR.

Figure 1: Reporting structure

2.7 METHOD STATEMENTS

Method statements are written submissions by the Contractor to the PM in response to the requirements of this EMPR or to a request by the PM. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.

- The Contractor shall not commence the activity for which a method statement is required until the PM has approved the relevant method statement.
- Method statements must be submitted at least five (5) days prior to the date on which approval is required (start of the activity).
- Failure to submit a method statement may result in suspension of the activity concerned until such time as a method statement has been submitted and approved.
- An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any

damage caused to the environment through activities undertaken without an approved method statement shall be rehabilitated at the contractor's cost.

- The method statements shall cover relevant details with regard to:
  - Construction procedures and location of the construction site.
  - Start date and duration of the procedure.
  - Materials, equipment and labour to be used.
  - How materials, equipment and labour would be moved to and from the site as well as on site during construction.
  - Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
  - Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
  - Compliance / non-compliance with the EMPR Specification and motivation if non-compliant.

3 EXPERTISE OF THE ENVIRONMENTAL ASSESSEMENT PRACTITIONERS

An Environmental Assessment Practitioner (EAP) appointed in terms of Regulation 17 (1) of Government Notice 543 of 2010 is required to:

- Be independent
- Have expertise in conducting environmental impact assessments including knowledge of the Act, these regulations and any guidelines that have relevance to the proposed activity
- Perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- Comply with the Act, these regulations and all other applicable legislation
- Take into account, to the extent possible, the matters listed in Regulation 13 of Government Notice 543 of 2010 when preparing the application and
- Disclose to the applicant and the competent authority all material information in the possession of the EAP that reasonably has or may have the potential of influencing any decision to be taken with respect to the application by the competent authority in terms of these regulations or the

objectivity of any report, plan or document to be prepared by the EAP in terms of these regulations for submission to the competent authority.

- The table below lists the EAP study team involved in this project. These will work with other specialists until and an Environmental Authorisation is issued by the DEA.

3.1 Details of the EAP

Table 1.2: Details of EAP

Name	Hellen Mlotshwa
Company	Nzumbululo Heritage Solutions for South Africa
Physical Address	4 Berger Road Vornavalley Midrand
Postal Address	P. O. BOX 4106; HALFWAY HOUSE 1685
Telephone Number	011 021 4937
Fax Number	086 544 2177
E-mail	info@nzumbululo.com
Role in Project	Environmental Consultant/Practitioner

Hellen Mlotshwa is a qualified and experienced environmental practitioner with years of experience on various environmental authorisation projects.

Detail of Applicant

Table 1.3: Details of the Proponent

Name	Lerato Mokgwatleng (Representative of Proponent)
Company	ESKOM SOC LIMITED
Postal Address	P.O. BOX 1091
Telephone number	011 800 6812
Fax number	0 86 660 5639
Email	MokgwaLL@eskom.co.za
Role in Project	Project Manager

3.2 Details of Environmental Authority

Table 1.4: Details of the Environmental Authority

Name	Constance Musemburi (Representative of Department of Environment)
Company	Department of Environmental Affairs
Postal Address	Private Bag X447 Pretoria 0001
Telephone number	012 399 9372
Fax number	012 320 7539
Email	cmusemburi@environment.gov.za
Role in Project	Project Manager

4 DESCRIPTION OF THE PROPOSED PROJECT

The proposed project will include the construction of a new +/-370km-long 765kv transmission powerline from Gamma Substation to Kappa Substation in the Northern and Western Cape Provinces respectively. The development will include auxiliary works such as upgrade of substations, access roads, construction camps and equipment or material storage sites along the proposed powerline servitude.

4.1 Project Location

The proposed project area is located in the Northern Cape and Western Cape Provinces. The powerline will traverse through the following towns:

- Victoria West in the Northern Cape, and
- Beaufort West,
- Three sisters,
- Merweville,
- Murraysburg,
- Prince Albert,
- Laingsburg,
- Touwsriver and
- Ceres in the Western Cape.

The proposed preferred powerline servitude and associated alternative routes will traverse through the following listed farm properties: The list of individual farms affected by the proposed powerline is attached on appendix 1 with the map.

These farms are distributed across the Northern Cape and Western Cape Provinces. The land-use activities on these farms comprises of commercial animal husbandry, conservancies areas, plantations and vineyards, urban and rural settlements, agro-industrial areas with associated infrastructures as well as vast networks of national regional and local roads, exiting transmission and distribution powerlines, bulk and reticulation subsurface water supply networks and such other auxiliary infrastructures.

4.2 Layout and design

The proposed project includes the following activities:

- Equip 1 x 765kV feeder bay at Gamma substation (extend existing busbar if necessary)
- Equip 1 x 765kV feeder bay at Kappa substation (extend existing busbar if necessary)
- Build the 2nd ±400km 765kV line from Gamma Kappa with 400MVAr line reactors at both ends.

4.2.1 Project Motivation

Electricity cannot be stored, It is therefore necessary to generate and deliver power over long distances at the very instant it is needed. In South Africa, thousands of kilometers of high voltage Transmission power lines transmit power, mainly from the Power Stations located at the Mpumalanga and Limpopo (Waterberg) coalfields, to major substation where the voltage is reduced for distribution to industry, businesses, homes and farms all over the country.

For Eskom Transmission to honor its mandate and commitment to meet the increasing needs of the end users, it has to establish and expand its infrastructure of Transmission power lines and Substations on an ongoing basis. Due to substantial annual load growth, load shifts and step loads, it has become necessary to reinforce the existing electrical infrastructure.

Most towns and cities purchase electricity in bulk from Eskom and sell it to households, industrialists and other end users within their areas of jurisdiction, while Eskom also sells bulk electricity directly to end users in some parts of South Africa.

MANDATE

Eskom has a mandate to satisfy potential customer needs, which implies certain responsibilities. One of the most significant of these is to find and maintain the balance between satisfying the needs of society and remaining within the capabilities of the environment. In order to achieve this, Eskom must continually re-asses its present infrastructure and take into account new developments to ensure that there is a continued supply of electricity, without significantly impacting on the environment.

4.3 Technical Details of the Project

4.3.1 Proposed Powerline

The proposed powerline will be approximately +-370km long. Various structures are being considered for use during the construction in different sections of the line subject to landscape features.

765kv Tower types

Towers for the proposed transmission power line would be between approximately 35m and 55m in height and extend over a footprint area ranging from approximately 14.5m x 14.5m to 40.8m x 52.1m, depending on the tower type used. The distance between each tower would be approximately 500m, however, all will be influenced by the topography and the need for bends in the line to remain within negotiated servitudes. The actual number of towers, the type of towers and other support structures associated with the proposed power line would be confirmed and detailed following approval of the proposed development and once the final alignment is negotiated with property owners.

In general, the type of towers to be used would consider weight, the area (e.g. topography characteristic), height, costs and erection time. In addition,

transmission power line routes are planned with as few bends along the route as possible.

4.4 Proposed Activities and Project Timeline

The activities for the construction and operation will be finalised during EIA phase.

4.4.1 Preconstruction

The project is currently on the pre-construction phase where the EA study is conducted. This phase of study's objective is to make detailed assessment of potential impact of the proposed development, propose environmental management programme. These form part of this EIAR, which will later be submitted to DEA to inform authorities in making their decision. When the project is approved and Environmental Authorisation is issued the project will need to be advertised and await objections from IAPs for 30 days. From there, the construction phase can commence.

4.4.2 Construction

As illustrated above, construction will commence once pre-construction studies are completed. Construction is estimated to take about 18-24 months. The construction activities for the proposed development will include the following activities.

4.4.2.1 Access roads

The access road will be gravel and constructed for vehicles. This access road will be along the entire length of proposed powerline. It will be used for construction phase and operation, which will be mainly for maintenance. The information about the access point and exact route for the access road will be negotiated and finalized with the landowners after completion and approval of the study.

4.4.2.2 Construction Camp

The proposed powerline will require the erection of a temporary construction camp. Due to the nature of this project the construction camp will be located within the existing boundaries. The EMP will include strict mitigation measures, which will manage the construction camp during construction. Eskom and the independent contractors

both appoint Environmental Control Officer (ECO), who will be responsible for the implementation of these measures.

The construction camp will be constructed at the nearest appropriate area to the three proposed location of switching station. The exact locations will be negotiated and finalized with relevant owners after completion and approval of the EA study.

4.4.2.3 Construction of transmission powerlines

The following activities will be conducted as part of constructing the transmission powerlines:

- Survey of the route for the powerline
- Selection of best-suited structures and foundations
- Final design of powerlines and placement of towers
- Issuing of tenders and award of contract to construction companies
- Vegetation clearance and construction of access roads (where required)
- Pegging of structures
- Construction of foundations
- Assembly and erection of structures
- Stringing of conductors
- Rehabilitation of disturbed area and protection of erosion sensitive areas
- Testing and commissioning.

4.4.2.4 Stringing of Conductors

There is a guide wire, which is used to string the conductors between towers. This can be undertaken mechanically or by hand. The line will generally be strung in sections. There will be cable drums placed at 2 km intervals during this stringing process. In order to minimise any potential negative impacts on the surrounding area, these cable drums are placed within the servitude.

4.4.3 Operation and maintenance

The operation and maintenance of the transmission powerline, and substation works will be on-going process for the entire period while electricity will be transmitted all

works will be monitored and managed according to the Environmental Management Programme.

5 MANAGEMENT, MITIGATION AND MONITORING PROGRAMME

This section provides, first in the form of the plain text, the key provisions for environmental management for the site, and then compiles into the form of the table a description of the mitigation measures that will be implemented to avoid or minimise the potential impacts. This table lists site-specific construction activities correlated with identified environmental impacts, provides site-specific mitigation measures, and frequency of the mitigation measures. It also mentions the parties responsible for implementation, supervision of the application of the environmental management plan.

5.1 Key Provisions for Environmental Management

Environmental impact mitigation can be further developed before proceeding with initial stage of construction (i.e., top soil stripping, grading, vehicles crossing, etc.) with method statements that shall be submitted by contractors. The common measures and key mitigation provisions specific to this site are listed below in section 4.2. These measures are integrated into activities, impacts, mitigations, responsibilities, see table in subsections.

5.1.1 General provisions

General measures that will be implemented to ensure that environmental impacts are avoided or mitigated include but not limited to the following

- Safety warning signs, authorizing only project personnel
- Adequate signage to ensure that areas delimited by the project are respected
- The construction camps will be subject to the EMPR requirements. In this case, mobile toilets of sufficient capacity should be provided. The collection of disposal of the sewage/ waste water shall be arranged properly in accordance with legislations.

- Alternative route during construction will be done with temporary gravel on sites of the existing tarred road.

5.1.2 Waste Management

- Waste bins will be placed for proper collection and segregation in a marked/ signed and dedicated area,
- Their collection should be organized on the construction site on a daily basis,
- The waste will be then be transported to the approved disposal site,
- Provision of adequate mobile toilets facility for workforce including treatment plant of appropriate capacity or with regular disposal at approved discharge point.

5.2 Environmental management programme to specific areas of concern

5.2.1 Compliance

Objectiv	i. Ensure compliance with all related safety, health, quality policies, specifications, risks and requirements				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction, Construction, Operation and Decommissioning phases					
1	Compliance	The Contractor shall comply with the environmental specifications and requirements on an on- going basis and any failure on his part to do so will entitle the PM to impose a penalty. In the event of on-compliance the following recommended process shall be followed: The PM shall issue a notice of non-compliance to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the ECO. The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice. The Contractor shall provide the PM with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the ECO.	All phases	Beginning of phases	C, SM, and ECO

		In the case of the Contractor failing to remedy the situation within the predetermined period, the PM shall impose a monetary penalty based on the conditions of contract. In the case of non-compliance giving rise to physical environmental damage or destruction, the PM shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so. In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMPR, disagreement regarding the implementation or method of implementation of conditions of the EMPR, etc. any party shall be entitled to require that the issue be referred to specialists for determination. The PM shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remediation measures			

5.2.2 Environmental Parameters

Objectives	**Project Area** **i.** Protection of the environmental parameters such as topsoil, vegetation, watercourses.

No.	Activity	Mitigation Measures	Phase	Frequency	Responsibility
Pre-Construction Phase					
1	Vegetation	i. Acquire written approval of the method statement by the PM for clearing vegetation. ii. Search and rescue a conservation-worthy plants for potential plants to be cleared. iii. Collect seeds, unless the area is not deemed suitable for seed collection iv. Ensure that all litter and non-organic material are removed from the area to be cleared before clearing of vegetation v. Retain vegetation cover for as long as possible. vi. Vegetation clearing in watercourses and wetland areas shall be conducted by hand. No heavy machinery shall be permitted in watercourses to clear vegetation. Vegetation cleared from watercourses shall be removed from the watercourse immediately to prevent flooding. vii. All indigenous plant material removed from cleared areas shall be stockpiled for mulching. All remaining vegetation shall be removed and disposed of at an approved landfill site.	Pre-construction	Once	C
2	Wetland and Riparian areas	Site establishment shall not take place on steep slopes, within 30 m of wetland areas and watercourses or at sites declared as no-go areas Construction to take place during dry season Construction should avoid sedimentation Access road to sealed with dust suppressant Develop wetland and vegetation habitat bio monitoring programme	Pre-construction	Once	C

3	Aesthetics	The Contractor shall ensure that the type and colour of roofing and cladding materials of any new buildings and structures constructed as part of the project are selected to reduce reflection and blend with the natural environment. The Contractor shall not deface, paint, damage or mark any natural feature (e.g. rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand with the PM. Any features affected by the Contractor in contravention of this clause shall be restored / rehabilitated to the satisfaction of the PM. All construction areas must be kept neat and tidy at all times. Different materials and equipment must be kept in designated areas and storing/stockpiling shall be kept orderly. Lighting shall be of the downward facing spill off type.	All phases	Once	C
Construction Phase					
1	Topsoil	1. The Contractor shall remove topsoil from all areas where topsoil will be impacted on by construction activities, including temporary activities such as storage and stockpiling, etc. 2. Stripped topsoil shall be stockpiled in areas agreed with the PM for later use in revegetation and shall be adequately protected. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth of topsoil stripped may vary. 3. Topsoil stockpiles shall be convex and no more than 2 m high. Stockpiles shall be shaped so that no surface water ponding can take place. 4. Topsoil stockpiles shall be protected from erosion by wind and rain	Constructio n	Once	C

		by providing suitable storm water and cut off drains and/or by establishing suitable temporary vegetation. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or would kill the seed bank. 5. Topsoil stockpiles shall not be subject to compaction greater than 1500 kg/m2 and shall not be pushed by a bulldozer for more than 50m. 6. Topsoil stockpiles shall be monitored regularly to identify any alien plants, which shall be removed when they germinate to prevent contamination of the seed bank. 7. Before topsoil is to be re-used the stockpiles shall be analysed by a suitably qualified landscape contractor / horticulturist and, if necessary, upgraded before use. 8. The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the approved method statements and the requirements of this EMPR.			
2	Soil erosion	i. The Contractor shall, as an ongoing exercise, implement erosion and sedimentation control measures to the satisfaction of the PM. ii. During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc. iii. Any runnels or erosion channels developed during the construction or maintenance period shall be backfilled and compacted and the			

		areas restored to a proper condition. iv. Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the PM. Consideration and provision shall be made for the following methods (or combination thereof): brushcut packing, mulch or chip cover, straw stabilising, watering, planting/sodding, soil binders and anti-erosion compounds, mechanical cover or packing structures (including the use of geofabric, log/pole fencing, etc.). v. Traffic and movement over stabilised areas shall be restricted and controlled, and damage to stabilised areas shall be repaired and maintained to the satisfaction of the PM. vi. In areas where construction activities have been completed and where no further disturbance would take place, rehabilitation and revegetation should commence as soon as possible.			
3	Vegetation	• The Contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction site as a result of their activities. • Clearing of natural vegetation shall be kept to a minimum. The removal, damage and disturbance of natural vegetation without the written approval of the PM are prohibited. • Before vegetation clearing takes place in any construction area, search and rescue and seed collection shall be undertaken. • The use of herbicides is prohibited unless approved by the PM.			

4	Fauna	i. The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place. ii. The feeding of any wild animals is prohibited. The use of pesticides is prohibited unless approved by the PM. No domestic pets or livestock are permitted on site.	Construction	Daily	ECO
5	Water quality	i. Water quality from runoff from any fresh bitumen surfaces shall be monitored by the ECO and remedial actions taken where necessary. iii. The Contractor shall ensure uninterrupted flow of clean surface water past the construction works to the satisfaction of the PM and ECO. This shall be done by diverting surface water flow (coffer dams, etc.), piping the surface flow past the works, etc. No watercourse may be diverted, dammed or modified without the approval of the method statement by the PM. Should this occur, the necessary approval must be obtained from DEA and DWA in terms of the National Water Act (No 36 of 1998). iv. Contaminated water (silt-laden, cement-contaminated, etc.) pumped from the works area shall be pumped into settlement ponds and not straight back into the watercourse or wetland areas. v. Water shall not be pumped from the settlement ponds into the river without the approval of the PM. vi. Washing of clothes and equipment, bathing and swimming in rivers, streams and dams are strictly forbidden.	Construction	Weekly	ECO
6	Water courses and wetlands	i. The Contractor shall not work within river floodlines, watercourses and wetlands without written approval from the PM as required for the execution of the work. An experienced freshwater ecologist shall	Construction	Daily	ECO

		be consulted for all issues related to wetlands. ii. As far as is reasonably possible, work in watercourses and wetland areas shall take place outside of the expected rainy season and allow sufficient time for rehabilitation processes to be effected before the rains commence, i.e. between the months of October and April. This includes any work requiring the diversion of rivers or sections of rivers, the stabilization of eroded drainage lines and any construction activities involving the crossing of watercourses and wetland areas. iii. All watercourses and wetland areas shall be protected from erosion and direct or indirect spills of pollutants, e.g. sediment, refuse, sewage, cement, oils, fuels, chemicals, wastewater, bituminous products, etc. iv. In the event of a spill, the Contractor shall take prompt action to clear polluted areas and prevent spreading of the pollutants. The Contractor shall be liable to arrange for professional service providers to clear affected areas, if required.. v. Drip trays shall be used for all pumps, generators, etc. in order to prevent water contamination as a result of fuel spills or leaks.			
7	Water provision	i. The Contractor shall make available safe drinking water fit for human consumption at the site offices and all other working areas. ii. All drinking water must be from a legal source and comply with recognized standards for potable use. The Contractor shall comply with the provisions of the National Water Act and its Regulations for taking water from rivers or streams and the use thereof. iii. If water is stored on site, drinking water and multi-purposed water	Constructio n	Daily	C

		storage facilities shall be clearly distinguished and demarcated.			
8	Dust control	i. The Contractor shall ensure that the generation of dust is minimized and shall implement a dust control programme to maintain a safe working environment, minimize nuisance for surrounding residential areas / dwellings and protect damage to natural vegetation, crops, etc. ii. Construction vehicles shall comply with speed limits and haul distances shall be minimized. Material loads shall be suitably covered and secured during transportation. iii. Exposed soil and material stockpiles shall be protected against wind erosion and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors. iv. The Contractor shall implement dust suppression measures (e.g. water spray vehicles, covering of material stockpiles, etc.) if and when required.	Construction	Daily	ECO
Rehabilitation Phase					
1	Vegetation rehabilitation	i. The Contractor shall appoint a suitably experienced landscaping contractor / horticulturist to compile a vegetation rehabilitation plan that shall detail search and rescue, seed collection, seed mixing, seeding methods, planting and vegetation establishment in all construction areas. The Contractor shall submit the vegetation rehabilitation plan to the PM for approval. ii. The landscaping contractor / horticulturist shall be familiar with all types of vegetation and his/her appointment must be approved by the PM. iii. The vegetation rehabilitation plan shall include the following:	Construction	Daily	ECO, PM, C

		i. Seed requirements, harvesting methods and locations, seed storage methods; ii. Search and rescue; iii. Handling of plant material rescued (translocation areas, propagation, etc.); iv. Establishment and maintenance of a project-specific nursery, if required; v. Topsoil, mulch, fertiliser and soil stabilizer requirements and application; vi. Landscaping and revegetation methods for each area, i.e. hydro seeding / hydromulching, planting, including locations and timing; vii. Procurement requirements and a list of species of plants to be procured, if any; viii. Vegetation establishment and maintenance requirements (irrigation, etc.) for all revegetated areas; and ix. The use of any herbicides, pesticides and other poisonous substances, if required as per Eskom guideline.			

5.2.3 Site Establishment and Demarcation

Objectives	**Project Area** **i.** Ensure proper demarcation of the project area prior to construction; **ii.** Ensure timely notice and negotiation with stakeholders in the event that access is required for construction purposes; and ii. Ensure that all areas impacted during construction are rehabilitated to suitable levels. **Servicing Vehicles** iii. Prevention of pollution of the environment; and iv. Minimise chances of transgression of the acts controlling pollution. **Sanitation** **i.** Ensure that proper sanitation is received. **Fencing and signage** **ii.** Install temporary fencing and signage **Batching Plants** iii. To ensure all agreements with Landowners are adhered to; iv. Prevention of complaints from stakeholders; and v. Successful rehabilitation of disturbed areas. **Wet Areas** vi. Avoid impact to wet areas.

No.	Activity	Mitigation Measures	Phase	Frequency	Responsibility
Pre-Construction Phase					
1	No go areas	i. Areas where construction activities (including traffic accommodation) are prohibited are referred to as no-go areas. Entry into these areas by any person, vehicle or equipment without the PM's written permission	All phases	Weekly	C, ECO, PM

		will result in a penalty. ii. All declared no-go areas will be demarcated by temporary fencing the position of which shall be agreed to by the PM and ECO, and appropriate signage. iii. All private property outside of the construction areas (including any bypass routes) as set out in the site layout plan shall be considered no-go areas. iv. The PM may declare additional no-go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO. v. Demarcation materials (fencing, signage, etc.) shall not be moved or removed at any stage of the project without the written consent of the PM.			
2	Fencing	i. The Contractor shall erect temporary fencing along the perimeter of designated no-go areas. ii. Temporary fencing shall, as a minimum, consist of wooden or metal posts at 3m intervals, with two plain wire strands tensioned horizontally at heights of 300 mm and 900 mm above the ground, threaded with commercial type danger tape. iii. The Contractor shall maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed.	All phases	Weekly	C
3	Sanitation	i. The Contractor shall install mobile chemical toilets on site (TRMSCAAC1 REV 3). The Contractor camp shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction. The Contractor camp shall have the	All phases	Daily	C, SM

		necessary ablution facilities with temporary toilet, which will be emptied once a week. ii. The Contractor will be responsible for the provision of and proper utilisation, maintenance and management of toilet, wash and waste facilities. Toilet facilities supplied by the contractor for the workers shall occur at a maximum ratio of 1 toilet per 15 workers. All temporary / portable toilets shall be secured to the ground to prevent them from toppling due to wind or any other cause. iii. Prior to the establishment of the ablution facilities, the Site Manager must approve an appropriate location. iv. The entrances to the ablution facilities shall be adequately screened from public view.			

4	Site Establishment – Contractors camp, and wastewater management	i. The contractor's camp shall be sited so as to cause the least amount of disturbance to adjacent landowners. ii. The Contractor shall supply a wastewater management system that will comply with legal requirements and be acceptable to DEA. A septic tank system is recommended to ensure the best practice environmental solution. iii. Where Eskom facilities are available the Contractor shall make use of such facilities where it is viable and negotiated with the Grid. iv. Should shower facilities be provided for the use by staff staying on site, the following controls must be imposed: v. Positioning of the shower, and specifically its discharge point, will be carried out to ensure that erosion and build up detergents does not occur; vi. All discharge from the shower and other washing facilities must pass through a suitable filter to reduce the load of detergents to the environment; vii. Filtered water discharge may thereafter be released to the environment, but mechanisms will be investigated to ensure that the water is evenly dispersed so as to lead to "greening up" and / or swampy conditions in one limited area; viii. Use of the shower facilities must be limited to staff or authorised persons only.	Pre-Construction and Construction	Daily	C

5	Cooking and eating areas	i. The cooking area will be positioned such that no vegetation is in close proximity thereto, including overhanging trees. An area around the cooking area will be cleared such that any escaping embers will not start an uncontrolled fire. ii. Eating areas shall be designated and demarcated. iii. Sufficient bins shall be present in this area for all waste material. iv. Dish washing facilities shall be provided. These may be very basic, but a process must be put in place to ensure that wastewater is disposed of appropriately (see Site Establishment - showers).	Pre-Construction	Once-off	C and ECO
	Gate installation and control	No new gate construction is anticipated, however, if needed, the contractor must refer to the Fencing Act, Act no 31 of 1963. v. Gate installation shall be according to TRMSCAAC1 REV 3 section 4.5 and the drawing 0.00/10261 Rev 2 as stated in the specifications. vi. The ECO shall approve gate positions. vii. All gate positions shall be three (3) metres off centre to allow for continued access when stringing takes place.			
	Batching Plants	Should there be a need of a batching plant, the siting shall be done in conjunction with the Eskom PM and the ECO. Refer to TRMSCAAC1 REV 3 section 4.8 for specifications regarding batching plants. Ensure all agreements reached with the Landowner are fulfilled.			
Construction Phase					

1	Project Area	i. Construction activities are limited to the area as demarcated by SM within the site identified for the construction of the pipeline. ii. Any area outside the construction area, required to facilitate access, construction activities, construction camps or material storage areas, where necessary, shall be negotiated with the affected stakeholders and written agreements shall be obtained. iii. All construction areas shall be cleared in accordance with the ECO and SM. Standard for Bush clearing ESKASABG3. iv. Any extra space to be cleared outside the construction area shall be negotiated and approved by SM. All areas marked as no go areas inside the parameters shall be treated with the utmost care and responsibility.	Construction	Monthly	SM, ECO and C
2	Sanitation	i. Staff shall be sensitised to the fact that they should use these toilets at all times. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. ii. Toilet paper is also a source of littering, and the Contractor shall be forced to clean up any litter. iii. Ablution facilities must be maintained in a hygienic state and serviced regularly. Toilet paper will be provided. iv. The Contractor will ensure that no spillage occurs when the toilets are cleaned or emptied and that a licensed provider removes the contents from the site. v. Disposal of such waste is only acceptable at a licensed waste disposal	Construction	Daily	ECO and C

		facility.			
3	Site Establishment	i. The site must be kept tidy and hygienic at all times with special reference to sanitation & water management. ii. Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop area. iii. The Contractor shall be in possession of an emergency spill kit that must be complete and available at all times on site. iv. No equipment shall be used which may cause irreparable damage to wet areas. The contractor shall use alternative methods of construction in such areas. **Refer to TRMSCAAC1 REV 3 section 4.4.1 regarding access through seasonally wet areas.**	Construction	Daily	C, ECO and SM
4	Cooking and eating areas	i. The feeding of, or leaving of food for animals, is strictly prohibited. ii. No fires for the purpose of cooking or warming purposes will be permitted other than within designated areas.	Construction	Daily	C and ECO
	Gate Installation and Control	iii. All gates shall be fitted with locks and be kept locked at all times. iv. Claims arising from gates left open shall be investigated and settled in full by the Contractor. v. If any fencing interferes with the construction process, such fencing shall be deviated / protected until construction is completed.	Construction	Daily	C and ECO
	Batching Plants	vi. The batching plant area shall be operated in such a way as to prevent contaminated water to run off the site and polluting nearby streams or water bodies. To this effect diversion berms can be installed to direct all wastewater to a catchments area.		Daily	C and ECO

Rehabilitation Phase					
1	Site Decommissioning	i. All areas where site infrastructure or campsite is established must be rehabilitated to their original state in which they were found. ii. Prior to the removal of structures an assessment of the end land use will be undertaken to determine which structures will be removed or retained. iii. Any specific requirements to prevent pollution during demolition of structures must be identified prior to the commencement of rehabilitation activities. iv. Disposal requirements must be identified prior to the commencement of rehabilitation or structure removal. v. Equipment, structures and building material that can be reused will be identified prior to the commencement of rehabilitation activities. vi. Scrap metal and equipment will be sold as scrap or disposed of at a suitably licensed facility. vii. Vegetation that was removed for the establishment of site infrastructure shall be reinstated into the area.	Prior to rehabilitation and rehabilitation	Monthly	C and ECO
	Batching Plants	viii. All areas used as batching areas must be rehabilitated once construction is completed. Should any claim be instituted against SM, due to the actions of the Contractor at a batching plant site, SM shall hold the Contractor fully responsible for the claim until such time that the Contractor can prove otherwise with the necessary documentation.	Rehabilitation	Monthly	C and ECO

5.2.4 Hazardous Substance Spills

Objectives	i. To ensure that spills occurring during the construction phase are suitably managed to reduce potential impacts on the environment.				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	Hazardous Spills	Ensure that potential hazardous materials on site are identified and documented in a register. Ensure that suitable spill kits and absorption materials are purchased prior to commencement with construction, and stored suitably in places where there is a high risk of hazardous spills occurring.	All phases	Once-off	C and ECO
Construction Phase and Operation phase					
1	Hazardous Spills	All contaminated soil / yard stone shall be removed and be placed in containers. Contaminated material can be taken to one central point where bio-remediation can be done. Smaller spills can be treated on site. A specialist Contractor shall be used for the bio-remediation of contaminated soil where the required remediation material and expertise is not available on site. All spills of hazardous substances must be reported to the ECO and appointed Engineering Environmental Advisor.	All phases	When-necessary	C and ECO
Rehabilitation Phase					
1	Hazardous	Ensure that rehabilitated areas are free of visible spills and are suitably	All phases	When-	C and ECO

	Spills	vegetated.		necessary	
Operational Phase					
Same as construction phase.					

5.2.5 Delivery of Materials

Objectives	vii. To ensure that all sub-contractors responsible for delivering materials to site operate in an environmentally friendly manner whilst on site; and viii. To ensure that the activities related to material deliveries do not create an unnecessary impact on the environment. ix. To ensure that all suppliers and their delivery drivers are aware of procedures and restrictions (e.g. no-go areas) in terms of this EMP.				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	Heavy machinery	i. All drivers and operators must be appropriately licensed.	Construction	Monthly	C and ECO
Construction Phase					
1	Heavy machinery	i. No vehicles coming on sites must spill oil. ii. No construction equipment, vehicles or unauthorised personnel will be allowed onto areas that have been re-vegetated. iii. Material shall be appropriately secured to ensure safe passage between destinations during transportation. Loads shall have appropriate cover to prevent them spilling from the vehicle during transit. iv. The Contractor shall be responsible for any clean-up resulting from the	Construction	Monthly	C and ECO

		failure by his employees or suppliers to property secure transported materials.			
Rehabilitation Phase					
1	Heavy Machinery	i. All areas where heavy machinery has access must be rehabilitated in terms of soil pollution.	Construction	Monthly	C and ECO
Operational Phase					
1	Heavy Machinery	ii. No oil/ petrol spills / leaks may occur.	Construction	Monthly	C and ECO

5.2.6 Excavation/Digging

Objective	• To ensure that all construction related activities including excavation, work is undertaken in such a manner that it reduces unnecessary impact to the environment.

No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
None					
Construction Phase					

1	Excavate foundations	During excavations no oil leaks from heavy vehicles may occur. PPE must be used by all workers using hand tools during the excavations. Spoil must be evenly spread.	Construction	Monthly	C and ECO
2	Excavate earth moving materials	During the excavation of earth materials no oil leaks may occur from heavy vehicles.	Construction	Monthly	C and ECO
3	Mixing concrete	During the mixing of concrete, concrete dust is emanated. Workers mixing concrete must wear PPE. Cement bags must not become litter after use. They must be disposed of in bins/skips (see Waste Management).	Construction	Monthly	C and ECO
4	Trenches	All workers using hand tools must make use of PPE. No spills may occur. All spills should be reinstated into foundations as backfill.	Construction	Monthly	C and ECO
Rehabilitation Phase					
1	De-establish contractors yard / store	All waste, garbage, surplus materials and oils spills to be cleared and site must be rehabilitated.	Rehabilitation	Weekly	C and ECO
2	Final inspection	During site inspection the site is to be cleared and rehabilitated back to its original state.	Rehabilitation	Weekly	C and ECO
Operational Phase					
1	Take over works	During site take / hand over the site must be accepted from the contractor and handed over.	Operations	Once – off	C, SM and ECO

5.2.7 Traffic accommodation and control

Objectives	i. Manage traffic.				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	Traffic	i. If required, planning of alternative routes must be done in conjunction between the Contractor and DEA. ii. All agreements reached shall be documented in writing and no verbal agreements should be made. iii. The Contractor shall properly mark all access/alternative routes. iv. Markers shall show the direction of travel. v. Roads not to be used shall be marked with a "**NO ENTRY** "sign. vi. Where required, speed limits shall be indicated and speed control measures applied on the roads.	All phases	All the time	C
Construction Phase					

1	Traffic	i. All speed limits shall be strictly adhered to at all times. ii. The installation of pipes and drifts, to facilitate accommodation of traffic or road usage, shall be at the discretion of the ECO on site. iii. Any dangerous crossings shall be marked as such and where necessary, speed limits shall be enforced. iv. All existing alternative routes used during construction, shall be maintained at all times to ensure that the road users can still use the road and local people have free access to and from their properties. v. All structures shall be properly designed and drawings shall be available for reference purposes. vi. The Contractor shall be required to ensure that traffic along the road is accommodated within the road reserve as far as is possible. vii. Any traffic accommodation outside the road reserve, excluding the temporary bypasses at the bridge demolition (if there will be any) and construction sites, shall utilize nearest existing farm as much as possible. viii. No new bypass or traffic accommodation routes shall be cleared or established without the approval of the PM.	Construction	Throughout	C
Rehabilitation Phase					
1	Traffic	Upon completion of the project all temporary roads or alternative routes shall be repaired to their original state.	End of contract	Once	C and ECO
Operational Phase					
None.					

5.2.8 Designated Storage Areas

Objective	i. To ensure that cognisance is taken of proper storage of dangerous goods and hazardous materials so as to avoid accidents, spillage, and impacts to the environment.				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	Workshop, equipment maintenance and storage	i. Where possible and practical all maintenance of vehicles and equipment shall take place in the workshop area, on a paved or concrete lined surface. ii. All hazardous substances shall be stored in suitable containers and storage areas shall be bunded. This includes all carbon substances like fuel and oil as well as herbicides and battery acid. iii. A register shall be kept on all substances and be available for inspection at all times.	All phases	Monthly	C and ECO
Construction Phase					
1	Workshop, equipment maintenance and storage	i. Only emergency repairs shall be allowed on site and a drip tray shall be used to prevent oil spills. ii. The following shall apply: • All contaminated soil shall be removed and be placed in containers. Contaminated soil can be taken to one central point at the Contractors campsite where bio-remediation can be done; • Smaller spills can be treated on site; • A specialist Contractor shall be used for the bio-remediation of contaminated soil;	Construction	Throughout	C, ECO, and SM

		• The area around the fuel storage drum at the Contractor's campsite shall also be re-mediated upon completion of the contract; and • All oil spills must be reported to ECO immediately. iii. Under no circumstances shall such waste be buried on site indiscriminately. iv. No maintenance or repair of construction vehicles or machinery will occur on site during the construction phase. Maintenance of equipment and vehicles will be preformed off-site at a suitably designed workshop. v. Movement of construction vehicles and machinery must be restricted to areas outside of sensitive areas on site. vi. No washing of plant may occur on the site. vii. The contractor will ensure that if emergency plant maintenance occurs on site, that there is no contamination of soil or vegetation (e.g. use of drip trays). viii. Drip trays will be provided for the stationary plant and for the "parked" plant. ix. All vehicles and equipment will be kept in good working order and serviced regularly. Leaking equipment will be repaired immediately or removed from the site. x. The relevant contractor must ensure that facilities for the collection of hydraulic and other vehicle oils are provided within the hard park area. xi. The repair of construction vehicles must be done on a paved surface to avoid leaking oils sipping into the			

		ground.			
2	Materials use, handling and storage	i. The Contractor will ensure that delivery drivers are informed of all procedures and restrictions required by this document. Such drivers will be supervised during off-loading, by a person knowledgeable of the requirements. ii. Materials will be appropriately secured to ensure safe passage between destinations. Loose loads (e.g. sand, stone chip, fine vegetation, refuse, paper and cement) will be covered. iii. The Contractor will be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. iv. All material lay-down areas and stockpiles will be subject to the Site Manager's approval. v. Imported fill / soil / sand materials will be free of weeds, litter and contaminants. vi. Storage areas will be roofed in an impervious material, with a suitable overhang or side cladding. Rainwater run-off will be chanelled away from the storage area as required. vii. Hydraulic fluids are stored in concrete lined surfaces with bund walls and must be designated in such a manner that any spillages can be contained and reclaimed without	Construction	Monthly	C and ECO

		any impact on the surrounding environment. viii. Hazardous and flammable substances must be stored and used in compliance with applicable regulations and safety instructions. ix. During servicing of vehicles or equipment, a suitable drip tray shall be used to prevent spills onto the soil, especially where emergency repairs are affected outside the workshop area. x. Leaking equipment shall be repaired immediately or be removed from site to facilitate repair. xi. Areas shall be monitored for spills and any spills shall be contained, cleaned and rehabilitated immediately. xii. Any leaking containers shall be repaired or removed from site.			
Rehabilitation Phase					
1	Servicing of Vehicles	None.			
Operational Phase					
1	Servicing of Vehicles	None.			

5.2.9 Waste Management

Objectives	x. To keep the construction site and road reserve neat and clean. xi. Disposal of rubble and refuse in an appropriate manner xii. Minimise litigation xiii. Minimise neighbour complaints xiv. No visible concrete spillage on the road reserve				
No	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	Refuse and Rubble Removal	i. A method statement is required from the Contractor that includes the layout of the camp, management of ablution facilities and waste management. ii. The Contractor camp shall have the necessary ablution facilities with portable toilets where such facilities are not available at commencement of construction. iii. The Contractor shall provide a wastewater management system that will comply with legal requirements and be acceptable to DEA. iv. The Contractor will supply waste collection bins where such is not available and all solid waste collected shall be disposed of at a registered waste disposal facility. v. A certificate of disposal shall be obtained by the Contractor and kept on site. All waste generated during construction and operation of the facility must be removed and disposed of at a waste disposal facility permitted in terms of Section 20 of the Environment Conservation Act, 1989 (Act 73 of 1989);	All phases	Throughout	C and ECO

		vi. In the case where a registered waste site is not available close to the construction site, the Contractor will be responsible to provide a method statement with regard to waste management. vii. Under no circumstances may solid waste be burned on site unless a suitable incinerator is available. viii. The Contractor shall supply waste collection bins where such is not available, as approved by the ECO, and all solid waste collected shall be disposed of at a registered waste dump. ix. A certificate of disposal shall be obtained by the Contractor and kept on file. x. Where a registered waste site is not available close to the construction site, the Contractor shall provide a method statement with regard to waste management. xi. The disposal of waste shall be in accordance with all relevant legislation.			
Construction Phase					

1	Refuse and Rubble Removal	1. The Contractor shall dispose of all excess material on site in an appropriate manner and at a designated place. 2. All packaging material shall be removed from site and disposed of and not burned on site. 3. No landfill may be used without the consent from the Landowner. 4. Should a landfill be used for biodegradable materials only, the rubble shall be compacted and at least 1m of soil shall cover the waste material. 5. No hazardous material, e.g. oil or diesel fuel shall be disposed of in any unregistered waste site. 6. No material shall be left on site that may harm man or animals. 7. Any broken insulators shall be removed and all shards picked up. 8. Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site. 9. Surplus concrete may not be dumped indiscriminately on site, but shall be disposed of in designated areas as agreed by the Landowner. Concrete trucks shall not be washed on site after depositing concrete into foundations. Any spilled concrete shall be cleaned up immediately. 10. Under no circumstances may solid waste be burned on site unless a suitable incinerator is available. 11. The Contractor shall dispose of all excess material on site in an appropriate manner and at a designated place. 12. All packaging material must be removed from the site and disposal of and not burned on site. 13. No material shall be left on site that may harm man or animals.	All phases	Throughout	C and ECO

		14. Any broken insulators shall be removed and all shards picked up. 15. Broken, damaged and unused nuts, bolts and washers shall be gathered and removed from site. 16. Surplus concrete may not be dumped indiscriminately on site and will be disposed of in designated areas as agreed by the Landowner. 17. The washing of concrete trucks on site is prohibited. Any spilled concrete shall be cleaned up immediately. 18. The Contractor must provide relevant authorities with proof of confirmation of service provision from waste service providers for the removal of wastes. 19. A general site-wide litter clean up will occur at least once a week. 20. Waste will be collected from site by a licensed contractor and removed to an appropriate waste disposal facility. 21. Wherever possible, materials will be recycled via a "Greens waste site". To this end, containers for glass, paper, metals, plastics, organic waste and hazardous wastes (e.g. oil rags, paint containers, thinners) will be provided in sufficient quantity on the site. 22. Waste will be removed during off-peak traffic periods to minimise impacts on local traffic patterns. 23. All waste generated during construction and operation of the facility must be removed and disposed of at a waste facility permitted in terms of Section 20 of the Environmental Conservation Act, 1989 (Act 73 of 1989). 24. Littering by the employees of the Contractor shall not be allowed.			

		25. All potentially hazardous and non-degradable waste shall be collected and removed to a registered waste site.			
Rehabilitation Phase					
1	Refuse and Rubble Removal	Same as construction phase.			

Operational Phase		
1	Refuse and Rubble Removal	Same as construction phase.

5.2.10 Excavation

Objectives	xv. Minimise damage to wet areas xvi. Successful rehabilitation of all damaged areas xvii. Prevention of erosion and no visible erosion scars three months after completion of construction.				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	Excavation	• The Contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. • The noise generated by the machinery for excavation, concrete mixing and laying cables must be highly localised. Construction activities must be restricted to normal working hours (7:00am – 17:00 pm).	Construction	Once-off	C and ECO
Construction Phase					

1	Excavation	i. Disturbance of topsoil on excavation sites with severe slopes shall be minimised at all costs. ii. Should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the PM for approval together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage. iii. Stockpiles shall be positioned and sloped to create the least visual impact. iv. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be reinstated to the satisfaction of the PM and ECO.	Construction	Throughout	PM, C and ECO
Rehabilitation Phase					
1	Excavation	None.			
Operational Phase					
1	Excavation	None.			

5.2.11 Fire Prevention

Objectives	xviii. No veld fires started by the Contractor's work force. xix. No claims from Landowners for damages due to veld fires. xx. No litigation.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility
Pre-Construction Phase					
1	Fire Prevention	i. The Contractor shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months. ii. The Contractor will document a fire reduction management plan. The plan will identify sources of fire hazard, and appropriate management measures to reduce the identified risk. The relevant authority will be notified of such potential fire hazards.	All phases	Throughout	C and ECO
Construction Phase					
1	Fire Prevention	i. Preferentially no fires will be lit on the site, if however required, fires must be limited to use for cooking and heating use only within a designated area. This area will be a suitable distance from fuel sources. A fire will be constantly monitored while present. ii. In terms of the Atmospheric Pollution Prevention Act (No 45 of 1965) (APPA), burning is not permitted for waste disposal. iii. Suitable precautions shall be taken (e.g. suitable fire extinguisher, welding curtains) when working with welding or grinding equipment near potential sources of combustion. iv. All fire control mechanisms (fire fighting equipment) will be routinely inspected by a qualified investigator for efficacy thereof and be approved by local fire services. Such mechanisms will be present and accessible at all times. v. All staff on site will be made aware of general fire prevention and control methods, and the name of the responsible person to alert to the presence of a fire.	All phases	Throughout	C and ECO

		vi. The Contractor will advise the relevant authority of a fire outside of a demarcated area as soon as it starts and will not wait until he can no longer control it.			
Rehabilitation Phase					
1	Fire Prevention	Same as construction phase.			
Operational Phase					
1	Fire Prevention	Same as construction phase.			

5.2.12 Claims from Damages

Objectives	xxi. Minimise complaints from Landowners xxii. Prevent litigation due to outstanding claims by ensuring that claims are settled within one (1) month. xxiii. Successful completion of the contract and all Landowners signing release forms within 6 months of completion of the project.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility
Pre-Construction Phase					
1	Claims from Damages	None.			
Construction Phase					
1	Claims from Damages	• All damage to property shall be recorded immediately. • The ECO should also keep a photographic record of such damage. • The date, time of damage, type of damage and reason	All phases	When necessary	C and ECO

		for the damage shall be recorded in full to ensure the responsible party is held liable. • All claims for damage should be directed to the ECO for appraisal. • The Contractor shall be held liable for all unnecessary damage to property. • A register shall be kept of all complaints from Landowners. • All claims shall be handled immediately to ensure timeous rectification / payment.			
Rehabilitation Phase					
1	Claims from Damages	None.			
Operational Phase					
1	Claims from Damages	None.			

5.2.13 Noise / Working Hours

Objective	xxiv. To ensure hat noise is managed in such a manner that no complaints are received.				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
None					
Construction Phase					

1	Noise	i. In order to prevent noise impacts resulting from construction activities, working hours are to be limited to weekdays between 7h00 to 17h00. ii. If certain construction requires work outside of these hours, all adjacent landowners have to be informed prior to any construction outside of the specified hours commencing. iii. If there are complaints about low frequency noise after the refurbishment, ESKOM would have to get a noise expert to do measurements and recommend mitigation.	Construction	Throughout	C and ECO
Rehabilitation Phase					
1	Noise	Same as Construction Phase.			
Operational Phase					
1	Noise	Same as Construction Phase			

5.2.14 Archaeology

Objective	xxv. Protection of archaeological sites and land considered to be of cultural value; xxvi. Protection of known sites against vandalism, destruction and theft; and xxvii. The preservation and appropriate management of new archaeological finds should these be discovered during construction.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility
Pre-Construction Phase					
1	Planning	Ensure all known sites of cultural, archaeological, and historical significance are demarcated on the site layout plan, and marked as no-go areas.	All phases	Throughout	C and ECO

Construction Phase					
1	Archaeology or heritage important sites/ features	i. Should any heritage resources be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped. ii. Should any heritage resources be exposed during excavation or be found on site, a registered heritage specialist must be called to site for inspection. iii. Should any heritage resources be exposed during excavation or be found on site, the relevant heritage resource agency must be informed about the finding; iv. Under no circumstances may any heritage material be destroyed or removed form site; v. Should remains and/or artefacts be discovered on the site during earthworks, all work will cease in the area affected and the Contractor will immediately inform the Construction Manager. vi. Should any remains be found on site that is potentially human remains, the South African Police Service should also be contacted.	All phases	Throughout	C and ECO
Rehabilitation Phase					
1	Archaeology or heritage important sites/ features	Same as construction phase.			
Operational Phase					
1	Archaeology or heritage important sites/ features	Same as construction phase.			

5.2.15 Adjacent landowners

Objectives	xxviii. Control actions and activities in close proximity to inhabited areas; xxix. No complaints from adjacent Landowners; xxx. No damage to private property.

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility
Pre-Construction Phase					
1	Directly affected landowners	i. All adjacent property owners will be demarcated on a site layout plan prior to construction phase commencing. ii. The Contractor shall under no circumstances interfere with the property of adjacent landowners. iii. If water is required, the Contractor shall negotiate with the relevant Landowner and a written agreement shall be drawn up.	Throughout project	Weekly Inspections	C and ECO
Rehabilitation Phase					
1	Directly affected landowners	Same as construction phase.			
Operational Phase					
1	Directly affected landowners	Same as construction phase.			

Objective	xxxi. Proper way of handling bitumen products and/ or surfacing materials

No.	Activity	Mitigation Measures	Duration	Frequency	Responsibility
Pre-Construction Phase, Construction, Operation and Decommission					
1	Surfacing	i. Over spray of bitumen products outside of the road	Construction	Weekly	C and ECO

	materials	surface and onto roadside vegetation shall be prevented using a method approved by the PM. ii. When heating of bitumen products, the Contractor shall take cognisance of appropriate fire control measures iii. Stone chip / gravel excess shall not be left on road / paved area verges. This shall be swept / raked into piles and removed to an area approved by the PM.			
Construction Phase and Rehabilitation					
1	Cement and concrete batching	Concrete mixing directly on the ground shall not be allowed and shall take place on impermeable surfaces to the satisfaction of the PM. The concrete batching activities shall be located in an area of low environmental sensitivity to be identified and approved by the PM. All runoff from batching areas shall be strictly controlled, and cement-contaminated water shall be collected, stored and disposed of at a site approved by the PM. Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented. Unused cement bags shall be stored out of the rain where runoff won't affect it. Used (empty) cement bags shall be collected and stored in weatherproof containers to prevent wind blown cement dust and water contamination. Used cement	Construction	Daily	C

		bags shall not be used for any other purpose and shall be disposed of on a regular basis via the solid waste management system. Washing facilities are needed at the site camp to soak cement bags. All excess concrete shall be removed from site on completion of concrete works and disposed of. Washing of the excess into the ground is not allowed. All excess aggregate shall also be removed.			
Operational Phases					
1	**Cement and concrete batching**		None		

5.2.16 Safety, Health, Environment, Risk and Quality Assurance

Objective	xxxii. Ensure compliance with all related safety, health, quality policies, specifications, risks and requirements				
No.	**Activity**	**Mitigation Measures**	**Duration**	**Frequency**	**Responsibility**
Pre-Construction Phase					
1	SHERQ	Acquire an approved quality control plan (QCP) and SHERQ policy	Planning	Once	C
Construction Phase					

1	SHERQ	Appoint approved quality control inspector (QCI) Keep the project QCI, Health and Safety documents up to date Ensure compliance Comply with the Construction Regulations Comply to the with ESKOM's health and safety specification (if available) Keep the approved health and safety file on site Health and safety file to be reviewed	All phases	Throughout	C, QCI, SM and All

6 CONCLUDING REMARKS

This concludes the Environmental Management Programme for the proposed construction of 765 kV power lines of approximately 370km in length and substation works to accommodate the powerline in Northern and Western Cape Province. The proposed location of the power line is in an area, which has already been disturbed by previously developments. Nonetheless, the proposed new power line will provide electricity for future developments in the Northern and Western Cape Province.

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