DRAFT

ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

for

THE PROPOSED CONSTRUCTION OF THE LULAMISA - DIEPSLOOT EAST - BLUE HILLS - CROWTHORNE 88 kV POWER LINE AND ASSOCIATED SUBSTATIONS NEAR MIDRAND IN GAUTENG PROVINCE

Submitted as part of the Draft Basic Assessment Report

March 2018

COMPILED BY:
Envirolution Consulting (Pty) Ltd
PO Box 1898
Sunninghill
2157
Tel: (0861) 44 44 99
Fax: (0861) 62 62 22
E-mail: info@envirolution.co.za
Website: www.envirolution.co.za

PREPARED FOR:
Eskom Holdings SOC Ltd.
Eskom Distribution
P.O.Box 1091
Johannesburg
20001
Tel: (011) 800 2706

TABLE OF CONTENTS

APPENDICES

DEFINITIONS AND TERMINOLOGY

Alien species: A species that is not indigenous to the area or out of its natural distribution range.

Alternatives: Alternatives are different means of meeting the general purpose and need of a proposed activity. Alternatives may include location or site alternatives, activity alternatives, process or technology alternatives, temporal alternatives or the 'do nothing' alternative.

Ambient sound level: The reading on an integrating impulse sound level meter taken at a measuring point in the absence of any alleged disturbing noise at the end of a total period of at least 10 minutes after such meter was put into operation.

Assessment: The process of collecting, organising, analysing, interpreting and communicating information which is relevant.

Biological diversity: The variables among living organisms from all sources including, terrestrial, marine and other aquatic ecosystems and the ecological complexes they belong to.

Commence: The start of any physical activity, including site preparation and any other activity on site furtherance of a listed activity or specified activity, but does not include any activity required for the purposes of an investigation or feasibility study as long as such investigation or feasibility study does not constitute a listed activity or specified activity.

Construction: Construction means the building, erection or establishment of a facility, structure or infrastructure that is necessary for the undertaking of a listed or specified activity as per the EIA Regulations. Construction begins with any activity which requires Environmental Authorisation.

Cumulative impacts: The impact of an activity that in itself may not be significant, but may become significant when added to the existing and potential impacts eventuating from similar or diverse activities or undertakings in the area.

Decommissioning: To take out of active service permanently or dismantle partly or wholly, or closure of a facility to the extent that it cannot be readily re-commissioned. This usually occurs at the end of the life of a facility.

Direct impacts: Impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (e.g. noise generated by blasting operations on the site of the activity). These impacts are usually associated with the construction, operation, or maintenance of an activity and are generally obvious and quantifiable.

Disturbing noise: A noise level that exceeds the ambient sound level measured continuously at the same measuring point by 7 dB or more.

'Do nothing' alternative: The 'do nothing' alternative is the option of not undertaking the proposed activity or any of its alternatives. The 'do nothing' alternative also provides the baseline against which the impacts of other alternatives should be compared.

Ecosystem: A dynamic system of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit.

Endangered species: Taxa in danger of extinction and whose survival is unlikely if the causal factors continue operating. Included here are taxa whose numbers of individuals have been reduced to a critical level or whose habitats have been so drastically reduced that they are deemed to be in immediate danger of extinction.

Endemic: An "endemic" is a species that grows in a particular area (is endemic to that region) and has a restricted distribution. It is only found in a particular place. Whether something is endemic or not depends on the geographical boundaries of the area in question and the area can be defined at different scales.

Environment: the surroundings within which humans exist and that is made up of:

i. The land, water and atmosphere of the earth;
ii. Micro-organisms, plant and animal life;
iii. Any part or combination of (i) and (ii) and the interrelationships among and between them; and
iv. The physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.

Environmental Authorisation (EA): means the authorisation issued by a competent authority (Department of Environmental Affairs) of a listed activity or specified activity in terms of the National Environmental Management Act (No 107 of 1998) and the EIA Regulations promulgated under the Act.

Environmental assessment practitioner (EAP): An individual responsible for the planning, management and coordinating of environmental management plan or any other appropriate environmental instruments introduced by legislation.

Environmental Control Officer (ECO): An individual appointed by the Owner prior to the commencement of any authorised activities, responsible for monitoring, reviewing and verifying compliance by the EPC Contractor with the environmental specifications of the EMPr and the conditions of the Environmental Authorisation

Environmental impact: An action or series of actions that have an effect on the environment.

Environmental impact assessment: Environmental Impact Assessment, as defined in the NEMA EIA Regulations, is a systematic process of identifying, assessing and reporting environmental impacts associated with an activity.

Environmental management: Ensuring that environmental concerns are included in all stages of development, so that development is sustainable and does not exceed the carrying capacity of the environment.

Environmental management programme: An operational plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of a proposal and its ongoing maintenance after implementation.

Habitat: The place in which a species or ecological community occurs naturally.

Hazardous waste: Any waste that contains organic or inorganic elements or compounds that may, owing to the inherent physical, chemical or toxicological characteristics of that waste, have a detrimental impact on health and the environment.

Indigenous: All biological organisms that occurred naturally within the study area prior to 1800.

Indirect impacts: Indirect or induced changes that may occur because of the activity (e.g. the reduction of water in a stream that supply water to a reservoir that supply water to the activity). These types of impacts include all the potential impacts that do not manifest immediately when the activity is undertaken or which occur at a different place because of the activity.

Interested and affected party: Individuals or groups concerned with or affected by an activity and its consequences. These include the authorities, local communities, investors, work force, consumers, environmental interest groups, and the public.

Method Statement: a written submission by the Contractor in response to the environmental specification or a request by the Site Manager, setting out the plant, materials, labour and method the Contractor proposes using to conduct an activity, in such detail that the Site Manager is able to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications.

Pre-construction: The period prior to the commencement of construction, which may include activities which do not require Environmental Authorisation (e.g. geotechnical surveys).

Pollution: A change in the environment caused by substances (radio-active or other waves, noise, odours, dust or heat emitted from any activity, including the storage or treatment or waste or substances.

Rare species: Taxa with small world populations that are not at present Endangered or Vulnerable, but are at risk as some unexpected threat could easily cause a critical decline. These taxa are usually localised within restricted geographical areas or habitats or are thinly scattered over a more extensive range. This category was termed Critically Rare by Hall and Veldhuis (1985) to distinguish it from the more generally used word "rare."

Red Data Species List: Species listed in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species, and/or in terms of the South African Red Data list. In terms of the South African Red Data list, species are classified as being extinct, endangered, vulnerable, rare, indeterminate, insufficiently known or not threatened (see other definitions within this glossary).

Significant impact: 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.

Vulnerable species: A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Waste: Any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 of the NEM WA; or any other substance, material or object that is not included in Schedule 3 of the NEM WA that may be defined as a waste by that is identified as waste by the Minister of Environmental Affairs (by notice in the Gazette). Any waste or portion of waste, referred to in the section above, ceases to be a waste:

(i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;

(ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;

(iii) where the Minister of Environmental Affairs has, in terms of Section 74 of the NEM WA, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or

(iv) where the Minister of Environmental Affairs has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste

1. PROJECT DETAILS

1.1 Background

Eskom Holdings SOC Limited (("Eskom") is proposing the construction of the Diepsloot East and Blue Hills Substation and an 88kV overhead power line from the existing Lulamisa Substation to the proposed Diepsloot East Substation to the proposed Blue Hills substation and an 88kV underground cable from the proposed Blue Hills Substation to the existing Crowthorne Substations, in Gauteng Province (**hereafter** the Lulamisa-Diepsloot East-Blue Hills-Crowthorne power line and substations – please refer to **Figure 1**). The project has been previously submitted for environmental authorisations (EA) as three (3) separate projects to the Department of Environmental Affairs (DEA); the previous applications have been withdraw and are hereby combined into one application entailing the construction of two substations and an 88kV powerline.

It is in response to the electricity challenges detailed above, that Eskom intends to increase its capacity to meet the growing demand in the Diepsloot/ Midrand area as it is evident that the existing network does not have the capacity to meet the required supply. In addition, future planned developments will increase the demand for electricity. Hence, new power lines and substations are required to support the existing network and new planned developments.

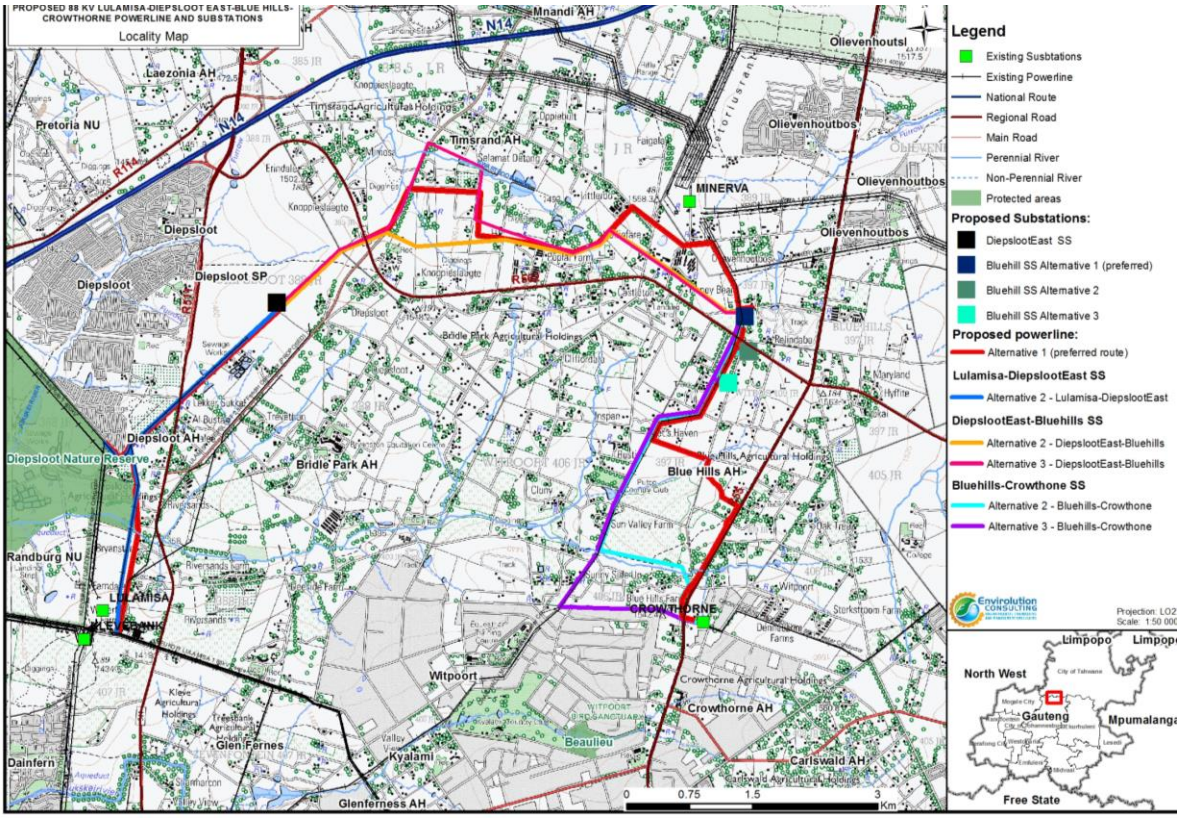

Figure 1: Locality map showing the proposed substations and power line alternatives (refer to Appendix A for A3 maps).

1.2 Findings of the Basic Assessment

This section provides a summary of the environmental assessment and conclusions drawn for the proposed construction of the Diepsloot East and Blue Hills Substation and an 88kV overhead power line from the existing Lulamisa Substation to the proposed Diepsloot East Substation to the proposed Blue Hills substation and an 88kV underground cable from the proposed Blue Hills Substation to the existing Crowthorne Substations. Through the assessment of impacts associated with the proposed substations and power line both potentially positive and negative impacts have been identified. The most significant environmental impacts associated with the proposed project include:

Vegetation Assessment:
This assessment found that the majority of the vegetation that could be impacted on by the proposed electrical infrastructure comprised secondary grassland and modified areas. However, a patch of grassland, representative of the Egoli Granite Grassland, is present between the Lulamisa SS and the Diepsloot East SS, while moist grasslands, riparian vegetation and ridge vegetation are present throughout the project area and are regarded as vulnerable to development. The secondary grasslands provide habitat to the provincially protected *Gladiolus vinosomaculatus* and included moist grasslands wherein the Declining *Hypoxis hemerocallidea* and *Eucomis autmnalis* were recorded. Furthermore, provincially protected orchid species (*Habenaria* species) were also recorded in the moist grassland.

In conclusion, the proposed development(s) could proceed provided that the mitigation measures a set out in this report are diligently implemented to limit the potential impacts on vegetation during construction and operation of the developments.

Fauna Assessment:
The possibility of the faunal assemblages being significantly affected by the proposed development is unlikely based on the findings of this assessment. Temporary changes to the abundance and distribution of faunal species may occur during the construction phase but should be insignificant with many species re-occupying the area when constructions activities have ceased.

It is recommended that the development occurs on habitat types identified with low or medium ecological sensitivities. Where areas of high ecological sensitivity need to be disturbed, the necessary permits and mitigation measures recommended by the wetland specialist should be implemented. Destruction of moist grassland and rank grassland should also be minimised in order to prevent disturbance of the African Grass Owls present within the study area.
Should all suggested mitigation measures be implemented, this proposed project can be permitted.

Wetlands:
The proposed powerline, both overhead and underground cables, potentially affect 11 wetland units with 16 Wetland crossings. None of the proposed new substations are located in wetlands. The route which has the least potential negative effect on wetlands overall is Alternative 1 (Preferred Route). **Both the Preferred Route and the Lulamisa to Diepsloot East Alternative 2** cross the same number of wetlands. One line is not preferred over the other. **Diepsloot East to Blue Hills Alternative 2 is the preferred line** with only 3 crossings Diepsloot East to Blue Hills Alternative 3 and the Preferred Route both have 6 crossings and therefore are least preferred. **Blue Hills to Crowthorne Preferred Route** has 3 crossings and is therefore **preferred.** Blue Hills to Crowthorne

Alternative 3 has 4 crossings and is therefore second preferred The Alternative 2 route has 4 crossings and runs parallel to wetland 9 and is therefore least preferred. This is summarised below.

Heritage Assessment:

No sites, features or objects of cultural heritage significance were identified in the study area, Impact analysis of cultural heritage resources under threat of the proposed development, is based on the present understanding of the development that as no sites, features or objects of cultural significance are known to exist in the development area, there would be no impact as a result of the proposed development.

Geotechnical Assessment:

The project is complex due to three components and various alternatives. All three routes as well as the alternatives have *the same geotechnical constraints* as there are no changes in the geology. The geotechnical constraints can only be verified and described in detail after the fieldwork phase, i.e. excavation of test pits etc. It is recommended that a detail geotechnical investigation be conducted along the power line routes as well as substation sites in order to verify this desk study and to provide site specific appropriate founding solutions. The recurrence interval of mining induced seismic events and the influence of the potential fault zone (underground cable) should be determined and taken into consideration for the design of pylons, the substations & potential slope instability of the cable trench.

Alternative 1 is recommended for Lulamisa to Diepsloot although this line is slightly longer than Alternative 2, but avoid running through township. For the Diepsloot East to Blue Hills section, Alternative 2 is the preferred line as it is the shortest route with one major road (R562) & 8 minor road crossings. Blue Hills to Crowthorne section Alternative 1 is preferred as this is the shortest route, two major road (R562 & R55) & five minor road crossings. Cross over two potential vlei areas and potential fault zone near the end.

Visual

The study area's predominant land use is agricultural holdings which consist of low density residential properties and fragmented open spaces between it. The only exceptions are north of Lulamisa Substation, where high density residential developments occur, and Blue Hills Estate and surroundings which consist of upmarket suburbs. In these areas, viewer incidence is regarded medium to high, but generally, the study area has a low to moderate viewer incidence to the proposed project components. The risk of indirect impacts occurring is very low. It could be argued that typical risk sources could be the erosion in disturbed areas due to unsuccessful rehabilitation. Erosion could lead to unsightly soil disturbances, but is considered unlikely if sound rehabilitation measures are implemented and monitoring strategies assess the rehabilitation process. Residual visual impacts are highly probable due to the fact that the visibility of the new overhead power line and substations cannot be effectively mitigated. Sensitive placement of the structures, additional screen planting and cosmetic solutions will cause a reduction in the impact severity, but residual impacts may remain. The underground cable is expected to have no residual visual impacts as the visual environment should return to its pre-construction condition. Both Bluehills Substation Alternative 1 and Alternative 3 are located on sites that offer screening capacity that can conceal the substations partially therefor preferred. Alternative 1 power line is preferred across the three section as it alignment runs on the eastern perimeter of the new development north of Lulamisa Substation avoids (Lulamisa to Diepsloot), avoids crossing over developed smallholdings and rather go around it (Diepsloot East to Bluehills) and avoids cutting through the least number of smallholdings and will therefore cause the least visual intrusion (Blue Hill SS to Crowthorne).

Social

Based on the social assessment, the following general conclusions and findings should be noted:

- The majority of the negative social impacts anticipated are of a medium significance and are anticipated to respond to mitigation. Even though the impacts are thus of importance, mitigation could reduce the negative impacts to acceptable levels. Those impacts rated of a medium significance are therefore concluded not to result in grave negative social impacts on the affected property owners and social environment.
- Even though the construction activities would be temporary in any one place at a time, the inflow of workers could still impact on the residents quality of life but only for the duration of the construction activities in that specific area. Due to all the developments already undertaken in Section 1 of the study area, this impact is anticipated to have limited negative impacts in this specific area.
- An inflow of jobseekers to the construction sites is highly likely. Due to the movement of activities along the servitude area, the concentration of large numbers of jobseekers at one specific area however is not expected.
- The construction of the power line, substations and underground cable would create very limited job opportunities for unskilled labour. The positive impacts for the local residents are thus limited, although the possible limited direct and indirect employment opportunities associated with the project and possible local procurement should still be seen as beneficial.
- No additional job opportunities are expected during the operational phase.
- Local procurement should be maximised where possible as this could benefit and stimulate the local economy.
- The construction of the proposed power line, substations and underground cable could result in changes or disruptions in the daily living and working activities of residents caused by the movement of the workers, noise and dust pollution, transportation routes and/or the number of construction vehicular traffic. Once operational, limited negative impacts in this regard are anticipated.
- Safety and security issues remain worrying. Pro-active mitigation measures should be taken in this regard during the construction process. In addition, the affected property owners should be fully informed of the construction schedule and activities involved.
- With regards to health impacts, the key concern is the spread of HIV/Aids during the construction phase and the possible negative impact of EMFs on animals and people.
- Temporary intrusion impacts such as increased dust and noise levels during the construction phase are expected to respond to mitigation.
- Although negative social impacts would be experienced, the proposed power line and underground cable would assist in providing electricity to many households in the area. A stable electricity supply will thus have a positive impact on existing and proposed new developments (residential and business related) in the greater Johannesburg and Midrand areas, which could in turn greatly boost the economic growth potential of those areas. The improved electricity grid as a result of the proposed project could thus result in positive economic spin-offs in the regions benefiting from the stable and improved electricity supply.
- The proposed development should, thus from a social point of view, be considered by the DEA.

From a Social perspective, all three alternatives for the **Blue Hills substation** could be pursued, but Alternative 2 would remain the preferred as it is situated within an existing servitude. Alternative 1 is preferred for the first section (ie **Lulamisa MTS to Diepsloot East**) of the line, followed by Alternative 2 for another section of the line. To the east of the R511, both alternatives could be pursued. For the **Diepsloot East to Bluehills** part of the line, Alternative 1 is preferred, as it would result in an alignment further away from residential dwellings. In this regard, however, the alignment in close proximity to The Owls Loft Country House with the subsequent possible impacts on the establishment should be considered. However in the section of the **Blue Hill to Crowthorne** it is recommended that an alignment within the existing servitude be followed; Alternative 1 would thus be the preferred alignment as this mainly runs alongside the eastern boundary of the estate along the R55 can be pursued and avoids a number of settlements. *Note: It should, however, be noted that outside the boundaries of the Blue Hills Country and Equestrian Estate, north of Mopani Road, the deviated route would be in close proximity to a residential dwelling and the Sunset Boma. The latter is a tourism establishment that focuses on conferences, weddings and other functions. Mitigation during the construction phase would be critical to limit any negative impacts on the residential dwelling and the tourism establishment.*

Cumulative Impact Assessment:

Due to the largely modified and secondary nature of much of the vegetation, the proposed development could accelerate degradation, fragmentation and erosion in the area. However, cumulative impacts on the vegetation and watercourse can be limited if mitigation measures as set out in this report are adhered to as a minimum. With regards to the fauna in the area, diminished species diversity and persistence in the area can take place if impacts are not properly mitigated. In terms of the visual impact of the area, cumulative impacts are generally improbable but moderate risks occur in two locations, namely north of the Lulamisa Substation and south of the Minerva Substation where existing power lines occur near the newly proposed power lines. The visual dominance of electrical infrastructure will be increased and aggravates visual intrusion levels.

No-go alternative

The No-go option implies that the Project does not proceed, and will thus comprise of Eskom not going ahead with the construction of the proposed infrastructure. It is important that the network is supported by the construction of all three components of the project, namely between Lulamisa and Diepsloot East, between Diepsloot East to Blue Hills and between the Blue Hills to Crowthorne substations, and that the two proposed new substations are constructed at Blue Hills and Diepsloot East. Ideally if the status quo of the environment remains unchanged no negative impacts will occur, however due to the growing demand for energy and activities that will require electricity in the area, this alternative is not feasible. Should Eskom rely on the existing network to supply future demand it is highly likely that present supply will be compromised due to the increased load on the network. Although the no-go alternative has been considered, it is not a practical project alternative in terms of providing stable electricity supply in the area as it implies a continuation of the current situation or the status quo; therefore, it doesn't render any positive outcomes.

The project will improve the customer interruptions and also the performance of the supply. By not increasing the supply to the greater area, development will be constrained as the already existing network is operating at near-capacity and will not be able to accommodate the amount of load that will be brought by future developments. The 'Do nothing' alternative is, therefore, not a preferred alternative.

.

2. PURPOSE AND OBJECTIVES OF THE EMPr

It is understood that any development can pose various risks to the environment as well as the residents or businesses in the surrounding area. These possible risks should be taken into account during the planning phase of the development. An Environmental Management Programme (EMPr) is required for the proposed project as per the National Environmental Management Act (Act No. 107 of 1998) (NEMA) EIA Regulations, 2014. The implementation of this EMPr, through the appointed contractor, remains the responsibility of the applicant, Eskom.

The purpose of this EMPr is to formulate mitigatory measures that should be made binding to all contractors during construction of the proposed development, as well as measures that should be implemented during the operational phase. The point of departure for this EMPr is to take a pro-active route by addressing potential problems before they occur. The EMPr will also provide management responses that will ensure that the impacts of the development are minimised. This should limit corrective measures needed during the construction and operational phases of the development. Additional mitigation will be included throughout the project's various phases as necessary. This EMPr is, therefore, a stand-alone document, which must be used on site during each phase of the development (planning, construction and operational phases).

This document should be flexible so as to allow the contractor and developer to conform to the management commitments without being prescriptive. The management commitments prove that the anticipated risks on the environment will be minimised if they are adhered to consistently. The onus set out in the EMPr rests with the developer, main contractors and subcontractors, which promotes responsibility and commitment. Any parties responsible for transgression of the underlying management measures outlined in this document will be held responsible of non-compliances and will be dealt with accordingly.

EXPLANATION OF INCLUSIONS AND EXCLUSIONS
A vegetation assessment was conducted as part of the Basic Assessment (BA) process. All protected species/ species of conservation concern that are found during construction will thus require a plant rescue and protection plan. This plant will have to be compiled for the construction phase of this project after the final route has been determined.
No open space plan is required due to no open space zoning for this linear project. The substation site will be designed as per requirements and the nature of the usage will not enable open space planning, landscaping apart from maintenance of the surface area (paved or surfaced with gravel) inside the fence around the substation.
A wetland rehabilitation plan was conducted as part of the BA process. It is attached as Appendix C of this EMPr as well as the BA Report.
ESKOM has its own minimum standards for bush clearing and maintenance of overheard powerlines and applicable servitudes. This document forms part of the tender agreements with contractors. The requirements outlined in the standards must be adhered to during the construction of the powerline.
A storm water plan in the design of the substations is required and must incorporate these requirements in the detailed design drawings. The design has not yet been finalised. Prior to construction, the storm water management plan must be submitted to the GDARD for their information and approval (if required).
Mitigation measures for the management and control of soil erosion have been included as part of the BA Report and this draft EMPr
Mitigation measures for erosion management have been included as part of the BA Report and this draft

EMPr.
A traffic impact assessment is not required. This is a predominantly rural area with low traffic volumes. The proposed projects will only have limited increase in traffic during the construction phase.

This EMPr has been based on the findings of the on site assessment undertaken by Envirolution and the specialist studies. All the environmental specifications and the procedures discussed this EMPr were also developed in accordance with the relevant legislation applicable to the development.

2.1 Project Team

This draft Environmental Management Programme was compiled by:

Company Name:	Envirolution Consulting (Pty) Ltd
Contact person:	Gesan Govender
Compilers:	Cheda Sheila Bolingo
E-mail:	sheila@envirolution.co.za
Postal Address:	P.O Box 1898, Sunninghill, 2157
Telephone Number:	(0861) 44 44 99
Fax Number:	(0861) 62 62 22

- Cheda Sheila Bolingo, the principle author of this Basic Assessment holds an Honours Bachelor degree in Environmental Management and 6 years of experience in the consulting field. Her key focus areas are on strategic environmental assessment and advice on environmental impact assessments; public participation; environmental management programmes, and mapping through ArcGIS for variety of environmental projects. She is currently involved in several diverse projects across the country.
- Gesan Govender, the project manager and Environmental Assessment Practitioner (EAP) responsible for this project, is a registered Professional Natural Scientist and holds an Honours degree in Botany. He has over 15 years of experience within the field of environmental management. His key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; compliance reporting; the identification of environmental management solutions and mitigation/risk minimising measures; and strategy and guideline development. He is currently responsible for the project management of EIA's for several diverse projects across the country.

Inputs to compile this EMPr was received from the following specialists:

- Fauna – Christine Kneidinger of C.E.M.S.
- Vegetation – Antoinette Eyssel of Dimela EcoConsulting
- Heritage - Johan van Schalkwyk of Johan Heritage Consultant
- Geotech Desktop Report– Martin van der Walt of M.J. Van Der Walt Engineering Geologist CC
- Visual – Mader van den Berg of I-scape
- Social – Ingrid Snyman of Batho Earth
- Wetland- Antoinette Bootsman of Limosella Consulting

.

3. KEY LEGISLATION APPLICABLE TO THIS PROJECT

The following legislation and guidelines have informed the scope and content of this EMPr:

- National Environmental Management Act (NEMA) (Act No 107 of 1998)
- Environmental Impact Assessment (EIA) Regulations, published under sections 24 (5) of the NEMA (GNR R982, GNR 983, GNR 984 and GNR 985 in Government Gazette 38282 of 4 December 2014)
- Guidelines published in terms of the NEMA EIA Regulations, in particular:
  - Companion to the National Environmental Management Act (NEMA) Environmental Impact Assessment (EIA) Regulations of 2010 (Draft Guideline; DEA, 2010)
  - Public Participation in the EIA Process (DEA, 2010)

Several other Acts, standards, or guidelines have also informed the project process and the scope of issues addressed and assessed in the EIA Report. A review of legislative requirements applicable to the proposed project is provided in the table that follows.

Table 1: Relevant legislative and permitting requirements applicable to the proposed project

Legislation	Applicable Requirements	Relevant Authority
National Environmental Management Act (Act No 107 of 1998)	The EIA Regulations have been promulgated in terms of Chapter 5 of the Act. Listed activities which may not commence without an environmental authorisation are identified within these Regulations. In terms of S24(1) of NEMA, the potential impact on the environment associated with these listed activities must be assessed and reported on to the competent authority charged by NEMA with granting of the relevant environmental authorisation. In terms of GNR 983 of 2014 a Basic Assessment Process is required to be undertaken for the proposed project.	Department of Environmental Affairs (DEA) – competent authority Gauteng Department of Agriculture and Rural Development (GDARD)
National Environmental Management Act (Act No 107 of 1998)	In terms of the Duty of Care Provision in S28(1) the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to ensure that any pollution or degradation of the environment associated with this project is avoided, stopped or minimised. In terms of NEMA, it has become the legal duty of a project proponent to consider a project holistically, and to consider the cumulative effect of a variety of impacts.	DEA GDARD
National Water Act (Act No 36 of 1998)	Water uses under S21 of the Act must be licensed unless such water use falls into one of the categories listed in S22 of the Act or falls under the general authorisation. In terms of S19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent and remedy the effects of pollution to water resources from occurring, continuing, or recurring.	Department of Water and Sanitation (DWS)
National Environmental Management: Air	S18, S19, and S20 of the Act allow certain areas to be declared and managed as “priority areas.”	DEA CoJ

Legislation	Applicable Requirements	Relevant Authority
Quality Act (Act No 39 of 2004)	Declaration of controlled emitters (Part 3 of Act) and controlled fuels (Part 4 of Act) with relevant emission standards. GN R 827 – National Dust Control Regulations prescribes general measures for the control of dust in all areas	

National Heritage Resources Act (Act No 25 of 1999)	» S38 states that Heritage Impact Assessments (HIAs) are required for certain kinds of development including
	  » The construction of a road, power line, pipeline, canal or other similar linear development or barrier exceeding 300 m in length;
	  » Any development or other activity which will change the character of a site exceeding 5 000 m^2 in extent
	» The relevant Heritage Authority must be notified of developments such as linear developments (i.e. roads and power lines), bridges exceeding 50 m, or any development or other activity which will change the character of a site exceeding 5 000 m^2; or the re-zoning of a site exceeding 10 000 m^2 in extent. This notification must be provided in the early stages of initiating that development, and details regarding the location, nature and extent of the proposed development must be provided.
	» Stand-alone HIAs are not required where an EIA is carried out as long as the EIA contains an adequate HIA component that fulfils the provisions of S38. In such cases only those components not addressed by the EIA should be covered by the heritage component.
		South African Heritage Resources Agency (SAHRA)
		
		Provincial Heritage Resources Authority

National Environmental Management: Biodiversity Act (Act No 10 of 2004)	In terms of S57, the Minister of Environmental Affairs has published a list of critically endangered, endangered, vulnerable, and protected species in GNR 151 in Government Gazette 29657 of 23 February 2007 and the regulations associated therewith in GNR 152 in GG29657 of 23 February 2007, which came into effect on 1 June 2007. In terms of GNR 152 of 23 February 2007: Regulations relating to listed threatened and protected species, the relevant specialists must be employed during the EIA Phase of the project to incorporate the legal provisions as well as the regulations associated with listed threatened and protected species (GNR 152) into specialist reports in order to identify permitting requirements at an early stage of the EIA Phase. The Act provides for listing threatened or protected ecosystems, in one of four categories: critically endangered (CR), endangered (EN), vulnerable (VU) or protected. The first national list of threatened terrestrial ecosystems has been gazetted, together with supporting information on the listing process including the purpose and rationale for listing ecosystems, the criteria used to identify listed ecosystems, the implications of listing ecosystems, and summary statistics and national maps of listed ecosystems (National Environmental Management: Biodiversity Act: National list of ecosystems that are threatened and in need of protection, (GG 34809, GN	DEA GDARD

Legislation	Applicable Requirements	Relevant Authority
	1002), 9 December 2011). GNR 598: The Alien and Invasive Species (AIS) Regulations provides for the declaration of weeds and invader plants.	
National Forests Act (Act No. 84 of 1998)	In terms of S5(1) no person may cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell donate or in any other manner acquire or dispose of any protected tree or any forest product derived from a protected tree, except under a license granted by the Minister to an (applicant and subject to such period and conditions as may be stipulated". GN 908 provides a list of protected tree species.	Department of Agriculture, Forestry and Fisheries
National Veld and Forest Fire Act (Act 101 of 1998)	In terms of S13 the landowner would be required to burn firebreaks to ensure that should a veldfire occur on the property, that it does not spread to adjoining land. In terms of S13 the landowner must ensure that the firebreak is wide and long enough to have a reasonable chance of preventing the fire from spreading, not causing erosion, and is reasonably free of inflammable material. In terms of S17, the applicant must have such equipment, protective clothing, and trained personnel for extinguishing fires.	Department of Agriculture, Forestry and Fisheries
Hazardous Substances Act (Act No 15 of 1973)	This Act regulates the control of substances that may cause injury, or ill health, or death due to their toxic, corrosive, irritant, strongly sensitising or inflammable nature or the generation of pressure thereby in certain instances and for the control of certain electronic products. To provide for the rating of such substances or products in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, modification, disposal or dumping of such substances and products. » Group I and II: Any substance or mixture of a substance that might by reason of its toxic, corrosive etc, nature or because it generates pressure through decomposition, heat or other means, cause extreme risk of injury etc., can be declared as Group I or Group II substance » Group IV: any electronic product; and » Group V: any radioactive material. The use, conveyance, or storage of any hazardous substance (such as distillate fuel) is prohibited without an appropriate license being in force.	Department of Health
National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008)	The Minister may by notice in the *Gazette* publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. The Minister may amend the list by – » Adding other waste management activities to the list. » Removing waste management activities from the list.	DEA: Chemicals and Waste Management GDARD: General waste

Legislation	Applicable Requirements	Relevant Authority
	» Making other changes to the particulars on the list. In terms of the Regulations published in terms of this Act (GN 921), A Basic Assessment or Environmental Impact Assessment is required to be undertaken for identified listed activities (Category A and B) while Category C Activities (such as storage of waste) must be undertaken in accordance with the necessary norms and standards. Any person who stores waste must at least take steps, unless otherwise provided by this Act, to ensure that: » The containers in which any waste is stored, are intact and not corroded or in » any other way rendered unlit for the safe storage of waste. » Adequate measures are taken to prevent accidental spillage or leaking. » The waste cannot be blown away. » Nuisances such as odour, visual impacts and breeding of vectors do not arise; and » Pollution of the environment and harm to health are prevented.	
National Road Traffic Act (Act No 93 of 1996)	» 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" outline the rules and conditions which 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 National Road Traffic Act and the relevant Regulations.	South African National Roads Agency Limited (SANRAL) (national roads) Provincial Department of Transport

4. PHASES OF THE PROJECT

The process which was followed in compiling the EMPr is in compliance with NEMA EIA Regulations (2014), and applies the principle of Integrated Environmental Management (IEM).

The EMPr deals with the following phases as detailed below.

4.1 The Planning Phase

The EMPr offers an ideal opportunity to incorporate pro-active environmental management measures with the goal of attaining sustainable development.

Pro-active environmental measures minimize the chance of impacts taking place during the construction and operational phase. There is still the chance of accidental impacts taking place; however, through the incorporation of contingency plans (e.g. this EMPr) during the planning phase, the necessary corrective action can be taken to further limit potential impacts.

4.2 The Construction Phase

The bulk of the impacts during this phase will have immediate effect. If the site is monitored on a continual basis during the construction phase; it is possible to identify these impacts as they occur. These impacts will then be mitigated through the contingency plans identified in the planning phase, together with a commitment to sound environmental management from the developer.

4.3 Rehabilitation Phase

Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

4.4 The Operational Phase

By taking pro-active measures during the planning and construction phases, potential environmental impacts emanating during the operational phase will be minimised. This, in turn, will minimise the risk and reduce the monitoring effort, but it does not make monitoring obsolete.

5. RESPONSIBILITIES OF THE ROLE PLAYERS

5.1 Developer (Eskom)

The developer remains ultimately responsible for ensuring that the development is implemented according to the requirements of the EMPr. Although the developer appoints specific role players to perform functions on his/her behalf, this responsibility is delegated. The developer is responsible for ensuring that sufficient resources (time, financial, human, equipment, etc.) are available to the other role players (e.g. the ECO, ELO and contractor) to efficiently perform their tasks in terms of the EMPr. The developer is liable for restoring the environment in the event of negligence leading to damage to the environment.

The developer must ensure that the EMPr is included in the tender documentation so that the contractor who is appointed is bound to the conditions of the EMPr.

The developer must appoint an independent Environmental Control Officer (ECO) during the construction phase to oversee all the environmental aspects relating to the development.

5.2 Contractor

The contractor, as the developer's agent on site, is bound to the EMPr conditions through his/her contract with the developer, and is responsible for ensuring that he adheres to all the conditions of the EMPr. The contractor must thoroughly familiarise him/herself with the EMPr requirements before construction begins and must request clarification on any aspect of these documents, should they be unclear. The contractor must ensure that he/she has provided sufficient budget for complying with all EMPr conditions at the tender stage.

The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site engineer in terms of the EMPr.

5.3 Resident Engineer (RE)

The Resident Engineer (RE) will be appointed by the 'Consultant' and will be required to oversee the construction programme and construction activities performed by the Contractor. The RE is expected to liaise with the Contractor and ECO on environmental matters, as well as any pertinent engineering matters where these may have environmental consequences. He/she will oversee the general compliance of the Contractor with the EMPr and other pertinent site specifications. The RE will also be required to be familiar with the EMPr specifications and further monitor the Contractor's compliance with the Environmental Specifications on a daily basis, through the Site Diary, and enforce compliance.

5.4 The Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the developer as an independent monitor of the implementation of the EMPr. He/she must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. The ECO must attend relevant project

meetings, conduct inspections to assess compliance with the EMPr and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO is responsible for:

- Liaison with relevant authorities;
- Liaison with contractors regarding environmental management; and
- Undertaking routine monitoring and appointing a competent person/institution to be responsible for specialist monitoring, if necessary.

The ECO has the right to enter the site and do monitoring and auditing at any time, subject to compliance with health and safety requirements applicable to the site (e.g. wearing of safety boots and protective head gear).

(a) Liaison with Authorities

The ECO and Eskom Environmental Representatives will be responsible for liaising with DEA. The ECO must submit environmental audit reports to the authorities should they be required for the project. These audit reports must contain information on the contractor and developer's levels of compliance with the EMPr. The audit report must also include a description of the general state of the site, with specific reference to sensitive areas and areas of non-conformance. The ECO must indicate suggested corrective action measures to eliminate the cause of the non-conformance incidents. In order to keep a record of any impacts, an Environmental Log Sheet (refer to **Appendix 1 of this EMPr)** is to be kept on a continual basis.

(b) Liaison with Contractors

The ECO is responsible for informing the contractors of any decisions that are taken concerning environmental management during the construction phase. This would also include informing the contractors of the necessary corrective actions to be taken.

5.5 Environmental Liaison Officer (ELO)

The contractor must appoint an Environmental Liaison Officer (ELO) to assist with day-to-day monitoring of the construction activities. Any issues raised by the ECO will be routed to the ELO for the contractors' attention. The ELO shall be permanently on site during the construction phase ensuring daily environmental compliance with the EMPr and should ideally also be a senior and respected member of the construction crew. Past experience has revealed that, ELO's that can relate to the work force are the most effective for information transfer and ensuring compliance with the EMPr.

All the responsible parties mentioned in this section are responsible for ensuring the implementation of the EMPr and Waste Management Plan (WMP) procedures outlined in the Tables, for the duration of the project.

6. ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

The EAP and Project specialists have evaluated all potential issues in a corridor of approximately 1000 meters wide. This would allow for fine scale adjustments of the tower positions if required. The table that follows forms the core of this EMPr for the construction and operational phases of the development. This table should be used as a checklist on site, especially during the construction phase.

Compliance with this EMPr must be audited during the construction phase and following completion of construction.

6.1 Planning Phase EMPr

Overall Goal: undertake the pre-construction (planning and design) activities in a way that:

- Ensures that the design responds to the identified environmental constraints and opportunities.
- Ensures that pre-construction activities are undertaken in accordance with all relevant legislative requirements
- Ensures that adequate regard has been taken of any landowner and community concerns and that these are appropriately addressed through design and planning (where appropriate).
- Ensures that the best environmental options are selected for the linear components.
- Enables the construction activities to be undertaken without significant disruption to other land uses and activities in the area.

In order to meet this goal, the following activity/actions and the action required have been identified, together with necessary actions and monitoring requirements.

Table 2: Planning & Design Phase

Activity / issue	Action required	Responsible party	Frequency
Appointment and Duties of ECO	The Developer must appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the environmental management plan.	Developer	Once-off
	The developer must provide the ECO and contractor with a copy of the EMPr.	Developer	Once-off
	The priority of the ECO is to maintain the integrity of the development conditions outlined in the EMPr.	ECO	Continuous
	The ECO must form part of the project management team and attend all project meetings.	ECO	Continuous
	The contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.	ECO, Contractor	Once-off

Activity / issue	Action required	Responsible party	Frequency
Appointment and Duties of ELO	The contractor must appoint an Environmental Liaison Officer (ELO). This person will be required to monitor the situation with a direct hands-on approach, and ensure compliance and co-operation of all personnel.	Contractor	Once-off
EMPr	This EMPr must be made binding to the main contractor as well as individual contractors and should be included in tender documentation for the construction contract.	Developer, ECO	Once-off
	All activities on the site must comply with the **City of Johannesburg and City of Tshwane's** By-Laws.	Developer, ECO and Contractor	Continuous
Environmental Protection Plan	Within 21 days of the Commencement Date, the Site Contractor shall prepare and submit to the Project Manager for approval in consultation with the ECO an Environmental Protection Plan. The Plan shall cover all environmental protection works and shall also include descriptions of environmental safeguards and emergency procedures.	Developer, ECO, Contractor	Once - off
	The Plan shall include a description of the administrative structure and lines of communication which shall be established between the Contractor's and his subcontractors' workforce for the implementation of environmental protection procedures. Details of the expertise available for the implementation of environmental protection procedures must also be provided.	Contractor, RE, ECO	Once off
	In addition this plan must have a site layout plan and showing the final positions and extent of all permanent and temporary site structures and infrastructure, including: • Buildings • Contractors' accommodation. • Contractors' camp • Roads and access routes • Gates and fences. • Essential services (permanent and temporary water, electricity and sewage) • Rubble and waste rock storage and disposal sites. • Site toilets and ablutions.	Contractor, RE, ECO	Once off

Activity / issue	Action required	Responsible party	Frequency
	• Firebreaks. • Excavations and trenches. • Topsoil stockpiles. • Spoil areas. • Construction materials stores. • Vehicle and equipment stores. • All temporary and permanent water management structures including bunds and sumps		
Layout Design to responds to identified environmental constraints and opportunities	• Minimise: Clearing of indigenous trees with a stem diameter exceeding 15 cm must be kept to the lowest number possible, regardless of species/protection status • Undertake a pre-construction walk-through footprint investigation for protected flora and burrowing terrestrial vertebrates. • The above pre-construction footprint investigations will be used together with results from the ecological specialist report to draft the following: o A comprehensive search and rescue program for plants and possible burrowing animals. Search and Rescue program should be developed and implemented, preceded by a meticulous investigation of all footprint areas by a suitably qualified botanist, conducted during the optimal growing season (January to March) along the entire footprint area o A comprehensive alien invasive species eradication and management plan o Update and finalise the rehabilitation and revegetation plan, this must include a topsoil management plan if required o Update and finalise the erosion control management plan • Use design-level mitigation measures recommended in respect of habitat and ecosystem intactness and prevention of species loss as detailed within the EIA Report o This includes positioning components of the development as close as possible	Contractor, RE, ECO	Once off

Activity / issue	Action required	Responsible party	Frequency
	together and as much as possible on the low sensitivity portions of the study area o Strictly adhere to existing tracks/roads where ever possible to gain access to the site o Sites for storing, mixing, and handling topsoil piles (if necessary) or any introduced materials, including all machinery or processing implements, must be placed in an ecologically least sensitive area and at least 500 m from any type of wetland. Such sites must be clearly indicated in site plans and the drafting of relevant detailed method statements and/or management plans requested from the relevant contractor or environmental firm. • Access roads and machinery turning points must be planned to minimise the impacted area, avoid the initiation of accelerated soil erosion and prevent unnecessary compaction and disturbance of topsoils, prevent obstruction or alteration of natural water flow • Compile a comprehensive erosion control plan for the footprint area as part of the final design of the project • Compile a comprehensive vegetation rehabilitation management plan. • Compile a detailed invasive plant management and monitoring programme as guideline for the entire construction, operational and decommissioning phase o This plan must contain WfW-accepted species- specific eradication methods o It must also provide for a continuous monitoring programme to detect new infestations • Undertake a detailed geotechnical survey of the proposed tower positions in order to fully understand the soils in terms of founding conditions and erosion potential. • Bird-friendly power line tower and conductor designs must be used. The tower designs used should be those which are poorly suited to serve as nesting substrates by most bird species and with perching areas situated in areas either off-set or well away from the conductors.		

Activity / issue	Action required	Responsible party	Frequency
	• Plan to install anti-collision devices such as bird flappers onto the power lines where these cross avifaunal sensitive areas. • Ensure that, as far as possible, riparian areas are spanned/ pole structures are not placed within proximity to rivers, streams. Ensure placement of footprints outside 1:100 year floodlines. • The **terms** of this EMPr and the Environmental Authorisation must be included in all tender documentation and Contractors contracts • It is recommended that a detail geotechnical investigation be conducted along the power line routes as well as substation sites in order to verify the desk study and to provide site specific appropriate founding solutions. • The recurrence interval of mining induced seismic events should be determined and taken into consideration for the design of pylons and the substation.		
	• During the **detailed** design phase, the footprint and design of structures, particularly stormwater infrastructure and the pylons located within wetland boundaries, should aim to have the least impact on habitat quality and hydrology of the wetlands and rivers. Designs should take into account soil properties, slopes and runoff energy. In Granitic or sandy soils, stormwater should be allowed to infiltrate into the soil profile to follow natural subsurface flowpaths to sustain wetlands lower in the landscape. • Trenches for underground cables should not be placed parallel to the wetlands, if this is unavoidable, subsurface seepage water should be released back into the wetland in such a way as not to cause canalization or erosion.	Contractor, RE, ECO	Once off
Permits and Permissions	The Developer shall ensure that all pertinent permits, certificates and permissions have been obtained prior to any activities commencing on site and ensure that they are strictly enforced / adhered to. This includes, for example, updating the Department of Water Affairs (DWA) licence and obtaining biodiversity permits, etc.	Contractor, Developer	Continuous

Activity / issue	Action required	Responsible party	Frequency
	The Contractor shall maintain a database of all pertinent permits and permissions required for the contract as a whole and for critical activities for the duration of the contract.	Contractor, Developer	Continuous
Effective communication mechanisms	• Undertake negotiations with affected landowners and nearby tourism establishments i.e. Edgecombe House Conference Centre and Sunset Boma, House and agree on landowner-specific conditions for construction and maintenance • Implement a grievance mechanism procedure for the public	Contractor, Developer	Continuous
Method Statements	The Contractor shall submit written Method Statements to the RE for the activities identified by the RE or ECO. Activities that will require method statements include: • Logistics for the Environmental Awareness Training Course • Location and Layout of Construction camp • Construction procedures • Protection of heritage resources (graves, old buildings and bridges) • Solid and Hazardous Waste Management • Drainage and Storm water planning • Dust Control • Stockpiling area • Vegetation removal • Materials and equipment to be used • Getting the equipment to and from the 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 Specifications	Contractor, RE, ECO .	As necessary

Activity / issue	Action required	Responsible party	Frequency
	• Site camp establishment • Concrete pre-cast and batching operation • Emergency procedures • Materials, equipment and staffing requirements • Transporting the materials and/or equipment to, from and within the site • Stockpiling of rubble • General and Hazardous waste management on site • The storage provisions for the materials and/or equipment • The proposed construction procedure designed to implement the relevant Environmental Specifications • Other information deemed necessary by the RE and/or ECO. Method Statements shall be submitted at least ten working days prior to the proposed commencement of work on an activity to allow the RE (and/or ECO) time to study and approve the method statement.		
	Contractor shall not commence work on that activity until such time as the Method Statement has been approved in writing by the RE contract.	Contractor, RE, ECO	Continuous
	The Contractor shall carry out the activities in accordance with the approved Method Statement.	Contractor, RE. ECO	Continuous
	Under certain circumstances, the RE may require changes to an approved Method Statement. In such cases the proposed changes must be agreed upon in writing between the Contractor and the RE, and appropriate records retained.	Contractor, RE	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the EMPr specifications.	Contractor, Developer	Continuous
Environmental Awareness and Training	• The Contractor shall ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include; ∗ What is meant by "Environment" ∗ Why the environment needs to be protected and conserved ∗ How construction activities can impact on the environment ∗ What can be done to mitigate against such impacts ∗ Awareness of emergency and spills response provisions ∗ Social responsibility during construction of the power lines e.g. being considerate to local residents • It is the Contractor's responsibility to provide the site foreman with environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. • Training should be provided to other staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary. • Use should be made of environmental awareness posters on site. • The need for a "clean site" policy also needs to be explained to the workers. • Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. • The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed.	Developer, Contractor, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Existing Services and Infrastructure	The Contractor shall ensure that existing services (e.g. roads, pipelines, power lines and telephone services) are not damaged or disrupted.	Contractor, RE, ECO	Continuous.
	The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted.	Contractor	As necessary
	Such repair or reinstatement will be to the Contractor's cost and shall receive top priority over all other activities.	Contractor	Continuous
	A time limit for the repairs may be stipulated by the RE in consultation with the Contractor.	Contractor, RE, ECO	Continuous
Environmental incidents	The contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves. All incidents must be reported to the ECO and the developer.	ELO, ECO, Contractor	Continuous

6.2 Construction Phase EMPr

Overall Goal: Undertake the construction phase in a way that:

- Ensures that construction activities are properly managed in respect of environmental aspects and impacts.
- Enables construction activities to be undertaken without significant disruption to other land uses and activities in the area, in particular concerning noise impacts, traffic and road use, and effects on local residents.
- Minimises the impact on the indigenous natural vegetation, and habitats of ecological value.
- Minimises impacts on fauna in the study area.
- Minimises the impact on heritage sites should they be uncovered.
- Establishes an environmental baseline during construction activities on the site, where possible.

Table 3: Construction Phase

Activity / issue	Action required	Responsible party	Frequency
Site establishment	If construction camp is required in the study area, the contractor must establish a construction camp in an area as agreed with the ECO. The site for the construction camp must not be in an environmentally sensitive area such as close proximity to a watercourse, on a steep slope or on erosive soils. The area must be properly demarcated prior to establishment to prevent the construction camp from being unnecessarily large. The camp must be properly fenced.	ECO, Contractor	Once off
	The siting of the construction equipment camp/s must take cognisance of any sensitive areas reflected on the sensitivity map.	ECO, Contractor	Once off
	The working width of the construction area must be clearly demarcated by the installation of coloured pegs prior to construction. Particularly sensitive areas (e.g. river or drainage lines) must be demarcated with danger tape.	ECO, Contractor	Once off, monitor weekly
	The lateral spread of the construction must be monitored on a weekly basis.	ECO, ELO, Contractor	Monitor weekly

Activity / issue	Action required	Responsible party	Frequency
	The use of roads on landowner property should be determined based on discussions with landowners during the negotiation process. Letters of agreement with landowners must be kept on a file	ECO, Contractor	Continuous,
	ELO will also be required to monitor unauthorised movement of construction crew.	ELO, Contractor	Once off, monitor daily
	The developer should provide dustbins to be used during site preparation and surveying.	Developer	Once off
	To prevent excessive disturbance of natural vegetation, the contractor should use existing disturbed or paved areas wherever possible.	ECO, Contractor	Once off, monitor weekly
	To prevent the deterioration of surface water quality, the contractor must provide adequate ablution facilities. However these facilities must not be placed within the vicinity of watercourses. Toilets are to be emptied regularly throughout the construction phase. Every effort must be made to prevent the contamination of surface or sub-surface water.	Contractor	Bi-weekly inspections
Management of the construction site and construction workers	The Construction Site and surrounds are to be maintained in a clean orderly and presentable condition at all times.	Contractor	Monitor Daily
	Regular inspections by the Contractor (and ECO) will be undertaken using checklists to ensure a minimum standard of orderliness is maintained.	Contractor, ECO	Weekly
	Construction activities shall avoid causing unnecessary disruption and nuisance to adjacent landowners and the public as a whole.	Contractor	Continuous
	Ensure that all personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm. This can be achieved through the provision of appropriate environmental awareness training to all personnel. Records of all training undertaken must be kept.	Contractor	Monitor Daily
	A Code of conduct for construction workers should be implemented.	Contractor, ECO	Weekly

Activity / issue	Action required	Responsible party	Frequency
	Contractors must ensure that all workers before commencing work are informed of the conditions contained in the EMPr, specifically consequences of stock theft and trespassing on adjacent farms.	Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
Waste Management	• Construction method and materials should be carefully considered in view of waste reduction, re-use, and recycling opportunities. • Construction contractors must provide specific detailed waste management plans to deal with all waste streams. • Specific areas must be designated on-site for the temporary management of various waste streams, i.e. general refuse, construction waste (wood and metal scrap), and contaminated waste as required. Location of such areas must seek to minimise the potential for impact on the surrounding environment, including prevention of contaminated runoff, seepage, and vermin control. • Where practically possible, construction and general wastes on-site must be reused or recycled. Bins and skips must be available on-site for collection, separation, and storage of waste streams (such as wood, metals, general refuse etc.). • Bins and skips must be labelled for ease of waste management. • Disposal of waste must be in accordance with relevant legislative requirements, including the use of licensed contractors. • Uncontaminated waste shall be removed at least weekly for disposal; other wastes can be removed for recycling/ disposal at an appropriate frequency or ECO's discretion. • Disposal of waste shall be in accordance with relevant legislative requirements, including the use of licensed contractors. • Hydrocarbon waste must be contained and stored in sealed containers within an appropriately bunded area. • Waste must be kept to a minimum and must be transported by approved waste transporters to sites designated for their disposal. • Spilled cement will be cleaned up as soon as possible and disposed of at a suitably licensed waste disposal site. • Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time.	ELO, Contractor	Monitor daily - weekly
	• Regularly serviced chemical toilets facilities must be used to ensure appropriate control of sewage. Waste from these toilets should be disposed of at a licensed wastewater treatment works. • Upon the completion of construction, the area must be cleared of potentially		

Activity / issue	Action required	Responsible party	Frequency
	• Documentation (waste manifest) must be maintained detailing the quantity, nature, and fate of any regulated waste. Waste disposal records must be available for review at any time. • Regularly serviced chemical toilets facilities must be used to ensure appropriate control of sewage. Waste from these toilets should be disposed of at a licensed wastewater treatment works. • Upon the completion of construction, the area must be cleared of potentially polluting materials. • Dispose of all solid waste collected at an appropriately registered waste disposal site. Waste disposal shall be in accordance with all relevant legislation and under no circumstances may waste be burnt on site. • Where a registered waste site is not available close to the construction site, provide a method statement with regard to waste management. • Proof of appropriate disposal of all waste must be obtained from the waste contractors and kept on file. • Proof of appropriate disposal of all waste must be obtained from the waste contractors and kept on file.	ELO, Contractor	Monitor daily - weekly

Activity / issue	Action required	Responsible party	Frequency
Handling and storage of chemicals, hazardous substances	If potentially hazardous substances are to be stored on site, the Contractor shall provide a Method Statement detailing the substances/materials to be used together with the procedures for the storage, handling and disposal of the materials in a manner which will reduce the risk of pollution that may occur from day to day storage, handling, use and/or from accidental release of any hazardous substances used.	Contractor,	Monitor daily - weekly
	Hazardous chemical substances (eg. oil, hydrocarbons) used during construction shall be stored in secondary containers.	Contractor	Monitor daily - weekly
	The relevant Material Safety Data Sheets (MSDS) shall be available on Site. Procedures detailed in the MSDS shall be followed in the event of an emergency situation.	Contractor	Monitor daily - weekly
	The waste, resulting from the use of hazardous materials, shall be disposed of at a hazardous waste disposal site as approved by the RE. Storage and disposal of waste is regulated through other legislation, which should be complied with i.e. the Occupational Health and Safety Act. Records for disposal must be kept in the Environmental file	Contractor, RE	Monitor daily - weekly
	Surface water draining off contaminated areas containing oil and petrol would need to be channelled towards a sump which will separate these chemicals and oils.	Contractor, RE	Monitor daily - weekly
	Oil residue shall be treated with oil absorbent such as Drizit or similar and this material removed to an approved waste site.	Contractor, RE	Monitor daily - weekly

Activity / issue	Action required	Responsible party	Frequency
Traffic management and transportation of equipment and materials to site	• Appropriate dust suppression techniques must be implemented to minimise dust from gravel roads. These could include the use of water or other appropriate dust suppressants, as determined by the local site conditions. • Construction vehicles and those transporting materials and goods should be inspected by the contractor or a sub-contractor to ensure that these are in good working order and not overloaded. • Strict vehicle safety standards should be implemented and monitored. • All relevant permits for abnormal loads must be applied for from the relevant authority. • A designated access to the proposed site must be created to ensure safe entry and exit. • No deviation from approved transportation or construction routes must be allowed, unless roads are closed for whatever reason outside the control of the contractor. • Appropriate road management strategies must be implemented on external and internal roads with all employees and contractors required to abide by standard road and safety procedures. • Any traffic delays resulting from the presence of construction traffic must be co-ordinated with the appropriate authorities. • The movement of all vehicles within the site must be on designated roadways. • Signage must be established at appropriate points warning of turning traffic and the construction site (all signage to be in accordance with prescribed standards).	Contractor, RE	Daily

Activity / issue	Action required	Responsible party	Frequency
	• Signs must be placed along construction roads to identify speed limits, travel restrictions, and other standard traffic control information. Signage must be appropriately maintained for the duration of the construction period. • Appropriate maintenance of all vehicles of the contractor must be ensured. • An appropriate speed limit as agreed with the ECO should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment and lessen environmental degradation. • All construction vehicles and or machineries travelling on public roads must adhere to the specified speed limits and all drivers must be in possession of an appropriate valid driver's license.		

Activity / issue	Action required	Responsible party	Frequency
Management of dust and air emissions	• Roads must be maintained in a manner that will ensure that nuisance from dust emissions from road or vehicle sources are not visibly excessive. • Ensure that any damage to roads attributed to construction activities is repaired before completion of the construction phase. • Appropriate dust suppressant must be applied on all exposed areas and stockpiles as required to minimise/control airborne dust. These could include the use of water or other appropriate dust suppressants, as determined by the local site conditions. • Haul vehicles moving outside the construction site carrying material that can be wind-blown must be covered with tarpaulins • An appropriate speed limit should be implemented for vehicles travelling on site in order to minimise dust generation and ensure safety of personnel and the environment. • Dust-generating activities or earthworks may need to be rescheduled or the frequency of application of dust control/suppressant increased during periods of high winds if excessive visible dust is blowing toward nearby residences outside the site. • Strictly control vibration pollution from compaction plant or excavation plant.	Developer, Contractor	Daily
Minimise soil degradation and erosion	• Identify disturbance areas and restrict construction activity to these areas. • Rehabilitate disturbance areas as soon as practicable when construction in an area is complete. • Any new access roads required to be carefully planned and constructed to minimise the impacted area and prevent unnecessary excavation, placement, and compaction of soil. • Where new access roads cross natural drainage lines, culverts must be	ELO, Contractor	As necessary

Activity / issue	Action required	Responsible party	Frequency
	designed to allow free flow and regular maintenance must be carried out. Permit to disturb the drainage lines must be obtained from the Department of Water & Sanitation. • Minimise removal of vegetation which adds stability to soil. • Soil conservation: Stockpile topsoil for re-use in rehabilitation phase, protect stockpile from erosion • Erosion control measures (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, shade nets, or temporary mulching over denuded area as required). • Control depth of excavations and stability of cut faces/sidewalls. • Compile and implement an appropriate stormwater management plan.	ELO, Contractor	Continuous
Noise control	Construction and the use of construction machinery should be limited between 06h00 and 18h00 on weekdays only.	Developer, Contractor	Monitor daily
	Institute noise control measures throughout the construction phase for all applicable activities, including the construction times.	ELO, Contractor	Once off, as necessary
	Inform residents of nearby residential areas of planned noisy activities outside the timeframes stated above.	ECO, ELO, Contractor	Once off, as necessary
	No construction should occur during weekends, unless the adjacent residents (± 1km) have been notified in writing at least three days in advance.	ELO, Contractor	Once off, as necessary
	Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment.	Developer, ELO, Contractor	Continual
	Prior to blasting (if required), the contractor must inform the adjacent landowners at least five days in advance.	ELO, Contractor	As necessary

Activity / issue	Action required	Responsible party	Frequency
Topsoil management	• The topsoil cleared must be retained. The topsoil contains most of the inorganic matter, decomposed organisms and nutrients, thus the removal of the topsoil constitutes a major loss in terms of ecosystem function. • In order to ensure that the minimal amount of soil is removed with vegetation clearance, it is strongly advised that vegetation be harvested as close to ground level as possible before earthworks machinery is utilised. • Soil removed in this manner will contain the existing seed bank, stolons, rhizomes and runners as well as an additional supply of organic matter that will be beneficial during the early stages of vegetation reinstatement. • Harvested grass should be retained and used as a mulch to combat erosion.	ELO, ECO, Contractor	Once off, monitor weekly
	Topsoil and subsoil must be placed on opposite sides of the trench and must be kept separate throughout construction and rehabilitation.	ELO, ECO, Contractor	Monitor weekly
	Topsoil must not be stockpiled for an extensive period (> 3 months). This is to prevent the redundance of the existing seed bank as well as the alteration of the soil characteristics (permeability, bulk density etc.).	ELO, ECO, Contractor	Monitor weekly
	Erect signs and/or danger tape around the exposed excavations to warn the public of the inherent dangers.	ELO, Contractor	Continual
Destruction of heritage resources	The contractors and workers should be notified that heritage resources might be exposed during the construction work.	ECO	Once off
	Should any heritage resources be exposed during excavation, work on the area where the heritage resources were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible.	ECO, Contractor	Continuous
	All discoveries shall be reported immediately to the South African Heritage Resources Authority (SAHRA) so that an investigation and evaluation of the finds can be made. Acting upon advice from SAHRA, the Environmental Control Officer will advise the necessary actions to be taken.	ELO, Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Under no circumstances shall any heritage resources be removed or interfered with by anyone on the site unless under the instruction of SAHRA. Destruction of heritage resources is not allowed.	ELO, Contractor	Continuous
	Contractors and workers shall be advised of the penalties associated with the unlawful removal of heritage resources as set out in section 51(1) of the National Heritage Resources Act (Act No. 25 of 1999).	ECO	Once off
	A person or entity, e.g. the Environmental Control Officer, should be tasked to take responsibility for the heritage resources and should be held accountable for any damage.	Developer	Once off
Minimise the establishment and spread of alien invasive plants	Avoid creating conditions in which alien plants may become established: • Keep disturbance of indigenous vegetation to a minimum. • Rehabilitate disturbed areas as quickly as possible. • Do not import soil from areas with alien plants.	ECO,ELO, Contractor	Continuous
	Establish an on-going monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Biodiversity Act).	ECO,ELO, Contractor	Continuous
	Immediately control any alien plants that become established using registered control methods.	ELO, Contractor	Continuous
	Avoid creating conditions in which alien plants may become established: • Keep disturbance of indigenous vegetation to a minimum. • Rehabilitate disturbed areas as quickly as possible. • Do not import soil from areas with alien plants.	ELO, Contractor	Continuous
	Establish an on-going monitoring programme to detect and quantify any alien species that may become established and identify the problem species (as per Conservation of Agricultural Resources Act and Biodiversity Act).	ELO, Contractor	Continuous
	Remove vegetation only within the minimum width necessary for excavation.	ELO, Contractor	Once off

Activity / issue	Action required	Responsible party	Frequency
Minimisation of visual impacts associated with construction	• Avoidance o Do not locate the construction camp or laydown yards within 1 km from any residential area, unless it can be completely screened from sensitive viewpoints. o Its highly recommended to locate the bulk of the laydown yards at the existing Lulamisa and Minerva Substations as these sites have space within its boundaries. Smaller laydown yards can be established on the	ELO, Contractor	Continual

Activity / issue	Action required	Responsible party	Frequency
	proposed substation sites for both the substation and power line material. • Reduction o Clearly demarcate the construction sites to limit the footprint of disturbance. o Keep dust levels down by regularly wetting dirt roads and exposed soil areas during active construction. This is especially relevant on the dirt roads between the proposed Bluehills and existing Crowthorne Substations. o Remove rubble and other waste that is generated by the construction process as soon as possible and dispose at an appropriate dump site. o Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed soil surfaces. Monitor the rehabilitated areas for at least 6 months to ensure a sufficient vegetation cover is established that will prevent erosion from occurring. o Avoid removal of any large trees or shrubs that may open views to the construction site and compromise the natural screening capacity of the study area. o Carefully plan the trenching of the underground cable to minimise the construction duration and thereby reducing the period of visually intrusive views to the activity. Complete short sections at a time and fill-in and rehabilitate as soon as possible. • Remediation o Keep the construction camp neat and tidy at all times. Remove any waste from the site or contain it in an enclosed area out of sight from sensitive viewpoints. o Enhance the screening capacity of the construction sites by erecting a temporary fence with a 3m high shade cloth to avoid the unsightly construction processes.	ELO, Contractor	Once off

Activity / issue	Action required	Responsible party	Frequency
Limit impacts on watercourses	• Plan construction activities that necessitate water crossings to only cross watercourses at designated points • Access roads to remove existing structures must be restricted in wetland areas and buffers. These access areas must be designated in the planning phase to prevent contractors taking "short-cuts" through wetland areas and buffers • A temporary fence or demarcation must be erected around the works area to prevent water runoff and erosion of the disturbed or heaped soils into watercourse areas. • Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction / earthworks in that area (DWAF, 2005). • Limit compaction by not working in wet conditions and limiting vehicular access • During the construction phase measures must be put in place to control the flow of excess water so that it does not impact on the surface vegetation. • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and work areas. • Limit compaction by not working in wet conditions and limiting vehicular access • Do not permit vehicular or pedestrian access into natural areas or into seasonally wet areas during and immediately after rainy periods, until such a time that the soil has dried out (DAWF, 2005) • Watercourse boundaries and buffers must be clearly marked in the field with signs and/or highly visible flagging until construction-related ground disturbing activities are complete • Only necessary traffic should be allowed within these demarcated areas • Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the ECO • Storm water shall be allowed to soak into the land and natural attenuation areas. Special care must be given to ensure velocity is slowed before reaching the attenuation area • The contractor shall ensure that excessive quantities of sand, silt and silt-laden	ELO, Contractor	Continual

Activity / issue	Action required	Responsible party	Frequency
Destruction of vegetation	• Areas to be cleared will be clearly marked in the field to eliminate unnecessary clearing. • The extent of clearing and disturbance to the native vegetation will be kept to a minimum so that the impact on flora is restricted. • A site rehabilitation programme must be implemented. • Protected plants identified within the development footprint must not be	ELO, Contractor, ECO	Continual
		ELO, Contractor, ECO	Continual
		ELO, Contractor, ECO	Continual

Activity / issue	Action required	Responsible party	Frequency
	disturbed or removed prior to permit being granted. • The secondary grasslands provide habitat to the provincially protected *Gladiolus vinosomaculatus* and included moist grasslands wherein the Declining *Hypoxis hemerocallidea* and *Eucomis autmnalis* were recorded. Furthermore, provincially protected orchid species (*Habenaria* species) were also recorded in the moist grassland	ELO, Contractor	Continual
Destruction of Fauna	• Only areas where construction is to occur should be cleared of vegetation; • No natural watercourses, pans, or wetlands should be unnecessarily disturbed by the development with a 500m buffer zone (marked during the construction phase) allowed for between the edge of any of the above mentioned features or an appropriate buffer zone as determined by a wetland specialist; • Moist grassland, rank grassland and other suitable habitat for the African Grass Owl should not be disturbed during the period from January until April when these avifauna species are breeding. • The extent of the construction should be confined to disturbed areas or those identified as having a low / medium ecological sensitivity and demarcated. Where areas of high ecological sensitivity need to be disturbed, the necessary permits and mitigation measures recommended by the wetland specialist should be implemented. • No construction vehicles or personnel should be allowed to leave the demarcated area unless authorised to do so. • Servitudes and trenches should be constructed in such a way to ensure fauna species do not get trapped and can move freely through the area.	ELO, Contractor, ECO	Continual

Activity / issue	Action required	Responsible party	Frequency
Employment Creation and Local Procurement	• The use of local labour should be maximised where possible. • Eskom and the appointed contractors should create conditions that are conducive for the involvement of entrepreneurs, small businesses and SMME's during the construction process. • Tender documentation should contain guidelines for the involvement of labour, entrepreneurs, businesses and SMME's from the local sector	Eskom and Contractor	Once off

Activity / issue	Action required	Responsible party	Frequency
Impact on Daily Living and Movement Patterns	• Construction activities undertaken according to best practice by implementing the following: • Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction phase. • The movement of construction vehicles near the Blue Hills College should be limited to off-peak periods (if possible) to minimise adverse impacts on the movement of pedestrians/schoolchildren. • Construction vehicles should keep to the speed limits. Speeding on gravel roads should also be avoided to limit any excess dust pollution. • Clear warning signs should be erected at strategic places during the construction phase. • The contractor should contact affected property owners before construction commences to inform them of the contractor's plans, procedures, and schedules. • Access to properties should be maintained as far as possible. Expected difficulties with regards to access to properties should be clarified with the affected property owners. • Properties not affected by the proposed servitude area should preferably not be used to gain access to the construction sites. • Construction sites should be fenced off to limit unauthorised entry. • Sufficient water and sanitation facilities should be provided for the workers on site during the construction period. • Construction sites should be rehabilitated as soon as the construction activities and planning allow	Eskom and Contractor	Once off

Activity / issue	Action required	Responsible party	Frequency
Impact on Sense of Place	• Construction sites should be screened from the property owners and commuters where possible. • Construction debris should be removed as soon as construction activities allow. • Construction sites should be rehabilitated as soon as planning allows. • Clearing of vegetation should be avoided. • Gardens should be repaired if damaged by construction activities	Eskom and Contractor	Once off

Activity / issue	Action required	Responsible party	Frequency
Health, Safety and Security Risks	• The Contractor shall comply with all standard and legally required health and safety regulations as promulgated under the Occupational Health and Safety Act and associated regulations. • The Contractor shall provide a standard first aid kit at the site office of each camp and/or at additional identified locations where needed. • Before construction commences, the affected property owners should be informed of the details of the contractors, size of the workforce and construction schedules. • Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction phase. • Construction vehicles should keep to the speed limits. • Construction workers and permanent employees should be easily identifiable by wearing uniforms and even identity tags. • Construction workers should remain within the construction site boundaries. • The construction sites should be properly fenced and access should be controlled to limit unauthorised entry • A fire prevention and management plan must be implemented • The Contractor shall ensure that all site personnel are aware of the fire risks and how to deal with any fires that occur. This shall include, but not be limited to: ∗ Regular fire prevention talks ∗ Posting of regular reminders to staff. • Any fires, which occur, shall be reported to the Environmental Liaison Officer immediately and then to the relevant authorities.See example of Incident forms, attached)	Eskom and Contractor	Once off

Activity / issue	Action required	Responsible party	Frequency
Impact on the nearby schools (Blue Hills College & Blue Hills Reddford House School)	• Before construction commences, the school's governing body should be informed of the details of the contractors, size of the workforce and construction schedules. • Working hours should be kept to normal working hours (e.g. 7 am until 5 pm) during the construction phase. • Construction vehicles should keep to the speed limits. • Construction workers and permanent employees should be easily identifiable by wearing uniforms and even identity tags. • Construction workers should remain within the construction site boundaries. • The construction sites should be properly fenced and access should be controlled to limit unauthorised entry • A fire prevention and management plan must be implemented	Eskom and contractor	Continual

6.3 Rehabilitation Phase EMPr

Overall Goal: Undertake the rehabilitation measures in a way that:

- Ensures rehabilitation of disturbed areas following the execution of the works, such that residual environmental impacts are remediated or curtailed.

Table 4: Rehabilitation Phase

Activity / issue	Action required	Responsible party	Frequency
Rehabilitation of surface	All temporary facilities, equipment, and waste materials must be removed from site.	Developer	Once-off
	All temporary fencing and danger tape must be removed once the construction phase has been completed.	Developer	As necessary
	The area that previously housed the construction equipment camp is to be checked for spills of substances such as oil, paint, etc. and these should be cleaned up.	Developer	As necessary
	All hardened surfaces within the construction equipment camp area should be ripped, all imported materials removed, and the area shall be top soiled and re-vegetated.	Developer	As necessary
	Temporary roads must be closed and access across these blocked.	Developer	Continuous
	Necessary drainage works and anti-erosion measures must be installed, where required, to minimise loss of topsoil and control erosion.	Developer	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Prior to the application of topsoil • subsoil shall be shaped and trimmed to blend in with the surrounding landscape or used for erosion mitigation measures • ground surface or shaped subsoil shall be ripped or scarified with a mechanical ripper or by hand to a depth of 15 – 20 cm • compacted soil shall be ripped to a depth greater than 25 cm and the trimmed by hand to prevent re-compacting the soil • any foreign objects, concrete remnants, steel remnants or other objects introduced to the site during the construction process shall be cleared before ripping, or shaping and trimming of any landscapes to be rehabilitated takes place • shaping will be to roughly round off cuts and fills and any other earthworks to stable forms, sympathetic to the natural surrounding landscapes	Contractor, ECO to control	As necessary
	Application of topsoil • topsoils shall be spread evenly over the ripped or trimmed surface, if possible not deeper than the topsoil originally removed • the final prepared surface shall not be smooth but furrowed to follow the natural contours of the land • the final prepared surface shall be free of any pollution or any kind of contamination • care shall be taken to prevent the compaction of topsoil	Contractor, ECO to control	As necessary

Activity / issue	Action required	Responsible party	Frequency

	Soil stabilisation
	• mulch, if available from shredded vegetation, shall be applied by hand to achieve a layer of uniform thickness
	• measures shall be taken to protect all areas susceptible to erosion by installing temporary and permanent drainage work as soon as possible
	  o where natural water flow-paths can be identified, subsurface drains or suitable surface drains and chutes need to be installed
	• additional measures shall be taken to prevent surface water from being concentrated in streams and from scouring slopes, banks or other areas
	• runnels or erosion channels developing shall be back-filled and restored to a proper condition
	  o such measures shall be effected immediately before erosion develops at a large scale
		Contractor, ECO to control	As necessary

Revegetation	• revegetation of the final prepared area is expected to occur spontaneously to some degree where topsoils could be re-applied within 6 months • rescued Aloes should be planted on newly landscaped soils for stabilisation and initiate further nature revegetation	Contractor, ECO to control	As necessary
	Planting of species • geophytic plants shall be planted in groups or as features in selected areas • during transplanting care shall be taken to limit or prevent damage to roots • plants should be watered immediately after transplanting to help bind soil particles to the roots (or soil-ball around rooted plants) and so facilitate the new growth and functioning of roots	Contractor, ECO to control	As necessary

Activity / issue	Action required	Responsible party	Frequency
	Traffic on revegetated areas • designated tracks shall be created for pedestrian of vehicle traffic where necessary • Disturbance of vegetation and topsoil must be kept to a practical minimum, no unauthorised off road driving will be allowed		
Monitoring and follow-up treatments	Monitor success of rehabilitation and revegetation and take remedial actions as needed according to the respective plan • Erosion shall be monitored at all times and measures taken as soon as detected • Where necessary, reseeding or replanting will have to be done if no protective plant cover has been created	ECO during construction, suitable designated person / contractor after that	As necessary
	Weeding • It can be anticipated that invasive species and weeds will germinate on rehabilitated soils o These need to be hand-pulled before they are fully established and/or reaching a mature stage where they can regenerate o Where invasive shrubs re-grow, they will have to be eradicated according to the Working for Water specifications	Contractor	As necessary

6.4 Operational Phase EMPr

Overall Goal: To ensure that the operation of the proposed facility does not have unforeseen impacts on the environment and to ensure that all impacts are monitored and the necessary corrective action taken in all cases. In order to address this goal, it is necessary to operate the facility in a way that:

- Ensures that operation activities are properly managed in respect of environmental aspects and impacts.
- Enables the proposed facility operation activities to be undertaken without significant disruption to other land uses in the area, in particular with regard to traffic and road use, and effects on local residents.
- Minimises impacts on fauna using the site.

An environmental manager must ensure the implementation of the operational EMPr

Table 5: Operational Phase

Activity / issue	Action required	Responsible party	Frequency
Protection of Sensitive Environments and Natural Features	Alien species of vegetation should be removed from any working areas and the site camp(s). Alien vegetation species should also be eradicated when they begin to establish themselves in disturbed areas (disturbance of the natural vegetation will encourage the establishment of invasive species). In order to discourage the spread of alien species, soil should not be moved from one part of the site to another without the consent of the ECO.	ELO, Contractor, ECO	As necessary
	A monitoring programme should be implemented to enforce the continual eradication of alien and invasive species, especially along wetland and areas corresponding of primary grassland.	Developer	As necessary
	Checks must be carried out at regular intervals to identify areas where erosion is occurring. Appropriate remedial actions, including the rehabilitation of the eroded areas are to be undertaken.	Developer	As necessary

Activity / issue	Action required	Responsible party	Frequency
Protection of Indigenous natural vegetation, fauna	Vehicle movements must be restricted to designated roadways.	Developer	Continuous
	No disturbance of vegetation outside of the project site must occur.	Developer	Continuous
	Existing roads must be maintained to ensure limited erosion and impact on areas adjacent to roadways.	Developer	Continuous
	An on-going alien plant monitoring and eradication programme must be implemented, where necessary.	Developer	Continuous
Protection of avifauna	Maintain bird flappers to new lines in identified sensitive Areas	Developer	Continuous
	Maintain insulation of live components at support structures.	Developer	Continuous
Maintenance of rehabilitation	Rehabilitate disturbance areas should the previous attempt be unsuccessful.	Developer	Continuous
	Maintain erosion control measures implemented during the construction phase (i.e. run-off attenuation on slopes (sand bags, logs), silt fences, storm water catch-pits, and shade nets).	Developer	Continuous
Health & Safety	An emergency plan (including fire management) must be developed and implemented. Ensure that all fire extinguishers are replaced on or before their expiry dates.	Developer	Continuous
	Site Safety checks should be carried out in accordance with the pertinent Occupational Health and Safety requirements prior to site closure.	Developer	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Telephone numbers of emergency services shall be posted conspicuously in the office for use in emergency situations	Developer	Continuous
Social impacts	Conditions stipulated by property owners in terms of the construction activities should be implemented and monitored.	Developer	Continuous
	Where local skills are not available for the operation and maintenance of the line, Eskom should consider capacity building and training to ensure that locals are employable.	Developer	Continuous
	Careful consideration should be given to the tower designs in order to minimise impacts on existing structures and activities on affected properties.	Developer	Continuous
	It is recommended that Eskom implements a skills audit and develops a skills database.	Developer	Continuous
	Maintenance work to be undertaken should adhere to the guidelines and recommendations as stipulated for the construction phase.	Developer	Continuous
	• Maintenance work to be undertaken should adhere to the guidelines and recommendations as stipulated for the construction phase. • The school's governing body should be contacted in the event of maintenance and emergency work • A fire prevention and management plan must be implemented	Developer	Continuous
	A fire prevention and management plan must be implemented	Developer	Continuous
	Maintenance schedules should be communicated to the affected property owners, prior to maintenance being undertaken.	Developer	Continuous
Limit impacts on	• Storm water should be managed according to the Eskom Guidelines for Erosion Control and Vegetation Management.	Developer	Continuous

Activity / issue	Action required	Responsible party	Frequency
watercourses	• Stormwater should not be released into the wetlands river or their buffer zone • Control of alien invasive plants should form part of the maintenance plan • In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) must be informed immediately and corrective action taken • Management of point discharges • Pollution control • Maintenance activities should follow best practice • Monitoring for downstream degradation • Apply best practice methods and the mitigation measures specified above for the construction phase		
Minimisation of visual	• Avoidance	Developer	Continuous

Activity / issue	Action required	Responsible party	Frequency
impacts associated with operation	* Relocation of the Diepsloot East Substation will minimise its visual impact considerably. A potential site could be considered west of the R511 near the southern tip of Diepsloot settlement. A small quarry and light industrial activities are operated in this region. The properties are well screened by mature trees and very few sensitive observers will be affected. * An alternative site for the Bluehills Substation may be considered directly next to the existing Minerva Substation. This will keep the electrical infrastructure in close proximity to each other and minimise the extent of impacts to more sensitive areas. * A rerouting of a portion of the overhead power line between Lulamisa Substation and the southern tip of Diepsloot may be considered along the existing power line servitude 400 m west of the proposed routes. This will keep power lines in the same corridor. * The rerouting of the underground cable may be considered east on Summit Rd and south on the R55 to Valley Rd. This will keep the trenching within the road servitude and avoid cutting across other private properties. This is also a shorter route of 4.3 km. * 1.5. All suggested alternatives would have a lower visual impact, but new servitude and site negotiations will be required. It also has to be measured against its feasibility and will require a separate assessment process.		

Activity / issue	Action required	Responsible party	Frequency
	• Reduction o The consolidation of power lines in parallel servitudes is highly recommended. Cumulative impacts are considered a probability and parallel power lines will increase the visual dominance of electrical infrastructure. However, it is considered more acceptable to consolidate parallel power lines in one corridor than have numerous power lines in parallel or spread out over a larger area. o Location of the substation adjacent to other existing substations is considered an appropriate mitigation measure as this prevents substations scattered across the landscape. This will concentrate the impact in one location instead of spreading it out over a larger area. o Keep to the minimum number of directional changes to limit the number of strain towers to be used. Strain towers are considered the most visually intrusive due to their larger visual footprint.	Developer	Continuous
	• Remediation o Establish screen planting around the substation site to reduce its visual intrusiveness and to camouflage its presence. Appoint a qualified person such as a Landscape Architect, to propose where screen planting will be most effective and what species of plants should be established. o Treat the steel members of the transmission towers with a low gloss, galvanized paint to mitigate the initial shiny appearance of a new tower.	Developer	Continuous
	• Compensation o Negotiate with the landowners adjacent to the substation sites to establish screen planting on their properties to conceal the substations if planting on the substation site is not viable.	Developer	Continuous
	• Enhancement o Correspond with the local municipality to add additional street trees along the servitude. In time, it will conceal parts of the line and it will enhance the streetscape, adding to the established residential character.	Developer	Continuous

7. MONITORING PROGRAMME

OBJECTIVE: Monitor the performance of the control strategies employed against environmental objectives and standards

The monitoring programme proposes to include:

- Establishing a baseline through the taking of photographs of identified environmental aspects and potential impacts on the watercourse prior to construction
- Bi-weekly monitoring during the first month where after monthly audits will be conducted by the Environmental Control Officer to ensure compliance to the EMP conditions, and where necessary make recommendations for corrective action. These audits can be conducted randomly and do not require prior arrangement with the Project Manager.
- Compilation of an audit report with a rating of compliance with the EMP. The ECO shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable. All claims for compensation emanating from damage should be directed to the ECO for appraisal.
- The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the Landowners or community. All complaints / claims shall be handled immediately to ensure timeous rectification / payment by the responsible part.

The above monitoring should also integrate wetland fauna and flora monitoring as set out here. Monitoring refers to the repetitive and continued observation, measurement and evaluation of environmental criteria to follow changes over a period of time and to assess the efficiency of control measures. The monitoring plan aims to establish whether rehabilitation was successful, whether maintenance or related activities have impacts and whether the constructed infrastructure have detrimental impacts on the watercourses after construction (**please refer to the rehabilitation and monitoring plan in Appendix D7**).

7.1 Method of Monitoring

The independent ECO will ensure compliance with the EMPr, and will conduct monitoring activities. The ECO will undertake site inspections on a monthly basis or as specified in the environmental authorisation once issued. The ECO will report all non-compliances to the Site Manager and submit such reports to DEA

Once-off Monitoring:

- On completion of construction activities, monitoring should be done in order to record compliance with the targets set out in the EMP and to highlight any areas where further action is required in terms of rehabilitation or routine monitoring

Routine Monitoring:

- Seasonal monitoring: rehabilitation success, as well as signs of erosion, sedimentation and the presence of alien vegetation should be monitored twice during the summer months: once at the start and once at the end of the rainy season. This should be continued for at least three years after construction of the rehabilitation structures was completed.

- Rapid monitoring: For the first two years, monitoring should take place immediately after heavy rainfall to ensure that rehabilitated areas are intact and that no erosion and subsequent sedimentation took place.
- Annual monitoring: after three years, provided that all rehabilitation where found to be successful and no additional problems arose, monitoring can take place once a year after the first seasonal rainfall.

Problems such as failed re-vegetation and erosion should be remediated as soon as it is recorded in the monitoring process. Corrective action should be taken and can include the re-initiation of rehabilitation in severe cases or by correction of the problem. If problems arise due to the cable infrastructure that was not pre-empted in this plan, an engineer, wetland and vegetation specialist should be consulted as soon as possible.
It is recommended that fixed point photography is used to monitor vegetation and soil stability. This involves taking pictures of the areas monitored from the same point during each monitoring event. The images can be compared and serves as a record of the success of rehabilitation or the failure thereof.

7.2 Non Conformance Report

All supervisory stuff and ECO must be provided a means to be able to submit a non-conformance report to the site manager. The non-conformance report will describe in detail, the cause and effect of any environmental non-conformance by the contractor. Records of penalties may be required by the Authorities within 48 hours. The non-conformance report will be updated upon completion of the corrective measures indicated on the finding sheet. The report must indicate that remediation measures have been implemented timeously and that the non-conformance can be closed out to the satisfaction of the site manager and ECO.

7.3 Monitoring Reports

A monitoring report will be compiled by the ECO on a monthly basis and must be submitted to DEA for their records. This report should include details of the activities undertaken in the reporting period, any non-conformances or incidents recorded if any, corrective action required, and details of those non-conformances or incidents which have been closed out.

7.4 Final Audit Report

A final environmental audit report must be compiled by an independent auditor and be submitted to DEA upon completion of the construction and rehabilitation activities (within 30 days of completion of the construction phase (i.e.: within 30 days of site handover) and within 30 days of completion of rehabilitation activities. This report must indicate the date of the audit, the name of the auditor and the outcome of the audit in terms of compliance with the environmental authorisation conditions and the requirements of the EMPr

8. CONCLUSION

Provided this project is mitigated, as per the EMPr, the project will result in limited negative environmental impacts that can be mitigated through implementation of this EMPr. It is the applicant's responsibility to ensure that this EMPr is made binding on the contractor by including the EMPr in the contract documentation. The contractor must thoroughly familiarise himself with the requirements of the EMPr and appoint an environmental liaison officer (ELO) to oversee the implementation of the EMPr on a day-to-day basis.

Parties responsible for transgression of this EMPr should be held responsible for any rehabilitation that may need to be undertaken. Parties responsible for environmental degradation through irresponsible behaviour/negligence should receive penalties.

Key issues

- The Contractor and Developer must continuously apply all the relevant requirements by the OHSA Act and other legislations;
- Proper warning tape (e.g. orange danger nets) must be erected to inform public of the inherent dangers; and
- Should blasting activities be required on certain areas during foundations excavations, it is important that the relevant permits be obtained and that the adjacent landowners are informed of these planned activities five days in advance and that site notices informing the public are strategically placed at visible locations.

Should any additional recommendations or mitigation measures be reported during the review period of the Draft Basic Assessment Report and this EMPr, such additions will be added to the Draft EMPr that will be submitted along with the Final BAR.

APPENDIX A: AN EXAMPLE OF INCIDENT AND ENVIRONMENTAL LOG

ENVIRONMENTAL INCIDENT LOG				
Date	**Env. Condition**	**Comments** *(Include any possible explanations for current condition and possible responsible parties. Include photographs, records etc. if available)*	**Corrective Action Taken** (*Give details and attach documentation as far as possible)*	**Signature**

COMPLAINTS RECORD SHEET	**File Ref:** **Page of ….**	**DATE:** ……
COMPLAINT RAISED BY:		
CAPACITY OF COMPLAINANT:		
COMPLAINT RECORDED BY:		
COMPLAINT:		
PROPOSED REMEDIAL ACTION:		
ECO: _____ Date: _____		
NOTES BY ECO:		
ECO: _____ Date: _____ Site Manager: _____ Date: _____		