Environmental Management Programme

CROCODILE RIVER SUBSTATION AND POWERLINE

MAY 2018

MDARDLEA REF: 1/3/1/16/1E - 149

Notice no. R 983, 2014: Activity 11, 12.

Notice no. R 985, 2014: Activity 14.

ENPACT ENVIRONMENTAL CONSULTANTS CC
REG. 2004/051532/23

PROJECT DETAILS						
TITLE:	Croc River Substation and Powerline					
REPORT STATUS:	Environmental Management Programme					
LOCATION:	The Remaining Extent of Portion 14 of the farm Boschrand 283 JT, The Remaining Extent of farm Riverside 308 JT, Portion 1 of the farm Riverside 308 JT and Erven 7, 8, 10, 11, and 29 of Mataffin, Mpumalanga. The secondary substations will be located on Riverside Park Ext 27&29.					
COORDINATES:	**Latitude (S):**			**Longitude (E):**		
Start	25°	28'	02.60"	30°	55'	48.97"
End	25°	26'	30.41"	30°	56'	59.43"
EAP:	Enpact Environmental Consultants CC PO Box 12027, Nelspruit, 1200 Tel: 064 870 4968 E-mail: info@enpact.co.za					
PROGRAMME COMPILED BY:	Maryke André Enpact Environmental Consultants CC E-mail: info@enpact.co.za					
REVIEWED BY:	Heinrich Kammeyer Enpact Environmental Consultants CC E-mail: heinrich@enpact.co.za					
APPLICANT:	**City of Mbombela Local Municipality**					
PROGRAMME PREPARED FOR SUBMISSION TO:	**Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs: DARDLEA** The Directorate: Environmental Impact Management					
DATE OF COMPILATION:	**May 2018**					
ACTIVITIES APPLIED FOR:	Notice no. R 983, 2014: Activity 11 and 12. Notice no. R 985, 2014: Activity 14.					
MDARDLEA REFERENCE NUMBER:	1/3/1/16/1E - 149					

EAP EXPERTISE	
Maryke André	Maryke André is employed by Enpact Environmental Consultants CC and has 10 years with this company. Qualifications include a Btech Nature Conservation degree. Experience in Environmental Impact Assessments spans a wide range of projects including residential and business developments, tourism developments, infrastructure projects (roads, water, sewer and renewable power generation), concentrate farming and waste management facilities. She also deals extensively with the compilation of waste management and water use licence applications.
Heinrich Kammeyer	Heinrich Kammeyer is the owner of Enpact Environmental Consultants CC. Qualifications include a degree in Chemical Engineering, MBL and Masters Environmental Engineering (Cum laude). The Environmental Consulting Business which was started in 2004 has completed more than 150 Environmental Impact Assessment Applications to date. Experience in Environmental Impact Assessments, over the past 14 years, spans a wide range including residential and business developments, tourism developments, roads, water and sewer, renewable power generation, concentrate farming and waste management facilities. In addition he also has extensive experience in waste management licences as well as water use licence applications.

Table of content

List of tables

Appendixes:	
Appendix 1:	**Site plan**
Appendix 2:	**Environmental Authorisation**

Abbreviations:	
EA:	**Environmental Authorisation**
EIA:	**Environmental Impact Assessment**
ECO:	**Environmental Control Officer**
EMPr:	**Environmental Management Programme**
MDARDLEA:	**Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs**
NEMA:	**National Environmental Management Act**

Definitions:

Environmental Management Programme (EMPr): An EMPr is an environmental action plan or tool used to ensure that undue or reasonably avoidable adverse impacts of an activity are prevented, and that positive impacts are enhanced. It thus addresses the how, when, who, where and what of integrating environmental mitigation and monitoring measures through the project development activities.

Alien Vegetation: alien vegetation is defined as undesirable plant growth which will include, but not be limited to all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA), 1983 regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.

Environment: environment means the surroundings within which humans exist and that could be made up of the following:

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

Environmental Aspect: an environmental aspect is any component of the construction activity that is likely to interact with the environment.

Environmental Impact: an impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.

Environmental Authorisation: an environmental authorisation is a written statement from the Department of Agriculture, Rural Development, Land and Environmental Affairs, (MDARDLEA), which records its approval of a planned activity and the conditions of approval which may include mitigating measures required to prevent or reduce the effects of environmental impacts during the life of an activity.

Watercourse: means –

(a) river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, pan or lake or dam into which , or from which water flows; and any collection of water which the Minister ay, by notice in the Gazette, declare to be a watercourse as defined in the National Water Act, 1998 (Act No. 36 of 1998)

Environmental Management Programme
CROC RIVER SUBSTATION AND POWERLINE

1. INTRODUCTION

Enpact Environmental Consultants CC was appointed by the applicant to compile the Environmental Management Programme (EMPr) as part of the Environmental Impact Assessment Report for the proposed construction of a substation and powerline.

This EMPr complies with the requirements in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and the 2014 EIA Regulations as amended.

The Environmental Management Programme prescribes and directs the management of all environmental aspects, physical, natural and/social associated with and arising from the activities that meets the thresholds of activities listed under the EIA Regulations.

This Environmental Management Programme sets out the methods and guidance by which proper environmental controls are to be implemented to minimise and remediate environmental damage.

The EMPr must be read as a whole and complete document. The provisions of this EMPr are binding on the Holder of the Authorisation during the life of the activities. The EMPr must be read in conjunction with the conditions of the Environmental Authorisation for the specific project. In the event that any conflict occurs between the terms of the EMPr and the project specifications or environmental authorisation, the terms herein shall be subordinate.

The EMPr identifies the following:
- Construction activities that will impact on the environment.
- Relevant parties and their responsibilities
- Specifications with which the Holder of the Authorisation shall comply in order to protect the environment from the identified impacts.
- Actions that shall be taken in the event of non-compliances.

2. PROJECT OVERVIEW

It is proposed to construct a 132kV powerline from the Matsafeni substation to a new a substation that will accommodate 4 x 20 MVA transformers in order to provide electricity to the Fresh Produce Market and other Riverside Townships such as Ext. 27 & 29 west of the existing Riverside Industrial Park.

The new powerline will follow the existing tar roads as far as possible until it deviates from the roads to the proposed substation. An existing dirt road to the Croc River substation will be upgraded and paved as access.

The line will mostly be fixed to round self-supporting steel poles but where height or distance requires it, lattice type structures will be used for example at the crossing of the Crocodile River. Both of these structures will be bolted to concrete foundations. Footprints will not be more than 15m x 15m.

The new substation site is located on an old sport field and is transformed.

The line will be approximately 4,5 km in length. The construction period is expected to be 12 months.

Various potential environmental aspects and impacts have been identified and considered in the EIA Report to be submitted to MDARDLEA in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998).

The following table sums up the activities applied for:

R.983, 2014: Activity 11 – The development of facilities or infrastructure for the transmission and distribution of electricity— (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts; excluding the development of bypass infrastructure for the transmission and distribution of electricity where such bypass infrastructure is — (a) temporarily required to allow for maintenance of existing infrastructure; (b) 2 kilometres or shorter in length; (c) within an existing transmission line servitude; and (d) will be removed within 18 months of the commencement of development.	▪ The construction of an electrical substation and a 132kV powerline between the following points: • 25˚28'02.60"S 30˚55'48.97"E • 25˚26'30.41"S 30˚56'59.43"E
R.983, 2014: Activity 12 - The development of—(ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs—(a) within a watercourse; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding — (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves.	▪ The construction of a 132kV powerline where pylon/pole footprints will be 15m x 15m within or close to identified water resources where the alignment falls outside an urban area and outside the road reserve.
R.985, 2014: Activity 14 – The development of — (ii) infrastructure or structures with a physical footprint of 10 square metres or more; where such development occurs — (a) within a watercourse; (c) if no Development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse f. Mpumalanga - i. Outside urban areas: (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	▪ The construction of a 132kV powerline where the alignment will entail pylon/pole footprints of 15 x 15m within or close to identified water resources and where it falls within areas classified as Ecosystem Support Areas under the MBSP 2014 that can fall under ecosystem services areas.

The EMPr as a guideline document sets out what needs to be considered to mitigate identified potential impacts and describes how this could be achieved. It is therefore not a specification of exact methods. The document provides a basis for managing, mitigating and monitoring the

environmental impacts associated with all phases of the project in terms of NEMA, 1998 (Act No. 107 of 1998).

3. LEGAL REQUIREMENTS

Construction will be according to the best industry practices, as identified in the project documents. This EMPr, which forms an integral part of the contract documents, informs the Holder of the Authorisation as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project.

The Holder of the Authorisation should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications then the latter shall prevail.

Statutory and other applicable legislation

The Holder of the Authorisation is deemed to have made himself conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the project.

Major environmental legislation includes but is not limited to the following:

The Conservation of Agricultural Resources Act (CARA), 1983 (Act No. 43 of 1983) provides for control over the utilisation of the natural agricultural resources of South Africa in order to promote the conservation of soil, water sources and vegetation, as well as combating weeds and invader plants.

Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.

The Constitution, 1996 (Act No. 108 of 1996), which states that everyone has the right to an environment that is not harmful to their health or well-being, and to have the environment protected through reasonable legislative and other measures to prevent pollution and ecological degradation; promote conservation and ensure ecologically sustainable development and use of natural resources.

The National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998), which provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and provide for matters connected therewith. The most recent Environmental Impact Assessment Regulations that were promulgated in terms of this Act was in 2014.

Environmental Regulations in Terms of Chapter 5 of NEMA, 1998, Regulations R982, R983 and R984 of 2014 (as amended) describing the procedures and criteria for the submission, processing and consideration and decision of applications for environmental authorisation for activities and for matters pertaining thereto.

The Mpumalanga Conservation Act, 1998 (Act No. 10 of 1998), consolidate and amend the laws relating to nature conservation within the Province and to provide for matters connected therewith.

National Water Act, 1998 (Act No. 36 of 1998), makes provision for the protection of surface water and groundwater and their sustainable management for the prevention and remediation of the effects of pollution, as well as for the management of emergency situations.

National Veld and Forest Fire Act, 1998 (Act No. 101 of 1998), the purpose of this Act is to prevent and combat veld, forest and mountain fires. The applicant must be aware of the duty on owners to prepare and maintain firebreaks irrelevant of the applied for activities or the proposed land use.

The National Heritage Resources Act, 1999 (Act No.25 of 1999), to introduce an integrated and interactive system for the management of the national heritage resources; to promote good government at all levels, and empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations.

Promotion of Access to Information Act (Act No. 2 of 2000), to give effect to the constitutional right of access to any information held by the state and any information that is held by another person and that is required for the exercise or protection of any rights; and to provide for matters connected therewith.

National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) makes provisions to accomplish the objectives of the United Nations' Convention on Biological Diversity.

National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004), provides reasonable measures for the prevention of pollution and ecological degradation; and provides for specific air quality measures; for national norms and standards regulating air quality monitoring, management and control by all spheres of government.

National Environment Management: Waste Act, 2008 (Act No. 59 of 2008), aims to regulate waste management practices through provision of national norms and standards; specific waste measures; licensing and control of waste activities; remediation of contaminated land; as well as providing for compliance and law enforcement.

4. ENVIRONMENTAL MANAGEMENT AND RESPONSIBILITIES

The implementation of this EMPr requires the involvement and cooperation of all the role players involved in the project. Each will fulfil different but important roles as outlined in this document to ensure sound environmental management during the project specifically the construction phase. The holder of the authorisation will be responsible for implementation of the measures during the operational phase.

This EMPr includes conditions that must be specifically monitored and/or implemented by the following role players:

Table 1: Typical roles and responsibilities

Roles/Party	Responsibility
Competent Authority	The Mpumalanga Department of Agriculture, Rural Development, Land and Environmental Affairs (MDARDLEA) is the designated authority responsible for authorising and enforcing the EMPr.
Holder of the Authorisation	The Holder of the Authorisation is ultimately responsible for compliance with the conditions as set out in the approved EMPr and authorisation in order to comply with environmental legislation. Duties include: a) Responsible for compliance with the provisions of the Duty of Care and Rehabilitation of Environmental Damage contained in Section 28 of the NEMA;

Roles/Party	Responsibility
	b) Ensuring that the necessary environmental authorisations and permits have been obtained; c) Finding environmentally responsible solutions to activity related environmental problems and following all guidelines as set out in the EMPr; d) Issuing instructions to the builder where environmental considerations call for action to be taken; e) Instituting action against transgressions i.e. instituting a fine system, including ordering the removal of person(s) and/or equipment not complying with the EMPr specifications.
Environmental Control Officer (ECO)	An independent appointment by the Holder of the Authorisation to objectively monitor/audit the implementation of the EMPr and the conditions of the authorisation for a particular project during the construction period/specified period through audits conducted at a specified frequency. The ECO must remain employed until all rehabilitation measures as well as the site clean-up is completed and the site is handed over to the Holder of the Authorisation for operation. The ECO must have the necessary expertise or access to specialist input as may be required for the size and environmental sensitivity of a particular project, and shall give recommendations and communicate effectively with the other role-players. Duties of the ECO includes: a) Keep a copy of the Environmental Authorisation and all applicable permits, licences on site. b) Establish an effective environmental control program and routine management, liaison and reporting systems and prepare management reports. c) Audit the site at least once a month or on a frequency as specified in the authorisation. Reports must be made available on request to Interested and Affected Parties and as specified in the Authorisation to the MDARDLEA. d) Advise the Holder of the Authorisation on environmental issues or incidents during implementation of the EMPr and advise them of actions required. The results are to be included in the monthly report. e) Ensure continuous auditing of the activities during all phases for adherence to the EMPr. f) Identify problem areas and provide action plans to avoid further environmental damage. g) Review the contractors proposals for pollution control measures and advise on their adequacy. h) Ensure that any significant environmental incidents are reported to the MDARDLEA. i) Keep a site dairy (record complaints received on site and resolutions thereto, non-compliances as well as instructions) and copies of all environmental reports submitted to the MDARDLEA. Complaints shall be investigated within 24 hours, corrective action implemented and feedback should be give to the complainant on the remedial action taken. j) Ensure that open communication lines exist to receive and resolve any problems or complaints from the public.

Specific implementation and monitoring roles are highlighted in the environmental mitigation table.

5. ENVIRONMENTAL AWARENESS PLAN AND TRAINING

The Holder of the Authorisation shall ensure that adequate environmental training takes place. All employees must have been given an induction presentation on environmental awareness to understand the obligations in terms of the EMPr.

Where possible, the presentation needs to be conducted in the language of the employees.

The Environmental Control Officer must with the holder of the authorisation put together a plan that aims to:

- Inform all the staff/workers of the environment they will work in and the sensitivity with regards of certain areas and/or aspects;
- Explain certain aspects and the general measures that should be implemented in order to meet the requirements of the EA and EMPr.
- Training must be recorded and an attendance register kept.

6. REPORTING AND RECORD KEEPING

The Holder of the Authorisation must programme his work in such a way that the cause and effect of the authorised activity is identified and the activity planned so as to prevent any impact from happening.

Where prevention is not practicable or in the event of accidents or misapplications, the Holder of the Authorisation shall provide plans and measures, which will limit the magnitude, duration and intensity of the impact.

The ECO shall review the environmental management performance of the Holder of the Authorisation on a regular basis. The party shall be deemed not to have complied with the EMPr if:

- There is evidence of the contravention of any of the conditions of the EMPr.
- The person fails to comply with corrective or other instructions by the Environmental Control Officer.
- The person fails to respond to complaints from the public.
- The staff is found removing vegetation, entering neighbouring areas or cause disturbances due to unacceptable behaviour.

The ECO should document the nature and magnitude of the non-compliance in a designated register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions.

The Holder of the Authorisation shall advise the ECO of any emergencies on Site, together with a record of action taken, within 24 hours of the emergency occurring. Such emergency shall be reported to the holder of the EA.

Any non-compliance with the agreed procedures of the EMPr is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Failure to redress the cause shall be reported to the relevant authority. The responsible provincial or national authorities shall ensure compliance and impose penalties relevant to the transgression as allowed for within its statutory powers.

Table 2: Typical task table

Responsible party	Task	Frequency
Holder of Authorisation	Visual Inspections	Daily
Environmental Control Officer	Site Inspections and Compliance Audits	Monthly
	Environmental Audit Reports	Monthly or as prescribed by the EA

7. PROJECT ACTIVITIES AND MANAGEMENT STATEMENTS

The EMPr addresses the construction phase, specifically impacts related to the aquatic and terrestrial environment.

General measures are prescribed for the activities, which will entail that some potentially occurring impacts are minimised or prevented.

Decommissioning is not foreseen in the near future.

The following activities are anticipated with the proposed activity:

- Vegetation clearance, earthworks, trenching and cement and concrete mixing for preparation of the substation yard;
- Vegetation clearance where required for erection of the powerline poles;
- Small footprint earthworks and cement work or concrete mixing for powerline poles;
- Erection of poles and
- Installation of powerline via aircraft.

Table 3: Summary of the activities, aspects and impacts/risks that need to be avoided and/or mitigated

Activities and management aspects		Aspects	*Potential* impacts
1.	Planning • Demarcation of areas to be cleared	➢ Site demarcation	➢ Loss of and disturbance of ground cover, indigenous vegetation and creation of hard surfaces ➢ Potential loss of conservation important species ➢ Loss of topsoil and impact on soil conditions
2.	Site clearance • Clearance of vegetation from demarcated areas	➢ Vegetation loss ➢ Removal of groundcover ➢ Disturbance of soils ➢ Creation of hard surfaces ➢ Air emissions (Dust) ➢ Generation of waste (removed vegetation)	➢ Loss of ground cover and vegetation ➢ Potential loss of conservation important fauna/flora ➢ Impoverishment/degrading/fragmentation of riparian habitat and aquatic environment ➢ Surface and ground water pollution ➢ Air pollution
3.	Heritage resource management and protection • Heritage/archaeological site/s	➢ Potentially destroy/demolish unidentified sites of heritage or cultural importance	➢ Loss of heritage/culturally important sites
4.	Fauna and flora management • Removal of vegetation and potentially fauna • Alien vegetation control	➢ Removal of vegetation ➢ Removal of protected fauna and flora ➢ Earthworks ➢ Alien vegetation control	➢ Further fragmentation and loss of habitat ➢ Loss of conservation important species ➢ Loss of fauna & flora and onsite biodiversity ➢ Degradation of terrestrial ecosystems ➢ Increase in the invasion of alien vegetation
5.	Soil management • Soil disturbance	➢ Exposing of soil surfaces ➢ Creation of hard surfaces	➢ Loss of topsoil ➢ Soil pollution ➢ Erosion and siltation ➢ Surface water pollution
6.	Water management • Surface and storm water management	➢ Earthworks ➢ Discharge of storm water and or polluted surface water into receiving environment ➢ Erosion protection measures ➢ Pollution control measures	➢ Surface water pollution (quality and quantity) ➢ Impacts on downstream receiving environment and aquatic environment ➢ Erosion and sedimentation
7.	Air quality • Clearing activities and general construction	➢ Dust emissions	➢ Air pollution
8.	Noise management • Construction equipment and	➢ Noise generation from construction activities	➢ Noise pollution ➢ Change in ambient noise level

Activities and management aspects		Aspects	*Potential* impacts
	machinery • Construction activities		
9.	Waste management • Removed vegetative material • Concrete and cement mixing	➢ Handling of removed vegetation and ground cover ➢ Disposal of construction waste	➢ Pollution of environment ➢ Health and safety risks ➢ Visual impact
10.	Health, Safety and security • People movement, construction vehicles • Construction	➢ Increase in people movement to site and area ➢ Working with construction equipment/machinery ➢ Construction activities, soil movement	➢ Safety risk to construction workers
11.	Alien plant control, stabilisation of affected areas • Alien plant control • Erosion and sedimentation control	➢ Removal of alien plant vegetation ➢ Stabilising of unprotected soil surfaces	➢ Negative impacts on receiving environment ➢ Loss of topsoil ➢ Surface water pollution ➢ Erosion and sedimentation

Table 4: Impact Significance summary identifying the impacts and risks that need to be avoided and/or mitigated

IMPACT ASSESSMENT TABLE							
Impact description	**Period**	**Extent**	**Duration**	**Intensity**	**Probability**	**Significance pre-mitigation**	**Significance post mitigation**
Air (dust) pollution	Construction	Site	Short	Low	Probable	Very Low	Very Low
Erosion and sedimentation	Construction	Site	Short	Low	Unlikely	Low	Very Low
Soil contamination	Construction	Site	Short	Low	Unlikely	Medium	Low
Erosion and sedimentation	Operation	Site	Long	Medium	Unlikely	Low	Very Low
Oil contamination of soil	Operation substation	Site	Long	High	Unlikely	High	Low
Surface water pollution	Construction	Site	Short	Low	Probable	Medium	Low
Surface water pollution	Operation	Site	Long	Medium	Unlikely	Very Low	Very Low
Disturbance of seepage wetlands	Construction	Site	Short	Low	Unlikely	Low	Very Low
Disturbance of valley bottom wetland (alternative sub site)	Construction	Site and local	Short	Medium	Definite	Medium	Medium
Disturbance of valley bottom wetland (alternative sub site)	Operation	Site and local	Long	Medium	Definite	High	High-Medium
Disturbance of Croc River riparian zone – preferred	Construction	Site	Short	Low	Unlikely	Medium	Low

alignment							
Disturbance of Croc River riparian zone – alternative route	Construction	Site	Short	Medium	High	High	High
Degradation of a Critically Endangered vegetation type	Construction	Site	Short	Medium	Unlikely	Low	Very Low
Degradation of an Endangered vegetation type	Construction	Site	Short	Medium	Unlikely	Low	Very Low
Degradation of vegetation communities with High Biodiversity Value – preferred alignment	Construction	Site	Short	Medium	Unlikely	Low	Very Low
Degradation of vegetation communities with High Biodiversity Value – alternative alignment	Construction	Site	Short	Medium	High	Medium	Medium
Loss or damage of plant species of conservation importance – preferred alignment and sub	Construction	Site	Short	Low	Unlikely	Low	Very Low
Loss or damage of plant species of conservation importance – alternative sub	Construction	Site	Short	Medium	High	High	Medium
Degradation of watercourses	Construction	Site	Short	Low	Unlikely	Low	Very Low
Invasion of natural habitat by alien plants	Construction	Local	Short	Medium	Probable	Medium	Low
Loss of habitat for conservation-important fauna	Construction	Site	Short	Medium	Unlikely	Very Low	Very Low
Increase in poaching activities	Construction	Local	Short	Medium	Probable	Medium	Medium-Low
Powerline collisions and electrocutions	Operation	Local	Long	Medium to high	High	High-Medium	Low
Visual impact	Construction	Site	Short	Low	Probable	Low	Very Low
Visual impact	Operation	Local	Long	Low	Definite	Low	Low
Noise impact	Construction	Site	Short	Low	Probable	Low	Low
Traffic impact	Construction	Site	Short	Low	High	Low	Very low
Socio-economic impact (+) job opportunities	Construction	Local	Short	High	Definite	Medium (+)	Medium (+)
Social impact (+)	Operation	Regional	Long	Medium-High	High	Medium (+)	Medium (+)
Social impact (-)	Operation	Site	Long	Medium	Probable	Low	Very Low
Impact on heritage sites	Construction	Local	Short	Medium	Probable	Medium	Very Low
Safety and Security impact	Construction	Local	Short	Medium	Unlikely	Low	Low
Safety risks - labourers	Operation	Site	Long	Medium	Probable	Medium	Low

8. MANAGEMENT OBJECTIVES

The objectives of the EMPr and the mitigation measure proposed to be implemented are to ensure that the biophysical and social environments receive due consideration during the planning, construction and operational period. It will also outline guidelines for the sound management of environmental issues during these phases.

Some activities associated with the project needs to be subjected to certain conditions to become environmentally acceptable.

This document provides detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment. The measures prescribed aims to result in a cautious approach being applied to on-site environmental management to ensure prevention, minimising and remediation of potential impacts.

Furthermore, where opportunities arise to improve the biophysical and social environmental quality it should be investigated and implemented as appropriate (for example alien plant control, and erosion control).

The objectives of the EMPr are guided by the NEMA and EIA Regulations with the focus of ensuring sustainable development over the longer term.

A copy of the Environmental Authorisation and this EMPr must be available at the site at all times. Relevant staff must be acquainted with the contents of the documentation.

9. MANAGEMENT OUTCOMES

The EMPr should guide the Holder of the Authorisation and it should be implemented as an auditing list during the commencement of the authorised activities. Mitigation measures have been indicated for each management aspect or activity that may potentially result in impacts on the receiving environment. Refer to table 4 for the identified impacts and rated significance as well as the expected significance for each impact after mitigation is implemented.

Compliance with the EMPr should be monitored by the ECO and Department.

The management outcome of each identified measure is to prevent, minimise and/or remediate potential impacts to a degree that is environmentally acceptable.

10. PROJECT-SPECIFIC CONDITIONS

All the conditions as set out in the environmental authorisation is specific to this project and are to be read in conjunction with all other environmental documentation and permits.

The discovery of any sites with archaeological or historical interest that have not been identified must be treated as specified in the EMPr.

There are measures specific to the protection of the receiving environment. Implementation and monitoring of the proposed measures will ensure due consideration of the natural environment.

ENVIRONMENTAL MANAGEMENT MEASURES: CONSTRUCTION

*** Holder of authorisation can be represented by the contractor

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
1. Site establishment			
1.1 Construction camp and site offices Potential impacts: o Ecology o Noise o Air pollution o Ground water pollution o Surface water pollution o Traffic o Security o Health and Safety	▪ Only designated areas may be used for the storage of materials, machinery, and equipment, and for site office facilities. ▪ The site offices and other facilities must not be sited in close proximity to steep areas, as this will increase the potential for soil erosion. ▪ The offices, ablution facilities, stockpiles, spoil areas and hazardous material stockpiles must be located as far away as possible from any watercourse, and downstream of water bodies that might be present on the site. ▪ The Contractor must establish these facilities in a manner that does not adversely affect the environment. Facilities must be maintained in an orderly and tidy condition. ▪ Throughout the period of construction, the Contractor must restrict all activities to within the designated areas. ▪ The placement of equipment must be done in such a manner as to minimise the footprint and visual impact of the sites. ▪ Avoid the removal of any trees (except alien vegetation) within the confines of the site.	Contractor Engineer ECO	Start of project
1.2 General Potential impacts: o Health, safety impacts o Ecology, fauna and flora	▪ All reasonable steps to avoid unnecessary fires must be taken. ▪ Demarcate an area for cooking purposes for staff if required. ▪ Provide the necessary refuse bins with sealed lids at the eating area. Bins must be emptied on a regular basis at the domestic waste collection site. ▪ Bins must be animal proof and waste storage must not attract animals. ▪ Potable water for human consumption and personal hygiene must be available to workers.	Contractor ECO	Start and duration of construction
1.3 Fires Potential Impacts: o Ecology, fauna and flora o Health and safety impacts o Impacts on adjacent land users o Air quality decline	▪ All reasonable steps to avoid any fires must be taken. ▪ The contractor must be prepared for the event of a fire. ▪ The contractor must take all reasonable steps to extinguish any fires where other individuals may have started a fire, either intentionally or unintentionally. ▪ Burning of any wastes (vegetation, paper, plastics etc.) is strictly forbidden.	Contractor ECO	Start and duration of construction

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
1.4 Site clearing Potential impact: o Loss of aquatic/terrestrial ecology – important fauna and flora o Soil disturbances o Surface water pollution	▪ Utilise the method for vegetation clearing most appropriate for the environment. Use mechanical methods wherever possible. ▪ Disturbances must be strictly limited to the demarcated site. ▪ Obtain the necessary permits for the disturbance of species of conservation importance. ▪ Vegetative material must be appropriately stockpiled for redistribution over surfaces that need rehabilitation or show signs of erosion.	Contractor Engineer ECO	Start and duration of construction
1.5 Ablution facilities o Soil pollution o Surface water pollution	▪ If the existing ablutions are not adequate, provide portable chemical toilets at the construction site (1 toilet for 15 users). ▪ Chemical toilets must be emptied in the appropriate manner on a regular basis. Spillages will not be acceptable and the contents may only be disposed of into an acceptable sewage system. ▪ The use and maintenance of latrines in a clean, orderly and sanitary condition must be enforced. ▪ Ablutions must be screened.	Contractor ECO	Start and duration of project
1.6 Vehicles, access Potential Impacts: o Soil pollution o Surface water pollution o Ecology impacts	▪ Heavy vehicles may not cause unnecessary obstructions on any of the public roads. ▪ Activities must be well planned and monitored. ▪ The regulation of traffic during the construction period must adhere to all applicable legislation and regulations. The necessary signage must be in place. ▪ Speed limits for all vehicles to the site must be enforced during construction period. ▪ Contain fuel, oil or chemical spills, and arrange clean up in the event of spillage. ▪ Construction vehicles must be maintained to ensure that they do not emit excessive smoke or diesel fumes. ▪ Refuelling of construction vehicles must take place in dedicated areas on an impermeable hardened surface to prevent soil or water contamination, away from the water crossings. ▪ The servicing of any construction equipment and vehicles must be restricted to an approved workshop area preferably in the construction camp. ▪ No washing of vehicles in any streams or rivers. ▪ Ensure that drip trays are placed below fuel or oil leakages from parked construction equipment and construction vehicles to prevent the potential pollution of surface water run-off. ▪ The Contractor must make use of authorised existing roads and tracks. ▪ Where temporary access roads, especially over privately owned properties, are required, it must be approved. ▪ If temporary roads are approved these areas must be rehabilitated to a similar or better state after construction.	Contractor ECO	Start and duration of project

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
2.7 Storage areas for diesel and hazardous substances. Potential Impacts: o Soil pollution o Ground and surface water pollution o Safety risks (fire) o Health risks	▪ All hazardous materials must be stored in a secured, appointed area that is bunded, fenced and has restricted entry. In addition, hazard signs indicating the nature of the stored materials must be displayed on the storage facility or containment structure. ▪ The floors must be impermeable and adequate drainage from the bunded area must be provided. ▪ An emergency preparedness plan must be in place for implementation in case of leakage or spillage of any hazardous substance which can be harmful to an individual or the receiving environment. ▪ Soils contaminated by oils and lubricants must be collected and disposed of at a facility designated by the local authority to accept contaminated materials.	Contractor Engineer ECO	Start and duration of project
2. Heritage resource management and protection			
2.1 Archaeological sites o Loss of heritage sites	▪ Before construction of the substation starts a temporary fence must be erected around the graveyard to prevent construction workers from entering this area. ▪ The construction camp must not be located near the graveyard but rather west of the substation area. ▪ If any other site/s of cultural significance or heritage importance are discovered on site during the clearance, work must cease immediately in that area. The area must be secured and an archaeologist should be contacted. Construction may proceed in the relevant area once agreed mitigation measures have been implemented and approval from Heritage Resources Agency has been obtained. ▪ All discoveries shall be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken; ▪ Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site; and ▪ Contractors and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or palaeontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999).	Holder of Authorisation/ Contractor Archaeologist ECO	Start and duration of construction
3. Fauna and flora management			
3.1 Terrestrial ecology Potential impacts: o Removal of vegetation o Loss of sensitive or important plant species	▪ The sites and areas to be cleared must be demarcated. ▪ No vegetation destruction should take place within the Riparian Forest community as this vegetation type is classified as Critically Endangered and is listed as a Vulnerable Ecosystem. Powerlines crossing the Crocodile River should be placed above the forest canopy. ▪ Vegetation clearance should be kept to a minimum and clearing activities strictly controlled.	Contractor ECO	Start and duration of construction

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
○ Impacts on sensitive fauna ○ Erosion	▪ Natural areas where road, pylon or substation construction is planned should be checked by a suitably experienced botanist prior to construction to locate and move any conservation-important species. This includes the many Aloe species found in the northern section of the study area. ▪ The placement of pylons should be carefully considered in terms of vegetation destruction. No pylons should be placed within Wetland areas, and limited vegetation destruction should take place in the other sensitive vegetation communities. ▪ Workers/staff must be familiarised with the sensitivity of the area in general. ▪ Obtain the necessary permits and licences from DAFF or MTPA for the relocation or destruction of any protected trees or plants or animals. ▪ Translocation of conservation important plants within the impact footprints should be considered above destruction. Identified conservation important plants must be relocated to adjacent representative habitat. This should be done under the supervision of an experienced botanist / horticulturist. ▪ No wild animals may under any circumstances be handled, removed, injured or killed. Contact the ECO to assist if removal is required. ▪ Trees other than those of conservation importance that must be removed must be made available to woodcarvers. ▪ If any external labour teams are used during construction, then these teams should preferably be accommodated off site to curb poaching; if this is not possible then teams should be carefully monitored to ensure that no unsupervised access to plant and animal resources takes place. ▪ No unauthorised construction activities must be permitted within areas other than the demarcated area. ▪ Burning of cut vegetation during the site clearance should not be permitted. ▪ Ahead of any construction or excavation, topsoil and vegetation must be stripped and kept to be spread over areas that need to be rehabilitated on completion of construction. ▪ Engineering designs, methods and specifications should be strictly adhered to.		
3.2 Aquatic ecology Potential impacts: ○ Removal of vegetation ○ Loss of sensitive or important plant species ○ Surface water pollution ○ Sedimentation and erosion	▪ Pylons should be spaced to minimise impacts on wetlands, and in particular, the riparian zones. ▪ Minimise the footprints within or close to water resources. ▪ Suitably rehabilitate the area around the poles that will be within the seep wetland located close to the railway line. ▪ Make sure to remove any construction rubble or equipment from the seep wetland in which works will be required. ▪ No cement or concrete mixing may take place within wetlands or 15m thereof. ▪ Refer to the section on water management for pollution control measures which would reduce the potential impact on the aquatic ecosystems.	Contractor ECO	Start and duration of construction

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
3.3 Alien vegetation Potential impacts: o Invasion of alien plant species	▪ All alien plants currently established within the area and within 30m of the servitudes and footprint, especially the Crocodile River, should be destroyed and regular follow-ups should take place. ▪ Personnel tasked to control alien vegetation should receive appropriate training in the following: methods and control measures; equipment and techniques; types of herbicides and dosages applied; mixing techniques; storage of chemicals and equipment; health and safety issues; plant identification; procedures for equipment washing; equipment maintenance; record keeping, inter alia. ▪ Alien plants invading disturbed soil at construction site must be targeted and controlled in terms of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) Alien and Invasive Species Lists, 2014. ▪ Areas that were affected and does not form a part of the footprint must be stabilised and planted as soon as possible in order to minimise the risk of an increase in alien vegetation. ▪ Personnel tasked to control alien vegetation should receive appropriate training in the following: methods and control measures; equipment and techniques; types of herbicides and dosages applied; mixing techniques; storage of chemicals and equipment; health and safety issues; plant identification; procedures for equipment washing; equipment maintenance; record keeping, *inter alia*.	Contractor ECO	Start and duration of construction
4. Soil management			
4.1 Topsoil storage – where applicable	▪ Ahead of any construction strip the topsoil layer as well as overlying organic matter to the required depth. ▪ Store separately on a predetermined area within affected construction area. ▪ Stockpiles must not be higher than 2 meters and must not have slopes steeper than 1 vertical: 2, 5 horizontal. ▪ Protect topsoil stockpiles from erosion and contamination. ▪ Topsoil stockpiles must be utilised in rehabilitation efforts as soon as possible and must preferably not be stockpiled for longer than 6 months. ▪ Topsoil stockpiles must be cleared of any alien vegetation by means of appropriate methods and must not be compacted in any way.	Contractor Engineer ECO	Start and duration of construction
4.2 Erosion protection Potential impacts: o Erosion of currently undisturbed areas o Loss of topsoil	▪ Corrective actions have to be taken as and when required to stop any signs of erosion (prior, during and after construction). ▪ Erosion and siltation measures should be implemented from the start of construction (e.g. the use of temporary silt traps downstream of construction area). ▪ Prevent surface and storm water run-off water from being concentrated. ▪ Where possible, storm water must be released into an area which can act as a natural filter and reduce the erosion potential of the water. ▪ Maintain erosion preventative structures on a continual basis.	Contractor ECO	Start and duration of construction

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
	▪ Excavated soil must be kept to be spread over areas that need to be rehabilitated on completion of construction. ▪ The site must be monitored after completion to identify and correct signs of erosion.		
5. Water management			
5.1 Surface, ground and stormwater management Potential impacts: o Surface water pollution o Ground water pollution	▪ The footprints should be clearly demarcated and construction activities must be strictly controlled. ▪ Surface and storm water management most appropriate for the receiving environment must be implemented from the start of construction. ▪ Stormwater run-off must not be concentrated. ▪ Run-off must be managed prior to entering natural water resources. ▪ Mechanisms like contour walls, sediment trapping, energy dissipating or other erosion control structures must be put in place where stormwater is released toward water resources.	Contractor Engineer ECO	Start and duration of construction
5.2 Pollution control Potential impacts: o Surface water pollution and potential erosion	▪ Runoff from the working areas must be controlled. ▪ Prevent the discharge of water containing polluting matter or visible suspended materials. ▪ Prevent the creation of additional erosion prone construction areas which may cause sedimentation and surface water pollution. ▪ Run-off must not result in an unnecessary increased water flow velocity that may cause erosion. ▪ Encourage the infiltration of surface water into the ground where possible and minimise the extent of hardened surfaces by allowing for natural areas where possible. ▪ Should the onsite refuelling of vehicles be required, it should take place in a dedicated area on an impermeable hardened surface to prevent soil or water contamination. ▪ Contain fuel, oil or chemical spills, and arrange clean up in the event of spillage. ▪ Any spillages of pollutants must be contained and immediately cleaned. Report any incidents to the ECO and where required DWS offices. Concrete mixing sites: ▪ Mixing areas must be minimised and on impermeable surfaces. ▪ Carefully control all on-site operations that involve the use of cement or concrete. Strictly control run-off from these areas. ▪ Waste concrete and cement sludge from preparation areas must be collected on a regular basis, and disposed of at a registered landfill site. ▪ All waste or spilled concrete must be removed from the site at the end of construction.	Contractor ECO	Start and duration of construction
6. Air quality			
6.1 Dust emissions, air pollution Potential impacts: o Air quality decline	▪ Accidental fires should be prevented at all cost. ▪ Burning of vegetation that was cleared for construction or any other waste is not allowed. ▪ Dust suppression measures must be implemented during the construction period to reduce	Contractor ECO	Start and duration of construction

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
	dust emissions, if required. ▪ Exposed soil surfaces must be appropriately stabilised as soon as practically possible, removed vegetation can be spread over exposed surfaces to encourage the re-establishment of natural vegetation.		
7. Noise management			
7. 1 Noise generation Potential impacts: o Increase in ambient noise level	▪ Noise should be controlled at the source. Equipment control must be used to reduce the potential impact. ▪ The construction activities must take place during day-time hours from 06:00 – 18:00 and not on Sundays or public holidays. ▪ Complaints regarding noise during the construction phase must be addressed and practical measures implemented to reduce noise levels should it be required.	Contractor ECO	Start and duration of construction
8. Waste management			
8.1 Solid waste Potential impacts: o Surface water pollution o Visual	▪ No on site littering or dumping of waste of any nature must be allowed. ▪ No waste may be burned or buried on site. Littering and pollution must be prevented. ▪ Waste must be collected at demarcated areas only and regularly disposed of at a registered landfill. Litter must not attract or pose a threat to animals. ▪ Waste must be recycled where possible. Adequate containers or bins for waste removal must be supplied on site at a demarcated area.	Contractor/ ECO	Start and duration of construction
8.2 Hazardous waste Potential impacts: o Surface water, soil pollution o Health and safety	▪ Hazardous waste (diesel, oils etc.) must be disposed of at appropriately authorised disposal sites. ▪ Care must be taken not to dispose of hazardous materials with domestic waste – hazardous materials must be disposed of separately.	Contractor ECO	Start and duration of construction
9. Health, safety and security			
9.1 General Potential impacts: o Health and safety risks to workers, public	▪ The restriction of movement of staff must be made a condition. ▪ A contingency plan addressing possible emergency situations must be in place. ▪ The applicant must comply with the National Building Regulations and Building Standards Act, 1997 (Act No. 103 of 1997). ▪ The applicant must comply with the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993). ▪ Develop and implement a “clean construction site” programme. ▪ Waste must be collected in demarcated areas and regularly disposed of at a registered landfill site. ▪ Ensure that no on site dumping of wastes or dumping onto adjacent areas take place. ▪ Waste must under no circumstances be burnt on the construction site. ▪ Appropriate safety measures including but not limited to on- and off-site signage must be implemented and displayed during the construction period.	Contractor ECO	Start and duration of construction

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
	▪ Adequate provision should be made for ablution facilities and water for the construction staff. Placement of these facilities must be well planned. The Holder of the Authorisation must be forced to ensure the appropriate use and maintenance of these facilities ▪ Engineering supervision should ensure that environmental, health and safety aspects are observed by the applicants during the construction activities on the site.		
10. Rehabilitation with completion of works			
10.1 Rehabilitation of all disturbed areas Potential impacts: Lack of rehabilitation may result in further alien plant invasion, erosion and impacts on terrestrial and aquatic environments	▪ All areas disturbed during construction that will not be surfaced must be suitably rehabilitated. ▪ Exposed soil surfaces must be appropriately stabilised and/or vegetated as soon as construction is complete. ▪ Rehabilitation and/or restoration should be done within the shortest possible time after completion of construction activities to reduce further impacts. ▪ All construction material and waste must be removed from the site on completion of construction activities. ▪ Re-vegetation should be undertaken using indigenous riparian vegetation. Areas disturbed during construction activities must be suitably re-vegetated. ▪ Monitoring of aquatic ecosystems is not considered necessary because of the low risks of the proposed development on aquatic ecosystems.	Holder of Authorisation/ Contractor ECO	With completion of construction activities and end of construction period

ENVIRONMENTAL MANAGEMENT MEASURES: OPERATION

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
11. Powerline and substation			
11.1 Powerline flappers Potential impacts: o Ecology	▪ Electrocutions and collisions can be minimised by adapting fitting markers to the lighting conductor wire that is usually the highest, thinnest and most problematic component in an overhead power line configuration. ▪ Flappers must be brightly coloured 'aviation' balls, thickened wire coils, luminescent, shiny or hinged flashing or flapping devices. ▪ These "flappers" can be placed on the cables themselves along sensitive bird migration or travelling routes, such as at the proposed Crocodile River crossing point.	Contractor Engineer ECO	Operation
11.2 Substation and secondary substations o Surface water pollution o Soil pollution	▪ The substation yard must be prepared and built according to engineer designs. ▪ Ensure that leak proofed bunded area with oil pit is installed for each of the transformers. ▪ The existing track giving access to the substation site must be upgraded and paved. ▪ High Voltage 11 kV cables that must be laid from the new substation building (switchgear) to		

Activity/Aspect / Impact	Mitigation Required	Responsibility	Frequency/ Implementation
○ Safety risk ○ Terrestrial ecology	the proposed developments (secondary substations) must follow the access road (north of road) and other existing roads from where it will be aligned with the internal roads of the Riverside Park developments. ▪ Speed limits for all vehicles to the site must be enforced.		

Appendix 1: