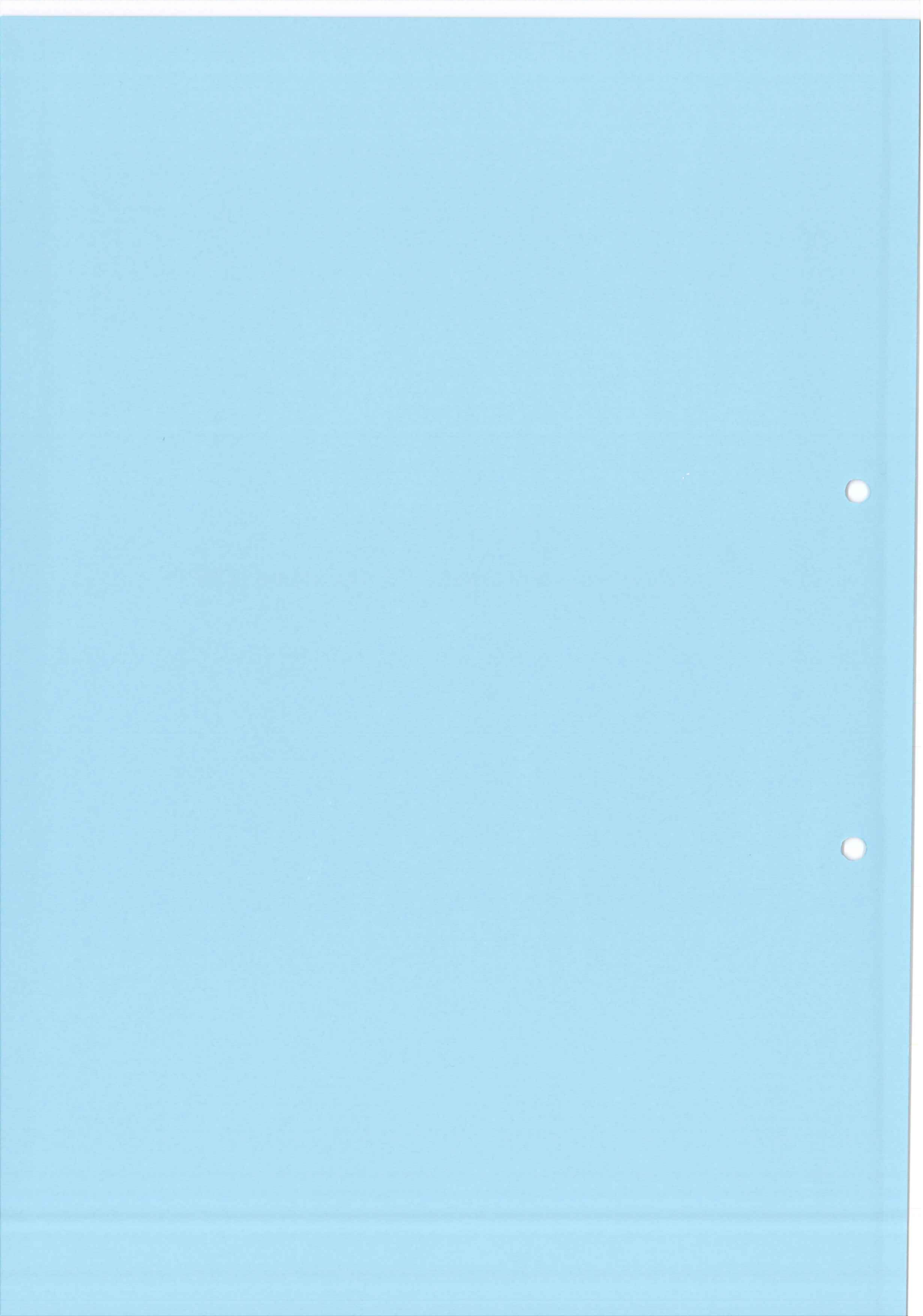


**Appendix G**  
**Environmental Management Programme (EMP)**



**ENVIRONMENTAL MANAGEMENT  
PROGRAMME (EMPR) FOR THE PROPOSED  
INSTALLATION OF BULK UNDERGROUND  
ELECTRICAL CABLES IN THE MUNICIPAL  
AREAS OF MOGALE CITY AND CITY OF  
JOHANNESBURG, GAUTENG PROVINCE.**

**NOVEMBER 2016**



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## **LIST OF DEFINITIONS, ABBREVIATIONS AND ACRONYMS**

<b>CARA</b>	Conservation of Agricultural Resources Act, 1983 (Act 43 of 1983)
<b>CBD</b>	Central Business District
<b>DEA</b>	Department of Environmental Affairs
<b>DWS</b>	Department of Water and Sanitation
<b>EIA</b>	Environmental Impact Assessment
<b>EIS</b>	Ecological Importance and Sensitivity
<b>ECO</b>	Environmental Control Officer
<b>EMC</b>	Ecological Management Class
<b>EO</b>	Environmental Officer
<b>EMPr</b>	Environmental Management Programme
<b>Eskom</b>	Eskom Holdings SOC Ltd
<b>GDARD</b>	Gauteng Department of Agriculture and Rural Development
<b>HDPE</b>	High Density Poly-ethylene
<b>HIA</b>	Heritage Impact Assessment
<b>I&amp;APs</b>	Interested and Affected Parties
<b>JRA</b>	Johannesburg Road Agency
<b>NEMA</b>	National Environmental Management Act, 1998 (Act 107 of 1998) as amended
<b>NEMBA</b>	National Environmental Management Biodiversity Act, 2004 (Act 10 of 2004)
<b>NHRA</b>	National Heritage Resources Act, 1999 (Act 25 of 1999)
<b>NWA</b>	National Water Act, 1998 (Act 36 of 1998)
<b>OHSA</b>	Occupational Health and Safety Act, 1983 (Act 85 of 1983)
<b>PES</b>	Present Ecological Status
<b>PPE</b>	Personal Protective Equipment
<b>REC</b>	Recommended Ecological Category
<b>SHEQ</b>	Safety, Health, Environment and Quality



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## 1 INTRODUCTION

The purpose of the Environmental Management Programme (EMPr) is to ensure that undue or reasonably avoidable adverse impacts of the project are prevented, that impacts which cannot be prevented are managed to reduce their significance and that the positive benefits of the project are enhanced.

The EMPr will therefore:

- Define the various measures to be taken during the life of the project (planning, construction, operation and maintenance) in order to enhance positive and minimise/reduce adverse environmental impacts and meet the performance specifications;
- Define the actions needed to implement these measures;
- Describe how this will be achieved; and
- Allocate responsibilities.

EMPr's are important tools for ensuring that the management actions/measures arising from the Environmental Impact Assessment (EIA) are clearly defined and implemented through all phases of the project.

## 2 PROJECT

Cables (11KVA) will be installed from the existing Dalkeith substation in City of Johannesburg Metropolitan Municipality to the Greengate area in Mogale City over a distance of approximately 4.8km. The cables will be installed along a road reserve (Marina road) and also cross Marina Road. It will then run across a number of properties within an existing Eskom servitude and crossing some wetlands (refer to wetland study). One property that it has to cross currently has no servitude. Three (3) cables (2 x 185mm and 1 x 300mm) will be installed up to the 3R ring main unit inside the Greengate Extension 19 development. From the 3R ring main unit to the 2R1B ring main unit two (2) cables will be installed.

## 3 POTENTIAL IMPACTS AND MANAGEMENT MEASURES

As part of the EMPr, the identified environmental impacts that may result from the various phases of the project, their risks or potential impacts and the proposed management measures thereof, are covered in Sections 7 - 12 of this report.

## 4 RESPONSIBILITY

The applicant, Eskom Holdings SOC Ltd (Eskom) will be responsible for the implementation of all mitigation and management measures as well as the compliance with this EMPr. During the construction phase, the applicant will delegate its responsibilities to the Construction Contractor. Each Contractor involved in the project will comply with the EMPr and will therefore appoint a Contractor's Representative (the title may vary), who is responsible for the on-site implementation of the EMPr (or relevant sections of the EMPr) and conditions of authorisations/licences.

The Contractor's representative can be:

- The site agent;
- Site engineer;
- A dedicated environmental officer; or
- An independent consultant.



The Contractor will ensure that the Contractor's Representative is suitably qualified to perform the necessary tasks and is appointed at a level such that he/she can interact effectively with other site contractors, labourers, the Environmental Control Officer (ECO), authorities, land owners and the public. The Contractor's Representative ensures that all sub-contractors working under the Contractor abide by the requirements of the EMPr as well as any authorisations/licences that may be issued.

In the event of the Contractor appointing an Environmental Officer (EO), or officers, their primary role will be to coordinate the environmental management activities of the Contractor on site. The EO may also be required to perform the following roles:

- Support the ECO in the monitoring and execution of the EMPr by maintaining a permanent presence on site;
- Inspect the site as required (daily/weekly) to ensure adherence to the management actions of the EMPr and authorisations/licences;
- Complete Site Inspection Forms on a regular basis (e.g. daily or weekly);
- Provide inputs to the regular (e.g. monthly) environment report to be prepared by the ECO;
- Liaise with the construction team on issues relating to implementation of, and compliance with, the EMPr and authorisations/licences;
- Maintain a record of environmental incidents (spills, impacts, legal transgressions etc.) as well as corrective and preventive actions taken; and
- Maintain a public complaints register in which all complaints are recorded.

The conditions of the authorisations and EMPr must be brought to the attention of all persons (employees, workers, consultants, contractors, visitors etc.) associated with the undertaking of these activities and the applicant must take such measures that are necessary to bind such persons to the conditions thereof (contracts with penalties for non-compliances).

The applicant can further enforce this by running workshops with all employees in order to raise environmental awareness. These workshops should cover aspects such as fire prevention, strict use of provided ablution facilities and general duty of care. A pamphlet can also be handed out on socially acceptable and environmentally responsible conduct such as water conservation, waste management etc.

Entity:	Responsible Person:	Contact details:
Eskom Holdings SOC Ltd	Mr Neo Masemola	079 412 0171
Environmental Control Officer (ECO)	To be appointed	Unknown
Construction Contractor (to be appointed by March 2017)	Environmental Officer	Unknown
Electrical Engineer – RPS Switchgear	Mr Maurice Makoni	083 441 5991

## 5 COMPLIANCE, MONITORING AND REPORTING

Accurate and up-to-date records will be kept (by the EO or other appointed contractor's representative) of all system malfunctions resulting in non-compliance with the EMPr or authorisations/licences. The applicant will also, within 24 hours, ensure that the relevant authorities (Department of Environmental Affairs (DEA) and/or Department of Water and Sanitation (DWS)) are notified of the occurrence or detection of any incident which has the

potential to cause, or has caused pollution of the environment, health risks or which is a contravention of any EMPr or environmental authorisation/licence condition. The applicant is then to submit an action plan indicating measures, which will be taken to:

- Correct the impacts resulting from the incident;
- Prevent the incident from causing any further impact; and
- Prevent a recurrence of a similar incident.

A complaints register will be kept on site and all complaints from the public and land owners will be noted therein as well as measures taken to rectify the situation as described above. The ECO will conduct monthly inspections to monitor compliance with EMPr and authorisation / license conditions. A checklist will be used for these purposes.

## 6 ALTERATIONS TO THE EMPR

As EMPRs should remain dynamic and flexible, certain conditions may require the EMPr to be revised. These conditions may include the following:

- Changes in legislation;
- Occurrence of unanticipated impacts or impacts of greater significance, intensity and extent than anticipated;
- Inadequate mitigation, i.e. where the level of an environmental parameter is not conforming to the required level despite the implementation of measures; and
- Secondary impacts which occur as a result of the mitigation.

## 7 ENVIRONMENTAL IMPACT ASSESSMENT

### 7.1 Methodology

The significance of the environmental impacts identified was assessed in terms of their:

- Duration;
- Extent;
- Probability; and
- Severity.

The above were used to determine the significance of an impact without any mitigation, as well as with mitigation.

Nature of an impact: An impact's nature can be positive (+) or negative (-).

Consequence: Considers duration, extent and severity

Consequence = duration + extent + severity

**Table 1: Environmental risk and impact assessment criteria.**

DURATION (D)		
Immediate	Less than 1 month	1
Short term	3 months	2
Construction	7 months	3
Life of project	Operational phase	4
Post closure	Time of rehabilitation and for re-establishment of natural systems	5
Residual	A permanent impact (100 years or more)	6
EXTENT (E)		



Site specific	Servitude	1
Local	Properties and surrounding properties	2
Regional	Mogale City Local Municipality & City of Johannesburg Metropolitan Municipality.	3
Provincial	Gauteng Province	4
National	Republic of South Africa	5
<b>PROBABILITY (P)</b>		
Rare	<5% probability of occurrence – may occur in exceptional circumstances	1
Unlikely	15% - 6% probability of occurrence – could occur at some time	2
Possible	45% - 16% chance of occurrence – might occur at some time	3
Likely	65% - 46% probability of occurrence – will probably occur in most circumstances	4
Almost Certain	90% - 66% probability of occurrence – is expected to occur	5
Definite	100%- will occur	6
<b>SEVERITY (S)</b>		
Catastrophic (critical)	Total change in area of direct impact, relocation not an option, death, toxic release off-site with detrimental effects, irreversible loss, huge financial loss	6
Significant (High)	> 70% change in area of direct impact due to loss of significant aspect, extensive injuries, long term loss in capabilities, off-site release to high extent, major financial implications	5
Serious	50 – 70% long term loss, extensive rehabilitation / restoration / treatment required, high financial impact, still restricted in extent	4
Moderate (medium)	20 – 49% change, medium term loss in capabilities, rehabilitation / restoration / treatment required, on-site release with outside assistance, medium financial impact	3
Minor	10 – 19% change, short term impact that can be absorbed, on-site release, immediate containment, low financial implications	2
Insignificant (low)	< 10 % change in the area of impact, no financial implications, localised impact, a small percentage of population	1

[Duration (D) + Extent (E) + Severity (S)] x Probability (P) = Impact Significance (IS)



IMPACT SIGNIFICANCE (IS)		
Impact Significance	IS score range	Description
Low (L)	<15	The impact is minor or insubstantial; it is of little importance to any stakeholder and can easily be rectified.
Moderate Low (ML)	16 - 45	The impact is limited in extent, even if the intensity is major; the probability will only be likely, the impact will not have a significant impact considered in relation to the bigger picture; no major material effect on decisions and will require only small scale management intervention bearing moderate costs.
Moderate high (MH)	46 - 70	The impact is significant to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
High (H)	71 <	The impact could render development options controversial or the entire project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in project decision-making.

## 7.2 Impact Assessment Rating

The impacts and associated significance ratings for each phase of the project were assessed (Tables 2, 3 and 4 below). The no-go option would not meet the need.

**Table 2: Impact significance for the construction phase.**

Aspect and description		Impact rating (before mitigation)							Impact Rating (after mitigation)						
Environmental Aspect	Description of Potential Impact	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Fauna & Flora	Removal of vegetation left along the route (servitude).	Positive due to presence of alien and invasive vegetation in already disturbed areas in the servitude							Positive due to presence of alien and invasive vegetation in already disturbed areas in the servitude						
Soil	Erosion potential during excavation	N	2	3	3	8	3	24	N	1	3	2	6	2	12
Land Use	Increase of development potential in the area.	Positive since underground cables will not impact current and potential future land use							Positive since underground cables will not impact current and potential future land use						
Visual Impact	Underground cables	No impact – not visible							No impact – not visible						
	Construction activities	N	2	3	2	7	4	28	N	2	3	2	7	3	21
Waste Management	Pollution / contamination due to improper waste handling	N	2	3	4	9	4	36	N	1	3	3	7	3	21

Aspect and description		Impact rating (before mitigation)						Impact Rating (after mitigation)							
Environmental Aspect	Description of potential impact	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Air Quality	Excessive airborne dust and toxic fumes due to construction, construction vehicles and equipment.	N	2	3	3	7	3	21	N	1	3	2	6	2	12
Storm Water Management	Contamination due to construction material	N	2	3	3	8	4	32	N	1	3	3	7	3	21
	Improper drainage & erosion	N	2	3	3	8	3	24	N	1	3	2	6	2	12
Health & Safety Requirements	Injury and health impacts.	N	2	3	3	8	3	24	N	1	3	3	7	2	14
Socio-Economic	Inconvenience to Residents/ land owners	N	2	3	2	7	4	28	N	1	3	2	6	3	18
	Socio-economic upliftment	Positive due to development potential													
Noise	Noise generated by construction vehicles and equipment	N	2	3	4	9	3	27	N	1	3	3	7	3	21



Aspect and description		Impact rating (before mitigation)							Impact Rating (after mitigation)						
Environmental Aspect	Description of potential impact	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Traffic	Increase in traffic due to movement of heavy construction vehicles/equipment.	N	2	3	3	8	3	24	N	2	3	2	7	2	14
Sensitive water environments (wetlands)	Impact on existing wetlands through which the cables will be installed.	N	2	3	4	9	4	36	N	2	3	2	7	2	14

No impact on climate, topography (underground cables) or geology (maximum depth of 1 m). No heritage impacts anticipated since the route follows an existing Eskom servitude and road reserves.

**Table 3: Impact significance for the operational phase**

Aspect and description		Impact rating (before mitigation)							Impact Rating (after mitigation)						
Environmental Aspect	Description of potential impact	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Socio-Economic	Unlock development potential in the area	Positive													
Maintenance & Safety measures	Negative impacts of underground cables	N	1	4	2	7	3	21	N	1	4	2	7	2	14
	Positive impacts of underground cables	Positive													
Sensitive water environments (wetlands)	Impact on existing wetlands through which the cables will be run.	N	2	6	2	10	3	30	N	2	6	1	9	1	9
		Positive													

**Table 4: Impact significance for the no-go option.**

Aspect and description		Impact rating (before mitigation)						
Environmental Aspect	Description of potential impact	Nature of Impact (positive / Negative)	Spatial Scale/ Extent (6)	Duration (6)	Severity (6)	Consequence	Probability (6)	Significance (108)
Socio-Economic	Job Opportunities Lost	N	2	4	3	9	3	27
	Lack of Development	N	2	4	3	9	2	18
	Electricity theft will remain a problem	N	3	4	3	10	4	40



## 8 PLANNING PHASE MANAGEMENT MEASURES

**Period:** 12 months (February 2016 – January 2017)

Since no physical on-site activities will be conducted during the planning phase, no impacts are anticipated but the planning phase will guide the following phases, identify their potential impacts and mitigation measures required.

The following activities will be undertaken during the planning phase:

- Determine need and urgency of project due to development in the area.
- Public participation process to identify issues and concerns of landowners and other Interested and Affected Parties (I&APs).
- Applications in terms of legal requirements will be submitted and authorisation will be obtained prior to proceeding with any on-site activities.

## 9 CONSTRUCTION PHASE MANAGEMENT MEASURES

**Period:** 7 months (February 2017 – September 2017)

The following is a summary of management measures that must be incorporated during the construction phase:

### 9.1 Fauna & Flora

**Potential impact:** Vegetation will be removed throughout the linear activity area (route). A 1.1 m wide area will be disturbed along the approximately 5 km route.

- Remain within demarcated areas during construction/installation to limit disturbance to surrounding areas (neighbouring properties and natural or undisturbed areas), no dumping etc. on surrounding properties.
- Remove all exotic/invasive species as Conservation of Agricultural Resources Act (CARA), 1983 (Act 43 of 1983) and National Environmental Management Biodiversity Act (NEMBA), 2004 (Act 10 of 2004) requires. Remove manually as only a registered weed control officer can chemically treat invader species.
- Care must be taken to avoid the spread of seeds of alien vegetation.
- Limit construction/installation activities (noise disturbance) to the day time and working hours for the purpose of not disturbing activities and ecological processes of nocturnal birds, small mammals etc.
- No animals may be captured or killed.
- No animals may be removed from the surrounding environment. A trained person must be contacted to relocate animals if any are encountered.
- Have a Waste Management Plan in place, as not to pollute the surrounding ecology thereby further reducing the ecological integrity.
- Prevent encroachment and spreading of invasive and exotic species through on-going monitoring after construction/installation activities have ceased. An alien eradication programme is to be established as part of the maintenance programme (see Section 12).
- An ECO shall be appointed during the construction/installation phase to ensure mitigation is applied and incidents are reported and reflect non-compliance to the EMPr.

## 9.2 Soil

**Potential impact:** Due to vegetation clearance, soils will be left exposed and vulnerable to erosion. Soils will be disturbed as trenching will be used in certain areas and horizontal directional drilling in others to install sleeves for the cables.

- No heavy machinery or vehicles in wetland to prevent compaction of soil.
- Construct appropriate erosion control and water diversion structures to prevent exposure and vulnerability of loosened soil and cleared areas to erosion.
- Reduce the likelihood of exposed soils being eroded by surface runoff, by limiting main construction activities to the dry season when the probability of rainfall events is very low.
- Rehabilitate all presently eroded areas to a state comparable to the surrounding area.
- The Contractor's Programme must include measures for stabilisation of areas that may be prone to erosion.
- On completion of the construction/installation work, all trenches and excavations must be backfilled and reinstated.
- Soil must be stored and backfilled in the same layers (horizons) in which they were removed.
- The area, which is excavated/ trenched, must always be kept to a minimum (safety and erosion concerns).
- The trench must be uniform in length and in depth. In other words, the sides must be parallel and vertical. The top of the trench must be cut with a saw to ensure smooth, uniform edges.
- Trench dimensions for the three (3) cables (from Dalkeith to the 3R ring main unit) will be 1.1m wide and 1m deep, and for the 2 cables (from 2R1B ring) will be 0.65m wide and 1m deep.
- The area of disturbance will be limited to 25m.
- The cables to be installed are 2 x 185mm and 1 x 300mm, 3C XLPE Aluminium 11kV rated cables.
- Six (6) 160mm HDPE cable sleeves are to be installed
- All excavation will be carried out by machine.
- Where the trench runs in Eskom's servitude next to the high voltage line, excavations will be done by hand.

## 9.3 Land use

**Potential impact:** Land use may change from an agricultural/rural area to an urban area due to development potential created in the area due to electrical installation. Privately owned land may have to be expropriated due to servitudes required.

- Most of the land along the proposed route is an already proclaimed Eskom servitude.
- Some of the route falls within road reserves.
- Expropriation of land to accommodate new servitude will be negotiated with land owners.
- Demarcate servitude to limit disturbance to surrounding properties and areas.
- Construction contractor must ensure management of staff/workers and give instructions as to acceptable behaviour and no access to surrounding properties.
- No overnight stays and no loitering during working hours allowed.
- No ad-hoc employment in construction area as this will encourage job-seekers to loiter in the area (safety risk).



- If any street furniture (e.g. street names, traffic signs, etc.) along Marina Road, have to be removed, arrangements must be made with the relevant authority for the removal, storage and re-erection.
- Show respect to property owners on whose properties servitudes are located in terms of privacy and security.

#### 9.4 Visual Impact

**Potential impact:** There will be no long term impact as the installation of the new cables will be underground, under an existing servitude. Underground cables have no visual impact compared to overhead power lines.

- No refuse or builders rubble generated shall be placed, dumped or deposited on adjacent/surrounding properties/areas including road verges, roads or public places and open spaces during or after the construction period.
- No waste will be burnt.
- No waste may remain on the construction site for more than two (2) weeks.
- The construction crew camp must be placed in a position removed from the adjacent properties and any natural area (wetlands).
- On completion of the construction work, all trenches and excavations must be backfilled and reinstated.
- Contracts must specify that sub-contractors be required to clean their work area after construction.

#### 9.5 Waste Management

**Potential impact:** Spillage of building aggregate (concrete, bitumen, bentonite) and other construction related materials as well as hydrocarbons (from vehicles and equipment) can cause soil and groundwater contamination.

- Collect general waste (building rubble and waste generated by workers) in suitable containers (drums/skips/bins) and remove from site for disposal to the local municipal landfill / waste management facility by the construction contractor on a regular basis (at least weekly or when skip is full).
- Ensure sufficient containers are available for storage of waste prior to removal off site to prevent overflow and littering on the site and surroundings.
- Reduce waste quantities and disposal costs through a reduction in the materials ordered and recycling.
- Arrange "Take-back" schemes – setting up schemes with suppliers to take back surplus materials.
- Though no special disposal methods are required (non-hazardous waste), non-biodegradable refuse such as glass bottles, plastic bags, etc. must be stored in suitable containers to allow for recycling and emptied on an as-required basis for recycling purposes during the construction and clean-up phase. Make sure that sub-contractors are aware of the placement of the bins and their responsibility to separate materials.
- Material storage areas should be safe, secure and weather-proof to prevent damage to or degradation of material quality (resulting in waste generation) and theft as well as potential pollution.
- Reduce and reuse – engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse.
- Contractors to report on the quantities of different waste streams they manage (landfill, reuse, recycling, energy recovery);

- Ensure no litter, refuse, waste and building rubble generated on the premises will be placed, dumped or deposited on the site, adjacent or surrounding properties including road verges, roads or public places and open spaces during the construction and clean-up phase.
- No waste will be burnt.
- No waste may remain on the construction site for more than two (2) weeks.
- Ensure copies of all waste manifests (safe disposal certificates) are kept, showing responsible handling, transport and disposal by a reputable waste handler.
- Litter patrols will be organised by the contractor.
- Construction contractor will ensure that all building materials / chemicals are effectively stored and managed. In the unlikely event of a spillage, an incident will be registered and sufficient clean-up procedures will be carried out immediately to prevent the spread of pollution.
- No on-site maintenance of vehicles or equipment should be planned.
- If emergency maintenance is required to on-site vehicles and/or equipment, drip trays and/or absorbent mats will be placed underneath the vehicles / equipment where maintenance work is conducted to prevent grease / oil spillages impacting the environment.
- Keep spill kits readily available on site to clean hydrocarbon spillages. All hydrocarbon spillages to be cleaned within 24 hours to prevent spreading and impacts on the environment.
- Waste containers for hydrocarbon waste must have covers to prevent rainwater infiltration.
- Any hazardous substances will be handled according to the relevant legislation relating to transport, storage and use of the substance (Material Safety Datasheets).
- Portable dry chemical toilets will be provided by the construction contractor for workers. Chemical toilets will be serviced as required to prevent overflows. Construction contractor will ensure that there are an appropriate number of mobile dry chemical toilets on site (typically 1 toilet for 20 people).
- Contractor to provide suitable ablution facilities (washing and changing area) for construction workers.
- No builders/workers will be housed on the site.
- Ablutions outside the provided facilities are not to occur under any circumstances.
- All re-usable material must be removed with care and re-used if possible.

## 9.6 Air Quality

**Potential impact:** Construction activities particularly earthworks, the use of cement and other building materials will produce airborne dust and possibly fumes.

- All vehicles and machinery/equipment used on, or entering the area, must be maintained and serviced regularly to ensure that they do not emit smoke or fumes. The contractor's representative must ensure that all on-site vehicles comply with the SANS 10181:2003 in conjunction with SANS 10282:2003 standards.
- Limit idling time of vehicles / equipment.
- Dispose waste as soon as possible to a municipal transfer station, skip or on a permitted landfill site. Waste must not be allowed to stand and decay, resulting in malodours and attracting vermin. Waste may not be burnt on site.
- No ad hoc cooking fires are to be allowed except in designated cooking areas.
- A complaints register must be kept throughout the construction and operational phase.



- Dust must be suppressed, on roads (where construction takes place) and construction sites, during dry periods, by the regular application of biodegradable soil stabilisation agent. Application of water to suppress dust should be avoided due to water scarcity.
- All mixing equipment will be closed systems with dust extractors.
- Seal complete earthworks to reduce dust and air pollution.

### 9.7 Storm Water Management

**Potential impact:** Contamination of surface runoff from incorrect handling of building materials, spillages etc. Flooding or ponding of storm water due to poor or improper drainage.

- Contractor must ensure that all building materials/chemicals are effectively stored (sealed containers) and managed (mixing etc.) to prevent contamination. In the unlikely event of a spillage, an incident shall be registered and sufficient clean-up procedures will be carried out immediately.
- All reagents, reagents storage tanks and mixing units must be supplied with a bunded area built to contain 110% of the capacity of the facility, to contain any spilled material and return back into the system if possible. The system must be maintained in a state of good repair and standby pumps must be provided.
- Ensure that silting does not occur as a result of rain and erosion.
- The cost of storm water implementation, management and maintenance, as well as flood risk, can be greatly reduced by identifying, retaining and enhancing the natural areas along which runoff flows and for natural habitat to retain ecological integrity.
- Embankments and/or diversion drains must be established around excavation areas and stockpiles to divert surface runoff away from the lowest lying points to avoid any potential water pollution spreading to the surrounding area and prevent sediments or fine soil particles from washing away.
- Topsoil stockpiles must be stored, shaped and sited (outside wetlands) so that they do not interfere with the flow of water to cause damming or erosion, or be eroded by water.
- Any water that is present in a trench must be pumped out before backfilling may take place.
- Storm water runoff must be controlled and kept to low velocity flows.

### 9.8 Health & Safety Requirements

**Potential impact:** Injury and health impacts.

- An ECO shall be appointed during the construction phase to ensure mitigation is applied and incidents are reported and reflect non-compliance to the EMP.
- Inform staff about environmental and safety risks associated with their work. Have documented work procedures. Make sure employees are competent for the work they perform.
- All construction vehicle drivers will be trained in terms of driving protocols i.e. adhering to speed limits, ensuring materials are safely secured, etc.
- Sign boards will be erected on both sides of the roads (where construction takes place) to make the public aware of slow moving construction vehicles (traffic control of heavy vehicles etc.).
- The credentials of the drivers will be verified by the construction contractor.
- No construction material must obstruct vehicle movement on public roads.

- Ensure that staff is familiar with the Occupational Health and Safety Act (OHSA), 1983 (Act 85 of 1983) and Policy. All the necessary safety regulations must be abided by including building codes and fire practice requirements.
- Supply personal protective equipment (PPE) required in work areas.
- Construction along the roads in road reserves shall be in accordance with recognised civil engineering practices:
  - The road authority must be informed 48 hours prior to the commencement of the work.
  - On completion of the work a completion notice must be sent to the road authority.
- Construction contractor must ensure management of staff/workers and give instructions as to acceptable behaviour and no access to surrounding properties.
- No overnight stays and no loitering during working hours allowed (safety risk to residents/land owners).
- No ad-hoc employment in construction area as this will encourage job-seekers to loiter in the area (safety risk to residents/land owners).
- Where the trench runs in Eskom's servitude next to the high voltage line, excavations will be done by hand.

### 9.9 Socio-economic

**Potential impact:** The most significant impact will be disruption and inconvenience to residents / land owners, during the construction phase. Residents may be disrupted and inconvenienced by dust, noise, etc.

- Construction contractor will ensure management of staff/workers and give instructions as to acceptable behaviour.
- Contractor will transport workers to and from the site on a daily basis to prevent movement of workers onto surrounding properties and within the area.
- No overnight stays and no loitering during working hours will be allowed.
- No ad-hoc employment in construction area as this will encourage job-seekers to loiter in the area.
- No construction must take place on Sundays and Public holidays, unless by prior arrangement with the I&APs.
- Construction activities will remain within the road reserve and servitude.
- This project will provide job creation opportunities to many skilled and semi-skilled labourers, which will be viewed as positive by the impacted sectors. As far as possible, all labour should be sourced locally to reduce unemployment level in the area (albeit temporary).
- Residents and businesses along the route / road may be inconvenienced due to construction (temporary).
- Illegal structures will not be considered for relocation by Eskom and relocation will be at the cost of the landowner.
- Employment of local labour will also avoid the need for temporary workers to need to seek accommodation in the area and/or disrupt social or relationship networks. This will reduce potential social disputes over employment and benefit.
- Businesses (e.g. convenience stores and take-away food businesses) may benefit from the sales to the construction workers.

### 9.10 Noise

**Potential impact:** Noise generated by construction crew/equipment and construction vehicles.



- Ensure vehicles are road worthy.
- Ensure proper lubrication and maintenance of machines.
- Design, fabricate and use quieter machines to replace the noisy ones.
- Reducing the noise produced from a vibrating machine by vibration damping i.e. making a layer of damping material (rubber, neoprene, cork or plastic) beneath the machine.
- Operate construction equipment at low and slow settings.
- Limit working hours (7:00 – 17:00 on weekdays).
- Monitor and enforce noise levels to reduce noise pollution.
- Reduce noise from construction vehicles and equipment by:
  - turning off engines when they are not in use;
  - checking the brakes are properly adjusted and don't squeal;
  - no revving the engine unnecessarily;
  - only using the horn in emergencies; and
  - replacing exhaust systems as soon as they become noisy.

### 9.11 Traffic

**Potential impact:** Increase in traffic due to slow movement of heavy construction vehicles can impact traffic flow on public roads.

- All construction vehicle drivers will be trained in terms of driving protocols i.e. adhering to speed limits, ensuring materials are safely secured etc.
- Sign boards will be created on both sides of all access roads to make the public aware of slow moving construction vehicles.
- The credentials of the drivers will be verified by the construction contractor.
- No construction material must obstruct vehicle movement on public roads.
- Work sites must be properly barricaded and signed irrespective of how long the work will take.
- Any traffic sign and barricading must be done according to the latest edition of the South African Roads and Traffic Signs Manual (SARTSM), Volume 2, Chapter 13.

### 9.12 Sensitive water environments (wetlands)

**Existing impacts:** infilling, illegal dumping, damming, alien infestation, erosion.

**Existing condition of three (3) identified natural wetlands and one (1) drainage line:**

- Change in ecosystem processes.
- Loss of natural habitat and biota but some natural habitat features remain.
- Present Ecological Status (PES) = D (largely modified)
- No red data species.
- Low biodiversity.
- Not sensitive to flow and habitat modifications.
- Insignificant role in moderating quality and flow of water of major rivers in two (2) unchannelled valley bottom wetlands and small role for channelled valley bottom wetland.
- Ecological Importance and Sensitivity (EIS) = D (low) for two (2) unchannelled valley bottom wetlands and C (moderate) for channelled valley bottom wetland.
- Recommended Ecological Category (REC) = D (largely modified) for two (2) unchannelled valley bottom wetlands and C (moderately modified) for channelled valley bottom wetland.

**Management measures:**

- **Minimise disturbance of wetland:** No heavy machinery or vehicles in wetland to prevent damage and compaction of soil. Drilling equipment (rig) to stand outside wetland and its buffer (32m).
- **Trenching as installation method:** Trenching in wetlands by hand. Trenching to be accompanied by installation of sub-soil drains to allow sub-surface flow to continue across the entire width of the wetland.
- **Horizontal directional drilling as installation method:** For channelled valley bottom wetland but preferably for all three (3) wetlands. Six (6) 160mm HDPE cable sleeves are to be installed.
- Where cables cross a road or watercourse (wetland), horizontal directional drilling is preferred.
  - 4.5m<sup>3</sup> is excavated on both sides of the road or in the buffer of the water resource to allow horizontal drilling.
  - The initial drill out is carried out using high-pressure water through drill rods.
  - Attached to the front of the rod is a cutting head and transmitter, which is controlled by a locator to achieve the correct line and level required.
  - The rods pass through mixing natural soil with the mud/water causing a small bentonite filled tunnel and at no time is a cavity formed.
  - Once the initial drill out is achieved, the transmitter and cutting head are removed. This is done by removing the securing collar and unscrewing the cutting head.
  - A reamer is then attached which contains multiple water jets and cutting face. This is attached by screwing it to the drilling rods and replacing the securing collar.
  - The passing of different size reamers, mixing natural soil with mud on a continual rotating system, is carried out until a bentonite filled tunnel is ready to receive the sleeves.
  - If at any time, a drill rod becomes bent, it is removed when it returns to the drilling rig.
  - The final reamer is then attached to a towing head that is inserted and expanded in the sleeve to be installed.
  - The sleeve displaces the bentonite as it is drawn through the tunnel and the bentonite fills the excavated pits.
  - The bentonite from the tunnel or from any blow outs will have to be removed by means of an excavator.
  - At no time is there a cavity created in the ground and the pipes are fully grouted in by displacement.
- **Water quality protection:** No stockpiling (to prevent sedimentation) or storage or mixing of materials (to prevent contamination) in wetlands.
- **Driver of wetland:** Prevent cut-off of storm water flow into the wetland.
- **Release from wetland:** Ensure wetland releases water into downstream water resources.
- **Rehabilitation:** Rehabilitate wetlands and buffer areas after installation – scarify, etc.
- **Monitoring:** Monitor wetlands bi-annually (wet and dry season) after completion of project to compare with baseline assessment and ensure wetland integrity is maintained (see Section 14.2).

## 10 OPERATIONAL PHASE MANAGEMENT MEASURES

The following is a summary of management measures that must be incorporated during the operational phase:

### 10.1 Socio-Economic



Socio-economic impacts on residents, businesses and community services will be positive. If mitigation measures are implemented to the required level, any negative impacts will remain mostly short term (construction phase) and of low significance.

- Unlock the development potential of the area.
- New developments will create jobs.
- Development in the area will have economic and financial benefits.
- The development of new businesses will increase the number of commuters into the area, which could have a positive impact for businesses due to an increased potential market and improve the income of existing businesses.
- Development in the area may increase business opportunities.
- Increases in property value, potential job creation opportunities, potential for community services and amenities.
- Businesses (e.g. convenience stores and take-away food businesses) may benefit from the sales to the construction workers.

## 10.2 Maintenance & Safety measures

Positive impacts:

- Underground cables are better protected against theft, damage etc. than overhead power lines.
- Underground cables have lower transmission loss than overhead power lines.
- Underground cables can be engineered to emit a lower magnetic field than overhead power lines.

Management of negative impacts:

- **Insulation deterioration:** Cables are susceptible to insulation deterioration because of the loading cycles the lines undergo during their lifetimes. As time passes the cables insulation weakens which increases the potential for a line fault. If the cables are installed properly, this debilitating process can take years and might be avoided altogether.
- **Fault location:** If and when a fault occurs, the cost of finding its location is expensive and time consuming.
- **Maintenance:** Only three (3) cables will be installed but six (6) sleeves will be installed to minimise disturbance at a later stage when additional cables need to be installed or when maintenance requires cables to be relocated due to damage to original sleeves or cables.
- **Fire causing damage to cables:** Clearing of vegetation in the servitude will prevent fire risk and heat damage to cables.

## 11 DECOMMISSIONING PHASE MANAGEMENT MEASURES

Decommissioning is not anticipated. The cables will remain indefinitely.

## 12 MAINTENANCE MANAGEMENT MEASURES

- Establish an alien and invasive eradication programme to prevent encroachment and spreading of invasive and exotic species along the servitude due to disturbance.
- Investigate any unplanned or unexplained power interruptions.

## 13 IMPACT OF NO-GO OPTION

The following impacts in terms of the no-go option were identified:

- Job opportunities will not be created.
- Support industries that provide goods, materials and services will not benefit from the construction phase, resulting in further loss of income in the local economy.
- Without the installation of bulk power cables, development within the area will be limited / hindered.
- Theft of power cables and illegally tapping into the electrical infrastructure are major problems within the area. Underground cables (versus overhead power cables) are difficult to reroute, tap or modify once these have been installed.

## 14 MONITORING REQUIREMENTS

During the installation of underground cables, monitoring and auditing of compliance with this EMP, the environmental and other authorisation conditions and with OHS Act Regulations are to be conducted. An Audit Protocol for the construction phase has to be drawn up by a suitably qualified person to include but not be limited to aspects listed below.

### 14.1 Construction Phase

The following aspects need to be audited:

#### a) OHS Act Compliance

- A register to be compiled to indicate that all the employees have been informed as to their rights under the Act; and
- Accident records must be kept, as per the Act and reported to the Department of Trade and Industry (DTI) and the Department of Labour.

#### b) EMP and environmental and other authorisation compliance (appoint an ECO) e.g. Pollution and environmental degradation.

- Littering and improper waste handling.
- Spillages of diesel, oil, grease. Containment and clean-up.
- Dust suppression.
- To minimise the impact on the natural environment as much as possible.

#### c) Noise Monitoring

- A record of complaints must be kept on the premises as well as the measures taken to address these complaints.

#### d) Safety aspects:

- Keeping to designated area; and
- Reporting fires, incidents, injuries etc.

### 14.2 Operational Phase

Undertake a wetland assessment bi-annually after installation to compare with baseline assessment and ensure wetland integrity is maintained.



## 15 ENVIRONMENTAL AWARENESS PLAN

### 15.1 Objectives

The objectives of an environmental awareness plan are to:

- Inform employees, contractors, businesses, residents (land owners) and visitors of any environmental risk which may result from their work or stay; and
- Inform employees, contractors, businesses, residents (land owners) and visitors of the manner in which the identified possible risks must be dealt with in order to avoid pollution or degradation of the environment.

In general, the purpose of implementing an environmental awareness plan is to optimise the awareness of those partaking in the activities, which have the potential to impact negatively on the environment, and in doing so, promote the goal of sustainable development.

### 15.2 Communication

Both objectives of the environmental awareness plan indicate that employees, contractors, businesses, residents (land owners) and visitors must be informed. Information sharing is only possible through effective communication channels.

The goal for proficient communication is to provide structures for effective communication, participation and consultation that relate to the organization's occupational health and safety hazards, environmental hazards and the Safety, Health, Environment and Quality (SHEQ) management system.

The objective of the communication procedure is to ensure effective communication flow, involvement of all levels of employees/contractors in the communication chain and to comply with the requirements in terms of ISO 9001:2008 clause 5.5.3 and ISO 14001:2004 clause 4.4.3.

### 15.3 Communication Responsibility

The management representative of Eskom has the responsibility, designated authority and accountability to ensure:

- Communication channels/processes are established, implemented and maintained;
- External communication: Communication with the media (press releases), governmental departments such as National: Department of Labour and DEA, Provincial: GDARD and Local: Mogale City Local Municipality, Johannesburg Roads Agency (JRA) and City of Johannesburg Metropolitan Municipality as well as I&APs on environmental issues;
- Internal communication:
  - Informing employees or contractors as to who is their representative and designated management appointee;
  - Placement of notice boards (moving equipment, construction works, no littering, no waste dumping, etc. during construction).
  - Obtaining information relating to responses required and/or requested by external parties from on-site representatives;
- Development and review of environmental policies and management of hazards/risks/impacts.

Employees and contractors have the responsibility to conduct themselves in a circumspect manner ensuring the image of Eskom is not damaged or discredited in any manner or means and the environment is not negatively impacted by their activities.

#### **15.4 Environmental Risk**

Employees and contractors shall be informed of any environmental risk, which may result from their work (injury, fire, environmental degradation etc.) through the communication channels established and described above. Employees, contractors, businesses, residents (land owners) and visitors will be informed of environmental risks through communication from management and documentation provided as well as notices erected. Environmental principles will be communicated effectively to newly appointed employees, employees returning from leave, as well as contractors and visitors upon entering the area.

Work procedures and protocols, which include potential risks, will be compiled for all tasks to be undertaken. Within each work procedure, an environmental risk section will be included. The environmental risk section will indicate whether the risk is to air, groundwater, surface water, soil, fauna or flora. The work procedure and rules and regulations will also then include actions to be taken by the employee and/or contractor to prevent or minimise the risk.

#### **15.5 General Considerations**

It is important to consider the level of education and literacy of the receiving audience and all information communicated should therefore be kept simple and be easy to understand, making use of pictures as much as is practically possible to also overcome possible language barriers in English documentation.

Employees, staff, workers and contractors on the project need to be equipped with the knowledge, skills and training to enable them to manage their task competently and safely without significant impact on their surrounding environment. Eskom and their contractors will ensure that they employ/appoint people qualified for the task, which is expected of them and/or provide in-house training to acceptable skill levels.

While management will ultimately be responsible and accountable, employees and contractors will also be given responsibility and accountability to follow procedures and report to management on certain aspects.

Basic environmental knowledge, training and awareness will be included in inductions for workers/contractors.

#### **15.6 Aspects Covered**

The first objective of the environmental awareness plan is to inform employees and contractors as well as residents (land owners) and visitors of any environmental risk which may result from their work or actions. The following aspects will be addressed during environmental awareness training for employees, personnel, staff, workers, contractors and visitors. The objective is to raise environmental awareness and educate people on environmentally responsible conduct.

The items have been structured to enable even uneducated visitors and workers to comprehend it. Pictures will be added to convey the message to illiterate people or people not familiar with English.



### 15.6.1 General

The following aspects are relevant under “General”:

- Importance of the environment and why we need to protect it.
  - Non-living elements: air, water, soil.
  - Living elements: plants, animals, humans.
  - Living elements depend on non-living elements for survival.
  - Relationship between living and non-living elements.
  - The life cycle to keep everything in balance.
  - People are reliant on the natural life cycle for their existence.
- Terminology
  - Any change to the environment due to human activities is called an impact. Impacts can be positive or negative. A positive impact is supply of power. A negative impact is pollution due littering and waste disposal.
  - Contamination or pollution is when a natural element such as air or water is impacted negatively due to human activities.
  - Environmental management is the control of human activities to minimise the impact on the natural environment as much as possible. It ensures that pollution is minimized and that people living in the environment are healthy (physically and mentally).
- The role of the employee, contractor, resident (land owner) and/or visitor.
  - What can you and I do to protect the environment? Discuss environmentally acceptable behaviour. Closing of taps, using provided ablution facilities, and placing waste in containers provided for it, reporting spillages etc.
  - What can you and I do to ensure that our actions do not cause unnecessary damage to the environment? Report and clean spillages, stay within demarcated areas etc.
  - There is always a reason for an environmental impact or accident and generally people are the reason.
  - Always work/act carefully so that you don't damage the environment and protect your own safety and health.
  - Obey the rules and regulations.
  - Report any impacts/incidents or accidents to your supervisor/manager.
  - Your role is important, be environmentally responsible and always aware of the environment.
  - Negative environmental impacts can cause death, injury, pain, suffering, diseases, damage to property and equipment, legal liability, cost, loss of productivity.
  - We must look after our environment for the sake of our children and their children.
- South African laws protecting the environment.
  - The Constitution of the Republic of South Africa, 1996;
  - National Water Act, 1998 (Act 36 of 1998);
  - National Environmental Management Act, 1998 (Act 107 of 1998);
  - National Environmental Management: Waste Act, 2008 (Act 59 of 2008);
  - National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004); and
  - National Environmental Management: Air Quality Act (Act 39 of 2004).

### 15.6.2 Animals

No hunting, poaching, snaring or killing of any animals will be allowed. Report animals seen within the area to your supervisor (workers) to have them safely removed as this poses a danger to them.

### 15.6.3 Plants

- Vegetation will be removed within the demarcated footprint of the servitude only.
- All alien/invasive vegetation to be removed. Organise events with residents (land owners) to remove alien/invasive vegetation in servitude for safety, continued visibility and prevention of fire. Refer to GNR 599 of 1 August 2014 for guidance on which plants to remove.

### 15.6.4 Sewage and ablution

No ablution or washing outside designated areas.

### 15.6.5 Waste Management

The following aspects are relevant to waste management:

- No littering is allowed along the route alignment or on neighbouring properties. A litter patrol will be conducted once a week during the construction phase to remove litter from the environment and properly dispose of this;
- No waste is to be buried along the route or on neighbouring properties;
- No burning of waste;
- Use skips/bins for general waste storage until it is collected for disposal;
- Oils / greases / fuel spillages (hydrocarbon waste) is considered hazardous and should be collected separately for recycling;
- Waste manifests or safe disposal certificates need to be obtained for all waste streams to ensure proper recycling or safe disposal; and
- Clean up any spillages and dispose appropriately of the waste, which was generated as a result.

### 15.6.6 Water

In terms of water usage, the following:

- Use water sparingly. No wastage of water will be allowed.

### 15.6.7 Sensitive Environments

Streams, rivers, wetlands and dams or any area associated with naturally occurring water is considered environmentally sensitive features and should be avoided.

- Remain within demarcated areas.
- Minimise disturbance to identified wetlands
- No equipment or people within delineated wetlands.
- Sleeve installation through wetlands to start from outside delineated wetland area.

### 15.6.8 Reporting & Recording

The following should be implemented in terms of reporting and recording:

- All complaints by members of the public or land owners should be registered and captured in a complaints register;
- All incidents should be recorded in an incident log sheet to allow investigation and remedial action;
- Report impacts/incidents/accidents immediately to a supervisor/manager;
- Investigate any impact/incident/accident to find out why it happened, what can be done to fix it and what should be done to prevent it from happening again; and
- Report any damage to infrastructure to supervisor/manager.



## 15.7 Recording and Reporting of Incidents / Accidents / Impacts

The second objective of the environmental awareness plan is to inform employees, contractors, businesses, residents (land owners) and visitors of the manner in which the identified possible risks must be dealt with in order to prevent degradation of the environment. Dealing with identified possible risks will include recording and reporting of incidents / accidents / impacts.

There are a range of common social issues that accompany most construction projects. These include the request to employ local labour, claims for damaged infrastructure, and personal safety concerns. The contractor must minimise 'Damage to property' claims and anticipate where they could arise.

### 15.7.1 Investigation Reports

All incidents / accidents / impacts (injuries, spillages etc.) will be recorded as per defined SHEQ standards. A standard format (investigation report) will be completed for each incident / accident / impact to allow further investigations into the matter.

The community and land owners can contact the responsible officer (not yet appointed) to register any incidents/accidents or impacts they might experience during the construction phase of the project.

The investigation report will contain the following information:

- Particulars and description of incident / accident / impact;
- The investigation panel;
- Root cause;
- Corrective and preventative measures to prevent recurrence;
- Witness and Insured's statements;
- Photos and Work Instructions; and
- Risk assessments carried out for the tasks performed.

### 15.7.2 Emergency and Contingency Measures

Emergency and contingency plans will be put in place in conjunction with the necessary equipment and personnel on stand-by to manage such situations as and when necessary. Codes of Practice, operating procedures and planned maintenance systems will be established for inspection, maintenance, and to ensure effective and continuous operation and early detection of any malfunction or emergency incident.

The following information (Table 5) should be displayed at the construction camp.

**Table 5: Example of Emergency Contact Details**

NETCARE	082 911
POLICE	10111
POLICE STATION (HONEYDEW)	011 801 8400
FIRE/AMBULANCE	10177
FIRE STATION (HUNTERS HILL)	011 794 2666
HOSPITAL (LIFE WILGEHEUWEL HOSPITAL)	011 796 6500



**Table 6: Example of Incident and Environmental Reporting Sheet**

INCIDENT AND ENVIRONMENTAL LOG SHEET													
Date:	2	0	/	m	m	/	d	d	:	Time:	Location:		
Nature of incident or risk type:	Procedure/ Process			Environmental			Safety		Health		Equipment/ Machinery		Other
Description / nature	Quantity of Spill/ Release:			Pollutant/ Substance:			Product Used:		Root Cause:				
Clean up or containment method:													
Hours lost:	Cost:												
Corrective actions taken:													
Incident reported by:				Signature:									
Capacity of person above:				Repeat Incident				YES					NO
Further investigation required:				YES				NO				Person handling further investigation:	