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Environmental Management Plan - Draft

The proposed Maningi Substation

Situated on Erf 304, Adolf Street in Sandown Extension 24, Sandton, Johannesburg

DEAT Ref: 12/12/201174

Environmental Management Plan
The Maningi Substation

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1. Introduction

This Environmental Management Plan (EMP) has been compiled by Marsh Environmental Services (MES) for Eskom Distribution for the proposed Maningi substation. The EMP has been compiled as per the principles of the National Environmental Management Act (NEMA, Act 107 of 1998) in application to the Department of Environmental Affairs and Tourism (DEAT) Environmental Impact Evaluation division. As part of Eskom's Integrated Environmental Management System, development and implementation of an EMP is required for all projects.

The EMP contains mitigation measures specific to the construction and operation of an 88Kv substation listed as follows in GN 386, Item 1(l):

"The construction of facilities or infrastructure, including associated structures or infrastructure for the transmission and distribution of electricity above ground with a capacity of more than 33 kilovolts and less than 120 kilovolts".

This EMP considers mitigation measures and recommendations contained in the following documents, commissioned and/or sourced during the planning phase of the Maningi substation:

1. Basic Assessment Report compiled by MES in application for environmental authorisation;
2. Risk Assessment pertaining to fire and health concerns compiled by IRCA;
3. Environmental Noise Assessment compiled by JH Consulting;
4. Generic Environmental Management Plan for proposed substation projects compiled by Eskom
5. Risk Identification and Classification of Risk for Central Region, Field Services Centre (Sandton) as at 30 Jan 2009;
6. Business Recovery Plan for the Sandton Field Service area;
7. Eskom Standard: Passive Fire Protection in Distribution Substation Yards (refer Item 2)

The following Eskom standards and procedures are applicable:

DPC 34-350	Reporting, Recording, Investigating, Costing and Following up of Incidents/Accidents
DST 34-315	Emergency Preparedness
DISASAAA0	Passive Fire Protection in distribution substation yards
ESKPVAAG5	Requirements for the Safe Processing, Storing, Removing and Handling of Asbestos or Asbestos containing material.
DISASAAT8	Provision and Use of Personal Protective Equipment (PPE)
EPC32-245	Environmental Procedure: Waste Procedure
EPC32-247	Environmental Procedure: Bush Clearing Procedure
DST34-440	Selection Purchase and Storage of Hazardous Material.
DISSCABF4	Distribution Specification on Personal Protective Equipment

2. Purpose of the EMP

The purpose of the EMP is to describe mitigation measures required for the design, development and operation of the substation within the surrounding residential context. The EMP will assist in obtaining a desired environmental end state and describes how activities that could have negative impact on the environment will be managed, monitored and

impacted areas rehabilitated. The EMP requires the allocation of responsibilities and actions required to mitigate the identified negative environmental impacts and requires that monitoring programmes are developed to track the implemented actions to ensure effective execution.

Specific mitigation measures have been considered during the design phase of the proposed substation (as identified in the Environmental Impact Assessment process) in order to minimise the potential environmental impacts associated with the facility. It is imperative that such design-phase mitigation measures are carried through to the construction and operational phases in order to minimise the social and environmental impacts of the substation during these phases. This EMP addresses the three phases of the development described below.

2.1 Planning Phase

Incorporating pro-active environmental management measures with the goal of attaining sustainable development can be achieved during this phase. Pro-active environmental measures minimize the chance of negative impacts occurring. Necessary corrective actions are proposed to further limit potential impacts.

2.2 Construction Phase

The bulk of the impacts during this phase will have immediate effect (e.g. noise and dust pollution). If the site is monitored on a continual basis during the construction phase, it is possible to identify these impacts as they occur. These impacts are identified and measures for mitigation proposed.

2.3 Operational Phase

The operational phase impacts of a development may be as severe as those posed in the construction phase if not properly managed. By taking pro-active measures during the planning and construction phases, potential environmental impacts originating during the operational phase can be minimised.

3. Conditions of the EMP

The EMP is not a static document and further consideration shall be given to:

- Specific conditions and supplementary mitigation measures stipulated in an environmental authorisation issued by DEAT, and
- Mitigation measures for impacts that might only become apparent during the construction and operational phases.

It is intended that the EMP be included with all construction and development tender documentation, such that the developer and contractor are aware of any additional costs that may be imposed as a result of the EMP, from the outset of the project. The provisions of the EMP shall be made binding on the developer and his contractors. The EMP shall be used as a tool for auditing environmental compliance.

4. General project description

4.1 Location

The site proposed for the development of the Maningi substation is Erf 304 Adolf Road in Sandown Extension 24, Sandton, Johannesburg. The site is located in a residential area and is bordered by residences in all directions.

4.2 Project description

The project entails the construction and operation of an 88kV electrical substation required for the transmission and distribution of electricity. The location of the site in a densifying residential part of Sandton requires that a range of safety and environmental mitigation measures are adhered to in order to mitigate the potential impacts on the recipient community. The proposed project has seen significant objection to its implementation in Sandown Extension 24. It is imperative that the mitigation measures are adhered to and that community relations are established and maintained by Eskom.

5. Risks and key issues

Various potential impacts were identified during the Environmental Impact Assessment (EIA) process undertaken, in terms of which mitigating design responses must be applied where applicable.

Construction

- Nuisance dust;
- Nuisance noise;
- Nuisance traffic;
- Crime;
- Property damage;
- Impacts on flora and fauna

Operation

- Substation maintenance
- Property devaluation
- Visual intrusion and loss of sense of place;
- Noise outfall;
- Cable theft and vandalism;
- Health and safety considerations;
- Fire;
- Stormwater

6. Responsibilities

Various role-players ensure the sustainability of the development on the receiving environment. The roles of the applicable persons/authorities responsible for overseeing environmental compliance in line with this EMP are described below. The contact details of the relevant stakeholders are contained in Appendix A of this document.

6.1 Environmental Authority

Any authorisation of commencement with the activity will reflect conditions and specific requirements contained in the Record of Decision issued by DEAT as appropriate. The duties of DEAT may extend to site visits during construction and operational phases as deemed appropriate.

6.2 Applicant

Eskom is liable for restoring the environment in the event of negligence leading to damage to the environment. Eskom remains responsible for ensuring that the development is implemented according to the requirements of the EMP as well as those conditions specified in the environmental authorization and is responsible for ensuring that sufficient resources (time, financial, human, equipment, etc.) are available to the other role players as identified here, to efficiently perform their tasks in terms of the EMP. Eskom must ensure that the EMP is included in the tender documentation so that the contractor who is appointed is bound to the conditions of the EMP. Eskom must appoint an independent Environmental Control Officer (ECO) during the construction phase to oversee all the environmental aspects relating to the development. The Project Manager will be accountable for ensuring that all precautions are implemented in line with the EMP.

6.3 Contractor

The contractor, as the applicants agent on site, is bound to the EMP conditions through his/her contract with the applicant, and is responsible for ensuring that he adheres to all the conditions of the EMP. The contractor must thoroughly familiarise him/herself with the requirements of the EMP before construction and request clarification where unclear. The contractor must ensure that he/she has provided sufficient budget for complying with all EMP conditions at the tender stage. The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site engineer in terms of the EMP.

6.4 Environmental Control Officer

An independent Environmental Control Officer (ECO) must be appointed by the applicant to oversee all the environmental aspects relating to this development. The ECO should be appointed during the planning phase and form part of the project team. He/she should attend relevant project meetings, conduct audits to assess compliance with the EMP and be responsible for providing feedback on potential environmental problems associated with the development. In addition, the ECO would be responsible for:

- Liaising with relevant authorities,
- Liaising with contractors regarding environmental management; and
- Liaising with the receiving community.

6.5 Community Liaison Officer

A Community Liaison Officer (CLO) may be informally appointed/nominated by the **Sandown Extension 24 Community Forum** to address the concerns of the community during the construction phase. The CLO will be invited to attend monthly project meetings during the construction phase and shall report any community concerns to the applicant, contractor and ECO. The CLO may ensure that construction activities are carried out in accordance with the EMP and report any deviations to the project team.

The CLO's duties may extend to the operational phase to include:

- Monitoring of maintenance activities specific to the Maningi substation including landscaping;
- Communicating community concerns to Eskom;
- Reporting excessive nuisance noise generated by the facility to Eskom;
- Reporting any apparent vandalism of the facility and safety issues;

6.6 Eskom Field Services

Eskom Field Services are responsible for undertaking routine maintenance of the substation during the operational phase as well as responding to emergencies. Reporting of emergency incidents and/or maintenance queries should be directed to Eskom Field Services.

7. Environmental Management Plan

The following tables form the core of this EMP for the planning, construction and operational phases of the Maningi substation. These tables should be used as a checklist on site during the respective phases. Compliance must be audited for the construction phase on a monthly basis and on an as needed basis or during maintenance schedules in the operational phase.

7.1 Planning and design phase

#	Aspect and impact	Item	Mitigation measures	Responsible person	Frequency
PLANNING AND DESIGN PHASE					
1	Compliance appointments	1.1	The applicant must appoint an ECO during the planning phase for the construction phase of the development.	Project Manager	Once-off
		1.2	The applicant must ensure the nomination of the CLO resident to Sandown Extension 24 for EMP auditing purposes for the construction and operational phases (monitoring assistance).	Project Manager, ECO	Once-off
2	Contingency planning	2.2	Contingency plans for fire, oil and water contamination etc. must be planned in conjunction with neighbouring landowners, the City of Johannesburg local municipality and the local fire department.	Project Manager, Field services	Once-off
3	Fire design general	3.1	Eskom to review standard for passive fire protection requirements, particularly in urban environments.	Eskom Distribution Project manager	Once-off
4	Highly Protected Risk insurance	4.1	Consider application of Highly Protected Risk (HPR) cover for the Maningi substation to ensure the provision of superior active and/or passive fire protection systems, particularly for the transformers and switchgear equipment.	Eskom Distribution Project manager	Once-off
5	Fire design Substation buildings & transformer bays	5.1	Incorporate high velocity water spray systems as a means of fire extinguishment of a possible outbreak in the facility.	Engineer, Project manager	Once-off
		5.2	Oil filled transformer bund areas should be fire separated from plant rooms by a minimum distance of 10 metres	Engineer, Project manager	Once-off
		5.3	The transformer bund area should have a capacity of 110% of the total liquid content of the oil filled equipment plus, in the event of the installation of an automatic high	Engineer, Project Manager	Once-off

#	Aspect and impact	Item	Mitigation measures	Responsible person	Frequency
PLANNING AND DESIGN PHASE					
			velocity water spray fire extinguishing systems, an additional volumetric volume for the fire water system discharged for a period of 20 minutes		
		5.4	All oil drainage pipes which discharge oil into the Holding Dam shall be fitted with flame traps to minimise fire spread between the Catchment Area and the Holding Dam.	Engineer, Project Manager	Once-off
		5.5	Drain pipe diameters shall make due allowance for the automatic fire protection system water which will be discharged into the Catchment Area.	Engineer, Project Manager	Once-off
		5.6	Fire barriers should be of 210mm thick brick or 150mm thick reinforced concrete to provide a two hour rated fire barrier between adjacent sets of transformers.	Engineer, Project Manager	Once-off
		5.7	All buildings shall be constructed from brick with concrete roof. The exterior walls and division walls between plant rooms and control rooms shall have a minimum fire rating of two hours.	Engineer, Project Manager	Once-off
		5.8	Fire walls having a two hour rating shall be built between each of the four oil filled transformers. These walls shall protrude at least one metre above the level of the highest conservator tank and shall be constructed from 210 mm thick brick or 150mm thick reinforced concrete.	Engineer, Project Manager	Once-off
6	Lightning and earthing	6.1	All buildings and steel structures shall be provided with lightning conductors, arrestors and earthing probes in keeping with an acceptable standard since the incidence of lightning on the Highveld region is very high.	Engineer, Project Manager	Once-off
		6.2	All electrical equipment shall be earthed in keeping with an acceptable standard.	Engineer, Project Manager	Once-off
7	Transformers	7.1	All entrance doors leading into plant rooms, control rooms shall not face onto the oil filled transformer bays.	Engineer, Project Manager	Once-off
		7.2	Oil filled transformer bund areas to be of approximate dimensions of 9 metre wide x 10 metres long. All entrance gates into each of the transformer bays shall be installed adjacent to the access roadways	Engineer, Project Manager	Once-off
		7.3	Provide two hour rated fire walls between each of the oil filled transformers and bund walls around each unit. The bund volumetric capacity shall contain 110% of oil contents of the transformer, plus additional volume for the containment of the fire water which will be discharged during fire fighting operations.	Engineer, Project Manager	Once-off
		7.4	Provide a suitable underground concrete dump tank which shall receive the oil and fire water from the largest transformer. The drain pipes shall be taken from each of the four transformer bund areas and discharged into the underground concrete dump tank. Each drain pipe shall be fitted with a suitable flame trap to prevent any fire at the transformer being transported into the dump tank.	Engineer, Project Manager	Once-off

#	Aspect and impact	Item	Mitigation measures	Responsible person	Frequency
PLANNING AND DESIGN PHASE					
		7.5	Connect the transformer bund areas to a suitable drainage pit by means of individual buried drain pipes and flame arrestors.	Engineer, Project Manager	Once-off
8	High velocity spray system	8.1	An automatic deluge type high velocity water spray system shall be installed around each of the oil filled transformer units. This system shall be controlled via a 100mm diameter deluge valve and a 20mm diameter hydraulic detector line. There shall be a minimum of six floor projectors, 8 core box projectors and 2 conservator projectors installed around each of the transformer units. The four sets of deluge valves required for the control of each of the 4-high velocity water spray systems shall be installed behind an exposure wall next to the 132 kV indoor GIS building.	Engineer, Project Manager	Once-off
9	Water pressure for high velocity spray system	9.1	The automatic deluge type high velocity water spray and hydrant systems shall be connected to an adequate and suitable source of water such as the municipal water main providing that this has sufficient water flow and pressure. The total water requirement for the high velocity water spray systems and hydrant system will be somewhere in the order of 3000 dm3/min at a running pressure of 450kPa. If this amount of water cannot be guaranteed by the municipality then it will be necessary to install a single galvanised mild steel reservoir and a single diesel driven fire pump which will achieve the flow/pressure requirements for the risk. The reservoir capacity required for the high velocity water spray systems and hydrants will be of the order of 268 cu.m. The design of the deluge type high velocity water spray systems shall be undertaken by a specialist fire protection consultant and shall be in keeping with the NFPA Standard No 15 and the protection equipment manufacturers' recommendations.	Engineer, Project Manager	Once-off
10	Smoke detection & fire warning	10.1	The buildings which contain switchgear and associated electrical equipment shall be provided with an early warning smoke detection system which shall comply with the SANS 10139.	Engineer, Project Manager	Once-off
		10.2	There shall be a central multi-zone fire alarm panel with backup 24 volt d.c. electrical supply, local audio and visual alarm (strobe light unit) mounted in a prominent position outside of the entrance door to the affected building. Smoke detectors shall be installed at roof level in each building and within cable floor ducts where these are provided.	Engineer, Project Manager	Once-off
11	Alarm	11.1	The Maningi sub station alarm panel shall relay all fire alarms etc. to the engineer and/or the Eskom emergency back-up team.	Engineer, Project Manager	Once-off
12	Switchgear fire extinguishment	12.1	Installation of "approved" in-cabinet aerosol fire extinguishing units in each main item of switchgear, within cable ducts and within the control room. These units shall be activated by means of a 'Thermocord' heat activation device in each instance and the generator units connected to a monitoring panel which shall indicate which unit has been activated. The monitoring	Engineer, Project Manager	Once-off

#	Aspect and impact	Item	Mitigation measures	Responsible person	Frequency
PLANNING AND DESIGN PHASE					
			panel shall be connected to the detection system alarm panel which shall indicate via the audible and visual (strobe light) system that a fire condition exists. The only 'approved' aerosol type fire extinguishing system available in South Africa at present is that provided by PYROGEN South Africa and is marketed via Alien Systems and Technologies (Proprietary) Limited. These systems shall comply with SANS 331:2005 or Australian/New Zealand Standard AS/NZ 4487:1997.		
13	Hydrants and fire fighting	13.1	Provide and install at least two double-outlet hydrant valves mounted on stand pipes spaced no more than 60 metres apart on an underground pipe system of minimum diameter of 100mm. Each hydrant stand-pipe shall be provided with a hose box with hoses, couplings and an adjustable spray type branch pipe. This pipe system shall be provided with sufficient water for fire fighting purposes, which shall not be less than 1200 dm3/min at a minimum residual pressure of 300 kPa. The system can be connected to the town main or, preferably, to the recommended fire pump and reservoir systems.	Engineer, Project Manager	Once-off
14	Transformer selection	14.1	Eskom must ensure that transformers and all components relating to the facility are of a suitable specification for achieving the objectives of maximum efficiency and reduction of potential ambient noise impacts during the operational phase.	Engineer, Project Manager	Once-off
15	Substation facade	15.1	Construction of the façade shall be undertaken in terms of the architect design drawings. Any deviation from the design should be approved by the ECO, Architect and project manager.	Project team	As necessary
16	Noise attenuation	16.1	Use of structure and vegetation should provide optimal attenuation of sound to below SANS 10103 thresholds for residential areas.	Engineer, Project Manager	As necessary
		16.2	Eskom shall enlist the services of an independent acoustics engineer to undertake inspection during installation as well as monitoring during installation to ensure that noise conditions are met.	Engineer, Project Manager	Once off
17	Landscaping	17.1	Hard surfaces shall be limited to the access area and the actual substation facility. The remaining property shall be landscaped with indigenous low-maintenance vegetation.	Engineer, Project Manager	As necessary

7.2 Construction phase

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency

CONSTRUCTION PHASE					
1	General	1.1	All tendering contractors will be made aware of the contents of this Environmental Management Plan (EMP) and any penalties arising from non-compliance.	Project Manager	Ongoing
		1.2	This EMP must be made binding to the main contractor as well as individual sub-contractors and should be included in the tender documentation of the construction contract.	Project Manager	Ongoing
		1.3	This EMP must be kept on site at all times and presented to auditors, government bodies or any interested and affected parties on request.	Project Manager	Ongoing
		1.4	The contractor shall not deviate from design drawings without the approval from the Project Manager	Project Manager	Continuous
2	Environmental incidents	2.1	An environmental incidence register shall be kept on site detailing the incident in terms of the scale and measures taken to rehabilitate the incident. Where significant environmental incidents are applicable, the ECO shall report these to the relevant authority.	Project Manager, ECO, ELO	Continuous
		2.2	The contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves.	Contractor, ECO, Project manager	As required
		2.3	Any non-compliance with any of the measures stipulated in this EMP must result in the penalties being issued to the transgressor. This must be included in the contract for any construction work.	Contractor, ECO, Project manager	As required
3	Community relations	3.1	Eskom must ensure the nomination of the CLO resident to Sandown Extension 24 (at planning stage) for EMP auditing purposes for the construction phase to assist with monitoring.	Project Manager	Once off
		3.2	The appointed ECO must ensure that the CLO has been suitably informed and is invited to all project meetings scheduled on site. Scheduling of site meetings must be provided to the CLO.	ECO, CLO, Project manager	As required
		3.3	A "Complaints Register" shall be kept on site, containing contact details of any complainant, as well as details pertaining to the complaint itself.	ECO, Contractor, Project manager	Ongoing
		3.4	The Project Manager and ECO shall attend to all complaints as soon as possible. Such matters should be addressed at monthly project meetings with the ELO.	ECO, Contractor, Project manager	Ongoing
		3.5	Residents within the vicinity of the project must be informed and kept informed of any construction dates or milestones.	ECO, Contractor, Project manager	Ongoing
		3.6	The CLO may report to the community as necessary regarding deviations from the EMP where such transgressions may potentially affect residents. All possible mitigating measures should be taken to minimise the impacts of construction on residents.	ECO, Contractor, Project manager	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
4	Work area and facilities	4.1	A suitable work area for site preparation must be identified to include the contractors camp. All vegetation not identified for removal must be kept intact.	ECO, Contractor, Project manager	Once off
		4.2	The site camp must be identified, demarcated and all equipment and materials must be stored in the designated area and secured from public access.	ECO, Contractor, Project manager	Once off
		4.3	Facilities including pools and tennis courts currently located on the site should be removed/backfilled to minimise maintenance during the operational phase and landscaped with indigenous trees to assist with sound attenuation.	Project manager, Engineer	Once off
		4.4	All site establishment components shall be positioned to limit visual intrusion on neighbouring residences and minimise the area disturbed.	Project manager, Contractor, ECO	Once off
		4.5	Washing and toilet facilities shall be provided on site in accordance with Eskom standards	Project manager, Contractor,	Once off
5	Fires	5.1	No open fires are permitted on private property, on site or in the veld, except under strictly controlled conditions and subject to the requirements of local ordinances and the National Veld and Forest Act (Act No. 101 of 1998).	Project manager, Contractor,	Ongoing
		5.2	In the event that equipment that might pose a fire hazard is used in the construction process, suitable fire fighting equipment is to be made available at the construction site and in the construction camp. Emergency preparedness for different incidents e.g. fire, oil spill incidents should be in place and be implemented if and when the need arises.	Project manager, Contractor,	Ongoing
6	Equipment & maintenance	6.1	Maintenance of equipment and vehicles shall be performed off-site at a registered workshop.	Project manager, Contractor,	Ongoing
		6.2	Drip trays shall be provided for stationary and parked vehicles.	Project manager, Contractor,	Ongoing
		6.3	No washing of plant (construction vehicles) may occur on the site.	Project manager, Contractor,	Ongoing
		6.4	The Contractor shall ensure that if emergency plant maintenance occurs on site, that there is no contamination of the soil or vegetation (e.g. use of drip trays).	Project manager, Contractor,	Ongoing
		6.5	All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the site.	Project manager, Contractor,	Ongoing
7	Erosion	7.1	Building levels and implementation of civil works should be planned to minimise erosion during	Project manager,	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
			construction	Contractor, Engineer	
		7.2	In the event of erosion occurring, timeous repairs must be effected by the contractor	Contractor, ECO	Ongoing
		7.3	All topsoil must be removed and stockpiled on the site to for reintegration into civil works or landscaping requirements.	Contractor, ECO	Once off
		7.4	Soil stockpiles should be no higher than 2m to avoid compaction. To prevent erosion of material that is stockpiled for long periods, the material must be retained in a bermed area. Dust suppression is necessary for stockpiles older than one month	Contractor, ECO	Ongoing
		7.5	During construction the Contractor shall protect areas susceptible to erosion by installing necessary temporary and/or permanent drainage works as soon as possible and by taking suitable measures to prevent surface water concentration into nearby roads.	Contractor, ECO	Once off
8	Soil Pollution	8.1	Proper storage facilities for the storage of oils, paints, grease, fuels, chemicals and any hazardous materials must be provided to prevent the migration of any accidental spillage onto the ground around the temporary storage area(s).	Contractor, Project manager	Ongoing
		8.2	No batching / mixing activities shall occur on a permeable surface and the batching / mixing area shall be kept neat and clean at all times.	Contractor, ECO	Once off
		8.3	All runoff from such areas shall be strictly controlled, with contaminated water collected, stored / contained and disposed of at an approved waste disposal site.	Contractor, ECO	Once off
		8.4	Unused cement bags shall be stored so as not to be affected by rain / runoff.	Contractor	Ongoing
		8.5	Used cement bags shall be stored so as to prevent wind blown dust and potential water contamination.	Contractor	Ongoing
		8.6	Concrete transportation to the site shall not result in spillage.	Contractor	Ongoing
		8.7	Cleaning of equipment and flushing of mixers shall not result in pollution, with all contaminated wash water entering the waste water collection system.	Contractor	Ongoing
		8.8	To prevent spillage onto roads, ready mix trucks shall rinse off the delivery shoot into a suitable sump prior to leaving the site.	Contractor	Ongoing
		8.9	Suitable screening and containment shall be in place to prevent wind blown contamination from cement storage, mixing, loading and batching operations.	Contractor	Ongoing
		8.10	All contaminated water from exposed aggregate finishes shall be collected and stored in sumps for disposal at an approved waste disposal site.	Contractor	Ongoing
		8.11	All visible remains of excess concrete shall be physically removed on completion of the plastering or concrete pouring and disposed off in an acceptable manner.	Contractor	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
		8.12	Storm water shall not be allowed to flow through the batching area. All effluent water from the camp washing facility shall be disposed of in a properly constructed French drain.	Contractor	Ongoing
9	Traffic impacts	9.1	Construction activities requiring the positioning of cables within the road servitude shall not serve undue impediment to traffic flow. Construction activities along the cable route shall occur outside of week peak traffic hours (7h30-9h00 and 16h00-17h30).	Project manager, contractor,	Ongoing
		9.2	Utmost care shall be taken to ensure that construction activities along the cable route do not to interfere with access to private properties.	Project manager, contractor, ECO	Ongoing
		9.3	Temporary access to the site shall be provided via the Adolf Street and North Road access point to Eskom and its contractors only in order to prevent congestion within Sandown Extension 24. The access point shall be controlled and monitored.	Project manager, contractor,	Ongoing
		9.4	Construction material delivery vehicles must be scheduled to arrive and leave the site outside peak traffic hours (7h30-9h00 and 16h00-17h30)	Project manager, contractor,	Ongoing
		9.5	Any temporary closure of public roads must be applied for and approved by the local council.	Project manager, contractor,	Ongoing
		9.6	Measures must be taken by the contractor to ensure that vehicles are clean before leaving the site in order to minimise the occurrence of road debris and dirt.	Contractor	Ongoing
10	Transportation	10.1	Emergency and contingency plans must be in place before the transportation of transformers or large components to the site.	Project manager, contractor,	Ongoing
		10.2	Oil contained in the transformers shall be drained prior to transportation to or from the site.	Project manager, contractor,	Once off
11	Visual impact	11.1	Vegetation to be retained on the site must be included in the design plan, be identified and marked.	Project manager, contractor, ECO	Once off
		11.2	In the event that construction activities are undertaken during the night, any lighting must be directed away from public roads and adjacent properties.	Project manager, contractor	As required
		11.3	Lighting should be sufficient to ensure security but should not constitute ‘light pollution’ to the surrounding areas.	Project manager, contractor	Ongoing
		11.4	Construction of the residential façade shall not deviate from the architectural and engineering design unless under specific instruction from the Project Manager or engineer.	Project manager, contractor, engineer, ECO	As required
12	Air pollution	12.1	Dust suppression techniques must be implemented on site.	Contractor	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
		12.2	The Contractor shall take preventative measures (e.g. screening, dust control, timing, pre-notification of affected parties) to minimise complaints regarding dust nuisances from construction activities.	Contractor	Ongoing
		12.3	Vehicles to be used during the construction phase are to be kept in good working condition and should not be the source of excessive fumes.	Contractor	Ongoing
		12.4	All materials transported to site must be transported in such a manner that they do not fly or fall off the vehicle. This may necessitate covering vehicles during transport.	Contractor	Ongoing
13	Noise pollution	13.1	Noise levels shall be kept within acceptable limits in accordance with the local by-laws.	Contractor	Ongoing
		13.2	Where possible construction work should be undertaken during normal working hours (08H00 – 17H00), from Monday to Friday.	Contractor	Ongoing
		13.3	If necessary special permission can be granted to continue work on Saturdays from 08H00 to 13H00; No work will be allowed on Sundays and Public Holidays.	Contractor	As required
		13.4	Should an extension of working hours be required, the adjacent property owners are to be consulted and informed in writing two days in advance of any overtime activities.	Contractor	As required
14	Health and safety	14.1	It is the responsibility of Eskom to ensure that all construction and operational processes and procedures are compliant with the relevant health and safety regulations.	Project manager, Contractor, H&S Officer	Ongoing
		14.2	Contractors shall take reasonable care of their own health and safety and cooperate with the employer to ensure that the requirements as set out in the Occupational Health and Safety Act and the Regulation fulfilled. Employees shall maintain each item of personal protective equipment provided to them and keep it clean and hygienic and in good state of repair.	Contractor, H&S Officer	Ongoing
15	Destruction of vegetation	15.1	Vegetation to be kept on site must be identified and marked. No marked vegetation shall be destroyed.	Contractor, ECO	Ongoing
16	Property damage	16.1	Construction activities requiring the positioning of cables within the road servitude shall not interfere with property frontages including landscaping and paving. Eskom will be liable for repairing damages incurred to private properties to pre-development conditions.	Contractor, ECO	Ongoing
17	Faunal impacts	17.1	Where potentially sensitive bird species are sighted within the site, such sightings must be reported to the ECO who must confirm the required mitigation actions required.	Contractor, ECO	Ongoing
		17.2	No fauna may be killed or injured on the site as a result of negligent actions by a contractor and his staff.	Contractor, ECO	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
		17.3	The construction site must be kept clean and tidy and free from rubbish to limit the occurrence of animal pest species.	Contractor, ECO	Ongoing
18	Security	18.1	No workers are permitted temporary or overnight residence on the site. Only security staff may have overnight quarters on the site.	Project manager, Contractor	Ongoing
		18.2	Security shall be provided on site for the duration of the construction phase.	Project manager, Contractor	Ongoing
		18.3	Records of all employees, contractors and subcontractors and their personal details shall be kept at the site office.	Project manager, Contractor	Ongoing
		18.4	All employees must carry (wear) appropriate and valid identification.	Project manager, Contractor	Ongoing
19	Sourcing of labour	19.1	It is understood that all works required for the installation of the substation are specialised. No labour may be sourced from the local area. All labour must be employed by a recognised body being Eskom, civil or engineering contractors.	Project manager, Contractor	Ongoing
20	Landscaping	20.1	Areas of the site where no hard surfaces are to be built are to be landscaped with indigenous, low maintenance grass species.	Project manager, Contractor, ECO	Once off
		20.2	Suitable indigenous trees which provide maximum sound attenuation properties should be planted on the site to assist in the attenuation of ambient noise.	Project manager, Contractor, ECO	Once off
		20.3	Facilities including pools and tennis courts currently located on the site should be removed/backfilled to minimise maintenance during the operational phase and landscaped with indigenous trees to assist with sound attenuation and indigenous low maintenance grasses to assist with the attenuation of stormwater.	Project manager, Contractor, ECO	Once off
21	Oil management	21.1	Appropriate containment facilities shall be designed to prevent spilled or leaked transformer oil from contaminating surface or groundwater. Bund walls will be installed. Refer to section on Hazardous Waste.	Project manager, Contractor, ECO	Once off
		21.2	Oil spill kits materials can be obtained from the following oil pollution clean-up consultants: *Green Banana* *Tel No. 011 740 7820* *Cell No: 082 458 4838* *E-mail address: pa@greenbanana.com* *Ensa* *Tel No: 011 477 3892* *Cell No: 083 376 1650*	Project manager, Contractor, ECO	As required

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
			E-mail:info@ensa.co.za Should an oil spill occur, the following procedure recorded in the Procedure for the Reporting, Recording, Investigating, Costing and follow-up of incidents/ accidents (DPC 34-350) must be followed. <u>Report the Spill:</u> All Oil spill must be reported to the Risk Management within 24hours: Shamaine Thulasaie (011 711 2764). <u>Assessment of the Spillage:</u> Assessment can be done by using the Model of Oil spill Assessment table. <u>Secure the site:</u> Contain the spill to avoid further pollution. Determine the spill boundaries Prevent unauthorised access to the spill site Notify all parties involved <u>Limit the spill by:</u> Closing a valve Repairing or plugging a leak Reposition the container		
22	Waste management	22.1	All construction-generated refuse / waste must be removed to an officially approved dumping site.	Project manager, Contractor, ECO	As required
		22.2	No on-site burying / dumping of waste materials, vegetation, litter or refuse shall occur. All solid waste shall be disposed of at suitable licensed disposal sites.	Project manager, Contractor, ECO	Ongoing
		22.3	Bins shall be provided in sufficient number and capacity to store all solid waste produced on a daily basis. These bins must be kept closed and emptied regularly (minimum daily) so that they are not overfilled.	Contractor	Daily
		22.4	Waste shall be collected from site by a licensed contractor and removed to an appropriate waste disposal facility.	Project manager, Contractor	Ongoing
		22.5	Wherever possible, materials shall be recycled via a “greens waste site”. To this end, containers for glass, paper, metals, plastics, organic waste and hazardous wastes (e.g. oil rags, paint containers, thinners) shall be provided in sufficient quantity on the site.	Contractor, ECO	Ongoing
23	Hazardous waste	23.1	Labelled containers must be provided to store used oils, as well as hazardous waste containers for oily rags, oil filters etc. and must be disposed of at an suitable approved register dumpsite.	Project manager, Contractor, ECO	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
		23.2	Hazardous storage and refuelling areas must be bunded with an impermeable liner to protect groundwater quality. The Contractor shall submit a method statement to the Project Manager for approval.	Project manager, Contractor, ECO	Ongoing
		23.3	Temporary fuel tanks must meet relevant specifications and be elevated so that leaks may be easily detected.	Project manager, Contractor, ECO	Ongoing
		23.4	Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site.	Project manager, Contractor, ECO	Ongoing
		23.5	Storage areas containing hazardous substances / materials must be clearly sign-posted.	Project manager, Contractor, ECO	Ongoing
		23.6	All temporary storage areas should include a bund wall high enough to contain at least 110% of any stored volume.	Project manager, Contractor, ECO	Ongoing
		23.7	Contractors shall submit a method statement and plans for the storage of hazardous materials and emergency procedures.	Project manager, Contractor, ECO	Ongoing
		23.8	Staff dealing with these materials / substances must be aware of their potential impacts and follow the appropriate safety measures.	Project manager, Contractor, ECO	Ongoing
		23.9	A suitable contractor must be employed to remove waste oil. These wastes should only be disposed of at DWAF approved landfill sites.	Project manager, Contractor, ECO	Ongoing
		23.10	The contractor must ensure that its staff is made aware of the health risks associated with any hazardous substances used and has been provided with the appropriate protective clothing/equipment in case of spillages or accidents and have received the necessary training.	Contractor	Ongoing
		23.11	All empty containers must be removed from the site for appropriate disposal at a licensed commercial facility.	Contractor	Ongoing
		23.12	Any spillage which may occur shall be investigated and reported to the ECO. Immediate action must be taken to remediate or rehabilitate the spill.	Project manager, Contractor, ECO, CLO	As necessary
24	Monitoring	24.1	A regular monitoring programme must be in place to ensure compliance with the EMP but also to monitor environmental issues and impacts not accounted for in the EMP.	Project manager, Contractor, ECO, CLO	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
CONSTRUCTION PHASE					
		24.2	The EMP shall be viewed as a living document to be updated as additional issues/impacts are encountered. The EMP shall consider the following: ▪ Environmental incidents register; ▪ Complaints register and, ▪ Minutes of project site meetings.	Project manager, Contractor, ECO, CLO	Ongoing
		24.3	A post-construction audit is to be undertaken to identify non-conformance with the EMP. Corrective actions must be undertaken before the contract is signed off by each respective contractor.	Project manager, Contractor, ECO, CLO	As required

7.3 Operational phase

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
OPERATIONAL PHASE					
1	Community relations	1.1	The project manager and Head of Field Services for the Sandton area shall ensure that communication channels with the Sandown Extension 24 community and CLO or suitable community representative are maintained.	Project manager	Ongoing
		1.2	The CLO shall be provided with a list of the appropriate Eskom contact persons (Appendix 1) and may distribute the list to other members within the community.	Project manager, Contractor, ECO, CLO	Once off
		1.3	A facility and landscaping maintenance schedule as compiled by Eskom Field Services shall be provided to the CLO who may distribute it to other members within the community. The CLO may ensure that maintenance is undertaken and report any significant deviations to the schedule to Field Services.	Project manager, CLO, Eskom Field Services	Once off
2	Emergency preparedness & disaster management	2.1	The Maningi sub station alarm panel shall relay all fire alarms etc. to the engineer and/or the Eskom emergency back-up team as well as the local fire station.	Project manager, Engineer, Eskom Field Services	Ongoing
		2.2	An organised system shall be implemented for the reporting, recording, investigation and analysis of emergency situations at Maningi.	Project manager, Eskom Field Services	Once off
		2.3	A site specific emergency preparedness plan must be undertaken for Maningi by Eskom. The Project Manager shall ensure that a copy of the site specific emergency preparedness plan is easily accessible to all relevant staff and the CLO or a suitable community representative.	Project manager, Eskom Field Services, CLO	Once-off
		2.4	Eskom shall be responsible for implementing and maintaining inspection systems to ensure that personnel, material, equipment, facilities and other emergency requirements are in place and ready for use	Project manager, Eskom Field Services	Ongoing

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
OPERATIONAL PHASE					
			or action.		
3	Facility monitoring	3.1	The Maningi substation components will be monitored by Eskom Field Services (Sandton Unit) and will be inspected weekly to ensure the operation, efficiency and safety of the facility.	Project manager, Eskom Field Services	Weekly
		3.2	Façade monitoring shall be undertaken by Field Services for vandalism or repair work required. Repairs required outside of routine maintenance should be effected timeously.	Project manager, Eskom Field Services	Weekly
		3.3	Landscape monitoring shall be undertaken by Field Services to determine landscaping requirements outside of routine maintenance.	Eskom Field Services	Weekly
4	Maintenance	4.1	**Façade** A schedule for maintenance of the façade including roofing, windows, painting, paving and fencing shall be prepared by Eskom Field Services to remediate any deficiencies in the visual aesthetic. Any major repair work identified should be undertaken as soon as possible. Care shall be taken to ensure that the facility is as in keeping with the residential character as possible.	Project manager, Eskom Field Services	Once off
		4.2	**Landscaping** A landscaping schedule including mowing and tree cutting/pruning activities shall be prepared by Eskom Field Services. Trees shall be cut only where they potentially interfere with structures on the site.	Project manager, Eskom Field Services	Once off
		4.3	**Components** A schedule for maintenance of switchgear and transformers shall be prepared by the engineer, project manager in conjunction with Eskom Field Services.	Project manager, Eskom Field Services	Once off
		4.4	**Maintenance other** Eskom Field Services shall ensure that all above ground infrastructure which is the property of Eskom is maintained to a suitable standard within the Sandown Extension 24 area.	Eskom Field Services	Ongoing
5	Lighting	5.1	Lighting should be sufficient to ensure security but should not constitute 'light pollution' to the surrounding residences. All reports of light pollution shall be investigated.	Project manager, Eskom Field Services	Ongoing
6	Noise	6.1	Eskom shall enlist the services of an independent acoustics engineer to undertake inspection during installation as well as monitoring during installation to ensure that noise conditions are met.	Project manager	As necessary
		6.2	Subsequent complaints of noise emanating from the Maningi substation from residents shall be directed to the CLO who in turn shall direct these to Eskom. Eskom shall ensure that such reports are investigated and undertake a noise monitoring programme in consultation with an independent acoustics engineer should there be reasonable grounds for concern.	Project manager, Eskom Field Services	As necessary

#	Aspect and impact	Item	Mitigation measures	Responsible person/s	Frequency
OPERATIONAL PHASE					
		6.3	Eskom shall ensure that noise levels remain within the SANS Code of Practice 10103:2008 for residential areas at all times and shall undertake additional noise mitigation measures if deemed appropriate by the specialist.	Project manager, Engineer	Ongoing
7	Security	7.1	**Fencing** Security to the Maningi substation is to be provided by way of an electrified boundary wall. Extra security precautions are provided considering the position of the site within a gated community.	Project manager, Engineer	Once off
		7.2	**Lighting** Lighting should be sufficient to ensure security but should not constitute 'light pollution' to the surrounding residences.	Project manager, engineer	As necessary
		7.3	**Alarm** An alarm system shall ensure that any security breeches to the facility are immediately communicated to Eskom Field Services, Sandton fire station and the police.	Project manager, engineer	As necessary

8. Conclusion

The EMP should be used as an on-site reference document during all phases of the development. Successful implementation and operation of the Maningi substation could serve as a model to be implemented in other densified areas, provided that community consultation is established and maintained. If the provisions of this EMP are maintained, the potential impact on the environment can be mitigated to an acceptable level.

Appendix 1

Stakeholder contact list