ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

for

PROPOSED DEVELOPMENT OF ESKOM NTSHONA 132kV SUBSTATION AND TWO OVERHEAD 132kV POWERLINES WITHIN MOGALE CITY LOCAL MUNICIPALITY, KRUGERSDORP, GAUTENG.

November 2015

Compiled for:
Eskom SOC Limited
P.O.Box 8610
Johannesburg
2000
Tel: (011) 711-2824
Fax: 086 604 1274

COMPILED BY:
Envirolution Consulting (Pty) Ltd
PO Box 1898
Sunninghill
2157
Tel: 0861 444 499
Fax: 0861 626 222
Email: info@envirolution.co.za

TABLE OF CONTENTS

DEFINITIONS AND TERMINOLOGY

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

Cumulative impacts: Impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (e.g. discharges of nutrients and heated water to a river that combine to cause algal bloom and subsequent loss of dissolved oxygen that is greater than the additive impacts of each pollutant). Cumulative impacts can occur from the collective impacts of individual minor actions over a period and can include both direct and indirect impacts.

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

Drainage line: A drainage line is a lower category or order of watercourse that does not have a clearly defined bed or bank. It carries water only during or immediately after periods of heavy rainfall i.e. non-perennial and riparian vegetation may or may not be present

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

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

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

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

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

Environmental impact assessment: Environmental Impact Assessment (EIA), as defined in the NEMA EIA Regulations and in relation to an application to which scoping must be applied, means the process of collecting, organising, analysing, interpreting and communicating information that is relevant to the consideration of that application.

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

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

General waste: Waste which does not pose an immediate hazard or threat to health or to the environment' and includes the following waste flows: domestic waste, construction and demolition waste, business waste, insert waste.

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

Hazardous waste: Waste that has the potential to cause a negative threat/impact to humans and/or the environment. It includes, but is not limited to, batteries, neon lights, fluorescent lights, printer cartridges, oil, paint, paint containers, oil filters, IT equipment etc.

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

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

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

Significant impact: An impact that by its magnitude, duration, intensity or probability of occurrence may have a notable effect on one or more aspects of the environment.

Waste: As per National Environmental Management: Waste Act means-

a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or
b) disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or
c) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste.

Watercourse: as per the National Water Act means -

(a) a river or spring;
(b) a natural channel in which water flows regularly or intermittently;
(c) a wetland, lake or dam into which, or from which, water flows; and
(d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks. community

ACRONYMA & ABBREVIATIONS

EA	Environmental Authorisation
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EMPr	Environmental Management Programme
GDARD	Gauteng Department of Agriculture and Rural Development

1. INTRODUCTION AND BACKGROUND

Envirolution Consulting has been appointed by Eskom SOC Holdings Ltd to undertake a Basic Assessment for the proposed development of a new 132 kV Ntshona substation with a footprint of 1.5 hectares in addition to the construction of two 132 kV overhead power lines extending from the proposed substation to the Westgate MTS substation in Krugersdorp, Gauteng Province. The first powerline is the Westgate-Ntshona line that will be approximately 2.2 km and the second line is the Westgate Rand Centre line that is approximately 5.3 km in length. The new substation location and overhead power line routes are situated on a mining industrial area on Portion 136 of the farm Luipaardsvlei 246 IQ and portion 52 on farm Rietvalei 241IQ, Gauteng Province. The project site falls within the jurisdiction of the West Rand District Municipality in close proximity to the Mogale City Local Municipality, Gauteng Province. Envirolution Consulting (Pty) Ltd was appointed to undertake a Basic Assessment for the proposed construction of a new Ntshona substation and two overhead power lines on portion 52 on farm Rietvalei 241IQ and portion 136 of the farm Luipaardsvlei 246 IQ, within the West Rand District Municipality, Gauteng Province.

The objective of the proposed powerline and substation is to strengthen the current network capacity as well as to improve the quality of supply and reliability in the surrounding areas. Furthermore, strategic servitudes are required for the network development projects conceptualised for the West Gauteng distribution area. The proposed development will also accommodate future and planned developments within the area.

It is understood that any development can pose various risks to the environment as well as the residents or businesses in the surrounding area. These possible risks should be taken into account during the planning phase of the development. The purpose of this document is to provide management responses that will ensure that the impacts of the development are minimised. This EMPr is, therefore, a stand-alone document, which must be used on site during each phase of the development (planning, construction and operational phases).

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

This document should be flexible so as to allow the contractor and developer to conform to the management commitments without being prescriptive. The management commitments prove that the anticipated risks on the environment will be minimised if they are adhered to consistently. The onus set out in the EMPr rests with the developer, main contractors and subcontractors, which promotes responsibility and commitment.

Any parties responsible for transgression of the underlying management measures outlined in this document will be held responsible of non-compliances and will be dealt with accordingly.

Aims and objectives of the EMPr

The purpose of this EMPr is to provide an easily interpreted reference document that ensures that the project environmental commitments, safeguards and mitigation measures from the environmental planning documents, project approvals, and Scope of Works are implemented. It aims to minimise impacts associated with the construction phase for the construction of the 132kV Ntshona substation and the associated construction of two new 132 kV overhead powerlines in Krugersdorp, Gauteng and make sure the impacts on the environment are kept to a minimum. This includes ensuring that the mitigation measures described in the Basic Assessment Report (if required) are implemented, to ensure continued monitoring of the construction phase and to ensure the involvement of interested and affected parties (IA&Ps) in a meaningful way.

The objectives for the EMPr are:

- To develop, implement and maintain effective management systems for the environmental aspects of the maintenance works;
- To document details of environmental protection infrastructure and controls so that they are able to provide long term protection for the natural environment;
- To ensure compliance with relevant legislation (National, Provincial and Local), regulatory requirements and environmental documents;
- To maximise the value and outcomes of environmental monitoring activities so that the information can be applied to the planning and implementation of future projects;
- To ensure that all Environmental Management considerations are implemented during the operational and maintenance phases of the project.

The EMPr has been developed been based on the findings of the on site assessment undertaken by Envirolution and the following specialist studies undertaken during the basic assessment process of this project:

- Wetland Delineation and Functional Assessment Report undertaken by Limosella Consulting, September 2015.
- A Vegetation Assessment Report undertaken by Limosella Consulting, September 2015.
- A Fauna and Habitat Assessment Report commissioned by I. L Rautenbach *et al*, September 2015.

- Geotechnical Investigation undertaken by M.J. Van Der Walt Engineering Geologist cc, September 2015.
- Heritage Impact Assessment undertaken by a Heritage Consultant J van Schalkwyk (D Litt et Phil), September 2015.
- Visual Impact Assessment undertaken by I-Dot Design Studio CC trading, September 2015.

All the Environmental specifications and the procedures discussed in this document were also developed in accordance with the relevant legislation applicable to the development.

2. PREPARATION OF THE ENVIRONMENTAL MANAGEMENT PROGRAMME (EMPr)

This draft Environmental Management Programme was compiled by:

Company Name:	Envirolution Consulting (Pty) Ltd
Contact person:	Mr Thabang Sekele
Physical Address:	223 Columbine Avenue, Mondeor
Postal Address:	P.O Box 1898, Sunninghill, 2157
Telephone Number:	(0861) 44 44 99
Fax Number:	(0861) 62 62 22
E-mail:	thabang@envirolution.co.za

Expertise of Environmental Practitioner that prepared the EMPr

Mr. Thabang Sekele forms part of the project team and acts as the Project Co-ordinator for all phases of the project. Thabang holds a BA (Environmental Management) in which he majored in Geography of which he plans on enrolling in a Postgraduate (Honours) programme in 2016. He is an Environmental Professional with good exposure to the Environmental Management field. Thabang's key focus is on strategic environmental assessment and advice; management and co-ordination of environmental projects, which includes integration of environmental studies and environmental processes into larger engineering-based projects and ensuring compliance to legislation and guidelines; environmental auditing and compliance reporting; the identification of environmental management solution and mitigation/risk minimising measures; environmental auditing, monitoring and reporting compliance. Thabang has been an Environmental Control Officer for various projects entailing Environmental Authorisations in Gauteng, Mpumalanga and Free State provinces of South Africa. Thabang is currently a Project Co-ordinator and Environmental Professional at Envirolution Consulting (refer to curriculum vitae attached within Appendix 2).

3. DESCRIPTION OF THE IMPACTS

The proposed substation construction of the overhead power lines and substation will have potential vegetation, wetland, fauna, and visual impacts. In terms of vegetation impacts the most significant impact of the powerline and substation development is expected to occur during the construction phase. While the excavation of soil for the base of pylons would remove vegetation, the vegetation could be rehabilitated and transformed areas could be re-vegetated with indigenous species that will improve the current degraded state of the area. If remedial measures and monitoring is properly employed, the vegetation that will be disturbed during construction could rehabilitate well over time, and long term impacts on vegetation could thus be minimal.

The Westgate-Rand Centre route has more potential impacts on the adjacent artificial wetland. The activities associated with constructing powerline infrastructure will affect hydrology, habitat and soils of wetlands as well as their associated buffer zone. The most important impact is the removal of vegetation and compaction of soil around the pylon footprint as well as along the servitude. If not remediated, these impacts can result in erosion and subsequent sedimentation of watercourses.

Due to the nature of the development, little of the existing natural habitat will be destroyed. Heavy motor vehicle usage over the study site and adjacent land will expose the soils on the site to erosion and compaction. It is predicted that can be ameliorated. There is no particular Red flagged area at the site. No loss of ecosystem function is anticipated.

Visually, during the site investigation it was noticed that most residents from Eleadah complex will not be affected by the proposed project due to a solid boundary wall restricting their views of the project site. A three storey apartment block is located on the western side of the complex and residents can overlook the project site. A relatively small number of viewers will be able to experience partial views of the Westgate-Ntshona line. A fair degree of screening will be provided by clusters of trees growing in the line of sight that will greatly limit their views

Figure 1 indicates the wetland sensitivity and the buffer zones in relation to the proposed development that were delineated by the wetland specialist. Although a buffer zone is indicated on the delineation (as per GDARD requirements) it falls into the alignment of the two power lines, however it must be ensured that pylons are not placed inside the 32 m buffer.

Other potential impacts that may occur during the construction may include soil erosion during the clearing of the existing vegetation, noise, dust and traffic from construction equipment and vehicles. Waste management issues such as littering which can also cause visual nuisance. Local security is also likely to be comprised during the construction phase by the presence of workers on site.

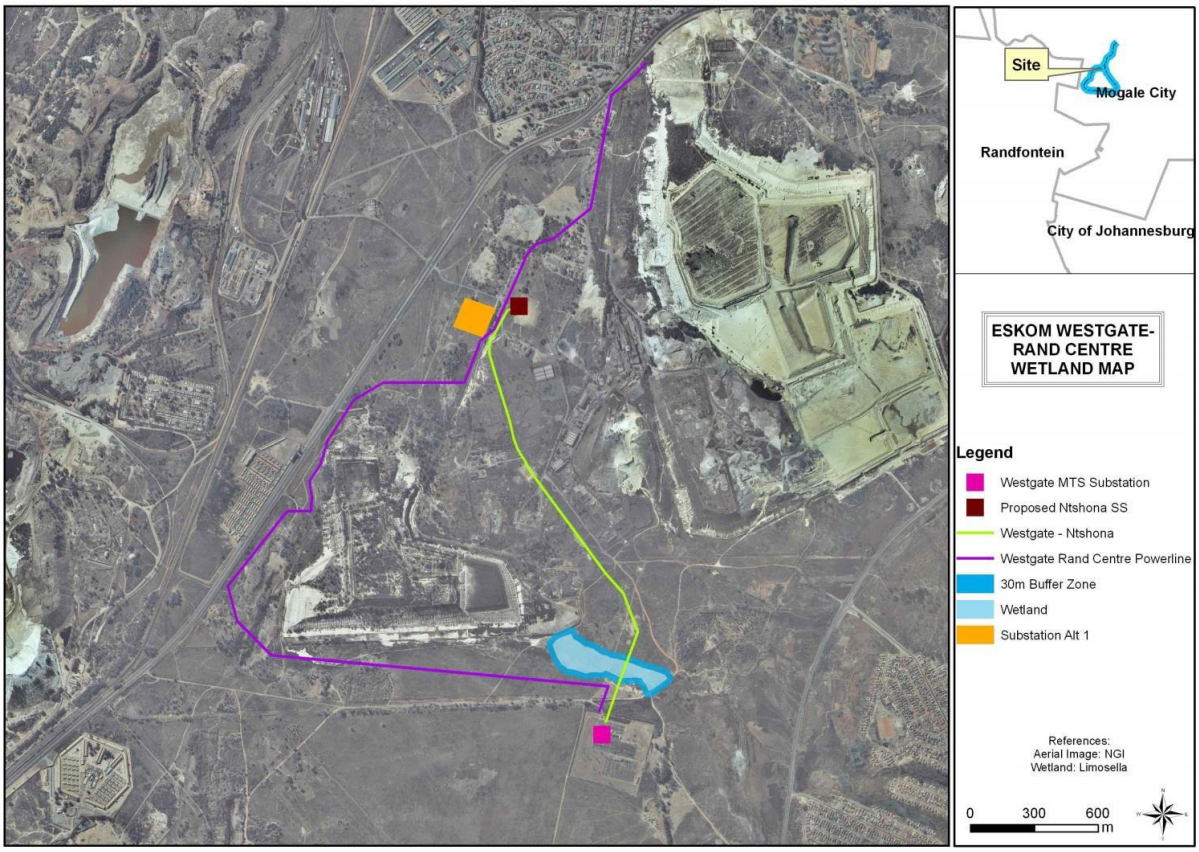

Figure 1: Wetland sensitivity area delineated together with associated buffer zones (Limosella Consulting, October 2015)

It thus of utmost importance that the mitigation measures proposed in this EMPr be adopted and be monitored by an independent person throughout the construction phase.

4. APPLICABLE LEGISLATION

Several laws and regulations apply to the protection of the environment and contain environmental principles and standards that need to be applied and permits and licences that need to be obtained. This EMPr will be subject to regulatory control under a range of State, Provincial and Local regulations. Such legislation largely embraces pollution prevention, resource use and conservation, and socio cultural (heritage) protection. This chapter reviews legislation pertaining to the development of the Ntshona substation and its two overhead associated 132kV power lines.

According to Section 2 (1, 2 & 3) of the National Environmental Management Act No. 107 of 1998 (NEMA), all organs of state have to apply certain principles set out in NEMA when taking decisions that may significantly affect the environment. The key principles of this Act include that all "actions" that they approve must be economically, socially and environmentally sustainable. It further states that "people and their needs" must be at the forefront of "its concern" and their interests must be served equitably. The intent of this EMPr is to ensure that the developer conducts all its activities related to the construction and maintenance of this erosion protection measure in accordance with the provisions of the NEMA, and has taken into account the provisions of the Constitution and the principles of Integrated Environmental Management.

Key environmental legislations that are applicable to the project are described below:

4.1 The Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)

The Constitution is the most important piece of legislation that provides a framework for environmental management in South Africa. There are various sections that have implications for environmental management, hence for sustainable development. The Bill of Rights is fundamental to the Constitution of South Africa and in, section 24 of the Act. Other sections in the Constitution that are of importance are section 32 which deals with the right of access to information; section 33 which provides for just administrative action; section 38 which deals with the extended *locus standi* provisions.

Section 24 therefore places a duty on all spheres of government to take reasonable steps, including to make laws, prevent pollution, promote conservation and ensure sustainable development.

While no permitting or licensing requirements arise from this legislation. However, this Act will find application during the construction phase of the project in proper management of the environment. An EMP has been compiled for this purpose, to ensure that the environment is protected throughout the phases of the development.

4.2 National Environmental Management Act, 1998 (Act No. 107 of 1998) (as amended)

The National Environmental Management Act (Act 107 of 1998) generally known as "NEMA" is South Africa's overarching framework for environmental legislation. The NEMA Act sets out the principles of Integrated Environmental Management (IEM). NEMA aims to promote sustainable development, with wide-ranging implications for national, provincial, and local government. Included amongst the key principles is that all development must be environmentally, economically and socially sustainable and that environmental management must place people and their needs at the forefront, and equitably serve their physical, developmental, psychological, cultural and social interest. Section 24 provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment. While Section 28 of NEMA creates a general duty of care on every person, and "person" is very widely defined, to take reasonable measures to prevent significant pollution or degradation of the environment from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment.

In terms of Section 19, the project proponent must ensure that reasonable measures are taken throughout the life cycle of this project to prevent significant pollution or degradation of the environment from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment

4.3 National Environmental Management: Biodiversity Act 2004 (Act 10 of 2004)

Provides management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act107 of 1998; the protection of species and ecosystems that warrant national protection and the sustainable use of indigenous biological resources.

4.4 The National Environmental Management Waste Act 2008 (Act 59 of 2008)

The National Environmental Management Waste Act (NEMWA) reforms the law regulating waste management in order to protect health and the environment providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable

development; to provide for institutional arrangements and planning matters; to provide for national norms and standards for regulating the management of waste by all spheres of government; to provide for specific waste management measures; to provide for licensing and control of waste management activities; to provide for the remediation of contaminated land; to provide for the national waste information system; to provide for compliance and enforcement; and to provide for matters connected therewith.

4.5 The Occupational Health and Safety Act 1993 (No 85 of 1993)

The Occupational Health and Safety Act makes provision in regulation Section 8 for the general duties of employers to their employees. Section 9 of the Regulations makes provision for general duties of employers and self employed persons to persons other than their employees.
While no permitting or licensing requirements arise from this legislation, this Act will find application during the construction phase of the project. Healthy and safety precautions measures must be put in place for the construction crew and the general public

4.6 The National Environmental Management: Air Quality Act 2004 (No 39 of 2004)

National Environmental Management: Air Quality Act (NEM:AQA) which provides for the control of dust, noise and offensive odours.
While no permitting or licensing requirements arise from this legislation, this Act will find application during the demolition phase of the project. Dust control regulations promulgated in November 2013 may require the implementation of a dust management plan.

4.7 The National Environmental Management: Water Act, 1998 (Act No. 36 of 1998)

The National Water Act aims to provide management of the national water resources to achieve sustainable use of water for the benefit of all water users. This requires that the quality of water resources is protected as well as integrated management of water resources with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved, managed and controlled.

Of specific importance to this application is Section 19 of the National Water Act, 1998 (Act No. 36 of 1998), which states that an owner of land, a person in control of land or a person who occupies or uses the land which thereby causes, has caused or is likely to cause pollution of a water resource must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring and must therefore comply with any prescribed waste standard or management practices. Section 20 outlines the control of emergency incidents.
For the purpose of this project a Water Use Licence is required in terms of Section 21 (c) impeding or diverting the flow of water in a watercourse and (i) altering the bed, banks, course or characteristics of a watercourse.

5. PHASES OF THE PROJECT

The point of departure for this EMPr is to take a pro-active route by addressing potential problems before they occur. This should limit corrective measures needed during the construction and operational phases of the development. Additional mitigation will be included throughout the project's various phases, as required and if necessary.

The EMPr deals with the following phases as detailed below:

5.1. The Planning and Design Phase

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

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

5.2. The Construction Phase

The bulk of the impacts during this phase will have immediate effect (e.g. noise-, dust- and water 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 will then be mitigated through the contingency plans identified in the planning phase, together with a commitment to sound environmental management from the developer.

5.3. Rehabilitation Phase

This phase will involve restoring the land impacted during the construction phase back to its original state. This process will mainly on rectifying the negative impacts that have been caused during construction by the removing pollution or contaminants and other dangerous substances from groundwater, sediment, or surface water and improvement of the soil.

5.4. The Operational Phase

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

6. ROLES AND RESPONSIBILITIES

The implementation of this EMPr requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase. The stakeholders are discussed below.

6.1. Developer

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

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

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

6.2. Contractor

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

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

6.3 The Environmental Control Officer (ECO)

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

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

- Assisting in ensuring that the necessary environmental authorisations and permits have been obtained prior to construction commencing.
- Reviewing the Contractor's construction Method Statements.
- Monthly site inspections of all construction areas with regard to compliance with the EMPr.
- Monitoring and verifying adherence to the EMPr, the EA and approved Method Statements at all times.
- Monitoring and verifying that environmental impacts are kept to a minimum.
- Taking appropriate action if the specifications are not followed.
- Monitoring the undertaking by the Contractor of environmental awareness training for all new personnel coming onto site.
- Advising on the removal of person(s) and/or equipment not complying with the specifications.
- Auditing the implementation of the EMPr and compliance with the EA on a monthly basis.
- Compiling a final audit report regarding the EMPr and its implementation during the construction period after completion of the contract and submitting this report to the Employer and the authorising authority.

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

(a) Liaison with Authorities

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

(b) Liaison with Contractors

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

6.4 Project Engineer (PE)

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

6.5 Environmental Liaison Officer (ELO)

The contractor must appoint an Environmental Liaison Officer (ELO) to assist with day-to-day monitoring of the construction activities. Any issues raised by the ECO will be routed to the ELO for the contractors' attention. The ELO shall be permanently on site during the construction phase to oversee the Contractor's internal compliance with the EMPr requirements and ensuring that the environmental specifications are adhered to. The ELO should ideally also be a senior and respected member of the construction crew.

The ELO will be responsible for keeping detailed records of all site activities that may pertain to the environment and include all these aspects in an environmental register. This register must be presented at each EMC meeting and be made available to the ECO during his/her monthly audits. In addition to the environmental register the ELO must keep a register of complaints from any community members on environmental issues. Finally, the ELO will be required to keep a record of all on-site environmentally related incidents and how these incidents were dealt with. Past experience has revealed that, ELO's that can relate to the work force are the most effective for information transfer and ensuring compliance with the EMPr.

6. ENVIRONMENTAL AWARENESS PROCEDURE

OBJECTIVE: Ensure all construction and operation personnel have the appropriate level of environmental awareness and competence to ensure continued environmental due diligence and on-going minimisation of environmental harm (Environmental Awareness Plan)

To achieve effective environmental management, it is important that Contractors and site employees are aware of the responsibilities in terms of the relevant environmental legislation and the contents of this EMPr. The developer is responsible for informing its employees and contractors (transportation contractor) of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the works in a manner that will minimise environmental impacts. The developer's obligations in this regard include the following:

- Employees must have a basic understanding of the key environmental features of the site and its surrounding environment.
- Ensuring that a copy of the EMPr is readily available on-site, and that all site staff are aware of the location and have access to the document. Employees must be familiar with the requirements of the EMPr and the environmental specifications as they apply to the operation of the facility.
- Ensuring that, prior to commencing any new site works, all employees have attended an Environmental Awareness Training course. The course must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented.
- Awareness of any other environmental matters, which are deemed to be necessary by the depot manager.
- Ensuring that appropriate communication tools are used to outline the environmental "do's" and "don'ts" (as per the environmental awareness training course) to employees.
- Records must be kept of those that have completed the relevant training.
- Refresher sessions must be held to ensure the operating staffs are aware of their environmental obligations.

Therefore, prior to the commencement of construction activities on site and before any person commences with work on site thereafter, adequate environmental awareness and responsibility are to be appropriately presented to all staff present onsite, clearly describing their obligations towards environmental controls and methodologies in terms of this EMPr. This training and awareness will be achieved in the following ways:

6.1 Environmental Awareness Training

Environmental Awareness Training must be undertaken by the Contractor and must take the form of an on-site talk and demonstration by the Contractor before the commencement of construction activities on site. A record of attendance of this training must be maintained by the Contractor on site.

6.2 Induction Training

Environmental induction training must be presented to all persons who are to work on the site – be it for short or long durations.

This induction training should be undertaken by the Contractor and should include discussing the Eskom's environmental policy and values, the function of the EMPr and the importance and reasons for compliance to these. The induction training must highlight overall do's and don'ts on site and clarify the repercussions of not complying with these. The reporting procedure must be explained during the induction as well. Opportunity for questions and clarifications must form part of this training. A record of attendance of this training must be maintained by the Contractor on site.

6.3 Toolbox Talks

Toolbox talks should be held on a scheduled and regular basis (at least once a month) where the Contractor and all employees on site hold talks relating to environmental practices and safety awareness on site. These talks should also include discussions on possible common incidents occurring on site and the prevention of reoccurrence thereof. Records of attendance and the awareness talk subject must be kept on file.

7. ENVIRONMENTAL MANAGEMENT PROGRAM (EMPr)

The following table forms the core of this EMPr for the construction and operational phases of the development. This table should be used as a checklist on site, especially during the construction phase. Compliance with this EMPr must be audited monthly during the construction phase and once immediately following completion of construction.

Table 1: Planning and Design Phase: Environmental Management Programme for the proposed project

Activity / issue	Action required	Responsible party	Frequency
Appointment and Duties of ECO	The Developer must appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the EMPr.	Developer	Once-Off
	The developer must provide the ECO and contractor with a copy of the EMPr.	Developer	Once-Off
	The priority of the ECO is to maintain the integrity of the development conditions outlined in the EMPr.	ECO	Continuous
	The ECO must form part of the project management team and attend all project meetings.	ECO	Continuous
	The contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.	ECO, Contractor	Once-Off
	Report on environmental compliance at the monthly site meetings	ECO, ELO	As necessary
Appointment and Duties of ELO	The contractor must appoint an Environmental Liaison Officer (ELO). This person will be required to monitor the situation with a direct hands-on approach, and ensure compliance and co-operation of all personnel. He should be fluent in the languages of the employees.	Contractor	Once-Off
EMPr	This EMPr must be made binding to the main contractor as well as	Developer, ECO	Once-Off

	individual contractors and should be included in tender documentation for the construction contract.		
Training for Site Personnel	All Contractor teams involved in construction work are to be required to undergo some form of environmental induction on their obligations towards environmental controls and methodologies in terms of this EMP, prior to commencing of the works.	Developer, ECO	Once-Off
	The Contractor shall ensure that all site personnel have a basic level of environmental awareness training. Topics covered should include; • What is meant by "Environment" • Why the environment needs to be protected and conserved • How construction activities can impact on the environment • What can be done to mitigate against such impacts • Awareness of emergency and spills response provisions • Social responsibility during construction of the fire station - It is the Contractor's responsibility to provide the site foreman with environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff. - Training should be provided to the staff members in the use of the appropriate fire-fighting equipment. Translators are to be used where necessary. - Use should be made of environmental awareness posters on site.	Contractor	Continuous

	- The need for a "clean site" policy also needs to be explained to the workers. - Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their introduction have been properly understood and are being followed.		
	Environmental inductions may take the form of onsite talks and demonstrations by the Contractor and the ECO. Induction report will be signed by the Contractor as well as the Employee undergoing Induction, and records kept for auditing purposes and copies given to the ECO for filing. The education / awareness programme should be aimed at all levels of management and staff within the Contractor's team, and particularly labour drawn from surrounding communities	ELO, ECO, Contractor	Continuous
Record Keeping	It is recommended that photographs are taken of the site prior to, during and immediately after construction as a visual reference. These photographs should be stored with related documents and other records related to this EMP.	Developer, Contractor	As necessary
	All specialists reports (Heritage Impact Assessment Wetland Delineation and Rehabilitation, Traffic Assessment, Traffic Statement and Access Study, Geotechnical Investigation	Developer, Contractor	Continuous
	The Contractor shall ensure that all pertinent permits, certificates	Contractor, Developer	Continuous

	and permissions have been obtained prior to any activities commencing on site and ensure that they are strictly enforced / adhered to. This includes, for example, updating the Department of Water Affairs (DWA) licence and other monitoring programs.		
	All records related to the implementation of this management plan (e.g. site instruction book, ECO reports, induction records, method statements, must be kept together in an office where it is safe and can be retrieved easily.	Developer, Contractor, ELO	As necessary
	All relevant records should be kept for a minimum of two years after construction and should at any time be available for scrutiny by any relevant authorities or stakeholder.	Developer, Contractor	As necessary
Layout Plan	• The Environmental sensitivity map compiled during the Basic Assessment should be used as a decision tool to guide the final layout design of the proposed development. • The extent of the construction sites and access roads should be demarcated on site layout plans and should be restricted to disturbed areas or those identified with low conservation importance. Therefore, no construction personnel or vehicle may leave the demarcated area except those authorised to do so. Those areas surrounding the construction site that are not part of the demarcated development area should be considered as “no-go” areas for employees, machinery or even visitors;	Developer, Contractor	Once - off

Environmental Protection Plan	Within 21 days of the Commencement Date, the Site Contractor shall prepare and submit to the Project Manager for approval in consultation with the ECO an Environmental Protection Plan. The Plan shall cover all environmental protection works and shall also include descriptions of environmental safeguards and emergency procedures.	Developer, ECO, Contractor	Once - off
	The Plan shall include a description of the administrative structure and lines of communication which shall be established between the Contractor's and his subcontractors' workforce for the implementation of environmental protection procedures. Details of the expertise available for the implementation of environmental protection procedures must also be provided.	Contractor, PE, ECO	Once off
	In addition this plan must have a site layout plan and showing the final positions and extent of all permanent and temporary site structures and infrastructure, including: • Buildings • Contractors' camp • Roads and access routes • Gates and fences. • Essential services (permanent and temporary water, electricity and sewage) • Rubble and waste rock storage and disposal sites. • Site toilets and ablutions.	Contractor, PE, ECO	Once off

	• Firebreaks. • Excavations and trenches. • Topsoil stockpiles. • Spoil areas. • Construction materials stores. • Vehicle and equipment stores. • Sensitive and No go areas & applicable buffers. This must include all areas of Environmental sensitivity (natural environment, sensitive habitats wetland areas and protected species) • All temporary and permanent water management structures including bunds and sumps		
Existing Services and Infrastructure	The Contractor shall ensure that existing services (e.g. roads, pipelines, power lines and telephone services) are not damaged or disrupted unless required by the contract and with the permission of the RE.	Contractor, PE, ECO	Continuous .
	The Contractor shall be responsible for the repair and reinstatement of any existing infrastructure that is damaged or services which are interrupted.	Contractor	As necessary
	Such repair or reinstatement will be to the Contractor's cost and shall receive top priority over all other activities.	Contractor	Continuous
	A time limit for the repairs may be stipulated by the RE in consultation with the Contractor.	Contractor, PE, ECO	Continuous

Emergency Preparedness	If chemicals in sufficient quantity and toxicity have the potential to be released on the construction sites, emergency contingency plans should be prepared as safety measures (Bunded areas). These safety measures should be communicated to the relevant personnel on the construction site. All hazardous installations require a Risk Assessment in terms of the Occupational Health and Safety Act, (Act No.85 of 1993) for construction sites.	Contractor, ELO	Once - Off
	The Contractor shall submit written Method Statements to the RE for the activities identified by the RE or ECO. Activities that will require method statements include: • Logistics for the Environmental Awareness Training Course • Location and Layout of Construction camp • Construction procedures • Cement and concrete batching • Solid and Hazardous Waste Management • Drainage and Storm water planning • Dust Control • Stockpiling area • Vegetation removal • Materials and equipment to be used • Getting the equipment to and from the site • How the equipment material will be moved while on site	Contractor	As necessary

Method Statements **Method Statements**	• How and where material will be stored • The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur • Timing and location of activities • Compliance/non compliance with Specifications • Site camp establishment • Concrete pre-cast and batching operation • Emergency procedures • Materials, equipment and staffing requirements • Transporting the materials and/or equipment to, from and within the site • Stockpiling of rubble • General and Hazardous waste management on site • The storage provisions for the materials and/or equipment • The proposed construction procedure designed to implement the relevant Environmental Specifications • Other information deemed necessary by the RE and/or ECO. Method Statements shall be submitted at least ten working days prior to the proposed commencement of work on an activity to allow the RE (and/or ECO) time to study and approve the method statement.		

	Contractor shall not commence work on that activity until such time as the Method Statement has been approved in writing by the RE contract.	Contractor, PE, ECO	Continuous
	The Contractor shall carry out the activities in accordance with the approved Method Statement.	Contractor, PE. ECO	Continuous
	Under certain circumstances, the RE may require changes to an approved Method Statement. In such cases the proposed changes must be agreed upon in writing between the Contractor and the RE, and appropriate records retained.	Contractor, PE	Continuous
	Approved Method Statements shall be readily available on the site and shall be communicated to all relevant personnel. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the EMPr specifications.	Contractor, Developer	Continuous
Site Establishment	The contractor shall establish his construction camp, office/s and any other infrastructure as per the agreed site layout plan in a manner that does not adversely affect the environment.	Contractor, ECO	Once-Off
	The contractor shall submit a method statement for site clearance for approval by the RE in consultation with the ECO. Site establishment shall take place in an orderly manner and all required amenities shall be installed at Camp site before the main workforce move onto site.	PE, Contractor, ECO	Once-Off
	Designate access roads during the planning phase allowing only wetland crossing at designated points	Contractor, ECO	Once-off
	The Construction camp shall have the necessary ablution facilities	Contractor, ECO	Continuous

	with chemical toilets at commencement of construction activities to the satisfaction of the Project Manager. The Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.		
	Safe drinking water for human consumption shall be available at the site offices and at other convenient locations on site. All water used on site must be taken from a legal source and comply with the recognised standards for potable and other uses.	Contractor, ECO	Continuous
	No fires on site will be allowed. Activities which may pose a risk of fire must be identified and suitable measures must be put in place to prevent any possible damage by fire. Contractors must inform the staff of the risk of fires and fire prevention and emergency procedures in the event of a fire. Fire fighting equipment shall be supplied by the Contractor at suitable locations	Contractor, ECO	Continuous
	The construction camp must preferably be positioned where it will not visually impact on adjacent landowners and should not be located in an environmentally sensitive area	Contractor, ECO	Once off
	All sensitive areas, heritage (if encountered), wetland, drainage lines, should be demarcated and fenced off before development commences. These areas should be treated as “no go” areas.	Contractor, ECO, ELO	Continuous
	Invasive alien plant species should be treated in an appropriate manner.	ELO and Contractor	Continuous
	Alien plant eradication and follow-up control activities prior to	ELO and Contractor	Continuous

	construction, to prevent spread into disturbed soils, as well as follow-up control during construction.		

Table 2: Pre - Construction Phase: Environmental Management Programme for the proposed project

Activity / issue	Action required	Responsible party	Frequency
Compaction and destruction of natural vegetation	Make use of existing roads in such a way as to minimise impact on the wetland	ELO and Contractor	Continuous
	Plan construction to take place during the drier winter months	Contractor, Developer	Once-Off
	Plan construction activities to have the smallest possible footprint	Contractor, Developer	Continuous
	Minimise the width of the construction servitude across a wetland zone	Contractor, Developer	Once-Off

Activity / issue	Action required	Responsible party	Frequency
	Demarcate the construction footprint prior to commencement of construction and ensure that all workers and contractors are aware that access beyond the demarcated areas are not allowed Where the structures will affect a wetland, the edge / boundary of this wetland must be clearly demarcated in the field with poles, sticks, or any solid structure that will last for the duration of the development. These indicators could be coloured as follows and communicated to workers **Red** – Indicating the edge / boundary of the wetland **Orange** – Indicating the edge of the buffer zone	ELO, Contractor, ECO	Continuous
	Plan construction camps to be placed outside of watercourses and their associated buffer zones	Contractor, Project Engineer	Once – Off
	Plan construction activities that necessitate water crossings to only cross watercourses at designated points	Contractor, Project Engineer	Continuous
	Avoid linear disturbances that run parallel to a watercourse	Contractor, Project Engineer	Continuous
Impact on the hydrology and	Excavate and backfill trenches on a progressive basis where trenches occur in wetlands	Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
morphology of the wetland	Do not allow excavations to stand open for longer than 2 days where at all possible. Excavations should preferably be opened and closed on the same day (DWAF, 2005)	ELO, Contractor	Continuous
	Plan excavation to take place only once the required materials are on site	ELO, Contractor	Continuous
	Re-vegetation must be ongoing and relevant to terrestrial, wetness zone and slope	Contractor, ECO, ELO	Continuous
Footprint and related impacts	Make use of existing road servitudes as far as possible	Contractor, ECO, ELO	Continuous
	Minimise the width of the construction servitude across the wetland zone and demarcated the construction footprint prior to commencement of construction and ensure that all workers and contractors are aware that access beyond the demarcated areas are not allowed	Contractor, Project Engineer	Once - Off
	Only use access roads as designated during the planning phase	Contractor, ELO	Continuous
	Only cross watercourses at designated points should this be absolutely necessary	Contractor, ELO	As necessary

Activity / issue	Action required	Responsible party	Frequency
	Crossings to be undertaken with only one vehicle that have the minimum footprint as decided on during planning	Contractor, ELO	As necessary
	Limit compaction by not working in wet conditions and limiting vehicular access. Ensure that all workers and contractors are aware of this	Contractor, ELO	Continuous
	Do not permit vehicular or pedestrian access into natural areas or into seasonally wet areas during and immediately after rainy periods, until such a time that the soil has dried out (DAWF, 2005)	Contractor, ELO	Continuous
	Only necessary traffic should be allowed within these demarcated areas	Contractor, ELO	Continuous
	Contractors should refrain from impacting areas beyond the demarcated construction area	Contractor, ELO	Continuous
	Minimise disturbance and loss of soil	Contractor, ELO	Continuous
	The contractor must avoid traffic or storing of equipment and material in vegetated areas that will not be cleared	Contractor, ELO	Continuous
General health safety of workforce	Due to the presence of slimes a radiation survey should be conducted prior to construction to ensure safety of the construction personnel.	Developer, Contractor	Once-off

Table 3: Construction Phase: Environmental Management Programme for the proposed project

Activity / issue	Action required	Responsible party	Frequency
	Cement and plaster should only be mixed within mixing trays. Washing and cleaning of equipment should also be done within a bermed area (outside of the wetland buffer), in order to trap any cement or plaster and avoid excessive soil erosion. These sites must be rehabilitated prior to commencing the operational phase	Contractor, ELO, ECO	As necessary
	The mixing of concrete should only be done at specifically selected sites on mortar boards or similar structures to contain run-off into drainage lines, streams and natural vegetation	Contractor, ELO, ECO	As necessary
	Materials such as fuel, oil, paint, herbicide and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas. These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall	Contractor, ELO, ECO	Continuous
	Storage of materials as described above may not be within the 1:100 floodline, watercourses or associated buffer areas	Contractor, ELO, ECO	Continuous
	In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water and Sanitation (DWS) must be informed immediately	Contractor, ELO	As necessary
	All equipment should be parked overnight and/or fuelled at least 30 meters from the wetland	Contractor, ELO	As necessary

Activity / issue	Action required	Responsible party	Frequency
	Drip trays (minimum of 10cm deep) must be placed under all leaking vehicles that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised	Contractor, ELO, ECO	Continuous
	Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle	Contractor, ELO, ECO	Continuous
	Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone	Contractor, ELO, ECO	Continuous
	Remove all construction equipment and material on completion of construction	Contractor, ELO	Once off
Sedimentation	Increased run-off during construction must be managed using berms and other suitable structures as required to ensure flow velocities are reduced; this must be done in consultation with the ECO	Contractor, ELO, ECO	Continuous
	The contractor shall ensure that excessive quantities of sand, silt and silt-laden water do not enter watercourses. Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses must be taken	Contractor, ELO, ECO	Continuous
	Where applicable, silt trenches between the works area and downstream wetland could be used to trap any sediment washing off the works area and to prevent scouring of the stream line in case of heavy flows.	Contractor, ELO, ECO	As necessary

Activity / issue	Action required	Responsible party	Frequency
	Where wetlands are adjacent to the construction areas and these areas slopes toward the wetland, install sediment barriers along the edge of the construction areas as necessary to prevent sediment flow into the wetland	Contractor, ELO, ECO	As necessary
	Sediment barriers must be properly maintained throughout construction and reinstalled as necessary until replaced by permanent erosion controls or restoration of adjacent upland areas is complete	Contractor, ELO, ECO	As necessary
	It is important that topsoil should be conserved in areas where bedrock is shallow to avoid sedimentation	Contractor, ELO	Continuous
	Should water need to be pumped around the works area and discharged back into the wetland, care must be taken to ensure that the water is discharged in a manner that does not cause siltation or erosion downstream. As such it is recommended that any water to be discharged from pumping around the construction area or from dewatering operations be first discharged into a structure that allows the settlement of all suspended material, and which allows the diffuse discharge of water into the wetland. The water must be dissipated on re-entry into the wetland, to reduce the changes of erosion	Contractor, ELO, ECO	As necessary

Activity / issue	Action required	Responsible party	Frequency
Spread of alien invasive			
	Alien invasive species that where identified within servitude should be removed prior to construction related soil disturbances. This will prevent seed spreading into disturbed soils	Contractor, ELO, ECO	As necessary
	Appointment of alien plant working group / assign this duty to specific staff	Developer	As necessary
	If herbicide must be used it should be registered for aquatic use	Contractor, ELO, ECO	As necessary
	Acquire the necessary equipment for removal and control	Developer, Contractor, ELO	As necessary
	Planned sequence of areas to be cleared of invasive plants	Contractor, ELO, ECO	As necessary
	A register of the methods used, dates undertaken, as well as herbicides and dosage used must be kept and available on site. The register must also include incidents of poisoning or spillage	Contractor, ELO	As necessary
	Ensure that contractors can identify the relevant plants and are aware of the removal procedures	Developer	As necessary
	Construction equipment must be cleaned prior to site access. This will prevent alien invasive seed from other sites to spread into disturbed soils	Contractor, ELO	Continuous
	Manual removal methods are preferred to chemical control	Contractor, ELO	As necessary

Activity / issue	Action required	Responsible party	Frequency
Environmental incidents	The contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves	Contractor , ELO,	Continuous
Hazardous materials storage	Materials storage areas will not be allowed in close proximity to ecologically sensitive areas	Contractor	Continuous
	Materials storage areas should be sited outside the 1:50 year flood line of watercourses	Contractor, ECO	Continuous
	The areas around fuel tanks are to be bunded in accordance with SANS 1089:1999: Part 1	ELO, Contractor	Once off
	Hazardous chemicals or potentially hazardous chemicals used during construction shall be stored in secondary containers and all relevant Material Safety Data Sheets (MSDSs) shall be available on site	Contractor	Continuous
	The relevant emergency procedures relevant to particular chemicals used on site, as per the MSDSs and suppliers guidelines, will be followed in the event of an emergency	Contractor	Continuous
	The contractor shall prevent discharge of any pollutants such as cement, concrete, lime, chemicals, fuels and oils into any water sources and adequate storm water control measures will be implemented where these substances are handled	Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
Soil management	All wingwalls, yardwalls, steps, etc. should be separated from the main structure by means of movement joints as detailed in the Geotech Report undertaken during the basic assessment process.	Contractor	As necessary
	Gulleys should be separated from the walls using a softboard packing between them as detailed in the Geotech Report undertaken during the basic assessment process.	Contractor	As necessary
	All saltglazed pipework should incorporate flexible rubber ring or bitumen joints as detailed in the Geotech Report undertaken during the basic assessment process	Contractor	As necessary
	Steel water pipes should be kinked where they enter buildings as detailed in the Geotech Report undertaken during the basic assessment process	Contractor	As necessary
	Particular attention should be paid to drainage and no stormwater should be allowed to stand in pools adjacent to buildings as detailed in the Geotech Report undertaken during the basic assessment process	Contractor, ELO, ECO	Continuous
	Ensure that no flower beds, shrubs or large trees are planted close to the building. Any trees of significant height should be at least 1,5 times their eventual height away from the building as detailed in the Geotech Report undertaken during the basic assessment process	Contractor, ELO, ECO	Continuous
	Connections to WC pans through walls should be flexible by using either rubber or plastic piping as detailed in the Geotech Report undertaken during the basic assessment process.	Contractor	As necessary

Activity / issue	Action required	Responsible party	Frequency
Handling and disposal of contaminated water	No discharge of pollutants such as cement, concrete, lime, chemicals, fuels or oils will be allowed into any water resource	ELO, Contractor	Continuous
	Only above ground temporary storage tanks will be allowed on site	ELO, Contractor	Continuous
	Contaminated or potentially contaminated water will be kept separated from unpolluted stormwater and no unpolluted stormwater will be allowed into the conservancy tank	ELO, Contractor	Continuous
Lighting	Working hours shall generally be restricted to daylight hours	ELO, Contractor	Continuous
	If working hours are required outside of daylight hours, the contractor shall provide notification by completing the Night work Application three days in advance of the work taking place.	ELO, Contractor	Continuous
	Security lights shall be directed from the perimeter wall towards the centre of the camp with a down angle	ELO, Contractor	Continuous
Waste management	Litter generated by the construction crew must be collected in rubbish bins and disposed of weekly at registered waste disposal sites.	ELO, Contractor	Weekly
	All building rubble, solid and liquid waste etc must be disposed of as necessary at an appropriately licensed refuse facility.	ELO, Contractor	Once off, as necessary
	Ensure that no refuse wastes are burnt on the premises or on surrounding premises. No fires will be allowed on site.	ELO, Contractor	Monitor daily
	The construction site must be kept in a clean and orderly state at all times.	Contractor, Construction crew	Monitor daily

Activity / issue	Action required	Responsible party	Frequency
	Ensure that no litter, refuse, wastes, rubbish, rubble, debris and builders wastes generated on the premises be placed, dumped or deposited on adjacent/surrounding properties during or after the construction period of the project are disposed of an approved at dumping site as approved by the Council.	ELO, Contractor	Monitor daily - weekly
Stormwater Management	No stockpiles or construction materials may be stored or placed within any drainage line that may be in close proximity of storm water drains	Contractor, ELO, ECO	Continuous
	Should a freak storm displace the temporary earth embankments or other erosion control structures, a visual inspection of the site must be made and any damage be recorded. Any damage and loss of soil resulting from a storm is to be remedied immediately. Should the temporary walls collapse due to construction error, the contractor is to fund the remediation process	Contractor, ELO, ECO	Continuous
	Storm water at the construction crew camp must be managed so as to reduce the silt loads into the ecological environment. Measures must be implemented to distribute storm water as evenly as possible to avoid point sources of erosion	Contractor, ELO, ECO	Continuous
	The site must be managed in a manner that prevent pollution of drains, downstream watercourses or groundwater, due to suspended solids, silt or chemicals	Contractor, ELO, ECO	Continuous
	No stockpiles or construction materials may be stored or placed in close proximity to storm water drains.	Contractor, ELO, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Temporary cut-off drains and berms may be required to capture storm water and promote infiltration.	Contractor, ELO, ECO	Continuous
Noise management	Construction and the use of construction machinery should be limited between 06h00 and 18h00 on weekdays only.	Developer, Contractor	Monitor daily
	Institute noise control measures throughout the construction phase for all applicable activities, including the construction times.	ELO, Contractor	Once off, as necessary
	Ensure that noise licensers are installed on the construction vehicles and machineries to reduce the noise level	ECO, ELO, Contractor	Continuous
	Inform residents of nearby residential areas of planned noisy activities outside the timeframes stated above.	ECO, ELO, Contractor	Once off, as necessary
	No construction should occur during weekends, unless the adjacent residents have been notified in writing at least three days in advance.	ELO, Contractor	Once off, as necessary
	Construction activities must abide by the national noise laws and the municipal noise by-laws with regard to the abatement of noise caused by mechanical equipment.	Developer, ELO, Contractor	Continuous
Dust control	Wet all unprotected cleared areas and stockpiles with water to suppress dust pollution during dry and windy periods.	ECO, ELO	As necessary
	Ensure proper rehabilitation of disturbed areas in order to minimise bare patches.	ELO, Contractor	Continuous
Crime, safety and security	Ensure that the construction vehicles are under the control of competent personnel and are in proper working order.	Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Ensure that only suitably qualified personnel use construction vehicles	Contractors	Continuous
	Ensure that the contact details of the police or security company and ambulance services are available on site	Contractor	Continuous
	Limit access to the construction crew camp to construction workers through access control.	ELO, Contractor	Continuous
	Comply with the requirements of the Occupational Health and Safety Act, 1993 (Act No.85 of 1993) requirements.	ELO, Contractor	Continuous
	Ensure that the handling of equipment and materials is supervised and adequately instructed.	ELO, Contractor	Continuous
	Vehicular traffic during construction activities must be limited to a maximum speed limit of 30 km/hr.	ELO, Contractor	Continuous
Crime, safety and security	Site notices informing the public of the planned activities must be placed at visible locations a few days prior to any blasting.	ELO, Contractor	As necessary
	The security fence around the development site must be completed before construction commences internally.	ELO, Contractor	Once-off
	Security fence is to be inspected daily to ensure no illegal entry points are created.	ELO, Contractor	Daily
	The site and crew are to be managed in strict accordance with the Occupational Health and Safety Act, 1993 (Act No.85 of 1993) and the National Building Regulations.	Contractor	Continuous
	The contractor must supply his own security arrangements for the construction camp within the framework of the EMPr.	Contractor, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Equipment and materials must be handled by staff that have been supervised and adequately trained.	Contractor, ELO	Continuous
	Staff must be regularly updated about the safety procedures.	Contractor, ELO	Continuous
	Emergency facilities must be available and adequately supplied for use by staff and customers.	Contractor, ELO	Continuous
	Ensure that the handling of equipments and materials is supervised and adequately instructed.	Contractor, ELO	Continuous
	Limit access to the construction crew camp only to the workforce.	Contractor, ELO	Continuous
	Do not allow the movement of public within the development site by posting notices at the entrance gates, and where necessary on the boundary fence.	Contractor, ELO	Once-off, monitor daily
	Appropriate notification signs must be erected, warning the residents and visitors about the hazards around the construction site and presence of heavy vehicles	Contractor, ELO	Once-off, or as necessary
Excavation	Topsoil and subsoil must be placed on opposite sides of the trench and must be kept separate throughout construction and rehabilitation	Contractor, ELO, ECO	As necessary
	Topsoil must not be stockpiled for an extensive period (> 3 months). This is to prevent the redundance of the existing seed bank as well as the alteration of the soil characteristics (permeability, bulk density etc.).	ELO, ECO, Contractor	As necessary
	Erect signs and/or danger tape around the exposed excavations to warn the public of the inherent dangers.	ELO, Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Ensure that excavated and stockpiled soil material is stored and bermed on the higher lying areas of the site and not in any storm water run-off channels or any other areas where it is likely to cause erosion or where water would naturally accumulate.	ECO, Contractor	As necessary
Stockpiling soil	The areas where excavated soil will be stockpiled must be bordered by berms to prevent soil loss caused by rain.	ELO, Contractor	As necessary
	Topsoil must be reinstated.	ELO, Contactor	As necessary
Destruction of heritage resources	Should any archaeological artefacts be exposed during excavation, work on the area where the artefacts were found, shall cease immediately and the ECO shall be notified as soon as possible.	ELO, Contractor	As necessary
	Upon receipt of such notification, the ECO will arrange for the excavation to be examined by an Archaeologist as soon as possible	ECO, Contractor	As necessary
	Under no circumstances shall archaeological artefacts be removed, destroyed or interfered	ELO, Contractor	Continuous
	Any archaeological sites exposed during construction activities may not be disturbed prior to authorisation by the South African Heritage Resources Agency	ECO, Contractor	As necessary
Aesthetic / visual	Prevent unnecessary removal of vegetation outside the width of the working area by clearly demarcating the working area	ELO, Contractor	Continuous
	Remove spoil material from the area once the trench has been filled	Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Remove vegetation and topsoil and stockpile separately from subsoil prior to excavation of the cable trench.	ELO, Contractor	Continuous
	Revegetate disturbed ground in the working area by seeding and spreading of vegetation that has been removed from the trench at the start of construction.	ELO, Contractor	Continuous
Traffic impact	• Access to the site must follow current and established routes The contractor should be responsible for any damage caused to the road or road curb/verges. • No vehicles will be allowed within the 30m buffer of sensitive environments (wetland, pans, drainage lines)	Developer, Contractor	Continuous

Table 4: Operational Phase: Environmental Management Programme for the proposed project

Activity / issue	Action required	Responsible party	Frequency
Pollution of the wetland	In the event that maintenance must be carried out, all equipment should be parked overnight and/or fuelled at least 500 meters from a watercourse	Developer	Continuous

Activity / issue	Action required	Responsible party	Frequency
Prevent/limit sedimentation	The contractor shall ensure that a method statement is prepared prior to maintenance work to ensure that excessive quantities of sand, silt and silt-laden water do not enter watercourses. Appropriate measures, e.g. erection of silt traps, or drainage retention areas to prevent silt and sand entering drainage or watercourses must be taken	Developer	As necessary
	Plan monitoring during the operational phase to ensure that the construction footprint is adequately rehabilitated	Developer	As necessary
	During maintenance or emergencies in areas that slope toward wetlands, install sediment barriers along the edge of the maintenance activity as necessary to prevent sediment flow into wetlands	Developer	As necessary
Preventing spread of alien invasive	Plan an alien invasive plant work group that can carry out follow-up alien plant control for at least three years after construction	Developer	As necessary
	Ensure that contractors can identify the relevant plants and are aware of the removal procedures	Developer	As necessary

Table 5:Rehabilatation Phase: Environmental Management Programme for the proposed project

Activity / issue	Action required	Responsible party	Frequency

Activity / issue	Action required	Responsible party	Frequency
Erosion	The contractor shall be responsible for rehabilitating all eroded areas in such a way that the erosion potential is limited after construction has been completed	Contractor, ELO	During and immediately after construction
	All slopes that are disturbed during construction should be stabilised immediately to prevent erosion	Contractor	During and immediately after construction
	Re-vegetation should be done immediately after construction, especially in sloped areas	Contractor	During and immediately after construction
	Disturbed areas that require rehabilitation should be mulched to encourage vegetation re-growth	Contractor	As necessary
	Where crossings of watercourses are unavoidable eco-friendly soft options (such as wooden poles) should be placed over the wet area to be driven over	Contractor, ELO, ECO	As necessary
	Where all preventative measures have failed and erosion persists soft and hard rehabilitation options, such as eco-logs or weirs, should be considered in conjunction with an engineer and wetland specialist	Contractor, ELO, ECO	As necessary
	Erosion control of all banks must take place so as to reduce erosion and sedimentation into river channels or wetland areas	Contractor, ELO, ECO	Continuous
	Any erosion gullies/channels created during construction should be filled to ensure silt does not drain into the wetland (Teixeira-Leite, 2009	Contractor, ELO, ECO	As necessary
	Spoil from the construction zone should not be placed within the wetland	Contractor, ELO, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	Bare ground exposed after vegetation removal must be rehabilitated as soon as possible	Contractor, ELO, ECO	As necessary
Mobilisation of pollutants	In case of emergencies or unforeseen events, problem must be remediated immediately and any spillage into any watercourses be reported to the Department of Water and Sanitation. In addition, the soil must be stabilised (import additional topsoil if necessary) and re-vegetated as soon as possible. Re-vegetation should include seeds from the adjacent grassland and any rescued protected plants and/or plants of conservation concern that might have been impacted upon by the emergency / unforeseen event	Contractor, ELO	As necessary
	Remove all project-related material used to support equipment on completion of construction	Contractor, ELO	Once off
	Any contaminated soil from the onsite needs to be removed and properly disposed off	Contractor, ELO,ECO	As necessary
	Materials such as fuel, oil, paint, herbicides and insecticides must be sealed and stored in bermed areas or under lock and key, as appropriate, in well-ventilated areas	Contractor, ECO, ELO	Continuous
	These substances must be confined to specific and secured areas within the contractor's camp, and in a way that does not pose a danger of pollution even during times of high rainfall	ECO, Contractor, ELO	Continuous
	Storage of materials as described above may not be within the 1:100 floodline, watercourses or associated buffer areas	Contractor, ELO, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	In the case of pollution of any surface or groundwater, the Regional Representative of the Department of Water Affairs (DWA) must be informed immediately	Contractor, ELO, ECO	As necessary
	All equipment should be parked overnight and/or fuelled at least 500 meters from a watercourse	Contractor, ELO	Continuous
	Drip trays (minimum of 10cm deep) must be placed under all leaking vehicles and machinery that stand for more than 24 hours. Vehicles suspected of leaking must not be left unattended, drip trays must be utilised.	Contractor, ELO, ECO	Continuous
	Drip trays must be utilised during repairs and maintenance of all machinery. The depth of the drip tray must be determined considering the total amount / volume of oil in the vehicle. The drip tray must be able to contain the volume of oil in the vehicle	Contractor, ELO	As necessary
	Provision of adequate sanitation facilities located outside of the wetland/riparian area or its associated buffer zone	Contractor, ELO	Continuous
	Any water discharged must comply with the relevant Water Quality limits/guidelines specified by DWAS.	Contractor, ELO	As necessary

8. CONCLUSION

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

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

Key issues

- Construction should take place in the dry season, leaving enough time for the germination of seeds and revegetation of barren areas before the onset of the rainy season;
- Warning tape must be erected to inform public of the inherent dangers; and
- Regarding potential blasting activities that may be required on certain areas, it is important that the adjacent landowners are informed of these planned activities a few days in advance and that site notices informing the public are strategically placed at visible locations.

APPENDIX 1: INCIDENT AND ENVIRONMENTAL LOG

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

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

APPENDIX 2: Curriculum Vitae of Thabang Sekele

CURRICULUM VITAE

Name:	THABANG AMOS SEKELE
Name of Firm:	ENVIROLUTION CONSULTING (PTY) LTD
Position:	Project Co-ordinator and Environmental Control Officer
Date of Birth:	23 March 1988
Nationality:	South African
Languages:	English, Afrikaans, Sepedi, Setswana, Zulu

1. EDUCATIONAL QUALIFICATIONS

- BA, University of South Africa (Geography, Environmental Management), 2014.

EMPLOYMENT EXPERIENCE

ENVIROLUTION CONSULTING

Envirolution Consulting is a specialist consulting company, focusing on Environmental Engineering and Management Consulting.

FEBRUARY 2015 - PRESENT: PROJECT CO-ORDINATOR / ENVIRONMENTAL CONTROL OFFICER

Environmental Control Officer for the following projects (current/in process):

- Environmental Control Officer for Broadacres Residential Development, Fourways (Gauteng)
- Environmental Control Officer for Fairlands Rehabilitation and Embankment Protection of the Spruit River, Fairlands, Randburg (Gauteng)
- Environmental Control Officer for Khayalitsha Extension 11 Housing Project, Tembisa (Gauteng)
- Environmental Control Officer for Kruisfontein Phase 3 Bulk Water Supply Pipeline, Soshanguve, Tshwane (Gauteng)
- Environmental Control Officer for Stinkwater Water Reticulation and Yard Connections, Hammanskraal. Tshwane (Gauteng)
- Environmental Control Officer for Tsakane Housing Project, (Gauteng)
- Environmental Control Officer for Tsakane Bulk Water Services and Pump Station, (Gauteng)

- Environmental Control Officer for Villa Liza Sewage Pipe and Storm Water system installation, Boksburg (Gauteng)
- Environmental Control Officer for Gautrain Rapid Rail Link Project at Rhodesfield and Centurion Stations (Gauteng)
- Environmental Control Officer for Rainbow Chicken Expansion of farming operations at Bronkorstspruit (Gauteng)
- Environmental Control Officer for Johannesburg Development Agency Alexandra Automotive Industrial Park (Gauteng)
- Environmental Control Officer for Johannesburg Development Agency, Upgrade and Redevelopment of Paterson Park Recreational centre (Gauteng)
- Environmental Control Officer for Zamdela Civils Installations Project at Sasolburg (Free State)
- Environmental Control Officer for Reconstruction of Abbes Road and Ancillary works at Braamfisherville (Gauteng)

Trainee Environmental Auditor for the following project(s):

- Eskom Kusile Power Station Bi-Annual Audit (July 2015) at eMalahleni (Mpumalanga)

Project Co-ordinator for the following projects (current/in process):

- Basic Assessment for the construction of Plaatjies 132kV Substation and rebuilding of Plaatjies 88kV powerline, Braamfisherville, City of Johannesburg Municipality, Gauteng Province (Eskom)
- Basic Assessment for the construction Tarlton-Westgate SAR Millsite 132kV line and expansion of the SAR Millsite substation, Krugersdorp, Gauteng Province (Eskom)
- Basic Assessment for the construction of 132 kV Ntshona substation and two 132 kV powerline, Krugersdorp, Gauteng Province (Eskom)
- Basic Assessment for the construction Taunus Diepkloof 132kV 41 km powerline and two 132 kV substations, Johannessburg south and Westonaria, Gauteng Province (Eskom)

ENVIRONMENTAL ADMINISTRATOR FOR MYEZO ENVIRONMENTAL MANAGEMENT SERVICES (PTY) LTD

Myezo Environmental Management Services (Pty) Ltd, is a company that provides a range of environmental services mainly specialising in mining, since 2005. Responsibilities: environmentally related issues and administration.

2014 - 2015: ENVIRONMENTAL ADMINISTRATOR

Myezo projects included:

- Alexkor Sea Concession exporation - Compiling background information document and general administration.
- Clover Alloys – Maintaining and administering the project file and monitoring environmental compliance with the Environmental Management Programme

MOKGOBELA TRADING CC

Mokgobela Trading is a company mainly involved in providing building maintenance and minor construction services.

2013 – 2014: JUNIOR OPEATIONS ASSISTANT

Mokgobela duties included:

- Observing external service providers in water-use licence applications
- Drafting reports from public participation meetings
- Occasionally supervising artisans on site
- Observing senior colleagues in drafting reports
- Gathering information about residents surroundings
- Attending community forum meetings
- Data capturing and creating spread sheets
- Answering telephone queries
- Booking meetings
- Drafting of memos

STANDARD BANK:

FRAUD DETECTION DEPARTMENT

2012 - 2013: FRAUD DETECTION CONSULTANT

Responsibilities:

- Monitoring incoming credits on accounts
- Investigating suspicious transactions
- Drafting reports on fraud accounts
- Filing documents according to various criteria
- Liaising with other banks on transactions

- Reporting fraudulent activities
- Suspending fraudulent accounts
- Educating clients
- Data capturing

ABSA BANK:

DEBT REVIEW DEPARTMENT

2009 - 2011: DEBT REHABILITATION AND COLLECTION AGENT

Responsibilities:

- Educating clients
- Collecting on overdue accounts
- Selling debt solutions to clients
- Handling queries
- Updating contact details and address
- Verifying client's personal details

REFERENCES:

Mr Gesan Govender
Director
Envirolution Consulting
Tel: 086 144 4499
Cell: 083 419 8905
Fax: 086 162 6222
E-Mail Address: gesan@envirolution.co.za

Mr Sicelo Jebe
Stakeholder Relation Manager
Myezo Environmental Management Services
Tel: 012 998 7642
Cell: 082 754 8100 / 078 005 5903
Fax: 012 998 7641
E-Mail Address: sicelo@myezo.co.za

Ms. Nothabo Dlamini
Team Leader
Nedbank

Tel: 011 710 4000
Cell: 082 433 4688
Email: NothaboD@Nedbank.co.za

Mrs. Perpetua Mokgobela Malebane
Managing Director
Mokgobela Trading cc
Tel: 011 985 1132
Cell: 072 575 6338

Mrs. Zainub Khan
Team Manager
Standard Bank
Tel: 011 641 6227
Cell: 076 476 1208
E-Mail Address: zainub.khan@standardbank.co.za

Mr. Anesh Muganpersad
Team Leader
Absa Bank
Tel: 011 276 3615
Cell: 083 929 0116
E-Mail Address: Anesh.Mungapersad@absa.co.za