



**PROPOSED RELOCATION AND CONSTRUCTION OF THE ST ANDREWS PRIMARY SCHOOL ON
PORTION 102, PART OF REMAINDER OF FARM SLUIS 354-IT, MKHONDO LOCAL MUNICIPALITY,
MPULAMALANGA**

Draft Environmental Management Programme

July 2022

SUBMITTED TO:

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1. Introduction

1.1 Background

Lyma Consulting Engineers was appointed by South African National Roads Agency Soc Limited (SANRAL) to apply for an Environmental Authorisation through the Basis Assessment process according to the 2014 EIA regulation's as amended for the proposed relocation and construction of the St Andrews primary school on portion 102, part of remainder of farm Sluis 354-IT, Mkhondo Local Municipality, Mpumalanga Province. The South African National Roads Agency is responsible for the construction and maintenance of the national freeways including N2 which commences in the East at Ermelo and heads South-East through Piet Retief and other towns and cities, to Cape Town. SANRAL is planning to upgrade the Panbult intersection of the N2 a Section 34 of the N2 between Ermelo and Piet Retief, situated 40 km from Piet Retief near Panbult station. Upgrading of the Panbult interchange would improve road safety on the N2-34 at Panbult particularly in terms of the current traffic of trucks transporting coal from Kangra Coal in Driefontein to the Panbult Coal sidings.

During the design phase, it was established that the St Andrews Primary School, which is currently located between the N2-34 and the railway line in Panbult, would fall within the servitude of the planned interchange and was most likely to be adversely impacted by the development in terms of mainly, access, safety and noise impacts. The best option will be to relocate the school to another site in the area. Since 2015, an extensive process was undertaken to acquire land for the school in properties in the surrounding areas and there was extensive consultation with landowners in the area in this regard. In 2017, Mondi agreed 22 hectares of piece of land adjacent to their planned Agri-village on Portion 102, a Remainder of the Farm Sluis 354-IT, Mkhondo Local Municipality, Mpumalanga (See **Figure 1 – Locality map**).

1.2 Project Locality

The proposed relocation and construction of the St Andrews primary school on portion 102, part of remainder of farm Sluis 354-IT, Mkhondo Local Municipality, Mpumalanga Province (see **Figure 1- Locality Map**).

1.3 Purpose of the Environmental Management Program

The purpose and intent of an environmental management Programme (EMPr) is that it provides guidelines, processes and procedures that can ensure that the environment is not detrimentally affected by the proposed development. This includes strategies for monitoring the impacts on the site. The EMPr is a dynamic document, which will be reviewed, revised and updated during the life span of the project.

1.4 Administrative Requirements

Copies of this EMPr shall be kept at the site office and shall be distributed to all senior contract personnel. All personnel shall be required to familiarise themselves with the contents of this document, particularly those charged directly with environmental management of the site.

1.5 Roles and Responsibilities

The responsibility for the implementation of this EMPr lies with several stakeholders, each fulfilling a different but critical role in protecting the environment during the construction phase.

1.6 Department Environment, Forestry and Fisheries (DEFF)

The Department of Environment, Forestry and Fisheries (DEFF) will be responsible for reviewing and authorising the EMPr. The Department holds the right for inspections and monitoring the project to ensure that the environmental conditions are met.

1.7 Site Engineer/Municipality's Representative

The Engineer will act as the Department's on-site implementing agent and has the responsibility to ensure that these responsibilities are executed in compliance with EMP and other relevant legislation, for example the OHS. This role will include but is not limited to the following:

- Ensuring that all authorisations and permits have been obtained and are communicated to the Contractor
- Defining measures to deal with transgressions on site e.g. rules and penalties for contravention of the EMP. These may include ordering the removal of person(s) and/or equipment not complying with the EMPr specifications
- Assisting the Contractor in finding environmentally responsible solutions to problems.

1.8 The Contractor

The Contractor shall ensure the implementation of the EMPr, and that all the provisions detailed herein are adhered to. The Contractor shall also designate a person to be responsible for everyday environmental management on site. This designated person must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. This person must also be the liaison between the contractor and landowners. The designated person's duties shall include the following:

- conduct daily inspections to monitor compliance with the EMPr,
- provide reports and feedback on potential environmental problems associated with the development to the project team and Environmental Control Officer (ECO).
- convey the contents of this EMP to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce.

1.9 Environmental Control Officer

The developer may manage the contractors' compliance through the appointment of an independent Environmental Control Officer (ECO) to assist in the monitoring of the impact of the project on the environment as per the EMP.

The main functions of the ECO are the following:

- objectively monitor implementation of relevant environmental legislation and the EMPr for the project.
- proactively have access to specialist expertise as and when required, these include heritage specialists etc.
- conduct audits on compliance to relevant environmental legislation and the EMP for the project.
- ECO shall convey the contents of this EMPr to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce.
- The ECO shall submit a monthly environmental compliance report, in writing, to the project team, and as may be directed the authorities. The report shall include a description of all activities on site, problems identified, transgressions noted and remedial action implemented.

The ECO shall remain employed until all rehabilitation measures as well as site clean-up are completed and the site is handed over to SANRAL by the contractor for operation.

1.10 Environmental Awareness and Training

The Contractor shall ensure that adequate environmental awareness training of site personnel takes place and that all construction workers receive an induction presentation on the importance and implications of the EMP. The training shall be conducted as far as is possible in language understood by the employees, and may be undertaken by the ECO. As a minimum, training should include:

- Explanation of the importance of complying with the EMPr

- Discussion of the potential environmental impacts of construction activities and protection of sensitive areas
- Employees' roles and responsibilities, including emergency preparedness
- Explanation of the mitigation measures that must be implemented when carrying out their activities
- Explanation of the management structure of individuals responsible for matters pertaining to the EMPr
- The benefits of improved personal performance

The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

1.11 Contractor Environmental Method Statements

Method Statements are written submissions to the Engineer by the Contractor, and response to a request Engineer. The Method Statements set out the plant, materials, labour and method that the contractor proposes using to carry out an activity, identified by the Engineer. The Method Statements contain the appropriate detail such that Engineers are able to assess whether the contractor's proposal is in accordance with the requirements of the EMPr. The contractor must sign each Method Statement along with the Engineer to formalise the approved Method Statement.

All Method Statements including those which may be required as ad hoc or emergency construction method statements must be submitted to the Engineer for approval prior to the commencement of the activity.

Any changes to the method of works must be reflected by amendments to the original approved Method Statement. Any changes in this regard must be approved by the Engineer on the understanding that such changes are environmentally acceptable and in line with the requirements of this EMPr.

1.12 Appointment of an Environmental Control Officer (ECO)

An independent ECO should be appointed to oversee all environmental aspects relating to the development. The ECO should ideally be appointed during the planning phase and his/her responsibilities will include:

Auditing of compliance with the EMPr (the frequency of audits will be determined during the planning phase);

- Writing of auditing reports and submitting it to relevant parties;
- Liaison with relevant authorities;
- Liaison with contractors regarding environmental management;
- Reviewing of the complaints register that is to be kept on site during the construction phase;
- Liaison with interested and affected parties when complaints need to be addressed;
- Limiting construction activities to the construction areas;
- Waste management; and
- Legal compliance with all relevant environmental legislation;

The ECO shall have the right to investigate the site at any time during the project phases and unexpected visits will be allowed. Weekly or at least monthly audit reports shall also be made available to all the relevant parties when required.

1.13 Staff Awareness

Staff must be made aware of their responsibilities to ensure that impacts such as fire, safety and pollution are taken care of. This must include an induction program. The movement of construction workers must be controlled and access to adjacent properties must be prohibited. The local municipality by-laws must be noted and complied with.

1.14 Involvement of the ECO

The ECO should be involved in any decisions that are taken on site. This should include the approval of the layout plan and activities that are to be undertaken during the construction phase.

1.15 Complaints Management

To establish and maintain a system of records which provide full documentation of complaints and how all complaints received are effectively addressed. The point is to establish processes and procedures to effectively address all complaints received. Management and mitigation requirements:

- a) A formal accessible grievance procedure should be implemented and made available for the communities;
- b) Address all grievances swiftly, in a fair and transparent manner;
- c) Develop a grievance procedure to specifically address gender matters;
- d) The EO shall open and maintain a complaint register and an incident register in which all complaints or incidents received from the community must be recorded. The following information must be recorded in the complaints register:
 - The name and contact detail of the complainant (if not anonymous);
 - The date, time and nature of the complaint;
 - The response and investigation undertaken;
 - Which actions were taken and who the person responsible for the action was.
- e) The following must be recorded in the incidents register:
 - The name of the persons involved in the incident;
 - The date, time and nature of the incidents;
 - The actions that were taken.
- f) If the facility is approached by the community, they will be polite and courteous and assist them in the locating the relevant personnel who will deal with the complaint.

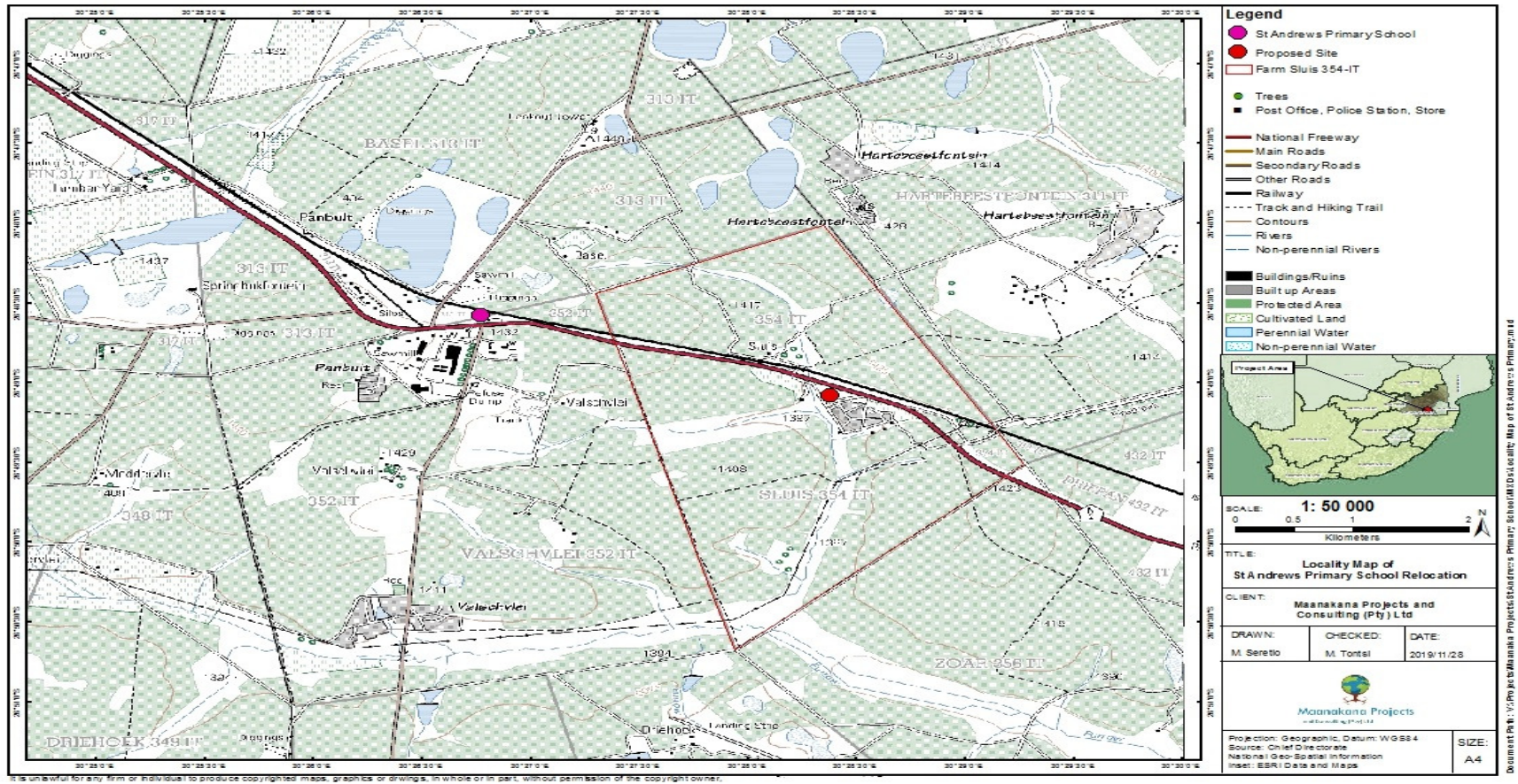


Figure 1 – Locality Map

2. Planning and Design

2.1 Contractor Requirements

The Contractor must be made aware of the issues and impacts surrounding the proposed development site. The Contractor must also be provided with a copy of the EMP and the EMP must form part of any tender documents.

2.1.1 Waste Management

The inappropriate handling and disposal of waste materials can impact on both human safety and risk contamination of the natural environment. This management and mitigation plan covers the handling and disposal of solid waste, including domestic, construction, and hazardous waste as well as waste water/contaminated water and old shutter oil, generated during construction.

The waste management principles of prevent, minimise, recycle or re-use, with disposal as a last option will apply. Only permitted / licenced, registered and municipal landfills will be considered as options for disposal of waste. The contractor must compile a Waste Management Method Statement with minimum requirements:

- Classification / Identification of waste streams as described but not limited to the sections that follow;
- Designate waste disposal facilities (bins, skips, etc) for each waste stream;
- Designate individuals responsible for waste management on site and train accordingly;
- Identify where and how to dispose of difference waste streams; record keeping and maintaining waste manifest and safe disposal certificates to account for all waste removed off site for safe disposal.

The plan is made up of the following components:

- Domestic waste,
- Inert waste,
- Hazardous waste, and

- Handling and disposal of contaminated waste water.

2.1.2 Domestic Waste

The objective is to ensure that all domestic waste generated during construction is disposed of at a licensed municipal waste disposal facility. The target is to reduce the amount of waste produced, re-use of material where possible, recycle the material where possible and disposal as the last resort.

To achieve this, the following is important:

- a) Ensure segregation of hazardous wastes from non-hazardous waste,
- b) Segregation of waste must be maximised so that reuse and recycling are not compromised,
- c) Utilise lidded bins and or covered skips to prevent windblown waste into neighbouring properties and limit rodent, pests and bad odours,
- d) Maintain waste manifests for all waste streams and safe disposal certificate / way bills,
- e) Disposal of all waste must be done at a licensed disposal facility in accordance with all applicable legislation, and such a manner as not to cause any nuisance or secondary pollutions.
- f) The Contractor shall make time and resources needed to undertake routine housekeeping of the works areas and site establishment areas at a minimum of weekly interval. Housekeeping shall include:
 - Maintenance of barriers;
 - Structures;
 - Signage;
 - Materials stockpiles to ensure that they are safe and aesthetically acceptable and to the satisfaction of the ECO;
 - Construction materials shall be stacked in a safe, neat and orderly fashion and shall comply with the requirements of the OHSA,

- Windblown litter construction debris and spoil shall be collected and removed for safe disposal.
- g) Littering will not be allowed on site,
- h) Dumping of waste will not be allowed,
- i) The excavation and use of rubbish pits on site is forbidden, and
- j) Burning of rubbish is forbidden.

2.1.3 Inert waste

To ensure that the inert waste is responsibly disposed of and responsibly reuse and dispose of inert material waste. Management and mitigation requirements include:

- a) Construction waste materials will be recycled or re-used in the construction process as far as possible,
- b) Regular clearing and disposal of spoil material, and
- c) Where waste is to be transported by truck, it will be covered with a tarp appropriately when travelling through inhabited areas.

2.1.4 Hazardous waste

To ensure that hazardous waste is treated accordingly or disposed at an appropriate registered waste disposal facility. Management and mitigation requirements include the following:

- a) Used oil, lubricants, and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and stored as hazardous materials before being sent back to the suppliers or recycled by a reputable registered / permitted company;
- b) An oil / water separator should be installed to collect run-off from designated wash bays and designated fuel areas (if provided on site by contractor). Oils collected in this manner will be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at waste disposal sites for toxic / hazardous materials,

- c) Used spill material, filter materials shall be temporarily stored in a designated hazardous waste bin / skip for safe disposal off site to a licenced disposal facility to receive such waste,
- d) Contaminated soil must be unearthed to the point of infiltration, bagged, sealed and temporarily stored in a designated hazardous waste bin / skip for safe disposal off site to a licensed disposal facility to receive such waste,
- e) In the occurrence where solid contamination is to be treated insitu the Contractor is to provide the ECO with a method statement for approval. The method statement should have detailed but not be limited to the following:
 - The process to treat soil contamination; and
 - Soil testing to be administered to verify that all contaminants have been removed.
- f) Dumping of hazardous waste will be disposed of at the appropriate landfill site for hazardous substances,
- g) Empty cement bags are considered hazardous waste and must be disposed of at the appropriate landfill site for hazardous substances, and
- h) Certificate of safe disposal must be provided for every load and must include the date and vehicle registration number.

2.1.5 Handling and disposal of contaminated waste water

To ensure the handling and disposal of contaminated water is done within the framework of applicable acts and regulations. Management and mitigation measures requirements include:

- a) No discharge of pollutants such as cement, concrete, lime, chemicals, fuels, or oils will be allowed into any water resources and surrounding environment,
- b) Grey water from kitchens, showers, and or sinks shall be discharged at municipal sewer system and such connection should be

approved by the Water Quality Division of the City's Water and Sanitation Department,

- c) Runoff from fuel areas, workshop areas, wash bays, and concrete swills shall be treated as hazardous liquid waste in accordance with the NEMWA Norms and Standards,
- d) Waste areas shall be placed and constructed in such a manner so as to ensure that no pollution occurs, including ground water pollution, and
- e) Contaminated water must be stored in accordance with NEMWA Norms and Standards and removed by tanker to a licensed facility.

2.1.6 Storm Water Management

A Professional Engineer must draft a storm water management plan before construction commences. This should include consideration of the following:

- Methods to control storm water run-off during the construction phase so that significant silt does not enter the storm water management system;
- Implementation of measures to dissipate the energy of the storm water before it is released into the drainage areas;
- The distribution of storm water runoff as evenly as possible from the site;
- The soil must be stabilized in order prevent wash downs into any water resource;
- All storm water drainage lines shall contain water flow arrestors to prevent erosive action on the sides of the drainage lines;
- Use of acceptable features throughout the site reduce the velocity of water runoff;
- The sediment and erosion control measures should remain in place until construction is complete;
- Road drainage to deflect storm water off the road surface will be required;
- Any waste water and or storm water that is discharged during the construction phase will have to comply with the requirements of the National Water Act, specifically with the conditions set by the General

Standard (Regulation 9225, Government Gazette, 18 May 1984)
unless a license is issued that sets specific standards for
selected variables,

- Any erosion channels which develop during the construction period must be suitable backfilled, compacted and restored to proper condition (i.e. vegetated etc.)

2.1.7 Water Abstraction

Water abstraction will not be permitted unless authorisation is granted by DWS. To obtain all necessary authorisations in terms of Section 21 of the National Water Act (No36 of 1998). Any abstraction of water for construction or operational purposes must be approved by DWS.

2.1.8 Wetland Preservation

Wetlands surrounding the development will be affected by construction activities. Management and mitigation requirements include but includes those raised by the wetland specialist:

- a) Limit the footprint area of the construction activities within site boundaries;
- b) Construction vehicles must use existing roads and internal roads to access site;
- c) During construction, all building materials should be kept out of the wetland areas as well as the associated buffer zones;
- d) Keep all demarcated sensitive zones outside of the construction area off limits during the construction and rehabilitation phases of the development;
- e) Appropriate sanitary facilities must be provided during construction and operational phase and all waste removed to an appropriate licensed waste facility;
- f) Limit vegetation clearance to the absolute minimum to avoid increased silt loads and runoff velocities and volumes which may affect the hydrology of downstream wetland areas;

- g) In the event of a breakdown, spill prevention measures must be implemented to prevent ingress of hydrocarbons;
- h) All vehicles must be regularly inspected for leaks;
- i) It must be ensured that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage;
- j) Re-fuelling must take place on an impervious area to prevent ingress of hydrocarbons;
- k) All spills must be immediately removed to the point of infiltration. Contaminated soil must be disposed of at a licensed Hazardous waste disposal facility.
- l) Proliferation of alien and invasive species is expected within any disturbed areas. These species should be eradicated and controlled to prevent their spread beyond the development footprint;
- m) Removal of alien and weed species encountered on the property must take place in order to comply with existing legislation National Environmental Management: Biodiversity Act 2004 (Act No 10 of 2004) Alien and Invasive Species Regulations, 2014;
- n) Care should be taken with the choice of herbicide to ensure that no additional impact and loss of indigenous plant species occurs due to the herbicide used;
- o) Implement soil erosion prevention and control measures;
- p) Monitor all systems for erosion and incision;
- q) Upon rehabilitation, reseedling of indigenous grasses should be implemented in all impacted areas and strategic planting of grassland species should take place; and
- r) As much vegetation growth as possible should be promoted in order to protect soils. In this regard, special mention is made of the need to use indigenous vegetation species where hydro-seeding, wetland and rehabilitation planting are to be implemented.

2.1.9 Pollution control and discharge measures

To ensure no pollution of wetland with grease hydrocarbons, suspended solids. Management mitigation measures include:

- a) Storage, handling and disposal of fuels, oils, lubricants and other potentially harmful chemicals (and their containers) will be undertaken as per **section 2.2.4.3** of this EMPr;
- b) Discharges of liquid waste will not be allowed;
- c) Any spillages of pollutants, irrespective of size, shall be contained and cleaned immediately as per establishment spill procedures,
- d) The Contractors shall implement measures to prevent, reduce and mitigated water contamination, including prevention of contamination by suspended sediments;
- e) The buffer zones as presented by the **Wetland Specialist** must be adhered to;
- f) The Contractor shall prevent discharge of any pollutants, such as cements, concrete, lime, chemicals and fuels into any water sources / course;
- g) Run-off from fuel storage areas / workshops / vehicle washing areas must be directed into an oil separator for safe disposal as described in section; and
- h) Disposal of any waste water that is discharged during the construction phase will have to comply with the requirements of the National Water Act, specifically with the conditions set by the General Standard (Regulation 9225, Government Gazette, 18 May 1984) unless a license is issued that sets specific standards for selected variables.

2.1.10 Socio – Economic Management Plan

- Develop and adopt a local procurement policy to maximise the benefit to the local economy;
- Develop a database of local companies, which will qualify as potential service providers prior to the commencement of the tender process for construction contractors. These companies should be notified of tender and invited to bid;
- Local employment policy shall be developed together with a training programme;
- A list of locally available labour and skills shall be developed. Preference shall be given to local communities for employment; and
- Recruitment shall be based on sound labour practises and with gender equality in mind.

2.2. Contractor Requirements

2.2. Contractor's Camp

The construction camp must be located away from at least 32m buffer of the wetland to reduce impact and away from the road to minimise visual and noise impacts.

All movable materials and associated accessories must be stored overnight in the camp. The camp needs to be fenced with a lockable with access control for security purposes. If staff is to be accommodated on site, then adequate facilities (e.g. chemical toilets, cooking facilities, potable water etc.) must be provided.

2.3. Eating areas

The contractor must ensure that there is a designated eating area that is protected from the elements (rain, wind, sun) and has adequate seating to accommodate the staff.

- Eating area should be located away from construction noise, dust, waste storage areas, hazardous materials stores, fuel storage and dispensing areas and other activity that may contaminate food or impair comfort.
- The eating areas shall provide adequate seating to accommodate the staff. The eating area shall make provision for smoking area, including seating and a fire proof sand filled container for extinguisher cigarettes.
- Smoking shall otherwise be prohibited across the site and in the work area.
- The eating area must be kept neat and tidy at all times.

2.4. Emergency Preparedness Plan

Emergency preparedness plan will ensure that impacts are limited / and or addressed accordingly. Emergency preparedness and response plan must be compiled and detail the following:

- A telephone contact list of personnel responsible for emergency prevention and response (the relevant client representative and local authority services);
- A list and description of the types of emergencies that may arise on site;
- Site evacuation procedures and emergency assembly point (drills to be conducted);
- Procedures to be followed in the event of an incident;
- Safeguard measures to prevent fire, with special reference to hazardous materials, fuels and lubricants and explosives stores;
- A layout plan showing the following:
 - The location and type of firefighting equipment;
 - Emergency assembly point;
 - Evacuation routes.

The emergency preparedness plan must encompass Spill Management Plan and Fire Management Plan as follows:

2.5. Spill management plan

The purpose of this plan is to prevent spills on site. In the event of a spill, quick and effective remedial action must be taken to ensure little or no significant impact. In the event of a hydrocarbon spill, the source of the spillage shall be isolated and the spillage contained. The contaminated area must be unearthed to the point of infiltration. All contaminated soil and materials must be treated as hazardous waste and disposed of at a licensed facility to receive such waste, except in the case where insitu soil treatment will occur.

The contractor is required to submit a method statement on spill prevention and detail how spills will be managed. The minimum requirements include:

- Spill prevention measures, such as drip trays, need to be made available on site and proper use communicated to the workforce;
- All spills must be reported to the ECO for immediate remedial action;
- All employees must be aware of the emergency procedures to be followed in order to deal with spills and leaks;
- The contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on site at all times;

- Treatment and remediation shall be undertaken to the reasonable satisfaction of the ECO.

2.6. Fire Management Plan

Controlled fires may be permitted on site in designated areas for recreational purposes;

A designated smoking area within the camp laydown area must be provided, a fire proof sand filled container for extinguishing cigarettes. Smoking shall otherwise be prohibited across the site and in the work areas. Employees must be aware of the procedures to be followed in the event of a fire. Fire drills must be conducted every six months or as otherwise required by the OHS. Adequate fire protection measures and fire fighting equipment must be available at each work area and the camp laydown area to deal with the type and nature of fire that may arise. The contractor shall prepare a Fire Prevention and Fire Emergency Method statement.

The method statement should include, but limited to the following:

- Fire fighting training for designated site staff;
- Sources of fire risk;
- Measures to comply with any requirements of local authority fire department;
- Measures to minimise the risk of accidental fires;
- Measures to control accidental fires.

2.7. Complaints Register

A complaints register must be kept on site in the main construction camp office. All complaints, issues and concerns shall be incorporated in feedback reports to client. Where a complaint requires corrective action, this must be communicated to the relevant parties to ensure that the complainant is satisfied. Interested and Affected Parties must be notified when construction activities are to commence. Develop grievance procedure to specifically gender matters and all other complaints received from the community.

2.8. Soil Erosion and Erosion Management and Mitigation Plan

Excessive erosion can lead to land degradation and the reduction of the areas carrying capacity. It is important to implement an erosion management plan and also conserve the soil potential. The objective is to conserve soil potential and management and mitigation measures include:

- a) Vegetation shall be stripped in a sequential manner as the work proceeds so as to reduce the time that stripped areas are exposed to the elements,

- b) Top soiling and revegetation will be utilised to gain access to site,
- c) Only existing access roads will be utilised to gain access to site,
- d) Storm water control shall be undertaken to prevent soil loss from the site,
- e) All embankments shall be protected by a cut off drain to prevent water from running down the face of the embankment, resulting in soil erosion,
- f) Areas around internal roads, stockpiles shall be visually monitored during site inspection,
- g) A photographic record of the on-site conditions shall be kept by the EO to aid in the identification of erosion problems,
- h) Signs of rill and gully erosion shall be remediated immediately, erosion berms should be installed to prevent gully formation and siltation of the wetland resources:
- i) Typical remediation techniques also include:
 - Silt fences,
 - Hay bales,
 - Eco-logs, and
 - Jute mats.

2.9. Ground water and soil contamination

The objective is to preserve soil and groundwater resources and management mitigation measures include:

- a) Mixing / decanting of all chemicals and hazardous materials takes place on a drip tray or impermeable surface,
- b) Ensure all hazardous storage tanks / drums / stores are designed and managed in order to prevent pollution of rains, groundwater and soils,
- c) No batching / mixing of cement shall occur directly on unprotected ground,
- d) Empty cement bags shall be stored for safe disposal of site in weatherproof containers to prevent windblown cement dust or be affected by rain or runoff events,
- e) The contractors shall take all reasonable measures to prevent the spillage of cement /concrete during batching and construction operations. During pouring, the soil surfaces shall be protected using plastic and all visible remains of concrete shall be physically removed on completion of the cement / concrete shall be removed and disposed of via the solid waste management system.
- f) Where 'ready-mix' concrete is used, the Contractor shall ensure that the delivery vehicles do not wash their chutes directly onto the ground, and
- g) Any spillages resulting from the "ready-mix" delivery shall be immediately cleared and disposed of via the solid waste management system. Ready-mix shall not be permitted to

dump drum wash unless into designated contaminated water pond which is properly lined with impermeable materials and which must be fully rehabilitated at completion.

2.10. Stripping of Topsoil

Topsoil that is removed for construction purposes must be stockpiled in a designated area. This area must be located upslope and away from any storm water channels, gullies or drains. The stockpile should be planted with grass to prevent erosion and wash-away of topsoil.

The soil that is to be covered by permanent structures must be stripped to a depth of 0.15m and stockpiled to a maximum height of 2.0m. No vehicles shall be permitted to drive onto the stockpiles and the stockpile must not be contaminated with any pollutants, including litter. The topsoil must be used for any rehabilitation after the construction period. The removal of herbaceous material from the stockpile must be prohibited.

2.11. Provision of Services

Chemical toilets must be provided for construction workers prior to the commencement of any construction activities.

- These must be regularly maintained and emptied as and when required;
- Toilets must be located within walking distance of the work staff and an average of 1 toilet per 5 workers must be provided;
- Toilets must not be located further than 100m from the place of work;
- Toilets must be secured to the ground to ensure they are not blown over during high winds or bumped over;
- The contractor shall also make available provisions for workers to wash their hands after using the toilets.
- Where portable toilets are located within view of the public or neighbouring residences or places of business, efforts should be taken to screen such facilities from view.
- The use of pit latrines and sock-away is prohibited. Washing, whether of the person or of personnel effects and acts of excretion and urination are strictly prohibited other than at the facilities provided.

2.3. Provision of Services

2.3.1. General Conditions

The contractor and sub-contractors that are appointed to undertake the work needed to comply with the requirement of this EMP as well as any conditions laid down by the client.

No fires may be ignited outside the confines of the construction camp unless with just cause and reason. There should be no unnecessary disturbance of areas where construction works are not taking place and the ECO need to approve areas for stockpiling and storage prior to their use.

2.3.2. Traffic and Transportation Management and Mitigation

Due to the nature of the proposed project, the potential to impact on traffic flow and patterns is unavoidable. Compliance to the road safety measures and recommendations would minimise disruptions and negative impact to traffic flow and patterns. To reduce impact of traffic on traffic the following mitigation measures are recommended:

- Adequate contraction signage is in place to inform public of the increased construction activities in the affected areas by placing adequate signage;
- Regulation of construction traffic to minimise the impact on regular road users;
- Regulation of normal road traffic to minimise impact of construction activities on these road users and to ensure a safe passageway for both these road users as well as normal road users;
- Traffic marshals to be available at all times to regulate traffic in and out of the study site.

2.3.3. Storage of Equipment

All materials that can be moved (e.g. wheelbarrows, picks, axes etc.) and all vehicles that remain overnight on the site must be stored in the contractor's camp. This area must be fenced during the construction phase.

2.3.4. Vehicle Movement/Repairs

The movement of heavy vehicles to and from the site must occur during off peak traffic hours (after 8h30 and before 16h30 during the week). No heavy vehicles may be permitted to move on site on weekends.

Roads in the direct vicinity of the site will be subject to continual use by construction vehicles, particularly heavy vehicles, carrying building materials, waste, etc. Special care should be taken to prevent spillages on the roads. Vehicles should be equipped with drip trays to prevent

oil and fuel spillages. In the event of spillages, it should be reported immediately and cleaned as soon as possible.

Notices should be placed on visible locations in the vicinity of the construction site to warn public of construction activities and indicating that heavy vehicles may be using the road.

2.3.5. Storage of Fuel, Cement, Dangerous and Toxic Materials

All fuels that are stored on site shall be bunded to 110% of the capacity of the bulk fuel storage container. This must be protected from damage by vehicles. The fuel storage area must not be located near (i.e. less than 100m) any water resource, including a spring, river, stream or surface water body.

Hazardous materials such as oils and paints should also be stored in specifically designed storage facilities.

Minor vehicle repairs must only take place within the confines of the contractor's camp. An appropriate work surface (i.e. bunded concrete floor) must be provided that can collect oils, fuels and the like and these must be collected into an appropriate bin.

Where there have been oil/fuel leakages, contaminated soil must be removed and disposed of at an appropriately permitted site.

Cleaning of cement mixing and handling equipment should be done using proper cleaning trays and all empty cement containers should be removed from the site for appropriate disposal at a licensed commercial facility.

2.3.6. Control of Noise

Construction activities can cause environmental noise pollution. A disturbing noise is one that exceeds the zone sound level or the ambient sound level by 7 dB or more. A noise nuisance is defined as meaning "any sound that disturbs or impairs or may disturb or impair the convenience or peace of persons". This includes the use of power tools, movement of vehicles, etc. The following specific measures must therefore be adhered to:

Limit construction times to the following hours:

06:00 to 18:00 during the week (Monday to Friday);

07:00 to 17:00 on Saturdays, and

No noisy activities on a Sunday;

Should blasting be required during the construction phase, the necessary permits must be obtained

from the local authority and any other relevant authority;

The contractor must comply with all applicable occupational health and safety requirements;

Blasting times must be limited to the hours from 08:00 to 17:00 during weekdays only; and

Screen construction activities from residential, social and business entities with soil berms to limit noise.

Personnel, visitors and workers on the site must at all times be equipped with appropriate hearing protection measures to ensure noise impacts do not damage the persons hearing. A site Health and Safety Officer (HSO) must be appointed to regularly inspect the site and ensure compliance with the Occupation Health and Safety Act. In the event that noise levels exceed 85dBA, then appropriate measures must be taken and enforced by the HSO.

2.3.7. Safety and Security

The contractor's personnel must be adequately trained and informed in the tasks that they are expected to perform. This is required for their own safety as well as the safety of colleagues and other interested and/or affected parties. The contractor must ensure that his equipment is protected. Solid and construction waste should not accumulate on site as this could attract rodents and also poses a safety hazard. All excavated areas and/or holes should be clearly demarcated.

The movement of construction workers through the residential areas should be restricted wherever possible. Adequate fencing needs to be provided around the site. This needs to be checked and maintained during the construction phase.

2.3.8. Waste Management

- All domestic waste generated by the contractor's activities at the contractor's camp must be stored in either refuse bins (i.e. steel or plastic 210L drums) or in a waste skip.
- If weather conditions are windy, nets should cover these bins or skips. The Contractor must ensure that these containers are emptied on a weekly basis, or as and when required.
- All litter shall immediately be deposited into refuse bins or the waste skip.

- No litter must be left in the work areas or contractor's camp.
- Construction waste must be stockpiled in the contractor's camp and the Contractor must dispose of this waste at a registered waste disposal site.
- Contaminated construction waste must be dealt with separately.
- Soils that have been contaminated by diesel, petrol, oil or any other substance that may inhibit the growth of plants must be removed to a registered waste disposal site for hazardous waste.
- Only appropriate fill shall be used to replace the lost material.

Contaminated soil must be unearthed to the point of infiltration, bagged, sealed and temporarily stored in a designated hazardous waste bin/ skip for safe disposal off site to a licensed disposal facility to receive such waste. The burning of waste on site shall be prohibited. Waste skips must be provided in easy accessible areas. These must be emptied on a regular basis. Building rubble must not be dumped or stockpile in open space areas, on pavements or on adjoining properties.

Provision must be made for a refuse storage area for temporary storage of refuse for the proposed development.

Provision needs to be made for the temporary storage of hazardous materials such as fuels, oils and paints. These could be stored in a ventilated, bunded area that can contain 110% of the volume of the largest container. Access to this storage area should be prohibited. The site must be protected from vehicle damage and must be regularly inspected for leaks, damage or pollution.

2.3.9. Air Quality

Dust generated by construction and earth moving activities and vehicle movement on temporary access roads must be mitigated by using appropriate dust suppression methods such as wetting these areas using a water bowser.

Vehicle movement must be restricted to a speed of 35 km/hour across the site. Visual dust monitoring must be maintained by the ECO measures to abate dust implemented as soon as possible. Stockpiles need to be covered in windy conditions and topsoil wetted down if required.

2.3.10. Surface Water

- The ponding of water must be allowed to drain without giving rise to erosion, siltation or flooding;
- Borrow Pits may not be used to establish a dam without prior consultation with the Department of Water and Sanitation (DWS).

2.3.11. Groundwater

The abstraction of groundwater, for any purpose during the construction phase, is not necessary and shall be prohibited. Water may not be pumped from surface pools or from the ground for use as dust suppression or in the construction process.

The disturbance of groundwater resources such as fountains or springs must not be affected by the excavation or utilisation of borrows pits.

2.3.12. Sites of Cultural/Historical Significance

Should any archaeological artefacts or resources be exposed during excavation, work on the area where these resources are found should cease immediately and the environmental control officer notified in this regard. The environmental control officer then needs to call on the services of an archaeologist so that the findings can be examined. No resources should be removed or interfered with prior to authorisation from the South African Heritage Resources Agency.

2.3.13. Terrestrial Ecology

- The harming, maiming, hunting or poaching of wildlife in any form or manner shall be prohibited;
- Contain fires ignited on site;
- Prevent the harvesting, removal or destruction of indigenous plant species not associated with construction activities;
- Remove all exotic plant species from site and institute a program to control the spread of alien exotic species
- The burning of plants shall be prohibited
- Only indigenous trees shall be used for landscaping. No alien exotic species may be used for landscaping.

2.3.14. Socio Economic Impacts

The activity will constitute the relocation and construction of the St Andrews primary school on portion 102, part of remainder of farm Sluis 354-IT, Mkhondo Local Municipality, Mpumalanga Province.

The following management mitigation measures are adhered to:

- Appoint as many locally unemployed unskilled or low skilled labourers in Ekurhuleni Metropolitan Municipality and surrounds to lessen risk of unacceptable social behaviour and to minimise the potential for criminal activity or perceived perception of an increase in criminal activity due to the presence of an outside workforce and influx of people;
- Screening prior to hiring should be undertaken, and proper monitoring procedures should be adhered to minimise the risk of crime and violent behaviour;
- Fence off the facility to avoid unauthorised access. Access control and a method of identification of site personnel are required at all times. Security lighting should be implemented at all times;
- Ensure that security personnel on site are on a permanent basis;
- Working hours should be kept between 7am and 5pm as to be agreed with surrounding landowners and occupiers;
- Local community organisations, adjacent land owners, policing forums / neighbouring watches must be informed of any late-night activities. Liaise with existing forums to communicate information to the community and to assist in the monitoring of compliance;
- Ensure that open fires on the site for heating, smoking or cooking are not allowed except in designated areas;
- Provide adequate fire fighting equipment on site and provide fire fighting training to selected staff;
- A comprehensive employee induction program should be developed to cover land access protocols, road safety, etc
- All vehicles must road worthy and drivers must be qualified and made aware of the potential road safety issues and follow the speed limits;
- Adequate signage along the access roads needs to be provided to warn motorists of the facility;
- Ensure that proper safety gear are administered and safety precautions are taken; and

- Put procedures and regulations in place to control loitering and the construction of informal dwellings in the vicinity of the facility.

2.3.15. Dust Management

To minimise dust emissions from the facility thus reducing complaints received regarding dust nuisance. Management mitigation measures include:

- a) Visual dust monitoring must be undertaken by the EO or project manager and dust abatement measures implemented immediately should excessive dust releases be noticed,
- b) Screening is an option that the client could consider to keep dust within the study area,
- c) Vehicles travelling along the access roads must adhere to speed limits to avoid creating dust,
- d) A maximum speed limit of 40km/hr must be adhered to on all site roads,
- e) Client must identify if water high dust generation activities. Techniques proposed for controlling dust include water spraying and of application of dust suppression. If water is the chosen method of suppressing dust, a water tank must be available with water at all times. The driver of the water tank must be adequately trained in mixing and applying measure on area.

2.3.16. Site Rehabilitation

The aim of site rehabilitation is to successfully restore areas disturbed by construction to their pre-construction state. The plan consists of the following components:

- Disturbed areas to be rehabilitated,
- Re-vegetation of disturbed area,
- Rehabilitation and reinstatement of borrow pits and
- Rehabilitation of wetland and riparian areas;
- Methods for planting grasses from seed, cuttings and sods;
- Clear the site of all inert waste and rubble, including surplus rock and foundations. After the material has been removed, the site shall be re-instated and rehabilitated, Stockpiled topsoil and indigenous vegetation should be used for all rehabilitation purposes.

The rehabilitation plan must ensure that erosion by runoff water does not occur. This must include:

- Filling in of open trenches (post construction) and the return of natural, endemic and

- Establishment of vegetative cover to 80% of the rehabilitated area making use of a hydro seed method using an indigenous mix of grasses. On the grass course sections, seeds and cover appropriate for the golf course can be used.
- Regular watering of rehabilitated areas must be undertaken. This must also include the regular removal of exotic plants.
- All disturbed areas must be adequately rehabilitated and regular audits must be conducted to ensure stabilisation and cover.

2.3.17. Health and Safety during construction

- The Contractor shall comply with all legislation with regard to man-made facilities and activities in the area, including the Occupational Health and Safety Act (Act 85 of 1993).
- The relevant authorities should be notified of any interruptions of services, especially water supply lines, sewerage lines, and telecommunication lines. These should be identified before any construction activities commence and appropriate protective measure should be implemented.
- Disruption of access for local residents during bridge and road construction, haulage, or any other construction activity shall be kept to a minimum and shall only take place with the prior consent of the PM.
- The Contractor shall liaise with the Project Manager (PM) on a regular basis with regard to specific activities which could cause inconvenience to neighbors, especially the disruption of services. The PM will inform neighbors of such activities in good time.
- The contractor will notify the relevant landowners two weeks prior to entering their land in writing. The receiving landowner must sign receipt of this notification.
- Where community liaison officers are required, the contractor will work through the community liaison officer to notify the community of relevant activities and hazards on site. All communication is to be listed by the site engineer in charge of the project.
- Gates that may be found open or closed will be left in the same state as they were found, subject to the requirements of the landowner/lessee.
- The contractor is to ensure that all necessary required way-leaves approvals are available on site at all times.
- The PM must be notified by the contractor should it become evident that way-leave agreements have not been obtained as soon as it becomes known.
- Safety Data Sheets (SDSs) must always be readily available on site for all chemicals and hazardous substances to be used on site.

- An incompatibility study of chemicals that cause fires when stored close to each other must be included in the safety data sheets.
- All the hazardous substance on site shall be handled/ utilised by the competent employees/ personnel.
- Cement mixing will occur in a designated area on an impervious layer (e.g. plastic or cement mixing pit). The runoff water will be contained for re-use in cement mixing or disposed of to the waste water system.
- Unused cement bags will be stored in an area not exposed to the weather and packed neatly to prevent hardening or leakage.
- Storage areas containing hazardous substances / materials must be clearly indicated.
- Any storage tanks containing hazardous materials must be placed in a ventilated bund wall area. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material.
- Hazardous substances must be stored and handled in accordance with the appropriate legislation and standards, which may include the Hazardous Substances Act, the Occupational Health and Safety Act, relevant associated Regulations, and applicable SABS and international standards.
- The Contractor will notify the site engineer and the ECO immediately of any pollution incidents.
- The Contractor to have an emergency spill kits available on site should there be a spillage of a hazardous substance.
- The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown the hydrocarbon spillage.
- Hydrocarbon contaminated material/soil shall be collected and disposed of at a registered hazardous disposal facility.
- Maintenance vehicles must have designated spillage kits so that oil spillages can be pick-up immediately once noted.
- Staff is to receive awareness training on picking up oil spillages.
- Drip trays must be placed under all vehicles when immobile for longer than 24 hours. Vehicles suspected of leaking must be monitored. Dripping oil must be stopped immediately once detected.
- Drip trays must be of a sufficient size and volume to catch any hydrocarbons that might leak from a stationary vehicle

- No maintenance that could result in oil spillages to be done on site.
- Fuel, lubricants, transmission and hydraulic fluids shall only be stored in the designated areas.
- All spillages from any chemical must be reported to the ECO.
- Unless otherwise directed, contaminated soil will be disposed of at appropriate dumping site that is permitted to accept contaminated soil.
- All related documents for disposal of hazardous waste are to be copied to the ECO and retained on site to be included in the end of project documents.
- Empty containers in which hazardous substances were kept are to be treated as hazardous waste.

2.3. Mitigation Measures and Proposed Management Programme

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
PLANNING & DESIGN				
Contractor Requirements	Ensure that the Contractor is aware of his/her responsibility	Provide the contractor with the EMP and Geotechnical Report	Client	
Environmental Control Officer	Ensure that activities on site are compliant with the requirements of the EMP	Appoint an independent Environmental Control Officer to oversee environmental aspects of the development	Client	
Geology & Soils	Ensure surface stability	Decide upon foundation types for the structures from those suggested in the geotechnical report / Engineering Reports	Professional Engineer	
Traffic	Ensure there is no congestion	Ensure proper traffic control during construction	Traffic Engineer / Client	
Geology and Soils	Ensure that damp does not rise from underneath structures.	Include the necessary precautionary measures in design.	Professional Engineer	
Storm Water Management Plan	Ensure that adequate provision is made for storm water run-off	Draw up a Storm Water Management plan for the site taking into consideration the gradient and road alignments; Construct a temporary attenuation pond	Professional Engineer	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		to contain storm water runoff during the construction period; Ensure that storm water can drain freely from the site; and Use a line of secured Bayles of hay (along the foot of the site) to prevent silt entering the road reserve and drainage channels.		
Visuals & Aesthetics	Ensure that the visual aspects of construction are taken into consideration to lessen impacts on residential, business and social amenities in the area.	Screen construction areas with shade cloth or other suitable material from adjacent properties.	Contractor	
Waste Management	Ensure the effective and efficient separation, storage and removal of waste from the site	Develop a Waste Management Plan for the construction phase which will detail: <ul style="list-style-type: none"> - Schedules for collection - Responsible parties for collection - Details regarding waste separation (hazardous vs. general) 	Project Engineer	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
		<ul style="list-style-type: none"> - Provision of facilities for the separation and storage of waste - Details regarding the disposal of the waste (hazardous and general) - Assigns responsibilities for these activities 		
SITE ESTABLISHMENT				
Construction activities	Ensure that there is no unnecessary disturbance to areas on the site and that construction activities take environmental considerations into account	A layout plan for construction activities needs to be developed and approved by the Environmental Control Officer	Project Engineer Contractor Environmental Control Officer	
Contractor's Camp	Ensure that the contractor's camp does not pollute the environment and is not located on a sensitive site i.e. 100 m away from rivers or streams	Staff facilities, ablutions, chemical toilets, potable water must be provided for the staff	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
Contractor's Camp	Ensure that camp does not infringe on adjacent property owners	Locate the camp away from immediately adjacent property owners	Contractor	
Soil	Ensure preservation of the top soil	Top soil stockpiles must be placed in approximately 1,5 to 2 m and must be established in disturbed zones	Contractor	
Soil	Ensure that erosion impacts and siltation is kept under control	Areas scheduled for construction should be cleared only 1 week prior to construction	Contractor	
Training	Improve the awareness of all construction personnel with regard to environmental matters	Develop and implement a training programme to address environmental issues and responsibilities	Environmental Control Officer Contractor	
CONSTRUCTION				
Archaeological Evidence	Ensure the protection of any archaeological sites.	Construction must be stopped and a professional archaeologist consulted should any archaeological remains be uncovered.	Contractor Environmental Control Officer Archaeologist	
Borrow Pits	Ensure that the soil resources	No borrow pit may be excavated from any	Contractor &	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	are not over exploited	sensitive or open space areas	Environmental Officer	
Blasting	Ensure blasting does not pose a danger to workers or staff	Authorisation to undertake blasting activities must be obtained from the relevant authority	Contractor	
Blasting	Ensure blasting does not pose a danger to workers or staff	All conditions relating to blasting and the Occupational Health & Safety Act must be complied to	Contractor	
Cleaning of equipment	Ensure that spillages are minimised and that where these occur, that they are appropriately managed	Proper cleaning trays should be used for the cleaning of cement mixing and handling equipment A wash-bay with sump / evaporation pond must be used to clean vehicles and prevent the run off of polluted wash water.	Contractor	
Communication	Ensure that interested and affected parties are provided with a medium through which to lay complaints with regard to activities on site	A complaints register should be kept in the site office.	Contractor	
Contaminated	Ensure that soils that are	All soils that have been contaminated by	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
Soil	contaminated do not pollute the environment	fuel spills, paints spills, etc. must be appropriately removed from the site, which must then be rehabilitated.		
Contractor's camp	Ensure that the contractor's camp is secure	All materials and equipment that can be moved must be stored overnight in the contractor's camp	Contractor	
Disturbed Ground Conditions	Ensure that disturbed ground conditions are identified	Accurately locate the presence of disturbed ground conditions during installation of underground services and construction	Contractor	
Disturbed Ground Conditions	Ensure the stability of the disturbed ground conditions	Prior to the construction of housing units, stabilise the disturbed ground conditions	Contractor	
Dust	Ensure dust does not significantly pollute neighbouring properties	Wet all exposed sand areas such as roadways, stockpiles and working areas that give rise to dust. This must ensure adequate dust suppression.	Contractor	
Environmental Control Officer	Ensure that there is compliance with the EMP on site	An Environmental Control Officer may inspect the site at any time during the construction phase	Environmental Control Officer	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
Environmental Control Officer	Ensure that there is compliance with the EMP on site	A mid-construction and post-construction report should be forwarded to client for their information	Environmental Control Officer	
Effect of the EMP	Ensure that the EMP is enforced on all contractors	Each contractor and subcontractor must be notified on the content of this EMP.	Project Manager	
Effect of the EMP	Ensure that the EMP is enforced on all contractors	All contractors and subcontractors must be bound by the content and requirements in this EMP	Project Manager	
Fill Materials	Ensure the stability of fill materials	Fill materials must be compacted to the relevant densities	Professional Engineer	
Ground Water	Prevent the contamination of groundwater resources	Vehicles must be equipped with drip trays to prevent spillages of oils and fuels. Site specific hydrogeology studies should be conducted should any excavation take place	Contractor	
Loss of faunal species	The capture or hunting of any fauna on the site is not permitted	Should any fauna such as hedgehogs be encountered on site during development, they must be carefully relocated into the neighbouring natural grassland areas.	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
Installation of Services	Ensure that all points for water provision are regularly inspected for erosion impacts	Implement adequate mitigating measures to curtail any erosion impacts.	Contractor	
Installation of Services	Ensure that water used to wash machinery and any other “grey” water does not pollute the site	Provide a wash bay with a gravel floor to contain such water.	Contractor	
Litter	Ensure that the site remains clean and clear of litter	All litter must be collected into rubbish bins located on the site. These bins must be regularly (i.e. weekly) collected and transported to a registered waste disposal facility.	Contractor	
Noise	Ensure that nuisance noise from construction activities does not disrupt the surrounding landowners	Limit construction time to the following hours: 06:00 to 18:00 during week; 07:00 to 15:00 on Saturdays, and no noisy activities on Sundays	Contractor	
Noise	Ensure that nuisance noise does not disrupt the	Jack hammering and blasting, if required, must take place between the hours of	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	surrounding land owners	08:00 and 17:00 during the week only		
Noise	Ensure that nuisance noise from construction vehicles does not disrupt the surrounding landowners	No heavy vehicles may be permitted to move on site outside of work hours	Contractor	
Road Works and Traffic	Ensure that soil does not erode from culverts or similar structures	All culverts or similar structures must be stabilised with gabions and/or indigenous grasses	Professional Engineer	
Road Works and Traffic	Ensure that local residents are not inconvenienced by the movement of construction vehicles off-site	The movement of heavy vehicles from the site must occur outside of peak traffic hours (after 08h30 and before 16h30)	Contractor	
Road Works and Traffic	Ensure that local residents are not inconvenienced by the movement of construction vehicles off-site	Spillages on the roads should be avoided. When these occur, they should be cleaned immediately	Contractor	
Road Works and Traffic	Ensure that local residents are not inconvenienced by the movement of construction	Notices should be placed at relevant locations during the construction period indicating that heavy vehicles are using	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	vehicles off-site	the road		
Safety & Security	Ensure the safety and security of staff and the public	All local authority by-laws must be adhered to	Contractor	
Safety & Security	Ensure the safety and security of staff and the public	All contractors must take cognisance of and abide by the Occupational Health and Safety Act (1993)	Contractor	
Safety & Security	Ensure the safety and security of staff and the public	Trenches to a depth greater than 1.5 m must be supported or appropriate warning must be provided.	Contractor	
Safety & Security	Ensure the safety and security of staff and the public	Provided fencing needs to be checked and maintained	Contractor	
Safety & Security	Ensure the safety and security of staff and the public	The movement of construction workers through the residential area should be restricted wherever possible	Contractor	
Soil	Ensure that storm water cannot erode the top soil stockpile	Construct and maintain a berm around top soil stockpiles	Contractor	
Storage Facilities	Ensure that hazardous materials are stored	Specifically, designed storage facilities need to be provided and used for	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	according to legislative requirements	hazardous materials.		
Storage Facilities	Ensure that fuel stored on site does not pose a pollution and fire hazard	Fuels stored on site shall be bunded to 120% of the capacity of the largest container.	Contractor	
Storage Facilities	Ensure that fuel stored on site does not pose a pollution hazard	The fuel storage area must not be located less than 100m from any water resource	Contractor	
Storm Water Run-off	Ensure that run-off does not contribute to erosion & siltation	Construct and maintain berms on the site to contain storm water run-off or establish riffle beds or retention ponds, as appropriate	Contractor	
Vehicle repairs	Ensure that spillages are minimised and that where these occur, that they are appropriately managed	Minor vehicle repairs on an appropriate work surface may take place in the contractor's camp	Contractor	
Waste	Ensure the adequate removal of solid waste	All wastes (hazardous or general) must be collected and disposed of at an appropriate registered facility.	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
Waste	Ensure the adequate management of waste	Nets need to be provided over bins and skips should windy conditions prevail	Contractor	
Waste	Ensure the adequate management of waste	No waste should be burnt on site	Contractor	
Wet Wastes	Ensure that no wet waste is disposed of down drains, sewers, etc.	No wet wastes or solvents shall be permitted to be disposed of down sewers, drains or storm water drains	Contractor	
Wet Services	Ensure the integrity of the wet service infrastructure	Non-ferrous metal pipes or plastic pipes must be used for the wet services	Contractor	
POST CONSTRUCTION				
Site Rehabilitation	Ensure the site is left clean, orderly and free of rubble after construction activities	Remove all rubble, rubbish, litter, unused building equipment, contaminated soils or any other relevant articles from the site following the end of the construction phase	Contractor	
Soil	Promote the rehabilitation of the site back to its original condition as far as possible	Soil that has been compacted during construction activities must be ripped in two perpendicular directions	Contractor	
Soil	Ensure the re-use of top soil	Top soil that is stockpiled on site must be	Contractor	

Issue	Objective	Mitigation Measure	Responsibility	Compliance Notes
	for rehabilitation	used to rehabilitate the disturbed areas		
Sidewalk Rehabilitation	Ensure that the sidewalks are left clean, orderly and free of rubble after construction activities	Rehabilitate disturbed sidewalks; remove all rubble, rubbish, litter or any other relevant articles from the sidewalks	Contractor	
MONITORING				
Audit Reports	Ensure adequate reporting of progress with the development	Regular reports: start, mid and end construction audits are currently proposed, and should be forwarded to GDARD for review	Environmental Control Officer	
Monitoring	Ensure compliance with the requirements of the EMP and client	Undertake monitoring activities on at least a monthly basis.	Environmental Control Officer	

2.3 Operational Phase: Mitigations and Monitoring

2.3.1 Mitigation Measures			
Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibility
Production and economic activities	Impacts on local communities through employment and economic stimulus Impacts on regional economy	Occupational health and safety regulations to be complied with. Social and Labour considerations to be included in strategic planning. Preferred employment for local communities Social awareness and upliftment program through environmental awareness, skills upliftment Social improvement program through engaging with local suppliers and economic ventures Engagement with local community Implementation of Corporate Social responsibility	Communications and Public Relations manager

General – Occupational Health and Safety	All activities may lead to noise impacts, impact injuries, falling from height injuries, traffic incidents and slips, trips and falls.	Occupational Health and Safety Regulations complied with by employer and employees OHS training provided to all employees OHS Risk Assessments conducted to ascertain hazard zones Personal Protective Equipment supplied to all employees where relevant OHS hazard warning signs in all areas where required Fire alarm and fighting equipment to be in place as per risk.	Human resources manager Production manager Plant Manager Health and Safety officer/risk manager
Project Activity	Potential Environmental Impacts	Proposed Mitigation Measures	Institutional Responsibility
General – environmental awareness	All activities	Awareness training to be provided to all personnel regarding responsibilities to	Human resources manager

Industrial Process/Cooling Water	Resource Consumption, groundwater impacts from leaks	Preventative Maintenance and Monitoring Program Installation of Membrane Bioreactor Installation of water conservation interventions	Plant Manager Environmental Manager
Change rooms	Resource Consumption	Installation of water conservation	Plant Manager Human Resources
Change rooms	Resource consumption	Awareness training to be provided to all personnel regarding responsibilities to the environment	Environmental Manager

2.3.2 Monitoring				
Project activity	Location	Parameter	Monitoring Method	Monitoring Frequency
Atmospheric Field	Office block	Wind direction, wind speed, rainfall, relative humidity	Weather station	Real-time
Noise	Fence line, materials handling, foundry, mill house, roadways	Decibels	Sound level meter	Quarterly
Waste Management	Waste storage areas, waste generation points	Volume	Inspections, Weighbridge, waste manifest, waste accounting	On-going
Housekeeping	Site	Housekeeping Protocol/ISO14001 EMS procedures	Observed Tasks, Site inspections, incident reporting, Corrective Action Notices	On-going

Environmental Management	Site	Housekeeping, Waste Management Plan, Stormwater Plan, Maintenance Plan Development and Implementation of an ISO14001 EMS or similar system	Observed Tasks, Site inspections, incident reporting, Corrective Action Notices	On-going
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3. CONCLUSION

In conclusion, it should be noted that the EMPr should be regarded as a dynamic document and changes should be made to the EMPr as required by project evolves while retaining the underlying principles and objectives on which the document is based.

4. SUMMARY OF THE SPECIALIST STUDIES

4.1. Ecological Study

The proposed site is slightly to moderately undulating plains, including some low hills and pan depressions, with the presence of the vegetation which is short dense grassland dominated by the usual Highveld grass composition such as *Aristida*, *Digitaria*, *Eragrostis*, *Themeda*, *Tristachya* etc; with small, scattered rocky outcrops with wiry, sour grasses and some woody species (*Acacia caffra*, *Celtis Africana*, *Diospyros lycioides subsp lycioides*, *Parinari capensis*, *Protea caffra*, *P. welwitschii* and *Rhus magalismsontanum*). The vegetation on the proposed site is classified under Gm 12 Eastern Highveld Grassland.

The proposed relocation and construction of the St Andrews primary school project site is regarded as of Medium sensitivity. Having undertaken a vegetation assessment of the proposed area, our assessment is that the proposed activity, if undertaken in accordance with the mentioned mitigation measures (recommendations) and detailed Environmental Management Programme will have limited significance.

- No red data was observed on site,
- No species of conservation was observed on site,
- The site is close to reconstruction and development programme government housing settlement where various anthropogenic activities take place. Vegetation in some areas is trampled and illegal dumping site

has been established on site which makes it unsuitable habitat for red data species.

Although no sensitive or red data species were observed during the time of assessment, minimum destruction of the environment must be adhered to. From an ecological perspective, due care must be undertaken when developing on this area and all relevant mitigation measures implemented.

4.2. Wetland Assessment Study

In the results obtained, the presence of areas with varying EIS and PES were observed within the study site with some areas observed like being in good condition and ecologically important, while other areas were observed as being more significantly modified and of low ecological importance. The wetlands within 500 m radius of the proposed relocation site deserve the level of protection and consideration, so there is a need to respect 32 m buffer around the wetlands.

In the present state the features of the present wetland showed different types of transformation with specific impacts originated from the previous impacts such as impoundment, altered flow and inundation caused by rain and increased sediment loading. The findings showed that the negative impacts of the proposed project of construction of school will be experienced during the pre-construction and construction phase of the project will have a very low impact, but a 32 m buffer around the wetlands should be respected. It was projected that, the impacts during the pre-construction and construction phase could be well mitigated and this will have a negligible impact in the construction and operational phase.

In the operational phase, the impact is falling under very low category, and could be regarded as negligible. The implementation of the project and plans should be institutionalised through regular monitoring and auditing. Based on the

assumption that such project and plans for the proposed relocation of the St Andrews primary school on portion 102, part of remainder of farm Sluis 354-IT will be implemented in accordance with national and international industry standards, it is the opinion of the wetland specialist that the proposed project should be authorised. Although the proposed development will be operational for approximately 40 years. In case there is an impacted wetland, the treatment of impacted wetland is expected to continue well behind the life of the school.

Recommendations regarding the protection of the wetland on the proposed relocation of the school are provided below. These are based on the sensitivity analyses.

4.3. Mitigation measures for the current wetland

4.3.1. General Measures

- In case there will be a crossing, a methodology plan must be approved by an ECO or a wetland specialist.
- Design features to prevent disturbance of the flow patterns and hydrologic regimes critical to conservation of the wetland.
- No stockpile areas (this excludes vegetation blocks removed from the trench) should be located within wetland boundary, or within the associated buffer zone.
- Rehabilitation of disturbed in-stream and riparian habitat must commence immediately after construction is completed. Any material removed from the in-stream or riparian zone must be returned and bedded in their original position as far as practicably possible.
- During the construction, the construction footprint of the proposed construction of 8 broilers chicken houses must be kept outside of river/ wetland areas.
- Ensure that construction-related waste and effluent do not affect the wetland areas and associated buffer zones.

- No dumping of waste should take place within the wetland and associated buffer zone. If any spills occur, they should be cleaned up immediately.
- Restrict construction to the drier summer months, if possible, to avoid sedimentation of wetland features in the vicinity of the proposed development.
- Connectivity of the wetland features in the system need to be maintained in order to ensure continuity of the habitats and resources.
- Ensure that all activities impacting on geohydrological resources of the proposed site are managed according to the relevant DWAF Licensing regulations and groundwater monitoring and management requirements.
- Contractors responsible for the proposed project within the vicinity of the wetland areas must sign a declaration stating that they will adhere to all stipulations of the Environmental Management Plan relating to wetland crossing if there is a need for crossing.

4.3.2. Erosion Control

- Where possible, silt fences / barriers or other relevant measures should be installed along the edge of wetland to prevent soil erosion and ingress of runoff water carrying silt from the catchment of the wetland (i.e. the slopes surrounding the watercourse/ wetland) to enter the water body.
- In sandy wetland where the risk of development of erosion and knick points is high, temporary drainage of water through the wetland can be considered to minimise the risk of erosion.
- Shoring up trench walls, close monitoring of development of head cuts during construction (precursors to donga erosion) and the correct rehabilitation of wetland vegetation after the trench has been backfilled must take place.

- The protection of wetland vegetation from damage through the implementation of measures such as the use of running tracks must be implemented to prevent soil erosion.

4.3.3. Removal of Vegetation

- The vegetation within the footprint of the trench must be removed immediately prior to the onset of excavation.
- An ECO should be used to oversee this process.
- The vegetation must be removed in squares by means of 'turfing', to a depth of approximately 50 cm to ensure that the organic layer and topsoil are removed in an intact state, whilst retaining the root zone of the vegetation and herbaceous vegetation in an intact state.
- The vegetation blocks must be placed on the opposite side of the running track / work platform to the trenchline on a strip of geotextile membrane. The vegetation blocks should be stockpiled in such a way that the vegetation has sufficient water and sunlight to survive. Care should be taken not to overly wet the vegetation, as this would result in minerals leaching out of the soils and the possible erosion and collapse of the blocks.
- As far as practicable immediately after the backfilling of the trench has been completed, the vegetation blocks must be returned and bedded in to their original position of removal, and care must be taken to retain the original order / position of the blocks so as to retain the distribution of vegetation characteristic to each hydrological zone within the wetland as far as possible.

4.3.4. Re-vegetation and prevention of compaction

- Blocks of wetland vegetation and underlying soil along the trench through the wetland must be removed from the footprint of the trench and preserved to be returned into the same location once the trench is backfilled.
- Watercourse/ Wetland soils should not be compacted as this could alter the hydrology of the watercourse/ wetland, restrict plant growth, and lead to erosion within the wetland.

4.3.5. Prevention of Pollution

- Access of people and vehicles to watercourse/ wetland along the proposed project must be managed under the supervision of an ECO.
- The placing of silt fences / silt barriers adjacent to the wetland to prevent discharge of silt into the watercourse/ wetland, and the inclusion of buffer zones in which no stockpiles, machinery, chemicals or construction camps must be included to prevent pollution into the watercourse/ wetland.
- Wetland must not be viewed in isolation from the surrounding slopes / catchment, as eroded material or other potential pollutants emanating from the surrounding non-wetland areas adjacent to the wetland boundaries may enter the wetland and cause significant pollution of the wetland.
- A copy of the Basic Assessment Report and associated Environmental Management Plan must be present at the work site for easy reference to specialist recommendations in sensitive areas.
- It is recommended that the construction crew be educated about the sensitivities involved in these areas as well as the potential species they could encounter.

- No hazardous materials (such as oil) should be kept within 50 m of the edge of a wetland buffer zone.

Appendix A-Curriculum Vitae of the Suthor of this EMPr

CV of Milambo Freddy Tshiala

PERSONAL DETAILS

SURNAME: TSHIALA

NAMES: MILAMBO FREDDY

CONTACT NUMBER: 0836691702

Email address: mftshiala@gmail.com

CAREER OVERVIEW

2012-Current: Managing Director/EAP/Biodiversity Specialist

2009-2014: Environmental Assessment Practitioner (EAP) at Asande Projects
(Consulting and Engineering)

INDUSTRY EXPERIENCE

- Environmental Impact Assessment
- Biodiversity Assessment (Fauna and Flora Assessment, Ridge Study & Wetland Assessment, Invasive Alien Plants study)
- Agricultural Potential Assessment
- Project Management
- Training and Capacity Building

TERTIARY EDUCATION

2014: Doctor of Philosophy in Environment and Society at the University of Pretoria

2006: Master's Degree in Environment and Society at the University of Pretoria

2000: BSC (Honours Degree) in Agronomy at the University of Kongo

SHORT COURSES CERTIFICATES

2015: Occupational Health and Safety Act 1993 (NQF LEVEL 5 WITH CREDIT 12) at UNISA

2015: Applying SHE Principles and Procedures

2015: Construction Regulations Training

2014: Introduction to OHSACT

2013: Wetlands Management: Introduction and Delineation at University of Free State

2006: Horticultural Management Training at the University of Pretoria

2004: Learning ArcGis at University of Pretoria

MEMBERSHIP IN THE PROFESSIONAL BODIES

2013-Current: Registered in the Environmental Assessment Practitioners of South Africa

2014-Current: Registered in the South African Council for Natural Scientific Professions

Maanakana Projects and Consulting (Pty) Ltd

Position: Managing Director

Period: 2012-Current

PROJECT NAME	YEAR	RESPONSIBILITY
ENVIRONMENTAL IMPACT ASSESSMENT		
Basic Assessment for the Proposed Construction of an 18km long pipeline with an internal diameter of 2100 for the remainder of B16 pipeline starting from Zuikerbosch Pumping Station to Slangfontein with associated cross connections and end connections.	2016	Basic Assessment
Basic Assessment for upgrading the Mathyszensloop Bus Route in Thembisile Hani local municipality, Mpumalanga Province	2013	Basic Assessment
Basic Assessment for upgrading the Tweefontein Bus Route in Thembisile Hani local municipality, Mpumalanga Province	2013	Basic Assessment
ENVIRONMENTAL MONITORING AND AUDITING		
Tightlining at TM1 at Transnet in Durban	2013-2014	Environmental Monitoring and Auditing
ECOLOGICAL ASSESSMENT (FAUNA AND FLORA)		
Ecological Assessment For the Proposed Construction of an 18km long pipeline with an internal diameter of 2100 for the remainder of B16 pipeline starting from Zuikerbosch Pumping Station to Slangfontein with associated cross connections and end connections.	2016	Fauna and Flora Assessment
Wetland Assessment and Delineation Report as part of the Environmental Assessment and Authorisation Process for the proposed N2 Panbult Interchange upgrade for South African National Roads Agency Limited (SANRAL) Project at Panbult Siding in Mpumalanga Province.	2016	Fauna and Flora Assessment
Report for Flora and Fauna Specialist Studies for Illiondale Wetland Rehabilitation Project in Ekurhuleni Municipality. (Quotation No.: KEQ. ERM. 03.39).	2015	Fauna and Flora Assessment

Flora and Fauna Specialist Studies for the Soutpansberg Drive Wetland Rehabilitation Project in Ekurhuleni Municipality.	2014	Fauna and Flora Assessment
Fauna and Flora Assessment Report as part of the Environmental Assessment and Authorisation Process for the proposed Construction and Establishment of Beef Feedlot and Associated Infrastructures on Portion 2, 8, 9, 11 and 15 of the Kleinwater Farm Project, Mpumalanga Province.	2013	Fauna and Flora Assessment
Fauna and Flora Assessment Report as part of the Environmental Assessment and Authorisation Process for the proposed Expansion and Construction of Poultry Houses for Broiler Production for Farm Puntlyf Bronkhorspruit Project, Gauteng Province.	2013	Fauna and Flora Assessment
Fauna and Flora Assessment Report as part of the Environmental Assessment and Authorisation Process for the proposed Expansion and Construction of Poultry Houses for Broiler Production for Farm Puntlyf Bronkhorspruit Project, Gauteng Province.	2013	Fauna and Flora Assessment
WETLAND ASSESSMENTS		
Wetland Assessment and Delineation Report as part of the Environmental Assessment and Authorisation Process for the proposed N2 Panbult Interchange upgrade for South African National Roads Agency Limited (SANRAL) Project at Panbult Siding in Mpumalanga Province.	2016	Wetland Assessment
Wetland Assessment and Delineation Report as part of the Environmental Assessment and Authorisation Process for the proposed township situated on portion 27 and 28 of the farm Hartherley 331-JR at Mamelodi, City of Tshwane Municipality.	2013	Wetland Assessment
INVASIVE ALIEN PLANTS SPECIES		
Report for the Investigation on the Nature and Extent of Invasive Alien Plant Infestations on Rand Water Sites: Rietvlei Site.	2015	Invasive Alien Plant Specialist
Final Report for the Investigation on the Nature and Extent of Invasive Alien Plant Infestations on Rand Water Sites: Zwartkopjes Site (Mapleton, Palmiet and Eikenhof).	2015	Invasive Alien Plant Specialist

REFERENCES

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