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ENVIRONMENTAL MANAGEMENT PROGRAMME

In terms of the **National Environmental Management Act**
(NEMA, Act 107 of 1998, including the August 2010 Environmental Regulations)
For

PARKDENE FILLING STATION, ERF 11221

c/o Sandkraal & Main Road,

Parkdene, George

Prepared for the Applicant: Lenasia Developers & Builders CC

By: *Cape EAPrac*

Report Reference: GEO139/22

Department Reference: EG12/2/4/1-D2/22/0067/11

Case Officer: Mrs. Renetta Roets

Date: 19 September 2012

ENVIRONMENTAL MANAGEMENT PROGRAMME

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National Environmental Management Act
(NEMA, Act 107 of 1998, including the August 2010 Environmental Regulations)

PARKDENE FILLING STATION, Erf 11221

Parkdene, George

Submitted in terms of:
Stakeholder Review

Report Issued by:

Cape Environmental Assessment Practitioners

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APPENDICES

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Glossary of Terms

CARA	**Conservation of Agricultural Resources Act (Act 43 of 1983)** - provides for control over the utilization of the natural agricultural resources of the Republic in order to promote the conservation of the soil, the water sources and the vegetation and the combating of weeds and invader plants; and for matters connected therewith.
EMP	**Environmental Management Programme –** an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction and operation, and decommissioning of a project are prevented and that positive benefits of the projects are enhanced.
DEA	**National Department of Environmental Affairs** – the national authority responsible for the sustainable environmental management and integrated planning.
DEA&DP	**Department of Environmental Affairs & Development Planning –** the provincial authority for sustainable environmental management and integrated development planning.
ECA	**Environment Conservation Act, 1989** - To provide for the effective protection and controlled utilization of the environment and for matters incidental thereto.
ECO	**Ecological Control Officer** – independent site agent appointed by a proponent to observe and enforce environmental policies and principles on a development site.
ELC	**Environmental Liaison Committee** – committee established to provide guidance and oversee compliance with the EMP and Environmental Authorisation.
NEMA	**National Environmental Management Act (Act 107 of 1998)** – national legislation that provides principles for decision-making on matters that affect the environment.

1 INTRODUCTION

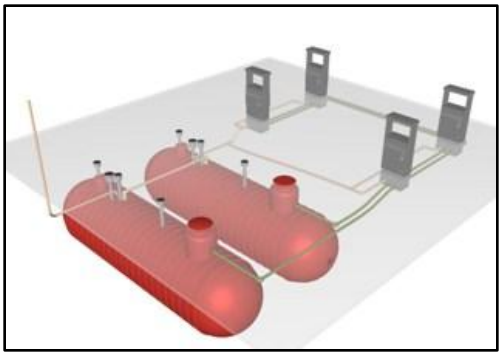
Cape Environmental Assessment Practitioners (*Cape EAPrac*) was appointed by the Applicant, Mr. Aboobaker Ismail (Lenasia Builders & Developers CC) to develop an Environmental Management Programme (EMP) which will be used to promote and ensure environmental monitoring and control during all phases (construction, operation and possible decommissioning) of the proposed development of the **Parkdene Filling Station** on Erf 11221, which is located on the corner of Sandkraal Road and Main Road, Parkdene, George.

Figure 1: Development site (Erf 11221, Parkdene, George)

The Applicant intends to develop a filling and service station with service facilities for the dispensing of both octane (petrol) and diesel fuels.

Approximately five Underground Storage Tanks (USTs) with an approximate combined capacity of 115m^3 for fuel storage will be installed. The filling and service station will also include amenities such as a convenience store and carwash facilities. The filling station has been designed to accommodate the refueling of trucks.

Figure 2: Schematic illustration of USTs



This EMP contains **management requirements** and **recommendations** made by *Cape EAPrac*, as well as in terms of the regulations contained in the **National Environmental Management Act** (NEMA, Act 107 of 1998, including the August 2010 Environmental Regulations) and best practice principles. This EMP should be updated to include any conditions of **Environmental Authorisation** (EA) and additional recommendations or changes that may occur during the scope of the works.

Section 28 of NEMA provides for the **Duty of Care** principle that "…*obliges every person who causes, has caused or may cause significant environmental degradation to take reasonable measures to prevent such degradation from occurring, continuing or recurring*". This clause forms the underpinning philosophy of this EMP.

A "**Quick Reference**" guide for construction activities is attached as ***Appendix 2*** and must be read in conjunction with the relevant sections of this report. Please note, the quick reference guide cannot be read in isolation and must be read in conjunction with this EMP.

1.1 PURPOSE OF THIS EMP

The purpose of this EMP is to ensure that the **environmental impacts** of the various phases of the project on the environment are **managed, mitigated** and kept to a **minimum.** This includes ensuring that the mitigation measures described in the Basic Assessment Report (BAR) and the specialist reports are implemented.

The EMP must provide easily understood and clearly defined actions that should be implemented during the each phase of the proposed development. The EMP is a dynamic document that is flexible and responsive to new and changing circumstances.

The document is **binding** on the **Project Proponent**, all **contractors** and **sub-contractors** and **visitors** to the site. It must be included as part of any **tender documents** as well as **contractual documents** between the Project Proponent and any contractors. Copies of this EMP must be kept **on site** and all **senior personnel** are expected to familiarise themselves with the content of this EMP.

1.2 STATUS OF THE EMP

The EMP must form part of all **contract documents** including all tender and final documents. The programme must be read in conjunction with the contract documents including the Specifications and where applicable, the Bill of Quantities. Where a conflict exists between the Specifications and Bill of Quantities and the EMP, the matter shall be brought to the attention of the Applicant, consulting engineer and the ECO for resolution. The rates included for each activity in the Bill of Quantities shall include for compliance with the Environmental Management Program.

It is of utmost importance that this EMP be read in conjunction with the **Environmental Authorisation** (EA). Should the EA contain requirements (conditions) that contradict any points in this EMP, such requirements (conditions) in the authorisation supersede this EMP. **This EMP will be updated if an Environmental Authorisation is obtained.**

The acceptance of the EMP by the **Department of Environmental Affairs & Development Planning** will confer a **legal obligation** to comply with the specifications of the EMP on the project proponent and the appointed contractors. Any **substantial** changes, updates or upgrades to the EMP must be submitted to and approved by the Department.

1.3 DEVELOPMENT SITE

The development site is located on the corner of Sandkraal and Main Road, Parkdene, George. The site is currently accessed by vehicles from an entrance on Main Street, George. The development site has existing Business Zone rights.

The site falls within the jurisdictional area of the George Municipality and within the urban edge of George. The site forms part of a mixed commercial and residential section of the Parkdene area, George.

The development site covers an area of approximately 4 995m^2 and is located in Parkdene, approximately 3,5 kilometres South-East of the Central Business District of George.

Figure 3: Development site, Erf 11221, Parkdene, George

2 PROJECT PHASING

2.1 CONSTRUCTION PHASE

The construction phase of the development refers to the **actual construction** of the proposed filling station facility, including all earthworks and bulk services construction (access road, service infrastructure etc). The construction period has not yet been finally determined, but will

be better estimated once the Environmental process has been completed. The construction programme will be included in this EMP once it has been finalised. Extensions due to delays are always a possibility and in the event that the end date for construction is extended, this EMP must still be considered binding. This EMP focuses on the construction phase of the development as described above.

2.2 OPERATION PHASE

The operational phase of the development will commence once occupancy of the filling station takes place (i.e. once a service provider takes occupation of the constructed premises).

Operation Phase compliance with this EMP is required by, but not limited to, the following entities:

- Tenants;
- All contractors (deliveries, waste removal, service providers, etc.);
- All personnel; and
- Users of the facility.

2.3 CLOSURE AND DECOMMISSIONING PHASE

Closure of a service station is subject to financial considerations prevalent to the economic climate and technological development and as such it is difficult to predict such action. As such, specific management recommendations are not included in this EMP. Should decommissioning occur in the future, compliance with all **relevant legislation** as well as the development of specific decommissioning management plans, must be implemented.

3 DEVELOPMENT PROPOSAL

As shown by the facility layout, the filling and service station consists of the following components:

- Access road
- Parking
- Forecourt (Refueling area)
- Convenience store & Administration
- Road

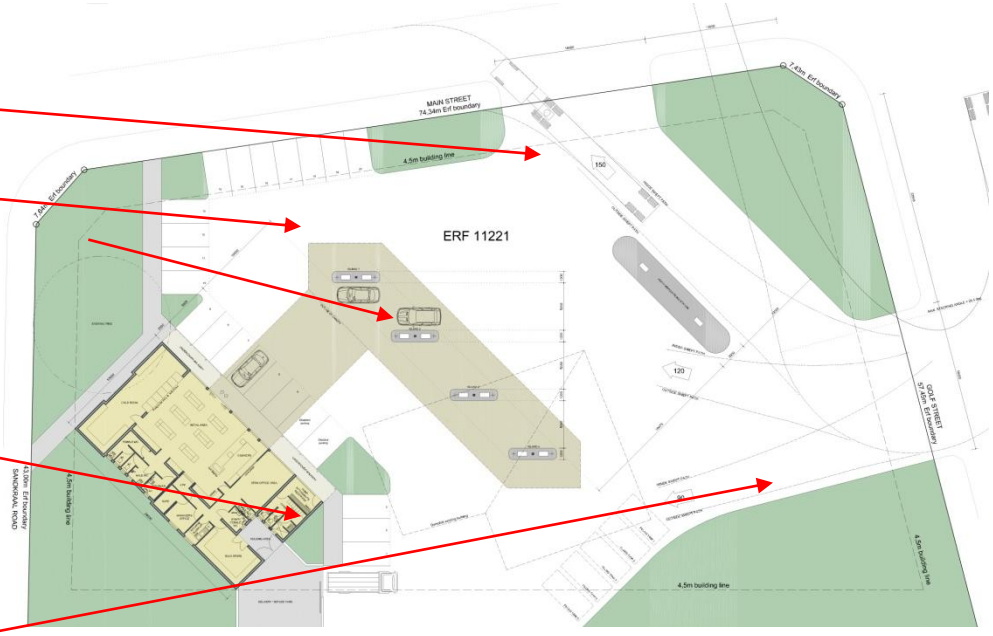


Figure 4: Facility layout

4 LEGISLATIVE REQUIREMENTS

The Project Proponent is required to comply with all necessary legislation and policies applicable to the above mentioned development. These include but are not limited to:

4.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (NEMA, ACT 107 OF 1998)

The National Environmental Management Act (NEMA, Act No. 107 of 1998) embraces the notion of sustainable development as contained in the Constitution in that everyone has the right:

- to an environment that is not harmful to their health or well-being; and
- to have the environment protected for the benefit of present and future generations through reasonable legislative and other measures.

NEMA aims to provide for cooperative environmental governance by establishing principles for decision-making on all matters relating to the environment and by means of Environmental Implementation Plans (EIP) and Environmental Management Programmes (EMP). In terms of the NEMA "listed activities" identified in Regulations R386 and R387, an Environmental Authorisation is required for this proposed development.

4.2 ENVIRONMENT CONSERVATION ACT, 1989 (ECA)

The EIA regulations contained in the Environmental Conservation Act (ECA) have been replaced by NEMA. The contractor must comply with the draft regulations pertaining to noise as published in the province of Western Cape Provincial Extraordinary Gazette as provision made in section 25 of the ECA), as well as Section 24 of the ECA regarding waste management and Section 20 of the ECA dealing with waste management under Part IV, Control of Environmental Pollution.

4.3 NATIONAL ENVIRONMENTAL MANAGEMENT: WASTE ACT (NEM:WA, ACT 59 OF 2008)

NEM:WA was instituted to reform the law regulating waste management in order to protect health and the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecological 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 the 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.

In short NEM:WA deals with the handling, treatment, processing, recycling, re-use and/or storage of both ‘general’ and ‘hazardous’ waste products. The Environmental Process required for the Basic Assessment Process is being undertaken in terms of NEM:WA.

4.4 NATIONAL WASTE MANAGEMENT STRATEGY

The National Waste Management Strategy presents the South African government's strategy for integrated waste management for South Africa.

It deals among others with: Integrated Waste Management Planning, Waste Information Systems, Waste Minimisation, Recycling, Waste Collection and Transportation, Waste Treatment, Waste Disposal and Implementing Instruments

4.5 NATIONAL ENERGY REGULATOR OF SOUTH AFRICA (NERSA)

The National Energy Regulator (NERSA) is a regulatory authority established as a juristic person in terms of Section 3 of the National Energy Regulator Act, 2004 (NER, Act No. 40 of 2004). NERSA’s mandate is to regulate the Electricity, Piped-Gas and Petroleum Pipeline industries in terms of the Electricity Regulation Act, 2006 (Act No. 4 of 2006), Gas Act, 2001 (Act No. 48 of 2001) and Petroleum Pipelines Act, 2003 (Act No. 60 of 2003).

NERSA’s Strategic Objectives are:

- To implement relevant energy law efficiently and effectively;
- To implement relevant energy regulations efficiently and effectively;
- To identify, develop and implement relevant energy rules efficiently and effectively;

- To establish the credibility, legitimacy and sustainability of NERSA as an independent and transparent energy regulator;
- To create an effective organisation that delivers on its mandate and purpose; and
- To evaluate the Energy Regulator's effectiveness.

NERSA's mandate is further derived from written government policies as well as Regulations issued by the Minister of Minerals and Energy. NERSA is expected to proactively take necessary regulatory actions in anticipation of and in response to the changing circumstances in the energy industry.

4.6 NATIONAL ELECTRICITY REGULATION ACT (ACT 4 OF 2006)

This Act aims to establish a national regulatory framework for the electricity supply industry; to make the National Energy Regulator the custodian and enforcer of the national electricity regulatory framework; to provide for licenses and registration as the manner in which generation, transmission, distribution, trading and the import and export of electricity are regulated; and to provide for matters connected therewith.

This proposal will produce electricity and distribute it into the national grid and as such all applicable provisions in this Act must be adhered to.

4.7 SANS 10400 APPLICATION OF THE NATIONAL BUILDING REGULATIONS

The application of the National Building Regulations contains performance parameters relating to fire safety, sanitation systems, moisture penetration, structural safety, serviceability and durability. It also takes into account how the above can be established to reflect social expectations in a manner which supports sustainable development objectives.

4.8 SANS 1535

SANS 1535 contain the standards as prescribed by the South African Bureau of Standards (SABS) required for Glass Reinforced Polyester Coasted Steel Tanks for Underground Storage of Hydrocarbons and Oxygenated Solvents Intended for Burial Horizontally. These norms and standards must be applied.

4.9 SANS 10089

SANS Part 3 contains the industry standards for the installation of USTs, pumps/dispensers and pipe work at service stations and consumer installations as prescribed by the South African Bureau of Standards.

4.10 SANS 1830

SANS 1830 contains industry standards for flexible piping to be used for underground purposes at serve stations.

4.11 NATIONAL BUILDING REGULATIONS

The National Building Regulations and Building Standards Act as amended must be complied with. This act addresses, inter alia:

- Specifications for draftsmen, plans, documents and diagrams;
- Approval by local authorities;
- Appeal procedures;
- Prohibition or conditions with regard to erection of buildings in certain conditions;
- Demolition of buildings;
- Access to building control officers;
- Regulations and directives; and
- Liability.

4.12 CONSERVATION OF AGRICULTURAL RESOURCES ACT (CARA)

The Conservation of Agricultural Resources Act aims to provide for the conservation of natural agricultural resources by maintaining the production potential of land, combating and preventing erosion and weakening or destruction of water resources, protecting vegetation and combating weeds and invader plant species.

4.13 NATIONAL VELD AND FOREST FIRE ACT (ACT 101 OF 1998)

The purpose of the National Veld and Forest Fire Act is to **prevent and combat veld, forest and mountain fires** throughout the RSA and to provide institutions, methods and practices for achieving this purpose. Institutions include the formations of such bodies as **Fire Protection Associations** (FPA's) and Working on Fire. The Act provides the guidelines and constitution for the implementation of these institutions as well as their functions and requirements.
All landowners are required in terms of this Act to prepare and maintain **firebreaks** on the boundary of their property and any adjoining land. Only the Minister may exempt a landowner from providing firebreaks.

In areas that are considered a high fire rise, especially in vegetation types that tend to be fire driven ecosystems, it is recommended that a fire management plan is put in place, or the owner becomes a member of the local FPA and fall under the umbrella of the regional fire management strategy**.**

4.14 NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The purpose of the National Heritage Resources Act is to:

- Introduce an integrated and interactive system for the management of the national heritage resources;
- Promote good government at all levels,
- Empower civil society to nurture and conserve their heritage resources so that they may be bequeathed to future generations;
- To lay down general principles for governing heritage resources management throughout South Africa;
- To introduce an integrated system for the identification, assessment and management of the heritage resources of South Africa;
- To establish the South African Heritage Resources Agency together with its Council to co-ordinate and promote the management of heritage resources at national level;
- To set norms and maintain essential national standards for the management of heritage resources in South Africa and to protect heritage resources of national significance;
- To control the export of nationally significant heritage objects and the import into South Africa of cultural property illegally exported from foreign countries;
- To enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources;
- To provide for the protection and management of conservation-worthy places and areas by local authorities; and
- To provide for matters connected therewith.

There have not been any activities identified in terms of this Act, however it does not relieve the Applicant from undertaking due diligence of these regulations.

4.15 OCCUPATIONAL HEALTH AND SAFETY ACT (ACT 85 OF 1993)

The Act provides for the health and safety of persons at work and for the health and safety of persons in connection with the use of plant and machinery; the protection of persons other than persons at work against hazards to health and safety arising out of or in connection with the activities of persons at work. In terms of this Act, **a Health and Safety Officer** and Protocol must be implemented on the site during construction.

5 RESPONSIBILITIES

The various role players in the implementation of an authorised development are required to undertake various activities and responsibilities. The Department of Environmental Affairs and Development Planning is the overriding authority regarding this activity.

The following figure shows the organizational structure details for the implementation of the Environmental Authorisation and this EMP. The structure illustrates the reporting procedures for stakeholders in the implementation of this EMP.

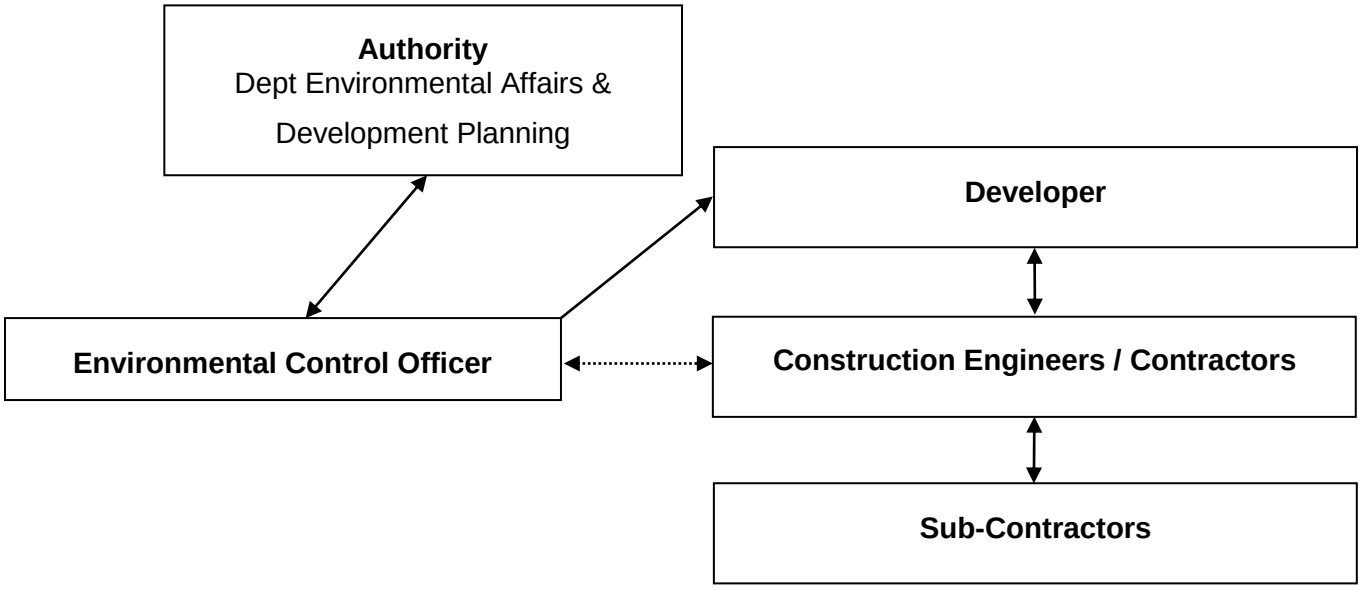


Figure 5 EMP implementation organisational structure.

5.1 PROJECT PROPONENT

The Project Proponent is the person or entity who is responsible for carrying out the Activity that is authorised in terms of NEMA and / or this EMP.

The responsibilities of the Project Proponent include but are not limited to the following:

- Be conversant with the EMP, any relevant Environmental Authorisation, Waste License, Permit or any other legally binding documentation;
- Ensure that the senior site personnel are aware of and understand the conditions and recommendations contained in the EMP, any relevant Environmental Authorisation, Waste License, Permits or any other legally binding documentation;
- Order the removal of any person(s) and / or equipment found in contravention of any of the above mentioned authorisations.

5.2 ENGINEERS AND CONTRACTORS

The Engineers and Contractors are responsible for physically carrying out the relevant activities, and onto whom the majority of the recommendations in this EMP are intended. The responsibilities indicated here are also relevant to Sub-Contractors.

The responsibilities of the Engineers and Contractors include but are not limited to the following:

- Be conversant with the EMP, any relevant Environmental Authorisation, Waste License, Permit or any other legally binding documentation;
- Have a responsibility to adhering to any conditions and recommendations laid out in above mentioned documentation;
- Prevent actions that may cause harm to the environment;
- Be responsible for any remedial activities in response to an environmental incident within their scope of influence;
- Liaise with the ECO and the Project Proponent in the event that any industry regulated standards are in contradiction with the EMP or any other authorisations;
- Review and amend any construction activities to align with the EMP and Best Practice Principles;
- Ensure compliance of all site personnel and / or visitors to the EMP and any other authorisations.

5.3 ECOLOGICAL CONTROL OFFICER (ECO)

It is recommended that a suitably qualified **Environmental Control Officer** (ECO) be appointed to oversee all activities for the duration of the construction phase of the project.
The responsibilities of the ECO include, but are not limited to, the following responsibilities:

- Provide environmental **induction training** to contractors on site;
- Provide maintenance, **update and review** of the EMP if necessary;
- **Liaison** between the Project Proponent, Contractors, Authorities and other lead stakeholders on all environmental concerns, including the implementation of the EMP;
- Compilation of **Environmental Control Report (ECR)** to ensure compliance with the EA, EMP and duty of care requirements. Reports will be submitted to the Department of Environmental Affairs & Development and the project team on a monthly basis;
- Compilation of the **Environmental Audit Report** or Environmental Completion Statement, six months after completion of construction (or as otherwise defined in the Environmental Authorisation). Reports should be submitted to the DEA&DP and Project Proponent;
- Ensuring **compliance** with this **EMP** during the Construction Phase;
- Ensuring **compliance** with the **Environmental Authorisation**;
- Ensure **implementation** of the mitigation and rehabilitation measures and recommendations referred to in the Basic Assessment Report (BAR) and Specialists Report, EA and EMP;
- Provide **guidance and interpretation** of the EA and EMP where necessary;
- Issuing site instructions to the Contractor for **corrective actions** required;
- The ECO is required to conduct **twice weekly** site visits for the **first week** of construction and thereafter, **weekly** for the **remainder of the construction** period, in order to ensure the contractor receives the necessary induction and that all procedures

are in place. Additional visits may be undertaken in the event of any unforeseen environmental accidents;
- The duration and frequency of these visits may be increased or decreased at the discretion of the ECO;
- Attendance of **site meetings** (as scheduled);
- Maintain a **record of environmental incidents** (e.g. spills, impacts, legal transgressions etc) as well as corrective and preventative measures taken. This information must also be included in the ECR;
- Maintain a **public complaints register** in which all complaints and action taken must be recorded. This information must also be included in the ECR; and
- The ECO has the authority to **stop work** on site if he / she consider that any actions of non-compliance of the EMP, authorisations or General Duty of Care are taking place.

5.4 ENVIRONMENTAL INDUCTION AND TRAINING

The ECO in consultation with the contractor shall ensure that adequate environmental **awareness training** of senior site **personnel takes place and that all construction workers receive an induction** presentation on the importance and implications of the EMP. The presentation shall be conducted, as far as is possible, in the employees' language of choice. The contractor should provide a translator from their staff for the purpose of translating should this be necessary.
As a minimum, training should include:

- Explanation of the **importance of complying** with the EMP.
- Discussion of the potential **environmental impacts** of construction activities.
- The **benefits** of improved personal performance.
- Employees' **roles and responsibilities**, including emergency preparedness (this should be combined with this induction, but presented by the contractors Health and Safety Representative).
- Explanation of the **mitigation measures** that must be implemented when carrying out their activities.
- Explanation of the specifics of this **EMP** and its specification (no-go areas, etc.)
- Explanation of the **management structure** of individuals responsible for matters pertaining to the EMP.

Should the staff turnover be high and with additional appointment of sub-contractors, it may be necessary to do additional induction training sessions. This is at the discretion of the ECO.

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

6 CONSTRUCTION PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

6.1 ESTABLISHMENT OF CONTRACTORS SITE CAMP

The Contractors Site Camp must be established in consultation with the ECO and, if located on private property, with the permission of the relevant landowner. The site camp should not be erected on any areas considered sensitive and no indigenous vegetation may be removed, damaged or disturbed without consent from the ECO. The following points are applicable:

- The Contractors Site Camp must be situated **within the development area**. Site Camps that are allowed off site may only be erected once written permission from the landowner is obtained and any other necessary authorisations are in place.
- The site camp must be clearly demarcated and **fenced off** with shade netting.
- **Topsoil** from the site camp area must be stripped and **stockpiled** for **reuse** during rehabilitation. This must be done to ensure no contamination of the topsoil while the site camp is in use.
- All construction **material** must be **stored in the site camp**, unless otherwise approved by the ECO.
- **No personnel may overnight** in the site camp, except in the case of a night watchman / security.
- **Fires** for cooking and/or heating are **only** allowed **within the site camp**.
- **Fuel** may only be stored **in the site camp**.
- Storage of **waste** must take place **within the site camp** and must be **removed** on a regular basis.
- The site camp must be provided with sufficient **ablution facilities** (toilets and potable water) of which the content must be disposed of regularly and at the suitable facilities.

6.2 DEMARCATION OF WORK AREAS

The demarcation of **no-go areas** is of extreme importance to ensure that damage is restricted to the future developed area and that areas outside this demarcated area are protected and not damaged unnecessarily.

The process for this is as follows:

- The exact footprint of the construction areas to be **surveyed and pegged**;
- The contractor in conjunction with the ECO must walk and inspect the areas determined and **mark the full extent of the area to be disturbed** (allowing sufficient space for the construction activity);
- This disturbance is to be **clearly marked** with a double strand of wire with danger tape placed between strands as detailed in **Appendix 1, Figure 1**;
- All areas outside this demarcated area are considered as **"no-go" areas** for any construction activity including movement of staff;

- Construction staff must be briefed as part of the **environmental induction** on the requirements regarding the no-go areas; and,
- Non-compliance with no go demarcation will be penalised.

The entire boundary of the development site must be demarcated by erecting shade netting of 1.5metres high.

Figure 6: Examples of shade netting demarcation

6.3 EROSION CONTROL

Any areas that are identified by the ECO as being **prone to erosion** must be suitably **protected**. During construction, the Contractor shall protect all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc.

Any **erosion channels** developed during construction on steep slopes must be **backfilled, compacted** and **restored** to an acceptable condition.

Stabilisation of cleared areas to prevent and control erosion and/or sedimentation shall be actively managed. The method of stabilisation shall be determined in consultation with the ECO.

Consideration and provision shall be made for the following methods (or combination thereof): **brushcut packing**, **mulch or chip cover**, **straw stabilising**, **watering**, **planting/sodding**, **soil binders** and **anti-erosion compounds**, **mechanical cover** or **packing structures** (including the use of geofabric, log/pole fencing, etc.). Traffic and movement over stabilised areas shall be **restricted and controlled**, and damage to stabilised areas shall be **repaired and maintained** to the satisfaction of the ECO.

Any excavations for bulk services on slopes steeper than 1:4 should where possible, take place at right angles to the slope to avoid having to cut a ‘road’ into the slope. Any excavations into the slope by mechanical means will need to be temporarily **shored up** to prevent slumping. Such shoring can take the form of untreated wooden boards pegged into the slope. The

necessary compaction of the replaced sand over the trench and disturbed slope must be undertaken. The brushwood removed from the excavation should be replaced over the disturbed area to prevent wind and water erosion and facilitate the rehabilitation process. The temporary shoring can be left in place, which will eventually rot and be absorbed into the soil.

In areas where construction activities have been completed and where no further disturbance would take place, **rehabilitation and re-vegetation should commence** as soon as possible. A suitable rehabilitation method statement must be submitted to the ECO for approval.

The Contractor shall, as an ongoing exercise, implement erosion and sedimentation control measures to the satisfaction of the ECO.
See **Appendix 1, Figure 2 & 3** for further details regarding erosion control on the site.

6.4 STORMWATER MANAGEMENT

After the site has been demarcated with shade netting, it is recommended that the Norther and Eastern boundaries of the site be protected by **silt fencing** to avoid stormwater damage.

Sand bagging can be applied on these boundaries in event where heavy rainfalls are expected.

Refer to Figure 1 for diagrammatic representations of silt fencing specifications.

6.5 EARTHWORKS

Earthworks are required for the construction of a foundation for the various facilities required for the filling and service station. The site currently identified for the plant is currently vacant and covered by vegetation species of low conservation value.

It is recommended that the topsoil of the designated area is stripped to a depth of approximately 150mm and stockpiled separately from the remaining spoil.

During the earthworks, security must be implemented to prevent unauthorised access of any open excavations (both for human and animal safety) using signage, danger tape or any other barrier agreed upon.

6.6 FIRE MANAGEMENT AND PROTECTION

Care must be taken to ensure that none of the construction activities result in fires. Precautions must be undertaken to protect habitation, biodiversity and against loss of life and infrastructure.

The following points must be considered with regards to fire protection on site:

- **NO OPEN FIRES** are allowed **anywhere** on the construction site, except for cooking purposes and then only in the site camp under controlled conditions;
- **Cigarette butts** may not be thrown in the veld, but must be disposed of correctly in suitable receptacles. It is recommended that smoking areas are identified and demarcated and sand filled receptacles provided for smokers. Smoking should then only be allowed in these areas;
- In case of an emergency, the **contact details** of the local fire and emergency services must be readily available;
- Contractors must ensure that basic **firefighting equipment** is available on site as per the specifications defined by a qualified health and safety consultant;
- **Biomass** generated from removal of invasive and indigenous vegetation (where applicable) should be removed from site and **not burned in situ;** and
- Fire risk on site is a point of discussion that must take place as part of the **environmental induction**.

6.7 NOISE AND EMISSION CONTROL

It is recommended that noise generation be kept to a minimum and that construction activities be confined to **normal working hours** (08:00 - 17:00 on workdays).

Apart from confining noise to the normal hours as detailed above, the following noise abatement (reduction of intensity and amount) measures should be implemented:

- Provide baffle and noise screens to noisy machines as necessary;
- Provide absorptive linings to the interior of engine compartments;
- Ensure machinery is properly maintained (fasten loose panels, replace defective silencers);
- Switch off machinery immediately when not in use; and
- Reduce impact noise by careful handling.

The Contractor shall be responsible for compliance with the relevant legislation with respect to noise *inter alia* Section 25 of ECA.

Emission control in vehicles will be reduced by implementing the above mentioned noise control methods. Furthermore the following should be taken into account:

- All diesel vehicles should be correctly maintained and serviced to minimise unnecessary exhaust emissions;
- Any vehicles with smoking exhausts should be tested for emissions and repaired immediately;
- Speed limits must be adhered to; and,
- Vehicles and other diesel driven machinery should be switched off when not in use.

6.8 WASTE MANAGEMENT

An integrated waste management approach should be adopted on site. Only approved waste disposal methods are allowed. The Contractor shall ensure that all site personnel are instructed in the proper disposal of all waste. The Contractor shall ensure that **sufficient disposal facilities** are available.

Recycling must be encouraged on site and recycling bins must be provided and clearly marked. It is recommended that local community leaders are contacted to identify groups or individuals who may benefit from the disposal of recyclable material and scrap metal.

Disposal of all waste materials must be done at suitable facilities. **No dumping** of any waste material on or off site is permitted.

The disposal of all **general waste** must take place at a landfill licensed in terms of Section 20 of the Environmental Conservation Act, 1989 (Act No. 73 of 1989) and the National Environmental Management: Waste Act, 2008 (NEM:WA, Act No 59 of 2008).

6.8.1 Solid Waste

The Contractor shall ensure that all facilities are maintained in a **neat and tidy** condition and the site shall be kept **free of litter**. Measures must be taken to reduce the potential for litter and negligent behavior with regard to the disposal of all refuse. At all places of work the Contractor shall provide **litterbins, containers** and **refuse collection facilities** for later disposal.

Solid waste may be temporarily stored on site in a **designated area** approved by the ECO prior to collection and disposal. Solid waste must be removed on a **weekly basis** to a licensed waste disposal site. The Contractor shall supply the Project Proponent and ECO with **certificates of disposal**. Recyclable waste should be recycled if at all possible.

Waste storage **containers** shall be covered, tip-proof, weatherproof and scavenger proof. The **waste storage area** shall be **fenced off** to prevent wind-blown litter.

No burning, on-site burying or **dumping of waste** shall occur. Used (empty) **cement bags** shall be collected and stored in **weatherproof containers** to prevent windblown cement dust and water contamination. Used cement bags may not be used for any other purpose and shall be disposed of on a weekly basis via the solid waste management system.

6.8.2 Construction Rubble and Waste

All construction waste must be disposed of at an approved site (no construction rubble may be spoiled anywhere on site). No illegal dumping of construction material may take place.

6.8.3 Scrap Metal

Recycling of scrap metal is recommended. Scrap metal must be disposed of off-site at suitable facilities or arrangements made for community involvement in the recycling.

6.8.4 Hazardous Waste

All hazardous waste (including bitumen, etc.) shall be disposed of at an approved **hazardous landfill site**. The Contractor shall provide **disposal certificates** to the ECO.

Unused or rejected tar or bituminous products must be returned to the supplier's production plant. Under no circumstances may the spoiling of tar or bituminous products on the site, over embankments, or any burying, be allowed.

Used oil, lubricants, grease and cleaning materials, etc. from the maintenance of vehicles and machinery shall be collected in holding tanks and sent back to the supplier or removed from site by a specialist oil recycling company for disposal at an approved hazardous waste site.

6.9 SANITATION

Chemical ablution facilities must be available for the use by construction staff for the duration of the construction period. The following must therefore be implemented:

- Toilet and washing facilities must be **available** to the site personnel at all times;
- These must be situated **within** the construction area (preferably at the site camp) at an area approved by the ECO;
- One toilet for every **15 personnel** is required;
- For linear construction areas, at least one toilet must be mobile to allow for distribution along the route as the work commences. Toilets should be located at least within 300m of a construction crew along a linear route;
- The facilities must be **serviced** on a regular basis to **prevent any spillage**;
- The servicing contractor must **dispose of the waste** in an approved manner;
- The ECO must be provided with the **service providers'** details and the **service schedule** for the site;
- The toilets should be **secured** to ensure that they do not blow over in windy conditions;
- All toilet facilities must be **removed** from site on completion of the contract period; and,
- Should the construction period be interrupted by a **builders break**, the toilets should be emptied prior to the break.

6.10 CONCRETE BATCHING

Cement powder has a high alkaline pH that may contaminate and adversely affect both soil pH and water pH negatively. A rapid change in pH can have consequences on the functioning of soil and water organisms as well as on the botanical component.

All concrete batching should take place on an area that is **to be hard surfaced** as part of the development. Concrete batching outside such areas may only take place with the necessary approval of the ECO and then all topsoil must be stripped and stockpiled for reuse. Concrete mixing areas must have **bund walls** or a **settling pond** in order to prevent cement run off. Once the settling ponds dry out, the concrete must be **removed** and **dispatched** to a suitable disposal site.

When using **Readymix** concrete, care must be taken to prevent spills from the trucks while offloading. This form of batching is preferable for large constructions as no on site batching is required and there is a lesser likelihood of accidental spills and run off. Trucks may not be washed out on site.

Batching at satellite sites must be done on a **batching plate** i.e. wood or metal sheet, to prevent soil contamination. In order to prevent cement run off, both under normal circumstances and in event of rain, batching plates **must be used.**

6.11 FUEL STORAGE

The above ground storage of fuel is subject to authorisation in terms of the National Environmental Management Act (NEMA as amended 2006) Regulations 385 and 386, if more than 30m³ is stored on site at any one time.

Should a temporary fuel storage facility be required, the Contractor must ensure that he/she complies with legislation and that the following measures are in place:

- Temporary **fuel storage** must take place **within the contractors site camp** in an area approved by the ECO;
- **No** storage of fuel may take place during the construction phase, on any other portion of the site;
- Mobile fuel units used to refuel plant on site must make use of **drip trays** when refueling;
- Where possible, **double lined storage tanks** should be used;
- All storage tanks must be **ISO 9001** certified;
- Storage facilities should not be located within a watercourse flood plain, near a wetland area or where there is a potential for any spilled fuel to enter a watercourse or groundwater;
- Fuel storage facilities should be located on **flat ground**. No cut and fill should take place immediately on or adjacent to fuel storage areas;
- **Bund walls** must be constructed to contain at least 110% of the total capacity of the storage tanks;
- Bund walls must be constructed of **impermeable material or lined** to ensure that petroleum products cannot escape;

- A suitable material should be placed in the base of the bund walls to soak up any **accidental spillages**;
- A sealable tap system may be implemented to drain water collecting in the bund walls. The tap must be at the base of the bund wall and **drainage** must be **supervised** to ensure that no pollutants are tapped out;
- The tanks should be locked and **secured** when not in use;
- Automatic **shut-off nozzles** are required on all dispensing units;
- Storage tanks should be drained **within one week** of completion of activities (unused fuel can be used by the contractor on other work sites or returned to the supplier). If the construction program extends over the Christmas period shutdown, the contractor must ensure that storage tanks are emptied prior to this period;
- All storage tanks, containers and related equipment should be regularly **maintained** to ensure the safe storage and dispensing of fuel. The Engineer is to sign off on the condition suitability of the storage tanks;
- Defective hoses, valves and containment structures should be promptly **repaired**;
- Vehicle and equipment **fuelling** should be undertaken on a hard impermeable surface or over drip pans to ensure spilled fuel is captured and cleaned up; and
- The area must be totally **rehabilitated** on completion of the contract and all contaminated material must be taken to a registered dumping site for that purpose.

6.12 DUST MANAGEMENT

The movement of construction vehicles and removal of existing vegetation from the route will create dust that could impact on the surrounding vegetation and cause inconvenience to neighbouring property owners. Every effort must be made to contain this impact. Construction vehicles must **adhere to speed limits** and minimisation of haul roads must be implemented. During dry, dusty periods haul roads should be kept dampened to prevent excess dust. **No potable water or seawater** may be used for damping haul roads.

As an alternative, products such as road environment dust suppressants (REDS) would be recommended in order to minimize the use of water for controlling dust pollution.

Exposed **stockpile materials** must be adequately **protected** against wind (covered), and should be sited taking into consideration the prevailing wind conditions.

Trucks bringing in materials must be covered to prevent dust and small particles escaping and potentially causing damage to people and property.

Please see attached **Appendix 1, Figure 4** showing a diagrammatic representation of the management of haul roads.

6.13 REHABILITATION

Any disturbed area that is not designated for roads or buildings must be rehabilitated using rescued plant material. No alien vegetation may be used for any rehabilitation work. A Rehabilitation Method Statement must be approved by the ECO. Ideally rehabilitation of plant material should take place prior to the rainy season in order that the plants establish sufficiently. However, in areas that may be a concern for erosion, irrigation may be justified to establish a vegetative barrier against erosion.

It is anticipated that **limited rehabilitation will be required** for this proposal as the area designated for the filling and service station is already transformed.

6.14 USE OF LOCAL LABOUR

It is strongly recommended that the contractor make use of local labour as far as possible for the construction phase of the project.

6.14.1 Targets

- The target should be to have the majority of semi-skilled labour local to the George Municipal area.
- An average total of 80% or higher should be maintained for the region.
- The contractor should endeavor to source local suppliers that are BEE compliant.
- The contractor must ensure that suitable procurement policies are in place that supports local economic growth.
- Locally manufactured products must be used as far as possible.

6.14.2 Record Keeping

Records should be kept of all personnel under the main contract as well as those under any subcontractors employed by the contractor.

The main contractor must provide the breakdowns of their contract as well as all sub-contractors. The following criteria for classification must be recorded and submitted to the ECO and the Engineer:

Staff Type	**Local to the George Municipal Area.**		**Regional**		**Outside of Southern Cape**	
	Number	Percentage	Number	Percentage	Number	Percentage
Semi skilled						

Operators						
Artisans						
Junior Management						
Senior Management						
Professionals						

Apart from the labour records detailed above, financial records should be kept indicating the financial contribution to the local economy through the input into wages and the use of local suppliers.

6.14.3 Site Security

Theft and other crime associated with construction sites is not only a concern for surrounding residents and businesses, but also the developer and the contractor.

Considering this, contractors need to be proactive in order to curtail theft and crime on and resulting from the construction site. It is recommended that the contractor develop a jobsite security plan prior to commencement of construction. This jobsite security plan should take into account protection of the construction site from both internal and external crime elements as well as the protection of surrounding communities from internal crime elements. All incidents of theft or other crime should be reported the South African Police Service, no matter how seemingly insignificant.

6.15 HERITAGE REQUIREMENTS

No archeological studies have been undertaken for this proposal, however, as earthworks are proposed for the foundations of the filling station, there is always the possibility of unearthing artifacts and / or remains. As a general principle, the legislation governing Heritage Resources requires the following:

- Should any **heritage remains** be **exposed** during excavations, these must be **immediately reported** to the ECO and the Provincial Heritage Resource Authority of the Western Cape, namely Heritage Western Cape in terms of the national Heritage Resources Act (Act No. 25 of 1999). Heritage remains uncovered or disturbed during earthworks **may not be disturbed** further until the necessary approval has been obtained from Heritage Western Cape.

- Should any **archaeological remains** including (but not limited to) fossil bones, fossil shells, coins, indigenous ceramics, colonial ceramics, marine shell heaps, stone artifacts, bone remains, rock art, rock engravings and any antiquity be discovered during construction, they must be immediately **reported** to the ECO and Heritage Western Cape and **not disturbed further** until the necessary approval has been obtained.

- Should any **human remains** be uncovered, they must immediately be **reported** to the ECO, Heritage Western Cape archaeologist, who can be contacted on (021) 483-9692 and the South African Police Services. Construction in the area must **cease immediately** and the site may not be disturbed further until the necessary approval has been obtained.

6.16 METHOD STATEMENTS

Method statements are written submissions by the Contractor to the Engineer and ECO in response to the requirements of this EMP or to a request by the Engineer or ECO. The Contractor shall be required to prepare method statements for several specific construction activities and/or environmental management aspects.

The Contractor shall not commence the activity for which a method statement is required until the Engineer and ECO has approved the relevant method statement. In cases where such activities have commenced before the appointment of the ECO, method statements may be requested if the ECO is not satisfied that activities are being undertaken in terms of this EMP.

Method statements must be submitted at least **five (5) days** prior to the date on which approval is required (start of the activity). Failure to submit a method statement may result in **suspension of the activity** concerned until such time as a method statement has been submitted and approved.

An approved method statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the contract. However, any damage caused to the environment through activities undertaken without an approved method statement shall be **rehabilitated at the contractor's cost**.

Additional method statements can be requested at the ECO's discretion at any time during the construction phase.

The method statements shall cover relevant details with regard to:

- Construction procedures and location of the construction site.
- Start date and duration of the construction period.
- Materials, equipment and labour to be used.
- How materials, equipment and labour would be moved to and from the site as well as on site during construction.
- Storage, removal and subsequent handling of all materials, excess materials and waste materials of the procedure.
- Emergency procedures in case of any reasonably potential accident / incident which could occur during the procedure.
- Compliance / non-compliance with the EMP specification and motivation if non-compliant.

6.16.1 Method statements required:

Based on the specifications in this EMP, the following method statements are required as a minimum (more method statements may be requested as required at any time under the direction of the ECO):

- Site clearing;
- Site layout and establishment;
- Cement and concrete batching;
- Solid waste control system;
- Erosion remediation and stabilisation;
- Fire control and emergency procedures;
- Petroleum, chemical, harmful and hazardous materials.

6.17 HEALTH AND SAFETY

The contractor must ensure compliance with the Occupational Health and Safety (No. 85 of 1993). Of key importance is the following (Section 8 of the aforesaid act);

8. General duties of employers to their employees

(1) Every employer shall provide and maintain, as far as is reasonably practicable, a working environment that is safe and without risk to the health of his employees.

(2) Without derogating from the generality of an employer's duties under subsection (1), the matters to which those duties refer include in particular-

(a) the provision and maintenance of systems of work, plant and machinery that, as far as is reasonably practicable, are safe and without risks to health;

(b) taking such steps as may be reasonably practicable to eliminate or mitigate any hazard or potential hazard to the safety or health of employees, before resorting to personal protective equipment;

(c) making arrangements for ensuring, as far as is reasonably practicable, the safety and absence of risks to health in connection with the production, processing, use, handling, storage or transport of articles or substances;

(d) establishing, as far as is reasonably practicable, what hazards to the health or safety of persons are attached to any work which is performed, any article or substance which is produced, processed, used, handled, stored or transported and any plant or machinery which is used in his business, and he shall, as far as is reasonably practicable, further establish what precautionary measures should be taken with respect to such work, article, substance, plant or machinery in order to protect the health and safety of persons, and he shall provide the necessary means to apply such precautionary measures;

(e) providing such information, instructions, training and supervision as may be necessary to ensure, as far as is reasonably practicable, the health and safety at work of his employees;

(f) as far as is reasonably practicable, not permitting any employee to do any work or to produce, process, use, handle, store or transport any article or substance or to operate any plant or machinery, unless the precautionary measures contemplated in paragraphs (b) and (d), or any other precautionary measures which may be prescribed, have been taken;

(g) taking all necessary measures to ensure that tire requirements of this Act are complied with by every person in his employment or on premises under his control where plant or machinery is used;

(h) enforcing such measures as may be necessary in the interest of health and safety;

(i) ensuring that work is performed and that plant or machinery is used under the general supervision of a person trained to understand the hazards associated with it and who have the authority to ensure that precautionary measures taken by the employer are implemented; and

(j) causing all employees to be informed regarding the scope of their authority as contemplated in section 37 (1) (b).

The Occupational Health and Safety Act aims to provide for the health and safety of persons at work and for the health and safety of persons in connection with the activities of persons at work and to establish an advisory council for occupational health and safety.

The **main contractor** must **ensure compliance** with the Occupational Health and Safety Act. The **main contractor** must ensure that all **sub-contractors** comply with the Occupational Health and Safety Act.

6.18 IMPLEMENTATION SCHEDULE

This portion of the EMP is applicable to **all construction activities** for the required portion on DR 1526 that is being upgraded. It will remain in place for the duration of the construction phase.

TASK	RESPONSIBILITY	TIMEFRAME
Appointment of Contractors	Project Proponent / Contracting Engineer / Client	Prior to Construction
Demarcation of No Go Areas	ECO / Contracting Engineer	From Appointment
Establishment of Site Camp	Contractors / Contracting Engineer	Prior to Construction commencing
Environmental Awareness and Induction	ECO	From Appointment
Health and Safety Protocol	Contractor / Health and Safety	Duration of contract

	Officer	
Attendance of Site Meetings	Project Proponent / Contracting Engineer / Contractor / ECO / Health and Safety Officer	Monthly for the duration of the contract (or as otherwise arranged).
Ablution Facilities	Contractor	Duration of contract
Waste Management	Contractor	Duration of contract
Cement Batching	Contractor	Duration of contract
Fuel Storage	Contractor	Duration of contract
Noise Control	Contractor	Duration of contract
Dust Management	Contractor	Duration of contract
Compliance with Noise Regulations	Contractor	Duration of contract
Erosion Control	Contractor	Duration of contract
Fire Management	Contractor / Project Proponent	Duration of contract
Audit Reports	ECO	Monthly for duration of contract
Non-compliance	ECO / Relevant Authority	Duration of contract
Compliance with all environmental management requirements	All role players	Duration of contract

6.19 CONSTRUCTION PHASE MONITORING

Monitoring of the construction progress must be done by means of **photographic documentation** (both random and fixed point photography) by the ECO. This information must be included in the environmental control report (ECR) as described in Section 4.1.

Furthermore, it is recommended that an audit, six months after completion of construction is undertaken to monitor the rehabilitation of the site and to assess any possible impacts that may have occurred. This audit should be considered as the Environmental Completion Statement.

7 OPERATION PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

The Operation Phase of the proposal commences once the construction activities have ceased and occupancy of the filling station takes place (i.e. once a service provider takes occupation of the constructed premises).

The facility will consist of five USTs with a combined capacity of 125m^3 for the dispensing of both octane (petrol) and diesel fuels. Various amenities (restaurant, take-away / pizza and a 24-hour convenience store) will also be provided for. This section of the report deals with certain requirements during the Operational Phase to ensure long term environmental sustainability.

7.1 DESIGN CONSIDERATIONS

Design considerations can make a significant impact on how buildings interact with the environment and lessen the effects of humankind on their surrounds. The following design phase considerations are specific to the proposed filling station.

7.1.1 Water Conservation

Water conservation is of vital importance. Our water resources are under extreme pressure from pollution and development and all efforts to minimise usage should be implemented. No potable water may be used for the irrigation of gardens or other outdoor uses.

Dual Flush Toilets

Conservative estimates have shown that a saving of more than 22 000 litres per household can be achieved annually with the installation of dual flush toilets (Aquanotion, 2008). All toilets for the service station must be fitted with a dual flush system.

Low Flow Taps

Low flow tap use aerators to reduce the flow of the water. These are either built into the faucet or added as an aftermarket product. The faucets in restrooms should have a peak flow of less than 10 litres per minute.

All bathroom basins within the service station, must be fitted with low flow faucets.

For the kitchens operating on the facility premises, it is not necessary to install aerators as kitchen sinks seldom run without a plug.

Geyser and Pipe Insulation

Apart from the savings in terms of energy as detailed below, insulating geysers and pipes save water, as shorter periods of running the tap to get hot water are required.

Geysers, where implemented (i.e. restrooms / bathrooms as well as staff restrooms and kitchens) must have geyser insulation installed and all hot water pipes.

Rainwater Tanks

Rainwater tanks should be installed to collect runoff water from hard surfaces such as building roofs. Tanks can be installed above ground or underground depending on the architectural requirements. These tanks will provide water for outdoor activities such as water of gardens or outdoor cleaning of the facility.

Above ground water tanks can be screened with architectural input.

Consideration should be given to the implementation of solar pumps at each rainwater tank, in order to more effectively supply the water to where needed. The overflow from rainwater tanks should be directed into the storm water system. All water sources situated externally on buildings (i.e. outdoor taps) should be fed from these rainwater tanks.

Other water saving measures applicable to the operating of the filling station includes the following:

- Check taps and toilets regularly for **drips and leaks,** and repair them promptly;
- **Washers** should be replaced regularly; and
- **Water free solvents** can be considered for washing windscreens and windows.

Water-wise Landscaping

The appointed landscape architects / contractors must ensure that water-wise landscaping principles are incorporated into the detailed landscaping plans. The holder of the authorisation must also ensure that the recommendations with regards to landscaping made in the Basic Assessment Report, be implemented into the landscaping design.

The following principles apply to water-wise gardening:

- **Landscape with locally occurring plant species** – these species are generally best suited as they seldom require additional watering (a list of applicable plant species are attached as Appendix 4 of this EMP);
- Consider the **quality and type of the lawn**, if any lawns are to be included in the landscaping design. Lawns can use vast amounts of water, thus reducing lawn areas to the minimum can be considered. Tougher, low-water lawn types such as Buffalo grass rather than Kikuyu should be considered;

- **Maintain the garden** – including the removing of unwanted plants, the planting of perennials rather than summer annuals, as they have deeper root systems and need less watering;
- Improve the **soil and mulch** – soil water-holding capacity is improved by higher organic content. Mulching (covering the soil with a thick layer of bark, compost, straw etc.) keeps the soil much more moist and is particularly applicable for gardens that are still in an early phase, i.e. not yet established;

- **Water correctly** - avoid watering during the heat of the day or in windy conditions;
- The best irrigation system is **drip irrigation** – it uses 25% of water used by normal irrigation systems with the same effect, and can even be placed under lawn areas.

7.1.2 Energy Conservation

The provision of energy has become a controversial topic lately, and has led to the reconsideration of energy usage. Energy saving practices can provide cost saving to the supplier / operator as well as encouraging the practice of sustainable business in owners, staff and users of a facility. Staff should also be made aware of these protocols and understand the principles behind the practices. Many of such reconsiderations require inclusion during the design phase of the development, and include the following:

Insulation

Ensure that the buildings are adequately **insulated** so as to avoid dependence on high energy heating and cooling systems. Insulation and ventilation on heat generating equipment is also recommended. Design consideration should also take into account building angles, which will allow natural cooling and heating effects to take place.

Solar heating and water systems

Solar heated water systems are an innovative way of producing hot water without putting additional pressure on municipal power supply. The developer and design team should implement this system on all buildings to be constructed as part of the development.

Energy efficient lighting

In terms of Best Practice Principles, it is required that energy saving lighting fixtures be used throughout the entire development. It is therefore specified that Light Emitting Diode (LED) or Compact Fluorescent (CF) lighting be used as opposed to incandescent lighting. This is required for all internal and external lighting, including street lighting and signage.

NO external High Pressure Sodium (HPS) or Metal Halide (MH) spot or floodlights are to be installed.

Solar Energy – Generation of electricity

Solar energy is created by light and heat which is emitted by the sun, in the form of electromagnetic radiation. With modern technology, it is possible to capture this radiation and turn it into usable forms of energy such as electricity.

Solar Cooling Systems

Where required, the design team should consider the use of solar cooling systems such as absorption and adsorption chillers as opposed to conventional air conditioning units (potentially for the restaurant / administration facilities). The appointed electrical and civil engineers can give input on this.

Evaporative Cooling Systems

Consideration should be given to evaporative cooling systems as these cut down considerably on energy usage for appliances such as air conditioners. Furthermore, these systems ensure that fresh air circulates within units, which reduces environmental health risks. The system operates by drawing fresh air (the hotter the better) from outside the building, which passes through moistened pads which cools it down. The air is filtered before flowing through outlets in the facility.

Other general energy saving measures that are recommended for the filling station includes the following:

- All electrical equipment should be **correctly maintained and checked** for efficiency to ensure optimal use of energy. Only necessary equipment should be used at any given time. Low energy equipment and items that can use renewable energy should be encouraged;
- Continued **maintenance and monitoring** of compressed air system is recommended. This will ensure that leaks are detected promptly, thus avoiding unnecessary running of compressors and the additional electrical use;
- **Switch off** lights and equipment when they are not required. Installation of energy efficient lighting, fridges and other equipment wherever possible is recommended;
- Canopy lighting uses large quantities of electricity. Spot lighting at required places such as at fuel pumps can minimise the impact of canopy lighting;
- Increase **air conditioner thermostat** set point by 1 to 2°C in warm weather, and decrease it slightly in cool weather. Extreme change variations between the thermostat set point and the ambient air temperature requires higher energy consumption. Use of Evaporative Cooling Systems should be investigated and possibly used in considering high energy Air Conditioners;
- **Install electrical usage meters** to measure and monitor consumption; and
- Use of **skylights** in convenience centers will minimise the need for lighting during the day.

7.2 WASTE MANAGEMENT

Effective management of general waste contributes to a more **sustainable implementation of landfill sites** and the management thereof. Sorting of recyclable materials at source, i.e. in each facility forming part of the service station, will cause less backlog at the landfill site and decreases the availability of material, thus allowing for more effective and safer management of the landfill site.

Recycling

It is recommended that **recycling bins** are placed at a central point in the development, with access for all residents to encourage recycling of most of the general waste that is produced. Bins need to be adequately marked for ease of reference. The facility can enter into an agreement with a local recycling organization for collection of these materials (and possibly link with some of the established residential developments in the surrounding area).

See Appendix 2 for a reference document on what can be recycled and how recycling works.

Petroleum Product Waste Management

Petroleum products are classified as **hazardous** and as such any waste products of these materials during Operation must be **handled, stored and disposed** in the correct manner. Systems for the recycling of many of these products are available and must be undertaken. Staff must be adequately trained and informed of the nature of the waste material and its handling. The following must be taken into consideration:

- Waste material such as oil, coolants, battery water and fuel products must be stored in **separate containers and clearly labeled;**
- All waste the can be **recycled,** must be recycled; and
- Only **registered contractors** may remove the waste products from the site.

Waste management around the shopfront and restaurant facilities should encourage and implement the recycling of solid waste.

Garden & Biodegradable Refuse

The extent to which landscaping around the service station will be implemented, is unknown. However, should a landscaped are be considered and in the event that outside contractors provide the maintenance of the area, the following will be applicable:

Garden refuse (such as prunings and grass clippings) may not be disposed of in the open space areas. Unwanted germination of seed in natural areas is to be prevented at all costs.
Kitchens produce a large amount of biodegradable refuse.
Both the garden and biodegrable refuse must feed into the Municipal waste handling system and may not be disposed of at the site, or any nearby location.

No burning of garden waste will be permitted on site. Only dumping at a recognized landfill site will be allowed.

7.3 FIRE RISK PREVENTION AND MANAGEMENT CONTROL

In terms of environmental aspects of fire management, due to the fact that much of the area is going to be hard surfaced or landscaped, there is little impact on biodiversity in the area.

However, fire management when dealing with flammable and combustible materials in close proximity to urban development is of extreme importance.

All staff must be adequately trained and informed of the procedures for dealing with a potential problem. Contact details for local Disaster Management Services and Fire Department must be clearly and easily visible to both staff and members of public.

7.4 FUEL AND FORECOURT MANAGEMENT

The overall management objectives of Operational Phase section of the EMP is to understand the environmental risks and responsibilities associated with the operation of service stations, and to take action to improve the management aspects. Once construction activities are completed, the greatest potential impact on the surrounding environment is the possible **contamination by petroleum products.** Environmental performance by suppliers is becoming more recognized and has positive financial benefits to companies that have proven track records in sustainable and principled development and operation.

7.4.1 Fuel Deliveries

Fuel deliveries pose the highest risk period for large scale accidental fuel spills. Extra vigilance by both staff and the delivery personnel must be observed. The following should be taken into consideration:

- During **fuel deliveries** the tanker driver must be present at all times;
- The underground storage tanks and the delivery tanker must be fitted with **emergency cut-off switches;**
- **Vapour recovery equipment** (if available) should be implemented to avoid air pollution and to minimise fuel loss;
- Tankers must off-load in the forecourt containment area (bunded area) where **land or storm water pollution** can be minimized. Spill containment must be available nearby in the event of an accidental spill;

- Tankers must be **maintained and regularly serviced** to ensure that no components leak or are damaged. The fuel station operator should be able to direct queries regarding the state of the tankers to the relevant company; and
- Adequate **Health and Safety mechanisms** must be implemented during fuel deliveries.

7.4.2 Underground Fuel Tanks

Underground fuel tanks must comply with the relevant standards for design, construction and maintenance of filling stations and USTs (South African Bureau of Standards, SANS 089, SANS 1535, and SANS 1830).

Installation of tanks must include suitable **containment measures** to ensure that leakages are avoided.

Once the tanks are operational, the following must be taken into account:

- **Regular monitoring** of fuel levels will ensure early detection of leakage;
- Electronic gauges and / or probes must be regularly **checked and maintained;** and
- Any indication of **leakages** must be directed to the relevant management structure immediately. The contact details of the responsible individual must be easily available to the relevant personnel.

7.5 POLLUTION PREVENTION & CONTROL

7.5.1 Emergency Fuel Spills

Petrol and diesel spills are one of the greatest hazards faced by filling station operators. **Emergency procedures** for spills should be **clearly defined and easily visible** to both staff and members of the public. This should include contact details of emergency personnel.

Spill prevention should be ensured by correct design of the forecourt area. This would include adequate bunding and drainage.

A spill kit should be developed and kept on site. The kit should be properly equipped and clearly marked. All staff should be trained in emergency spill procedures and know where the spill kit is located. In general, the response to the spill should include the following:

- **Switch off all pumps using the cut-off switch.** This switch should be within easy access of console attendants;
- **Keep the public away from the spill area;**
- **Contain the spill** using brooms or a sand/soil dam to prevent contamination of the storm water system. Use absorbents to soak up as must of the spill as possible;
- Materials specifically for dealing with leaks (e.g. Drizit, Zorbit) can be applied;

- Call the local **Disaster Management** agents if a major spill occurs;
- Contact a **Waste Contractor** who is licensed to dispose of the used absorbents;
- Absorbents used to mop up fuel are flammable and considered hazardous waste, these must be disposed of correctly by a registered contractor;
- Should the spill access a storm water system, appropriate measures must be implemented to prevent **downstream contamination**. It is strongly recommended that a professional is identified and appointed to deal with such contamination. The details of this individual / company must be included in the Emergency Spill procedures;
- An Emergency Response Plan will be available at the facility.

7.5.2 Air Pollution

Fuel vapours are a source of air pollution at a service station, as are the exhaust fumes from vehicles making use of the facility. Awareness campaigns should be implemented to inform vehicles users of the impacts of exhaust emissions and methods to reduce these impacts. Fuel vapours from the facility can be managed by implementing the following:

- **Minimise vapour leaks.** This reduces air pollution and fuel loss;
- **Fuel nozzles** should be fitted with cut off mechanisms once the back pressure reaches a certain level indicating a full tank;
- Underground **tank seals** must be regularly checked to ensure good condition. Caps must be appropriately sealed; and
- **Vent pipes** must be constantly monitored to ensure that they are working effectively.

7.5.3 Noise Pollution

Noise pollution at a service station can be very offensive and invasive to neighbouring land uses. Every effort should be made to reduce noise nuisance, especially during **early mornings or late night**. The following should be taken into consideration:

- **Avoid** loud background noise that is clearly audible away from the forecourt;
- **Secure drain grates** to avoid noise caused by vehicles driving over them; and
- Avoid receiving fuel and other deliveries at night.

7.6 STORMWATER MANAGEMENT

The Best Practice Guidelines for Water Resource Protection stipulate that stormwater drainage systems must be designed in such a way that stormwater run-off is conveyed in a controlled manner that will not negatively affect upstream, adjacent or downstream properties and other watercourse users.

The civil engineers (Vela VKE) proposed that surface water run-off from hard-surfaced and paved areas drain along the road surfaces and be channeled through inlets into existing piped stormwater system.

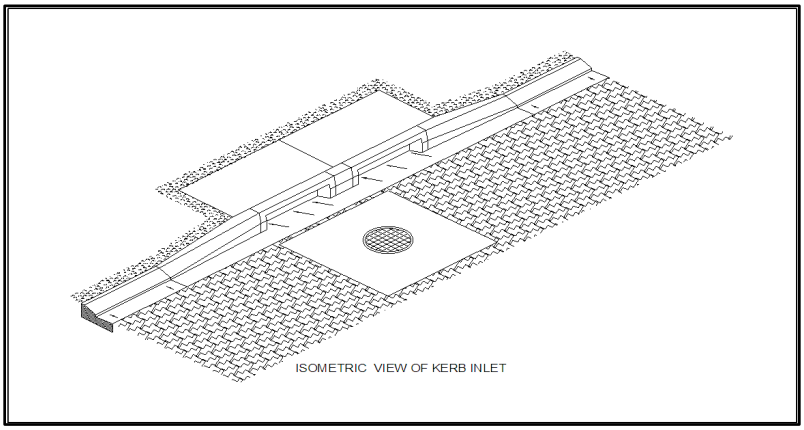


Figure 6: Example of a typical stormwater inlet structure within a road surface (MVD, 2010).

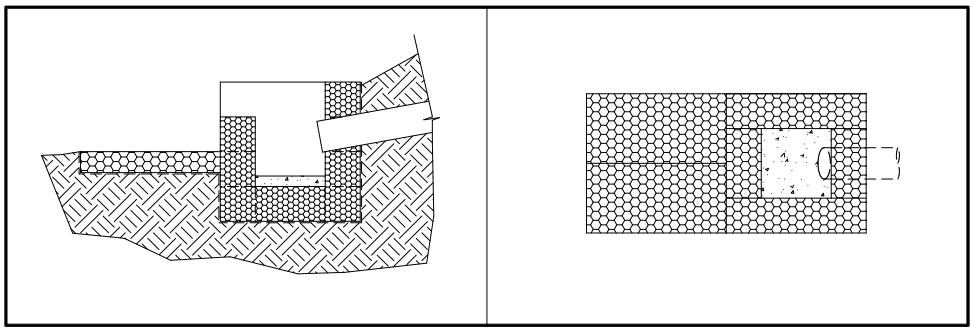


Figure 7: Example of typical energy dissipating structures at stormwater pipe outlet (MVD, 2010).

A stormwater contamination risk commonly associated with filling station includes the collection of hydrocarbon and other petroleum pollutants by surface water run-off, potentially ending in stormwater systems. To avoid potential contamination of surface water, stormwater management principles specifically applicable to the operating of the filling station will need to be implemented.

Various design and stormwater management principles can be incorporated to avoid the described risk. These principles include the following:

7.7 ISOLATE FORECOURT STORMWATER RUN-OFF

It is proposed that stormwater run-off from the forecourt dispensing area **be separated** from stormwater run-off from the remainder of the facility, due to the risk of pollutants associated with the dispensing area, contaminating the storm water system.

By **separating** the clean run-off from potential contaminated run-off, the risk can be adequately management.
A **forecourt separator** will be installed:

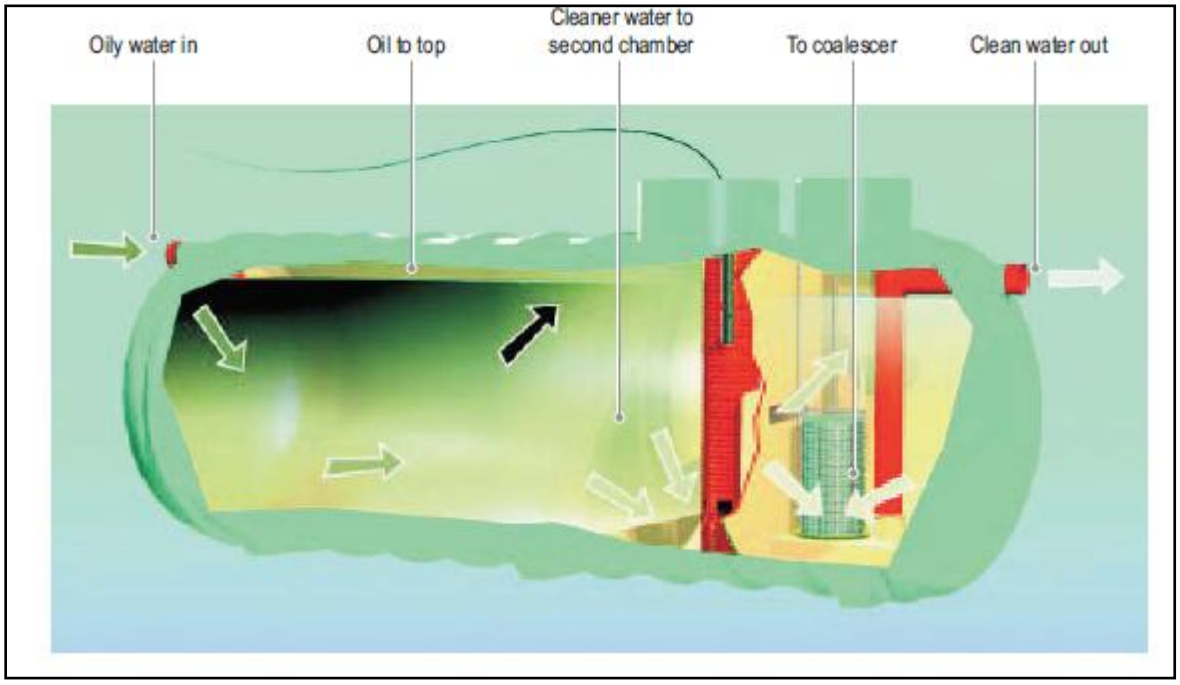


Figure 5: Schematic illustration of a typical forecourt separator (Vela VKE, 2011).

The forecourt separator will intercept hydrocarbon pollutants such as petroleum and oil and prevent their entry to the stormwater drainage system. The outflow of the separator will discharge into the sewer and not into the stormwater system.

The separator will be designed to function in the following manner:

- Contaminated water enters the separator;
- Liquid is retained for a sufficient period of time to ensure that the lighter than water pollutants (e.g. oils and petrol), separate and rise to the surface of the water and are retained within the separator;
- Decontaminated water is discharged (into the sewer system); and
- Retained oil must be emptied from the separator once the level of oil is reached and discharged of at a suitable facility.

7.8 PREVENT CONTAMINATED WATER FROM LEAVING THE FORECOURT

Measures should be taken to ensure that no contaminated or potentially contaminated surface water leaves the forecourt / contaminated area, finding its way into the stormwater system. Such measures include the following:

- Stormwater drains should not be located near the forecourt area;
- The stormwater system must be designed in such a way that the **uncontaminated** rainwater be directed **away** from the forecourt canopy into the stormwater drains;
- The underground areas of both the forecourt and fuel delivery area must be bunded with impermeable material to prevent run-off;
- All bunded areas must be regularly checked to ensure good condition and functioning;
- The forecourt separator must be well maintained and regularly checked to ensure that it is functioning effectively;
- All cleaning and washing should be confined to the bunded forecourt area; and
- Avoid hosing down of the forecourt, rather consider sweeping or vacuuming the area, using absorbent material and water free solvent to remove grime and to keep the premises clean.

7.9 PREVENT RAINWATER ENTERING THE FORECOURT

The correct design of the hard-surfaced forecourt are can ensure that potential contaminated stormwater run-off do not result in surface water contamination. The following should be considered and implemented:

- The forecourt area should be covered with a roof that has an overhand of at least 10°;
- The hard-surfaced forecourt floor should be designed with a minimum slope of at least 2%, allowing any rain or other surface water (potentially contaminated with hydrocarbon pollutants) to drain towards central inlets linked to the sewage system; and
- Regular checks must be done for leaking roofs or stormwater pipes that may be discharging water onto the forecourt or into the bunded area.

7.10 INSTALL RAINWATER TANKS

Rainwater drainage from the forecourt canopy and other roof buildings will be harvested and stored for storage in rainwater tanks.

With the majority of the rainwater from roofed areas captured in rainwater tanks, a minimal volume of rainwater will drain to the stormwater system.

7.11 OPERATIONAL PHASE HEALTH & SAFETY

Potential health and safety risks for the general public have been identified as a possible operational phase impact. An **Emergency Response Plan** must be available and the staff will be informed / trained on how to implement the emergency plan (*a service provider still needs to*

be confirmed, at which stage the Emergency Response Plan of the specified service provider will be included for implementation).

Typical risks associated with service stations include the following:

- Fire;
- Fuel spillage;
- Physical injury;
- Medical emergencies;
- Crime incidences.

The potential impact (especially fire risks and fuel spillages) can be avoided to a high degree, provided that the following mitigation measures are implemented:

FIRE & FUEL SPILLAGE RISKS:

- The facility will need to comply with all relevant norms relating to the design, construction and maintenance of filling stations to avoid circumstance which could expose the general public to health and safety risks;
- The South African Bureau of Standards codes: SANS 089, SANS 1535, SANS 1830 must be implemented;
- The Occupational Health & Safety Act (Act 85 of 1993) must be implemented where relevant;
- An **emergency switch** must be installed – allowing all pumps to be switched off immediately in case of an emergency;
- On-site fire extinguishers must **be available at all times** and must be regularly checked and maintained;
- Refilling of the USTs **must not be unattended;**
- Automatic cut-off devices must be installed on all refueling equipment to avoid fuel spillages;
- **Regular monitoring** on all equipment for fuel leakages;
- All staff must be **adequately trained** and **informed** of the procedures for dealing with a potential fire and fuel spillage problems;
- Product spills can be soaked up with **sand or sawdust**;
- **No water** must be used for petro or electrical fires;
- **Trained staff** can attempt to extinguish the blaze with the proper equipment;
- Buildings must be **evacuated;**
- **Contact details** for local Disaster Management Services and Fire Department must be clearly and easily visible to both staff and members of public;

PHYSICAL INJURY & MEDICAL EMERGENCIES:

- Designated staff must be trained in first aid techniques;
- All new staff must be given basic first aid training as part of induction training;

- First aid kits to an acceptable standard must be readily available;
- Contact details for the nearest doctor and hospital must be readily available and clearly visible.

CRIME INCIDENCES:

- Contact details for the nearest police station must be readily available and clearly visible;
- Contact / report the incidence with the nearest police station;
- Ask customers to move away from the problem area;
- Lock all pumps as soon as possible.

The above information typically forms part of an **Emergency Response Plan**. As a service provider still needs to be confirmed, at which stage a specific Emergency Response Plan in accordance with the service provider's requirements will be developed.

8 DECOMMISSIONING PHASE ENVIRONMENTAL MANAGEMENT REQUIREMENTS

8.1.1 Abandonment of Underground Storage Tanks

Underground storage tanks that are no longer in use or have not been used to store flammable or combustible liquids for a continuous period of two years should be considered abandoned.

Abandoned or broken underground tanks must be removed by experienced contractors. The likelihood of contaminated soil around the tanks is often high and this must be correctly removed and disposed of. Groundwater is at risk from contamination by defunct tanks and it is advised that monitoring of the groundwater should be undertaken if large quantities of fuel have been lost.

A Decommissioning Plan must be prepared for the decommissioning phase, stipulating the necessary management and monitoring for the specific decommissioning activity.

The forecourt underground area as well as the area surrounding the USTs will be bunded / encased with an impermeable material. With decommissioning, soil contamination will be restricted to these two contained areas.

Careful removal and proper disposal of any petroleum products, USTs and pipework will be necessary to avoid unnecessary contamination. Any hazardous waste must be disposed off at a recognized hazardous waste disposal facility.

With closure of the site, it is recommended that a **contamination assessment** be undertaken to determine if any contamination has taken place, which will indicate whether any rectification and

site rehabilitation will be needed. Considering the design of the facility (underground encasings) it will possible to restrict the contamination assessment to the two described areas.

Any other legislative requirements at the time of decommissioning should be complied with.

9 NON-COMPLIANCE

Any person is liable on conviction of an offence in terms of sub regulation (1) of the National Environmental Management Act to imprisonment for a period not exceeding two years or to a fine not exceeding an amount prescribed in terms of the Adjustment of Fines Act, 1991 (Act No. 101 of 1991).

Apart from a fine resulting from any legal mechanism, the ECO may impose a **penalty** for **non-compliance** in terms of this Environmental Management Plan. The procedure detailed below is for a spot fine in terms of this EMP and does not detail the procedure for fining in terms of any other legal mechanism

9.1 PROCEDURES

The contractor shall comply with the environmental specifications and requirements of this EMP and Section 28 of NEMA, on an on-going basis and any failure on his part to do so will entitle the ECO to **impose a penalty**.

In the event of non-compliance the following recommended process shall be followed:

- The ECO shall issue a **Notice of Non-compliance** to the Contractor, stating the nature and magnitude of the contravention. A copy shall be provided to the Project Proponent.
- The Contractor shall **act to correct the transgression** within the period specified in by the ECO.
- The Contractor shall provide the ECO with a **written statement** describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions. A copy shall be provided to the Project Proponent.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the ECO shall **impose a Monetary Penalty** (spot fine) based on the conditions of contract.
- Should the transgression be a blatant disregard of conditions of the EMP, the ECO can at their discretion immediately issue a **fine** and require the **remediation** (without first giving the contractor a chance to remediate).
- In the case of non-compliance giving rise to physical environmental damage or destruction, the ECO shall be entitled to undertake or to cause to be undertaken such

remedial works as may be required to make good such damage and to recover from the Contractor the **full costs** incurred in doing so.

- In the event of a dispute, difference of opinion, etc. between any parties in regard to or arising out of interpretation of the conditions of the EMP, disagreement regarding the implementation or method of implementation of conditions of the EMP, etc. any party shall be entitled to require that the issue be referred to **specialists** for determination.
- The ECO shall at all times have the right to **stop work** and/or certain activities on site in the case of non-compliance or failure to implement remediation measures.
- Proof of **payment** for a spot fine must be provided to the ECO.
- Monetary fines will be payable into predetermined account and the funds must be used for conservation / rehabilitation efforts outside of the development site. The funds will be allocated at the discretion of the ECO, Project Proponent or the Environmental Liaison Committee (ELC, if such a body is established).

9.2 OFFENCES AND PENALTIES

Any avoidable non-compliance with the conditions of the EMP shall be considered sufficient ground for the imposition of a penalty.
Possible offences, which should result in the issuing of a contractual penalty, include, but are not limited to:

- Unauthorised entrance into no-go areas;
- Catching and killing of wild animals;
- Open fires outside of the contractor camp site;
- Unauthorised damage to natural vegetation;
- Unauthorised camp establishment (including stockpiling, storage, etc.);
- Hydrocarbons / hazardous material: negligent spills / leaks and insufficient storage;
- Ablution facilities: non-use, insufficient facilities, insufficient maintenance;
- Insufficient solid waste management (including clean-up of litter, unauthorised dumping etc);
- Erosion due to negligence / non-performance;
- Excessive cement / concrete spillage / contamination'
- Insufficient fire control and unauthorised fires; and
- Non-induction of staff.

10 MONITORING AND AUDITING

Regular monitoring and auditing of quantifiable aspects of this OEMP should be implemented in order to ensure that the facility attains the expected level of sustainability. It is recommended that an audit be completed every six (6) months for a period of one (1) year after completion of construction.

All monitoring measures described in this EMP and the Basic Assessment Report must be implemented.

11 REFERENCES

Lochner, P. 2005. *Guideline for Environmental Management Plans.* CSIR Report No ENV-S-C 2005-053H, Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs and Development Planning, Cape Town.

MVD, 2010. *Proposed Amanzi Moya Development Environmental Impact Assessment: Civil Services Supporting Information*

Vela VKE, 2012. *Engineering Services Report for Lenasia Builders and Developers CC, Sandkraal Filling Station, Erf 11221, George*

Figure 2 (Schematic Illustration of USTs) obtained on 25 January 2011 from http://www.google.com/imgres?imgurl=http://www.jaycawley.net/images/USTsGaspumps1.jpg&imgrefurl=http://www.jaycawley.net/&usg=__CdET6TCmPESUclOi8b7YGk0aRgo=&h=238&w=317&sz=14&hl=en&start=40&sig2=kpNQbvGX42sayBJyu0InGA&zoom=0&um=1&itbs=1&tbnid=175Mi4st2oTLnM:&tbnh=89&tbnw=118&prev=/images%3Fq%3DUnderground%2BStorage%2BTanks%26start%3D20%26um%3D1%26hl%3Den%26client%3Dopera%26sa%3DN%26rls%3Den%26ndsp%3D20%26tbs%3Disch:1&ei=2P0vTanVLMH7lweoubmrCg

Appendix 1

Diagrammatic representation of required environmental control mechanisms.

Appendix 2

EMP – Quick Reference Guide

NB – This Quick reference guide cannot be read in isolation and must be considered along with total EMP document.

SPECIFICATION:	**EMP REF**
ENVIRONMENTAL EDUCATION	**5.2**

OBJECTIVES:

- To achieve environmental awareness among construction site personnel of the procedures to be followed to comply with the EMP.

GOALS:

- Ensure that every site employee receives basic environmental awareness training within one week of commencing work on the site.

RESPONSIBILITIES:

- The Contractor is responsible for making Environmental Appointments to ensure that the specifications of the EMP are complied with.
- The Contractor is responsible for ensuring that all of his staff, sub-contractors and workers receive basic environmental awareness training within their first week. A record of the names & dates of personnel receiving this training is to be maintained.
- The ECO must be available, if necessary, to provide environmental induction training to site management staff.
- The ECO shall monitor the contractor's compliance with the requirement to provide sufficient environmental awareness training to all site staff.
- The ECO shall check that the content of the environmental training is appropriate & is of a sufficiently high standard, & recommend adjustments where necessary.

PROCEDURES:

- Prior to camp establishment a workshop/site induction meeting shall be held to discuss the environmental issues and procedures to be complied with during the work contract. Attendees shall be the Developer, the Main Contractor, Site manager, foremen and ECO, as well as all appointed site officers.
- All employees of the Contractor, including sub-contractors and their employees, that spend more than 1 day a week or four days in a month on site, are required to attend an Environmental Induction session before construction commences. This session shall cover all aspects related to the EMP.
- Accurate attendance registers of these sessions shall be kept by the Contractor and filed.
- Ad hoc or additional training shall be undertaken by the Contractor if required to by the ECO, for specific activities that may potentially impact the environment, or if the work is being undertaken in sensitive environments.
- Environmental signage is to be displayed on the site including – "no smoking", "fire hazards", etc.
- A basic outline of the Environmental Awareness Training to be given to workers is provided in the form of a "Do's and Don'ts" poster, which shall also be displayed in the site camp or office.

RECORDS AND DOCUMENT CONTROL:

- Records of Environmental Appointments
- Records of Environmental Awareness Training

SPECIFICATION:	**EMP REF:**
SITE ESTABLISHMENT AND DEMARCATION	**6.1 & 6.2**

OBJECTIVES:

- Minimise negative environmental impacts by reducing the construction "footprint".

GOALS:

- Ensure that the Site Establishment and Fire Prevention Plans are adhered to.
- Ensure that the Minimum Requirements is implemented.
- Demarcate "No-Go" areas with two-strand wire fencing and danger tape zig zagged through it.
- Make all construction workers aware of the restrictions on "no-go" areas

PROCEDURES:

Prior to Site & Campsite Establishment

- Submit a Site Establishment Plan to the ECO for approval prior to work commencing on site. The plan should indicate the locations of construction infrastructure including the campsite and it's contents and layout, wash areas, workshop washing, batching area, toilets, stores, site office, material and topsoil stockpile areas. This plan must be approved by the ECO.
- Prepare and keep a fire prevent plan on-site. The plan should describe what fire prevention and protection measures will be applied on the site, including a list of fire fighting equipment available.
- Ensure that all the stipulations of the Minimum Requirements Checklist are implemented and signed off by the ECO.

Establishment of the Site

- All construction activity is to be restricted to within the site boundaries, as well as all plant, labour and materials. Any deviation from this requires written permission from the ECO.
- No unauthorized entry, stockpiling, dumping or storage of equipment or materials (imported or excavated) outside site boundaries is permitted.
- Should no alternative means of completing specified work be available other than to utilise "no-go" areas, permission to enter these demarcated areas must be provided in writing by the ECO.

Establishment of the Campsite

- The location of the campsite must be in accordance with the approved Site Establishment Plan. Any deviation from this requires written permission from the ECO.
- The campsite is to contain at a minimum the following:
  - Stores (including materials and fuels stores)
  - Areas for storing vehicles, plant & equipment
  - Waste containment facilities
- No vehicle washing facilities may be established on the site or in the campsite.

RECORDS AND DOCUMENT CONTROL:

- Provide ECO with Method Statement detailing Site Location and Layout.
- The Site Establishment Plan & Fire Prevention Plan is to be filed.

SPECIFICATION:	**EMP REF:**
CONSTRUCTION ACTIVITIES & WORKS	**6**

OBJECTIVES:

- Minimise the impact of construction activities on the immediate and surrounding natural and social environment.
- Prevent contamination of the ground, groundwater, wetlands, river, streams and downstream properties and surrounding environment from construction activities.

GOALS:

Institute the following at the commencement of construction works:

- Procedurally correct cement/concrete batching works &
- Sufficient and functional equipment washing facilities.

RESPONSIBILITIES:

- The **Engineer** is to monitor the technical aspects of the construction process and liaise with the ECO where activities could have a detrimental effect on the environment.
- The **Contractor** is to carry out the construction works according to the environmental specifications, as well as other applicable specifications and laws. He is to provide the necessary materials, equipment & training to comply with EMP procedures.
- The **ECO** must be available to assist the Contractor in providing environmental awareness training, and finding environmentally viable solutions to construction impacts.

PROCEDURES:

Construction Times

- Construction works shall take place at the following times:
  - 7h00 to 18h00 Monday to Friday
  - 8h00 to 14h00 on Saturdays;
  - No work on public holidays
- If work outside of these hours is planned, permission from the ECO must be sought. Depending on the type & duration of work being undertaken, letter drops to surrounding residents may be required.

Site Works (Preparation, clearing and stabilisation)

- Site clearing is to be limited to only the area necessary for the carrying out of the specified works.
- A Method Statement must be approved for soil stripping before construction commences.
- Topsoil stockpiles shall not exceed 1m in height and 2m in width, and shall be protected from wind erosion and runoff by covering with a suitable fabric approved by the ECO.
- Once earthworks are complete, the disturbed areas are to be stabilised.

Batching and Mixing Areas

- No mixing of concrete or cement directly on the ground is permitted.
- Mortar (dugga) boards are to be provided to prevent spillage from concrete mixing.
- Cement/concrete batching & mixing work areas are to be kept clean at all times and the area is to be lined with plastic to prevent ground contamination, and bermed with sand or bricks to prevent runoff. Visible remains and aggregate shall be physically removed and immediately disposed of as solid waste. Location of mixing and batching works outside of the campsite area is to be approved by the ECO, and indicated on the Site Establishment Plan.

- Bulk cement silos & batching storage areas are to be lined with plastic of concrete, & screened & contained, by fencing such as ready-fence panels, to ensure that no windblown cement dust or water contamination occurs.

Work Areas

- Bricklayers & plasterers are to minimize any cement spill or runoff in their work area, & ensure that the work area is cleaned of all cement spillage at the end of each workday.
- Both used & unused cement bags are to be stored in weatherproof containers so as not to be affected by rain or runoff.
- Should work be undertaken in areas where services have been completed, storm water catch pits are to be closed with hessian/bidum or other suitable pervious material to prevent sand and contaminants from entering the storm water system.
- The Contractor is to ensure that all reasonable measures are taken to limit erosion and sedimentation from construction activities. Erosion protection measures could include cut-off drains and/or berms.

Equipment Cleaning Areas & Activities

- No washing of vehicles or equipment is permitted on site.
- All wastewater resulting from batching of concrete is to be collected in conservancy tanks, cleaning pits or sumps, to be disposed of as contaminated water.
- Plastic or concrete lined cleaning pits are to be installed to facilitate washing of all cement & painting equipment. The size & number of pits must be sufficient to handle expected outputs from concrete batching, cement mixing & painting. A functional, non-leaking, water point must be installed at each pit. (Disposal of contaminated water - see *Specification* 5).
- Contaminated soil resulting from concrete/cement spills is to be removed immediately after the spillage has occurred and placed on the appropriate rubble stockpile.
- No contaminated runoff is to be permitted to enter the storm water system.
- Ready-mix trucks are not permitted to clean chutes at the work site. Cleaning into foundations, or dedicated cleaning pits or sumps is permitted.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded by the ECO.

SPECIFICATION:	**EMP REF:**
WASTE MANAGEMENT	**6.6, 6.7 & 6.8**

OBJECTIVES:

- Reduce the amount of waste produced by construction activities.
- Prevent pollution of surrounding natural and residential areas.
- Promote the reuse and recycling of materials.

GOALS:

- Institute regular daily work area clean-ups, and weekly site clean-ups.
- Reduce materials wastage.
- Institute efficient waste management practices by employing good-housekeeping rules.

RESPONSIBILITIES:

- The **Contractor** is to institute and enforce an effectively functioning waste management system for the duration of the contract.
- The **ECO** is to regularly evaluate that the waste management practice is adequate and advise on procedures for optimum efficiency.

PROCEDURES:

Solid Waste Management:

- A construction refuse collection structure shall be erected immediately on the commencement of construction work. The minimum requirement for a refuse collection structure is as follows:
  - 4 Ready-fence panels (3m x 1.8m) with shadecloth or hessian attached to the panels, one panel being movable to provide access. The structure shall have a roof (ready fence panel, or similar) to contain waste materials in windy conditions. The floor of the structure shall be lined (with DPC plastic or similar) to prevent ground contamination from leachate such as cement powder residue.
  - If construction refuse skips are utilised, they are to be covered with shadecloth (or similar) to ensure the containment of waste.
- Refuse bins with lids shall be provided for household waste (lunch litter) and placed in eating areas, and any other areas where deemed necessary to control littering.
- Refuse bins are not permitted to overflow and are to be emptied regularly.
- Recycling shall be instituted where possible – 44 gallon drums in the campsite for glass and tins as a minimum. Cardboard, paper (other than cement bags) and boxes shall be separated from other refuse and a separate structure be built for this purpose.
- No littering of any kind is permitted on site. Any accumulation of litter must be cleaned up immediately by the Contractor or responsible party.
- Building rubble is to be kept separate from other construction waste. Rubble is to be kept clean of brick ties, plastics, papers and cement bags at all times.
- Accumulation of large stockpiles of rubble and waste is not permitted. Waste is to be removed at regular intervals (at least once a week).
- Building rubble stockpiles and refuse structures shall be positioned to permit easy access by rubble removal trucks.
- All waste is to be disposed of at an approved landfill site.
- No burning or burying of waste is permitted on site.

***Wastewater Management*:**

- The disposal of wastewater produced construction works or cleaning pits is to be carried out as follows:
  - The top 60% of the wastewater may be disposed down the sewerage system,
  - The remaining water and sludge must be disposed of a registered landfill site with solid waste.
- No washing of vehicles is permitted on site or in the campsite.

Ablution Facilities:

- Sufficient ablution facilities shall be provided –1 toilet per 15 workers maximum. Should any deviation from this be necessary written permission from the ECO shall be required.
- Chemical toilets are to be serviced weekly. The Contractor is to ensure that no spillage occurs, and that the contents are removed from site according to approved methods.
- All toilets are to be secured to prevent them from being blown over, and have properly closing doors.
- Chemical toilets are to be emptied prior to temporary site closure for a period longer than 4 days.
- No long drops are permitted.
- No ablution anywhere on the work site or surrounding area is permitted – this is a finable offence.

Hazardous Waste:

- Hazardous waste such as oil, diesel, petrol, chemicals, paints and solvents are to be disposed of separately from general waste and taken to an approved hazardous waste disposal site.
- Hazardous waste materials are to be stored in secondary containers (e.g. secured collection drums) until disposal to hazardous waste.
- Drip trays used to collect spillage from equipment; vehicles and plant must be regularly emptied into the appointed secondary container (which could also include diesel tank bunding if available on site) and replaced under the vehicle.
- A “cover” / roof must be placed over the diesel tank, to minimize the production of contaminated water in the drip area as a result of rain.

Waste Management Practice:

- The Contractor shall delegate a specific waste management job description to an individual or team, if directed by the ECO.
- Areas impacted by construction activities must be regularly maintained. This includes the cleaning of roads, pavements and the rehabilitation of impacted landscaped areas.
- The contractor shall provide sheltered eating areas with waste containers in the campsite for all construction personnel. The site office can be used for this purpose.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded in by the ECO. (Examples of incidents related to waste management could include overflowing waste containment areas, accumulation of rubble; incorrect or negligent disposal of the products of hydrocarbon spills; spillage of toilet cleaning chemicals etc.)
- Copies of hazardous waste disposal receipts are to be filed
- Method statements are to be filed in the Site EMP File.

SPECIFICATION:	**EMP REF:**
WATER RESOURCE MANAGEMENT	**GENERAL**

OBJECTIVES:

- Reduce incidents of wastage of water on site.

GOALS:

- To use water resources sparingly & recycle/reuse where possible.

RESPONSIBILITIES:

- The **Contractor** is to ensure that water resource management is implemented.
- The **ECO** is to regularly audit water resource management practice on the site.

PROCEDURES:

Work site operations

- Leaking water taps and hosepipes are to be repaired immediately.
- Running water taps and hosepipes are not to be left unattended.
- Unused water standpipes are to be secured from leakage.
- Taps are to be attached to secured supports and used in preference to standpipes with no valve mechanism to open and close water supply. All hose and taps to be utilised during construction are to be fitted with the correct & appropriate plumbing fittings.

Dust suppression measures

- Watering with potable water as a dust suppression measure is prohibited. It is preferable that material stockpiles be covered rather than watered.
- Road Environmental Dust Suppressants .(REDS) may be required to be implemented at the discretion of the ECO.

Abstraction

- Any abstraction from natural water sources such as stream or groundwater will require a Method Statement for approval by the ECO and Engineer.
- Well point provisions also require a Method Statement approved by the ECO/Engineer, as well as approval from the DWAF.

RECORDS AND DOCUMENT CONTROL:

- Copies of water use permit approvals are to be filed.
- Details of any incidents are to be recorded.
- Method statements are to be filed in the Site EMP File.

SPECIFICATION:	**EMP REF:**
DUST AND NOISE CONTROL	**6.6 & 6.11**

OBJECTIVES:

- Minimise dust and noise generation from construction activities.

GOALS:

- Comply with all Occupational Health & Safety regulations.
- Undertake to minimize dust generation without excessive water usage.
- Create awareness around construction activities that could potentially cause noise or dust disturbance, or light pollution to the surrounding residential area.

RESPONSIBILITIES:

- The **Contractor** is to take all reasonable measures to minimise dust and noise generation on site, by implementing appropriate dust suppression and noise control measures where such impacts are unavoidable.
- The **Contractor** is to advise the ECO should construction activities be expected to cause excessive dust, noise or light pollution. A Method Statement may be required by the ECO.
- The **Contractor** is to maintain an incident record with regard to issues arising out of dust and noise generation. Should these issues escalate, detailed monitoring of noise and wind conditions by the Contractor may be called for by the ECO.
- The **ECO** has the authority to issue a stop works order for inadequate dust and noise control measures, & shall maintain a complaints register.

The **Enginee**r may be requested to, in consultation with the Contractor and ECO, to revise a particular construction specification to limit dust, noise or light generation.

PROCEDURES:

Dust – generated by works

- Removal of vegetation is to be avoided until such time that soil stripping is required.
- Should construction work in such stripped areas not be commencing within a short period of time (one week) the exposed areas shall be re-vegetated or stabilised.
- Soil stabilising measures could include rotovating in straw bales (at a rate of 1 bale/ 20m²), applying chemical soil binders, mulching or brush packing the disturbed area, or creating windbreaks using brush, bales or shadecloth fences.
- Sand stockpiles are to be covered with hessian, shadecloth or DPC plastic.
- Stockpiles are to be located in sheltered areas and the usable/cut face orientated away from the direction of the prevailing wind for that season.
- Excavating, handling or transporting erodable materials in high wind or when dust plumes visible shall be avoided.
- If high winds prevail the ECO or Engineer shall decide whether cessation of activities is required, and if necessary they shall have the authority to temporarily stop certain of the works until wind conditions become more favourable.

Dust – generated by roads and vehicle movement

- Vehicle speeds shall not exceed 40km/h along gravel roads or 20km/h on unconsolidated or non-vegetated areas. Dust plumes created by vehicle movement are to be monitored.
- If access and haul roads are generating dust beyond acceptable levels dust suppression

measures must be initiated. These include, but are not limited to the following:

- Reduction of travelling speeds along the road.
- Restriction of vehicle or plant usage.
- Application of chemical soil binders.
- Application of a suitable sacrificial road surfacing.

Noise

- All noise and sounds generated by plant or machinery must adhere to SABS 0103 specifications for the maximum permissible noise levels for residential areas.
- All plant and machinery are to be fitted with adequate silencers.
- No sound amplification equipment such as sirens, loud hailers or hooters may be used on site except in emergencies.
- No amplified music is permitted on site.
- No noisy work is to be conducted over the weekends or public holidays, or outside of 07h00-17h00 on weekdays.
- If work is to be undertaken outside of normal work hours, permission must be obtained from the ECO and Local Authority. Prior to commencing any such activity the Contractor is also to advise the potentially affected neighbouring residents. Dates, times and the nature of the work to be undertaken are to be provided. Notification could include letter-drops.

RECORDS AND DOCUMENT CONTROL:

- Copies of Council approval to work outside of normal working hours are to be filed.
- Details of any incidents are to be recorded.
- Method statements are to be filed in the Site EMP File.

SPECIFICATION:	**EMP REF:**
FIRE PROTECTION	**6.5**

OBJECTIVES:

- Take all necessary precautions to reduce the risk of fire on the site.
- Put into place appropriate fire fighting equipment to deal with a fire.

GOALS:

- Draw up and institute a Fire Protection Plan on the site in case of a fire break-out.

RESPONSIBILITIES:

- The **Contractor** is responsible for drawing up and implementing a Fire Protection Plan.
- The **ECO** is to audit adherence to the Fire Plan.

PROCEDURES:

Fire Prevention Plan

- The Fire Protection Plan is to be submitted to the ECO with the Site Establishment Plan prior to the commencement of works on site, & filed in the Site EMP File.
- A Fire Protection Plan shall include the following:
  - Identification of all potential fire hazards.
  - Identification of fire fighting equipment to be provided on site.
  - Details of training for site staff in fire fighting techniques, and frequency of fire drills.
  - Contact details of local fire brigade.
- The number of people to be trained is to be consistent with the size & nature of the site.

Fire fighting equipment

- Basic fire-fighting equipment is to be placed at strategic locations on site (e.g. at the site office, flammable material store and watchman's container), and maintained in good working order to the satisfaction of the local fire authorities.
- A fire evacuation route is to be clearly demarcated & kept clear of obstruction at all times.

Precautions

- Emergency numbers are to be clearly displayed on the outside of the site office.
- No open fires are permitted outside the contractors' site where they are not allowed to be left unattended.
- Smoking is prohibited near places where any readily combustible or flammable materials are present. Notices to be prominently displayed prohibiting smoking in such areas.
- Welding, flame cutting and other hot work is only to be undertaken in places where the necessary safety precautions are in place (i.e. not near potential sources of combustion. A fire extinguisher must be immediately accessible at such work sites).
- All flammable materials are to be stored in a suitable, lockable storage area.
- Combustible materials may not accumulate on the construction site.
- Cooking is to be restricted to bottled gas facilities in the existing building. This facility is to be supervised and strictly controlled. Fire extinguishers must be readily available in these areas.

RECORDS AND DOCUMENT CONTROL:

- A copy of the Fire Prevention Plan is to be filed.
- Details of any incidents are to be recorded.

SPECIFICATION:	**EMP REF:**
ENVIRONMENTAL PROTECTION	**6**

OBJECTIVES:

- Minimise disturbance to surrounding flora and fauna and archaeological sites.

GOALS:

- Limit the amount of earthworks to only what is necessary to undertake the works.
- Ensure the proper protection of fauna and flora.
- Ensure that the topsoil for this area is stored as per specifications in this EMP.

RESPONSIBILITIES:

- The **Contractor** is to ensure that all natural features and vegetation identified by the ECO or LA are not damaged or disturbed by construction activity.
- The **Contractor** is to inform all workers about protective measures to be undertaken when working with or near any natural environments or features.
- The **ECO** is to audit the effectiveness of protective procedures undertaken.

PROCEDURES:

- The Contractor shall not deface, paint, mark or damage any natural features (e.g. rock outcrops, tree trunks etc.) in or around the site.
- The use of indigenous “waterwise” plants is encouraged, and invasive alien species is prohibited.
- Trapping, poisoning & shooting of animals, & the collection of eggs is strictly forbidden.
- Disturbance of animals such as snakes on site is not permitted.
- No livestock is permitted on site. Domestic animals are to be kept under control.
- No natural water sources on or around the site may be used for the purpose of swimming, washing of bodies, clothes or machinery.
- If any remains or artifacts are discovered on site during earthworks, the Contractor shall stop works immediately and contact the ECO, who will ensure that the SAHRA is notified. No work in this area can continue until authorised to do so by SAHRA.
- The site boundaries are to be pegged out on site and no construction-related activities (including access, location of toilets, stock piling of materials or parking of vehicles) may take place outside of the site boundaries.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded. (Examples of incidents to be recorded could include damage to vegetation; wildlife found on the site; transgressions into “no-go” areas, discovery of objects of archaeological or historical value etc.)

SPECIFICATION:	**EMP REF:**
FUEL, FLAMMABLES & STORES	**6.10**

OBJECTIVES:

- Prevent accidents and spillages when handling and storing fuels and flammables.

GOALS:

- Maintain a 'no-incident' record & institute all applicable Health & Safety Regulations.

RESPONSIBILITIES:

- The **Contractor** is to ensure that
  - fuels and flammable materials are stored in adequate facilities and handled correctly;
  - storage needs to be approved by the Chief Fire Officer of the local authority, via a permit issued in terms of the Community Fire Safety Bylaw.
  - staff handling these substances receive the appropriate training and PPC & PPE;
- the necessary fire-fighting equipment and signage is in place.

PROCEDURES:

Refueling

- No vehicles/machines are to be refueled on site except at designated refueling locations.
- If refueling on site, or from drums, the ground must be protected and proper dispensing equipment is to be used (i.e. hand pumps and funnels). Drums may not be tipped over.

Storage

- All fuels and flammable materials are to be stored safely and clearly labeled.
- Ensure that the required MHDS are kept on file in the site office
- Safety signage ("No Smoking", "No Naked Lights" and Danger"), & product identification signs, are to be clearly displayed on fuel stores and tanks.
- These temporary tanks must be bunded with an impermeable lining, and the capacity of the bunding shall be 110% of the total volume of the tanks.
- The tanks shall be situated on a concrete hard standing surface.
- Adequate precautions shall be provided to prevent spillage during the filling of any tank and during the dispensing of the contents.
- The capacity of the tank shall be clearly displayed and the product contained within the tank clearly identified using the emergency information system detailed in SABS 0232 part 1.
- Tanks on site shall not be linked or joined via any pipe work, but shall remain as separate entities.
- The tanks and bunded areas shall be covered by a roofed structure to prevent the bunded area from filling up with rainwater.
- Enretech, or similar must be placed in the bunding to absorb spills and water.
- Empty fuel tanks and storage containers are to be sealed and stored in an area where the ground is protected by an impermeable lining.
- Fuel and flammable materials are to be kept under lock and key at all times.
- Storage areas for flammable materials are to comply with standard fire safety regulations.
- Adequate fire-fighting equipment shall be available close at hand.
- No smoking is permitted within the vicinity of the stores.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded. (Examples of incidents to be recorded could include fuel spills, theft from stores, fire caused by negligent use etc.)

SPECIFICATION:	**EMP REF:**
POLLUTION PREVENTION & REMEDIATION	**GENERAL**

OBJECTIVES:

- Protect the immediate and surrounding environment from pollution events.

GOALS:

- Institute pollution prevention when construction activities could result in pollution events.
- Have sufficient pollution remediation materials on site to deal with minor pollution events.

RESPONSIBILITIES:

- The **Contractor** is to undertake a risk assessment to determine when and where the possibility exists of pollution events occurring. He is also to ensure that adequate pollution prevention measures are instituted and provide pollution control materials.
- The **ECO** is to undertake compliance monitoring, and provide advise if required.

PROCEDURES:

Pollution prevention

- Plant and vehicles are to be serviced regularly and are to be repaired immediately upon developing leaks or other breakages.
- If static plant is to be stored for longer than 6months it shall be located in a lined (plastic or concrete) and bunded area to prevent pollution from storm water runoff.
- Use drip trays and/or bunding where losses cannot be prevented but are likely to occur.
- Appropriately sized drip trays are to be provided for all plant and machinery.
- Drip trays are to be inspected daily for leaks & emptied when necessary, more frequently during rain events to prevent overflow. Oil & diesel spills are considered hazardous and disposal of such contaminants is required to follow the procedures set out in the EMP.
- Drip trays to be supplied for all repair work undertaken on site and in the campsite.
- Stand – by generators will be accommodated at the pump station. The pump station will allow full operation of the pump stations in times of power outages and thereby prevent spillages.

Air pollution prevention

No open fires are permitted on site.

Spill remediation

- Appropriate equipment to deal with fire or pollution incidents is to be readily available on site. Including sandbags, fire extinguishers, absorbent material (sufficient to treat a minimum of 200ℓ of hydrocarbon liquid spill), drip trays for plant /machinery leaks, drums/containers for contaminated water & products of drip trays or minor spills.
- Soil contaminated with hazardous substances, fuel or oil shall be bio-remediated with Enretech or similar product and disposed of as required by the manufacturer in consultation with a specialist consultant.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded. (Details of the type of pollution event and method of containment and remediation or rehabilitation are to be provided).

SPECIFICATION:	**EMP REF:**
PLANT & ANIMAL RESCUE, LANDSCAPING & REHABILITATION	**6**

OBJECTIVES:

- Provide installation guidelines for the revegetation and landscaping of impacted areas

GOALS:

- Create an aesthetically pleasing environment that compliments the surrounding natural environment and residential fabric.

RESPONSIBILITIES:

- The **Landscape Architect** is to ensure that all landscaping installation is undertaken according to specifications.
- The landscaping Plan shall be implemented prior to the occupation of the first unit.
- The **ECO** is to monitor the compliance of the Contractor and Landscaping Contractor to the specifications of the EMP.

PROCEDURES:

Landscaping and Revegetation

Landscaping and revegetation requires specialist input and should be drawn up by a Landscape Architect (LA). This specification therefore, only provides procedures, which govern the methods that the landscaping specifications are implemented.

- Only planting as specified in the approved Landscape Plan shall be implemented.
- The use of indigenous “waterwise” plants is encouraged, invasive alien species is prohibited.
- Imported topsoil and compost is to be weed free.
- The installation of landscaping should only occur once all construction activities in the specified area have ceased.
- All landscaped areas shall be considered ‘no-go’ areas.
- A maintenance contract shall be implemented according to the LA’s specification.
- Alien species must be removed.

Rehabilitation

- In the event of damage to the environment occurring as a result of negligent actions, or non-compliance with the EMP, by the Contractor during construction, the ECO may require that rehabilitation of the area be carried out.
- Should such rehabilitation be called for, the Contractor, in consultation with the ECO, shall be required to appoint a suitably qualified person to undertake the necessary rehabilitation. This appointment, and the works necessary will be at the Contractors cost, and no extension of time will be granted.

Plant & Animal Rescue

- The ECO must conduct thorough plant and animal Search and Rescue prior to commencement of any construction on any given area.
- It is recommended that construction activities commence from areas of most disturbance towards most natural areas in order to allow mobile fauna chance to escape.
- Removal of any fauna from the site must be done so with accompanying permits.
- All rescued plant material must be kept on site at a temporary nursery and reused for rehabilitation.
- Should such rehabilitation be called for, the Contractor, in consultation with the ECO, shall be

required to appoint a suitably qualified person to undertake the necessary rehabilitation. This appointment, and the works necessary will be at the Contractors cost, and no extension of time will be granted.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded. (Incidents may include the removal of incorrect species, damage to historic or other features during clearing or landscaping installation etc.).
- Copies of any permits obtained must be kept on site.

SPECIFICATION:	**EMP REF:**
SAFETY & SECURITY	**5.2 & 6.13**

OBJECTIVES:

- Employ the highest standards of safety on the site.
- Ensure that while site security is undertaken, impacts on the environment minimised.

GOALS:

- Maintain a "no-accident" record for the duration of the contract.
- Comply with all the regulations of the Occupational Health and Safety Act.

RESPONSIBILITIES:

- The **Contractor** is to ensure that all safety and security issues are dealt with, and that precautionary procedures are in place. The procedure detailed below are suggested in terms of this EMP. The contractor must however ensure that they comply with all provisions of the Occupational Health and Safety Act.

PROCEDURES:

Safety Plan

- Emergency contact numbers are to be displayed conspicuously on the outside of the Site office: These include 1) the Fire Department, 2) the Police & 3) the Ambulance service.
- Contact numbers for Contractor, Site manager, Engineer & ECO are also to be displayed.

The Contractor is to comply with the *Occupational Health & Safety Act (1993)* and the *Construction Regulations (2003)* in all respects.

Safety (Fire Safety & Hazardous Materials

- All structures that are vulnerable to high winds must be secured, including toilets.
- All manhole openings are to be covered and clearly demarcated with danger tape.
- Any open excavations deeper than 0,5m are to be clearly demarcated with danger tape.
- Road safety precautions shall be implemented when works are undertaken on or near public roads to ensure traffic safety.
- Necessary safety gear appropriate to the task being undertaken is to be provided to all site personnel (e.g. hard hats, safety boots, masks etc.).
- No unauthorized firearms are permitted on site.
- If a site is to be closed for longer than a week then the Contractor is to comply with the specifications to be followed in the Site Closure Checklist.

Security

- Night watchmen are to be provided with adequate cooking and heating facilities, a suitable method of disposing of wastewater, and access to communication equipment.
- Valuable plant and equipment is to be stored so as to prevent it from being stolen.
- Access to fuel stores is to be strictly controlled.

Training

- The Contractor is to ensure that his personnel are aware of procedures to be followed in case of emergencies such as fire, hydrocarbon spill or leaks. The correct use and need for PPE must also be covered.
- Night watchmen are to be included in environmental education training.

RECORDS AND DOCUMENT CONTROL:

- Details of any incidents are to be recorded. (Incidents may include theft, traffic accidents on or near the site, even if not related to construction activities).
- Any criminal activities must be reported to the local SAPS.

SPECIFICATION:	**EMP REF:**
SITE COMMUNICATION	**GENERAL**

OBJECTIVES:

- Institute functional communication between site personnel, Engineer, Developer & ECO.
- Avoid undue negative impacts by implementing an effective communication structure.
- Provide a mechanism for issuing site instructions, fines and penalties.

GOALS:

- Establish a record of communication on site; including site instructions & penalties.

RESPONSIBILITIES:

- The **Developer, Engineer and/or Contractor** are to ensure that the ECO is included in site meeting proceedings.
- The **Contractor** is to inform the ECO if any planned activities could potentially have a negative impact on the immediate and/or surrounding environment.
- The **ECO** is responsible for advising the Contractor of any potential environmental impacts that come to his/her attention, and workshop possible solutions.

PROCEDURES:

Site Meetings

- Regular site meetings shall be established at the commencement of site works. The frequency of meetings is to be dictated by the amount and type of work being undertaken at the time, and may alter during the contract.
- Minutes are to be taken and distributed within a reasonable time following the meeting.

Environmental Site Instruction Book (ESI Book)

- A duplicate ESI Book, as a minimum, is to be made available to the ECO at all times.
- Any instructions of an environmental nature are to be put in writing by the ECO.
- Should instructions have cost implications for the contract beyond the expected cost related to the carrying out of duties to ensure compliance with the EMP, these will be discussed with the Engineer, and the way forward recorded in the ESI Book.
- Instructions and actions are to be acknowledged in writing & dated by the Contractor.
- Outstanding items are to be discussed at Site Meetings and non-compliances recorded.
- Outstanding items can also be subject to penalties.
- The ESI Book can also be used to issue warnings for non-compliance with specifications.
- The ESI Book can also be utilised by the Contractor, to inform the ECO of activities that may have detrimental impacts on the environment. Any actions discussed by the ECO & Contractor to mitigate these impacts can then also be recorded.

Penalty Book

- A separate book is to be held on site throughout the construction contract for the issuance of penalties & fines. Again, a duplicate book is required as a minimum.
- All penalties/fines are to be issued in writing by the ECO & signed for by the Contractor.
- Copies of fines are to be forwarded to the Developer, who will be responsible for deducting the amounts from the Contractor's payment certificates.

Written Approval

- In situations where written approval from the ECO is required, this may take the form of:

- A formal letter from the ECO.
- Written acknowledgement of a request noted in the ESI book by the Contractor.

- Written permission in the ESI Book of a verbal request from the Contractor.

RECORDS AND DOCUMENT CONTROL:

- The ESI & Penalty Books are to be retained on site, & utilised by the ECO & Contractor.
- The **Engineer or Developer** will be responsible for site meetings and related minutes.
- Minutes of Site Meetings are to be filed in the Site EMP File.

SPECIFICATION:	**EMP REF:**
METHOD STATEMENTS	**6.15**

REASON FOR METHOD STATEMENTS:

- Written method statements are required for any activities that have been identified as potentially harmful to the environment, or when work is to be undertaken in environmentally sensitive areas.
- To provide construction detail for activities not outlined in this EMP, or those that deviate from the specifications contained herein.

PURPOSE AND OBJECTIVES:

- The **purpose** of the Method Statement is to assist the Contractor and ECO in determining what, if any, impacts the activity might have on the environment.
- The **objective** of the Method Statement would then be to determine what mitigation could be undertaken to minimise the potential negative impacts.

GOALS:

- Prevent damage or disturbance to the environment, particularly if in environmentally sensitive areas.
- Create awareness in how to approach and implement work procedures that are environmentally sensitive such that they have minimum impact on the surrounding environment.
- Provide a construction procedure that can be viably implemented on site.
- Provide a standard by which the construction activity can be audited against.

RESPONSIBILITIES:

- The **ECO** has the authority to call for Method Statements to be prepared for activities being undertaken in environmentally sensitive areas or that require more detail than provided in specification of this EMP.
- The **ECO** is responsible for approving submitted Method Statements, in consultation with the LOCAL AUTHORITY, where necessary.
- The **Contractor** will draw up Method Statements when required to do so by the ECO.

PROCEDURES:

- Method Statements will be drawn up by the contractor, and produced within a reasonable time as required by the ECO.
- No activity may commence, except in the case of emergencies, prior to the approval of the Method Statement. Doing so may result in the issuing of a penalty.
- The ECO is to comment on & respond with any changes and/or additions within 1 week.
- The ECO may also seek additional advice from the local authority before issuing final approval.
- Work shall be carried out in accordance with the specifications of the Method Statement, and compliance auditing will be carried out by the ECO.
- Approved Method Statements shall be added to the Site EMP.

- Method Statements are to include the following information:
  - **What** work is to be undertaken
  - **How** the work will be carried out (work process, methods & materials to be used)
  - **Where** work will be done (describe locality, provide diagram)
  - **Timeframe** of work (begin and estimated completion dates, together with time sequence of actions)

- Describe the process to follow to ensure that no damage, disturbance or pollution to the environment occurs. Describe the remedial process that will be undertaken if any damage/pollution occurs.
- Describe the emergency procedure to follow in case of fire/accident/spillage related to the work being undertaken.

- Method Statements that may be required, but not limited to, are listed below:
  - **Access routes** – location, upgrading, construction, and rehabilitation of temporary haul routes
  - **Alien plant clearing** – method of control or eradication of alien vegetation
  - **Blasting –** method and associated safety logistics for blasting
  - **Bunding –** method of bunding for static plant and bulk fuel storage
  - **Cement/concrete batching –** location, layout and preparation of cement batching works and/or mixing areas
  - **Demolition –**method, handling and disposal of demolished and hazardous materials; noise and dust mitigation; safety issues.
  - **Hazardous and poisonous substances –** handling/storage; emergency/spillage/ fire procedures; herbicide/pesticide and poisonous substance use; disposal methods for hazardous building materials if found
  - **Piling, jacking and thrust boring-** piling operation method (e.g. driven or bored), in situ casting or pre-cast pile structures
  - **Rock breaking-** details of chemical applications used for rock breaking
  - **Rehabilitation –** rehabilitation of disturbed areas, revegetation post-construction
  - **Settlement ponds and sumps –** layout and preparation for ponds and sumps
  - **Sources of materials-** when applicable, details of materials imported to the site
  - **Sensitive environments –** construction of boundary walls adjacent to wetland
  - **Traffic –** traffic safety measures for entry/exit onto and off public road
  - **Vegetation clearing-** method of clearing during site establishment
    - **Water abstraction-** methods of abstraction and utilisation of water from natural water sources

RECORDS AND DOCUMENT CONTROL:

Copies of approved Method Statements are to be inserted into the Site EMP File, and list updated.

SPECIFICATION:	**EMP REF:**
PENALTIES & INCENTIVES	**9**

OBJECTIVES:

- Enforcement of the specifications of the EMP.

GOALS:

- Provide a structure for the issuance of penalties or fines, the collection of these fines, and the destination of these monies.

RESPONSIBILITIES:

- The **ECO** is responsible, for the issuing of penalties or fines in respect of non-compliance with the specifications contained in the EMP.
- The **ECO** shall record these penalties/fines in the Penalty Book and provide a copy to the Developer.
- The **Developer** shall be responsible for the collection of these fines and ensuring that these monies are paid over to the nominated environmental organisation.
- The **Relevant AUTHORITY or ELC** shall verify that the monies are paid over to the nominated organisation prior to issuing final clearance for the development.
- The **Contractor** shall be responsible for the payment of the fines and any corrective measures stipulated.

PROCEDURES:

Spot Fines and Penalties

- Spot fines may be issued by the ECO to an individual or the Contractor for non-compliance with the EMP.
- Spot fines may be imposed immediately on the non-compliance, and the amount will be at the discretion of the ECO and will be dependant on the severity of the impact on the environment.
- Penalties may be issued by the ECO for activities, or lack of action, on the part of the Contractor to ensure that the specifications of the EMP are upheld.
- In the case of penalties, the ECO may issue a warning prior to fining which states a time period by which the non-compliance is to be corrected.
- Penalties can be issued over and above the costs of rehabilitating damage done to the environment. Such corrective measures shall be for the Contractors cost and cannot be claimed for in the Contract Bill and no extension of time shall be granted for undertaking such work.
- Repeated offences may result in the suspension of all or part of the works, or the removal from site, personnel and/or equipment committing the non-compliance.
- Where possible and applicable, sub-contractors or individual perpetrators will be identified on the record of the penalty or fine.
- The passing down of penalties by the Contractor to sub-contractors or individuals, shall be at the Contractor's own discretion.
- For each subsequent offence of the same nature the penalty or fine may be doubled in value to a maximum of R5000.
- Penalties or fines issued for non-compliance to the EMP do not prevent any prosecution under any other law.
- The ECO may suspend all, or part of the works, if it is deemed that damage to the environment will result from continuing with the activity. The suspension can be enforced until the activities,

procedure or equipment is corrected. (No extension of time will be granted for such delays and all costs for corrective and/or rehabilitation measures will be borne by the Contractor).

- Stop works orders are to be recorded in the Environmental Site Instruction Book and the Council, Developer, Engineer advised immediately thereof.
- The following list of non-compliances may result in the suspension of all or part of the works:
  - Where the ECO is of the opinion that activities may have a severely negative or irreversible impact on the environment.
  - Commencing work prior to the approval of the Method Statements
  - Repeatedly failing to adhere to corrective measures recorded in the ESI Book, or those issued subsequent to penalties.

Repeated non-compliance with the specifications of the EMP.

- Details of the non-compliance and subsequent penalty or fine are to be recorded in the Penalty Book as follows:
  - Fine No: For record keeping purposes.
  - Date of Issue: Day/Month/Year
  - Non-compliance: Details of the transgression with reference to the EMP procedure or ESI to be provided.
  - Amount: In Rands
  - Corrective measures: Details of remedial or rehabilitative actions to be carried out. Warnings can be given of further penalties to be issued, should non-compliance with the stipulated corrective measures not be undertaken within a specified time period.
- Copies of fines are to be forwarded to the Developer, who will be responsible for deducting the amounts from the Contractor's payment certificates.

***Collection of Penalties & Fines*:**

- All penalties & fines issued by the ECO are to be copied to the Developer, to be subtracted from the Contractor's monthly payment certificate.
- The Developer shall maintain a record of the amounts deducted. This record is to be verified by the ECO.
- All monies collected by the Developer as a result of penalties or fines during the contract shall be donated to an environmental organisation, nominated by the local authority.
- Proof of payment to the nominated organisation will be a requirement of Final Clearance, and is included as an item in the Final Site Clearance Checklist.

Incentives

- The ECO may consider issuing an Environmental Certificate Award to teams or individuals who carry out their work in an environmentally responsible manner, and are co-operative with regards to environmental issues.
- The Certificate is to be prepared and presented by the ECO, and a copy provided for the Site EMP File.

RECORDS AND DOCUMENT CONTROL:

- The Penalty Book is to remain on site at all times, and copies of the fines sent to the Developer, for deduction from the Payment Certificate.
- The Penalty Book or copies of the Penalties are to be added to the Site EMP File at the end of the contract.
- Copies of Environmental Certificates are to be filed in the Site EMP File.

SPECIFICATION:	**EMP REF:**
MONITORING & REPORTING	**10**

OBJECTIVES:

- Provide a detailed record of the carrying out of construction activities in respect of the environment.
- Provide a record of compliance should disputes arise, or claims against the Contractor be levied.

GOALS:

- Improved environmental management during the construction process.

RESPONSIBILITIES:

- The **Contractor** is to ensure that all construction activities are carried out in compliance with the specifications of the EMP.
- The **Contractor** is also required to keep the Site EMP File up to date by filling in the required Record Sheets and Incident Report.
- The **ECO** is required to undertake regular on-site monitoring of construction activities and carry out audits of compliance, on a monthly basis.

PROCEDURES:

- Construction activities, in respect of the environmental aspects thereof, are to be documented and recorded by the Contractor as indicated in the EMP.
- On-site monitoring is to be carried out on a regular basis by the ECO. Site records are to be kept of these visits.
- Photographic records of environmental issues and site activities as related to environmental parameters are to be maintained by the ECO for the duration of the contract.
- Monthly audit reports are to be carried out by the ECO and submitted to the Developer and local authority, and provide a copy for the Site EMP File.
- The Site EMP File must be updated by the Contractor and provided to the Developer for his records at the end of the contract.
- The ECO is to maintain a duplicate EMP File.

RECORDS AND DOCUMENT CONTROL:

- Site notes are to be held by the ECO.
- The ESI Book and Penalty Book are to remain on site at all times.
- The **Site EMP File** is to remain on site at all times, and be updated regularly.
- A duplicate EMP File is to be held by the ECO.
- **Audit Reports** are to be kept on record.

Appendix 3

Recycling of construction materials

Appendix 4

List of applicable plant species