# *Environmental Management Programme for the proposed Daggafontein Sewer Pump Station, at Daggafontein in Springs, Gauteng Province*

## *Environmental Management Programme (Empr)*

**Competent Authority Reference Number:**

**COMPETENT AUTHORITY:**
**GDARD**

**APPLICANT:**
**CoE**

**Project Number:**

**Prepared for:**
**Tangos Consultants (Pty) Ltd on Behalf of CoE**

**September 2019**

# This document has been prepared by Vulcano Engineering and Environmental Consultants

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|---|---|
| **Report Type:** | Environmental Management Programme/Olan |
| **Project Name:** | Proposed Upgrading of Daggafontein Sewer Pump Station |
| **Project Number:** | **PS-WS 36-2016** |

| Name | Responsibility | Signature | Date |
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| Mulovhedzi TL | Report Compile | | |
| Ratshitanga L | Report Check | | |
| Mudzunga F | Report Review | | |

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# INTRODUCTION

City of Ekurhuleni Intends Upgrade Daggafontein Sewer Pump Station at Daggafontein suburb in Springs Township. Sewage will flow from affected existing houses sewer system through 160mm diameter into existing interconnected 4 sumps with 200mm diameter pipe proceed to new upgraded 2 sumps through 200mm diameter sewer pipe to fill up new 2 sumps to a certain level for the pump system to operate. The sewer pump system will then pump sewer wastes from 2 sumps through valve chamber with 80mm diameter sewer pipe connected to existing rising main till to sewer gravity outfall.

The aim of the project is to see to it that the sewage waste are under control since old existing Daggafontein sewer pump station was abandoned, and sewer wastes were being polluting Daggafontein environment and putting human life at risk. This identified as urgent matter to be considered to prevent current pollution on the area.

In terms of activity alternatives, these could not be considered as the minor problem is addressing a specific need and as such cannot be replaced by a different activity. Based on the above-mentioned reasons, both the site and activity alternatives were not considered for the proposed development.co-ordinate are $26^0$ 18' 0.44"S, $28^0$ 29' 41.60" (Start point) and $26^0$ 18' 0.99"S, $28^0$ 29' 39.43"E and 28 18 2.17" S, (End point)

## Scope of the Environmental Management Plan

This Environmental Management Plan (EMP), prescribes and directs the management of all environmental aspects, physical, natural and / or social, associated with and arising from construction work to be undertaken for the proposed construction of the upgrading of Daggafontein sewer pumps station, as well as relevant aspects of the on-going operational phase.

This EMP must be read as a whole and complete document and is numbered accordingly. For convenience of implementation, the EMP has been divided into sections, dealing generally with management, structure and accountability, technical issues and environmental specifications respectively.

## Objectives of the EMP

The objectives of the Management Plan are to:

- Outline guidelines for construction and operational management for the sound management of environmental issues pertaining to the execution of all construction work associated with the project;

- Provide detailed specifications for the management and mitigation of activities that have the potential to impact negatively on the environment;
- Provide a standard for management of environmental issues pertaining to the execution of civil and other construction work with specific reference to issues raised through the environmental studies undertaken for the project; and
- Reduce the environmental impacts of civil and any other construction work through the proactive employment of sound and effective working practices.

## 1.3 Project Description

City of Ekurhuleni Intends to upgrade new existing Sewer Pump Station at Daggafontein suburb in Springs Township. The project upgrading of new Daggafontein sewer pump station entails the followings:

- The upgrading of existing 4 new sumps,
- Construction 2 new proposed sumps are approximately 195m Deep with a 2184mm diameter,
- Installation of 2 submissive sewer pumps,
- Installation 2 stainless steel chain,
- Construction of new sewer valve chamber,
- Installation of 1 Telemetric System Box,
- Installation of 1 MCC Box,
- Construction of 10m new propose connecter sewer pipe of 150mm Diameter.
- The project falls within the Jurisdiction of City of Ekurhuleni within Gauteng District Municipality of Gauteng Province. (*Please refer to Appendix A for locality map and project route sketch plan).*

Vulcano Engineering & Environmental Consulting CC has been appointed by Tangos Consultants to conduct an Environmental Impact Assessment and compilation of Environmental Management Plan respectively, as per the requirements of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and EIA Regulation 2014 -2017 as amended.

The proposed project was found not trigger any Activity in terms of the Government Notice R983,R984 and R985 as promulgated on the National Environmental Management Act,1998 (Act no.107 of 1998) and EIA Regulation 2014-2017 as amended as per confirmation from GDARD issued on  with ref. no. ***Gaut:005/19-20/0196***.

## 1.4 General Accountability and Environmental Management

### 1.4.1 Environmental Control Officer (ECO)

It is the responsibility of the project manager to appoint a qualified Environmental Control Officer (ECO) for the proposed project activities in writing. The ECO will be responsible for communicating environmental issues associated with the site to the constructor, resident engineer and the applicant. Should any non-compliance with the EMP take place, the ECO must communicate this with the party responsible for the non-compliance as well as the constructor, resident engineer and the applicant. If the non-compliance continues after written request by the ECO to rectify the situation, the ECO must inform the local municipality / provincial environmental authority in writing. The ECO is also responsible for the explanation of environmental issues contained in this EMP to anyone working on site. Should any issues arise on the site of an environmental nature or concern, the ECO will be responsible for taking the appropriate action.

The duties of the ECO shall include the following:

- Enforcement and implementation of the conditions stipulated in the Authorisation/ Comments and Record of Decision to be issued by GDARD and any other competent regulatory body having authority over the project or the activities concerned;
- Implementation and enforcement of the conditions of the local and district municipality's Environmental Policy, Procedures and relevant Standards, as applicable and revised from time to time;
- Implementation and enforcement of the conditions of this EMP and the Environmental Specifications included herein, throughout the construction phase of the project;
- Taking all actions necessary to ensure compliance with the above policies, procedures and standards, in line with the objectives set for this EMP;
- The development and presentation of formal programmes for training and education of construction staff in:

  i. Sound environmental management practices;
  ii. The management of specific issues generally applicable to the project;
  iii. Specific procedures related to aspects of construction activity with the potential for direct interaction with the environment; and
  iv. Integrated waste management principles, litter and waste control.

- Determination and enforcement of environmental "no-go" areas in consultation with site management staff and related to haul and access roads on and off-site, site storage and accommodation areas;

- Specific rehabilitation and re-vegetation management plans shall be submitted by the Contractor and approved (without prejudice or accountability being to such approval) by the ECO. Monitoring the management and progress on rehabilitation plans according to agreed rehabilitation objectives instituted on site shall rest with the ECO; and
- The ECO shall have access to the site and all activities occurring thereon, with due regard for all safety requirements. The ECO shall furthermore have unfettered authority to order restriction or control measures over any activity which is contradictory to the EMP and / or the Record of Decision, through the appropriate site management structures.

### 1.4.2 Resident Engineer (RE)

The RE will be required to:

- Be familiar with the contents of the EMP;
- Monitor the Contractor's compliance with the Environmental Specifications on a daily basis, through the Site Diary, and enforce compliance;
- Communicate to the Contractor, verbally and in writing, the advice of the ECO and the contents of the ECO reports;
- Request for, review and approve any Method Statements prepared by the Contractor in consultation with the ECO;
- Designate and manage the working areas as per the approved construction site layout, including sensitive environments and 'no-go' areas;
- Advise on materials that may be used to designate working areas and materials to be used for the works as and when necessary;
- Issue site instructions giving effect to the ECO requirements where applicable;
- Communicate to the ECO, verbally and in writing, at least 10 working days in advance regarding any proposed actions which may have negative impacts on the environment, with specific reference to blasting;
- Undertake damage assessments where incidents, accidents and serious infringements have occurred on or a relevant distance off site or neighbouring properties;
- Review and approve all areas that have been rehabilitated by the Contractor;
- Review complaints received and issue instructions as necessary;
- Accompany the ECO during site inspections and/or inform the ECO in writing, of any infringements of the EMP and to issue instructions to the Contractor on the advice of the ECO;
- Implement Temporary Work Stoppages where serious environmental infringements and non-compliances have occurred;
- Maintain a record of complaints from the public and communicate these to the Contractor and the ECO; and

- Facilitate proactive communication between all role-players in the interests of effective environmental management.

### 1.4.3 Contractor

Role

With specific reference to the EMP, the role of the Contractor will be to:

- Implement, manage and maintain the construction elements of the EMP for the duration of his/her contract;
- Designate, appoint and/or assign tasks to personnel who will be responsible for managing all or parts of the construction EMP;
- Assign appropriate authority, accountability and responsibility for these personnel to carry out their duties;
- Ensure that all sub-contractors and other workers appointed by the Contractor are aware of their environmental responsibilities while on site or during the provision of their services off site;
- Ensure that all sub-contractors and other workers appointed by the Contractor are complying with, and implementing the construction EMP during the duration of their specific contracts; and
- Provide appropriate resources – budgets, equipment, personnel and training –for the effective control and management of the environmental risks associated with the construction of the project.

Duties and responsibilities of the constructor

The Contractor shall have the following responsibilities:

- Be familiar with the contents of the EMP and the specifications contained herein;
- Comply with the Environmental Specifications contained in the EMP and subsequent revisions;
- Confirm legislative requirements for the construction works, and to ensure that appropriate permissions and permits have been obtained before commencing activities;
- Prepare Method Statements, programme of activities and drawings/plans for submission to the RE (and ECO); when requested;
- Undertake daily site inspections to monitor environmental performance and conformance with the Environmental Specifications;
- Notify the ECO and RE immediately in the event of any accident or infringements of the Environmental Specifications and ensure appropriate remedial action is taken;

- Notify the ECO and at least 10 working days in advance of any activity he has reason to believe may have significant adverse environmental impacts, with specific reference to blasting, so that mitigation measures may be implemented timeously;
- Ensure environmental awareness among his employees, sub-contractors and workforce so that they are fully aware of, and understand the Environmental Specifications and the need for them;
- Maintain a register of environmental training for site staff and sub-contractor's staff for the duration of the contract;
- Undertake rehabilitation of all areas affected by construction activities to restore them to their original states, as determined by the RE and the ECO;
- Rehabilitating services, utilities, private/public property and other areas adversely affected by construction activities outside of demarcated areas.
- Communicate and liaise with the RE / Site Manager and the ECO to ensure effective, proactive environmental management with the overall objective of preventing or reducing negative environmental impacts while enhancing positive environmental impacts.

Contractor's EMP

The Contractor will also set up his / her own management system to ensure and monitor the application of the EMP and associated Environmental Specifications. This system shall, at a minimum, provide for:

- The preparation of Method Statements as required ;
- The effective and accountable management of construction activities relative to the Environmental Specifications;
- Prominent attention to management of blasting activities;
- Reporting on a regular basis and as required on environmental issues;
- Recording, in writing, all communication / correspondence with all pertinent stakeholders and other parties on environmental issues; and
- Regular, constructive and proactive liaison with the ECO.

### 1.4.4 General Accountability

**Table 1.1: General accountability and responsible official**

| Document | Accountability | Designation/Department | Official |
|---|---|---|---|
| Authorisation / Record | Project management | Tangos Consultant & Client | Mr F Ngombe |

| Document | Accountability | Designation/Department | Official |
|---|---|---|---|
| of Decision | compliance | | |
| Authorisation / Record of Decision | Design & construction management compliance | Tangos Consultant &Client | Mr .F Ngombe |
| Authorisation / Record of Decision | Implementation, in conjunction with EMP | Environmental Control Officer | Not applicable for now until a contractor has been appointed |
| EMP | Site and EMP compliance | Contractor & Environmental Control Officer | Not applicable for now until a contractor has been appointed |
| EMP | Project management implementation | ECO, Contractor | |
| EMP | Project and site: implementation and enforcement | Environmental Control Officer, Engineer, Client | Not applicable for now until a constructor has been appointed |
| EMP | Construction Implementation | Contractor | Not applicable for now until a constructor has been appointed |

# IMPACT ASSESSMENT

## Potential issues Identified during the Impact Assessment

Potential issues identified are as per the Environmental Management Plan report compiled for this project. In order to ensure uniformity, the assessment of potential impacts will be addressed in a standard manner so that a wide range of impacts is comparable. For this reason a clearly defined rating scale is provided to assess the impacts associated with the environmental investigation.

Each impact identified will be assessed in terms of probability (likelihood of occurring), extent (spatial scale), intensity (severity) and duration (temporal scale). To enable a scientific approach to the determination of the impact significance (importance), a numerical value will be linked to each rating scale (refer to table 2.1- 2.5). The sum of the numerical values will define the significance. The following criterion was applied to the impact assessment for the construction proposed project:

**Table 2.1: Probability**

| Category | Rating | Description |
|---|---|---|

| | | |
|---|---|---|
| Definite | 3 | More than 90 percent sure of a particular fact or of the likelihood of that impact occurring |
| Probable | 2 | 70 to 90 percent sure of a particular fact or of the likelihood of that impact occurring |
| Possible | 1 | 40 to 70 percent sure of a particular fact or of the likelihood of that impact occurring |
| Improbable | 0 | Less than 40 percent sure of a particular fact or of the likelihood of that impact occurring |

**Table 2.2: Extent**

| Category | Rating | Description |
|---|---|---|
| Site | 1 | Immediate project site |
| Local | 2 | Up to 5 km from the project site |
| Regional | 3 | 20 km radius from the project site |
| Provincial | 4 | Provincial |
| National | 5 | South African |
| International | 6 | Neighbouring countries/overseas |

**Table 2.3: Duration**

| Category | Rating | Description |
|---|---|---|
| Very short-term | 1 | Less than 1 year |
| Short-term | 2 | 1 to 5 years |
| Medium-term | 3 | 5 to 10 years |
| Long-term | 4 | 10 to 15 years |
| Very long-term | 5 | Greater than 15 years |
| Permanent | 6 | Permanent |

**Table 2.4: Intensity**

| Category | Rating | Description |
|---|---|---|
| Very low | 0 | Where the impact affects the environment in such a way that natural, cultural and social functions are not affected |

| Category | Rating | Description |
|---|---|---|
| Low | 1 | Where the impact affects the environment in such a way that natural, cultural and social functions are only marginally affected |
| Medium | 2 | Where the affected environment is altered but natural, cultural and social function and processes continue albeit in a modified way |
| High | 3 | Where natural, cultural or social functions or processes are altered to the extent that they will temporarily cease |
| Very high | 4 | Where natural, cultural or social functions or processes are altered to the extent that they will permanently cease |

**Table 2.5: Significance Rating**

| Score | Significance Rating |
|---|---|
| **2 – 4** | **Low** |
| **5 – 7** | **Low to Moderate** |
| **8 – 10** | **Moderate** |
| **11 – 13** | **Moderate to High** |
| **14 – 16** | **High** |
| **17 – 19** | **Very High** |

Based on the information contained in the tables above, the potential impacts are assigned as significance rating (**S**). This rating is formulated by adding the sum of the numbers assigned to extent (**E**), duration (**D**) and Intensity/Magnitude (**I**) and multiplying this sum by the probability (**P**) of the impact.

**S= (E+D+I) *P**

## Soil

*Loss of soil resource*

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Loss of soil resource | Possible | Site | Short term | Very low | Low to moderate |
| With Mitigation | Improbable | Site | Short term | Very low | low |

During the re-construction phase, the soils underlying the road reserves in which the proposed project is to be developed will be disturbed. These top and sub soils will require stripping and stockpiling for future use and rehabilitation. Sub soils stripped during construction phase could be used as berms or other water diversion structures during construction that will be needed on the upslope side of the construction activities.

Topsoil is a resource of high conservation value to current and future generations because it is a gene bank containing seeds of indigenous species and forms the growing medium for plants, flowers and trees. It is usually nutrient rich and has a good texture for plant growth. It is therefore an important medium for the successful rehabilitation and landscaping of disturbed land and is a valuable part of the environmental system.

The impact is regarded as of low to moderate significance which could be permanent should no mitigation be implemented. With implementation of recommended mitigation the impact could reduce to low significance, which will remain, up to such time that the area is rehabilitated and landscaped after construction.

*Soil Contamination/Pollution*

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | • | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Soil contamination | Possible | Site | Short term | Very low | Low to moderate |
| With Mitigation | Improbable | Site | Short term | Very low | low |

Identified potential soil pollution could result from the release, accidental or otherwise, of chemicals, oils, fuels, sewage, wastewater containing cement and concrete waste, detergents, solid waste, litter and other such

substances. Rainwater running into exposed areas containing cement, oil, diesel and other such substances could also result in soil pollution threat to site and adjacent properties. However, this type of pollution can be avoided if mitigation strategies are put in place and implemented.

The impact is regarded as of low to moderate significance which could be permanent should no mitigation be implemented. With mitigation the impact could reduce to low significance, which will remain, up to such time that the area is rehabilitated after construction.

## Erosion

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | • | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Erosion | Probable | Site | Permanent | Medium | Moderate to high |
| With Mitigation | Improbable | Site | Short term | Very low | Low to moderate |

All land at the site will be susceptible to erosion when the vegetation cover and top soil is removed. Therefore, the erosion potential is expected to be moderate. The impact is considered to be permanent with a moderate to high significance should no remedial measures be implemented, but could reduce to low significance if mitigated.

## Natural vegetation

*Loss of vegetation due to site clearance*

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Vegetation removal | Definite | Site | Permanent | Very low | low |
| With Mitigation | Definite | Site | Permanent | Very low | Low |

The project site is characterised by overgrown grass and litter. Considering that the proposed project is located within road reserves. Vegetation such as grass will be removed. Of this grass specie identified on site, none are registered as protected species. However, those grass species that can be accommodated on the project design will not be removed; they will rather form part of the landscaping after the construction phase.

Therefore the project site cannot be rehabilitated to its original condition; the impact would persist through all phases' construction development and is considered to be of low significance.

## Alien Plant Invasion

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | • | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Spread of alien plants | Possible | Site | Short | Low | Low to moderate |
| With Mitigation | Improbable | Site | Very short | Very low | Low |

Construction activities at the proposed project area could encourage spread of alien invader plant species via imported material and construction vehicles. This is a potentially negative impact of medium significance at the site, and it could be cumulative and prevail beyond the operational phase if not managed properly.

The impact is considered to be of low significance.

## Air Quality

*Dust deposition*

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Dust Deposition | Definite | Local | Short term | Medium | Moderate |
| With Mitigation | Improbable | Site | Very short term | Low | Low |

Aspects associated with the construction phase will definitely cause dust deposition to the area. Vehicle entrainment of dust from construction sites represents a relatively large source of fugitive dust emissions.

Gaseous and particulate emissions from vehicle tailpipes are far lower and therefore of less significance in terms of their impacts. Various components of the bio-physical and socio-economic environment *may* be impacted by the atmospheric emissions associated with the construction phase. Such components include: ambient air quality, local residents, road users, employees and the aesthetic environment.

Therefore, the dust potential is expected to be moderate. The impact is considered to be permanent during the construction phase with a moderate to high significance should no remedial measures be implemented, but could reduce to low significance if mitigated.

## Noise

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Noise impact | Definite | Local | Short term | Medium | medium |
| With Mitigation | Probable | Site | Very short term | Low | Low |

The impact, in terms of the ambient noise levels resulting from the noise emissions from the construction activities, is very much limited to the area of specific activities. This holds for both the day and night because of the assumption that construction activities would be very much reduced during the night.

This is a potentially negative impact of medium significance at the site, and it could be cumulative and prevail beyond the accepted level if not managed properly.

## Sites of Archaeological and Cultural Interest

*Damage to sites of archaeological and cultural interest*

| Construction | Operational | Decommissioning | Closure |
|---|---|---|---|
| • | • | | |

*Impacts*

| Theme | Probability | Extent | Duration | Intensity | Significance |
|---|---|---|---|---|---|
| Damage to sites of archaeological and cultural interest | Probable | Local | Very short term | Low | Low to moderate |
| With Mitigation | probable | Site | Very short term | Very low | Low |

No signs of heritage resources such as archaeological sites were found that could be significantly impacted on during the construction phase.

# ENVIRONMENTAL MANAGEMENT MEASURES

## Soil

*Management Objective*

To conserve soil resources and to maintain the viability of soil disturbed by the development and associated infrastructure and to ensure that plants, flowers and trees can be sustained during landscaping.

### Loss of soil resource

*Management criteria*

- Topsoil up to a maximum of 30 cm should be removed before construction from all areas where physical disturbance of the surface will occur;
- Topsoil (up to a maximum of 30 cm) that is removed must be stockpiled for re-use in subsequent landscaping activities;
- The topsoil should be stockpiled separately from the subsoil and any other materials; and shall not be used for building or any maintenance activities;
- Soil heaps should not be higher than 1,5 metres;
- Soil heaps must be covered to prevent wind and water erosion;
- No remnants of stockpiles should be left in positions or states that may be eroded during and after construction;
- Stockpiled soil used during landscaping shall be enriched with dilute concentrations of fertiliser to reinstate nutrients and encourage biological activity within the soil;
- Ensure that equipment movement over the stockpiles is limited to avoid soil compaction and subsequent damage to soil structure; and
- Stockpiles must be monitored regularly to avoid soil erosion and soil structure damage.

## Soil contamination/ Pollution

*Management Objective*

To conserve soil resources and to control potential contamination maintain from the development and its associated infrastructure.

*Management criteria*

- The constructor should ensure that there is an incident management system, including procedures and training, for dealing with incidents as prescribed by the Environmental Awareness guideline. Major spillage incidents (i.e. chemicals, oils, diesel, etc.) should be reported to the Local and District Municipality, Department of Mineral Resources, Department of Water Affairs, and Department of Environmental Affairs and Tourism. Appropriate remedial measures must be implemented in consultation with these regulatory authorities;
- If spills do occur and soils become contaminated, the appropriate remedial measures must be identified in consultation with an appropriately qualified specialist. If necessary, the polluted soils should be classified as waste and be discarded at an appropriate permitted waste site;
- After removal of the contaminated soils, the affected areas will be landscaped and rehabilitated;
- The contractor shall also ensure that rainwater does not run into areas containing cement, oil, diesel and other such substances as this could result in a pollution threat to sensitive environmental areas;
- Storage areas for these substances (if applicable) must be placed on high lying ground and contain a bounded area in case of a spill;
- Berms must be constructed to direct all runoff into existing storm water systems;
- The engineers must prepare temporal storm water channel for unexpected rains during construction. These measures may include, but not be limited to:
  - silt fences;
  - brushwood; and
  - Rows of sawdust-filled onion bags.

- The constructor must also ensure that no wastewater may run freely into any of the surrounding roads, streets and streams;
- Runoff containing high sediment loads should not to be released directly into natural or municipal drainage systems or nearby hydrological features;
- Should sediment occur in runoff, it is recommended that an attenuation pond be constructed to allow solids to settle out prior to leaving the site;
- Runoff from the site itself must be free from oil, waste and litter before joining the storm water system. This must be ensured by securing any containers containing hazardous substances, so that it cannot enter runoff, and by cleaning up any refuse and construction material from the site on a regular basis;
- Litter management in the storm water system must be implemented. It is outside the scope of this document to prescribe litter trap designs, but the important aspect is that it should be incorporated into the design of the development. Litter traps will prevent solid waste from entering the storm water system;
- All designs should be in accordance with the Guidelines for Human Settlement, Planning and Design (CSIR & Construction Technology, 2000);
- In the event of any pollution entering an environmentally sensitive area and/or buffer zone as a result of the contractor's actions, the contractor shall be responsible for all costs incurred to assist in pollution control and/or to clean up the polluted area. The responsibility of the remediation of the pollution/erosion event will ultimately lie with the applicant;
- Builders' rubble and other debris must be confined to the building site and may not be stored/discarded on any open space outside the development area; and
- In the event of pollution caused as a result of construction activities, the contractor, according to section 20 of the National Water Act (Act No. 36 of 1998), shall be responsible for all costs incurred by organisations called to assist in pollution control and/or to clean up polluted areas. The public shall not call upon any organisation to assist with clean-up activities before the matter has been discussed with the contractor. The ECO must be notified immediately following any pollution event.

## Erosion

*Management Objective*

To ensure the prevention of erosion.

*Management criteria*

- The contractor and client must take reasonable measures (to the satisfaction of the ECO) to prevent erosion caused by work, operations and activities undertaken during excavation and construction activities;
- The contractor is responsible for rehabilitating all disturbed areas in such a way that no future erosion will occur; and
- In the event of rain during the excavation and construction period, erosion may occur. Any erosion that occurs during a heavy rainfall event must be remediated at the expense of the contractor. This will include clean-up of the silt deposited and filling up of erosion channels that may form.

## Natural Vegetation

*Management objective*

To minimise vegetation destruction, land degradation, erosion and vegetation loss.

*Management criteria*

- Once re-construction is complete, rehabilitation of all un-built areas must be undertaken in order to restore the aesthetic and ecological value of the area;
- Only indigenous vegetation should be utilised for the rehabilitation of disturbed areas. Rehabilitation should be undertaken according to the following schedule:

- Infilling of all excavation work, ensuring that subsoil is filled in first, to ensure that topsoil is present on the surface in order to ensure a suitable plant growth medium. Substrate that is not suitable for plant growth should not be used for infilling of excavations unless used at a suitable depth e.g. deeper than 2 m;
- Removal of all construction rubble from the site, including substances that cannot be used for infilling of excavations must be undertaken; and
- Soil erosion prevention measures should include the placement of silt fences, staked grass sods and rows of sawdust filled onion bags.

## Alien plant Invasion

*Management objective*

To ensure control and management of the potential alien-plant invasions.

*Management criteria*

Prior to construction the contractor shall ensure that existing invasive alien vegetation is cleared from the entire site. Species that are declared invasive species (according to the Conservation of Agricultural Resources Act (Act 43 of 1983) must be removed from the site. Follow up clearing may be necessary if the species re-establish following the initial clearing. Other alien species (non-listed) occurring on site may not be used in the landscaping and should be removed from site where possible.

## Storm Water Management

*Management objective*

To reduce the impact of the construction activities on storm water management facilities.

*Management Criteria*

- Natural (storm water) runoff must be diverted away from the construction area towards the storm water drains or channels. In addition, it must be ensured that storm water is not allowed to collect to form ponds or excessively muddy conditions;

- Special care must be taken in areas susceptible to erosion, e.g. steep slopes. The contractor must ensure that excessive quantities of sand, silt and silt-laden water do not enter the storm water system;
- Appropriate measures, e.g. erection of silt traps, or drainage retention areas, to prevent silt and sand entering drainage lines or watercourses must be taken;
- The contractor must clear any partial or complete blockage of the storm water drainage system as a result of construction activities at his/her own expense;
- Litter traps must be cleaned regularly (after any rain); and
- Erosion protection must be provided at storm water discharge points.

## Air Quality

*Management objective*

To reduce the potential of PM 10 deposition in and around the proposed project site.

*Management Criteria*

Dust control measures, which will be implemented during the construction phase, are outlined in Table 6.1. Control techniques for fugitive dust sources generally involve watering, chemical stabilization, and the reduction of surface wind speed through the use of windbreaks and source enclosures.

**Table 6.1: Dust Control Measures to be implemented during Construction Activities**

| Construction Activity | Control Measures |
|---|---|
| Debris handling | Wind speed reduction through sheltering and wet suppression |
| Truck transport | Wet suppression |
| Dust entrainment | ➢ Reduction of unnecessary traffic and strict speed control<br>➢ Require haul trucks to be covered; and<br>➢ Wet material being hauled |

| Construction Activity | Control Measures |
|---|---|
| Materials storage, handling and transfer operations | Wet suppression |
| Earthmoving and dozing operations | Wet suppression |
| General construction | Wind speed reduction, wet suppression & early paving of permanent parking |
| Open areas (wind-blown emissions) | Early re-vegetation, compaction and stabilization of disturbed soil; Reduction of frequency of disturbance |

## Noise

*Management objective*

To minimise the noise impact on the surrounding environment and construction personnel.

*Management Criteria*

The following remedial measures should be adhered to:

- All workers will have access to and wear noise reduction personal protection equipment (PPE) appropriate to their working conditions;
- Construction activities will be reduced during the night time;
- All the equipment, especially the diesel powered construction and earth moving equipment, will be well maintained;
- Ensure all vehicle noise emissions are within industry norms;
- The maintenance schedule will include the checking of exhaust and intake silencers. Any change in the noise emissions characteristics of equipment must serve as an indicator for its immediate withdrawal from service and placement on the maintenance schedule;

- All blasting procedures (if any) will be limited to the day time; and
- Noise monitoring will be undertaken by the constructor throughout the construction phase to ensure that noise levels comply with Safety and Health Standards.

## Sites of Archaeological and Cultural Interest

*Management Objective*

To ensure that the construction activities does not impact negatively on sites of Archaeological and cultural interest that occurs on and close to the project site.

*Management Criteria*

If archaeological or heritage sites are exposed during construction work, work must be halted and it should immediately be reported to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the findings can be made. Old burial grounds (if found) will be reported to the ECO who will advise the contractor as to the mode of action, which will include informing the South African Heritage Resources Agency (SAHRA).

## Impact of Blasting (if any) on Adjacent Properties

*Management objective*

To reduce the impact of blasting activities on the surrounding properties and have a record of the current status of all infrastructure to protect the interest of the community.

*Management Measure*

The following recommendations are made for the proposed project:

- All blasting should be undertaken during the day (12h00 and 16h00) in order to eliminate the disturbance level associated with blasting activities;
- The constructor must establish an open channel of communication, in order to ensure that all issues and concerns are known and are addressed;
- Scheduled blasting times should be planned in advance and be clearly indicated in the construction site as well as at all access areas, be updated at least 24 hours prior to the blast, displaying the time and date of the blast;

- Surrounding property owners should be informed of the blasting procedures and schedules;
- Employees and outside contractors etc. should be informed of the blasting procedures and the associated safety measures during induction;
- Prior to blasting, all vehicles and machinery will be removed from the blast area and parked at a designated site, as determined by the site manager;
- Measures will be in place to reduce the possibility of air blasts and ground vibrations;
- Where access roads cannot be barricaded by means of booms or gates, a vehicle equipped with a red flag must barricade the road; and
- Warnings will be given prior to blasting.

## Impact on Road

*Management Objective*

To ensure that the entrances to the proposed project site from the existing roads in the area are safe.

*Management Criteria*

- The constructor will be in continuous consultation with the relevant parties during the construction phase;
- The constructor should arrange with the relevant parties to remove commercial/advertising signage, where necessary, in order to improve sight distances at the entrances of the project site from the existing roads where necessary;
- Signage to reduce speeds and warning of large trucks crossing roads, including flasher lights should be implemented ;
- Illumination or the use of reflectors on both the horse and trailer of all the construction haulage trucks should be implemented on and off site;
- Vehicles will keep to a 40 km speed limit to minimize wear and ensure safety within and around the construction site; and
- The constructor should comply with all technical standards according to the Provincial Roads Authority.

# MANAGEMENT OF CONSTRUCTION SITE

## Accommodation and Site Camps

- No accommodation, temporary or otherwise, is allowed at facilities other than those approved in accordance with the relevant specifications. Staff shall be accommodated off-site, wherever this is possible;
- No site camp may be situated on any area demarcated as sensitive or restricted;
- Site camps shall be properly fenced and adequately demarcated;
- No domestic animals are allowed on the site;
- No uncontrolled cooking facilities are permitted, in the field or working area;
- No open fires are permitted in the field, except under strictly controlled conditions and subject to the statutory requirements of local ordinances and the National Veld and Forest Fire Act, 1998, (No. 101 of 1998);
- No littering or dumping of solid waste of any description is permitted on the site. All litter, especially plastics, as well as other material capable of being dispersed through the surrounding properties and constituting a hazard to adjacent business and residential activities shall be regularly collected, at least on a daily basis, and properly stored prior to disposal to an approved site;
- Construction waste shall be recycled wherever possible, in accordance with the principles to be included in the waste management plan;
- Site management procedures shall include a written waste management plan prescribing the safe and hygienic collection, temporary storage and off-site disposal of all domestic waste;
- Site and contract management procedures included in the waste management plan shall also investigate and address waste avoidance and waste minimisation during construction;
- Provision must be made for adequate chemical sanitation facilities and no French drains will be permitted on site; and
- All facilities shall be regularly inspected by designated site management staff for compliance with the provisions of this EMP.

## Restriction to Working Area and Hours

All construction activities should be restricted to the designated areas in order to be able to control and minimise the impact on the existing neighbouring properties. Working areas are defined as those areas required by the contractor to undertake the works as agreed with the ECO.

Working hours for all operations shall be limited to between 07h00 and 17h00 during weekdays (Monday to Friday) and between 07h00 and 13h00 on Saturdays. No work may take place on a Sunday or Public Holidays. Any deviations to these work hours must be cleared with the Labour official prior to implementation.

## Ablution Facilities

The contractor will be responsible for the provision of:

- A minimum of two chemical toilets shall be provided per 15 persons;
- Toilets provided by the contractor must be easily accessible;
- All toilets will be located at a designated area within the construction site area. However, this must be authorised by the ECO before erection;
- The toilets shall be of a neat construction and shall be provided with doors and locks and shall be secured to prevent them from falling over;
- Toilets shall be placed outside areas susceptible to potential erosion;
- The contractor shall supply toilet paper at all toilets at all times. Toilet paper dispensers shall be provided in all toilets. S.H.E bins must also be made available and serviced in female toilets at all times;
- It is the responsibility of the contractor to make sure that staff make use of the provided toilets;
- The contractor (or reputable toilet-servicing company) shall be responsible for the cleaning, maintenance and servicing of the toilets;

- The contractor shall ensure that the toilets are emptied on a weekly basis or as required and before any builders' or other public holidays;
- The contractor shall ensure that the waste is stored and disposed of off-site to the satisfaction of the ECO and the local authority;
- The contractor shall ensure that no spillage occurs when chemical toilets are cleaned and emptied. Any accidental spillage must be reported to the ECO and the client, and cleaned up immediately;
- The contractor shall ensure that the toilets are protected from vandals;
- If the contractor (or reputable toilet-servicing company) fails to provide and/or maintain all site sanitation facilities in a clean and hygienic condition, the ECO (or public) may request the contractor to suspend all construction work until the requirements have been met; and
- Biodegradable soaps are recommended for all washing areas on site.

## Refuse

Refuse refers to all solid waste, including construction debris (cement bags, wrapping material, timber, cans, wire, nails, etc), waste and surplus food, food packaging, organic waste etc. The contractor shall be responsible for the establishment of a refuse control and removal system that prevents the spread of refuse within and beyond the construction site.

- The contractor shall ensure that all refuse is disposed of by him/her and the sub-contractors' employees into the refuse bins supplied and arrange to be emptied on a daily basis. These bins must be adequate in number and accessibility;
- Waste shall be separated into recyclable and non-recyclable waste, and shall be further separated as follows:
    - Hazardous waste, consisting of substances that may be harmful to the receiving environment, and therefore require precautionary measures when handled. Examples include (but not limited to) oil, paint, diesel etc.;
    - General waste, consisting of non-hazardous substances and substances that cannot be recycled. Examples include (but not limited to) construction rubble, excess construction materials that cannot be reused, and food waste;
    - Reusable construction material, which can be used at other construction sites; and

- Recyclable waste shall preferably be deposited in separate bins painted in different colours. Recyclable material includes paper, tins and glass. The contractor is advised that "Collect-a-Can" collect tins, including paint tins, chemical tins, etc. for recycling.

- Refuse bins shall be watertight, wind-proof and scavenger proof and shall be appropriately placed throughout the site and shall also be conspicuous (e.g. painted bright yellow). Refuse must also be protected from rain, which may cause pollutants to leach out;
- Particular caution is to be exercised with regards to handling of hazardous waste, to ensure that it does not spill or leak from the waste collection containers;
- The contractor or the appointed Waste Removal Company shall collected refuse out of the construction site. Refuse must be disposed of at a registered site, which is also approved of by the contractor and the local authority;
- Refuse may not be burned or buried on or near the site;
- The contractor shall provide cleaning services to clean up the contractors camp and construction site on a daily basis. These areas shall then be inspected by the contractor to ensure compliance with this requirement;
- A litter patrol around the construction area is to take place twice weekly to ensure that all litter is cleared up;
- The contractor shall be warned, in writing, by the ECO of any infringement and will be expected to clear the litter within 24 hours of the notification; and
- The contractor shall be responsible for cleaning the contractor's camp and construction site of all structures, equipment, residual litter and building materials at the end of the contract.

## Eating Areas

The contractor shall, in conjunction with the ECO, designate restricted areas for eating. The contractor shall provide adequate refuse bins that must be cleaned on a daily basis. If fires are required for cooking purposes, they must be restricted to the construction camp and the location agreed upon by the ECO. The feeding, or leaving of food, for stray or other animals in the area is strictly prohibited.

## Fuel and Chemical Management

The constructor shall only store fuel and chemicals on site after obtaining authorisation from the ECO who will have conducted proper investigation and regulation requirement and obtain necessary authorisation. The contractor shall ensure that:

- All fuels and chemicals that will be used during construction (e.g. Petrol, diesel, grease, oil, brake fluid,) are stored and handled carefully so as to prevent spillage;
- In the event of a spill, appropriate steps must be undertaken to prevent widespread pollution. These liquids shall be confined to specific and secured areas within the contractor's camp and shall be clearly marked;
- The liquids will be stored in a bounded area with adequate containment (at least 1.5 times the volume of the fuel) with an impermeable floor beneath them for potential spills or leaks, in such a way that does not pose any danger of pollution even during times of high rainfall;
- In addition, the contractor must ensure that workers do not smoke or take part in any activity that may result in sparks in the vicinity of fuels and other flammable substances to prevent ignition;
- Refuelling of vehicles shall only take place at a predetermined area, where adequate measures are in place to prevent spillage or pollution. A specialist waste contractor shall dispose of any hazardous waste off-site at a licensed hazardous waste disposal site; and
- The contractor will be responsible for ensuring that any party delivering potentially dangerous chemicals and oil to site is aware of the appropriate storage and drop-off locations and procedures. Transfer of hazardous chemicals and other potentially hazardous substances must be carried out so as to minimise the potential leakage and prevent spillage onto the soil.

## Spillage Control

The constructor should ensure:

- Drip trays must be put in relevant locations (inlets, outlets, points of leakage, etc) so as to prevent such spillage or leakage during transfer;

- The contractor shall stand any equipment that may leak, and does not have to be transported regularly, on watertight drip trays to catch any pollutants;
- The drip trays shall be of a size that the equipment can be placed inside it. Drip trays shall be cleaned regularly and shall not be allowed to overflow;
- Substances, which cannot be reused, must be disposed of according to the relevant waste disposal procedure. The ECO shall inform and advise the contractor as to the best waste disposal procedure;
- The contractor shall also keep the necessary materials and equipment on site to deal with spillage of the relevant hazardous substances present on site;
- The contractor shall set up a procedure for dealing with spills, which will include notifying the ECO and the relevant authorities immediately following the spillage event. These procedures must be developed with consultation and approval by the appointed ECO; and
- The clean-up of spills caused as a result of the construction activities, and any damage to the environment, shall be for the contractor's own account. A record must be kept of all spills and the corrective action taken.

## Handling of Hazardous Material

All relevant national, regional and local legislation with regard to the transport, use and disposal of hazardous materials must be strictly complied with. In addition the constructor should:

- Obtain the advice of the manufacturer with regard to the safe handling of hazardous materials supplied;
- Ensure that there is an emergency procedure in place to deal with accidents and incidents (e.g. spills) arising from hazardous substances;
- Ensure that all personnel on site are properly trained concerning the proper use, handling and disposal of hazardous substances;
- Report major incidents (i.e. spills in excess of 50 litres) to the ECO immediately. Any spill incidents must be cleaned up immediately and in according with the emergency procedure; and

- Supply the ECO with a list of all hazardous materials that would be present on site during the construction period. The same applies to any sub-contractor that must provide the contractor with this information.

## Vehicles

- Site vehicles are only permitted within the demarcated construction camp, as required, to complete their specific task;
- All construction vehicles should be in a good working order to reduce possible noise pollution. Compliance with the as outlined in the national noise-control regulations (GN R154 in *Government Gazette* No. 13717 dated 10 January 1992) No. 5479 of 1999 must be conformed with at all times;
- On-site vehicles must be limited to approved access routes and areas (including turning circles and parking);
- Servicing and maintenance of vehicles on-site shall be avoided as far as possible;
- Driver awareness and safety management programmes must be devised, implemented and recorded, for audit and monitoring purposes;
- The Contractor must place appropriate warning signs at the entrances / exits to the site, as well as at all level street crossings. The last mentioned signs shall be in addition to the normal signage present at “private” level crossings and shall indicate to road users the nature of the activity occurring in the immediate site; and
- Construction will be limited to normal working hours, in order to limit disturbance from vehicles and construction activity to the neighbouring properties.

## Control of the use of Cement and Concrete

Cement and concrete are hazardous to the natural environment on account of the very high pH of the material, and the chemicals contained therein. As a result the contractor must ensure that:

- Concrete may only be mixed on mortar boards, and not directly on the ground;

- The visible remains of concrete, either solid, or from washings, must be physically removed immediately and disposed of as waste (washing of visible signs onto the soil surface is not acceptable); and
- All aggregate must also be removed from site and appropriately disposed of.

## Temporary Fencing

- The contractor must ensure that the construction camp and site is enclosed with a fence for the duration of the construction period;
- The mesh size should be small enough for the fence to act as a catch net for wind-blown debris and as a demarcation of the site;
- The fence will serve to prevent public access to the camp/site, for public safety and security reasons; and
- The contractor must maintain the fence for the duration of the construction period. All temporary fences must be removed and the site restored on completion of the project.

# SITE REHABILITATION

After construction, any area cleared or disturbed (as a result of the activity) within and outside the boundaries of the construction site shall be rehabilitated to a state as agreed by the GDARD, Local Authority, Community and Project compliance according to the specifications of a landscape architect and the ECO.

All construction equipment and excess aggregate, gravel, stone, concrete, bricks, temporary fencing and the like shall be removed from the site upon completion of the work. No discard materials of whatsoever nature shall be buried on the site, or on any vacant or open land in the area, only be disposed of at the appropriate registered waste disposal site.

Topsoil that is disturbed or removed during construction and excavation must be replaced, preferably using topsoil stockpiled prior to excavation activities, or with topsoil sourced from elsewhere. However, where possible, soils from different areas should not be mixed. Care must be taken not to mix the topsoil with the subsoil during shaping operations

# EMERGENCY PROCEDURES

The contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include, but are not limited to, fire, spills, contamination of the ground, accidents to employees, use of hazardous substances and materials, etc.

The contractor must ensure that lists of all emergency telephone numbers/contact persons (including fire control) are kept up to date and that all numbers and names are posted at relevant locations throughout the duration of the construction period.

## Fire

- The contractor must take all reasonable measures to ensure that fires are not started as a result of construction activities on site, and shall also ensure that their operations comply with the Occupational Health and Safety Act (Act No. 85 of 1993);

- No large open fires are permitted on site;
- Sparks generated during welding, cutting of metal or gas cutting can result in fires. Every possible precaution shall therefore be taken when working with this equipment near potential sources of combustion;
- Such precautions include having an approved fire extinguishers immediately available at the site;
- The contractor shall ensure that there is basic firefighting equipment available on site at all times. The contractor shall appoint a member of his staff to be responsible for the installation and inspection of this equipment; and
- The contractor is to ensure that he/she has the contact details of the nearest fire station in case of an emergency.

## Safety

The contractor must ensure:

- Compliance with the Occupational Health and Safety Act (Act No. 85 of 1993) and Construction Regulation 2014;
- That reasonable measures are taken to ensure the safety of all site staff;
- That all construction vehicles using public roads are in a roadworthy condition, that drivers adhere to the speed limits and that their loads are secured and that all local, provincial and national regulations are adhered to;
- That all accidents and incidents are recorded and reported to the ECO; and
- The contractor is to ensure that he/she has the contact details of the nearest emergency rooms (hospitals) to the site, of both private and public hospitals.

# MANAGEMENT AND MONITORING

This section focuses on the systems and procedures required to ensure that the environmental specifications contained in the EMP are effectively implemented, monitored, enforced and recorded.

# Location of the Environmental Management Plan

All contractors on site shall at all times have a copy of the EMP in their respective site office (located in the construction camp).

## Training and Awareness

- All site staff shall be made formally aware of the contents of this EMP and its conditions;
- Project management shall ensure that all contractors, sub – contractors or service providers of any nature are certified as being aware of, conversant with and sufficiently trained in the performance of their duties so as to be able to apply this EMP to all applicable aspects of their work and behaviour on site;
- Training records must be regularly monitored and measures to ensure that new contractors or staff are trained or re-trained as necessary;
- The ECO shall devise and conduct specific environmental training interventions of a general environmental or task / discipline - specific nature, in conjunction with the construction functions concerned. Such courses shall include:
    - General environmental awareness, as part of normal induction training or stand – alone module for all levels of project staff;
    - Specific programme for machine and vehicle operators;
    - Specific programme for delegated Environmental Officers operating on an Site staff must be made available for attendance and certification of competence in terms of such training material; and
    - The currency and application of environmental training of site staff will be measured and reported per site audits conducted.

## Communication with Property owners

- Contractors and all project staff shall treat the property and privacy of adjoining landowners and / or communities with the utmost respect;
- Any action that may be construed as causing nuisance or harm to the person or property of others shall be avoided. Non – compliance must be followed up and dealt with accordingly;

- The Project and Construction Manager must establish formal contact with the landowners where properties occur within a 100 m – 1 km radius. Such landowners must be provided with the contact numbers of relevant project and site management staff, with whom any complaint, concern or issue can be lodged for immediate attention;
- Communications structures should include a central "hot line" where complaints can be logged and followed up, independently by immediate site management;
- Special arrangements must be made regarding communication with landowners or parties affected by blasting on site; and or proposed activity.
- A complaint register recording the names and nature of complaints /communications must be maintained, for follow – up and audit purpose.

## General Monitoring and Reporting

- The appointed ECO as well as the contractors on site are responsible for ensuring compliance with the EMP;
- It is suggested that periodic EMP compliance reports (audits) are compiled by the ECO and submitted to the contractor for his/her review and correction of non-compliance issues. It is the responsibility of the ECO to report any non-compliance, which is not correctly rectified to GDARD, Local Municipality, and any affected department;
- Interested and Affected Parties must be allowed access to the EMP document. They have the right to monitor specific aspects of the EMP (e.g. noise regulations, working hours stipulated) in conjunction with the contractor in a reasonable and informal manner, without unreasonably disrupting construction activities. No member of the public may, however, enter construction site without prior approval from the contractor;
- The contractor shall keep a record of all complaints received from the community and communicate them to the ECO. These complaints must be addressed and mitigated within reason;
- Records relating to the compliance/non-compliance with the conditions of the EMP as well as audit reports shall be kept in good order and shall be made available to CoE, GDARD, DWS, and any affected department within seven days after a written request has been received; and
- It is suggested that all records be kept for at least two years following construction activities for reference purposes.

# GENERAL CONDITIONS

- This EMP shall be binding on all the parties involved in the construction phases and shall be enforceable at all levels of contract and operational management within the project;
- The EMP shall be deemed a binding commitment by the parties to act within the intent and spirit of sound environmental management and to cooperate and enforce the specifications contained therein, as and where necessary;
- The EMP recognises and enables the force of law attached to environmental aspects of the project;
- Work shall at all times be approached with due concern for the natural and social environment. Management and site procedures shall be directed towards minimising environmental impact and / or damage in all aspects of the work;
- Archaeological remains, artificial features and structures older than 60 years are protected by the Natural Heritage Resources Act, Act 25 of 1999. Should any archaeological artefact (e.g. ostrich eggs, shell flasks), unmarked human burials or heritage resources be exposed during excavation for the purpose of laying foundations or site clearing and levelling, construction in the vicinity of the finding must be stopped. An archaeologist must be called to the site for inspection and the South African Heritage Agency advised accordingly. Under no circumstance may any artefacts be destroyed or removed from the site;
- The gaining of water for construction purposes must at all times comply with the permitting and licence requirements of the Department of Water Affairs and the local municipality;
- Blasting work that may be required on site shall be carried out entirely within the provisions of the Explosives Act, Act 26 of 1956 and all other relevant engineering and safety standards;
- Execution of work falling within the ambit of this EMP and Environmental Specifications shall be carried out in accordance with Method Statements, where required by the Resident Engineer (RE) and / or Environmental Control Officer (ECO). A method statement is a written submission by the Contractor to the RE setting out the plant, materials, labour, timing and method the Contractor proposes using to carry out an activity, in such detail that the Resident Engineer and ECO are able to assess whether the Contractor's proposal is in accordance with the EMP and its specification and will produce results in accordance with the intent of the specifications;
- The RE or a designated Engineer / Manager may, at his / her sole discretion, stop any work, activity or process not in accordance with this directive;

- This EMP and Environmental Specifications are applicable to the Works in its entirety. The EMP shall be expanded, customised and added to as may be necessary to meet any specific condition that may be encountered on the site as a whole;
- Once having been accepted by CoE, this EMP shall be seen as a dynamic document. However, any substantial changes shall be submitted to department for acceptance before any such changes may be effected; and
- Project and Site Management personnel shall furthermore establish appropriate management structures, liaison and communication forums to integrate all construction activities into existing safety programmes. Accountability, joint functions and specific responsibilities must be clearly defined in formal documentation.

# APPENDIX A: THE LOCALITY MAP FOR THE PROPOSED PROJECT

# APPENDIX B: PROPOSED PROJECT ILLUSTRATION

# APPENDIX C: WEEKLY ENVIRONMENTAL AND SAFETY CHECKLIST

# APPENDIX D: MONTHLY ENVIRONMENTAL AUDIT CHECKLIST

# APPENDIX E: ENVIRONMENTAL INCIDENT REPORT