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Draft Construction Environmental Management Plan for Proposed Construction of Stormwater Ponds and the Introduction of Wetland Habitats on Portions 74 and 86 of Farm 609, Philippi

DEA&DP Ref: 16/3/1/1/A2/30/3070/13

Prepared By

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CONTENTS

KEY TERMS AND ABBREVIATIONS

The definitions given below are for explanatory purposes only and are applicable to this Environmental Management Programme. In the event that any conflict arises between the definitions contained herein and those contained within the contract documentation, those within the contract documentation shall prevail.

Affected environment: Those parts of the socio-economic and biophysical environment impacted on by the development.

Alien species: An alien species is (a) a species that is not an indigenous species; or (b) an indigenous species translocated or intended to be translocated to a place outside its natural distribution range in nature, but not an indigenous species that has extended its natural distribution range by natural means of migration or dispersal without human intervention, as defined in the National Environmental Management: Biodiversity Act, 2004 (NEMBA; Act No. 10 of 2004)

Audit/Monitoring: Regular inspection and verification of construction activities for degree of compliance to the Environmental Management Program.

Batch plant: A concrete or plaster mixing facility and associated equipment and materials.

Bund: Enclosure under / around a storage facility to contain any spillage.

Contractor: The principal persons / company and all other sub-contractors involved in the construction of the project.

Construction camp: Construction camp refers to all site offices, staff accommodation, container sites, workshops and testing facilities.

Construction phase: The construction phase period of a Construction Site.

EMP: Environmental Management Plan: a plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide all phases of the implementation of the development and include all site works.

ECO: Environmental Control Officer - a qualified, independent environmental Consultant. The person responsible for ensuring that the requirements of the EMP are implemented.

Emergency: A situation requiring immediate action and where failure to implement appropriate actions timeously may result in environmental damage.

Engineer: A person who represents the client and is responsible for the technical and contractual development.

Environment: The surroundings within which humans exist and that are made up of – (i) the land, water and atmosphere of the earth; (ii) micro-organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing, as defined in the National Environmental Management Act, 1998 (NEMA; Act No. 107 of 1998).

Environmental Awareness Course: An environmental education course for the Contractor's management staff and labour force, which informs them of the requirements of the EMP. The ECO must present and co-ordinate courses.

Environmental Management: That part of the overall management process which seeks to ensure, as far as possible, that no avoidable impact is caused to the environment and that when this is unavoidable that the consequences are understood prior to the impact being caused and that the impact is then mitigated as far as possible.

Environmental Management Programme: That part of the overall management process which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

Environmental Officer: A person with adequate environmental knowledge to understand and implement the EMP by conducting on site inspections determined by the ECO and the client.

Eradication Programme: The organised clearing and rehabilitation of land infested by invasive alien species of plant.

Groundwater: The water that fills the natural openings present in the rock or unconsolidated sands.

Hazardous: Contains an element of risk. Dangerous or toxic to life.

Hazardous Substances: This means any substance or mixture of substances, product or material declared to be a hazardous substance under section 2(1) of the Hazardous Substance Act (1973).

HWC: Heritage Western Cape.

Maintenance: The complete upkeep, support and protection of areas/regions/sites.

Method Statement: Document that describes the scope of the intended work in a step-by-step in order for the PM and ECO to understand the contractors intentions.

Mitigation: The implementation of practical measures to reduce adverse impacts or enhance beneficial impacts of an action.

No Go Areas: Areas identified as being environmentally sensitive in some manner and delineated on plan and on the site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained from the Engineer/Project Leader prior to entry.

Penalties: Penalties, which can be imposed on the contractor and/or his subcontractors in the event of a contravention of this EMP.

Pesticide: Pesticides are chemicals used by humans to kill organisms that threaten their health and well-being, pets and livestock or cause damage to crops. This includes insecticides, herbicides, fungicides, acaricides, nematicides and rodencides (after Fuggle et al, 1992).

Pollution: Any change in the environment caused by substances, radioactive or other waves; or noise, odours, dust or heat, emitted from any activity, including the storage or treatment of waste or substances, construction and the provision of services, whether engaged in by any person or an organ of state, where that change has an adverse

effect on human health or well-being or on the composition, resilience and productivity of natural or managed ecosystems, or on materials useful to people, or will have such an effect in the future.

Potentially hazardous substance: A substance, which, in the reasonable opinion of the Engineer, can have a deleterious effect on the environment.

Project Manager: The person responsible for ensuring that on-site activities are undertaken in accordance with the requirements of the EMP.

Reasonable: Means, unless the context indicates otherwise, reasonable in the opinion of the Engineer/Project Leader after he has consulted with a person, not an employee of the client, suitably experienced in "environmental implementation plans" and "environmental management plans", both as defined in the National Environmental Management Act (Act No 107, 1998).

Rehabilitation: To re-establish or restore to a healthy, sustainable capacity or state.

SAHRA: The South African Heritage Resources Agency.

Site: The 'site' refers to the cadastral entity (-ies) awarded to the Contractor and any other area reasonably required by the Contractor to undertake the construction activities in order to fulfill the contract.

Solid waste: Means all solid waste, including construction debris, chemical waste, excess cement/concrete, wrapping materials, timber, tins and cans, drums, wire, nails, food and domestic waste.

Specification: A technical description of the standards of materials and workmanship that the Contractor is to use in the Works to be executed, the performance of the Works when completed and may include the manner in which payment is to be made. It is essential for the specifications to be clear, concise and to the point, and use should not be made of ambiguous terms or phraseology.

Works: The works to be executed in accordance with a contract.

1 INTRODUCTION

1.1 Background

The Edith Stevens pond lies opposite the property on which the proposed activity will be undertaken. The pond is connected to the lotus canal by three 2.4m x 1.8m portal box culverts. It is required that two additional 2.4m x 1.8m box culverts be installed to allow adequate flow into the pond. At 19.37mAMSL water flows into the existing western detention pond south of vanguard drive referred to as the vanguard drive pond. There are currently three 1.2m x 0.6m box culverts under Vanguard Drive which link the two ponds, the total required capacity is three 3.0m x 1.2m which will be achieved through a combination of the existing culverts and proposed additional capacity under Vanguard Drive. To provide a stormwater balancing system able to accommodate the 1: 50 year flood event, the capacity of the Vanguard Drive pond must be increased from its current capacity of approximately 15,000m3 to 74,000m3.

Downstream of the ponds is the Vygekraal Road culvert which restricts flow. The stormwater conveyance facilities downstream of Vygekraal Road are at capacity and pass through dense residential areas with little or no room for expansion, therefore the flow restriction at Vygekraal Road must be maintained to avoid the increased flood risk to these properties. The flow restriction is maintained by controlling the head in the canal to 20.5mAMSL. Without the suggested upgrades, during the 50 year event water levels in the canal would rise causing inundation of the adjacent roads, increase flows passing downstream and potential flooding upstream.

The primary intentions of the proposed upgrades are to accommodate a 1:50 year storm event, and to ensure residents residing outside of the 50 year flood line are no longer affected, and to reduce the risk of flooding on transportation routes such as Duinefontein Road and Lansdowne Road. Without these ponds key transportation routes such as Duinefontein Road and Lansdowne road would be at risk from flooding. Residents residing close to the canal edge would also be at risk from flooding upstream and downstream of the site. The location of the site is critical as it is currently connected to the Edith Stevens stormwater pond via culverts under Vanguard drive and the two facilities currently function in unison. The project will increase the capacity of the current Philippi pond and the size of its links between the Edith Stevens pond and the lotus canal.

The City of Cape Town therefore intends to transform portions of even 74 and 86 of Farm 609 Philippi in order to accommodate the construction of stormwater ponds and the introduction of wetland habitat into the area. The proposal entails the upgrading of existing stormwater ponds and culverts connected to the Lotus Canal. The pond will require additional linkages in the form of culverts crossing under roads. The stormwater ponds/wetlands are required to avoid flooding downstream and upstream and also to manage the volume of stormwater as per the requirements of the Stormwater Master Plan for the area.

The project proposal includes a number of development components. These components include; erection of a perimeter fence to prevent any further dumping, earthworks, soft landscaping and construction of additional culverts providing a connection between the pond and the channel.

The subject property is located directly to the south of Vangaurd Drive and to the east of Papkuilsvleiweg road within the suburb of Philippi. Other than the degraded wetland on site, no river systems are located within 500m of the Site. The natural vegetation on site is generally in very poor condition and so little vegetation remains that it is largely impossible to say what the exact nature of the original vegetation might have been like. Various wetland vegetation characterised as either wetland or terrestrial species dominated by alien and invasive species, with very few indigenous floral species. The approximated co-ordinates of the site are Latitude: 34°0' 17.46"S and Longitude: 18°33' 1.09"E. The site lies within the Urban Edge of the Cape metropole (see Figure 1).

Figure 1: Location of the Site

1.2 Purpose/Objectives of the EMP

The purpose of an Environmental Management Plan (EMP) is defined in the Integrated Environmental Management Guideline Series (DEA, 1992) as: “A plan that organises and co-ordinates mitigation, rehabilitation and monitoring measures in order to guide the implementation of the proposal”. This EMP serves as a baseline information document and provides guidance for preventing or mitigating environmental impacts that may result as part of the construction phase of the project. The EMP provides

details regarding measures to be undertaken during the implementation of the Project to ensure the protection and enhancement of the environment and human health. It is intended for use by the Environmental Control Officer (ECO), the Principal Agents for civil and building works respectively, the various Contractors and sub contractors appointed to the project, the regulatory authorities and the project Development team as a whole.

In addition, this EMP addresses the applicable requirements of the conditions of project approval in terms of Regulation E1 of the National building Regulations for approval to construct building(s) in terms Section 4(2) of Act 103 of 1977, which ensures that the application complies with the provisions of the National Building Regulations and Building Standards and any other applicable law. In a nutshell, the objectives of this EMP are thus:

- Make application for and receive regulatory approval as per the project schedule;
- Maximize recycling opportunities and minimize disposal of wastes.
- Apply emission controls during these activities to minimize the release of dust and contaminants to the surrounding environment;
- To prescribe the best practicable control methods to lessen the environmental impacts associated with the construction of the development;
- To monitor and audit the performance of personnel in applying such controls; and
- To ensure that appropriate environmental training is provided to construction personnel.
- Define activities which may have an impact and define mitigation and control measures;
- Identify responsibilities and establish decision making processes;
- Emergency response planning including procedures, response actions and responsibilities;
- Development of contingency plans; and to
- Ensure compliance with relevant environmental legislation

1.3 Format of the EMP

The scope of environmental management described in this EMP pertains to the entire proposed development and has been divided into five sections:

Section 1: Provides background information, a purview of the affected environment and impacts envisaged, aims and objectives of this EMP and contents of this EMP.

Sections 2: The section outlines the applicable legislation, regulatory and other requirements; organisational structure.

Sections 3: Describes how the EMP would be implemented. The section outlines policy statement, organisational structure, the management structure and responsibilities of the various stakeholders. The procedures for environmental management and monitoring of the construction phase are also presented.

Sections 4: This section includes environmental specifications relating to the construction phase of the development and associated infrastructure.

Sections 5: Provides details about site cleanup and rehabilitation upon completion of the contract.

2 ENVIRONMENTAL LEGISLATION

2.1 Legislative Framework

This EMP, which forms part of the Contract document, informs the Contractor as to his duties in the fulfillment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by project activities. The Contractor should note that obligations imposed by the EMP are legally binding in terms of environmental statutory legislation (i.e. the Environment Conservation Act, 1989, Act No. 73 of 1989). In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter shall prevail.

2.2 Applicable Legislation, Regulatory and Other Requirements

The National Environmental Management Act No. 107 of 1998, as amended in June 2010, and the Environmental Impact Assessment Regulations, provides for the control of activities that may have an impact on the environment. The proposed development will constitute the following listed activities as defined in terms of Government Notice No. R.544 of 2010 that reads as follows:

> ***Activity 39:*** *The expansion of (i) canals; (ii) channels; (iii) bridges; (iv) weirs; (v) bulk storm water outlet structures; (vi) marinas; within a watercourse or within 32 metres of a watercourse, measured from the edge of a watercourse, where such expansion will result in an increased development footprint but excluding where such expansion will occur behind the development setback line.*
>
> ***Activity 41:*** *The expansion of facilities or infrastructure for the off-stream storage of water, including dams and reservoirs, where the combined capacity will be increased by 50000 cubic metres or more.*

The listed activities above requires a basic environmental assessment to be undertaken and Frontline Safety Health and Environmental Consultants was commissioned to undertake this EIA for the proposed development. This draft Basic Assessment Report (BAR) serves as the documentation in support of an assessment level study that forms part of a basic Environmental Impact Assessment (EIA) for the proposed construction of stormwater ponds and the introduction of wetland habitats on Portions 74 and 86 of Farm 609, Philippi. The competent authority that will be responsible for decision-making regarding the proposed activity is the Department of Environmental Affairs and Development Planning (DEA&DP).

2.3 Statutory and Other Applicable Legislation

The Contractor shall identify and comply with all South African national and provincial environmental legislation, including associated regulations and all local by-laws relevant to the project. Key national and

provincial environmental legislation that is currently applicable to the construction phase of the project must be complied with.

Cognisance will be taken of, but is not limited to, the following pieces of legislation during the construction phase of the project:

- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004);
- Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965);
- NEM Waste Act, 2008 (Act 59 of 2008)
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Water Act, 1998 (Act No. 36 of 1998);
- Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002);
- Environment Conservation Act, 1989 (Act No. 73 of 1989), as amended;
- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- Occupational Health & Safety Act, 1993 (Act No. 85 of 1993);
- Health Act, 1977 (Act No. 63 of 1977); and
- Hazardous Substances Act, 1973 (Act No. 15 of 1973).

The project will also take cognisance of, but is not limited to, the following by-laws of the City Of Cape Town:

- Storm Water Pollution
- Air Quality Management 2010
- Environmental Health
- Integrated Waste Management Amended By-Law 2010
- Stormwater Management
- Streets Public Places and the Prevention of Noise Nuisances
- Traffic 2011

The Contractor shall establish and maintain procedures to keep track of, document and ensure compliance with environmental legislative changes.

2.4 Environmental Standards

All applicable environmental standards contained within the environmental legislation shall be adhered to.

3 IMPLEMENTATION OF THE EMP

3.1 Scope and Terms of Reference

Frontline Safety Health and Environmental Consultants have been appointed by the Developer to compile a Construction Environmental Management Plan (EMP) for the proposed project. The EMP is compiled to address the activities related to the construction of the proposed construction of stormwater ponds and the introduction of wetland habitats on Portions 74 and 86 of Farm 609, Philippi, which may have a significant impact upon the environment.

Although careful consideration is always given to the completion schedule and cost, these two items will not necessarily be used to limit the types and frequency of control and contingency measures to be implemented. Imposition of a control or contingency measure will always be followed by a review of the effectiveness and appropriateness of the control measure. For all planned activities, stopping of an activity is an available measure that will be implemented when other control and contingency methods are not effective. Resumption of the activity is always of paramount importance. However, resumption will not occur unless effective control measures have been implemented to the satisfaction of the relevant parties. It is important to note that the development and implementation of environmental specifications is an on-going process that is iterative in nature.

This document is thus the first version of the EMP for the proposed construction of stormwater ponds and the introduction of wetland habitats on Portions 74 and 86 of Farm 609, Philippi. This EMP is submitted to the DEA&DP for approval and no construction works should commence until the Applicant has received the approval.

The EMP outlines the procedures that govern the way in which the Contractor shall conduct him/herself on the proposed activity. The document will form the basis for the environmental specifications that the Contractor, in terms of the construction contract, will be obliged to adhere to during construction. This document will be included in the contract documentation and will thus form a binding agreement between the Contractor and the Applicant.

3.2 Contractual Agreement

This EMP is to be an annexure to the Tender documentation as a commitment from the contractors regarding all their activities and to make them aware of their environmental responsibilities. Failure by any of the contractors' or sub-contractors' employees to adhere to the document will be considered cause for the offending employees to be potentially removed from the site, and/or that the damage be repaired at the cost of the contractor. The Project Manager (PM), under advisement of the ECO, may recommend the removal of equipment causing continual environmental damage.

The EMP is a legally binding agreement between the Applicant, ECO and the contractors. It is therefore important to ensure that the actions specified by the EMP are enforced through integration of the EMP into the tender and other project related documents for the project as a set of environmental specifications. Copies of this EMP shall be made available to the ER, the Contractor and the ECO. A copy of the document must be available on site at all times. The PM, under advisement of the ECO, may recommend that the contractors suspend part or all of the works if they fail to comply with the specifications set out in the EMP and method statements supplied by themselves or other responsible parties. The suspension shall be enforced until such time as the offending procedure or equipment is corrected. No extension of time will be granted for such delays and all costs will be borne by the contractors. A policy statement is now presented, together with a list of the most important pieces of legislation pertaining to this project.

3.3 Environmental Policy Statement

The policy statement that follows is formulated specifically to support this construction phase EMP for the proposed construction of stormwater ponds and the introduction of wetland habitats on Portions 74 and 86 of Farm 609, Philippi. All construction personnel will be required to commit themselves to this policy.

- Adherence to the requirements of the EMP for the project;
- Management of all construction and associated activities so as to minimise the risk of pollution of ground and surface water, the air and the soil;
- Management of all construction and associated activities so as to minimise the nuisance and disruption to people resident in proximity or commuting through the area;
- Adherence to the environmental legislation relevant to the location and nature of the work being conducted; and
- Compliance with the monitoring and auditing programmes contained in the EMP, to ensure its accountable and transparent implementation.

3.4 Financing of environmental control

Financing of environmental control requirements as outlined in this document is the sole responsibility of each Contractor appointed by the Developer. Therefore it is accepted that the cost incurred for implementing this plan by any Contractor would be allocated for in the tender document.

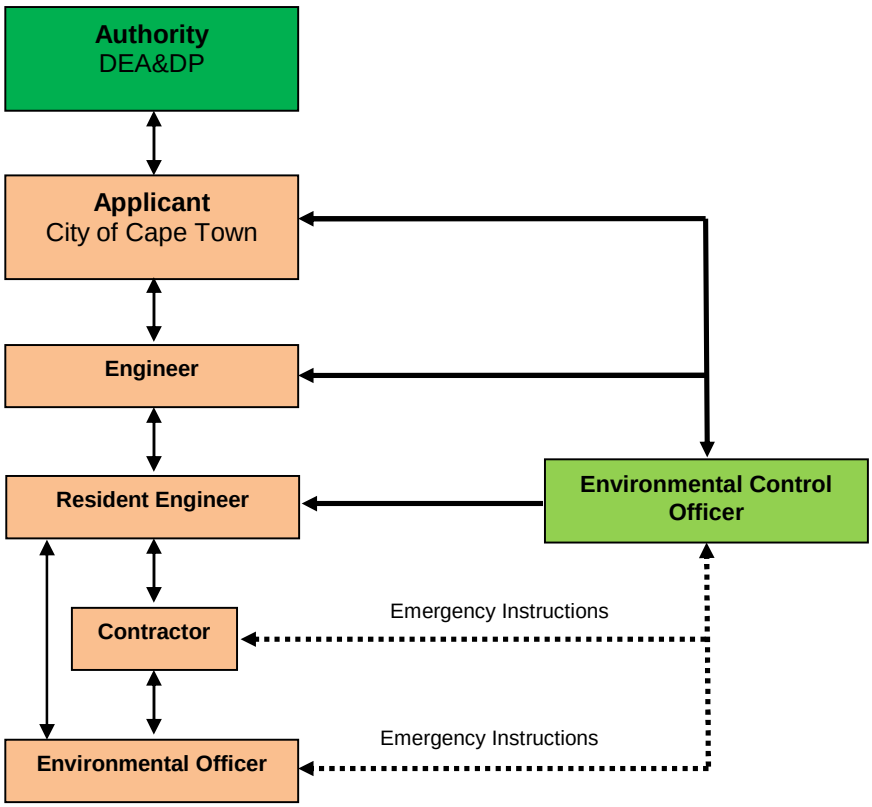
Where any uncertainties arise in this matter the responsibility for costs is that of the Developer. Any responsibilities not defined in this document will be the responsibility of the Developer. In this regard the National Environmental Management Act (NEMA) allows for the relevant authorities to take actions and recover costs where and when appropriate.

3.5 Organisational Structure and Responsibility Linkage

It is essential that an organisational structure is established early in the construction phase of the project and that all parties concerned accept the structure. This identifies the responsibilities and the authority of the proponent, design team, Project Manager (PM), consulting engineers and the numerous contractors

and sub-contractors. The relationship between the PM, the engineers and the contractors' site agents are key links in the structure. The organisational structure also clarifies the channels to direct instructions and provides the means of interaction between the various groups involved. Good communication is a prerequisite of maintaining the organisational structure and is vital to the smooth operation of the project.

Essentially, the responsibility for the application of the EMP for the project begins with the proponent who will devolve the responsibility to the designated PM to assume this task within his or her portfolio. Details of the management structure for this Construction EMP are presented below. All official communication and reporting lines including instructions, directives and information shall be channeled according to the management structure presented below.



The ECO will then ensure that the requirements of the EMP are implemented by monitoring and auditing the performance of the PM in achieving the requirements, while also providing strategic support and advice. In practice, on-site responsibility would typically lie with an engineer tasked with particular components of the project. The ECO may at times communicate directly with the engineer, but always with recourse to the PM.

3.6 Roles and Responsibilities

The implementation of this Construction EMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during the construction phase. Formal roles and responsibilities are necessary to ensure that key procedures are executed. Specific responsibilities of the key role-players during the operation phase are presented below.

3.6.1 Department of Environmental Affairs and Development Planning (DEA&DP)

DEA&DP is the designated authority responsible for authorising this Construction EMP and has overall responsibility for ensuring that the Applicant complies with this EMP and any conditions listed in the Environmental Authorisation.

DEA&DP shall also be responsible for approving any amendments that may be required to the EMP. DEA&DP may also perform random site inspections to check compliance with the Construction EMP.

3.6.2 Applicant (City of Cape Town)

The Applicant is ultimately responsible for the implementation of the EMP and the financial cost of all environmental control measures. The Applicant must ensure that any person acting on their behalf complies with the conditions / specifications contained in this EMP. The Applicant is also responsible for the appointment of a Project Manager / Engineer, Contractor and Environmental Control Officer (ECO).

The Applicant shall address any site problems pertaining to the environment at the request of the DEA&DP, Project Manager / Engineer and / or ECO.

3.6.3 Role of the Project Manager (PM)

The PM is responsible for ensuring that on-site activities are undertaken in accordance with the requirements of the EMP. The PM will thus need to ensure that:

- Method statements requested by the ECO are submitted for approval;
- Corrective action is implemented as required;
- Appropriate records and information regarding compliance with the EMP requirements are maintained and made available to the ECO;
- All site instructions are copied to the ECO; and
- Instructions as required by the ECO are issued to the relevant contractor.

3.6.4 Engineer or Project Manager

- The Engineer or Project Manager shall oversee the planning, design and construction phases of the project.
- The Project Manager or Engineer shall appoint a Resident Engineer (RE) to act as on-site implementing agent. In the situation where no Engineer is appointed, the Project Manager shall appoint a Resident Project Manager to act as on-site implementing agent. For the purposes of this document the term Engineer will be
- used interchangeably with Project Manager. Similarly, “RE” will be used interchangeably with Resident Project Manager.

- The Engineer shall address any site problems pertaining to the environment at the request of the RE and/or the ECO. The Engineer shall also be responsible for issuing penalties for contravention of the EMP.

3.6.5 Resident Engineer

A Resident Engineer (RE) shall act as the Developer's on-site implementing agent and has the responsibility to ensure that Developer's responsibilities are executed in compliance with the EMP. Any on-site decisions regarding environmental management are ultimately the responsibility of the RE.

The role of the resident engineer will be to ensure that the contractors initiate and complete work activities in accordance with contract documents, specifications, drawings, EMP, Project specific Contingency and Emergency Response Plan, and all municipal regulations. The RE shall assist the ECO where necessary and shall have the following responsibilities in terms of the implementation of this document:

- Reviewing and approving the Contractor's Method Statements with input from the ECO where necessary.
- Monitoring and verifying that the EMP and Method Statements are adhered to at all times and taking action if specifications are not followed.
- Keeping a photographic record of construction activities on site.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO where necessary.
- Ordering the removal of person(s) and/or equipment not complying with the EMP specifications.
- Issuing spot fines for transgressions of site rules of the EMP
- Delaying any construction activity if he/she believes the environment has been or is likely to be seriously harmed / impacted.
- Providing input into the ECO's ongoing internal review of the EMP.
- Communicating environmental issues to the Environmental Officer.

3.6.6 Role of the Environmental Control Officer (ECO)

The ECO is responsible for ensuring that the requirements of the EMP are upheld and is to be employed by the Project Proponent for the duration of the project. The ECO should have appropriate qualifications and training and experience in the implementation of environmental management specifications. The ECO provides feedback to the Project Manager regarding all environmental matters. Contractors are answerable to the ECO (or Project Manager, depending on contractual arrangements) for non-compliance with the requirements stated in the EMP.

More specifically, the ECO shall:

- Request, review and approve method statements from the Contractor and Sub-contractors prior to any construction commencing.
- Undertake weekly inspections at the outset of the project and, thereafter, regular inspections (on average once or twice per week) of the construction site in order to check for compliance with

method statements as well as specifications outlined in this document. This should also involve completion of a weekly checklist, which will also serve as site records.

- Ensure that the Contractor and his Subcontractors and his employees have received the appropriate environmental awareness training before site establishment/ set up.
- Meet with the Contractor to discuss the implementation of and non-conformances with this document in Site meetings. These meetings will serve to re-affirm overall policy for the project, method statements as well as discuss weekly checklists.
- Identify appropriate corrective action if non-compliance occurs or unforeseen environmental issues arise that require environmental management action.
- Keep a register of major incidents (spills, injuries, complaints, legal transgressions, etc) and other documentation related to the EMP.
- Report to the Project Manager any problems (or complaints) related to conformance with this document which cannot first be resolved in co-operation with the Contractor and/or his Subcontractors.
- Assist in finding environmentally acceptable solutions to construction problems.
- Identify and make minor amendments to the EMP where appropriate.
- The ECO shall have the authority to issue penalties for non-compliance with the EMP
- Issue site instructions to the Contractor for corrective actions required.
- Conduct regular audits to ensure that the system for implementing the EMP is operating effectively. Reports/audits should be sent to the DEA&DP, City Of Cape Town's E&HRM Branch as well as to contractors on a monthly basis.

3.6.6.1 Requirements for the post of ECO

- A suitably qualified environmental practitioner with a sound knowledge of the environment and environmental management principles.
- A person independent from the Contractor, Client or Project Engineer with four or more years of environmental site management and able to ensure EMP compliance monitoring experience on construction projects.

3.6.6.2 Authority of the ECO

The ECO has the authority to stop works if in his/her opinion there is a serious threat to, or impact on the environment, caused directly by the construction operations. This authority is to be limited to non-compliance to the EMP and emergency situations where consultation with the Client is not immediately available. The ECO is to inform the Client of the reasons for the stoppage and agree on a solution to the problem as soon as possible.

Upon failure by the contractor or his employee to show adequate consideration to the environmental aspects of this contract i.e. willful destruction of the environment, the ECO may recommend to the Client/site representative to have the contractor's representative or any employee(s) removed from the site or work suspended until the matter is remedied. No extension of time will be considered in the case of such suspensions and all costs will be borne by the contractor.

3.6.7 Role of the Contractor

The role of the Contractor is as follows:

- The Contractor shall appoint, at his / her own cost, an Environmental Officer (EO) or Site Agent to ensure that the EMP is implemented and ensure that all environmental specifications and Construction requirements are met at all times.
- The Contractor shall ensure that all employees, sub-contractors, suppliers, etc. are fully aware of the environmental issues and requirements detailed in this EMP;
- Ensure on-site handling and off-site disposal of hazardous wastes is carried out in compliance with the Waste Management Plan and applicable health and safety regulations/standards.
- The Contractor shall liaise closely with the ECO and PM and will ensure that works on site are conducted in an environmentally sensitive manner in accordance with this EMP;
- The Contractor is to have a copy of the EMP on site and be familiar with its contents;
- In conjunction with the ECO, the Contractor must ensure that all employees (permanent and temporary) and all sub-contractors that work on the site for longer than two days, receive Environmental Awareness Training within one week of being on site;
- To implement all provisions of the EMP. If the Contractor encounters difficulties with specifications, he / she must discuss alternative approaches with the RE and/or the ECO prior to proceeding;
- To prepare the required Method Statements ;
- To rehabilitate any sensitive environments damaged due to the Contractor's negligence. This shall be done in accordance with the RE's and ECO's specifications. Failure to comply with the EMP may result in fines and reported noncompliance may result in the suspension of work or termination of the contract by the Engineer.

3.6.8 Sub-Contractors

All subcontractors (if any) have environmental responsibilities during the performance of their various activities on the Project in particular:

- The preparing and implementing of and specific environmental control plans deemed necessary by the Site Manager or his nominee to correct identified deficiencies or to enhance overall environmental performance and compliance on the Project;
- Taking all necessary precautions or actions in relation to any activity conducted on the Project that may potentially cause environmental harm and ensuring compliance with this EMP and relevant regulations including the development and implementation of an environmental monitoring program;
- Providing initial and ongoing environmental awareness training including induction training for all new employees detailing each persons individual environmental responsibilities and key aspects of the EMP and their own environmental objectives and compliance plans, and any other details specific to their individual work scope on the Project;
- The immediate verbal reporting to the site manager of all environmental incidents, non-conformances, or concerns and the timely implementation of corrective actions or remediation strategies to control or ameliorate the extent of environmental harm; and

- Ensure that all environmental complaints are handled in a prompt and courteous manner and in compliance with the guidelines contained in this EMP.

3.6.9 Environmental Officer

The Environmental Officer (EO) shall be responsible for monitoring, reviewing and verifying the Contractor's compliance with the EMP. The EO's duties in this regard shall include, *inter alia*, the following:

- Monitoring and verifying that the EMP and Method Statements are adhered to at all times and taking action if specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Assisting the RE and ECO in finding environmentally responsible solutions to problems;
- Inspecting the site on a regular basis with regard to compliance with the EMP;
- Keeping accurate and detailed records of these inspections;
- Reporting any incidents of non-compliance with the EMP to the RE and / or the ECO; and
- Keeping a register of complaints on site and recording community comments and issues, and the actions taken in response to these complaints.

3.6.10 All On-Site Project Personnel

- Attend required training;
- Follow all requirements of the EMP; and to
- Immediately inform supervisor or designate of any issue of non-compliance with this EMP and/or regulation.

3.7 EMP Administration

Copies of the EMP shall be made available to the DEA&DP, Contractor, EO, Engineer, RE, ECO and other members of the project team. Copies of the EMP shall be kept at the site office/s during the construction phase and shall be distributed to the EO and all other senior contract personnel. All senior personnel shall be required to familiarise themselves with the contents of this document.

Any significant revisions to the EMP must be approved by the DEA&DP before any revison. Records will be kept in the document indicating changes made. The ECO shall be responsible for the implementation and distribution of any "approved" revisions to the EMP.

The Applicant and the Contractor must sign an "Environmental Agreement", which presents the Contractor's obligations in terms of the EMP.

The Engineer may order the Contractor to suspend part or all of the works during the construction phase if the Contractor fails to comply with the specifications set out in the EMP and Method Statements supplied by the Contractor and any Sub-contractors. Such suspension shall be enforced until compliance is achieved.

3.8 Method Statements

A method statement is a living document that allows for modifications to be negotiated between the contractors and the PM, as circumstances dictate. All method statements will form part of the EMP documentation and are subject to all terms and conditions contained in the EMP. Note that a method statement is a point of departure for understanding the nature of the intended actions to be carried out and allows for all parties to review and understand the procedures to be followed in order to minimise risk of harm to the environment. Changes to, and adaptations of, method statements can be implemented with the prior consent of all parties.

A method statement describes the scope of the intended work in a step-by-step description in order for the PM and ECO to understand the contractors intentions. This will enable them to assist in devising any mitigation measures, which would minimise negative impact during these tasks. For each instance where it is requested that a contractor submit a method statement to the satisfaction of the PM and ECO, the format should clearly indicate the following:

WHAT	A brief description of the work to be undertaken
HOW	A detailed description of the process of work, methods and materials
WHERE	A description/sketch map of the locality of work (if applicable)
WHEN	The sequencing of actions with due commencement dates and completion date estimates.

Any Method Statement shall be produced within such reasonable time as the Engineer shall specify. The Contractor shall not commence the activity until the Method Statement has been approved and shall, except in the case of emergency activities, allow a period of 48hrs for approval of the Method Statement. Such approval shall not unreasonably be withheld.

Approved Method Statements shall be readily available on the Site and shall be communicated to all relevant personnel. The Contractor shall carry out the Works in accordance with the approved Method Statement. Approval of the Method Statement shall not absolve the Contractor from any of his obligations or responsibilities in terms of the Contract. All method statements are to be to the satisfaction of the PM, the ECO and the DEA&DP, the City Of Cape Town Environmental and Heritage Resource Management.

3.9 Record of Activities and Record Keeping

The RE, ECO and EO shall keep a record of activities on site, including but not limited to meetings attended, Method Statements received and approved, issues arising on site, cases of non-compliance with

the EMP, penalties/fines issued and corrective action taken to solve problems that arise. In addition, the Contractor shall keep a record of complaints from interested and affected parties.

The RE shall undertake photographic monitoring of the contract. This shall include a photographic record of all areas that will be impacted by the construction activities prior to construction activities commencing. Photographs are to be taken of the site prior to, during and immediately after construction, as a visual reference.

These photographs must be stored with other records related to this EMP. Any environmental non-compliance reported must have the support of sufficient photographic proof to mitigate the non-compliance report. The ECO shall monitor all sensitive work environments, which may also include photographic monitoring.
All records relating to the implementation of this management plan (e.g. checklists and/or diary, Method Statements, etc.) must be kept together so that it can be retrieved easily. These records must be available for scrutiny by any relevant authorities.

3.10 Security and Safety on Site

Although largely an operational issue, security of the site will need to be maintained during construction. The Contractor will be responsible for the security of its personnel, construction camps and equipment. No personnel will be permitted to live on the site. Security personnel present after hours must be provided with the necessary cooking, heating and ablution facilities. Security lighting should not result in a nuisance for neighbouring properties.

The Contractor shall comply with all relevant national, provincial or local regulations with regard to safety on site to ensure the safety of his staff. All accidents and incidents resulting in injury or death during construction are to be reported.

Construction activities on the Site will be conducted in accordance with the Health and Safety Plan. Each contractor and consultant will be responsible for implementing their Project specific Health and Safety Plan and will be responsible for monitoring their respective personnel for health and safety. Contractors shall follow the guidelines of the Occupational Health and Safety Act (85 of 1993):

The wearing of hard hats by -

- All persons entering the site;
- All persons within 10m of any situation where any form of lifting or hoisting equipment is being used;
- Any personnel working in any other situation where the possibility of head injury is present, e.g. an area where overhead work is taking place.

The wearing of gloves by personnel -

- Handling heavy materials;
- Carrying out maintenance activities within a crusher;

- Engaged in welding or gas cutting activities; and
- Handling materials/equipment with unfinished steel edges.

The wearing of approved safety shoes or safety boots by -

- All persons entering the construction site or workshop, storage and depot areas.

The wearing of safety goggles by -

- Persons operating equipment under dusty conditions;
- Persons engaged in cutting or welding activities; and
- Persons engaged in grinding activities.

The wearing of hearing protection by -

- All persons engaged in rock drilling activities (>85 decibel):
- All crushing operators; and
- Any persons entering into high noise areas (>85 decibel). These areas should be appropriately marked using a standard National Occupational Safety Association (NOSA) pictogram.

The wearing of fall arrest equipment by -

- Any person carrying out work 2m above ground level, unless it is being carried out from a safe and protected work platform; and
- All heavy equipment operators.

3.11 Emergency Preparedness and Procedures

The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate response to unexpected or accidental actions or incidents that will cause environmental impacts, throughout the life cycle of the project. Such incidents may include, *inter alia*:

- Accidental discharges to drainage channels and land;
- Accidental exposure of employees to hazardous substances;
- Accidental fires;
- Accidental spillage of hazardous substances;
- Accidental toxic emissions into the air; and
- Specific environmental and ecosystem effects from accidental releases or incidents.

It is the responsibility of the contractor to assess the potential risks to the environment as a result of the project. As such, the contractor must have the necessary standard emergency operating procedures in place to deal with any potential emergency during the construction phase. Each contractor will be required to prepare and implement a Project-specific Contingency and Emergency Response plan that will be specific to the work activity being performed or met the requirements of the Emergency Response Plan. The Emergency Response Plans will cover topics such as:

- Emergency organisation (manpower) and responsibilities, accountability and liability;
- A list of key personnel;

- Details of emergency services (e.g. the fire department, spill clean-up services, etc.);
- Internal and external communication plans, including prescribed reporting procedures where required by legislation;
- Actions to be taken in the event of different types of emergencies;
- Incident recording, progress reporting and remediation measures required to be implemented;
- Information on hazardous materials, including the potential impact associated with each, and measures to be taken in the event of accidental release;
- Training plans, testing exercises and schedules for effectiveness;
- Preventative Measures such as training, site security, waste management, storage of machinery, equipment and materials;
- Emergency notification procedures including emergency definition, storms, spills, releases, vehicle accidents, personal injury, crime activity, fire emergency, notification and investigation, and documentation;
- Response procedures including: site evaluation, response procedures in the event of fire, personal injury, spills/releases, and responsibilities;
- All staff should be made aware of the necessary basic emergency procedures in the event of an emergency including injuries to staff. The appropriate equipment and identified personnel to deal with such basic emergencies should be available on site.

Above all, the Contractor shall comply with the emergency preparedness and incident and accident-reporting requirements, as required by the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), the National Environmental Management Act, 1998 (Act No. 107 of 1998), the National Water Act, 1998 (Act No. 36 of 1998) and the National Veld and Forest Fire Act, 1998 (Act No 101 of 1998) as amended and/or any other relevant legislation.

3.12 Temporary Site Closure

If the Site is closed for a period exceeding one week, a checklist procedure shall be carried out by the Contractor in consultation with the ECO. Contractor's Safety Officers (in terms of the Occupational Health and Safety Act) are to check site and report to the Engineer in terms of:

- Fuels / flammables / hazardous materials stores safe and secure/locked.
- Ensure fuel stores as low in volume as possible. No leaks.
- Bund/s empty
- Fire extinguisher serviced and accessible.
- Secure area from accidental damage e.g. vehicle collision.
- All trenches and manholes secured.
- Fencing and barriers in place per the Occupational Health and Safety Act
- Notice boards applicable and secured.
- Emergency and Management contact details displayed.
- Security persons briefed and have facility for contact.
- Night hazards checked e.g. reflectors, lighting, traffic signage.

- Fire hazards identified – local authority notified of any potential threats e.g. large brush stockpiles, fuels etc.
- Inspection schedule and log by security or contracts staff.
- Wind and dust mitigation in place e.g. straw, brush packs, irrigation.
- Slopes and stockpiles at stable angle.
- Water contamination and pollution
- Fuels hazardous stores secure.
- Cement and materials stores secured
- Toilets empty and secured
- Refuse bins empty and secured (lids)
- Bunding clean and treated e.g. Spill Sorb or Enretech powder
- Drip trays empty & secure (where possible)
- Structures vulnerable to high winds secure.

The Contractor is to ensure that all temporary closure requirements are met before leaving the site.

3.13 Surrounding Land Use and Community Relations

Cognisance must be taken of the proximity of the industrial establishment and the neighbouring farms. General disturbance should be kept to a minimum.

Without compromising the construction process, local BEE service providers and local labour from the surrounding community should be employed as far as possible. The intention is to ensure that previously disadvantaged individuals benefit from the proposed project during the construction phase. Those successful in obtaining employment should be provided with the appropriate training.

The Contractor shall be responsible for responding to third party or public queries and/or complaints relating to operations. The Contractor shall notify the ECO and the Engineer of any complaints lodged. The Contractor shall be responsible for maintaining a Complaints Register to record complaints received and action taken. This register will be made available to the ECO, the Engineer and, if required, the DEA&DP.As part of social responsibility, the Developer and Contractors shall encourage and implement wherever possible the procurement of locally based labour, skills and materials.

3.14 Communication and Site Inspections

3.14.1 Site Meetings

Regular site meetings must be held for the duration of the construction period. Provision must be made in the agenda of each site meeting for Environmental Management issues to be discussed to facilitate the transfer of information and to update all parties on the environmental compliance aspects of the project as a whole. The ECO should present a summary report on environmental issues at such meetings. These

meetings are to be attended by the ECO, Project Manager or Engineers representative, Contractor and a representative of each of the sub-contractors working on site at the time.

At such meetings environmental queries must be resolved, agreed actions planned with dates of the actions and compliance / non-compliance by the Contractor to be noted. If required, penalties and remedial actions must also be tabled and planned. The frequency of meetings may be altered by the ECO, based on the nature of the works taking place on site at any time, and the level of compliance with the EMP by the Contractors. Issues relating to complaints or comments received from the public shall also be discussed at these meetings. Minutes of the meetings shall be prepared by the RE and copied to all attendees, including the DEA&DP before the next meeting.

3.14.2 Site Inspection

A site inspection programme will be implemented and will comprise:

- Visual inspections of site activities by the ECO shall initially be on a weekly basis for the duration of the establishment of the site camp, hoarding off of trees and hedges, structures, no-go areas, etc; and
- Review of records and documentation to reconcile them with the construction programme.

Records shall be maintained during the construction phase to enable compliance with the EMP specifications to be demonstrated. These will typically comprise a daily log of activities that record waste management (documentary proof of type, volume, disposal and transport), fuels and chemicals management (deliveries, spills etc.) and other environmental issues such as adverse weather (wind, rain) and surface water run-off.

3.15 Penalties, Bonuses and EMP Review

3.15.1 Individual Transgressions

Non-compliance with the conditions of the EMP will constitute a breach of Contract. The PM/Engineer (in consultation with the ECO) can impose spot penalties on an individual for any contraventions of the EMP. By imposing spot penalties on individuals guilty of contravening the EMP, the PM will be able to ensure that the requirements of the EMP are taken seriously not only by the management personnel on site, but also by other site staff. Table 3.1 shows the ranges of spot penalties for different contraventions of the EMP. The PM/Engineer should use these as a guide and use his/her own judgement in determining the issues of non-compliance and the severity of the contravention and thus the value of the spot penalties:

Table 3.1: Range of spot penalties for individuals

An individual entering the defined No Go boundaries of or around the site;	R20 – 100
An individual driving a vehicle into the defined No Go boundaries of the site;	R200 – 1000
Driving any earthmoving plant into the defined No Go boundaries of the site;	R500 – 3000
Plant operator ignoring a verbal warning to have an oil leak from machinery;	R50 – 200

An individual littering on and around the site;	R20 – 200
An individual not making use of the ablution facilities;	R20 – 200
An individual spilling fuels (non use of funnels/pumps etc);	R50 – 500
An individual causing unnecessary damage to flora and fauna on site;	R20 – 2000
An individual eating outside of the defined eating area;	R20 – 100
Smoking on site other than in the designated site camp;	R20 – 100
Playing loud music (No amplified music allowed on site)	R50 - 200

The abovementioned penalties should be revised when the construction phase commences to ensure relevance. For each subsequent similar offence committed by the same individual, the penalties should be doubled in value to a maximum value of R5 000. The Project Manager/Engineer will not collect the penalties from individuals, but will rather inform the Contractor of the contravention, the individual's identity and the amount of the penalty.

The penalties will be deducted from the Contractors' monthly certificate, or the Project Manager/Engineer will issue a variation order, to the value of the penalties, for the Contractor to undertake activities that would in some way enhance the state of the environment or the site. It will be the Contractor's responsibility to reclaim such penalties from the guilty individuals. These penalties do not preclude any prosecution under any other law.

3.15.2 Contractors Transgressions

Non-compliance with the specifications of the EMP constitutes a breach of contract for which the Contractor may be liable to pay penalties. The Contractor is deemed not to have complied with the EMP if:

- There is evidence of contravention of the EMP specifications, including any noncompliance with an approved Method Statement;
- Construction activities take place outside the defined boundaries of the site;
- Environmental damage ensues due to negligence;
- The Contractor fails to comply with corrective or other instructions issued by the RE within a specific time period;
- The Contractor fails to respond adequately to complaints from the public;
- There is a complaint from the local environmental authority with respect to non-compliance that has not been adequately addressed after a valid instruction from the RE to rectify the complaint;
- There is contravention of the EMP specifications which relate to activities outside the boundaries of the construction sites; and
- There is evidence of contravention of the EMP specifications within the boundaries of the construction site, site extensions and haul/access roads;

The Contractor shall timeously notify the Applicant of the details of any non-compliance and the measures taken to rectify the situation. A list of fines, including but not limited to those activities presented in

Appendix A, shall be imposed by the RE on the Contractor, his staff and/or the Sub-Contractors' staff for contravention of the environmental specifications.

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he / she shall be liable to pay a fine. Non-compliance with the specifications of the EMP constitutes a breach of Contract for which the Contractor may be liable to pay a fine.

The Engineer, in consultation with the RE and ECO, shall determine the amount of the penalty fine. The Engineer, in determining the amount of such fine, shall take into account *inter alia*, the nature of the offence, the seriousness of its impact on the environment, the degree of prior compliance/noncompliance, the extent of the Contractor's overall compliance with environmental protection requirements and, in particular, the extent to which he / she considers it necessary to impose a sanction in order to eliminate / reduce future occurrences. The following serves as a guide for such penalties in certain situations.

NOTE THAT THESE PENALTIES DO NOT PRECLUDE PROSECUTION UNDER ANY OTHER LAW.

Table 3.2: Range of penalties for contractors transgressions

Excessive litter on the site or in the site camp; Waste must be disposed of at an official waste deposit site on a regular basis	500 – 5000
Water wastage or water contamination	300 – 3000
Inadequate control/management of storm water or pollution of the storm water system	400 – 3000
Spillage of fuels on site	300 – 3000
Inadequate provision of waste bins	100 – 1000
The non provision of eating areas	100 – 1000
Unnecessary dust generation and inadequate control	100 – 1000
Unnecessary noise generation	100 – 1000
Uncontrolled fires on site	500 – 2000
Non provision of hydrocarbon fuel absorbents	100 – 1000
Traffic offences by Site-bound vehicles on public roads in proximity	100 – 2000
No topsoil may be removed or altered outside the demarcated area and/or which was not specified	100 – 2000
All surplus material to be taken off-site and be disposed of at approved site	500 – 5000
Inadequate ablution facilities	1000– 5000
Ablution facilities not serviced regularly, (according to the manufacturer's instructions) and kept clean	100 – 1000
Concrete may only be mixed within the boundaries of the bunding area or demarcated area and/or where was agreed on by the ECO	500 – 5000
All excess cement & concrete mixes to be contained on construction site and removed from site when necessary or requested by the ECO	300 – 3000

Ensure that loose building material is covered to prevent dust pollution	100 - 1000
Rainwater from construction & building site/s must be channelled, contained & allowed to dry out, so as not to transport any pollutants into the surrounding area. Temporary trenches, straw stabilising, brush cutting can be used	500 – 5000
Cement-contaminated water; paint; oil; cement slurries etc must be stored in watertight containers or as agreed with ECO	500 – 5000
The absence of or inadequate drip trays or bunding facilities	300 – 3000
Failure to address oil/fuel leaks from on-site machinery	500 – 5000
Rehabilitation: Remove rocks and stones and stock pile in area recommended by ECO; Removal of all old concrete and alien materials from site	500 – 5000

The issuing of a penalty will usually be preceded by a verbal warning by the ECO, during which a time frame for rectifying the situation, as well as the penalty to be implemented should this not be done within the time frame, will be agreed on. The value of the penalty will depend on the seriousness of the contravention, and thus the Project Manager/Engineer must use his/her judgement in determining the value of the penalty.

In addition to penalties, the Project Manager/Engineer has the power to remove from Site any person who is in contravention of the EMP, and if necessary, the Project Manager/Engineer can suspend the relevant part or all of the works, as required. Note that penalties can be issued over and above costs that are incurred for the repair or rehabilitation of any environmental damage caused by the Contractor and all the parties over which they have responsibility. In this regard costs incurred by the Contractor in repairing or rehabilitating any environmental damage caused by non-compliance with the EMP cannot be claimed in the Contract Bill, nor can any extension of time be claimed for such works.

The payment of a penalty fine is subject to the following:

- If he / she is reasonably satisfied of the Contractor’s failure to comply with the terms of the Contract dealing with protection of the environment;
- If he / she is reasonably satisfied that it is necessary to impose such fine in order to achieve future compliance; and
- After he / she has consulted with a person suitably experienced in "environmental management plans" (as defined in National Environmental Management Act, No. 107 of 1998) as to whether there has been a failure to comply with a term of the Contract dealing with protection of the environment and as to a reasonable amount of the fine.

The Engineer shall, with respect to any fine imposed, provide the Contractor with a written statement giving details of the offence, the facts on which the assessment is based and the terms of the Contract (by reference to the specific clause) which has been contravened.

At the sole discretion of the Engineer, they may at any time before one month after the issue of the Certificate of Completion (for the last completed portion of the Works should there be more than one),

reverse all or some, in whole or in part, of previously imposed fine and shall include such reversed payment in a subsequent Payment Certificate. Penalty amounts should be deducted from Certificate payments made to the Contractor. These funds must be kept separately and donated to a non-profit organisation that works in the environmental or conservation field. The Project Team must nominate such an organisation collectively.

3.15.3 Bonuses

The ECO together with the Project Manager/Engineer may consider a bonus system and/or environmental certificate award for teams or individuals that perform works in an environmentally responsible manner.

3.16 Review of EMP

Although care has been taken to address all known relevant environmental issues for the construction phase, it may become necessary to add or amend certain procedures or instructions to improve the efficiency of the EMP. Only those additions or amendments of this EMP that will either improve environmental protection or can be proven not to have any negative effect to the immediate and surrounding environment will be considered. Any party involved with the development project can suggest changes to the EMP via the ECO. Such suggestions will be discussed at the project meeting and changes minuted and drafted into the existing EMP in the form of an appendix or amendments. Such amendments to the EMP shall also be copied to all parties, including the DEA&DP, and the City Of Cape Town Environmental and Heritage Resource Management.

Changes or deviations furthermore have to be motivated in writing by means of a motivation report and the same procedures for acceptance as in the case of a standard Method Statement have to be followed. If any additions or amendments must be submitted to the DEA&DP for approval, and must be included in the tender specifications for the Contractor. No deviation from the contents of this document is allowed without the above-named prescribed procedures.

As indicated in the introduction section of this EMP, the document is intended to be a dynamic document that will evolve and be updated to meet the changing needs of the Project as it proceeds through each element. Modifications to the document may arise from either a result of Site activities, or from external concerns. Unless otherwise or as founding conditions dictate, this EMP will be reviewed on a six monthly basis or as circumstances dictate. For example, should a non-routine event that requires the implementation of contingency measures occur as a result of following routine procedures, and then the routine procedures will be evaluated and modified. Such modification will be made to the appropriate part of the EMP. The modifications, once adapted, will also be monitored to ensure continued effectiveness.

Additionally, external influences to the EMP might include changes to legislation that require specific evaluations or modifications to procedures being utilized. The intention is to ensure that it remains relevant to the construction phase at all times. Modifications to procedures will be communicated to all Site personnel, as well as to external personnel, including the DEA&DP.

4 ENVIRONMENTAL SPECIFICATIONS

4.1 Site Construction Camp Establishment

"Construction Camp" refers to all storage stockpiles sites, site offices, container sites, other areas required to undertake construction and rest areas for employees.

The Contractor's Camp and Materials Storage Area shall be located in consultation with the ECO. The Contractor is required to fence off or visually screen the site camp. The construction camp/s shall be located at an easily accessible point and within an area of low environmental sensitivity. The contractor shall supply cooking facilities that are suitable for the environment and are not liable to cause the outbreak of fires.

No site staff other than security personnel shall be housed on site. No overnight camping/staying on site is allowed. If overnighting is necessary for security purposes then it must be cleared with the ECO on site. The Contractor shall provide water and/or washing facilities at the camp site for personnel. The Contractors Camp and Materials Storage Area shall be kept neat and tidy and free of litter. The Contractor is to ensure that the site camp complies with the Occupational Health and Safety Act (first aid and fire fighting equipment, display of emergency numbers etc).

4.1.1 Toilet Facilities

The Contractor shall provide suitable sanitary arrangements (e.g. chemical toilets) as per building guidelines (SABS 0400). There should be one toilet for every 15 workers on site. The Contractor shall be responsible for enforcing the use of the facilities. Toilets must be easily accessible and shall be secured in order to prevent them from blowing over. The siting of toilets shall be done in consultation with the RE or ECO to ensure that they are easily accessible for employees and away from residential houses off site. Performing ablutions outside of established toilet facilities is strictly prohibited.

Toilets shall not be more than 50 m away from where construction activities are being undertaken. Toilet(s) shall be located at least 32 m away from watercourses, floodplains or drainage channels, and shall be sited in consultation with the RE and ECO and regularly serviced. The Contractor shall consider placing toilet(s) on a trailer so that they can be removed from each site and taken to the construction camp on a daily basis.

The Contractor shall be responsible for ensuring that all ablution facilities are maintained in a clean and sanitary condition to the satisfaction of the RE or ECO. The Contractor shall provide toilet paper. The Contractor shall appoint a suitable Sub-contractor to empty toilets on a regular basis. The Sub-contractor shall ensure that there is no spillage when the chemical toilets are cleaned and that the contents are properly removed from site.

4.1.2 Demarcation of Eating Areas

The Contractor must designate eating areas for the approval of the ECO, which must be clearly demarcated. These areas shall provide adequate temporary shade to ensure that employees do not move off site to eat. The Contractor shall provide adequate refuse bins at all eating areas to the satisfaction of the RE and shall ensure that all eating areas are cleaned up on a daily basis. Collected waste shall be stored in a central waste area within the construction camp that has been approved by the RE and ECO.

No eating of meals must take place outside these designated areas without the approval of the Contractor/ECO. The eating areas shall be restricted to the site offices and contractors' camp. If employees are to eat elsewhere on the site, the contractors shall, in consultation with the ECO, designate places for eating in the working areas, and shall provide adequate water for washing, toilets and refuse bins at all these places, which should be cleaned on a daily basis. Sufficient waste bins must be present in the eating area and emptied regularly.

4.1.3 Water Provision

The Contractor shall be responsible for ensuring that there is access to clean drinking water for all employees on site. If water is stored on site, drinking water and multi-purposed water storage facilities shall be clearly distinguished and demarcated.

MS: The Contractor shall submit a Method Statement indicating the layout and preparation of the construction camp(s)

4.2 Defining No-go and Working Areas

It is important that activities are conducted within a limited area to facilitate control and to avoid impacts on the areas adjacent to the developable area. Areas where construction activities (including traffic accommodation) are prohibited are referred to as no-go areas and shall be demarcated to ensure that environmentally sensitive areas are not impacted on by construction activities. Appropriate no-go areas or areas of special features identified by the RE and/or the ECO shall be marked on a site layout plan prior to any works commencing on site. The RE may declare no-go areas at any time during the construction phase as deemed necessary and/or at the request of the ECO. Working areas are defined as those areas required by the Contractor to undertake the development.

Final site demarcation must be carried out with all relevant parties (who will be responsible) present for the day-to-day activities on the site and may include;

- The Client or his delegated Representative
- Environmental Consultant
- Main Contractor or his delegated Representative
- Sub-contractor (if applicable)
- Environmental Control Officer
- Environmental Officer (if applicable)

The proposed site will be demarcated prior to the commencement of any construction or earth-moving activities and this includes site establishment, the moving of construction material or any other items onto the site, etc.

The Contractor must maintain in good order the perimeter fencing and barriers for the duration of construction activities, or as otherwise instructed. Any temporary fencing removed for the execution of any portion of the works is to be reinstated by the Contractor as soon as practicable. The Contractor at the end of the contract must remove all demarcation, fencing or barriers not forming part of the final works on Site. The Contractor shall ensure that all plant, labour and materials remain within the boundaries of the working areas. Access must be restricted to development footprints only, with no disturbance of areas outside the development footprints allowed. All areas outside the perimeter of the site shall be considered as no-go areas. No areas outside the working areas may be cleared, damaged, excavated or leveled.

4.3 Site Clearing and Excavation

4.3.1 Vegetation Clearing

No vegetation clearing shall take place without prior written approval of the Method Statement (MS) by the RE. Any trees or shrubs to be removed shall be marked with hazard tape or paint by the RE to ensure that only those trees requiring removal are cut down. Before clearing of vegetation, the Contractor shall ensure that all litter and non-organic material is removed from the area to be cleared.

Vegetation clearing shall take place in a phased manner in order to retain vegetation cover for as long as possible in order to reduce the size of areas where dust can be generated by wind. All invasive plants and weedy species should be removed from the construction areas, including borrow pit areas, prior to construction to inhibit further spread of these species in these areas as a result of the construction and borrow pit development activities. Any existing patches of invasive vegetation shall be removed by manual cutting of plants to ground level or to below the water level. The Contractor shall not use heavy machinery to remove such patches of vegetation.
All cut invasive vegetation shall be disposed of off-site at an approved disposal site. Stockpiling of cut vegetation shall only be permitted in areas indicated by the RE and/or the ECO. No cut vegetation shall be burnt on site. All remaining vegetation shall be removed and disposed of at an approved landfill site.

4.3.2 Topsoil

The Contractor shall remove topsoil from all areas where topsoil will be impacted on by construction activities, including temporary activities such as storage and stockpiling, etc. Stripped topsoil shall be stockpiled in areas agreed with the RE for later use in revegetation and rehabilitation of the borrow pit sites and shall be adequately protected. Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter.

Topsoil shall be stored in stockpiles less than 2 m in height. Stockpiles shall be shaped so that no surface water ponding can take place. Stockpiles shall be protected from erosion by wind and rain by providing suitable stormwater and cut off drains, by establishing suitable temporary vegetation, and/or by the placement of hay bales or shade cloth screens or covered with hessian or geofabric. Stockpiles shall not be covered with materials such as plastic that may cause it to compost or kill the seed bank. Stockpiles shall not be left for more than eight months before being used for rehabilitation, as soil chemistry and natural processes decline after time, resulting in poor rehabilitation success. Topsoil stockpiles shall not be subject to compaction greater than 1500 kg/m2 and shall not be pushed by a bulldozer for more than 50 m.

Topsoil stockpiles shall be monitored regularly to identify any invasive and/or alien plants, which shall be removed when they germinate to prevent contamination of the seed bank. Any topsoil contaminated by hazardous substances shall not be used but shall be disposed of at an approved landfill site. Material that cannot be used in the proposed project shall be removed and retained in uncompacted stockpiles. This material shall be used for the reshaping of disturbed areas before topsoil is spread during rehabilitation.

The Contractor shall be held responsible for the replacement, at his own cost, for any unnecessary loss of topsoil due to his failure to work according to the requirements of this Construction EMP.

4.3.3 Stockpiling

Any stockpiling of gravel, cut, fill or any other material including spoil (if any) must only be allowed in degraded areas or areas below the future cover of buildings and tar or paved parking surface. Any area used for stockpiling and not covered by building development must be returned to at least the state they were in before stockpiling and it must be ensured that the erosion potential of these areas is not increased. The Contractor must ensure that the material does not blow or wash away or mix with each other. If the stockpiled material is in danger of being washed or blown away, the Contractor must cover it with a suitable material, such as hessian, netting or plastic.

4.3.4 Archaelogical Material

If any archaeological material or artefacts, fossil remains (e.g. fossil shells, petrified wood or plant remains, vertebrate bones, teeth), or human remains are discovered during earth moving activities, all construction activities must be stopped immediately and the site clearly demarcated. The Contractor must inform the RE and ECO as soon as possible in order to establish relevant procedures for notifying Heritage Western Cape. Should any unmarked human remains be disturbed, exposed or uncovered during construction or borrow pit operations, these should be reported to the South African Heritage Resources Agency (SAHRA) and Heritage Western Cape.

The Contractor will be required to abide by the specifications as set out by SAHRA and Heritage Western Cape or the project archaeologist appointed to investigate the find. The Contractor may not, without a permit issued by the relevant heritage resources authority, move, destroy, damage, excavate, alter, deface or otherwise disturb archaeological material.

MS: The Contractor shall submit a vegetation clearing Method Statement, which clearly details how the clearing will be done, where and how cleared material will be stored or disposed of, etc. The Method Statement shall also include the details of the invasive vegetation clearing programme, which shall indicate eradication areas, vegetation types, method of eradication, phasing and maintenance after initial clearing, including the defects notification period.

4.4 Erosion and Sedimentation Control

The Contractor shall, as an ongoing exercise, provide sedimentation and erosion control when working within the wetland area, to the satisfaction of the RE and ECO. During construction the Contractor shall protect areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking other measures necessary to prevent the surface water from being concentrated in wetlands and from scouring the slopes, banks or other areas.

Any runnels or erosion channels developed during the excavations and construction period shall be backfilled and compacted, and the areas restored to an acceptable condition (as determined by the RE and ECO). 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 RE and ECO.

The implementation of the following methods (or combination thereof) may be considered where applicable:

- Brushcut packing;
- Mulch or chip cover (no alien plant material may be used for this purpose);
- Straw stabilising (at a rate of one bale/m² rotated into the top 100 mm of the completed earthworks – only straw bales held with string (not wire) may be used);
- Watering;
- Planting/sodding;
- Hand seeding/sowing;
- Application of soil binders and anti-erosion compounds; and/or
- Mechanical cover/packing structures (including the use of geofabric, hessian cover, log/pole fencing).

The Contractor shall demarcate stabilised areas with painted stakes or hazard tape. Traffic and movement over stabilised areas shall be restricted and controlled by the Contractor, and damage to stabilised areas shall be repaired and maintained by the Contractor to the satisfaction of the RE and ECO.

During excavation activities the Contractor shall implement measures to prevent the migration of material from the works into drainage features and stormwater and or sewage systems. This may include the use of a cut-off trench, straw bales or geofabric siltation barriers constructed across the site at specific points.
In areas where excavation activities have been completed and where no further disturbance would take place, rehabilitation and revegetation shall commence as soon as possible.

MS: The Contractor shall submit a Method Statement detailing how to deal with erosion and sedimentation issues.

4.5 Works in Watercourse(s)

The Contactor shall only use access routes to the watercourses accepted by the RE and ECO. The Contractor, RE and ECO shall agree on how and where to access a stream or watercourse. In determining the location of the access into a wetland, a stream or water channel, cognisance must be taken of sensitive areas (e.g. surface water, natural vegetation, steep banks, etc.). The Contractor shall ensure that minimal damage is caused to banks. As far as possible, the

No machinery is allowed in any watercourse (defined as the current low flow or "wet" area of the watercourse) without prior approval. Where the Contractor believes that it is necessary to enter the wetlands with a vehicle, a Method Statement must be submitted prior to the anticipated activity for consideration by the RE and ECO. The Method Statement shall include a motivation for the need of mechanised work in the watercourse and measures that will be adopted to reduce the impact of such activity. If machinery is to be used in a watercourse, it should not cross over the low flow area any more than absolutely necessary. Any work requiring the fording of the wetland by machinery and vehicles shall be undertaken at slow speed and with clean vehicles (no leaks, etc.) and along a single track.

The Contractor shall not divert, dam or modify any watercourse without the approval of the RE and ECO. All temporary and permanent fill used adjacent to or within the wetland shall be comprised of clean sand or larger particles. Silts, clays, granitic sands and boulders, shall not be permitted in the fill. Banks shall be suitably stabilised incrementally immediately after construction. Stabilisation facilities shall be continuously maintained.

The Contractor shall not modify the bed of any channels or watercourses or cause any physical damage to any aspects of a watercourse other than that necessary to complete the works as specified and in accordance with the accepted Method Statement(s). Construction may not permanently alter the surface or subsurface flow of water through any aquatic ecosystem.

MS: The Contractor shall submit a Method Statement detailing how work in the wetland and other watercourses shall be undertaken (including timing and phasing of activities, diversion of water, etc.). The Method Statement shall include a motivation for the need of mechanised work in the watercourse and measures that will be adopted to reduce the impact of such

4.6 Water Diversion/Drainage

If work in the wetland or a watercourse has to proceed in flow conditions, the Contractor shall ensure uninterrupted flow of clean surface water past the construction works to the satisfaction of the RE and ECO. This shall be done by draining/diverting water away from the work areas.

Contaminated water (silt-laden, cement-contaminated, etc.) pumped from the works area shall be pumped into a settlement pond to reduce the amount of suspended sediments before re-entry into the watercourse. The Contractor shall shape the excavated floors in accordance with the layout plans to ensure that water does not accumulate within the excavations.

4.7 Protection of Natural Features, Flora and Fauna

4.7.1 Protection of Natural Features

The Contractor shall not permit employees to make use of any natural water sources (e.g. wetland, streams, open water bodies) for the purposes of swimming, personal washing and the washing of machinery or clothes. The Contractor shall not deface, paint, damage or mark any natural features situated in or around the site for survey or other purposes unless agreed beforehand with the RE. Any features affected by the Contractor in contravention of this clause shall be restored/rehabilitated to the satisfaction of the RE and ECO.

The Contractor shall prevent pollution of surface or underground water and shall comply with the Water Act, 36 of 1998, and any other national, provincial and local legislation regarding the prevention of water pollution, including the pollution of ground and storm water.

The Contractor must ensure that all reasonable precautions are taken to prevent the pollution of the ground and water resources as a result of site activities. Ground contamination may hinder or prevent the re-establishment of natural vegetation. The Contractor shall keep the necessary materials and equipment on site to deal with ground spills of any of the materials used or stored on site. In addition, the Contractor shall ensure that no oil, petrol, diesel, paint, etc. is discharged onto the ground.

Pumps and all machinery requiring oil, diesel etc. that are to remain in one position shall be placed on drip trays. The drip trays shall be emptied regularly and the contaminated water disposed of offsite at a facility capable of handling such wastewater. Drip trays shall be cleaned before any possible rain events that may result in the drip trays overflowing and before long weekends and holidays.

Storm water and/or groundwater may accumulate on site during the construction period and there is the potential for this water to be contaminated as a result of construction procedures. The Contractor shall ensure that this water does not become contaminated. Contaminated water (e.g. cement washings or waste water from ablution etc) shall be collected in a conservancy tank, removed from the site and disposed of in a manner approved by the ECO.

Potential pollutants of any kind and in any form must be kept, stored, and used in such a manner that any escape can be contained and the water table not endangered. This particularly applies to water emanating from runoff from fuel depots/workshops/truck washing areas. Wash down areas must be placed and constructed in such a manner so as to ensure that the surrounding areas are not polluted.

Contaminated water includes water that is carrying excess sediment due to construction activities. The contractor, being responsible for the construction and effective containment and maintenance of settlement ponds must ensure that the surrounding environment is not adversely affected as a result of construction activities. Contaminated water storage facilities must not be allowed to overflow and appropriate protection from rain and flooding must be implemented.

Contaminated water that is removed from site must be disposed of at a facility approved by the ECO and Local Authority. No contaminated water that does not meet the water quality standards and criteria under the National Water Act may be released into a natural system, whether it is to surface or groundwater
All cement effluent from mixer washings, and run-off from batching areas and other work areas must be contained in suitable sedimentation ponds. Sedimentation ponds must be allowed to dry out on a regular basis to allow for solid material to be removed. This material must be disposed of in a suitable manner, depending on the nature of the material, and to the discretion of the ECO.

4.7.2 Protection of Flora and Fauna

The removal, damage or disturbance of flora, fauna or avifauna is forbidden outside the immediate construction area without the written approval of the RE. The clearing of vegetation shall be undertaken as specified in Section 4.3.1.

The Contractor shall ensure that no hunting, trapping, shooting, poisoning or otherwise disturbance of any fauna takes place. The feeding of any wild animals is prohibited. No domestic pets or livestock are permitted on site.

The Contractor shall be responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction site as a result of their activities. The Contractor shall ensure that vehicles do not enter natural vegetation outside of the footprint required for construction. Care shall be taken at all times to avoid sensitive vegetation of high conservation value. Specific care shall be taken to avoid environmentally sensitive no-go areas, including but not limited to the key areas.

The removal, damage and disturbance of natural vegetation without the written approval of the RE are prohibited. The use of herbicides is prohibited unless approved by the RE and ECO. If disturbed by construction activities, the riparian habitat and vegetation of the river/streams shall be rehabilitated and planted with suitable indigenous riparian plants once construction activities are complete. Land disturbed during stormwater ponds development and construction works shall be rehabilitated.

4.8 Materials Handling and Storage

4.8.1 Transportation and Handling of Material

The Contractor shall ensure that all subcontractor suppliers and their delivery drivers are aware of procedures and restrictions (e.g. no-go areas) in terms of this Construction EMP. The Contractor (and

suppliers) shall ensure that all materials are appropriately secured to ensure safe passage between destinations. Loads including, but not limited to sand, stone chip, vegetation, refuse, shall have appropriate cover to prevent them spilling from the vehicle during transit. The Contractor shall be responsible for any clean-up resulting from the failure by his employees or suppliers to properly secure transported materials. The Contractor shall ensure that these delivery drivers are supervised during on and offloading. The movement of construction vehicles should be limited to daylight hours as far as possible. The dangers associated with the movement of large haulage vehicles shall be clearly sign-posted in both directions leading up to the proposed site.

Vehicles leaving the Site shall not deposit/shed mud or sand as they drive to the area under construction. Loads shall be covered with a tarpaulin or similar to prevent disturbances to other road users on windy days.

4.8.2 Storage of Construction Materials and Hazardous Substances

The storage of any materials (e.g. cement, oil, fuel, herbicides, etc.) shall not take place within 32 m of any demarcated no-go areas or watercourses or drainage channels. All fuel, oil and other hazardous substances (i.e., fuel, poisons, etc.) shall be confined to demarcated, adequately bunded areas within the construction camp and stored in suitable containers.

Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. Fuel shall be stored in steel tank(s) supplied and maintained by the fuel suppliers. Tank(s) shall be adequately bunded (110% of volume). The floor and wall of the bund area shall be impervious to prevent infiltration of any spilled/leaked fuel, oil or hazardous substance into the soil. Suitable fire fighting equipment, to the approval of the RE, shall be supplied and installed by the Contractor in the hazardous substances storage area.

The relevant Material Safety Data Sheets for all hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) shall be submitted to the RE. The Contractor shall have a copy of the Material Safety Data Sheets readily available and ensure that he/she or his/her employees who are required to use such substances are fully conversant with the safe handling precautions, protective equipment to be used and storage precautions to be taken.

Areas for the temporary stockpiling of excavated material and other construction material shall be as agreed with the RE and ECO. No material of any description shall be stockpiled in any wetland areas. The Contractor shall ensure that run-off from any stockpile, fuel/oil or hazardous substance storage area is contained and does not pollute the ground or enter the channels or any other water features in the construction areas.

If potentially hazardous substances are to be stored on site, the Contractor must provide a Method Statement detailing the substances/materials to be used, together with the storage, handling and disposal procedures of the materials to the Engineer and the ECO.

Paints: - No paint products may be disposed of on Site and brush/roller wash facilities must be established to the satisfaction of the Engineer and the ECO. Oil based paints and chemical additives and cleaners such as thinners and turpentine must be strictly controlled. A Method Statement detailing the paint management procedures is required.

Hazardous building materials: -Hazardous building materials (e.g. asbestos, fibre claddings, refrigerants, coolants, sub-station cooling oils, etc) must be identified and dealt with in accordance with the relevant safety and health legislation. All such material must be separated on Site and disposed off at appropriate licensed disposal sites. The Contractor must supply the ECO with a certificate of disposal. Hazardous materials should be stored under lock and key in designated areas with properly displayed and visible warning signs. The Contractor shall comply with all relevant legislation with regard to the transport and storage of such substances. The Contractor shall provide proof to the RE and ECO that relevant authorisation to store such substances has been obtained from the relevant authority. The Contractor shall comply with all applicable by-laws with regard to road safety and the transport of materials, especially hazardous materials.

In addition, hazard signs indicating the nature of the stored materials shall be clearly displayed on the storage facility or containment structure. Before containment or storage facilities can be erected, the Contractor shall furnish the RE and ECO with details of the preventative measures (emergency procedure to deal with accidents and incidents arising from hazardous substances), which are proposed to be installed in order to mitigate against pollution of the surrounding environment from leaks or spillage. The preferred method of such mitigation shall comprise a concrete floor that is bunded. The Contractor shall furnish employees with details of the proposed preventative measures.

The Contractor shall report major incidents (spills in excess of 50 litres) to the RE and ECO immediately and follow the designated emergency response procedure.

The Contractor shall be responsible for the training and education of all employees who will be handling hazardous materials about their proper use, handling and disposal. All the necessary handling and safety equipment required for the safe use of petrochemicals and oils shall be provided by the Contractor to, and used or worn by, the staff whose duty it is to manage and maintain the machinery and equipment.

Contractors shall identify fuels and hazardous substances to be stored on the site and shall ensure that they know the effects of these substances on their staff and the environment. A copy of a fuels and hazardous substance inventory shall be supplied to the ECO by the contractors.

Contractors shall ensure that the quantities of fuels and chemicals on site are appropriate to the requirements and are stored and handled so as to avoid the risk of spillage. All fuels, oils and chemicals shall be confined to specific and secured areas, approved by the ECO. These materials shall be stored in an area with a concrete or other impervious base, which is adequately bunded. The volume of the bund shall be two times the volume of the containers stored. Gas and fuel should not be stored in the same storage area, and any generators used on the site should also be placed on a bunded surface.

In the event that fuels, oils and other hazardous fluids are to be stored on site and approval of fuel storage must be given by the ECO and Project Manager/Engineer (refer to the SABS bulk and small volume fuel storage guidelines as available from the local Fire Fighting Authorities).

Basic guidelines to follow if any fuels are to be stored are as follows:

- These areas must comply with general fire safety requirements.
- All vehicles, equipment, fuel and petroleum services and containers must be maintained in a good condition that prevents leakage and possible contamination of soil or water supplies. Drip trays are to be used in these storage areas to prevent contamination of the ground in the event of spills/ leaks
- All plants/fuel tanks must have a bund or drip tray present (whichever is applicable) to use in the event off accidental spillage of oils and fuels and must contain a capacity level of 120% of the capacity of the plant fuel and oil tanks.
- A suitable leak proof container for the storage of oiled equipment (filters, drip tray contents and oil changes etc.) must be established.
- Fuels and oils must be safely located in a designated area out of harms way from the elements and safety and fire prevention must be strictly adhered to.
- All spills are to be recorded in the ESO diary.

In addition, the following must be implemented:

- All fuel stores must be equipped with a fire extinguisher;
- No vehicle servicing may take place on the site. Servicing of equipment that uses hydrocarbon fuels, oils, lubricants and other hazardous chemicals may only take place in the site camp under conditions approved by the ECO and the Project Manager/Engineer;
- A suitable leak proof container is to be used for the storage of oiled equipment. This container is to be removed from site and the contents disposed of at an approved waste site as required;
- Fuels and oils must be stored in tanks or drums with lids that remain firmly shut and shielded from the elements. Safety and fire prevention precautions must be strictly adhered to (ref SABS fuel storage standards);
- All fuels are to be stored within a lined demarcated area in the Site Camp. No refuelling is to take place outside of this demarcated area unless authorised by the ECO. Note that filling machinery in the field (on site) from canisters should be cleared with the ECO and both a “no leak” funnel / pump and one of the above mentioned absorption products must be on hand in the event of such refuelling taking place;
- All fuel, oil or hydraulic fluid spills are to be reported to the Project Manager/ Engineer and ECO immediately so that appropriate clean-up measures can be implemented.

MS: The Contractor shall submit a Method Statement detailing the location of storage, methods intended for storage of oil, fuel, herbicides, pesticides and other hazardous/poisonous substances. This Method Statement should also detail precautions that shall be implemented to limit spills and leakage of these substances.

4.9 Equipment Servicing, Cleaning and Storage of Equipment

All vehicles and equipment must be maintained in a good condition in order to minimise the risk of leakage and possible contamination of the soil, groundwater, surface water and/or storm water by fuels, oils and hydraulic fluids.

All plant, construction equipment, vehicles shall be stored within the construction camp, unless prior arrangements have been made with the RE or ECO. Drip trays shall be provided for stationary plant (e.g. excavators, compressors, pumps, generators, etc.) and for "parked" plant (e.g. mechanised equipment).

4.10 Appropriate use of Machinery

Contractor must at all times carefully consider what machinery is appropriate to the task while minimizing the extent of environmental damage. The contractor may not operate any machinery including a fuel driven compressor outside the demarcated area. Where practical, all maintenance of plant and machinery on Site must be performed in workshops. If it is necessary to do maintenance outside of a workshop area, the Contractor must obtain the approval of the Engineer and the ECO prior to commencing activities.

All vehicles and equipment must be routinely inspected for fuel and oil leaks and kept in good working order and serviced regularly. Leaking equipment must be repaired immediately or removed from the Site. When servicing equipment, drip trays must be used to collect the waste oil and other lubricants. Drip trays must also be provided in construction areas for stationary plant (such as compressors) and for "parked" plant (such as scrapers, loaders, vehicles). Drip trays should be kept free of water that will float the oil to overspill. All drip trays/bungs to attain a 120% capacity of the plant fuel/oil capacity.

Appropriate 2.5kg (minimum requirement) dry powder SABS approved and service certified fire fighting extinguishers must be easily available at strategic points on the site (e.g the site office, fuel stores, etc.

4.11 Refuelling and Maintenance

4.11.1 Refuelling

Where reasonably practical, plant and vehicles shall only be refuelled in a demarcated refuelling/servicing area within the construction camp as agreed to with the RE and ECO. If this is not reasonably practical, then the surface under the temporary refuelling area shall be protected against pollution (e.g. the use of drip trays) to the reasonable satisfaction of the RE and/or the ECO prior to any refuelling activities. No refuelling shall be permitted within 32 m of any rivers, local drainage channels or any other water features.

The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown spills and where possible is designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle the total volume of the hydrocarbon/hazardous substance stored on site. This material must be accepted by the RE prior to any refuelling or maintenance activities.

4.11.2 Maintenance

All vehicles and equipment shall be kept in good working order and serviced regularly. Leaking equipment shall be repaired immediately or removed from the site. Where reasonably practical, maintenance activities shall only be undertaken in a demarcated maintenance area (as agreed to with the RE and ECO). No maintenance activities shall be allowed within 32 m of the wetland or other streams, local drainage channels or any other water features, unless this is absolutely necessary.

When servicing equipment, drip trays shall be used to collect the waste oil and other lubricants. All hazardous waste from maintenance activities shall be disposed of as specified in Section 4.8.2.

The washing of equipment shall be restricted to urgent maintenance requirements only. All washing shall be undertaken in the maintenance area, and these areas must be equipped with suitable wastewater collection measures. The use of detergents for washing shall be restricted to low phosphate and nitrate containing, low sudsing-type detergents.

4.12 Accidental Leaks and Spills

Watercourses should be protected from direct or indirect spillage of pollutants such as refuse, garbage, cement, concrete, sewage, chemicals, fuels, oils, aggregate, tailings, wash water, organic materials and bituminous products. In the event of a spillage during the construction phase, the responsibility for spill treatment lies with the Contractor and the Contractor will be liable to arrange for competent assistance to clear the affected area. The Contractor shall compile and maintain environmental emergency procedures to ensure that there will be an appropriate rapid response to unexpected or accidental environment-related incidents throughout the life cycle of the project.

The Contractor shall prevent pollution of surface or groundwater, which could result from their activities. Such pollution could result from the release, accidental or otherwise, of oils, fuels, sewage etc. The Contractor shall ensure that his/her employees are aware of the procedure to be followed for dealing with spills and leaks. Any accidental leak and spill of fuel, oil or other hazardous substances is to be reported to the RE or ECO immediately so that the best remediation method can be quickly implemented.

Drip trays shall be used for all pumps, generators, etc. in order to prevent water contamination as a result of fuel spills or leaks. The Contractor shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on site at all times.

In the event of a hydrocarbon spill, the source of the spillage shall be isolated and the spillage contained. The area shall be cordoned off and secured. The Contractor shall ensure that there is always a supply of absorbent material readily available to absorb/breakdown and where possible is designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle the total volume of the hydrocarbon/hazardous substance stored on site. This material must be accepted by the RE prior to any

refuelling or maintenance activities. Hydrocarbon contaminated material/soil shall be collected and stored in a bunded area until future disposal.

The relevant Material Safety Data Sheets (MSDSs) for all hazardous chemical substances (as defined in the Regulations for Hazardous Chemical Substances) shall be on site. Procedures detailed in the MSDSs shall be followed in the event of an emergency situation.

The Contractor shall be liable to arrange for professional service providers to clear the area affected by the spill, if required.

The individual responsible for, or who discovers a hazardous waste spill must report the incident to the Contractor, the RE and ECO. The Contractor shall assess the situation in consultation with the RE and ECO and act as required. In all cases, the immediate response shall be to contain the spill. The Contractor, in consultation with the RE and ECO, shall determine the exact treatment of polluted soil/water. Areas cleared of hazardous waste shall be re-vegetated according to the RE's instructions.

Should water downstream of the spill be polluted, and fauna and flora show signs of deterioration or death, specialist hydrological or ecological advice must be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the Contractor, RE and ECO. The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input.

MS: The Contractor shall submit a Method Statement detailing the precautions that shall be implemented to limit spills and leakage of these hydrocarbons and other hazardous substances.

4.13 Environmental Education

According to the National Environmental Management Act (107 of 1998), any costs incurred to remedy environmental damage shall be borne by the person responsible for that damage, it is therefore critical that the contractors read and understand the requirements of this document. It is a requirement of the act that everyone takes reasonable measures to ensure that they do not pollute the environment.

The information presented at the course shall be communicated by the Contractor to the rest of the employees on the site, to any new employees coming onto site after the initial training course and to his / her suppliers. The presentation shall be conducted, as far as is possible, in the employees' language of choice. Please note that FAILURE to attend the training will result in a penalties being issued to the contractor.

As a minimum, training shall include:

- 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;
- Ensure that all employees are aware that they are NOT to harm or kill any animal, especially lizards and snakes.
- Individual responsibilities under the EMP and complaint handling procedures;
- Risk management strategies for addressing potential environmental impacts and for developing appropriate control strategies for any activity perceived to pose an environmental risk;
- Explanation of the importance of complying with the EMP;
- Employees' roles and responsibilities, including emergency preparedness;
- Explanation of the mitigation measures that must be implemented when carrying out their activities;
- Key environmental concerns and associated control strategies
- How hazardous or dangerous goods will be handled;
- Waste minimisation, recycling, and disposal guidelines;
- Incident and emergency response actions including reporting and recording guidelines

In view of the above paragraph, the following must be fulfilled:

- All personnel working on the construction site must attend environmental awareness training workshops conducted by the ECO. The purpose of these workshops is to provide staff with the information they require to enable them to meet the requirements of the EMP.
- Contractors shall make allowance for site staff to attend an initial environmental awareness training workshop of approximately one hour. In addition, contractors shall ensure that all new staff and sub-contractors attend environmental awareness training workshops before commencement of work.
- All personnel involved in day-to-day activities that could have an impact on the environment must be given on-the-job training in the procedures to be followed.
- Contractors shall keep a register of all personnel attending the awareness training workshops and the on-the-job training detailed above and copy this to the ECO.
- All new staff and sub-contractors that start work during the course of the contract must attend the training workshops conducted by the ECO.
- All staff must be trained in emergency response procedures through the conducting of dry runs of emergency situations. Records of emergency response training must be maintained and must include an attendance list for each training session. These records must be made available for audit purposes.

The Contractor shall keep records of all environmental training sessions, including names of attendees and dates of their attendance.

4.14 Working Hours and Construction Personnel

During construction, working hours will be permitted from 06:00 to 18:00 Mondays to Saturdays. The Contractor shall be familiar with all relevant local by-laws and regulations concerning noise, hours of operation, etc. and shall adhere to these by-laws and regulations. Only emergency work shall be allowed on Sundays and at night.

The Contractor shall negotiate for any permits requiring deviation from local by-laws and/or regulations. The Contractor shall be held responsible for any complaints received from the authority and/or public with respect to any contravention of the agreed conditions. Other work outside of normal hours shall be subject to consultation with residents in close proximity of the construction site that will be affected by the noise.
It should be noted that written approval from the Local Authority needs to be obtained for any work that is to be undertaken outside of normal working hours.

Without compromising construction and schedules, local labour should be employed as far as possible. Those successful in obtaining employment should be provided with the appropriate skills development and training. The Contractor is to submit the names of all personnel on site. Personnel will only be permitted to eat and smoke in cordoned-off areas and no littering, alcohol or drugs will be allowed on site.

4.15 Batching and Mixing Areas

Asphalt plants are considered scheduled processes listed in the second schedule to the atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965). Should the use of an asphalt plant be required on site, the Contractor will be required to obtain the necessary permit from DEA&DP.

Crushing plants (if any) and asphalt or concrete batching plants shall be located in an area of low environmental sensitivity. Such sites will be subjected to regular inspection by the relevant authorities during the life of the project. In addition, the selection, entry onto, operation, maintenance, closure and rehabilitation of such sites shall be the same as for “spoil sites” with the exception that the Contractor shall provide additional measures to prevent, contain and rehabilitate any environmental damage from toxic/hazardous substances. In this regard, the Contractor shall provide plans that take into account such additional measures such as concrete floors, bunded storage facilities, linings to drainage channels etc.

Cement powder has a high pH. Spillage of dry cement powder and concrete slurry will affect both soil and water pH adversely. Careless handling of cement products resulting in spillage could have serious detrimental effects on the surrounding environment.

The Engineer (in collaboration with the ECO) must indicate the permitted location of batching plants (including the location of cement stores and sand and aggregate stockpiles), if these are to be present on Site, on a site plan. A Method Statement indicating the layout and preparation of such facilities may have to be submitted. Cleaning of equipment and flushing of mixers must not result in pollution of the surrounding environment. All wastewater resulting from batching of concrete must be disposed of via the contaminated water management procedure. Used cement bags must be stored in weatherproof containers to prevent wind dispersion and water contamination. Used cement bags must be disposed of on a weekly basis via the solid waste management system, and must not be used for any other purpose. Cement bags may not be disposed of on-site, but removed on a weekly basis to an approved dumpsite.
All visible remains of excess concrete must be physically removed and disposed of on completion of cement work. Washing the remains into the ground is not acceptable. All excess aggregate must also be removed.

The following recommendations/ mitigation measures must be implemented to minimise impact:

- No batching activities shall occur on unprotected substratum of any kind (i.e. directly on the ground). Concrete mixing must take place on top of boarding and/or sheeting so as to protect the ground. This board and or sheeting must be removed from the site once the mixing is complete. Cement must be mixed on mixing trays that prevent runoff and spillage. No mixing will be allowed directly on the ground's surface;
- Concrete batching to take place at identified areas only in consultation with the ECO;
- Cement contaminated water may not enter a natural water system e.g. wetland. Preventative measures include establishing sumps from where contaminated water can be either treated in situ. All wastewater and runoff from batching areas shall be strictly controlled, and cement contaminated water shall be collected, stored and disposed of at an approved site;
- Contaminated water storage facilities shall not be allowed to overflow and appropriate protection from rain and flooding shall be implemented;
- Care shall be taken to collect contaminated wash-water resulting from cleaning activities of equipment and flushing of mixers, and dispose of it in a manner approved by the IE and ECO;
- Suitable screening and containment shall be in place to prevent wind-blown contamination associated with bulk cement silos, loading and batching;
- Dry mixing batching areas to be carefully placed in consultation with the ECO. If possible/appropriate ready mix concrete must be used;
- Cement bags are to be stored securely out of harms way from the elements (wind and rain). Unused cement bags are to be properly stored so as not to be affected by rain or runoff events;
- Used cement bags are to be stored in a wind and rainproof container for disposal. Used bags are to be removed from site on a regular basis and under no circumstances burned as a method of disposal;
- Sand and stone to be stored on plastic if it is stored outside the future fenced off site;
- Responsibly used ready-mix concrete and cement is preferred to site batched mixes;
- Cement contaminated equipment is to be washed so that contaminated water does not enter storm water, groundwater and/or drainage lines. Contaminated water must either be removed from site or, with the approval of the ECO and the Local Authority, be disposed of into the local sewage system. Where possible, contaminated water should be recycled back into the batching process;
- Contaminated soil resulting from a cement or concrete spill is to be removed or rehabilitated at the cost of the Contractor and to the satisfaction of the Project Manager/Engineer and the ECO;
- The Contractor shall apply to the relevant national authority for approval and closure of these measures; and
- The Contractor shall invite the relevant regulatory authorities to inspect the site within 2 months after any plant is commissioned and at regular intervals thereafter, not exceeding 12 months apart.

Note: In the event of Ready Mix concrete deliveries taking place on site the site foreman must ensure that no wash-down of ready mix trucks takes place on or around the site except, as a last resort, at the concrete batching area where concrete waste water may be contained into the existing bunding pit. Any alternative method of disposal must be approved on the basis of Method Statement to be submitted for the approval of the ECO.

MS: The Contractor shall submit a Method Statement detailing cement storage, concrete batching areas and methods, method of transport of cement and concrete, storage and disposal of used cement bags, etc. for each concrete batching or on-site cement mixing operation.

4.16 Waste Management

The Contractor is responsible for the establishment of a waste control system that is acceptable to the Project Manager/Engineer and the ECO. This system is to be presented to the ECO in the form of a Method Statement prior to the commencement of works. For the purposes of this EMP, waste includes all debris, refuse, hazardous waste, construction litter and asphalt (tar) waste. The Contractor shall submit a Method Statement indicating the waste handling and management during the construction period.

4.16.1 Solid Waste

Solid waste includes all construction debris (cement bags, old cement, tags, wrapping materials, timber, cans, wire, nails, etc.), waste and surplus food, food packaging, organic waste, etc. The Contractor shall be responsible for the establishment of a solid waste control and removal system in order to prevent the spread of waste in, and beyond, the construction site that is acceptable to the RE and ECO.

Disposal of solid waste shall be at a permitted landfill site or at a site approved by DEA in the event that an operating permitted landfill site is not within reasonable distance from the site offices. No waste material shall be burned at the site offices, or anywhere else on the site, including the approved solid waste disposal site (also refer to COLTO Specification 1404(a).

All waste bins must have lids and be suitably wind-proof, being made of a durable, appropriate material.

Bins are to be located at all areas of the site, with waste to be removed from the waste bins daily or when near full. All waste shall be stored in a demarcated area, which meets the satisfaction of the RE and ECO.

Dumping of construction rubble, cut vegetation or other material shall only be permitted in areas indicated by the RE and ECO (also refer to COLTO Specification 3203 and 4306). The Contractor shall ensure that the site is cleaned up on a daily basis. The general cleanliness of the site shall be considered as part of the site inspections undertaken by the Contractor and ECO.

Wherever possible, materials used or generated by construction shall be recycled. Containers for glass, paper, metals and plastics shall be provided, should sufficient recyclable material be generated. Office and camp areas are particularly suited for this purpose. These materials could be sold to appropriate recycling merchants or taken to an appropriate recycling plant.

4.16.2 Litter

No littering by construction workers must be allowed. During the construction period, the facilities shall be maintained in a neat and tidy condition, and the site is to be kept free of litter. Fines shall be implemented for persons found littering.

Measures shall be taken to reduce the potential for litter and negligent behaviour with regard to the disposal of all refuse. At all places of work, the Contractor shall provide litter collection facilities for later safe disposal at approved waste disposal sites (also refer to COLTO Specification 1302(b).

Refuse collected from the working areas must be stored in a water- and animal- proof enclosure at the designated site camp. Refuse is to be removed from the site camp at least once a week by the Contractor or an appointed refuse removal agent (or approved local waste removal system). Refuse must be disposed of at an approved waste disposal site.

The Contractor will ensure that waste and surplus food, food packaging and other waste is not deposited by employees anywhere on the site except in refuse bins for removal on a daily basis by the Contractor to the central point in the site camp. Refuse bins shall be watertight, wind-proof and scavenger-proof, and shall be placed at regular intervals throughout the site. The ECO will approve the design of the bins. Refuse collected from the site shall be stored in an appropriate closed and weatherproof container and removed once a week.

Refuse shall be separated into suitable categories and re-cycled. Construction debris such as scrap metal shall be collected in a skip container and disposed of at an approved dumpsite. Refuse may not be burnt or buried on the site, or in the vicinity. Contractors shall identify a permitted refuse disposal site for various categories of waste and provide documentary proof to the PM and ECO of the type and volume of waste to be disposed of there. The Contractors shall provide workers to clean up the site on a daily basis and the general cleanliness of the site shall form part of the site inspections undertaken by the ECO.

4.16.3 Hazardous Waste

Hazardous waste such as bitumen, tar, oils, etc. shall be disposed of in an approved hazardous landfill site. Special care should be taken to avoid spillage of tar products such as pre-coating fluid to avoid water-soluble phenols from entering the ground or contaminating water.

Under no circumstances shall the spoiling of bituminous products on the site, over embankments, or any burying be allowed. Unused or rejected bituminous products shall be removed from site and taken to the supplier’s production plant. No spillage of bituminous products shall be allowed on site. In the event of the above occurring, the affected areas shall be promptly reinstated to the satisfaction of the RE and ECO.

Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and returned to the supplier. Water and oil should be separated in an oil trap.

Oils collected in this manner should be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at approved waste disposal sites for toxic/hazardous materials. Oil collected by a mobile servicing unit should be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company. The Contractor shall ensure that an emergency preparedness plan is in place for implementation in the case of a spill or substances, which can be harmful to an individual or the receiving environment.

All used filter materials should be stored in a secure bin for disposal off site. Hazardous waste shall not be stored or stockpiled in any area other than that designated on the construction site layout. Hazardous and flammable substances must be stored and used in compliance with the applicable regulations and safety instructions. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials.

Petroleum, chemical, harmful and hazardous waste is to be stored in an enclosed and bunded area. The location of such bund sites is to be approved by the Project Manager/Engineer and the ECO. This waste will be disposed of at a hazardous waste disposal site as approved by the Local Authority. Storage and disposal etc. is also controlled through other relevant legislation that must be compiled with e.g. the Occupational Health & Safety Act.

All hydrocarbon (e.g. fuel, oils and contaminated soil/materials) and other hazardous waste resulting from spills, refuelling and maintenance activities shall be disposed of at a licensed hazardous waste site or, where possible, sold to an approved used-oil recycling company. The Contractor shall provide disposal certificates issued by the hazardous waste disposal facility to the RE. In addition, disposal certificates shall be kept at the site office for inspection by any relevant authority.
Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery may be collected in holding tanks prior to disposal.

No hydrocarbon and hazardous waste shall be burnt or buried on site. Under no circumstances shall the spoiling or burial of tar or bituminous products be allowed on site. Unused or rejected tar or bituminous products shall be returned to the supplier's production plant.

4.16.4 Spoil Sites

The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site used during the contract period. This shall include existing spoil sites that are being re-entered.

Before spoil sites may be used, proposals for their locality, intended method of operation, maintenance and rehabilitation shall be given to the RE and ECO for approval. The affected landowner must be consulted and must provide consent for the location of these spoil sites on his property prior to the submission of proposals for use to the Contractor. No spoil site shall be located within 500 m of any watercourse, nor in areas of high ecological sensitivity identified in the EIA. A photographic record shall be kept of all spoil sites

for monitoring purposes, and must include photographs of before the site is used, as well as after re-vegetation.

The use of approved spoil sites for the disposal of hazardous or toxic wastes shall be prohibited unless special measures are taken to prevent leaching of the toxins into the surrounding environment. Such special measures shall require the approval of the relevant provincial or national authority. The Contractor shall be required to obtain the necessary authority approval.

Spoil sites shall be shaped to fit the natural topography. Slopes shall not exceed a vertical: horizontal ratio of 1:2. Only under exceptional circumstances shall approval be given to exceed this ratio. These sites shall receive a minimum of 75 mm topsoil and be grassed with a suitable seed mixture. Appropriate revegetation measures to minimise soil erosion shall be undertaken by the Contractor. The Contractor may motivate to the RE and ECO for other acceptable stabilising methods, but this motivation cannot be based solely on cost savings. The RE and ECO may only approve a completed spoil site at the end of the construction period upon receipt from the Contractor of a landowner's clearance notice and an engineer's certificate certifying slope stability. The Contractor's costs incurred in obtaining the necessary certification for opening and closing of spoil sites shall be deemed to be included in the tendered rates for spoiling.

4.16.5 Wastewater

The Contractor(s) shall prevent pollution of surface or groundwater from the release, accidental or otherwise of contaminated water (including contamination with chemicals, oils, fuels, cement, sewage, construction water, water carrying products, etc.) as a result of construction activities.

The Contractor shall be responsible for the construction and operation of necessary collection facilities in order to prevent such pollution and/or settlement of suspended matter, and shall dispose of the collected waste water as approved by the RE. Water from any kitchen, showers, laboratories, sinks, etc. shall be discharged into a conservancy tank for removal from the site.

The Contractor shall ensure that water runoff from fuel depots, workshops, truck washing areas and concrete swills passes through an oil separation/settlement system before being released or alternatively is directed into a conservancy tank for disposal at a site approved by the ECO and local authority.

Temporary stormwater drainage and detention from the works shall be designed in collaboration with the RE and ECO. No wastewater shall be disposed of directly into any surface water bodies.

> ***MS: The Contractor shall submit a Method Statement detailing how wastewater would be collected from all wastewater generating areas (e.g. maintenance areas, batching plants, bunds, etc.), as well as storage and disposal methods. The Method Statement shall also detail the temporary stormwater drainage on site.***

4.17 Access onto Private/Neighbouring Property

The Contractor shall contact and notify the landowner(s) prior to undertaking any construction activities on his/her property as per the defined works.

The Contractor shall ensure that his/her staff do not enter the private properties adjacent to the construction site under any circumstances except on official business.

4.18 Storm Water Control

Contractors shall take reasonable measures to prevent erosion resulting from a diversion, restriction or increase in the flow of storm water caused by the presence of their works, operations and activities, all to the satisfaction of the ECO. Any storm water collected in bunded areas containing oils, fuels, chemicals or other potentially polluting substances shall be pumped out of the bund, collected in a suitable container and removed from the site for disposal as per the City of Cape Town storm water-pollution by law. Ground water and storm water in excavated areas shall be filtered through settlement ponds and filters before being discharged/ pumped into the storm water system.

Contractors shall provide adequate control measures to prevent storm water damage and erosion during construction. Control measures should include the control by sumps and adequate pumping of water ingress into trenches below the water table. Storm water should also be directed into attenuation ponds wherever possible. All methods of storm water control during the construction phase are to be agreed and approved by the PM and ECO. Berms and existing storm water drainage systems shall be used to prevent surface run-off from entering site excavations.

4.19 Dust Control

The Contractor shall ensure that the generation of dust is minimised and shall implement a dust control programme to maintain a safe working environment, minimise nuisance for surrounding agricultural activities, residential areas/dwellings, etc. The Contractor shall take all reasonable measures to minimise the generation of dust as a result of construction activities. Appropriate dust suppression measures, to the satisfaction of the RE, shall be used when dust generation is unavoidable, particularly during prolonged periods of dry weather. Such measures shall also include the use of temporary stabilising measures (e.g. chemical soil binders, straw, brush packs, chipping etc.).

The Contractor will be solely responsible for the control of dust and for any claims against the proponent for damages resulting from dust. All activities that generate dust will be kept moist with water. If possible non-potable water should be used for dust mitigation.

The Contractor shall ensure that exposed areas and material stockpiles are adequately protected against the wind (e.g. wetting exposed soil/gravel areas during windy conditions, covering of material stockpiles,

etc.). The location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors.

Construction vehicles shall comply with speed limits (speed limit for light vehicles is 40 km/hr and for heavy vehicles 20 km/hr) and haul distances shall be minimised. Material loads shall be suitably covered and secured during transportation.

Soil stockpiles (if any) shall be located in sheltered areas where they are not exposed to the erosive effects of the wind. Also, sand will be covered with shade cloth if not used for more than 24 hours. To control dust from the batching operation, water shall be spayed on the materials at regular intervals. Excavation, handling and transport of erodible materials shall be avoided under high wind conditions. During high wind conditions, the PM and ECO shall evaluate the situation and make a recommendation as to whether dust-damping measures are adequate, or whether work should cease altogether until wind speeds drop to acceptable levels.

4.20 Noise Control

Noise generation during construction could create disturbance and a nuisance for people working, resident in and commuting through the area. Contractors shall thus restrict working hours for construction activities to: **07h00-18h00 on weekdays** (excluding public holidays); and **08h00-13h00 on Saturdays** (excluding public holidays). No work is to be done on Sundays.

However, any deviation from the working hours needs to be pre-approved by the Consultants in consultation with the ECO. If contractors wish to work outside of these hours, this must be with the agreement of the PM, ECO and the building regulations. The ECO is, however, to be fully informed of any complaints received regarding noise levels during the construction period.

Please note that all equipment and machinery used on site should be fitted with the appropriate silencers to minimise any noise pollution.

4.21 Preparation of Building Material

The Contractor must ensure that any delivery drivers are informed of all procedures and restrictions (including "no go" areas) required to comply with the Specifications. The Contractor must ensure that these delivery drivers are supervised during offloading, by someone with an adequate understanding of the requirements of the Specifications.

All manufactured and/or imported material must be stored within the demarcated area, and, if so required, out of the rain. All lay down areas outside of the construction camp must be subject to the Engineer and the ECO’s approval in such a way as not to cause a nuisance or environmental damage. All building materials are to be prepared at the batching plant, to enable the effects of cement and other substances, and the resulting effluent to be more easily managed. It is essential that any imported material i.e. base material for

road works, building sand, bedding base sand for pipe / cable lines etc. must be screened and of which the origins must be identified prior to arriving at the receiving environment, this must be approved by the Engineer / ECO.

4.22 Fire Prevention

The Contractor shall take all reasonable steps to avoid any fires. Prior to the commencement of construction activities the Contractor is to ascertain the fire requirements of the local council and must submit a contingency plan in case of fire to the RE. The Contractor shall ensure that there is basic fire-fighting equipment on site (including toll plazas) at all times. This equipment shall include, as a minimum, fire extinguishers and beaters.

In order to reduce the risk of fires, smoking is not allowed other than at designated smoking points where the risk of fire is considered to be acceptably low. If smoking is to be allowed on site then arrangements must be made for disposal of cigarette butts. No smoking will be allowed outside the agreed upon areas. Suitable fire fighting equipment must be readily available in this area.

No open fires shall be allowed on site for the purpose of cooking or warmth. *Bona fide* braai fires (such braai fires shall be limited to the traditional “month end” braais and not individual daily cooking fires) may be lit within the construction camp area only.

The contractor will be requested to remove any person from the site who is found lighting a fire or smoking outside of the designated smoking area.

Suitable fire fighting equipment must be readily available. The Contractor will be liable for all costs incurred by organisations called to extinguish any fires started by any person(s) under their control. In such an event, the Contractor will be liable for all costs incurred to remediate burnt areas on the site and areas to which the fire has spread.

The Contractor must ensure that the contact details of the nearest Fire Department are displayed on site (together with other emergency services) and that all persons involved with the project know the location of these numbers on site.

The Contractor shall pay the costs incurred by organisations called to put out fires started by himself or any Sub-contractor. The Contractor shall also pay the costs incurred to reinstate burnt areas as deemed necessary by the RE.

The Contractor shall also take all reasonable steps to extinguish any fires where other road users may have started a fire, either intentionally or unintentionally. The Contractor shall take all reasonable steps to prevent the accidental occurrence or spread of fire. The Contractor shall appoint a fire officer who shall be responsible for ensuring immediate and appropriate action in the event of a fire. The Contractor shall ensure that all site personnel are aware of the procedure to be followed in the event of a fire.

MS: Prior to the commencement of construction activities, the Contractor is to ascertain the fire requirements of the local authority and must submit a fire contingency plan MS

4.23 Cleanliness of Public Roads

Contractors shall ensure that construction vehicles are not overloaded so as not to spill construction or excavated material onto any public roads in the proximity. Contractors shall provide a washing system for cleaning the wheels of vehicles moving off-site, and shall ensure that this is utilised as required. Filtering of ground-water seeping into excavated areas prior to leaving (or being pumped from) site will help keep roads clean.

4.24 Traffic Accommodation and Control

The EO may also act as a Traffic Safety Officer (TSO). The TSO shall be required to ensure that construction activities do not obstruct traffic and that adequate traffic accommodation measures are put in place. In general, the TSO shall ensure that regular road users are not unreasonably delayed due to construction activities.

The TSO shall make adequate provision to accommodate pedestrian traffic where appropriate.

This section outlines management of construction traffic within the Project site, and nearby local roads. The Contractor must control the movement of all vehicles and plant including that of his suppliers so that they remain on designated routes. In addition such vehicles and plant must be so routed and operated as to minimise disruption to regular users of the routes not on the Site. On Site, the vehicles of the Contractor and his suppliers must not exceed a speed of 25 km/h. On public roads adjacent to the Site vehicles will adhere to municipal and provincial traffic regulations.

Traffic control and safety shall be done in accordance with the South African Traffic Safety Manual, with the relevant signs, flagmen, barriers, etc being provided at the various access points. Traffic control shall be done in co-operation with local traffic officials. All laws and regulations applicable on the public road system are enforceable on the construction site.

Due to the activities involved in the construction phase, trucks and other related vehicles will be using the roads leading to the site. These vehicles will need to be roadworthy and abide by the speed limits. The Contractor should ensure that additional construction vehicles do not produce excess noise and that generation of dust is kept to a minimum. Contractors must ensure that their vehicles are road-worthy and that loads are properly secured.

The Contractor shall ensure that all construction vehicles using public roads are in a roadworthy condition, that they adhere to the speed limits and that their loads are secured. Vehicles transporting materials such as topsoil and spoil shall be covered to prevent their contents falling/blowing off and causing a traffic

hazard. The Contractor must place cordons, barriers and warning signs around excavations and wherever there is a hazard to workers, the public and animals.

No access/haul roads other than those required for construction purposes shall be developed. As far as possible, existing roads shall be used for access/haulage purposes. The Contractor in consultation with the RE and ECO shall approve all new temporary access/haul roads. All temporary roads no longer required shall be decommissioned and the land rehabilitated appropriately.

4.25 Visual Aspects

The exposure of bare soil through the removal of vegetation prior to mining shall be restricted to those areas required for access roads and the establishment of the borrow pits. Rehabilitation shall take place as soon as possible after mining is completed. Land disturbed by construction activities shall be rehabilitated.

4.26 Method Statements: Contractors Requirements

Specified contractors shall provide method statements for approval by the PM and ECO prior to work commencing on aspects of the project deemed or identified to be of potential risk to the environment, when called upon to do so by the PM. In addition, method statements from contractors may be required by the relevant authorities or the ECO for specific sensitive actions. Method Statements shall cover applicable details with regard to:

- Contractor's camp establishment including fuel storage, toilet facilities and waste management;
- Vegetation clearing and rehabilitation plan;
- Construction procedures and works in watercourse(s);
- Protection of natural features;
- Storm water management, erosion and sedimentation control (plan of how storm water and ground-water is going to be handled on site, example, seeping into excavated areas, erosion and sedimentation control);
- Pollution prevention (location, layout, preparation and operation of all wash areas, including vehicle wash, paint washing and clearing);
- Windblown sand and dust control measures;
- Batching plant activities if any (location, layout and preparation of cement/ concrete batching facilities including the methods employed for the mixing of concrete including the management of runoff water from such areas);
- Noise control;
- Storage, handling and management of hazardous substances/material;
- Solid waste management (solid waste control, stockpiling of excavated material and removal of waste from Site);
- Traffic management;
- Fire control; and
- Any other information deemed necessary by the ECO or DEA&DP

The RE and / or the ECO shall specify any additional Method Statements that may be required. Where relevant the Method Statements indicated above can be combined on agreement with the RE or ECO.

All method statements are to be to the satisfaction of the PM, the ECO and the City Of Cape Town Environmental and Heritage Resource Management.

Method Statements shall be submitted to the RE and ECO **at least three (3) days prior** to the commencement of operations. It should be noted that Method Statements must contain sufficient information and detail to enable the RE and ECO to apply their minds to the potential impacts of the works on the environment. The Contractor will also need to thoroughly understand what is required of him / her in order to undertake the works.

Work shall not commence until Method Statements have been approved by the RE. Failure to submit Method Statements may cause the RE to order the Contractor to suspend part or all of the works concerned until a Method Statement has been submitted and approved. Failure to submit Method Statements at least three days prior to commencing the relevant activity may result in a fine. Any damage caused to the surrounding environment by work done without prior approval shall be rehabilitated at the Contractor's cost.

5 SITE CLEAN UP AND REHABILITATION

5.1 Site Clean Up

On completion of construction, the Contractor shall ensure that all structures, equipment, materials, waste, rubble, notice boards and temporary fences used during construction are removed with minimal damage to the surrounding area. The Contractor shall clean and clear the site to the satisfaction of the ECO. The cost of such rehabilitation will be for the Contractor's account and no extension of time will be granted. At the conclusion of the project an environmental audit report shall be compiled and submitted to City Of Cape Town Environmental and Heritage Resource Management. This report shall be compiled by the ECO, in collaboration with the RE, EO and the Contractor. It shall, as a minimum, outline the implementation of the EMP, and highlight any problems and issues that arose during the construction period to report, on a formal basis, the lessons learned from this project.

The Contractor shall ensure that all temporary structures, equipment, materials, wastes and facilities used are removed upon completion of the contract. The site cleanup must be to the satisfaction of the City Of Cape Town Environmental and Heritage Resource Management, Project Manager/Engineer and the ECO. A site closure checklist will only be given once site has been closed.

5.2 Rehabilitation

If deemed necessary by the Project Manager/Engineer, the ECO or the City Of Cape Town Environmental and Heritage Resource Management, the contractor may have to employ a suitably qualified person to rehabilitate areas damaged during construction activities on site. In the event of damage occurring to the environment due to the irresponsible actions of the Contractor, (including non-compliance with the EMP), rehabilitation may be required as decided upon by the ECO, the ECO and the Project Manager/Engineer. The completed rehabilitation is to be to the satisfaction of the Project Manager/Engineer and the ECO.

It is recommended that a Landscaping Contractor who is familiar with the local vegetation be appointed to undertake the rehabilitation and revegetation of any construction areas where natural vegetation has been disturbed, as identified by the RE in consultation with the ECO botanist.

The rehabilitation programme shall be implemented as soon as possible after completion of each phase of the excavation operations. As much of the revegetation as possible shall take place at the start of the rainy season to maximise water availability and minimise the need for watering. If revegetation takes place during the dry season, irrigation of planted areas may be necessary.

The Contractor shall grade the slopes to blend in with the natural slope of the surrounding areas. All slope changes shall be smoothed to moderate gradients so that flowing curves that blend into the surrounding

landscape are formed in preference to sharp angles. No steep, highly erodible slopes shall be permitted. This would limit erosion by encouraging quicker and more successful establishment of vegetation on the slopes.

Precautions shall be taken to prevent soil erosion during rehabilitation. Erosion control measures (e.g. application of straw mulches or soil binders to exposed soil) shall be put in place in all rehabilitated areas, including access roads, stockpiles and any other disturbed areas associated with the upgrade operations. If necessary, wind protection measures such as shade cloth screens shall be erected to protect the soil and vegetation.

The objective of post-construction rehabilitation shall be to encourage the regrowth of the local flora, as far as possible. The Landscaping Contractor shall compile a vegetation rehabilitation plan that shall detail seed collection, seed mixing, seeding methods, planting and vegetation establishment in each borrow pit area. The recommended method for rehabilitating disturbed areas is by collecting seed from plants in the same community in nearby undisturbed vegetation for sowing on disturbed areas. Hydroseeding using commercially available seed must be avoided. The Contractor shall submit the vegetation rehabilitation plan to the RE for approval. The RE shall consult a botanical specialist for expert advice of the appropriateness of the rehabilitation plan. The same procedure shall apply in the cases of construction areas identified for specific revegetation by the RE in consultation with the ECO.

The vegetation rehabilitation plan shall include (but is not limited to) the following:

- Seed requirements, harvesting methods and locations, seed storage methods;
- Topsoil, mulch, fertiliser, soil stabiliser and irrigation requirements and application;
- Landscaping and revegetation methods for each area, i.e. hydromulching, planting, including locations and timing;
- Procurement requirements and a list of species of plants to be procured, if any;
- Vegetation establishment and maintenance requirements (irrigation, etc.) for all revegetated areas;
- The use of any herbicides, pesticides and other poisonous substances, if required.

5.3 Environmental Completion Statement

An Environmental Completion Statement is a report by the ECO/Environmental Consultant to the relevant authorities stating completion of the project and compliance with the EMP and conditions. The following environmental statements may be required to be completed on completion of all site construction activities and submitted in line of sequence to the relevant office for perusal and reference.

5.4 ECO: Environmental Completion Statement

The ECO must submit an environmental closing statement relating to all environmental and technical issues that occurred on site as well as any conclusions regarding incidents such as written warnings, stoppages of works and penalties.

APPENDIX 1: EXAMPLE OF METHOD STATEMENT

CONTRACT: ……DATE: ……

PROPOSED ACTIVITY (give title of method statement and reference number):

WHAT work is to be undertaken? (give a brief description of the works):

WHERE are the works to be undertaken? (where possible, provide an annotated plan and a full description of the extent of the works):

WHEN are the works to start, what is the anticipated finish date?

HOW are the works to be undertaken? (provide as much detail as possible, including annotated maps and plans where possible): **Note: please attach extra pages if more space is required**

DECLARATIONS

1) PERSON UNDERTAKING THE WORKS

I understand the contents of this Method Statement and the scope of the works required of me. I further understand that this Method Statement may be amended on application to the signatories hereunder and that the ECO will audit my compliance with the contents of this Method Statement.

_____ (Print name)

_____(signed) Dated:_____

2) ENVIRONMENTAL CONTROL OFFICER

The work described in this Method Statement, if carried out according to the methodology described, is satisfactorily mitigated to prevent avoidable environmental harm:

_____ (Print name)

_____(signed) Dated:_____

3) RESIDENT ENGINEER/ENGINEER REPRESENTATIVE/CLIENT

_____ (Print name)

_____(signed) Dated:_____

APPENDIX 2: ENVIRONMENTAL WEEKLY CHECKLIST

CONTRACTOR: ENVIRONMENTAL WEEKLY CHECKLIST

SITE: _____ PHASE OF WORK & % OF COMPLETION:_____

ENVIRONMENTAL ASPECT	YES[√]/ NO[x]	COMMENTS
1. Environmental File on Site and updated on a regular basis, including environmental incidents		
2. All new personnel on site have attended the environmental awareness course		
3. Contractor's camp is neat and tidy and the labourers' facilities are of an acceptable standard		
4. Sufficient and appropriate firefighting equipment is visible and readily available		
5. Waste control and removal system is being maintained		
6. Refuse bins in place and maintained and are weather and scavenger proof		
7. Adequate toilets (one toilet per 15 workers) are in place and maintained in a hygienic condition		
8. Drip trays are being utilised where there is a risk of incidental spillage		
9. Bunds/ drip trays are being emptied on a regular basis (especially after rain)		
10. No leakages (oil & fuel) are visible from construction vehicles and equipments		
11. No go areas, remaining natural features and trees have not been damaged		
12. Dust control measures (if necessary) are in place and are effectively controlling dust		
13. Noise Control measures (if necessary) is in place and is working effectively		
14. Erosion control measures (if necessary) are in place and are effective in controlling erosion		
15. Stockpiles (if any) are located away from public areas, do not exceed 2 m in height and are protected from erosion		

Completed by:…….. Sign:…….. Date:……/……/2014

To be submitted at the end of each week to the Environmental Control Officer (ECO)

Received by ECO: Sign:…… Date: ……/……/2014

APPENDIX 3: BASIC RULES OF CONDUCT

BASIC RULES OF CONDUCT

The following list represents the basic Do's and Don'ts towards environmental awareness, which all participants in this project must consider whilst carrying out their tasks. These are not exhaustive and serve as a quick reference aid.

NOTE: ALL new site personnel must attend an environmental awareness presentation. Please inform your foreman or manager if you have not attended such a presentation or contact the ESO.

DO:

- USE THE TOILET FACILITIES PROVIDED – REPORT DIRTY OR FULL FACILITIES
- CLEAR YOUR WORK AREAS OF LITTER AND BUILDING RUBBISH AT THE END OF EACH DAY – use the waste bins provided and ensure that litter will not blow away.
- REPORT ALL FUEL OR OIL SPILLS IMMEDIATELY & STOP THE SPILL CONTINUING.
- DISPOSE OF CIGARETTES AND MATCHES CAREFULLY. (Littering is an offence.)
- CONPENALTIES WORK AND STORAGE OF EQUIPMENT TO WITHIN THE IMMEDIATE WORK AREA.
- USE ALL SAFETY EQUIPMENT AND COMPLY WITH ALL SAFETY PROCEDURES.
- PREVENT CONTAMINATION OR POLLUTION OF STREAMS AND WATER CHANNELS.
- ENSURE A WORKING FIRE EXTINGUISHER IS IMMEDIATELY AT HAND IF ANY "HOT WORK" IS UNDERTAKEN e.g. welding, grinding, gas cutting etc.
- REPORT ANY INJURY OF AN ANIMAL.
- DRIVE ON DESIGNATED ROUTES ONLY.
- PREVENT EXCESSIVE DUST AND NOISE.

DO NOT:

- REMOVE OR DAMAGE VEGETATION WITHOUT DIRECT INSTRUCTION.
- MAKE ANY FIRES.
- INJURE, TRAP, FEED, HARM OR KILL ANY ANIMALS – this includes birds, snakes, lizards etc.
- ENTER ANY FENCED OFF OR MARKED AREA.
- ALLOW CEMENT OR CEMENT BAGS TO BLOW AROUND.
- SPEED OR DRIVE RECKLESSLY
- ALLOW WASTE, LITTER, OILS OR FOREIGN MATERIALS INTO THE STREAM
- LITTER OR LEAVE FOOD LAYING AROUND

Notes:

1. Must any animals be encountered then do not harm them. The ESO or RE must be contacted to remove these safely. The harming of any animal will result in disciplinary action.
2. Construction and heavy machine operators must be particularly sensitive to staying within access routes and prevention of unnecessary damage. Dust and noise is also of particular concern. Ensure that vehicles and machinery do not leak fuel or oils. Refueling or maintenance must be done within the maintenance camp area only.
3. Alien plant clearing and control work teams must be closely supervised.