Construction Environmental Management Plan

for the

UPGRADE OF ROAD DR3610, MANGETTI WEST, NEHALE LYAMPINGANA CONSTITUENCY TO GRAVEL STANDARDS (OSHIKOTO REGION)

For submission to:
Ministry of Environment & Tourism
Department of Environmental Affairs

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ABBREVIATIONS

ESMP	Environmental and Social Management Programme
DEA	Department of Environmental Affairs
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
ELO	Environmental Liaison Officer
EMP	Environmental Management Plan
I&AP	Interested and Affected Parties
MAW&F	Ministry of Agriculture, Water & Forestry

DEFINITIONS

Alien Vegetation: Alien vegetation is defined as undesirable plant growth which shall include, but not be limited to, all declared category 1, 2 and 3 listed invader species. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area.

Audit: Regular inspection and verification of construction activities for implementation of the ESMP.

Batch Plant: Machinery used on site for the mixing and production of concrete and associated equipment and materials.

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

ESMP: This document, Environmental and Social Management Plan for managing potential environmental impacts during the construction phase of a development.

Contaminated Water: Water contaminated by the Contractor's activities, e.g. concrete water and runoff from plant/personnel wash areas.

Construction Activity: A construction activity is any action taken by the Contractor, his subcontractors, suppliers or personnel during the construction process.

Contractor: Any legal entity or consortium contracted by the Roads Authority or their executing agent to undertake the activity associated with the construction of the proposed development.

DEA: Namibia's Department of Environmental Affairs, the Government authority responsible for authorising activities in terms of the Environmental Management Act, No. 7 of 2007.

Emergency Situation: An incident, which potentially has the ability to significantly impact on the environment, and which, could cause irreparable damage to sensitive environmental features. Typical situations entail amongst others the:-

- Spill of petroleum products and lubricants into the aquatic system;
- Potential damage, erosion and slumping of unstable river embankments or drainage channels;
- Potential event of impeding the continuous flow of water to downstream water users dependant on the flow; and
- Dangerous situation where livestock and children can be injured by any activity emanating from the construction or rehabilitation of the project implementation.

Engineer: The person(s) who represents the Roads Authority (the Proponent) and are responsible for the technical and contractual implementation of the works to be undertaken by the appointed contractors.

Engineering Representative (ER): A person who represents the Engineer on Site and is responsible for the technical and contractual implementation of the works to be undertaken.

Environment: The biosphere in which people and other organisms live. It consists of renewable and non-renewable natural resources, natural or modified ecosystems and habitats, and places of cultural significance.

Environmental Impact: An impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity between the limits that define the construction site. An impact may be the direct or indirect consequence of a construction activity.

Environmental Impact Assessment (EIA: The process of examining the environmental effects of a project. The assessment requires detailed/specialist studies of significant issues that have been identified during the environmental Scoping phase.

Environmental and Social Management Plan (EMP): A detailed plan of action prepared to ensure that recommendations for enhancing positive impacts and/or limiting or preventing negative environmental impacts are implemented during the life-cycle of a project.

Environmental Control Officer (**ECO):** A suitably qualified professional to be appointed by the Roads Authority (the Proponent) who oversees the construction phase and ensure that all environmental specifications and ESMP obligations are met during the phase. The ECO will be responsible for the monitoring, reviewing and verifying of compliance with the ESMP by the Contractor.

Environmental Liaison Officer (ELO): A suitably qualified person to be appointed by the Engineer who will oversee the day-to-day operations of the contractor on-site.

Hazardous Substance: A substance that, in the reasonable opinion of the Engineer and/or ECO, can have a harmful effect on the environment.

Monitoring: Regular inspection and verification of construction activities for degree of compliance to the ESMP.

'No Go' Areas: Areas identified as being environmentally sensitive in some manner and demarcated on plan, and on the Site with pegs or fencing and which are out of bounds to unauthorised persons. Authorisation must be obtained prior to entry.

Proponent: The Company or its duly authorised and appointed representative, with rights to undertake the development on the Site.

Road Reserve: The road reserve is a corridor of land, defined by co-ordinates and proclamation, within which the road, including access intersections or interchanges, is situated. A road reserve may, or may not, be bounded by a fence.

Road Width: For the purposes of the ESMP, the Road Width is defined as the area within the Road Reserve i.e. fence line to fence line, but also includes all areas beyond the Road Reserve that are affected by the continuous presence of the road i.e. a reach of a water course.

Search and Rescue: The location and removal of specified plant species, without unnecessary damage, and their transfer to a specified location (on-site nursery).

Species of Special Concern: Those species listed in the Endangered, Threatened, Rare, Indeterminate, or Monitoring categories of the South African Red Data Books, and/or species listed in Globally Near Threatened, Nationally Threatened or Nationally

Near Threatened categories (Barnes, 1998).

Site: The boundary and extent of development works and infrastructure, including any areas off the main site on which works are to be carried out in order to allow the development to proceed successfully.

Solid Waste: 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 descriptions 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 the manner in which payment is to be made.

Topsoil: The top 30cm of soil (topsoil) and root material of cleared vegetation.

Works: The construction operations and all related and incidental works, such as search and rescue, fencing and rehabilitation, in connection with the execution and carrying to completion of the project.

PART 1: OVERVIEW

1. INTRODUCTION

This document represents the framework Environmental and Social Management Plan (ESMP) for the proposed upgrade of Road DR3610, Mangetti West within the Nehale LyaMpingana Constituency (Oshikoto Region).

1.1 THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP)

1.1.1 Scope of the ESMP

The Environmental and Social Management Program (ESMP) is based on a baseline assessment conducted and will be implemented during project construction as part of the client's requirement and legal requirements. This ESMP is intended as a generic document which will be used for the basis of tendering.

In order to ensure a holistic approach to the management of environmental impacts during the construction of the road DR3610, this ESMP sets out the methods by which proper environmental controls are to be implemented by the Contractor and all other parties involved, and monitored by the Environmental liaison Officer (ESM) and Engineering Representative (ER).

This ESMP intends to guide and manage the construction activities on each construction site and surrounding areas as they relate to the natural environment. It describes mitigation measures, and is prescriptive, identifying specific people or organisations to undertake specific tasks. This document must further be seen as open-ended, requiring regular review and updating via the correct channels in order for it to effectively guide environmental management of this project.

The provisions of this ESMP are binding on the Proponent and any other third party appointed by the Proponent.

This ESMP has been designed to suite the particular civil construction activities and needs of the proposed development, and incorporates the following:

- General civil construction mitigation measures;
- Specific project mitigation measures;
- Construction activities that could impact on the environment;
- Specifications with which the Contractor shall comply in order to protect the environment from the identified impacts; and
- Actions that shall be taken in the event of non-compliance

The ESMP has the following goals:

- Identification of construction activities that could impact on the environment;
- Detailing the mitigation measures and specifications with which the contractor shall comply in order to minimise the extent of environmental impacts during construction by providing procedures for their implementation;
- Defines corrective actions that shall be taken in the event of non-compliance and;
- Prevent long-term environmental degradation.

The ESMP is a dynamic document subject to similar influences and changes as are created by variations to the provisions of the project specification. Any substantial changes shall require the approval of the Environmental Control Officer (ECO) and the Engineer.

Through monitoring and auditing, feedback for continual improvement in environmental performance must be provided and corrective action taken to ensure that the ESMP remains effective.

Copies of the ESMP shall be kept at the site office and will be distributed to all senior contract personnel. All senior personnel shall be required to familiarize themselves with the contents of this document.

1.1.2 Legal Requirements

Construction will be according to the best industry practices. This ESMP, which forms an integral part of the contract documents, informs the contractor as to his duties in the fulfilment of the project objectives, with particular reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project, but also rehabilitation requirements. The contractor should note that obligations imposed by the ESMP are legally binding in terms of environmental statutory legislation and in terms of amendments to the particular conditions of contract that pertain to this project. 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.

It is expected that the Contractor is conversant with all environmental legislation pertaining to the project. In addition the Contractor shall also take cognisance of National Government Legislations, which may be applicable to the contract.

1.1.3 Amendments to the ESMP

Any party involved with the Project can suggest changes to the ESMP via the ECO and Engineer. Approved changes will be minuted and drafted into this existing ESMP in the form of an appendix or amendment. This should be clearly stipulate in the ESMP to avoid

confusion (see ESMP Revision).

1.2 THE PROJECT

1.2.1 Background

Urban Green cc, as independent environmental consultants and impact assessors have been appointed by the Project Engineers (Windhoek Consulting Engineers and KnightPiesold Consulting) to facilitate the Integrated Environmental Management procedure for the proposed road upgrade of Road DR3610, Mangetti West, Nehale LyaMpingana Constituency (Oshikoto Region).

The process, which is to be followed, is in compliance with the Environmental Impact Assessment Regulations (GN. No. 30 of 2012) as required by Section 27(3) of the Environment Management Act, 2007 (Act no. 7 of 2007). The proposed development is identified as an activity, which may have some effects on the environment (i.e. social and natural environments) and as a result of being an existing proclaimed road only requires an environmental management plan.

1.2.2 Study Area

The study area for purpose of this CEMP is defined to be at road DR3610, Mangetti West, Nehale LyaMpingana Constituency, Oshikoto Region.

1.2.3 Nature of the Development

The development entails the upgrading of an existing proclaimed road from the current sand track to gravel standards. The upgrading involves the clearance of vegetation to increase the width of the road and opening-up of quarries for purpose of obtaining base gravel, which will be used for road construction purpose.

The activity is thus associated with larger construction vehicles moving in the area and setting-up of a temporary construction camp.

1.2.4 Scale and Scope of the Development

The proposed activity (upgrade of road) stretches over a distance of 50km with a width (road reserve) of 30 meters (15 meters to either side of the road centre line). Construction will be carried out with the main contractor performing labour-based construction methods and SME contractors performing the labour-intensive activities. The future gravel road surface will be 7.50m in width which would enabling a safe travelling speed of 100km/h.

1.2.5 Need and Desirability of the Development

The upgrading of road DR3610 is listed as a high priority within the Oshikoto Road Master Plan (Roads Authority, 2004). The upgrading is considered important as it will improve much

needed connectivity, reduce road maintenance costs, reduce travelling time and costs and accidents for users. Furthermore, the upgraded road will have a great socio-economic benefit to the farmers in the particular part of the Oshikoto Region as the road is expected to unlock the area and provide much needed linkage with established market centres such as Ondangwa, Rundu and Tsumeb.

PART 2: COMPLIANCE MONITORING

2.1 IMPLEMENTATION OF THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PROGRAMME

Implementation of the ESMP will be the responsibility of all parties involved with the development. The ER and ELO will be central to this implementation on a day-to-day basis, while the Engineer and ECO will be responsible for monitoring.

2.2 ROLES AND RESPONSIBILITIES OF THE ROLE PLAYERS

The implementation of the ESMP requires the involvement of several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase.

2.2.1 The Developer

- Appoint qualified and experienced professionals, as required.
- Attain all necessary approvals.
- Liaise with the ECO and Engineer regarding environmental management and provide the ECO and Engineer with all relevant documentation and plans.
- Support and comply with the ESMP specifications.

2.2.2 The Engineer

- Assisting the developer in the appointment of a qualified and experienced Environmental Liaison Officer (ELO).
- Assisting the ECO and Engineering Representative (ER) in ensuring that the conditions of the ESMP are being adhered to and implemented.

The Engineer, along with the ECO must obtain, examine and approve Method Statements.

- Promptly issuing instructions requested by the ECO to the Contractor/s.

- Deduct environmental penalties from certificate payments as agreed and instructed by the ECO.
- Assisting the ECO in making decisions and finding solutions to environmental problems that may arise during the construction phase.
- Oversee the responsibilities of the ER and Contractor/s, and assist in all required matters.

2.2.3 The Engineer's Representative (ER)

The Engineer will delegate powers to the Engineer's Representative (ER) on site who would act as the Employer's implementing agent and has the responsibility to ensure that the Employer's responsibilities are executed in compliance with relevant legislation and the ESMP.

Any on-site decisions regarding environmental management are ultimately the responsibility of the ER. The ER will have the following responsibilities in terms of the implementation of this ESMP:

- Ensuring that the necessary environmental authorizations and permits have been obtained.
- Assisting the Contractor in finding environmentally responsible solutions to problems with input from the ECO (Environmental Control Officer) where necessary.
- Taking appropriate action if the specifications are not followed.
- Ordering the removal of person(s) and/or equipment not complying with the ESMP specifications.
- Recommending and issuing fines for transgressions of site rules and penalties for contravention of the ESMP.
- Advising on the removal of person(s) and/or equipment not complying with the specifications (via the ER).
- Auditing the implementation of the ESMP and compliance with authorization on a monthly basis.
- Undertaking a continual review of the ESMP and recommending additions and/or changes to the document after completion of the contract.

2.2.4 The Environmental Control Officer (ECO)

The Environmental Control Officer (ECO) is appointed by the developer as an independent monitor of the implementation of the ESMP (i.e. independent of the developer and the

contractors). The ECO should additionally be a suitably qualified environmental professional. He/she must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. The ECO must attend relevant project meetings, conduct inspections to assess compliance with the ESMP and be responsible for providing feedback on potential environmental problems associated with the development.

In addition, the ECO is responsible for:

- Liaison with relevant authorities;
- Liaison with contractors regarding environmental management; and
- Undertaking routine monitoring and appointing a competent person/institution to be responsible for specialist monitoring, if necessary.

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

The ECO will be responsible for site audits, followed by an environmental control report, that will detail the status of the environmental compliance, and highlight where action needs to be taken. The environmental control report will be submitted to the ER and the developer and will be kept on record.

2.2.4.1 Liaison with Authorities

The ECO will be responsible for liaising with the Department of Environmental Affairs. The ECO must submit all environmental audit reports to the authorities. These audit reports must contain information on the contractor and developer's levels of compliance with the ESMP and Record of Decision (RoD). The audit report must also include a description of the general state of the site, with specific reference to sensitive areas and areas of non-conformance. The ECO must indicate the necessary corrective action measures to eliminate the cause of the non-conformances.

2.2.4.2 Liaison with Contractors

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

2.2.5 Environmental Liaison Officer (ELO)

For the purposes of implementing the conditions contained herein, the Contractor shall submit to the ER for approval the appointment of a nominated representative of the Contractor as an Environmental Liaison Officer (ELO) to assist with day-to-day monitoring of

the construction activities for the contract. Any issues raised by the ECO will be routed to the ELO for the contractors' attention. The ELO shall be permanently on site during the construction phase to ensure daily environmental compliance with the EMP and should ideally also be a senior and respected member of the construction crew. Past experience has revealed that ELO's that can relate to the work force are the most effective for information transfer and ensuring compliance with the EMP.

The ELO will report directly to the ECO regarding environmental compliance. The site audits undertaken by the ECO, will be undertaken alongside the ELO. The ECO will point out areas of concern, and the ELO will be responsible for ensuring the day to day compliance with the EMP. Should any emergencies arise the ELO will alert the ECO who will take action. There shall be an approved ELO on the site at all times.

The ER shall have the authority to instruct the Contractor to replace the ELO, if in the ER's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMP or this specification. Such instruction shall be in writing and shall clearly set out the reasons why a replacement is required.

Before the Contractor commences with each Construction Activity, the ELO shall give to the ER a written statement setting out the following:

- The type of construction activity.
- Locality where the activity will take place.
- Identification of impacts that might result from the activity.
- Identification of activities or aspects that may cause an impact.
- Methodology for impact prevention for each activity or aspect.
- Methodology for impact containment for each activity or aspect.
- Emergency/disaster incident and reaction procedures (needs to be demonstrated)
- Treatment and continued maintenance of impacted environment.

The contractor may provide such information in advance of any or all construction activities provided that new submissions shall be given to the ER whenever there is a change or variation to the original.

2.2.6 Community Liaison Officer (CLO)

The contractor must appoint a Community Liaison Officer (CLO) to act as a point of contact between the contracting team and the community that will be affected by the construction activities. Any complaints from the community about construction activities must be channelled through the CLO, and the CLO should relay feedback from the contractor to the

groups of I&APs. See Complaints Record attached as Appendix A. One person can take on both the ELO and CLO roles. Alternatively, the CLO can be a representative of the community.

The CLO must liaise with I&AP groups, as necessary, and record any comments received and correspondence with said I&APs. The CLO should also attend all site meetings.

2.2.7 Contractor

- The contractor, as the developer's agent on site, is bound to the RoD and ESMP conditions through his/her contract with the developer, and is responsible for ensuring that he adheres to all the conditions of the ESMP and the RoD.
- The contractor must thoroughly familiarise him/herself with the ESMP and RoD requirements before coming onto site and must request clarification on any aspect of these documents, should they be unclear.
- Compile Method Statements as listed under 2.4.3 below.
- Ensure that all third parties who carry out all or part of the Contractor's obligations under the Construction Contract comply with the requirements of this CEMP.
- The contractor must ensure that he/she has provided sufficient budget for complying with all ESMP and RoD conditions at the tender stage.
- The contractor must comply with all orders (whether verbal or written) given by the ECO, project manager or site ER in terms of the ESMP.

2.3. CONSTRUCTION MONITORING

The ECO will carry the responsibility of monitoring the implementation of the ESMP on-site, assisted by the ER. In this regard, the ECO will submit a monitoring report to the Engineer and the Directorate of Environmental Affairs (DEA) until after all rehabilitation work has been completed. A pro-forma monitoring report is contained in Appendix B.

The monthly monitoring report should include:

- A copy of the Monitoring Report (Appendix B);
- A description of any environmental accident or developments which could potentially develop into a non-conformance event by the Contractor; and
- Minutes from the meetings.

Any non-compliance with the agreed procedures of the ESMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.

Non-conformance identified during monitoring must be recorded. This Report must describe, in detail, the cause, nature and effects of any environmental non-conformance by the Contractor/s and could stand as evidence should legal action be required. If possible, photographs should also be included as evidence to substantiate the report. This report will also suggest mitigation measures to correct the non-conformance (if necessary) and contemplate revisions to any of the strategies used in the construction phase, whether they pertain to monitoring or to construction methods used on site. The non-conformance shall be documented and reported as part of the Monthly Monitoring Report.

2.4. ENVIRONMENTAL AUDITING

Auditing should be conducted at least twice for the duration of the project construction phase. Commonly, the audit of a site will cover all management procedures, operational activities & systems, and environmental issues. The environmental audit will be compiled objectively and conducted by an independent, competent entity.

2.5 ON-SITE DOCUMENTS

Copies of the documents described below must be maintained on site at all times, available to both the Engineer and Environmental Control Officer (ECO), to be provided on request to authorities or stakeholders for inspection. Contractors' meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance.

2.5.1 Site Instruction Entries

The Site Instruction Book entries will be used for the recording of general site instructions as they relate to the works on site and ESMP measures. It will also be used for the issuing of stop-work orders issued by the ECO for the purposes of immediately halting any particular activities of the Contractor in lieu of the environmental risk that they may pose.

2.5.2 ECO Diary Entries

The purpose of these entries will be to record the comments of the ECO as they relate to activities on the site including infringements, possible changes to the ESMP or work stop orders.

2.5.3 Method Statements

Method statements from the appointed Contractor will be required for specific sensitive actions on request of the authorities or ECO/Engineer. A method statement forms the baseline information on which sensitive area work takes place and is thus considered a "live document" in that modifications can be negotiated between the Contractor and ECO if or as required. The Contractor (and, where relevant, any subcontractors) must also sign the Method Statement, thereby indicating that the works will be carried out according to the approved methodology. Changes in the methodology must be reflected by amendments to

the original approved Method Statement. Amendments must be signed by both the ECO and Engineer, denoting that the change is environmentally acceptable. The Contractor must also sign the amended Method Statement.

All method statements will form part of the ESMP documentation and are subject to all terms and conditions contained within the ESMP main document. The Method Statement shall cover applicable details with regard to:

- Construction procedures;
- Materials and equipment to be used;
- How and where materials will be stored;
- The containment of accidental leaks or spills;
- Timing and location of activities; and
- Any other information deemed necessary by the ECO.

More detailed information with regards to Method Statements is attached as Appendix C.

2.5.4 Monitoring Reports

Copies of the monitoring reports compiled by the ECO should be kept on site for inspection.

2.5.5 Monthly Feedback Reports

Copies of the monthly feedback reports compiled by the Environmental Liaison Officer (ELO) should be kept on site for inspection.

2.5.6 Other Documents

A list of other reports to be kept on site is -

- Final design documents and diagrams issued to and by the Contractor.
- All communications detailing changes of design/scope that may have environmental implications.
- Occupational health and safety reports.
- Complaints register.
- Incident and accident reports.
- Emergency preparedness and response plans.
- Crisis communication manual.

- Monthly site meeting minutes during construction.
- Minutes of meetings.
- All relevant permits.
- All method statements from the Contractor.

2.6 ENVIRONMENTAL INCIDENTS

An environmental incident is defined as any unplanned event that results in actual or potential damage to the environment, whether of a serious or non-serious nature. An incident may involve non-conformance with any of the following:

- Legal requirements;
- Requirements of the EMP;
- Requirements of the Record of Decision; and
- Any verbal or written order given by the ECO on site while discharging his duties.

The contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident. The contractor must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves. The contractor must also change his/her operating procedures, at his/her cost, where applicable, to prevent a recurrence of an incident.

The ELO must inform the ECO of serious incidents immediately upon occurrence of the incident.

The ELO must complete an Incident Report (refer to Appendix D) for all environmental incidents. The ELO shall investigate incidents in collaboration with the ECO, if both persons are required. The focus of these investigations will not be to apportion blame, but to determine the root cause of the incident and to prevent a recurrence of similar incidents.

The ELO must send Incident Reports to the ECO on a monthly basis together with the audit report. In the case of serious incidents or emergencies, the incident report should be sent to the authority as soon as possible after the incident has been recorded.

2.7 NON COMPLIANCE AND PENALTIES

The ECO shall issue the Contractor a notice of non-compliance whenever transgressions are observed. The contractor/s shall act immediately when such notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be

recorded in a dedicated register and the response noted with the date and action taken.

Failure to redress the cause shall be reported to the DEA for them to deal with the transgression, as it deems fit.

The Contractor is deemed not to have complied with the ESMP if, inter alia:

- There is evidence of contravention of the ESMP specifications within the boundaries of the construction site, site extensions and roads;
- There is contravention of the ESMP specifications which relate to activities outside the boundaries of the construction site;
- Environmental damage ensues due to negligence;
- Construction activities take place outside the defined boundaries of the site; and/or
- The Contractor fails to comply with corrective or other instructions issued by the ECO and/or Engineer within a specific time period.

It is recommended that the engineers/contractors institute penalties for the following less serious violations and any others determined during the course of work as detailed below:

- Littering on site.
- Lighting of illegal fires on site.
- Persistent or un-repaired fuel and oil leaks.
- Any persons, vehicles or equipment related to the Contractor's operations found within the designated "no-go" areas.
- Excess dust or excess noise emanating from site.
- Possession or use of intoxicating substances on site.
- Any vehicles being driven in excess of designated speed limits.
- Removal and/or damage to fauna, flora or cultural or heritage objects on site.
- Urination and defecation anywhere except at designated facilities.
- Where environmental damage is caused or a pollution incident, and/or failure to comply with any of the environmental specifications contained in the ESMP, the Developer and/or Contractor shall be liable.

The following violations, and any others determined during the course of work, should be penalised:

- Hazardous chemical/oil spill and/or dumping in non-approved sites.
- Damage to sensitive environments.
- Damage to cultural and historical sites.
- Unauthorised removal/damage to indigenous trees and other vegetation, particularly in identified sensitive areas.
- Uncontrolled/unmanaged erosion.
- Unauthorised blasting activities (if applicable).
- Pollution of water sources.
- Unnecessary removal or damage to trees.

2.7.1 Procedures

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ER to impose a penalty. In the event of on-compliance the following recommended process shall be followed:

- The ER shall issue a notice of non-compliance to the Contractor through the ECO, stating the nature and magnitude of the contravention.
- The Contractor shall act to correct the non-conformance within 24 hours of receipt of the notice, or within a period that may be specified within the notice.
- The Contractor, through the ECO, shall provide the ER with a written statement describing the actions to be taken to discontinue the non-conformance, the actions taken to mitigate its effects and the expected results of the actions.
- In the case of the Contractor failing to remedy the situation within the predetermined time frame, the Engineer shall impose a monetary penalty based on the conditions of contract.
- In the case of non-compliance giving rise to physical environmental damage or destruction, the Engineer shall be entitled to undertake or to cause to be undertaken such remedial works as may be required to make good such damage and to recover from the Contractor the full costs incurred in doing so.
- In the event of a dispute, difference of opinion, etc. between any parties with regard to or arising out of interpretation of the conditions of the ESMP, disagreement regarding the implementation or method of implementation of conditions of the ESMP, etc. any

party shall be entitled to require that the issue be referred to specialists for determination.

- The Engineer shall at all times have the right to stop work and/or certain activities on site in the case of non-compliance or failure to implement remedial measures.

2.7.2 Offences and Penalties

Where the Contractor inflicts non-repairable damage upon the environment or fails to comply with any of the environmental specifications, he shall be liable to pay a penalty fine over and above any other contractual consequence.

The Contractor is deemed NOT to have complied with this Specification if:

a. within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of the Specification;

b. environmental damage due to negligence;

c. the Contractor fails to comply with corrective or other instructions issued by the ER within a specific time;

d. the Contractor fails to respond adequately to complaints from the public.

Penalties for the activities detailed below, will be imposed by the ER on the Contractor and/or his Subcontractors:

a.	Actions leading to erosion	A penalty equivalent in value to the cost of rehabilitation plus 20%
b.	Oil spills	A penalty equivalent in value to the cost of clean-up operation plus N$ 3,000.00
c.	Damage to indigenous vegetation	A penalty equivalent in value to the cost of restoration plus N$ 5,000.00
d.	Damage to sensitive environments	A penalty equivalent in value to the cost of restoration plus N$ 5,000.00
e.	Damage to cultural sites	A penalty to a maximum of N$ 100,000.00 shall be paid for any damage to any cultural/ historical sites

f.	Damage to trees	A penalty to a maximum of N$ 10,000.00 shall be paid for each tree removed without prior permission, or a maximum of N$ 5,000.00 for damage to any tree, which is to be retained on site.
g.	Damage to natural fauna	A penalty to a maximum of N$ 5,000.00 for damages to any natural occurring animal
h.	Any persons, vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a “no-go” area	N$ 4,000.00
j.	Litter on site	N$ 1,000.00
k.	Deliberate lighting of illegal fires on site	N$ 5,000.00
l.	Individuals not making use of the site toilet facilities	N$ 100.00
m.	Any person, vehicle, item of plant, or anything related to the Contractors operations causing a public nuisance	N$ 1,000.00

- Penalties may be issued per incident at the discretion of the Engineer. The Engineer will inform the Contractor of the contravention and the amount of the fine, and will deduct the amount from monies due under the Contract.
- For each subsequent similar offence the fine may, at the discretion of the ER, be doubled in value to a maximum value of N$ 10,000.00.
- Payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

- In the case of a dispute in terms of this section, the Engineer shall determine as to what constitutes a transgression in terms of this document.

2.8. ENVIRONMENTAL AWARENESS TRAINING

2.8.1 The Environmental Liaison Officer (ELO)

The ELO must be appropriately trained in environmental management and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract. The ECO should be available to provide training to the ELO, ER and the contractors should this be necessary.

2.8.2 Environmental Awareness Course

The contractor should ensure that adequate environmental training takes place. All employees should have an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The Contractor shall provide a suitable venue and ensure that the specified employees attend the course. The Contractor shall ensure that all attendees sign an attendance register, and shall provide the ER with a copy of the attendance register.

As a minimum, training should include:

- Explanation of the importance of complying with the ESMP.
- Discussion of the potential environmental impacts of construction activities.
- The benefits of improved personal performance.
- Employees' roles and responsibilities, including emergency preparedness.
- Explanation of the mitigation measures that must be implemented when carrying out their activities.
- Explanation of the specifics of this ESMP and its specification (no-go areas, etc.)
- Explanation of the management structure of individuals responsible for matters pertaining to the ESMP.
- The contractor shall keep records of all environmental training sessions, including names, dates and the information presented.

2.9 PUBLIC PARTICIPATION

An ongoing process of public participation shall be maintained during construction to ensure the continued involvement of interested and affected parties (I&APs) in a meaningful way.

Public meetings to discuss progress and any construction issues that may arise shall be held at least every two months and more regularly if deemed necessary by the ER. These meetings shall be arranged by the CLO, but shall be facilitated by the ER. The Contractor shall present a progress report at each public meeting. All I&APs that participated in or were informed during the Baseline Assessment shall be invited to each of the public meetings.

2.10 EMERGENCY PREPAREDNESS

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 construction period. Such activities may include, inter alia:

- Accidental discharges to water and land.
- Accidental exposure of employees to hazardous substances.
- Accidental veld or forest fires.
- Accidental spillage of hazardous substances.
- Accidental toxic emissions into the air (e.g. at asphalt plants).
- Specific environmental and ecosystem effects from accidental releases or incidents.

These plans shall include:

- Emergency organisation (manpower) and responsibilities, accountability and liability.
- A list of key personnel and contact details.
- Details of emergency services available (e.g. the fire department, spill clean-up services, etc.).
- 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.

2.11 FINANCING OF ENVIRONMENTAL CONTROL

Financing of the environmental requirements as outlined in this document, apart from the appointment of the ECO and specialists (if so required), is the sole responsibility of the

Contractor appointed by the Developer. Therefore, it is accepted that the cost incurred for implementing this ESMP by the Contractor would be allocated for in the tender document. Any responsibilities not defined in this document or where any uncertainties arise in this matter will be the responsibility of the Developer.

The cost of complying with the environmental regulations shall be covered by the tendered rates for the various items in the schedule of quantities and no separate payment will be made to the Contractor to fulfil the requirements of this section. However, additional payment will be made for specific work instructed by any relevant authority.

2.12 DISPUTES AND DISAGREEMENTS

Any disputes or disagreements between role players on-site (with regard to environmental management) will be referred to the Developer. If no resolution on the matter is possible it must be presented to an outside party agreed by all parties involved or to the Directorate of Environmental Affairs for clarification.

2.13. GOOD HOUSEKEEPING

The contractor shall undertake "good housekeeping" practices during construction. This will help avoid disputes on responsibility and allow for the smooth running of the contract as a whole. Good housekeeping extends beyond the wise practice of construction methods that leaves production in a safe state from the ravages of weather to include the care for and preservation of the environment within which the site is situated.

2.14 POST-CONSTRUCTION ENVIRONMENTAL AUDIT

A post-construction environmental audit must be carried out and submitted to the DEA, in order to fulfil conditions of this ESMP.

PART 3 - ENVIRONMENTAL SPECIFICATIONS

3.1 SCOPE

These specifications cover the requirements for controlling the impact of construction activities on the natural and social environment.

3.2 THROUGHOUT ALL PHASES

The following tables form the core of this ESMP for the construction and operational phases of the development. These tables should be used as a checklist on site, especially during the construction phase. Compliance with this ESMP must be audited during the construction phase and once immediately following completion of construction. This must be followed up with annual audits for a period of two years during the operational phase.

Table 1: Throughout all Phases

Activity / issue	Action required	Responsible party	Frequency
Appointment and duties of ECO	• Developer must appoint an independent Environmental Control Officer (ECO) who must monitor the contractor's compliance with the ESMP.	Developer	Once-off
	• The contractor must attend a site inspection and orientation session with the ECO to identify and be informed of the sensitive areas of the site and take cognisance of any important environmental considerations for the construction phase.	ECO, Contractor	Once-off

	• The ECO must form part of the project management team and attend project meetings.	ECO	Continuous
	• The contractor must ensure that the construction crew attend an environmental briefing and training session presented by the ECO prior to commencing activities on site.	Contractor, ECO	Once-off
	• The ECO shall keep a record of all communication with external interested and affected parties on the site.	ECO	Continuous
	• The ECO shall conduct monthly audits of the site during the construction phase, or more frequently if required. The monthly audits will be followed by the compilation of an environmental control report that will be submitted to the ER and the developer.	ECO	Continuous
Appointment and duties of ELO	• The contractor must appoint an Environmental Liaison Officer (ELO) to take responsibility for the implementation for all provisions of this ESMP and to liaise between the contractor, community, client and consultants. The ELO must be appointed at least 14 days after the site-handover. This person will be required to monitor the situation with a direct hands-on approach, and ensure compliance and co-operation of all personnel. He should be fluent in the languages of the employees.	Contractor	Once-off
	• The ELO will be required to be permanently on site from the commencement to the end of the contract and shall at every site meeting report on the status of the implementation of all provisions of the ESMP.	ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	• The ELO will report to the ECO. The ELO will be responsible for reporting any potential emergency situations to the ECO, who will decide on what action to take.	ELO, ECO	Continuous
Appointment of contractors & labourers	• Local contractors and labourers from the area should be used in order to stimulate the local economy.	Developer, CLO; ECO	Once-off
	• The developer must provide the contractor with a copy of the ESMP and any other relevant documentation or supporting documents. This ESMP must be contractually binding on the contractor.	Developer	Once-off
Verification of site development plan and other drawings	• The Contractor shall submit to the ER for his approval, plans of the exact location, extent and construction details of construction camps, offices, workshops, staff accommodation and testing facilities on the site and the impact mitigation measures the Contractor proposes to put in place. • The plans shall detail the locality as well as the layout of the waste treatment facilities for litter, kitchen refuse, sewage and workshop-derived effluents.	ECO, Contractor	Once-off

Activity / issue	Action required	Responsible party	Frequency
Verification of site development plan and other drawings	• The site offices should not be sited in close proximity to steep areas, as this will increase soil erosion. Preferred locations would be flat areas along the route. If the route traverses water courses, streams and rivers, it is recommended that the offices, and in particular the ablution facilities, aggregate stockpiles, spoil areas and hazardous material stockpiles are located as far away as possible from any water course as possible.	ECO, Contractor	Once-off
Management and monitoring of the ESMP	• This ESMP must be made binding on the main contractor as well as subcontractors and should be included in tender documentation for the construction contract. The developer is legally responsible for compliance with the ESMP. • The ELO shall ensure that all aspects of the ESMP are implemented during construction. • The ELO shall attend regular site inspections and meetings and minutes shall make provision for reporting on every aspect of the ESMP.	ELO, ECO	Once-off
Environmental incidents	• The contractor must take corrective action to mitigate an incident appropriate to the nature and scale of the incident and must also rehabilitate any residual environmental damage caused by the incident or by the mitigation measures themselves.	ELO, ECO, Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
	• The contractor must also change his/her operating procedures, where applicable, to prevent a recurrence of an incident. The contractor must comply with any recommendations made by the ECO in this regard.	ELO, ECO, Contractor	Continuous
	• The ECO must compile, in consultation with ELO, an Environmental Incident Report and investigate the root causes of incidents (See Appendix D).	ELO, ECO	Continuous
Training of construction workers	• An information pamphlet is to be distributed by the ECO to all contractors and their employees at the cost of the developer, and the contents thereof explained to all contactors and employees. • The objective is to inform all personnel on site of the sensitive areas on site and the penalties for non-compliance with the measures contained in this ESMP.	ECO, ELO, Developer, Contractors	Once-off, Continuous
Waste management	• The contractor must ensure the site is kept clean and free of litter throughout the length of road being upgraded. • The ELO must supervise a litter patrol twice a week to ensure that the site is free from litter. • This litter patrol must be undertaken from the first week that the contractor is on site until the last week when he/she leaves the site.	Contractor, ELO, ECO	Continuous

Waste management	• Proper waste handling facilities must be provided for on-site and emptied daily. Solid waste shall be stored in an appointed area in covered, tip proof metal drums for collection and disposal. • A refuse control system shall be established for the collection and removal of refuse to the satisfaction of the ER. • The contractor shall immediately deposit waste in the litterbins.	Contractor, ELO, ECO	Continuous
	• Waste may not be left in any other area temporarily prior to being deposited in a bin.	ELO, ECO, Contractor	Continuous
	• Adequate measures to collect, remove and safely dispose of waste must be implemented during each stage of the proposed development, from site preparation to final construction.	Developer, Contractor, ECO, ELO	Continuous
	• The ECO must approve the waste disposal arrangement.	ECO	Once-off
	• No litter, refuse, waste, rubble and builder's waste generated on the premises are to be placed, dumped or deposited on adjacent/ surrounding properties including road verges, roads or public places and open spaces during or after the construction period of the proposed development. • 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 sites.	ECO, ELO, Developer, Contractors	Continuous

	• No waste shall be burnt or buried at the site.	ELO, ECO	Continuous
	• The contractor shall dispose of all waste at licensed waste disposal sites, and shall keep waste manifests on site as a record of volumes and types of waste that have been removed.	ELO	Continuous
	• No waste shall be burned at the site offices, nor anywhere else on the site, including the approved solid waste disposal site.	ECO, ELO, Developer, Contractors	Continuous
	• Special care should be taken to avoid spillage of tar products such as tar prime or 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, in borrow pits or any burying, be allowed. Unused or rejected bituminous products shall be taken to the supplier's production plant. No spillage of bituminous products shall be allowed on site. Affected areas shall be promptly reinstated to the satisfaction of the ER.	ECO, ELO, Developer, Contractors	Continuous
Construction areas	• Construction activities may not spread beyond the demarcated areas, except with the prior approval of the ECO. • The main construction activities must take place in areas that are already disturbed.	ELO, ECO	Continuous

Construction areas	• The ELO must monitor the lateral spread of construction outside of demarcated areas on a weekly basis.	ELO, ECO	Continuous
Heritage sites/artefacts	• If an artefact on site is uncovered, work in the immediate vicinity shall be stopped immediately. The contractor shall take reasonable precautions to prevent any person from removing or damaging any such article and shall immediately upon discovery thereof inform the ER of such discovery. The National Monuments Council is to be contacted who will appoint an archaeological consultant. Work may only resume once clearance is given in writing by the archaeologist. • Should heritage sites or graves be found, the necessary process is to be followed as per the National Heritage, 2004 (Act No. 27 of 2004). • Construction personnel must be alert and must inform the ECO should they come across any culturally significant findings or unmarked graves.	Developer, Contractor, ECO, ELO	Continuous
Graves	• If a grave is uncovered on site, or discovered before the commencement of work, then all work in the immediate vicinity of the gravesite shall be stopped and the ER informed of the discovery. The National Monuments Council should be contacted and arrangements made for an undertaker to carry out exhumation and reburial. The undertaker will, together with the National Monuments Council, be responsible for attempts to contact family of the deceased and for the site where the exhumed remains can be re-interred.	Developer, Contractor, ECO, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Graves	• Unmarked graves may not be tampered with until the relevant authorities have been on site for inspection and have issued directives. • The necessary relocation procedures must be followed when relocating any graves.	Developer, Contractor, ECO, ELO	Continuous
Invasive species	• The alien and invasive species identified on site must be eradicated and controlled. • Any proclaimed weed or alien species that propagates during the contract period shall be cleared by hand before seeding.	Developer, Contractor, ECO, ELO	Continuous
	• The Contractor shall be held responsible for the removal of alien vegetation within the Road Reserve disturbed during road construction. This includes, for example, service roads, stockpile areas, stop/go facilities, windrows and wherever material generated for or from road construction has been stored temporarily or otherwise within the Road Reserve. This responsibility shall extend for the duration of the defects liability period.	Contractor	Continuous
	• The construction site and any disturbed areas must be inspected monthly for signs of invasive alien species.	ECO	Monthly

Activity / issue	Action required	Responsible party	Frequency
	• Invasive species found must be removed immediately after the ECO has pointed them out. • The contractor shall follow the ECO's recommendations regarding appropriate methods for removal, which may vary for different species.	ELO, ECO	Continuous
Safety and security	• The developer must fence off the works area and any sensitive areas of the site. • The construction workings shall be well lit during the evening.	Developer, Contractor, ELO	Once-off
	• The contractor must keep a first aid kit and the telephone numbers of the local emergency services in prominent positions at the site office. • All personnel must be aware of the location of this information.	ELO	When necessary
	• In areas that are accessible to the public, the contractor must erect signs and/or danger tape around exposed excavations to warn the public of the inherent dangers.	Contractor	Continuous

Health and safety	• The Contractor shall submit a strategy to ensure the least possible disruption to traffic and potential safety hazards during construction. This strategy must be approved by the social consultant before commencement of construction. • The strategy should include a schedule of work indicating when and how road crossings (construction at existing intersections) will be made. The schedule should be updated and distributed to all stakeholders. • The Contractor shall also liaise with the Traffic Authorities for their approval in this regard. • Proper traffic and safety warning signs must be placed at the construction site to the satisfaction of the Engineer and the Developer. • The Contractor must adhere to the regulations pertaining to Health and Safety, including the provision of protective clothing, failing which the Contract may be ended with immediate effect. • Dust protection masks shall be provided to task workers if they complain about dust. • Potable water must be available to workers to avoid dehydration. This water should be of acceptable standards to avoid any illness. At least 5 litres of drinking water per person per day should be made available during construction. • The contractor must enforce relevant Health and Safety Regulations for these specific activities. • The contractor should also comply with relevant Labour Laws as stipulated by the Labour Act.	Contractor. ELO	Continues

Structural stability	• All development must be done in concurrence with the recommendations made by the geotechnical engineers.	Developer, Contractor, ELO	Continuous
Sewage	• Construction workers must use the ablution facilities provided.	Contractor, ECO	Continuous
Stormwater management	• There is to be no uncontrolled discharge of effluent into any watercourse.	Contractor, ECO	Continuous
	• Runoff is to be controlled as close to the source as possible.	Contractor, ECO	Continuous
Record keeping	• The ER and the ELO to the Contractor will continuously monitor the Contractor's adherence to the approved impact prevention procedures and shall issue to the Contractor a notice of non-compliance whenever transgressions are observed. The ELO should document the nature and magnitude of the non-conformance in a designated register, the action taken to discontinue the non-conformance, the action taken to mitigate its effects and the results of the actions. The non-conformance should be documented and reported to the ER's Representative in the monthly report.	ER, ELO	Continuous
	• The ECO will compile an environmental control report following each monthly site audit, which will be distributed to the ER and the developer.	ECO	Monthly
	• Copies of any record of decision or ESMPs for specific borrow pits or quarries used on the project shall be kept on site and made available for inspection by visiting officials from the employer or DEA.	ER, ELO	Continuous

Compliance and penalties	• The Contractor shall act immediately when such a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register and the response noted with the date and action taken. This record shall be submitted with the monthly reports and a verbal report given at the monthly site meetings.	Contractor	Continuous
	• Any avoidable non-compliance with the above-mentioned measures shall be considered sufficient ground for the imposition of a penalty. The value of the penalty shall not be less than the payment that would have been due to the Contractor for the day's production of the relevant item of work that gave cause for the infringement. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define the manner by which the environment is managed.	Contractor, developer	Continuous
	• Failure to redress the cause shall be reported to the relevant authority for them to deal with the transgression, as it deems fit.	ECO, developer, contractor	Continuous

3.3 PLANNING AND DESIGN PHASE

Table 2: Planning and Design Phase

Activity / issue	Action required	Responsible party	Frequency
Lighting	• All security lights must be angled downwards (down lighting) to limit light pollution at night.	ECO, ELO, Developer, Contractors	Once-off
Negotiations with property owners	• The Developer shall negotiate an agreement for the replacement or fixing of any infrastructure affected by the proposed road roads upgrade. • The contractor shall be informed of the agreement between the affected property owners and the Developer before construction work commences. • Should any agreements be made between local residents and the developer, all parties will have to adhere to these agreements.	ECO, ELO, Developer, Contractors	Once-off
Scheduling of construction activities	• The commencement of construction activities must preferably be scheduled for the dry winter months (April - September) to decrease the risk of erosion during heavy rainfall.	Developer, ECO	Once-off
	• Building should commence as soon as possible after clearing of vegetation and earthworks.	Contractor, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Stormwater management	• The quality, quantity and flow direction of any surface water runoff shall be established prior to disturbing any area for construction purposes. Cognisance shall be taken of these aspects and incorporated into the planning of all construction activities. Before a site is developed or expanded, it shall be established how this development or expansion will affect the drainage pattern. • Recognised water users / receivers shall not be adversely affected by the expansion or re-development.	ER, contractor, ECO, ELO	Once-off
	• The Contractor shall submit to the ER his proposals for prevention, containment and rehabilitation measures against environmental damage of the identified water and drainage systems that occur on the site. These must be approved by the ECO.	Contractor, ER, ECO	Once-off
	• Debris filters should be added to all stormwater inlets, and silt fences established where erosion is predicted.	Contractor, ECO	Once-off
	• All surface canals must include Armourflex areas, to allow for some infiltration and to reduce stormwater runoff volume and velocity. • Where only impermeable lining is possible, energy dissipaters are to be added to all stormwater outflows, including shallow gradients and uneven surfaces.	Contractor, ECO	Once-off

Activity / issue	Action required	Responsible party	Frequency
	• No water source shall be polluted in any way due to proposed changes. • Streams, rivers, pans, wetlands, dams, and their catchments shall be protected from erosion, 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. • Storm water discharge points of all storm water channels must be inspected regularly. • If these points are not sufficiently stable for the increased flow rates, additional stabilisation measures must be implemented.	Contractor, ECO	Continuous
	• Consideration shall be given to the placement of sedimentation ponds or barriers where the soils are of a dispersive nature or where toxic fluids are used in the construction process. The sedimentation ponds must be large enough to contain runoff so that they function properly under heavy rain conditions.	Contractor, ECO	Continuous

3.4 PRE-CONSTRUCTION AND SITE ESTABLISHMENT PHASE

Table 3: Pre-construction and Site Establishment Phase

Activity / issue	Action required	Responsible party	Frequency
Bird nests	• If the contractor finds bird nests that may interfere with construction, he/she must contact the ELO, who will arrange for their movement after consultation with an appropriate expert.	ELO, ECO	When necessary
Clearing of vegetation	• At the outset of construction (or during construction as may be applicable), the ECO and the contractor shall visit all proposed borrow-pits, haul roads, access roads, camp sites, and other areas to be disturbed. Areas to be disturbed shall be clearly demarcated, and no land outside these areas shall be disturbed or used for construction activities. Detailed instructions and final arrangements for protection of sensitive areas, keeping of topsoil and rehabilitation of disturbed areas shall be made, in line with the guidelines in this document. The ECO shall be consulted before any new areas are disturbed which have not yet been visited. • No off-road driving shall be allowed, except on the agreed upon haul and access roads.	Contractor, ECO	Before construction commences

Activity / issue	Action required	Responsible party	Frequency
	• Vegetation shall only be cleared within the road reserve, while trees with a trunk diameter exceeding 100 mm (1 meter above ground) shall be left intact. The reserves on either sides of this corridor may not be cleared of vegetation, unless permission is given to do so for detours or access roads. • No indigenous tree or shrub on or adjacent to the site shall be felled, lopped, cut or pruned until it has been clearly marked for this purpose by the ELO or ECO. • The ECO will specify the method of marking, and the Contractor will be informed in writing. • Only trees and shrubs directly affected by the works, and such others as may be indicated by the ECO, may be felled or cleared. • Trees that need to be trimmed should be so with the right equipment and aesthetical acceptable manner. • In all areas where the Contractor intends to, or is required to clear the natural vegetation and soil, either within the Road Reserve, or at designated or instructed areas outside the Road Reserve, a plan of action shall first be submitted to the ER. The ER will consult with the ECO for the approval of the vegetation clearing plan.	Contractor, ELO, ECO	Once-off

Activity / issue	Action required	Responsible party	Frequency
	• The plan shall contain a photographic record and change/land reference of the areas to be disturbed. This shall be submitted to the ER for his records before any disturbance/stockpiling may occur. The record shall be comprehensive and clear, allowing for easy identification during subsequent inspections.	Contractor,ER, ECO	Once-off
	• No vegetation shall be cleared outside of the demarcated construction areas. • The construction area is to be demarcated using barrier tape, outside of which is to be considered a no-go area.	ELO, ECO	Continuous
	• Clearing of vegetation is to be minimised. The natural vegetation encountered on the site is to be conserved and left as intact as possible. • Vegetation clearance must be done gradually and not all at once.	ELO, ECO	Continuous
Erosion control measures	• Excavations in soft or erodible material will require erosion control measures and correct rehabilitation methods. • These measures must include the construction of cross drains and berms.	Contractor; ECO	Once-off

Activity / issue	Action required	Responsible party	Frequency

Sewage	• Safe and effective sewage treatment will require one of the following sewage handling methods:
	  • septic tanks and soak-aways,
	  • dry composting toilets such as “enviro loos”,
	  • or chemical toilets which are supplied and maintained by a subcontractor.
	• The type of sewage treatment will depend on the geology of the area selected, the duration of the contract and proximity (availability) of providers of chemical toilets.
		Contractor	Once-off

	• The contractor shall provide sufficient chemical toilets on the site to serve the entire construction crew. • Adequate toilet facilities shall also be provided. Use of the veld for this purpose shall not, under any circumstances, be allowed. The contractor shall be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the ER.	Contractor, ELO	Once-off

Activity / issue	Action required	Responsible party	Frequency
	• Should a soak away system be used, it shall not be closer than 800 m from any natural water course or water retention system. • The positioning of the chemical toilets is to be done in consultation with the ER. • Particular reference in the site establishment plan shall be given to the treatment of sewage generated at the site offices, site laboratory and staff accommodation. • Sanitary arrangements should be to the satisfaction of project management, the local authorities and legal requirements. • Toilets should be easily accessible and should be positioned within walking distance from wherever employees are employed on the works.	Contractor, ELO, ECO	Once-off
Siting of construction camp	• The ELO must laisse with communities to ensure that the construction camp is not located in an area where it will cause undue nuisance to the community.	CLO, Contractor	Once-off
	• Prior to establishment of the construction camp, the Contractor shall produce a plan showing the positions of all buildings, laydown yards, and other infrastructure for approval by the ECO.	Contractor, ECO	Once-off

3.5 CONSTRUCTION PHASE

Table 4: Construction Phase

Activity / issue	Action required	Responsible party	Frequency
Sewage	• Chemical toilets shall be serviced daily to avoid overflowing and unpleasant odours. • The Contractor should arrange for regular emptying of toilets and should be entirely responsible for enforcing their use and for maintaining such latrines in a clean, orderly and sanitary condition to the satisfaction of the ER.	Contractor, ELO	Daily
	• Outside toilets should be provided with locks and doors and should be secured to prevent them from blowing over. The toilets should also be placed outside areas susceptible to flooding.	Contractor, ELO	Continuous
Waste management & water resource management	• The Contractor shall submit a waste management plan, including how it is intended to dispose of hazardous waste, as described hereunder. This plan should be reviewed and approved by the engineer and ECO before implementation.	Contractor, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Waste management & water resource management	• Toilet facilities should be available in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males. The toilets should be such that they can be transported to various sites and to be emptied at an approved sewage site. No person should have to walk more than 1km for the use of a toilet. • Construction rubble and other waste generated during construction must be disposed of on a regular basis at an approved waste disposal site. A temporary waste site may be demarcated for temporary storage of waste, but this area must be identified and clearly marked in the waste management plan. ▪ Adequate separate containers for hazardous and domestic waste must be provided on site and at the construction camp.	Contractor, ELO	Continuous
Firewood collection	▪ Collection of firewood on site is prohibited. The Contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings. The contractor shall ensure that energy sources are available at all times for construction and supervision personnel for heating and cooking purposes. ▪ The contractor shall provide adequate facilities for his staff so that they are not encouraged to supplement their comforts on site by accessing what can be taken from the natural surroundings.	Contractor, ELO	Contractor, ELO

Activity / issue	Action required	Responsible party	Frequency
Fires	• Fires shall only be allowed in facilities or equipment specially constructed for this purpose. A firebreak shall be cleared and maintained around the perimeter of the camp and office sites.	Contractor, ELO	Contractor, ELO
Tar and bitumen	• Tar and bitumen is to be mixed on mixing trays only, and not on exposed soil. • After all tar and bitumen mixing is complete, all waste tar and bitumen shall be removed from the batching area and disposed of at a licensed waste disposal site (closest site expected to be Tsumeb). • Stormwater shall not be allowed to flow through the batching area. Tar and bitumen sediment shall be removed from time to time and disposed of in a manner as instructed by the ECO.	Contractor	Continuous
Batching sites	• Such sites will be the subjects of regular inspection by the relative authorities during the life of the project.	Contractor, developer, ECO	Once-off
	• 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 against environmental damage from toxic/hazardous substances.	Contractor, ELO, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	• The contractor shall provide plans that take into account such additional measures as concrete floors, bunded storage facilities, linings to drainage channels and settlement dams. Ultimate approval of these measures shall be from the relevant national authority, as shall approval of closure. The ER will assist the Contractor in his submissions to the relevant authority.	Contractor, ER, ECO	Once-off
	• Effluent from concrete batch plants and crusher plants should be treated in a suitable designated sedimentation dam to the legally required standards to prevent surface and groundwater pollution. The designs of such a facility should be submitted to the ER for approval.	Contractor, ER	Once-off
Dust suppression	• The contractor shall ensure that bare soil or soil stockpiles are dampened at least once per day during dry and windy periods. • Dust caused by strong winds should be controlled by means of water spray vehicles.	Contractor	When necessary
	• The contractors must cover all vehicles transporting material that can be blown off (e.g. soil, rubble etc.), with a tarpaulin, and these vehicles are to travel at maximum speed of 40km/h on site.	Contractor	Continuous
	• Entry and exit points onto the construction area shall be cleared of dust and mud as necessary.	Contractor	When necessary

Activity / issue	Action required	Responsible party	Frequency
Storage and handling of hazardous substances	• Petrochemicals, oils and identified hazardous substances shall only be stored under controlled conditions. • All hazardous materials i.e. bitumen binders will be stored in a secured, appointed area that is fenced and has restricted entry. A walled, concrete platform or dedicated store with adequate flooring or bermed area must be used to accommodate chemicals such as fuel, oil, paint, herbicide and insecticides, as appropriate, in well-ventilated areas. Storage of bituminous products shall only take place using suitable containers to the approval of the ER. • A concrete floor that is bunded should be used. The contractor shall provide bunding that can hold 110% of the volume of the bulk fuel storage containers. The Contractor shall provide proof to the ER that relevant authorisation to store such substances have been obtained by the relevant authority. • Hazard signs indicating the nature of the stored materials shall be displayed on the storage facility or containment structure. • Before containment or storage facilities can be erected the Contractor shall furnish the ER with details of the preventative measures he proposes to install in order to mitigate against pollution of the surrounding environment from leaks or spillage. • The proposals shall also indicate the emergency procedures in the event of misuse or spillage that will negatively affect an individual or the environment.	Contractor, ECO	Once-off

Activity / issue	Action required	Responsible party	Frequency
	• Bulk fuel storage containers shall be placed away from areas of intensive movement of machinery to prevent accidental damage to the containers and well clear of the residential dwellings along the stretch of road to be upgraded. • Bulk fuel storage containers shall be placed away from low-lying areas and away from residential dwellings. • Fuel should be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel should be avoided. An adequate bund wall, 110% of volume, should be provided for fuel and diesel areas to accommodate any spillage or overflow from these substances. The area inside the bund wall should be lined with an impervious lining to prevent infiltration of the fuel into the soil. • Gas welding cylinders and LPG cylinders should be stored in a secure, well-ventilated area. • All spillages from any potential groundwater contaminants such as lubricants, hydrocarbon-based fuels, etc. must be safely and immediately removed to an appropriate disposal facility. • Oil residue shall be treated with oil absorbent such as Drizit or similar and this material removed to an approved waste site. • Surface water draining off contaminated areas containing oil and petrol must be channelled towards an oil separator. • In the case of pollution of any surface water, the ECO should be informed immediately.	Contractor, ECO	When necessary

Activity / issue	Action required	Responsible party	Frequency
	• Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery should be collected in a holding tank and sent back 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 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. • All used filter materials should be stored in a secure bin for disposal off site. Any contaminated soil should be removed and replaced. Soils contaminated by oils and lubricants should be collected and disposed of at a facility designated by the local authority to accept contaminated materials.	Contractor, ELO, ECO	When necessary
	• The refuelling area must be in a central area, and must comply with SABS standards.	Contractor, ECO	Once-off
	• All construction material shall be stored in the demarcated area of the construction camp. Under no circumstances may material be stored outside of the demarcated area on naturally vegetated areas.	ELO	Weekly

Activity / issue	Action required	Responsible party	Frequency
Maintenance of machinery	• No maintenance of machinery shall take place at the area of work or on any naturally vegetated areas. • Machinery maintenance shall only take place at the construction yard. • The contractor shall provide drip trays to prevent the contamination of soil or water during maintenance operations.	ELO	Continuous
	• The contractor must ensure that the construction vehicles are under the control of suitably qualified personnel and are in proper working order to avoid excessive noise and fumes, and have no fuel or lubricant leakages.	Contractor, ECO	Continuous
	• 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 Contractor's and his subcontractor's and supplier's plant, machinery and equipment.		
Movement of vehicles	• Vehicles must remain on existing roads or tracks where possible.	Contractor	Continuous
	• No unauthorised movement of vehicles shall take place outside demarcated areas.	ELO, ECO	Weekly
Revegetation	• Re-vegetation must occur as soon as possible.	ECO, Contractor	Continuous

Activity / issue	Action required	Responsible party	Frequency
Disturbance or killing of animals	• No killing or disturbance to any fauna may occur on the construction site including snakes. Penalties must be enforced for interfering with fauna, including hunting or snaring. • The Contractor shall advise his workers of the penalties associated with the needless destruction of wildlife. • The Contractor and his employees shall not bring any domestic animals onto the site. • There shall be no feeding of indigenous animals. • The Contractor shall ensure that domestic and indigenous animals are safe from injury.	ECO, ELO, Developer, Contractors	Once-off, Continuous
Management of topsoil and stockpiling of soil	• All topsoil and other soil horizons must be managed strictly according to Appendix E. • Where compaction has taken place in disturbed areas, these areas must be ripped and covered with topsoil separately kept for this purpose. This includes the road reserve where grass should be encouraged to re-establish.	Contractor, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Spoil sites	• The Contractor shall be responsible for the safe siting, operation, maintenance and closure of any spoil site used during the contract period, including the defects liability 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 ER for his approval. The location of these spoil sites shall have signed approval from the affected landowner before submission to the ER. • No spoil site shall be located within 500m of any watercourse. • A photographic record shall be kept of all spoil sites for monitoring purposes. This includes before the site is used and after re-vegetation.	Contractor, ECO, ELO	Continuous
	• 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 toxicants into the surrounding environment. Such special measures shall require the approval of the relevant Provincial or National authority. • The same shall apply for the disposal of solid waste generated from the various camp establishments. The ER will assist the Contractor in obtaining the necessary approval if requested by the Contractor.	Contractor, ECO, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Stockpiles	• The contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible can be transported direct to and placed at the point where it is to be used. However, should temporary stockpiling become necessary, the areas for the stockpiling of excavated and imported material shall be indicated and demarcated on the site plan submitted in writing to the ER for his approval, together with the Contractor's proposed measures for prevention, containment and rehabilitation against environmental damage.	Contractor, ECO, ELO	Continuous
	• The areas chosen shall have no naturally occurring indigenous trees and shrubs present that may be damaged during operations. Care shall be taken to preserve all vegetation in the immediate area of these temporary stockpiles. During the life of the stockpiles the Contractor shall at all times ensure that they are: • Positioned and sloped to create the least visual impact; • Constructed and maintained so as to avoid erosion of the material and contamination of surrounding environment; and • Kept free from all alien / undesirable vegetation.	Contractor, ECO, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
	• Excess materials from windrows, in situ milling or any detritus of material from road construction activities may not be swept off the road and left unless specifically instructed to do so in the contract drawing or under instruction from the ER	Contractor, ECO, ELO	Continuous
	• In all cases, the ER shall approve the areas for stockpiling and disposal of construction rubble before any operation commences.	Contractor, ECO, ELO	Continuous
Excavation, hauling and placement	• The Contractor shall provide the ER with detailed plans of his intended construction processes prior to starting any cut or fill or layer. The plans shall detail the number of personnel and plant to be used and the measures by which the impacts of pollution (noise, dust, litter, fuel, oil, sewage), erosion, vegetation destruction and deformation of landscape will be prevented, contained and rehabilitated. Particular attention shall also be given to the impact that such activities will have on the adjacent built environment. • The Contractor shall demonstrate his “good housekeeping”, particularly with respect to closure at the end of every day so that the site is left in a safe condition from rainfall overnight or over periods when there is no construction activity.	Contractor, ECO, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Sound abatement	• The planning of construction activities (construction site) must endeavour to minimise the noise impact on adjacent landowners. • The use of whisper coarse surfacing to be investigated. • Construction work must be undertaken during normal working hours (08H00 –17H00). • In this regard, vehicles should idle as little as possible, construction schedule times must be adhered to, and all construction workers must be encouraged to keep noise to a minimum on site. • Project management should endeavour to keep noise generating activities to a minimum. Noises that could cause a major disturbance for instance blasting, should only be carried out during daylight hours. Compliance with the appropriate legislation with respect to noise, should be mandatory. • Should noise generating activities have to occur at night for instance drilling of blast holes, the people in the vicinity of the drilling should be warned about the noise well in advance and the activities should be kept to a minimum.	Contractor, ECO	Continuous
Blasting	• Wherever blasting activity is required on the site (including quarries and/or borrow pits) the contractor shall rigorously adhere to the relevant statutes and regulations that control the use of explosives.	Contractor, ELO, ECO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Blasting	• The contractor shall, prior to any drilling of holes in preparation for blasting, supply the ER with a locality plan of the blast site on which shall be shown the zones of influence of the ground and air shock-waves and expected limits of fly-rock. • The plan shall show each dwelling, structure and service within the zones of influence and record all details of the dwellings/structures/services including existing positions, lengths and widths of cracks, as well as the condition of doors, windows, roofing, wells, boreholes etc. • The contractor, alone, shall be responsible for any costs that can be attributed to blasting activities, including the collection of fly-rock from adjacent lands and fields. The submission of such a plan shall not in any way absolve the contractor from his responsibilities in this regard. • The contractor shall indicate to the ER the manner in which he intends to advertise to the adjacent communities and/or road users the time and delays to be expected for each individual blast.	Contractor, ELO, ECO	Continuous
Spills	• The ECO must check for spillages at the fuel storage area on a weekly basis.	ECO, ELO, contractor	Weekly

Activity / issue	Action required	Responsible party	Frequency
Spills	• Streams, rivers and dams 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, the Contractor would be liable to arrange for competent instances to clear the affected area. • Responsibility for spill treatment lies with the Contractor. The individual responsible for, or who discovers a hazardous waste spill must report the incident to his/her ELO or to the ER. The ELO will assess the situation in consultation with the ER and act as required. In all cases, the immediate response shall be to contain the spill. The exact treatment of polluted soil / water shall be determined by the Contractor in consultation with the ELO and the ER. Areas cleared of hazardous waste shall be revegetated according to the ER'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 will be sought for appropriate treatment and remedial procedures to be followed. The requirement for such input shall be agreed with the ER. • The costs of containment and rehabilitation shall be for the Contractor's account, including the costs of specialist input.	ECO, ELO, contractor	Weekly

Activity / issue	Action required	Responsible party	Frequency
Water for human consumption	• Water for human consumption should be available at the site offices and at other convenient locations on site. • All effluent water from the camp / office sites shall be disposed of in a properly designed and constructed system, situated so as not to adversely affect water sources (streams, rivers, pans, dams, etc.). Only domestic type wastewater shall be allowed to enter this drain.	Contractor, ELO	Continuous
Quarries and borrow pits	• The removal of material at borrow-pit sites shall be focused where the least significant vegetation exists. If material is only available around significant mature trees (more than 100 cm circumference – 1 meter above ground), clusters of trees should be preserved while suitable material is excavated around them. A 3 meter buffer must be conserved around the cluster of mature trees. The ER shall visit all proposed borrow-pit areas and indicate where and how material may be removed, before works commence. A cluster constitutes 3 or more trees in close proximity (within 20 m radius). • The Engineer and surveyor must draft a plan for approval before commencement of a borrow pit. This plan must indicate the required resources and sensitive areas that may not be mined (indication of the mature trees). • All borrow-pits must be rehabilitated.	Contractor, ELO	Before construction commences

Activity / issue	Action required	Responsible party	Frequency
Quarries and borrow pits	• The ELO shall liaise with the applicable local headmen and residents regarding whether their borrow-pits shall be shaped as water reservoirs during rehabilitation. • At those borrow-pits not to be shaped as reservoirs, topsoil (the top layer of organic material, even if the topsoil in non-existent, the top layer of organic material) at borrow pits shall be stockpiled separately and the stockpile maintained for use at the end of the contract to rehabilitate the borrow pits. • The borrow pits shall be rehabilitated by trimming the sides to a slope not steeper than 30° and evenly spreading the top soil over the area to allow for the growth of new vegetation. • Final payment will not be issued unless the environmental consultant is satisfied with the obligations listed under this section (borrow pit management. • The borrow pit floor should be levelled as part of rehabilitation management. • All spoil material at the borrow pits shall be neatly shaped and no loose material will be left inside the borrow pits. • The contractor's attention is drawn to the requirement of the MAW&F, that before entry into any quarry or borrow pit, a permit for the establishment, operation and closure of the quarry or borrow pit must have been obtained from the MAW&F.	Contractor, ELO	Before construction commences

Activity / issue	Action required	Responsible party	Frequency
	• It is the responsibility of the Contractor to ensure that he obtains from the ER, a copy of the approved permit prior to entry into the quarry or borrow pit. • The conditions imposed by the relevant ESMP are legally binding on the Contractor and may be more extensive and explicit than the requirements of this specification. • In the event of any conflict occurring between the requirements of the specific EMP and this specification the former shall apply. • The cost of complying with the requirements shall be deemed to be included in existing rates in the Schedule of Quantities.	MAW&F, Contractor, ELO, ECO	Continuous

3.6 POST-CONSTRUCTION PHASE

Table 5: Post-Construction Phase

Activity / issue	Action required	Responsible party	Frequency
Landscaping	• All cleared areas shall be landscaped and prepared for natural revegetation to resemble pre-construction topography as closely as possible.	Contractor, ECO	Where necessary
Revegetation	• The effectiveness of revegetation and erosion control must be monitored periodically. In the event that rehabilitation is not successful, corrective action must be taken. • This may include bringing in additional topsoil, reseeding and mulching, depending on the reasons for the failure of the prior re-vegetation methods.	ELO, ECO	Weekly
Rehabilitation	• Areas that are rehabilitating must be demarcated with danger tape to prevent vehicular access to these areas. • The area where the site offices were erected will require rehabilitation at the end of the contract. All construction material, including concrete slabs and braai areas are to be removed from the site on completion of the contract. • All bunding areas, equipment, waste, temporary structures, stockpiles, etc. must be removed from the camp and work sites.	ELO, ECO	Monthly

Activity / issue	Action required	Responsible party	Frequency
	• Alien vegetation particularly the Downy thorn apple (*Datura innoxia*) and Wild tobacco (*Nicotiana glauca*) that occur in the project corridor must be weeded. • All cuttings must be shaped with a slope to provide a natural appearance, without having to destroy significant vegetation on top of the slope. • Existing borrow pits adjacent to main roads need also be rehabilitated during rehabilitation phase. • Final payment will not be issued unless the environmental consultant is satisfied with the obligations listed under this section ("rehabilitation").	Contractor, ELO, ECO	Continuous
Removal of construction materials	• Once construction is complete, all construction materials are to be removed in an appropriate manner.	Contractor, ECO	Daily
Replacement of topsoil	• Topsoil is to be replaced strictly according to the steps in Appendix E.	Contractor, ELO, ECO	Continuous
Spoil sites	• Spoil sites will be shaped to fit the natural topography. These sites shall receive a minimum of 75 mm topsoil and be grassed with the recommended seed mixture. Slopes shall not exceed a vertical: horizontal ratio of 1:3. Only under exceptional circumstances shall approval be given to exceed this ratio.	Contractor, ECO, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Spoil sites	• Appropriate grassing measures to minimise soil erosion will be undertaken by the Contractor. This will include both strip and full sodding. The Contractor may motivate to the ER for other acceptable stabilising methods. • The ER may only approve a completed spoil site at the end of the defects liability period upon receipt from the Contractor of a landowner's clearance notice and a ER'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.	Contractor, ECO, ELO	Continuous
Stockpiles	• After the stockpiled material has been removed, the site shall be reinstated to its original condition. No foreign material generated / deposited during construction shall remain on site. Areas affected by stockpiling shall be landscaped; top soiled, grassed and maintained at the contractor's cost until clearance from the ER is received.	Contractor, ECO, ELO	Continuous
Topsoil management	• Topsoil shall be removed from all areas where physical disturbance of the surface would occur and shall be stored and adequately protected. The contract will provide for the stripping and stockpiling of topsoil from the site for later re-use. • Topsoil is considered to be the natural soil covering, including all the vegetation and organic matter. Depth may vary at each site.	Contractor, ECO, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Topsoil management	• The areas to be cleared of topsoil shall include the storage areas. • The subsoil is the layer of soil immediately beneath the topsoil. It shall be removed, to a depth instructed by the ER, and stored separately from the topsoil if not used for road building. This soil shall be replaced in the excavation in the original order it was removed for rehabilitation purposes.	Contractor, ECO, ELO	Continuous
	• All topsoil stockpiles and windrows shall be maintained throughout the contract period in a weed-free condition. Weeds appearing on the stockpiled topsoil shall be removed by hand.	Contractor, ECO, ELO	Continuous
	• The topsoil stockpiles shall be stored, shaped and sited in such a way that they do not interfere with the flow of water to cause damming or erosion, or itself be eroded by the action of water. Stockpiles of topsoil shall not exceed a height of 2 m, and if they are to be left for longer than 6 months, shall be analysed, and if necessary, upgraded before replacement. Stockpiles shall be protected against infestation by weeds.	Contractor, ECO, ELO	Continuous
	• Soils contaminated by hazardous substances shall be disposed of at an approved waste disposal site.	Contractor, ECO, ELO	When necessary

Activity / issue	Action required	Responsible party	Frequency
	• The Contractor shall ensure that no, or minimal topsoil is lost due to erosion – either by wind or water. Areas to be top soiled and grassed shall be done so systematically to allow for quick cover and reduction in the chance of heavy topsoil losses due to unusual weather patterns. The Contractor's programme shall clearly show the proposed rate of progress of the application of topsoil and grassing. • 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 progress plan approved by the ER. • The Contractor's responsibility shall also extend to the clearing of drainage or water systems within and beyond the boundaries of the Road Reserve that may have been affected by such negligence.	Contractor, ECO, ELO	Continuous
Waste management and water resource management	• Construction rubble and other waste generated during construction must be disposed of on a regular basis at an approved waste disposal site. A temporary waste site may be demarcated for temporary storage of waste, but this area must be identified and clearly marked in the waste management plan. • Adequate separate containers for hazardous and domestic waste must be provided on site and at the construction camp.	Contractor, ELO	Continuous

Activity / issue	Action required	Responsible party	Frequency
Waste management and water resource management	• The workforce must be sensitised to dispose of waste in a responsible manner and not to litter. • No waste may remain on site after completion of the project.	Contractor, ELO	Continuous
	• Toilet facilities should be available in the following ratio: 2 toilets for every 50 females and one toilet for every 50 males. The toilets should be such that they can be transported to various sites and to be emptied at an approved sewage site. No person should have to walk more than 1km for the use of a toilet. • A demarcated vehicle service area should be provided. This area should have an impermeable floor, oil trap and dedicated wash bay area. All used water must first run through the oil trap before the effluent is allowed to exit. • Construction rubble and other waste generated during construction must be disposed of on a regular basis at an approved waste disposal site. A temporary waste site may be demarcated for temporary storage of waste, but this area must be identified and clearly marked in the waste management plan. • Adequate separate containers for hazardous and domestic waste must be provided on site and at the construction camp.		

Activity / issue	Action required	Responsible party	Frequency
	• Servicing of vehicles is only permitted in the demarcated vehicle service area, except for large immobile vehicles which may be serviced on site, on condition that oils and lubricants are prevented from spilling through the use of drip trays or other suitable containers. • Drip trays should be available for all vehicles that are intended to be used during construction. These trays should be placed underneath each vehicle while the vehicles are parked. The drip trays should be cleaned every morning and the spillage handled as hazardous waste. • Accidental spills must be cleaned immediately. The contaminated soil must be suitably disposed of in a container suitable for hazardous waste. • Oil, lubricants, and other hazardous materials must be stored in separate containers (concrete liner, container, or metal or plastic drip tray) and stored for transport and disposal at an approved waste disposal site or for collection by an oil recycling company such as WESCO Salvage (this company collects significant quantities of oil from central locations throughout the country). • Fuel tanks on site must be properly bunded. The volume of the bunded area must be sufficient to hold 1.5 times the capacity of the storage tanks. The floor of the bunded area must be impermeable and the sides high enough to achieve the 1.5 times holding capacity. • Foam fire extinguishers must be in close proximity to fuel kept on site. There should be trained personnel to handle this equipment. At least two extinguishers should be placed at every fuel storage area.	Contractor, ELO	Continuous

3.7 OPERATIONAL PHASE

Table 6: Operational Phase

Activity / issue	Action required	Responsible party	Frequency
Signage	• All signs must be within the prescribed guidelines and maintained to the applicable requirements.	Developer	Continues
Effluent from the Road	• The developer must ensure that any hazardous substances that are spilled from vehicles travelling on the roads are cleared up as soon as possible. • A spill management procedure must be in place so that any spills are cleared up prior to the hazardous substances entering the stormwater system or the surrounding natural vegetation.	Developer	Continuous
Spirit of EMP	• All activities mentioned herein must be carried out in the spirit of reducing the potential impacts that are identified in the environmental studies, and with this end-goal in mind.	Developer	Continuous

3.8. BORROW PIT REHABILITATION GUIDELINES

3.8.1 Severity Classification

Borrow pits after use have different shapes and depths and are located in different environments. Therefore, they have to be considered individually. Nevertheless, general criteria can be used to describe the hazard potential.

The following table determines the Severity Class for the hazard potential of any borrow pit – focussing on the protection of health and safety of both animals and people.

The following methodology is applicable to determine the severity class:

- The borrow pits are checked against the criteria depicted in the table below and their hazard potential is classified as None / Low / Medium / High;
- Should any class score fall within the next higher class, then the classification of the borrow pit be determined by that higher class score;
- Example

1. High walls:	<1 m	None
2. Road proximity:	>100 m	None
3. House/Dwelling proximity:	400 m	Low
4. Surface water drainage:	>500 m	Low
5. School proximity:	>500 m	None
5. Livestock present	0	None
⇨ **Risk Result:**	**Low Risk**	

Severity Classification	**A**	**B**	**C**	**D**
High Walls (height)	< 1 m	1-2 m	2-3 m	>3 m
Road Proximity from shoulder of the road	>100 m	60-100 m	20-60 m	<20 m
House - Dwelling Proximity distance	>250 m	100 – 250 m	50 – 100 m	<50 m
Surface water drainage lines proximity distance	>500 m	300 – 500 m	100 – 300 m	<100 m
School Proximity distance	>500 m	300 – 500 m	100 – 300 m	<100 m
Livestock present in the camp / area	0	1-5	6-10	>10

Risk – Result	None	Low	Medium	High

3.8.2 Borrow Pit Rehabilitation

3.8.2.1 General

In order to reduce the hazard potential of borrow pits several approaches are potentially possible, however not all of them will eliminate the hazard in the long run. For instance fencing-off the borrow pit would eliminate the danger of people or animal falling into the pit, however on the other hand, cattle can also not reach the pit to drink, except if a lockable gate is included. Further, future erosion might extend the borrow pit beyond the fence and subsequently be a potential danger again.

On the other hand, structural measures are more expensive options; however, they potentially mitigate the danger sustainably. Nevertheless, also structural measures will have to be selected carefully. The typical measure is to slope the pit in such a way, that it is safe, but still accessible, as required.

However, this might require the upper rim to be extended further, and adjacent land use (e.g. homesteads) might be too close to realize this option. Further, dozing soil into the pit in order to reduce the slope and to prevent future erosion on the one hand, on the other hand reduces the storage volume, which will be opposed by the local community, as experienced numerous times in the past.

Further, depending on the soil type, the loose soil in the borrow pit, once soaked with water poses a life treat to animals as they can get stuck and if not being able to free themselves, they will die.

(i) Option One

This option is considered the ideal rehabilitation option and it has to be considered as first option for borrow pits, with a Severity Classification of

- ✓ **None** or
- ✓ **Low** or
- ✓ **Medium**

and

- ✓ **where enough material is available for the rehabilitation actions.**

The following mitigation measures have to be applied:

1. The borrow pit floor will be levelled and no topographical high points will be present

on the floor;

2. No walls or steps will be present in or around the borrow pit;
3. The borrow pit floor will be free of any spoils, large rocks or any form of construction waste;
4. The slopes will have a gradient not steeper than 1:3 and will be graded or bladed;
5. Should dead vegetation be available, it will be distributed evenly on the slopes to prevent wind and water erosion;
6. Overburden, top-soil and any other material, which was removed when the borrow pit was opened and stockpiled on the outer sides of the borrow pit, will be distributed on the slopes and floor of the borrow pit with a maximum thickness of 300 mm;
7. Finishing of the slopes should be done in concentric circles, starting from the borrow pit floor and moving upwards towards ground level to prevent initial erosion induced by water and wind;
8. Remaining material (overburden and topsoil) will be shaped as a berm with a maximum slope 1:3, with a distance of at least 3.0 m from the edge of the borrow pit and not closer than 9.0 m to any structures (roads, buildings, etc.). The berm will not be higher than 1.0 m;

All alien vegetation has been removed from the floor, the slopes and berms of the borrow pit.

(ii) Option Two

Should the application of the first rehabilitation option not be possible, this Option Two shall be considered.

This rehabilitation option is applicable to borrow pits, which have a Severity Classification of

- ✓ **High** or
- ✓ **where sloping to the outside not possible due to adjacent obstacles** or
- ✓ **where not enough material is available for the rehabilitation actions of Option One.**

The following mitigation measures have to be applied:

1. The borrow pit floor will be levelled and no topographical high points will be present on the floor;
2. The borrow pit floor will be free of any spoils, large rocks or any form of construction waste;

3. The borrow pit will be fenced off:
    a. with mesh wire and galvanized steel poles, minimum height 1.2m,
    b. with one access to the pit, which will be controlled by a gate of the same material as the fence, the gate will be lockable and access granted to the land owner only, if possible,
    c. with the fence being constructed at least 5.0 m from the edge of the borrow pit, enclosing the entire borrow pit;
4. A distance of at least 9.0 m to any adjacent structures, roads and other obstacles shall be maintained;
5. All alien vegetation has been removed from the floor, the slopes and berms of the borrow pit.

3.8.2.2 Borrow Pit Taking-Over Certificate

It is essential that any borrow pit after rehabilitation meets all requirements set out in Option One (ideally) or Option Two (alternatively). Only after the rehabilitation meeting all requirements, the borrow pit can be handed over to the land owner and officially considered as rehabilitated.

After the borrow pit has been handed over, the contractor or any other party may not be allowed to engage in any further activities in or around the handed-over borrow pit. This includes, but is not limited to activities such as further excavations, dumping of overburden or spoils, sloping, etc.

In order to keep records of the rehabilitation operations meeting all requirements and in order to avoid claims from the public with regard to un-rehabilitated borrow pits, it is prudent to record the completion of the rehabilitation in accordance with the specifications and the acceptance thereof.

The Borrow Pit Tanking-Over Certificate attached as Appendix F shall therefore be signed by the parties upon completion of the rehabilitation and handed over to the client for record keeping.

APPENDIX A - COMPLAINTS RECORD SHEET

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

NOTES BY ECO:
ECO: _____ Date: _____ Site Manager: _____ Date: _____

APPENDIX B - PRO-FORMA MONITORING REPORT

Report No:..... **Date:.....**

Method Statements	Contractor:	Date received:

Environmental Education	Contractor:	Date undertaken:

Issue	Observation	Remedial action	Compliance
1 Construction			
1.1 All plant, personnel, etc. restricted to works area?			
1.2 Contractor's Camp located in area of low environmental sensitivity as indicated by the Engineer?			
1.3 Where needed, sensitive areas adequately fenced off?			
1.4 Fencing well maintained?			

	Observation	Remedial action	Compliance
1.5 No unauthorised entry, stockpiling, etc. outside work areas?			
1.6 All vehicles and plant remain on designated routes?			
1.7 Information posters put up and maintained where needed?			
1.8 No smoking in hazardous areas?			
1.9 Basic fire fighting equipment available on Site?			
1.10 No burning of wastes as a means of disposal?			
1.11 Staff aware of procedures in the event of spills/leaks?			
1.12 Materials for dealing with spills/leaks available?			

	Observation	Remedial action	Compliance
1.13 Emergency contact numbers displayed at Contractor's office?			
1.14 Complaints Register up to date?			
1.15 Archaeological material found on Site mitigated?			
1.16 No animals trapped or harmed?			
1.17 No flora removed or damaged outside work areas?			
1.18 Adequate drainage and retaining works in place to control erosion/siltation?			
1.19 Restricted traffic over stabilised areas?			
1.20 No concrete mixing on bare ground?			
1.21 Concrete batching restricted to area of low environmental sensitivity?			

	Observation	Remedial action	Compliance
1.22 All wastewater from concrete mixing area disposed of via wastewater management system?			
1.23 Concrete mixing area kept neat and clean?			
1.24 Suitable screening and containment of cement silos?			
1.25 All visible remains of excess concrete removed on completion of concrete work?			
1.26 No pollution from drilling operations?			
1.27 Location and rescue of plants undertaken by suitably qualified contractor?			
1.28 Rescued plants moved to nursery if direct transplantation not possible?			
1.29 After vegetation clearance, all unstable areas are properly stabilised?			

	Observation	Remedial action	Compliance
1.30 Cleared vegetation properly disposed of?			
1.31 All wastes removed from cleared area and disposed of?			
1.32 Mulched vegetation stored in bags?			
1.33 Fertilisers containing phosphates not used?			
1.34 No planting undertaken where construction works have not yet been finished?			
1.35 No unauthorised traffic on revegetated areas?			
2 Materials			
2.1 Construction materials adequately secured to ensure safe deliveries?			
2.2 All materials being stored inside Contractor's Camp?			
2.3 All imported materials free of weeds, litter, etc.?			

	Observation	Remedial action	Compliance
2.4 Stockpile areas approved?			
2.5 Topsoil stripped and stockpiled at a suitable site prior to earthworks?			
2.6 No spoil stockpiled outside agreed areas?			
2.7 Spoil stockpiles correctly shaped and protected?			
2.8 All plants used for landscaping/rehabilitation listed in the approved plant list?			
2.9 Plants adequately protected during transit and at storage facilities?			
2.10 Plants healthy and free from diseases and pests?			
3 Plant			
3.1 Fuel/oil storage facilities adequately secured and protected against leakage?			

	Observation	Remedial action	Compliance
3.2 Safety signage provided at fuel storage areas?			
3.3 All electrical/petrol pumps suitably equipped and placed not cause any danger of ignition?			
3.4 Fuel storage areas comply with fire safety regulations?			
3.5 Necessary authorisations obtained for temporary above ground fuel tanks?			
3.6 Capacity of a fuel tank does not exceed 9000 ℓ?			
3.7 Fuel tanks erected at least 3.5 m away from buildings, boundaries or other flammable materials?			
3.8 Adequate toilet facilities provided for staff (min. 1 toilet per 30 workers)?			
3.9 Toilets adequately maintained?			

	Observation	Remedial action	Compliance
3.10 All workers use toilets?			
3.11 Scavenger-proof bins with lids provided at eating areas?			
3.12 Waste temporarily stored inside Contractor's Camp in weather- and scavenger-proof bins?			
3.13 No burying or dumping of wastes on site?			
3.14 Waste management system in place?			
3.15 Refuse disposed of at licensed landfill?			
3.16 Adequate waste-water management system in place?			
3.17 Approval for discharge of contaminated water into municipal sewer system?			

	Observation	Remedial action	Compliance
3.18 Runoff from workshops, fuel depots, etc. directed into conservancy tanks for disposal at approved site?			
3.19 Wash areas placed and built in such a way that does not cause any pollution?			
3.20 All maintenance of plant and equipment takes place in workshop?			
3.21 All plant is well maintained (no leaking)?			
3.22 Workshop has a bunded, impermeable floor sloping towards oil trap?			
3.23 Contractor's Camp tidy?			
3.24 All plant and machinery have drip trays, which are checked and emptied daily?			
3.25 All repairs on machinery using fuels or lubricants done over a drip tray?			

	Observation	Remedial action	Compliance
3.26 Static plant located within a bunded area?			
3.27 Measures in place to minimise dust generation?			
3.28 No handling/transport of erodible materials under high wind conditions?			

EMP Transgressions	Contractor:	Date:	Fine issued:

Complaints	Date received:	Action taken:

Other issues	

APPENDIX C - METHOD STATEMENTS

A method statement describes the scope of the intended work in a step-by-step description in order for the ECO or Engineer to understand the Contractor's intentions. This will enable them to assist in devising any mitigation measures, which would minimise environmental impact during these tasks. The method statement should also clearly stipulate mitigation methods of the intended works, against which the contractor's performance will be measured. For each instance wherein it is requested that the Contractor submit a method statement to the satisfaction of the ECO and Engineer, the format should clearly indicate the following:-

- What - a concise, description of the task/work to be undertaken;
- How - a detailed description of the process of work, methods, materials and mitigation strategies;
- Where - a description/sketch map of the locality of work (if applicable); and
- When - the sequencing of actions with due commencement dates and completion date estimates.

The Contractor must submit the method statement two weeks before any particular construction activity is due to start, especially with respect to impacts on sensitive ecosystems. Work may not commence until the method statement has been accepted by the ECO and Engineer, and clearly communicated to the workforce. The Contractor shall, except in the case of emergency activities, allow 14 days for consideration and approval of the Method Statement. The ER or ECO may require changes to a Method Statement if the proposal does not comply with the specifications or if, in the reasonable opinion of the ER or ECO, the proposal may result in damage to the environment in excess of that permitted by the specifications. Approved Method Statements shall be communicated to all relevant personnel.

All Method Statements listed below, shall be provided by the Contractor before the activity commences:

- Bunding
    - o Method of bunding for static plant and bulk fuel storage.
    - o Camp establishment and fencing.
- Location and layout of the Contractor's Camp
    - o Method of installing fences required for working areas and Contractor's Camp.

- Concrete batching
    - Location, layout and preparation of concrete batching facilities, including the methods employed for mixing of concrete including the management of runoff water from such areas.
- Bulk earthworks
    - Location, layout, silt/sediment management and the management of runoff from bulk earthworks areas.
- Demolition
    - Proposed method of demolition, including handling and disposal of materials.
- Dust
    - Dust control protocol.
- Fire and hazardous substances
    - Handling and storage of hazardous wastes.
    - Emergency spillage procedures and compounds to be used.
    - Emergency procedures for accidental fire.
    - Methods for the disposal of hazardous materials.
    - Fuels and fuel spills
    - Methods of refuelling vehicles.
- Details of methods for fuel spills and clean-up operations.
- Protection of archaeological resources
    - Methods for dealing with archaeological resources in the event that any are found.
- Protection of environmentally sensitive resources (fauna and flora)
    - Methods for dealing with conservation areas or areas identified as environmentally sensitive requiring protection.
    - Locality and preparation of onsite nursery to house vegetation relocated from construction areas or propagated locally for replanting purposes.
    - Details of methods dealing with the identification, transportation and transplanting of flora species of conservation value.

  - Details of methods dealing with the identification, capture and relocation of fauna species of conservation value.

- Borrow-pit areas
  - Clearance of vegetation
  - Storage of topsoil
  - Storage of material on-site
  - Removal and transportation of base material
  - Rehabilitation
- Rehabilitation
  - Rehabilitation of disturbed areas after construction is complete.
- Settlement ponds and sumps
  - Layout and preparation of settlement ponds and sumps.
- Solid waste management
  - Solid waste control and removal of waste from Site.
- Sources of materials
  - Details of materials imported to the Site (where applicable).
- Topsoil handling and stockpiling
  - Details on stripping, handling and stockpiling of topsoil.
- Wash areas
  - Location, layout, preparation and operation of all wash areas.
- Storm water management
  - Details of how storm water is to be handled on Site.

APPENDIX D – ENVIRONMENTAL INCIDENT LOG

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

APPENDIX E – MANAGEMENT OF SOIL

Source of topsoil

(i) Topsoil shall be stripped from all areas that are to be utilised during the construction period and where permanent structures and access is required. These areas will include temporary and permanent access roads, construction camps, and lay down areas, pump sites, valve chambers, and reservoir sites and borrow pits. Topsoil shall be stripped after clearing of woody vegetation and before excavation or construction commences.

(ii) The topsoil is regarded as the top 300mm of the soil profile irrespective of the appearance, structure, agricultural potential, and composition of the soil.

Topsoil stripping

(i) Soil shall be stripped to a minimum depth of 150mm and maximum depth of 300mm or to the depth of bedrock where soil is shallower than 300mm. Herbaceous vegetation, overlying grass and other fine organic matter shall not be removed from the stripped soil.

(ii) No topsoil which has been stripped shall be buried or in any other way be rendered unsuitable for further use by mixing with spoil or by compaction using machinery.

(iii) Topsoil shall preferably be stripped when it is in a dry condition in order to prevent compaction.

Topsoil stockpiling

(i) Environmental Control Officer shall indicate places for stockpiling stripped topsoil in areas, which have been approved for stripping.

(ii) Soil stockpiles may take the form of windrows.

(iii) There must be no mixing of topsoil and sub-soils.

(iv) Soil stockpiles should be located on higher lying areas, and as close as possible to access routes, to minimise the need for additional road networks. The temporary storage of topsoil, inert spoil, fill etc. should be above the 1 in 100 year flood line or at least 100 m from the top of the bank of any watercourse, whichever is the maximum or as agreed with the ECO.

(v) To prevent erosion, material stockpiled for long periods (2 weeks) should be retained in a bermed area to avoid contact with stormwater runoff.

(vi) Topsoil, mulch and subsoil stockpiles must be placed in higher-lying areas of the site, and must not be positioned within stormwater channels or areas of ponding.

(vii) Topsoil stripped from different soil zones shall be stockpiled separately and clearly identified as such. Under no circumstances shall topsoil obtained from different soil zones be mixed.

(viii) Soil stockpiles shall not be higher than 2m or stored for a period longer than one year. The slopes of soil stockpiles shall not be steeper than 1 vertical to 2.5 horizontal.

(ix) No vehicles shall be allowed access onto the stockpiles after they have been placed.

(x) Topsoil stockpiles shall be clearly demarcated in order to prevent vehicle access and for later identification when required.

(xi) Soil stockpiles must not become contaminated with oil, diesel, petrol, garbage or any other material, which may inhibit the later growth of vegetation in the soil.

(xii) After topsoil removal has been completed, the Contractor shall apply soil conservation measures to the stockpiles where and as directed by the ER or ELO. This may include the use of erosion control fabric or grass seeding.

Topsoil replacement

(i) Topsoil shall be replaced to a minimum depth of 75mm over all areas where it has been stripped and over disused borrow pits, after construction in those areas has ceased. Topsoil placement shall follow as soon as construction in an area has ceased.

(ii) All areas onto which topsoil is to be spread shall be graded to the approximate original landform with maximum slopes of 1:2.5 and shall be ripped prior to topsoil placement. The entire area shall be ripped parallel to the contours to a minimum depth of 300mm.

(iii) Topsoil shall be placed in the same soil zone from which it had been stripped.

(iv) However, if there is insufficient topsoil available from a particular soil zone to produce the minimum specified depth, topsoil may be brought from other soil zones at the approval of the ER or ECO.

(v) Where topsoil that has been stripped by the Contractor is insufficient to provide the minimum specified depth, the Contractor shall obtain suitable substitute material from other sources at no cost to the employer. The suitability of the substitute material shall be determined by means of soil analysis, which is acceptable to the ECO.

(vi) No vehicles shall be allowed access onto or through topsoil after it has been reinstated.

(vii) After topsoil reinstatement is complete, cleared and stockpiled vegetative matter shall

be spread randomly by hand over the top soiled area. The vegetative material must be replaced on the areas from where it has been removed.

APPENDIX F - BORROW PIT TAKING-OVER CERTIFICATE

Date: _____

Borrow Pit Name and Number: _____

Location (road-km / GPS coordinates): _____

The above borrow pit shall only be handed over once **all of the listed criteria** have been met by the contractor.

Item No.	Description	Comments	Complies Yes / No
1.	The floor is level and no man made topographical high or low points are present in the borrow pit		
2.	The site in and around the pit is clear of any illegal dumping of foreign material, spoils and construction waste		
3.	Gradients of the pit slopes are less than 18 degrees (1:3) and are finished perpendicular to the slopes to prevent water erosion		
4.	The slopes are covered with overburden/top soil, if available, with a thickness of not more than 300 mm		
5.	Available dead vegetation is placed on the slopes of the borrow pits		
6.	The berm of excess soil outside the pit is not higher than 1.0 m, sloped 1:3 and min. 3.0 m away from the edge of the pit and min. 9.0 m away from any structure		
7.	There are no walls or steps present in or around the borrow pit, if so, then the pit has been fenced off according to spec.		
8.	All alien vegetation has been removed from the floor, the slopes and berms of the pit		

Land Owner: _____
_____ *(Name)* *(Signature)*

Contractor: _____
_____ *(Name)* *(Signature)*

Consultant: _____
_____ *(Name)* *(Signature)*

Client: _____
_____ *(Name)* *(Signature)*