

ERMELO - MAJUBA RAILWAY LINE

ENVIRONMENTAL MANAGEMENT PLAN

prepared for



prepared by



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REFERENCES

- 1. Railway Engineering Procurement Plan, Protekon Projects**
- 2. Operational Environmental Management Plan: Ermelo-Majuba Railway Line, Spoornet, 2005**
- 3. Environmental Management Plan: Civil and Electrical Construction Work, Spoornet, 2004**
- 4. Record of Decision for the proposed long term coal supply to Eskom's Majuba Power Station: Mpumalanga Provincial Government, Department of Agriculture and Land Administration Directorate: Environmental Management**
- 5. City of Cape Town: Environmental Management Programme, Version 4, 2001**
- 6. Environmental Management Programme (EMP), Line Construction, 2005: Eskom**
- 7. Environmental Management Plan for the construction of a mainland boathouse with jetty and parking area, Thaba Thitja Island, Lesotho, 2005: Golder Associates in collaboration with Bapela Cave Klapwijk**
- 8. N-3 Toll Road, Cedara to Heidelberg, The Environmental Management System incorporating the Environmental Management Plan: Cave Klapwijk and Associates, July 1999**
- 9. Proposed Long Term Coal Supply to Eskom's Majuba Power Station. Final Environmental Impact Report. Golder Associates, September 2004.**

ERMELO-MAJUBA RAILWAY LINE: ENVIRONMENTAL MANAGEMENT PLAN

1 INTRODUCTION

1.1 Scope

The scope of this document is to provide environmental management guidelines to the Contractors constructing the railway line. This document shall form part of the contract. The recommendations and constraints, as set out in this document shall be enforceable under the general conditions of contract.

1.2 Environmental Aspects and Impacts

Environmental aspects could be defined as “those components of the company’s activities, products and services that are likely to interact with the environment”. An environmental impact could be defined as “any change to the environment, positive or negative, resulting from an environmental aspect”.

The contractors shall plan activities in such a way that negative impacts are prevented and positive impacts are enhanced. In the event that prevention is not practicable, or is not achieved because of misapplication, the contractors shall apply approved measures that shall limit and contain the magnitude, duration and intensity of the impact as soon as practical. The contractors shall demonstrate that they are capable of repairing and reinstating the damaged environment. General good construction practice shall play an important role in avoiding the occurrence of an impact.

1.3 Layout of Document

This EMP outlines the following:

- Management guidelines that form the basis for environmental management on site.
- Mitigation Measures (both general and specific) are those environmental measures, procedures and controls, which relate to projects of this nature. These apply to the phases of preconstruction, construction and operation. The decommissioning

phase is not considered in this document. This shall be dealt with at the time that the line is to be decommissioned. At that time a closure audit shall be commissioned and the results worked into a Decommissioning Environmental Management Plan.

- Monitoring Programme refers to the Environmental Monitoring Programme.
- The monitoring of the EMP shall be done by the on site Environmental Control Officer (ECO) using the EMP document as a checklist. The monitoring shall be scored in the score column using a possible scale of:
 - -1: If compliance of EMP aspect is not achieved.
 - 0: If compliance of EMP aspect is not applicable at point in time.
 - +1: If compliance of EMP aspect is achieved.

The scoring can be accumulated to determine a percentage compliance per monitoring period. The monitoring shall be forwarded to the Environmental Manager (EM) by means of a monthly monitoring compliance report (Appendix 5).

1.4 Record of Decision

The Record of Decision (ROD) has set out requirements of environmental management that have been incorporated in to this document. The ROD document is available for reference as Appendix 1.

The EMP is one requirement of the ROD and the EMP shall, wherever necessary, be updated from time to time to accommodate new aspects that may arise during the projects lifetime.

2 OBJECTIVES OF THE EMP

This document provides appropriate mitigation measures designed to minimise or eliminate the significant adverse impacts that may be caused as a result of the development, access road construction and the establishment of the contractors' camps. Mitigation can be achieved in two ways, namely:

- By employing preventative measures during the construction phase, and

- By rehabilitating after construction is completed.

The primary objectives of the EMP are to:

- Describe actions for achieving mitigation measures.
- Define organisational and administrative arrangements for environmental management and monitoring of the contract, including defining the responsibilities of staff and co-ordination, liaison and reporting procedures.
- Ensure that discussions are held with site supervision staff, regarding pro-active environmental management, such that potential problems can be identified and mitigation measures adopted prior to rehabilitation work being carried out.
- Define procedures for environmental control, in the event of pollution (spillage) or similar events requiring action.

3 LEGAL REQUIREMENTS

Construction shall be according to best industry practices. This EMP shall be included as environmental specifications in the contract and informs the Contractors about 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. If any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter shall prevail.

3.1 Related Acts and Regulations

A list of relevant legislation is contained in Appendix 8. This list, although not extensive, shall need to be updated from time to time as new or revised legislation becomes applicable.

4 MANAGEMENT GUIDELINES

4.1 Resource Allocation

In order to ensure that this EMP is implemented, the following staff resources shall be made available:

- The Spoornet Environmental Manager (EM) to assume responsibility for monitoring the compliance of the management measures contained in this document.
- An Environmental Control Officer (ECO) appointed by the EM, Spoornet to assume responsibility for implementing the management measures contained in this document during construction.
- An Independent Environmental Auditor (EA) appointed by Spoornet who shall from time to time audit the Environmental Management Process and prepare an Environmental Audit Report.
- A Landowner Liaison Officer (LLO) appointed by Spoornet to assume responsibility for setting up a Landowners Liaison Committee, consulting with landowners and resolving any issues or disputes and who shall liaise with ECO on a regular basis.

4.2 Duties of Environmental Manager towards Environmental Management

The EM must as a minimum:

- Know the background to the project and ensure the implementation of the EMP.
- Act as a guide and advisor to the contractors on environmental issues during implementation and rehabilitation.
- Ensure frequent and regular auditing of the project for adherence to the EMP, identify problem areas and provide action plans to avoid costly stoppages and / or further environmental damage.
- Ensure that open communication lines exist for reporting of any significant environmental incidents.

4.3 Training and Environmental Awareness of Employees

The ECO shall convey the contents of this document, the conditions of the Record of Decision from Mpumalanga Department of Agriculture and Land Administration (M-DALA) as well as the Landowner Special conditions to the Contractors site staff and discuss the contents in detail with the SpoorNet Project Team and Contractors at a pre-construction meeting. This formal induction training shall be done with all main and sub-contractors. Record of the training date, people whom attended and discussion points shall be kept by the ECO.

The ECO shall be appropriately trained in environmental management and shall possess the skills necessary to impart environmental management skills to all personnel involved in the contract.

The Contractors, together with the EM and the ECO, shall ensure that the contractors' employees receive adequate environmental training prior to the commencement of construction. All employees shall have an induction presentation on environmental awareness. The cost, venue and logistics shall be for the Contractors' account. Where possible, training must be conducted in the language of the employees. The induction and training shall, as a minimum, include the following:

- The significant environmental impacts, actual or potential, of their work activities.
- The environmental benefits of improved personal performance.
- The potential consequences of departure from specified operating procedures.
- The mitigation measures required to be implemented when carrying out their work activities.

The purpose of this training is to ensure that these employees:

- acquire a basic understanding of the key environmental features of the work site and environs;
- are thoroughly familiar with the requirements of the Environmental Protection and Control Specifications as they apply to the Works;

- receive basic training in the identification of archaeological artefacts, and rare and endangered flora and fauna that may be encountered along the route;
- are made aware of any other environmental matters which are deemed to be necessary by the PM or the ECO.

4.4 Responsible Parties

- Responsibility for the implementation of the EMP lies with SpoorNet. This responsibility shall be delegated to the contractors but SpoorNet shall retain legal responsibility.
- On-site assistance, monitoring of construction (to ensure compliance with this EMP) and environmental reporting shall be the responsibility of the EM. The ECO shall provide assistance and information to the EM.

4.5 Compliance by Contractors

The contractors shall be deemed **not to have complied** with the environmental mitigation measures if:

- There is evidence of negligence or recklessness resulting in the contravention of any of the clauses, both within and outside the boundaries of the construction site;
- The contractors fail to comply with instructions issued by the ECO;
- The contractors fail to respond to complaints from the public;
- The contractors' staff are found poaching or entering neighbouring areas.

The contractors shall monitor their own performance relative to the requirements stipulated in the EMP and shall record and report on non-conformances. Failure to identify and react to non-conformances shall be deemed to be default by the contractors.

4.6 Monitoring of EMP

The EM shall assess conformance to the plan on a regular basis, shall record non-conformances and shall initiate corrective action. Refer also to Appendix 9 of this EMP for further details regarding the Water Quality Monitoring Programme.

4.7 Record Keeping, Compliance and Penalties

- The ECO shall monitor the contractors' adherence to the EMP and shall issue the contractors with a notice of non-compliance whenever transgressions are observed. The ECO shall record the nature and magnitude of the non-compliance in a register, the action taken to discontinue the non-compliance, the action taken to mitigate its effects and the results of the actions.
- The contractors shall act immediately when a notice of non-compliance is received and correct whatever is the cause for the issuing of the notice. Complaints received by the LLO regarding activities on the construction site pertaining to the environment shall be recorded in a register and the response noted with the date and action taken. This record shall be submitted by the LLO to the ECO to be included in the monthly reports and the verbal report given by the ECO at site meetings.
- Any avoidable non-compliance shall be considered sufficient grounds for the imposition of a penalty. Any non-compliance with the procedures prescribed through the EMP is a transgression of the owner's permit conditions.

5	MITIGATION MEASURES
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5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.1.1 Compliance with the EMP and ROD	<p>The EMP and ROD form part of the contractual documentation and requirements.</p> <p>Written notice must be provided to M-DALA fourteen days prior to construction commencing.</p>	- Contractors		
5.1.2 Site camps & storage areas	<p>The construction camp shall be located at an easily accessible point and within an area of low environmental sensitivity. The location shall be identified in consultation with the PM, landowner liaison officer and the landowner.</p> <p>Labour camps are to be located in the towns of Ermelo and Amersfoort as far as possible.</p> <p>Should labour camps not be able to be located in nearby towns, they may be established on farmlands once negotiations and agreements with agreeable landowners have taken place.</p> <p>Site camps for the storage of machinery and construction materials may be established on</p>	<p>- Contractors</p> <p>- Environmental Control Officer</p> <p>- Project Manager</p> <p>- LLO</p> <p>- Contractors</p> <p>- Environmental Control Officer</p> <p>- Contractors</p> <p>- Environmental Control Officer</p> <p>- Liaison Officer</p> <p>- Landowner</p> <p>- Contractors</p> <p>- Environmental</p>		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>farmlands once negotiations and agreements with agreeable landowners have taken place.</p> <p>No site camps shall be located closer than 50 metres from any stream, spring or dam and vegetation including trees shall not be damaged or felled.</p> <p>Site establishment shall take place in an orderly manner and all amenities shall be installed at Camp sites before the main workforce move onto site.</p> <p>Site camps shall be fenced.</p> <p>Prior to establishment of the site camp(s), the Contractors shall produce a plan showing the agreements with relevant farmers for site camps (if applicable), positions of all buildings, lay-down yards, storage of equipment, vehicle wash areas, fuel storage areas, batching areas and other infrastructure for approval by the PM and the ECO.</p>	<p>Control Officer</p> <ul style="list-style-type: none"> - Liaison Officer - Landowner <p>- Contractors</p> <ul style="list-style-type: none"> - Contractors - Environmental Control Officer <p>- Contractors</p> <ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager 		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>The Contractors shall supply a wastewater management system that shall comply with legal requirements and be acceptable to Spoornet.</p> <p>The site camps shall have the necessary ablution facilities with chemical toilets where such facilities are not available at commencement of construction. Toilet facilities shall be sited such that they do not cause water or other pollution.</p> <p>The Contractors shall not use the land forming the Site, or connected with, the Works, for any purpose whatsoever other than for the proper carrying out of the Works under the Contract and shall not place any camps that may be required for himself and his employees within the boundaries of the servitude. Storage sites for materials and equipment within the servitude area may be approved by the PM and the ECO.</p> <p>No construction material to be stored closer than 100m from any watercourse.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager - Contractors - Contractors - Contractors 		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	No trees or bushes shall be damaged or cut down by the Contractors or by any of his employees whether for use on the Works or otherwise without <u>the written consent</u> of the PM and the ECO and then only where and in the manner as they may direct.	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer 		
5.1.3 Access routes	<p>Planning of temporary access routes must be done in conjunction between the Contractors, Spoornet ECO, Landowner Liaison Officer and the Landowner. All agreements reached shall be documented in writing and no verbal agreements should be made. The condition of existing access / private roads to be used shall be documented with photographs.</p> <p>Temporary road shall be fenced before use</p> <p>Access to the construction site is to be strictly controlled.</p> <p>The Contractors shall properly mark all access roads. Markers shall show the direction of travel. Roads not to be used shall be marked with a "NO ENTRY " sign.</p> <p>Where new access roads are constructed</p>	<ul style="list-style-type: none"> - Contractors - Spoornet - Landowners - Contractors - Contractors - Contractors - Contractors 		

5.1	Phase 1: Preconstruction (General)
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Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>water diversion berms shall be installed from the start of the contract. These berms shall be maintained at all times and be repaired at the end of the contract. Where berms are installed on severe slopes the outflow shall be suitably stone pitched to prevent erosion from starting at the base of the berm.</p> <p>No roads shall be constructed on slopes of more than 20% unless such roads follow contours. In such areas the Contractors shall only use existing roads or alternative methods of construction.</p> <p>The installation of concrete pipes and drifts, to facilitate access, shall be in collaboration with the ECO on site. All structures shall be properly designed and drawings shall be available for reference purposes. Any dangerous crossings shall be marked as such.</p> <p>Where necessary a suitable mixture of grass seed shall be used to re-seed damaged areas. Badly damaged areas shall be fenced in to enhance rehabilitation. The seed mixture should comply with the parameters as set out in Appendix 10 Transnet Specifications for</p>	<p>- Contractors</p> <p>- Contractors - Environmental Control Officer</p> <p>- Contractors</p>		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Erosion Control.			
5.1.4 Borrow pits & quarries	<p>All borrow pit sites shall be clearly indicated on plan.</p> <p>Prior to the onset of any quarrying or borrow pit activities the Contractors shall establish from the PM whether authorization has been obtained in terms of an Environmental Management Plan to be submitted in support of application for a prospecting right or mining permit. Section 39 and Regulation 52 of the Minerals and Resources Petroleum Development Act 2002 (Act 28 of 2002).</p> <p>No excavation or blasting activities shall commence before the necessary authorizations are in place.</p>	<ul style="list-style-type: none"> - Contractors - Spoornet - Contractors - Environmental Control Officer - Spoornet - Contractors 		
5.1.5 Landowner liaison	<p>The Landowner Liaison Officer is to establish a forum with the PM, the EM, the ECO, the Contractors, the Engineers and Affected Landowners so that any queries, complaints or suggestions can be dealt with quickly and by the appropriate person(s).</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager - Liaison Officer - Landowner - Environmental Manager 		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>The forum shall determine the frequency of meetings, outside of individual complaints.</p> <p>The forum may also deal with safety and security related issues on a regular basis (to be determined by the forum).</p> <p>The Landowner Liaison Officer shall establish a complaints register to record / register all complaints relating to the construction of the railway line. The Landowner Liaison Officer, in consultation with the EM and ECO, shall develop a protocol relating to the steps that would be followed once a complaint has been received. The protocol shall cover at least the following steps: registration, investigation, reporting and follow-up action.</p> <p>Information regarding landowners details shall be available at camp sites</p>	<ul style="list-style-type: none"> - Forum - Forum - Environmental Control Officer - Environmental Manager - Liaison Officer 		
5.1.6 Security, gates and fences	<p>The servitude shall be fenced.</p> <p>Notification signs must be erected along the servitude of the railway line warning people of the hazards around the construction site and</p>	<ul style="list-style-type: none"> - Contractors - Contractors 		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/Chainage/Area	Comment	Score
	<p>any presence of heavy vehicles on site.</p> <p>The Landowner Liaison Officer shall agree with the landowners what security arrangements must be followed for access to the site.</p> <p>The security arrangements shall include the position of gates, which gates require locks and keys and which fences are to be replaced or removed and in what sequence.</p> <p>These arrangements shall be confirmed in writing to each landowner who shall sign the said document.</p>	<ul style="list-style-type: none"> - Landowners Liaison Officer - Landowners Liaison Officer - Contractors - Landowners Liaison Officer - Landowners 		
5.1.7 Outstanding environmental surveys	Any outstanding environmental surveys of adjacent land where site camps or laydown areas are proposed must be carried out and completed in advance of the construction phase's commencement.	<ul style="list-style-type: none"> - Contractors - Spoornet 		
5.1.8 Identification and protection of sensitive	These areas, habitats, features or structures must be identified in the field and marked and	<ul style="list-style-type: none"> - Contractors - Environmental 		

5.1 Phase 1: Preconstruction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
areas – fauna, flora, archaeology	fenced where appropriate.	Control Officer		
5.1.9 Pollution	<p>The Contractors shall prepare and submit a sound and practical Method Statement on how to prevent all forms of pollution during construction on awarding of contract. The EM shall have to approve this statement.</p> <p>The Method Statement should include the steps to be taken in the event of any pollution occurring.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Manager - Contractors 		

Phase 1: Preconstruction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.1.10 Flora and Fauna	<p>Bothas lark, a vulnerable bird species, is present on the Martin Dinkelman and Faan de Swart farms.</p> <p>Disturbance in the form of camp sites and material laydown areas shall not be established on the grassveld habitat of this bird or in any undisturbed area.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer 		

Phase 1: Preconstruction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Wherever possible, keep cuts at slope angles which are negotiable by animals (<40 degrees). If threatened animal species are found in particular sections of the route, consider the functional value of additional access across the alignment to encourage the animals to move from one side of the railway to the other.	- Contractors		
5.1.11 Archaeology, Monument and Historical Sites	<p>The position of known sites shall be shown on the final profiles and plans of the railway route.</p> <p>Contractors shall be informed of the location of historical remains and archaeological sites that are in close proximity to the servitude area Appendix 3.</p> <p>The contractors shall avoid these areas.</p> <p>Gravesite 7 shall be fenced off because of its low visibility.</p> <p>Removal of stones from the old stone buildings by construction staff shall be strictly prohibited.</p> <p>If any cases arise where there shall be</p>	<p>- Spoornet</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors - Spoornet</p> <p>- Contractors</p> <p>- Contractors</p>		

Phase 1: Preconstruction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>unavoidable damage to an identified heritage site, a permit must be obtained, prior to damage to the site, from SAHRA</p> <p>Any graves identified in the EIA shall be clearly marked to provide a clearance of at least 3 metres and treated as no-go areas.</p> <p>All monuments, heritage sites and historical sites shall be treated with the utmost respect. No destruction of any site shall be allowed. Should it be necessary to remove any graves, the necessary procedures shall be followed and permits obtained.</p>	<ul style="list-style-type: none"> - Environmental Control Officer - Contractors - Contractors 		
5.1.12 Water pollution	<p>Sites or locations of existing water pollution shall be identified.</p> <p>The particulars of the polluted water shall be recorded in written and photographic form.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Contractors - Environmental Control Officer 		
5.1.13 Water quality monitoring	The water quality baseline analysis has been	- Spoornet		

Phase 1: Preconstruction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	completed. This data set shall be used as a baseline against future monitoring which shall be evaluated.			
5.1.14 Visual quality	<p>Design fencing not to exceed a height of 1.4 metres (7 strand standard stock fence).</p> <p>Investigate the possibility of pigmenting the masts a dark green or brown colour so as to reduce their visibility with distance from the line.</p> <p>Tree screens shall be planted where agreed between the CLO and the landowner. The positions recommended in the EIA specialist reports (visual) shall be consulted (refer to Appendix 12 & 5.2.28)</p>	<ul style="list-style-type: none"> - Spoornet - Contractors 		
5.1.15 Noise	Noise attenuation barriers, constructed either as walls or earth berms, are recommended in the areas where farmhouses or labour complexes shall be significantly impacted by train noise. One farm school is also recommended for mitigation. Refer to Appendix 11 Noise Mitigation Detail.	<ul style="list-style-type: none"> - Contractors - Spoornet 		

Phase 1: Preconstruction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>The noise attenuation barriers shall be designed in a manner that shall complement the need to assist in blocking the glare from locomotive's headlights at night.</p> <p>Of the thirty residential sites for which mitigation shall be required, it is recommended that eight affected families are relocated to new housing constructed outside of the zone of influence of the train noise. This recommendation applies to three farmhouses and five labour complexes. Barriers are recommended to mitigate noise impacts for the remaining cases in which sleep disturbance is predicted. Details are provided in Appendix 11.</p> <p>Since noise regulations prevent habitation of buildings within the direct noise impact zone, vacated homesteads must be demolished and removed at Spoornet's cost.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Spoornet - Landowners Liaison Officer - Spoornet 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
Risk Management				
5.2.1 Stock theft	<p>Inform landowners that their stock must be clearly marked for identification purposes.</p> <p>The stock should be allowed access across the servitude with strict supervision.</p> <p>Specific crossing over points should be agreed upon with specific landowners and temporary gates provided until the permanent crossing structures are complete.</p> <p>Perimeter fence should continuously be maintained.</p>	<ul style="list-style-type: none"> - Landowners Liaison Officer - Landowner - Contractors - Contractors - Environmental Control Officer - Landowners Liaison Officer - Contractors 		
5.2.2 Trespassing & Movement Control	Spoornet shall apply methods and the staff to ensure that trespassing does not occur on the site or areas related to the site.	<ul style="list-style-type: none"> - Spoornet 		
5.2.3 Fire risk	<p>A joint fire fighting team must be established and equipped.</p> <p>The services of a Fire Risk Officer must be</p>	<ul style="list-style-type: none"> - Contractors - Landowners Liaison Officer - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>employed to assess and advice on fire risk.</p> <p>Contractors shall forward the name of the fire officer to the PM for approval.</p> <p>Overgrown bushes and grass must be cut periodically.</p> <p>Workers shall not be allowed to make open fire for any reason at the site.</p> <p>Fire breaks should be effected periodically and arranged in collaboration with the adjacent landowners.</p>	<ul style="list-style-type: none"> - Project Manager - Contractors - Contractors - Contractors - Landowners - Liaison Officer - Landowners 		
5.2.4 Pedestrian safety	Crossing points must be identified / constructed at specified areas to ensure school children and other pedestrian's safety.	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Landowners - Liaison Officer - Landowners 		
Physical				

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.2.5 Access roads / Haul roads	<p>No new permanent access roads other than as detailed by the PM in collaboration with the ECO shall be developed by the Contractors.</p> <p>Existing roads shall be used as far as possible.</p> <p>Temporary access roads shall be approved by the PM in consultation with the ECO. No deviation from approved access roads shall be allowed.</p> <p>Should temporary roads be built, the topsoil shall be stripped as described under item "Topsoil" prior to construction and reinstated on completion of use.</p> <p>All temporary access roads no longer required, shall be decommissioned, ripped and the land rehabilitated to the original land use.</p> <p>All stormwater channels or berms shall be constructed to allow for easy vehicular crossing.</p> <p>All cut and fill slopes are to be seeded with</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager - Contractors - Environmental Control Officer - Project Manager - Contractors - Contractors - Contractors - Contractors 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>grass species as per Transnet's Specifications for Erosion Control Guidelines. Refer to Appendix 10. This shall include spoil material pushed over the road edge down slope.</p> <p>Trimming shall consist of bringing the existing or previous shaped ground to an even surface with the final levels generally following the original surface. Where machine operations are not practicable, because of confined space or steep slopes, trimming shall be done using hand tools.</p> <p>All sharp cut edges shall be rounded off to blend with the existing landform.</p> <p>All trimming of side slopes of cuttings shall be completed before any work on the sub-base is commenced inside such cutting.</p> <p>During construction the Contractors shall protect all areas susceptible to erosion by installing all necessary temporary and permanent drainage works as soon as possible and by taking such other measures as may be necessary to prevent the concentration of surface water and the</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	scouring of slopes, banks and other areas.			
	<p>The Contractors shall not allow erosion to develop on a large scale before effecting repairs and all erosion damage shall be repaired as soon as possible. Topsoil washed away shall be replaced.</p> <p>All surface runoff shall be collected in side drains on the upslope shoulder of the road. These drains shall be stonepitched to prevent erosion.</p> <p>Access road on slopes shall not be constructed directly up or down the slope but across the contour utilizing switchbacks, the corners of which shall be protected on the downslope by gabions.</p> <p>All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties.</p> <p>The Landowner Liaison Officer, in conjunction with the Contractor, ECO and Landowners, shall draft a physical access plan. All</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors - Environmental Control Officer</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>agreements should be in writing and well documented.</p> <p>The physical access plan shall allow for the installation of concrete pipes and drifts where such structures may be needed to facilitate access. This shall be done in collaboration with the ECO.</p>	<ul style="list-style-type: none"> - Landowner - Environmental Control Officer - Contractors - Project Manager 		
5.2.6 Borrow pits and quarries	<p>All borrow pits and quarries shall be operated strictly in terms of a separate EMP, approved by the Department of Minerals and Energy for each site.</p> <p>All borrow pits and quarries used / opened for the construction of the railway line shall be rehabilitated and a closure certificate application shall be made to the relevant region of the Department of Minerals and Energy (DME).</p> <p>Where applicable, the success of the re-vegetation associated with the rehabilitation of borrow pits and quarries shall be monitored.</p> <p>Where the standard and cover of vegetation</p>	<ul style="list-style-type: none"> - Contractors - Spoornet - Environmental Control Officer - Contractors - Environmental Control Officer - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	growth is considered to be low the necessary actions shall be taken to ensure a minimum vegetation cover of 80 % and completed to the satisfaction of the PM.			
5.2.7 Gates and fences	<p>The contractors are referred to the Fencing Act, Act no 31 of 1963.</p> <p>The Contractors, Landowner Liaison Officer and affected landowners shall agree on the positioning of the gates.</p> <p>All gates permitting access to the fenced servitude shall be fitted with locks and be kept locked at all times during the construction phase.</p> <p>Damage to fencing, gates and other infrastructure shall be repaired immediately and to the satisfaction of the landowner.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Landowners Liaison Officer - Landowners - Contractors - Contractors - Landowners Liaison Officer - Landowners 		
5.2.8 Site establishment and decommissioning	Main bulk service providers such as Telkom and Eskom shall be advised of the construction activities.	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>All routes for service infrastructure shall take cognisance of any special features on site and shall be re-routed around “no go” areas.</p> <p>To facilitate the necessary monitoring, the Contractors shall inform the PM of the intended actions and programme for camp site establishment.</p> <p>The camp site layout shall take cognisance of access for deliveries and services, and future works. Likely disturbance to landowners as well as security implications shall be considered.</p> <p>The Contractors shall maintain in good order all demarcation fencing and barriers for the duration of construction activities, or as otherwise instructed.</p> <p>Ensure that the workers have enough potable water in order to prevent them from going to nearby streams or farms to fetch water.</p> <p>At the end of the contract the Contractors shall</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>remove all redundant infrastructure, construction materials and waste to an approved dump site.</p> <p>All disturbed areas which are to remain free of development shall be rehabilitated to the satisfaction of the ECO.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Contractors - Environmental Control Officer 		
5.2.9 Waste management	<p>The method statement for prevention of pollution and rectifying statements should be approved by the EM.</p> <p>Solid waste must be collected on a daily basis and shall be stored in an approved area in covered, tip-proof metal drums with lids for collection and disposal.</p> <p>A routine refuse collection and removal shall be implemented. All waste removed from site must be in covered vessels/drums.</p> <p>Disposal of solid waste shall be at a licensed</p>	<ul style="list-style-type: none"> - Contractors - Environmental Manager - Contractors - Contractors - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	landfill. The contractors must indicate to the EM where waste shall be disposed of. The EM must verify that such plans are acceptable.	- Environmental Manager		
	No waste shall be burned on the site.	- Contractors		
• Litter and refuse	<p>The site shall be kept free of litter.</p> <p>The contractors shall provide rubbish bins for litter at appropriate locations and shall arrange for regular collection and removal of the accumulated litter. All bins must be fitted with covers / lids to prevent windblown loss of litter.</p> <p>Burying or burning of litter shall not be permitted on site.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		
• Liquid	<p>The contractors shall prevent discharge of any pollutants, such as cement, concrete, lime, chemicals and fuels into any water resources.</p> <p>Discharge of contaminated water shall not be allowed.</p> <p>The method of handling grey water shall be set out in a plan that shall be submitted by the</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Contractors to the EM for approval.			
	Runoff from contaminated areas such as fuel depots, workshops, truck washing areas and concrete moving areas shall be retained on site. A plan to dispose of contaminated water shall be submitted by the Contractors to the EM for approval.	- Contractors		
• Rubble	All building rubble shall be temporarily stored in a demarcated area and shall be disposed of at a licensed landfill.	- Contractors		
5.2.10 Workshop and equipment storage	<p>These areas shall be chosen so as to cause the least impact on the biophysical and social environment.</p> <p>Maintenance and refuelling sites and materials storage areas shall not be erected within 100 m of drainage lines.</p> <p>Storage areas for materials that could impact on the environment shall be roofed with impervious material. Sufficient roof overhang or sides of sufficient height shall avoid the ingress of wind-blown rain.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>Storm water shall be diverted around storage areas. Storm water falling on the storage area shall be incorporated in the waste management system.</p> <p>Storage areas for oils, grease, chemicals and other hazardous materials (including cement and lime) shall be placed as bunded areas on impermeable surfaces. These should be sited away from drainage lines.</p> <p>Fuel shall be stored in a secure area in a steel tank supplied and maintained by the fuel suppliers. Leakage of fuel shall be avoided by placing tanks on impervious base with bunding. A bund wall providing for 110% of the volume in storage shall be provided to accommodate any spillage or overflow. The area inside the bund wall shall be lined with an impervious lining to prevent infiltration of the fuel into the soil.</p> <p>The contractors shall provide proof to the EM that authorisation to store substances requiring such authorisation has been obtained from the relevant authority. Storages shall comply with the conditions of authorisation and the relevant</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>legislation. Before containers or storage facilities are erected, the contractors shall furnish the PM with details of the pollution control measures he proposes to implement. The proposal shall include the emergency procedures for handling spillages or discharges.</p> <p>The storage areas shall not be utilised for accommodation purposes.</p> <p>The storage area shall be kept tidy and the area shall be rehabilitated after use.</p> <p>An inventory of any hazardous chemicals/substances (including that within equipment) kept on site, along with a description of possible ill effects and treatment of health-related afflictions resulting from accidents, shall be kept in the storage area as well as by the appropriate manager. These areas shall be securely fenced if required by the authorisation or relevant legislation.</p> <p>Gas welding cylinders and LPG cylinders shall be stored in a secure, well-ventilated area.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>A notice board with the contact details of the responsible party shall be displayed at the gate to the storage area.</p> <p>The contractors shall ensure that any suppliers and sub-contractors drivers are informed of the EMP requirements. Off loading shall be supervised by the contractors.</p> <p>Refuelling and maintenance of vehicles shall be confined to designated areas. These areas shall be underlain by an impermeable surface which slopes towards grease traps to ensure that no spillage of greases, oils or fuels occurs.</p> <p>All repairs done on machinery using hydrocarbons as fuels or lubricants shall have a drip tray placed strategically to avoid incidental spillage.</p> <p>Drip trays shall be inspected and emptied daily and serviced when necessary. In particular drip trays shall be closely monitored during rain events to ensure that they do not overflow.</p> <p>Recovered used oils and greases are to be</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>stored on covered impermeable bunded areas (110% stored volume) in sealed drums. Full drums are to be transported from site for disposal to a registered recycling company or a registered hazardous waste site. Records of safe disposal shall be kept by the Contractors on site.</p> <p>Workers shall be made aware of the health risks associated with any hazardous substances used (e.g. smoking near refuelling depots), and shall be provided with appropriate protective clothing equipment in case of spillages or accidents.</p>	- Contractors		
5.2.11 Hazardous materials	<p>All hazardous materials shall be identified.</p> <p>Hazardous waste such as oil shall be disposed of at a landfill licensed for this purpose. Absolute care shall be taken to prevent spillages from entering the ground or water environment.</p> <p>Areas that are contaminated shall be promptly reinstated to the satisfaction of the EM. Any contaminated soil shall be removed and</p>	<p>- Contractors</p> <p>- Environmental Control Officer</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>replaced with clean soil. Soil contaminated by oils and lubricants shall be treated on site in accordance with acceptable practice as agreed by the ECO.</p> <p>All used combustion engine filters shall be stored in a secure bin for disposal at an approved designated waste site.</p> <p>Used oil, lubricants and cleaning materials from the maintenance of vehicles and machinery shall be collected in a holding tank and returned to the supplier. Water and oil shall be separated in an oil trap. Oils collected in this manner shall be retained in a safe holding tank and removed from site by a specialist oil recycling company for disposal at a disposal site licensed for this purpose. Oil collected by a mobile servicing unit shall be stored in the service unit's sludge tank and discharged into the safe holding tank for collection by the specialist oil recycling company.</p> <p>Records of all disposals shall be kept on site by the contractors.</p>	<p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.2.12 Servicing vehicles	<p>Servicing of vehicles in the veld is strictly prohibited. Only emergency repairs shall be allowed on site and a drip tray and absorbent mats shall be used to prevent oil spills. All vehicles shall be serviced in the designated area inside the Contractors camp. In the event of a breakdown in the veld, any oil spills shall be cleaned up immediately. The following shall apply:</p> <ul style="list-style-type: none"> - All contaminated soil shall be removed and placed in containers. Contaminated soil can be taken to one central point at the Contractors campsite where bio-remediation can be done. - Smaller spills can be treated on site. The ECO to approve any treatment actions proposed by the Contractors. - The area around the fuel storage drum at the Contractors' campsite shall also be re-mediated upon completion of the contract. <p>All old parts, packaging, old oil, etc. shall be disposed of in the correct manner and in a</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Contractors - Environmental Control Officer - Contractors - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	proper area designated for such waste materials. Under no circumstances shall such waste be buried on site indiscriminately.			
	Records of safe disposal shall be kept by the Contractors on site.	- Contractors		
5.2.13 Batching plants	<p>Concrete shall be mixed only in areas that have been specifically demarcated for this purpose.</p> <p>The siting of batching plants shall be done in conjunction with the landowner and the ECO.</p> <p>All concrete that is spilled outside these areas, shall be promptly removed by the Contractors and taken to an approved dump site. After all concrete mixing is complete, all waste concrete shall be removed from the batching area and disposed of at an approved dump site.</p> <p>Storm water shall not be allowed to flow through the batching area. Water laden with</p>	<p>- Contractors</p> <p>- Contractors - ECO - Landowners Liaison Officer - Landowners</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>cement shall be collected in an impervious retention area for evaporation.</p> <p>The cement / concrete residue and waste shall be removed from the retention area at the completion of the contract for disposal at a registered disposal site. Records for disposal shall be kept by the contractors.</p> <p>The batching plant area shall be operated in such a way as to prevent contaminated water to run off the site and polluting nearby streams or water bodies. To this effect diversion berms can be installed to direct all wastewater to a catchment area.</p>	<p>- Contractors</p> <p>- Contractors</p>		
5.2.14 Herbicide use	<p>Herbicides that are used on site shall be cleared with the Mpumalanga Provincial Department of Agriculture (M-DALA) before application.</p> <p>All herbicides used on the site shall be the correct type for the purpose and shall not cause residual environmental damage or pollution after application.</p> <p>The herbicide shall be applied only by a</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	person who is certified and has a licence to apply and advise on herbicides.			
5.2.15 Routing of services	<p>Main bulk service providers shall be advised of the construction.</p> <p>All routes for service infrastructure put in place by the contractors, shall take cognisance of environmentally sensitive features and shall be re-routed temporarily around "no-go" areas.</p> <p>All routes chosen shall take into account the requirements of the delivery vehicles such as size, weight / axle lead, turning circles and physical condition of the route.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		
5.2.16 Blasting	<p>All structures within close proximity to blasting shall be photographed prior to and after blasting.</p> <p>The relevant farmers are to be informed two days prior to the intended blasting which is to occur within a specific area and shall be advised in writing of the precautions to be taken and of the blasting times.</p> <p>When blasting the Contractors shall take</p>	<p>- Contractors</p> <p>- Spoorner</p> <p>- Contractors</p> <p>- Landowners Liaison Officer</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	measures to limit flyrock.			
	<p>Flyrock 150mm and larger which falls beyond the cleared working area shall be collected and removed together with the rock spill.</p> <p>The Contractors shall contact the relevant Eskom personnel prior to blasting within a 500m vicinity of power lines and comply with the necessary requirements of blasting within the vicinity of power lines.</p> <p>The topsoil shall be stripped and stockpiled before commencement of drilling for blasting.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

Biophysical				
5.2.17 Soil conservation and management				
<ul style="list-style-type: none"> Source of topsoil 	Topsoil shall be stripped from all areas that are to be utilized during the construction period and where permanent structures and access is required. These areas shall include at least	- Contractors		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	temporary access roads, railway line earthworks footprint, construction camps, laydown areas and borrow pits. Topsoil shall be stripped after clearing of woody vegetation and before excavation or construction commences.			
<ul style="list-style-type: none"> Topsoil stripping 	<p>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.</p> <p>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 by machinery.</p> <p>Topsoil shall preferably be stripped when it is in a dry condition in order to prevent compaction.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Contractors 		
<ul style="list-style-type: none"> Topsoil stockpiling 	Stripped topsoil shall be stockpiled in areas which have been approved by the PM and the ECO. Soil stockpiles may take the form of windrows.	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>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.</p> <p>Soil stockpiles shall not be higher than 2.5m 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.</p> <p>No vehicles shall be allowed access onto the stockpiles after they have been placed. Topsoil stockpiles shall be clearly demarcated in order to prevent vehicle access and for later identification when required.</p> <p>Soil stockpiles shall not be allowed to become contaminated with oil, diesel, petrol, garbage or any other material which may inhibit the later growth of vegetation in the soil.</p> <p>After topsoil stockpiling has been completed, the Contractors shall apply soil conservation measures to the stockpiles where and as directed by the PM or ECO. This may include the use of erosion control fabric or grass seeding.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Contractors - Contractors - Contractors - Environmental Control Officer - Project Manager 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Any invasive species or declared noxious weeds occurring on the topsoil stockpiles shall be controlled/removed by the Contractors when it occurs.			
<ul style="list-style-type: none"> Topsoil placement 	<p>Topsoil shall be placed 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. Refer to Appendix 10 Transnet's Specifications for Erosion Control Guidelines.</p> <p>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 to be topsoiled shall be ripped parallel to the contours to a minimum depth of 300mm.</p> <p>Topsoil shall be placed in the same soil zone from which it had been stripped. However, if there is insufficient topsoil available from a particular soil zone to produce the minimum</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors - Project Manager - Environmental</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>specified depth, topsoil may be brought from other soil zones at the approval of the PM or ECO.</p> <p>Where topsoil that has been stripped by the Contractors is insufficient to provide the minimum specified depth, the Contractors shall obtain suitable substitute material from other sources. The suitability of the substitute material shall be determined by means of a soil analysis which is acceptable to the PM or ECO.</p> <p>No vehicles shall be allowed access onto or through topsoil after it has been placed.</p> <p>After topsoil placement is complete, cleared and stockpiled vegetative matter shall be spread randomly by hand over the topsoiled area.</p>	<p>Control Officer</p> <p>- Contractors - Project Manager - Environmental Control Officer</p> <p>- Contractors - Contractors</p>		
5.2.18 Stormwater and erosion control	The Contractors shall take all reasonable measures to limit erosion and sedimentation due to the construction activities and shall, in	<p>- Contractors - Project Manager</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>addition, comply with such detailed measures as may be required by the project specification. Where erosion and/or sedimentation, whether on or off the Site, occurs despite the Contractors complying with the foregoing, rectification shall be carried out in accordance with details specified by the PM. Where erosion and/or sedimentation occurs due to the fault of the Contractors, rectification shall be carried out to the reasonable requirements of the PM.</p>			
5.2.19 Fire control	<p>No open fires shall be allowed on site under any circumstance (The Forest Act, No 122 of 1984). The Contractors shall have fire-fighting equipment available on all vehicles working on site, especially during the winter months.</p> <p>Any fires, which occur, shall be reported to the PM immediately.</p> <p>Smoking shall not be permitted in those areas where there is a fire hazard. Such areas shall include the workshop and fuel storage areas and any areas where the vegetation or other material is such as to make liable the rapid spread of an initial flame.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>In terms of the Atmospheric Pollution Prevention Act, burning is not permitted as a disposal method.</p> <p>The Fire Officer who shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedure to be followed.</p> <p>The Contractors shall ensure that there is basic fire-fighting equipment available on Site at all times. This shall include at least rubber beaters when working in urban open spaces and at least one fire extinguisher of the appropriate type when welding or other "hot" activities are undertaken.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		
5.2.20 Pollution				
<ul style="list-style-type: none"> Soil 	All soil contaminated by oil, fuel, etc. shall be collected immediately, placed in plastic bags and disposed of at an acceptable disposal site to the approval of the PM or the Environmental Control Officer. Alternatively the collected soil shall be treated with an organic oil breakdown	- Contractors		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	product such as Ecosorb or similar in a central dedicated area, clearly marked for this purpose.			
<ul style="list-style-type: none"> Water 	<p>Bulk abstraction of water for construction purposes shall require a permit from the Department of Water Affairs and Forestry (DWAF). The Contractors are to ensure that all necessary permits are in place prior to abstracting water from streams or rivers.</p> <p>All care shall be taken by the Contractors not to pollute the water in streams or in underground aquifers.</p> <p>The Contractors shall design, construct, maintain and operate suitable pollution control facilities necessary to prevent discharge of water containing polluting matter or visible suspended materials into rivers, streams or existing drainage systems.</p> <p>Waste run-off water from the vehicle wash bays, workshops and diesel/fuel tank areas shall be collected in a series of covered conservancy tanks with oil baffles/oil traps. The oil sludge thus collected shall be disposed</p>	<ul style="list-style-type: none"> - Contractors - Spoornet - Contractors - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>of at an approved hazardous waste disposal site or removed by waste oil recycling contractors. Water from conservancy tanks shall be drained to retention areas to allow silt settlement.</p> <p>Records of disposal are to be kept on site by the Contractors.</p>	- Contractors		
• Dust	<p>The Contractors shall be solely responsible for the control of dust and for any costs against the Employer for damages resulting from dust.</p> <p>The Contractors shall take all reasonable measures to minimize the generation of dust as a result of construction activities to the satisfaction of the PM.</p> <p>Removal of vegetation shall be avoided until such time as soil stripping is required and similarly exposed surfaces shall be re-vegetated or stabilised as soon as is practically possible.</p> <p>Excavation, handling and transport of erodible materials shall be avoided under high wind</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>conditions or when a visible dust plume is present.</p> <p>During high wind conditions, the PM shall evaluate the situation and make recommendations as to whether dust-damping measures are adequate, or whether working shall cease altogether until the wind speed drops to an acceptable level.</p> <p>Where possible, soil stockpiles shall be located in sheltered areas where they are not exposed to the erosive effects of the wind. Where erosion of stockpiles becomes a problem, erosion control measures shall be implemented at the discretion of the PM.</p> <p>Vehicles shall not speed along dust roads.</p> <p>Appropriate dust suppression measures shall be used when dust generation is unavoidable, e.g. dampening with water, particularly during prolonged periods of dry weather in winter.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		
<ul style="list-style-type: none"> Noise 	Noise levels exceeding 85dB shall only be permitted where approved by the PM or during an emergency situation.	- Contractors		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Noise during the construction period should be mitigated by scheduling activities that generate excessive noise during appropriate times during the day. In areas sensitive to noise, work should be prohibited at night and on Sundays. The Contractors shall liaise together with the landowner liaison officer and the landowners about how best to minimise the noise impact and the landowners should be kept informed of the nature and duration of the intended activities.	<ul style="list-style-type: none"> - Contractors - Landowners Liaison Officer 		
5.2.21 Flora and Fauna	<p>Should any new nesting site or plant communities be found, during the construction process, that were not known or have been noted before, the ECO shall be informed immediately of the finding. Each site shall be assessed for merit and the necessary precautions be taken to ensure the least disturbance.</p> <p>Protected or endangered species may occur along the line route. Special care should be taken not to damage or remove any such species unless absolutely necessary. Permits for removal must be obtained from Provincial</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Contractors 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>Nature Conservation should such species be affected. All plants not interfering with the operation of the line shall be left undisturbed.</p> <p>Collection of firewood is strictly prohibited.</p> <p>The Contractors shall ensure that all Works are undertaken in a manner which minimises the impact on the local fauna and the following shall apply to the fauna management and protection:</p> <p>Under no circumstances shall any animals be handled, removed, killed or interfered with by the Contractors.</p> <p>The Contractors shall not bring any domestic animals onto the site.</p> <p>There shall be no feeding of animals.</p> <p>The Contractors shall ensure that domestic and native animals belonging to the local community are kept away from unprotected works.</p> <p>Trapping, poisoning and/or shooting of animals</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>is strictly forbidden.</p> <p>The Contractors shall advise his workers of the penalty associated with the needless destruction of wildlife, as set out in the Animals Protection Act (Act 71 of 1962) sec. 2 (fine R2 000 and/or 12 months imprisonment).</p> <p>Except to the extent necessary for the carrying out of the Works, flora shall not be removed, damaged or disturbed nor shall any vegetation be planted.</p>	<ul style="list-style-type: none"> - Contractors - Contractors 		
5.2.22 Protection of Vegetation	<p>The Contractors shall ensure that all works are undertaken in such a manner that vegetation outside the Works area is not damaged under any circumstances.</p> <p>The following provisions shall apply with respect to the protection of areas of vegetation:</p> <ul style="list-style-type: none"> - No tree or shrub shall be felled, lopped, cut or pruned without the prior written approval of the PM or the ECO. 	<ul style="list-style-type: none"> - Contractors - Contractors - Environmental Control Officer - Contractors - Environmental Control Officer - Project 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - No tree or shrub shall be felled, lopped, cut or pruned until it has been clearly marked for this purpose by the PM or the Environmental Control Officer. The method of marking shall be specified by the PM or the ECO, and the Contractors shall be informed in writing. - No tree shall be burned for any reason. - For every tree protected by these specifications which is removed or, in the opinion of the PM or ECO, is unduly damaged by the Contractors, the Contractors shall pay a fine of R10 000.00 per tree. - Trees that have been selected for preservation by the PM or the ECO shall be fenced around their drip line. The fence shall be clearly marked with danger tape. No vehicles may be parked underneath these trees. The area shall also not be used for <u>material storage</u> or as allocation for <u>temporary buildings</u>. 	<p>Manager</p> <ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager <ul style="list-style-type: none"> - Contractors <ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager <ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Project Manager 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - The ECO shall advise the Contractors on the relocation of any tree which needs to be protected and shall acquire the necessary permission from M-DALA (Natural Resources) where required. - The Contractors shall remove all alien vegetation from the works area for the duration of construction and maintenance period. Such vegetation shall be identified by the ECO and the method of eradication shall be specified by him. - The use of the top layer of soil for rehabilitation that is contaminated with the seed of alien vegetation (i.e. black wattle), shall not be permitted. 	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Contractors - Environmental Control Officer - Contractors 		
5.2.23 Water quality control	<ul style="list-style-type: none"> - The Contractors shall control surface runoff by: <ul style="list-style-type: none"> * construction of stabilised diversion or perimeter cut-off drains to intercept run-off from undisturbed areas and to divert run-off around the works areas; * installation of stabilised interceptor 	<ul style="list-style-type: none"> - Contractors 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>drains which run across the site along the contour;</p> <ul style="list-style-type: none"> * installation of stabilised collector drains which run down the slope perpendicular to the contours; * construction of sedimentation retention ponds; * construction of gabion (or similar) weir structures. <ul style="list-style-type: none"> - Limit movement of vehicles and equipment. - Minimise the area exposed by: <ul style="list-style-type: none"> * staging operations * progressive stabilisation of works as completed * provision of temporary grassing or other treatments to disturbed areas. - Construction of silt traps by: 			

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> * use of hay bales in drainage lines or elsewhere * use of silt fences * use of gravel and geotextile silt barriers <p>All diverted and pumped water shall be discharged at locations on the surface from which it cannot re-enter the works and in a manner which does not cause erosion, pollution or nuisance to landholders, other Contractors employed by the employer or other persons within or adjacent to the site, or disrupt valuable habitats that are to be preserved.</p> <p>Disposal of waste oil or other chemicals from workshops and other areas shall not cause pollution of rivers, streams or soil.</p> <p>Before any work is carried out in any area of the site, all specified or directed or approved pollution control measures shall be in place and operational.</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	No organic or inorganic substances shall be burnt. This includes particularly timber waste, plastic and styrofoam products. This waste material shall be disposed of in dump sites as approved by the PM.	- Contractors		
Social, Health & Safety				
5.2.24 Toilet facilities	The Contractors shall install mobile chemical toilets on site. Staff shall be sensitised to the fact that they should use these toilets at all times.	- Contractors		
5.2.25 Landowner liaison	<p>All negotiations shall be between Spoornet, the Landowner and the Landowner Liaison Officer. NO verbal agreements shall be made. All agreements shall be recorded properly and all parties shall co-sign the documentation.</p> <p>The Landowners shall always be kept informed about any changes to the construction programme should they be involved. The Landowner Liaison Officer should keep the Landowners informed. The contact numbers of the Landowner Liaison</p>	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Landowner Liaison Officer - Contractors - Environmental Control Officer - Spoornet - Landowner Liaison Officer 		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>Officer shall be made available to the Landowners. This shall ensure open channels of communication and prompt response to queries and claims.</p> <p>All contact with the Landowners shall be courteous at all times. The rights of the Landowners shall be respected at all times.</p> <p>Should water be required, the Contractors shall negotiate with the relevant Landowner together with the landowner liaison officer and a written agreement shall be drawn up.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Contractors - Landowner Liaison Officer 		
5.2.26 Emergency procedures	<p>The Contractors shall submit Method Statements covering the procedures for the following emergencies:</p> <ul style="list-style-type: none"> - Fire The Contractors shall advise the relevant authority of a fire as soon as one starts and shall not wait until he can no longer control it. The Contractors shall ensure that his employees are aware of the procedure to be followed in the event of a fire. 	<ul style="list-style-type: none"> - Contractors 		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Accidental leaks and spillages The Contractors shall ensure that his employees are aware of the procedure to be followed for dealing with spills and leaks, which shall include notifying the PM, the ECO and the relevant authorities. The Contractors shall ensure that the necessary materials and equipment for dealing with spills and leaks is available on Site at all times. Treatment and remediation of the spill areas shall be undertaken to the reasonable satisfaction of the PM and the ECO. - Hydrocarbon spill In the event of a hydrocarbon spill, the source of the spillage shall be isolated, and the spillage contained. The area shall be cordoned off and secured. The Contractors shall ensure that there is always a supply of absorbent material readily available to absorb/ breakdown and where possible is designed to encapsulate minor hydrocarbon spillage. The quantity of such materials shall be able to handle a minimum of 200 l of hydrocarbon liquid spill. 			

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.2.27 Safety	<p>Telephone numbers of emergency services, including the local fire fighting service, shall be posted conspicuously in the Contractor's office near the telephone.</p> <p>No unauthorised firearms are permitted on Site. The PM shall arrange for authorisation of relevant firearms to be allowed on site (e.g. the security guards protecting the equipment).</p>	<p>- Contractors</p> <p>- All</p>		
5.2.28 Scenic Quality	<p>Ensure that the railway servitude is well maintained and kept free of litter.</p> <p>Ensure that the railway embankments are rehabilitated with indigenous grasses and are maintained in a stable condition.</p> <p>Plant tree clusters (preferably trees that occur naturally on the Highveld just inside the right of way in areas where sensitive view lines are affected. The tree screens should be designed to mimic the existing patterns (existing blue gum clusters) in the landscape so that they do not appear out of place. The tree screen should consist of a combination of fast-growing non-invasive exotic trees such as those currently commonly used by landowners</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors - Spoornet</p>		

5.2 Phase 2: Construction (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>(mainly certain species of gums) and slower-growing indigenous trees that occur naturally on the Highveld that can over time replace the exotics. The areas in which tree screens should be planted to mitigate impacts to current occupants are included in Appendix 12 for detail of planting locations at farmhouses. Tree screens at houses would have to be agreed to by the landowner.</p> <p>Ensure that all light fixtures associated with the sub-stations provide precisely directed illumination when activated to reduce light spillage beyond the immediate surrounds of the sub-station site.</p> <p>The Contractors shall not establish or undertake any activities which, in the opinion of the PM or ECO, are likely to adversely affect the scenic quality of the area. The PM may direct the Contractors to refrain from such activities or to take ameliorative actions to reduce the adverse effect of such activities on the scenic quality of the environment.</p> <p>No painting or marking of natural features shall be done. Marking for surveying and other</p>	<p>- Contractors</p> <p>- Contractors</p> <p>- Contractors</p>		

5.2 Phase 2: Construction (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>purposes shall only be done with pegs and beacons.</p> <p>All cut and fill forms shall be rounded at the edges to blend them with the surrounding landforms.</p> <p>All packed rock and exposed rock cuttings shall be treated in order to blend their colour with the colours of the natural weathered rocks of the adjacent environment.</p>	<p>- Contractors</p> <p>- Contractors</p>		
Cultural and Heritage				
5.2.29 Archaeology	<p>Archaeological sites shall be deemed no-go areas.</p> <p>Should any archaeological sites be uncovered during construction, their existence shall be reported to the ECO immediately. An archaeologist shall then take the necessary action so that construction can continue.</p>	<p>- Contractors</p> <p>- Environmental Control Officer</p> <p>- Spoornet</p> <p>- Contractors</p> <p>- Environmental Control Officer</p>		
5.2.30 Buildings and structures	The Contractors shall under no circumstances	- Contractors		

5.2 Phase 2: Construction (General)

[illegible]

Phase 2: Construction (Specific)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.2.32 Flora and Fauna	Where impact on untransformed grassland habitat is unavoidable, verify that threatened species do not occur in the areas that are affected by railway construction. If threatened species are found, implement appropriate	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer 		

Phase 2: Construction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	conservation measures. Refer to Appendix 13 for localities.			
	Use normal stock fencing along the servitude of the route. Expanded metal safety fencing is only to be used in identified areas.	- Contractors		
5.2.33 Archaeology, heritage and burial grounds	<p>Ensure that gravesite 7 is fenced off because of its low visibility. This is deemed necessary because the big trees at the old farmyard would make a suitable camp site / storage site for construction teams.</p> <p>Ensure that no stones are removed from the old stonewalls for construction or filling in purposes without a permit from the relevant heritage resources authority.</p>	<p>- Contractors</p> <p>- Contractors</p>		
5.2.34 Water quality monitoring	Regular water quality monitoring of selected boreholes and stream / river crossings shall be carried out by Spoornet. This shall be done in accordance with the Requirements for Water Quality Monitoring. Refer to Appendix 9.	- Environmental Control Officer		
5.2.35 Site reinstatement	Once construction has been completed the site shall be cleared of all redundant	- Contractors		

Phase 2: Construction (Specific)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>infrastructure, waste and construction that shall not be used during the operation phase.</p> <p>All areas disturbed during the contract / construction period shall be reinstated to a condition in keeping with the requirements of the Re-vegetation Guidelines and the satisfaction of the ECO.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
Risk Management				
5.3.1 Random and illegal crossing of rail line	<p>Perimeter fence along the railway line shall be continuously maintained.</p> <p>“Illegal crossing” signs should be visibly displayed.</p> <p>Foot bridges should be considered at strategic areas.</p>	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Spoornet - Spoornet 		
5.3.2 Security and trespassing	<p>Regular security patrols shall be carried out to limit and prevent vandalism.</p> <p>Regular maintenance should be kept in place.</p> <p>Trespassers to the servitude shall be prosecuted.</p> <p>Clearly marked boards that warn potential trespassers must be displayed at predetermined places.</p>	<ul style="list-style-type: none"> - Spoornet - Spoornet - Spoornet - Spoornet 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
5.3.3 Prevention of stock theft	<p>The maintenance road shall be interrupted at predetermined places.</p> <p>A standard stock fence along the servitude shall be maintained along the railway line.</p> <p>The servitude area must be equipped with an alarm system linked to armed reaction.</p> <p>A security response team must be employed to be on stand-by on a 24 hour basis.</p>	<ul style="list-style-type: none"> - Spoornet - Spoornet - Spoornet - Spoornet 		
5.3.4 Movement control	The service road must be interrupted.	- Spoornet		
5.3.5 Fire risk	<p>A joint fire fighting team must be established and equipped.</p> <p>The services of a Fire Risk Officer must be employed to assess and advise on fire risk.</p> <p>Overgrown bushes and grass must be cut periodically.</p> <p>Fire breaks should be effected periodically.</p>	<ul style="list-style-type: none"> - Spoornet - Landowner Liaison Officer - Spoornet - Spoornet - Spoornet 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Fire engines with the appropriate fire fighting equipment must be available along the route.	- Spoornet		
Physical				
5.3.6 Rehabilitation monitoring	<p>The areas where rehabilitation of the disturbed or altered landscape has been carried out shall be monitored to assess its degree of success or failure. Particular attention shall be given to cut and fill slopes.</p> <p>Where failure to stabilise the area is identified, these areas shall immediately be repaired.</p> <p>Such repair work shall be done to the EM's satisfaction and signed off by him.</p>	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer - Contractors - Contractors 		
5.3.7 Borrow pit and quarry monitoring	The application procedure and standards of rehabilitation for closure shall comply with the requirements of the Minerals and Petroleum Resources Development Act No 28, 2002.	<ul style="list-style-type: none"> - Contractors - Environmental Control Officer 		
5.3.8 Access road maintenance	All roads used for access to the site shall be continuously and satisfactorily maintained to ensure safe use and minimum erosion of the surface and sides.	- Contractors		
5.3.9 Drainage	All drainage structures associated with the	- Spoornet		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	railway line shall be maintained to ensure surface water flows as planned and that no ponding occurs near or adjacent to the line or servitude.			
Biophysical				
5.3.10 Water quality monitoring	<p>Surface and ground water monitoring shall take place once every six months at the designated sample positions identified by the marker plates.</p> <p>The results of the samples shall be recorded and comparisons made to the baseline values.</p> <p>A report outlining the findings shall be submitted to the EM.</p> <p>The frequency of sampling may be decreased or increased at the discretion of the EM.</p> <p>Refer to Appendix 9 Requirements for Water Quality Monitoring.</p>	<ul style="list-style-type: none"> - Environmental Control Officer - Environmental Control Officer - Environmental Control Officer - Environmental Control Officer - Environmental Control Officer 		
5.3.11 Vegetation monitoring	The vegetation growing within the railway line	- Environmental		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>servitude shall be monitored twice a year, once after the first rains and again at the end of the rain season.</p> <p>The presence, type and growth of alien species and the vegetation coverage of the cut and fill slopes shall be reported upon. The report shall outline what action shall be taken.</p> <p>The vegetation's contribution to fire risk shall be assessed as shall the effectiveness and presence of adjacent fire breaks.</p>	<p>Control Officer</p> <p>- Environmental Control Officer</p> <p>- Spoornet</p> <p>- Environmental Control Officer</p> <p>- Spoornet</p>		
5.3.12 Fauna monitoring	The presence of the fauna species identified in the Environmental Impact Report shall be monitored to determine whether the railway line has affected the range or habitat over time.	- Environmental Control Officer		
5.3.13 Noise	Maintenance work that generates excessive noise should be undertaken at appropriate times during the day in order to minimise impacts. In areas sensitive to noise, such work shall not be done at night or on Sundays except in cases of emergency. In such cases the matter will be discussed with the landowners.	<p>- Contractors</p> <p>- Landowners Liaison Officer</p>		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>Trains must be operated at the passing loops to minimise braking noise and coupling clank as much as possible.</p> <p>Locomotives and rolling stock are to be maintained in good running order.</p> <p>Train hooting may only be used for absolutely essential reasons as to avoid frightening animals.</p>	<ul style="list-style-type: none"> - Contractors - Contractors - Contractors 		
Social, Health & Safety				
5.3.14 Landowner liaison	The adjacent landowners shall be regularly kept up to date with aspects that relate to the safe and effective operation of the railway line. This communication shall be done by the LLO through the Landowner Liaison Committee.	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Landowners Liaison Officer 		
5.3.15 Traction maintenance				
<ul style="list-style-type: none"> • Hydrocarbon pollution 	Hydrocarbon pollution / hydrocarbon spillage from axle boxes, engines, gear cases and fuel and oil systems and so on from staged or idling locomotives shall be prevented by the	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>following actions:</p> <ul style="list-style-type: none"> - Staff training and awareness. - Supervision to prevent extended idling. - Strict adherence to procedures for idling and servicing. - Visual monitoring of stabling points. - Reporting of locomotive defects. - Improved maintenance cycle on locomotives. - Immediate clean-up of spills and leaks. 			
5.3.16 Infrastructure maintenance				
<ul style="list-style-type: none"> • Fire risk management 	<p>Correct procedures shall be followed during welding and grinding so as to prevent fires. This shall be managed by the following actions:</p> <ul style="list-style-type: none"> - Draft policies & guidelines on veld fire prevention. 	- Spoornet		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Implement a Fire Danger Rating System. - Draft guidelines & standards for equipment maintenance. - Implement a staff training and awareness program. - Implement a waste management system. - Stand by fire fighting equipment at work sites. 			
<ul style="list-style-type: none"> • Disposal of ballast waste 	<p>The disposal of waste accumulated in ballast and waste ballast shall be controlled to prevent pollution of the receiving environment. This control shall be managed by the following:</p> <ul style="list-style-type: none"> - Ensure proper waste classification through chemical analyses before disposal of ballast. - Identify specifically designated spoiling sites with approval of regulatory authorities. - Prepare and implement site specific 	- Spoornet		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	Environmental Management Plan. - Implement training and awareness program.			
<ul style="list-style-type: none"> Oil, grease and fuel spillage 	<p>The service and maintenance of on-track machines shall ensure that oil, grease, fuel and hydraulic oil is not spilled but contained and that no pollution of the soil or water results from such maintenance / service procedures. This shall be managed by the following:</p> <ul style="list-style-type: none"> - Compile a directive regarding machine servicing and waste disposal. - Identify and implement planned rehabilitation of polluted sites. - Enforce contract management. 	- Spoornet		
<ul style="list-style-type: none"> Vegetation control in the rail reserve 	<p>Vegetation growth in the rail reserve shall be controlled in such a manner so as to eliminate the risk of fires. This shall be managed by the following:</p> <ul style="list-style-type: none"> - Compile policies and guidelines on the prevention of veld fires. - Provide adequate fire protection equipment 	- Spoornet		

5.3 Phase 3: Operation (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>to staff.</p> <ul style="list-style-type: none"> - Avoid welding and grinding operations when grass is dry and windy conditions exist. If welding or grinding in such conditions is unavoidable, provide a suitable firebreak by hoeing or skoffeling. - Fire Danger Rating System should also be considered. - Provide staff with training on fire fighting and control. - Prevent accumulation of flammable materials. 			
<ul style="list-style-type: none"> • Chemical control of vegetation and invasive plants 	<p>The use and application of chemical substances to eradicate or control vegetation growth in the rail reserve shall be done in such a manner that shall not pollute the soil, damage the adjacent ecosystems and damage nearby crops. Such management of the control shall include the following:</p> <ul style="list-style-type: none"> - Accurate, quantified survey of high risk, environmentally sensitive areas should be conducted. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Correct evaluation of tenderer's herbicide/application proposal in line with legal requirements and own knowledge of local environmental condition. - Ensure thorough evaluation of tenderer's documents to ensure compliance. - Strict supervision of weedspray applications. - Due care should be taken during the application of herbicides to ensure that only the track area is sprayed. - Accurate, quantified survey of declared noxious weeds should also be conducted. - Ensure correct evaluation of tenderer's herbicide/application proposal in line with legal requirements and own knowledge of local environmental conditions. - Ensure thorough management of contracts to ensure compliance. 			

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
<ul style="list-style-type: none"> Manual vegetation control and employee safety 	<p>The manual control of vegetation in the rail reserve shall be undertaken only under strict safety precautions. These precautions shall include the following:</p> <ul style="list-style-type: none"> - Equip workers with detonators to warn train drivers. - Train drivers should also be informed of areas on the line where workers might be busy with vegetation clearing. - Ensure contractors are well trained and equipped to deal with vegetation control on track profile. - Mixing of weed spraying chemicals and calibration of equipment are to be carried out by trained staff. - Contract specifications to be followed. - Spot checks to be carried out. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet 		
<ul style="list-style-type: none"> Bush encroachment 	<p>Bush encroachment shall be treated and eradicated with herbicides and not slashed</p>	<ul style="list-style-type: none"> - Environmental Control Officer 		

5.3 Phase 3: Operation (General)

Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>since this encourages further growth. The management of herbicide application shall include the following:</p> <ul style="list-style-type: none"> - Ensure that the spray operators have full knowledge of the designated areas that requires spraying. - Contractors to cease operation timeously when inclement weather adversely affects spraying operation. - Adequate care to be taken during the spray operation to prevent drifting of herbicides. 	- Spoornet		
<ul style="list-style-type: none"> • Pollution caused by spillages during transport 	<p>Pollution of the natural environment caused by coal spillage from wagons during transport shall be prevented by implementing the following management aspects:</p> <ul style="list-style-type: none"> - Wagons should be maintained to prevent or minimize the possibility of leaks from faulty valves. - Planned rehabilitation of sites to acceptable standards. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Identify material to recycle. - Waste separation on site if possible. - Prepare and implement site-specific environmental management plan and submit to M-DALA for record. - Report any leaks or faulty valves immediately. 			
<ul style="list-style-type: none"> • Derailments and pollution 	<p>Line inspection should be effected regularly.</p> <p>Security patrols must be conducted continuously.</p> <p>The pollution of the natural environment that shall result from the spillage of hazardous chemicals or solutions following a derailment shall be minimised by taking immediate action as set out by the Spoornet Hazmat Services division. Such action and reaction shall include the following:</p>	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Environmental Control Officer - Environmental Control Officer - Spoornet - Project Manager 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Immediate reaction would include: isolation, containment and minimisation of the spillage. - Implement the Spoornet contingency Plan. - Provide depot personnel with training on containment / cleanup and rehabilitation measures. - Timeous communication with the Rail Incident Commander, Spoornet Hazmat services and Spoornet Environmental Management re proposed actions. - Implement the site-specific environmental cleanup plan prepared by Spoornet Environmental Management. 			
<ul style="list-style-type: none"> • Clean-up of derailment sites 	<p>Derailment sites shall be thoroughly cleared and cleaned so that no remaining debris or substance shall pollute the natural environment. In addition, the following management actions shall be implemented:</p> <ul style="list-style-type: none"> - Timeous communication with the Rail Incident Commander, Spoornet HAZMAT 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Project Manager 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<p>and Spoornet Environmental Management re: proposed actions.</p> <ul style="list-style-type: none"> - Ensure that Environmental Management is timeously informed and involved in the clean-up process. - Provide depot personnel with training on containment / clean-up and rehabilitation measures. - Spoornet Environmental Management to carry out site closure audit as well as liaison with regulatory authorities. 			
<ul style="list-style-type: none"> • Signing off of derailment sites 	<p>No derailment sites shall be considered rehabilitated and cleared until such sites have been signed off by the EM that they pose no pollution or safety threat to the environment or community. The management action shall include the following:</p> <ul style="list-style-type: none"> - Liase timeously with Environmental Management to prepare an environmental clean-up plan to meet legal requirements. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Environmental Manager 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Environmental Management to carry out final site closure audit. - Spoornet Environmental Management to liaise with regulatory authorities. 			
<ul style="list-style-type: none"> • Embankments and cuttings 	<p>Embankments and cuttings shall be monitored regularly for signs of erosion and where identified remedial and re-vegetation methods shall be undertaken to stabilise the eroding slopes. The management of these slopes shall include the following:</p> <ul style="list-style-type: none"> - Inclusion of sensitive areas in on-track and reserve weed spray planning. - Use correct selective herbicides. - Thorough control and monitoring of weed spraying actions. - Identification, listing, quantification of affected areas. - Development and implementation of long term erosion control programme including revegetation of bare areas. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	<ul style="list-style-type: none"> - Prevent burning of the vegetation on banks and cutt slopes in the first five years after stabilisation. 			
<ul style="list-style-type: none"> • Surface water drains 	<p>All drainage structures related to the railway line servitude shall be kept clear and maintained to ensure surface water drainage away from the track and servitude is effective. The management of this function shall include the following:</p> <ul style="list-style-type: none"> - Compile effective drain maintenance guidelines. - Regular physical inspections of drains and culverts for effectiveness. 	- Spoornet		
<ul style="list-style-type: none"> • Prevention of flood damage 	<p>Flood damage in and adjacent to the railway servitude shall be eliminated by implementing the following:</p> <ul style="list-style-type: none"> - Development and implementation of drain / culvert maintenance program based on records and site inspections. - Use of selected, desirable vegetation to assist in the erosion control actions. 	- Spoornet		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
	- Compile effective maintenance guidelines.			
<ul style="list-style-type: none"> Monitoring and maintenance of fences 	<p>Fencing along the railway line servitude shall be regularly monitored and all breaks shall be immediately repaired. The management actions for fence monitoring and maintenance shall include the following:</p> <ul style="list-style-type: none"> - Identification and listing of the location, extent of high risk areas and associated problems as a basis for decision making regarding need for replacement and fencing type should be done. - Planned interaction / communication with adjoining landowners to encourage joint action, understanding of the problems and safety awareness development. - Liaison with Asset Protection and Local Authorities. - Erect weldmesh fencing where high risks have been identified. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Landowner Liaison Officer 		

5.3 Phase 3: Operation (General)				
Aspects	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
<ul style="list-style-type: none"> Level crossings 	<p>Level crossings shall be cross-checked with the agreements made with the landowners.</p> <p>The safety aspect at level crossings shall be addressed by ensuring good line of sight along the line in both directions. In addition the following management actions need to be applied:</p> <ul style="list-style-type: none"> - Determine risk level and develop a maintenance plan for the management of level crossing e.g. signage etc. - Development of maintenance programme for line of sight at roads to be retained based on site inspections. - Drivers to report level crossings where vegetation may be obscuring line of sight. - Develop a maintenance programme for whistle boards and level crossing warnings at roads based on site inspections. 	<ul style="list-style-type: none"> - Environmental Control Officer - Spoornet - Landowners Liaison Officer - Environmental Control Officer - Spoornet 		

5.4 Phase 4: Decommissioning				
Aspects (General)	Management Requirements	Responsibility/ Chainage/Area	Comment	Score
<p>The Decommissioning Phase shall be considered towards the end of the use of the railway line to convey coal to Majuba Power Station. This is many years in the future.</p> <p>To specify decommissioning requirements at the Preconstruction Phase of the Project can be premature.</p> <p>It is therefore practical to assess the factors related to the Decommissioning Phase at that time and to carry out an audit of the line to determine the status of all related environmental, social and heritage aspects. With this knowledge and understanding of conditions, a Decommissioning EMP can be produced that fits and relates to the conditions present and at hand.</p>				

