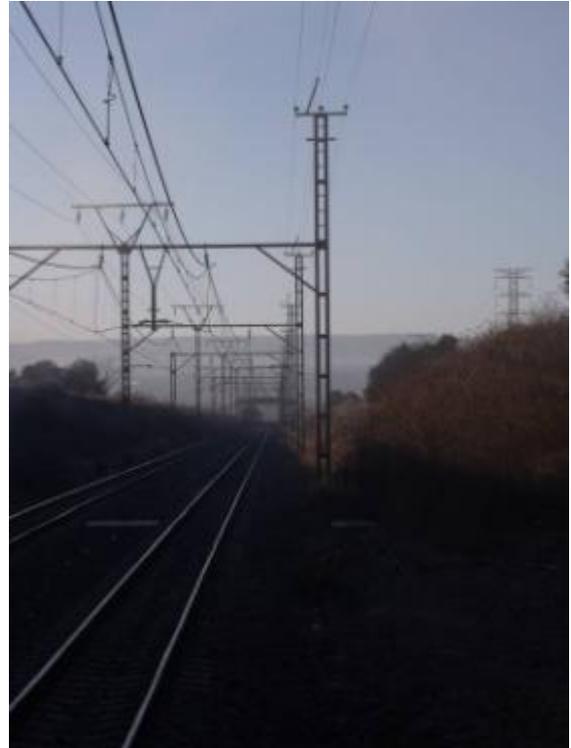


January 2011

Post-Authorisation Phase

*Kusile Railway Project: Proposed construction of a railway line (and associated infrastructure) from the existing Pretoria-Witbank railway (parallel to the N4) to the Kusile Power Station*



DEA REF NO: 12/12/20/1488

Proponent: Eskom Generation

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**FINAL (DYNAMIC) ENVIRONMENTAL  
MANAGEMENT PLAN (version 3)**

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Project: 12202

## PURPOSE OF THIS DOCUMENT

Eskom Generation has appointed Zitholele Consulting (Pty) Ltd, an independent company, to conduct an Environmental Impact Assessment (EIA) to evaluate the potential environmental and social impacts of the proposed project. The Environmental Assessment Practitioner (EAP) is Mrs Jacqui Hex.

As part of the NEMA EIA Regulation requirements an Environmental Management Plan (EMP) must be compiled for the construction, operation and decommissioning phases of the proposed development. An EMP is a tool that takes a project from a high level consideration of issues down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. As such an EMP is a critical part of an EIA.

According to the EIA Regulations, Interested and Affected Parties (I&APs) had an opportunity to comment on the proposed mitigation measures presented in the Draft EMP, which was appended to the Draft Environmental Impact Report (DEIR). After public review, the Draft EIR and EMP were updated and were submitted to the DEA for a decision about the project.

Environmental Authorisation (EA) was granted on 23 April 2010. An appeal was received on the decision and this EMP has been amended to include the requirements as set out in the applicant response to the appeal as well as the conditions stipulated in the EA. This EMP is being submitted to the DEA for their consideration and approval.

### Summary of what the Environmental Management Plan Contains

This EMP contains the following:

- Detailed description of the scope of the EMP;
- Roles and responsibilities for the implementation of the EMP;
- Information on the proposed management / mitigation measures;
- Proposed mechanisms for monitoring compliance to the EMP and reporting thereon; and
- Penalties and claims for offences

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Appendix H: Documentation and reporting examples

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Appendix J: Risk Assessment for Rotary Core Drilling

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## GLOSSARY OF TERMINOLOGY

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<b>Bi-monthly</b>	means every second month. Similarly “ <i>two-monthly</i> ” is assumed to have the equivalent meaning to “ <i>bi-monthly</i> ”
<b>Contractor</b>	means the <b>main contractor</b> as engaged by Eskom for the construction of the subject infrastructure, including all Sub-contractors and service providers appointed by the main contractor of his own volition for the execution of parts of the Works. “ <i>Contractor</i> ” also includes any other contractor engaged by Eskom directly in connection with any part of the construction operations, which is not a nominated sub-contractor to the main contractor
<b>Environment<sup>1</sup></b>	(i) the land, water and atmosphere of the earth; (ii) micro organisms, plant and animal life; (iii) any part or combination of (i) and (ii) and the interrelationships among and between them; and (iv) the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and wellbeing
<b>Environmental Control Officer</b>	means a person who is responsible for the monitoring of the implementation of the requirements of an EMP
<b>Environmental Officer</b>	means a person who is responsible for the implementation of the requirements of an EMP
<b>Environmental Impact Assessment (EIA)</b>	means a study of the environmental consequences of a proposed course of action
<b>Environmental Impact Report (EIR)</b>	means a report assessing the potential significant impacts as identified during the Scoping phase

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<sup>1</sup> As defined in terms of the National Environmental Management Act (No 107 of 1998).

<b>Environmental impact</b>	means an environmental change caused by some human act
<b>Environmental Monitoring Committee</b>	means a committee that monitors the implementation of an EMP and EA and provides an advisory role to the authorities and project proponent
<b>Environmental Management Plan (EMP)</b>	The synthesis of all proposed mitigative and monitoring actions, set to a timeline with specific responsibility assigned and follow-up actions.
<b>Method Statement</b>	means setting out in detail how the management actions contained in an EMP will be implemented, in order to ensure that the environmental objectives are achieved
<b>Public Participation Process</b>	means a process of involving the public in order to identify needs, address concerns, in order to contribute to more informed decision making relating to a proposed project, programme or development
<b>Scoping</b>	means a procedure for determining the extent of and approach to an EIA, used to focus the EIA to ensure that only the significant issues and reasonable alternatives are examined in detail
<b>Scoping Report</b>	means a report describing the issues identified

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## LIST OF ABBREVIATIONS

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<b>CaSO<sub>3</sub></b> .....	Calcium Sulphite
<b>CaSO<sub>4</sub></b> .....	Calcium Sulphate
<b>CO<sub>2</sub></b> .....	Carbon Dioxide
<b>DEA</b> .....	Department of Environmental Affairs
<b>DWA</b> .....	Department of Water Affairs
<b>EA</b> .....	Environmental Authorisation
<b>ECA</b> .....	Environment Conservation Act (No. 73 of 1989)
<b>EIA</b> .....	Environmental Impact Assessment
<b>EIR</b> .....	Environmental Impact Report
<b>EMP</b> .....	Environmental Management Plan
<b>EMProgs</b> .....	Environmental Management Programs
<b>EMS</b> .....	Environmental Management Systems
<b>EO</b> .....	Environmental Officer
<b>EPP</b> .....	Environmental Protection Policy
<b>FGD</b> .....	Flue Gas Desulphurization
<b>GDARD</b> .....	Gauteng Department of Agriculture and Rural Development
<b>HIA</b> .....	Heritage Impact Assessment
<b>I&amp;AP</b> .....	Interested and Affected Party
<b>Km</b> .....	Kilometre
<b>kV</b> .....	Kilovolt
<b>kWH</b> .....	Kilowatt Hour
<b>M</b> .....	Metre
<b>m<sup>3</sup></b> .....	Cubic Metre
<b>MDALA</b> .....	Mpumalanga Department of Agriculture and Land Affairs
<b>NEMA</b> .....	National Environmental Management Act (No. 107 of 1998)
<b>MW</b> .....	Megawatt
<b>NHRA</b> .....	National Heritage Resources Act (No. 25 of 1999)
<b>NWA</b> .....	National Water Act (No 36 of 1998)
<b>PES</b> .....	Project Environmental Specification
<b>PPP</b> .....	Public Participation Process
<b>SAHRA</b> .....	South African Heritage Resources Agency
<b>SES</b> .....	Standard Environmental Specification
<b>SO<sub>2</sub></b> .....	Sulphur Dioxide
<b>ToR</b> .....	Terms of Reference

## PART A: INTRODUCTION

*Part A provides a brief introduction and overview of the purpose and structure of this guideline document.*

### 1. BACKGROUND

The Kusile Power Station, and its infrastructure, including rail and road transportation, received Environmental Authorisation (EA) in March 2008. According to the original planning, sorbent would only be transported by rail to the power station while the roads network would be used for other transportation. However, during the detailed design of the infrastructure, the authorised rail route was deemed not feasible due to some technical challenges. The planning process also showed that the rail construction and operation would not be ready when the first generation unit comes into operation thus necessitating an alternative sorbent transportation mechanism. Road transportation was deemed an appropriate *temporary* alternative until the railway is operational.

One of the conditions of the EA (March 2008) for the construction of Kusile Power Station was that it must be fitted with the most advanced air pollution reducing equipment ever installed at a power station in South Africa (Flue Gas Desulphurisation [FGD]). This technology would result in a minimum of 90% of the sulphur dioxide (SO<sub>2</sub>) being removed from the power station emissions, bringing it in line with international emission standards.

Alkaline sorbents (materials used to adsorb either liquids or gases) are used for scrubbing flue gases to remove the SO<sub>2</sub>. Lime is used on large coal or oil fired boilers as found in power plants, as it is less expensive than sodium hydroxide. Therefore, a sorbent is required to reduce the amount of SO<sub>2</sub> that is emitted. The SO<sub>2</sub> reacts with the calcium in the limestone to form calcium sulphate (CaSO<sub>4</sub>) or calcium sulphite (CaSO<sub>3</sub>) and CO<sub>2</sub>. The source of sorbent would be determined through a commercial process.

Zitholele Consulting (Pty) Ltd was appointed by Eskom to assist them in complying with the environmental requirements for the proposed project. The Environmental Impact Assessment (EIA) process was initiated on Eskom's behalf in April 2009. In terms of the National Environmental Management Act (Act 107 of 1998) (NEMA) EIA Regulations an Environmental Management Plan (EMP) must be compiled for the construction, operation and decommissioning phases of the proposed development. An EMP is a tool that takes a project from a high level consideration of issues down to detailed workable mitigation measures that can be implemented in a cohesive and controlled manner. As such an EMP is a critical part of an EIA.

## 2. PURPOSE OF THIS DOCUMENT

The purpose of this EMP is to:

- Sketch the background for the development;
- Introduce the structure of the EMP, particularly in terms of the contractual application of the environmental specifications;
- Highlight the salient features of the EMP;
- Detail the roles of the various parties with respect to the implementation and monitoring of the EMP;
- Clarify and streamline the implementation of the EMP;
- Define requirements and procedures for monitoring;
- Outline procedures for proactive environmental management and environmental control, in the event of pollution or similar incidents; and
- Ensure compliance with the conditions stipulated in the Environmental Authorisation (23 April 2010) and provide additional mitigation measures in adherence to the response to the appeal (28 May 2010) as well as the appeal decision from the minister, dated 24 October 2010.

It should be noted that this EMP is part of the EIA process being undertaken for the Kusile Rail Project (ref # 12/12/20/1488), and should be read in conjunction with the Final Environmental Impact Report, the Environmental Authorisation and all associated appendices.

## 3. STRUCTURE OF THIS DOCUMENT

This document has been divided into four parts, each addressing a different aspect of the EMP. This EMP has been structured in a manner such that it can be incorporated into the Kusile Power Station EMP as this project forms part of the associated infrastructure of the Power Station.

- **Part A** provides a brief introduction and overview of the purpose and structure of this guideline document;
- **Part B** sets the context for the EMP by providing an overview of the project, summarising the objectives of the EMP, highlighting the scope of the EMP and briefly emphasising Eskom's environmental commitments;
- Since this EMP has been developed as a set of environmental specifications, **Part C** provides an introduction to the specification, an overview of the structure and application of the

specification and highlights the environmental considerations that should inform the tender adjudication process; and

- **Part D** provides guidance in terms of the on-site (route) implementation of the EMP, highlighting the organisation structure and various roles and responsibilities, emphasising the importance of awareness training, summarising the requisite approach to monitoring and auditing and addressing the requirement for review and amendment of the environmental specifications.

## **PART B: SETTING THE CONTEXT**

*The purpose of Part B is to set the context for the EMP by providing an overview of the project, summarising the objectives of the EMP, highlighting the scope of the EMP and briefly emphasising Eskom's environmental commitments. In developing the environmental specifications and documentation related to the on-site (route) implementation of the EMP cognisance has been taken of these requirements.*

### **4. OVERVIEW OF THE PROPOSED PROJECT**

#### **4.1 Background**

The project comprises the construction, operation and decommissioning of a railway line, from the existing Pretoria-Witbank line, and associated infrastructure, to the Kusile Power Station, in the Witbank area. The project will include the following infrastructure as illustrated in the site plan (Figure 1):

- Single carriage railway:
  - Railway track;
  - Railway Overhead Traction Equipment (OHTE);
  - Railway yard / unloading facility (within the Kusile Power Station construction site).
- Associated infrastructure:
  - Relay room;
  - Two substations;
  - Communication masts;
  - Two 132 / 88 kV power lines
  - Over / under passes (water body and road crossings)
  - Access roads and fencing.

##### **4.1.1. Preferred operations at the unloading facility**

Figure 2 below illustrates the mode of operation that may be used at the unloading facility:

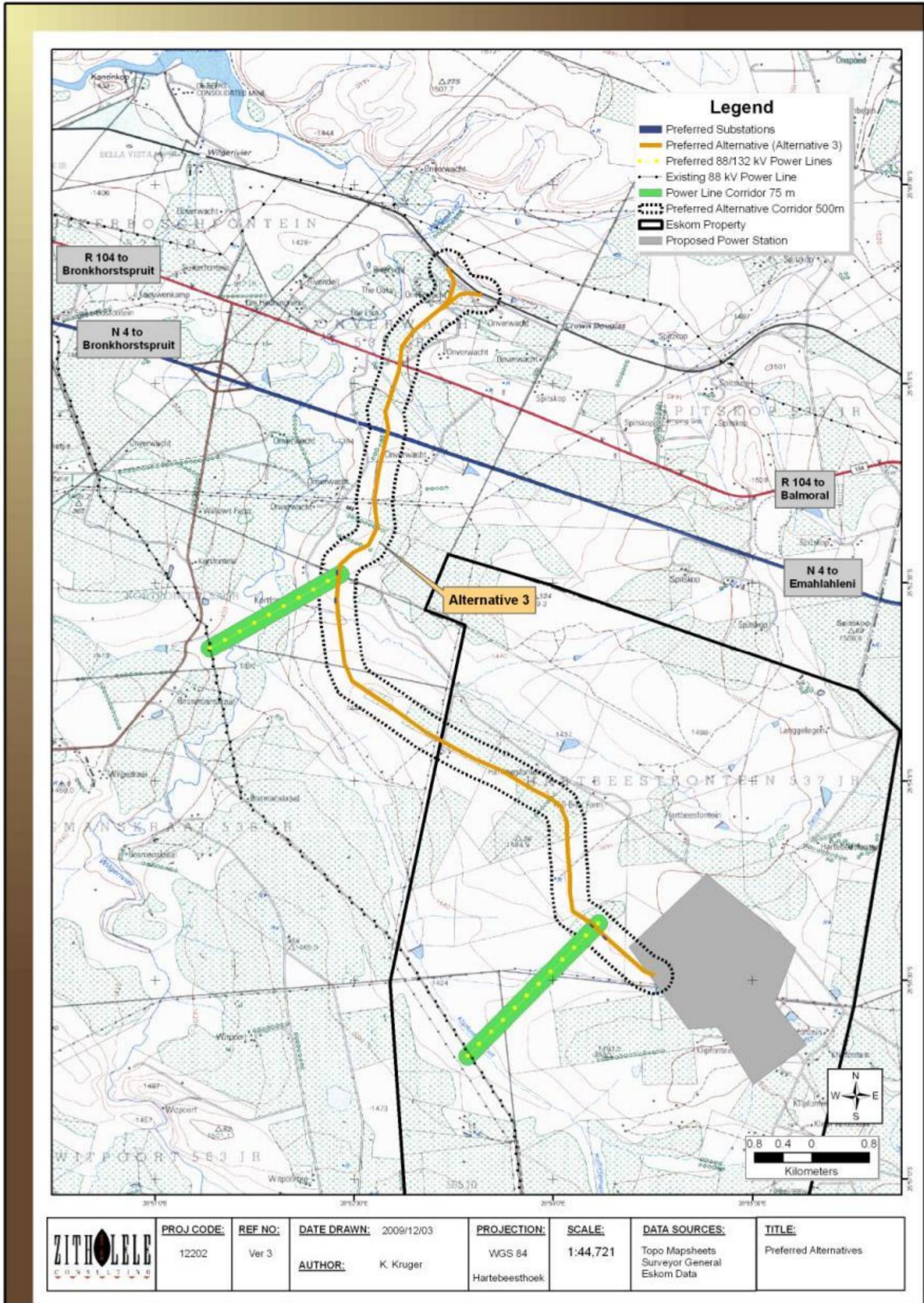
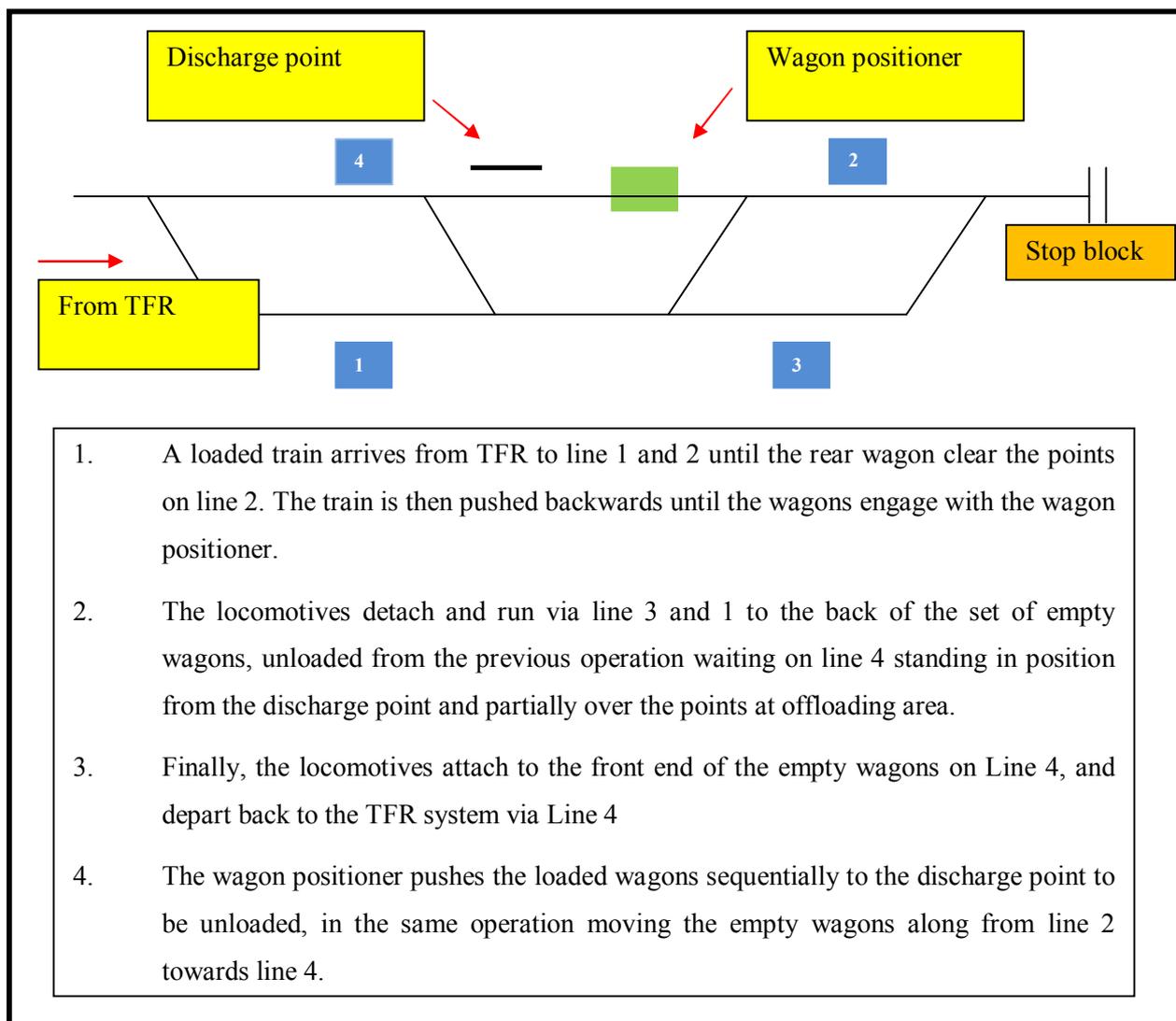


Figure 1: Site plan for the proposed project – Approved Alternative.

A loaded train will arrive at the yard passing the unloading facility going back on the unloading facility line until the train is on this line. The locomotives will then push the train back until the wagons engage with the indexer system. The locomotives will then run back around the wagons on the loop to the opposite side of the unloading facility to pull clear the set of empty wagons unloaded during the previous operation, and the train will depart.



This operational method is recommended based on the following reasons:

- It requires fewer shunting operations;
- Reduced wear and tear of points; and
- Reduced safety risks.

#### **4.1.2. Preferred Corridors**

Three railway corridor alternatives, two northern 132 / 88kV power line corridor alternatives and two southern 132 / 88kV power line corridor alternatives with associated substations were considered in

the EIA process for the Kusile Rail Project. This section contains a summary of the approved corridors as per the Environmental Authorisation, particularly as it relates to the design of the railway. Eskom must take cognisance of these recommendations and agree to their incorporation within the project design.

#### Railway Corridor Alternatives

The approved railway corridor, Alternative 3, is 500 metres wide with a 35 metre wide servitude. The reason for approving a corridor is to ensure that slight deviations of the rail route are possible within the approved corridor, should any specific environmental sensitivity or technical limitation be identified in the final detailed planning stage, post authorisation. All associated infrastructure must be located within the approved railway corridor with the exception of the two 132 / 88kV power lines required to electrify the railway (access road, substations, overhead traction equipment will be within the approved railway corridor). The access road will be constructed parallel to the railway line within the approved 500 metre corridor and will have width of 31 metres. The 20 metre mast for signalling directions will also be constructed within the approved servitude.

#### Northern 132 / 88kV Power Line Corridor Alternatives

The northern 132 / 88kV power line corridor (A) is located approximately halfway between the Kusile Power Station construction site and the existing Pretoria – Witbank railway. The intention of this power line is to feed a substation located halfway between the power station and the existing railway. The 132 / 88kV power line corridor being assessed is 70 metres wide and the servitude required is 36 metres in width. Alternative A-(b) was approved by the DEA.

#### Southern 132 / 88kV Power Line Corridor Alternatives

The southern 132 / 88kV power line corridor (B) is located to the immediate west of the Kusile Power Station construction site. The intention of this power line is to feed a substation located at the Kusile Power Station. This 132 / 88kV power line corridor being assessed is also 70 metres wide and the servitude required is 36 metres in width. Alternative B-(b) was approved by the DEA.

## **4.2 Integration of environmental considerations into the project design**

### **4.2.1. *Associated Infrastructure Layout***

The associated infrastructure has been outlined in the Final EIR and in Figure1. The exact layout of the proposed infrastructure will be finalised post environmental authorisation within the approved railway and power line corridors. The layout will be determined by taking environmental and social sensitivities and technical feasibility into consideration.

During the walk down of the approved corridors Eskom shall ensure that a suitably qualified person peg out all sensitivities identified within the corridors. This information must be consolidated into a map with exclusion zones. These exclusion zones must be avoided and the associated infrastructure must be constructed outside of these areas.

#### **4.2.2. Design specifications pre-construction**

##### Noise

Two different types of railway wagons were considered in this EIA, namely: tippler and bottom discharge wagons. From an environmental and social perspective the bottom discharge wagon is preferred as it will result in a lesser noise impact at the unloading facility.

#### **4.2.3. Design specifications during operations**

##### Air

The wagons will be transporting sorbent. Although the air quality impacts assessment was undertaken as a worst case precautionary approach with wagons not being covered during transportation it is strongly advised that wagons be covered to prevent / minimise windblown sorbent during transportation.

#### **4.2.4. Transport and Access Routes**

All trips for delivery of construction related materials should utilise the N4. These trips to and from the N4 should use the R545 to the Kusile Power Station construction site.

The shoulder sight distance along the R104 where the rail crossing will be located is adequate for this class of road and will not be an issue even if construction traffic gains access to and from the site at this point. Therefore it is recommended that this road be used to access the site. W107 and W108 intersection warning signs with IN 11.569 supplementary warning plates must be erected on the R104 approaching the existing intersection with the D2236, and at the potential point of access to the site, indicating the presence of heavy vehicles at the intersections.

The R104 between Bronkhorstspuit and Balmoral is tarred road and in good condition. However with heavy construction traffic over a period of two years, if this road pavement is not monitored, surface distress and edge deterioration could develop and accelerate and potentially become road safety hazards. This road should be resurfaced back to its original condition once construction is completed;

A detailed construction-related traffic management plan must be developed prior to the commencement of any construction work both in terms of road safety and road pavement maintenance.

## **5. OBJECTIVES OF THE EMP**

Environmental management does not end with obtaining the required environmental authorisations. Rather there is a need to ensure that the remedial requirements identified during the environmental process are effectively realized during project implementation, and this is where EMPs have a key role to play.

An EMP is defined as “an environmental management tool used to ensure that undue or reasonably avoidable adverse impacts of the construction, operation and decommissioning of a project are prevented, and that the positive benefits of the projects are enhanced”. Impacts range from those incurred during start up (site clearing, erection of the construction camp), through those incurred during the construction activities themselves (erosion, pollution of watercourses, noise, and dust), to those incurred during site remediation (soil stabilisation, revegetation) and to operational activities (dust, noise). Specifically, the objectives of this EMP can be articulated as follows:

- To give effect to the construction, operation and decommissioning-related requirements;
- To give effect to the environmental commitments articulated in Eskom’s corporate policies and commitments;
- To ensure that these requirements / commitments are expressed in a manner that is accessible to all parties and is binding upon those responsible for project implementation;
- To ensure that sufficient resources are allocated to the project budget in order to give effect to the environmental requirements / commitments, and to ensure that the scale of EMP-related interventions is consistent with the significance of identified impacts;
- To provide a coherent and pragmatic framework for the implementation of the requirements, ranging from the inclusion in the Kusile Power Station Environmental Monitoring Committee (EMC), through the roles and responsibilities of the key project participants to the auditing and reporting of compliance;
- To facilitate appropriate and proactive response to unforeseen events or changes in project implementation that were not considered in the EIA process; and

- To ensure that the construction, decommissioning and operational phases of Kusile Rail Project do not result in undue or reasonably avoidable adverse environmental impacts, and that any potential environmental benefits are enhanced.

## **6. SCOPE OF THE EMP**

The scope of the EMP must ensure that the objectives outlined in Section 5 will be addressed, and is principally determined by the key documentation related to the EIA process, notably the Final EIR, the Framework EMP, the Environmental Authorisation (23 April 2010) and the Appeal Decision (24 October 2010). A brief overview of the key issues raised in each of these documents is provided below.

### **6.1 Environmental Impact Report**

In terms of the Final EIR (November 2009), various construction and operation-related environmental impacts were identified, including:

- Disturbance of flora and fauna;
- Impacts on water resources (sedimentation and water quality);
- Increase in traffic volumes in the vicinity of the construction site / route;
- Noise pollution;
- Impact on existing infrastructure;
- Socio-economic impacts;
- Windblown dust and sorbent;
- Litter / waste pollution;
- Interruption of road services;
- Storage and utilisation of hazardous substances on site;
- Risk of fire;
- Disturbance to sense of place, visual aesthetics; and
- Security risks.

None of the construction phase impacts were deemed to have a highly significant impact on the environment, given their relatively short duration and localised extent. Many of the operational phase impacts were, however, assessed as being of medium significance and requiring specific mitigation interventions in order to avoid and minimise impacts on the biophysical and especially the human

environment. In this regard, the EIR emphasised that this comprehensive EMP be developed and implemented to protect sensitive onsite and offsite features through managing construction and operational activities that could have a detrimental effect on the environment, and avoiding or minimising potential impacts.

## **6.2 Framework EMP**

A Framework EMP (refer to **Table 1** and **Appendix B**), which broadly outlines the type and range of mitigation measures that could be implemented during the pre-construction, construction, operational and decommissioning phases of the project, is included in the Final EIR and this EMP. The intention is that this will form the outline for the subsequent development of detailed construction and operational EMP documentation once the project has been authorised. Key recommendations emanating from the Framework EMP of relevance to the EMP include the following:

### ***Environmental input into tender drafting and adjudication:***

- Incorporate relevant environmental management specifications into the tender and contract documentation;
- Incorporate relevant payment items into the schedule of quantities; and
- Assess ability of tenderers to adequately manage the environmental issues;

### ***Environmental management of the construction phase:***

- Monitoring and enforcement of specified environmental management requirements:
  - Appoint an Environmental Control Officer (either independent or in-house, preferably the ECO for the power station);
  - Develop and implement an environmental auditing system for the construction phase;
  - Audit the Contractors compliance with the requirements of the environmental specification contained within the relevant Contract Document; and
  - Produce regular (monthly) environmental audit reports for submission to the DEA.
- Communication with Contractor and his staff:
  - Include environmental considerations as an item on the agenda of the monthly site meetings for each Contractor;
  - Include environmental considerations in the Contractors programme (where relevant);
  - Appoint a senior manager on the Contractors staff as the designated Environmental Officer, empowered to manage compliance with the environmental requirements on behalf of the Contractor;
  - Compile and implement the necessary Method Statements;

**Table 1: Framework EMP (summary of the main impacts and management activities per activity).**

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
<b>1. COMPLIANCE WITH ENVIRONMENTAL LEGISLATION</b>								
All Activities (railway and all associated structures and infrastructure, including the 88kV power lines, substations and access roads)	Compliance with Regulation 385, 386, 387 of National Environmental Management Act	Delay in onset of activity  Suspension of construction & operational phases  Prosecution	<b>Objective:</b> To ensure that requisite EIA authorisation has been received  <b>Mechanism:</b>  1) Complete the statutory EIA <sup>i</sup> process	EA (and appeal adjudication if relevant) received from the DEA <sup>ii</sup>	EIA Consultant	EIA process and documentation	Prior to site establishment	ESKOM
	Compliance with Sections 34, 35, 36 and 38 of National Heritage Resources Act.	Delay in issuing of NEMA <sup>iii</sup> EA  Delay in onset of activity  Suspension of construction phase  Prosecution	<b>Objective:</b> To ensure that the requisite heritage inputs have been integrated into the EIA process  <b>Mechanism:</b>  1) Solicit comment from Gauteng/ Mpumalanga Heritage Agency or SAHRA <sup>iv</sup> as part of the EIA consultation process 2) Complete permit application process if required	Comment from SAHRA as input into the DEA EA  Permit(s) to destroy identified resources (if required) received from Responsible Heritage Authority	EIA Consultant  Heritage Specialist	EIA process and documentation  NHRA <sup>v</sup> permit application	Prior to submission of EIA (for comment)  Prior to site establishment (for any permits)	ESKOM
Railway and access road bridges over water courses	Compliance with Section 38 of National Water Act	Delay in onset of activity  Suspension of construction and operational phases  Prosecution	<b>Objective:</b> To ensure that requisite WULA authorisation has been received  <b>Mechanism:</b>  Complete the statutory WULA process	WUL authorisation received from DWA	Eskom	WULA process and documentation from EIA	Prior to site establishment	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
Waste handling and disposal	Compliance with the National Environmental Management Waste Act	Delay in issuing of the EIA EA  Delay in onset of activity  Suspension of construction & operational phases  Prosecution	<b>Objective:</b> To ensure that the requisite authorisation has been received  <b>Mechanism:</b>  Solicit comment from DWA <sup>vi</sup> as part of the EIA consultation process	Comment from DWA as input into the DEA EA	EIA Consultant (to provide input)	EIA process and documentation	Prior to submission of EIA (for comment)	ESKOM
<b>2. ENVIRONMENTAL INPUT INTO TENDER DRAFTING AND ADJUDICATION</b>								
All Activities (railway and all associated structures and infrastructure, including the 88kV power lines, substations and access roads)	Compilation of tender documentation and Specifications	Negative impacts on environment during construction	<b>Objective:</b> To ensure acceptable management of environmental issues during construction  <b>Mechanism:</b>  1) Incorporate relevant environmental management specifications into the Tender and Contract documentation <sup>vii</sup>  2) Incorporate relevant payment items into the Schedule of Quantities	Tender documentation and Contract Documentation include environmental management requirements	Engineering Design Consultant/ ESKOM  Environmental Consultant/ ESKOM	EIA documentation  Specialist studies  Framework EMP	Tender Design & Design Review Stage	Review by ESKOM
	Tender Adjudication	Negative impacts on environment during construction	<b>Objective:</b> To ensure acceptable management of environmental issues during construction  <b>Mechanism:</b>  1) Assess ability of Tenderers to adequately manage the environmental issues	Tender evaluation report contain reference to environmental ability of tenderers  Successful Contractor shows clear commitment to and capacity for meeting the environmental management obligations	Engineering Design Consultant/ ESKOM  Environmental Consultant/ ESKOM	Completed Tender Documentation  In-house Environmental Agreement and Tenderer Questionnaire (where applicable)	Tender Adjudication Stage	Review by ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
<b>3. ENVIRONMENTAL INPUT INTO DESIGN</b>								
All Activities (railway and all associated structures and infrastructure, including the 88kV power lines, substations and access roads)	Detailed design of infrastructure	Design fails to respond optimally to the environmental considerations	<p><b>Objective:</b> To ensure that the design responds to the identified environmental constraints and opportunities</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Consider design level mitigation measures recommended by the specialists, especially with respect to wetlands, noise, air quality, flora, aquatic ecology and heritage</li> <li>2) Balance technical and financial considerations against environmental constraints and opportunities in finalising the design of key elements</li> <li>3) Incorporate in-house procedures, where relevant and available</li> <li>4) <u>Where applicable, ensure that appropriate and suitable technologies, which are environmentally friendly, are implemented in the design of all activities authorised;</u></li> <li>5) <u>Submit criteria for construction camp and material storage site selection and measures for management of sites and related activities such as ablution and housing facilities, waste and water management at such areas to the DEA;</u></li> <li>6) <u>Submit measures for protection / avoidance of heritage resources identified on site to the DEA.</u></li> <li>7) <u>The authorised activity shall not commence within 30 days of the date of signature of the authorisation;</u></li> <li>8) <u>14 days written notice must be given to the DEA that the activity will commence. Commencement for the purposes of this condition includes site preparation.</u></li> </ol>	<p>Design meets objectives and does not degrade the environment</p> <p>Design and layouts etc respond to the mitigation measures and recommendations in the EIR</p>	<p>Engineering Design Consultant/ ESKOM</p> <p>Environmental Consultant/ ESKOM</p>	<p>EIA documentation</p> <p>Specialist studies</p> <p>Framework EMP</p> <p>In-house procedures (were relevant and available)</p>	Tender Design & Design Review Stage	ESKOM
Landowners	Negotiation with landowners	Landowners unfairly prejudiced by proposed siting of railway line, access road, power line and	<p><b>Objective:</b> To ensure adequate regard has been taken of landowner concerns and that these are appropriately addressed</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Initiate negotiations with landowners timeously</li> <li>2) Address reasonable expectations/ requests</li> </ol>	<p>Location of infrastructure does not prejudice any landowners</p> <p>Location and layout responds to issues recorded in</p>	ESKOM	<p>EIA process</p> <p>In-house procedures for landowner negotiations and expropriation</p>	Ideally initiated together with submission of final EIA (which indicates	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
		substations	<p>where possible</p> <p>3) In event of impasse follow legal expropriation route, but ensure that extent of expropriation is minimised, restrictions on land use are minimised and reasonable costs are paid</p>	<p>the Issues Trail</p> <p>Ideally, landowners should be satisfied with outcome of negotiations process. In event of impasse requiring expropriation, landowners should be afforded reasonable and appropriate rights/ access</p>			<p>preferred corridors)</p> <p>Finalised prior to site establishment</p>	
Railway, access roads and power lines	Selection of preferred corridor	Corridor that degrades environment unnecessarily and poses heightened health and safety risk	<p><b>Objective:</b> To ensure selection of BPEO<sup>viii</sup> for the rail and power line corridors</p> <p><b>Mechanism:</b></p> <p>1) Select corridor that curtails environmental impacts and enhances environmental benefits, whilst being technically feasible and affordable</p> <p>2) In adjudicating the preferred routing, careful consideration must be given to, in particular, the risks associated with the conveyer (e.g. dust and noise).</p>	<p>Routing meets objective.</p> <p>Selected route minimises any negative environmental impacts, maximises any benefits and minimise health and safety risks</p>	ESKOM	EIA documentation Specialist studies Framework EMP	Prior to submission of EIA	ESKOM
Railway line and underground water table	Ensuring that areas where cut operations are required do not intersect with the water table	Cut operations may intersect with the water table and result in the decanting of aquifers thereby impacting on borehole users in the area.	<p><b>Objective:</b> To ensure that cut operations do not impact on the water table.</p> <p><b>Mechanism:</b></p> <p>1) <u>Prior to cut operations rotary core drilling is required in areas where the water table is expected to be high.</u></p> <p>2) <u>Before rotary core drilling commences a risk assessment must be undertaken subject to comments from affected landowners</u></p>	<p><u>Areas with high water tables are avoided.</u></p>	ESKOM	Risk Assessment (subject to comment from affected landowner)	<u>Prior to construction</u>	<u>ESKOM</u>
<b>4. ENVIRONMENTAL MANAGEMENT OF THE CONSTRUCTION PHASE<sup>ix</sup></b>								

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
All Activities (railway and all associated structures and infrastructure, including the 88kV power lines, substations and access roads)	Monitoring and enforcement of specified environmental management requirements	Negative impacts on environment during construction of railway and associated structures/ infrastructure	<p><b>Objective:</b> To ensure that the construction of the railway and associated structures/ infrastructure does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Appoint an Environmental Control Officer is (either independent or in-house, preferably the ECO for the power station)</li> <li>2) Ensure that this project is included in the existing Kusile Power Station EMC meetings</li> <li>3) Develop and implement an environmental auditing system for the construction phase</li> <li>4) Audit the Contractors compliance with the requirements of the environmental specification contained within the relevant Contract Document</li> <li>5) Produce regular (monthly) environmental audit reports for submission to the DEA</li> <li>6) <u>Records relating to monitoring must be kept on site and made available for inspection to any relevant and competent authority in respect to this development.</u></li> <li>7) <u>The DEA reserves the right to monitor and audit the development through its life cycle to ensure that it complies with the conditions of the EA</u></li> <li>8) <u>All compliance and monitoring correspondences must be forwarded for attention of the Director: Compliance Monitoring Directorate within the DEA;</u></li> </ol>	<p>Environmental impacts effectively monitored and managed during the construction phase with no residual impacts on the environment</p> <p>Comprehensive record of compliance and remedial actions available to ESKOM and the authorities</p>	<p>Site Engineer</p> <p>Environmental consultant</p> <p>ESKOM</p>	<p>Contract Document</p>	<p>During Construction Phase (from site establishment to Contract Completion)</p>	<p>ESKOM</p> <p>DEA/ MDALA<sup>x</sup>/ GDARD<sup>xi</sup></p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
Communication	Communication with Contractor and his staff	Inability to communicate effectively with the Contractor regarding their environmental obligations, resulting in unnecessary environmental degradation	<p><b>Objective:</b> To ensure that there is effective communication with the Contractor on environmental issues</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Include environmental considerations as an item on the agenda of the monthly site meetings for each Contractor</li> <li>2) Include environmental considerations in the Contractors programme (where relevant)</li> <li>3) Appoint a senior manager on the Contractors staff as the designated Environmental Officer, empowered to managed compliance with the environmental requirements on behalf of the Contractor</li> <li>4) Compile and implement the necessary Method Statements</li> <li>5) Undertake environmental awareness training of all site staff during the commencement of each Contract, with regular refreshers for the duration of the Contract</li> <li>6) Raise awareness amongst construction workers about local traditions and practices;</li> <li>7) Ensure that employment procedures / policy is communicated to local stakeholders, especially local fire control committee / initiative, local farmers / land owners as well as the ward 32 local councillor;</li> <li>8) Consult with local South African Police Services ( SAPS) to establish standard operating procedures for the control and removal of loiterers at the construction site; and</li> <li>9) Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers must also be provided with identification tags.</li> <li>10) Launch aggressive culturally appropriate STI and HIV/AIDS awareness campaigns;</li> <li>11) Distribute condoms by placing them at centrally located points;</li> <li>12) Control access to the construction site to prevent sex workers;</li> <li>13) Employ local women to decrease their financial vulnerability.</li> </ol>	Environmental management requirements are proactively communicated with the Contractor and reflected in a more responsible approach to construction	Contractor Site Engineer Environmental consultant/ ESKOM	Contract Document Programme Meetings [Note: costs of awareness training covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM in-house technical & environmental staff

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Communication with public	Inability to deal with public queries and complaints	<p><b>Objective:</b> To ensure that the public has a mechanism to contact a responsible individual in order to obtain information or report complaints</p> <p><b>Mechanism</b></p> <ol style="list-style-type: none"> <li>1) Provide a contact number of someone responsible for the site on the site signage</li> <li>2) Maintain a complaints register on site to allow public complaints to be recorded. Complaints should be noted and signed off at site meetings</li> <li>3) Hold meetings with EMC at agreed frequencies</li> <li>4) Inform local businesses about the expected influx of construction workers so that they could plan for extra demand; and</li> <li>5) Ensure that the local community communicates their expectations of construction workers' behaviour with the construction sub-contractor, and formalize a written agreement between the community and the sub-contractor.</li> <li>6) Have clear rules and regulations for access to the construction site to control loitering;</li> <li>7) Factual and transparent information should be supplied to the community from the beginning of the project;</li> <li>8) Employment opportunities should also be offered to the local community</li> </ol>	Public are able to communicate effectively with the relevant members of the project team either to obtain information or lodge complaints	Contractor	Contract Document  [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
Site Establishment	Site / corridor establishment ~ Access	Hazards to landowners and public, and security of materials	<p><b>Objective:</b> To secure the Site / Corridor against unauthorised entry and to protect members of the public/ landowners</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Secure Site / Corridor in an appropriate manner</li> <li>2) Where necessary to control access, fence and secure Contractor's camp (if not utilising power station contractor camp)</li> <li>3) <u>The applicant shall ensure that fencing of the railway and the access road is adequate and protection measures are taken to minimise the potential risk of theft.</u></li> <li>4) Provide alternative access/ detours for public/ landowners</li> </ol>	Site / Corridor is secure and there is no unauthorised entry  No members of the public/ landowners injured	Contractor	Contract Document  [Note: costs covered within contract price]	Erection ~ during site establishment  Maintenance ~ for duration of Contract	Site Engineer Environmental Consultant  ESKOM in-house technical & environmental staff
	Site establishment ~	Site infrastructure	<b>Objective:</b> To minimise the environmental consequences associated with the establishment of	Site infrastructure has limited impact	Contractor	Contract	During site establishment	Site Engineer

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	<i>Site structures</i>	that degrades the visual aesthetics of the area, unnecessarily exacerbates environmental consequences of construction and leads to public complaint	the site infrastructure <b>Mechanism:</b> 1) Locate key site infrastructure in environmentally acceptable area and limit its extent 2) Position site infrastructure so as to limit visual intrusion on neighbours or the greater environment 3) Select materials for site infrastructure that limit reflection and blend in with the environment 4) Accommodate temporary services underground and within the same trench where possible	on the visual aesthetics of the area and does not result in unnecessary environmental degradation		Document [Note: costs covered within contract price]	nt	Environmental Consultant ESKOM
	Site establishment ~ <i>Geology and Topography</i>	Site infrastructure that damages or destroys the geology strata and topography of the area, unnecessarily exacerbates environmental consequences of construction	<b>Objective:</b> To minimise the environmental consequences associated with the establishment of the site infrastructure <b>Mechanism:</b> 1) Significant precautionary measures are required to stabilise the cuttings, which may include having to reduce the slope angles and construction of temporary support measures. This must be done in order to minimise instability and soil erosion during construction. 2) Where the underlying geology is of the Dwyka formation precautions must be put in place to prevent the rocks from slaking (mechanically breaking down) upon exposure, and ravelling of exposed cut faces is a geotechnical characteristic of these formations that must be addressed in the design of the cutting. 3) No blasting is undertaken on site without a suitable blast design, compiled in line with relevant SANS codes and approved by an appropriately qualified professional; 4) Limit the cut and fill operations to the preferred alternative alignment servitude; and 5) Ensure that adequate storm water control measures are in place to prevent erosion.	Limit damage to geological strata and topography.  No complaints from public	Contractor	Contract Document [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site establishment ~ <i>Protection of topsoil and</i>	Destruction and loss of topsoil, and sensitive areas/ artefacts	<b>Objective:</b> To retain topsoil for later use in closure and to ensure that disturbance to sensitive areas or artefacts is minimised	Sufficient topsoil for closure available	Contractor	Contract Document [Note: costs	During Construction Phase (from site	Site Engineer Environmental Consultant

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	<i>sensitive areas/ artefacts</i>	(which could include indigenous vegetation, fauna, aquatic ecosystems or heritage resources)	<p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Locate key site infrastructure in environmentally acceptable area and limit its extent</li> <li>2) Remove topsoil approximately 150 mm deep from establishment, working area and stockpile areas, and stockpile for later use</li> <li>3) Protect topsoil stockpiles against erosion and contamination</li> <li>4) Provide containment and settlement facilities for effluents from concrete mixing facilities</li> <li>5) Provide spill containment facilities for hazardous materials like fuel and oil</li> <li>6) Minimise the extent of areas cleared</li> <li>7) Identify sensitive areas or artefacts and demarcate these as no-go areas</li> <li>8) Develop contingency plans to address heritage resource discoveries during construction</li> <li>9) Ensure that all machinery on site is in a good working order;</li> <li>10) Limit all activities to the proposed railway line servitude;</li> <li>11) Ensure that adequate storm water control measures are in place to prevent erosion;</li> <li>12) Avoid placement of ballast on the clay soils;</li> <li>13) Spread absorbent sand on areas where oil spills are likely to occur, such as the refuelling area in the hard park;</li> <li>14) If soils are excavated for the cut operations, ensure that the soil is utilised elsewhere for rehabilitation/road building/fill purposes; and</li> <li>15) Ensure that soil is stockpiled in such a way as to prevent erosion from storm water.</li> <li>16) Graveyards can be demarcated with brick walls or with fences when they are retained in-situ within 30m from the railway line or associated infrastructure.</li> <li>17) <u>Should any artefacts be exposed during excavations, construction must cease upon the discovery of such findings. Under no circumstances artefacts be destroyed or removed from sites unless approved by the SAHRA</u></li> </ol>	<p>No topsoil contaminated with cement materials, fuel, oil or other undesirable compounds</p> <p>No sensitive sites or artefacts damaged or destroyed</p>		covered within contract price]	establishment to Contract Completion)	ESKOM
	Site	Destruction of	<b>Objective:</b> To retain ecological integrity and	Limited extent of	Contractor	Contract	During	Site Engineer

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	establishment ~ <i>Terrestrial Ecology</i>	terrestrial fauna and flora and sensitive areas/ artefacts (which could include indigenous vegetation, fauna, aquatic ecosystems or heritage resources)	<p>minimise disturbance to sensitive areas</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) All construction areas should be demarcated prior to construction to ensure that the footprint of the impacts are limited (including areas where vehicles may traverse);</li> <li>2) The sensitive vegetation should be avoided and construction limited to 50 m from the edge of the wetlands and streams;</li> <li>3) All alien invasive species on site should be removed and follow up monitoring and removal programmes should be initiated once construction is complete;</li> <li>4) <u>All alien invasive plants occurring on site must be addressed in accordance with the Conservation of Agricultural Resources Act No. 43 of 1983. Hunting, trapping, poisoning, snaring of animals or cutting / collection of firewood is strictly prohibited;</u></li> <li>5) Adhere to the Eskom vegetation management guideline;</li> <li>6) Investigate the option of establishing a nature area on Eskom property to act as an impact offset. The area to the north of Kusile power station has been purchased by Eskom and will provide the ideal area for such an offset area;</li> <li>7) Remove sensitive plants by means of the Search-and-Rescue exercise as undertaken for the Kusile power station;</li> <li>8) Place rescued plants in the Kusile nursery prior to re-establishment in a natural area, preferably in the off-set area;; and</li> <li>9) Install power lines according to the Eskom bird collision prevention guideline.</li> <li>10) <u>Install bird diverters on the earth wire between towers where lines are in close proximity to water bodies.</u></li> </ol>	vegetation destroyed during construction activities		Document  [Note: costs covered within contract price]	Construction Phase (from site establishment to Contract Completion)	Environmental Consultant  ESKOM
	Site establishment ~ <i>Aquatic Ecology</i>	Destruction of aquatic ecology and sensitive areas	<p><b>Objective:</b> To retain aquatic ecological integrity and minimise disturbance to sensitive areas</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Avoid any spillage or pollution entering the system during construction phase.</li> </ol>	Limited damage to sensitive aquatic ecosystems identified on the site	Contractor	Contract Document  [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract	Site Engineer  Environmental Consultant  ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
			2) Maintain surveillance of construction activities; 3) Limit speed and traffic on dirt roads adjacent to sites; 4) Construction should take place at the right time of the year to reduce runoff into streams; and 5) Sediment traps should be put into place and should be maintained. 6) Infrastructure and design should take into account the natural flow of the current system and base flow; and 7) Access roads and construction should where possible avoid the streams and adjacent riparian zones and take into consideration base flow (i.e. compaction and diversion).				Completion)	

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site establishment ~ <i>Surface, wetlands and groundwater</i>	Pollution of water resources by effluents	<p><b>Objective:</b> To avoid pollution of water resources</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Establish contaminated water management system</li> <li>2) Provide suitable and sufficient ablution facilities that are serviced regularly</li> <li>3) Provide containment and settlement facilities for effluents from concrete mixing facilities</li> <li>4) Provide spill containment facilities for hazardous materials like fuel and oil</li> <li>5) Demarcated areas where waste can be safely contained and stored on a temporary basis during the construction phase should be provided at the hard park;</li> <li>6) When adequate volumes (not more than 1 month) have accumulated all waste is to be removed from site and disposed of at a licensed facility;</li> <li>7) Waste is not to be buried on site;</li> <li>8) Hydro-carbons should be stored in a bunded storage area;</li> <li>9) All hazardous materials <i>inter alia</i> paints, turpentine and thinners must be stored appropriately to prevent these contaminants from entering the environment;</li> <li>10) Spill-sorb or similar type product must be used to absorb hydrocarbon spills in the event that such spills should occur;</li> <li>11) Care must be taken to ensure that in removing vegetation adequate erosion control measures are implemented;</li> <li>12) No construction vehicles or activities will be allowed to work within 50 m of any of the streams or wetlands on site, unless this cannot be avoided, then it should only occur under supervision of the ECO;</li> <li>13) Demarcate the no-go areas with tape and ensure that the demarcation remains in place for the duration of the construction works; and</li> <li>14) Use existing river crossings where possible.</li> <li>15) If generators are used they should be placed in a bunded area to capture all potential spillages;</li> <li>16) No pit latrines should be allowed;</li> <li>17) Rail wagons should be covered to prevent any</li> </ol>	<p>Effluents managed effectively</p> <p>No pollution of water resources</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	During site establishment	<p>Site Engineer</p> <p>Environmental Consultant</p> <p>ESKOM</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
			spillages of lime during operations 18) Groundwater monitoring in the railway study area should be included in the existing monitoring protocol for the construction of the Kusile power station 19) Install necessary drainage works and anti-erosion measures. Appropriate measures must be taken to maintain these drainage channels. It is Eskom's responsibility to ensure that maintenance is undertaken at regular intervals or on a when necessary basis;					
	Site establishment ~ <i>Solid waste</i>	Pollution of environment with solid waste materials	<b>Objective:</b> To avoid pollution of environment with solid waste materials <b>Mechanism:</b> 1) Demarcate, and enforce use of, a designated eating area 2) Provide adequate waste bins 3) Set up system for regular waste removal to approved facility 4) Minimise waste by sorting wastes into recyclable and non recyclable wastes 5) Prohibit burying or burning of waste on Site 6) <u>Ensure measures for management and minimisation of waste and disposal of all waste at appropriate waste disposal facilities including waste at the construction camp. Under no circumstances shall any waste be disposed in water bodies, all waste shall be appropriately handled and disposed of at the relevant disposal facility.</u>	Appropriate management of solid wastes  No complaints from public	Contractor	Contract Document  [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site establishment ~ <i>Fire</i>	Increased fire risk to surrounding areas	<b>Objective:</b> To decrease fire risk <b>Mechanism:</b> 1) Provide adequate cooking and heating facilities for staff 2) Prohibit open fires 3) Develop emergency protocols for dealing with fires 4) Ensure adequate fire-fighting equipment is available on site, particularly near "hot" works	No occurrence of fires on site or on surrounding areas	Contractor	Contract Document  [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ <i>Materials</i>	Risk of environmental contamination or safety hazard to public/ site staff resulting from inappropriate treatment of materials	<p><b>Objective:</b> To ensure that materials are handled, used and stored in a manner that limits the risk of environmental contamination or a safety hazard</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Inform delivery drivers re requirements of the specifications (Appendix D)</li> <li>2) Secure materials during transport</li> <li>3) Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose</li> <li>4) Dispose of hazardous substances in terms of the relevant legal requirements</li> <li>5) Limit spillage of hazardous substances or substances with the potential to cause contamination of the environment</li> <li>6) Develop emergency protocols for dealing with spillages particularly where these pose a pollution risk or involve hazardous substances</li> <li>7) Compile and implement the necessary Method Statements</li> <li>8) Undertake environmental awareness training of all site staff</li> </ol>	<p>Correct handling, use and storage of materials, including hazardous materials</p> <p>No incidents of environmental contamination</p> <p>No accidents or incidents related to the handling of materials</p> <p>No public complaints</p>	Contractor	Contract Document  [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM
	Site management ~ <i>Equipment maintenance and storage</i>	Presence of plant on site which exacerbates environmental impact including pollution and nuisance	<p><b>Objective:</b> Ensure that all plants on site are well maintained and serviced in the appropriate manner</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Ensure that all plants or equipment are in good working order</li> <li>2) Undertake maintenance within specified area (workshop)</li> <li>3) Use drip trays for all stationary or parked plant and when servicing equipment away from designated areas</li> </ol>	<p>All plants in good working order</p> <p>Maintenance of plants do not result in environmental degradation</p> <p>No public complaints</p>	Contractor	Contract Document  [Note: costs covered within contract price]	During Construction Phase (from site establishment to Contract Completion)	Site Engineer Environmental Consultant ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ <i>Surface water and/or existing stormwater systems</i>	Contamination of stormwater runoff with suspended solids	<p><b>Objective:</b> Contain soils and materials within defined areas and prevent contamination of stormwater runoff</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Identify predetermined stockpile areas for topsoil, construction materials and excavated material</li> <li>2) Dispose of waste excavated material at appropriate waste disposal sites</li> <li>3) Rehabilitate site to prevent soil erosion, including temporary revegetation of areas that will remain exposed for extended periods</li> <li>4) Undertake concrete mixing away from sensitive areas and on impermeable surfaces</li> <li>5) Store fuels in storage area that is appropriately bunded and drains to a sump</li> <li>6) Ensure that substances that pose a risk of water contamination are appropriately stored and disposed of</li> <li>7) Develop and implement water monitoring programme where work abuts aquatic systems</li> </ol>	<p>Correct stockpiling of excavated material on site</p> <p>No waste material left on site</p> <p>No erosion on site</p> <p>No pollution of water resources</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	During Construction Phase (from site establishment to Contract Completion)	<p>Site Engineer</p> <p>Environmental Consultant</p> <p>ESKOM</p>
	Site management ~ <i>Dust</i>	Dust nuisance from the excavated and stockpiled materials	<p><b>Objective:</b> To avoid dust nuisance from excavated materials or construction materials</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Implement dust suppression measures e.g. regular watering</li> <li>2) Undertake concrete mixing away from sensitive areas</li> <li>3) Develop and implement dust monitoring programme</li> </ol>	<p>Appropriate management of dust</p> <p>No complaints from public</p> <p>No complaints from site staff</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	During Construction Phase (from site establishment to Contract Completion)	<p>Site Engineer</p> <p>Environmental Consultant</p> <p>ESKOM</p>
	Site management ~ <i>Noise</i>	Noise nuisance from construction equipment	<p><b>Objective:</b> To avoid noise nuisance from construction equipment</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Limit working hours for noisy equipment to daylight hours</li> <li>2) Fit silencers appropriate to equipment</li> <li>3) Develop and implement noise monitoring programme</li> </ol>	<p>Appropriate management of noisy activities</p> <p>No complaints from public</p> <p>No complaints from site staff</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	During Construction Phase (from site establishment to Contract Completion)	<p>Site Engineer</p> <p>Environmental Consultant</p> <p>ESKOM</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ <i>Traffic</i>	Traffic nuisance from construction vehicles	<p><b>Objective:</b> To avoid traffic nuisance from construction vehicles</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) All trips for delivery of materials should utilise the N4. These trips to and from the N4 should use the R545 to the Kusile Power Station construction site;</li> <li>2) The shoulder sight distance along the R104 where the rail crossing will be located is adequate for this class of road and will not be an issue even if construction traffic gains access to and from the site at this point. Therefore it is recommended that this road be used to access the site;</li> <li>3) W107 and W108 intersection warning signs with IN 11.569 supplementary warning plates must be erected on the R104 approaching the existing intersection with the D2236, and at the potential point of access to the site, indicating the presence of heavy vehicles at the intersections.</li> <li>4) The R104 between Bronkhorstspruit and Balmoral is tarred road and in good condition. However with heavy construction traffic over a period of two years, if this road pavement is not monitored, surface distress and edge deterioration could develop and accelerate and potentially become road safety hazards. This road should be resurfaced back to its original condition once construction is completed;</li> <li>5) A detailed construction-related traffic management plan must be developed prior to the commencement of any construction work both in terms of road safety and road pavement maintenance.</li> <li>6) Construction traffic should not in normal circumstances be permitted to use any portion of the existing gravel access roads, the proposed service road within the future rail reserve would be more appropriate as a site access road.</li> <li>7) All road design work must be carried out by suitably qualified personnel, compliant with relevant standards and be approved by the appropriate road authority.</li> <li>8) All other construction vehicles, e.g. tippers, dump trucks, compactors, water bowsers, etc. will as far as possible be confined to site and will not travel on public roads.</li> </ol>	<p>Appropriate management of traffic activities</p> <p>No complaints from public</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	During Construction Phase (from site establishment to Contract Completion)	<p>Site Engineer</p> <p>Environmental Consultant</p> <p>ESKOM</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Site management ~ <i>Public health and safety</i>	Hazardous conditions to landowners and members of the public	<p><b>Objective:</b> Provide adequate warning to landowners/ public regarding potential hazards and ensure safe access where required</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Ensure adequate signage for landowners/ public about the work, particularly where work abuts major public thoroughfares or use areas</li> <li>2) Erect and maintain fencing and gated access to restricted areas</li> <li>3) Implement requisite traffic safety measures at abutting roads</li> <li>4) Implement requisite safety measures where there are abutting public use areas</li> <li>5) Ensure adequate accessibility to landowners/ public where required for safe access</li> </ol>	<p>Safe conditions for public</p> <p>No members of the public/ landowners injured</p> <p>Signboards put up before construction commences</p> <p>Provision of safe access routes for landowners/ public, which are clearly demarcated and visible</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	During Construction Phase (from site establishment to Contract Completion)	<p>Site Engineer</p> <p>Environmental Consultant</p> <p>ESKOM</p>
	Closure ~ <i>Environmental integrity</i>	Environmental integrity of site undermined resulting in reduced visual aesthetics, erosion, compromised land capability and the requirement for on-going management intervention	<p><b>Objective:</b> To ensure that the site is appropriately rehabilitated following the execution of the works, such that residual environmental impacts are remediated or curtailed</p> <p><b>Mechanism:</b></p> <ol style="list-style-type: none"> <li>1) Remove all temporary facilities and waste materials</li> <li>2) Replace stockpiled topsoil</li> <li>3) Install necessary drainage works and anti-erosion measures</li> <li>4) Landscape and revegetate disturbed areas with appropriate vegetation</li> <li>5) Ensure that the Contractor is required to maintain revegetated areas until an acceptable cover has been achieved</li> </ol>	<p>All portions of site, including construction camp and working areas, cleared of equipment and temporary facilities</p> <p>Topsoil replaced on all areas, and stabilised</p> <p>Disturbed areas rehabilitated</p> <p>Acceptable cover achieved on closed site</p> <p>Closed site free of erosion and alien invasive plants</p>	Contractor	<p>Contract Document</p> <p>[Note: costs covered within contract price]</p>	Following execution of the works	<p>Site Engineer</p> <p>Environmental consultant</p> <p>ESKOM</p> <p>DEA/ MDALA/ GDARD</p>

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
<b>5. ENVIRONMENTAL MANAGEMENT OF THE OPERATIONAL AND DECOMMISSIONING<sup>xii</sup> PHASES</b>								
All Activities (railway and all associated structures and infrastructure, including the 88kV power lines, substations and access roads)	Environmental management documentation and procedures	No framework within which to locate the management of the operational and decom. phases  No procedures against which to assess environmental performance during the operational and decom. phases and thus no measure of compliance	<b>Objective:</b> To develop environmental management documentation and procedures which are consistent with the existing Environmental Management Procedures and will ensure the effective and proactive management of the operational and decom. phases  <b>Mechanism:</b>  1) Use the existing Generation Business Unit Environmental Management Procedure as the basis to develop site specific environmental documentation and procedures for the railway, including its associated structures and infrastructure  2) Ensure that Environmental Management Procedures provide site specific environmental policies and management plans that comply with ESKOM's EMS  3) Ensure that the procedures are practical and implementable on the site	Environmental Management Procedure for the railway and associated infrastructure which is consistent with the Business Unit's existing documents, complies with ESKOM's EMS requirements and will ensure effective management of the operational and decommissioning phases	Environmental Consultant  ESKOM	EIA documentation  Specialist studies  Framework EMP  In-house procedures (were relevant and available)  ESKOM EMS	Prior to the onset of operation	ESKOM
	Environmental management of the operational phase	Negative impacts on environment during operation	<b>Objective:</b> To ensure that the operation of the railway line and associated structures/ infrastructure does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed  <b>Mechanism:</b>  1) Implement the operational phase management procedures outlined in the Environmental Management Procedure  2) Comply with all requirements of all permits, authorisations and/ or licenses received	Environmental impacts effectively monitored and managed during the operational phase with no residual impacts on the environment  Comprehensive record of compliance and remedial actions available to ESKOM and the authorities	ESKOM (in-house environmental staff)	Environmental Management Procedure  ESKOM EMS	During operation	ESKOM

ACTIVITY	ASPECT	IMPACT	MITIGATION MEASURE: (objective and mechanism)	PERFORMANCE INDICATOR	RESPONSIBILITY	RESOURCES	SCHEDULE	VERIFICATION
	Environmental management of the decom.	Negative impacts on environment during decom.	<p><b>Objective:</b> To ensure that the decom. of the railway line and associated structures/ infrastructure does not result in avoidable impacts on the environment, and that any impacts that do occur are anticipated and managed</p> <p><b>Mechanism:</b></p> <p>1) Implement the decom. phase management procedures outlined in the Environmental Management Procedure</p>	<p>Environmental impacts effectively monitored and managed during the decom. phase with no residual impacts on the environment</p> <p>Comprehensive record of compliance and remedial actions available to ESKOM and the authorities</p>	ESKOM	<p>Environmental Management Procedure</p> <p>ESKOM EMS</p>	During decom.	ESKOM

- Undertake environmental awareness training of all site staff during the commencement of each Contract, with regular refreshers for the duration of the Contract;
  - Raise awareness amongst construction workers about local traditions and practices;
  - Ensure that employment procedures / policy is communicated to local stakeholders, especially local fire control committee / initiative, local farmers / land owners as well as the ward 32 local councillor;
  - Consult with local South African Police Services (SAPS) to establish standard operating procedures for the control and removal of loiterers at the construction site;
  - Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers must also be provided with identification tags;
  - Launch aggressive culturally appropriate STI and HIV/AIDS awareness campaigns;
  - Distribute condoms by placing them at centrally located points;
  - Control access to the construction site to prevent sex workers; and
- Communication with public:
    - Provide a contact number of someone responsible for the site on the site signage;
    - Maintain a complaints register on site to allow public complaints to be recorded. Complaints should be noted and signed off at site meetings;
    - Hold meetings with EMC at agreed frequencies;
    - Inform local businesses about the expected influx of construction workers so that they could plan for extra demand;
    - Ensure that the local community communicates their expectations of construction workers' behaviour with the construction sub-contractor, and formalize a written agreement between the community and the sub-contractor through the EMC and other structures;
    - Have clear rules and regulations for access to the construction site to control loitering;
    - Factual and transparent information should be supplied to the community from the beginning of the project; and
    - Employment opportunities should also be offered to the local community.
  - Site establishment ~ *Access*:
    - Secure Site / Corridor in an appropriate manner;
    - Where necessary to control access, fence and secure Contractor's camp (if not utilising power station contractor camp); and
    - Provide alternative access/ detours for public/ landowners.
  - Site establishment ~ *Site structures*:

- Locate key site infrastructure in environmentally acceptable area and limit its extent;
  - Position site infrastructure so as to limit visual intrusion on neighbours or the greater environment;
  - Select materials for site infrastructure that limit reflection and blend in as much as possible with the environment; and
- Site establishment ~ *Geology and Topography*:
    - Significant precautionary measures are required to stabilise the cuttings, which may include having to reduce the slope angles and construction of temporary support measures. This must be done in order to minimise instability and soil erosion during construction;
    - Where the underlying geology is of the Dwyka formation precautions must be put in place to prevent the rocks from slaking (mechanically breaking down) upon exposure, and ravelling of exposed cut faces is a geotechnical characteristic of these formations that must be addressed in the design of the cutting;
    - No blasting is to be undertaken on site without a suitable blast design, compiled in line with relevant SANS codes and approved by an appropriately qualified professional;
    - Should chemical breakdown as opposed to physical blasting be undertaken the chemicals to be utilised will be restricted to 95% crushed burnt lime and 5% additives to control the process. By doing so chemical cracking or breaking down of rock will prevent seepage of chemicals into the groundwater;
    - Limit the cut and fill operations to the preferred alternative alignment servitude; and
    - Ensure that adequate storm water control measures are in place to prevent erosion.
  - Site establishment ~ *Protection of topsoil and sensitive areas/ artefacts*:
    - Locate key site infrastructure in environmentally acceptable area and limit its extent;
    - Remove topsoil approximately 150 mm deep from establishment, working area and stockpile areas, and stockpile for later use;
    - Protect topsoil stockpiles against erosion and contamination;
    - Provide containment and settlement facilities for effluents from concrete mixing facilities;
    - Provide spill containment facilities for hazardous materials like fuel and oil;
    - Minimise the extent of areas cleared;
    - Identify sensitive areas or artefacts and demarcate these as no-go areas;
    - Develop contingency plans to address heritage resource discoveries during construction;
    - Ensure that all machinery on site is in a good working order;
    - Limit all activities to the proposed railway line servitude;

- Ensure that adequate storm water control measures are in place to prevent erosion;
  - Spread absorbent sand on areas where oil spills are likely to occur, such as the refuelling area in the hard park;
  - If soils are excavated for the cut operations, ensure that the soil is utilised elsewhere for rehabilitation/road building/fill purposes;
  - Ensure that soil is stockpiled in such a way as to prevent erosion from storm water; and
  - Graveyards can be demarcated with brick walls or with fences when they are retained in-situ within 30m from the railway line or associated infrastructure.
- Site establishment ~ *Terrestrial Ecology*:
    - All construction areas should be demarcated prior to construction to ensure that the footprint of the impacts are limited (including areas where vehicles may traverse);
    - The sensitive vegetation should be avoided and construction limited to 50 m from the edge of the wetlands and streams where possible;
    - All alien invasive species on site should be removed and follow up monitoring and removal programmes should be initiated once construction is complete;
    - Adhere to the Eskom vegetation management guideline (TGL 41-334);
    - Remove sensitive plants by means of the Search-and-Rescue exercise as undertaken for the Kusile Power Station;
    - Place rescued plants in the Kusile nursery prior to re-establishment in a natural area, preferably in the off-set area; and
    - Install power lines according to the Eskom bird collision prevention guideline (TGL 41-335).
  - Site establishment ~ *Aquatic Ecology*:
    - Avoid any spillage or pollution entering the system during construction phase;
    - Maintain surveillance of construction activities;
    - Limit speed and traffic on dirt roads adjacent to sites;
    - Construction should take place in the winter season to reduce runoff into streams;
    - Sediment traps should be put into place and should be maintained;
    - Infrastructure and design should take into account the natural flow of the current system and base flow; and
    - Access roads and construction should where possible avoid the streams and adjacent riparian zones and take into consideration base flow (i.e. compaction and diversion).
  - Site establishment ~ *Surface and groundwater*:
    - Establish contaminated water management system;
    - Provide suitable and sufficient ablution facilities that are serviced regularly;

- Provide containment and settlement facilities for effluents from concrete mixing facilities;
- Provide spill containment facilities for hazardous materials like fuel and oil;
- Demarcated areas where waste can be safely contained and stored on a temporary basis during the construction phase should be provided at the hard park;
- When adequate volumes (not more than 1 month) have accumulated all waste is to be removed from site and disposed of at a licensed facility;
- Waste is not to be buried on site;
- Hydro-carbons should be stored in a bunded storage area;
- All hazardous materials *inter alia* paints, turpentine and thinners must be stored appropriately to prevent these contaminants from entering the environment;
- Spill-sorb or similar type product must be used to absorb hydrocarbon spills in the event that such spills should occur;
- Care must be taken to ensure that in removing vegetation adequate erosion control measures are implemented;
- No construction vehicles or activities will be allowed to work within 50 m of any of the streams or wetlands on site, unless this cannot be avoided, then it should only occur under supervision of the ECO;
- Demarcate the no-go areas with tape and ensure that the demarcation remains in place for the duration of the construction works;
- Use existing river crossings where possible;
- If generators are used they should be placed in a bunded area to capture all potential spillages;
- No pit latrines should be allowed;
- Rail wagons should be covered to prevent any spillages of lime during operations; and
- Groundwater monitoring in the railway study area should be included in the existing monitoring protocol for the construction of the Kusile Power Station and should include for monitoring of Nitrates in response to blasting activities.
- Drilling logs shall be maintained by the driller and communicated directly to the blaster. The logs shall indicate depths and lengths of voids, cavities, and fault zones or other weak zones encountered as well as groundwater conditions.
- Explosive products shall be managed on site so that they are either used in the borehole, returned to the delivery vehicle, or placed in secure containers for offsite disposal.
- Spillage of hydrocarbons / chemicals around the borehole shall be avoided, but where it occurs either be placed in the borehole or cleaned up and returned to an appropriate vehicle for handling or placement in secured containers for offsite disposal.

- Loaded explosives shall be detonated as soon as possible and shall not be left in the blastholes overnight, unless weather or other safety concerns reasonably dictate that detonation should be postponed.
  - Loading equipment shall be cleaned in an area where wastewater can be properly contained and handled in a manner that prevents release of contaminants to the environment.
  - Explosives shall be loaded to maintain good continuity in the column load to promote complete detonation. Industry accepted loading practices for priming, stemming, decking and column rise need to be attended to.
  - Explosive products shall be selected that are appropriate for site conditions and safe blast execution.
  - Explosive products shall be selected that have the appropriate water resistance for the site conditions present to minimize the potential for hazardous effect of the product upon groundwater.
  - Remove the muck pile from the blast area as soon as reasonably possible.
  - Manage the interaction of blasted rock piles and storm water to prevent contamination of water supply wells or surface water.
  - Wherever possible, keep regulated containers that are stored outside more than 15 metres from surface water and storm drains, 25 metres from private boreholes, and 120 metres from public boreholes.
- Site establishment ~ *Solid waste*:
    - Demarcate, and enforce use of, a designated eating area;
    - Provide adequate waste bins;
    - Set up system for regular waste removal to approved facility;
    - Minimise waste by sorting wastes into recyclable and non recyclable wastes; and
    - Prohibit burying or burning of waste on Site.
  - Site establishment ~ *Fire*:
    - Provide adequate cooking and heating facilities for staff;
    - Prohibit open fires;
    - Develop emergency protocols for dealing with fires; and
    - Ensure adequate fire-fighting equipment is available on site, particularly near “hot” works.
  - Site management ~ *Materials*:
    - Inform delivery drivers re requirements of the specifications (**Appendix D**);
    - Secure materials during transport;

- Identify appropriate storage areas for stockpiling of materials, storage of hydrocarbons and storage of hazardous substances and ensure that these areas are appropriately prepared for their purpose;
  - Dispose of hazardous substances in terms of the relevant legal requirements;
  - Limit spillage of hazardous substances or substances with the potential to cause contamination of the environment;
  - Develop emergency protocols for dealing with spillages particularly where these pose a pollution risk or involve hazardous substances;
  - Compile and implement the necessary Method Statements; and
  - Undertake environmental awareness training of all site staff.
- Site management ~ *Equipment maintenance and storage*:
    - Ensure that all plants or equipment are in good working order;
    - Undertake maintenance within specified area (workshop); and
    - Use drip trays for all stationary or parked plant and when servicing equipment away from designated areas.
- Site management ~ *Surface water and/or existing stormwater systems*:
    - Identify predetermined stockpile areas for topsoil, construction materials and excavated material;
    - Dispose of waste excavated material at appropriate waste disposal sites;
    - Rehabilitate site to prevent soil erosion, including temporary re-vegetation of areas that will remain exposed for extended periods;
    - Undertake concrete mixing away from sensitive areas and on impermeable surfaces;
    - Store fuels in storage area that is appropriately bunded and drains to a sump;
    - Ensure that substances that pose a risk of water contamination are appropriately stored and disposed of; and
    - Develop and implement water monitoring programme where work abuts aquatic systems.
- Site management ~ *Dust*:
    - Implement dust suppression measures e.g. regular watering;
    - Undertake concrete mixing away from sensitive areas, and in paved areas (impermeable surfaces); and
    - Develop and implement dust monitoring programme.
- Site management ~ *Noise*:
    - Limit working hours for noisy equipment to daylight hours;

- All Occupational Safety and Health Administration (OSHA) requirements will be followed;
  - If necessary, especially in areas where blasting is planned in proximity to buildings, blasting mats or soil overburdens will be used to reduce the amount of noise generated near the structures.
  - Good public relations in the surrounding areas near the planned blasting sites will be conducted throughout the project.
  - All activities related to blasting shall follow Best Management Practices (BMPs) to prevent contamination of groundwater including preparing, reviewing and following an approved blasting plan; proper drilling, explosive handing and loading procedures; observing the entire blasting procedures; evaluating blasting performance and handling and storage of blasted rock.
  - Fit silencers appropriate to equipment; and
  - Develop and implement noise monitoring programme.
- Site management ~ *Traffic*:
- All trips for delivery of materials should utilise the N4. These trips to and from the N4 should use the R545 to the Kusile Power Station construction site;
  - The shoulder sight distance along the R104 where the rail crossing will be located is adequate for this class of road and will not be an issue even if construction traffic gains access to and from the site at this point. Therefore it is recommended that this road be used to access the site;
  - W107 and W108 intersection warning signs with IN 11.569 supplementary warning plates must be erected on the R104 approaching the existing intersection with the D2236, and at the potential point of access to the site, indicating the presence of heavy vehicles at the intersections;
  - The R104 between Bronkhorstspuit and Balmoral is tarred road and in good condition. However with heavy construction traffic over a period of two years, if this road pavement is not monitored, surface distress and edge deterioration could develop and accelerate and potentially become road safety hazards. This road should be resurfaced back to its original condition once construction is completed;
  - A detailed construction-related traffic management plan must be developed prior to the commencement of any construction work both in terms of road safety and road pavement maintenance;
  - Construction traffic should not in normal circumstances be permitted to use any portion of the existing gravel access roads, the proposed service road within the future rail reserve would be more appropriate as a site access road;
  - All road design work must be carried out by suitably qualified personnel, compliant with relevant standards and be approved by the appropriate road authority; and
  - All other construction vehicles, e.g. tippers, dump trucks, compactors, water bowsers, etc. will as far as possible be confined to site and will not travel on public roads.

- Site management ~ *Public health and safety*:
  - Ensure adequate signage for landowners/ public about the work, particularly where work abuts major public thoroughfares or use areas;
  - Erect and maintain fencing and gated access to restricted areas during construction and operation;
  - Implement requisite traffic safety measures at abutting roads;
  - Implement requisite safety measures where there are abutting public use areas; and
  - Ensure adequate accessibility to landowners/ public where required for safe access.
- Closure ~ *Environmental integrity*:
  - Remove all temporary facilities and waste materials;
  - Replace stockpiled topsoil;
  - Install necessary drainage works and anti-erosion measures. Appropriate measures must be taken to maintain these drainage channels. It is Eskom's responsibility to ensure that maintenance is undertaken at regular intervals or on a when necessary basis;
  - Landscape and re-vegetate disturbed areas with appropriate vegetation; and
  - Ensure that the Contractor is required to maintain re-vegetated areas until an acceptable cover has been achieved.

***Environmental management of the operational phase:***

- Environmental management documentation and procedures:
  - Develop site specific environmental documentation and procedures for the railway, including its associated structures and infrastructure;
  - Ensure that Environmental Management Procedures provide site specific environmental policies and management plans that comply with ESKOM's EMS; and
  - Ensure that the procedures are practical and implementable on the site.
- Environmental management of the operational phase:
  - Implement the operational phase management procedures outlined in the Environmental Management Procedure;
  - Ensure that the properties of the Limestone are low in silica as far as possible as this could result in lung disease; and
  - Comply with all requirements of all permits, authorisations and/ or licenses received.

***Environmental management of the decommissioning phase:***

- Environmental management of the decommissioning phase.
  - Develop an EMP for the decommissioning of the railway line and associated infrastructure.

- Implement the decommissioning phase management procedures outlined in the Environmental Management Procedure.

### **Monitoring during construction**

The existing Kusile Power Station monitoring programme shall be amended to include the following for the new infrastructure:

- Surface and Groundwater monitoring:
  - Frequency: Monthly;
  - Duration: Throughout the construction phase;
  - Parameters: As per the existing surface and groundwater monitoring program as well as Nitrates.
  - Extent: Additional surface and groundwater monitoring points must be identified by a surface and groundwater specialist to ensure a holistic sampling network.
- Aquatic Monitoring:
  - Frequency: Quarterly;
  - Duration: Throughout the construction phase;
  - Parameters: As per existing aquatic monitoring programme;
  - Extent: At all water body crossings, to be confirmed by aquatic specialist.
- Dust Monitoring:
  - Frequency: Monthly;
  - Duration: Throughout the construction phase;
  - Parameters: As per existing air quality (dust) monitoring programme;
  - Extent: To be determined by air quality specialist.
- Noise Monitoring:
  - A noise monitoring programme must be compiled by a noise specialist.

### **6.3 Environmental Authorisation**

Additional requirements / conditions as per the Environmental Authorisation are provided below:

#### **Planning Phase:**

The Applicant must submit the following to the DEA prior to construction:

- Criteria for construction camp and material storage site selection and measures for management of sites and related activities such as ablution and housing facilities, waste and water management at such areas;
- Measures for protection/avoidance of heritage resources identified on site. Should any artefacts be exposed during excavations, construction must cease upon the discovery of such findings. Under no circumstances shall artefacts be destroyed or removed from sites unless approved by the South African Heritage Resources Agency;
- Measures for management and minimisation of waste and disposal of all waste at an appropriate waste disposal facility including waste at the construction camp. Under no circumstances shall any waste be disposed in water bodies, all waste shall be appropriately handled and disposed of at the relevant disposal facility;
- Measure for management of noise during the implementation and operational phases to ensure that noise standards are met;
- Measures to ensure protection of wetlands including buffer zones, measures for construction of bridges over water crossings and measures to avoid impacts on the good quality groundwater on site;
- Measures for the management of traffic during construction at the N4, R101, D2236 and accommodation plan for the existing gravel roads to ensure safety of road users at all times;
- Measures for removal of sensitive vegetation / protection of no-go areas;
- Measures for the control of erosion where areas are cleared for access and construction;
- Adequate storm water management measures;
- Where applicable, the Applicant must ensure that appropriate and suitable technologies, which are environmentally friendly, are implemented in the design of all activities authorised;
- Measures to ensure containment and rehabilitation of all hazardous material spill.

### **Construction Phase:**

The following must be undertaken during the construction phase:

- Installation of bird diverters on the earth wire between towers where lines are in close proximity to water bodies (condition 1.9);
- All construction activities including vehicle movements, construction camps, maintenance activities and access roads must be undertaken within the approved 500 metre corridor of the approved rout alternative 3. Therefore the boundaries must be clearly indicated to the contractors (condition 1.11);

- All alien invasive plants occurring on site must be addressed in accordance with the Conservation of Agricultural Resources Act No. 43 of 1983. Hunting, trapping, poisoning, snaring of animals or cutting / collection of firewood is strictly prohibited (condition 1.12);
- No water use activities as per the National Water Act No. 36 of 1998 shall be undertaken unless approved by the Department of Water Affairs (condition 1.13);
- The Applicant shall ensure that fencing of the railway and the access road is adequate and protection measures are taken to minimise the potential risk of theft (condition 1.15).

### **Monitoring:**

- Emergency incidents must be addressed and reported in accordance with Section 28 and 30 of the NEMA (No. 106 of 1998) as amended (condition 1.17);
- The existing Environmental Monitoring Committee (EMC) for the Kusile Power Station Project must include this project in complying with condition 3.2.11 of the EA issued for the Kusile Power Station on 5 June 2007 (condition 1.18);
- The Applicant must appoint an independent suitably qualified Environmental Control Officer (ECO) for the construction phase of the development who will have the responsibility to ensure that the mitigation / rehabilitation measures and recommendations referred to in the EA are implemented and to ensure compliance with the provision of this EMP;
  - The ECO will be appointed before commencement of any land clearing or construction activities (condition 1.19.1);
  - The ECO shall keep record of all activities on site, problems identified, transgressions noted and a task schedule of tasks undertaken by the ECO (condition 1.19.2);
  - The ECO shall submit an environmental audit report on a quarterly basis, in writing, to the Director of Environmental Impact Evaluation Directorate of the DEA (condition 1.19.3);
  - The ECO shall remain employed until all rehabilitation measures, as required for implementation due to construction damage is completed and the site is ready for operation (condition 1.19.4);
  - Records relating to monitoring and auditing must be kept on site and made available for inspection to any relevant and competent authority in respect of the DEA (condition 1.19.5).

### **Recording and reporting to the DEA:**

- Records relating to monitoring must be kept on site and made available for inspection to any relevant and competent authority in respect to this development (condition 1.20);
- The DEA reserves the right to monitor and audit the Development through its life cycle to ensure that it complies with the conditions of the EA (condition 1.21);
- All compliance and monitoring correspondences must be forwarded for attention of the Director: Compliance Monitoring Directorate within the DEA (condition 1.22).

### **Commencement of the activity**

- The authorised activity(ies) shall not commence within thirty (30) days of the date of signature of the authorisation (condition 1.23);
- Should the Applicant be notified by the Minister of a suspension of the authorisation pending appeal procedures, the Applicant shall not commence with the activity (ies) unless authorised by the Minister in writing (condition 1.24).

### **Notification to authorities**

- Fourteen (14) days written notice must be given to the DEA that the activity will commence. Commencement for the purposes of this condition includes site preparation. The notice must include a date on which it is anticipated that the activity will commence (condition 1.25).

### **Operation of the activity**

- Fourteen (14) days written notice must be given to the DEA that the activity operational phase will commence (condition 1.26).

### **Site closure and Decommissioning**

- Should the activity ever cease or become redundant, the Applicant shall undertake the required actions as prescribed by legislation at the time and comply with all relevant legal requirements administered by any relevant and competent authority at that time (condition 1.27);
- No exotic plant species shall be used for rehabilitation purposed except for indigenous plants (condition 1.28).

### **General**

- A copy of the EA must be kept at the property where the activity (ies) will be undertaken. The authorisation must be produced to any authorised official of the DEA who requests to see it and must be made available for inspection by any employee or agent of the holder of the authorisation who works or undertakes work at the property (condition 1.29);
- Where any of the applicant's contact details change, including the name of the responsible person, the physical or postal address and / or telephonic details, the applicant must notify the DEA as soon as the new details become known to the applicant;
- The holder of the authorisation must notify the Department, in writing and within 48 (forty eight) hours, if any condition of this authorisation cannot be or is not adhered to. Any notification in terms of this condition must be accompanied by reasons for non-compliance. Non-compliance with a condition of this authorisation may result in criminal prosecution or other actions provided in the NEMA (1998) and the regulations (condition 1.31);
- National government, provincial government, local authorities or committees appointed in terms of the conditions of the authorisation or any other public authority shall not be held responsible for any damages or losses suffered by the applicant or his successor in title in any instance where construction or operation subsequent to construction be temporarily or permanently stopped for reasons of non-compliance by the applicant with the conditions of authorisation as set out in the EA or any other subsequent document emanating from the conditions of the authorisation.

## 7. ESKOM'S ENVIRONMENTAL MANAGEMENT POLICIES AND COMMITMENTS

Irrespective of the legal obligations attached to any EA, the success of environmental management and mitigation measures is inextricably linked to the proponent's commitment to ensure that these are adequately developed and implemented. For developments, like the Kusile Rail Project, it is expected that this commitment would be developed as a coherent environmental philosophy that is demonstrably integrated into the proponent's corporate culture. Accordingly, this section provides a brief overview of Eskom's corporate environmental management policies and commitments

### 7.1 Vision

*"Together building the powerbase for sustainable growth and development."*

<i>Together:</i>	One Eskom, unified, working together in partnership with others
<i>Building:</i>	Planning for the future, building South Africa's economy
<i>Powerbase:</i>	Providing the electricity foundation for positive sustainable development
<i>Sustainable:</i>	Ensuring continued delivery on economic, environmental and social outcomes

<i>Growth:</i>	Empowering South Africa, its people and the economy
<i>Development:</i>	Securing a brighter future for all and integrating the first and second economy

The principles of social equity and environmental sustainability are clearly articulated within the Eskom Vision. This vision was developed to align Eskom with the capacity expansion era and was born of Eskom's recognition that, given the major role it plays in accelerating growth in the South African economy, it has a responsibility to ensure that sustainable development becomes a reality.

## **7.2 Environmental Management System**

One of Eskom's environmental strategies is the development and implementation of an Environmental Management System (EMS). Linked to this is a requirement for the development and implementation of Environmental Management Programmes (EMProg's) for its projects. In terms of the EMProg guideline (copy included in **Appendix C1**), EMProg's must be developed and implemented, in terms of the relevant line division EMS, for (1) existing and future Eskom land (route, servitude); and (2) projects for which an EIA or screening was undertaken. Moreover, Eskom's environmental land policy requires that all Eskom land be continually managed, through the control of operations and activities that take place on it, to ensure the sustainable utilisation of the asset. It also requires that all Eskom land be managed, operated, and maintained in terms of an established EMProg.

In terms of the requirements of the EMProg guideline, an EMProg would need to be developed for the Kusile Power Station Project and associated infrastructure (this Kusile Rail Project being a component thereof) as a plan of action that sets out a required environmental end state and outlines how activities that could have a negative impact on the environment will be managed and monitored, and how impacted areas will be rehabilitated.

## **7.3 2009 Annual Report**

The Eskom Director's Annual Report for 2009 has, inter alia, the following to say about their EMS:

*“The Eskom EMS ensures that oversight and control measures are in place for our environmental duty of care. It also highlights the environmental impacts of our varied activities and checks that effective controls are in place. Many parts of our business have received ISO 14001 standard certification, while the rest of the group undertakes audits and management reviews to ensure that the standards are adhered to. Funds allocated for environmental capital and operational expenditures amounted to R1,10 billion on capital projects and R1,02 billion on operational environmental activities (2008: R1,3 billion capital and R460 million operational).”*

#### **7.4 United Nations Global Compact**

The United Nations (UN) Global Compact requests companies to embrace, support and enact nine universal principles in the areas of human rights, labour standards and the environment. Eskom, a signatory to the compact, continues to support the UN Global Compact through its sustainable practices. Eskom is committed to aligning itself with international sustainability reporting initiatives.

## **PART C: ENVIRONMENTAL SPECIFICATIONS**

*Part C provides an introduction to the environmental specifications, presents an overview of the structure and application of the specification and highlights the key environmental considerations that should inform the tender adjudication process.*

### **8. INTEGRATION OF THE EMP INTO THE CONTRACT**

As alluded in Section 2, this EMP has been written in a form and language that is consistent with the tender / contract documentation used for engineering contracts i.e. the EMP takes the form of a set of environmental specifications that can integrate in the civil, mechanical and electrical tender / contract documentation. There are various advantages to this approach:

- The Contractor is made aware of the EMP at the tender stage;
- The Contractor is able to cost for compliance with the EMP;
- The EMP is presented to the Contractor in the language and terminology with which he is familiar, and unnecessary duplication and contradiction is eliminated;
- Inclusion of the EMP within the contract ensures that the EMP becomes a legally binding document within a well-developed legal framework; and
- The standardised form and structure of the environmental specifications ensures that with time and each new contract, the Contractor becomes increasingly familiar with, and thus more accepting of, the EMP and implements it with the same diligence as any other set of specifications contained within the contract.

Ultimately, by measuring compliance against an explicit set of environmental controls that are well located within a robust legal framework, the approach has been proven to enhance success in the implementation and enforcement of the EMP significantly.

### **9. SPECIFICATION STRUCTURE AND APPLICATION**

#### **9.1 Overview**

For the Kusile Rail Project, the proposed construction activities would be distributed across a range of civil and electrical contracts, and thus environmental specifications would need to be inserted into each individual contract package. However, at the time of compiling this EMP, very little project detail was available to inform the environmental specifications, which negated the possibility of developing a tailored set of environmental specifications for each Contract. To address this, the following approach was adopted:

- The primary environmental controls have been provided for in the form of a generic suite of environmental specifications, referred to as the Standard Environmental Specification (SES). The SES is common to all Contracts, and would be inserted unmodified into each Contract Document (refer to **Appendix D** for a copy of the SES).
- Other contract requirements with environmental obligations

The contract documentation for Kusile Rail Project will be compiled in terms of the New Engineering Contract (NEC) for Construction.

## 9.2 Method statements

Environmental practitioners are not specialists with regard to construction techniques. Therefore, so as not to hinder construction activities by stipulating elaborate, costly and/ or ineffective mitigation measures, the environmental specification is underpinned by a series of Method Statements, within which the Contractor is required to outline how they propose to mitigate any identified environmental risk. For example if the specification states that “*cement contaminated water shall not be allowed to contaminate the soil or adjacent watercourse*”, the Method Statement compiled by the Contractor would be required to outline how he or she intends to achieve this requirement.

In terms of the environmental specifications for the Kusile Rail Project (specifically Subclause 3.5), the Contractors must submit various written Method Statements to the Engineer and ECO<sup>14</sup>, as requested in the Specification. For the purposes of the environmental specifications, a Method Statement is defined as “*a written submission by the Contractor to the Engineer in response to the Specification or a request by the Engineer, setting out the materials, labour and method the Contractor proposes using to carry out an activity, identified by the relevant specification or the Engineer when requesting the Method Statement, in such detail that the Engineer is enabled to assess whether the Contractor's proposal is in accordance with the Specifications and/or will produce results in accordance with the Specifications*”. The Method Statement must cover applicable details with regard to:

- Construction procedures,
- Materials and equipment to be used,
- Getting the equipment to and from site,
- How the equipment/ material will be moved while on site,
- How and where material will be stored,

- The containment (or action to be taken if containment is not possible) of leaks or spills of any liquid or material that may occur,
- Timing and location of activities,
- Compliance/ non-compliance with the Specifications, and
- Any other information deemed necessary by the Engineer.

The environmental specifications set very stringent requirements in terms of the provision of Method Statements and the commencement of the activities they cover:

- Any Method Statement required by the Engineer or the specification must be produced within the timeframes specified by the Engineer or the specification (typically two weeks);
- The Contractor may not commence the activity covered by the Method Statement until it has been approved, except in the case of emergency activities and then only with the consent of the Engineer;
- The Engineer may require changes to a Method Statement if the proposal does not comply with the specification or if the proposed methodology carries an unreasonable risk of excessive damage to the environment;
- Approved Method Statements must be readily available on the site and must be communicated to all relevant personnel;
- The Contractor is required to carry out the activities covered by the Method Statement in accordance with the proposed approach; and
- Approval of the Method Statement does not absolve the Contractor from their obligations or responsibilities in terms of the Contract.

**Appendix E** explains Method Statements and provides a pro forma Method Statement sheet as a guide for the compilation of the requisite Method Statements. Method Statements may be applied not only for environmental purposes but for health and safety purposes as well.

### **9.3 Provisions for addressing non-conformance**

Ultimately, the key to effective environmental management during the construction, operation and decommissioning phases is ensuring that the requirements of the EMP are adequately and appropriately implemented on site (along the route). Accordingly, monitoring performance and addressing non-compliance are key attributes of any environmental interventions. Part D addresses the actual process for identifying and addressing non-compliance, whilst this section provides an overview of the provision made for this in the environmental specification.

Broadly, the mechanisms for addressing non-compliance that are provided for in the environmental specifications and associated contract documentation can be divided into the following categories:

- Controlling performance via the certification of payments;
- Requiring the Contractor to “*make good*”, at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours; and
- Removing environmentally non-compliant staff/ plant from site, or suspending part or all of the activities on Site (along the route).

Provision is made for the imposition of these punitive measures, either through the environmental specification or the broader conditions of contract. Section 15.2 provides an overview of how these various measures should be used to address non-compliance, whilst this section simply provides an overview of the mechanism(s) enabling this course of action.

### ***Certification of payment***

As outlined previously, one of the main aims of translating the EMP into a set of environmental specifications is to provide the Contractor with a reasonable opportunity to cost for compliance with the environmental obligations. Accordingly, the environmental specifications for Kusile Rail Project include a series of Measurement and Payment clauses, and compliance with the environmental requirements is assessed as part of the certification of each Payment Certificate. Where the Contractor has failed to comply with specific obligations emanating from the environmental specifications, payment for the specific items to which their non-compliance relates would be withheld. Where the Contractor fails entirely to provide or fulfil for a period of time all or part of the services and obligations required of them in respect of the specification, the Engineer could decide to reduce the Contract Price, either by the full value of the relevant item or by an appropriate proportion of that value.

To provide an effective incentive for compliance, the Measurement and Payment clauses are divided into fixed and time-related costs. Payment for fixed costs is based on proof of compliance with the specified requirement. For time-related costs, the value for that item is divided by the duration of the Contract (in months), and payment is certified on a monthly basis, based on proof of compliance with that item. Time-related costs are only reimbursed once the relevant fixed cost has been certified. Time-related costs are forfeited on a *pro rata* basis for each month during which the Contractor fails to show compliance with the requirements of the relevant item.

To prevent the Contractor circumventing his liabilities by “zero-rating” the various items scheduled in terms of the environmental specifications, the SES includes the following subclause (Subclause 11.1); “*The Contractor shall tender a rate or sum against each scheduled item and shall not price any item as nil or “0-00” and shall not indicate that the cost of any of the items listed in this schedule as being included elsewhere. In the event that the Contractor fails to provide a rate or sum, prices an item as nil or “0-00”, or indicates an item as being included elsewhere, the Engineer shall assign what he believes to be reasonable price to each of these items and the Tendered Sum shall not be adjusted to accommodate any additional costs.*”

### ***Making good on environmental damage***

The requirement to make good any environmental damage stems from the following provisions:

- By entering into a Contract with Eskom, the Contractor has agreed to comply with the various obligations attached to that Contract, which include the environmental responsibilities detailed in the relevant SES and PES.
- The Contractor shall take all reasonable steps to protect the environment (both on and off Site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operations.”

In light of these considerations, the Contract is expected to meet their environmental commitments, failing which it is reasonable to expect them to make good on any environmental degradation, at their own cost. To give emphatic weight to this requirement, Subclause 10.2 of the SES notes; “*Where environmental damage occurs as a result of the failure of the Contractor to comply with the requirements of this Specification, the requisite remediation shall be effected to the satisfaction of the Project Manager and at the cost of the Contractor.*”

### ***Penalties***

Subclause 10.3 of the SES provides a list of environmental transgressions for which the Engineer can impose penalties upon the Contractor, and the magnitude of these penalties. These essential represents a “*stick*” with which to force compliance and punish negligence by the Contractor.

Penalties are issued per incident at the discretion of the Engineer, and are issued in addition to any remedial costs incurred because of non-compliance with the environmental specifications. The Engineer would inform the Contractor of the contravention and the amount of the penalty, and would deduct the amount from the next Payment Certificate. For each subsequent similar offence, the penalty would be doubled in value, up to a specified maximum amount (*viz.* R 250 000, Subclause 10.3).

***Removal from site and suspension of works***

The Engineer has the power to remove from site, any person who is guilty of misconduct, or is incompetent, negligent or constitutes an undesirable presence on Site. Failure to comply with the requirements of the environmental specifications could suffice in this regard. Similarly, Subclause 5.2 of the SES requires that all Plant is in good working order, and accordingly the Engineer could order any Plant that does not meet this requirement to be removed from Site.

Where the Engineer deems the Contractor to be in breach of any of the requirements of the Contract he may order the Contractor to suspend the progress of the Works or any part thereof. Failure to comply with the requirements of the environmental specifications would constitute such a breach.

**10. ENVIRONMENTAL CONSIDERATIONS IN ADJUDICATION OF TENDER**

In terms of this EMP, Eskom has an obligation to ensure compliance by various parties with a suite of environmental requirements related to the construction, operation and decommissioning phases. The compilation of the EMP and its integration into the Tender Document, as a suite of environmental specifications, forms part of meeting this obligation. However, to ensure that these obligations continue to be fulfilling during the actual construction, operation and decommissioning processes, it behoves Eskom to ensure that the appointed Contractors possess the requisite environmental management experience and expertise. Accordingly, it would be prudent for Eskom to ensure that environmental considerations form part of the tender adjudication process. Key considerations in this regard would be as follows:

- To request as part of the tender process that the Contractor provide his environmental policy and indicate how this will influence the way the construction process is approached and managed on Site. Subclause 1.2 of the SES requires the Contractor to prepare an “Environmental Protection Policy” (EPP) for the specific project. At the tender stage the Contractor would merely be asked to provide the overarching environmental policy for the Company or Joint Venture and not the project-specific EPP;
- To request as part of the tender process a list of the Contractor’s previous experience in terms of the on site implementation and management of environmental requirements;
- To request as part of the tender process an indication of the proposed organisational structure for the Contract, and specifically for the Contractor to indicate which staff would be acting in the capacity of Environmental Officer (EO) and which senior staff member would have overall responsibility for ensuring compliance by the Contractor with the specified environmental requirements; and

- To confirm, upon receipt of the Tender, that the Contractor has made sufficient allowance in his Tender Price for meeting the various environmental requirements outlined in the relevant SES and PES.

During the tender adjudication process for each Contract, each Contractor should be scored in terms of the aforementioned considerations and allocated an environmental competency score. This score should form a key consideration in the final decision-making regarding the award of the various contracts.

## **PART D: ON-SITE (ROUTE) IMPLEMENTATION**

*Part D provides guidance in terms of the on-site implementation of the EMP, highlighting the organisation structure and various roles and responsibilities, emphasising the importance of environmental induction, summarising the requisite approach to monitoring and auditing and addressing the requirement for review and amendment of the environmental specifications.*

### **11. ORGANISATIONAL STRUCTURE**

The organisational structure identifies and defines the responsibilities and authority of the various role-players (individuals and organisations) involved in the project. All instructions and official communications regarding environmental matters shall follow the organisational structure shown in Figure 3.

The organisational structure reflected in Figure 3 has been developed to ensure that:

- There are clear channels of communication;
- There is an explicit organisational hierarchy for Kusile Rail Project;
- Potential conflicting or contradictory instructions are avoided;
- The organisational structure mirrors that of the Kusile Power Station Project for easy integration.

In terms of the defined organisational structure reflected in Figure 3, all instructions that relate to environmental matters will be communicated to the Contractor via the Engineers Representative. The only exception to this rule would be in an emergency (defined as a situation requiring immediate action and where failure to intervene timeously would, in the reasonable opinion of the ECO, result in unacceptable environmental degradation), where instructions may be given directly to the Contractor. The detailed roles and responsibilities of the various role-players identified in the organisational structure are outlined in Section 12.

### **12. ENVIRONMENTAL ROLES AND RESPONSIBILITIES**

As is evident from Figure 3, the key-role-players for Kusile Rail Project are the DEA, the EMC (combined with existing Power Station EMC), Eskom (including the existing Environmental Office) and the Contractor. The detailed roles and responsibilities of each of these organisations are outlined below.

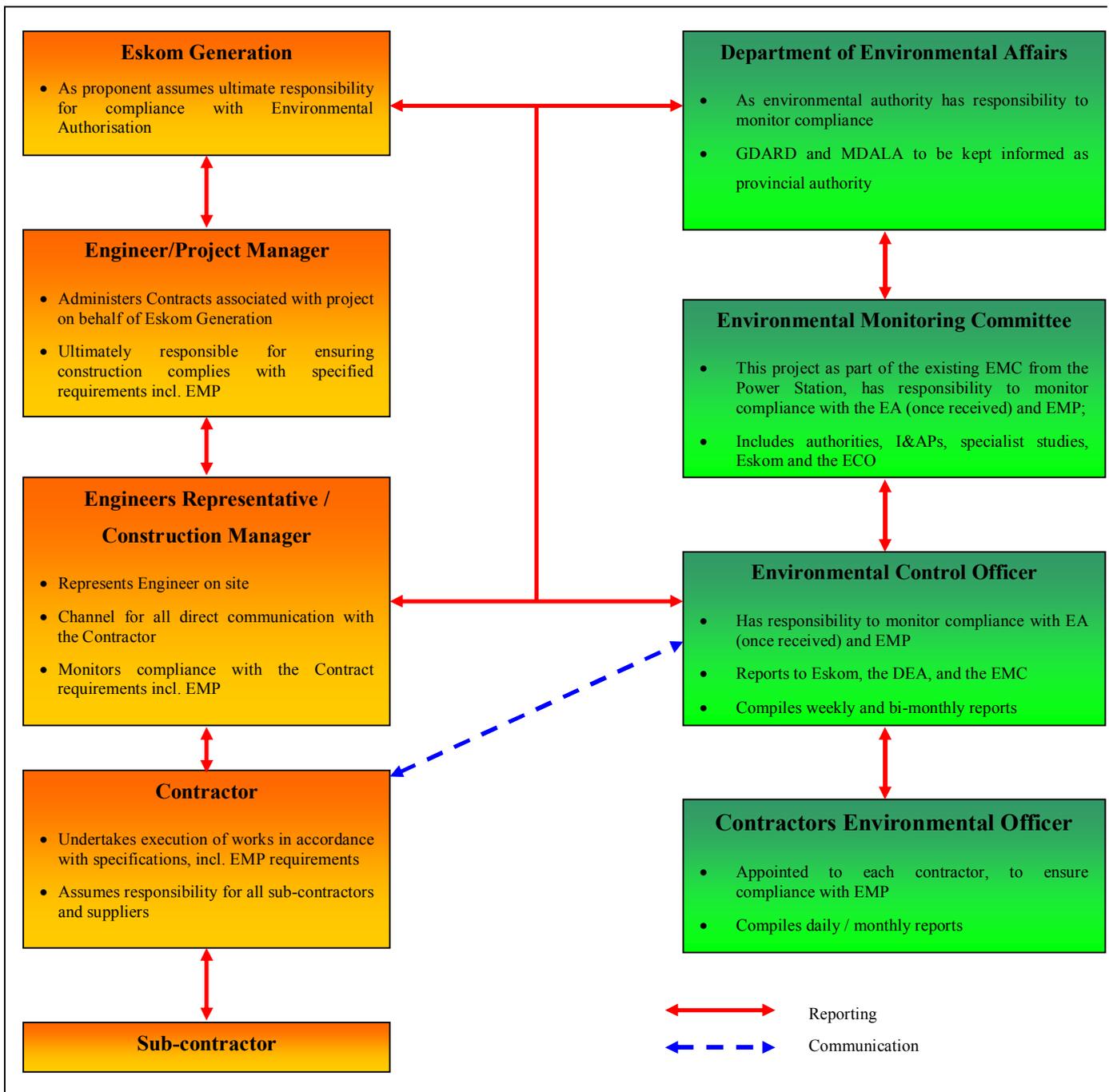


Figure 3: Organisational Structure: Kusile Rail Project.

### 12.1 Department of Environmental Affairs

As the competent environmental authority, the DEA has the responsibility to ensure that the proponent, viz. Eskom, complies with the conditions of the Environmental Authorisation for the Kusile Rail Project (23 April 2010) as well as the requirements of the broader

environmental legislation, specifically the NEMA and the ECA. Compliance would be confirmed via the following mechanisms:

- Receipt and review of the environmental reporting required in terms of the Environmental Authorisation;
- Attendance at the bi-monthly EMC meetings; and
- *Ad hoc* and planned site inspection by the DEA Compliance and Enforcement Directorate.

The DEA would be assisted in this compliance monitoring function by the GDARD and MDALA.

## **12.2 Environmental Monitoring Committee**

A specific condition in the Environmental Authorisation for the Kusile Power Station was the requirement of an EMC in terms of subclauses contained under Condition 3.2.11. The following representatives were, as a minimum, required to be included in all EMC meetings:

- An independent chairperson appointed by the EMC membership;
- An appropriately experienced ecologist;
- Representatives from the public (at least two people);
- The ECO;
- Contractors' EOs, when and where relevant;
- A senior representative from the main contractor; and
- An air quality specialist.

Due to the Kusile Rail Project being an auxiliary function of the Kusile Power Station all issues relevant to the Kusile Rail Project must be incorporated into the existing EMC forum.

The EMC currently meets on a bi-monthly basis. In terms of subclause 3.2.11.6 of the EA received for the Kusile Power Station, its roles and responsibilities are to:

- Monitor and audit compliance with the Environmental Authorisation, environmental legislation and environmental reporting (EIR and EMPs); and
- Make recommendation to the DEA in terms of monitoring and auditing of the project.

A requirement of Subclause 3.2.11.1 of the Kusile Power Station EA, was that Eskom provide the EMC with a clear Terms of Reference (ToR). Accordingly, a ToR was compiled and updated to incorporate the Kusile Rail Project and is included in **Appendix F** of this EMP for the Kusile Rail Project for information purposes.

### **12.3 Eskom**

As the Proponent, Eskom must ensure that the implementation of Kusile Rail Project complies with the requirements of the DEA EA, this EMP, as well as any obligations emanating from other relevant environmental legislation. Although part of this obligation is being met by the development of the EMP, and its integration into the contract documentation, the constitution of the EMC and the appointment of the ECO (new or the current ECO for the Kusile Power Station), Eskom cannot delegate out of this responsibility *in toto*. Accordingly, Eskom retains various key roles and responsibilities during the construction, operation and decommissioning of the railway and associated infrastructure. These are outlined below.

Eskom, as an organisation must ensure that adequate funding is made available for the implementation and monitoring of the environmental controls emanating out of the EIR, EA,, EMP and applicable environmental legislation. This would include the appointment of the ECO and the financial requirements for the running of the EMC (to a lesser extent as this is currently being funded by Eskom through the Kusile Power Station EA), as these are explicit requirements of the EMP.

The Engineer ( $\approx$  Eskom's Project Manager) must:

- Be fully conversant with the EIA reporting for the project, the conditions of the EA (once received), the EMP and all relevant environmental legislation.
- Ensure that all the specifications, legal constraints and Eskom standards and procedures pertaining to the project, specifically with regards to environment management, are highlighted to Eskom and its Contractor(s) so that they are aware of these; and
- Ensure that the environmental specifications are correctly implemented throughout the project by means of site inspections and meetings. This will be documented as part of the site meeting minutes.

The Engineers Representative ( $\approx$  Eskom's Construction Manager) must:

- Be fully knowledgeable with the contents of the EIA Reporting;
- Be fully knowledgeable with the contents and conditions of the EA;
- Be fully knowledgeable with the contents of the EMP, specifically as articulated into the environmental specifications attached to each Contract;
- Be fully knowledgeable with the contents of all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Have overall responsibility of the environmental specifications and their proper implementation;
- Ensure that regular audits are conducted to confirm compliance with the environmental specifications;
- Ensure there is communication with the Engineer or his delegate, the ECO and the relevant Site Engineers on matters concerning the environment;
- Ensure that no actions are taken which will harm or may indirectly cause harm to the environment, and take steps to prevent pollution on the site.

#### **12.4 Environmental Control Officer**

Eskom must appoint a suitable qualified ECO or extend the Kusile Power Station ECO's responsibilities and scope to monitor compliance with this EMP, environmental legislation and the EA (once received), on a daily basis on behalf of the EMC. To fulfil these requirements, the ECO would need to have relevant on site experience and would need to be permanently based on site for the duration of the construction phase. It should be noted, unless otherwise stated in the EA, the ECO could be an Eskom employee, as long as they have the requisite environmental training and experience.

The ECO will be responsible for monitoring, reviewing and verifying compliance by the Contractor with the environmental specification. Accordingly, the ECO would be required to:

- Be fully knowledgeable with the contents of the EIA Reporting;
- Be fully knowledgeable with the contents and conditions of the EA;
- Be fully knowledgeable with the contents of the EMP, specifically as articulated into the environmental specifications attached to each Contract;

- Be fully knowledgeable with the contents of all relevant environmental legislation and Eskom environmental policies and procedures, and ensure compliance with these;
- Ensure that compliance with the conditions of the EA and environmental specification are monitored and verified through regular and comprehensive inspections of the site and surrounding areas, and that the results of these inspections are reduced to writing;
- Ensure that if the environmental specifications are not followed then appropriate measures are undertaken to address this; and
- Report to the EMC and the DEA every two months regarding compliance with the requirements of the EMP, environmental legislation and the EA (once received);

In meeting the aforementioned obligations, the ECO's specific duties would include the following:

- Assisting the Engineer in ensuring necessary environmental authorizations and permits have been obtained;
- Confirming that activities on Site comply with legislation;
- Monitoring and verifying that the conditions of the EA and environmental specifications are adhered to at all times and requiring the Contractor to take action if these are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum;
- Reviewing and approving construction Method Statements together with the Engineer;
- Giving a report back on the environmental issues at the monthly site meetings and other meetings that may be called regarding environmental matters;
- Inspecting the Site and surrounding areas regularly with regard to compliance with the environmental specifications;
- Ensuring that a register of complaints is kept by the Contractor and that all complaints are appropriately recorded and addressed;
- Ensuring that the requisite environmental induction occurs for all new personnel coming onto site;
- Assisting the Engineer in certifying payment for items related to the environmental specification;

- Recommending the issuing of penalties for contraventions of the environmental specifications;
- Advising on the removal of person(s) and/or equipment, not complying with the specifications, from site;
- Completing the requisite environmental reporting, which should include a daily site diary entry, weekly audit checklists, a bi-monthly (*viz.* every second month) environmental compliance report for submission to the EMC and incident reports;
- Keeping a photographic record of progress on Site from an environmental perspective;
- Attending the EMC meetings to report on environmental compliance, as stipulated in the EMC ToR (**Appendix F**); and
- Undertaking project and contractors audits.

As outlined previously, all instruction issued by the ECO would go through the Engineer's Representative, who will then convey these to the Contractor.

## **12.5 Contractors**

By virtue of the environmental obligations delegated to the Contractor through the Contract Document, all contractors (including subcontractors and staff) and service providers appointed for Kusile Rail Project would be responsible for:

- Ensuring adherence to the environmental specifications;
- Ensuring that Methods Statements are submitted to the ECO for approval before any work is undertaken. Any lack of adherence to this will be considered as non-compliance to the specifications ;
- Ensuring that any instructions issued by the Engineer, on the advice of the ECO, are adhered to;
- Ensuring that there must be communication tabled in the form of a report at each site meeting, which will document all incidents that have occurred during the period before the site meeting;
- Ensuring that a register is kept in the site office, which lists all the transgressions issued by the ECO;
- Ensuring that a register of all public complaints is maintained; and
- Undertaking subcontractors audits.

Ensure that all employees, including those of sub-contractors receive training before the commencement of construction in order that they can constructively contribute towards the successful implementation of the environmental requirements of the Contract.

The most important actions by the Contractor to ensure compliance with the environmental requirements, relates to the establishment of an adequate and appropriate organisational structure for ensuring the implementation and monitoring of the requisite environmental controls. In terms of these requirements, the SES (Subclause 3.2) specifies, *“A suitably qualified senior staff member employed full time on site by the Contractor shall be responsible for environmental monitoring and control. This position shall be designated as the Environmental Officer (EO). The EO shall be a person with adequate environmental knowledge to understand and implement these Specifications, as determined by the Engineer. As a minimum requirement the EO should pose a tertiary qualification in a relevant field and two years of experience in environmental monitoring and control”*. It is vital that the EO is appointed prior to the commencement of a contract; a four week period should be allowed.

The EO's specific duties relate to the implementation of the environmental controls contained within the environmental specification, and which are audited by the ECO. Accordingly, the EO's duties include:

- Ensuring that activities on Site comply with legislation;
- Monitoring and verifying that the environmental specifications are adhered to at all times and taking action if the specifications are not followed;
- Monitoring and verifying that environmental impacts are kept to a minimum and taking action to address any environmental degradation;
- Compiling the requisite Method Statements for review by the ECO and Engineer;
- Proactively developing environmentally responsible solutions to problems, in consultation with the EO where necessary;
- Giving a report back on the environmental issues at the monthly site meetings and other meetings that may be called regarding environmental matters;
- Keeping records of all activities / incidents concerning the environment on Site;
- Inspecting the Site and surrounding areas regularly with regard to compliance with the environmental specifications;

- Maintaining a register of complaints, ensuring that all complaints are appropriately recorded and addressed and notifying the ECO of each complaint and how it was resolved;
- Undertaking the requisite environmental induction for all new personnel coming onto site, as well as any refresher or *ad hoc* induction that might be required during the Contract;
- Completing the requisite environmental reporting, namely a daily compliance checklist, a record of staff induction and incidence reports, for submission to the ECO;
- Keeping a photographic record of progress on Site from an environmental perspective; and
- Undertaking subcontractor audits.

### **13. INDUCTION OF SITE STAFF**

The Contractor is responsible for creating awareness among employees and sub-contractors of their environmental obligations in terms of the environmental specifications, and for ensuring that employees are adequately experienced and properly trained in order to execute the Works in a manner that will minimise environmental impacts. The Contractors obligations in this regard include the following:

- Ensuring that a copy of the environmental specifications is readily available on site, and that all site staff are aware of the location and have access to the document. It is particularly important that the EO have access to the environmental specifications in order for them to fulfil the roles and responsibilities outlined in Section 12.5.
- Ensuring that, prior to commencing any site works, all employees and sub-contractors have attended an Environmental Awareness Training course. The Environmental Awareness Training course would be conducted by the EO, who must provide the site staff with an appreciation of the project's environmental requirements, and how they are to be implemented. All new staff coming onto site after the commencement of construction activities must also attend the Environmental Awareness Training course, and refresher courses should be undertaken on a quarterly basis. A detailed record of all training sessions, including a list of attendees must be compiled by the Contractor and submitted to the Engineer on a regular basis. Although the responsibility for the

compilation of an appropriate and adequate Environmental Awareness Training course rests with the Contractor, a generic example has been included in **Appendix G** to assist in this regard.

- Ensuring that all site staff are aware of the requirements of any approved Method Statements that have bearing on their activities, and, where necessary, that any specialised training required to ensure compliance with the approved Method Statements, has been provided.
- Ensuring that regular *ad hoc* training is provided, both as part of the daily toolbox talks as well as to address specific environmental concerns or areas of non-compliance.
- Ensuring that employee information posters, outlining the environmental “do’s” and “don’ts” (as per the environmental awareness training course) are erected at prominent locations throughout the Site (an example of a generic information poster is included in **Appendix G**).

It has become common practice for the environmental induction requirements to be addressed as part of the standard worker Health and Safety induction programme that accompanies the recruitment of new staff. Although this approach is supported, the Contractor must ensure that the environmental considerations are adequately covered during this induction process. If, in the reasonable opinion of the ECO, the Health and Safety induction training is not adequately addressing environmental aspects, he/ she may require the Contractor to develop a stand-alone environmental induction programme.

## **14. CONFIRMING COMPLIANCE**

Ultimately, the key to effective environmental management during the construction phase is ensuring that the requirements of the EMP, and specifically the environmental specifications, are adequately and appropriately implemented on site. Accordingly, monitoring performance and addressing non-compliance are key attributes of any construction, operation and decommissioning phase environmental interventions. The following sections provide an overview of how this should be achieved for the current project.

### **14.1 Monitoring and reporting**

As alluded to in the preceding sections, four levels of compliance monitoring are provided for in terms of the Kusile Rail Project construction, operation and decommissioning phases, namely:

- The DEA;
- The EMC;
- The ECO; and
- The EO.

The key party in this monitoring hierarchy is the ECO, as his reporting will form the basis for satisfying the DEA and the EMC regarding Eskom's compliance with the requirements of the EIR, EA (once received) and other relevant legislation. The EO's role will be to ensure that the Contractor meets the various environmental obligations attached to the environmental specifications, and to maintain a record that confirms such compliance.

The aim of the monitoring and auditing process would be to check the implementation of the environmental specifications routinely, in order to:

- Monitor and audit compliance with the prescriptive and procedural terms of the environmental specifications;
- Ensure adequate and appropriate interventions to address non-compliance;
- Ensure adequate and appropriate interventions to address environmental degradation;
- Provide a mechanism for the lodging and resolution of public complaints;
- Ensure appropriate and adequate record keeping related to environmental compliance;
- Determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes, in order to enhance the efficacy of environmental management on site; and
- Aid communication and feedback to the EMC and authorities.

Monitoring should be undertaken daily (i.e. continuous monitoring) by both the EO and ECO, although the reporting frequency would vary. In addition to any incident reporting:

- The EO would be required to complete a daily audit checklist and monthly report, and submit these to the ECO;
- The ECO would be required to complete a weekly audit checklist, and compile a bi-monthly (*viz.* every second month) environmental compliance report for submission to the EMC. It would also be prudent for the ECO to maintain a daily Environmental Site Diary as an independent record of compliance/incidents.

The accurate capturing and reporting of monitoring results is critical to ensure that the degree of compliance, and nature of any non-compliances/ incidents, is unambiguously communicated to all role-players, from the Contractor through the Engineer to the EMC and the DEA. Accordingly, routine monitoring would be undertaken using audit checklists, which would be compiled by the EO (daily checklist) and ECO (weekly checklist) prior to the commencement of the construction activities. The course of all incidents, from occurrence through to resolution, would also need to be recorded in the form of an incident report. To assist the ECO and EO in the development of the requisite monitoring documentation, examples of daily and weekly checklists, as well as of an incident report, have been included in **Appendix H**. It is important to note that these only represent examples, and checklists tailored for the specific Kusile Rail Project requirements would need to be developed by the EO/ ECO.

As outlined in Section 13.4, one of the key responsibilities of the ECO would be the compilation of a bi-monthly (*viz.* every second month) environmental compliance report for submission to the EMC and the DEA. Although this reporting would be informed by the daily, weekly and incident reporting, the bi-monthly environmental reporting would need to provide a more substantial assessment of compliance with the requirements of the SES (various contractors) and the EA (once received). **Appendix I4** provides an example of an auditing protocol that could be considered for this purpose. This protocol provides a quantitative assessment of compliance with each of the key EA and EMP requirements and enables a compliance rating to be determined for each Contractor. Not only does the proposed approach provide an accessible summary of the project environmental performance, and its management, but it also enables the level of compliance by a Contractor to be tracked on a bi-monthly basis, and for any deterioration in the degree of compliance to be readily identified and addressed. As for the daily, weekly and incident reporting examples, this protocol would need to be tailored by the ECO for the specific Kusile Rail Project requirements.

## **14.2 Addressing non-conformance**

### ***Mechanisms***

As outlined in Section 9.3, four avenues exist for addressing non-compliance by the Contractor, and are provided for either in the environmental specifications or in the broader contract requirements, *viz.*:

- Controlling performance via the certification of payments;

- Requiring the Contract to “*make good*”, at their own cost, any unjustifiable environmental degradation;
- Implementing a system of penalties to dissuade environmentally risky behaviours; and
- Removing environmentally non-complaint staff/ plant from site, or suspending part or all of the activities on Site.

The type and extent of the corrective measures required to address non-compliance would depend on the nature of the transgression and the Contractor’s history in terms of compliance with their environmental obligations. When deciding on the nature of any punitive actions, however, it is important to recognise that the effective implementation of the environmental specification is highly dependant on the quality of the working relationships that develop between the key role-players, specifically between the Engineer, the Contractor and the ECO. Accordingly, an excessive response to non-compliance, particularly for a minor or unintentional transgression, may cause significant environmental degradation in the long term due to its effect in eroding the Contractor commitment to meeting their environmental responsibilities. Moreover, other mechanisms, like an expanded environmental induction programme, may prove more effective than purely punitive measures in controlling non-compliance in the long-term. This is an important consideration that must be borne in mind by the ECO, EMC and authorities when responding to non-compliance.

The certification of payment and the expectation for the Contractor to “*make good*” any environmental degradation represent the most elementary mechanisms for forcing compliance. Ultimately, the Contractor should want to comply so that he can be paid for meeting his / her environmental obligations and thus environmental inputs into the certification of payments becomes a fundamental part of the enforcement process. This said, the nature of the activities associated with Kusile Rail Project is such that even with the best of intentions, environmental degradation can and invariably will occur. The costs of having to make good on such environmental degradation is usually sufficient punishment without the need to look to other punitive measures.

Penalties represent the next tier in castigatory measures, followed by removal from site, with suspension of work representing the apex of potential remedies. As alluded to previously, the implementation of these measures requires careful considered:

- Penalties would typically be warranted by persistent negligence on the part of the Contractor or failure to respond adequately to environmental considerations;

- Removal from site would typically be warranted where a particularly staff member or piece of equipment is the cause of persistent environmental damage.
- Suspension of the Work would only be warranted under rare circumstances, and then only with the Employers approval, where the Contractors actions have caused or are likely to cause significant environmental degradation.

### ***Procedure***

Should there be any incident on site affecting the environment, irrespective of whether it is the result of non-compliance or not, the following lines of communication should be implemented:

- All incidents must to be reported to the Engineer , EO and ECO immediately;
- Depending on the severity of the incident, the Engineer and/or ECO are to notify Eskom, the relevant authorities, the EMC and emergency services (if required), regarding the incident. Although all incidents must be recorded in the site reporting, the decision regarding the need to notify other parties (*i.e.* Eskom, relevant authorities, the EMC and emergency services) will be at the discretion of the Engineer and ECO;

All issues of non-compliance must be reflected in the environmental reporting (including the daily and weekly checklists), and an incident report must be completed for all environmental incidents (*i.e.* any environmental degradation resulting from the construction activities, irrespective of whether it is the result of non-compliance or not). Environmental Incident reports must address the following aspects<sup>20</sup>:

- Description of the incident;
- Remedial action required, including the deadline for such action;
- Relevant/ supporting documentation: *i.e.* providing evidence of the incident and the cause of the incident;
- Relevant diagrams to support the description of the incident and/ or the remedial action to be taken;
- Provision for dates and signatures of both the ECO and Engineer at issuing of the report, as well as completion and verification of the remedial action, as specified in the report.

## **15. SPECIFICATION REVIEW AND AMENDMENT**

Owing to the lack of information available at this stage amendments are likely to be necessary as more information becomes available and as lessons are learned during the construction process. Recognising this, this EMP must be seen as a dynamic document. Accordingly, as outlined previously, one of the key roles of monitoring compliance will be to determine the effectiveness of the environmental specifications and recommend the requisite changes and updates based on audit outcomes. Where revision is warranted, the ECO would be required to draft such amendments and submit it to the EMC for comment prior to submission to the DEA for approval.

## **16. COMPLIANCE WITH OTHER LEGISLATION**

Apart from the requirements of the EIR, EMP and EA (once received), Eskom and its Contractors will be required to comply with the full suite of South African Legislation concerning the natural environment, pollution and the built environment. This legislation includes but is not limited to:

- National Environmental Management Air Quality Act (No 39 of 2004);
- National Heritage Resources Act (No 25 of 1999);
- National Water Act (No 36 of 1998);
- National Environmental Management Waste Act (No 59 of 2008);
- Environment Conservation Act (No. 73 of 1989), including the noise regulations and litter controls promulgated thereunder;
- National Environmental Management Act (No 107 of 1998);
- National Veld and Forest Fire Act (No 101 of 1998);
- National Forest Act (No 84 of 1998);
- National Road Traffic Act (No 93 of 1996);
- Occupational Health and Safety Act (No 85 of 1993);
- Conservation of Agricultural Resources Act (No 43 of 1983) and the regulations dealing with declared weeds and invader plants as amended from time to time;
- National Building Regulations and Building Standards Act (No 103 of 1977);
- Health Act (No 63 of 1977); and
- Hazardous Substances Act (No 15 of 1973).

## **Appendix A: Environmental Authorisation**

## **Appendix B: Framework EMP**

## **Appendix C: Eskom corporate documentation**

## **Appendix D: Standard environmental procedure**

## **Appendix E: Method statement for *pro forma***

**Appendix F: Terms of Reference for Environmental  
Monitoring Committee**

## **Appendix G: Generic environmental training course**

## **Appendix H: Documentation and reporting examples**

## **Appendix I: Rotary Core Drilling Method Statement**

## **Appendix J: Risk Assessment for Rotary Core Drilling**

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<sup>i</sup> EIA = Environmental Impact Assessment

<sup>ii</sup> DEA = Department of Environmental Affairs

<sup>iv</sup> SAHRA = South African Heritage Resources Agency

<sup>v</sup> NHRA = National Heritage Resources Act

<sup>vi</sup> DWA = Department of Water Affairs

<sup>vii</sup> The in-house EMPs may need to be augmented with project specific “project specifications” to ensure that the environmental issues are comprehensively addressed in the Tender Document.

<sup>viii</sup> Within this context BPEO, or Best Practicable Environmental Option, is defined as “for a given set of objectives, the option that provides the most benefits or least damage to the environment as a whole, at acceptable cost, in the long term as well as in the short term” (Royal Commission on Environmental Pollution, 1988). Here environment includes both the social and biophysical components.

<sup>ix</sup> It is understood that effect will be given to the requirements listed here by ensuring that they are integrated as specifications (where appropriate) into the Tender Document, as highlighted under Section 2.

<sup>x</sup> MDALA = Mpumalanga Department of Agriculture and Land Affairs

<sup>xi</sup> GDARD = Gauteng Department of Agriculture and Rural Development

<sup>xii</sup> Abbreviated to decom.