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14. Environment and Social Impact Management Plan (ESIMP)

14.1 Introduction

The purpose of the ESIMP is to ensure that social and environmental impacts, risks and liabilities identified during the ESIA process are effectively managed during the construction, operation and closure of the proposed project. The ESIMP specifies the mitigation and management measures to which the Proponent is committed and shows how the Project will mobilize organizational capacity and resources to implement these measures. The ESIMP also shows how mitigation and management measures will be scheduled.

The key objectives of the ESIMP are to:

- Formalize and disclose the program for environmental and social management; and
- Provide a framework for the implementation of environmental and social management initiatives.

Best practice principles require that every reasonable effort is made to reduce and preferably to prevent negative impacts while enhancing the benefits. These principles have guided the EIA process. In many cases, potential negative impacts have been avoided through careful design and location of facilities.

The ESIA involved concurrent and ongoing data collection and public consultation activities to date.

14.2 Environment and Social Impact Management Plan (ESIMP)

Work underpinning the ESIMP has complied with L.N. 101: EIA/EA Regulations 2003 and IFC Performance Standards and includes the following:

- A public participation process;
- Acquiring the NEMA's approval on a terms of reference for the ESIA Study based on the issues scoped therein; and
- An ESIA report of the proposed Project, including specialist reports, that aims to:
 - List potential impacts and risks associated with the proposed Project;
 - Identification of mitigation measures relating to the potential negative environmental and social impacts identified during the ESIA process; and
 - Formulation of the ESIMP against the negative impacts.

The ESIMP covers information on the management and/or mitigation measures that will be taken into consideration to address impacts with respect to:

- Planning and design;

- Pre-construction and construction activities;
- Operation; and
- Closure, where relevant.

Given below is a description of the mitigation measures to be applied in the project phases described above.

14.2.1 Planning and design

Planning and design is necessary to ensure that mitigation and impact management can be effectively implemented in the context of relevant HSE policies. Planning involves the following activities:

- Identifying and defining the various environmental aspects and related potential positive and negative impacts that can result from the power plant's activities;
- Establishing a procedure to identify legal and other requirements to which the organization is subject;
- Identifying and defining appropriate mitigation and management measures, including those reinforcing positive impacts; and
- Establishing and maintaining documented, scheduled environmental objectives and targets at each relevant function and level within the organization.

Environmental aspects and potential impacts will mainly emanate from the following project-related activities:

- Construction of the 84MW thermal power plant which includes:
 - 10 x 20V32 Wärtsilä generating sets;
 - Waste heat Recovery system;
 - Medium Voltage switch Gear;
 - Step up transformers 11/66 KV;
 - High Voltage switch Gear;
 - Transportation and delivery to site of the above components;
 - Civil and structures works;
 - Installation activities;
 - Commissioning and start up; and
 - Testing.
- Construction of an access road from the main Mombasa – Nairobi highway to the project site.

Section 13 described and rated potential environmental impacts in terms of their potential significance. The management measures presented in this ESIMP have been developed in response to these impacts. Performance standards providing a robust measure of the effectiveness of the defined mitigation are defined as part of the project monitoring (*See* Section 14.7).

There is clear division of responsibility between the design team responsible for the planning of the proposed power plant and the construction team responsible for building it. The most important factors influencing the design of the proposed power plant have been considered over several years by the international community and many countries have local design standards according to which thermal power plants must be built.

The key anticipated environmental impact and/or benefits which could arise with mitigation during preconstruction and construction, operation and closure of the proposed project include the following:

- Impact on flow of surface water;
- Air pollution from the stack emissions;
- Noise and vibration emanating from the gensets;
- Creation of employment opportunities;
- Accidents as a result of increased traffic;
- Compatibility with existing and proposed land uses.

14.2.2 Pre-construction and construction

The ESIMP will put in place measures to avoid and mitigate impacts and optimize benefits arising from activities during the preconstruction phase (e.g. establishment of access roads, construction camp and clearing of the construction site) and the construction phase (e.g. installation of gensets, auxiliaries, etc.) of the project. The construction process is detailed in Section 5. The principal focus of project management for pre-construction and construction will include: personnel and contractor management and training; conduct and site management; maintenance of complaints register; emergency preparedness; and management and mitigation of impacts such as noise, dust, safety and pollution. The programs and plans relating to these management measures are presented in Sections 14.4 and 14.5 respectively.

Assignment of responsibility and sub-contractor management by the EPC contractor is especially important during the construction phase, when sub-contractors will be building the power plant. Contractors may also be used on an ongoing basis for a range of maintenance and other functions during the operational phase. Contractors will be held to the highest HSE performance requirements to ensure they meet national and international standards.

14.2.3 Operation

The proposed power plant will involve the generation of electric power for evacuation to the national grid by the KP&LC. The heavy fuel oil required to run the gensets will be transhipped from Mombasa by road to the power plant.

The above operational controls require that a responsible party, a budget and an implementation schedule are specified and allocated to further enable and facilitate implementation.

During the operational phase of implementing the ESIMP, specific roles and responsibilities must be assigned. These roles include dedicated HSE management roles and responsibilities of all company personnel.

14.2.4 Checking and corrective action

Checking and if necessary, implementing corrective actions form the fourth component of the ESIMP management cycle. They ensure that:

- The required ESIMP management activities are being implemented; and
- The desired outcomes are being achieved.

As such this component includes four key activities as follows:

- Monitoring selected environmental quality variables as defined in the objectives and targets;
- Ongoing inspections of the operational controls and general state of the operations;
- Internal audits to assess the robustness of the ESIMP or to focus on a particular performance issue; and
- External audits to provide independent verification of the efficacy of the ESIMP.

14.2.5 Construction phase HSE inspections

Section 8 of the ESIA Study discusses the management of HSE during the construction phase of the project. As part of this process, an ongoing and pragmatic HSE inspection program will be implemented to ensure that potential HSE transgressions can be identified proactively and mitigation measures implemented.

14.2.6 Internal and external audits

Where the monitoring data and the inspection reports highlight problems, an internal audit can be used to ascertain the source of the problem and to define action to prevent its recurrence. The three key areas for audit are facilities (are they operating properly?), project procedures (are they properly designed and implemented?) and finally, and perhaps most importantly Contractor's HSE performance.

International lending institutions and commercial banks may have their own requirements for external, independent monitoring verification, as well as regular audits of the EMP implementation.

14.2.7 Corrective Action

There are several mechanisms for implementing corrective action, both during the construction and operational phases. The main mechanisms to address transgressions include verbal instruction (in the event of minor transgressions from established procedure, usually following a site inspection); written instruction (identifying source/s of problems, usually following an audit) and contract notice (following possible breach of contract).

14.2.8 Reporting

The findings of all of the above will be structured into instructive reporting that provides information to all required parties on HSE performance, together with clearly defined corrective action where this is seen to be required. Both the monitoring and inspections are reported on continuously. Within the reporting structure it is necessary to create a review function that continuously assesses the reporting and prescribes any necessary corrective action. Reporting will include the provision of information on the HSE performance to external stakeholders and surrounding communities.

14.2.9 Management Review

The final component of the EMP management cycle is a formal management review that takes place at defined intervals, both during the construction and operational phases. The purpose of the management review is for senior project management to review the environmental management performance during the preceding period and to propose measures for improving that performance in the spirit of continuous improvement.

14.3 Impact Mitigation and Management

Table 14-1 indicates the EMP for the proposed project. The management/mitigation table is clustered according to aspect (for example water quality). Table 14-1 also presents a schedule for the implementation of management/mitigation activities, sub-divided by project phase.

Table 14-1: Mitigation and Management Plan relating to impacts caused by project activities during all project phases

Aspect	Impact	Mitigation Measure	Schedule				Management Plan
			Pre-con	Con	Op	Cl	
Geology and topography	Soil compaction	In order to prevent irreversible construction compaction effects arising from construction plant and equipment, ensure that to the extent possible, construction is undertaken during dry periods. On completion, all non-built up areas should be landscaped.					<ul style="list-style-type: none"> • Planning and design • Rehabilitation and closure plan
	Soil erosion	To prevent soil erosion, all non-built up areas should be landscaped and appropriate soil binding grass planted.					<ul style="list-style-type: none"> • Planning and design • Rehabilitation and closure plan
Surface water	Impact on flow	If possible undertake initial construction activities during the dry season to prevent water/soil run-off especially on side slopes. Water should also be diverted away from the project footprint areas through properly constructed drainage channels					<ul style="list-style-type: none"> • Planning and design • Construction management plan • Construction control plan • Rehabilitation and closure plan
	Impact on water quality	Ensure that spills emanating from construction plant and equipment are cleaned immediately. Any petroleum products stored on site must be stored in bunded areas to prevent contamination of surface water. Contractor to adhere to Construction HSE management plan during the construction phase.					<ul style="list-style-type: none"> • Planning and design • Construction management plan • Construction control plan

Aspect	Impact	Mitigation Measure	Schedule				Management Plan
			Pre-con	Con	Op	Cl	
Ecology	Impacts on terrestrial ecology	Set up measures to ensure that during preconstruction and construction, impacts on sensitive ecological areas and individual protected biota are minimized and that good management is exercised during operation so as to prevent ecological impacts					<ul style="list-style-type: none"> • Construction management plan • Construction control plan • Rehabilitation and closure plan
Air quality	Decreased air quality due to dust and VOC emissions	Develop and implement effective measures for minimization of dust during the preconstruction and construction phase, followed by rehabilitation in a timely manner. Contractor to ensure that construction plant and equipment is in a good state of repair at all times to prevent adverse exhaust air emissions.					<ul style="list-style-type: none"> • Air quality management program
	Decreased air quality due to stack emissions	Set up an air quality monitoring station about 10km east of the project site to monitor ambient air quality (SO _x , NO _x , PM ₁₀ , PM _{2.5} , etc.). The results of the air quality should be checked against national air quality standards for compliance and in the absence of these, with the WHO air quality guidelines.					<ul style="list-style-type: none"> • Air quality management program
Waste	Pollution from waste generation	Develop and implement safe procedures for management of non-hazardous and hazardous wastes in accordance with L.N. 121: Waste Management Regulations, 2006. Contractor is responsible for this during the construction phase and the Proponent during the					<ul style="list-style-type: none"> • Waste management plan

Aspect	Impact	Mitigation Measure	Schedule				Management Plan
			Pre-con	Con	Op	Cl	
		operational phase of the project.					
Noise and vibration	Noise during construction	Contractor's plant and equipment should comply as a minimum with requirements of L.N. 25: Noise Prevention and Control Rules, 2005.					• Noise management program
	Noise during operation	The power plant will be designed to maintain noise levels at 70 dB(A) at the fence line. The Proponent will develop, rollout and implement a written hearing conservation program for those employees that may be exposed to noise environments exceeding 90 dB(A) over an 8-hour time weighted average period or 85 dB(A) continuous noise. This is in accordance with L.N. 25: Noise Prevention and Control Rules 2005.					• Noise management program
Socio-economics	Compatibility with existing and proposed land uses	The Proponent should create public awareness about "safe" land uses of any future projects in the vicinity of the proposed project area					• Community safety plan • Land acquisition and compensation plan
	Increased crime and in-migration	Implement measures to manage expectations about job creation during the preconstruction, construction and operational phases. Develop and put into practice strategies to minimize crime, to include effective communication with landowners to inform them about the movement of work teams, and codes of conduct for contractors and employees.					• Community safety plan • Labor and human resource plan • Soil conservation management program

Aspect	Impact	Mitigation Measure	Schedule				Management Plan
			Pre-con	Con	Op	Cl	
	Creation of employment opportunities	Implement where feasible measures to employ local community members during both the preconstruction and construction phase, as well as the operational phase.					
	Increased risk of disease with influx of workers and opportunity seekers	Ensure effective communication with communities to limit expectations of employment creation. Develop and implement a HSE program for employees.					
	Social divisions over limited jobs and perceived preferential access	Develop and implement transparent employment and procurement measures which comply with the regulatory framework and maximize local benefits.					
	Accidents as a result of increased traffic	Implement measures to ensure that traffic and road safety hazards are minimized during the preconstruction, construction and operational phases.					
Traffic	Damage to roads and other transport infrastructure	Develop and implement measures to repair regularly used roads to the project site especially the turn-off to the project site from the Nairobi – Mombasa highway. Ensure that contractor vehicles comply with axle load limits.					<ul style="list-style-type: none"> • Community safety plan
	Increased traffic and road safety hazard	Develop and implement a traffic management plan to take advantage of off-peak hours for delivery of construction materials and abnormal loads during the construction phase.					

Aspect	Impact	Mitigation Measure	Schedule				Management Plan
			Pre-con	Con	Op	Cl	
		Contractor drivers should possess defensive driving skills gotten from a reputable training consultancy.					
Health and safety	Occupational health and safety	Develop and implement contractor safety rules which include the relevant provisions of OSHA, WIBA and their respective subsidiary legislation. Specifically ensure that the construction complies with L.N. 40: Building Operations and Work of Engineering Construction Rules, 1984.					<ul style="list-style-type: none"> • Contractor health and safety program • Emergency response plan • Social responsibility plan • Community safety plan

Pre-con: Pre-construction phase
 Con: Construction phase
 Op: Operational phase
 Cl: Closure

14.4 Estimated cost of mitigation measures and EMP

The following table provides the cost of implementing the mitigation measures and management plan associated with the proposed project. The costs have been estimated on the basis of zero based accounting and may change during the actual pre-construction, construction, operational and closure phases of the project.

Table 14-2: Estimated cost of mitigation measures and EMP

Aspect	Impact and mitigation measure	Schedule				Cost estimate (US\$)
		Pre-con	Con	Op	Cl	
EMP Supervision costs	Costs incurred for supervising the pre-construction, construction (12 months) and operational phases (20 years) respectively					297,000 ¹ (Opex)
Independent environmental monitoring	Monitoring of environmental parameters (air quality-6 monthly, noise quality-annual, effluent quality-quarterly, etc.)					6,000 ² per annum (Opex) ³
Geology and topography	Soil compaction: all non-built up areas will be landscaped on completion of the construction phase					3,000 (Construction cost) ⁴
	Soil erosion: all non-built up areas will be landscaped on completion of the construction phase					3,000 (Construction cost)

¹ Cost includes a full-time HSE Officer based at the site (1 year-construction phase and 20 years-operational phase)

² Includes cost of independent sampling and analysis of various environmental parameters

³ Opex costs are expected to occur over the lifetime of the project which is estimated to be 20 years

⁴ Construction costs are one-off costs estimated to occur during the construction phase

Aspect	Impact and mitigation measure	Schedule				Cost estimate (US\$)
		Pre-con	Con	Op	Cl	
Surface water	Impact on flow: drainage channels will be constructed to divert water away from project footprint areas					10,000 (Construction cost)
	Impact on water quality: any petroleum products stored at the project site will be kept in bunded areas					12,000 (Construction cost)
Ecology	Impacts on terrestrial ecology					10,000 (Opex)
Air quality	Decreased air quality due to dust and VOC emissions: site watering costs to suppress dust emissions					1,000 (Construction cost)
	Decreased air quality due to stack emissions					Covered under independent environmental monitoring above
Waste	Pollution from waste generation					4,000 (Construction cost) and 1,500 per month (Opex)
Noise and vibration	Noise during construction					Covered under independent environmental monitoring above
	Noise during operation					Covered under independent environmental monitoring above

Aspect	Impact and mitigation measure	Schedule				Cost estimate (US\$)
		Pre-con	Con	Op	Cl	
Socio-economic environment	Compatibility with existing and proposed land uses					36,000 ⁵
	Proponent's corporate social responsibility program					200,000
	Increased crime and migration: provision of private security during the pre-construction, construction and operational phases of the project respectively					15,000 (Construction cost) 300,000 (Opex)
	Creation of employment opportunities: a Community Liaison Officer to be hired during the pre-construction, construction and operational phases of the project					To be determined in accordance with Kenyan labor laws during construction and operational phases of the project 240,000 (Opex)
	Increased risk of disease with influx of workers and opportunity seekers					Costs of community liaison officer covered under creation of employment opportunities

⁵ Costs associated with public awareness to be created by the Proponent over the lifetime of the project about adjacent land use

Aspect	Impact and mitigation measure	Schedule				Cost estimate (US\$)
		Pre-con	Con	Op	Cl	
	Social divisions over limited jobs and perceived preferential access: Implementation of Proponent's HR Policy Manual by EPC Contractor					To be determined in accordance with Kenyan labor laws during construction phase of the project
	Accidents as a result of increased traffic					30,000 (Construction cost)
Traffic	Damage to roads and other transport infrastructure: includes costs of repairing used roads					50,000 (Construction cost)
	Increased traffic and road safety hazards					10,000 (Construction cost)
Health and safety	Occupational health and safety					100,000 per year (Opex)

14.5 Management programs

14.5.1 Rationale

The majority of mitigation measures outlined in Table 14-1 cannot be implemented as discrete, isolated actions, since there are spatial, temporal and causal interactions amongst impacts. Therefore it is advisable to implement mitigation and management actions via integrated management programs. These programs are outlined below. While generally the programs have been divided into preconstruction and construction, operational and closure phase programs, some of them start during construction and continue into closure, such as soil conservation management, air quality, noise quality and water management.

During the preconstruction and construction phase there will be several specific environmental and social impacts which pose various risks. A more detailed construction HSE management program, including contract specifications that apply specifically to construction activities, will be developed during the detailed design phase.

The management programs, principles and key measures which are detailed below, will include:

- Soil conservation management program;
- Water quality management program;
- Air quality management program;
- Conservation of natural habitats program; and
- Noise management program.

The implementation of the EMP is also linked to a series of comprehensive management plans. These are typically substantial initiatives that will be in place for the life of the activity (and in some cases beyond). The management plans are presented in Section 14.5. Management and mitigation measures should adhere to legislative requirements. Where no legal guidance is provided, industry and/or international good practice should be applied as far as is practicable.

14.5.2 Soil conservation management program

This program aims to ensure that soil is conserved for rehabilitation through project construction, operation and closure. The program will include the following requirement:

- The minimum area required for infrastructure construction shall be cleared of vegetation.
- Measures shall be taken to ensure that topsoil and subsoil excavated from the construction site is properly managed. These measures are contained in the construction control plan in Section 14.5.3.

- A minimum amount of storm water will be allowed to flow on to the site, and control measures to meet industry norms and standards will be implemented to ensure that storm water damage is avoided and minimized.
- Topsoil shall not be disturbed more than is absolutely necessary on the construction site, and where possible should be appropriately stock-piled, such as in the form of a berm to minimize visual impacts. The stockpiled soil can then be reused following closure of the site for rehabilitation purposes.
- Denuded areas shall be surfaced as soon as feasible after construction, where clearing or use has been temporarily used for construction.
- At closure, the site shall be restored to a suitable land use capability.

14.5.3 Water management program

This program aims to ensure that surface water quality is conserved through preconstruction, construction, operation and closure phases. The surface water management program includes the following:

- Measures shall be instituted to minimize erosion and sediment transport, especially during preconstruction and construction activities. These measures should include: limiting areas cleared of vegetation, the avoidance of clearing during the wet season and the re-vegetation of cleared areas as soon as is feasible. If construction occurs during the wet season, erosion control measures must be used on sloping ground to prevent the development of rills and gullies.
- Remedial measures shall be implemented by the Contractor in the event of erosion resulting in the sedimentation of surrounding areas after due consideration of the costs and benefits of such removal activity.
- Infrastructure shall be designed to ensure that contaminated run-off does not reach watercourses.
- A surface monitoring system, including flows and water quality, shall be established and implemented for the duration of the operation of the power plant. These must comply as a minimum with L.N. 120: Water Quality Regulations, 2006.

Effluent management

Provision shall be made for suitable sewage facilities for construction workers and permanent personnel. It is anticipated that an onsite ablution sewerage system will be installed where suitable municipal connections cannot be provided.

14.5.4 Air quality management program

This program aims to ensure that air quality is maintained through preconstruction and construction. The air quality management program includes the following:

Dust management

- Areas cleared of vegetation during construction shall be minimized as the primary defense against dust generation. Refer to measures in the construction control plan.
- Dust abatement measures shall be implemented to control dust generated by construction activities. Refer to the construction control plan and construction management plan.
- Cleaning of the construction site and rehabilitation of unsurfaced areas will take place as soon as possible following the installation of infrastructure. Refer to measures in the construction control plan.
- A complaints register and protocol will be drawn up as a means for surrounding landowners, residents and public residents to voice their issues and concerns, particularly those relating to the nuisance effects of dust and noise (*See communication and information program*). The register will be set up prior to the commencement of construction activities (*See communication and information program*). These public complaints should be responded to as a matter of urgency and where possible, measures taken to minimize the cause of dust and noise.

Emissions

- The Contractor shall ensure the fitment of appropriate components and equipment to prevent fugitive emissions, as per national standards or international practices. The contractor shall ensure the regular maintenance of this equipment.
- A vehicle maintenance plan shall be implemented to prevent excessive emissions. This is pertinent during the construction phase of the project for contractors.

14.5.5 Conservation of natural habitats program

This program aims to ensure that damage of natural habitats is avoided, minimized and mitigated during the construction phase. Wherever possible, the project site shall be designed to minimize impacts on natural habitat, in particular the aquatic/riparian environment. Any regulatory requirements relating to wetland/ riparian habitat shall be complied with.

- Measures shall be implemented as part of the construction management plan and construction control plan to avoid and/or minimize the construction footprint for the proposed project/haul roads and access routes, lay-down areas, borrow areas, campsites etc.

- The Contractor shall take measures to rehabilitate the construction site following the completion of proposed project and establishment of associated infrastructure.

14.5.6 Noise management program

This program aims to ensure that noise generated by construction and operation activities is kept to a minimum and adheres to relevant noise standards. The noise management program includes the following:

- The Contractor shall ensure that construction activities are limited to working hours (i.e. between 06:00hrs and 19:00hrs daily) from Monday to Saturday, or as required in terms of legislation and/or negotiated with local landowners. Campsite/s if required will be placed at a distance from neighboring landowners and residents so as to minimize disturbance.
- Noise generating equipment will be designed to control and dampen noise emissions, and will be located at a distance far enough from the nearest noise sensitive development, to ensure that the increase in ambient noise level will comply with ISO standards.
- Landowners, residents and public shall be able to register their complaint / concern about noise through a complaints register set up prior to the commencement of construction activities (*See* communication and information program). These public complaints should be responded to as a matter of urgency and where possible measures must be taken to minimize the noise.

14.6 Management plans

14.6.1 Overview

The following management plans need to be implemented during construction, operation, decommissioning and closure of the proposed project:

- Construction management plan.
- Construction control plan.
- Labor and human resources plan.
- Workplace health and safety plan.
- Community safety plan.
- Land acquisition and compensation plan.
- Emergency management and response plan.
- Social responsibility plan.
- Rehabilitation and closure management plan.

A number of the issues to be addressed in these plans are regulated in existing laws, regulations and guidelines. In addition, it is recognized that the content of several plans will be generic, in the sense that existing procedures are documented in standard codes of practice, and that adaptations of such generic plans will only be possible as a dynamic process during construction and operation. Plans presented below, therefore, contain specific actions as well as undertakings to prepare additional plans as required prior to the commencement of certain activities during the detailed design phase. The Proponent recognizes the need for ongoing development and revision of all plans to ensure their continued applicability.

14.6.2 Construction management plan

The construction management plan to be implemented by the Contractor shall include the following key measures:

14.6.3 Management of construction campsites

1. The Contractor shall comply with all relevant laws and regulations concerning water provision, sanitation, wastewater discharge and solid waste disposal.
2. The Contractor shall not locate the campsite/s in any area in which vegetation is pristine, nor within 100m of any watercourse, nor in any area that could cause nuisance or safety hazards to surrounding landowners, inhabitants or the general public. The location of a construction campsite requires prior landowner agreement.
3. Prior to the commencement of construction, the Contractor shall also prepare documentation for the construction campsite which will contain, but is not limited to, details of: (a) site layout; (b) topsoil management; (c) sewage treatment; (d) solid waste disposal; (e) erosion control (f) fencing; (g) litter management; (h) provision for vehicle and plant servicing; (i) management of hazardous materials, (j) water supply, (k) management of fire risk (l) rehabilitation; and (m) security. The documentation shall be submitted to the Proponent as a part of the Contractor's project specific Environmental Plan prior to establishment on site.
4. The Contractor shall keep the construction campsite clean and tidy at all times. The Contractor shall not leave domestic waste uncontained, and temporary storage shall be fenced to keep out people and animals. No permanent domestic waste disposal shall be permitted at the campsite. All domestic refuse is to be removed weekly to an existing licensed domestic landfill.
5. The Contractor shall take specific measures to prevent the spread of fires, caused by activities at the campsite. These measures may include appropriate instruction of employees about fire risks and the construction of firebreaks around the site perimeter.
6. The Contractor shall prevent accelerated erosion from the construction campsite and shall not discharge polluted runoff into drainage lines (*See* soil conservation and water management programs).

Management of fuels and other hazardous materials

8. The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials.
9. The Contractor shall manage all hazardous materials and wastes in a safe and responsible manner, and shall prevent contamination of soils, pollution of water and/or harm to people or animals as a result of the use of these materials.
10. The Contractor shall prepare a hazardous materials and waste management plan for inclusion in the site specific Environmental Plan to be submitted to the Proponent prior to establishment on site. This plan shall include but not be limited to measures to prevent: (a) contamination of soils; (b) pollution of water; (c) safe siting and storage; (d) containment of lubricants and waste oil during maintenance of vehicles; and (e) tampering with tanks.
11. The Contractor shall manage all hazardous materials to be used on site according to L.N. 121: Waste Management Regulations, 2006 under the EMCA and shall ensure that the handling, storage, transport and disposal of these materials meet the requirements of these regulations.
12. The Contractor shall not locate any fixed fuel storage tanks in any location other than at the approved plant yard or campsite. Any fuel storage facilities with a capacity greater than 1000 liters shall be located on flat or gently sloping ground and shall be bermed from the surrounding area to contain at least 110% of the total capacity of the storage containers. The berms and the floor of the bermed area shall be of impermeable material or be lined to ensure that petroleum products cannot escape.
13. The Contractor shall not construct fixed fuel storage, or otherwise service or refuel any vehicle or equipment within 100 m of a watercourse or wetland, within a floodplain, or where there is the potential for spilled fuel to enter a watercourse or groundwater (*See* water quality management program). Should it not be possible to establish such a facility outside of the 100m zone, the Contractor shall ensure that the necessary precautions are taken to prevent and clean up spillages, including spill kits on the bowsers.
14. The Contractor shall enclose all fixed storage by a security fence with a lockable gate.
15. The Contractor shall place on-site tools and equipment, such as pumps, compressors and generators on bermed impermeable sheeting (e.g. polyethylene or other similar material) to prevent hydraulic fluid or fuel leaks from contaminating soil or groundwater or entering any watercourse or wetland.
16. The Contractor shall take all reasonable precautions to prevent fuel and lubricant spills during the course of construction. To this end, the Contractor shall ensure that: (a) there is no overfilling of diesel bowsers and equipment tanks; (b) regular audits are performed to verify that no leaking or defective equipment is brought onto site; and (c) any oils or lubricants discharged during routine vehicle servicing on site are captured using drip trays, containers or other appropriate containment measures.

17. The Contractor shall ensure that fuelling and repairs are carried out or supervised by personnel familiar with spill containment and cleanup procedures.
18. The Contractor shall ensure that there is sufficient absorbent material available on site to manage accidental spills. The Contractor shall immediately clean up accidental spillages of fuels and oils, or other hazardous substances, and shall report the incident to the Proponent and the measures taken to remediate the spill problem.

Management of the construction site

20. The Contractor shall prevent littering and the random discard of any solid waste on or around the construction site.
21. The Contractor shall manage hazardous waste.
22. The Contractor shall minimize the risk of bush fires.
23. The entire construction site will be hoarded with appropriate fencing.
24. The Contractor shall prevent trespassing on the construction area. Public entry to the area shall be prohibited and signs to this effect shall be erected at points of potential public entry.
25. The Contractor shall ensure that contract employees remain within the construction area and do not trespass on to neighboring land.
26. The Contractor shall determine safe travelling speeds for the construction site and access roads and shall ensure that these restrictions are enforced. This may include, but not be limited to, the monitoring of vehicle speeds and the erection of speed limit signs.

Emergency preparedness

27. The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards.
28. The emergency plan shall include the establishment of a network of communication between the Contractor and emergency services including the police, traffic police, local medical and ambulance services, fire departments, etc.
29. The Contractor shall test emergency preparedness with drill operations and shall review drills, conduct mock emergencies and remedy shortcomings to ensure a high level of emergency readiness to deal with environmental and third party incidents.

Fire prevention and management

30. The Contractor shall take all necessary precautions to prevent the ignition of bush fires caused either deliberately or accidentally as a result of the work being performed.
31. The Contractor shall prepare a fire safety policy in accordance with the relevant requirements of L.N. 59: Fire Risk Reduction Rules, 2007.

32. The Contractor shall prepare a fire prevention and fire emergency management plan as a part of the Environmental Plan to be submitted to the Proponent prior to establishment on site. The plan shall include, but not be limited to, the following: (a) sources of fire risk; (b) measures to comply with any requirements of local authority fire departments; (c) measures to meet requirements agreed between the Proponent and the surrounding landowners; (e) measures to minimize the risk of accidental fires caused by any activity related to the work; and (f) measures to control an accidental fire.
33. The Contractor shall provide adequate firefighting equipment at specified localities on the work site to meet any emergency resulting from ignition of a fire. This equipment should as applicable include but not be limited to (a) fire extinguishers; and (b) fire resistant clothing for fire fighters.
34. The Contractor will ensure that hot work is prohibited under specified meteorological conditions with high fire risk and that appropriate and adequate firefighting equipment would be required to be on standby at all times where hot work is being carried out.
35. Wherever practicable, bush shall not be cleared using burning. In instances where this is not possible, controlled burning can only take place upon request of and approval from the surrounding landowner, when there is no wind and appropriate firefighting measures are in place.

Management of dust and noise nuisance

35. The Contractor shall control dust within the construction site and the access road leading to it from the main highway to ensure that no detrimental effects to landowners, occupants or the general public are caused. Control measures to be considered include the use of water bowsers to wet down surfaces that have been denuded and which have the potential to generate dust (*See* air quality program).
36. The Contractor shall comply with the legal requirements for the management of noise impacts as specified in L.N. 25: Noise Prevention and Control Rules, 2005. If instructed to do so by the Proponent, the Contractor shall demonstrate compliance with the noise regulations by means of measurement of residual noise levels at receiver points specified by the Proponent. Measurement shall be in accordance with the requirements of the noise regulations.

Surrounding land owner and occupier relations

38. The Contractor shall respect the property and rights of surrounding landowners and occupiers at all times and shall treat all such persons with deliberate courtesy.
39. Access over land, the integrity of fences, the closure of gates, control of littering, dust control, noise abatement, sedimentation and contamination of ground and surface waters, damage to landscape and vegetation, and all such environmental matters shall be controlled as far as practicable, by the Contractor in the best interests of the land owner or occupier.

Complaints register

41. The Contractor shall establish and maintain a register for periodic review by the Proponent that logs all complaints raised by landowners, occupiers or the general public about construction activities. The register shall be regularly updated and maintain records, including the name of the complainant, his or her domicile and contact details, the nature of the complaint and if any action that was taken to rectify the problem.

Health management

42. The Contractor shall comply with all relevant legislative requirements governing worker health and safety (e.g. OSHA, WIBA, Public Health Act, etc. and their respective subsidiary regulations).

The Contractor shall also prepare and implement a program to minimize the spread of HIV infection as a result of the construction contract. The program shall be prepared with the assistance of a medical doctor with experience of HIV prevention and treatment.

14.6.4 Construction control management plan

The construction control management plan to be implemented by the Contractor shall include the following key measures:

Control of access

1. The Contractor shall strictly control access to the construction site for security and public safety reasons.

Control of topsoil and subsoil

2. The Contractor shall store topsoil (defined as the soil above 150 mm) excavated from the site in a wind row or stockpile which shall be discernibly separate from wind rows or stockpiles of any other excavated materials.
3. Topsoil shall not be contaminated with anything that might impair its plant-support capacity (e.g. aggregate, cement, concrete, fuels, litter, oils, domestic and industrial waste).
4. The Contractor shall temporarily stockpile topsoil in a location that will minimize any loss due to erosion or mixing with other material.
5. The Contractor shall ensure that topsoil is stockpiled in a manner and for a period of time that does not result in deterioration in its plant support capacity.
6. Topsoil for the proposed project shall be used to construct a berm to minimize visual impact of the facility. This topsoil shall be stored in such a way that it can eventually be used to appropriately rehabilitate the site following closure of the proposed project, depending on the future land use.

Control of material supply and borrow areas

7. The Contractor shall, as far as possible, source all material needed to develop the project from existing permitted quarries in the area.
8. The Contractor shall prepare a method statement including plans, detailing the expected quantity of excavation, temporary and permanent drainage control, the final contouring of the borrow pit and the proposed method of rehabilitation and shall submit this to the Proponent for approval prior to opening the borrow pit.

Control of construction near watercourse crossings

The proposed power plant site is within 700 m of the Stony Athi River and no drainage lines have been identified on the site. Although direct impacts are not envisaged on the watercourse during construction, points 9 – 10 below are included as a precautionary measure:

9. The Contractor is responsible for controlling riparian and stream damage to the river systems resulting from the construction of the power plant and associated infrastructure.
10. The Contractor shall comply with any conditions of approval set by the NEMA or Ministry of Water, over and above the requirements of this EMP.

Rehabilitation

11. The site should be cleared of construction materials. The Contractor should remove waste materials from the site to appropriate waste disposal sites.
12. The Contractor shall remove all temporary works from the construction site, restore and re-vegetate the areas along the perimeter of the site.
13. The Contractor shall prevent concentrated run-off along, or next to, the construction site and shall do so by shaping the land, establishing vegetation where necessary, and taking other appropriate measures to absorb and disperse runoff.
14. The Contractor shall establish vegetation cover (using species appropriate to the local area) in all areas disturbed by the works in the first growing season after construction, and shall maintain this cover for the duration of the maintenance period.
15. Re-vegetation shall be done on all borrow areas, temporary access roads, spoil sites, camp sites and the like.

Hydro-testing

16. The procurement and discharge of water required for hydro-testing shall comply with the requirements of the Water Act and related regulations. The standards relating to discharge will depend on the receiving environment into which the water is discharged, the rate of discharge and the nature of any additives included in the water.
17. Prior to implementation of the hydro-testing, the Contractor shall prepare a plan which complies with any requirements set by the NEMA or the Ministry of Water.

18. The Contractor shall ensure that dust and noise caused by cleaning operations do not cause nuisance to surrounding landowners, occupiers or the general public. The Contractor shall prepare a method statement in this regard which shall include, but not be limited to: the location of cleaning/drying operation sites; the anticipated peak and equivalent equipment noise levels that will result from the operations and the period over which they will occur; the location of surrounding inhabitants; the methods proposed to limit noise levels at the nearest noise receptors to meet the legal requirements of L.N. 25: Noise Prevention and Control Regulations, 2005 under the OSHA.

14.6.5 Labor and human resource plan

The labor and human resources plan to be implemented by the Contractor and the Proponent shall include the following key measures:

1. The Contractor shall establish a labor and human resources plan that addresses the employment of national employees and expatriate employees, which shall be submitted to the Proponent.
2. The plan shall be based on the following principles:
 - a) Compliance with national policy and legislation (e.g. Employment Act) and international labor conventions and norms.
 - b) Clear and transparent conditions of service, as appropriate.
 - c) Open and fair recruitment procedures.
 - d) Well-structured, transparent and locally-appropriate remuneration and compensation procedures.
 - e) Accessible and appropriate training and development.
 - f) Clearly defined and open dispute resolution procedures.
3. Wherever possible, first priority should be given to hiring qualified local people especially from within the project area. It is expected that the great majority of employees in all phases will be Kenyan nationals.
4. The labor and human resources plan shall, as appropriate, be adapted by the Proponent and applied during the operational phase of the project.

14.6.6 Workplace health and safety plan

The workplace health and safety plan to be implemented by the Contractor and the Proponent shall include the following key measures:

1. All relevant national legislation including the OSHA, WIBA and related regulations shall be adhered to in order to provide a safe and healthy environment for all employees, contractors, suppliers and the community during construction and operational phases of the project.
2. The Contractor shall develop a health and safety plan in fulfillment of legal requirements for submission to and approval by the Proponent prior to the start of construction activities.
3. The Proponent shall ensure workplace health and safety during the operational phase of the project. Management should lead by example to ensure that legislative and contractual requirements are met.
4. Health and safety performance will be continuously monitored and procedures reviewed with the aim of eliminating risk as far as reasonably practicable.

14.6.7 Community health and safety plan

The community health and safety plan to be implemented by the Contractor and the Proponent shall include the following key measures:

1. All relevant national legislation including the OSHA, WIBA and related regulations shall be adhered to ensure that the health and safety of proximate communities and the public at large are not threatened during construction and operational phases of the project.
2. During the construction phase, the Contractor shall manage and control construction activities in order to minimize the risks to community health and safety. Special attention shall be paid to threats posed by the movement of construction vehicles, security and access control to the construction site, transport safety management and control of dust, noise and water pollution.
3. The Proponent will undertake a risk assessment of the project prior to its operation. The findings of this assessment will inform the development of an emergency safety plan and be included into the Proponent's HSE procedures.

14.6.8 Emergency management and response plan

The emergency management and response plan to be implemented by the Proponent shall include the following:

Emergency management planning

1. The Proponent shall develop an emergency management plan to guide the coordination and operational handling of an emergency situation to include:
 - (a) Structure and operation of the emergency management team.
 - (b) Establishment of an emergency management centre.

- (c) Information retained by the emergency management team.
 - (d) Incidents requiring activation of the plan.
 - (e) Incident severity classification.
 - (f) Process to be followed in the event of an emergency.
2. Information pertaining to emergency management shall be reported through the HSE reporting process.

Emergency response plan

The community health and safety plan to be implemented by the Contractor and the Proponent shall include the following key measures:

3. The Proponent must compile a comprehensive emergency response plan for the project, in conjunction with the emergency services of the local municipality. As a minimum requirement, the plan must cover the following aspects:
- (a) Kenyan and international safety regulations.
 - (b) Scope of the emergency response plan.
 - (c) Notification of local authorities.
 - (d) Details of the power plant.
 - (e) Aim of the emergency response plan.
 - (f) Objectives of the emergency response plan.
 - (g) Emergency arrangements, procedures and plans.
 - (h) Roles and responsibilities in the event of an emergency.
 - (i) Information requirements in the event of an emergency.
 - (j) Evacuation of people.
 - (k) The role of local communities.
 - (l) Regular testing of the emergency response plan.
 - (m) Planning for the eventuality of failures associated with the project and associated infrastructure.
 - (n) Causes of the project failures.
 - (o) Probability of project failures.
 - (p) Hazards and effects of the project failures, including fire, explosion, toxic effects, blast effects, projectile effects, asphyxiation effects, noise and damage to nearby assets, such as water resources.
 - (q) Hazard range and emergency planning distances.
 - (r) Anticipation of worst credible incidents.

4. Emergency preparedness will be the responsibility of a manager based at the power plant. The manager will be responsible for implementing a locally relevant emergency response plan, which will include: ongoing staff emergency training; equipment maintenance and inspection; ongoing contact with local emergency staff; emergency fire/contamination drills with and without local emergency services; and communication to local residents.

14.7 Corporate HSE structure

HSE forms part of the core corporate management and administration structure of the Proponent in recognition of its key functions in the company and in order to ensure that environmental and social concerns are integrated throughout company activities and line function divisions.

Key posts in the corporate structure will be established at the onset of project implementation, that is, once the go-ahead is given and detailed design and construction start. At full capacity, the HSE unit will be structured to include a range of posts that will address the various requirements detailed in this EMP. The HSE Manager will be responsible for ensuring that all HSE requirements that have been identified in this ESIA report, as well as others that may become apparent during project implementation, are met effectively.

The HSE Manager will be responsible for all HSE issues that are related in any way to the construction of the project. The Plant Manager will be ultimately accountable for ensuring that all environmental and social management facilities and procedures that will be required during operation of the Project are included in the design, and that operations proceed in compliance with HSE requirements. The Plant Manager will in turn report to the Managing Director.

14.7.1 HSE construction phase roles and responsibilities

The Proponent plans to put in place a specific team to manage the construction phase of the proposed Project. This team will be separate from the operations team, but will coordinate as required to ensure that there are no conflicts between operational and construction requirements. The physical construction will be managed by an EPC Contractor (Mantrac), who in turn will sub-contract specific components to various construction sub-contractors.

The EPC Contractor's environmental and social staff will be supervised by the Proponent's HSE organization. The Proponent's HSE staff may include some or all of the following:

- HSE Manager – to oversee the implementation of all HSE requirements as defined by the Proponent (essentially the requirements stipulated in this EMP, but others may also become apparent and be included during project implementation). He/she should possess the requisite qualification pertaining to HSE and must have necessary experience, five of which a part needs to have been in a senior HSE management position.

- Environment Manager will also oversee environmental matters with his HSE staff (HSE officers). The staff should possess suitable qualifications in a natural science and/or environmental science/management discipline and should have appropriate experience.
- The HSE Officer will be responsible for the implementation of the various environmental management requirements that need to be met by the Managing Contractor as well as the various other contractors that will be operating on the site. This function will include regular inspections, coordination of reporting, and site wide environmental monitoring. The HSE officer should have tertiary qualification in a natural science and/or environmental science/management discipline with suitable and relevant work experience.
- Independent environmental consultant/s – will be commissioned from time-to-time to assist with specific tasks (e.g. review information and provide advice on specialist issues, assist in the preparation of an annual monitoring report and conduct environmental auditing). An independent environmental expert(s), in any field (e.g. wetlands, terrestrial ecology, water management, etc.) may be appointed on request of the Environmental Manager to provide specialist advice.

Contractors will be expected to have their own HSE Managers and their activities will be overseen by the Proponent's HSE staff. In addition, key line functions will have specific environmental and social management responsibilities included in their job descriptions and performance criteria. Critical among these is the Construction Manager. The Construction Manager will be accountable for environmental and social management during the construction phase. Specific responsibilities will include:

- The effective implementation of the EMP.
- Regular performance reviews.
- Corrective and/or remedial action where this may be required.

An HSE Coordination Committee will be established to review, on an ongoing basis, progress in respect of the implementation of the EMP requirements. This Committee will be made up of representatives of the Proponent and the EPC Contractor. Meetings will be held monthly with the specific objectives of:

- Reviewing implementation progress of the programs and plans described in the EMP against implementation and performance objectives and targets.
- Highlighting areas of concern.
- Identifying any required interventions and prescribing corrective actions and schedule.
- Allocating budget and appointing responsible parties.

14.7.2 Contractor arrangements during the construction phase

The following construction phase contractor arrangements will be made to support HSE and EMP implementation:

- A detailed code of practice for construction teams will be prepared and implemented. This code will guide the management and behavior of construction teams. The code will include items relating to health and safety. The code of practice for construction workers will include provisions for, as minimum, the prevention of HIV/AIDS.
- Information on the implications of construction will be disseminated before construction starts.
- Contracts will be key tools in managing many potential negative impacts, such as transport related incidents. In this context both construction and operational contracts will specify required environmental and social practices.

14.7.3 Training, awareness and capacity building

The presence on site of one experienced HSE Manager with previous exposure to similar projects, will allow on-the-job training on a daily basis. During the execution of the project it will be necessary to develop and implement HSE training and awareness programs. These will range from direct and dedicated training programs for specific HSE functions to broad HSE awareness programs that will need to be rolled out across the entire workforce. The following will be pursued:

- Formal HSE management training.
- HSE awareness training for all levels of workers.
- Supplementary initiatives, including toolbox talks, directives, newsletters, videos and induction programs.

14.8 Monitoring

The programs and plans described above will be subject to monitoring. In general, monitoring will have two key elements: routine monitoring against set standards or performance criteria; and periodic review or evaluation. This will often focus on the effectiveness and impact of the program or plan as a whole. In some cases, independent parties will undertake review and evaluation. The diverse monitoring requirements and responsibilities will be consolidated within the HSE function, and will share human resources, databases and management reporting procedures.

During the construction phase, the Proponent shall be fully entitled to monitor and inspect Contractors' written records to demonstrate compliance with the ESIMP. This compliance monitoring is intended to verify that the responsible parties are implementing the management measures/procedures/specifications contained in the ESIMP. Compliance will mean that the Contractor is fulfilling his/her contractual obligations.

During the operational phase of the Project, monitoring will be undertaken to ensure compliance with management measures in the ESIMP and operational procedures. Independent auditors will periodically (annually) review the Proponent's environmental and social performance against established objectives and targets. If the Project is funded by funding institutions, the Proponent will be required to produce an annual monitoring report, which should be independently verified prior to being submitted to the lenders.

14.8.1 Program monitoring

The Proponent shall regularly monitor program implementation. This process will include (as appropriate) the regular monitoring of:

- Erosion of soil resulting in the immediate surroundings of the power plant.
- Air quality and ambient emissions, including dust generated by construction activities (12 months). Air quality will be measured continuously at an air quality monitoring station to be set up about 10km east of the project site.
- Surface water quality and flows and borehole sampling (12 months after construction). This monitoring will be used to establish a water quality baseline against which water quality and flows can be compared.
- Noise (measured in dBA) generated by construction activities (12 months) and arising from the LPG storage facility (after commissioning) using specific measurement parameters, reference times and measurement locations.

14.8.2 Plan monitoring

All of the management plans make provision for monitoring and evaluation. Special attention should be given to the monitoring arrangements related to biophysical impacts, occupational health and safety, and emergency response.

During the construction phase of the Project, the Contractor's HSE manager must report all environmental impacts (e.g. large scale erosion) as well as accidents and incidents to the Proponent's representative. These reported impacts and incidents will be captured on a database to ascertain trends and track progress in the implementation of preventative and corrective actions, and benchmarking against other, similar operations.

Depending on the level of severity, accidents and incidents will be investigated by the EPC Contractor's HSE division, with key input from the line management to ensure accountability. Rewards and recognition could be given to the best performing work team on a monthly basis. The primary objective of these interventions is to recognize the positive behaviors and outcomes of workers with regards to safety.

During operation, the Proponent's HSE unit will monitor the health and safety of personnel and contractors, in compliance with legislative requirements. Emergency incidents should be reported to the relevant authorities. These reported incidents impacts will be captured on a database to identify weaknesses in the emergency response plan and track progress in the implementation of preventative and corrective actions and benchmarking against other, similar operations.