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11 Environment Management Plan (EMP)

This EMP seeks to manage and keep to a minimum the negative impacts of the proposed 220kV transmission line project and at the same time, enhance the positive and beneficial impacts.

11.1 Objectives of the EMP

The objectives of the EMP are to:

- Identify a range of mitigation measures which could reduce and mitigate the potential impacts to minimal or insignificant levels;
- To identify measures that could optimize beneficial impacts;
- To create management structures that address the concerns and complaints of stakeholders with regards to the development;
- To establish a method of monitoring and auditing environmental management practices during all phases of development;
- Ensure that the construction and operational phases of the project continues within the principles of Integrated Environmental Management;
- Detail specific actions deemed necessary to assist in mitigating the environmental impact of the project;
- Ensure that the safety recommendations are complied with;
- Propose mechanisms for monitoring compliance with the EMP and reporting thereon; and
- Specify time periods within which the measures contemplated in the final environmental management plan must be implemented, where appropriate.

11.2 EMP roles and responsibilities

Several professionals will form part of the construction team. The most important from an environmental perspective are the Project Manager (Galetech Energy Developments of Ireland), the Project HSE Officer, the EPC Contractor, and the developer (Kipeto Energy Limited).

The Project Manager is responsible for ensuring that the EMP is implemented during the **pre-construction** and **construction** phases of the project.

The Project HSE Officer is responsible for monitoring the implementation of the EMP during the design, **pre-construction** and **construction** phases of the project.

The EPC contractor is responsible for abiding by the mitigation measures of the EMP which are implemented by the Project Manager during the **construction** phase.

The Project Manager is responsible for ensuring that the EPC contractor complies with the mitigation measures and EMP requirements during the **design, pre-construction** and **construction** phases of the project.

An Operations and Maintenance (O&M) company will be responsible for implementation of the EMP during the **operational** and **decommissioning** phases of the project. Decommissioning will however entail the appointment of a new professional team and responsibilities will be similar to those during the design, pre-construction and construction phases. It is unlikely that the transmission line will be decommissioned for several years.

11.2.1 Project Manager

The Project Manager is responsible for overall management of the project and EMP implementation. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the EIA License issued by NEMA;
- Be familiar with the recommendations and mitigation measures of this EMP, and implement these measures;
- Monitor site activities on a daily basis for compliance;
- Conduct internal audits of the construction site against the EMP;
- Confine the construction site to the demarcated area; and
- Rectify transgressions through the implementation of corrective action.

11.2.2 Project HSE Officer

The Project HSE Officer is responsible for the implementation of the EMP during the construction phase as well as liaison and reporting to the Developer, Contractor, Landowners and Authorities. The following tasks will fall within his/her responsibilities:

- Be aware of the findings and conclusions of the Environmental Impact Assessment and the conditions stated within the EIA License;
- Be familiar with the recommendations and mitigation measures of this EMP;
- Conduct weekly/monthly audits of the construction site according to the EMP and EIA License conditions;
- Educate the construction team about the management measures of the EMP and EIA License conditions;
- Regularly liaise with the construction team and the project leader;
- Recommend corrective action for any environmental non-compliance incidents on the construction site; and
- Compile a regular report highlighting any non-compliance issues as well as good compliance with the EMP.

11.2.3 EPC Contractor

The EPC contractor is responsible for the implementation and compliance with recommendations and conditions of the EMP.

- Ensure compliance with the EMP at all times during construction
- Maintain an environmental register which keeps a record of all incidents which occur on the site during construction. These incidents include:
 - Public involvement / complaints
 - Health and safety incidents
 - Incidents involving Hazardous materials stored on site
 - Noncompliance incidents

Most Landowners will see the construction period as interference with their daily activities. There could potentially be a negative attitude towards the whole construction process.

Landowners are always apprehensive toward changes they do not control and strangers on their properties. If and where the transmission line is close to any inhabited area, the necessary precautions shall be taken by the Contractor to safeguard the lives and property of the inhabitants. The Contractor shall under no circumstances interfere with the property of Landowners or nearby Communities.

11.2.4 Contractor HSE Officer

The Contractor HSE Officer will be appointed by the EPC contractor to monitor activities on site on a daily basis. The Contractor HSE Officer will be the HSE Officer's representative on the site and will report back on all audit trips. The Contractor HSE Officer must report any major incidents immediately to the Project HSE Officer.

11.2.5 Independent HSE Auditor

The independent HSE auditor will conduct an environmental audit during the construction phase of the project on a six-monthly basis according to the provisions of the Environmental Management Plan. The independent auditor will:

- Conduct independent environmental audits;
- Submit audit reports to the Project HSE Officer and if required, relevant authority;
- Engage specialist sub-consultants when required.

11.2.6 Environmental management responsibilities

The following are the environmental management responsibilities of the various parties during construction and operational phases. Unless otherwise stated the EMP will be adhered to as follows:

- The Contractor's HSE Officer will be the responsible party for compliance with this EMP during the construction phase;
- The monitoring party will be the Project HSE Officer;
- Method of record keeping will be weekly to two weekly inspections depending on the stage of the project;
- The inspection technique will include a review of records that will be kept on site by the Contractor HSE Officer and/or site inspections;
- The Client will bear ultimate responsibility for environmental management.

11.3 Environmental monitoring

A monitoring program will be implemented for the duration of the construction phase of the project. This program will include:

- Monthly environmental inspections to confirm compliance with the EMP and EIA License conditions. These inspections can be conducted randomly and do not require prior arrangement with the project manager;
- Compilation of an inspection report complete with corrective actions for implementation;
- Monthly HSE committee meetings to be held to ensure compliance with the OSHA and its subsidiary legislation.

The HSE Officer shall keep a photographic record of any damage to areas outside the demarcated site area. The date, time of damage, type of damage and reason for the damage shall be recorded in full to ensure the responsible party is held liable.

All claims for compensation emanating from damage should be directed to the Project HSE Officer for appraisal. The Contractor shall be held liable for all unnecessary damage to the environment. A register shall be kept of all complaints from the Landowner or community. All complaints/claims shall be handled in a timely manner to ensure timeous rectification/payment by the responsible party.

It should be noted that it is difficult to outline a formal monitoring protocol for specific environmental parameters and key impacts until detailed transmission line design have been completed. A formal monitoring protocol will be included within the revised EMP once the detailed transmission line design has been completed, and once recommendations and conditions from the reviewing authority have been received. It should further be noted that for the same reasons mentioned above, it is difficult to delineate the cost of the EMP for specific mitigation measures and therefore this has been excluded from the EMP tables.

The EPC contractor shall be responsible for acquiring all necessary permits during the construction phase of the project. Such licenses include any abstraction of water permits, local authority approvals for camp site locations and operations, extraction of aggregates from borrow pits and their rehabilitation, etc.

11.3.1 Compliance with the EMP and associated documentation

A copy of the EMP must be kept on site during the construction period at all times. The EMP will be made binding on all contractors operating on the site and must be included within the Contractual Clauses. It should be noted that in terms of the principles of environmental management espoused through the EMCA, those responsible for environmental damage must pay the repair costs both to the environment and human health measures to reduce or prevent further pollution and/or environmental damage (the polluter pays principle).

The Contractor is deemed not to have complied with the EMP if:

- Within the boundaries of the site, site extensions and haul/access roads there is evidence of contravention of clauses; or
- If environmental damage arises due to negligence; or
- The contractor fails to comply with corrective or other instructions issued by the Project HSE Officer or Authorities within a specified time; or
- The Contractor fails to respond adequately to complaints from the public.

The Proponent is deemed to be out of compliance with the EMP if:

- Within the boundaries of the site there is evidence of contravention of clauses;
- If environmental damage arises due to negligence;
- The Proponent fails to respond adequately to complaints from the public.

11.3.2 Training and Awareness

11.3.2.1 Training of Construction Workers

The Construction Workers must receive basic training in environmental awareness, including the storage and handling of hazardous substances, minimization of disturbance to sensitive areas, management of waste, and prevention of water pollution. They must also be appraised of the EMP's requirements.

11.3.2.2 Contractor Performance

The Contractor must ensure that the conditions of the EMP are adhered to. Should the Contractor require clarity on any aspect of the EMP, the Contractor must contact the Project HSE Officer for advice.

11.4 EMP requirements for pre-construction phase

The requirements that need to be fulfilled during the pre-construction phase of the project are as follows:

- There should be continuous liaison between the Proponent, the EPC contractor and Landowners along the wayleave to ensure all parties are appropriately informed of construction phase activities at all times;
- The Landowners should be informed of the starting date of construction as well as the phases in which the construction will take place;
- The EPC contractor must adhere to all conditions of contract including the Environmental Management Plan;
- The EPC contractor should plan the construction program taking cognizance of climatic conditions along the wayleave especially wet seasons and disruptions that can be caused by heavy rains;
- Where existing private roads are in a bad state of repair, such roads' condition shall be documented before they are used for construction purposes. This will allow for easy assessment of any damage to the roads which may result from the construction process. If necessary some repairs should be done to prevent damage to equipment;
- The construction site office must keep a proper record of all complaints received and actions taken to resolve the complaints;
- A Project HSE Officer should be appointed by the Proponent and Contractor HSE officer should be appointed by the EPC contractor to implement this EMP as well as deal with Landowner related matters;
- Internal and external environmental inspections and audits should be undertaken during and upon completion of construction. The frequency of these audits should be quarterly;
- The Project HSE Officer should conduct regular inspections along the wayleave in order to maintain good control over the construction process during the construction phase;
- A formal communications protocol should be set up during this phase. The aim of the protocol should be to ensure that effective communication on key issues that may arise during construction be maintained between key parties such as the Project HSE Officer, project manager and EPC contractor. The protocol should ensure that concerns/issues raised by stakeholders are formally recorded and considered and where necessary acted upon. If necessary, a forum for communicating with key stakeholders on a regular basis may need to be set up. This could be done through the EPC contractor's site office that would meet on a regular basis. The communications protocol should be maintained throughout the construction phase.

Table 11-1: Environment Management Plan-Pre-construction Phase

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Pre-construction phase impacts	<ol style="list-style-type: none"> 1) The Proponent should appoint a project HSE Officer while the EPC Contractor should appoint his/her HSE officer; 2) Demarcate clearly (e.g. using fencing) all areas to be developed before construction commences; 3) The EPC contractor to comply with the conditions of the EIA License for the project; 4) Maintain records of environmental incidents and avail a copy of these records to relevant lead agencies on request throughout the construction phase; 5) Identify and confirm suitable sites for the construction camps and storage areas for materials; 6) Store construction equipment in construction camps. Ensure oil changes take place on an impermeable surface such as reinforced concrete slab; 7) Provide as much as possible opportunities for employment to persons from the local areas along the wayleave; 8) Train site staff on the following areas of environmental management; <ol style="list-style-type: none"> a) Environmental awareness training for construction staff, concerning the prevention of accidental spillage of hazardous chemicals and oil; pollution of water resources (both surface and groundwater), air pollution and litter control and identification of archaeological artifacts; b) Project Manager shall ensure that the training and capabilities of the Contractor's site staff are adequate to carry out the designated tasks; 	KEL, Project HSE Officer	Bi-monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<ul style="list-style-type: none"> c) Operators of construction equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks; d) No operator shall be permitted to operate critical items of mechanical equipment without having been trained by the EPC Contractor and certified competent by the Project Manager; e) Staff should be educated as to the need to refrain from indiscriminate waste disposal and/or pollution of local soil and water resources and receive the necessary safety training. 		

11.5 EMP requirements for construction phase

11.5.1 Site preparation

Site clearing along the wayleave will be limited to the width of the proposed wayleave which is about 60m. Site clearing must take place in a phased manner, as and when required. Areas which are not to be constructed on within say one month of time must not be cleared to reduce erosion risks. The area to be cleared must be clearly demarcated and this footprint strictly maintained. Topsoil from the must be neatly stockpiled at the edge of the wayleave ready for backfill when required.

11.5.2 Establishment of Construction Camps and Materials yards

The proposed 100MW wind farm and 220kV transmission line project will utilize approximately two construction camps and laydown areas. The construction camp locations have been identified based on the ease of access to the wind farm area as well as the transmission line.

Site establishment shall take place in an orderly manner and all required amenities shall be installed at Camp sites before the main workforce move onto site. The Construction camp shall have the necessary ablution facilities with chemical toilets at commencement of construction. The EPC Contractor shall inform all site staff to make use of supplied ablution facilities and under no circumstances shall indiscriminate sanitary activities be allowed other than in supplied facilities.

The Contractor shall supply waste collection bins where such is not available and all solid waste collected shall be disposed of using NEMA approved waste handlers. A Waste Tracking Sheet required by Legal Notice 121: Waste Management Regulations, 2006 will be obtained by the EPC contractor and kept on file. The disposal of waste shall be in accordance with the Waste Management Regulations, 2006. Under no circumstances may any form of waste be burnt on site.

Table 11-2: Environment Management Plan-Construction Phase

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
<p>Poor traffic and access management during construction</p>	<p>Construction traffic</p> <ol style="list-style-type: none"> 1. Clearly define construction routes and required access roads; 2. Use the minimum number of trips for delivering construction plant and equipment along the wayleave; 3. Strictly control the access of all construction and material delivery vehicles especially during wet weather to avoid compaction and damage to the topsoil structure; 4. Schedule the delivery hours to avoid peak hour traffic, weekends and evenings; 5. Implement wheel washing and damping down of un-surfaced roads to reduce dust and nuisance; 6. Service vehicles and equipment regularly to avoid the contamination of soil from oil and hydraulic fluid leaks, etc. Servicing of vehicles and equipment must be done off-site and on an impermeable surface such as concrete; 7. Soils compacted by construction equipment along the wayleave should be ripped and regarded. <p>Access</p> <ol style="list-style-type: none"> 8. Rehabilitate temporary access roads prior to the EPC contractor leaving the site; 9. Position entry and exit points strategically to ensure minimal effects on traffic; 10. Clearly signpost primary routes to the site and issue to all suppliers and Sub-Contractors. 	<p>EPC contractor, Project HSE Officer</p>	<p>Bi-weekly</p>

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>11. Plan access routes to the site for construction purposes in conjunction with the EPC contractor and affected Landowners. All agreements reached should be documented and no verbal agreements should be made. The EPC contractor shall clearly mark all access roads.</p> <p>12. Where new access roads are constructed, this must be done according to design and contract specifications. Drainage channels shall be suitably designed to ensure erosion does not occur, especially at the outflow points. The new access road shall be designed to allow for the natural flow of water where required. Crossing of eroded areas on access routes to new sites shall be thoroughly planned and installed according to design and contract specifications. All areas susceptible to erosion shall be protected with suitable erosion control measures from the onset of the project. Prevention is the ultimate aim, as restoration is normally difficult and costly.</p> <p>Road maintenance</p> <p>13. All damaged roads shall be rehabilitated using suitable measures. In the event of rehabilitation work being required on private roads, such work will be done to the original specifications of the private road;</p> <p>14. Access roads should be maintained in good condition by attending to potholes, corrugations and stormwater damage as soon as these develop.</p> <p>General</p> <p>15. Safety requirements shall be complied with at all times during the construction phase. All equipment transported shall be clearly labeled as to their potential hazards according to specifications. All the required safety labeling on the containers and trucks used shall be in place;</p>		

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	16. The Contractor shall ensure that all the necessary precautions against damage to the environment and injury to persons are taken.		
Improper setup and operation of Construction camps	<p>Site of construction camp</p> <ol style="list-style-type: none"> 1. The EPC contractor to seek approval from the relevant local authority for the location of the construction camp. Factors to consider during siting of construction camps include location of local residents and/or ecologically sensitive areas, including flood zones and slip/unstable zones. If the EPC contractor chooses to locate the camp site on private land, he must get prior permission from both the Project Manager and respective landowner; 2. Minimize the size of the construction camp (especially where natural vegetation or grassland has had to be cleared for its construction); 3. Provide adequate parking for site staff and visitors. This should not inconvenience or serve as a nuisance for neighbors; 4. Provide adequate drainage around the camp site to avoid standing water and/or sheet erosion. <p>Storage of materials (including hazardous materials)</p> <ol style="list-style-type: none"> 5. Choose storage area location by considering prevailing winds, distances to water bodies, general onsite topography and water erosion potential of the soil. Impervious surfaces must be provided where necessary; 6. Designate, demarcate, fence off and secure all storage areas to minimize the risk of crime; storage areas should be safe from access by unauthorized persons; 7. Provide fire prevention facilities at all storage facilities; 	EPC contractor, Project HSE Officer, Contractor HSE Officer	Bi-weekly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>8. Store all hazardous materials such as oils, paints, thinners, fuels, chemicals, etc. in properly constructed and impermeable bunded areas. Hazardous materials must not be allowed to contaminate the subsurface or enter into drainage systems. Siting of hazardous material storage areas must be approved by the Project Manager.</p> <p>9. The EPC contractor to acquire MSDSs for all chemicals and hazardous substances used on site. Training on environmental impacts of chemicals and hazardous substances and PPE required to worn must be provided to the users.</p> <p>10. Hazardous material storage areas must be signposted clearly</p> <p>11. Use a NEMA licensed waste handler for disposal of all used oils from the camp sites. A waste tracking sheet must be completed as required by L.N. 121: Waste Management Regulations 2006 whenever used oils are being disposed.</p> <p>12. Dispose off any excess concrete mixes in consultation with the Project Manager.</p> <p>13. Immediately contain, recover and cleanup any spillages that may occur during the construction phase. All spillages must be reported to the HSE Officer and Project Manager.</p> <p>Drainage of construction camp</p> <p>14. Ensure that all potentially contaminated run-offs from the construction camp meets the discharge limits set under Legal Notice 120: Water Quality Regulations. Run-off from the camp site must NOT discharge into neighbors' properties or into adjacent wetlands, rivers or streams.</p>		

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>End of construction</p> <p>15. Rehabilitate all storage areas after construction has been completed on site and all excess material has been removed. Such areas shall be rehabilitated to their natural state. Any spilled concrete shall be removed and soil compacted during construction shall be ripped, leveled and re-vegetated;</p> <p>16. Store construction materials, soil stockpiles, machinery and other equipment in designated areas;</p> <p>17. The construction camp must be kept clear of litter at all times. Spillages within the construction camp need to be cleaned up immediately and disposed of in the hazardous skip bin for correct disposal. No open fires are allowed within the construction camp and no wood from surrounding vegetation may be used to create a fire.</p>		
Lack of HSE training for construction staff	<p>Environmental training</p> <p>1. Ensure that all site personnel have a basic level of environmental awareness training. The EPC contractor must submit a proposal for this training to the Project HSE Officer for approval.</p> <p>Topics covered should include;</p> <ul style="list-style-type: none"> • What is meant by “Environment”; • Why the environment needs to be protected and conserved; • How construction activities can impact on the environment; • What can be done to mitigate against such impacts; • Awareness of emergency and spills response provisions; and • Social responsibility during construction e.g. being considerate to local 	EPC contractor, Project HSE Officer	Monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>residents.</p> <ol style="list-style-type: none"> 2. It is the Contractor’s responsibility to provide the site foreman with no less that 1 hour’s environmental training and to ensure that the foreman has sufficient understanding to pass this information onto the construction staff; 3. Training should be provided to the staff members on the use of the appropriate fire-fighting equipment. Translators are to be used where necessary; 4. Use should be made of environmental awareness posters on site; 5. The need for a “clean site” policy also needs to be explained to the workers; 6. Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitized to any potential hazards associated with their tasks. <p>Monitoring of environmental training</p> <ol style="list-style-type: none"> 7. The Contractor must monitor the performance of construction workers to ensure that the points relayed during their induction have been properly understood and are being followed. If necessary, the Contractor HSE Officer and/or a translator should be called to the site to further explain aspects of environmental or social behavior that are unclear. Toolbox talks are recommended. 		
Improper use and management of borrow pits	<p>Location of borrow pits</p> <ol style="list-style-type: none"> 1. Borrow pit localities must be negotiated with the relevant local authority to ensure consensus of their location; <p>Management of borrow pits</p> <ol style="list-style-type: none"> 2. The EPC contractor must also compile an information document which states the methods which will be utilized when creating borrow pits. This document must include, but not be limited to the following: 	EPC contractor, Project HSE Officer, Contractor HSE Officer	Monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<ul style="list-style-type: none"> • Plans which detail the expected quantity of excavation that will be required; • Temporary and permanent stormwater control; • The final contouring of the borrow pit and the proposed method of rehabilitation; • The current status and land use of the borrow pit; • Topsoil management strategy (preservation of topsoil for reinstatement); • Proposed management of dangerous conditions (e.g. steep slopes, loose and unstable material, holes). 		
Impacts relating to construction of the transmission line	<p>General construction</p> <ol style="list-style-type: none"> 1. Limit construction time to daylight hours in sensitive areas such as residential areas. Where construction is required after hours in order to avoid traffic interruptions, notification is to be sent out to all potentially affected land owners. 2. Send out prior notifications to relevant lead agencies, parastatals, etc. when essential services such as water or electricity are to be affected by the construction process. <p>Clearing and grading</p> <ol style="list-style-type: none"> 3. Refer to paragraph 11.5.1 above. <p>Construction of lattice towers</p> <ol style="list-style-type: none"> 4. The design of the towers should be done in accordance with applicable international standards. 5. The tower foundations will be constructed out of reinforced concrete in accordance with appropriate design standards 6. Contractors experienced in the erection of towers will be engaged 	EPC contractor, Project Manager	Bi-weekly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>7. The contractor will clean up the tower foundation area after erection of each tower and all wastes handled in accordance with L.N. 121: Waste Management Regulations, 2006.</p> <p>Stringing cables on insulators</p> <p>8. The correct insulators as provided in the Project Manager’s specifications will be used.</p> <p>9. Carefully inspect the transmission cables for defects as they are strung from the drums.</p> <p>10. Use the correct cable sizes according to appropriate transmission line standards and codes of practice for a 220kV transmission line.</p> <p>Foundations for towers</p> <p>11. Clear as little as possible the four holes required for the steel tower foundation legs.</p> <p>12. Place the top soil on one side of the excavated hole for use during reinstatement</p> <p>13. Excavate and cart away to an approved land fill site the soil removed below the top soil level to the final depth of each hole</p> <p>Reinstatement</p> <p>14. Rip the compacted areas along the wayleave to loosen the soil and then rehabilitate it.</p>		
Impacts related to soils and geology	<p>Soil erosion</p> <p>1. Provide wind screening and stormwater control to prevent soil loss from the site;</p> <p>2. Use silt fences and/or sand bags in areas that are susceptible to erosion;</p> <p>3. Sensitive areas need to be identified prior to construction so that the necessary</p>	EPC contractor, Project HSE Officer	Monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>precautions can be implemented.</p> <ol style="list-style-type: none"> 4. Regularly maintain all erosion control mechanisms; 5. Retain vegetation where possible to avoid soil erosion. Vegetation clearance should be phased to ensure that the least area of soil is exposed to potential erosion at any one time; 6. Re-vegetate disturbed surfaces immediately after construction activities are completed; <p>Soil compaction</p> <ol style="list-style-type: none"> 7. Construction vehicles must only be allowed to utilize existing tracks or pre-planned access routes. 8. Soils compacted during construction should be deeply ripped to loosen compacted layers and re-graded to even running levels. Topsoil should be re-spread over landscaped areas. <p>Soil contamination</p> <ol style="list-style-type: none"> 9. The EPC contractor will arrange to remove all construction related contaminated topsoil to the full depth of pollution and replace it at his own expense with approved topsoil; 10. The EPC contractor will be responsible for remediating any polluted topsoil. 		
Impacts related to surface water and groundwater	<p>Sanitation</p> <ol style="list-style-type: none"> 1. Provide adequate sanitary facilities for male and female construction workers in accordance with the Public Health Act requirements; 2. Ensure that sanitary facilities are regularly serviced and emptied to reduce the risk of surface or groundwater pollution. 	EPC contractor, Project HSE Officer	Weekly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>Hazardous materials</p> <ol style="list-style-type: none"> 3. Place all hazardous materials in bunded containment areas with sealed surfaces; 4. All hazardous substances must be stored at least 50m from any water body on site; 5. Contaminated wastewater must be managed by the Contractor to ensure existing water resources on the site are not contaminated. All wastewater from general activities in the camp shall be collected, treated and removed from the site for appropriate disposal. <p>Public areas</p> <ol style="list-style-type: none"> 6. Food preparation areas should be provided with adequate washing facilities and food refuse should be stored in sealed refuse bins which should be removed from site on a regular basis; 7. The EPC contractor should take steps to ensure that littering by construction workers does not occur and persons should be employed on site to collect litter from the site and immediate surroundings, including litter accumulating at fence lines; 8. No washing or servicing of vehicles will be allowed on permeable surfaces. <p>Water resources</p> <ol style="list-style-type: none"> 9. Site staff shall not be permitted to use any other open water body or natural water source adjacent to or within the designated site for the purposes of bathing or washing of clothing; 10. Treated water (or another source approved by the Project HSE Officer) should instead be used for all activities such as washing of equipment or disposal of any type of waste, dust suppression, compacting, etc. 11. An Effluent Discharge License shall be acquired from NEMA for the camp site to 		

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	ensure effluent discharge compliance in accordance with the discharge limits stated in L.N. 120: Water Quality Regulations, 2006.		
Impacts of air quality	<p>Dust control</p> <ol style="list-style-type: none"> 1. The EPC contractor will dampen un-surfaced and un-vegetated areas with a water bowser or sprinklers when necessary to reduce dust; 2. Excavations and other clearing activities must only be done during agreed working times and permitting weather conditions to avoid drifting of dust into neighboring areas; 3. The Contractor shall be responsible for dust control on site to ensure no nuisance is caused to a Landowner or neighboring communities; 4. A speed limit of 40km/h must not be exceeded; 5. Any complaints emanating from the lack of dust control shall be attended to immediately by the EPC contractor. <p>Rehabilitation</p> <ol style="list-style-type: none"> 6. The EPC contractor will commence rehabilitation of exposed soil surfaces as soon as practical after completion of earthworks. <p>Fire prevention</p> <ol style="list-style-type: none"> 7. No open fires shall be allowed on site under any circumstance. All cooking shall be done in demarcated areas that are safe and cannot cause runaway fires; 8. The Contractor shall have operational fire-fighting equipment available on site at all times. The level of fire fighting equipment must be assessed and evaluated thorough a fire risk assessment process. 	EPC contractor, Contractor HSE Officer	Daily

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts of noise on surrounding areas	<ol style="list-style-type: none"> 1. The EPC contractor should comply with applicable sections of Legal Notice 61: Noise and Vibration Pollution Control Regulations, 2009 for environmental noise and Legal Notice 25: Noise Prevention and Control Regulations, 2005 for occupational noise; where necessary hearing protection should be worn; 2. Construction site yards, workshops and other noisy fixed facilities should be located well away from noise sensitive areas. Truck traffic should be routed away from noise sensitive areas, where possible; 3. Construction activities are to be contained to reasonable hours during the day and early evening. Night-time activities near noise sensitive areas should not be allowed; 4. With regard to unavoidable very noisy construction activities in the vicinity of noise sensitive areas, the contractor and his HSE Officer should liaise with local residents on how best to minimize impact, and the local population should be kept informed of the nature and duration of intended activities; 5. Noise from laborers must be controlled; 6. Noise suppression measures must be applied to all construction equipment. Construction equipment must be kept in good working order and where appropriate fitted with silencers which are kept in good working order. Should the vehicles or equipment not be in good working order, the contractor may be instructed to remove the offending vehicle or machinery from site; 7. The contractor must take measures to discourage laborers from loitering in the area and causing noise disturbance. Where possible labor shall be transported to and from the site by the contractor or his Sub-Contractors. 	EPC contractor, Contractor HSE Officer	Daily

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts on ecology along the wayleave	<p>Existing vegetation</p> <ol style="list-style-type: none"> 1. Existing indigenous vegetation must be retained where possible. A follow up vegetation survey should be conducted before site clearing to demarcate vegetation that should remain and remove and relocate any plants of botanical or ecological significance. Vegetation will be removed as it becomes necessary; 2. Materials should not be delivered to the site prematurely which could result in additional areas being cleared or affected; 3. No vegetation to be used for firewood. <p>Rehabilitation</p> <ol style="list-style-type: none"> 4. All damaged areas shall be rehabilitated upon completion of the contract to as near pre-construction conditions; 5. All natural areas impacted during construction must be rehabilitated with locally indigenous grasses typical of the representative botanical unit; 6. Rehabilitation must take place as soon as construction is complete to avoid the edge effect, the infiltration of alien species and soil erosion within the wayleave; <p>Permits</p> <ol style="list-style-type: none"> 7. Permits for removal of any protected species must be obtained from KWS or KFS or other relevant lead agency should such species be affected. 8. All plants not interfering with the operation of the transmission line construction shall be left undisturbed, clearly marked and indicated on the site plan; 9. The construction workspace must be well demarcated and no construction activities must be allowed outside of this demarcated footprint; 10. Only vegetation within the trench area to be excavated must be removed. 	Project HSE Officer, Contractor HSE Officer	Weekly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>Vegetation removal must be phased in order to reduce impact of construction;</p> <p>11. Construction site office and laydown areas must be clearly demarcated and no encroachment must occur beyond demarcated areas.</p> <p>12. Construction areas must be well demarcated and these areas strictly adhered to.</p> <p>13. Soils must be kept free of petrochemical solutions that may be kept on site during construction. Spillage can result in a loss of soil functionality thus limiting the re-establishment of flora.</p> <p>Utilization of resources</p> <p>14. Gathering of firewood or any other natural material onsite or in areas adjacent to the site is prohibited unless with prior approval of the Project HSE Officer.</p>		
Impacts arising from inconsistent waste management	<p>Construction rubble</p> <p>1. All rubble from demolition activities must either be used on site as part of the existing development, or must be taken away from the project site and disposed off appropriately;</p> <p>2. Rubble must not be dumped on site but must be placed within a receptacle for regular removal;</p> <p>3. Construction rubble shall be disposed of in pre-agreed, demarcated spoil dumps that have been approved by the Kajiado County Council.</p> <p>Litter management</p> <p>4. Refuse bins must be placed at strategic positions to ensure that litter does not accumulate within the construction site;</p> <p>5. A housekeeping team should be appointed to regularly maintain the litter and rubble situation on the construction site;</p>	EPC contractor, Project HSE Officer, Contractor HSE Officer	Weekly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>6. Waste disposal will need to take place in accordance with Legal Notice 121: Waste Management Regulations, 2006;</p> <p>7. Littering by the employees of the Contractor shall not be allowed under any circumstances. The Contractor HSE Officer shall monitor the neatness of the work sites as well as the Contractor campsite;</p> <p>8. Receptacle containers should be maintained on site. These should be kept covered and arrangements made for them to be disposed regularly from the site;</p> <p>9. Waste Tracking Sheets providing disposal shall be provided for the Project HSE Officer's inspection.</p> <p>Hazardous waste</p> <p>10. All hazardous materials must be carefully stored as advised by the Project HSE Officer, and then disposed offsite using NEMA approved waste handlers;</p> <p>11. Contaminants will be stored safely to avoid spillage;</p> <p>12. Machinery must be properly maintained to keep oil leaks in check.</p> <p>Sanitation</p> <p>13. The Contractor shall install mobile chemical toilets on the site;</p> <p>14. Staff shall be sensitized to the fact that they should use these facilities at all times. No indiscriminate sanitary activities on site shall be allowed;</p> <p>15. There should be enough toilets available to accommodate the workforce in accordance with the Public Health Act requirements. Male and females must be accommodated separately where possible;</p> <p>16. Toilets shall be serviced regularly and the contractor HSE Officer shall inspect toilets;</p>		

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>17. Under no circumstances may open areas, neighbors fences or the surrounding bush be used as a toilet facility;</p> <p>18. Potable water must be provided for all construction staff.</p> <p>Remedial actions</p> <p>19. Depending on the nature and extent of the spill, contaminated soil must be either excavated or treated on-site;</p> <p>20. Excavation of contaminated soil will involve careful removal of soil using appropriate tools/machinery to storage containers until disposed of using NEMA approved waste handlers;</p> <p>21. If a spill occurs on an impermeable surface such as cement or concrete, the surface spill must be contained using oil absorbent materials;</p> <p>22. If necessary, oil absorbent sheets or pads must be attached to leaky machinery or infrastructure.</p> <p>23. Materials used for the remediation of petrochemical spills must be used according to product specifications and guidance for use.</p> <p>24. Contaminated remediation materials must be carefully removed from the area of the spill so as to prevent further release of petrochemicals to the environment, and stored in adequate containers until appropriately disposed off.</p>		

Table 11-3: Environment Management Plan-Operations Phase

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts associated with construction site decommissioning	<p>Removal of equipment</p> <ol style="list-style-type: none"> 1. Remove all structures comprising the construction camp. Check for any previous construction related chemical soil contamination and cleanup. Return the ground conditions within the camp sites to their near original state by undertaking the necessary landscaping. <p>Associated infrastructure</p> <ol style="list-style-type: none"> 2. All rubble is to be removed from the site to an approved disposal site as approved by the Project Manager. Burying of rubble on site is prohibited. 3. The site is to be cleared of all litter. 4. The Contractor is to check that all watercourses are free from building rubble, spoil materials and waste materials. 5. Fences, barriers and demarcations associated with the construction phase are to be removed from the site unless stipulated otherwise by the Engineer. 6. All residual stockpiles must be removed or spread on site as directed by the Engineer. 	EPC Contractor, Proponent, Project Manager, Project HSE Officer, Contractor HSE Officer	Weekly
Impacts associated with transmission line operations and maintenance	<p>Maintenance</p> <ol style="list-style-type: none"> 1. All applicable standards, legislation, policies and procedures must be adhered to during operation; 2. Periodic inspection of the wayleave must take place to monitor the status of the transmission line; 	Proponent	Monthly

Impact	Environmental Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>Public awareness</p> <p>3. The Proponent should conduct an HSE awareness campaign to landowners/residents affected by the transmission line;</p> <p>4. The emergency preparedness plan must be ready for implementation at all times should an emergency situation arise.</p>		
Impacts on biodiversity	<p>1. Indigenous vegetation must be maintained along the wayleave and all exotic species removed as they appear and disposed off appropriately.</p> <p>2. Vegetative re-establishment shall, as far as possible, make use of indigenous or locally occurring plant varieties</p> <p>3. No faunal species must be harmed by maintenance staff during any routine maintenance at the transmission line.</p>	Proponent	Monthly
Impacts on health and safety	<p>Emergency response plan</p> <p>1. Upon completion of the construction phase, an emergency response risk assessment should be undertaken and specific contingency plans incorporated in the transmission line crisis management plan to ensure the safety of the staff and surrounding land owners and users in case of an emergency.</p>	Proponent	Monthly

Table 11-4: Social Management Plan

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
Impacts due to increased employment in the project area	<ol style="list-style-type: none"> 1. The use of labor intensive construction measures should be used where appropriate; 2. Training of labor to benefit individuals beyond completion of the project 3. Labor to be sourced from the local community where possible 4. Local suppliers to be used where possible 5. The Project Manager must ensure that all staff working on the proposed project must be in possession of a Kenyan Identity Document or a relevant work permit. 	EPC contactor, Project HSE Officer, Contractor HSE Officer	Weekly
Impacts related to health and safety on workers and the public exposed to construction hazards	<p>Worker safety</p> <ol style="list-style-type: none"> 1. Implement safety measures, work procedures and first aid on site. Workers have the right to refuse work in unsafe conditions; 2. Develop and implement a construction health and safety plan which must be approved by the Project Manager. 3. Comply with the relevant requirements of OSHA during the construction phase and especially Legal Notice 40: Building Operations and Works of Engineering Construction Rules, 1984 (BOWEC); 4. Train workers thoroughly in the safe use of potentially dangerous equipment; 5. Contractors must ensure that all equipment is maintained in a safe operating condition; 6. Record all incidents in a “General Register” as required by OSHA and maintain an updated copy of the Register in the site office for inspection. Any health and safety incident must be reported to the project manager immediately and a DOSH1 form filled out and forwarded to the nearest County DOSHS Officer; 7. Provide first aid facilities on site at all times as required by Legal Notice 160: First 	Proponent, EPC Contractor, Project HSE Officer, Contractor HSE Officer	Daily

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>Aid Rules, 1977;</p> <p>8. The Contractor shall take all the necessary precautions against the spreading of disease such as measles, foot and mouth, etc. especially under livestock;</p> <p>9. The contractor must ensure that all construction workers are made aware about HIV/AIDS and the risks surrounding this disease. The location of the local clinic where more information and counseling is offered must be indicated to workers;</p> <p>10. Material stockpiles or stacks, such as, cable drums, tower components, etc. must be stable and well secured to avoid collapse and possible injury to site workers/local residents.</p> <p>Welfare facilities</p> <p>11. Eating areas should be regularly serviced and cleaned to ensure the highest possible standards of hygiene and cleanliness;</p> <p>12. Fires are not to be allowed for cooking or heating purposes anywhere along or near the construction areas.</p> <p>Protective gear</p> <p>13. Construction staff and visitors without exception must always wear appropriate Personal Protective Equipment (PPE) while working. Access to any part of the construction site will be forbidden to anyone not donning the correct PPE;</p> <p>14. The EPC contractor will adhere to the “Protection of Eyes” Schedule within the OSHA.</p>		

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>Site safety</p> <p>15. The construction camp must remain fenced for the entire construction period;</p> <p>16. Potentially hazardous areas such as trenches are to be demarcated and clearly marked;</p> <p>17. The EPC contractor will place adequate warning signs in all hazardous working areas;</p> <p>18. Uncovered manholes and excavations must be clearly demarcated;</p> <p>19. Emergency numbers for local police and rescue services etc. must be placed in a prominent area;</p> <p>20. Firefighting equipment must be placed in prominent positions across the site where it is easily accessible. This includes fire extinguishers, a fire blanket as well as a water tank;</p> <p>21. Suitable conspicuous warning signs in English and all other applicable languages must be placed at all entrances to the site;</p> <p>22. All speed limits must be adhered to.</p> <p>Construction equipment safety</p> <p>23. All construction plant and equipment must be properly guarded to prevent injuries to workers;</p> <p>24. All equipment used for construction must be in good working order with up to date maintenance records.</p> <p>Hazardous Material Storage</p> <p>25. Staff that will handle hazardous materials must be trained on the health and safety aspects of storage, handling and distribution;</p>		

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>26. Any hazardous materials (apart from fuel) must be stored within a lockable store with a sealed floor;</p> <p>27. All storage tanks containing hazardous materials must be placed in bunded containment areas with sealed surfaces. The bund walls must be high enough to contain 110% of the total volume of the stored hazardous material;</p> <p>28. Material Safety Data Sheets (MSDS) which contain the necessary information pertaining to a specific hazardous substance must be present for all hazardous materials stored on the site;</p> <p>29. The provisions of Legal Notice 60: Hazardous Substances Regulations, 2007 promulgated in terms of the OSHA must be adhered to. This applies to solvents and other chemicals possibly used in the construction phase.</p> <p>Procedure in the event of a petrochemical spill</p> <p>30. The individual responsible for or who discovers the petrochemical spill must report the incident to the Project Manager, contractor HSE officer or EPC Contractor. The problem must be assessed and the necessary actions required will be undertaken;</p> <p>31. The immediate response must be to contain the spill;</p> <p>32. The source of the spill must be identified, controlled, treated or removed.</p> <p>Fire management</p> <p>33. Firefighting equipment should be present on site at all times as per Legal Notice 59: Fire Risk Reduction Rules, 2007;</p> <p>34. All construction staff must be trained in fire hazard control and firefighting techniques;</p>		

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<p>35. All flammable substances must be stored in dry areas which do not pose an ignition risk to the said substances;</p> <p>36. No open fires will be allowed on site;</p> <p>37. Smoking may only be conducted in demarcated areas.</p> <p>Safety of surrounding residents</p> <p>38. All residents affected by the construction of the transmission line should be notified in advance of any known potential risks associated with the construction site and the activities on it. Examples of these are:</p> <ul style="list-style-type: none"> • Earthworks/earthmoving machinery on steep slopes above houses/infrastructure; • Risk to residence along haulage roads/access routes. 		
General social impacts along the wayleave and its vicinity	<ol style="list-style-type: none"> 1. EPC contractor to ensure that communications with affected persons along the wayleave is always courteous; 2. No interruptions other than those negotiated shall be allowed to any essential services. Damage to infrastructure shall not be tolerated and any damage shall be rectified immediately by the Contractor. A record of all damage and remedial actions shall be kept on site; 3. All existing private access roads used for construction purposes, shall be maintained at all times to ensure that the local people have free access to and from their properties. Speed limits shall be enforced in such areas and all drivers shall be sensitized to this effect; 4. Any possible disruptions to essential services must be kept to a minimum and should be well advertised and communicated to the Landowners and surrounding Communities. The position of all underground utilities in the vicinity of a site must 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	be obtained from the Landowners or local Community and clearly marked. Where required such lines shall be deviated.		
Impacts on grazing land	<ol style="list-style-type: none"> 1. The EPC contractor will not fence off the construction area thus preventing livestock from grazing; 2. Rehabilitate all disturbed grazing areas within the wayleave and construction workspace to near original condition to enable livestock continue to graze; 3. Fence off exposed areas for maintenance to prevent livestock from moving through the area; 4. Compensation to landowners will be provided if livestock gets hurt as a direct result of negligence on the maintenance team's part; 5. The area should be rehabilitated upon completion of the maintenance activities to ensure that the land is returned in the same condition as prior to the maintenance activities. 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Monthly
Impacts associated with influx of construction workers	<ol style="list-style-type: none"> 1. For workers not indigenous to the wayleave area, awareness will be created among construction workers about local traditions and practices; 2. Communities living in close proximity to the wayleave should be given an opportunity through the local area chief's office to communicate their expectations of construction workers' behavior; 3. Implement methods (posters, talks, etc.) to create HIV and STI awareness amongst construction workers; 4. Payment to Kenyan construction workers should comply with applicable Kenyan Labor Laws in terms of minimum wages; 5. Where local laborers are employed on a more permanent basis, the EPC contractor shall mandatorily register such workers with statutory bodies such as the KRA, 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	NHIF and NSSF and make the necessary deductions from the worker's wages for onward transmission to the statutory bodies.		
Impacts associated with job seekers	<ol style="list-style-type: none"> 1. The EPC contractor will notify the local District Officer of the employment procedures of the company; 2. No loitering will be allowed in the vicinity of the camp sites. The EPC contractor to work with relevant security agencies to evict any loiterers. 3. Construction workers should be clearly identifiable by wearing proper construction uniforms displaying the logo of the construction company. Construction workers could also be issued with identification tags. 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Bi-monthly
Impacts associated with attitude formation against the project	<ol style="list-style-type: none"> 1. Engage the local community early on and throughout the construction phase about the construction activities to get their buy-in. 2. Employment opportunities should first be offered to the local community if the skills are available within the community. 3. The undertakings in the EMP should also be implemented effectively and with due diligence. 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Bi-monthly
Impacts of additional demand on existing utilities	<ol style="list-style-type: none"> 1. Water is a scarce resource along the wayleave and subsequently construction workers should be made aware of the limited availability and conservation measures; 2. Construction camps should be located away from areas of concern to avoid pollution of water bodies. 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Bi-monthly
Impacts on sanitation	<ol style="list-style-type: none"> 1. Construction workers should receive medical advice regarding correct sanitation and receive correct medical attention where required; 2. Adequate water facilities should be provided; 	EPC Contractor Project HSE Officer, Contractor HSE	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	<ol style="list-style-type: none"> 3. Sufficient portable chemical toilets on site and at the construction camps should be provided; 4. Adequate sanitation services (e.g. showers) at the construction camp should be provided with effective drainage facilities to ensure that used water is carried away from the site. 	Officer, Proponent	
Impacts on integration with local communities	<ol style="list-style-type: none"> 1. An aggressive STI and HIV/AIDS awareness campaign should be launched, which is not only directed at construction workers but also at the community as a whole; 2. Contraceptives (such as condoms) should be distributed by placing them at centrally located points and by ensuring that construction workers and community members are aware of the availability and location of contraceptives. The distribution of contraceptives should be approached with the necessary cultural sensitivity; 3. Access at the construction site should be controlled to prevent commercial sex workers from either visiting and/or loitering at the construction village; 4. Local women should be empowered. This could be achieved by employing them to work on the project, which in turn would decrease their (financial) vulnerability. 	EPC Contractor Project HSE Officer, Contractor HSE Officer, Proponent	Bi-monthly
Impacts associated with archeology and cultural heritage	<ol style="list-style-type: none"> 1. Develop and implement appropriate measures for artifacts of archeological and cultural significance unearthed during the construction phase; 2. The workforce should be made aware of reporting any possible historical or archaeological finds to the HSE Officer so that appropriate action can be taken; 3. Any discovered artifacts shall not be removed under any circumstances; 4. Report any archaeological sites and/or graves uncovered during construction to the Project Manager; 5. Implement measures to ensure that behavior and practices of construction workers 	EPC Contractor Project HSE Officer, Contractor HSE Officer, KEL	Bi-monthly

Impact	Social Mitigation Measure/Monitoring Plan	Responsibility	Frequency/ Monitoring requirement
	do not cause offence to local communities and land owners.		