LAKE TURKANA WIND POWER LIMITED

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) REPORT FOR THE PROPOSED STRENGTHENING OF LAISAMIS- SOUTH HORR (D371) AND SOUTH HORR- LOIYANGALANI (C77) ROAD

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AUTHENTIFICATON

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ABBREVIATIONS AND ACRONYMS

AIDS	-	Acquired Immune Deficiency Syndrome
ASALs	-	Arid and Semi-arid lands
ASL	-	Above Sea Level
CBOs	-	Community Based Organisations
DDPs	-	District Development Plans
DO	-	District Officer
DSDO	-	District Social Development Officer
DWO	-	District Water Officer
EA	-	Environmental Audit
EIA	-	Environmental Impact Assessment
EHS	-	Environmental Health and Safety
ESMP	-	Environmental and Social Management Plans
EMCA	-	Environmental Management Coordination Act
EMP	-	Environmental Management Plan
FDG	-	Focus Discussion Groups
FPE	-	Free Primary Education
GDP	-	Geo-Data-Base
GIS	-	Geographical Information System
GoK	-	Government of Kenya
GPS	-	Geographical Positioning System
GRC	-	Grievance Redressal Committee
GRM	-	Grievance Redressal Mechanism
Ha	-	Hectares
HIV	-	Human Immuno-deficiency Virus
Hr	-	Hour
ICT	-	Information Communication Technology
IFC	-	International Finance Corporation
KeNHA	-	Kenya National Highways Authority
KeRRA	-	Kenya Rural Roads Authority
Km	-	Kilometres
KFS	-	Kenya Forest Service
KRB	-	Kenya Roads Board

KURA	-	Kenya Urban Roads Authority
KWS	-	Kenya Wildlife Service
MoH	-	Ministry of Health
MoR	-	Ministry of Roads
NEAP	-	National Environment Action Plan
NEMA	-	National Environmental Management Authority
NGOs	-	Non-Governmental Organizations
NRT	-	Northern Rangeland Trust
PAPs	-	Project Affected Persons
PRSP	-	Poverty Reduction Strategy Paper
RMLF	-	Road Maintenance Levy Fund
RPF	-	Resettlement Policy Framework
STIs	-	Sexually Transmitted Infections
TOR	-	Terms of Reference

EXECUTIVE SUMMARY

THE PROJECT OVERVIEW

Lake Turkana Wind Power Limited (LTWP) Ltd has been granted permission by the Ministry of Roads to strengthen identified weak sections of the195 km of the Laisamis- South Horr (D371) and South Horr-Loiyangalani Road (C77). The road is to be strengthened to a standard engineered gravel for the purpose of easing the transportation of materials and equipment to the project staging area during construction of a proposed wind farm at Loiyangalani. According to the existing road classification and the new institutional arrangement in the road sector, the 131 km Laisamis-South Horr (D371) section fall under the jurisdiction of the Kenya Rural Roads Authority (KeRRA) while the 64 km South Horr-Loiyangalani section fall under the Kenya National Highway Authority (KeNHA). Thus administration and execution of the work will be carried out in close collaboration of these statutory bodies and the Ministry of Roads which has granted the authority to LTWP to execute the work. In order to contribute towards sustainable development, an Environmental and Social Impact Assessment (ESIA) is necessary for the proposed road construction.

PROJECT LOCATION AND SCOPE

The proposed work is located in Marsabit South District which was hived out of the bigger Marsabit district in 2008. The road is an existing road and branches off from the main A2 Isiolo-Moyale road at Laisamis as D371 in Northerly direction and passes through various centres which include Ngurunuit, Illaut and South Horr. From South Horr the road becomes C77 after joining the main road from Baragoi and moves on through Kurungu all the way to Loiyangalani. The entire stretch is a murram road that is marked by low lying terrain lying between numerous hills and dry sand river beds. In general the road is in a motorable status. However, sections of the road cut across the dry sand river beds and are extensively damaged and are unstable for heavy vehicular loading.

The rehabilitation work entails light and heavy excavation, gravelling, reconstruction of some sections, light grading and improvement of drainage structures**.** The main output of the work is a motorable standard engineered gravel road with a gravel running surface, road cross drain comprising of culverts and perforated drifts. The geometrics of the existing road will also be improved by widening of existing horizontal curves and improvement of vertical curves. The road strengthening project is estimated to cost about KShs1.2 billion putting the average cost to be KShs 6.2 million per kilometre. The actual construction is expected to take one year.

TERMS OF REFERENCE

LTWP Ltd has contracted Eng. Prof. B. N. K. Njoroge, a registered EIA/EA Lead Expert to carry out an ESIA study on the proposed strengthening/rehabilitation of Laisamis – South Horr – Loiyangalani road in accordance to NEMA regulations and the IFC guidelines.The Terms of Reference for the ESIA are:

- Description of the road furniture with regard to its geographic, ecological and social.
- Review the policy, legal and administrative framework within which the assessment is carried out, including Kenyans environment protection regulations and IFC guidelines on social and environmental suitability and sustainability of road construction projects.
- Concise description of the baseline environment of the study area with regard to relevant physical, biological, socio-economic and labour conditions including any anticipated changes before the start of the project.
- Determination of the social and environmental impacts and risks (including labour, health and safety) of the proposed rehabilitation/strengthening works. The assessment should also propose relevant and appropriate mitigation and management measures.
- Development of Action Plan and Management System which describes and prioritises the actions needed to implement mitigation measures, corrective actions and monitoring measures

necessary to manage the impacts and risks identified in the Assessment. The management system must incorporate operational policies, procedures and practices that will be followed when carrying out the mitigation measures.

- Development of monitoring plan that gives specific description and technical details of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements and definition of thresholds that will signal the need for corrective actions as well as deliver a monitoring and reporting procedure.
- Consultation with project affected communities in a structured and culturally appropriate manner. The consultation should be free, prior, informed and apply to all stages of the project.
- Compilation of the Environmental and Social Assessment Report for submission to NEMA for approval.

ANALYSIS OF ALTERNATIVE ROUTE

The alternative to the proposed Laisamis -Khorr- Ilaut-South Horr - Loiyangalani road is Marsabit – Kargi – Loiyangalni road. The Marsabit – Kargi – Loiyangalani route branches off from the main Isiolo – Marsabit 10 km from Marsabit town and runs 218 km in a westerly direction. The road has reasonable horizontal geometrics with long straight sections and curves with large radii. The road however has unfavourable vertical curves, is poorly drained although in most sections the alignment is free draining. There are a few drifts located at seasonal river beds. In addition, there is no guarantee for the availability of adequate construction materials since the alignment soils are mostly loamy sands. Strengthening of this route will be more expensive than the proposed Laisamis – South Horr – Loiyangalani. The Kargi route would also lengthen the haulage distance of the wind farm equipment by an additional 50 kilometres, the distance to the takeoff point from Isiolo on the Isiolo-Marsabit road. The Kargi route in addition did not show evidence of availability of adequate water needed during construction stage. Thus, the Laisamis-Khorr-llaut-South Horr-Loiyangalani was selected for strengthening.

Air and railway transportation were not found feasible alternatives as the area is not served by railway line or large cargo airports.

PERFFORMANCE STANDARDS, LEGAL AND INSTITUTIONAL FRAMEWORK

Kenya has a policy, legal and administrative framework for environmental management. Under the frame work, the National Environment Management Authority (NEMA) is responsible for ensuring that environmental impact assessments (EIA's) are carried out for new projects and environmental audits on existing facilities as per the Environmental Management and Coordination Act 1999. The financing institutions such as the World Bank through its IFC branch have also developed guidelines for carrying out an Environmental and Social Impact Assessment (ESIA) for new development. These guidelines are generally known as the Performance Standards and the Environmental Health and Safety (EHS) guidelines. The key objective of the Kenyan policies and IFC guidelines is to ensure protection of environment, Community and Occupational Health and Safety.

The aim of both the Kenyan environmental policy and the IFC guidelines is to ensure that projects are developed in manner that is socially responsible and reflect sound environmental practices. Therefore the risks and impacts to the environment and communities within the project area must be avoided and if avoidance is not possible, mitigation measures must be developed. In addition, IFC guidelines also aim at ensuring that affected communities are appropriately engaged. This is normally done through public consultation where the affected communities express their views on project risks, impacts and mitigation measures. The client then considers and responds to these concerns and opinions. After carrying out an ESIA, management policies should be established that consist of a combination of operational policies, procedures and practices for addressing

identified impacts and risks. Where specific mitigation measures and actions necessary for the project to comply with applicable laws and regulations are identified, an action plan will be prepared.

The protection of basic rights of workers is necessary in a project. They should be provided with safe and healthy working conditions. In the proposed Pollution prevention and control techniques and practices during the design, construction, operation and decommissioning of the project must be applied. The project-specific pollution prevention and control techniques applied during the project life-cycle will be tailored to the hazards and risks associated with project emissions, wastewater and solid management. Measures must be put in place in the proposed project to avoid or minimize risks to and impacts on the health and safety of the local community during the project cycle. Involuntary settlements necessitated for in the proposed project must be compensated for. In this project, design has been done to ensure that the road passes through the road reserve. The proposed road passes through a vast area with wildlife and indigenous plants. Biodiversity and natural resources must be conserved. The proponent of the proposed project should ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples. Existing cultural heritage in the project area must be protected.

PUBLIC CONSULTATION

Public Consultation of the project is a requirement for an environmental assessment process. The aims of public consultation are disclosure of planned activities of the proposed project and impacts identified through the Environmental and Social Impact Assessment; identification of concerns and grievances from interested and affected people; harnessing of local expertise, needs and knowledge from interested and affected people and response to grievances and enquiries of affected people.

The key stakeholders identified in this project were;

1. Area sub chief, chief and District Officers
2. Forester from Kenya Forest Service (KFS)
3. Senior Warden from Kenya Wildlife Service (KWS)
4. Town clerk and treasurer from Marsabit County Council
5. Regional manager from Kenya Rural Roads Authority (KeRRA)
6. An engineer from Kenya National Highway Authority(KeNHA)
7. The District Water Officer
8. Affected communities living along the road alignment.

The approach adopted included public meetings, administration of questionnaires and discussions with the key stakeholders.

Through the public consultation, some of the key concerns raised were;

- There should be adequate and timely compensation of the affected people who will be required to relocate to pave way for the road. The affected persons should be compensated before construction begins. However, the road passes through the existing road reserve and thus compensation will not be anticipated.
- The contractor should make use of locally available resources such as casual labourers, construction materials as well as hired vehicles.
- The contractor should work closely with the local communities', local provincial administration, village elders, area leaders like chiefs, sub chiefs and other community opinion leaders.
- The Contractor should find technical solutions for preserving the available water facilities and sources especially the ones found very close to the road.
- The Contractor should preserve and/or improve accesses to any available feeder roads.
- Cutting down of trees should be avoided as much as possible to avoid destruction of indigenous trees as well as habitats**.** The Contractor should also plant trees after construction works.

- The communities expressed concerns on the possibility of destruction of their grazing land and pastures for their animals during upgrading of the road. This should be kept to a minimum

PROJECT IMPACTS

Construction Impacts

The positive impacts that were identified during the construction of proposed road were;

1. Creation of employment for the skilled and semiskilled locals such as sociaeconomists, trainers, casual labourers for road construction and cooks and cleaners at the construction camps and casual workers
2. Flourishing of businesses mainly at trading centres located along the road due to increased demand of basic commodities and services such as food, accommodation and construction materials.

The negative impacts identified during the construction of the proposed road are

1. Increased soil erosion due to excavation works along the road alignment as well as improper drainage of runoff from the road to lower catch
   ment areas. This is likely to be of high magnitude in the steep areas.
2. There may be pollution of air, soils, crops and water sources along the road profile resulting from exhaust and engine emissions from vehicles and equipments used during the construction.
3. The proposed road realignment at the road junction and acquisition of borrow pits located on private land are likely to result into loss of land. This may also be caused by temporarily traffic diversions on private land where the road reserve is not adequate.
4. There may be increased solid and liquid waste which may lead to pollution of air, land and water sources in the area.
5. The road construction works may also lead to increases cases of sexually transmitted due to influx of workmen who are associated with irresponsible behaviours.
6. There is likely to be destruction of biodiversity along the road profile, access routes to the borrow pits and the borrow pit sites.
7. The noise from vehicles and equipment used during construction may scare away the wild animals.

Implementation Impacts (Operational phase)

The positive impacts identified when the road will be under use are;

1. Increased business opportunities due to opening up of the area as well as demand for basic commodities. The road may lead to development of trading centres as well as improvement of existing ones in terms of basic needs such as housing, water and sanitation facilities.
2. The water available to the surrounding communities will increase since the water sources developed by the contractor for construction works will be handed over to them.
3. There will be enhancement of industries in the area such as livestock and fishing due to reduce transport costs and time to market centres.
4. There may also be limited employment opportunities for people who will be involved in maintenance of the road.
5. The road may also open up the area to tourists since the road traverses a forest that has are indigenous and wild animals.
6. The road will also ensure that the community along the road alignment get relief which they mainly rely on.

The negative impacts anticipated during operation of the road are,

1. Exhaust and engine emissions from vehicles used for transportation of materials and equipments may cause air pollution, which can have an impact on public health, crops and

vegetation along the road, soils and water sources. Regular servicing of these vehicles may reduce the emissions.

2. Increased traffic along this route may lead to accidents along the road network. The designs should make provision for bumps in the appropriate places.
3. The road will be used for transportation of heavy loads to the wind farm. This may lead to development of pot holes along the road. The Contractor must ensure regular maintenance of the road in adequate time.
4. There may also be increased sexually transmitted diseases especially from the workers and truck drivers who are associated with irresponsible sexual behaviours. Training should continue in the trading centres and in the areas where the workers well be accommodated.

Decommissioning Impacts

Positive Impacts

1. There will be creation of employment although short lived for locals who will be involved in dismantling the labour camps.
2. The contractor may consider selling off the construction materials such as campsite to community living around the construction camps. This will come at a subsidized rate to the locals.

Negative Impacts

1. There are likely to be accidents during the dismantling of the road construction camps and burrying and making good of borrow pits. Barriers should be put where heavy machinery will be under use to avoid people trespassing. The Contractor should also employ competent people to operate the machines used in order to maintain this to a minimum.
2. During the dismantling works, there is likely to be noise to the households living around the camps. The Contractor should consider putting up the camps in less occupied areas.
3. The will be air pollution from the equipment that will be used during the demolition works from dust. The exhaust fumes from vehicles and equipment used is also likely to pollute the soils, vegetation and water sources around the camp. The Contractor may consider watering the area before demolition work starts.

Proposed Mitigation Measures

The mitigation measures that can be incorporated into the design of the road network, during construction and operation stages of the Laisamis - Loiyangalani road in order to mitigate the negative environmental impacts are;

1. Construction of culverts will be accounted for in the road design so that flow in the rivers and streams in unimpeded, and improved drainage along the project road through side drains. These features must be properly designed and regularly maintained to prevent runoff from accumulating by the side of the road
2. Scour checks and gabion mattresses will be introduced in the side drains at specified intervals to reduce the impact of runoff. Grouted stone pitching and rock fill gabion works will be necessary to protect culvert inlets and outlets and control soil erosion. Embankments should be planted with shrubs and grasses to reduce erosion of road embankments. Gravel sites must be made good and indigenous trees and shrubs planted along the road.
3. Dust emissions can be reduced during construction by dumping the gravel pit area, and occasional spraying with water along the deviation routes or earth along the road section. In the case of deviations, slowing the speed of traffic by using bumps and/ or clearly marked road signs may contribute to reducing dust levels. Haulage routes will need to be identified and maintained by watering to minimize the impact of dust.

4. Vehicles to be used during construction must be regularly maintained. Proper disposal of oil drained from Contractor's trucks and lorries and used oil filters should be done sensibly with the Resident Engineer approving method of disposal.
5. The area to be excavated should be cordoned off to avoid accidents both to human and animals. Gravel pits must be landscaped and reinstated or back-filled with overburden if the depth of the overburden is sufficient to allow for this.
6. Blasting of rock outcrops along road alignment should be done during the day, and residents in the vicinity of the area being blasted should be suitably warned of blasting activities, including the time and date that the blasting is to take place.
7. People should be informed of intended roadwork activities, including likely dates for commencement and completion of works. Warning signs should also be introduced on the approach to market/settlement areas.
8. Alternative water sources for the project must be developed such as boreholes to avoid stressing the already scarce commodity. The water quality supplied to the construction camps must meet the WHO regulations on drinking water.
9. The camp should not be located at isolated points along the road where they will attract periphery businesses, and provide a nucleus for the growth of unplanned settlements.
10. A central canteen for the workforce at the construction camp would contribute towards the general good health in the camp as kitchen wastes can be disposed of in an organized manner and hygiene can be monitored.
11. Workmen should be provided with suitable protective gear (such as nose masks, ear muffs, helmets, overalls, industrial boots, etc.), particularly during blasting, drilling, while working on the asphalt, and handling tar. There must be a fully equipped first aid kit and a Health Safety and Environment Officer who has first aid training and knowledge of safety regulations. In addition, the Contractor must have workmen's compensation cover.
12. The location of latrines in the camp should preferably be downhill of potable water sources, or 50 m to 100m from any water body. Communal bathrooms/ lavatories with soak away pits are less polluting option, but would be slightly more expensive.
13. Sexually Transmitted Diseases (STDs) awareness campaigns should be conducted in the camp as well as in the settlements/ trading centres.
14. Road safety should be observed through use of signs and especially near market centres.
15. All the people who live along the road as well as affected communities will be alerted of the improvement works through public consultation.

RECOMMENDATIONS AND CONCLUSIONS

Recommendations

Following the impact analysis presented in the previous sections, here below are the recommendations:

- The Proposed project to be implemented in compliance with the relevant legislation and planning requirements. The proponent must ensure that the impacts are kept to a minimum level
- A clear environmental and social management plans have been developed. The proponent should ensure the implement the mitigation guideline provided in the EMP in collaboration with the Contractor. The Resident Engineer for the project needs to make progress reports indicating the implementation of the plans.
- The groundwater exploration has indicated limited sources of water with low yields with daily estimate of 130 m3. The amount required for construction and use by people on site will be in the region of 450 m3/d. Thus there is required investigation of additional water sources to meet the daily demand as well as for the different uses in relation to quality consideration.

Conclusion

From the foregoing the following conclusions are made:

- No serious and adverse objections were received from the communities occupying the entire corridor. The road will also lead to economic improvement to people living along the road profile. It is therefore considered suitable for the local area.
- The proposed project has actively involved the key stakeholders who did not object the development. Thus the success of the implementation project can be guaranteed.
- The proposed project does not pose adverse socio-economic impacts and is an initiative towards improving accessibility in the area. Therefore, it is a project worth to be supported by donor agencies.

In conclusion, the study recommends timely implementation of the project with strict adherence to the proposed Environmental Management and Social Management Plans. The project benefits have been identified to far outweigh the negative impacts for which a mitigation plan has been prepared. Further, the proponent has carefully considered and applied acceptable local and international standard/regulations at all stage of project planning and would thus qualify for donor funding.