

**CORRUGATED SHEETS LTD  
(REINFORCED STEEL DIVISION)  
P.O BOX 83594 - 80100  
MOMBASA**

**Email:** [csl@nyumba.com](mailto:csl@nyumba.com)

**Tel** +254 727 605 899, +254 722 204 848, +254 020 2023860

**PROPOSED OVERHAUL AND REPLACEMENT OF A HOT ROLLING STEEL MILL  
AT THE REINFORCED STEEL DIVISION OF THE CORRUGATED SHEETS  
LIMITED LOCATED ON A SECTION OF PARCEL OF LAND PLOT NUMBER  
24606 AT KOKOTONI AREA OF KALIANGOMBE SUB-LOCATION, RABAI  
LOCATION, RABAI SUB-COUNTY, KILIFI COUNTY.  
GPS COORDINATES: 3<sup>0</sup> 55' 06.39''S and 39<sup>0</sup> 31' 46.15''E**

**ENVIRONMENTAL IMPACT ASSESSMENT  
STUDY**

Compiled by:-

**SIGTUNA CONSULTANCY LIMITED**

Registered and Licensed EIA/EA Firm of Experts Reg. No.9582

P.O. BOX 569-80100

MOMBASA

E-mail: [office@sigtunaconsultancy.org](mailto:office@sigtunaconsultancy.org), [sigtunaconsultancy@yahoo.com](mailto:sigtunaconsultancy@yahoo.com)

Tel: 254 0722 493 772

**2020**

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**Philip Manyi Omenge**  
EIA/EA Lead Expert Reg. No. 1559  
**Study Team Leader**  
**Sigtuna Consultancy Limited EIA/EA Firm of Experts**

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**ENVIRONMENTAL IMPACT ASSESSMENT  
STUDY**

**Submitted by:-**

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**MR. HASMUKH PATEL  
DIRECTOR  
CORRUGATED SHEETS LIMITED**

## **EXECUTIVE SUMMARY**

This report presents findings of an Environmental Impact Assessment Study for a proposed overhaul and replacement of a hot rolling steel mill. The proponent of the project is Corrugated Sheets Limited; the location of the proposed project is within the Reinforced Steel Division (RSD) of the Corrugated Sheets Limited (CSL). RSD is located on a section of land parcel number 24606 at Kokotoni area of Kaliangombe Sub-location, Rabai location, Rabai Sub-County, Kilifi County. The Environmental Impact Assessment Study was carried out as provided for in Legal Notice No. 31 of 2019, section 58 (2) of the Environmental Management and Coordination Act, 1999 (Amended) 2015 and the Environmental (Impact Assessment and Audit Regulations), 2003. Other national policies and legislations relevant to the proposed project were reviewed.

### **Objective**

The objective of the proposed project is to overhaul the old hot rolling mill whose capacity is 4tons/day and replace it with a new and modern hot rolling steel mill of capacity 16tons/day.

### **Process inputs and products**

Raw materials that will be used will be billets; fuel that will be used will be Industrial Diesel Oil and furnace oil, water will be the main coolant. Expected products will be hot rolled steel angles, zed section, tee section, flat bars.

### **Expected waste**

Expected waste will include mill scales, steel scrap, damaged furnace lining insulating materials, used oil, used grease and effluent from sanitary facilities.

### **Potential positive impacts**

Potential positive environmental impacts will include:-

- ✓ On job training opportunities for local people
- ✓ Technology transfer
- ✓ Support for development of local community through company CSR programme
- ✓ Taxes to National government
- ✓ Taxes to Kilifi County Government
- ✓ Foreign exchange earnings through exports
- ✓ Potential for local economic improvement

### Potential negative impacts

Construction phase potential negative environmental impacts will include:-

- ✓ Impacts on air quality
- ✓ Noise and vibration impacts
- ✓ Occupational injuries and accidents to construction workers
- ✓ Traffic related impacts
- ✓ Waste related impacts

Operational phase potential negative environmental impacts will include:-

- ✓ Impacts on air quality
- ✓ Noise and vibration impacts
- ✓ Impacts related to oils and lubricants spills
- ✓ Occupational injuries and accidents to construction workers
- ✓ Traffic related impacts
- ✓ Waste related impacts
- ✓ Water use related impacts

Decommissioning phase potential negative environmental impacts will include:-

- ✓ Impacts on air quality
- ✓ Noise and vibration impacts
- ✓ Occupational injuries and accidents to construction workers
- ✓ Traffic related impacts
- ✓ Waste related impacts

### Proposed mitigation measures

<b>Construction phase</b>	
<b>Potential negative impact</b>	<b>Proposed mitigation measures</b>
Impacts on air quality	<ul style="list-style-type: none"> <li>- Secure the entire construction site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all construction staff with appropriate personal protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</li> <li>- Ensure all construction workers make proper use of the PPEs</li> </ul>

	<p>provided.</p> <ul style="list-style-type: none"> <li>- Periodically monitor air quality levels at the construction site by measuring local particulate matter</li> </ul>
Noise and vibration impacts	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others. Ensure the construction site is secured by appropriate noise attenuators.</li> <li>- Provide all construction staff with appropriate noise preventions PPEs such as ear plugs and ear mufflers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>
Occupational injuries and accidents to construction workers	<ul style="list-style-type: none"> <li>- All construction workers to be given appropriate personal protective equipment.</li> <li>- All construction workers to first be trained on the appropriate use of the provided personal protective equipment.</li> <li>- Project proponent to ensure each construction worker and visitors to the construction site also use the provided personal protective equipment.</li> <li>- The project proponent to ensure that tools and equipment provided for use at the proposed construction site are well serviced and maintained.</li> <li>- Project proponent to ensure that the construction site is free of hazards.</li> <li>- The project proponent to ensure that among the construction workers are trained first aiders.</li> <li>- Project proponent to ensure there is a fully equipped first aid station at the proposed project site.</li> <li>- Project proponent to ensure appropriate measures are put in place to minimize fugitive dust by regularly flooding with water all dusty working areas especially during windy periods.</li> </ul>

Traffic related impacts	<ul style="list-style-type: none"> <li>- Develop and implement a traffic marshal plan for the construction site</li> <li>- Provide sufficient parking/ holding area for traffic delivering and collecting materials from the construction site.</li> </ul>
Waste related impacts	<ul style="list-style-type: none"> <li>- Ensure all waste generated at the construction site is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced vehicles collect waste from the construction site</li> <li>- Management to try to minimise waste generation by practicing the principles of refusing to generate waste, reducing waste generation, reusing generated waste, recycling generated waste and reusing and or recycling most of generated waste</li> </ul>
<b>Operational phase</b>	
<b>Potential negative impact</b>	<b>Proposed mitigation measures</b>
Impacts on air quality	<ul style="list-style-type: none"> <li>- Ensure appropriate scrubbers are provided in the design of the hot rolling mill to scrub out all potential contaminants gasses in the flue stream from burning of IDO and furnace oil.</li> <li>- Ensure the hot rolling steel mill is always maintained on schedule as prescribed by the manufacturers.</li> <li>- Monitor the content of chimney emissions every three months as per the Environmental Management and Coordination (Air Quality) Regulations, 2014</li> </ul>
Noise and vibration impacts	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others. Ensure the construction site is secured by appropriate noise attenuators.</li> <li>- Provide all operational staff with appropriate noise preventions PPEs such as ear plugs and ear muffers</li> </ul>

	<ul style="list-style-type: none"> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>
Impacts related to oils and lubricants spills	<ul style="list-style-type: none"> <li>- Provide appropriate containment structures around all IDO and furnace oil storage tanks to collect any spills.</li> <li>- Provide for oil spill absorbents for quick absorption of any accidental spills</li> </ul>
Traffic related impacts	<ul style="list-style-type: none"> <li>- Develop and implement a traffic marshal plan for the for the operational phase</li> <li>- Provide sufficient parking/ holding area for traffic delivering and collecting materials from the hot rolling steel mill</li> </ul>
Waste related impacts	<ul style="list-style-type: none"> <li>- Ensure all waste generated during operational phase is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced vehicles collect waste from the hot rolling steel mill.</li> <li>- Management to try to minimise waste generation during operational phase by reusing and or recycling most of generated waste</li> </ul>
Increased competition for water in the area	<ul style="list-style-type: none"> <li>- Explore alternative sources of water that can be used such as roof catchment, rock catchment and collection from neighbouring quarry pits to minimise drawing water from local pipeline for industrial use.</li> <li>- Provide adequate water storage tanks on site to store water from roof catchment from the extensive roofs of the godowns during rainy season that can be used in cooling of plant and equipment.</li> <li>- Minimise water demand by ensuring used water from the cooling circuit is routed through an adequately sized and effective cooling tower and pressure filter to filter the water for recycling purpose.</li> </ul>
<b>DECOMMISSIONING PHASE</b>	
<b>Potential negative impact</b>	<b>Proposed mitigation measures</b>



Impacts on air quality	<ul style="list-style-type: none"> <li>- Secure the entire decommissioning site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all decommissioning staff with appropriate personal protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</li> <li>- Ensure all decommissioning workers make proper use of the PPEs provided.</li> <li>- Periodically monitor air quality levels at the decommissioning site by measuring local particulate matter</li> </ul>
Noise and vibration impacts	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others.</li> <li>- Ensure the decommissioning site is secured by appropriate noise attenuators.</li> <li>- Provide all decommissioning staff with appropriate noise preventions PPEs such as ear plugs and ear mufflers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>
Traffic related impacts	<ul style="list-style-type: none"> <li>- Develop and implement a traffic marshal plan for the site being decommissioned.</li> <li>- Provide sufficient parking/ holding area for traffic collecting waste from the decommissioning site.</li> </ul>
Waste related impacts	<ul style="list-style-type: none"> <li>- Ensure all waste generated at the site being decommissioned is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced vehicles collect waste from the site being decommissioned.</li> </ul>

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## **1. BACKGROUND**

### **1.1 Introduction**

This report is an Environmental Impact Assessment (EIA) Study for proposed overhaul and replacement of a hot rolling steel mill at the reinforced steel division of the Corrugated Sheets Limited. The Environmental Impact Assessment Study and report was prepared as provided for in Legal Notice No. 31 of 2019, section 58 (2) of the Environmental Management and Coordination Act, 1999 and the Environmental (Impact Assessment and Audit Regulations), 2003.

### **1.2 Project definition**

The proposed project will be to overhaul and replace the old hot rolling steel mill whose capacity is 4tons/day with a modern more efficient hot rolling steel mill of capacity 16tons/day.

### **1.3 Location**

The Reinforced Steel Division (RSD) of Corrugated Sheets Limited (CSL) is located on a section of land parcel number 24606 at Kokotoni area of Kaliangombe Sub-location, Rabai location, Rabai Sub-County, Kilifi County the GPS Coordinates for the two divisions are 3<sup>0</sup> 55' 06.39''S and 39<sup>0</sup> 31' 46.15''E. Appendix 1 gives land documents.

### **1.4 Project Proponent**

The project proponent is Corrugated Sheets Limited (CSL), a limited company carrying out business in the Republic of Kenya. A copy of the proponent's PIN certificate and certificates of incorporation is attached in appendix 2.

### **1.5 Project Objective and Scope**

#### **1.5.1 Objective**

The objective of the proposed project is to overhaul the old hot rolling mill and replace it with a new and modern hot rolling steel mill.

#### **1.5.2 Scope**

The proposed study will cover the following:-

- ✓ Extension of the current godown to provide additional space that will be required for the upgraded mill

- ✓ Overhauling of identified sections of the old hot rolling mill.
- ✓ Installation and fitting on new sections and parts of the hot rolling steel mill
- ✓ Upgrading of support facilities to much the needs of the upgraded mill

### **1.6 Terms of Reference**

Terms of reference (ToR) for the EIA study were prepared and submitted to the National Environment Management Authority (NEMA) for approval. The ToR was approved by NEMA appendix 3 is copy of the ToR approval letter from NEMA.

## **2. BACKGROUND TO ENVIRONMENTAL IMPACT ASSESSMENT**

### **2.1 Definition of Environmental Impact Assessment**

Broadly environmental impact assessment (EIA) refers to the need ‘to identify and predict the impact on the environment and on man’s health and wellbeing of legislative proposals, policies, programmes, projects and operational procedures, and to interpret and communicate information about the impacts’(Munn 1979). UNECE (1991) defines EIA as ‘an assessment of the impacts of planned activity on the environment’, IAIA (2009) on the other hand defines EIA as ‘the process of identifying, predicting, evaluating and mitigating the biophysical, social and other relevant effects of proposed development proposals prior to major decision being taken and commitments made’. Glasson *et.al* (2012) defines EIA as ‘a systematic process that examines the environmental consequences of development actions in advance’. EIA is thus a vital tool that aid formulation of development actions, decision making, an instrument for sustainable development and vehicle for stakeholder consultation and participation (Glasson *et.al* 2012).

### **2.2 The purposes of EIA**

#### **2.2.1 An aid to decision making**

EIA is an aid to decision-making. For the decision maker, for example, a local authority, it provides a systematic examination of the environmental implications of a proposed action, and sometimes alternatives, before a decision is taken. The EIA can be considered by the decision-maker along with other documentation related to the planned activity. EIA is normally wider in scope and less quantitative than other techniques, such as cost-benefit analysis (CBA).It is not a substitute for decision making, but it does help to clarify some of the trade-offs associated with a proposed development action, which should lead to more informed and structured decision-making. The EIA process has a potential, not always taken up, to be a basis for negotiation between the developer, public interest groups and the planning regulator. This can lead to outcome that balances well the interests of the development action and the environment.

#### **2.2.2 An aid to the formulation of development actions**

Developers may see the EIA process as another set of hurdles to jump before they can proceed with their various activities; the process can be seen as yet another costly and time-consuming activity in the development consent process. However, EIA can be of great benefit to them, since it can provide a framework for considering location and design issues and environmental issues in parallel. It can be an aid to the formulation of development actions, indicating areas where a project can be modified to minimize or eliminate all together its adverse impacts on the

environment. The consideration of environmental impacts early in the planning life of a development can lead to more environmentally sensitive development; to improved relations between the developer, the planning authority and the local communities; to a smoother development consent process, and sometimes to a worthwhile financial return on the extra expenditure incurred. O’Riordan and Sewell (1981) links such concepts of negotiation and redesign to the important environmental themes of ‘green consumerism’ and ‘green capitalism’. The growing demand by consumers to goods that do no environmental damage, plus a growing market for clean technologies, is generating a response from developers. EIA can be the signal to the developer of potential conflict; wise developers may use the process to negotiate ‘environmental gain’ solutions, which may eliminate or offset negative environmental impacts, reduce local opposition and avoid costly public inquiries. This can be seen in the wider and contemporary context of corporate social responsibility (CSR) being increasingly practiced by major businesses (Crane et al.2008)

### **2.2.3 A vehicle for stakeholder consultation and participation**

Development actions may have wide-ranging impacts on the environment, affecting many different groups in society. There is increasing emphasis by government at many levels on the importance of consultation and participation by key stakeholders in the planning and development of projects. EIA can be a very useful vehicle for engaging with communities and stakeholders, helping those potentially affected by a proposed development to be much better informed and to be more fully involved in the planning and development process.

### **2.2.4 An instrument for sustainable**

Existing environmentally harmful developments have to be managed as best as they can. In extreme cases, they may be closed down, but they can still leave residual environmental problems for decades to come. It would be much better to mitigate the harmful effects in advance, at the planning stage, or in some cases avoid the particular development together. This of course leads on to the fundamental role of EIA as an instrument for sustainable development- a role some writers have drawn attention to as one often more hidden than it should be when EIA effectiveness is being assessed (Jay et al.2007)

## **2.3 Origins and development of EIA**

The first EIA legislation was formerly established in the United States of America in 1969 (NEPA 1970), in Europe the 1985 European Community directive on EIA (Directive 85/337)

introduced broadly uniform requirements for EIA for all member states (CEC, 1985). In Australia, the Commonwealth EIA system was established in 1974 under the Environmental Protection (Impact of Proposal) Act (Wood 2003, Elliott and Thomas, 2009). The United Kingdom enacted a formal legislation on EIA in 1988 (Glasson *et.al* 2012). China formerly enacted its first EIA legislation in 1979 (Moorman and Ge 2007). In Africa and the Middle East, Israel and Algeria pioneered in enactment and implementation of EIA legislations in 1982, 2003 and 1983, 1990 respectively (Economic Commission for Africa, (2005) Almagi *et.al* (2007). In East Africa Uganda pioneered in enacting EIA legislation in 1998, Kenya EIA legislation was enacted in 2000, and implemented in 2003 (Morara *et.al* 2011).

## **2.4 Key elements in the EIA process**

The environmental impact assessment process comprises of various interactive steps such as screening, scoping, consideration of alternatives, action design, preparation of the EIA report, reviewing or evaluating the report, decision making, and post decision activities such as monitoring and auditing (Glasson *et al.*, 1994; Wood, 1995). According to UNEP (2002) key elements in the EIA process are screening, scoping, impact analysis, mitigation, reporting, review, decision-making, follow up and public involvement. Figure 2 is the schematic presentation of general EIA process adopted from UNEP' environmental impact assessment training manual.

### **2.4.1 Screening**

Screening determines whether or not a proposal requires an EIA and, if so, what level of analysis is necessary. This process brings clarity and certainty to the implementation of EIA, ensuring that it neither entails excessive review nor overlooks proposals that warrant examination. Legal Notice No. 31 of 30<sup>th</sup> April 2019, that amended the second schedule of the Environmental Management and Coordination Act, 1999 categorizes Steel Mills under high risk projects in section 3 (9) (p) of the amended second schedule of the Act. Based on this, it is required that an environmental impact assessment study report be submitted for the proposed project. Regulation 11 (1) of the Environmental (Impact Assessment and Audit) Regulations, 2003 require that an environmental impact assessment study be conducted in accordance with the terms of reference developed during the scoping exercise by the proponent and approved by the Authority.

### **2.4.2 Scoping**

Scoping identifies the important issues in readiness for preparation of terms of reference; it is a critical, early step in the preparation of an EIA (UNEP, 2002). The scoping process identified the issues that are likely to be of most importance during the EIA and eliminated those that are of little concern. In this way, the EIA study was focused on the significant effects and time and money are not wasted on unnecessary investigations (Glasson *et al.*, 2012). The following were the key issues identified to be focused on during the EIA study.

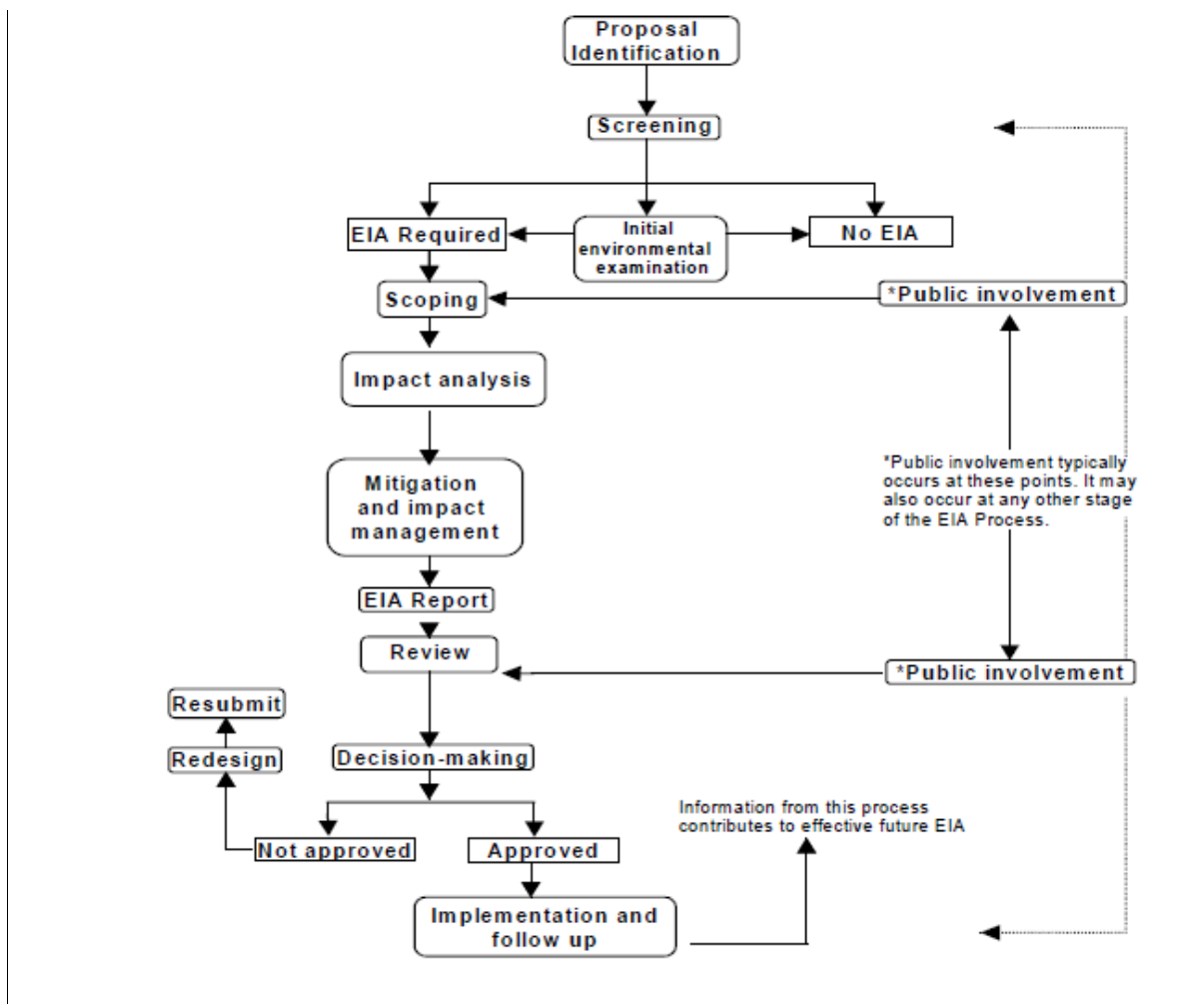
- ✓ Impacts on local air quality
- ✓ Noise and vibration impacts
- ✓ Traffic related impacts
- ✓ Waste related impacts
- ✓ Occupational injuries and accidents
- ✓ Increase demand and use of water

### **2.4.3 Impact analysis**

Impact analysis is carried out in the detailed phase of the EIA; it involved identifying the impacts more specifically, predicting the characteristics of the main impacts and evaluating the significance of the residual impacts (UNEP, 2002).

### **2.4.4 Impact Mitigation**

Mitigation is the stage of the EIA process when measures are identified to avoid, minimize or remedy impacts. These measures are implemented as part of the process of impact management, together with any necessary adjustments to respond to unforeseen impacts. Both elements are integral to ensuring that the EIA process leads to practical action to offset the adverse environmental impacts of proposed developments (UNEP, 2002). Mitigation recommends feasible and cost-effective measures to prevent or reduce significant negative impacts to acceptable levels.



**Figure 1: Generalized EIA process flowchart. Adapted from UNEP 2002**

### 2.4.5 Reporting

Reporting involves compiling all the information obtained into an EIA report which is a keystone document. It assembles the information that assists the proponent in managing the impacts of the proposal, the responsible authority in decision-making and condition setting; and the public in understanding the likely impacts of the proposal (UNEP, 2002).

### 2.4.6 Report review

The review stage of the EIA report is one of the main ‘checks and balances’ built into the EIA process to establish the quality of an EIA. It helps to ensure the information submitted is credible and sufficient for decision-making purposes (UNEP, 2002) by verifying the accuracy and comprehensiveness of the report (Glasson *et al.*, 2012). The decision-making element of the EIA process involves approving or rejecting the proposal and setting conditions. Decision making stage provides for incorporation of environmental considerations into proposed development

(Glasson *et al.*, 2012). Once the proposed project is approved, implementation and follow up complete the EIA process (UNEP, 2002).

#### **2.4.7 Monitoring and auditing**

Monitoring, auditing and other tools are used to ‘close the loop’ of impact prediction and condition setting (Sadler, 1996). Monitoring and auditing is vital as it is used to identify the impacts that occur; to check that these are within the levels predicted and required by legislation; determine that mitigation measures are properly implemented and work effectively; ensure the environmental benefits expected are being achieved; and provide feedback to improve future applications of the EIA process (Arts, 1998).



### 3. APPROACH AND METHODOLOGY

#### 3.1 Approach

At the beginning of the assignment inception meetings were held between the Proponent representative and the Consulting Team Leader both in the office at the proposed project site. The meetings served as formal introduction for clarification of Terms of Reference (ToR) for the study team and physically show the team the proposed project site. ToR report was developed and submitted to NEMA.

#### 3.2 Methodology

The following methodology was used in undertaking the Environmental Impact Assessment:

- i) Scoping and development of Terms of Reference
- ii) Desk review of relevant project documents including project design documents, relevant policy and legislative documents including relevant international conventions, agreements and protocols ratified by Kenya.
- iii) Field visits for detailed documentation of site conditions and actual site assessment.
- iv) Public participation
- v) Impact prediction and mitigation measures determination
- vi) Reporting.

##### 3.2.1 Scoping

Scoping identified the important issues in readiness for preparation of terms of reference; it was a critical, early step in the preparation of an EIA study report. The scoping process identified the issues that are likely to be of most importance during the EIA and eliminated those that were of no concern.

##### 3.2.2 Desk review

Desk top review included review of the following:

- ❖ **Policy documents:** National Environment Policy, 2013, Kenya National Youth Policy, Kenya Gender Policy, and KNBS Economic Survey Report 2017, National Climate Change Framework Policy Sessional Paper No. 5 of 2016 among others.
- ❖ **National legislations:** The Constitution of Kenya, 2010; The Environmental Management and Coordination Act (EMCA), 1999; The Environmental (Impact Assessment and Audit) Regulations, 2003; The Environmental Management and Coordination (Water Quality) Regulations, 2006; The Environmental Management and Coordination (Waste Management) Regulations, 2006; Environmental Management and

Coordination (Air Quality) Regulations, 2014; The Public Health Act Cap 242; The Occupational Safety and Health Act 2007; The Physical Planning Act 1996, Cap. 286, The Water Act 2016; Climate Change Act, 2016 among others.

- ❖ **Development Plans:** Kilifi County Integrated Development Plan 2013-2017
- ❖ International agreements, Conventions, and WB Policies:

### **3.2.3 Field assessment**

Field assessment involved visiting the proposed project site and documenting the current condition on the site. This involved documenting existing structures of the old hot rolling steel mill, support infrastructure and neighboring facilities. Also the location where the extension of the godown was to be done was assessed in relation to the existing old mill. The assessment also included the existing access road to the steel mill and available parking space within the compound of the facility. The site was assessed for any flora and fauna and observations recorded. GPS coordinates for the site were taken by a handheld GPS and photographs of site observation were taken. Site office meetings were held between the Lead Consultant, the Division Manager and the Company Environmental and Safety Officer respond to questions and emerging issues during site assessment.

### **3.2.4 Public participation**

Public participation involved conducting three public meetings (barazas) in three different locations adjacent to the proposed project site as was suggested by the local leadership. The meetings were also publicized locally through the Sub-Chief- Mzee wa Mtaa- Nyumba Kumi channel to ensure the information reached each housed within every Nyumba Kumi cluster. To supplement the local meetings a detailed questionnaire survey was carried out, the questionnaire survey targeted various groups/ institutions including local leaders, civil society groups operating in the area, local learning institutions, local faith based institutions and local health institutions.

### **3.2.5 Reporting**

All the information and data collected from scoping exercise, the desk top document review, field assessments, and stakeholder consultation and participation was compiled into two reports namely:-

- ✓ Terms of Reference Report; and
- ✓ Environmental Impact assessment (EIA) Study Report.

Terms of Reference Report was submitted to NEMA as specified in Regulation 11 (1) and 11(2) of the Environmental (Impact Assessment and Audit) Regulations, 2003. The Environmental

Impact assessment (EIA) Study Report was prepared as specified in Regulation 18 of the Environmental (Impact Assessment and Audit) Regulations, 2003 and submitted to NEMA as specified in Regulation 19 of the Environmental (Impact Assessment and Audit) Regulations, 2003.

### **3.3 Study team**

The Environmental Impact Assessment Study was carried out by Sigtuna Consultancy Limited firm of experts. The composition of the experts was as follows:

- ✓ Philip Manyi Omenge, Team Leader, EIA/EA Lead Expert, Natural Resources Management/Ecology, Rural Development, Conflict Management and Gender Mainstreaming Specialist.
- ✓ Hezekiah Adala, EIA/EA Lead Expert, Mechanical Engineer, Safety Advisor;
- ✓ James Morumbasi Mong'oni a registered EIA/EA Lead Expert, a Mechanical Engineer, a Safety Practitioner, Safety Trainer, and Inspector of pressure vessels and lifting equipment
- ✓ Jonathana Katana Yeri, EIA/EA Associate Expert, Graduate Engineer Soil, Water and Environment
- ✓ Christopher Wanyama- Community Development and EIA Field Assistant

Registration certificate and practicing license of the firm of experts and those of experts is attached in appendix 4. Baseline air quality was carried out by Polucon Services (Kenya Limited) an accredited laboratory while noise and vibration was carried out by Clamson Ogutu- an Occupational Hygienist and EIA/EA Lead Expert.

## **4. POLICY AND LEGAL FRAMEWORK**

### **4.1 Relevant National Policies**

#### **4.1.1 National Environment Policy, 2013**

The National Environment Policy document was prepared with the goal of bettering the quality of life for present and future generations through sustainable management and use of the environment and natural resources. The document underscores the importance and contribution of environment and natural resources to the local and national economy, people's livelihoods and the provision of environmental services such as watershed protection and carbon sequestration. It also reviews the status of environment in Kenya and highlights the key environmental issues and challenges. It identifies Kenya's critical ecosystems and natural resources and proposes measures to enhance conservation and management of ecosystems and sustainable use of natural resources. It addresses a wide range of issues relating to environmental quality and health. The areas covered include air quality, water and sanitation, waste management, radiation, toxic and hazardous substances, noise, HIV and AIDS and environmental diseases. It also outlines strategies and actions that will ensure effective implementation of the Policy and the Environmental Management and Coordination Act.

#### **4.1.2 National Climate Change Framework Policy Sessional Paper No. 5 of 2016**

This Policy was developed to facilitate a coordinated, coherent and effective response to the local, national and global challenges and opportunities presented by climate change. The policy adapts an overarching mainstreaming approach to ensure the integration of climate change considerations into development planning, budgeting and implementation in all sectors and at all levels of government. The Policy therefore aims to enhance adaptive capacity and build resilience to climate variability and change, while promoting a low carbon development pathway. The response to climate change in Kenya must adhere to the constitutional governance framework and commitment to sustainable development, while addressing the goal of attaining low carbon climate resilient development. To attain the latter, the policy focuses on appropriate mechanisms to enhance climate resilience and adaptive capacity, and the transition to low carbon growth.

### **4.2 National legislations**

#### **4.2.1 The Constitution of Kenya, 2010**

The Constitution of Kenya 2010 is the overarching legal framework for matters on environment. It recognizes the environment as part of the country's heritage, and which must be safeguarded

for future generations. It provides for the right to a clean and healthy environment for every person in Article 42, obligating the state to enact legislation to protect that right as well as to establish systems of environmental impact assessment, environmental audit and monitoring of the environment in Article 69.

Article 69 imposes on the State, other obligations including, to:

- Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources, and ensure the equitable sharing of the accruing benefits;
- Encourage public participation in the management, protection and conservation of the environment;
- Eliminate processes and activities that are likely to endanger the environment; and
- Utilize the environment and natural resources for the benefit of the people of Kenya.

Article 69 (2) similarly confers a conservation obligation on parties including the proponent of the proposed hot rolling steel mill. The proponent is thus obligated to cooperate with State organs and other persons to protect and conserve the environment.

#### **4.2.2 The Environmental Management and Co-ordination Act, 1999**

EMCA, 1999 (amended) 2015, provides a legal and institutional framework for the protection and conservation of the environment in line with Article 42 of the Constitution of Kenya, 2010. The ultimate objective is to provide a framework for integrating environmental considerations into the country's overall economic and social development. According to section 58 of the Act projects specified in the second schedule that are likely to have significant impact on the environment have to be subjected to an EIA study. Steel mills are categorized as high risk projects in the second schedule of the act and hence must be subjected to environmental impact assessment study prior to implementation.

#### **4.2.3 The Occupational Safety and Health Act, 2007**

This Act came into force in 2007 and replacing The Factories and Other Places of Work Act, Cap 514. It makes provisions for the health, safety and welfare to be observed by employers and persons employed in places of work. Part IV of the act covers health issues such as the state of cleanliness, refuse management, employee space requirement, ventilation and sanitary conveniences. Part V covers fire safety, operation and maintenance of machinery, fencing requirements, storage of dangerous substances, training and supervision of workers. Part VI

deals with welfare issues; drinking water supply, washing facilities, sitting areas and first aid provision.

#### **4.2.4 The Lands Act 2012**

The Land Act 2012 is “an Act of Parliament to give effect to Article 68 of the Constitution, to revise, consolidate and rationalize land laws; to provide for the sustainable administration and management of land and land based resources, and for connected purposes”. Part I of the act is preliminary provisions, part II of the act deals with management of public land, part III of the act deals with administration of public land (Leases, Licenses and Agreements), part IV of the act deals with community land, part V of the act deals with administration and management of private land, part VI of the act deals with general provisions of leases, part VII of the act deals with general provisions of charges, part VIII of the act deals with compulsory acquisition of interests in land, part IX of the act deals with settlement programmes, part X of the act deals with easements and analogous rights, part XI of the act deals with miscellaneous, the schedule lists repealed laws i.e. The Wayleaves Act, Cap. 292 and The Land Acquisition Act, Cap. 295. The proposed project will fully comply with the provisions and requirements of the Lands Act 2012.

#### **4.2.5 The Public Health Act Cap 242**

Key relevant provisions of this Act are:

- Section 10, 11, 12, and 13 for regulating the maintenance, repair and inspection of drains, latrines, cesspool or septic tanks
- Section 28, 29, and 30 which give requirements for the construction of drains in connection with buildings and
- Section 115 prohibiting nuisances that may cause injury or health hazards.

The proposed project will comply with the provisions of the Public Health Act.

#### **4.2.6 Work Injuries Benefits Act 2007**

Section 7 of the Act stipulates that every employer shall obtain and maintain an insurance policy with an insurance company approved by the Minister in respect of any liability that the employer may incur under this Act to any of his employees. An employee who is involved in an accident resulting in the employees’ disability or death is subject to the provisions of this Act, and entitled to benefits provided for under the Act. Section 3 of the Act however states that no employee shall be entitled to compensation if an accident, not resulting to serious disability or death, is

caused by the deliberate and willful misconduct of the employee. The proposed project will comply with the provisions and requirements of this Act.

### **4.3 Regulatory Framework**

#### **4.3.1 The Environment (Impact Assessment and Audit) Regulations, 2003**

These regulations provide guidelines for conducting an EIA study as well as environmental auditing and monitoring. The Regulations state in Regulation 3 that "the Regulations should apply to all policies, plans, programmes, projects and activities specified in Part III and V of the Regulations" basically lists the guidelines of undertaking, submission and approval of the EIA/SEA Report. The Regulations requires proponents to conduct annual environmental audits to identify the environmental impacts of their undertakings and propose mitigation measures to improve their environmental performance. Section 17 of the same regulation stipulates that during the process of conducting the audit the proponent shall seek the views of persons who may be affected by their operations. The proponent of the proposed project would be required to comply with the provisions of this legislation.

#### **4.3.2 Building Operations and Works of Engineering Construction Rules, 1984**

The provisions of the Factories Act relevant to building operations and engineering construction works are contained in the Abstract of the Act for Building Operations and Works of Engineering Construction Rules. These rules specify the minimum safety and health measures to be taken during construction works which include that the proponent should:

- Give notice of particular operations or works;
- Such notice should be sent in writing to the Occupational Health and Safety Officer, not later than seven days after commencement of construction;
- Post printed copies or prescribed abstracts of the Occupational Safety and Health Act at the site of operations or works (Section 61 of the Act);
- Provide sufficient and suitable sanitary conveniences for persons employed. These must be kept clean and well lit.

The contractor appointed by the proponent would be expected to adhere to these provisions.

#### **4.3.3 Environmental Management and Coordination (Noise and Excessive Vibration) (Pollution Control) Regulations, 2009**

The regulations apply to persons wishing to operate or repair any equipment or machinery, engage in any commercial or industrial activity that is likely to emit noise or excessive

vibrations. The regulations specify the limits or levels within which these shall be undertaken. The Regulations also stipulate in the second schedule that construction activities undertaken during the night should not emit excessive noise beyond the permissible levels.

#### **4.3.4 Environmental Management and Coordination (Water Quality) Regulations, 2006**

These regulations provide protection to ground water or surface water from pollution by providing the limits and parameters of pollutants in treated waste water which can be discharged into the environment.

Relevant provisions of this regulation applicable to the proposed project include:-

- Every person shall refrain from any act which will directly or indirectly cause pollution and it shall be immaterial whether or not the water source was polluted before the enactment of these regulations;
- No person shall throw or cause to flow into or near a water source any liquid, solid or gaseous substance or deposit any such substance as to cause pollution;
- Discharge of effluent from sewer must be licensed according to the act;
- Water abstraction must only be done after approval of an Environmental Impact Assessment study.

#### **4.3.5 Environmental Management and Coordination (Waste Management) Regulations, 2006**

Part II of these regulations lists the responsibility of the waste generator and prescribes the proper mechanism of handling all waste through segregation and finally proposes environmental management programme through implementation of cleaner production mechanisms.

Relevant provisions of this regulation include:-

- Prohibition of any waste disposal on a public highway, street, road, recreational area or in any public place except in designated waste receptacle
- All waste generated to be collected, segregated and disposed in a manner provided for under these regulations
- All waste generators to minimize waste generated by adopting cleaner production methods
- All waste transporters to be licensed according to the Act
- Collection and transportation of the waste to be done in such a manner not to cause scattering of the waste



- The vehicle and equipment for waste transportation to be in such a manner not to cause scattering or escape of the waste

At the construction stage of construction debris would be generated. The proponent should ensure that the waste is managed in line with the provisions of these regulations.

#### **4.3.6 Environmental Management and Coordination (Air Quality) Regulations, 2014**

The objective of these Regulations is to provide for prevention, control and abatement of air pollution to ensure clean and healthy ambient air. The general prohibitions state that no person shall cause the emission of air pollutants listed under First Schedule (priority air pollutants) to exceed the ambient air quality levels as stipulated under the provisions of the Seventh Schedule (Emission limits for controlled and non-controlled facilities) and Second Schedule (Ambient air quality tolerance limits). The proponent will be guided by provisions of this act, during operation phase. Air quality monitoring will be guided by the standards stipulated thereof.

## 5. BASELINE INFORMATION

### 5.1 Existing structures at the proposed project site

The proposed project is to be implemented within what is known as the Reinforced Steel Division (RDS) of Corrugated Sheets Limited. Existing structures within RDS include the following:-

- ✓ Administration offices
- ✓ Large godown building that houses the old hot rolling mill (Ruffrol Mill 10 inch) and the Thermal Mechanically Treated (TMT) mill.
- ✓ Warehouses and stores
- ✓ Parking space
- ✓ Water culling tower and circulating tanks
- ✓ Electricity power sub-station of 33KV
- ✓ A standby generator
- ✓ Four above ground tanks for storage of Industrial Diesel Oil (IDO) and furnace oil



**Plate 1: A section of the outside of the godown & the inside shoeing part of the steel mill inside**



**Plate 2: Support facilities of the steel mill i.e. 33KV sub-station, water cooling system & bulk IDO storage**

These facilities will be upgraded to match the requirement of the new mill. The godown will be expanded to create room for the expanded mill, the warehouses and stores will also be expanded to meet storage needs of the increased production. Cooling water circulation system complete with the cooling tower will be modernised to meet the cooling needs of the modernised hot

rolling mill. Bulk storage of IDO and furnace oil will be improved to match increased consumption of the modernised hot rolling mill. The enclosure compound of the sub-station will be rehabilitated but the current capacity is sufficient for the enhanced mill. However the capacity of the standby generator will have to be improved.

## **5.2 Environmental Baseline**

Some of the most important environmental parameters that can challenge from activates of a hot rolling mill include local air quality, ambient noise & vibration. Local air quality could change as a result of stuck emissions while noise & vibrations could change as a result of the actual operation of the hot rolling steel mill. The RSD is a going concern with operational hot rolling steel mills i.e. the absolute technology Ruffrol Mill 10 inch and the TMT mill. The proposed project intends to overhaul and replace the outdated and inefficient Ruffrol Mill 10 inch. RSD being an existing factory, baseline stuck emission, noise & vibration from the current mill that is documented in this EIA study were those which were the most current statutory monitoring reports carried out in the year 2020 and submitted to NEMA as per the provisions of Environmental Management and Coordination (Air Quality) Regulations, 2014 and the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 respectively. CSL the project proponent, deemed this data relevant as baseline data for the current EIA study since it was the most current monitoring data current out at the RSD during the period the EIA study was done.

### **5.2.1 Baseline air quality**

#### **5.2.1.1 Introduction**

Table 1 of the First Schedule of the Environmental Management and Coordination Act (Air Quality) Regulations, 2014, gives Ambient Air Quality Tolerance Limits for various types of pollutants within an industrial setting such as the Reinforced Steel Division of the Corrugated Sheets Limited, where the proposed project is to take place. Any ambient air quality monitoring for such a setting should therefore be done against these limits. Table 2 of the First Schedule of the Environmental Management and Coordination Act (Air Quality) Regulations, 2014 gives the Ambient Air Quality at the Property Boundary of an industrial setting. Any ambient air quality monitoring at the property boundary for such a setting should therefore be done against these limits. The second schedule of the regulations, lists the priority pollutants to be monitored. The third schedule of the regulations gives the emission limits of air pollutants for controlled and non-controlled facilities in various industrial settings. The fourth schedule of these regulations

gives a guideline on air pollution monitoring parameters from stationary sources for various industry facilities. The frequency of monitoring is dependent on the parameter and should be reported on a quarterly basis.

### 5.1.1.2 Baseline air quality monitoring findings

A baseline Air stack emission monitoring was conducted by Polucon Services (Kenya) Limited between 17<sup>th</sup> and 23<sup>rd</sup> March 2020. Two runs were done at the furnace chimney and the oxidizing boiler stack and the results are tabulated in the tables 1 & 2 below, appendix 5 is the detailed air quality monitoring report.

**Table 1: Furnace stack measurements**

Regulated parameters	Run 1 concentration (mg/NM <sup>3</sup> )	Run 2 concentration (mg/NM <sup>3</sup> )	Average concentration (mg/NM <sup>3</sup> )	Emission Limits Limits(mg/NM <sup>3</sup> )	Emission Rates	
					Run 1	Run 2
Total Particulate matter	98	110	104	240	-	-
Sulphur dioxide (SO <sub>2</sub> )	652	568	610	500	51.988	60.421
Nitrogen dioxides (NO <sub>2</sub> )	417.12	325.77	371.45	200	16.427	17.461
Carbon monoxide	468.75	328.31	398.53	-	18.431	17.569
Hydrocarbons	<0.1%	<0.1%	<0.1%	-	<0.1%	<0.1%

**Table 2: Oxidizing Boiler Stack gas measurements**

Regulated parameters	Run 1 concentration (mg/NM <sup>3</sup> )	Run 2 concentration (mg/NM <sup>3</sup> )	Average concentration (mg/NM <sup>3</sup> )	Emission Limits Limits(mg/NM <sup>3</sup> )	Emission Rates (Kg/h)	
					Run 1	Run 2
Total Particulate matter	42	39	70.5	40.2	4.46	-
Sulphur dioxide (SO <sub>2</sub> )	164.74	153.00	158.87	400	13.489	15.180
Nitrogen dioxides (NO <sub>2</sub> )	202.93	181.08	191.97	1500	16.4649	18.002
Carbon monoxide	97.50	132.17	114.84	500	7.978	9.370
Hydrocarbons	<0.1%	<0.1%	<0.1%	300	<0.1%	<0.1%

## 5.2.2 Baseline noise & vibration

### 5.2.2.1 Introduction

The Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 define noise as “any undesirable sound that is intrinsically objectionable or that may cause adverse effects on human health or the environment . Noise can be either intermitted or intrusive”. Intermitted noise is noise whose level suddenly drops to several times the level of background noise, on the other hand; intrusive noise is external or noise from another part of the building which penetrates the structural deficiencies of a room or building. Noise can also be defined as unwanted or undesirable sound derived from sources such as industrial set up and operations, road traffic or construction works that interferes with normal activities such as conversation, sleep or recreation. Vibration consists of rapidly fluctuating motions; human response to vibration is a function of the average motion over a longer (but still short) time period, such as 1 second.

### 5.2.2.2 Baseline noise and vibration findings

The baseline noise survey for the Reinforced Steel Division of Corrugated Sheets Limited was conducted on the 9<sup>th</sup> March 2020 by Mr. Clamson Ogutu an Occupational Hygienist and a registered EIA/EA Lead Expert to establish the potential impact to the existing working environment, and provide data that can be used to mitigate negative impacts from the factory operations. Table 3 below is findings of noise and vibration while appendix 6 is the detailed noise and vibration monitoring report.

**Table 3: Noise and vibration monitoring results**

Location	Measured Noise Levels dB(A)			Shift	Workers	OEL/TVL	Time	Remarks
	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>					
<b>Administration block</b>								
Administration office	57.0	54.1	59.8	8	3	55.0	13.15	Above ILO OEL
Reception	69.0	63.7	73.9	8	2	55.0	13.17	Above ILO OEL
<b>Production</b>								
Bonded warehouse 414	75.3	69.1	81.4	8	5	90.0	13.19	Within OEL
Furnace TMT	90.1	83.5	96.7	8	4	90.0	13.21	Above OEL
Mill operator point 1	95.3	90.3	100.3	8	1	90.0	13.24	Above OEL
Mill operator point 2	94.4	90.2	98.5	8	1	90.0	13.26	Above OEL

Cooling point	94.8	91.0	98.5	8		90.0	13.28	Above OEL
Cooling bay	87.9	83.6	92.1	8	5	90.0	13.31	Within OEL
Loading area	81.8	76.9	86.6	8	10	90.0	13.35	Within OEL

### 5.3 Climatic baseline conditions

Climate is influenced by monsoon winds with the rainfall pattern being characterized into long rains (April-June with an average of 1040mm) and short rains (end of October to December with an average of 240mm). The average annual rainfall for the county is 640mm. The annual mean temperature in the county is 27.9<sup>0</sup>C with a minimum of 22.7<sup>0</sup>C and a maximum of 33.1<sup>0</sup>C. The hottest month is February with a maximum average of 33.1<sup>0</sup>C while the lowest temperature is in July with a minimum average of 22.7<sup>0</sup>C. On average, the temperatures are always high in Kokotoni. Most rainfall (rainy season) is seen in April, May, October and November. On average, the warmest month is March and on average, the coolest month is September. May is the wettest month and February is the driest month.

#### 5.3.1 Temperature

On average, the temperatures in Kokotoni are always high. The warmest month is March and the coolest month is July. The average annual maximum temperature is: 87.8° Fahrenheit (31.0° Celsius) and the average annual minimum temperature is 69.8° Fahrenheit (21.0° Celsius).

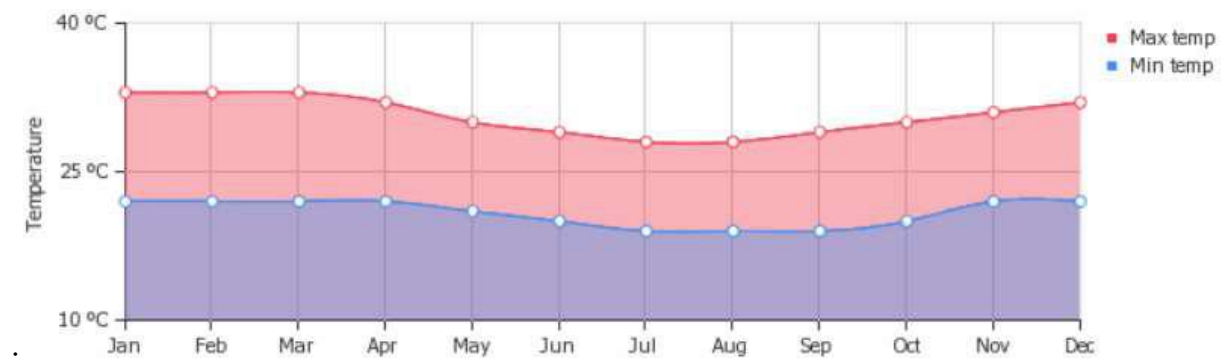


Figure 2: Average minimum and maximum temperatures of Kokotoni over the year

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (24.2 KM).

#### 5.3.2 Sunshine

On average, January, March and October are the sunniest months while May has the lowest amount of sunshine. Figure 3 below is the monthly total of sun hours over the year in Kokotoni.



**Figure 3: Monthly total of sunshine hours over the year in Kokotoni**

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (24.2 KM).

### 5.3.3 Water Temperature

On average, March has the hottest water temperature while September has the coldest water temperature. Figure 4 below is the mean water temperature in Kokotoni over the year.

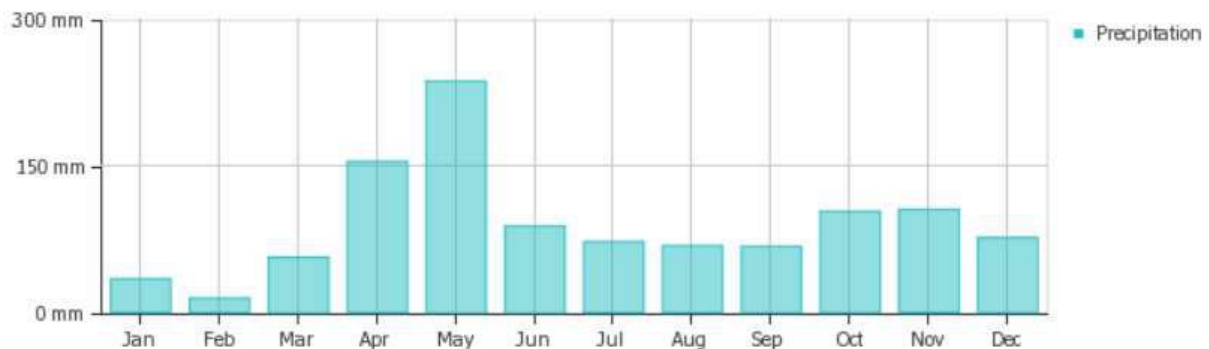


**Figure 4: Average mean water temperature in Kokotoni over the year**

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (24.2 KM).

### 5.3.4 Precipitation

A lot of rain (rainy season) in Kokotoni, falls in the months of April, May, October and November. On average, May is the wettest month while February is the driest month. The average amount of annual precipitation is: 39.37 (999.9 mm) as shown in figure 5 below.

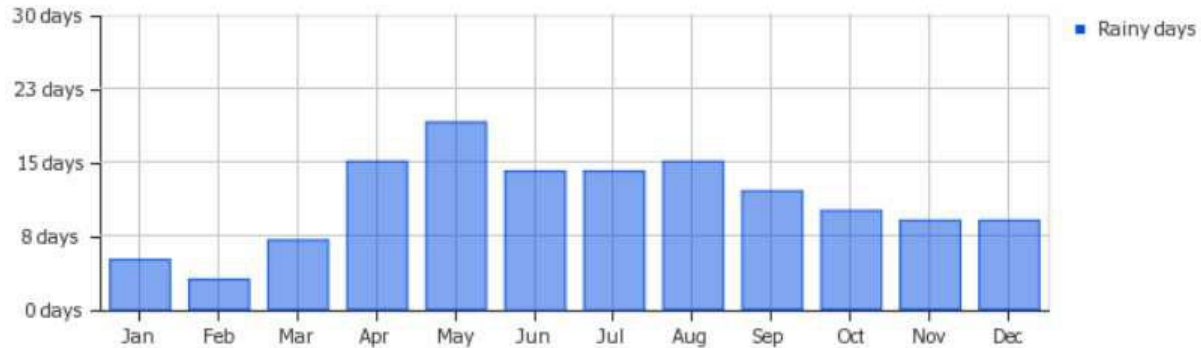


**Figure 5: Average precipitation in Kokotoni over the Year**

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (24.2 KM).

### 5.3.5 Monthly Rainy Days

Most rainy days are in the months of April, May, October and November with May having the highest number of rainy days. February has the least number of rainy days. Figure 6 below shows the average monthly rainy days in Kokotoni over the year.



**Figure 6: Average Monthly Rainy Days in Kokotoni over the year**

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (24.2 KM).

### 5.3.6 Humidity

On average, May is the most humid month in Kokotoni while February is the least humid. Figure 7 is the mean monthly relative humidity over the year in Kokotoni.



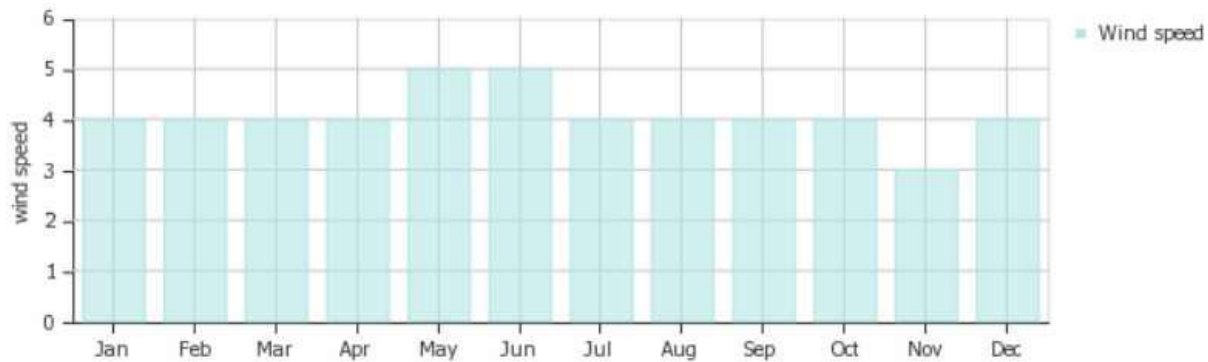
**Figure 7: Mean monthly relative humidity over the year in Kokotoni**

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (0.0 KM).

### 5.3.7 Wind Speed

On average, the windiest months in Kokotoni are May and June while the least wind is seen in November. Figure 8 below is the mean monthly wind speed (meters per second).





**Figure 8: Mean monthly wind speed over the year in Kokotoni in meters per second**

Source: [www.weather-and-climate.com](http://www.weather-and-climate.com); Data from nearest weather station: Mombasa, Kenya (24.2 KM).

## 5.4 Socio-economic background

The proposed project site is to be at Kokotoni area of Kaliangombe Sub-location, Rabai location, Rabai Sub-County, Kilifi County. The socio-economic background described in this section is thus that of Kilifi County.

### 5.4.1 Agriculture and Rural Development

Most farmers in the County are subsistence and most of the purchased inputs are certified seeds. There is limited use of both organic and inorganic fertilizers. Most of the farm holdings are less than a hectare. The County's variety of micro-climates makes the area suitable for the production of a variety of crops such as mangoes, cashew nuts, maize, beans, pigeon peas and cow peas. The main livestock enterprises include Dairy Cattle, Beef Cattle, Poultry, Sheep, Goats, Pigs, Rabbits and Bee-keeping. The major potentials which exist in the fisheries sub-sector include mariculture development; exploitation of deep sea fisheries; ice production for fish preservation; acquisition, securing and development of fish landing sites; empowering of fishers to enhance sustainable utilization of fisheries resources. The major activities under cooperatives are savings and credit cooperatives (SACCOs) are fishing cooperatives. Other types of cooperatives include ranches, transport, quarrying and multi-purpose.

### 5.4.2 Potential crops for cultivating in Kilifi

The average precipitation of 900 mm and mean-annual temperature of 27°C hold potential for agricultural development. Horticultural crops and vegetables such as chillies, brinjals, okra, onions and tomatoes can be cultivated along the Coastal plains. Staples like maize, rice, bananas, cow peas, green grams and beans can also do well. Northwards, along the Sokoke Forest, is land with medium agricultural potential. Further north, are the pineapple fields in Magarini County that can provide large scale farming. Jatropha, aloe vera and vanilla grow well in the County and

could be promoted for the production of bio-diesel, pharmaceuticals, cosmetics and food products.

#### **5.4.3 Trade, Tourism and Industry**

Tourism is one of the most important economic activities in the County. The major tourist attractions in the County are historic sites; topography; flora and fauna; water sports and recreation; cultural attractions and agro-tourism.

The industries in the County are manufacturing industries. Most of them are medium and small-scale enterprises. Small-scale Jua Kali cottage industries are also available in the County. Small-scale manufacturing industries have emerged and they manufacture goods such as Neem Soap and Wood Carvings.

Trading patterns in the County revolve around trading in agro-based goods, raw materials and other products from the manufacturing sector. In the County various types of trade such as retail, wholesale, distribution and hawking are carried out in a very elaborate way. The wholesale businesses are few and are located mainly in the major trading centres such as Kilifi and Malindi.

#### **5.4.4 Mining and manufacturing**

Kilifi County is rich in minerals; mainly titanium and iron ore, that have spurred extensive industrial mining activities. Other minerals extracted include barites, galena, rubies, pozzolana, gypsum and limestone. Salt mining and sand harvesting have been carried out over the years to take advantage of the sandy, salty waters. While these are economically lucrative, they are equally responsible for destruction of its mangrove forests. As for manufacturing sector there are:

- ✓ Two Cement factories in County (Mombasa Cement Limited and Athi River mining)
- ✓ Salt extracting companies in Malindi
- ✓ Milly fruit processing at Mtwapa
- ✓ Sandal factory in Kikambala
- ✓ Milk processing factory in Kilifi

#### **5.4.5 Tourism**

Tourism is very important for the County. It creates opportunities for employment in the service industries associated with it, such as transport, entertainment and advertising.

There has been an up-trend in tourism over the last few years and the County is well positioned to benefit from; local tourism, eco-tourism, pro-poor tourism, educational tourism, cultural

tourism and sport tourism. All these trends offer opportunities for significant growth of the tourism sector in Kilifi County.

#### Main attractions

- ✓ Rabai Church
- ✓ Gede Ruins
- ✓ Vasco da Gama Pillar
- ✓ Mnarani Ruins
- ✓ Mangrove Forests
- ✓ Arubuko Sokoke Forest which hosts the Tsavo East National Park
- ✓ Indian Ocean
- ✓ Kafuloni
- ✓ Sabaki and Rare Rivers
- ✓ Marine parks of Malindi, Watamu and Mtwapa are a great tourist attraction.

### **5.4.6 Physical Infrastructure**

The movement of people for socio-economic and cultural activities depends on good transport and communication system. A good road network provides access to the markets, health and other social facilities and also reduces incidences of insecurity.

The improvement of telephone services has made it easier to communicate within the County and other outside areas. This has improved efficiency in service delivery and decision making. The improvement in the communication system makes the communities who can contribute to their development.

#### **5.4.6.1 Public Amenities**

##### **Health Facilities**

The County has inadequate health facilities especially in the rural areas. Issues concerning mother and child care are not adequately addressed in most rural facilities. The same rural health facilities are also far from the community making them difficult to access. Also as a result of high poverty levels, women are discouraged from visiting facilities due to fee charges.

Has several healthcare facilities both private, missionary and public serving the residents.

Large county hospitals include;

- Kilifi District Hospital
- Malindi District Hospital
- Watamu Hospital.

### Private Big hospitals include

- Tawfiq Hospital
- Star hospital
- Wananchi Medical
- St. Peters
- BOMU medical
- Khairat Medical

### Missionary Hospitals include

- St. Lukes Hospital
- St. Benedicts

### **Education (Schools & Universities)**

Has 252 primary schools, 64 secondary schools, 81 private primary schools, 5 private secondary schools and 2 international schools. Has a total of 8 higher learning institutions;

- Pwani university
- Mount Kenya University (Kilifi county campus)
- Kenya Utalii college (Kilifi county campus)
- Nairobi university (Kilifi county campus)
- Mombasa Aviation (Kilifi County campus)
- DALC education (Kilifi county Campus)
- Kenya school of flying (kilifi county center)

### **Social Halls**

Commonly used in presiding of wedding extensions, business meetings, community meetings and many more. Some of the common halls are;

- Nidhamia muslim hall-malindi
- Kaloleni Social Hall

### **Recreational Parks & Stadia**

Refreshment of strength and spirits not only meant for recreation but sightseeing too...experience the calm embrace blended with nature, heritage, and culture. These include;

- Uhuru Gardens - Malindi
- Mazeras , Mazingira Park - Kilifi

### **Stadiums**

Local stadiums best ideal for sport activities and any related outdoor functions. Include;

- Karisa Maitha - Kilifi
- Malindi Municipal Ground

#### **5.4.7 HIV/AIDS**

According to the Ministry of Health, the County's HIV/AIDS prevalence rate is between 15-17 percent. The high prevalence rate in the County is caused by promiscuity, prostitution, drug addiction, and alcoholism, traditional practices such as wife inheritance, polygamy and belief in witchcraft. This trend has led to increased poverty levels in the County. The major challenges brought about by emergence of HIV/AIDS in the County include increase in number of children in need of special protection. The HIV/AIDS prevalence in the County is estimated at 15% implying that one in every seven adults is infected with the virus.

#### **5.4.8 Gender inequality**

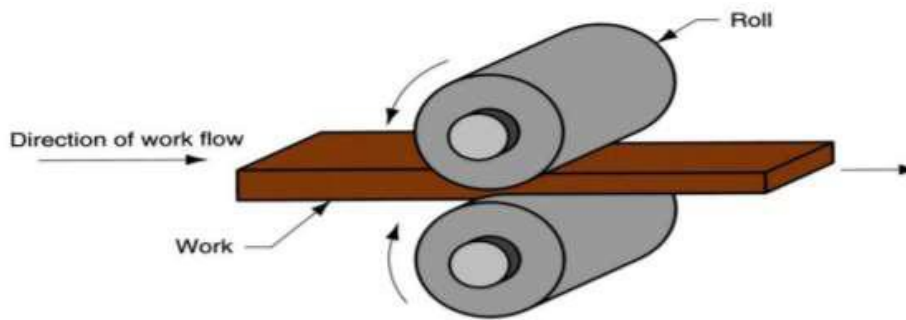
Gender concerns in Kilifi County relate to the place of men and women in society, education, economic activities, land and other property ownership. In the County, women form the bulk subsistence of agricultural labour and are engaged in activities such as growing and marketing farm produce. Other chores include caring for children and other domestic chores. Many women in the County do not own land and other property and therefore cannot use land as collateral to get bank credit. In semi-arid areas such as many parts of Ganze Sub-County, women devote many more hours looking for water.

#### **5.4.9 Water**

Semi-Arid areas in the County have acute water problem. Women travel long distances looking for water for domestic use. This takes most of their time which they could have used elsewhere for productive and economic activities. The water quality in most areas is low hence exposing them to diseases.

## 6. BACKGROUND TO STEEL ROLLING

Rolling is a deformation process in which work thickness is reduced by compressive forces exerted by two opposing rolls.



**Illustration 1: An illustration of rolling process**

The rotating rolls perform two main functions:

- Pull the work into the gap between them by friction between work-part and rolls
- Simultaneously squeeze the work to reduce cross section.

### 6.1. Types of Rolling

#### 6.1.1 Rolling by geometry of work

- Flat rolling-used to reduce thickness of a rectangular cross-section
- Shape rolling-a square cross-section is formed into a shape such as an I-beam

#### 6.1.2 Rolling by temperature of work

- Hot Rolling- This is the most common due to the large amount of deformation Required
- Cold rolling- This one produces finished sheet and plate stock

##### 6.1.2.1 Hot Rolling

Hot rolling is a metalworking process that occurs above the re-crystallization temperature of the material. After the grains deform during processing, they re-crystallize, which maintains an equiaxed microstructure and prevents the metal from work hardening. The starting material is usually large pieces of metal, like semi-finished casting products, such as slabs, blooms, and billets. If these products came from a continuous casting operation the products are usually fed directly into the rolling mills at the proper temperature. In smaller operations, the material starts at room temperature and must be heated. This is done in a gas- or oil-fired soaking pit for larger work-pieces; for smaller work-pieces, induction heating is used. As the material is worked, the temperature must be monitored to make sure it remains above the re-crystallization temperature. To maintain a safety factor a finishing temperature is defined above the re-

crystallization temperature; this is usually 50 to 100 °C (90 to 180 °F) above the re-crystallization temperature. If the temperature does drop below this temperature the material must be re-heated before more hot-rolling. .

## **7. DESIGN OF THE PROPOSED PROJECT**

### **7.1 Introduction**

The proposed overhaul and replacement the old hot rolling steel mill will involve preparatory activities, implementation activities and operation activities. The proposed project is designed in such a way that the current 4tons/day old obsolete mill is to be overhauled and replaced with a modern more efficient mill of capacity 16tons/day.

#### **7.1.1 Preparatory phase activities**

Activities that will be carried out during the preparation phase will include the following:

- ✓ Assembly of materials and equipment that will be required for the overhaul and replacement of the hot rolling mill.
- ✓ Identification of sections of the old hot rolling mill that will be overhauled.

#### **7.1.2 Implementation phase activities**

Activities that will be carried out during the implementation phase will include the following:

- ✓ Overhauling of identified sections of the old hot rolling mill. This will include dismantling of the identified section, dismembering the section and replacement of the old sections with new ones.
- ✓ Upgrading of support facilities to much the needs of the upgraded mill
- ✓ Installation and fitting on new sections and parts of the hot rolling steel mill
- ✓ Extension of the current godown to provide additional space that will be required
- ✓ Management of resulting waste

#### **7.1.3 Operational phase activities**

Activities that will be carried out during the operational phase will include the following:

- ✓ Test running of the replaced hot rolling steel mill
- ✓ Full operation of the replaced hot rolling mill
- ✓ Environmental monitoring activities
- ✓ Management of operation waste

### **7.2 Design components of the Mill.**

Once the overhaul and replacement has been done , the structural layout of the resulting modern mill will consists of the following; reheating furnace, 470mm roughing mill-2 stand, 320mm intermediate mill-5 stand, 275mm continuous mill with DC drive mill-6 stand, approach roller table, Y-table, turning wall table, pinch roll and fly shear, quenching system, coal pulverizer, AC & DC panel room, material testing laboratory, re-heating furnace for structural mill, 470mm roughing mill-3 stand, 410mm intermediate mill-2 Stand, 410mm continuous mill-2 stand, 320mm continuous mill-2 stand, crop and cobble shear for structural mill, dividing shear for



structural mill, automatic cooling bed for structural mill, packing bed for structural mill, transfer table for structural mill, straightening machine for structural mill, cold shear for structural mill and cold saw for structural mill. All these components will be assembled into a hot rolling mill during the implementation phase of the project. The structural mill layout drawings are appended on appendix 7.

### **7.3 Process description**

Hot rolling is a metalworking process in which steel billets are heated in a furnace above the recrystallization temperature to plastically deform the billets in the working or rolling operation. This process is used to create shapes with the desired geometrical dimensions and material properties while maintaining the same volume of steel. Process steps for hot rolling are reheating billets in a reheated furnace, first reduction of heated billets in Roughing Mill, further reduction in the Intermediate Mill and final reduction in the continuous and block mill to attain the desired finished products. The entire hot rolling process will take place during the implementation phase of the project. Each of hot rolling process steps are elaborated below.

#### **7.3.1 Process inputs**

##### **7.3.1.1. Raw materials**

The raw material that will be used in the production of hot rolled steel products is billets. A billet is a length of metal that has a round or square cross-section, with an area less than 36 square inch (230 cm<sup>2</sup>). The billets that will be used at the RSD will be imported.

##### **7.3.1.2 Inputs**

Industrial Diesel Oil (IDO), furnace oil, electricity, water, oils and lubricants will be the necessary process inputs. IDO will be the fuel used for hot rolling in the rolling mill; furnace oil will be used for heating the furnace, electricity will power the entire mill, water will be a coolant for the mill will oils and lubricants will lubricate the plant and equipment.

#### **7.3.2 Reheating Furnace**

Billets which are the raw material will first be re-heated prior to rolling in reheating furnace. The furnace to be used will be the Oil Fired Pusher Type Reheating Furnace constructed as per the latest Furnace Technology to minimise the heat losses and optimise fuel consumption. The inside of the Furnace will be lined with appropriate insulation material such as bricks or fire-wool blanket to minimise heat loss. The Furnace heating speed will be regulated to achieve the required production capacity.

### **7.3.3 Roughing Mill**

From the furnace, the heated billets will make through repeated passes in the Roughing Mill. This will reduce the material being rolled to approximately 34x34 mm / 30x30 mm. The Roughing Mill will be one adoptable to raw materials of 130 x 130 mm to 100 x 100 mm billet as per availability in the market. The mill will have 3 stands of pinion centre distance of 470 mm pinion, driven by 1500 HP 8 pole motor.

### **7.3.4 Intermediate Mill**

The Intermediate Mill is the continuous mill from Roughing Mill. The material from Roughing Mill is introduced in continuous mill having 4 passes where material is further reduced to required size of approx. 28 to 30 mm.

## **7.4. Auxiliary/Support facilities**

The cooling system for the hot rolling mill, electricity supply system, bulk storage of IDO will be the main direct support facilities for the hot rolling steel mill. Water will be the main coolant for plant and equipment of the hot rolling mill. The plant will be served by an elaborate water cooling system that will consist of bulk of bulk water storage tanks, water pumping and circulation system and cooling tower. The hot rolling mill is a heavy consumer of electricity, there will be a 33KV electrical sub-station on site to supply electricity to the plant. Fuel used in heating in the mill will be IDO and furnace oil. Bulk storage tanks for IDO will be on site to supply the required fuel. Other support facilities will include sanitary facilities for staff, offices and other welfare facilities.

## **7.5 Products and by-products**

### **7.5.1 Products**

Products that will be generated from hot rolling process will be hot rolled steel product namely angles, zed section, tee section, flat bars.

### **7.5.2 Byproducts**

The hot rolling process will not generate any byproducts, hence there will be no byproducts produced.

## **7.6 Waste**

Solid waste likely to be generated from the hot rolling process will be mill scales, steel scrap from trimming of edges of hot rolled products and mill repair and maintenance. Other solid waste will include damaged furnace lining insulating materials. Liquid waste that will be generated will be used oil (waste oil), used grease and effluent from sanitary facilities.

## **8. ANALYSIS OF ALTERNATIVES**

A Project Alternative (project option) is another combination of the project's costs, schedules, resources, and risks that allow achieving the same results as compared to the project baseline. It is one or more ways to produce the project and address its need while using the same resource base yet operating in a new way and facing new working conditions. Project alternatives considered for the proposed overhaul and replacement of the Hot Rolling Mill are the Yes-project alternative, the No-project alternative, alternative project site and alternative project technology. Evaluation of each of the projection options is as follows.

### **8.1. The Yes-project alternative**

The Yes-project alternative means that the proposed project be implemented as currently proposed without alterations. This implies that the current location remain unchanged. The proposed project is an overhaul and replacement of the old hot rolling mill. Thus the current location of the proposed project remains the same. The proposed project location is at Kokotoni area of Kilifi County off Mombasa-Nairobi Highway. The proposed project site is adjacent to other industrial installations such as the Pickling Division, the Bitumen Division and Standard Rolling Mills. Secondly the proposal envisages that the replaced new mill to use the same auxiliary/ support facilities and infrastructure that are currently existing on site. This will significantly reduce the project cost

### **8.2. The No-project alternative**

The no project alternative means that the project be rejected in its entirety as currently proposed. This means that implementation of the proposed project as currently proposed will not be realized. This implies that the current design of the project be rejected, the proposed location and the proposed technology all be rejected. This project alternative will deny the project proponent the opportunity to overhaul and replace the old hot rolling mill. It implies that the old mill with limited capacity of 4 tons per hour using outdate technology will remain. This project alternative will deny the proponent the opportunity to modernize the hot rolling mill and improve its production capacity fourfold.

### **8.3. Alternative project site**

This alternative considers an alternative site to implement the proposed project. This alternative will not be relevant for the proposed project because the proposed project is not a new project but rather improving an existing project in a particular location. The proposed overhaul and replacement of the hot rolling steel mill can only be done in the existing location as the

overhauled hot rolling mill will have to utilize existing site infrastructure and support facilities among other structures on site that will not be affected by the overhaul.

## **9. OCCUPATIONAL SAFETY AND HEALTH**

### **9.1 Introduction**

Occupational Health and Safety (OHS) is of importance at project sites. It is important for mechanisms to be put in place to predict potential risks, incidents and hazards in the said working environment. This is because the occupational environment directly affects employees involved in the project, the neighborhood, visitors, contractors, sub-contractors and the general public. Therefore before commissioning commencement of project implementation, a number of safety measures have to be in place to ensure the safety of employees, neighbors and the general public. Employees and visitors to the project site may be exposed to potential occupational safety and health risks. The type and level of exposure is generally related to factors controlled by the employer/ developer. Such factors include design, equipment, tools, work procedures, project, and employee training. Occupational health and safety risks that should be considered by the employer arise from normal functions and operations and during unusual circumstances such as accidents and incidents. The employer/ developer is responsible for:

- Implementation of appropriate national and internal recognised OHS standards, practices and guidelines.
- Inclusion of meaningful participation of employees in implementation and maintenance of procedures and processes.
- Implementation of a programme to change employee culture and attitudes regarding health and safety.
- Planning, implementing and monitoring programs required to ensure OHS at the workplace.
- Provide and maintain workplace, plant, equipment, tools and machinery and organise work so as to eliminate or control hazardous ambient work factors.
- Provide appropriate occupational health and safety training for all employees.
- Provide adequate personal protective equipment to all employees.
- Record and report occupational injuries and illness.
- Ensure contract specifications include demands for service providers, contractors, and sub-contractors to have or establish enabling them to meet the OHS requirements of the employer.

### **9.2. Occupational Health and Safety Management**

An Occupational Health and Safety Management system (OHSMS) will be established, managed and operated for the proposed project. The system will contain the following features:

1. Occupational Health and Safety Policy for the company

2. Organizational framework of the OHSMS
  - ✓ Staffing of OHSMS
  - ✓ Competence requirements
  - ✓ Operating procedures
  - ✓ Training programs
  - ✓ Documentation
  - ✓ Communication
3. OHSMS objective (documentation)
4. Hazard prevention
  - ✓ Risk assessment
  - ✓ Prevention and control measures (active and negative)
  - ✓ Management of changes
  - ✓ Emergency preparedness and response
  - ✓ Procurement (tools, equipment, services, contractors)
5. Performance monitoring and measurements
  - ✓ Hazard prevention measures
  - ✓ Ambient working environment
  - ✓ Work related injuries, ill health, disease and injuries
6. Evaluation
  - ✓ Feedback
  - ✓ Corrective measures
  - ✓ Action plan

### **9.3. Employee safety**

In addressing requirements and needs to ensure employee safety, the following will be in place: -

- Provision of adequate personal protective equipment.
- Enforcement and proper use of personal protective equipment by all employees.
- Provision of first aid and emergency services on site.
- In case of injury of employee during work; management must have a clear policy on treatment of the injured employee.
- In case of permanent disability arising from injury at work place, adequate compensation should be available within the provisions of applicable national law.
- Appropriate plant, machinery, tools and equipment in sound working condition must be provided to employees to enable them work safely.

- All practical measures must be in place to ensure that the work place does not have high heat levels, dust and excessive noise.

#### **9.4. Safety of neighbours and general public**

Project sites are associated with incidents and accidents that can be a safety concern to neighbors and general public. The contractor must ensure the safety of all neighbors and the general public is taken care of by putting the following measures in place: -

- ✓ All neighbours to be informed of the date of commencement of project.
- ✓ Heavy vehicles and trucks that will be ferrying in plant and equipment to the project site to observe required minimum speed limit when approaching the site to avoid accidents.
- ✓ There should be notices and warning prominently displayed at entry of project site and strategically around the project boundaries informing other workers and general public of on-going activity and safety requirements.

#### **9.5 Machine use and Electrical Safety**

During the implementation of the proposed project, it is expected that different machines, tools and equipment will be used. In regard to electrical safety, the following will have to be undertaken: -

- Installation and fitting of proper electrical appliances to enable supply of electrical energy to utility point.
- All electrical installations and fittings are done according to electrical safety rules.
- All electrical wires must be safely insulated.
- Sockets and other electrical outlets must be securely fitted.
- When not in use all machines should be shut down.
- Qualified and well-experienced electrician should be hired to carry out all electrical work.
- Safety slogans should be strategically posted as a reminder to employees.
- Operating manuals of equipment should be available for use whenever needed.

#### **9.6. Internal Safety**

During the entire project implementation and operation cycle, safety of the employees on the site should be taken care of. Some of the things that need to be in place include:-

- ✓ Emergency preparedness
- ✓ First aid
- ✓ Welfare facilities
- ✓ Personal protective equipment

### **9.7. First-Aid**

- i. Contractor to ensure qualified First Aiders are available to administer first aid to affected employees at all times.
- ii. An appropriately equipped First-Aid station to be easily accessible at the project site.
- iii. The First Aid station to be adequately equipped to meet first aid needs at the project site.
- iv. A written Emergency Procedure to be in place.

### **9.8. Welfare facilities**

- i. Changing rooms for workers to be provided.
- ii. Shower rooms and washing facilities to be provided.
- iii. Contractor to avail potable drinking water to all employees at site.
- iv. Appropriate and adequate Personal Protective Equipment to be provided
- v. The enforcement on the consistence of the correct use of PPE provided
- vi. The PPE provided are to maintain clean and replaced when damaged or worn out.

### **9.9. Ambient factors in the project site**

#### **9.9.1 Noise**

Management will put in place a comprehensive noise conservation programme which will include the following:-

- i) Training of workers in noise prevention, control and management.
- ii) Provision of appropriate noise protective devices to workers.
- iii) Training of the workers on the importance of making appropriate use of the protective devices provided.
- iv) Monitoring of noise levels through periodic noise survey.
- v) Use of appropriate noise attenuators.
- vi) Audiometric test of workers

#### **9.9.2 Dust**

- ✓ Exposure to dust to be controlled by ensuring dust accumulation at project site is controlled.
- ✓ Equipment to be selected, especially that with in-built dust extraction.
- ✓ Employee exposed to dust to be provide with disposable dust masks.

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## 10. STAKEHOLDER CONSULTATION

Consultation with stakeholders that are likely to be affected and those that are likely to have an interest in the proposed project was conducted as provided for in Regulation 17 of the Environmental (Impact Assessment and Audit) Regulations, 2003. The consultation was vital and served to:-

- Inform local community especially those drawn from the proposed project site of the proposed development within their locality.
- Explain to the local community the nature of the proposed project, its objectives and scope.
- Give local community especially those drawn from the proposed project site an opportunity to present their views, concerns and issues regarding the proposed.
- Obtain suggestions from the local community and other stakeholders on possible ways potential negative impacts can be effectively mitigated and how the local community can be part of the proposed project.

The consultation was two-fold, namely;

- Questionnaire survey
- Public meetings /*Barazas*

### 10.1 Questionnaire survey

A detailed questionnaire survey (appendix 8) was carried out that targeted to reach out to primary stakeholders at the grass root. This included local learning institutions, local faith based institutions, local medical institutions, opinion leaders and business community.

#### 10.1.1 Respondents

1. Kaliang'ombe Primary School
2. Kokotoni Investments Ltd
3. Furgan Petroleum Company
4. Kokotoni Dispensary
5. Haja Salim
6. Tsuma Benard
7. Munga Ndune Mung'aro
8. Musyoka
9. Salama
10. Dickson
11. Elizabeth Ngugi

12. Hassan Kombao Chikoko
13. Elizabeth Gonda
14. Suleiman Daniel Kithome
15. Mwanaidi Jumaa
16. Elvis Wanje

### **10.1.2 Stakeholders' Views, concerns and input on how the proposed project will impact on them and the environment**

- The proposed project has led to loss of jobs and thus increase in an employment rate among the dwellers.
- Livelihoods have been disrupted for many who depended on the company directly or indirectly.
- Loss of jobs and an upsurge in unemployment rate will translate to a security threat in the hood.
- Population decline has been witnessed in the area after most of the workers losing jobs.
- Waste products from the plant will negative impact on the health of the workers and the people in the neighborhood
- The project may heavily impact on the water resource that is already a scarce resource in the area
- The project is likely to benefit only the investor because of the new technology in application while impoverishing the lives of those who depended on the previous plant.
- Increased production will lead to meeting the ever increasing clients need
- Improved technology is likely to mitigate negative environmental impacts
- The impact of the proposed project to the local community will depend on the environmental safety put in place.

### **10.1.3 Proposed measures to address issues and concerns for a safe and health the environment**

- Put measures in place to deal with the unemployment among youths.
- Provide an alternative source of livelihood to persons who lost jobs.
- Medical assessments should periodically be carried out for those in operations and in the immediate neighborhood to maintain safe operations
- Construction of a medical facility to serve the residents who are prone to environmental pollution from the company's operations
- Carry out education and awareness programs on the working processes of the proposed plant and the negative impacts it may have on the people.

- Installation and plant processes should be friendly to the environment.
- Sound measures should be instituted to buffer the community from the negative impacts that may emanate from the operations.
- Provide water that is a basic and a rare commodity to Kokotoni residents
- The company to provide the residents with an alternative residential land so as to be far from their operations for even medication if provided will not help if the operations still cause negative impacts that affect the residents' health.
- Institute programs in the community that will improve the lives of residents like education and socio-economic programs.
- Maintenance of the access road to the company from the Mombasa Highway should be done periodically to avoid the many potholes; tarmacking or block paving will work better to reduce on dust generated along it.
- Plant more trees around the company and its environs to reduce and or curb environmental pollution

## **10.2 Public Barazas**

Public consultation through public meetings involved carrying out three public meetings within the neighborhood of the proposed project site.

### **10.2.1 First Public Baraza**

The following were the main issues that emanated from this meeting: (appendix 9 gives detailed minutes of the proceedings of the baraza)

- Emissions from the proposed Mill should be managed appropriately.
- Water sources for cooling purposes at the proposed Mill should not conflict with the already scarce water sources for the community.
- Noise at the proposed Mill should be managed appropriately.
- Health and safety of employees should be taken care of at the proposed Mill.
- The local community should be given first priority when it comes to job opportunities at the proposed project.
- Payments to employees at the existing Mill are often too low. Therefore payments should be reviewed upwards.

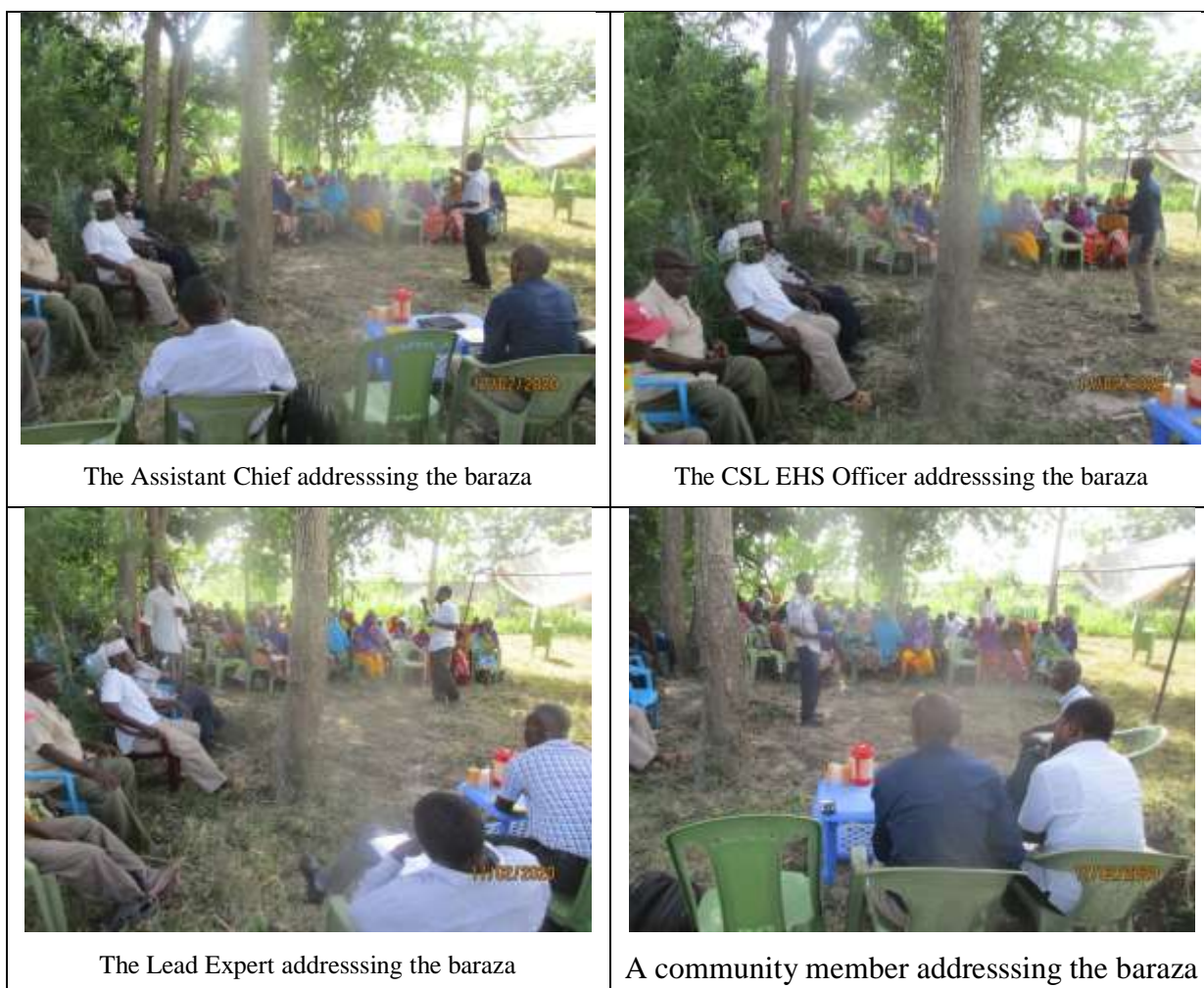


Plate 3: Proceedings at the First Public Baraza

### 10.2.2 Second Public Baraza

The following were the main issues that emanated from this meeting: (appendix 10 gives detailed minutes of the proceedings of the baraza).

- That water used for cooling of the machines should be handled properly to prevent impacts on the environment.
- That the local community should be given first priority when it comes to job opportunities at the proposed project.



### 10.2.3 Third Public Baraza

The following were the pertinent issues that came out from this meeting (appendix 11 gives detailed minutes of the proceedings of the baraza):

- That the local community should be given first priority when it comes to job opportunities at the proposed project.
- That, emissions from the Mill should be handled appropriately to avoid impacts on the environment.
- That, women from the community should be given first priority when it comes to job opportunities at the proposed project.



The Assistant Chief addressing the baraza



The CSL EHS Officer addressing the baraza



The Lead Expert addressing the baraza



The Kokotoni PHO addressing the baraza

Plate 5: Proceedings at the third Public Baraza

## 11. POTENTIAL ENVIRONMENTAL AND SOCIAL IMPACTS

### 11.1 Impact identification and predication

The type, scale and location of the proposed project guided the scope of the impact identification. The direct and indirect project-related impacts on the environment and local community and residual impacts were considered during the assessment of impacts. The extent of impact covers the project site, specific project activity at particular period and potentially affected areas beyond the project site. Duration in which the impact takes place is also considered in the evaluation of the impact. The period can be specific to the period of certain activities or could be related to the occupancy period of the project development. Thus, in terms of duration an impact can be viewed as a short, medium, long term impact or permanent. Impact can affect biodiversity partially or completely. For instance only small part of habitat, ecological processes or small population of species can be destroyed by the impact. Thus, magnitude of an impact was evaluated as proportion of the environmental entity affected. The probability of the impact to happen was derived from the frequency of the activity and frequency of impacts. The four characteristics described above were used to synthesise significance of the impact as shown in impact significance assessment criteria (figure 9) that is used to generate the risk assessment matrix (figure 10).

#### EXTENT

Localized (At localized scale and a few hectares in extent)	1
Study area (The proposed site and its immediate environs)	2
Regional (County and Regional level)	3
National (Country)	4
International (Beyond Kenya)	5

#### MAGNITUDE

Small and will have no effect on the environment	0
Minor and will not result in an impact on the processes	2
Low and will cause a slight impact on the processes	4
Moderate and will result in process continuing but in a modified way	6
High (processes are altered to the extent that they temporarily cease)	8
Very high and results in complete destruction of patterns and permanent cessation of the processes	10

**DURATION**

Very short (0 – 1 Years)	1
Short (1 – 5 Years)	2
Medium term (5 – 15 years)	3
Long term (>15 years)	4
Permanent	5

**PROBABILITY**

Highly improbable (<20% chance of occurring)	1
Improbable (20 – 40% chance of occurring)	2
Probable (40% - 70% chance of occurring)	3
Highly probable (>70% - 90% chance of occurring)	4
Definite (>90% chance of occurring)	5

Figure 9: Impact significance assessment criteria

**11.2 Determination of the environmental and social risk of the impacts**

The environmental and social risk of each of the identified impact was calculated by multiplying impact consequence by impact probability. Impact consequence is the summation of the extent of the impact, its duration and magnitude as shown in the risk assessment matrix below.

		CONSEQUENCE (Extent+Duration+Magnitude)																			
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
PROBABILITY	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40
	3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60
	4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80
	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100

Figure 10: Risk assessment matrix

**NOTE 1:** Risk = Consequence x Probability

**NOTE 2:** Consequence = Extent + Duration + Magnitude

**NOTE 3:** Confidence assessment (low, medium and high) based on combination of available information and expert judgment

**Low impact (<30)** this impact would not have a direct influence on the decision to implement the proposed project

**Medium impact (30-60)** the impact could influence the decision to implement the proposed project unless the impact is effectively mitigated



**High impact (>60)** the impact will have a direct influence on the decision to implement the proposed project

### **11.3 Potential Environmental Impacts**

The implementation of the proposed overhaul and replacement of the old hot rolling steel mill with a new modern mill will potentially result in environmental impacts that will affect the biophysical environment. The biophysical environment includes living things (bio), such as plants and animals, and non-living things (physical), such as rocks, soils and water. The biophysical environment is made up of four parts: the atmosphere, hydrosphere, lithosphere and biosphere. Interactions occur between the four spheres. The atmosphere refers to the whole mass of air surrounding the earth. At a local level it refers to the air of a locality. The hydrosphere is the portion of the earth that is composed of water in all forms i.e. running water, ice and water vapor. The lithosphere refers to the rocks and soils on the crust of the earth. The biosphere is the zone of the earth and adjoining parts of the atmosphere in which plants and animals exist.

#### **11.3.1 Potential negative environmental impacts during construction phase**

Proposed project site is an existing workplace; the site has an existing steel mill and associated facilities all under use. Beside the site is adjacent to existing industries such as Bitumen Division and Pickling Division of Corrugated Sheets Limited. Because of this there is almost no flora and fauna at the site that can be affected by the proposed project. Consequently, potential environmental impacts of the proposed project on flora and fauna were not considered. The construction phase of the proposed overhaul and replacement of the old hot rolling steel mill with new mill will potentially result in negative environmental impacts including:-

- ✓ Impacts on air quality
- ✓ Noise and vibration impacts
- ✓ Traffic related impacts
- ✓ Waste related impacts

##### **11.3.1.1 Potential negative impacts on air quality during construction phase**

Implementation of the proposed overhaul and replacement of the old hot rolling steel mill with a new mill will involve a number of site activities that could potentially result in release of particulate matter into the surrounding atmosphere. These activities will include dismantling of sections of the old mill, extension of the existing godown to accommodate

requirement of the new mill and construction equipment activity on site. These activities will potentially release loose particulate matter into the atmosphere that will alter local air quality. Potential negative impacts of such loose airborne particulate matter may include the following:-

- ✓ Smothering of vegetation foliage from dust.
- ✓ Eye irritation when fine dust particles being blown by the wind enter the eye.
- ✓ Chocking effect when airborne particulate matter is inhaled

An assessment of the environmental risk associated with impacts on local air quality at the project site as a result of implementation of the proposed project was informed by the identified potential negative impacts resulting from potential change in local air quality. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts during construction phase to local air quality when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 4 below.

**Table 4: Assessment of environmental risk on local air quality**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	12
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential change in ambient air quality of proposed project site is low. This implies that impacts associated with ambient air quality alteration at the proposed project site should not have a direct influence on the decision to implement or not implement the proposed project.

### **11.3.1.2 Potential negative impacts resulting from traffic in and out of the site during construction phase**

Implementation of the proposed project will generate significant quantity of waste such as scrap metal that will require to be evacuated out of the project site. Parts of the hot rolling mill that will be installed will have to be ferried into the project site in trucks. These together with other activities during the construction phase could potentially increase traffic flow in and out of the proposed project site. Potential increase in traffic in and out of the proposed project site could result in some negative impacts. These impacts could include:-

- ✓ Increase in exhaust emissions from the trucks that will have an effect on local air quality
- ✓ Increase in time required by other users of the access road into and out of the facility

- ✓ Increase in wear and tear of the access road hence more environmental resources such as gravel will be required to maintain the access road.
- ✓ Increase in the volume of water that will be required to sprinkling the access road to arrest fugitive dust during dry periods.

An assessment of the environmental risk associated with impacts of increased in traffic in and out of the proposed project site during the construction phase was informed by the identified potential negative impacts resulting from potential increase in traffic. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts during construction phase as a result in traffic increase when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 5 below.

**Table 5: Assessment of environmental risk on local air quality**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	2
Risk = (Extent + Magnitude + Duration) x Probability	8
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential change in traffic in and out of the proposed project site is low. This implies that impacts associated with traffic increase at the proposed project site should not have a direct influence on the decision to implement or not implement the proposed project.

### **11.3.1.3 Potential negative impacts of noise and vibration during construction phase**

Heavy equipment such as cranes will be used during the overhaul and replacement of the old mill with a new mill. Other equipment will be used in dismantling sections of the old mill, others equipment will be used in cutting, grinding, shaping and joining section of the mill. Prior to installing the new mill, the existing godown will have to be extended to cater for the needs of the new mill. In extending the godown soil excavation works, trenching and other construction activities will be done. All these activities will be possible by help of appropriate equipment. Resulting waste include scrap will be mobilized out of the site by help of equipment including loaders, dump trucks. The use of heavy equipment could result in noise and vibration on site.

Noise is unwanted or undesirable sound derived from point sources such as construction site while vibration is the transmission of low frequency energy through the medium of ground or buildings. Noise travels through the air as waves of minute air pressure fluctuations caused

by vibration, and travels away from the noise source as an expanding spherical surface. As a result, the energy contained in a sound wave is spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source. Noise levels at different distances can be affected by factors such as topographic features, structural barriers and atmospheric conditions (wind speed and direction, humidity levels, and temperatures). Vibration consists of rapidly fluctuating motions; human response to vibration is a function of the average motion over a longer (but still short) time period, such as 1 second. Use of construction equipment at the site that are capable of resulting in noise and vibration will likely be for a short period limited to the construction phase. The potential resulting impact will therefore be short term. Potential impacts of noise and vibration from use of heavy construction equipment at the proposed project site could include the following:-

- ✓ Interfere with conversation and communication at the workplace
- ✓ Negate general work performance, thought and concentration.
- ✓ Negate relaxation.
- ✓ Causes annoyance.
- ✓ Results in noise induced hearing loss if exposure is for a long time.

An assessment of the environmental risk associated with noise and vibration at the project site as a result of using heavy construction equipment at the proposed project was informed by the identified potential negative impacts associated with noise and vibration. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from noise and vibration when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 6 below.

**Table 6: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	2
Risk = (Extent + Magnitude + Duration) x Probability	8
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with noise and vibration from construction equipment at the proposed project site is low. This implies that impacts associated with noise and vibration at the proposed project site should not have a direct influence on the decision to implement or not implement the proposed project.

### 11.3.1.4 Potential negative impacts resulting from waste generated during the construction phase

Waste that will likely be generated during the construction phase of the proposed project will include steel scrap, construction debris and excavated soil. The steel scrap will be generated from the dismantling and overhaul of the old hot rolling mill, excavated soil will be generated from trenching works to extend the godown while construction debris will be generated from construction works on site. Potential negative impacts likely from this waste could include:-

- ✓ Scattering of the waste on site that will be a safety hazards to construction workers and visitors to the construction site
- ✓ Excavated soil if poorly handled on site could block site storm water drainage that could result in ponding and stagnation of storm water when it rains.

An assessment of the environmental risk associated with waste generated at the proposed project was informed by the identified potential negative impacts associated with the potential waste that will be generated. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from waste generated when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 7 below.

**Table 7: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	2
Risk = (Extent + Magnitude + Duration) x Probability	8
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential waste that could be generated at the proposed project site is low. This implies that impacts associated with potential waste to ne generated at the proposed project site should not have a direct influence on the decision to implement or not implement the proposed project.

### 11.3.2 Proposed mitigation measures for construction phase impacts

**Table 8: Proposed mitigation measures for construction phase negative impacts**

Potential negative impact	Proposed mitigation measures
Impacts on air quality	<ul style="list-style-type: none"> <li>- Secure the entire construction site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all construction staff with appropriate personal</li> </ul>

	<p>protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</p> <ul style="list-style-type: none"> <li>- Ensure all construction workers make proper use of the PPEs provided.</li> <li>- Periodically monitor air quality levels at the construction site by measuring local particulate matter</li> </ul>
Noise and vibration impacts	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others. Ensure the construction site is secured by appropriate noise attenuators.</li> <li>- Provide all construction staff with appropriate noise preventions PPEs such as ear plugs and ear muffers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>
Traffic related impacts	<ul style="list-style-type: none"> <li>- Develop and implement a traffic marshal plan for the construction site</li> <li>- Provide sufficient parking/ holding area for traffic delivering and collecting materials from the construction site.</li> </ul>
Waste related impacts	<ul style="list-style-type: none"> <li>- Ensure all waste generated at the construction site is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced vehicles collect waste from the construction site</li> <li>- Management to try to minimise waste generation by practicing the principles of refusing to generate waste, reducing waste generation, reusing generated waste,</li> </ul>

	recycling generated waste and reusing and or recycling most of generated waste
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### 11.3.3 Potential negative environmental impacts during operation phase

- ✓ Impacts on air quality
- ✓ Noise and vibration impacts
- ✓ Impacts related to oils and lubricants spills
- ✓ Traffic related impacts
- ✓ Waste related impacts
- ✓ Water use related impacts

#### 11.3.3.1 Potential negative impacts of air quality during the operation phase

Industrial Diesel Oil (IDO) will be the fuel used for producer gas for the hot rolling process while furnace oil will be used to pre-heating the furnace and then heating of pushed in billets to suitable temperatures to begin hot rolling process. As a result of heating of the IDO and furnace oil there will be potential emission of Sulphur oxide (Sox), Nitrogen Oxides (NOx), Carbon Dioxide (CO<sub>2</sub>), Carbon monoxide, Hydrocarbons (HC) and Hydrogen Sulfide. These potential negative impacts from the potential emissions could include:-

- ✓ Formation of acid rain in the locality when the potential emissions are emitted when it is raining.
- ✓ Chocking and irritation of the throat
- ✓ Irritation of eyes
- ✓ Skin irritation

An assessment of the environmental risk associated with potential emissions during operational phase of the proposed project was informed by the identified potential negative impacts associated with emissions during operational phase. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from emissions when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 9 below.

**Table 9: Assessment of environmental risk resulting from emission during operational phase**

Extent of impact	2
Magnitude of impact	4
Duration of impact	3
Probability of impact	4

Risk = (Extent + Magnitude + Duration) x Probability	36
Environmental risk of site vegetation clearing	Medium impact

The outcome of the assessment of the environmental risk associated with potential emissions during operational phase of the proposed project is medium. This implies that impacts associated with potential emissions during operational phase of the proposed project should influence on the decision to implement or not implement the proposed project unless the impacts are effectively mitigated.

### **11.3.3.2 Potential negative impacts of noise and vibration during operational phase**

The operational of the hot rolling mill such as cutting of billets, loading and movement of cut pieces of billets to the furnace area, the actual hot rolling process, movement of hot rolled steel products along the cooling bed loading of hot rolled product will potential contribute to noise and vibration. The use of heavy equipment such as cranes and forklift trucks to move heavy raw materials such as billets and heavy steel products could also result in noise and vibration on site. Noise is unwanted or undesirable sound derived from point sources such as hot rolling activities while vibration is the transmission of low frequency energy through the medium of ground or buildings. Noise travels through the air as waves of minute air pressure fluctuations caused by vibration, and travels away from the noise source as an expanding spherical surface. As a result, the energy contained in a sound wave is spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source. Noise levels at different distances can be affected by factors such as topographic features, structural barriers and atmospheric conditions (wind speed and direction, humidity levels, and temperatures). Vibration consists of rapidly fluctuating motions; human response to vibration is a function of the average motion over a longer (but still short) time period, such as 1 second. The use of heavy equipment and hot rolling process could result in noise and vibration limited to the time and duration of the hot rolling process. Potential impacts of noise and vibration during operational phase of the hot rolling mill could include the following:-

- ✓ Interfere with conversation and communication at the workplace
- ✓ Negate general work performance, thought and concentration.
- ✓ Negate relaxation.
- ✓ Causes annoyance.
- ✓ Induces hearing loss if exposure is continuous for a long time.



An assessment of the environmental risk associated with noise and vibration during the operational phase of the hot rolling mill was informed by the identified potential negative impacts associated with noise and vibration. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from noise and vibration when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 10 below.

**Table 10: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	4
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	21
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with noise and vibration during operational phase of the proposed project is low. This implies that impacts associated with noise and vibration during operational phase should not have a direct influence on the decision to implement or not implement the proposed project.

### 11.3.3.3 Potential negative impacts of oils and lubricants spills

Oils and lubricants will be used in fuelling and lubricating of the mill. IDO and furnace oil will be used to fire the hot rolling and furnace respectively. Various mill lubricants will also be used. These fuels and lubricants will be stored in tanks and drums. Spills during re-filling of the tanks and drums and during dispensing of the oils and lubricants could result in environmental pollution. Potential negative impacts from oil and lubricant spills could include:-

- ✓ Contamination of local soil where the spillage occur
- ✓ Contamination of surface and ground water bodies if the spilled oils and lubricants flow into a water body
- ✓ Burning effect of vegetation if the spilled oils and lubricants flow into vegetation area.

An assessment of the environmental risk associated with spills of oils and lubricants during the operational phase of the hot rolling mill was informed by the identified potential negative impacts associated with spills of oils and lubricants. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from spills of oils and lubricants when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 11 below.

**Table 11: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	4
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	21
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with spills of oils and lubricants during operational phase of the proposed project is low. This implies that impacts associated with spills of oils and lubricants during operational phase should not have a direct influence on the decision to implement or not implement the proposed project.

#### **11.3.3.4 Potential negative impacts resulting from traffic during operational phase**

During operational phase of the proposed project heavy raw materials such as billets will be ferried to the steel plant to meet the production requirements. Other items required for the production process such as IDO, furnace oil will also be ferried in. Bulky finished steel products will be continuously evacuated out of the plant into the market. The ferrying in of raw materials and evacuation of finished products out of the plant could potentially increase in traffic in and out of the steel mill during operational phase. Potential negative impacts that could result from such increase in traffic could include:-

- ✓ Increase in exhaust emissions from the trucks that will have an effect on local air quality
- ✓ Increase in time required by other users of the access road into and out of the facility
- ✓ Increase in wear and tear of the access road hence more environmental resources such as gravel will be required to maintain the access road.
- ✓ Increase in the volume of water that will be required to sprinkling the access road to arrest fugitive dust during dry periods.

An assessment of the environmental risk associated with impacts of increased in traffic in and out of the steel mill during the operational phase was informed by the identified potential negative impacts resulting from potential increase in traffic. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts during operational phase as a result in traffic increase when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 12 below.

**Table 12: Assessment of environmental risk on local air quality**

Extent of impact	2
Magnitude of impact	2

Duration of impact	4
Probability of impact	2
Risk = (Extent + Magnitude + Duration) x Probability	16
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential change in traffic in and out of the proposed project site during operational phase of the steel mill is low. This implies that impacts associated with traffic increase at the proposed project site during the operational phase should not have a direct influence on the decision to implement or not implement the proposed project.

### 11.3.3.5 Potential negative impacts resulting from waste generated during operational phase

The main waste that will be generated from the hot rolling steel mill will be mill scale and pieces of scrap metal. Mill scales will be generated from hot rolling process while steel scrap will be generated from trimming of steel products to get fine edges. Potential negative impacts likely from this waste could include:-

- ✓ Scattering of the waste on site that will be a safety hazards to construction workers and visitors to the construction site

An assessment of the environmental risk associated with waste generated at the proposed project during operational phase was informed by the identified potential negative impacts associated with the potential waste that will be generated. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from waste generated during operational phase when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 13 below.

**Table 13: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	4
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	21
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential waste that could be generated during operational phase of the proposed project is low. This implies that impacts associated with potential waste to be generated at the proposed project site should not have a direct influence on the decision to implement or not implement the proposed project.

### 11.3.3.6 Potential negative impacts resulting from increase in water use during operational phase

Water will be used as a coolant to cool plant and equipment. This will require significant amounts to meet cooling needs of the expanded mill. Water being scarce commodity in the area, extracting water from available sources such as the local pipeline for industrial use could contribute to a reduction of available water in the area for other uses including domestic use. Potential negative impact of increase demand of water to the plant will be increased competition for the already limited water resource in the project area by the various water users in the area including domestic users. Increase in competition for the infinite water resources could result in reduced available water for local domestic use.

An assessment of the environmental risk associated with increased water demand and use during operational phase was informed by the identified potential negative impacts associated with increase in water demand and use. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from increase in water demand and use during operational phase when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 14 below.

**Table 14: Assessment of potential negative impacts of increase in demand and use of water during operation phase**

Extent of impact	2
Magnitude of impact	4
Duration of impact	4
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	30
Environmental risk of site vegetation clearing	Medium impact

The outcome of the assessment of the environmental risk associated with potential impacts resulting from increase in demand and use of water during operational phase of the proposed project is medium. This implies that negative impacts associated with increase in demand and use of water during operational phase of the proposed project should influence on the decision to implement or not implement the proposed project unless the impacts are effectively mitigated.

### 11.3.4 Proposed mitigation measures for operational phase negative impacts

**Table 15: Proposed mitigation measures for operational phase negative impacts**

Potential negative impact	Proposed mitigation measures
Impacts on air quality	<ul style="list-style-type: none"> <li>- Ensure appropriate scrubbers are provided in the design of the hot rolling mill to scrub out all potential contaminants gasses in the flue stream from burning of IDO and furnace oil.</li> <li>- Ensure the hot rolling steel mill is always maintained on scheduled as prescribed by the manufacturers</li> <li>- Monitor the content of chimney emissions every three months as per the Environmental Management and Coordination (Air Quality) Regulations, 2014</li> </ul>
Noise and vibration impacts	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others. Ensure the construction site is secured by appropriate noise attenuators.</li> <li>- Provide all operational staff with appropriate noise preventions PPEs such as ear plugs and ear mufflers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>
Impacts related to oils and lubricants spills	<ul style="list-style-type: none"> <li>- Provide appropriate containment structures around all IDO and furnace oil storage tanks to collect any spills.</li> <li>- Provide for oil spill absorbents for quick absorption of any accidental spills</li> </ul>
Traffic related impacts	<ul style="list-style-type: none"> <li>- Develop and implement a traffic marshal plan for the for the operational phase</li> <li>- Provide sufficient parking/ holding area for traffic delivering and collecting materials from the hot rolling steel mill</li> </ul>
Waste related impacts	<ul style="list-style-type: none"> <li>- Ensure all waste generated during operational phase is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> </ul>

<b>Potential negative impact</b>	<b>Proposed mitigation measures</b>
	<ul style="list-style-type: none"> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced vehicles collect waste from the hot rolling steel mill.</li> <li>- Management to try to minimise waste generation during operational phase by reusing and or recycling most of generated waste</li> </ul>
Increased competition for water in the area	<ul style="list-style-type: none"> <li>- Explore alternative sources of water that can be used such as roof catchment, rock catchment and collection from neighbouring quarry pits to minimise drawing water from local pipeline for industrial use.</li> <li>- Provide adequate water storage tanks on site to store water from roof catchment from the extensive roofs of the godowns during rainy season that can be used in cooling of plant and equipment.</li> <li>- Minimise water demand by ensuring used water from the cooling circuit is routed through an adequately sized and effective cooling tower and pressure filter to filter the water for recycling purpose.</li> </ul>

### 11.3.5 Potential negative environmental impacts during decommissioning phase

The decommissioning phase of the proposed hot rolling steel mill will potentially result in negative environmental impacts including:-

- ✓ Impacts on air quality
- ✓ Noise and vibration impacts
- ✓ Traffic related impacts
- ✓ Waste related impacts

#### 11.3.5.1 Potential negative impacts on air quality during decommissioning phase

Decommissioning of the hot rolling steel mill will involve a number of activities that could potentially result in release of particulate matter into the surrounding atmosphere. These activities will include dismantling of all sections of the hot rolling mill, dismantling of support facilities and infrastructure, dismantling of buildings on site such as offices. These activities will potentially release loose particulate matter into the atmosphere that will alter local air quality. Potential negative impacts of such loose airborne particulate matter may include the following:-

- ✓ Smothering of vegetation foliage from dust.

- ✓ Eye irritation when fine dust particles being blown by the wind enter the eye.
- ✓ Chocking effect when airborne particulate matter is inhaled

An assessment of the environmental risk associated with impacts on local air quality at the project site during decommissioning phase of the proposed project was informed by the identified potential negative impacts resulting from potential change in local air quality. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts during decommissioning phase to local air quality when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 15 below.

**Table 16: Assessment of environmental risk on local air quality**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	12
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential change in ambient air quality during decommission phase is low.

#### **11.3.5.2. Potential negative impacts of noise and vibration during decommissioning phase**

Heavy equipment will be used to dismantle the steel mill, demolish the godown, offices and other building and support infrastructure. The use of these equipment and other tools could potentially contribute to noise and vibration during the decommissioning phase. Noise is unwanted or undesirable sound derived from point sources while vibration is the transmission of low frequency energy through the medium of ground or buildings. Noise travels through the air as waves of minute air pressure fluctuations caused by vibration, and travels away from the noise source as an expanding spherical surface. As a result, the energy contained in a sound wave is spread over an increasing area as it travels away from the source. This results in a decrease in loudness at greater distances from the noise source. Noise levels at different distances can be affected by factors such as topographic features, structural barriers and atmospheric conditions (wind speed and direction, humidity levels, and temperatures). Vibration consists of rapidly fluctuating motions; human response to vibration is a function of the average motion over a longer (but still short) time period, such as 1 second. Use of

heavy equipment during decommissioning can result in noise and vibration. The potential resulting impact will therefore be short term. Potential impacts of noise and vibration from use of heavy construction equipment during decommissioning phase could include the following:-

- ✓ Interfere with conversation and communication at the workplace
- ✓ Negate general work performance, thought and concentration.
- ✓ Negate relaxation.
- ✓ Causes annoyance.
- ✓ Induces hearing loss if heard long enough and is loud enough.

An assessment of the environmental risk associated with noise and vibration during decommissioning phase as a result of using heavy equipment was informed by the identified potential negative impacts associated with noise and vibration. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from noise and vibration when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 16 below.

**Table 17: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	2
Risk = (Extent + Magnitude + Duration) x Probability	8
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with noise and vibration during decommissioning phase is low.

### **11.3.5.3 Potential negative impacts resulting from traffic in and out of the site during decommissioning phase**

Decommissioning of the proposed hot rolling steel mill will generate significant quantity of waste. Waste generated during decommissioning phase will have to be ferried out of the site in a fleet of trucks. These could potentially increase traffic flow in and out of the proposed project site. Potential increase in traffic in and out of the proposed project site could result in some negative impacts. These impacts could include:-

- ✓ Increase in exhaust emissions from the trucks that will have an effect on local air quality
- ✓ Increase in time required by other users of the access road into and out of the facility



- ✓ Increase in wear and tear of the access road hence more environmental resources such as gravel will be required to maintain the access road.
- ✓ Increase in the volume of water that will be required to sprinkling the access road to arrest fugitive dust during dry periods.

An assessment of the environmental risk associated with impacts of increased in traffic in and out of the proposed project site during the decommissioning phase was informed by the identified potential negative impacts resulting from potential increase in traffic. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts during construction phase as a result in traffic increase when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 17 below.

**Table 18: Assessment of environmental risk on local air quality**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	12
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential change in traffic in and out of the proposed project site during decommissioning phase is low.

#### **11.3.5.4 Potential negative impacts resulting from waste generated during decommissioning phase**

Large quantities of waste will be generated from the decommissioning phase of the hot rolling steel mill. These wastes could include steel scrap, concrete waste, electronic waste, timber scrap among other waste. Potential negative impacts likely from this waste could include:-

- ✓ Scattering of the waste on site that will be a safety hazards to construction workers and visitors to the construction site,
- ✓ Blockage of drainage

An assessment of the environmental risk associated with waste generated at the proposed project during decommissioning phase was informed by the identified potential negative impacts associated with the potential waste that will be generated. The assessment was done using the risk assessment matrix. The confidence of assessment of impacts resulting from

waste generated during decommissioning phase when unmitigated and the resulting environmental risk based on the risk assessment matrix is as tabulated in table 18 below.

**Table 19: Assessment of environmental risk resulting from noise and vibration**

Extent of impact	1
Magnitude of impact	2
Duration of impact	1
Probability of impact	3
Risk = (Extent + Magnitude + Duration) x Probability	12
Environmental risk of site vegetation clearing	Low impact

The outcome of the assessment of the environmental risk associated with potential waste that could be generated during decommissioning phase of the proposed project is low.

### 11.3.6 Proposed mitigation measures for decommissioning phase impacts

**Table 20: Proposed mitigation measures for decommissioning phase impacts**

Potential negative impact	Proposed mitigation measures
Impacts on air quality	<ul style="list-style-type: none"> <li>- Secure the entire decommissioning site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all decommissioning staff with appropriate personal protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</li> <li>- Ensure all decommissioning workers make proper use of the PPEs provided.</li> <li>- Periodically monitor air quality levels at the decommissioning site by measuring local particulate matter</li> </ul>
Noise and vibration impacts	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others.</li> <li>- Ensure the decommissioning site is secured by appropriate noise attenuators.</li> <li>- Provide all decommissioning staff with appropriate noise preventions PPEs such as ear plugs and ear muffers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>

<b>Potential negative impact</b>	<b>Proposed mitigation measures</b>
Traffic related impacts	<ul style="list-style-type: none"> <li>- Develop and implement a traffic marshal plan for the site being decommissioned.</li> <li>- Provide sufficient parking/ holding area for traffic collecting waste from the decommissioning site.</li> </ul>
Waste related impacts	<ul style="list-style-type: none"> <li>- Ensure all waste generated at the site being decommissioned is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced vehicles collect waste from the site being decommissioned.</li> </ul>

#### **11.4 Potential social impacts**

The implementation of the proposed overhaul and replacement of the old hot rolling steel mill with a new modern mill will potentially result in social impacts that will affect the social environment. Social environment refers to the aggregate of social and cultural institutions, forms, patterns, and processes that influence the life of an individual or community. It includes the immediate physical and social setting in which people live or in which something happens or develops. Social environment also includes the culture that the individual lives in, and the people and institutions with whom they interact. The interaction may be in person or through communication media. Potential social impacts can positive, negative or a combination of both. The potential social impacts can affect individuals, households or a community and they can be caused directly by project activities such as job creation or by environmental changes brought about by project activities such as increased ambient noise levels, reductions in air quality or alterations of the quality of local water sources.

##### **11.4.1 Potential positive social impacts during construction phase of the proposed project**

Potential positive social impacts likely during the construction phase of the proposed project could include:

- ✓ Employment opportunities for the local community
- ✓ Support to existing local businesses

- ✓ On job training opportunities for local people

#### **11.4.1.1 Employment opportunities for the local community**

Construction phase of the proposed project will likely create direct employment opportunities. Direct labour force will be required in all site construction activities. Other direct employment opportunities will include in the area of equipment operators such employees who will be hired to operate equipment used on site. This and other construction activities will create employment to the local community. The project also will provide indirect employment opportunities, this will include food outlets who will benefit from clientele drawn from workers at the proposed project site, other service providers such as transporters who will be hired to ferry construction materials into the site and construction waste out of the site. .

#### **11.4.1.2 Support to existing local businesses**

Once the implementation of the proposed project begins and local people and others get employed in the project, they will be remunerated for their work. This will translate to more money available in the pocket hence improved purchasing power. Local businesses are likely to benefit from improved purchasing power of people in the area as a result of their remuneration. There is likelihood that there will be more money in the pockets of people who will be directly or indirectly employed in the project and that part of the money will be spent in the local economy hence benefits local businesses.

#### **11.4.1.3 On job training opportunities for local people**

Implementation of the proposed project will present an opportunity for non-skilled local people to be involved in the project and acquire skills through on-job training. Skills that will be acquired could include how to overhaul and install a new hot rolling mill. Further skilled but inexperienced local people will have an opportunity to sharpen their skills and develop experience.

#### **11.4.2 Potential positive social impacts during the operational phase of the proposed project**

Potential positive social impacts likely during the operational phase of the proposed project could include:

- ✓ Potential for local economic improvement
- ✓ On job training opportunities for local people
- ✓ Technology transfer
- ✓ Support for development of local community through company CSR programme

- ✓ Taxes to National government
- ✓ Taxes to Kilifi County Government
- ✓ Foreign exchange earnings through exports

#### **11.4.2.1 Potential for local economic improvement**

Implementation of the proposed project and the actual operation of the hot rolling steel mill will over time contribute to improvement of local economy. Economic changes affecting job opportunities, business viability and potential to enhance incomes will be some of the key gains that will likely be expected over time. It is expected that majority of the labour force that will be required in the steel mill will be sourced locally. This will translate to improved household income meaning households will be in a better position to educate their children, provide food, shelter and medicare.

#### **11.4.2.2. On job training opportunities for local people**

Once operational, the hot rolling steel mill will present an opportunity for on job training of local people especially those from Kokotoni and Kaliangombe area of Kilifi County. The training could be in different sections of the hot rolling steel mill. Such training will enable local people build capacity, gain new knowledge and experience to be competitive in the job market.

#### **11.4.2.3 Technology transfer**

The proposed overhaul and replacement of the old hot rolling steel mill with a new hot rolling steel mill will bring in new and up-to-date hot rolling technology in the steel mill sector. The people who will be working in the hot rolling steel mill will have an opportunity to learn and interact with the various technological aspects that will be used in the mill. Through such interaction there will be transfer of the technologies that will be used to the local people.

#### **11.4.2.4 Support for development of local community through company CSR programme**

The proponent will be required to plough back part of the proceeds from the investment into the local community by putting in place appropriate corporate social responsibility programmes. The proponent will consult with local leadership on areas of support for company CSR projects.

#### **11.4.2.5. Increased production of hot rolled steel products in the country**

Implementation of the proposed project will contribute to increase the manufacture of hot rolled steel products produced in Kenya.

#### 11.4.2.6. Payment of Taxes to National government

The proposed project once operational will contribute to revenue earnings to government through payment of statutory taxes to the national government.

#### 11.4.2.7 Payment of Taxes to County Government of Kilifi

The proponent will require permits and licenses that will be issued by the County Government of Kilifi.

#### 11.4.2.8 Foreign exchange earnings

It is envisaged that part of the hot rolled steel products that will be produced from the steel mill will be exported within the Eastern Africa region. The exports once realized will earn the country foreign exchange.

#### 11.4.3 Proposed measures to enhance potential positive impacts

Measures that can be put in place to enhance identified potential positive impacts of the proposed project are tabulated in table 20 below.

**Table 21: Proposed measures to enhance identified positive social impacts**

Potential positive impacts	Proposed measures to enhance the positive impacts
<b>Construction phase</b>	
Employment opportunities for the local community	<ul style="list-style-type: none"> <li>- Local people from the project area to be given first priority to benefit in direct employment opportunities during the construction.</li> <li>- Local women to be considered for employment during construction period, the contractor should ensure that the women are retained throughout the construction period to improve gender equality and reduce disparities. This should be put in place as part of the contractor's terms of reference and procedure for monitoring.</li> <li>- There should be no sourcing of unskilled or semi-skilled construction labour force from outside the project area.</li> <li>- Local youths of both male and female gender and local women who form the bulk of local labour force to be given utmost priority when sourcing construction labour force</li> <li>- Both the male and female gender to be given equal priority by allocating equal slots for each gender when sourcing construction labour force.</li> <li>- Daily checking of records of numbers of each gender working at the</li> </ul>

<b>Potential positive impacts</b>	<b>Proposed measures to enhance the positive impacts</b>
	construction site to be done to ensure the ratios are maintained.
Support to existing local businesses	<ul style="list-style-type: none"> <li>- Construction materials that is available locally to be sourced locally.</li> <li>- Required services to be sourced locally.</li> </ul>
On job training opportunities for local people	<ul style="list-style-type: none"> <li>- Local youths to be given opportunities to learn and develop their skills at the project site.</li> <li>- Local students in local tertiary institutions to be given opportunities for attachment at the project site to be exposed to the work environment</li> <li>- Local youths who have graduated from tertiary institutions to be given internship positions to sharpen their skills and acquire experience.</li> </ul>
<b>Operational phase</b>	
Potential for local economic improvement	<ul style="list-style-type: none"> <li>- Local people working in the steel rolling mill are encouraged to invest part of their earnings locally.</li> <li>- Proponent encouraged to support local business by purchasing required goods and services locally</li> </ul>
On job training opportunities for local people	<ul style="list-style-type: none"> <li>- Local youths to be given opportunities to learn and develop their skills at the project site.</li> <li>- Local students in local tertiary institutions to be given opportunities for attachment at the project site to be exposed to the work environment</li> <li>- Local youths who have graduated from tertiary institutions to be given internship positions to sharpen their skills and acquire experience</li> </ul>
Technology transfer	<ul style="list-style-type: none"> <li>- Local people to be given priority to work in different sections of the hot rolling steel mill to learn new technological skills.</li> </ul>
Support for development of local community	<ul style="list-style-type: none"> <li>- Proponent to invest part of the proceeds in support of local community development projects..</li> <li>- Local community to appropriately prioritize community projects to</li> </ul>

<b>Potential positive impacts</b>	<b>Proposed measures to enhance the positive impacts</b>
through company CSR programme	be financed under the CSR programme.

#### **11.4.4 Potential negative social impacts during the construction phase of the proposed project**

Potential negative social impacts likely during the construction phase of the proposed project could include:

- ✓ Alteration of local air quality
- ✓ Occupational injuries and accidents to construction workers
- ✓ Labour influx

##### **11.4.4.1 Alteration of local air quality**

Implementation of the proposed project will involve a number of site activities that could potentially result in release of particulate matter into the surrounding atmosphere. These activities will include dismantling of sections of the old mill, extension of the existing godown to accommodate requirement of the new mill and construction equipment activity on site. These activities will potentially release loose particulate matter into the atmosphere that will alter local air quality. However, these activities will be localized and for a short time period restricted to the construction phase.

##### **11.4.4.2 Occupational injuries and accidents to construction workers**

Construction workers at the proposed project site will potentially be exposed to risks associated with the construction occupation. Some of the risks include exposure to fugitive dust, exposure to noise and vibrations. Some of these risks may result to accidents and or injuries to the workers at the proposed project site. Injuries can arise from use of tools and equipment and from the construction process. The injuries can include cuts and bruises, falling from height and colliding. Social impacts associated with occupational injuries and accidents will include the following:-

- ✓ Injury to and or loss of family bread winner translating to diminished family income which translates to reduced family purchasing power and ability to meet family financial obligations.



- ✓ Ailment/sickness to affected worker that negatively affects the productivity of such a worker hence reducing financial earnings of such a worker which translates to reduced purchasing power of such a worker.
- ✓ Loss of productive workforce resulting in reduced productivity.
- ✓ Increase in down time resulting in diminished productivity.

#### **11.4.4.3 Labour influx during construction phase**

Construction phase of the proposed project will require both skilled and unskilled labour force to be involved in the construction and supply of associated goods and services to the project. In the event that the required skilled workforce and associated goods and services cannot be obtained locally either because of lack of technical skills, capacity and or lack of the required goods and services locally, in such a scenario, the required labour force and or required goods and services may be sourced outside the project area. In such a scenario, there is a potential for potential construction workers together with other people who will be supplying goods and services to the proposed project in the short term to migrate and settle at the project area resulting in a labour influx into the project area. Social impacts associated with such labour influx will include the following:-

- ✓ Local inflation of commodity prices: Labour influx may result in an increase in demand of goods and services at local centres such as Kokotoni Centre and its environs; this may result in local price hikes and/or crowding out of community consumers.
- ✓ Increased pressure on local accommodation facilities and rent hiking. Sourcing of construction labour outside the project area will necessitate that they seek for convenient accommodation close to the project site. This will increase pressure on available accommodation facilities. Further due to increased demand for accommodation there may be increase of accommodation prices and crowding out of local residents.
- ✓ Incidence of child labour and school dropout the proposed project will potentially increase opportunities for the host community to sell goods and services to the incoming workers. Depending on the nature of the social fabric and individual local family dynamics, such an opportunity can be a temptation to parents who can allow their children to produce and deliver these goods and services at the expense of attending school. This will lead to school dropout.
- ✓ Gender-based violence: Construction workers in construction sites such as that of the proposed project are young males although more recently young females are now joining the construction workforce. Based on this it is likely that construction staff to the

proposed project site may be male dominated. Young males who are away from home on the construction job will be separated from their family and act outside their normal sphere of social control. This can lead to inappropriate behavior, such as sexual harassment of women and girls, exploitative sexual relations, and illicit sexual relations with minors from the host community.

#### **11.4.5 Potential negative social impacts during the operational phase of the proposed project**

Potential negative social impacts likely during the operation phase of the proposed project could include:

- ✓ Alteration of local air quality
- ✓ Labour influx
- ✓ Occupational injuries and accidents

##### **11.4.5.1 Alteration of local air quality**

Potential alteration of local air quality will be as a result of emissions from the use of IDO and furnace oil in the hot rolling process. As a result of heating of the IDO and furnace oil there will be potential emission of Sulphur oxide (Sox), Nitrogen Oxides (NOx), Carbon Dioxide (CO<sub>2</sub>), Carbon monoxide, Hydrocarbons (HC) and Hydrogen Sulfide. In the absence of appropriate mitigation measures such as effective scrubbers and emission monitoring, the emissions can potentially alter local air quality.

##### **11.4.5.2 Operational phase occupational injuries and accident**

During the operational phase of the hot rolling steel mill, workers could be exposed to injuries and accidents as a result of routine work, working environment, condition of working tools and equipment, lack of technical knowhow, experience and fatigue. Injuries and accidents to workers while working could be as a result different reasons including:-

- ✓ Not servicing and maintaining the hot rolling mill on schedule and as per recommendations of the manufacture.
- ✓ Poorly serviced and maintained working tools and equipment.
- ✓ Lack of experience and technical knowledge on the use and operation of the equipment.
- ✓ Lack of use of appropriate personal protective equipment when working.
- ✓ Poor conditions of the working environment.
- ✓ Poor state of the mind of workers when working such as absent mindedness, stress and fatigue.

Social impacts associated with occupational injuries and accidents will include the following:-

- ✓ Injury to and or loss of family bread winner translating to diminished family income which translates to reduced family purchasing power and ability to meet family financial obligations.
- ✓ Ailment/sickness to affected worker that negatively affects the productivity of such a worker hence reducing financial earnings of such a worker which translates to reduced purchasing power of such a worker.
- ✓ Loss of productive workforce resulting in reduced productivity.
- ✓ Increase in down time resulting in diminished productivity

#### 11.4.6 Proposed mitigation measures for identified potential negative social impacts

Measures that can be put in place to mitigate potential negative social impacts during the construction and operation of the proposed hot rolling steel mill are tabulated in table 21 below.

**Table 22: Proposed mitigation measures for potential negative social impacts**

Potential negative social impact	Proposed mitigation measure
<b>Construction phase</b>	
Alteration of local air quality	<ul style="list-style-type: none"> <li>- Secure the entire construction site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all construction staff with appropriate personal protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</li> <li>- Ensure all construction workers make proper use of the PPEs provided.</li> <li>- Periodically monitor air quality levels at the construction site by measuring local particulate matter</li> </ul>
Labour influx	<ul style="list-style-type: none"> <li>- First priority to be given to people from the local community when recruiting construction workers.</li> <li>- Unskilled and semi-skilled labor to be strictly sourced from the local community</li> <li>- Skilled labor to be sourced out of the local community when it</li> </ul>

<b>Potential negative social impact</b>	<b>Proposed mitigation measure</b>
	has been ascertained that there is no person from the local community with such a skill.
Occupational injuries and accidents to construction workers	<ul style="list-style-type: none"> <li>- All construction workers to be given appropriate personal protective equipment.</li> <li>- All construction workers to first be trained on the appropriate use of the provided personal protective equipment.</li> <li>- Project proponent to ensure each construction worker and visitors to the construction site also use the provided personal protective equipment.</li> <li>- The project proponent to ensure that tools and equipment provided for use at the proposed construction site are well serviced and maintained.</li> <li>- Project proponent to ensure that the construction site is free of hazards.</li> <li>- The project proponent to ensure that among the construction workers are trained first aiders.</li> <li>- Project proponent to ensure there is a fully equipped first aid station at the proposed project site.</li> <li>- Project proponent to ensure appropriate measures are put in place to minimize fugitive dust by regularly flooding with water all dusty working areas especially during windy periods.</li> </ul>
<b>Operational phase</b>	
Alteration of local air quality	<ul style="list-style-type: none"> <li>- Ensure appropriate scrubbers are provided in the design of the hot rolling mill to scrub out all potential contaminants gasses in the flue stream from burning of IDO and furnace oil.</li> <li>- Monitor the content of chimney emissions every three months as per the Environmental Management and Coordination (Air Quality) Regulations, 2014</li> <li>- Proponent and relevant Lead Agencies to act on feedback from local community in regard to local air quality</li> </ul>
Labour influx	<ul style="list-style-type: none"> <li>- First priority to be given to people from the local community</li> </ul>

<b>Potential negative social impact</b>	<b>Proposed mitigation measure</b>
	<p>when recruiting workers for the operational phase.</p> <ul style="list-style-type: none"> <li>- Unskilled and semi-skilled labor who will be hired during the operational phase of the proposed project to be strictly sourced from the local community</li> <li>- During the operational phase of the proposed project, required skilled labor to be sourced out of the local community after exhausting those available in the local community.</li> </ul>
Occupational injuries and accidents	<ul style="list-style-type: none"> <li>- During operational phase all workers to be given appropriate personal protective equipment.</li> <li>- Workers hired during the operational phase to first be trained on the appropriate use of the provided personal protective equipment.</li> <li>- Project proponent to ensure all operational phase workers and visitors to the project site also use the provided personal protective equipment provided appropriately.</li> <li>- The project proponent to ensure that tools and equipment provided for use during the operational phase are well serviced and maintained.</li> <li>- The project proponent to ensure that among the operational phase workers are trained first aiders.</li> <li>- Project proponent to ensure there is a fully equipped first aid station at various sections of the hot rolling steel mill.</li> </ul>

## **12. ENVIRONMENTAL MANAGEMENT PLAN**

### **12.1 Introduction**

Environmental (Impact Assessment and Audit) Regulations, 2003 define Environmental Management Plan (EMP) to mean “all details of project activities, impacts, mitigation measures, time schedule, costs, responsibilities and commitments proposed to minimize environmental impacts of activities, including monitoring and environmental audits during implementation and decommissioning phases of a project”.

#### **12.1.1 Proposed project activities**

The proposed overhaul and replacement the old hot rolling steel mill will involve preparatory activities, implementation activities, operation activities and decommissioning phase.

#### **12.1.2 Preparatory phase activities**

Activities that will be carried out during the preparation phase will include the following:

- ✓ Assembly of materials and equipment that will be required for the overhaul and replacement of the hot rolling mill.
- ✓ Identification of sections of the old hot rolling mill that will be overhauled.

#### **12.1.3 Implementation phase activities**

Activities that will be carried out during the implementation phase will include the following:

- ✓ Overhauling of identified sections of the old hot rolling mill. This will include dismantling of the identified section, dismembering the section and replacement of the old sections with new ones.
- ✓ Installation and fitting on new sections and parts of the hot rolling steel mill
- ✓ Extension of the current godown to provide additional space that will be required
- ✓ Management of resulting waste

#### **12.1.4 Operational phase activities**

Activities that will be carried out during the operational phase will include the following:

- ✓ Test running of the replaced hot rolling steel mill
- ✓ Full operation of the replaced hot rolling mill
- ✓ Environmental monitoring activities
- ✓ Management of operation waste

#### **12.1.5 Decommissioning phase activities**

Activities that will be carried out during the decommissioning phase will include the following:

- ✓ Dismantling of the hot rolling steel mill

- ✓ Dismantling of all support infrastructure
- ✓ Disposal of resulting waste
- ✓ Site rehabilitation

## **12.2 Working policies to be developed and documented by the proponent to guide project implementation**

Implementation of the proposed project will require careful and sound environmental planning to ensure that all issues and concerns raised by all stakeholders are fully addressed and that all potential negative impacts are appropriately mitigated to ensure environmental sustainability. To achieve this; Corrugated Sheets Limited who is the project proponent will upgrade existing policies and develop new ones where there is no existing policy to guide the implementation of the proposed project. The policies once upgraded and or developed will be vital in the following ways among others:

- ✓ The policies will enable management to develop and maintain sound relations with construction workers and the neighboring community.
- ✓ The policies will enable management put in place measures and structures that will care for the safety, health and welfare of all workers on site and the neighboring community residents.
- ✓ The policies will provide a framework for management to plan for, and put in place, monitoring programmes that will ensure conservation and protection of the environment, appropriate waste management and disposal.
- ✓ The policies will provide a framework for Corrugated Sheets Limited to assume its corporate social responsibility for its activities with regard to conservation of the environment as well as for the well-being of the local community.

The following policies will need to be developed and documented by the project proponent:-

- ❑ Environmental and sustainability policy
- ❑ Occupational Health and safety policy
- ❑ Stakeholder engagement and involvement policy
- ❑ Training and development policy
- ❑ Risk Management policy

### **12.2.1 Environmental and sustainability policy**

Corrugated Sheets Limited has an existing environmental policy. Management will be required to updated and enhance this policy to an environmental and sustainability policy. The enhanced policy will guide the project proponent to carry out the proposed project

activities with the highest regard to the natural environment, social environment and sustainable utilization of environmental resources. The policy will be in line with applicable national legislations, international guidelines, standards and best practices. The environmental and sustainability policy will therefore cover the following, among other issues:-

- ✓ All national statutory requirements that the proponent will have to comply with before commencement of project implementation.
- ✓ Systems to be put in place to ensure continuous environmental improvement and performance throughout the project lifecycle.
- ✓ Comprehensive measures to be adopted by the proponent to ensure that utilization of natural resources are optimal with measures in place to ensure resource availability for future generation.
- ✓ Awareness creation to the surrounding community regarding sustainable utilization of natural resources, protection of sensitive ecosystems and bio-diversity maintenance for communal livelihood.
- ✓ Measures that provide for and ensure balancing between natural resource use, environmental conservation and economic development.

### **12.2.2 Occupational Health and safety policy**

The project proponent has an existing Occupational Health and Safety Policy in place. However, management will be required to update this policy to meet the expanded requirement of the proposed project. This will ensure that the project proponent put in place appropriate measures that will ensure that the health, safety and welfare of all employees is cared for. Further the policy will also ensure and safeguard the health and safety of the local community within the project catchment. In addition to this the policy will safeguards the health and safety of visitors to the project site and all other stakeholders. The policy will highlight the following, among others:-

- ✓ Identity health and safety requirements of employees that need to be safeguarded in line with requirements and provisions of national legislations, international guidelines of best practices.
- ✓ Identity health and safety requirements of local community within the project catchment area that need to be safeguarded in line with requirements and provisions of national legislations, international guidelines of best practices.



- ✓ Identity health and safety requirements of visitors to the project site that need to be safeguarded in line with requirements and provisions of national legislations, international guidelines of best practices.
- ✓ Identity health and safety requirements of all other stakeholders that need to be safeguarded in line with requirements and provisions of national legislations, international guidelines of best practices.
- ✓ Identify ways and means of safeguarding health and safety of employees, local community, visitors to the project site and all other stakeholders.
- ✓ Identify safety measures that need to be put in place for all machines and equipment to be used.
- ✓ Identify required appropriate safety and rescue equipment to be availed in all work places within the project site.
- ✓ Document an elaborate emergency procedures and actions.
- ✓ Identify ways of ensure risk is eliminated and or minimized within the project site
- ✓ Document required training needs in safety.

### **12.2.3 Stakeholder engagement and involvement policy**

The project proponent will develop and document a comprehensive stakeholder engagement and involvement policy that will ensure that the project proponent develops and maintains sound relations with all stakeholders. The policy will identify all the project stakeholders including those who have an interest in the project and those that are affected by the project. In additions the policy will provide a broad framework on how each of the stakeholders will be engaged and involved in the project. The policy will highlight the following, among others: -

- ✓ Identify all project stakeholders and potential stakeholders
- ✓ Identify the stake/interest/role of each of the identified stakeholder
- ✓ Outline how management will address each stakeholder needs/requirements/interests
- ✓ Document how project management will engage and involve each of the stakeholders
- ✓ Document how the stakeholders will interact among themselves and with the project

### **12.2.4 Training and development policy**

The project proponent will develop and document a comprehensive training and development policy to meet project environmental protection and sustainability needs, project occupational safety and health needs, community health and safety safeguard needs, and other training and development needs that will be necessitated by project activities. The training and

development policy will be aligned to applicable national legislations, international guidelines and best practices. The policy will highlight the following among other issues:-

- ✓ In-house training and capacity development for project workforce to address and meet required project environmental protection and sustainability threshold.
- ✓ In-house training and capacity development for project workforce to address and meet required project occupational safety and health threshold.
- ✓ In-house training and capacity development for project workforce to address and meet required community health and safety safeguard threshold.

### **12.2.5 Risk Management policy**

The project proponent will develop and document a comprehensive risk management policy to address all potential risks that are likely to be associated with the project. The policy will document guidelines of addressing each potential risk with the aim of preventing the risk from occurring while spelling out measures to be taken to address the risk should it occur. The risk management policy will cover project related environmental risks, project related social risks, and project related occupational risks among other risks. The risk management policy will highlight the following among others:-

- ✓ Identify all project related risks to the natural environmental and social environment.
- ✓ Spell out measures to be made to prevent identified project risks
- ✓ Spell out remedial measures that will be taken should the risk occur

## **12.3 Environmental and Social Management Plans**

In order for the proposed project to be socially acceptable and environmentally sustainable, the following management plans complete with action plans are proposed. The plans and action plans will be operationalized throughout the lifecycle of the proposed project.

- ✓ Air quality management plan
- ✓ Noise and vibration management plan
- ✓ Oils and lubricants spills management plan
- ✓ Occupational safety and health management plan
- ✓ Waste management plan
- ✓ Traffic management plan
- ✓ Water use management plan

### **12.3.1 Air quality management plan**

Management objectives of the air quality management plan are as follows:

- ✓ Project activities do not result in significant alteration of local air quality.

- ✓ Any observed incident of ambient air pollution should be handled as per the site pollution incident contingency plan.
- ✓ Appropriate measures be put in place to address any potential ambient air pollution including immediate reporting the pollution incident to NEMA and other relevant lead agencies

The ambient air pollution prevention action plan guiding principle will be continuous and sustained improvement in ambient air pollution prevention from proposed project activities, improvement on site construction, operation and decommissioning activities, safety and environmental performance, supported by regular feedback from all neighbours and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all stakeholders to be involved in actions taken. Potential ambient air pollution that may arise from implementation of proposed project activities may include generation of fugitive dust during construction phase, stuck emissions from burning of IDO and furnace oil during operational phase and generation of fugitive dust during decommissioning phase.

**Table 23: Air quality management action plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Potential air quality pollution during construction phase	<ul style="list-style-type: none"> <li>- Smothering of vegetation foliage from fugitive dust.</li> <li>- Eye irritation when fine dust particles being blown by the wind enter the eye.</li> <li>- Chocking effect when airborne particulate matter is inhaled</li> </ul>	<ul style="list-style-type: none"> <li>- Secure the entire construction site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all construction staff with appropriate personal protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</li> <li>- Ensure all construction workers make proper use of the PPEs provided.</li> <li>- Periodically monitor air quality levels at the construction site by measuring local particulate matter</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- The public</li> </ul>	Throughout the construction period	<ul style="list-style-type: none"> <li>- Visually monitor fugitive dust by observing of dust settled on foliage and on other surfaces</li> <li>- Feedback from construction workers</li> </ul>	50, 000
Potential air quality	<ul style="list-style-type: none"> <li>- Formation of acid rain</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure appropriate scrubbers are provided in the design of the hot</li> </ul>	<ul style="list-style-type: none"> <li>- Directors of CSL</li> </ul>	Prior to commence	<ul style="list-style-type: none"> <li>- Quarterly sampling of</li> </ul>	250,000

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
pollution during operational phase	<ul style="list-style-type: none"> <li>- Chocking and irritation of the throat</li> <li>- Irritation of eyes</li> <li>- Skin irritation</li> </ul>	<ul style="list-style-type: none"> <li>rolling mill to scrub out all potential contaminants gasses in the flue stream from burning of IDO and furnace oil.</li> <li>- Monitor the content of chimney emissions every three months as per the Environmental Management and Coordination (Air Quality) Regulations, 2014</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environment al and safety Officer</li> <li>- Section workers</li> <li>- Neighbours</li> </ul>	ment of operational phase and be sustained throughout the operational phase	stuck emissions and testing of emission content by a NEMA accredited laboratory	
Potential air quality pollution during decommissioning phase	<ul style="list-style-type: none"> <li>- Smothering of vegetation foliage from dust.</li> <li>- Eye irritation when fine dust particles being blown</li> </ul>	<ul style="list-style-type: none"> <li>- Secure the entire decommissioning site with appropriate dust screens to trap fine dust particles</li> <li>- Sprinkle water to arrest fugitive dust</li> <li>- Provide all decommissioning staff with appropriate personal</li> </ul>	<ul style="list-style-type: none"> <li>- Directors of CSL</li> <li>- General Manager RSD</li> <li>- CSL Environment al and safety</li> </ul>	Throughout the decommissioning phase	- Visual observation of settled fine dust on surfaces within the decommissioning site	200,000

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
	<p>by the wind enter the eye.</p> <ul style="list-style-type: none"> <li>- Chocking effect when airborne particulate matter is inhaled</li> </ul>	<p>protective equipment (PPEs) such as dust masks, overalls, helmet, dust coats, safety boots and goggles.</p> <ul style="list-style-type: none"> <li>- Ensure all decommissioning workers make proper use of the PPEs provided.</li> </ul>	<p>Officer</p> <ul style="list-style-type: none"> <li>- Section workers</li> <li>- Neighbours</li> </ul>		<ul style="list-style-type: none"> <li>- Periodically sample and measure site particulate matter levels</li> </ul>	

### **12.3.2 Noise and vibration management plan**

Management objectives of the noise and vibration management plan are as follows:

- ✓ Project activities do not result in significant noise and vibration.
- ✓ Any incident of noise and vibration should be handled as per the comprehensive noise and vibration contingency plan.
- ✓ Noise and vibration at the proposed project site to be within the prescribed limits in the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations 2009.

The noise and vibration action plan guiding principle will be continuous and sustained improvement in reducing levels of noise and vibration from proposed project activities, improvement on site construction, operation and decommissioning activities, safety and environmental performance, supported by regular feedback from all neighbors and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all stakeholders to be involved in actions taken. Potential noise and vibration at the proposed site could be as a result of use of heavy construction equipment and the actual hot rolling process.

**Table 24: Noise and vibration management action plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Potential noise and vibration during construction phase	<ul style="list-style-type: none"> <li>✓ Interfere with conversation and communication at the workplace</li> <li>✓ Negate general work performance, thought and concentration .</li> <li>✓ Negate relaxation.</li> <li>✓ Causes annoyance.</li> <li>✓ Induces hearing loss</li> </ul>	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others.</li> <li>- Ensure the construction site is secured by appropriate noise attenuators.</li> <li>- Provide all construction staff with appropriate noise preventions PPEs such as ear plugs and ear mufflers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- The public</li> </ul>	Throughout the construction period	<ul style="list-style-type: none"> <li>- Periodic measurement of noise and vibration at the site when noise levels are deemed to be high</li> </ul>	100, 000



Issue/Concern	Potential Negative Impacts	Proposed mitigation measures	Responsible Actors	Timeframe	Monitoring	Cost KSH
	if heard long enough and is loud enough.	maintained and serviceable.				
Potential noise and vibration during operational phase	<ul style="list-style-type: none"> <li>✓ Interfere with conversation and communication at the workplace</li> <li>✓ Negate general work performance, thought and concentration</li> <li>✓ Negate relaxation.</li> </ul>	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others.</li> <li>Ensure the construction site is secured by appropriate noise attenuators.</li> <li>- Provide all operational staff with appropriate noise preventions PPEs such as ear plugs and ear mufflers</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- Neighbours</li> </ul>	Prior to commencement of operational phase and be sustained throughout the operational phase	<ul style="list-style-type: none"> <li>- Periodic measurement of noise and vibration levels</li> </ul>	100,000

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
	✓ Causes annoyance.	<ul style="list-style-type: none"> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>				
Potential noise and vibration during decommissioning phase	<ul style="list-style-type: none"> <li>✓ Interfere with conversation and communication at the workplace</li> <li>✓ Negate general work performance, thought and concentration</li> <li>✓ Negate relaxation.</li> </ul>	<ul style="list-style-type: none"> <li>- Develop and implement a comprehensive noise conservation programme that includes training, equipment maintenance, engineering controls, use of PPEs, noise measurements among others.</li> <li>- Ensure the decommissioning site is secured by appropriate noise attenuators.</li> <li>- Provide all decommissioning staff with appropriate noise preventions PPEs such as ear plugs and ear</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- Neighbours</li> </ul>	Throughout the decommissioning phase	-	200,000

Issue/Concern	Potential Negative Impacts	Proposed mitigation measures	Responsible Actors	Timeframe	Monitoring	Cost KSH
	<ul style="list-style-type: none"> <li>✓ Causes annoyance.</li> <li>✓ Induces hearing loss if heard long enough and is loud enough.</li> </ul>	<ul style="list-style-type: none"> <li>mufflers</li> <li>- Enforce proper use of the provided noise protective PPEs by all workers.</li> <li>- Ensure equipment used are well maintained and serviceable.</li> </ul>				

### **12.3.3 Oils and lubricants spills management plan**

Management objectives of the oils and lubricants spills management plan are as follows:

- ✓ Project activities do not result in significant spillages of IDO, furnace oil and lubricants.
- ✓ Any observed incident of spills of oils and/or lubricants should be handled as per the site spill incident contingency plan.
- ✓ Appropriate training of personnel and availability of equipment to always be in place to address any potential spill.

The oils and lubricants spill action plan guiding principle will be continuous and sustained improvement in eliminating spillages at the proposed project activities, improvement on site construction, operation and decommissioning activities, safety and environmental performance, supported by regular feedback from workers, neighbors and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all stakeholders to be involved in actions taken. Potential oils and lubricant spills can be from bulk handling of IDO and furnace oil on site, dispensing and use of the oils and lubricants, equipment servicing and maintenance.

**Table 25: Oils and lubricants spills management action plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Potential oil spills during construction phase	<ul style="list-style-type: none"> <li>✓ Contamination of local soil</li> <li>✓ Contamination of surface and ground water</li> <li>Burning effect of vegetation</li> </ul>	<ul style="list-style-type: none"> <li>- Provide for oil spill absorbents for quick absorption of any accidental spills</li> <li>- Provide spill containment at equipment servicing area</li> <li>- Provide for automated dispensing direct to the utility point/equipment</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- The public</li> </ul>	Throughout the construction period	- Physically checking of any spills on a daily basis	10, 000
Potential oil spills during operational phase	<ul style="list-style-type: none"> <li>✓ Contamination of local soil</li> <li>✓ Contamination of surface and ground water</li> <li>Burning effect of</li> </ul>	<ul style="list-style-type: none"> <li>- Provide appropriate containment structures around all IDO and furnace oil storage tanks to collect any spills.</li> <li>- Provide for oil spill absorbents for quick absorption of any accidental spills</li> <li>- Provide spill containment at</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> </ul>	Prior to commencement of operational phase and be sustained throughout the	Physically checking of any spills on a daily basis	10,000

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
	vegetation area.	equipment servicing area - Provide for automated dispensing direct to the utility point	- Section workers - Neighbours	operational phase		
Potential oil spills during decommissioning phase	✓ Contamination of local ✓ Contamination of surface and ground water bodies ✓ Burning effect of vegetation	- Provide for oil spill absorbents for quick absorption of any accidental spills - Provide spill containment at equipment servicing area - Provide for automated dispensing direct to the utility point	- General Manager RSD - CSL Environmental and safety Officer - Section workers - Neighbours	Throughout the decommissioning phase	- Physically checking of any spills on a daily basis	20,000

### **12.3.4 Occupational safety and health management plan**

Management objectives of the occupational safety and health management plan are as follows:

- ✓ Project activities do no compromise the occupational safety and health of project workers, visitors to the project site and neighbors of the project.
- ✓ Only appropriate and serviceable tools, equipment, plant and machinery are used in executing the project.
- ✓ An appropriate occupational safety and health management system be implemented at the workplace.
- ✓ Continuous training of workers in workplace safety

The occupational safety and health action plan guiding principle will be continuous and sustained improvement in eliminating workplace hazards associated with project activities, improvement on site construction, operation and decommissioning activities, safety and environmental performance, supported by regular feedback from workers, neighbors and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all stakeholders to be involved in actions taken. Potential workplace safety concerns include working at height, working in confined areas, and exposure to fugitive dust, emissions, noise and vibration and working in slippery surfaces.

**Table 26: Occupational safety and health action plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Occupational injuries and accidents to workers during construction, operation and decommissioning phases	<ul style="list-style-type: none"> <li>✓ Injury to and or loss of family breed winner</li> <li>✓ Loss in productivity</li> <li>✓ Loss of productive workforce.</li> <li>✓ Increase in down time</li> <li>✓ Increased company litigation</li> <li>✓ Tainting of company corporate image</li> </ul>	<ul style="list-style-type: none"> <li>- Provide appropriate PPEs.</li> <li>- Training in the appropriate use of PPEs</li> <li>- Use only well serviced and maintained tools, equipment, plant and machinery</li> <li>- Project proponent to ensure that the construction site is free of hazards.</li> <li>- Train workers in first aid.</li> <li>- Provide a fully equipped first aid station at the proposed project site.</li> <li>- Minimize fugitive dust</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- The public</li> </ul>	Throughout the project cycle i.e. construction, operation and decommissioning	<ul style="list-style-type: none"> <li>- Monitor the proper use of PPEs</li> <li>- Monitor daily report of accidents and incidents</li> <li>- Pre-employment medical examination of employees</li> <li>- Annual medical examination of workers</li> </ul>	500, 000



### **12.3.5 Waste management plan**

Management objectives of the waste management plan are as follows:

- ✓ Waste generated from the proposed project to managed and disposed in such a way that it does not result in environmental pollution.
- ✓ Deliberate measures to be put in place to refuse to generate waste, to reduce waste generated, reuse the waste or recycle the generated waste
- ✓ Strict adherence to the provisions and requirement of the Environmental Management and Coordination (Waste Management) Regulations, 2006.

The waste management action plan guiding principle will be continuous and sustained improvement in management of waste generated from proposed project activities, improvement on site construction, operation and decommissioning activities, safety and environmental performance, supported by regular feedback from workers, neighbors and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all stakeholders to be involved in actions taken. Potential sources of waste from proposed project activities include dismantling activities of the old mill, construction activities of new godown, construction activities and actual production of steel products from the mill.

**Table 27: Waste management action plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Generation of waste from proposed project activities	<ul style="list-style-type: none"> <li>✓ Scattered waste within the project site is a safety hazard</li> <li>✓ Poor disposed waste can block site drainage channels</li> </ul>	<ul style="list-style-type: none"> <li>- Ensure all waste generated at the construction site is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure all waste generated at the construction site is managed and disposed as per the provisions of the Environmental Management and Coordination (Waste Management) Regulations, 2006</li> <li>- Provide appropriate receptacles for dropping waste</li> <li>- Ensure only NEMA licenced</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Environmental and safety Officer</li> <li>- Section workers</li> <li>- The public</li> </ul>	Throughout the project cycle i.e. construction, operation and decommissioning	<ul style="list-style-type: none"> <li>- Records of generated waste</li> <li>- Records of disposal methods</li> </ul>	1,000,000

Issue/Concern	Potential Negative Impacts	Proposed mitigation measures	Responsible Actors	Timeframe	Monitoring	Cost KSH
		<p>vehicles collect waste from the construction site</p> <ul style="list-style-type: none"> <li>- Management to try to minimise waste generation by practicing the principles of refusing to generate waste, reducing waste generation, reusing generated waste, recycling generated waste and reusing and or recycling most of generated waste</li> </ul>				

### **12.3.6 Traffic management plan**

Management objectives of the traffic management plan are as follows:

- ✓ Traffic in and out of the proposed project site does not inconvenience other access road users.
- ✓ Traffic safety for workers, visitors and neighbors of the proposed project site in terms of all traffic in and out of the proposed project site
- ✓ Strict adherence to traffic regulations for all traffic in and out of the proposed project site.

The traffic management action plan guiding principle will be continuous and sustained improvement in management of traffic in and out of the proposed project site improvement on site construction, operation and decommissioning activities, safety and environmental performance, supported by regular feedback from workers, neighbors and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions, all stakeholders to be involved in actions taken. Traffic in and out of the proposed project site will be delivering construct material, plant and equipment to be installed, delivery of raw materials, collection of finished product and waste.

**Table 28: Traffic management action plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Increase in traffic along access road to and out of RSD	<ul style="list-style-type: none"> <li>✓ Increase in exhaust emissions that will have an effect on local air quality</li> <li>✓ Increase in time required by other users of the access road into and out of the facility</li> <li>✓ Increase in wear and tear of the access road</li> <li>✓ Increase of fugitive dust along access</li> </ul>	<ul style="list-style-type: none"> <li>✓ Develop and implement a traffic marshal plan for the for the operational phase</li> <li>✓ Provide sufficient parking/ holding area for traffic delivering and collecting materials from the hot rolling steel mill</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- CSL Transport Manager</li> <li>- The public</li> </ul>	Throughout the project cycle i.e. construction , operation and decommissioning	- Number of trucks in and out of the proposed project site	50,000

### **12.3.7 Water sourcing and use management plan**

Management objectives of the water sourcing and use management plan are as follows:

- ✓ Increased demand for water for industrial use at the expanded mill does not result in scarcity of water for local domestic use.
- ✓ Development and use of alternative water sources such as roof catchment and rock catchment to minimize quantities drawn from local pipeline
- ✓ Industrial water recycling and reuse

The water sourcing and use management action plan guiding principle will be continuous and sustained improvement in the sourcing and use of water in the hot rolling mill. This will be supported by regular feedback from workers, neighbors and stakeholders through consultative meetings, management reviews and evaluations. To ensure adherence to the set conditions all stakeholders to be involved in actions taken.

**Table 29: Water sourcing and use management plan**

<b>Issue/Concern</b>	<b>Potential Negative Impacts</b>	<b>Proposed mitigation measures</b>	<b>Responsible Actors</b>	<b>Timeframe</b>	<b>Monitoring</b>	<b>Cost KSH</b>
Increase in water demand and use	<ul style="list-style-type: none"> <li>✓ Increased competition for water in the area</li> <li>✓ Reduction of water availability for domestic use</li> </ul>	<ul style="list-style-type: none"> <li>✓ Explore alternative sources of water that can be used such as roof catchment, rock catchment and collection from neighbouring quarry pits to minimise drawing water from local pipeline for industrial use.</li> <li>✓ Provide adequate water storage tanks on site to store water from roof catchment from the extensive roofs of the godowns during rainy season that can be used in cooling of plant and equipment.</li> <li>✓ Minimise water demand by ensuring used water from the cooling circuit is routed through an adequately sized and effective cooling tower and pressure filter to filter the water for recycling purpose.</li> </ul>	<ul style="list-style-type: none"> <li>- General Manager RSD</li> <li>- The public</li> </ul>	Throughout the project cycle	- Water availability for local domestic use	1,000,000

## 12.4 Environmental Monitoring

### 12.4.1 Noise and excessive vibrations monitoring

The noise levels will be monitored quarterly to ensure they are in line with the provisions of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009 as shown in the table 30 below.

**Table 30: Maximum permissible noise levels for constructions sites (Measurement taken within the facility).**

Facility		Maximum Noise Level Permitted (Leq) in dB(A)	
		Day	Night
i.	Health facilities, educational institutions, homes for disabled etc.	60	35
ii.	Residential	60	35
iii.	Areas other than those prescribed in (i) and (ii)	75	65

Timeframe: Day; 6:01am-6:00pm & Night; 6:01pm-6:00am

Source: Second schedule of the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.

### 12.4.2 Air Quality Monitoring

Monitoring of particulate matter to ensure that the project activities adhere to the Ambient Air Quality requirements at Property Boundary for General Pollutants. Part (b) of the First Schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014 require that the particulate matter for at a property boundary should not exceed  $70\mu\text{g}/\text{m}^3$ . The proponent will be monitoring particulate matter from the project site during construction phase to ensure they are within the legal limits. During operation phase the proponent will monitor stuck emissions from all stuck of the hot rolling steel mill, Pollutants that will be monitored are those stated in the fourth schedule of the Environmental Management and Coordination (Air Quality) Regulations, 2014. The pollutant that will be monitored on a quarterly basis will include opacity, particulate (dust), sulphur oxide, nitrogen oxides and carbon monoxide.



### **12.4.3 Solid waste disposal monitoring**

Waste generated and disposed from the steel mill will be managed and disposed as provided for in the Environmental Management and Coordination (Waste Management) Regulations, 2006. To ensure that the provisions of this regulation is adhered to, the proponent will monitor the type of solid waste generated, quantity of solid waste generated, frequency of collection and disposal, where the waste is disposed and proof of waste tracking documents in the format provided in FORM III schedule one of the Environmental Management and Coordination (Waste Management) Regulations 2006. This monitoring is to be done monthly.

### **12.5 Training and capacity building**

The following training and capacity building is proposed:-

- Sensitization of the Proponent, and Contractor who will undertake the implementation of the proposed project on the importance of the EMP, its contents, how it is applied and who is responsible for the implementation of each part of the EMP.
- Training and capacity building for contractor and the construction labour on the importance and proper use of PPEs.
- Training and capacity building for Contractor and construction labour on acceptable waste management practices.
- Training and capacity building of the construction site occupational safety and health committee on construction site occupational safety and health requirements and individual safety obligations.
- Training and capacity building of construction site first aiders.
- Training and capacity building on construction site fire safety team
- Sensitization on HIV and AIDS and other communicable diseases to site construction workforce.

### **12.6 Institutional arrangements for safeguard implementation and reporting**

#### **12.6.1 Institutional arrangement**

The responsibility of implementation of the safeguards proposed in this EMP is vested on the project proponent who is Corrugated Sheets Limited. The National Environment Management Authority (NEMA) and other relevant lead agencies will enforce compliance. There will be periodic site visits by NEMA and relevant lead agencies to assess and enforce compliance. During the construction phase, the contractor will be required to prepare monthly progress reports and submit the progress reports to the proponent on the contractor's contractual obligations on safeguards implementation responsibilities specified in the EMP.

The contractor will be supervised on the ground directly by the proponent or proponent representative as will be determined by the proponent. The proponent will be required to promptly respond to improvement orders issued by NEMA and other lead agencies by compiling a report on the issues raised in the orders. The proponent will be required to prepare periodic monitoring reports and annual environmental audit reports and submit these reports to NEMA and other relevant lead agencies.

### **12.6.2 Reporting obligations**

The following reports will be prepared:

- ✓ Monthly progress reports by the contractor on the implementation status of every obligation of the contractor on safeguards implementation specified in the EMP. These monthly reports will be submitted by the contractor to the Proponent.
- ✓ Periodic monitoring reports to be prepared by the proponent and submitted to NEMA on the status of :-
  - i) Air quality as prescribed in the Environmental Management and Coordination (Air Quality) Regulations, 2014.
  - ii) Noise and excessive vibration as prescribed in the Environmental Management and Coordination (Noise and Excessive Vibration Pollution) (Control) Regulations, 2009.
  - iii) Waste management as prescribed in the Environmental Management and Coordination (Waste Management) Regulation, 2006.
- ✓ Initial Environmental Audit report to be prepared by the proponent and submitted to NEMA in the first year of operation of the project to confirm the efficacy and adequacy of the EMP.
- ✓ Self-environmental audit report to be prepared annually by the proponent and submitted to NEMA to report on the progress of implementation of the EMP.
- ✓ Reports responding to NEMA improvement orders to be prepared by the proponent and submitted to NEMA as and when such improvement orders are issued.

### **12.7 Environmental auditing**

The project proponent will carry out an initial environmental audit and Annual Environmental Audit for the project activities as provided for in the Environmental (Impact Assessment and Audit) Regulations 2003. The Audits will serve to confirm the efficacy and adequacy of the proposed Environmental Management Plan.

## **12.8 Decommissioning**

Decommissioning of the project will involve terminating project operations, dismantling of all project equipment and allied infrastructure and rehabilitating the site to the original status. Before decommissioning will be done, the Project Management will communicate in writing to the National Environment Management Authority stating their intension to decommission and provide a detailed decommissioning plan for approval.

## **13. FINDINGS, CONCLUSION AND RECOMMENDATIONS**

### **13.1 Key findings**

The following are the main findings:

- ✓ The proposed project proponent is Corrugated Sheets limited, the proposed project site is within the the Reinforced Steel Division of the Corrugated Sheets Limited at Kokotoni on plot number 24606.
- ✓ Within the Reinforced Steel Division of the Corrugated Sheets Limited, there is an existing hot rolling mill and a TMT mill.
- ✓ The neighbors of the proposed project site are factories owned by Corrugated Sheets Limited
- ✓ The proposed project will involve overhaul and replace an old hot rolling steel mill capacity 4tons/day at the Reinforced Steel Division of the Corrugated Sheets Limited and replace it with a new mill of capacity 16tons/day.
- ✓ Required fuels will be Industrial Diesel Oil and furnace oil, electricity will power the mill while water will be the coolant.
- ✓ Raw materials that will be used are billets; the expected final products will be hot rolled steel angles, zed section, tee section, flat bars.
- ✓ Expected waste to be generated will be mill scales, steel scrap, damaged furnace lining insulating materials, used oil and grease and effluent from sanitary facilities.
- ✓ Potential positive impacts will include employment opportunities for the local community, support to existing local businesses, on job training opportunities for local people, technology transfer, support for development of local community through company CSR programme, taxes to National Government, taxes to County Government of Kilifi, foreign exchange earnings through exports.
- ✓ Potential negative impacts will include air emission, noise and vibration, increase in traffic, waste generation, increase in industrial water use, occupational injuries and accidents to workers.
- ✓ Measures have been identified and proposed to mitigate predicted potential negative impacts and appropriate environmental management action plans outlined.

### **13.2 Conclusions**

The predicted potential positive impacts can be maximised to reap maximum benefits by implementing proposed measures of enhancing each positive impacts. Likewise, fully implementation of identified mitigation measures of each potential negative impact can ensure minimization of potential negative effects to acceptable levels.

### 13.3 Recommendations

- ✓ To ensure environmental sustainability, the proposed environmental management plan to be fully implemented once the proposed project is approved and licenced for implementation. The project proponent to provide an adequate budget for the full implementation of the proposed environmental management plan.
- ✓ The implementation of the proposed project to adhere to all legal provisions.
- ✓ Issues, concerns and suggestion raised during the stakeholder consultation (public barazas and questionnaire survey) to be addressed.
- ✓ Waste generated during the cycle of the project to be strictly handled as stipulated in the Environmental Management and Coordination (Waste Management) Regulations, 2006.
- ✓ All air emissions to adhere to the provisions of the provisions of Environmental Management and Coordination (Air Quality) Regulations, 2014.
- ✓ Noise and vibrations to be within the limits stipulated in the Environmental Management and Coordination (Noise and Excessive Vibration) (Pollution Control) Regulations, 2009.
- ✓ All effluent to be generated to be handled and managed as provided for in the Environmental Management and Coordination (Water Quality) Regulations, 2006.
- ✓ All occupation and safety issues to be addressed and managed as provided for in the Occupational Safety and health Act, 2007.

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## 15. APPENDICES

- Appendix 1 Land documents
- Appendix 2 Copy of the proponent's PIN certificate and certificates of incorporation
- Appendix 3 ToR approval
- Appendix 4 Practicing license of experts
- Appendix 5 Baseline air quality report
- Appendix 6 Baseline noise and vibration report
- Appendix 7 Structural layout of the hot rolling still mill
- Appendix 8 Questionnaire survey responses
- Appendix 9 Attendance list and minutes of the proceedings of the first baraza
- Appendix 10 Attendance list and minutes of the proceedings of the second baraza
- Appendix 11 Attendance list and minutes of the proceedings of the third baraza