# The Federal Democratic Republic of Ethiopia

## MINISTRY OF INDUSTRY

ENVIRONMENTAL SOCIAL IMPACT ASSESSMENT REPORT

**FOR BOLE LEMI II INDUSTRIAL ZONE**

**COMPETITIVENESS AND JOB CREATION PROJECT**

*January 2014*

# Executive summary

## Introduction

The Government of Ethiopia has in recent time given emphasis to ensuring faster and sustained development of the industry sector. It is making relentless efforts to implement its industrial growth and development plan which is also part of the current five years Growth and Transformation Plan (GTP). To this effect, the Government in association with the International Development Association (IDA) of the World Bank prepared Industrial Zone Development Project (IZDP), which will be implemented with funds contributed by the Government, the IDA and other donors.

IZDPs in collaboration with other partners are being implemented to specifically enhance the environmental, economic and social performance by utilizing available resources in an environmentally sustainable manner. The establishment of industry zone development in potentially suitable towns and cities of the country has been found as the best option to promote industry development in the country. The Government has therefore identified five IZDPs sites in the cities of Addis Ababa, Awassa, Kombolcha and Dire Dawa. Bole Lemi Industrial Development project is one among the identified sites in the city of Addis Ababa.

The development objective of the proposed IZDP is to contribute to job creation by attracting investments and improving enterprise competitiveness in the targeted industrial zones (IZs). This will be achieved by:

(i) Strengthening institutional and regulatory framework for IZ development, and capacity building;
(ii) Supporting industrial infrastructure development of IZs; and
(iii) Enhancing IZ linkages to small and medium enterprises (SMEs) through targeted interventions.

The Bole-Lemi Second Phase Industrial Zone Development Project to which the ESIA study will be conducted is expected to greatly contribute in the fulfilment of the above objective.

### *Objectives and methodology for the preparation of ESIA*

The Project will trigger a couple of World Bank environmental safeguards policies including OP 4.01 on Environmental Assessment. The consultant carried out scoping and found the potential impact of this project to have significant effect on the biophysical and socio- economic environment and thus requiring the preparation of full ESIA in line with the World

Bank's environmental and social safeguards policies on Environmental and Social Impact Assessment (OP 4.01) and consistent with national laws.

*The purpose of the ESIA is:*

- to inform decision makers about environmental and social impacts (including possible land acquisition and resettlement) at the project planning phase ;
- to bring into the attention of the planners and designers the magnitude of impacts and the possible alternative sites that can be considered to those minimize impacts;
- to identify social and environmental impacts of the proposed development project and recommended appropriate mitigation measures; and
- to prepare social and environmental management plan.

Preparation of the ESIA required review of previous studies relevant to the assignment and field work for making physical observation and consultation with the relevant stakeholders and the would be Project Affected Population (PAPs).

To this effect the consultant reviewed the existing environmental policies and legislations as well as procedures and guidelines useful to undertake the ESIA study. Furthermore, previous studies related to the project as well relevant policies and regulatory frameworks of the Ethiopian Government and other international and bilateral policies and strategies including the World Bank Safeguard Policies has been reviewed.

Consultations were also made at different levels including relevant personnel of the Ministry of Industry (MoI), Bole Sub-city and Woreda 11 in which the proposed IZ is located.

**Consultation at the Government level:** Meeting has been conducted with the personnel of relevant departments and directorate of the Ministry of Industry particularly the Industry Zone Development and Protection Directorate. In the absence of a fully-fledged feasibility study, such meetings were very useful in clarifying the overall objectives of the project and preferred mixes of factories that would operate in the IZ and the required outputs and benefits the nation expects to achieve from implementing this project. Furthermore, consultations were made with the experts in that assigned land. The expert in the Sub City clarified to the consultant the reason why they chose this site and further explained the criteria they used during the site selection process. The consultations made at the Woreda level (Woreda 11) were also very important for the understanding of the socioeconomic realities in the proposed Bole-Lemi Industrial Zone in terms of making an overall assessment on the population and settlements, livelihood, available public services and infrastructures and other social and economic activities and level

of awareness of the community regarding the proposed project.

Relevant line offices of the Woreda Administration were also consulted on issues such as dislocation and resettlement of PAPs, the readiness of relevant institutions to implement activities and assistances they can provide as per their mandates and responsible with respect resettlement and other related requirements.

**Consultations at the community level:** Consultations and discussions have also been made with the PAPs and other community representatives such as the elderly, religious leaders. Objectives of the ESIA, potential positive and negative impacts, possible mitigation measures and the Environment and Social Management Plan (ESMP) were discussed and views and opinions gathered.

Participants of the meeting in general supported the objectives and the construction and operation of the IZ. However, they couldn't hide their fears and reservations about the resettlement and other supporting activities that need to be implemented by the Government. Further, they requested for the Government to make the necessary effort to provide adequate compensation to the affected population for the land and asset they will lose due to project implementation and also provide them the necessary assistance to make their life better off.

### *Project Description and Justification*

The proposed Phase Two Bole Lemi Industry Zone Project is one of the industry zones to be developed in Addis Ababa city on a land area of about 183ha as part of the wider industrial growth development program of the country. A mix of factories will be operating within the IZ in 22 modern industrial sheds having two types of sizes of 5,777$m^2$ and 11,217$m^2$, with their common facility and parking area. The textile and leather factories are expected to use semi processed materials for nit to fit types of work therefore the factories will not be engaged in the dyeing and tanning processes which generally release heavy pollutants into the environment.

The Industry Zone is expected to construct all on-site infrastructure works such as sanitary installation, electrical installation, domestic water supply system, fire hydrant, sewerage, drainage as well as temporary storage for water and fuel. The IZ will also include the

development of other infrastructures that will provide support for the day to day operation of greenery, parks, and recreational areas such as gymnasium and football field. Common shower and toilets will also provide in the factory buildings.

Currently, the main agenda of the Federal Democratic Republic Government of Ethiopia is to eradicated poverty. One of the several strategic directions to realize this National agenda is to promote the industrialization process to play its role in the development of the country's economy.

The project is justified on the grounds that it will reduce the prevailing high unemployment rate while it will also address the trade deficit and lack of foreign exchange for importing required items and running development activities that rely heavily on imported technologies.

### *Description of the Project Environment*

The proposed Bole-Lemi Industry Zone Development Project is located in the southwestern part of Addis Ababa City administration in Woreda 11 of Bole Sub-city. It is bounded by two rivers (Lemi and Weji) which drain to Big Akaki River locally known as *Tiliku Akaki River*. The topography is predominantly flat agricultural with elevation decreasing towards the two rivers.

It is largely inhabited by people engaged in rural livelihood. Traditional mixed farming type of agriculture dominated by rain-fed farming is currently the most important economic activity in the three rural settlements (*Menders*) that will be affected by the establishment of the proposed industrial zone. Livestock ownership is comparatively low and is primarily geared towards owning some oxen and donkey needed for transporting and farming activities. Much of the area is allotted for crop production with very limited grazing land here and there.

The area is virtually devoid of any natural vegetation such as trees and shrubs due to heavy encroachment from farming, grazing and establishment of numerous quarry and stone crusher plants. However, there are still eucalyptus trees in areas very close to the villages. There is no designated sensitive area.

### *Potential Positive Impacts and Enhancement Measures*

The anticipated major potential impacts of the proposed IZ are:

- Contribution to reduction of the prevailing high unemployment rate while it will also address the trade deficit and lack of foreign exchange for importing required items and running development activities that rely heavily on imported technology and facilities.
- Local income generation and job creation for skilled, semiskilled and unskilled
- Skill and knowledge transfer
- Improved access to basic services
- Increased land and asset value of the surroundings

The above positive impacts can be enhanced by the implementation of various trainings that would enable the project affected population to be engaged in the different activities of the IZ. Furthermore, implementation of credit facilities and services that would enable them run their own businesses from the various service and market demands are anticipated to be created by the IZ.

*Potential Negative Impacts and Mitigation Measures*

- Dislocation of settlement with a resulting effect on loss of property, assets and income generation:

According to the data on PAPs provided by the Ministry of Industry 102 farming households (HH) of a total population of 440 consisting of 214 males and 225 females are expected to be dislocated. It is also indicated that the case of about 81 farming HH who reside in the area is also being examined for the legality of their entitlements. Furthermore, around 88 married youth population who currently reside in houses built within the premises of the compounds of their parents are also to be affected by loss of their houses, as well as farms and grazing lands. However, the Woreda Administration expressed that the above information provided by Bole Sub-city is not complete and will require further refinement. This information is expected to be rectified during the preparation of a Resettlement Action Plan (RAP) which is the requirement in the case of the proposed project as per the world Bank′s policy OP/BP 4.12 on Involuntary Resettlement**.** Other major negative impacts are:

- Disruption of social fabric/social relations
- Release of contaminants/pollutants from the IZ to the surrounding social and biophysical environment
- Impacts on health and safety of people working in the IZ due to inhalation, exposure to hazardous substances, injuries and accidents from machinery, traffic accident, increase in respiratory and eye diseases, HIV and STDs that results from population agglomeration.

Mitigation measures for the identified impacts such as the implementation of a Resettlement Action Plan (RAP) with the provision of basic social and economic infrastructures and various pollution and contamination mitigation techniques and measures have been recommended.

### *Environmental and Social Management and Monitoring Plan*

An ESMP has been prepared taking into consideration all negative impacts, recommending appropriate measures as well as responsible bodies and institutions for mitigation and monitoring. Most of the environmental management work has been found to be the responsibility of the Ministry of Industry and its IZ site management office in relation to the construction and operation of the IZ. Each and every factory will also be responsible for managing its own wastes in terms of managing the release and emission of wastes from the factory processes. The contractor and consultant′s site supervisor will also be responsible for the management of adverse impacts during the construction. Monitoring will be conducted by the IZ site office and relevant bodies such as the Ministry of Environment and Forestry, Addis Ababa EPA and Health Bureau. The Woreda office will be responsible for monitoring of the implementation of RAP.

The overall cost of Environmental and Social Management is indicated in the table below.

| No. | Description of Activities | Unit | Quantity | Unit Cost (Birr) | Total Amount (Birr) | Remarks |
|---|---|---|---|---|---|---|
| 1 | Compensation for the loss of housing | house | 93 | 100,000 | 930,000 | |
| 2 | Compensation for the loss of agricultural production for a duration of 10 years | ha | 750 | 14,400 | 10,800,000 | |
| 3 | Skill training for PAPs | individual | 100 | 3000 | 300,000 | |
| 4 | Restoration of ecology ( physical and biological measures) and establishment of buffer zone | Lump sum | | | 3,000,000 | |
| 5 | Establishment of buffer zone around the IZ | | | | 2,000,000 | |
| Total | | | | | 17,030,000. | |

Cost for monitoring of the implementation of mitigation measures and control of HIV/Aids and STD is 200,000 Birr/year.

In conclusion it can be stated that the implementation of the Bole- Lemi Phase Two Industrial Zone is expected to have significant contribution to the improvement of the economy of the country in general and the local communities in particular.

The ESIA that has been conducted shows that the nature of the proposed project and the environmental setting where it is located is such that the key adverse impacts can be controlled and mitigated within acceptable limits. Therefore, considering the long-term socio-economic benefits that can be gained, there are no significant environmental grounds for not proceeding with the proposed implementation of the proposed Bole-Lemi Phase Two Industrial Zone. The benefits that can be achieved from such IZ development far outweigh the negative impacts and inconveniencies.

Recommendations have already been given in the relevant sections with respect to minimizing or avoiding some of these negative impacts.

The other major point that has to be emphasized is the mitigation measures proposed for loss of assets and income in the form of different compensation measures should be carefully implemented with higher degree of seriousness and accountability.

For the proposed project to be successful, preparing an appropriate RAP is very important in order to create smooth relationship and get the cooperation of the PAPs which most often is not easy to attain in most development project if their interest is not properly addressed.

It is also recommended that the ecology of the IZ should be well maintained and even improved by establishing a carefully conserved and managed green area. Furthermore, implementation of a network of monitoring of ambient quality of air, water, soil, and other environmental resources is very important in order to get data on changes and trends that would give guidance to the discu makers and stakeholders to take necessary decision to rectify any unforeseen adverse impacts.

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Executive Summary
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FOR KILINTO II INDUSTRIAL ZONE

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PROJECT

March 2018

## 1. Introduction

The Government of Ethiopia (GoE) has given emphasis to ensure faster and sustained development of the industrial sector, as envisioned in the Growth and Transformation Plan (GTP). The GTP seeks to consolidate the positive development outcomes attained in the last decade to bring about broad-based and transformative structural changes required to stir the economy on rapid growth path toward becoming a middle-income country by 2025. This development goal is especially anchored on stimulating rapid growth and structural transformation of the agricultural and industrial sectors in ways that enhance wealth creation and expansion of employment opportunities in the economy.

As development tools, Industrial Parks (IPs) have been used in several countries to help stimulate economic development by attracting local and foreign direct investment (FDI), enhancing competitiveness, and facilitating export-led growth. The development of IPs is also intended to contribute to job creation by attracting investments and improving enterprise competitiveness.

Accordingly, as of recent times, the GoE is striving to establish IPs that are thought to facilitate and enhance the transformation. To this effect, the Government in collaboration with the International Development Association (IDA) of the World Bank is spearheading an Industrial Park Development program through the Competitiveness and Job Creation (CJC) Project which is implemented with funds contributed by GoE, the IDA and other development partners. The proposed *Kilinto* Industrial Park (KIP) is one of such development programs which is planned to be developed in a total area of 279ha. The proposed *Kilinto* IP is located in the south eastern part of Addis Ababa in *Woreda* 9 and 10 of *Kaliti* Sub-city which is one of the 10 sub cities of Addis Ababa. It is located at about 20 km from the city's centre.

Further, while striving to fulfil the objectives, the Government clearly recognizes that the development of the intended IPs can have some negative bio-physical and social impacts unless they are implemented by giving due emphasis to the protection of the environment as well. Wise management of the environment requires ability to forecast, monitor, measure and analyze environmental trends and assess the capability of the resource base (land-soil, water, air, energy, etc.) and the socio-economic system at different levels. Negative impacts of the development of the IP would reduce productivity and jeopardize long-term sustainability and can even cause irreversible environmental damage.

Hence, in order to ensure sustainability of the IPs, the Government has found it essential to integrate environmental and social concerns into the IPs development process. This report deals with the Environmental Social Impact Assessment (ESIA) part of the study. The study is expected to meet the legal requirements of the Ethiopian Government relevant to this project and the requirements indicated in the Environmental and Social Management Framework (ESMF), the Project Implementation Manual (PIM), the Resettlement Policy Framework (RPF) and other relevant operational policy. The main objective of preparing this ESIA is, therefore, to ensure that potential impacts of the establishment of the proposed KIP are identified at the early stage of a feasibility study in order to develop minimizing or avoiding strategies. The implementation of the IP should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment.

Assessing the possible environmental impacts of the proposed Industrial Park development will help identify the activities that are likely to give rise to significant adverse impacts with the aim of avoiding or minimizing the anticipated negative impacts by amending the design, operational processes or technologies applied; thereby ensuring the environmental sustainability of the project.

## 2. Objectives

The main objective of preparing this ESIA is, therefore, to ensure that potential impacts of the establishment of the proposed KIP are identified at the early stage in order to develop minimizing or avoiding strategies. The implementation of the IP should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment.

The specific objectives of the ESIA study are aimed at:

- Ensuring that environmental considerations are properly addressed into the development decision making process;
- Assessing bio-physical and socio-economic adverse effects that may result from the implementation of the IP; and
- Proposing mitigation measures that would minimize/ avoid adverse effects and prepare required Environmental and Social Management and Monitoring Plan.

The proposed industries are to be implemented with the guiding principle of (i) being eco-friendly, (ii) possessing flexibility, and (iii) maintaining quality work environment. Principles of eco-friendliness, flexibility and quality of work environment are to be maintained. It is expected that these concepts of development will have a very important bearing on the management of environmental resources. As indicated in the development concept for the master plan and land use of the IP, emphasis given to parks and green areas is very important. It is ideal for people's living and working in the IP.

As such, proposed master plan study of the Kilinto IP has already incorporated basic environmental principles as well as facilities expected to reduce and minimize, if not totally eliminate, much of the potential negative impacts on the socioeconomic and biophysical environment.

## 3. Impact Identifications and Analysis

Most general and common types of environmental impacts that can arise as a result of the implementation of the proposed industries in KIP have been identified:

### 3.1 Preconstruction Impacts

- **Potential Positive Impacts**
    - Creation of employment opportunities during construction
    - Enhancement of capacity building and technology transfer
    - Enhancement of market and investment in the construction and service sector economy
- **Potential negative impacts**

I) Socio-economic impacts

a) Impacts of land acquisition and loss of income generation
b) Impact on farm land
c) Impact on housing structures and homesteads (Involuntary Resettlement)
d) Disruption of social and cultural ties
e) Impacts on vulnerable groups
f) Impacts on public and community institutions
g) Impacts on the land use
h) Labour requirement/ recruitment of work force

i) Pressure on social and health infrastructure
j) Conflicts
k) Increase d level disease vectors (mosquitoes, rats, cockroaches, flies, etc)

**3.2 Construction Phase Impacts**

- Air quality
- Noise
- Pressure on existing roads/accidents
- Pressure on Available Water for domestic and other uses
- Impact on the water environment

**3.4 Operation Phase**

- **Potential Positive Impacts**
  - Import substitution
  - Promotion of export and generation of foreign exchange
  - Employment generation
  - Improving the quality and living standards of citizens
  - Increment in Gross Domestic Product (GDP)
  - Creation of eco-friendly environment
  - Good Experience
- **Potential negative Impacts**
  - Release of waste water and associated pollutants
  - Generation of solid waste (hazardous /non-hazardous)
  - Release of gaseous waste and other suspended particles causing air pollution
  - Noise Pollution
  - Impact on health and safety in the IP.

**4. Environmental and Social Management Plan (ESMP)**

The nature and type of industrial project to be implemented have been studied and as well as the potential impacts and mitigation measures have been proposed. As such in this part of the document recommended mitigation measures are translated into specific plan of actions by way of an Environmental and Social Management Plan (ESMP).

The ESMP will outline the significant adverse impacts, its recommended mitigation measures, the responsible organs to implement it, time of implementation, responsible organs to monitor

its implementation as well as training and capacity building as well as resources/ budget needed for the implementation of the mitigation measures.

The ESMP is intended to form the basis for impact management during project construction and operation. It is based on the Environmental and Social Management Framework (ESMF) and Resettlement Policy Framework (RPF) prepared for the project already. The ESMP should contain commitments that are binding on the proponent. It can be translated into project documentation and provide the basis for a legal contract that sets out the responsibilities of the proponent. In turn, the proponent can use the ESMP to establish environmental performance standards and requirements for those carrying out the works or providing supplies. The ESMP will also be used to prepare an environmental management system for the operational phase of the project.

During the feasibility study it was assumed for KIP to be a multi-sectoral IP which would include the following sectors: food and beverage, pharmaceutical and medical, furniture & fixtures, electronics and miscellaneous. However, the GoE later decided to develop the IP exclusively for pharmaceuticals due to the following reason: i) the pharmaceutical industry requires dedicated environment ii) the government wanted to set up an African Pharmaceutical hub, iii) Increase in export and high import substitution, and iv) technology transfer.

Moreover, the pharmaceutical sector is one of the focus sectors in the GTP-II, and in 2015 GoE developed a National Strategy for Pharmaceutical Manufacturing Development (2015-2025). According to this Strategy, the GoE is targeting manufacturers in generic medicines from China and India. The EIC reports that seven FDI pharmaceutical companies have expressed interest to lease land from Kilinto IP of which four have signed MoUs with the GoE and three are in advanced negotiations to conclude the MoU. While pharmaceutical manufacturing does not create as many jobs as labor intensive industries such as textile sectors, jobs created will be higher skilled and more paying. Attracting FDI in pharmaceutical manufacturing can contribute to improved standards of the local industries through joint ventures and improved regulation.

In view of the decision made to change the KIP exclusively to pharmaceuticals, the GoE has envisaged the existence of significant environmental and social concerns which are associated with the operational phases of the pharmaceutical industries, decided to upgrade the Waste Water Treatment Plant (WWTP) from conventional to Zero Liquid Discharge (ZLD) with a capacity of 14,000$m^3$ per day.

## 5. Mitigation measures of the Anticipated Environmental Impacts

Basic Principles

As it is a case of an establishment of an IP with the possibility of having different types industries the mitigation measures have been proposed in such a way that they apply mainly to the four categories of industries recommended by the master plan. But magnitude of impacts and desired specific mitigation measures can also differ depending on the nature and size of the industrial entity. The proposed mitigations measures can be used for the creation of awareness and training programs and have also been detailed in such a way that they can serve as an input to the tailored and detailed industry specific operation and safety manuals which need to be developed and the legislative and enforcing mechanisms that need to be implemented in the IP.

### 5.1 Impact mitigation measures for pre-construction phase

Land Acquisition and Loss of Housing and property and Income generation

- Minimizing of land acquisition to what is essentially required, put it differently 100% of a farmer's grazing, crop land or settling home must not be taken otherwise he/she must be given equivalent crop or grazing land from a similar farming zone.
- Livelihood restorations must be planned. This may include giving the project affected people (PAPs) appropriate share in the development projects; and providing basic training of skills which includes managerial and technical skills enabling the PAPs to participate in economic activities.
- Implementation of proper resettlement for those PAPs who lost their housings in areas not far away from the IP to enable them to rebuild their economy and culture.

Livelihood and Socio-Cultural Aspects

In order to mitigate the livelihood and social impacts that emanate from the implementation of the KIP as discussed in the previous chapter, implementation of a comprehensive package/program for livelihood restoration through capacity buildings and tailored trainings will be important. These have to be designed in such a way that will allow PAPs

- To get employment in the potential on-site job opportunities that will be created in the IP.

- To get employments in the many other off-site job opportunities expected to flourish in the provision of different services required for the huge population to be employed in the KIP at different income levels such as catering for food and lodging, shopping, entertainment, hair dressing, laundry, etc.
- To be self-employed in the different areas of business such as hotels, product distribution and urban agriculture activities such as dairy, fattening, chicken farms, etc. which are very prospective in terms of existing and future demand for their produces.

Employment in the proposed IP and in the other proposed areas of work should not be viewed as something requiring sophisticated skills. As per the assessment of the education profile of the PAPs, there are tens and hundreds of PAPs who already have basic education which can serve as a springboard for the trainings and capacity buildings required to be engaged in many of the jobs to be created. Short-term training assessments have been conducted by the consultant with the collaboration of the Technical and Vocational Educational Training (TVETs) and the Woreda Micro and Small Scale Enterprises Promotion Office which assert the possibility of realizing the proposed livelihood restoration program.

It has to be clearly endorsed institutionally that, given the same level skills and capability to handle a job, a priority for employment in this respect has to be given to PAPs who have lost their means of income fully or partially due to land acquisition by IP. Gaps have already been witnessed in such arrangement which require clear motivation and dedication on the part of the government organs to create necessary awareness and readiness among PAPs.

Institutional interface designed to implement such a program among relevant sectors is already being entertained by Akaki-Kaliti Sub city. It has to be dully encouraged and supported by the necessary institutional mechanisms to make it practical.

Awareness and sensitizing programs by way of organizing meetings and workshops need to be implemented to enable the surrounding population and PAPs to protect and distance themselves from undesirable engagements that violate cultural norms and attitudes to work negatively.

### 5.2 Construction Phase Mitigation Measures

The proposed mitigation measures for the associated potential impacts during the construction phase are addressed below.

(i) Air Quality

The main potential sources of emission are from combustion engines and dust, during construction related activities. These emissions will be short termed and local. Measures to prevent dust and GHG emissions from becoming a source of nuisance include:

- Implementation of best available technology (BAT);
- Regular maintenance of vehicle and construction equipment to keep the engines in good operating condition to reduce emissions from internal combustion engines;
- Construction site shall be periodically dampened with water to minimize dust;
- Use of road/ground watering equipment and observation of speed limits in unpaved areas as necessary in dry conditions to reduce dust emissions;
- Training of workforce in safe driving practices that reduces both the risk of accidents and fuel consumption including measured acceleration and driving within safe speed limit;
- Maintenance of plant and vehicles in good working order, e.g., exhausts, tyres etc;
- turning off engines when not in use, and
- Designation of transport routes to minimize distance travelled and overall fuel use and emissions;

(ii) Noise

Site workers requiring noise protection devices shall be provided with such devises and their use shall been mandatory. Noise sensitive areas should be clearly delineated with a 'NO NOISE" sign post, and construction activities should be restricted to daytime to avoid irritation of neighbouring communities.

Diesel engine construction equipment should be fitted with silencers, and heavy vehicle movements prohibited at night.

(iii) Water pollution mitigation measures

- Domestic wastewater from the operations of the workers should be collected and treated into the septic tank before being discharged to the environment. Mobile toilets are used as an impact mitigation measure for domestic wastewater of workers.
- Construction equipment accessories and oil, , must be collected comprehensively to avoid unexpected spilling on site.
- Design rainwater drainage ditches surrounding the site to prevent from contamination of impurities before discharging to the environment.

(iv) Mitigation Measures for Impacts of Solid Waste (SW) and Hazardous Waste (HZ)

SW includes building materials related waste such as rubble, sand and gravel, dead cement, the waste of external protection devices, domestic waste of workers on site including protective objects, cement bags, and others. The SW must be treated in a regular, concentrated and classified manner.

Construction waste: Limit waste generation in construction by reasonable calculation and use of raw materials; reminding workers the importance of efficient us of materials, strict management and supervision of the works.Non- toxic waste such as broken bricks, sand residual sand and soil which will be used for site clearance. The Contractors shall collect, classify and store construction waste regularly in the prescribed locations on site. The storage locations must be convenient for dumping. They should be designed with hard walls, cover, and temporary drainage ditches, etc to avoid losses and leakage of waste into the environment. The construction waste will be transported every day to proper sites. Other waste such as cement bags, protective equipment, steel pieces, welding rods, etc are collected and transported to designated places for reuse or resale to the wanting units. The contractors shall sign the contracts with the functional units which are specialized in transportation of waste under strict and regular supervision of the Project Management Unit, to avoid illegal dump of construction waste.

Domestic waste will be collected in dust bins near the tents and temporary works to protect the environment and hygiene. Contracts will be signed with the local Environment Service Suppliers to collect and dispose waste under current regulations.

The created hazardous solid waste such as oily rags and wasted oil must be collected in the specialized storage tanks and cans with sealed cover to secure hygienic storage and treated by hired functional agencies.

(v) Ground Water Quality

As the construction activities are not expected to impact adversely on groundwater flow and quality, no mitigation measures are recommended. However, the handling, storage and disposal of materials and wastes at all stages of the construction of the facility should be based on the ESMP developed for the project. Training on safe practices for personnel involved in handling, storage and disposal of materials and wastes should be provided.

The regular maintenance and inspection of equipment and vehicles will be ensured to prevent potential sources of leaks.

**(vi)** Soil Quality

Mitigation measures for the management of erosion and soil contamination will include:

- Application of appropriate erosion protection measures including river training methods on Idoro and Kerso Deso Rivers; such as concrete blocks revetment, and stone gabion mattress, would be considered depending on the slope, types of soil of the river bank, amount of discharge, and velocity of the flow. Appropriate method of improvement should be employed.
- careful execution of excavation works under aggressive weather conditions (rains, strong winds);
- storage of any hazardous wastes, as well as sanitary and cleaning wastes shall be done in storage facilities (tanks/containers) and at approved sites;
- Tanks for fuel storage shall be leak-proof and installed on concrete platform with gutters and grease separators. Fuel storage tanks shall be checked daily and in case of leakage will be replaced until repaired;
- Treatment of waste water from maintenance workshops in oil separators prior to discharge, and
- In case of any contamination, removal of contaminated soil and treatment/disposal of in a manner appropriate to the type of contamination.

(vii) Socio-economic

Construction of the IP will have a positive impact on the state and local government economies. New jobs will be created and these beneficial impacts shall be enhanced through the adoption of policies that encourage hiring, as practicable, of appropriately qualified workers from areas in the vicinity of the project for non-specialized positions.

(viii) Cultural Resources

There are no known historical or archaeological sites within the proposed project site. The probability of discovering historical or archaeological resources during construction activities

is low. However, in the event of a discovery, qualified personnel will be retained to evaluate the find.

### 5.3 Operation phase mitigation measures

(i) Control of Pollution by Waste Water

- Efficient utilization and reuse of water as required. Only essential amount shall be used for the different industrial purposes and consumptions since uncontrolled utilization of water means production of more waste water which makes pre-treatment and treatment more difficult and expensive.
- Good housekeeping is very important by way of appropriate storage of any oil and grease, toxic materials and making industrial plant clean and neat by cleaning and removing greases and other lubricants from machines and any spills on floors that can be easily washed by water.
- Pre-treatment at the level of each plant in as much as possible. Primary treatment at plant level is very important. Particularly, a lot can be done with physical characteristics. Waste water usually contains large quantities of floating rubbish. Floating matter, matter in suspension, colloidal matter can be removed by metal bars, coarse or fine screens, trickling filters, grit chambers, grease traps, plain sedimentation tanks.
- Provision of separate drainage for rain water and sewage to prevent overflow of sewage with rain water.

(ii) Control of Solid Waste (Both hazardous and non-hazardous)

Installation of proper solid waste management based on ‘three R’s – Reduce, Reuse and Recycle before destruction and maintaining safe storage of waste at the level of each industrial plant, public buildings and other areas within the IP is a very important control measure to start with.

- Reduction on use of raw materials: This will correspondingly decrease the production of waste.
- Reuse of waste materials: Refillable containers which are discarded after use can be re-used.
- Recycling of materials in the reprocessing of discarded materials into new useful products.

Where possible installation of composting technology, devices and equipment should be encouraged at a plant and IP level where conditions of type of waste generated are suitable as compost raw materials. This can be practical in the food and beverage industries.

All in all, the process of reducing, reusing and recycling saves money, energy, raw materials, land space and also reduces pollution. After all these processes the IP should dispose of any remaining solid waste (hazardous and non-hazardous) in their appropriate separate spaces. No solid waste shall be dumped in open spaces and along the banks of streams or in the streams and rivers themselves.

The IP management would be responsible for the collection, storage and disposal of solid waste at the IP level but each factory would be charged for the waste management cost. Each factory would also be obliged to collect and segregate its waste and expected to have standard waste bins. The frequency of waste collection will depend on the characteristics of the waste: organic waste would be collected daily but non-degradable materials can be collected twice or three times per week. Hazardous waste would be collected once in a month but the exact schedules can be fixed after studying the generation rate of the waste. Resource recycling facility will be available in the IP. The purpose is to maximize the eco-efficiency of the whole area. This facility will implement a central sorting and recycling for both non-hazardous industrial and municipal solid waste. Main functions include:

- Operating as a transfer station: The transfer station sorts and recycles industrial and municipal waste such as waste glass, waste plastic and waste paper. The transfer station can get not only economic benefit from resource recovery and decrease the amount of waste for transportation, but also can gain environmental benefit by reducing the amount of solid waste sent to the landfill. However, if not managed well, this station may be a potential source of pollution to the local surrounding, such as dust. Consequently, the transfer station will be designed as a closed facility.
- Treating wastes and turning them into new resources.
- Selling new products reclaimed from wastes.
- Providing storage facilities for those wastes with large amounts and potential value but irreclaimable currently, such as waste batteries.

All of the staff members of this facility will be strictly trained and have the capacity to ensure the operational safety.

*Disposal*

Landfills are the most common way of waste disposal and important component of an integrated waste management system. The currently operational waste disposal site (‘*koshe*’) is located approximately 13km away.

***Mitigation of Air Pollution***

Air pollution control from fixed sources may be accomplished by two fundamental approaches, which are categorized as control by dilution in the atmosphere by dispersion, or control at the source designed to reduce the air pollution emitted to the bare minimum.

- **Control by dilution in the atmosphere by dispersion**: The most positive way to abate air pollution is to prevent it. However, if available, smock stacks can be used to reduce ground level concentration of pollutants by giving natural atmospheric turbulence an opportunity to dilute the pollutant before it reaches ground level receptors in harmful concentrations.
- **Control at source:** This may be accomplished by controlling the pollutant from coming into existence or by destroying, altering, trapping it before it reaches the atmosphere.
- Measures such as source relocation, source shutdown, fuel or energy substitution, process changes, good operating practices, and utilization of air pollution control devices or techniques can be implemented as deemed necessary and as per standard regulations in place in the IP.
- Vehicular pollution can be checked by regular tune-up of engines; replacement of more polluting old vehicles; installing catalytic converters; by engine modification to have fuel efficient (lean) mixtures to reduce CO and hydrocarbon emissions; etc.
- Using mass transport systems for workers and residences around can be used as a mechanism to reduce pollution. Given the topography bicycles and other low fuel consuming transport systems can be important.
- Using biological filters and bio-scrubbers.
- Planting more trees, especially appropriate implementation of the green areas and parks recommended by the Kilinto IP master plan.
- Open burning of vegetation and other solid waste should, where possible, be avoided.
- Protect and enhance sinks and reservoirs of greenhouse gases (GHGs);
- Carry out continuous air emissions monitoring; and
- Regular dust suppression with water sprinkler on the haul roads will be practiced;

Last but not least, as a regulatory measure, emission standards set by the Ministry of Environment, Forest and Climate change, formerly Ethiopian Environmental Protection Authority have to be strictly followed.

*Mitigation of Noise Pollution*

- **Reduction in sources of noise:** Sources of noise pollution like heavy vehicles and old vehicles have to be restricted to areas which are far from public offices and facilities, residences and far from areas where concentration of industrial workers as well as community residences are located.
- Noise making machines should be kept in **containers with sound absorbing media** to interrupt the noise path.
- Proper **oiling** will reduce the noise from machinery.
- **Use of sound absorbing silencer** by using various types of fibrous materials can be used.
- **Planting more trees** having broad leaves is also recommended.
- Appropriate signs should be placed at areas where hearing protection for staff will be required;
- Workers operating the power generators will be provided with hearing protection in areas with high noise levels.

***Mitigation of Soil Erosion***

Though much of the area is not any more expected to continue as a crop production area where soil erosion could be serious, still efforts have to made to reduce soil erosion and lose of fertile top soil since a reasonable portion of the IP is expected to serve as a green and park area with a lot of plantation work where soil condition matters.

***Occupational Health (Health and safety of Workers)***

Issues related to the mitigation of potential occupational health and safety of workers and the community are many and very much varied. As indicated earlier they have to be addressed by the implementation of awareness creation and trainings and the development of industry type and nature tailored best practice guidelines and health and safety manuals as is common in the countries that operate well planned, studied and designed IPs.

Mitigation measures have to address appropriateness of general facility design and operation from the outset and other potential problems related to:

- Gaps in communication and training programs
- Installed preventive measures for the different type of industrial hazards (physical, chemical, biological, radiological, special hazard environments) and their monitoring
- Water Quality and Availability, Structural Safety of Project Infrastructure, Life and Fire Safety (L&FS), Traffic Safety, Transport of Hazardous Materials, Disease Prevention, Emergency Preparedness and Response
- Personal Protective Equipment (PPE)

Giving the details of the mitigation of each and every potential problem in the area of occupational and community health and safety at a level of IP planning makes it very difficult. It will be cumbersome and will make the ESIA document amorphous. Rather, as indicated earlier, the development of regulations and tailored manuals for an industrial category or each specific industry as deemed necessary in the following areas is recommended.

- **Responsibilities** with respect to enforcement and management of regulations and manuals, safety policy and safety management
- **Occupation Health and Safety** with respect to protection of employees, warning signs, mandatory signs, occupational risks, occupational precautions, housekeeping, etc.
- **Public Health** with respect to prohibited discharge, littering, infections, sanitary facilities, medical examination and availability and nature of health services to be provided.
- **Fire Regulations:** protection, prevention, control and action.
- **Electrical Regulations:** workmanship & material, conductors, over-current protective devices, etc.
- **General Guideline notes for indoor/outdoor premises**

***Socio-economic***

The IP is expected to contribute to the socio-economic enhancement of the surrounding area, specifically in employment generation, which will result in increased earnings for local artisans and small-scale businesses. However, the following negative socio-economic effects are likely:

- Socio-cultural conflicts between industries/contractor personnel and stakeholder communities due to difference in customs and beliefs;

- Changes in demographic/socio-cultural pattern leading to degradation of cultural values in local communities; and
- Pressure on existing infrastructure.

Measures in place to mitigate these possible impacts include:

- Continued consultation with the local communities to understand customs and beliefs;
- Education of non-local workers on the socio-cultural norms of and on proper conduct within stakeholder communities prior to mobilization and commencement of operations;
- Provision of follow-up awareness training of workers regarding the importance of proper conduct within the stakeholder communities, and
- Hiring, as practicable, appropriately qualified workers from the communities in the vicinity of the project for possible specialized and non-specialized positions**.**

**Public Safety**

With regards to public safety, IPDC will ensure the following:

- adequate protection and signalling of work environment (loading and hauling) in particular with clear markings of the safety boarders on the work perimeter;
- establishment of traffic plans at location of (partial) blockage of roads and implementation of appropriate traffic control at such locations;
- Prohibition of access to work sites by any person not having a permit to work, in particular where it concerns areas marked as 'restricted'. The latter shall include at least places occupied by operating mechanical and electrical equipment, open trenches, manholes and chambers.

## 6. Conclusion and Recommendations

Given the very low industrial development in the country at large, the development of industries and manufacturing that would help to achieve import substitution, export earnings, job creation and overall livelihood and development in the country is long overdue. As a result, the development of the KIP is most welcome due to the anticipated benefits that can enhance

the growth and development of the country in general and the project communities and surrounding areas in particular.

The most important thing is to ensure, in as much as possible, that potential positive and negative impacts of the establishment of the proposed Kilinto Industrial Park (KIP) are identified at the early stage of a feasibility study in order to develop enhancement and mitigation strategies. The implementation of the IP should be carried out without creating much adverse impacts on the biophysical and socioeconomic environment.

It is a unavoidable conclusion that a project as big as the establishment of an Industrial Park will not come without some significant negative impacts. As such, the assessment of environmental impacts made has identified activities that are likely to give rise to significant adverse impacts and one should work for ways and means of avoiding or minimizing the anticipated negative impacts by amending the design, operational processes or technologies applied; thereby ensuring the environmental sustainability of the project.

The negative impacts are mainly related to displacement of people; loss of farm land, houses and properties, as well as the potential for the spread of communicable diseases, the spread of HIVIAIDS, safety and health problems of employees and traffic accidents and injuries. Hence, the assessment made and the mitigation measures recommended have to be developed further at the detail design stage and translated into programs and actions during operation through the development of manuals and working procedures. In the preparation of its tender document for the construction of the IP project, the Project needs to ensure that clauses both for the environmental and social issues are included as suggested in this study and from other relevant studies and best practice experiences.

The contractor should also be obliged to implement environmental and social clauses included in the contract document. The monitoring of the project implementation has to be done on a regular basis by Industrial Parks Development and Environmental Safeguard Directorate (IPDESD). Other stakeholders, such as AAEPA local authorities and the public also need to be invited and consulted by IPDC from time to time and give their opinion and suggestions regarding the implementation of the project. The contractor also has to work in close cooperation with consultant designated as well as with the local authorities and strictly adhere to local regulations and avoid conflict and misunderstanding with local population and government.

As per assessment, the population residing in the project area and many of the stakeholders in the area would like to see the construction of the project as soon as possible. Public consultations held with different groups of the local community, and government officials as well as professional experts working in the project, indicate that the local population, PAPs and other stakeholders have expressed positive support for the project. There is no any significant environmental and social issue that would prevent the implementation of the project as long as the negative impacts are managed and proposed environmental management measures are adhered to by all concerned bodies.