ESIA SUMMARY

ESTABLISHMENT OF 5,600 TPD CLINKER CAPACITY GREENFIELD CEMENT PROJECT AND OPERATION OF CAPTIVE MINES
NEAR DERBA VILLAGE,
OROMIYA REGIONAL STATE,
FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA

Plant site

ETHIOPIA

OPSM

FEBRUARY 2008
ESIA SUMMARY

1. INTRODUCTION

MIDROC HOLDING (Al-Muwakaba For Industrial Development and Overseas Commerce) is a large company having many business interests in Ethiopia, Saudi Arabia and other countries.

DERBA MIDROC CEMENT PLC is proposing to establish a green field cement plant of capacity 5,600 tonnes per day (tpd) of clinker (cement capacity of 7000 tpd) based on Derba limestone deposit in Ethiopia.

This ESIA Summary outlines the Summary of the Environmental and Social Impact Assessment (ESIA), the Environmental and Social Management Plan (ESMP) and the Resettlement Action Plan (RAP) formulated for the proposed project, which includes the cement plant, captive raw material mines, proposed roads from the plant to the mines and from Derba village to the plant, belt conveyor from mines to plant, water pipeline and the power transmission lines.

2. PROJECT DESCRIPTION

The cement plant is proposed to be located about 8 km from Derba village in Sululta Wereda in Shoa Zone of Oromiya Regional State. The proposed mining area is located within the Aanda Weizero Peasant Association in Sululta Wereda, Shoa Zone of Oromiya Regional State and is about 7 km (crow fly distance) from the plant site.

The Derba Cement plant site is about 70 km from Addis Ababa the capital of Ethiopia. The coordinates and elevations of the plant and mining areas are given below. The project location is shown in the map below.

Coordinates: Latitude: 09° 27’28” to 09° 28’25” N; Longitude: 38° 34’31” to 38° 35’23” E

Elevation of Plant site: 2380 m to 2420 m above Mean Sea Level (MSL)

Elevation of Mining area: 1550 m to 1650 m above MSL

Ordinary Portland Cement (OPC) and Portland Pozzolana Cement (PPC) will be manufactured at the DMC Plant. Both the cements shall meet the requirements of Ethiopian National Standard No. EN-197.
OPC shall be produced as per CEM-I - 42.5 grade and shall contain 95% clinker and 5% gypsum. PPC shall be produced as per CEM-II - 32.5 grade and shall contain 67% clinker, 28% pumice and 5% gypsum. The annual cement capacity of the plant shall be 2.46 million tonnes per annum.

Cement consumption in Ethiopia during the period 1997-2007 has grown well, with a Cumulative Annual Growth Rate (CAGR) of around 10% per annum (pa). In the last 5 years, the growth rate was around 16.1% pa.

The cement consumption for the year 2006-07 is estimated to be around 2.05 million tonnes. The demand supply gap for cement has been estimated as given below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand (million tonnes)</th>
<th>Supply (million tonnes)</th>
<th>Gap (million tonnes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>2.05</td>
<td>1.75</td>
<td>0.30</td>
</tr>
<tr>
<td>2008</td>
<td>2.66</td>
<td>2.01</td>
<td>0.65</td>
</tr>
<tr>
<td>2009</td>
<td>3.38</td>
<td>2.82</td>
<td>0.56</td>
</tr>
<tr>
<td>2010</td>
<td>4.19</td>
<td>3.50</td>
<td>0.69</td>
</tr>
</tbody>
</table>

The proposed plant capacity is primarily based on market considerations and the availability of raw materials. The proposed location enjoys the twin advantage of proximity to raw material sources as well as market offered by the Addis Ababa, which is the capital and largest city of Ethiopia. Addis Ababa is also an important trade center of East Africa.

DMC is expected to command a market share of around 37% in its 1st year of operation, which will increase to 41% in its 4th year of operation. The plant will achieve 100% capacity utilization in its 4th year of operations.

The raw material and fuel requirements for the proposed plant are to be met from different sources as given below.

<table>
<thead>
<tr>
<th>Sn</th>
<th>Material</th>
<th>Source Locality</th>
<th>Distance from plant (km)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Limestone &amp; Marl</td>
<td>Mugher</td>
<td>6.5</td>
<td>The crusher, located in the mine, would be connected to the plant by a 7 km long belt conveyor.</td>
</tr>
<tr>
<td>2</td>
<td>Clay</td>
<td>Mulu Seyo</td>
<td>18</td>
<td>Considered as a corrective.</td>
</tr>
<tr>
<td>3</td>
<td>Sand</td>
<td>Mugher</td>
<td>15</td>
<td>Considered as a corrective.</td>
</tr>
<tr>
<td>4</td>
<td>Basalt</td>
<td>Near Gimbichu</td>
<td>10</td>
<td>Considered as a corrective.</td>
</tr>
<tr>
<td>5</td>
<td>Gypsum</td>
<td>Mugher</td>
<td>15</td>
<td>Considered as an additive</td>
</tr>
<tr>
<td>6</td>
<td>Pumice</td>
<td>Dera Ararate/ Nazerat</td>
<td>125</td>
<td>Considered as an additive</td>
</tr>
<tr>
<td></td>
<td>Fuel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>HFO</td>
<td>Middle East</td>
<td>-</td>
<td>Transport by sea up to Djibouti port, land transport 925 km</td>
</tr>
<tr>
<td>2</td>
<td>Imported coal</td>
<td>South Africa</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

The limestone deposit at present is accessible by about 12 km foot track from Derba Cement plant site, which is situated at a distance of 70 km from Addis Ababa. The deposit is surrounded by Mugher river and its tributaries. Due to the natural topography of the area, the limestone deposit lies in the valley (1550-1650 m above MSL) whereas the flat area where the plant is proposed to be located is at an altitude of 2380-2420 m above MSL. There is a sharp fall in elevation of approximately 800 to 850 m between the plant and the mining areas.
The best available technology, which is the dry process, shall be used for manufacture of cement. Cement manufacturing consists of raw meal grinding, blending, calcining to form clinker and cement grinding. In short, limestone and other materials containing calcium, silica, aluminium and iron oxides are crushed and milled into a raw meal. This raw meal is blended and is then heated in the pre-heater to initiate the dissociation of carbonate to calcium oxide and carbon dioxide. The meal then proceeds to the kiln for heating and reaction between calcium oxide and other elements to form calcium silicates and aluminates at a temperature up to 1450°C. The products leave the kiln as a nodular material called clinker. The clinker is inter-ground with gypsum and other additives like pumice to a fine product called cement. The adjacent Figure shows the cement manufacturing process from raw material quarrying to the bagging of the cement.

The manpower requirement for operation of the proposed plant is estimated as 474.

**Utilities**

The maximum power demand for the proposed plant is estimated at about 45 MVA. The power demand will be met from the national grid. The main feeder line passes near Chancho, where a sub-station will be constructed and a power line drawn over 20 km.

Water supply will be met from ground water sources. Borewells will be located near Mulo Seya village around 16 km away and pipelines will be laid up to the plant. The total requirement of water for the project including drinking and sanitation is around 2,000 m³/day.

A Sewage Treatment Plant (STP) to treat sewage effluent will be installed. The STP will cater to the plant and colony both and will have a capacity of 300 m³/day.

A residential colony to provide accommodation for plant personnel will be built. The Colony will have facilities like a health centre, school, shopping complex, recreation centre, guesthouse, gymnasium, sports playgrounds, etc.

### 3. POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

The ESIA study for the proposed Cement project has been carried out within the framework of local, national and international environmental regulations. The legislative framework applicable to the proposed project is governed by the Federal Democratic Republic of Ethiopia (FDRE), Africa Development Bank (AfDB), International Finance Corporation (IFC), European Investment Bank (EIB) and the Development Bank of Ethiopia (DBE).

#### 3.1 Regulatory Framework of FDRE

Ethiopia adopted its Constitution in 1995, which provides the basic and comprehensive principles and guidelines for environmental protection, and management in the country.

The FDRE consists of the Federal State and Regional States. Proclamations 33/1992, 41/1993 and 4/1995 define the duties and responsibilities of the Regional States which include planning, directing and developing social and economic development programs as well as protection of natural resources.

The Environment Protection Authority (EPA) has established an Environmental Impact Assessment system for Ethiopia including the preparation of Procedural and Sectoral Guidelines as a prerequisite for the approval of new development activities and projects. The EIA Process as applicable to development projects is detailed in the ‘Environmental Impact Assessment Procedural Guidelines Series 1’ of November 2003. As per Schedule I of the Guidelines, both cement plants as well as mining projects have significant environmental impacts, and, therefore, require a full EIA/EA study.

The Derba Cement plant will be responsible for implementing environmental management plans at its facilities in coordination with the Federal EPA and the Regional EPA for Oromiya Region. The
environmental performance of the project will be monitored on a regular basis through DMC’s own set up and through external/third party audits.

3.2 IFC/World Bank Guidelines

The proposed cement project falls under Category A as per IFC Performance Standards and its procedures for project appraisals. The WB and IFC provide detailed guidelines for the EA process. As of April 30, 2007, new versions of the World Bank Group Environmental, Health and Safety Guidelines (EHS) are in use. The EHS Guidelines also include sector specific:

- EHS Guidelines for Cement and Lime Manufacturing
- EHS Guidelines for Construction Material Extraction

In addition, IFC’s eight Performance Standards, viz., Social and Environmental Assessment and Management System; Labour and Working Conditions; Pollution Prevention and Abatement; Community Health, Safety and Security; Land Acquisition and Involuntary Resettlement; Biodiversity Conservation and Sustainable Natural resource Management; Indigenous People; and Cultural Heritage, will be adhered to throughout the operation of the project.

3.3 African Development Bank Guidelines

As per the Environmental and Social Assessment Procedures of AfDB, the proposed cement project including its associated raw material mining operations and utility connections is classified as Category 1. The projects assigned to Category 1 require a full ESIA, including the preparation of an ESIA report and ESMP.

4. Description of the Project Environment

In order to assess the baseline environmental status in the study area around the proposed project area, a primary and secondary data collection programme has been undertaken during the period July-Aug 07. The environmental components studied include:

- Physical/chemical components: Physiography, Geology, Geomorphology, Hydrometeorology, Hydrogeology, Surface and Ground water resources, Climatology, Meteorology, Ambient Air Quality, Noise Levels, and Soil quality.
- Land use, archaeology and cultural heritage
- Biological environment: Flora and Fauna
- Socio-economic components: Demography, education system, agricultural system and livestock, transportation networks and other infrastructure like water supply, public services, health status and medical facilities.

4.1 Topography & Drainage

Topography of the project area and of the surroundings consists of plains, mountains and valleys. The drainage of the project area is governed by the catchments of Blue Nile River, particularly Mugher river, which is one of the tributaries of the Blue Nile. Mugher river flows west of the proposed plant site in a deeply incised valley, which is at an elevation about 800 m lower than the plant area.

4.2 Climate

The climate of the area is characterized by two distinct seasonal weather patterns; the wet season extending from June to September, contributing about 70% of the annual rainfall, and the dry season which covers the period from October to May. The minimum and maximum temperature in the area vary from 9°C to 23.5°C. The average relative humidity during the year is 62%. The mean annual rainfall in the area is about 1158 mm.
4.3 **HYDROLOGY**

A detailed hydro-geological study has been carried out in the area. The groundwater recharge of the study area of 10 km radius around the plant and mining sites is estimated at 25 mio m³/ year. The total existing abstraction in the area is 5.1 mio m³/ year, which is only 20% of the available groundwater resources. The net available ground water in the area is 19.9 mio m³/ year. Thus it is safe to extract water from the area to meet DMC’s total water requirement of 0.73 mio m³/ year (~2000 m³/ day).

4.4 **WATER QUALITY**

Surface water samples from three (3) rivers, three (3) springs and a river confluence and ground water samples from six borewells in the area have been analysed for their physico-chemical properties. All samples are within the stipulated WHO/ Ethiopian Standards.

4.5 **AMBIENT AIR QUALITY**

The ambient air quality has been monitored at site and at various locations within the study area during the period August-September 2007. The average total particulate matter in the area varied from 42.5 – 118.8 µg/ m³, PM₁₀ varied from 13.3-54.4 µg/ m³, SOx varied from 19.5-24.4 µg/ m³ and NOx varied from 6.3 – 9.5 µg/ m³ at the monitoring stations located at Plant site, mines, Derba & Lilo villages. All values are within the draft Ethiopian AAQ standards.

4.6 **NOISE LEVELS**

The noise levels were monitored at four locations within the study area during August-September 2007. The average daytime and night time noise levels have both been recorded as 42 dB(A) and are well within the IFC and draft Ethiopian standards.

4.7 **ECOLOGY**

4.7.1 **Flora**

The vegetation composition, abundance, cover, and other relevant ecological information of the areas has been conducted. The study has covered both the core area, i.e., the plant and mining sites, as well as the buffer area, i.e., an area of 10 km radius around the plant and mining sites.

The area is rich in species composition though the abundance and distribution is highly influenced by anthropogenic factors such as crop cultivation, grazing, charcoal production and wood cutting for domestic uses. A total of 241 floral species belonging to 79 families have been recorded in the buffer zone. Most of these species are indigenous while a few others are exotic or naturalized. A total of 23 cultivated plant species and 60 medicinal plants were recorded in the buffer area. The plant species encountered include 15 endemic species of which 5 are highly endangered and 10 are of least concern as per Ethiopian statutes.

4.7.2 **Fauna**

Few fauna were observed in the core and buffer zones, as the area is highly impacted by deforestation and wildlife hunting. The fauna recorded in the buffer area include monkeys, baboons, hyenas, jackals, bush pig, serval, etc. There are no faunal species recorded from the Muger valley area that can be categorized as endangered, threatened or vulnerable. The species encountered are common forms that are observed in other parts of Ethiopia.
4.8 **Cultural, Historical & Archaeological Features**

No visible archaeological remains, which have scientific, cultural, public, economic, ethnic and historic significances, have been observed in the area. The risk value of both the plant and the mining sites is very low, where no significant observable archaeological evidence is found. The sites have no archaeological importance. However, a Chance Find protocol will nevertheless be prepared to cover any unexpected finds.

4.9 **Socio-Economic Scenario of the Area**

A detailed socio-economic survey has been carried out in the 10 km area around the project site. The poverty profile of the area is given below.

4.9.1 **Income/ Consumption Dimension of Poverty**

**Consumption/ Expenditure**

The results of the household survey carried out for the project area comprising of plant and mining areas reveal that the per capita consumption/ expenditure of the household and the population in the project area is estimated to be Birr 9214.37 and Birr 1722.77 respectively. According to the 2002 Development and Poverty Profile of Ethiopia the real per capita consumption expenditure of North and West Shoa zone, the area where the project is located, amounts to Birr 1087.2. The higher figure arrived at during the primary survey may partly be attributed to the time gap and current prices used in the calculation of the data.

In accordance with the 2002 Development and Poverty Profile of Ethiopia, the proportion of people in absolute poverty is about 31.7% in North and West Shoa Zones. This is by far better than the National and Oromiya Region absolute poverty figures of 39.9% and 44.2% respectively.

As indicated by the survey a significant portion of the expenditure incurred by people in the area is incurred on food. Food on average accounts for 56.4% of the household budget. Within the non-food category, clothing and house maintenance account for greater share of total expenditure (10.5 and 8.7%). Medical care and education budget contribute 4% and 0.8 % of the total household budget respectively.

**Income**

The major source of employment and income in the project area is mixed farming, i.e. crop production and livestock. Apart from the heads of the households who are often the breadwinners of the family, other family members also contribute to family income through employment in farming and off-farm activities.

The most important part of the income accounting to over 88.5% originates from agricultural and related activities mainly from the production of cereals and vegetables, perennial crops, domestic animals and its products, agro-forestry products and renting of farming lands. The remaining activities, i.e., trading, employment, handicrafts and others bring in the remaining income of the people. On the bases of the survey result, the annual per capita income of the households and population is computed to be Birr 10,287.62 and Birr 1923.4 respectively.

4.9.2 **Non-Income/ Consumption Dimension of Poverty**

**Demography**

The Plant and Mining sites are located close to Becho Dibdibe and Gimbichu villages within Becho Kidane Mehret and Handa Weizero Peasant Associations (PAs) respectively. The demographic details of the three PAs, viz., Becho Kidane Mehret (Plant area), Handa Weizero (Mining area) and Derba Gulele Beresa (the closest habitation of Derba) are given below:

<table>
<thead>
<tr>
<th>Sn</th>
<th>PA</th>
<th>Population</th>
<th>Number of Households</th>
<th>Avg. Family Size</th>
<th>Population Density (persons/sq km)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>1</td>
<td>Becho Kidane Mehret</td>
<td>804</td>
<td>872</td>
<td>1676</td>
<td>269</td>
</tr>
<tr>
<td>2</td>
<td>Handa Weizero</td>
<td>891</td>
<td>1611</td>
<td>2502</td>
<td>514</td>
</tr>
<tr>
<td>3</td>
<td>Derba Gulele Beresa</td>
<td>1825</td>
<td>2065</td>
<td>3890</td>
<td>1161</td>
</tr>
</tbody>
</table>
Female headed households are few. The average population density is 70.9 persons/sq km, which is more than the national average of 50 persons/km².

Females constitute 51.3% of the total population. Out of the total surveyed household heads (244) only 12.3% were female-headed households. The average family size in the project area is about 5.3. This is classified as a large family size, which usually indicates the characteristics of a poor family.

Residents of the project area are predominantly followers of the Orthodox Christian Religion (98.4%). The population of the project affected area is almost entirely of the Oromo ethnic group (97.5%) and Oromiffa is the major language spoken in the area. The Local Consultation is therefore carried out verbally and in Oromiffa language. The remaining 2.5% of the total households belong to Amhara ethnic group. None of the Project Affected Persons belong to ethnic minority groups.

**Education**

According to findings of the socio-economic survey, the overall literacy rate in the project area is very low. 81.5% of the surveyed household heads are illiterate whereas the remaining 18.5% are literate. Of this, less than a quarter of the household heads had formal education of which the majority was only till primary level.

Literacy rates are also disproportionate between sexes. While 88.5% of females are illiterate, the figure is 69.8% for males. Literacy rates are consistently higher for men than women throughout all levels of education.

Of the total household heads in the project area, 3.5%, 4.0%, 7.6%, and 1.5% and 1.5% have attained Lower Primary (1-4), Primary (5-8), and Secondary (9-10), Technical school and above grade 10 level education respectively.

**Farm Assets**

The main source of livelihood in the project area is agriculture. Therefore, land ownership in the project area becomes an important determinant of welfare. The major crops of the area are teff, barley, maize, sorghum, chickpeas, wheat, etc. Trees grown include banana, orange, mango, coffee, chat and eucalyptus tree is the dominant tree species. The area is mainly cultivated by means of traditional rainfed subsistence farming.

According to the survey results, average landholding of the surveyed household is found to be 2.8 ha. The majority, nearly 90.9% of the surveyed households own more than 2 ha of land. In general the size of individual land holding of the farmers in the study area is better than the average holdings on Regional and country levels. Thus farmers in the study area are likely to have better welfare status.

5. **PROJECT ALTERNATIVES**

Prior to arriving at a decision regarding establishment of a greenfield cement plant at Derba, different project alternatives were examined and reviewed. The options considered were:

- No project option
- Establishment of a new cement plant close to the quarry for production of cement.

Three possible plant locations have been considered.

**Option 1 (Mugher, in the valley):** This option would entail minimal transportation for limestone. However, other materials like pumice, coal, clay, which are available at a higher altitude, will have to be brought down to the valley. There is no road at present linking the heights to the valley area. Thus, a new 14 km long road shall have to be built. In addition transportation of cement also shall be difficult. Moreover, contiguous adequate flat land to the tune of 125 ha for location of plant is not available in the valley, and dispersion of kiln emissions will be difficult considering the elevation difference between the valley and the plateau.
Option 2 (Derba): This village has a good road connection. However, locating the plant close to habitation of Derba village is not advisable since it may lead to detrimental impacts on the local population.

Option 3 (8 km from Derba): The plant site can be connected to the mining area by a 7 km long conveyor. The flat area available is suitable for locating the plant with a residential complex. The site is also far from Derba village.

Thus Option 3 i.e. location of plant about 8 km from Derba has been selected to allow for minimal site disturbance and to avoid a site close to habitation.

The proposed new project works out to be economically viable, socially beneficial and environment friendly. The existence of abundant raw materials for cement production close to the proposed plant site, and the area being far away from habitation are the factors in favour of the selection of the proposed location at Derba.

6. POTENTIAL IMPACTS & MITIGATION MEASURES

The Operation phase of the proposed cement plant mainly comprises of the following activities:

- Excavation of limestone from the captive mines
- Transportation of crushed limestone from mines to plant site
- Transportation of other correctives/additives to the plant site
- Preparation of raw meal by adding correctives to limestone
- Clinkerisation of raw meal
- Cooling and heat recovery
- Blending & grinding of clinker by adding additives
- Packing & Despatch

The details of main activities and actions to be undertaken and their impacts during operation phase of plant and mines are summarized below. Similar summaries have been prepared for the construction stage and plant closure stage.

<table>
<thead>
<tr>
<th>Sn</th>
<th>Component</th>
<th>Activities</th>
<th>Potential Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transportation of raw materials and products</td>
<td>Increase in traffic movement, Washing and maintenance of vehicles</td>
<td>Disturbance to community &amp; its safety, Contribution of dust and gaseous pollutants like SO2, NOx, CO, VOC to ambient air quality, Contribution to ambient noise level, Disposal of solid waste &amp; waste water</td>
</tr>
<tr>
<td>2</td>
<td>Operation of plant / mines</td>
<td>Mines: Drilling, Blasting, Loading &amp; transportation, Operation of mining machinery; Plant: Crushing of limestone/other raw materials, Preparation of raw meal, Clinkerisation of raw meal, Cooling and heat recovery, Blending &amp; grinding of clinker, Packing &amp; Dispatch</td>
<td>Air emissions from operations are Dust, NOx, SO2, GHG and unburnt hydrocarbons, Generation of noise and vibrations from blasting, Waste water generation from: Water treatment plant, Domestic usages in plant, Solid waste from wastewater treatment plant as dry sludge, waste lubricating oil from machinery and municipal waste from domestic usages, Accidental spillage of oil, if any.</td>
</tr>
<tr>
<td>3</td>
<td>Socio-economic</td>
<td>Acquisition of land, Payment of taxes and royalty, Direct and indirect</td>
<td>Loss of agricultural land, Loss of grazing area, Employment to locals</td>
</tr>
<tr>
<td>Sn</td>
<td>Component</td>
<td>Activities</td>
<td>Potential Impacts</td>
</tr>
<tr>
<td>----</td>
<td>-----------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>employment</td>
<td>$\square$ Business opportunities to locals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development of infrastructure like roads, medical, transportation, etc</td>
<td>$\square$ Increase in per capita income</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Implementation of Welfare schemes</td>
<td>$\square$ Increase in literacy rate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Demand of local products and agricultural products</td>
<td>$\square$ Change in living standard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Development of green belt</td>
<td>$\square$ Regional development</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>$\square$ Saving of foreign exchange</td>
</tr>
</tbody>
</table>

6.1 QUALITATIVE IMPACT ASSESSMENT

The details of criteria adopted for impact assessment are as follows:

<table>
<thead>
<tr>
<th>Impact Rating</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of impact</td>
<td>Beneficial Positive</td>
</tr>
<tr>
<td></td>
<td>Adverse Negative</td>
</tr>
<tr>
<td>Duration of impact</td>
<td>Short term Impacts shall be confined to a stipulated time</td>
</tr>
<tr>
<td></td>
<td>Long term Impacts shall continue till the end of plant life</td>
</tr>
<tr>
<td>Likelihood of occurrence</td>
<td>Negligible &lt;10% Low 10-40%</td>
</tr>
<tr>
<td></td>
<td>Medium 40-60% High 60-80%</td>
</tr>
<tr>
<td></td>
<td>Very high 80-100%</td>
</tr>
<tr>
<td>Significance of impact</td>
<td>Minor Noticeable impacts only</td>
</tr>
<tr>
<td></td>
<td>Localized Noticed by adjacent locality &amp; may have direct impacts</td>
</tr>
<tr>
<td></td>
<td>Major Have direct sustainable impacts</td>
</tr>
<tr>
<td></td>
<td>Massive Ability to change the system</td>
</tr>
<tr>
<td>Potential impact level</td>
<td>Low Has practically no impact</td>
</tr>
<tr>
<td></td>
<td>Medium Has impact in local area</td>
</tr>
<tr>
<td></td>
<td>High Has impact in region</td>
</tr>
</tbody>
</table>

The qualitative impacts of the proposed project during construction and operation phases are summarized here:

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Impact Rating</th>
<th>Nature</th>
<th>Duration</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Land Use</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>Adverse</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Noise level</td>
<td>Adverse</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Water Resources</td>
<td>Adverse</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Waste Water</td>
<td>Adverse</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Soil &amp; Solid Waste</td>
<td>Adverse</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Ecology</td>
<td>Adverse</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Socio-economic &amp; employment</td>
<td>Beneficial</td>
<td>Short term</td>
<td>Medium</td>
<td>Localized</td>
<td>High</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Impact Rating</th>
<th>Nature</th>
<th>Duration</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation Phase</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green House Gas Emission</td>
<td>Adverse</td>
<td>Long term</td>
<td>High</td>
<td>Regional</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Noise level</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Traffic movement</td>
<td>Adverse</td>
<td>Long term</td>
<td>High</td>
<td>Localized</td>
<td>Medium</td>
<td></td>
</tr>
</tbody>
</table>
### ESIA Summary: Greenfield Derba Cement Project: DMC, Ethiopia

#### Impact Rating

<table>
<thead>
<tr>
<th>Particulars</th>
<th>Nature</th>
<th>Duration</th>
<th>Likelihood</th>
<th>Severity</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Resources</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>Medium</td>
</tr>
<tr>
<td>Waste Water</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>Low</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>Low</td>
</tr>
<tr>
<td>Ecology</td>
<td>Adverse</td>
<td>Long term</td>
<td>Medium</td>
<td>Localized</td>
<td>Low</td>
</tr>
<tr>
<td>Loss of agricultural/ grazing land</td>
<td>Adverse</td>
<td>Long term</td>
<td>High</td>
<td>Localized</td>
<td>High</td>
</tr>
<tr>
<td>Employment &amp; Economic growth</td>
<td>Beneficial</td>
<td>Long term</td>
<td>High</td>
<td>Regional</td>
<td>High</td>
</tr>
<tr>
<td>Socio-economic Measures</td>
<td>Beneficial</td>
<td>Long term</td>
<td>High</td>
<td>Localized</td>
<td>High</td>
</tr>
</tbody>
</table>

#### 6.2 MITIGATION MEASURES

The mitigation measures for the identified impacts are described below.

<table>
<thead>
<tr>
<th>Sn</th>
<th>Potential Impact</th>
<th>Main Source of Risk</th>
<th>Mitigation Measures</th>
</tr>
</thead>
</table>
| 1  | Natural Resources| Depletion of Limestone reserves and other corrective materials and additives | - Availability of raw materials shall be estimated properly  
- Regular review of raw mix to get consistent quality of products  
- Continuous attempt to control wastages during transportation, storage and handling of raw materials  
- Mining plan shall be prepared to optimize the mining methodology and ensure the implementation of a progressive reclamation plan to replant in areas where limestone has been excavated  
- Regular monitoring of availability of stocks and consumption of raw materials, dispatch of products and loss of material |
| 2  | Air Emissions    | Emission from mines  
- Drilling  
- Blasting  
- Loading and unloading  
- Crusher  
- Transportation  
- Wind erosion  
- Traffic movement | - Dust emissions from crusher will be controlled by bag filter.  
- All dumps will be suitably vegetated.  
- A speed limit shall be defined for the trucks/ dumpers moving within the mining area.  
- Dust suppression systems (water spraying) shall be adopted at faces/sites before and after blasting and while loading  
- Dust generated due to blast hole drilling shall be suppressed by using water injecting system of dust collectors in the drills.  
- Use of sharp drill bits for drilling holes and drills with water flushing systems (wet drilling) to reduce dust generation,  
- Use of sharp teeth for shovels to reduce dust generation,  
- Regular water spraying shall be carried out on haulage roads by water sprinklers during transportation of raw materials.  
- All vehicles and their exhausts would be well maintained and regularly tested for emission concentration.  
- Dust masks shall be provided to workers engaged at dust generation points like drills, loading, unloading points, etc.  
- Extensive plantation shall be carried out in and around the mining area  
- Use of good quality explosives having proper oxygen balance with regular monitoring. |
<table>
<thead>
<tr>
<th>Sn</th>
<th>Potential Impact</th>
<th>Main Source of Risk</th>
<th>Mitigation Measures</th>
</tr>
</thead>
</table>
| B  | Air emissions from stacks | Air Emissions  
- Crusher  
- Raw Mill  
- Coal Mill  
- Kiln  
- Clinker Cooler  
- Cement Mill  
- Packing Plant  
- DG sets  
- Traffic movement |  
- Ensure maximum efficiency of combustion in kiln and emergency DG sets  
- Suitably designed ESPs/ Bag filters will limit the dust concentration to 25 mg/ Nm³ in all emissions  
- In the event of failure of any pollution control equipment, automatic tripping in the control system will be provided  
- For ESP operations, any disturbance in the power supply to electrode will switch the whole unit off  
- Efficiency of each air pollution control equipment will be ensured to more than 99%  
- SO₂ and NOₓ emissions will be within the norms of 400 mg/ Nm³ and 600 mg/ Nm³ respectively as specified by IFC.  
- A well-designed burner system, will limit the core flame temperature to ensure a low value of NOₓ  
- Impact of CO emission will be negligible in view of the firing technique of keeping a positive oxygen balance.  
- Regular preventive maintenance of pollution control equipment  
- All vehicles and their exhausts will be well maintained and regularly tested for emission concentration.  
- Continuous dust monitor will be installed on all point emissions  
- Continuous SO₂ and NOₓ monitor will be installed on main stack |
| C  | Fugitive Emissions |  
- Storage and Conveying/ transportation of raw materials and products  
- Leakages from machinery and pipes |  
- Jet Pulse bag filters shall be provided at all dry material conveying and transfer points  
- Drop distances shall be minimized by the use of adjustable conveyors  
- Dust suppression system by water sprinkler at dump hopper of raw materials  
- Regular dust suppression with water sprinkler on the haul roads  
- Plant roads & approach roads shall be made of bitumen/ concrete & mechanical vacuum cleaner shall be used for cleaning of dust on internal roads  
- Open areas within the plant premises/ along boundaries of the plant premises shall be covered under green belt  
- Raw Materials/ products shall be fully covered during transportation to/ from the site by road. |
| D  | Green house Gas Emissions |  
- All stacks  
- Traffic movement |  
- The proposal to manufacture blended cement shall reduce clinker requirement in cement, thereby reducing GHG emissions.  
- The state-of-the-art-technology of 5 stage preheater shall lead to increased energy efficiency thereby reducing GHG emissions. |
| 3  | Noise Emissions |  
- Operation of noise generating equipment like compressors, pumps, DG sets, etc.  
- Maintenance  
- Traffic movement  
- Procurement of drill, loaders and dumpers and other equipment with noise proof system in operator's cabin |  
- Cumulative noise level at walkways and work areas shall be <85 dB (A) and no worker shall be exposed to a noise level >85 dB(A) without hearing protection  
- Noise level at the boundary of plant/ mines shall be <70 dB(A)  
- Blasting operations shall be carried out only during the day time using milliseconds detonators and cord relay so as to avoid high noise intensity  
- Regular maintenance of noise generating equipment  
- Provision of silencers shall be made wherever possible.  
- Necessary enclosures will also be provided on the working platforms/areas for local protection in high noise level areas  
- Proper lubrication & housekeeping to avoid excessive noise  
- The operators will be provided with necessary safety and protection equipment such as ear plugs, ear muffs etc.  
- Provision of plantation in and around the plant premises |
<table>
<thead>
<tr>
<th>Sn</th>
<th>Potential Impact</th>
<th>Main Source of Risk</th>
<th>Mitigation Measures</th>
</tr>
</thead>
</table>
| 4  | Ground Vibration/ Fly Rocks      | Drilling Blasting  | - Careful planning, checking, execution & monitoring of each blast  
- Blast holes shall always be initiated by short delay detonators rather than adopting instantaneous detonation. Short delay in blasting of successive blast holes effectively reduces the vibration problem.  
- Free faces shall be sufficiently cleared of any loose material before blasting and burden.  
- Multi row blasting shall be followed.  
- Use of ANFO, which has low velocity of detonation, shall also reduce the vibration problem. |
| 5  | Ground Water Resources           | Make up water      | - Continuous attempt shall be made to optimize/reduce the use of water  
- Water harvesting shall be carried out to the maximum extent possible  
- Regular monitoring of ground water table |
| 6  | Waste Water                      | Domestic RO Rejects| - STP with tertiary treatment shall be provided and no waste water shall be discharged from the plant premises  
- Treated effluent shall be used for dust suppression and plantation/greenbelt development  
- Rejects from RO of STP shall be sprayed on raw material stockpiles and coal stored in yard.  
- Construction of suitably designed drains all along the roads and boundary of the plant premises  
- Appropriate storm water and runoff control systems shall be provided to minimize the quantities of suspended material carried off site |
| 7  | Solid waste (hazardous & non-hazardous) | Maintenance and Operation of integrated plant Storage and handling of fuel Accidental spillage | - Whenever possible, use of non-hazardous instead of hazardous materials.  
- All hazardous (ignitable, reactive, flammable, corrosive, and toxic) materials shall be stored in clearly labeled containers or vessels  
- All hazardous wastes, process residues, solvents, oils, and sludges shall be properly disposed of  
- Recycle or reclaim materials where possible  
- If recycling or reclamation is not practical, wastes shall be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations.  
- Careful garbage transportation to dumping site and disinfections of transport vehicles body  
- Fire prevention systems and secondary containment shall be provided for storage facilities, to prevent fires or the release of hazardous materials to the environment |
| 8  | Spill Management                 | Maintenance and Operation Storage and handling of fuel Accidental spillage | - Impervious liners in place for fuel, lubricants and chemicals storage area.  
- Effective bunds capable of containing 110% of the volume within and enclosing all potentially contaminating materials to be used for fuel and lubricants storage area  
- Oil drip pans shall be used wherever there is significant potential for leakage including, but not limited to:  
  - Electric generator engine  
  - Compressors, pumps or other motors  
  - Maintenance areas  
  - Fuel transfer areas |
| 9  | Occupational Health & Safety     | All Operations     | - Provision of PPE like ear muffs, helmets, boots, dust masks, etc. to employees  
- Safe procedure for storage and handling the explosives shall be developed  
- Adequate training shall be provided to the staff  
- Regular medical check up of workers |
6.3 **Socio-Economic Development Plan**

DMC will actively contribute to improve the socio-economic conditions of the area. The details of the Socio-economic Development Plan are given below:

6.3.1 **Community Development Fund**

DMC is committing an annual contribution of Birr 250,000 per year for establishing a revolving fund to support/supplement the efforts to help finance small scale businesses for the local communities. A Committee comprising of officials from Sululta Wereda, PAs, and DMC will oversee the implementation of the fund. DMC shall continue the contribution till the cumulative contribution reaches Birr 2.5 million.

6.3.2 **Employment and Business Opportunities**

Preference is being/will be given in employment to able-bodied locals whose land has been permanently acquired for the project. Currently 70 local labour have been employed at the project. As the construction progresses, the local labour proposed to be employed shall be around 400. The Community Development Fund which will be established by DMC will help the interested locals in setting up small businesses like transportation, auto workshops, eateries, and other small shops which shall come up to cater to the cement plant and the “transport sector” visiting the plant.

6.3.3 **Road Development**

Major road building and upgradation is proposed by DMC in the area.

Road from the Plant to mines will for the first time link the valley to Derba and further. The proposed bridge over Mugher river will provide an access to the villages in the vicinity of the quarry and beyond. The road from Chancho to Derba, which is presently a gravel road, will be converted to a tarred black-topped road in stages which will provide a better connectivity. There are presently four old, narrow bridges over small streams on the way from Chancho to plant site. New bridges will be constructed alongside these bridges thereby providing much improved infrastructure in the area. A new, tarred road will be constructed from Derba to the plant site.

6.3.4 **Health Facilities**

A Health Centre staffed by a Doctor, a Nurse, Laboratory technician, pharmacist and other supporting staff will be set up within the plant which will serve the employees of DMC.

DMC plans to extend health facilities for the local community by establishing a Clinic for inhabitants around the plant site. The ownership and administration of the Clinic shall be with the Regional Government. The estimated cost of the Clinic, which will be allocated by DMC in its budget, is:

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establishment Cost</td>
<td>Birr 300,000</td>
</tr>
<tr>
<td>Health Facility Cost</td>
<td>Birr 200,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>Birr 500,000</strong></td>
</tr>
</tbody>
</table>

DMC is willing to support the upgradation and upkeep of the established Centre by providing the Centre up to Birr 10,000 per month aimed at supplementing the running expenses, manpower expenses, etc. In addition to the above, professional assistance to organize and run the Centre will be provided by DMC health professionals.

The health facility at quarry site will also be established to the same standards as the plant facility. The cost of health facility, which will be borne by DMC, is estimated as Birr 200,000. However, the administration and management of the health facilities will remain with the concerned office of the Regional Government. A financial assistance of Birr 10,000 per month will be given for meeting the running expenses of the Health Centre.

DMC health professionals will extend close cooperation and help in periodic health surveys and during occurrence of any accidents, calamities, etc.

Diseases of high concern during the construction phase due to labour mobility are sexually transmitted diseases (STDs) such as HIV/AIDS. DMC propose the following measures:
• Undertaking health awareness and education initiatives by imparting information and counseling to influence individual behaviour as well as promote individual protection, and protect others from infection.

• Training health workers in disease treatment

• DMC shall ensure ready access to medical treatment, confidentiality and appropriate care, particularly with respect to migrant workers

A number of measures are proposed to reduce the impact of vector-borne diseases like malaria in the workers and the local communities.

Sanitation in and around the project area will be improved to eliminate breeding habitats. Use of repellants, clothing, netting, etc. will be promoted. DMC will make efforts to provide appropriate drugs to workers and collaborate with public health officials to help eradicate disease reservoirs. It is proposed to monitor and treat the migrating population to prevent disease spread and also educate project personnel and area residents on risks, prevention, and available treatment.

**Education**

DMC commits to build new or expand the existing elementary school at the plant and quarry sites and hand over the same to the concerned Government office for managing them. DMC is allocating in its budget for expanding and upgrading the educational facilities at Derba town and quarry. The estimated costs are:

- Cost of additional classrooms at plant site and quarry : Birr 500,000
- Cost of facilities like desks, laboratory equipment, etc. : Birr 250,000
- **Total** : Birr 750,000

A Regional Vocational Training Center is proposed to be established by Sululta Wereda at Chancho. DMC will contribute about Birr 224,000 for the establishment of Vocational (Health Extension Workers and Farmers’ Training) Centre.

**Water Supply**

DMC will help in improving the water supply in the area. As observed during the socio-economic baseline survey, almost all villages rely on dirty, unpotable stream water for their water requirement. This has lead to prevalence of water borne diseases.

Water supply access will be extended to a total of seven villages around the plant and mining sites. These villages are Adero, Abale, Becho Kidanemehrat, Debedebe, Muger, Anda Wezero and Anda Botero. The amount of water, which shall be made available, is estimated to be 83,560 litres per day (assuming consumption of 20 l/ day) in the form of one water point per village. The water points shall be run by a Water Committee, which shall be established comprising of members of the community. The community will be expected to generate a small amount of revenue from the sale of water, so as to cover at least the maintenance cost of the system.

**Communication**

With the establishment of the plant, DMC will set up modern communication facilities like telephones, internet, etc. in the area, which will also be available to the local population.

**Electricity**

DMC will extend to 2MW electric power line for the community along the Derba-plant road and around the plant site to facilitate personal connections for the community. However, the cost of individual connections and bills based on the consumption will be borne by the individuals.

### 6.4 Audits and Monitoring

Environmental monitoring and audits will be undertaken during & after the construction and development phase and during operation phase to check that the environmental management measures are being satisfactorily implemented and that they are delivering the appropriate level of environmental performance. A summary of the proposed monitoring plan is given below.
## Impact Monitoring Method

<table>
<thead>
<tr>
<th>Impact</th>
<th>Monitoring Method</th>
<th>Parameters</th>
<th>Location</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air quality</td>
<td>Measurement/sampling</td>
<td>PM/PM$_{10}$, NO$_x$, SO$_x$</td>
<td>Pyro-processing stacks</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM/PM$_{10}$</td>
<td>Cement grinding and clinker cooler stacks</td>
<td>Continuous</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PM/PM$_{10}$, CO$_2$, Temperature, Oxygen level, combustion efficiency</td>
<td>Combustion sources</td>
<td>Biannually</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ambient PM/PM$_{10}$, NO$ _x$ and SO$_x$</td>
<td>Selected receptor villages, colony, plant premises</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Noise</td>
<td>Measurement</td>
<td>Leq (dB(A))</td>
<td>Mines, Crusher, Raw mill, Cement Mill</td>
<td>Biannually</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Four (4) sites around Plant site</td>
<td>Biannually and upon complaints</td>
</tr>
<tr>
<td>Surface and ground water</td>
<td>Sampling</td>
<td>Temperature, pH, Oil content, Suspended solids, COD</td>
<td>Ground water wells, installed grease traps, oil/ water separators, sedimentation tanks</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Soil</td>
<td>Sampling</td>
<td>Moisture content, pH, salinity, Nitrogen, Phosphate, Chloride, Potassium, Sodium</td>
<td>Agricultural plots near project site</td>
<td>Annual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heavy metal content (mercury, lead, chromium, copper, nickel, zinc and cadmium)</td>
<td></td>
<td>Every three years</td>
</tr>
<tr>
<td>Solid Waste</td>
<td>Audits, photographic documentation, and interviews</td>
<td>Generation, storage, recycling, transport and disposal</td>
<td>Plant premises</td>
<td>Quarterly</td>
</tr>
<tr>
<td>Biodiversity</td>
<td>Visual inspection and photographic documentation</td>
<td>General condition of the floral cover</td>
<td>Plant, mines and landscaped areas</td>
<td>Annual</td>
</tr>
<tr>
<td>Resource use</td>
<td>Metering</td>
<td>Water and energy consumption</td>
<td>Plant and mines</td>
<td>Continuously</td>
</tr>
<tr>
<td></td>
<td>Audit</td>
<td>Raw material consumption</td>
<td>Plant and mines</td>
<td>Continuously</td>
</tr>
<tr>
<td>Health and Safety</td>
<td>Health and safety surveys</td>
<td>Proper use of PPE, presence of safety signs, first aid kit, fire fighting devices, Injury/ illness records. Accident statistics recording in accordance with ILO standards, including recording of Lost-Day-Accidents per Million-man hours (LDA/MMH)</td>
<td>Plant, road linking plant to Derba</td>
<td>Continuously</td>
</tr>
<tr>
<td>Socio-economic</td>
<td>Field questionnaire</td>
<td>Local population</td>
<td>Plant and surrounding areas</td>
<td>Annually</td>
</tr>
<tr>
<td></td>
<td>Interviews</td>
<td>Employment records</td>
<td>Plant</td>
<td>Continuously</td>
</tr>
<tr>
<td>Operations monitoring</td>
<td>Visual inspection and documentation</td>
<td>Production rate, gas flow rates, counter readings, pressure valves, temperatures, abnormal readings, overloads, stoppages</td>
<td>All facilities and major equipment at Plant and Mines</td>
<td>Daily</td>
</tr>
</tbody>
</table>

The Federal EPA has no capacity for monitoring or environmental auditing. DMC will have a dedicated Environmental Management Cell within the plant to oversee environmental management of its operations. Like the EPA, the Government institutions like Wereda level offices at Chancho and PAs do not have the capacity to undertake or assist in implementing social development schemes in the area on behalf of DMC. Thus the Environmental Management Cell will have a strong Social set up to take care of the social development plans in the surrounding area. A Grievance Cell will also be established to address the complaints/grievances of the local communities.

### 7. PUBLIC CONSULTATION

Public consultation plays a key role in enabling the public to participate in the planning of project that affects the people directly. The project is proposed to be located within Oromiya Regional State of the country. There are five Weredas located within and around the project. There are twenty eight (28) Kebeles or Peasant Associations that are organized under the Weredas consisting of a number of settlement villages. The Kebele Peasant Association (PA) is the lowest governmental administrative unit of the rural area.

The consultative participants from administrative and community levels total to 1,247 consisting of 40 Wereda officials, 28 Kebele Peasant Associations council members, 223 community members consulted through community discussions and 956 individual household heads consulted privately.
The major issues identified and the suggestions proposed during the Public Consultation include:

- Contain smoke, dust, noise, hazardous discharge and minimize environmental pollution;
- Extend health services to the local residents by constructing hospital or health center;
- Create awareness among the people to combat the spread of HIV/AIDS and other STDs and provide treatment for patients;
- Provide appropriate compensation for the People to be evicted from their land. In addition, project should seek ways and means of restoring their livelihood;
- Create awareness among the people to benefit from project related activities such as trading, etc.;
- Develop infrastructure, school, electricity, telecommunications, hospital and the like for the community;
- Jointly seek remedial measures to regulate the unemployment rate in the project area;
- Assist the creation and operation of small and micro institutions;
- Launch reforestation program near the project site and the quarry;
- Community level discussion should continue to jointly identify and recommend corrective measures for the potential problems.

8. RESETTLEMENT PLAN

The Cement project comprises of the following sections, which necessitate acquisition of land:

- Plant area
- Mining area
- Road from Derba to plant site
- Road from Plant to Mines
- Road from Chancho to Derba
- Right of way for disturbances caused by power line, water pipeline and conveyor belt

As per the statutes of FDRE, DMC is required to pay lease rent for the land for the project, which is acquired by the Oromiya Regional Government. DMC is paying the Compensation for acquisition of this land, which is on account payment for the lease rent. The acquisition of the total plant area (125 ha), road from Derba to plant (4.83 ha), road from Chancho to plant (8.2 ha), land for water supply (4.35 ha) is already complete. Land acquisition for conveyor belt, mining area, power transmission line and road from plant to mines is under progress.

A total compensation of Birr 13,330,736.80 has been paid to 354 landowners who have lost part of their landholdings and 74 house owners who have lost their houses. The details of the compensation paid are summarized below:
## ESIA Summary: Greenfield Derba Cement Project: DMC, Ethiopia

### Purpose | Site/ Village | Land owners who have lost total land | Landowners who have lost part of their land | Land owners who have lost houses | Total Compensation paid (Birr) | Whether acquisition completed or in progress
---|---|---|---|---|---|---
| | Nos. | Total area (ha) | Compensation paid (Birr) | Nos. | Total area (ha) | Compensation paid (Birr) | Nos. | Total area (ha) | Compensation paid (Birr) |
### Plant site
- Becho Kidanemeheret
  - Total: 94
  - Landowners who have lost part of their land: 4
  - Area: 125.104 ha
  - Compensation paid: 4,466,034.36 Birr
- Derba Gulele Berisa PA
  - Total: 37
  - Area: 4.83 ha
  - Compensation paid: 349,143.60 Birr
### Road from Derba to Plant
- Due to Quarry site
  - Becho Kidanemeheret
    - Total: 4
    - Area: 0.75 ha
    - Compensation paid: 41,607.00 Birr
### Road from Plant to Mines
- Ada Gimbichu
  - Total: 116
  - Area: 139.70 ha
  - Compensation paid: 5,186,497.10 Birr
- Becho Kidanemeheret
  - Total: 88
  - Area: 23.07 ha
  - Compensation paid: 1,305,187.60 Birr
### Road from Chancho to Plant site
- Derba Gulele Berisa PA
  - Total: 50
  - Area: 7.86 ha
  - Compensation paid: 479,931.80 Birr
- Becho K. meheret (Dibdebe)
  - Total: 2
  - Area: 0.34 ha
  - Compensation paid: 18,722.00 Birr
### Road for Water supply
- Lilo-Chebeka
  - Total: 4
  - Area: 2.50 ha
  - Compensation paid: 33,819.60 Birr
- Amara Sefer
  - Total: 12
  - Area: 1.85 ha
  - Compensation paid: 12,595.35 Birr
### Conveyor Belt/Right of way
In progress
### Mining Area
- Anda Wiezero
  - Total: 32
  - Area: 6.21 ha
  - Compensation paid: 201,200.70 Birr
- Anda Wiezero
  - Total: 9
  - Area: 0.83 ha
  - Compensation paid: 6,099.19 Birr
### Power Transmission Line
In progress
<table>
<thead>
<tr>
<th></th>
<th>Nos.</th>
<th>Total area (ha)</th>
<th>Compensation paid (Birr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>354</td>
<td>187,942</td>
<td>12,100,838.30</td>
</tr>
</tbody>
</table>
The proposed cement project will impact on the physical, natural and socio-economic environments at Derba. The plant and mining operations will result in permanent changes in the land use of the area. Agricultural and grazing land will be converted to industrial and mining. However, the soil quality of the area will remain unchanged.

Air emissions from the plant will be highly controlled and the installation of state of the art pollution equipment will limit the dust and gaseous pollutants levels much below the norms specified by the IFC to ensure a continued good air quality in the area.

The proposed plant and mines will not affect the hydrology of the region. The drainage pattern will not be affected and the quality of the water will also not be affected by the mining operations. The vegetation in the mining area may be disturbed, causing a loss of crops, fruit trees and natural vegetation. However, the flora and fauna existing in the area are of common species. Mitigation measures including a rehabilitation and management program and a green belt/ afforestation plan will reduce the overall ecological impacts and in the long term improve the forest cover to the benefit of the fauna diversity.

Employment resulting from plant and mining operations and associated services and improved infrastructure and facilities in the area will be the main socio-economic benefits for the affected community. The acquisition of land in the plant and mining area and the access roads and the resettlement of people living in these areas are the major negative impacts of the project. The implementation of the resettlement action plan will mitigate these impacts in terms of compensation and improvement of livelihood of the affected families.