Mbalam Iron Ore Project
Environmental and Social Assessment

Volume 1 – Executive Summary

April 2011
TABLE OF CONTENTS

1 INTRODUCTION .............................................................................................................................. 1
1.1 Project Justification ....................................................................................................................... 5
  1.1.1 Economic Benefit ...................................................................................................................... 6
  1.1.2 Social Benefit .......................................................................................................................... 6
  1.1.3 Environmental Benefit ............................................................................................................ 6
  1.1.4 Environmental and Social Enhancement Programmes ........................................................... 7
  1.1.5 Conclusion ............................................................................................................................... 8

2 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA, VOLUME 2) .................. 9
2.1 Introduction ...................................................................................................................................... 9
2.2 Legal and Other Requirements ....................................................................................................... 9
  2.2.1 Social and Environmental Impact Assessment .......................................................................... 9
  2.2.2 Land Acquisition ...................................................................................................................... 10
  2.2.3 Environmental Regulation ...................................................................................................... 10
  2.2.4 Environmental Laws .............................................................................................................. 11
  2.2.5 Other laws include: .................................................................................................................. 12
  2.2.6 International Conventions ...................................................................................................... 12
2.3 Project Description ............................................................................................................................ 12
  2.3.1 Mining ................................................................................................................................... 13
  2.3.2 Ore Transport .......................................................................................................................... 16
  2.3.3 Port Facilities .......................................................................................................................... 16
2.4 Environmental Baseline .................................................................................................................... 19
  2.4.1 Mine Site ................................................................................................................................. 19
  2.4.2 Transport Corridor .................................................................................................................... 21
  2.4.3 Port Site .................................................................................................................................. 21
2.5 Social Baseline .................................................................................................................................. 23
  2.5.1 Indigenous People ..................................................................................................................... 23
  2.5.2 Medical Baseline ..................................................................................................................... 24
2.6 Stakeholder Consultation ................................................................................................................... 25
2.7 Issues, Impacts and Management ...................................................................................................... 29

3 ENVIRONMENTAL AND SOCIAL ACTION PLAN (VOLUMES 3- 13) .............................. 32
3.1 Volume 3: Environmental and Social Action Plan ........................................................................... 32
3.2 Volume 4: Stakeholder Consultation Plan ......................................................................................... 33
3.3 Volume 5: Community Development Plan ....................................................................................... 33
3.4 Volume 6: Indigenous Peoples Plan .................................................................................................. 34
3.6 Volume 8: Biodiversity Conservation and Management Plan ......................................................... 35
3.7 Volume 9: Emergency Management Plan ......................................................................................... 36
3.8 Volume 10: Marine Shipping and Contaminant Plan ....................................................................... 37
3.9 Volume 11: Waste Management Plan ................................................................. 37
3.10 Volume 12: Greenhouse Gas Abatement Plan ........................................ 37
3.11 Volume 13: Life of Mine and Closure Plan ............................................... 38

4 PROGRAMME IMPLEMENTATION ..................................................................... 39

5 SOCIAL AND ENVIRONMENTAL PROGRAMME COSTS ............................ 41
5.1 Embodied Environmental and Social Capital .............................................. 41
5.2 Environmentally relevant facilities and equipment .................................. 41
5.3 Operating Costs for Social and Environmental Programmes .................. 42

6 CONCLUSION .................................................................................................. 44
List of Figures

Figure 1: Cameroon is located in the hinge of Africa’s west coast .............................................................. 2
Figure 2: Regional map showing significant known iron deposits that could potentially utilise the Mbalm Project rail and port infrastructure ................................................................. 3
Figure 3: The Rail corridor (blue line) avoids existing communities and National Parks (green shaded).... 4
Figure 4: Typical truck and shovel operation for High Grade Hematite....................................................... 13
Figure 5: Proposed layout of mine facilities............................................................................................... 15
Figure 6: Trains up to 2.5 km long will deliver 25,000 tonne of iron ore to the port facility ..................... 16
Figure 7: Iron ore will be sea transported in large bulk ore carriers similar to those serving Australia’s Pilbara mines .................................................................................................................................. 17
Figure 8: Layout of port facilities and dredge channel at Lolabe ............................................................... 18
Figure 9: Botanical survey at Mbalm .......................................................................................................... 20
Figure 10: The short beaches at the proposed port site are not well suited for turtle nesting .............. 22
Figure 11: Baka village at Assoumindele .................................................................................................... 24
Figure 12: Stakeholder workshop at Abong Mbang ................................................................................... 26
Figure 13: The Plan Do Review cycle drives continual improvement ....................................................... 32
Figure 14: The Community Development Plan focuses on building capacity in impacted communities .. 34
Figure 15: Facilitation of sustainable fishing is a key objective of the Biodiversity Conservation and Management Plan .................................................................................................................................. 36

List of Tables

Table 1: Proposed Offset Programmes ........................................................................................................ 8
Table 2: CamIron Response to key Stakeholder Concerns ......................................................................... 28
Table 3: Management of key issues during Construction .......................................................................... 30
Table 4: Management of the Potential Environmental and Social Impacts during Operations .......... 31
Table 5: Performance targets and reporting for the Mbalm Project .............................................................. 39
Table 6: Environmental and social costs embodied in capital works programme .................................... 41
Table 7: Environmentally relevant facilities and equipment ..................................................................... 42
Table 8: Operating Costs for Social and Environmental Programmes ....................................................... 43
### List of Abbreviations and Acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARO</td>
<td>Asset Retirement Obligations</td>
</tr>
<tr>
<td>CED</td>
<td>Centre for Environment and Development</td>
</tr>
<tr>
<td>CO₂e</td>
<td>Carbon Dioxide Equivalent</td>
</tr>
<tr>
<td>CISAC</td>
<td>CamIron Sustainability Advisory Committee</td>
</tr>
<tr>
<td>CRAP</td>
<td>Compensation and Relocation Action Plan</td>
</tr>
<tr>
<td>CSF</td>
<td>CamIron Sustainability Fund</td>
</tr>
<tr>
<td>DSO</td>
<td>Direct Ship Ore</td>
</tr>
<tr>
<td>DWT</td>
<td>Dead Weight Tonnes</td>
</tr>
<tr>
<td>EP</td>
<td>Exploration Permit</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>ESA</td>
<td>Environmental and Social Assessment</td>
</tr>
<tr>
<td>ESAP</td>
<td>Environmental Action Plan</td>
</tr>
<tr>
<td>FMU</td>
<td>Forest Management Units</td>
</tr>
<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>HSE</td>
<td>Health, Safety and Environment</td>
</tr>
<tr>
<td>IPP</td>
<td>Indigenous Peoples Plan</td>
</tr>
<tr>
<td>ITTO</td>
<td>International Tropical Timber Organisation</td>
</tr>
<tr>
<td>MOF</td>
<td>Material Handling Facility</td>
</tr>
<tr>
<td>MINEP</td>
<td>Ministry of Environment and Nature Protection</td>
</tr>
<tr>
<td>MINIMIDT</td>
<td>Ministry for Mines, Industry and Technological Development</td>
</tr>
<tr>
<td>MINFOF</td>
<td>Ministry of Forest and Fauna</td>
</tr>
<tr>
<td>NGO</td>
<td>Non Government Organisation</td>
</tr>
<tr>
<td>RPA</td>
<td>Rehabilitation Provision Account</td>
</tr>
<tr>
<td>SCP</td>
<td>Stakeholder Consultation Plan</td>
</tr>
<tr>
<td>TSF</td>
<td>Tailings Storage Facility</td>
</tr>
<tr>
<td>ToR</td>
<td>Terms of Reference</td>
</tr>
<tr>
<td>UNFCCC</td>
<td>United Nations Framework Convention on Climate Change</td>
</tr>
<tr>
<td>WWF</td>
<td>World Wildlife Fund for Nature</td>
</tr>
</tbody>
</table>
CamIron is committed to responsible stewardship. We aim to add value to the environments and communities in which we operate through a shared commitment to continual improvement in every facet of our business. We will specifically:

- Ensure achieved outcomes comply with legal and other requirements as a minimum;
- Continually assess and improve our performance in mitigating environmental risks, fulfilling legal requirements and meeting the expectations of stakeholders;
- Communicate openly with employees, the community and regulatory authorities to capitalise on opportunities that benefit the environment and the community;
- Provide training so that people are aware of their potential environmental impacts and follow appropriate procedures to minimise them;
- Prevent the pollution of air, land and water through the provision of facilities that contain emissions and the management of activities to prevent spillage of fuels, hazardous chemicals and waste;
- Prohibit trapping of animals and consumption of bush-meat by CamIron employees and Contractors on CamIron property;
- Develop monitoring and management programmes to minimise potential impacts on forests and their wildlife;
- Plan for ultimate closure of operations by strategic placement of wastes and progressive rehabilitation of disturbed land as appropriate;
- Conserve resources and minimise emissions of greenhouse gases by operating efficiently and minimising waste;
- Support forest and other research programmes relevant to biodiversity conservation and community health in Cameroon; and
- Effectively engage stakeholders to anticipate and respond to issues of concern and negotiate in good faith for the resolution of disputes.
1 INTRODUCTION

The Mbalam Iron Ore Project is located in Cameroon in the hinge of Africa (refer Figure 1). It is being developed by CamIron SA, a Cameroon company owned by Sundance Resources Limited (90%) and Cameroon stakeholders (10%). Sundance Resources Limited also controls Exploration Permits in the adjacent Republic of Congo through Congo Iron SA (refer Figure 2). The Mbalam Iron Ore Project will comprise a mine; transport corridor and deep water port facility to be located on the coast of Cameroon south of Kribi to support a 35 million tonne a year operation for at least 25 years (refer Figure 3). The ore will be mined in two stages. Stage 1 will last for at least 10 years and exploit High Grade Hematite at a rate of 13.5 million tonnes a year from Mbalam and 21.5 million tonnes from the Nabeba Mine in Congo controlled by Sundance Resources Congo Iron subsidiary. Stage 2 will last for at least 15 years and export 35 million tonnes a year of High Grade Concentrate produced from the beneficiation of Itabirite ore at Mbalam.

The commercial viability of an iron ore mining Project depends on the quality of the ore, the size of the resource and the cost of processing, handling and export infrastructure. It has long been known that large quantities of iron ore were present at Mbalam and the area is zoned for mining by the Cameroon Government (refer Figure 3, dark grey area in EP 92). The deposit has remained unexploited because of the remote location of the proposed mine and the consequent high cost of transport and export infrastructure.

Increasing demand and pricing for high quality sea-borne traded iron ore over the past decade has opened up a window of opportunity to develop the Mbalam iron ore Project. CamIron completed the first phase of an ongoing exploration programme at Mbalam in 2008 which identified Indicated and Inferred Resources of 215 million tonnes of High Grade Hematite (60% Fe) and 2,325 million tonnes of Itabirite (38% Fe). The Itabirite has potential to be upgraded to a high quality product.

The resource tonnage is expected to increase with further exploration to be sufficient to support a viable iron ore project exporting 35 million tonnes of high quality product per year over a mine life of at least 25 years. CamIron is aiming to produce High Grade Hematite production for at least 10 years followed by Itabirite concentrate product for at least the following 15 years.

The provision of billions of dollars of port and rail infrastructure in Cameroon will be a likely catalyst for the development of many currently uneconomic iron ore deposits in Cameroon, Congo and Gabon that will likely see iron ore volumes in excess of 100 million tonnes a year eventually exported through the Lolabe Port (refer Figure 2).

CamIron seeks to maximise the economic, social and environmental benefits of the Mbalam Iron Ore Project and to mitigate adverse impacts wherever possible. The proposed mine is located in an area zoned for mining, the port in an area planned for development by the Cameroon Government as a multi-user port complex and the transport corridor avoids population centres and Conservation reserves (refer Figure 3). The Project is considered justified on financial, social and environmental grounds. The Exploration Phase of the Mbalam Project was authorised under a Brief Environmental and Social Assessment approved by MINEP in 2007. The Exploitation Phase of the Project requires a full Environmental and Social Assessment (ESA) comprising an Environmental and Social Impact Assessment (ESIA) and Environmental and Social Action Plan (ESAP).
Figure 1: Cameroon is located in the hinge of Africa’s west coast.
Figure 2: Regional map showing significant known iron deposits that could potentially utilise the Mbalam Project rail and port infrastructure
Figure 3: The Rail corridor (blue line) avoids existing communities and National Parks (green shaded)
The Terms of Reference for the Environmental and Social Assessment for the Mbalam Project were approved by MINEP in May 2008 and encompassed the proposed mine, 508 km transport corridor and port facilities (refer Figure 3) and were based upon:

- export of 35 mtpa of iron ore product;
- transport of products along a 508 km transport corridor between the mine and port
- port capable of receiving up to 380,000 DWT vessels

The principal consultant for the assessment is Cameroon-based Rainbow Environment Consult. The ESA comprises 3 sections presented in 13 volumes and presents CamIron’s strategy to sustainably develop the Mbalam Project. These comprise:

**Executive Summary (Volume 1):** Presents a concise, non-technical summary of baseline environmental and social data, impact assessment processes and management plans developed collaboratively with key stakeholders to enable the Mbalam Project to deliver significant financial, social and environmental benefit to Cameroon.

**Environmental and Social Impact Assessment (ESIA) (Volume 2):** Presents the regulatory framework for the Project followed by a comprehensive environmental and social baseline data presentation and Project description. The potential environmental and social impacts of the Project were assessed using AS 4360 Risk Standard. The main environmental and social priorities of the Project were the protection of forest wildlife from hunting by in-migrating people seeking opportunity; the protection of access to forest resources by indigenous Baka and Bagyeli; the building of capacity and in particular health, education and sustainable livelihoods in nearby communities, and the protection of marine turtles in the vicinity of the port.

**Environmental and Social Action Plan (ESAP) (Volumes 3-13):** The Project Environmental Management System (EMS) is presented in Volume 3 along with a description of the mitigation, monitoring and institutional measures that will be used to mitigate, offset and reduce social and environmental impacts of the Project to acceptable levels and enhance positive social and environmental benefits. Strategies to achieve 60 defined Environmental and Social Objectives of the Project are presented in Volumes 3 to 13. These Objectives are presented in component management plans including the Stakeholder Consultation Plan (Volume 4); Community Development Plan (Volume 5); Indigenous Peoples Plan (Volume 6); Compensation and Resettlement Action Plan (Volume 7); Biodiversity Conservation and Management Plan (Volume 8); Emergency Management Plan (Volume 9); Marine Shipping and Contaminant Plan (Volume 10); Waste Management Plan (Volume 11); Greenhouse Gas Abatement Plan (Volume 12) and; Life of Mine and Closure Plan (Volume 13).

Baseline social and environmental studies and stakeholder consultation have been completed in all areas of Project impact with the assistance of Cameroon and international experts. The impact assessment and associated action plans were developed with significant input from key stakeholders including local communities, NGO’s and Government Ministries. A number of stakeholder workshops were convened including sessions with directly impacted communities and with East and South Region stakeholders at Bertoua, Abong Mbang, Djoum and Ebolowa.

**1.1 Project Justification**

A key aspect of the ESA is to balance Project benefits and impacts. The Mbalam Project is justified on the basis that it will add significantly to the economic, social and environmental value of Cameroon.
1.1.1 Economic Benefit

There is high demand for iron ore to sustain modern society. Most of the sea-borne trade in iron ore is currently sourced from Brazil and Australia. Africa is also rich in iron ore but most of the deposits, similar to Mbalam, are distant from the sea and have remained undeveloped due to the prohibitive cost of constructing large-scale transport systems.

The size of the Mbalam Project gives it the potential to be the first world class iron ore project developed in central Africa. The size of the project does, however, require very significant capital expenditure estimated at US $3.3 billion for start-up. Financing a project of this scale is a significant challenge and will require international sources of capital.

The national benefit to Cameroon is dependent on the Terms of the Mbalam Convention being developed by CamIron and the Cameroon Government. The forecast economic benefit to Cameroon based on the development terms proposed by CamIron is currently estimated to exceed US $5 billion over the life of the Project.

The provision of billions of dollars of port and rail infrastructure in Cameroon will be a likely catalyst for the development of many currently uneconomic iron ore deposits in Cameroon, Congo and Gabon that will likely see iron ore volumes in excess of 100 million tonnes a year exported through the Lolabe Port as previously discussed.

1.1.2 Social Benefit

CamIron is committed to ensuring that the Project is socially equitable and has defined a strategy to allow directly impacted communities to build capacity in areas of health, education and services and prosper economically (refer Volume 5, Community Development Plan). The Indigenous Peoples Plan (refer Volume 6) presents the strategy to protect vulnerable indigenous Baka and Bagyeli from adverse social impacts and to ensure that they also benefit equitably from the Project.

The social impacts of the Project are dependent on effective implementation of management plans but the Project will provide local communities with the opportunity to improve the quality of their lives. This is well recognised at a community level and reflected in the positive feedback for the Project voiced at public meetings (refer Volume 2, Appendix 16). One of the greatest concerns expressed is that the Project may not happen at all or not happen quickly.

The Project has the potential to deliver great social benefit to the people of Cameroon and this is a central theme in the proposed management plans.

1.1.3 Environmental Benefit

The Project will have some unavoidable environmental impact, particularly with respect to the clearing of forest at the mine. The estimated 40 square kilometres of clearing at the mine is, however, about 0.02% of the 170,000 km² area of similar intact adjacent forest and the mine is located in an area officially designated for mining by the Cameroon Government. The disturbance footprint will ultimately be rehabilitated and recolonised by in-migrating wildlife from adjacent forest.

The priority for the Project is to conserve the adjacent forest and its wildlife and to limit long term wildlife impacts in this forest outside of the mine operations (refer Biodiversity Conservation and Management Plan, Volume 8). The presence of the mine will restrict access to sensitive wildlife habitat to the north of the Project by poachers who have already depleted the wildlife in forest areas to the south (refer Volume 2). CamIron will work with local communities and NGO’s to develop sustainable forest management practices with local communities. The development of an effective forest management system operating at a community level is a key to sustainable forest management as it is likely that much of the Cameroon forest inventory will
ultimately be degraded and depleted of fauna by uncontrolled hunting and forest activities. The management commitment of the Mbalam Project can therefore assist in securing a positive environmental outcome in the vicinity of the mine operations. Similarly the Project can be a catalyst to improve livelihoods in local Baka, Bagyeli and Bantu communities reducing reliance on forest resources and with consequent benefits for the sustainability of the forest.

No significant marine impacts are anticipated in the development of the port at Lolabe. However, CamIron recognizes the importance of conserving marine turtles and will provide support for the Kudu marine turtle project at Ebodje and is supportive of a plan by the Cameroon Government with the support of the World Wildlife Fund (WWF) to establish a marine park south of the proposed port facility (refer Volume 8, Biodiversity Conservation and Management Plan).

The project is designed to be energy and emissions efficient as discussed in the Project Greenhouse Gas Abatement Plan (Refer Volume 12). CamIron has additionally proposed to protect large areas of forest adjacent to the Project from clearing and logging to assist the retention of 200 million tonnes of potential carbon dioxide in the forest sink as well as delivering broader forest management benefits. Much of the iron ore produced at Mbalam will be exported to China where it essentially replaces low quality Chinese ore which if often beneficiated using coal fired power. The 17 million tonnes of CO₂ emissions calculated to be produced by the Mbalam Project over its life is a small fraction of the 137 million tonnes of CO₂ that would be emitted from the beneficiation of low grade ore in China to produce a similar tonnage.

1.1.4 Environmental and Social Enhancement Programmes

The Mbalam Project will be designed, constructed and operated to be socially equitable and environmentally sustainable. There is, however, opportunity to further enhance positive social and environmental outcomes in Cameroon (refer Table 1). Some of this enhancement will be achieved through strategic funding of Community Development, Indigenous People and Wildlife Conservation programmes from the CamIron Sustainability Fund receiving 0.5% of after tax profit expected to be between $3 and $5 million a year during operations. CamIron is proposing that $1.3 million a year from this fund be allocated to a number of key community developments, wildlife protection and indigenous peoples programmes (refer Table 1). These key programmes would continue to receive this level of funding irrespective of profit. The remainder of the Sustainability fund would be allocated on advice from an appointed advisory panel.
Table 1: Proposed Offset Programmes

<table>
<thead>
<tr>
<th>Programme</th>
<th>Offset</th>
<th>Timing</th>
<th>Cost/year</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lease wildlife rich UFA 10034 adjacent to the mining lease in the Ngoila-Mintom Interzone for conservation.</strong></td>
<td>• Land 160,000 ha vs 7,500 ha clearing footprint over Life of Mine.</td>
<td>Operations</td>
<td>Lease fee to be negotiated with MINFOF + $100,000 allocation for management</td>
</tr>
<tr>
<td></td>
<td>• CO₂ 200 million tonnes in sink vs 17 million tonnes of emissions over Life of Mine</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Forest Resources for Baka</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Community Development Programmes</strong></td>
<td>Base funding will be provided to health, education and business development programmes in directly impacted communities.</td>
<td>Operations</td>
<td>$500,000</td>
</tr>
<tr>
<td><strong>Forest Resource Mapping</strong></td>
<td>Baka and Bagyeli forest resources</td>
<td>Post approval</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>MINFOF bush-meat enforcement</strong></td>
<td>Bush-meat trafficking</td>
<td>Post approval</td>
<td>$100,000</td>
</tr>
<tr>
<td><strong>Kudu Project and Marine Park monitoring</strong></td>
<td>Marine and Turtle impacts</td>
<td>Operations</td>
<td>$150,000</td>
</tr>
<tr>
<td><strong>Ebola Research, John Hopkins Institute</strong></td>
<td>Great Ape impacts</td>
<td>Operations</td>
<td>$50,000</td>
</tr>
</tbody>
</table>

1.1.5 Conclusion

The Mbalam Iron Ore Project will generate significant wealth for Cameroon. It will generate direct and indirect employment and billions of dollars worth of Project infrastructure and utilities will be inherited by the country at mine closure. Financial benefits include direct and indirect taxation, royalty payments, employee and contractor taxes, wages and salaries, the purchase of goods and services, and the multiplier effects of all of the above. The Mbalam Project also has the potential to deliver significant social and environmental benefits, particularly through capacity building resulting from employment and training, infrastructure development and assistance with the development of robust systems and policies. A commitment by CamIron to directly contribute 0.5% of net dividends (after tax) to social and environmental programmes is particularly significant. The Project will deliver billions of dollars to Cameroon over its life and will serve as a catalyst for further development in Cameroon. The development of a national skills and infrastructure base will stimulate international interest in business opportunities in Cameroon.
2 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA, VOLUME 2)

2.1 Introduction

The ESIA summarises the regulatory framework and presents the environmental and social context of the Mbalam Project as determined from comprehensive environmental and social baseline studies completed on behalf of CamIron by Cameroon-based Rainbow Environmental Consult (REC).

The potential environmental and social impacts of the Project were assessed using ISO 14001 consistent methodology and in consultation with Cameroon and international experts. This assessment encompassed both the direct impacts of the Project and the indirect impact of people in-migrating to Project areas seeking opportunity.

The ESA also presents a comprehensive stakeholder consultation programme including community presentations, public workshops and regular meetings with key stakeholders completed during 2008 and 2009. The level of stakeholder support for the Project is very high. There is also a high level of willingness by local communities, Government Ministries and key NGO’s to work collaboratively with CamIron to maximise the benefits of the Project. The ESIA concludes with a presentation of the 60 environmental and social objectives of the Project. The Management Plans are presented in Volumes 3 to 13.

2.2 Legal and Other Requirements

2.2.1 Social and Environmental Impact Assessment

The Exploration Phase of the Mbalam Project is progressing under the conditions of an approved Brief ESA which is attached in Volume 3. Decree Nº2005/0577 of 23 February 2005 requires a project on the scale of the Mbalam Project to undergo a detailed Environmental and Social Assessment prior to approval.

The ESA approval process commenced with the preparation of a Terms of Reference document submitted to both the Minister for Mines and the Minister for the Environment. The Minister of Environment approved the Terms of Reference in May 2008.

The ESA must be undertaken consistent with the approved Terms of Reference with completed reports lodged with the Minister for Mines and the Minister for Environment. The Minister for the Environment consults with the Minister for Mines and an Inter-Ministerial Environment Committee on the acceptability of the ESA document and notifies the proponent on its acceptance or need for amendment.

Once the ESA document is accepted, each Ministry creates a team to verify the information, gather opinion from impacted populations and draft an evaluation report. This report is then transmitted to the Inter-Ministerial Committee on the Environment along with the ESA report, the impact study evaluation reports, and registers of consultations and public audiences. The Inter-Ministerial Committee then gives its opinion on the adequacy of the ESA study and the associated Management Plans to the Minister of Environment for a ruling. A favourable decision is time barred after three years of non-execution of the Project.

The Inter-ministerial Committee on the Environment plays a central role in the approval process and coordinates public review and comment on the ESA which can lead to amendments to the proposed Management Plans.
2.2.2 Land Acquisition

The process for the appropriation of land for the Project commences with a Ministerial Decree issued by the Minister in charge of town planning (MINDAF) that the construction and operation of the Mbalam Project is in the National interest. This Decree grants CamIron occupation rights as well as rights to use the lands in the easement in the mine, transport corridor and port areas of the Project. The land easement will be the Private Property of the State and allocated to the Project by several decrees including an Indemnisation Decree, an Expropriation Decree, and an Incorporation Decree. This will be followed by an authorisation to occupy Public Lands required for the Project. The Decree will allocate the easement lands on a temporary basis and a certificate of conformity will be issued. An Amendment Decree will then be made limiting CamIron’s usage rights in the land easement to that needed for the mining, processing and the transportation of iron-ore and ancillary supplies. All impacted stakeholders will be compensated at the Standard rates and CamIron will pay voluntarily pay additional supplementary compensation as appropriate.

The Divisional Officer is president of the expropriation and compensation commission according to the regulation in force, notably law n° 85/09 of the 04th of July 1985, and Decree n° 2003/418/PM of the 25th of February 2003. Decree n° 87/1872 of the 16th of December 1987 creates a verification and evaluation commission presided by the Divisional Officer (art 4). The CamIron representative must liaise closely with this commission which is created by an arrête from the Governor.

MINDAF will pay compensation at standard rates for crops, forestry products, wild resources, fish, buildings, and any other improvement ascertained by the verification and valuation commission. House valuations based on Arrete No 008321 MINUH (cfa/m²).

2.2.3 Environmental Regulation

The environmental protection policy of Cameroon is described in the National Environmental Management Plan (PNGE) which affirms the central place of the Environmental and Social Assessment in the Mbalam Project approval process.

There are five government departments with direct environmental management and approval roles in mining Projects in Cameroon in addition to the Inter-Governmental Committee for Environment described above.

- Ministry of Environment and Nature Protection (MINEP)

This is the principal governing body with respect to the environment and is charged with both Policy development and enforcement. It is the Ministry that ultimately approves the ESA and Management Plan. MINEP is the body which approves projects ESAs. In addition to the central office in Yaounde there are sub-offices for the East Region at Bertoua and the Upper Nyong Sub-division in Abong-Mbang. There are sub-offices near the proposed transport corridor in South Region at Ebolowa and Kribi.

- Ministry of Industry, Mines and Technological Development (MINIMIDT)

This Department has ultimate responsibility for exploration and mining regulation including enforcement powers for environmental pollution from mines.

MINIMIDT is in responsible for the elaboration of industry development strategies while enhancing the natural and human resources of the country and for the technological development of the various sectors of the national economy. Through its Mining and Geology Direction, MINIMIDT is in charge of formulating policies and strategies for the mining and geology sector. This ministerial department is responsible for the regulation of mining activities, including being able to enforce environmental laws in the case of pollution resulting from mining activity. It
is the patron Ministry for the Project and will have a strong input in the approval process for the ESA. Approval of the ESA by MINEP is a pre-requisite to the Mining Permit being attributed by the MINIMIDT.

- **Ministry for Forestry and Wildlife (MINOF)**
  With ultimate responsibility for the environmental protection of forests, this Department will have a key role in approving the ESA and in the development of Management Plans.

- **Ministry of Territorial Administration and Decentralisation (MINATD)**
  This department administers territorial administration, civil protection and decentralisation. It will play a key role in aspects such as land expropriation, compensation and resolving social conflicts.

- **Ministry of Territorial Administration and Decentralisation (MINDAF)**
  The Ministry of Land and Titles is responsible for the acquisition of lands for the Project, through a process known as Declaration of Public Utility or DUP. Once the Project is declared to be of Public Utility, it will take charge of the process that will provide the land needed for the Project transport infrastructure, through negotiations and compensation with land owners.

- **Ministry of Economy, Planning & Regional Development (MINEPAT)**
  MINEPAT has a key role in the development of long term national infrastructure plans. The Lands Ministry (MINDAF) will consult closely with MINEPAT on aspects such as the allocation of land for rail and port facilities in particular to satisfy themselves that the CamIron Project conforms with National infrastructure plans.

  The Kribi Deep Sea Port Authority is a Department of MINEPAT and will liaise closely with CamIron during the planning, construction and operation of the Mbalm Project port facilities.

2.2.4 **Environmental Laws**
Cameroon has a number of decrees and laws directly relevant to environmental management of mining and other operations associated with the Mbalm Project.

- **Environmental Management (loi cadre) Law 96/12 (5th August 1996)**
  This describes the legal framework for environmental management and assessment in Cameroon and includes principles of polluter pays, personal responsibility and participation. It affirms the need for an ESA for environmentally significant Projects and prohibits the disposal of waste in a manner that would have an adverse ecological impact.

- **Decree 2005/0577 of 23rd February 2005**
  This Decree details the procedure for conducting an ESA and describes specifically the content and scope requirements and the approval procedure as well as the follow-up and environmental monitoring requirements.

- **Mining Code Law 001/2001 (16th April 2001)**
  This law covers mining activities and specifically requires that all mineral exploitation and exploration is undertaken in a way that ensures the protection of flora and fauna and prevents or minimises discharges into the environment.

- **Forest, Fauna and Fishing Law 94/01 (20th January 1994)**
Formal impact assessment is required for all developments likely to disturb forests or aquatic environments including road construction. National forests in Cameroon are classified as either Permanent Forests (i.e. conservation and communal forests) or Non Permanent Forests (i.e. forests of national domain, community forests and private forests) which have lower levels of protection.

### 2.2.5 Other laws include:

- **Water System Law (98/005)**
  
  For the protection of surface and groundwater quality and particularly pertains to sewage treatment and other potential pollution.

- **Un-savoury Institutions Law (98/015)**
  
  The activities of facilities that constitute a physical or moral peril to the community are regulated and may require the imposition of a buffer zone.

- **EIA Categories (Decree 0070/MINEP on 8th March 2005)**
  
  Defines the principles for the setting of the various levels of Environmental Impact Assessment.

### 2.2.6 International Conventions

Cameroon is a signatory to a number of binding International conventions, each with its own set of obligations. It is the responsibility of the Cameroon Government to ensure that development projects conform to these requirements and this is evaluated in the ESA process. Cameroon is a signatory to the following conventions:

- The Convention on Biological Diversity (CDB).
- United Nations Framework on Climate Change (UNCC) also called the Kyoto Protocol.
- The UNESCO Convention for the Protection of the World Cultural and Natural Heritage.

### 2.3 Project Description

The Mbalam Iron Ore Project encompasses the mining, overland transportation and export of 35 million tonnes of iron ore a year over a mine life of at least 25 years. Stage 1, lasting at least 10 years, will focus on High Grade Hematite production with 13.5 Mt a year from Mbalam and 21.5 Mt a year from the Nabeba Mine in Congo. Lower quality Itabirite ore will then be mined and processed for the balance of the mine life in Stage 2 following depletion of High Grade Hematite reserves. This requires beneficiation to produce a high quality concentrate. Product will be delivered from the mine to the port on ore trains.
2.3.1 Mining

High Grade Hematite will be mined by conventional truck and shovel, crushed, screened, stockpiled transported and shipped from a port near Lolabe (refer Figure 4). The High Grade Hematite is at surface on rocky ridges elevated about 150 m above the surrounding countryside and its removal will remove a number of hills from the landscape with the mine pits then extending the depth. 5 Mt per year of “transitional ore” will also be mined in Stage 1 to produce 3.5 Mt of concentrate and 1.5 Mt a year of tailings which will be deposited in a small Stage 1 TSF.

Mbalam is designated for Mining by the Cameroon Government. The proposed mine facilities (refer Figure 5) include mining pits, waste dumps, process water supply, mineral processing facilities, Tailings Storage Facilities (TSF), workshops, accommodation facilities and associated mining and materials handling infrastructure and utilities.

When the High Grade Hematite is depleted it will be necessary to mine and beneficiate the underlying low grade Itabirite ore to produce a saleable high quality iron ore concentrate product. This ore will be finely ground before float separating the Hematite from the waste material (principally silica). This phase of the Project will require process water storage and a large Stage 2 TSF that will ultimately cover 1,000 ha. Mining volumes will increase and the increased power requirement at beneficiation will necessitate the use of third party hydro power rather than the on-site diesel or heavy fuel oil power generators used in High Grade Hematite production. Stage 2 power supply will be subject of a separate ESA to be completed during Stage 1.

Land disturbance at the mine will be rehabilitated progressively and the total disturbance footprint is estimated at about 50 km² over the life of the mine (refer Figure 5). A final closure Plan will be developed with key stakeholders within 5 years of ultimate mine closure but it is anticipated that areas disturbed by mining, including waste rock dumps and the Tailings Storage Facility will be progressively rehabilitated to forest and recolonised by wildlife in-migrating from
undisturbed adjacent areas. At the end of mining, the mine pits will fill with water which will overflow good quality water into existing water-courses. The post-mining water quality and volumes in streams is expected to be similar to that in streams prior to mining.
Figure 5: Proposed layout of mine facilities
2.3.2 Ore Transport

Crushed iron ore product will be railed to the port. The rail corridor has been optimised for construction and operations and avoids environmentally sensitive areas such as the Mengame Sanctuary/Kom National Park complex and the Campo Ma’an National Park. It also avoids large population centres. Within these constraints it is relatively direct over its total distance of 508 kilometres.

Each train will comprise four locomotives and approximately two-hundred 125 tonne payload wagons. Four to 5 trains will be needed each day to deliver the required 100,000 tonne of iron ore product 508 km from the mine to the port. Diesel fuel and other consumables needed at the mine will be back-loaded in purpose built wagons. A rail service road will be constructed adjacent to the rail track. The average disturbance width within the corridor is expected to be about 100 m which over 508 km equates to 5,080 hectares.

Figure 6: Trains up to 2.5 km long will deliver 25,000 tonne of iron ore to the port facility

Downstream processing of concentrate to iron pellets in a pellet plant at the port site is planned for Stage 2 and will also be the subject of a separate ESA to be completed during Stage 1.

2.3.3 Port Facilities

A dedicated iron ore port facility will be built on the southwest coast of Cameroon near Lolabe in an area that has been declared by the Cameroon Government as a Public Utility for the development of a multi-user port including the iron ore export facility. This area was specifically selected to minimise economic, social and environmental impacts. Unlike options further north near Grand Batanga, Lolabe is in close proximity to deep water which minimises the required length of the loading jetty and dredging costs to allow access to the 26 m deep water needed for loading ships up to 380,000 DWT (refer Figure 7). The area is south of the large population centres of Grand Batanga and Kribi and therefore social impacts are minimised. The area is north of turtle nesting beaches and the Campo Ma’an National Park and therefore environmental impacts are minimised. The hinterland planned for the rail loop and shore-based facilities has been heavily logged and fauna depleted. The area in the immediate hinterland is largely uninhabited, minimising social and environmental impacts.
Figure 7: Iron ore will be sea transported in large bulk ore carriers similar to those serving Australia’s Pilbara mines.

The loading causeway and jetty will be about 1 km long and extend to the 15 m depth contour. Large ships will access the jetty via a three kilometre long dredged channel extending to the 26 m depth contour. A rock-fill causeway will extend from the shore and include a Material Offloading Facility (MOF) inshore from the shipping berth (refer Figure 8). Shore based facilities will include a large product stockpile area on reclaimed coastal land, bulk fuel storage, warehousing, administration buildings, switchyards and maintenance workshops for the trains and ore cars. The disturbance footprint at the port is expected to be less than 10 km².
Figure 8: Layout of port facilities and dredge channel at Lolabe
2.4 Environmental Baseline

2.4.1 Mine Site

2.4.1.1 Geology

Banded Iron Formation ("BIF") deposits in the Mbalam region are hosted in Archaean iron formations. The BIF are important hosts for large Hematite deposits on a world scale in Canada, Australia, Africa and Brazil.

At Mbalam, the BIF have been recrystallised to Itabirites (ferruginous quartzites). Where the BIF have been subjected to shearing and isoclinal folding, the increased porosity has resulted in supergene enrichment from protore (30 – 40 % Fe) to massive Hematite (+60 % Fe). There is a complete range of grades from the protore, through Hematite (martite) enriched BIF to massive Hematite.

High Grade Hematite tends to outcrop on the larger hills and overlie deeper Itabirite material. This high grade near-surface material will be mined initially with low strip ratios and small volumes of waste rock.

Analysis of rock samples indicates that ore and waste rock at Mbalam is benign. The rock is low in sulphur and is typically acid neutralising with an average neutralising potential of 2.8 kg of CaCO₃/tonne of rock. It is also very low in metals other than iron and low in radio-nucleides. No issues are expected with acid mine drainage, metal laden leachates or radionucleides. Waste rock and ore will, however, be routinely characterised and if high sulphur waste rock is detected it will be encapsulated within the waste rock dump to prevent oxidation. Drainage from the waste rock stockpiles will be directed through sediment traps and sumps. No fibrous minerals have been detected or are expected in the ore-body or surrounding rock.

The beneficiation of Itabirite ore is expected to produce 1.5 tonne of tailings (predominantly quartz) and 0.4 tonne of waste rock per tonne of produced iron concentrate product. The benign tailings will be placed in a tailings dam which will be capped and revegetated on mine closure. Waste rock stockpiles will likewise be capped and revegetated.

2.4.1.2 Soils

Soils at Mbalam typically have low sodium content (sodicity) and dispersiveness. This makes them stable and lessens the need for rapid stabilisation of disturbed areas with grasses to protect the water quality in surface streams from sedimentation. Organic matter is confined to the top 10 cm of soil which will be stripped and stockpiled for use in re-vegetation programmes. Fertiliser will, however, be needed to counter acidity and high aluminium content should the soils be used for intensive agriculture programmes at the nearby Mbalam community.

The area is geotechnically stable, which ensures the long term stability of pits and tailings dams. The predominant clay soil is also ideal for sealing dams and rubbish dumps and will slow the transmission of hydrocarbons in the event of a fuel spill.

2.4.1.3 Groundwater

Groundwater at the mine is of high quality and, unlike the surface water, free of coliform bacteria and fit to drink. The ground water generally follows the topography with a dome at the centre of major hills and drained by valleys. The water is close to surface in valleys but is not an essential source of drinking water for humans or wildlife.
2.4.1.4  Flora and Forestry Resources

The flora at Mbalam is typical of the Dja Region (refer Figure 9). It is an evergreen, camerouno-congoles type forest with very high species diversity, and homogenous distribution with the exception of stands of *Gilbertiodendron dewevrei* in valleys with dry soils and lateritic red clay. There are also some stands of *Raphia regalis* on dry clay soils. No rare flora was found and there is a sparseness of trees of commercial value for logging (i.e. 20 m³ timber/ha) despite the relatively high 596/ha density of trees (represented by 138 species). The ratio of 15 to 25 cm Diameter at Breast Height (DBH) trees is 3 (instead of the 2 expected for an untouched forest) indicating that the area may have been disturbed at sometime in the past.

The Cameroon Government has suspended the allocation to logging companies of 930,000 ha of forest in the Ngoila-Mintom section of the TRIDOM region of Cameroon, pending the results of surveys for the purposes of creating a conservation area. This forest has been proposed as a cross-border corridor between the protected areas of the Dja, Nki and Minkebe. The proposed mining area at Mbalam has been designated for mining by the Cameroon Government and is located outside of proposed conservation areas.

![Figure 9: Botanical survey at Mbalam](image)

2.4.1.5  Fauna

The forests in the vicinity of the proposed mine are rich in fauna, however, the predicted clearing over the life of the mine represents only 0.02% of 170,000 km² of similar forest in the area. The mine will be revegetated and ultimately recolonised by fauna temporarily displaced into the surrounding forest. 27 mammal species have been identified in the Mbalam area. Fauna populations are higher to the north of the Project area but depleted in the south. The presence of
0.4 snares per kilometre and many shotgun shells in the area indicates high hunting pressure in the south. The presence of the mining operation is expected to form a hunting barrier to protect wildlife further north. Infrastructure, including proposed rail facilities, has been preferentially sited to the south of the mine to reduce fauna impacts (refer Figure 5). The greatest threat to fauna is hunting by an expanding community in nearby Mbalam. Community education, land-use planning, alternative protein and income support are recommended strategies to discourage hunting. CamIron will also lobby the Cameroon Government to protect intact forest areas within the Ngoila-Mintom interzone between the mine and the Dja Reserve to the north from logging and hunting so that it retains its value as a wildlife reservoir area.

2.4.1.6 Archaeology

There is no evidence of current human habitation in the proposed mine area with the exception of hunting tracks used sporadically by indigenous Baka. Evidence of iron-age smelting uncovered by land clearing operations were found during the archaeological survey conducted as part of the ESA. CamIron will conserve archaeological artefacts by routinely undertaking surveys during land clearing operations and ensure that any detected artefacts are catalogued and preserved.

2.4.2 Transport Corridor

2.4.2.1 Flora

The proposed transport corridor commences near the coast in Atlantic Coastal Forest dominated by Caesalpinacea. It traverses a swampy lowlands region occupied by the Hevecam Rubber Plantation and then moves into evergreen Cameroon-Congolese type forest that has been degraded by years of logging, hunting and settlement. It then passes the northern boundary of the Kom National Park before entering the relatively intact forests of the TRIDOM. These forests are similar to those at the proposed mine site.

2.4.2.2 Fauna

The fauna in the eastern section of the proposed transport corridor between the mine site and the Mengame Sanctuary/Kom National Park complex is diverse and similar to that at the proposed mine site. The proposed transport corridor passes north-east of the Mengame Sanctuary/Kom National Park complex through a degraded, populated and mixed agricultural area near the village of Yen. The corridor does not have a direct impact on the Reserve. Between Yen and Ebolowa it passes through heavily logged forests that have been depleted of fauna and then runs along the existing Ebolowa to Kribi road corridor which has also been depleted of fauna. Fauna populations are low in the western section of the transport corridor and in the port site hinterland.

2.4.2.3 Rivers

The Project is not expected to have an impact on river flows or the quality of water in the river systems crossed by the transport corridor. 23 species of fish in thirteen families were recorded from the waterways near Kom National Park and Mengame compared to 15 families and 55 species of freshwater fish in Campo-Ma’an National Park.

2.4.3 Port Site

2.4.3.1 Flora and Forestry Resources

The Atlantic coastal forests in the hinterland of the proposed Port have been logged at least twice but still contain 53 m³/ha of salvageable commercial timber. Species diversity is high with 680 species but no rare flora was identified. The coastal strip where most of the port facilities will be located has a mixture of active and fallow agricultural land.
2.4.3.2  Fauna
The hinterland of Lolabe has been heavily hunted and has both low population and low numbers of fauna species. The land-based port facilities are expected to have low fauna impact.

2.4.3.3  Marine Habitat
Marine sediments were assessed from a combination of seismic refraction survey work and grab sampling. A surface layer of soft mud thickens from a very thin to non-existent layer inshore to deep black mud deposits in deeper water beyond the 10 m contour. This mud layer overlies silty sand which in turn overlies weathered rock. This silty benthos, in combination with turbid water and water depth, is not conducive to the formation of benthic communities of seaweed, coral reef or seagrass that could support demersal (i.e. bottom feeding) fish and be disturbed by dredging operations. The marine ecosystem at the port site are supported largely by phytoplankton and the fishery is dominated by pelagic (i.e. mid-water) fish. The ecological impacts of port construction and dredging operations are expected to be limited to short term increases in water turbidity and have no adverse impact on local fish stocks. Unlike the Grand Batanga area to the north and areas further south, rocky outcrops at Lolabe are restricted to the immediate margins of the beach.

Four species of marine turtles frequent the coastal waters off Cameroon and two species come ashore to lay their eggs between October and April on the southern beaches. The proposed port is located several kilometres to the north of the main turtle nesting beaches and port infrastructure will have minimal impact on the beaches (refer Figure 8). The beaches at the port site are additionally short and lack a significant zone for turtle nesting between the high tide mark and adjacent coastal vegetation (refer Figure 10).

Figure 10: The short beaches at the proposed port site are not well suited for turtle nesting
2.5 Social Baseline

The proposed mine is located in the Ngoila sub-division which contains 25 communities, including the town of Ngoila. The total population in this area is around 6,500 people. At Mbalam II (i.e. Ntam) the population was estimated by the village chief to have grown from 319 to nearly 500 from 2006 to February 2008.

The proposed transport corridor traverses large areas of increasingly degraded forest as it runs from east to west. The population in these forests is low and concentrated along roads.

The largest concentrations of people are in the port site area. No communities at the port site will be directly impacted but there are 21 communities in nearby areas including 12 in the sub-divisions of Kribi and 9 in the sub-division of Campo with a total population of about 22,000 people. Most of these are located well north of the proposed port site in the Grand Batanga/Kribi area.

Ethnic diversity is high in the mine area (e.g. Njyem, Bulu, Baka and minority Foulbes, Maka, Kaka, Bamoun, Eton, Bamilele, and Douala tribes) and at the port (e.g. Lyassa, Mabi, Fang, Myae, Bagyeli, Bapuku and Banoho tribes). These groups are divided into clans and families and languages spoken include Njyem, Baka, Bulu near the proposed mine and Lyassa, Myae, Batanga and Fang near the port site. The main religions are Catholic, Protestant (Presbyterian, Adventist, Presbyterian orthodox) and Islamic. The origins of the various ethnic groups are detailed in the source report (refer Volume 2, Appendix 14).

Households comprise an average of 4 people usually including a husband, wife and children but sometimes including an extended family of grand-parents and grand-children. The demographic study indicated that there are more men than women (57% at mine, 51% at port), and that the populations are young with the majority of people under 15 years old.

Most agricultural revenue in the Mbalam area is from cocoa, cultivated fruit, palm oil and plantain while hunting is the main source of protein. Deer (Duiker) and hare are the most hunted animals but protected species are also consumed. Natural resources such as wood and non-wood forest products contribute to the household uses and economy. At the port site, manioc, plantain, macabo, maize, fruit, cucumber, igname and peanuts are the main crops but most port site communities are supported by fishing. Animal husbandry is largely limited to poultry with some sheep, goats and pigs.

The main issues and concerns of local communities are employment and training, improved social infrastructure and living conditions and support for business such as agro-production through provision of micro-finance.

2.5.1 Indigenous People

Indigenous hunter gatherers inhabit the equatorial forests of Africa. There are an estimated 250,000 to 600,000 in various ethnic groups living in the Congo rain-forest. They are traditionally semi-nomadic hunter-gatherers and speak several languages. The indigenous peoples of South Cameroon belong to the Mbenga group which includes the Baka near the mine and Bagyeli people near the port. These speak a different language.

In contrast, the Bantu are African people who probably originated in Cameroon some 5000 years ago before migrating to other parts of Sub-Saharan Africa. The Bantu comprise some 400 ethnic groups but speak languages with a common origin. They represent the huge majority of the population in Cameroon and amongst the new settlers to Mbalam and they dominate government administration and offices. Whilst poverty is still high in Cameroon, there is a high demand for land for development and the non-confrontational Baka are often disadvantaged.
There are 35 indigenous Baka villages in the Ngoila-Mintom subdivisions with a combined population of 1,481. They comprise less than 4% of the total local population of 12,500 (refer Figure 11).

There are 817 indigenous Bagyeli living in 20 villages in the port area. Two of these, with a population of 113, are located within the Hevecam rubber plantation and two, with a population of 75, are located near the Socapalm palm oil plantation.

Indigenous populations are scarce along the transport corridor due to degradation of the forests and a lack of forest resources to sustain their lifestyle. In the vicinity of the Mengaie Sanctuary, however, a population of some 8,000 people, living in 35 villages, was recorded in 2006. This population was dominated by Bantu and Bulu, with the minority Baka population of 400 people comprising about 5% of the population. Here again, conflicts between Bantu and Baka were reported, mainly due to land use issues and cultural conflict.

The priorities for indigenous people are land use rights, citizenship and equality of Project benefits in the face of competition from the more numerous, more assertive and higher skilled Bantu.

Figure 11: Baka village at Assoumindele

2.5.2 Medical Baseline

The Mbalam area is located in the Health Area of Ngoila which is one of the three Health Areas (along with Messok and Lomié) in the Health District of Lomié.
The Health Area of Ngoila services 26 villages and has a population of about 6000 people. There is one Health Centre (the Ngoila CMA, with 15 beds) and two Integrated Health Centres at Nkolakaye and Mbalam. There is also a military infirmary at Mbalam. None of these have beds. The qualified health personnel comprise 1 doctor, 1 certified nurse, 1 qualified nurse & 1 laboratory technician. The closest treatment centre for tuberculosis is at Lomie and HIV cases are sent to either Abong-Mbang or Djoum.

The Sub-divisional Health Centre at Ngoila (CMA) treated an average 38.6 cases per month in 2006. Baka generally treat their sick at home only. The main Baka village is situated 38 km from Ngoila CMA making access to this facility difficult.

The main complaints in order of frequency are Malaria (59%); acute respiratory infections (33%, 71% in children); gastro-enteritis, diarrhoea and worms (38%, 48% in children); pelvic inflammations and STD. The main cause of death is malaria and obstetric complications. Potential epidemic diseases include red diarrhoea (Shigella) and Ebola Virus. There have been no reported cases of these since 1998 when there were 295 cases of red diarrhoea and 50 deaths. Population surveys revealed that the main concerns are birth problems, drinking water, the cost of health and STDs.

The transport corridor crosses the four Health Districts of Djoum, Mvangan, Ebolowa and Kribi. All four of these Health Areas are short of qualified personnel and the most distant village is 115 km from the nearest Health Centre. These have similar health statistics as those of Ngoila, with the addition of Trypanosomiasis (sleeping disease) in the Health Area of Campo (Kribi Health District).

2.6 Stakeholder Consultation

Stakeholders of the Project include Government, local communities, indigenous populations, village chiefs and community representatives, NGO’s, industries and Parks and Reserves managers. Regular consultation with all these groups occurred throughout 2008, 2009 and 2010 to ensure people remained fully informed about the Project and its progress. These meetings provided stakeholders with the opportunity to discuss issues of concern, provide data relevant to the baseline studies and to participate directly in the impact assessment process and the development of management plans. A summary of CamIron's response to stakeholder concerns is presented below (refer Table 2).

In addition to the consultation programme, a large number of public meetings were held with potentially impacted communities following the approval of the Terms of Reference in May 2008. Communities were informed about the Project and its scope and invited to actively participate in the assessment process and the development of management plans. Questions and concerns about the Project were answered and a number of facilitated Workshops were convened. These Workshops included an assessment of risks and the proposal of management strategies from the viewpoint of the community. Similar meetings and Workshops were held with indigenous Baka and Bagyeli communities.

Workshops with key East and South Region stakeholders invited by the respective regional Governors were completed in February and March 2009. Additional workshops were convened in various east and south region communities during 2009 (refer Figure 12). Participants at these Workshops included administrators, ministerial delegates, key NGO and industry representatives, community representatives and the media. These meetings focussed on the potential benefits and challenges of the Project in the respective regions and provided CamIron with an opportunity to answer questions about the Project. The need for collaboration and partnership to achieve good outcomes was emphasised. CamIron reiterated a commitment to provide opportunity and to facilitate the development of strong independent communities. The Company has however pointed out that it must not assume the role of government and that it is important for the
Ministries and NGO’s to work closely with CamIron to ensure the development of strong and independent community capacity.

Figure 12: Stakeholder workshop at Abong Mbang

CamIron regularly attended Workshops and meetings convened by a variety of NGO’s and other stakeholders during 2008, 2009 and 2010. An overview of the Project was presented at many of these meetings which often had a theme of collaboration for sustainable development. CamIron also used these forums to discuss broader sustainable development initiatives not directly relevant to the Project but important for securing sustainability outcomes in Cameroon. An example of this is the need to protect the forests of the Ngoila-Mintom Interzone adjacent to the proposed Mbalam Project to secure a reservoir for wildlife and forest resources for indigenous Baka. CamIron raised this as a priority for action at the Sustainable Forests Forum organised by WWF and the Cameroon Parliamentary Committee in July 2009.

A series of Restitution Workshops were convened in April 2010 to prepare stakeholders for the MINEP directed public review of the ESA scheduled to commence on the 26/04/2010. These workshops were a voluntary and independent initiative from CamIron as a follow-up to previous workshops and were designed to encourage stakeholders to participate in the upcoming public review process and to answer technical questions about Project. Facilitation workshops were held at Yaounde, Bertoua, Abong Mbang, Kribi and Ebolowa in the two weeks prior to the public review and meetings were held with MINEP and MINFOF Delegates as well as the Senior Divisional Officers and the South and East Region Governors prior to the opening of the Public meetings. The minutes of the Facilitation Workshops are appended (refer Appendix 18) but in keeping with previous workshops stakeholder interest centred largely on employment and training opportunities.
CamIron will maintain routine contact with the following key Project stakeholders and ensure their views continue to be reflected in the impact assessment process and the development of management plans:

- Mbalam Community
- Baka Community
- Lolabe Community
- Hevecam
- Socapalm
- IRAD and Sodecoa
- Mengame Sanctuary/Kom National Park
- Logging Industry
- Menvele Dam Project
- Bagyeli Community at Port Site
- World Wildlife Fund (WWF)
- Centre for Environmental Development –Forest Peoples Programme (CED-FPP)
- International Tropical Timber Organisation (ITTO)
- KUDU Turtle Project
- AGEFO-Baka
- Regional Governors
- Yaounde Officials
- Ministerial Delegates MINEP & MINFOF
- Divisional and Sub-Divisional Officers
<table>
<thead>
<tr>
<th>Key Stakeholder</th>
<th>Concern</th>
<th>CamIron Response</th>
<th>ESA reference</th>
</tr>
</thead>
</table>
| Mbalam Community | Employment | • Local Employment Policy  
• Skills Development Programme | Volume 5 CDP Section 6.1.8 |
| Mbalam Community | Food security | • Manage population influx  
• Secure land tenure for Baka and Bantu  
• Agriculture development programmes in collaboration with Agriculture Ministry | Volume 5 CDP Section 6.1.3 |
| Mbalam Community | Improved infrastructure & services | • Programmes to be implemented in collaboration with relevant ministries and NGO’s. | Volume 5 CDP Section 6.1.9 |
| Mbalam Community | Displacement of wildlife | • Sustainable forest management with help of MINFOF and NGO’s.  
• Wildlife surveillance programmes. | Volume 8 BCMP Section 7.1.3 and 7.1.6 |
| Baka Community | Loss of forest resources | • Promote hunter gathering rights for Baka over key forest areas.  
• Sustainable forest management in collaboration with MINFOF and NGO’s | Volume 6 IPP Sections 5.2 and 5.7 |
| Baka Community | Employment opportunities with Project | • Local Employment Policy  
• Skills Development Programme | Volume 5 CDP Section 6.1.8 and Section 5.5 of Volume 6 IPP |
| Baka Community | Health and education | • Collaborative improvement programmes with relevant ministries and NGO’s. | Volume 6 IPP Section 5.5 and Volume 5 CDP Sections 8.4 and 8.8. |
| Communities in transport corridor | Displacement and compensation | • Avoid major communities. Minimise footprint and fairly compensate people as discussed in the Compensation and Management Plan. | Volume 4 SCP and Volume 7 C&RAP |
| Port Community | Employment | • Local Employment Policy  
• Skills Development Programme | Volume 5 CDP Section 6.1.8 |
| Port Community | Sustainable fisheries | • Secure land tenure  
• Fisheries development | Volume 5 CDP Section 8.7 |
| Port Community | Improved infrastructure & services | • Programmes to be implemented in collaboration with relevant ministries and NGO’s and an upgraded road to Kribi. | Volume 5 CDP Section 8.9 |
| Bagyeli Community | Loss of forest resources | • Sustainable forest management with help of MINFOF and NGO’s | Volume 6 IPP Sections 5.2 and 5.7 |
| Bagyeli Community | Employment opportunities with Project | • Local Employment Policy  
• Skills Development Programme | Volume 5 CDP Section 6.1.8 and Section 5.5 of Volume 6 IPP |
| Bagyeli Community | Health and education | • Collaborative improvement programmes with relevant ministries and NGO’s. | Volume 6 IPP Section 5.5 and Volume 5 CDP Sections 8.4 and 8.8. |
| WWF | Wildlife impacts at mine | • Sustainable forest management with help of MINFOF and NGO’s.  
• Wildlife surveillance programmes. | Volume 8 BCMP Section 7.1.3 and 7.1.6 |
| WWF and Kudu | Impact on turtles at port | • Selection of port site location  
• Support of Kudu Project  
• Support for marine park | Volume 8 BCMP Section 7.1.9 |
### Key Stakeholder | Concern | CamIron Response | ESA reference
--- | --- | --- | ---
CED and AGEFO-Baka Project | Impact of Project on Indigenous People | • Indigenous Peoples Plan with a priority on land tenure and sustainable management of forest resources. | Volume 6 IPP

## 2.7 Issues, Impacts and Management

Sixty Environmental and Social Objectives were developed from the impact assessment process. A summary of issues and impacts is presented below (refer Table 3 and Table 4). The implementation of appropriate controls and management plans effectively mitigates the short and long term risks of these potential impacts. Priority programmes include:

- Community development programmes in directly impacted communities.
- Protection of the forest resources of indigenous Baka and Bagyeli in areas of impact at mine and port.
- Protection of large fauna in the Mbalam area.
- Protection of marine turtles in port area.
- Managing emissions of Greenhouse gases.
### Table 3: Management of key issues during Construction

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Potential Impact</th>
<th>Key Controls</th>
</tr>
</thead>
</table>
| **Direct construction impacts** | • Loss of timber resources  
• Loss of non timber forest products  
• Loss of wildlife habitat  
• Acceleration of land erosion  
• Damage to archaeological sites  
• Displacement of wildlife  
• Introduction of weeds  
• Loss of turtle nesting beaches  
• Frightening nesting turtles away from nesting grounds  
• Smothering of benthic habitat with dredge spoil  
• Loss of access to fishing grounds by local fishermen | • Siting facilities for minimal impact including avoiding Nature Reserves.  
• Salvage commercially viable timber  
• Designing infrastructure for minimal land clearing  
• Completion of comprehensive baseline assessment  
• Effective management of earthmoving and dredging activities  
• Ongoing monitoring programmes  
• Facilitate sustainable fishing programmes (refer Biodiversity Conservation and Management Plan)  
• Offset Programmes including sustainable forest management strategies and support to key NGO’s (refer Volume 3 ESAP). |
| **Indirect construction impacts** | • Facilitating forest access to poachers  
• Facilitating in-migration of settlers  
• Displacement of local people  
• Marginalisation of indigenous Baka and Bagyeli  
• Loss of agricultural produce and fields.  
• Loss of timber resources allocated to others. | • Install security gates to control outsider access  
• Support MINOF anti-bushmeat enforcement programmes  
• Facilitate sustainable forest management programmes (Refer Biodiversity Conservation and Management Plan)  
• Facilitate securing access of Baka and Bagyeli to forest resources.  
• Facilitate sustainable livelihoods (refer Community Development Plan)  
• Pay appropriate compensation (refer Compensation and Relocation Action Plan) |
| **Operational activities during the construction period** | • Noise and vibration impacts on local communities and wildlife  
• Sedimentation and discolouration of rivers.  
• Fuel spills to land and water  
• Community safety issues with heavy road traffic  
• Fuel spill to ocean  
• Excess energy and greenhouse gas generation | • Siting of facilities for minimal impact  
• Buffer zone from local communities  
• Buffer zone for wildlife retreat  
• Well engineered crossings  
• Progressive rehabilitation  
• Use of good quality and well maintained equipment  
• Habituation of wildlife as already apparent at Mbalam  
• Well maintained mobile fleet with good procedures (eg. speed limits, fatigue management programmes, good communication systems)  
• Effective Emergency Plan (refer Emergency Response Plan)  
• Project design parameters to minimise Greenhouse Gas production (refer Greenhouse Gas Abatement Plan) |
### Table 4: Management of the Potential Environmental and Social Impacts during Operations

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Potential Impact</th>
<th>Key Controls</th>
</tr>
</thead>
</table>
| **Direct impacts during operations** | • Contamination of land and water with discharges of oils, metals and sediment and other substances  
• Noise and vibration disturbing nearby residents and wildlife  
• Depletion of natural springs used by local people or wildlife  
• Excessive use of energy and emissions of greenhouse gasses.  
• Generation of exhaust fumes impacting air quality  
• Generation of dust smothering vegetation and impacting workforce health.  
• Excessive generation of wastes including tyres, waste oil and batteries.  
• Proliferation of vermin feeding on food scraps at rubbish dump.  
• Roadside littering from delivery vehicles.  
• Major fuel spill from road-tanker accident.  
• Excess water in tailings dam  
• Contamination of land from tailings spill  
• Inability to cap unstable tailings and rehabilitate at closure  
• Contamination of air with dust at Port  
• Introduction of exotic plants and animals  
• Hunting and bush-meat consumption by workforce  
• Direct disturbance of community by mine employees | • ISO 14001 and AS 1401 consistent integrated managing systems driving continual improvement in performance (refer Volume 3 ESAP).  
• Good design of facilities and equipment.  
• Good procedures  
• Competent workforce through careful selection, training and good supervision.  
• Good monitoring, surveillance and incident response.  
• Effective community engagement and disputes resolution processes  
• Reduce, Reuse, Recycle system for wastes and ensure appropriate disposal  
• Use of emissions efficient third party power during beneficiation phase  
• No discharge of groundwater, or process water to rivers and streams.  
• Good design and geotechnically robust.  
• Manage discharge of tailings effluent.  
• Good inspection and surveillance systems  
• Capping and rehabilitation on closure  
• Good design parameters (i.e. stockpile height and orientation, moisture content of ore being loaded, effective scraper systems, effective dust suppression sprinklers, adequate sediment traps on stormwater discharge) to minimise stockpile dust at port  
• Clear and enforced Policies and rules controlling behaviour in combination with good workforce education programmes |
| **Indirect impacts during operations** | • Loss of capacity in key community services such as food security, health, education and law and order.  
• Excessive land clearing for agriculture.  
• Depletion of wildlife due to increased hunting pressure.  
• Marginalisation of indigenous Baka and Bagyeli due to competition with in-migrating Bantu peoples. | • Promote integrated land-use planning  
• Install Security Gate  
• No bush-meat and hunting Policy  
• Support MINFOF enforcement capacity  
• Support community education on wildlife  
• Facilitate sustainable livelihoods to lessen need to hunt |
3 ENVIRONMENTAL AND SOCIAL ACTION PLAN (VOLUMES 3-13)

The ESAP defines the management, mitigation, monitoring, and institutional measures needed to mitigate, offset, or reduce the adverse social and environmental impacts of the Project to acceptable levels and enhance positive social and environmental impacts. The ESAP is presented in ten volumes (refer Volumes 3-13).

3.1 Volume 3: Environmental and Social Action Plan

Volume 3 presents the Environmental Management System that will be used to drive good and continually improving environmental and social performance over the life of the Project within a Plan Do review Continual Improvement cycle (refer Figure 13).

**Figure 13: The Plan Do Review cycle drives continual improvement**

Volume 3 presents the strategies to achieve the key environmental and social objectives as follows.

- **Objective 1**: Implement an effective EMS to drive continual improvement in social and environmental performance over the life of the Project.
- **Objective 2**: Comply with legal and other requirements.
- **Objective 3**: Support regional forest management in the vicinity of the mine.
- **Objective 4**: Manage Transport Corridor to mitigate environmental and social impact.
- **Objective 5**: Manage Port facilities to mitigate environmental and social impact.
- **Objective 6**: Minimise impacts on water quality of rivers and streams during construction and operation.
- **Objective 7**: Minimise noise and vibration impacts during construction and operation.
• Objective 8: Manage dust from stockpiles and materials handling

The implementation strategy which will be resourced from a Sustainability Fund receiving 0.5% of after tax profit together with proposed environmental and social offset programmes are also presented in Volume 3.

3.2 **Volume 4: Stakeholder Consultation Plan**

The Stakeholder Consultation Plan defines the processes and procedures by which CamIron will engage stakeholders and consult with affected people throughout the Project’s lifespan. The stakeholder consultation objectives are:

• Objective 9: Consult stakeholders and consider their concerns in Project decisions.

• Objective 10: Engage Stakeholders in development of Management Plans.

• Objective 11: Establish strong and enduring relationships with key stakeholders.

3.3 **Volume 5: Community Development Plan**

This Plan presents the strategy by which CamIron provides opportunity to impacted communities and assists them to build capacity in the areas of skills, food security, health, education, infrastructure, law and order and sustainable livelihoods (refer Figure 14). It is closely aligned with the Biodiversity Conservation and Management Plan and the Indigenous Peoples Plan. Key Objectives are:

• Objective 12: Plan and manage in-migration of outsiders into local communities directly impacted by the Project.

• Objective 13: Support the principle of land tenure for local indigenous and Bantu people to prevent loss of land and resources to outsiders in-migrating into Project areas.

• Objective 14: Improve food security for expanding local communities.

• Objective 15: Combat the spread of HIV and other diseases in expanding local communities.

• Objective 16: Ensure high standards of road safety on access roads within Project areas.

• Objective 17: Support sustainable fisheries management in the vicinity of port-site to protect livelihoods and food security.

• Objective 18: Facilitate community training and education to enable local communities to take advantage of Project opportunities and facilitate employment and business development opportunities in local communities.

• Objective 19: Encourage government to develop appropriate community infrastructure and services for water supply, electrical power, communications and roads in local communities directly impacted by the Project.
3.4 Volume 6: Indigenous Peoples Plan

The Indigenous Peoples Plan (IPP) presents the results of the indigenous people social baseline study. The plan defines the Indigenous Peoples Consultation program and defines culturally appropriate grievance and compensation methods and actions for any Project affected indigenous groups. The key objectives of the IPP are:

- Objective 20: Map the territories and forest resources of the indigenous Baka and Bagyeli people as a step in securing long term access to forest resources.
- Objective 21: Facilitate the development of a Sustainable Forest Resource Management Plan for expanding local communities at Mbalam and the port site area.
- Objective 22: Assist Baka and Bagyeli people to obtain citizenship papers to facilitate equitable access to employment, training and services.
- Objective 23: Provide appropriate skills training for Baka and Bagyeli people to facilitate employment and business opportunity.
- Objective 24: Ensure specific provision is made for Baka and Bagyeli in the Community Development Plan in areas such as food security, health and education as an affirmative action for these vulnerable groups.
• Objective 25: Deliver culturally appropriate community education programmes about the Project and the management of forest resources to the Baka and Bagyeli.

• Objective 26: Support hunter and gathering rights for the Baka and Bagyeli within Forest Management Units adjacent to Project areas.

3.5 Objective 27: Maintain a long-term participatory approach to working with indigenous communities over the life of the Project.

Volume 7: Compensation and Resettlement Action Plan

The Resettlement Action Plan (RAP) defines all Project-affected people who will suffer economic displacement and/or physical displacement as a result of Project implementation. It also defines the resettlement and compensation strategies to be followed by the Project to mitigate economic and physical displacement. The Plan includes assistance to vulnerable people affected by the Project (with the exception of indigenous people covered by the IPP), a grievance mechanism, and monitoring and evaluation mechanisms for evaluating the outcome of the resettlement and compensation programs. The key objectives of the Compensation and Resettlement Action Plan are:

• Objective 28: Achieve voluntary negotiated agreements with impacted stakeholders to minimise the need for involuntary resettlement.

• Objective 29: Manage the in-migration of outsiders into the compensation zone during the negotiation process.

• Objective 30: Ensure adversely impacted people are compensated in a transparent and consistent manner.

• Objective 31: Ensure that the economic impact of displacement is mitigated.

• Objective 32: Target development opportunities for displaced people.

• Objective 33: Seek Government support to secure compensated land by preventing resettlement following compensation.

3.6 Volume 8: Biodiversity Conservation and Management Plan

This Plan presents the strategy that will be used by CamIron to protect wildlife, in particular, large mammals in the vicinity of the mine and marine turtles near the port. It has a focus on the sustainable use of forest and marine resources. It is closely aligned with the Community Development Plan (Volume 5) and shares a number of key objectives.

• Objective 34: Minimise land clearing footprint over the Project life to practical limits.

• Objective 35: Combat poaching of vulnerable wildlife adjacent to new access roads.

• Objective 36: Support Government in managing the loss of sensitive wildlife habitat to agricultural and residential land near an expanding Mbalam community.

• Objective 37: Manage impact on fauna from CamIron transport operations.

• Objective 38: Seek Government support for the protection of conservation values of Forest Management Units in the Ngoila-Mintom interzone north of the mining area.

• Objective 39: Facilitate sustainable fishing at Lolabe to conserve fish stocks.
- Objective 40: Manage port activities to minimise impacts on marine turtles.

![Image: Facilitation of sustainable fishing is a key objective of the Biodiversity Conservation and Management Plan](image)

**Figure 15**: Facilitation of sustainable fishing is a key objective of the Biodiversity Conservation and Management Plan

### 3.7 Volume 9: Emergency Management Plan

The objectives of the Emergency Management Plan are:

- Objective 41: Proactively manage Project activities to minimise the risk of emergencies.
- Objective 42: Respond quickly and effectively to emergency situations to mitigate consequences.
- Objective 43: Fully investigate all emergencies and provide effective post-emergency support to mitigate consequences and reduce the risk of a recurrence.

The EMP encompasses roles and responsibilities, the decision making process and presents four specific response plans:

- Medical Evacuation Plan
- Security Emergency Plan
- Missing Persons Plan
- Spill Response Plan
3.8 **Volume 10: Marine Shipping and Contaminant Plan**

The Marine Shipping and Contaminant Plan was prepared in fulfilment of CamIron Environmental Policy, Cameroon Law and International Standards. The Plan encompasses contamination prevention strategies and appropriate response in the event of a significant spill to ensure that short and long term impacts are minimised.

It presents strategies to achieve each of 5 objectives to protect the marine environment:

- Objective 44: Prevent shipping accidents that could result in a release of fuel oil and other contaminants.
- Objective 45: Control unloading operations to prevent spillage of fuel.
- Objective 46: Manage onshore bulk storage facilities to prevent spillage of fuel.
- Objective 47: Implement a ballast water management plan.
- Objective 48: Maintain Oil Spill Prevention and Response Capacity to minimise the risk of a spill and to mitigate consequences should a spill occur.

3.9 **Volume 11: Waste Management Plan**

The Waste Management Plan presents the strategy for managing solid and liquid waste generated by the Project over its life. These will be managed within a Reduce Reuse Recycle framework with appropriate disposal a last resort. The waste management plan encompasses descriptions of waste streams, logistics of waste management and strategies to achieve key Waste Management Objectives:

- Objective 50: No unauthorised disposal of hydrocarbon and chemical waste to landfill.
- Objective 51: Management of the site land-fill to ensure legal compliance and environmental protection.
- Objective 52: Appropriate disposal of medical waste to eliminate risk of infection to workforce or the community.
- Objective 53: Ensure workforce compliance with waste procedures.

3.10 **Volume 12: Greenhouse Gas Abatement Plan**

This Plan overviews the greenhouse gas mitigation strategies that will be employed in the design, construction and operation of the Mbalam Project. Key greenhouse gas objectives are as follows:

- Objective 54: Manage greenhouse gas emissions in design, construction and operations of the Mine, Transport Corridor and Port infrastructure.
- Objective 55: Publicly report progress on greenhouse gas abatement planning in all areas of operation.
- Objective 56: Integrate greenhouse gas efficiency into operational decisions.
3.11 Volume 13: Life of Mine and Closure Plan

The Life of Mine and Closure Plan presents the conceptual closure plan for CamIron which has been integrated into the design and operational parameters of the Project. It encompasses both the biophysical and social aspects of closure and the Objective is “To help others help themselves and leave behind a better future”. This Plan will evolve into a regularly reviewed Working Closure Plan during operations and within 5 years of Closure be replaced with a Final Closure Plan with significant input from key stakeholders including the Cameroon Government. Key closure objectives are:

- Objective 57: Develop physical completion criteria and rehabilitation techniques in consultation with key stakeholders.
- Objective 58: Develop social completion criteria in close collaboration with key stakeholders.
- Objective 59: Formally determine the Project Asset Retirement Obligation (ARO) annually and ensure sufficient funds are in place.
- Objective 60: Develop a Conceptual Life of Mine and Closure Plan.
4 PROGRAMME IMPLEMENTATION

CamIron will fund a team of environmental and social specialists to implement the environmental and social programmes defined in the ESA and to achieve the performance targets presented below (refer Table 5). These positions will be funded from the CamIron operating budget as will all expenditure associated with the implementation of the Environmental Management System (EMS) including monitoring and training programmes. Performance will be reported in the Annual Environmental Report.

Broader sustainability programmes in the areas of Community Development (refer Volume 5), Biodiversity Conservation (refer Volume 8) and Indigenous people (refer Volume 6) will be funded from the CamIron Sustainability Fund (CSF). The Fund will be established at the start of operations and thereafter receive 0.5% of after tax profits. Programme priorities will be determined with the assistance of an Advisory Panel comprising CamIron and key stakeholders.

<p>| Table 5: Performance targets and reporting for the Mbalam Project |
|-----------------|-----------------|-----------------|-----------------|
| Aspect          | Target          | Monitoring      | Frequency       | Reporting      |
| Dust at Port    | • No dust complaints  |
|                 | • &lt;4g/m^2/month at sensitive location |
|                 | • Deposition Gauge |
|                 | • Dust Track     |
|                 | • Dust complaints|
|                 | Monthly         | AER             |
| Noise at port   | • No noise complaints  |
|                 | • &lt;40 dba at nearest noise sensitive premises |
|                 | 24 hour noise survey |
|                 | Monthly         | AER             |
| Fuel spills     | No spills &gt;1,000 L |
|                 | Incident Report  |
|                 | As recorded     | AER             |
| Sewage effluent | Compliance with WA health criteria |
|                 | Monthly analysis of all STP effluent |
|                 | Monthly         | AER             |
| Oily waste disposal | No oily waste in landfill |
|                 | Landfill inspection |
|                 | Monthly         | AER             |
| Batteries       | No disposal of batteries in landfill |
|                 | Landfill inspections |
|                 | Monthly         | AER             |
| Recyclables     | 50% recycling |
|                 | Waste tracking  |
|                 | Monthly reconciliation | AER |
| Surface water quality | Drinking water standard (except bacteria) at agreed monitoring points in all Project areas |
|                 | Surface water analysis |
|                 | Monthly/Quarterly Depending on location | AER |
| Commercial timber | Compliance with annual MINOF approved timber felling plan |
|                 | Survey          |
|                 | Monthly         | AER             |
| Land Clearing   | Compliance with annual MINEP/MINFOF approved clearing plan |
|                 | Survey          |
|                 | Monthly         | AER             |
| Rehabilitation  | Rehabilitation of all non-active areas |
|                 | Survey          |
|                 | Annual          | AER             |</p>
<table>
<thead>
<tr>
<th>Aspect</th>
<th>Target</th>
<th>Monitoring</th>
<th>Frequency</th>
<th>Reporting</th>
</tr>
</thead>
</table>
| Bush meat        | No hunting or bush-meat consumption on site      | • Incident reports
                  | • Security gate inspections        | As recorded | AER       |
| Community complaints | No community complaints                           | Complaints Register                | As recorded | AER       |
| AMD              | Good quality effluent from waste rock dump      | Effluent analysis                  | Monthly    | AER       |
| GHG emissions    | Within annually determined target range.         | Annual calculation                 | Annual     | AER       |
5 SOCIAL AND ENVIRONMENTAL PROGRAMME COSTS

There were significant costs associated with a number of design decisions and in particular the decision to adopt the mid-northern rail route over the 31 km shorter southern rail route to avoid the Mengame Gorilla Sanctuary and the Campo-Ma’an National Park. This decision added an estimated $100 million to the capital construction costs of the rail system. This section provides an overview of the level of Socially and Environmentally relevant investment by CamIron to secure good outcomes for Cameroon and deliver a sustainable Project. Many of these costs are broad estimates and many fulfil multiple functions such as infrastructure protection. Adequate culverts for example prevent erosion and impacts on surface water flows and quality whilst protecting the rail infrastructure.

5.1 Embodied Environmental and Social Capital

This is the additional cost in the capital works programme resulting from decisions to protect communities and sensitive environments from Project impacts. The largest of these costs is the result of lengthening the rail corridor and increasing expenditure to avoid national parks and communities (refer Table 6).

Table 6: Environmental and social costs embodied in capital works programme

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Estimated cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lengthening rail corridor to avoid national parks and communities</td>
<td>&gt;$100 million</td>
</tr>
<tr>
<td>Adequacy of rail culverts (protection of hydrology)</td>
<td>$2-3 million</td>
</tr>
<tr>
<td>Rail bridge design to allow fauna underpass</td>
<td>$1-2 million</td>
</tr>
<tr>
<td>Security fencing (community safety) rail maintenance camps, conveyors</td>
<td>$1 million</td>
</tr>
<tr>
<td>and port facilities</td>
<td></td>
</tr>
<tr>
<td>Controlled crossings to protect public safety</td>
<td>$500,000</td>
</tr>
<tr>
<td>International Standard bulk fuel storage facilities (bunding)</td>
<td>$1-2 million</td>
</tr>
<tr>
<td>Emissions control systems on power stations and mobile equipment</td>
<td>$1-2 million</td>
</tr>
<tr>
<td>Buffer zones around facilities at port, rail and mine including annual</td>
<td>$5 million</td>
</tr>
<tr>
<td>leases, relocation of residents and ongoing security to prevent</td>
<td></td>
</tr>
<tr>
<td>resettlement</td>
<td></td>
</tr>
<tr>
<td>Waste rock dump design to accommodate stability/revegetation criteria</td>
<td>$5 million</td>
</tr>
<tr>
<td>Total</td>
<td>&gt;$120 million</td>
</tr>
</tbody>
</table>

5.2 Environmentally relevant facilities and equipment

In addition to the general embodied environmental and social capital previously described there will be a large amount of directly relevant environmentally relevant equipment. This includes items such as sewage treatment plants, rubbish dumps, truck wash’s, AS 1940 compliant bulk fuel storage facilities, plant nursery, controlled crossings, water trucks and monitoring equipment (refer Table 7).
Table 7: Environmentally relevant facilities and equipment

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Estimated cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sewage Treatment Plants (6x in construction)</td>
<td>$2 million</td>
</tr>
<tr>
<td>Truck wash facilities and oil water separation systems (6x)</td>
<td>$3 million</td>
</tr>
<tr>
<td>Rubbish dumps (including construction costs, fencing and management) (6x)</td>
<td>$3 million</td>
</tr>
<tr>
<td>Provision of skips and bins at all sites</td>
<td>$1 million</td>
</tr>
<tr>
<td>Recycling equipment (Compactors/balers, bioremediation facility, turbo-burner for oily/medical waste, rubbish truck, waste oil tanks)</td>
<td>$1 million</td>
</tr>
<tr>
<td>Plant nursery (for rehabilitation)</td>
<td>$500,000</td>
</tr>
<tr>
<td>Monitoring equipment (weather stations, water meters, dust meters, GPS, cameras, laboratory)</td>
<td>$500,000</td>
</tr>
<tr>
<td>Water trucks for dust suppression</td>
<td>$1 million</td>
</tr>
<tr>
<td>Road/Rail crossing barriers and lights</td>
<td>$2 million</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>&gt;$15 million</strong></td>
</tr>
</tbody>
</table>

5.3 Operating Costs for Social and Environmental Programmes

CamIron will have a fully integrated environmental management system (EMS) which places responsibility on individual departments within CamIron to manage their activities. Most environmentally relevant work for the Project is undertaken by these Departments including the operation of rubbish dumps, fuel storage, sewage treatment plants and truck wash pads. These programmes will amount to well over $5 million a year across the operation.

The primary role of the Environmental Department is monitoring, reporting and the implementation of the EMS. The cost of operating the Environment and Social teams will be about $2 million a year.

The third category of expenditure is the Sustainability Fund receiving 0.5% of after tax profit in operations and $500,000 a year during construction to fund Community Development, Wildlife Protection and Indigenous Peoples programmes.

The total operational expenditure on social and environmentally relevant programmes will exceed $10 million a year over the life of the operation (refer Table 8).
Table 8: Operating Costs for Social and Environmental Programmes

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment and operation of the Social/Environmental Team</td>
<td>$2 million/year</td>
</tr>
<tr>
<td>Operational environmental costs (rubbish dumps, wash pad maintenance, sewage treatment plants, waste management, dust suppression, security personnel etc.)</td>
<td>$5 million/year</td>
</tr>
<tr>
<td>Sustainability Fund Programmes in Construction</td>
<td>$1.5 million/year</td>
</tr>
<tr>
<td>Sustainability Fund Programmes in Operations</td>
<td>$3-5 million/year</td>
</tr>
<tr>
<td>Total</td>
<td>&gt; $10 million/year</td>
</tr>
</tbody>
</table>
6 CONCLUSION
CamIron has completed a comprehensive environmental and social assessment with the support of extensive stakeholder consultation and specialist expertise. This has enabled the development of management plans to deliver a project of significant economic, social and environmental benefit to Cameroon whilst mitigating impacts on environmental and social values. The proposed mine is situated in a land-use area currently designated for mining and the port facility is located in an area declared by the Cameroon Government as a Public Utility for a multi-user port facility. The Mbalam Project is highly justified on economic and social grounds and environmental impacts are manageable.